Health and Safety Assessments of Environmental Technologies

Operating Engineers National Hazmat Program

Bruce Lippy, CIH, CSP

Industry Partnerships

Morgantown, WV

Speaker's Background: Unapologetic Industrial Hygienist

Industrial Hygiene Film Strip Projectionist Club, Baltimore, 1968

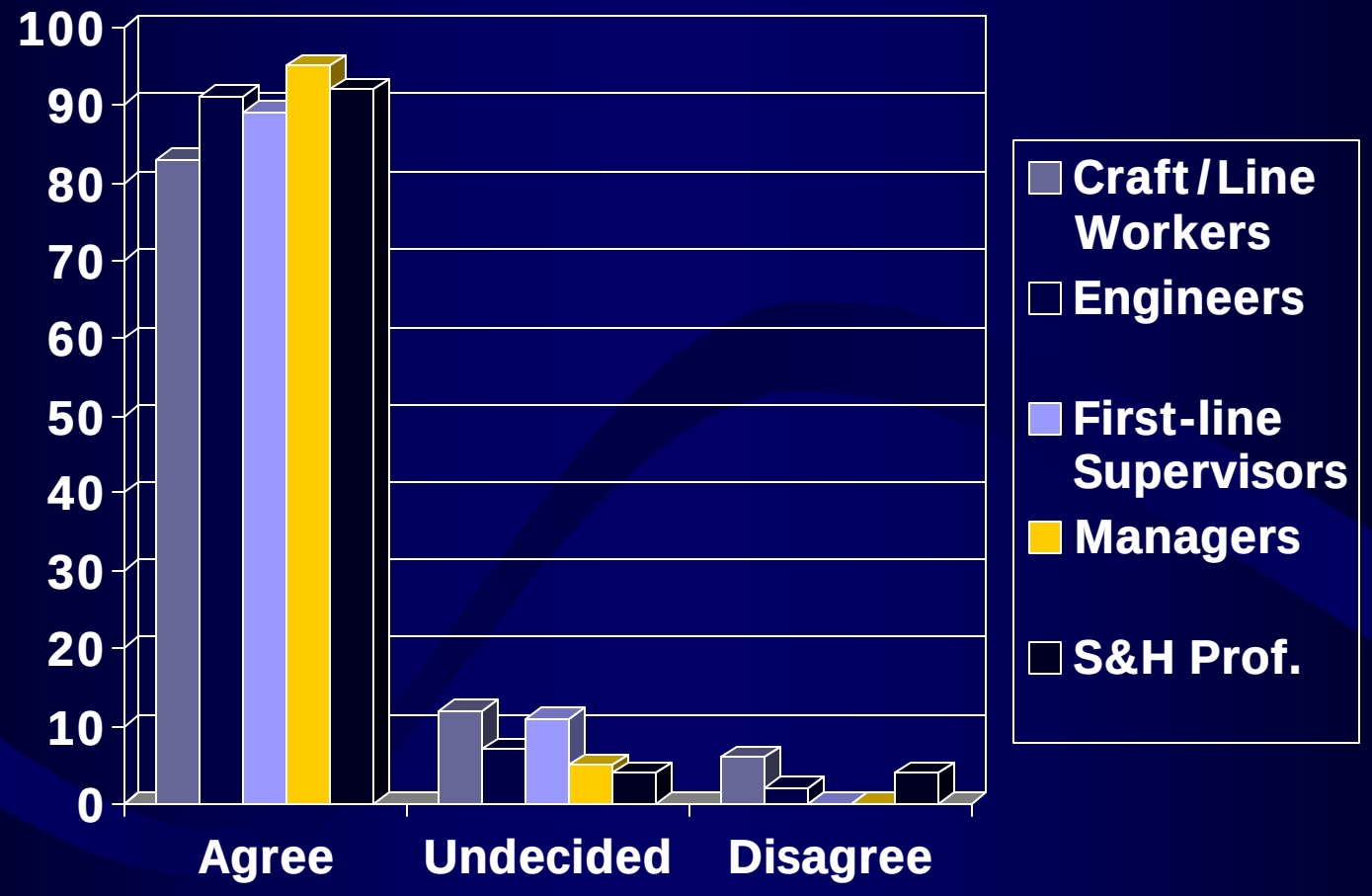
Background on the Operating Engineers

- Starting our 6th year of evaluating OST technologies for risks to workers.
- Evaluated over 60 technologies, mostly D&D through partnership with FIU.
- Produced several guidance documents.
- Will be creating TSDSs.
- Conducting survey on TSDSs.

DOE Integrated Safety Management

"My supervisor follows safety and health rules."

OENHP survey, Dec. 2000, N=219

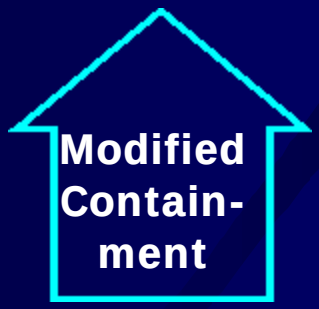


DOE Land Use Continuum

Estimating the Cold War Mortgage, March 1995

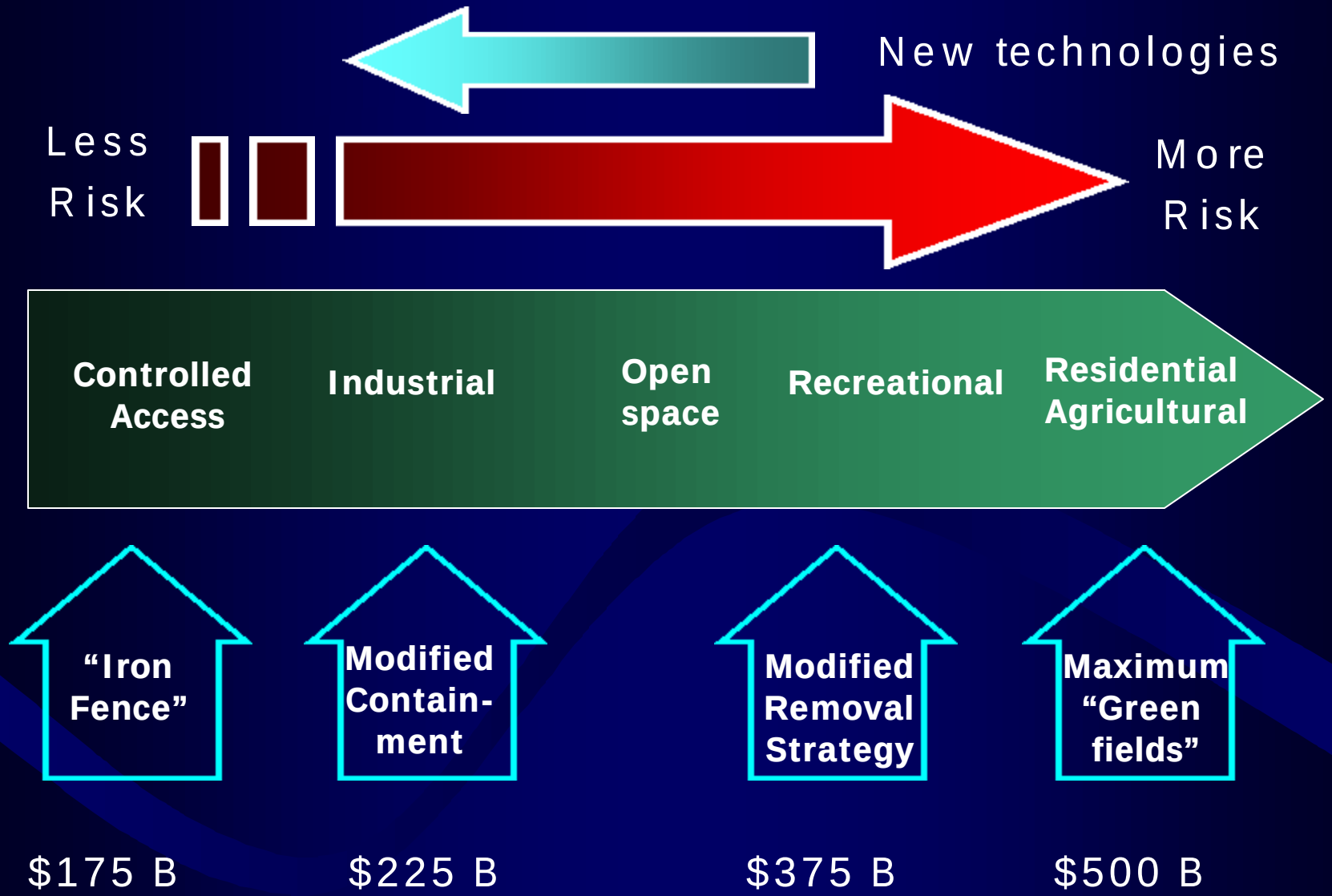
More Restricted

Less Restricted



$175 B $225 B $375 B $500 B

Remediation Worker Risks



Are Innovative Technologies Safer?

YES, generally

- Boyd and Oakley – 71% of 1999 OST technologies had a moderate-to-high potential for reducing worker exposures.
- Dr. Carolyn Huntoon embraced all of the recommendations of the EMAB Advisory Board
- But the devil is in the details. The accident at Portsmouth involved a safer technology.

Environmental Management Advisory Board Report

"…the OST Program addresses occupational safety and health more comprehensively than other federal agencies with development programs in the remediation technology sector…"

Which worker is at greater risk when working around buried nerve agent?

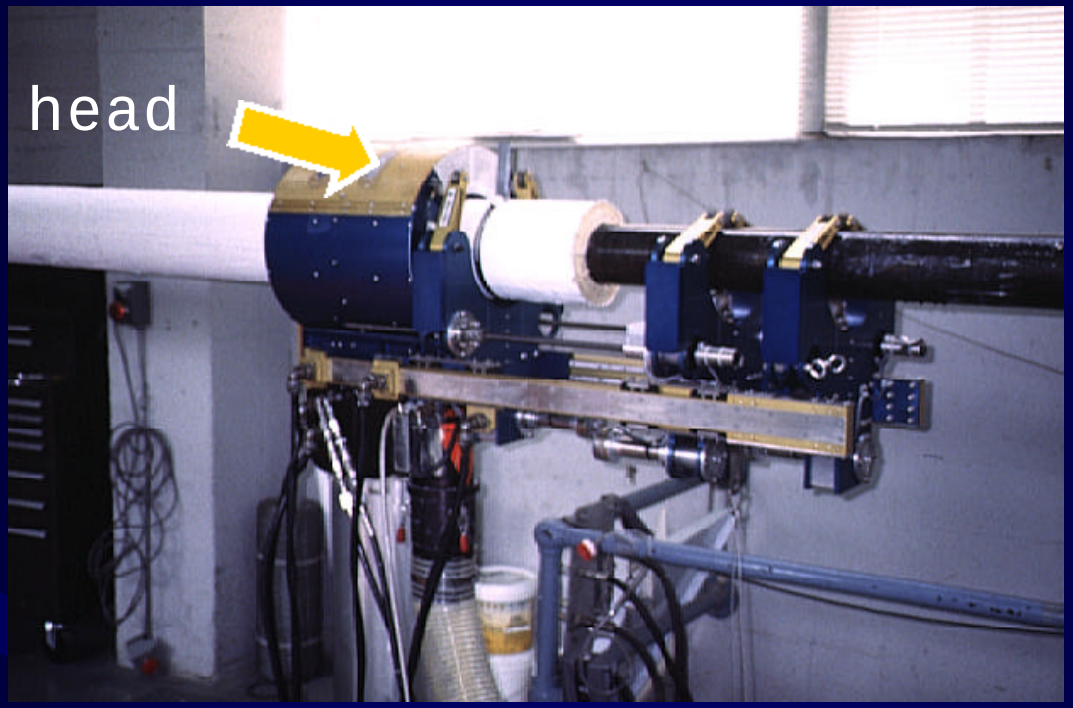
(Robotics can make a major difference)

Experience at WTC Disaster

The BOA Clean-Up Technology

Automated Asbestos Pipe Insulation Abatement

Cutting head



The BOA concept is much safer than present asbestos abatement techniques, but...

… it failed its only test on asbestos!

Lesson Learned Number 1: Involving workers in technology design and hazard assessment is critical

What other lessons have we learned through our program?

Lesson Two:

Many new D&D technologies are really loud, some are quite dusty, and there is real variability in results.

Results of Sampling

14 Concrete Decon Tests

	Dust	Noise
# samples	33	42
Mean	15.2 (mg/m3)	224.6 (% dose)
Highest	106.5 (mg/m3)	2399 (% dose)
CV	173%	195%

Hazard Example: Noise
Same job, different technologies

8-hour projected dose: 333%

8-hour projected dose: 2.76%

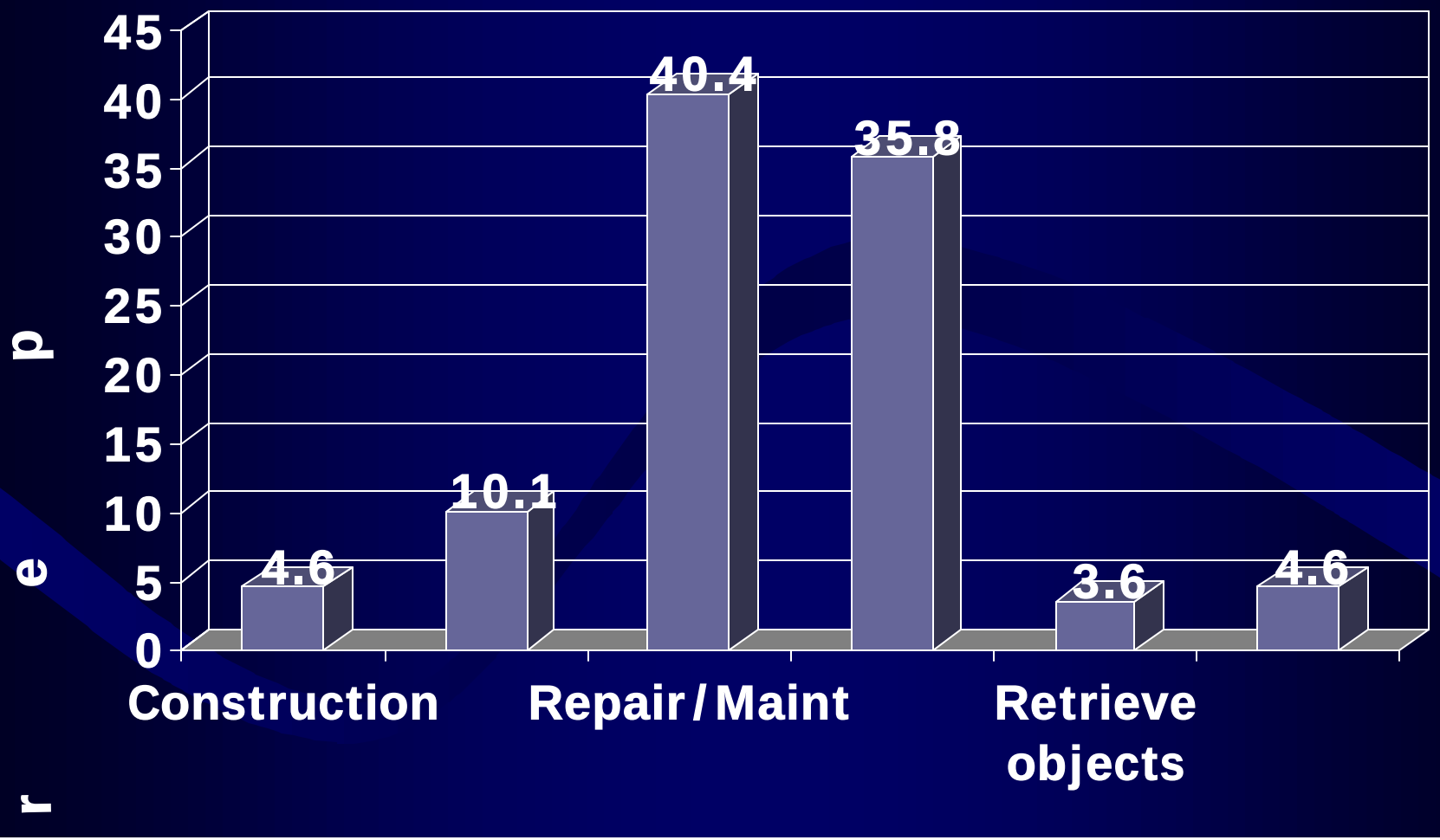
Lesson three: The technologies may be new, but the hazards are old

En-vac Robotic Blasting System

Lesson Four:

Maintenance work presents greater risk, particularly emergency maintenance work

Maintenance work in confined spaces NIOSH Evaluation, 109 Confined Space Fatalities (1983-1993)



"The workers know almost nothing about these technologies until they show up on site painted blue."

Clyde Frank, Ph.D.
DOE Office of Science and Technology

1996

Lesson five: workers need more information about the hazards of technologies

TECHNOLOGY SAFETY DATA SHEETS
Company Name
Technology Name

SECTION 1: TECHNOLOGY IDENTITY

Manufacturer's Name and Address:	**Emergency Contact:**
	Name:
	Phone: **Fax:**
	Information Contact:
	Phone: **Fax**

SECTION 6: ASSOCIATED HEALTH HAZARDS

Probability of Occurrence of Hazard:

1. Hazard may be present but not expected over background level
2. Some level of hazard above background level
3. High hazard level
4. Potential for imminent danger to life and health

Technology Safety Data Sheet

Section 3

Process Diagrams

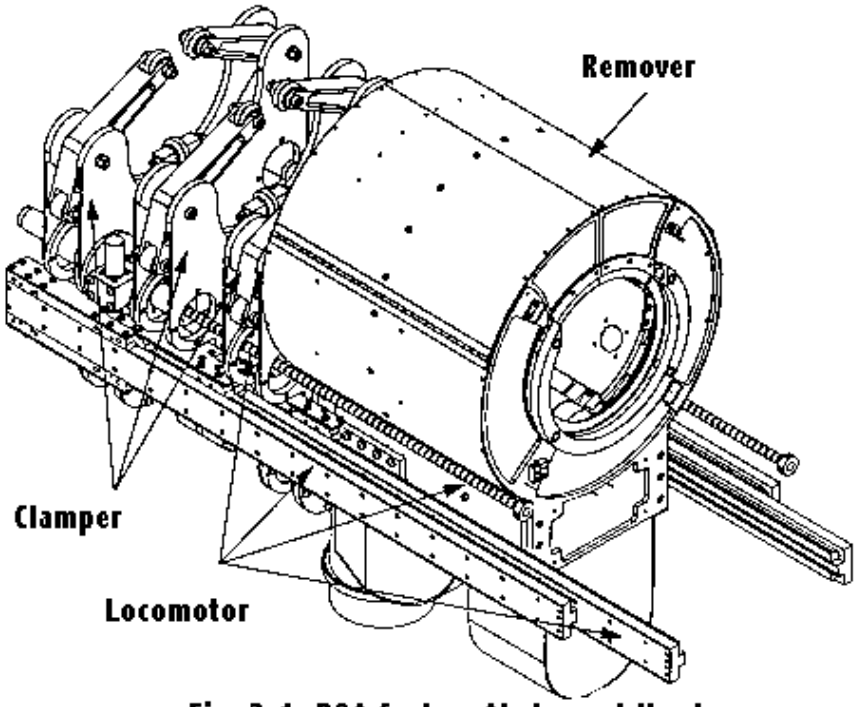


Fig. 3-1 BOA System Abatement Head

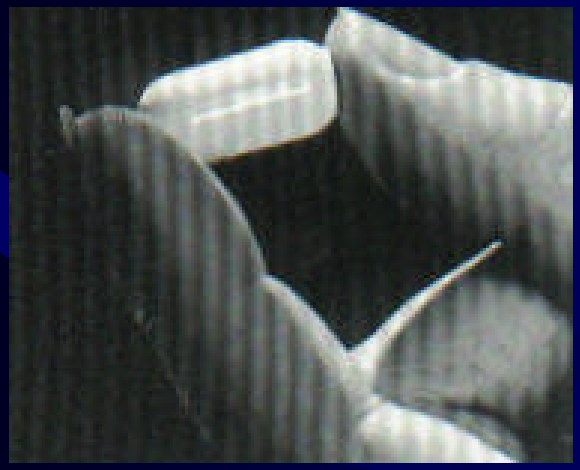
Lesson Six: Testing can expose dangerous assumptions

Heat stress is an important example

KoolJacket Lite™ Cooling Vest

Results of OENHP Assessment

- 31.5% - lower body core temperature
- 58% - higher body core temperature
- 10.5% - no change in wearing vs. not wearing vest



Bechtel
Hanford
Ensemble

CORETECH™ Suit

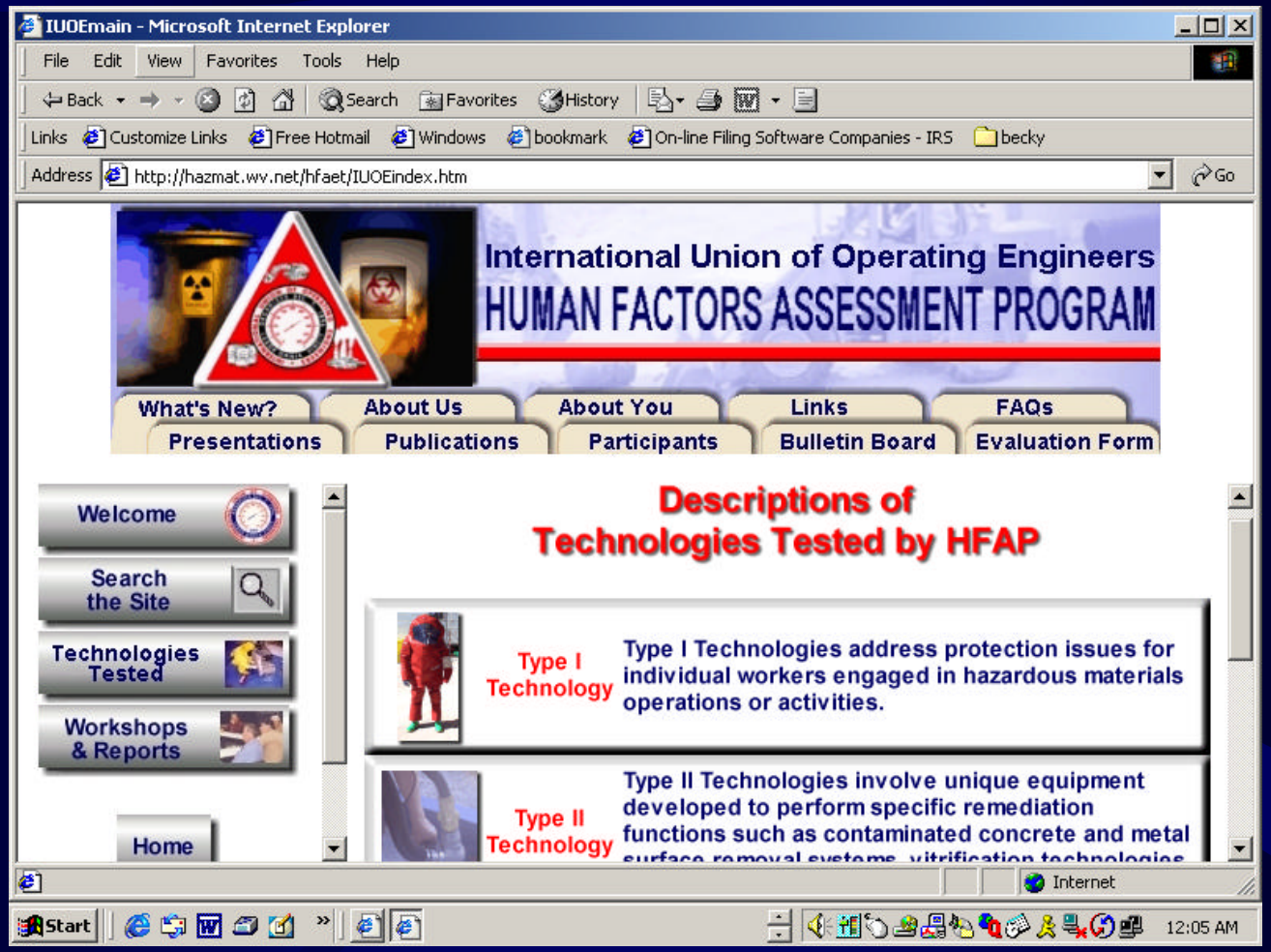
CORETECH™ Cooling Suit
Results of OENHP Assessment

Tested for 2-hour work period

- Body core temperatures maintained below ACGIH unacclimatized action limit value of 38 ^{o}C

- Baseline without cooling
  - 25 to 45 minute work period

Check our Website



http://www.iuoeiettc.org

Available on our website

- Full reports on technologies
- Technology Safety Data Sheets
- Extensive safety checklists
- National Technical Workshop reports

QUESTIONS?

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