

3M™ Aluminum Conductor Composite Reinforced (ACCR)

More Amps,  
More Confidence

**DOCKET**

**08-IEP-1B**

DATE JUL 31 2008

RECD. AUG 04 2008

for your most  
challenging applications



**3M ACCR**

Integrated Energy Policy Report Workshop  
Emerging Technologies for the Integration of Renewables  
July 31, 2008





3M is a diversified technology company serving customers and communities with innovative products and services.

- *Worldwide sales: \$24.5 billion*
- *International sales: \$15.5 billion (63 percent)*
- *Products sold in nearly 200 countries*
- *Operations in more than 60 countries*
- *76,000 employees; 34,000 in the US*
- *Over 40,000 products*

Practical, ingenious solutions that help  
customers succeed

# California



## *3M in California*

**Total Employees/Retirees**

**3,511**

(employees 2,074, retirees 1,437)

**Total Payroll**

**\$139,694,788.88**

**Total Export Value**

**\$56,194,473**

**Number of Suppliers**

**2,694**

**Total Paid to Suppliers**

**\$1,314,931,091**

**State Income Taxes**

**\$17,026,000**

**State Charitable Contributions**

**\$805,087**

April 2008

**3M**

## What is 3M™ ACCR?



- A high voltage, overhead transmission conductor...
- ...designed as a drop-in replacement for ACSR and ACSS on existing, thermally limited lines ....
- ...allowing utilities to use existing structures
- ...but capable of carrying 2 to 3 times the current.

## If Your Upgrade Requires...

- A large capacity increase – up to 2 to 3 times the existing line
- Lengthy, costly, risky construction or rebuild project
- Structure modifications or replacements
- Challenging installations
- Quicker back to service, lower cost installation
- A highly reliable, proven solution

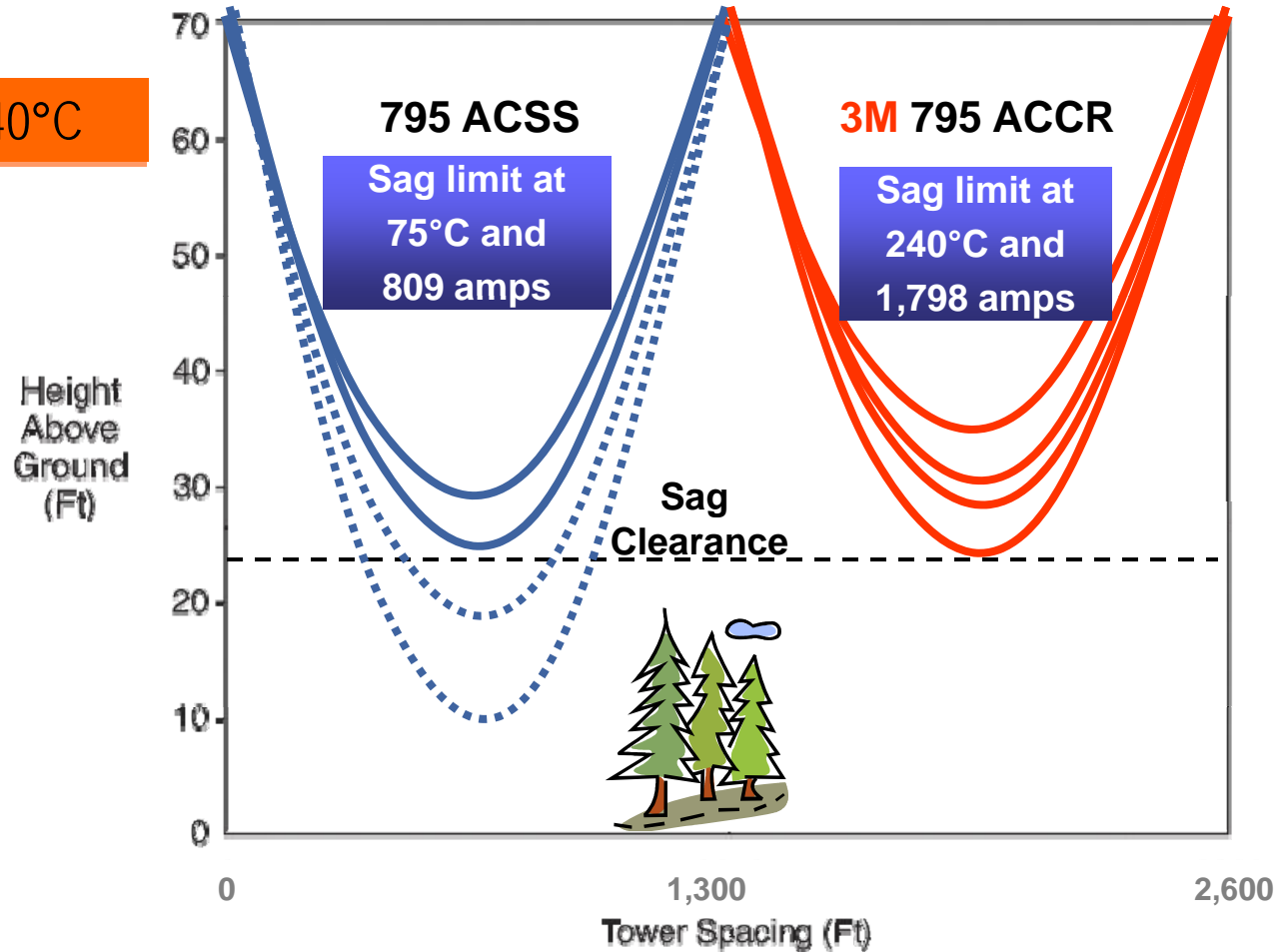


3M ACCR is your solution

## 3M ACCR – More Amps



240°C

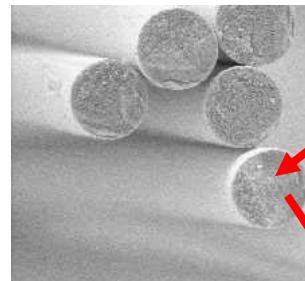


Assumes ACSS and 3M ACCR at 1,300 ruling span, initial tension 6,557 lbs @ 15° C, max. loading @ 30° F, no ice, 12 lbs wind; ambient conditions: 2f/s wind, 35° C, perpendicular wind direction, 0.5 emissivity and solar absorption.

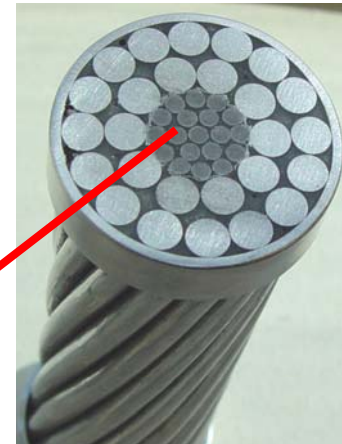
## 3M ACCR – More Amps, More Confidence

A breakthrough in materials science

- All aluminum-based
- Strong
- Light weight
- Low thermal expansion
- High modulus



*Metal matrix (inorganic)*



*Aluminum-oxide fibers*



## 3M ACCR – More Amps, More Confidence



- Consistent performance at high temperatures
- Less sag due to heat from high energy loads
- Match with load, tension, clearance requirements
- Less stretching
- Corrosion resistance without barriers between core and outer wires
- Durability, with life expectancy of 40+ years, even at high temp operation
- Capacity increase up to 2 to 3 times the existing conductor
- Proven, reliable solution installed and in the field with no failures.

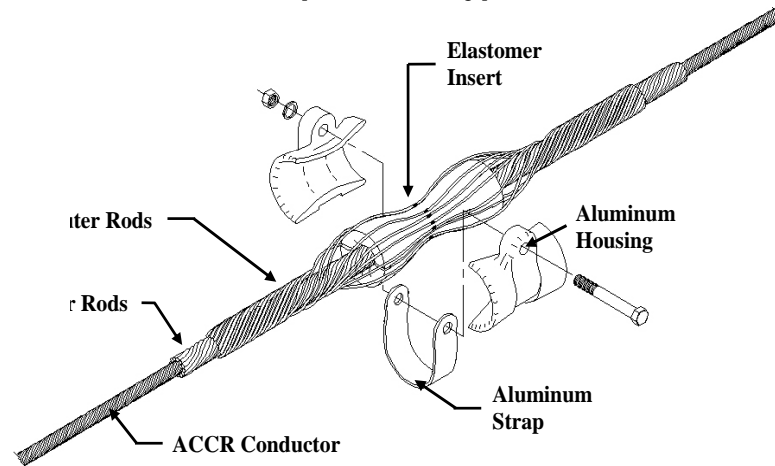




## Easy to Use

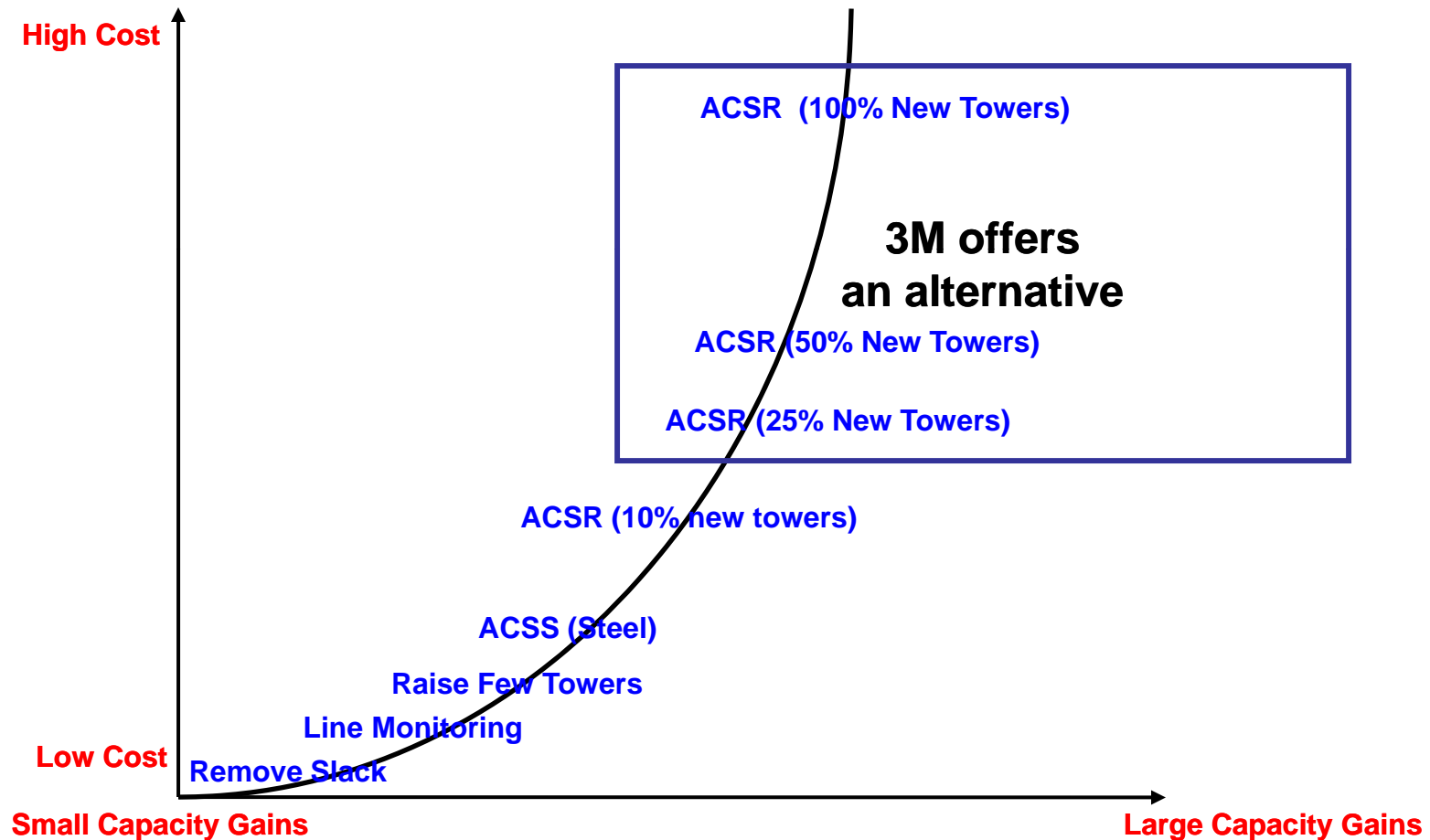


**ACA Compression-Type Hardware**



**PLP Helical Rod-Type Hardware**

# Re-conductor, Rather than Rebuild



# For Your Most Challenging Applications

## **Long span crossings and special siting situations**

Eliminate taller towers or reduce the number of towers

Eliminate inter-set structures

Lessen environmental impact

## **Corrosive environments**

Resist corrosion, even in coastal or high-pollution areas

No protective coatings required

Virtually no galvanic coupling

## **Changing clearance requirements**

Roadway/waterway changes are less costly and faster

## **Densely populated or underbuilt areas**

Quick, successful upgrade projects with minimal disruptions or additional land requirements



# For Your Most Challenging Applications



## **Environmentally sensitive areas**

Reduce land impacts  
Avoid visual changes to the line

## **Heavy ice regions**

High strength to weight ratios and a high modulus  
are ideal for heavy mechanical loads  
Increase reliability and safety

## **Aging structures**

Lighter cables reduce the load  
Get more value from existing assets -- towers last longer

## **Connecting New / Renewable Generation**

Increase capacity on existing structures  
Provide N-1 / G-1 contingencies



## Maximize the Upgrade Value – Maximize the Amps



- Increase unit sales on existing assets – benefit ratepayers by spreading fixed costs over more kWh sales
- Greater reliability and more useable capacity – improve N-1 ratings on paths
- More flexibility and responsiveness – serve unexpected load growth, new generation, upgrades on other lines
- Delay the next upgrade – additional capacity can continue to serve growing loads longer
- Certainty of project costs and timing – reconductoring versus building

# We're With You All The Way

- 100 Years in Business –  
We will be here



# 3M



# 3M