

# ***Workforce Development – What the Power Industry Needs From Universities***

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## **Nelson Peeler**

- VP System Planning & Operations
- Duke Energy

## **Kevin Bevins**

- Superintendent, System Protection and Control
- Santee Cooper

## **Rob Manning**

- VP Transmission
- EPRI

# Nelson Peeler – Duke Energy

- Basic Power Engineering Education
  - Generation
  - Transmission
  - Distribution
- Work Experience
  - Co-op
  - Internships
  - Projects

# Kevin Bevins – Santee Cooper – 8 C's

## Competence

- Basic power: Three-phase systems
- Single line diagrams
- Per unit calculations
- Delta-wye conversions
- Calculating line parameters
- Voltage drop
- Equipment ratings
- Power flow
- Economic dispatch
- Symmetrical components
- Fault studies
- Specifying CT tap settings
- Calculate protective device settings
- Fault location
- Stability studies

# Kevin Bevins – Santee Cooper

## Character

- Initiative
- Diligence
- Attentiveness
- Alertness
- Punctuality
- Discretion
- Thoroughness
- Responsibility
- Truthfulness
- Persuasiveness
- Flexibility

# Kevin Bevins – Santee Cooper

## Chemistry

- The ability to get along well with others
- Work on a team
- Respect – treat people the way you want to be treated
- Persuasiveness – the ability to guide vital truths around another person's mental roadblocks

# Kevin Bevins – Santee Cooper

## Communications

- Listening skills (attentive and active)
- Writing skills (including spelling, punctuation and grammar)
- Speaking skills (including public speaking)
- Power Point

# Kevin Bevins – Santee Cooper

## Cost Control - *No one has unlimited funding*

- Map and re-engineer business processes
- Define requirements for a RFP
- Economically compare alternatives
- Evaluate bids
- Cost justify a solution
- Build a business case

# Kevin Bevins – Santee Cooper

## Computer

- Word, Excel, Powerpoint, Visio, Access, Project (basic and advanced)
- Networking
- Database on a large scale
- Coding
- Control theory
- Cyber security



# Kevin Bevins – Santee Cooper

## Connections

- Theory with application
- Co-op or summer internship
- Tours – power plant, substations, energy control center
- Senior design project or research in power
- Real life experience or at least exposure

# Kevin Bevins – Santee Cooper

## Compliance

- Mandatory NERC Standards Subject to Enforcement
  - ✓ BAL Resource and Demand Balancing
  - ✓ CIP Critical Infrastructure Protection
  - ✓ COM Communications
  - ✓ EOP Emergency Preparedness and Operations
  - ✓ FAC Facilities Design, Connections, and Maintenance
  - ✓ INT Interchange Scheduling and Coordination
  - ✓ IRO Interconnection Reliability Operations and Coordination
  - ✓ MOD Modeling, Data, and Analysis
  - ✓ NUC Nuclear
  - ✓ PER Personnel Performance, Training, and Qualifications
  - ✓ PRC Protection and Control
  - ✓ TOP Transmission Operations
  - ✓ TPL Transmission Planning
  - ✓ VAR Voltage and Reactive

# Rob Manning – EPRI - 5 U's

## Understanding of Fundamentals

- Knowledge of the complexity of the electricity business
- Impact the internet of things
- Future energy systems will demand distributed intelligence
- Need people who see through the promises and hype of the latest new product to clearly understand the integration and aggregation challenges

# Rob Manning – EPRI - 5 U's

## Unrestricted Ideas

- Unburdened by past failures
- Encourage students to explore both what is possible and what is impossible
- Fresh thinking

# Rob Manning – EPRI - 5 U's

## Unbiased by Traditional Business Practices

- Experience, while one of our greatest advantages, can also be one of our greatest challenges
- As our teams and people build experience, they build history. Within that history are failures that build up our resistance
- Unlimited by their failures

# Rob Manning – EPRI - 5 U's

## Unbounded Access to Funding

- We are working on a number of the same things
- Leverage our work together
- Look closer at the opportunity to work together, to leverage each other's strengths, and to back-stand each other's weaknesses

# Rob Manning – EPRI - 5 U's

## Unbridled Passion

- Need people to pack that pipeline that love making a difference
- We need people that love what they do
- Figure out how to push people through a demanding and rigorous curriculum without extinguishing the fire that brought them to your doors

# In Summary

- Power and Energy field is changing rapidly
- Large new investments on the horizon
- Workforce is aging – big turnover soon
- Well educated, talented and experienced people are needed
- Opportunities are unlimited
- Now is the time to be A Power Engineer
- Preparing students is a partnership
- To quote Kevin Bevins: “All the World Needs is Unlimited EE’s in Power”



# Workforce Development is A Partnership

## University

- Undergraduate
- Graduate

## Industry

- Tours
- Special topics seminars
- Work experience
- Research support

## Students

- Interest, Passion, Initiative
- Work hard

# Universities

- Back to the basics
- Offering the right courses
- Labs and “hands on experience”
- Involvement in meaningful and applicable research
- Education doesn't stop at graduation
  - Developmental courses
  - Special topic courses
  - PE Review courses

# Industry

- Be involved in the educational process
  - Guest lectures
  - Seminar series
  - IEEE PES Chapters
- Support research projects
  - Financial, data and advisory
- Support Senior Design Projects
  - Financial, data and advisory
- Power Engineers – get involved in the recruiting process
  - Career Fairs, Interviews, Mentors

# Students

- Willing to take fundamental courses to learn the Basics
- Take as many electives as possible
- Pursue advanced degrees if desired
- Get work experience
  - Co-op
  - Internships
  - Part-time

# Questions and Comments !

