Insulation, Asset and Wildlife Protection
Steve Parker, Business Development
Market forces that influence Raychem Sales

PUBLIC UTILITY COMMISSIONS
(System Reliability)

US FISH & WILDLIFE
(Avian Electrocutions)

ASSET PROTECTION
(Substation Equipment)
Insulation, Asset & Wildlife Protection

40+ Years Of Product Development

- High performance, engineered polymers
  - Proprietary Polymer Blend Designed to offer superior Tracking and Erosion resistance
- E-beam Cross-linking process,
- unique in industry Superior electrical stability, high temperature strength, toughness, chemical resistance and elastic memory
  Foundation for all Heat-Shrink products
  Foundation for Raychem asset and wildlife products
Insulation, Asset & Wildlife Protection

Properties Of Medium Voltage Products

- High Dielectric Strength
- Non-tracking / low erosion rate
- Non-Cracking
- Chemical Resistant
- UV Stable
- Ozone Resistant
- Flexible
- Tough
- Corona Resistant
- Easily Removable
Insulation, Asset & Wildlife Protection

Insulation & Enhancement Systems

General Subgroups

- Switchgear and Clearance Reduction Products
- Animal Outage Protection – Substation / Overhead
- Contamination Protection Products
Switchgear and Clearance Reduction Products
Insulation, Asset & Wildlife Protection
Insulation, Asset & Wildlife Protection

Switchgear Products

- BPTM/BBIT Heat-Shrink Tubing
- HVIS Heat-Shrink Sheet
- RRBB Rigid Red Barrier Board
- HVBT Heat-Shrink Tape
- MVFT Cold Applied Fusion Tape
Insulation, Asset & Wildlife Protection

Bus Protection Tubing (BPTM)

Bus Bar Insulating Tubing (BBIT)

- Insulating values up to 35 kV
- Covers diameters ranging from .25” - 10.0”
- Can be used on all types of bus including round, rectangular, “L” and “T”
- Covers complex bends and geometries
- Used for bus bar clearance reduction
Insulation, Asset & Wildlife Protection

High Voltage Bus Tape (HVBT)

- One 2/3 layer is rated for 15 kV and two 2/3 layers are rated for 25 kV
- Available in 1”, 2” or 4” widths (25’ roll)
- Allows clean re-entry as it bonds to itself, but does not adhere to metal
- High abrasion resistance
- No shelf life
- Ultimate emergency retrofit solution
Insulation, Asset & Wildlife Protection

Medium Voltage Fusion Tape (MVFT)

- Cold applied
- Self amalgamating tape .030” x 2.0” x 36’ rolls
- Single 2/3 overlap wrap provides 15 kV protection
- Double wrap provides 35 kV protection
- Will not adhere to metal or porcelain
Insulation, Asset & Wildlife Protection

High Voltage Insulating Sheet (HVIS)

- Insulates bus and connections up to 35 kV
- One size fits all
- Great for the varied sizes and geometries commonly found in substation applications (26” wide in 20” or 33’ lengths)
- Allows clean re-entry, bonds to itself, however does not adhere to metal
- No need to putty connections
- Can be used to make custom re-usable covers
Insulation, Asset & Wildlife Protection

Barrier Boards

- Insulating barriers between phases in switchgear and dry-type transformers
- Designed for severe duty applications
- Alternative to polyester fibers embedded in resin – GP03
- Available in 4’ X 4’ or 4’ X 8 sheets, .250” thick
- Easily cut into intricate shapes using standard woodworking tools
- No toxic dust
Substation Products

Why Do Substations Need Protection From Bird & Animal Induced Flashovers?

- Protect expensive assets and increase equipment life expectancy
- Improve service level and customer satisfaction / loyalty
- Reduce risk of environmental damage due to catastrophic failures
- Protect endangered wildlife
Insulation, Asset & Wildlife Protection

Substation Products

- Bus Bar Insulation
- Bushing and Insulator Covers
- Squirrel Guards
- Inspection Covers
- Conductor Covers
Racoon
Snake
Insulation, Asset & Wildlife Protection

PVC Pipe from Home Depot does not make a good cover!
Barn Owl

Cover Vaporized

Covers too small, should be tween first & second skirt
#1 UTILITY ENEMY

ROCKY D. SQUIRREL
Insulation, Asset & Wildlife Protection

Bus Insulator Squirrel Guard (BISG)

- Forces animal to climb onto guard and become isolated
- Eliminating their ability to bridge phase to ground potential
- Hot-stick installable
- Range taking (1.5”- 4.5” insulator core O.D.)
- Holes for see-through visibility and reduced wind loading (tested at 95 mph)
- Recommended for switches and bus support insulators
Insulation, Asset & Wildlife Protection

Bus Insulator Squirrel Guard (BISG-24)

- Pre-assembled
- One person Hot-stickable
- Same non-tracking material
- No “fingers” to break
- True 360° isolation / protection
Insulation, Asset & Wildlife Protection

Tuscaloose, Alabama – April 2011
Insulation, Asset & Wildlife Protection

F-4 TORNADO, 200+ mph
Insulation, Asset & Wildlife Protection

Angle Bus Cover - BCIC
Insulation, Asset & Wildlife Protection

RRGS-100/400
Insulation, Asset & Wildlife Protection

BCAC & BCIC Bushing Covers
Insulation, Asset & Wildlife Protection

Medium Voltage Conductor Cover (MVCC)

- Family of 4 sizes - .250” to 1.75”
- Designed for short run, tight turning lines
- Rated for 25 kV phase to ground, 35 kV if all leads are covered
- Available in Red or Gray
Insulation, Asset & Wildlife Protection
Insulation, Asset & Wildlife Protection

BCAC-IC

- New inspection cover for bushings
- 360° viewing
- 3 pc. design allows multiple conductor exits
- Limited covered area – no bug house
- Excellent water wash-out
- Four sizes
Insulation, Asset & Wildlife Protection
Insulation, Asset & Wildlife Protection
Distribution Line Protection from Animals and Trees

- Line Covers
- Insulator Covers
- Switch Covers
Insulation, Asset & Wildlife Protection
Insulation, Asset & Wildlife Protection

BCIC Raptor Covers

Design for Horizontal Post

Design for Double Pin Application
Insulation, Asset & Wildlife Protection

BCIC Raptor Covers

- **BCIC-GT-PIN**
  Porcelain Pins 55-4 & 55-5
  Post Pins ANSI 57-2
  Polymer pins Hendrix HP125

- **BCIC-GT-PIN/CT**
  Vertical polymer post insulators (tie top & clamp top)
  Vise Top insulators (Hendrix Vise Top)

- **BCIC-GT-PIN/UCT**
  Universal Vise Top pin insulators

- **BCIC-GT-HZ**
  Horizontal Polymer Insulators

- **BCIC-GT-PIN-XL**
  Porcelain Pins 55-6, 55-7, 56-1

- **BCAC-G-ARM-01**
  Extension Arm for raptor covers
Insulation, Asset & Wildlife Protection

BCAC Lightning Arresters

- Heavy duty model
- 15 kV rating
- Two sizes
Insulation, Asset & Wildlife Protection

BCAC Cut-out Covers

- Covers for 100 and 200 amp cut-outs
- Porcelain and polymeric bodies
Insulation, Asset & Wildlife Protection

BCIC Recloser Covers

- Available in Three sizes
- Red or Gray
Insulation, Asset & Wildlife Protection

Dead End Cover
Insulation, Asset & Wildlife Protection

Avian Flight Diverter

- Range taking
- Hot-stickable
- High reflectivity
- Glow in the dark stickers
Insulation, Asset & Wildlife Protection

Osprey Nest
Insulation, Asset & Wildlife Protection

Osprey Nest With Perch Diverters
Insulation, Asset & Wildlife Protection

Monk Parakeet
Contamination Protection Products

- Creepage Extenders
- Booster Sheds
- Fecal Contaminant Covers
Insulation, Asset & Wildlife Protection

Wrap Around Creepage Extender (HVCE-WA)

Coal dust, fertilizers, salt contamination cause flashovers
Insulation, Asset & Wildlife Protection

Installation Of HVCE-WA
Insulation, Asset & Wildlife Protection

High Voltage Booster Shed (HVBS)

Boosters being installed for rain events

Booster during minor ice storm
Insulation, Asset & Wildlife Protection
Insulation, Asset & Wildlife Protection

Rigid Red Guano Shield (RRGS)
Insulation, Asset & Wildlife Protection

Transmission Line Covers (BCIC-115-PH)
Product Testing and Evaluations

Products Should Meet the Most Difficult Requirements of Worldwide Specifications

**Electrical & Mechanical**
- AC, DC & Impulse Withstand
- Wind Resistance
- Power Arc Resistance

**Environmental Aging**
- Salt Fog & Tracking Tests
- Multi-Stress (Temperature, UV, Electrical, Mechanical, Moisture and Contamination)
Insulation, Asset & Wildlife Protection

Product Testing & Evaluation

- Typical Set-up,
- 1 minute AC wet withstand test
Insulation, Asset & Wildlife Protection

Product Testing & Evaluation

- HV Power Arc
- 22 k amps
Insulation, Asset & Wildlife Protection

Product Testing & Evaluation

- Wind Tunnel
Insulation, Asset & Wildlife Protection

UV EXPOSURE and TRACKING

Tracking
Insulation, Asset & Wildlife Protection

TRACKING
Insulation, Asset & Wildlife Protection

How Tracking Occurs

VOLTAGE

Water plus contaminates plus current flow

Steam evolved due to heat formed by leakage current

Arc jumps across dry band causing degradation and carbon path

GROUND

VOLTAGE

Conducting carbon track

New dry band forms

Arc jumps across dry band

Carbon track extends

Carbon track Grows to failure

GROUND

MATERIAL MUST BE NON-TRACKING WITH EVENTUAL FAILURE BY EROSION ONLY

FLAME FAILURE IS NOT ALLOWED

63
Product Testing

UV Aging
Product Testing

UV Aging

Laboratory Units
Test 1000-5000 hours
Cycled with Temperature and Condensation
Flammability Testing

Three Subclasses:

• Vertical Flame Test
• Horizontal Flame Test
• Power Arc
EVERY CONNECTION COUNTS