

“Changing the Protective Clothing Paradigm”

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Protective Clothing Program Considerations

- Type and style of clothing
- Disposable vs. re-usable products
- Minimizing radwaste
- Managing logistics (i.e., shipping, receiving, storing, stocking, issuance, and collection)
- Other safety considerations (i.e., heat stress, materials handling)
- Economic costs

Historically, most nuclear plants have used launderable PC's

Frequent Shipments

Radiological monitoring (what is clean?)



Labor intensive

Shipped and stored as RAM

Inventory control

Damaged/rejected clothing is buried as DAW

New Technology:



- 💧 In 2002, OREX Technologies International introduced a new line of one-time use protective clothing products, along with a unique, patented processing system.
- 💧 The technology was developed with the aspects of radiation safety, industrial safety and waste minimization in mind.
- 💧 During the last three years, many plants have evaluated the PVA products and technology and transitioned to the one-time use products.

New Technology:

PVA Single-Use Product Technology

- Experience with the PVA single-use products and technology have shown many benefits:
 - Improved worker comfort and safety
 - Improved logistics
 - Reduction or reassignment of resources due to logistical improvements
 - Reduction of Personnel Contamination Events
 - Radwaste reduction



New Technology:

Worker Comfort and Safety



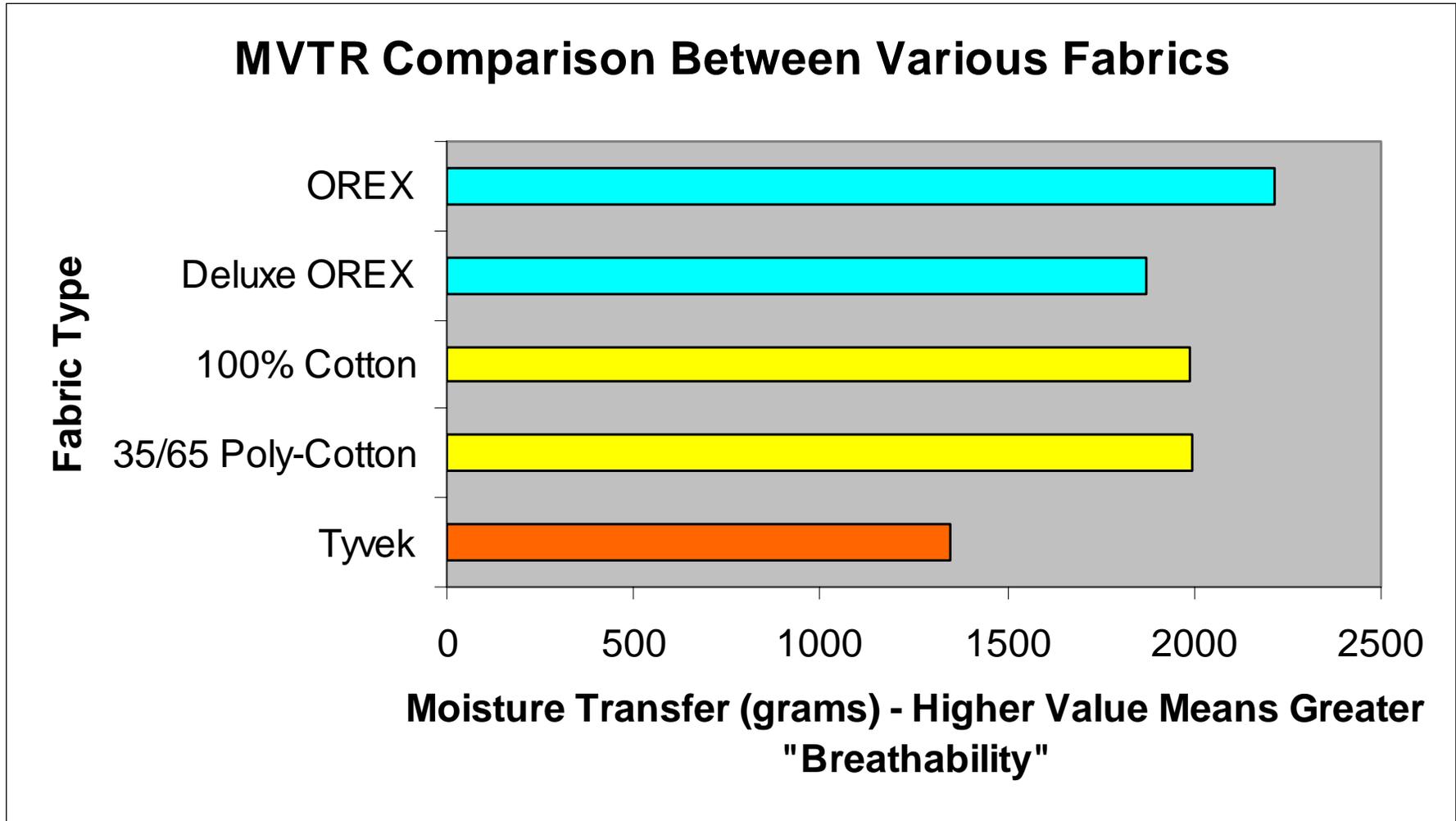
Improved Worker Comfort

-  PVA fabric breathes better than typical cloth fabric and significantly better than other disposable products

Reduced risk of materials handling related injuries

-  PVA fabric weighs 70% less than typical cloth used for launderable coveralls

Improved Worker Comfort – Reduced Heat Stress



New Technology: *Logistical Improvements*



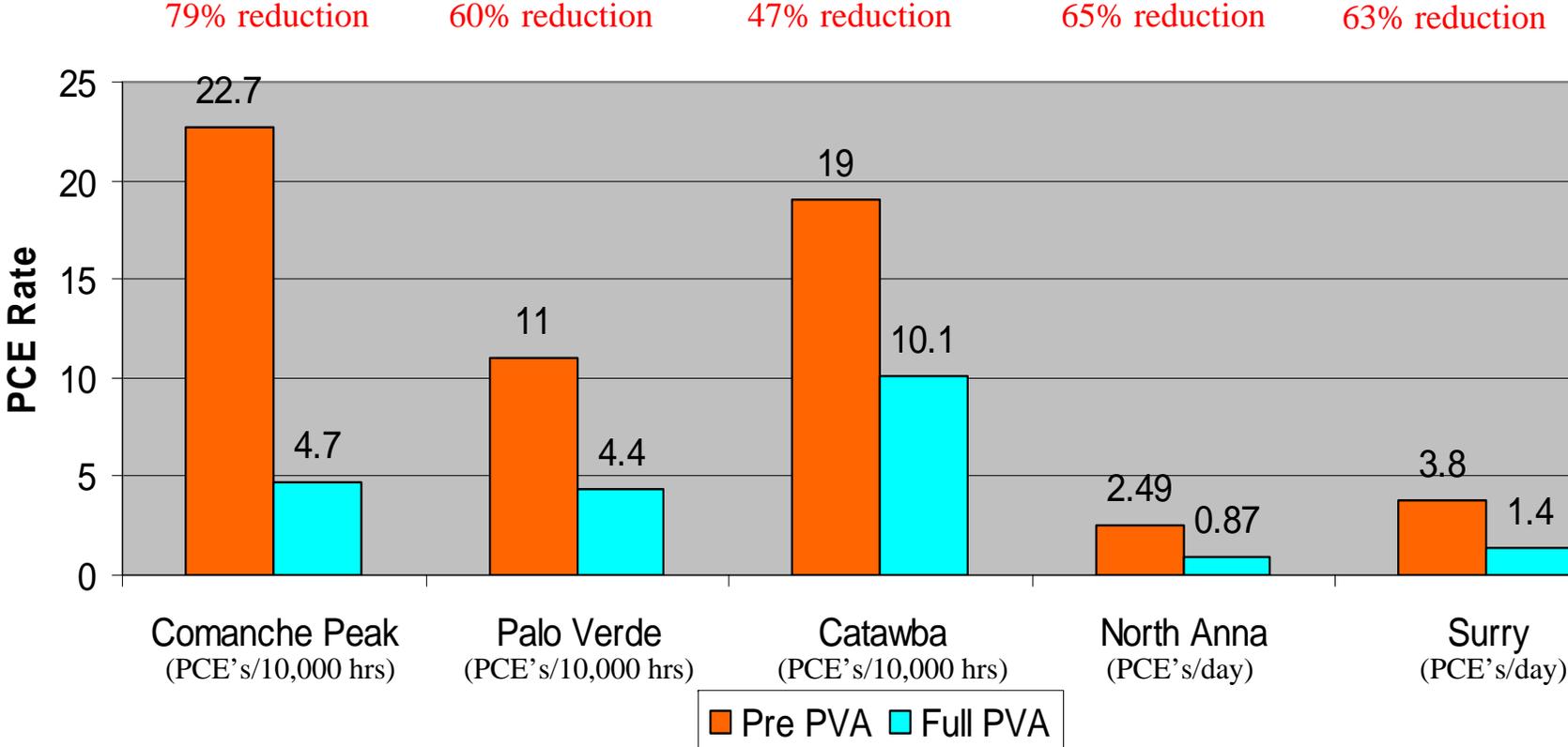
- 💧 Radiological surveys upon receipt are not required.
- 💧 RP support for security inspections is not required.
- 💧 New material may be stored in a non-radiologically controlled area.
- 💧 Frequency of restocking may be reduced.
- 💧 Incoming and outgoing shipments may be reduced or eliminated during the course of the outage.

New Technology:

Reduction of Personnel Contamination Events

- 🔹 Users tracked personnel contamination events (PCEs) to evaluate effectiveness of the products.
- 🔹 Most users informally reported **reductions of at least 40%**.
- 🔹 **Noted reductions are significant!**
- 🔹 Formally collected data from 5 plants:
 - 🔹 Comanche Peak
 - 🔹 Palo Verde
 - 🔹 Catawba
 - 🔹 North Anna
 - 🔹 Surry

Average PCE Reduction for All Plants



Why were PCE reductions observed?



- 💧 "*Decontamination*" is certainly a relative term.
- 💧 Some level of residual contamination remains in the clothing.
- 💧 **Many facilities believe that the source of numerous personnel contamination events is from the laundered protective clothing itself!**

Inherent Weaknesses of Laundry Monitoring

- Primarily beta sensitive
- Relatively insensitive to gamma
- Betas are easily attenuated
- Poor geometry and moving conveyor
- DRP's (hot particles) are especially problematic



New Technology: *Waste Minimization*

- 🔹 Innovative, Patented Processing Technology
- 🔹 PVA Materials are Dissolved and Filtered
- 🔹 Unique “Decon and Release” Technology Not Available with Other Disposable Products
- 🔹 No waste from processing of PVA products is returned to or reported to the generator
- 🔹 Mitigates waste requiring disposal at a licensed disposal facility
- 🔹 Environmentally friendly process – biodegradable





OREX Treatment System

Before Processing..



100 Pounds of OREX (7 Radbags!)

Before Processing..



7 RadBags Shoved into the Processor

After Processing..



Zippers and
Rubber Gloves

Close-up View Looking Inside Main Tank

SUMMARY

The Protective Clothing Paradigm is Changing!



- 💧 New Technology for Single-Use Protective Clothing has been used at many facilities
- 💧 Unique Processing Technology mitigates waste generation
- 💧 Benefits Reported by Users are Significant
- 💧 Offers New Options for Managing Existing *Health Physics, Industrial Safety, Radwaste* and *Logistical* Challenges and Improving Program Performance!

