Decontamination & Decommissioning Technology

34 Years of Nuclear Service

From TMI to Fukushima Daiichi……

…… and many places in between!

TMI-2
1979

9-11
World Trade Center

Fukushima
2011

US Commercial D&D Projects

Major decontamination and decommissioning works

- TMI-2 (Pennsylvania)
- Saxton (Pennsylvania)
- Waltz Mill (Pennsylvania)
- Connecticut Yankee (Connecticut)
- Big Rock Point (Michigan)
- Fort St. Vrain (Colorado)
- Yankee Rowe (Massachussetts)
- Maine Yankee (Maine)
- Trojan (Oregon)
- Rancho Seco (California)
- San Onofre Unit 1 (California)
- Humboldt Bay (California)
- Zion (Illinois)
- Indian Point Unit 1 (New York)

US DOE & Defense D&D Projects

Pentek equipment is present at of US DOE sites

- Hanford (Washington)
- INL (Idaho)
- Savannah River (South Carolina)
- Los Alamos NL (New Mexico)
- Lawrence Livermore NL (California)
- Argonne National Lab (Illinois)
- Brook Air Force Base (Texas)
- Midway Island
- Kwajalien (Marshall Islands)
- Knolls Atomic Power Lab (New York)
- Bettis Atomic Lab (Pennsylvania)
- Plum Brook (Ohio)
- Rocky Flats (Colorado)
- Fernald (Ohio)
- Oak Ridge (Tennessee)
- Mound Laboratory (Ohio)
- Elmendorf AFB (Alaska)
- Kansas City Plant (Missouri)

International D&D Projects

Reactors, defense and commercial facilities

- Sellafield (UK)
- BR-3 (Belgium)
- Latina (Italy)
- ARE Project, LTSF D&D (Malaysia)
- TRR (Taiwan)
- Chalk River (Canada)
- Whiteshell (Canada)
- Al Tuwaitha (Iraq)

Commercial Applications

Operating Nuclear Facilities & Lead Paint Remediation

- Routine decontamination
- Coating maintenance
- Repair and repainting of civil works

Oconee NPP (South Carolina, US)

Pedestrian Bridge, (City of Saitama, Japan

Fukushima-Related Supply

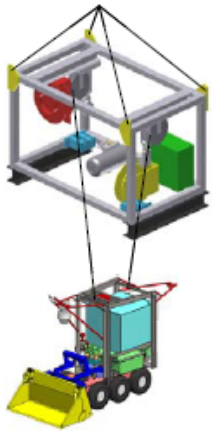
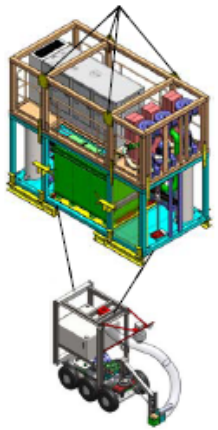
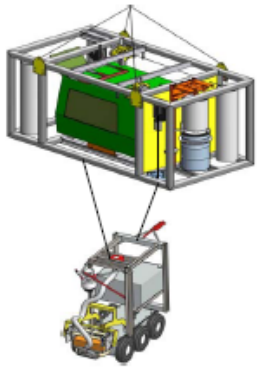
Pentek first visited Japan in October, 2011

- JAEA: standard decontamination system
- IHI: custom vacuum head for integration with specialized forest remediation system
- TEPCO: Unit 3, 5FL decontamination robots

Fukushima Unit 3, 5FL MOOSE®

(REF) Main Apparatuses Used in Decontamination Work

■Decontamination and debris removal work is conducted by hoisting remotely-controlled devices using a 600t crane.

Debris collection device	Small debris vacuum	Cutting & vacuuming device	High-pressure water cutting & vacuuming device	Debris collection
				
Work of collecting small debris	Work of vacuuming and removing small debris, dust, etc.	Work of cutting, vacuuming and removing concrete surface	Cutting and removal of floor surface layer using high-pressure water, and cleaning metal parts	Work of collecting and cutting debris

*The exhaust on the vacuum removes dust by means of a filter to curb any dust dispersion.
*As may be necessary, the above devices may be converted and new devices introduced.

Source: TEPCO
March 11th, 2015

Fukushima Unit 3, 5FL MOOSE®

First aerial delivery of decontamination capability

Fukushima Unit 3, 5FL MOOSE®

Delivery of 3 independent, remotely operated machines

Blade MOOSE®

Vacuum MOOSE®

Scabbling MOOSE®

Fukushima Unit 3, 5FL MOOSE®

Delivery included 100% independent utility skids

For Vacuum MOOSE®

For Scabbling MOOSE®

Fukushima Unit 3, 5FL MOOSE®

Nov. 2013 deployment of Blade MOOSE® to 5FL

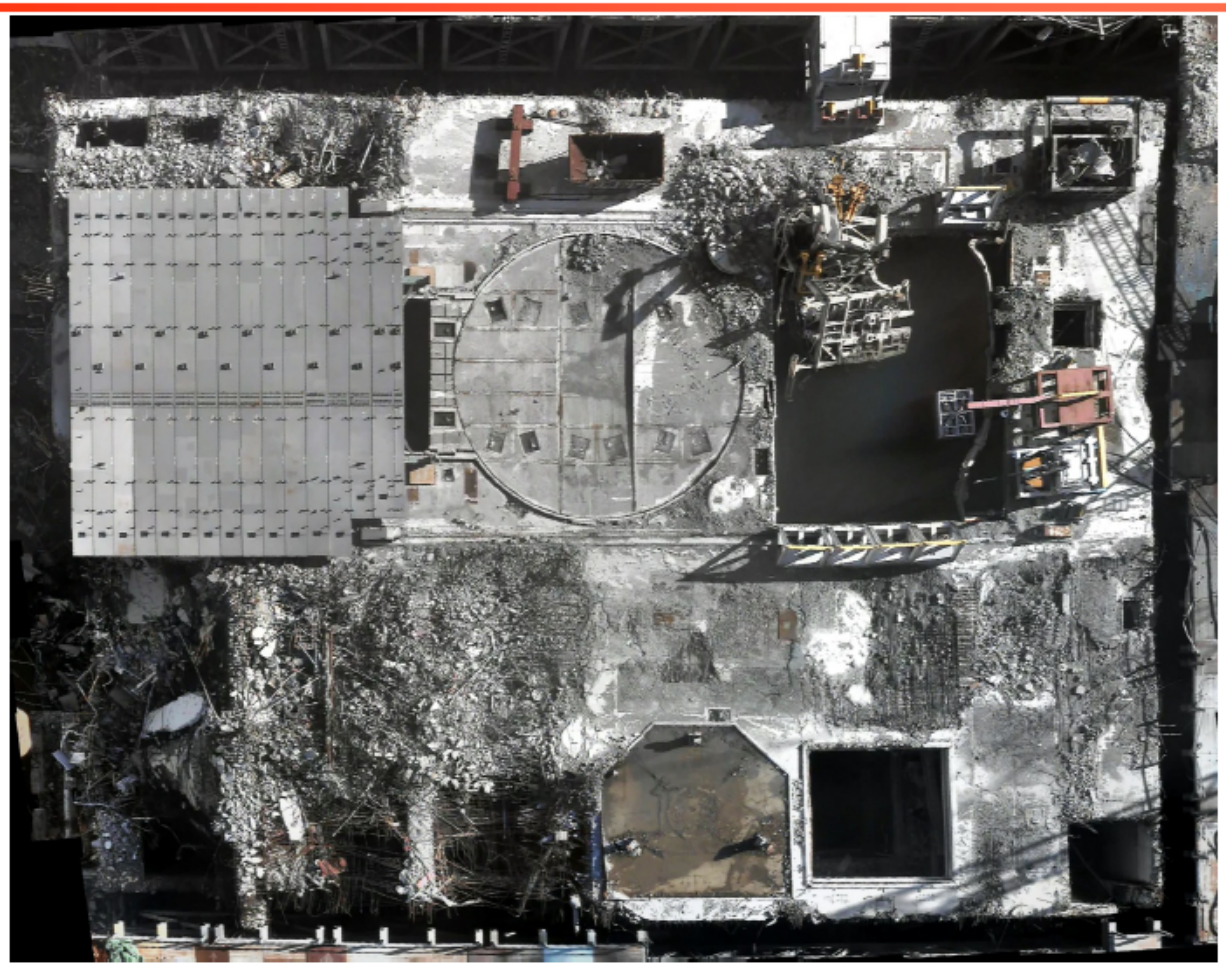
Source: TEPCO
Nov. 22nd. 2013

Source: TEPCO
Nov. 22nd. 2013

Fukushima Unit 3, 5FL MOOSE®

(REF) Condition of Refueling Level (Photo Taken: December 8, 2014)

PN



Source: TEPCO
March 11th, 2015

*Survey photographs have been combined to present an overall view

東京電力

Products for D&D Contractors

Pentek products are for professionals; not consumers

- 1-step mechanical surface decontamination tools cut and remove contaminated surfaces:
  - Structural concrete and steel surfaces
  - Painted surfaces
  - Sensitive architectural surfaces
- Integrated vacuum collection and packaging
- Weatherproof and decontaminable construction

Decontamination Tools

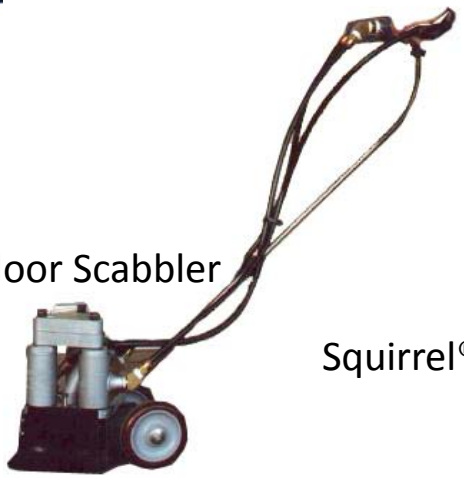
Dustless, effective control of airborne emissions

Corner Cutter®

Roto Peen® Cushioned Abrasive Wheel

Squirrel® II Crack Chaser

Squirrel® III Floor Scabbler



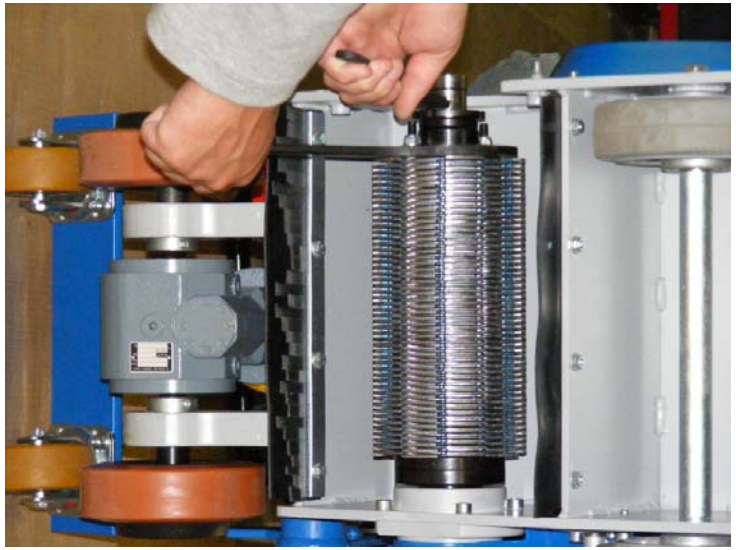
Squirrel® I Scabbler

Diamond Cutting Media

5X Improved decontamination productivity

Roto Peen® Cushioned Abrasive Wheel

Diamond Coated Abrasive Belts



Diamond Drum Scabbler

PENTEK Inc.

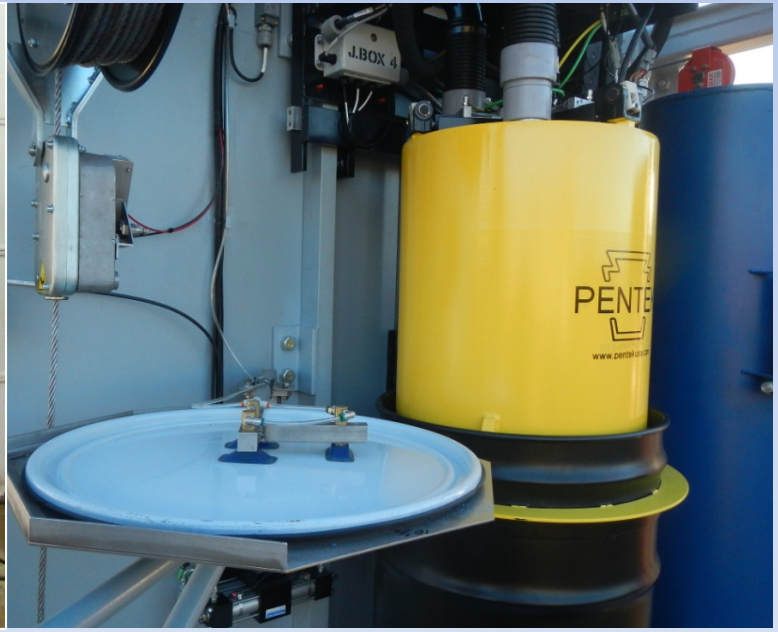
VAC-PAC® Collection Systems

HEPA filtered, high flow, low maintenance

Standard VAC-PAC®

Custom VAC-PAC®

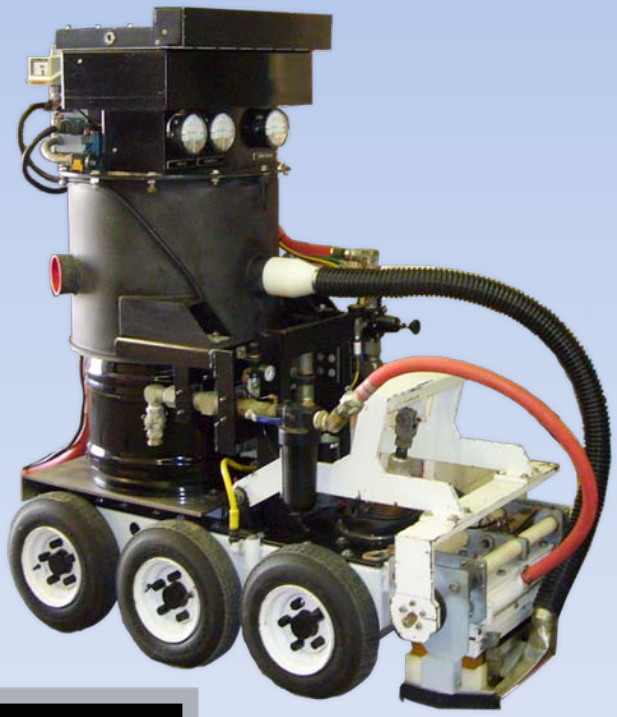
Self-Disposing VAC-PAC® Module



Remote Deployment Schemes

Floors and walls, or new aerial deployment

Standard MOOSE®



WallWalker®

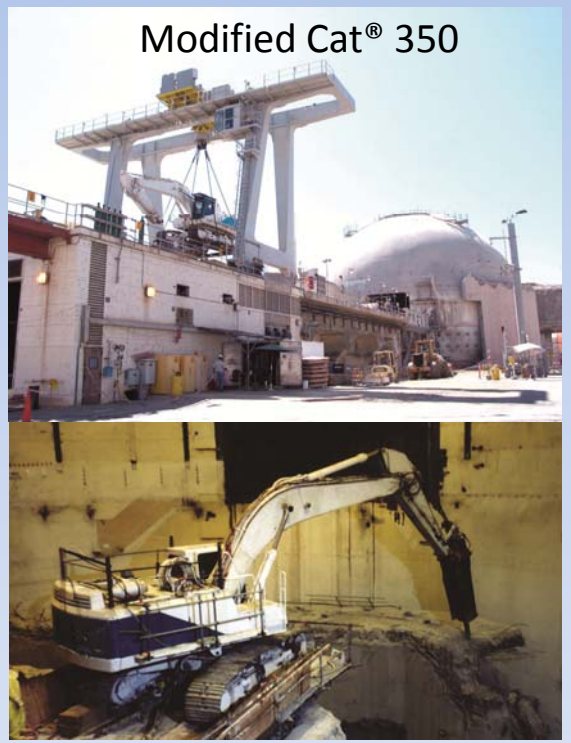
WORK HEADS
Rad Survey
Scabbling
Scarifying
- Abrasive
- UHP @3kBar
- Mechanical

Painting
Underwater

Aerial MOOSE®

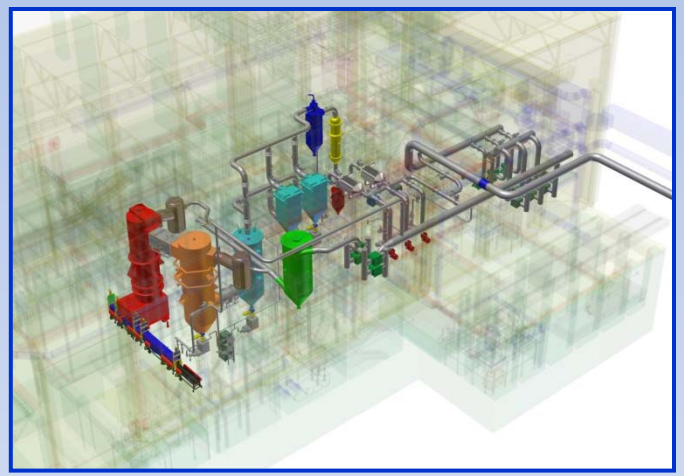
Demolition Equipment

Modifications for hazardous work locations



Waste Management

Automation of Hazardous Processes



Plasma Treatment of Radwaste

Self-Disposing HEPA Filtration Module

Innovative Technology

Process Improvements for Nuclear Plants Operations
Fire Barriers, Cable Life Management, Communications

Fire Barriers for Cable Tray Isolation

WiFi Mesh Networks for Open Air
& Submerged Environments

Instrumentation Cable Aging Diagnostics

PENTEK Inc.

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@Networking Sessions

- Decontamination
- Waste Management
- Investigation

- Representatives:
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  - Greg Allan: +1 412-973-1228

@Chiba, 11 & 12 April

- Trade Exhibition Demonstration for Lead Paint Removal
- Web site: http://www.maru-t.co.jp/topics/
- Location: Makuhari Messe, Chiba
  - » http://www.m-messe.co.jp/en/event/list

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