

# Perma-Fix Environmental Services, Inc. (Perma-Fix)



***A Global Provider of Nuclear Services & Waste Management***

Presented by Tammy Monday

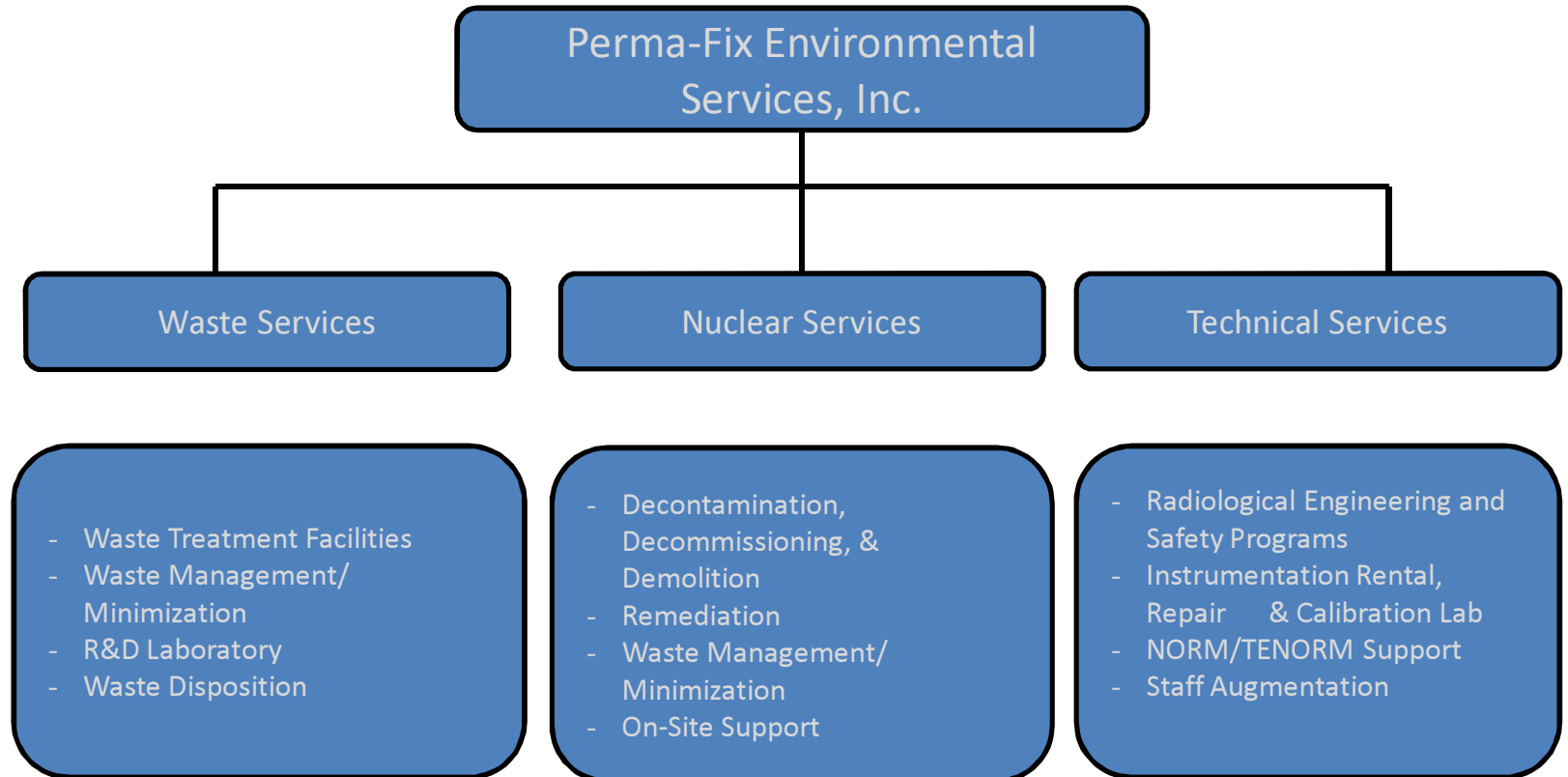
Vice President, Waste Services Sales and Business Development

# Mission Statement

- **Mission:** Perma-Fix is a global provider of safe, compliant and environmentally responsible nuclear services and radioactive waste management solutions.
- **Values:**
  - Integrity
  - Safety
  - Commitment to Our People & Communities
  - Commitment to Our Customers
  - Innovation
  - Value Added

***Safety, Innovation & Excellence --- Cornerstones of Our Success***

# Perma-Fix Organization



# Overview

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- About Perma-Fix
  - Nuclear services company and leading provider of nuclear waste management services
  - Publicly Traded Company (NASDAQ: Perma-Fix)
    - HQ – Atlanta, GA (Founded – 1990)
    - Revenue -- \$170M / Employees – 900

# Customers

- Perma-Fix Customers
  - U.S. Department of Energy
  - U.S. Department of Defense
  - Commercial Nuclear Industry
  - Research Labs & Educational Institutions
  - Hospitals and Pharmaceuticals
- Perma-Fix recognized as:
  - Leader in development of innovative treatment technologies for complex waste streams
  - Leader in providing the most comprehensive waste management services at both client sites and at our fully licensed / permitted facilities

# Waste Services

- Perma-Fix is a major provider of Mixed Low-Level Waste (MLLW) and Low-Level Waste (LLW) management services and has built our company around solving complex waste management challenges.
- Own and operate 4 MLLW/LLW Treatment Facilities:
  - Materials & Energy Corporation – Oak Ridge, TN
  - Diversified Scientific Services, Inc. – Kingston, TN
  - Perma-Fix of Florida, Inc. – Gainesville, FL
  - Perma-Fix Northwest Richland, Inc. – Richland, WA
- Nevada National Security Site (NNSS) certified for disposal of DOE generated wastes.
- Member of the CHPRC team at Hanford for clean-up of the Central Plateau (~160 employees on site) managing treatment and disposal operations.

# Perma-Fix Facilities



Perma-Fix Northwest - Richland, WA



DSSI - Kingston, TN



M&EC - Oak Ridge, TN

Perma-Fix Headquarters  
Atlanta, Georgia

- Other Office Locations:
- Knoxville, TN
  - Beaver, PA
  - St. Louis, MO (Schreiber, Yonley & Assoc. (Env. Engrs.))
  - Project sites across U.S. & U.K.



Perma-Fix Florida - Gainesville, FL

# Waste Services – Facilities Treatment Capabilities

Process		M&EC Facility	DSSI Facility	Perma-Fix of Florida	Perma-Fix of Northwest Richland
Neutralization and/or Stabilization of MLLW Liquids/Solids		✓	✓	✓	✓
Thermal Treatment of both TSCA and non-TSCA Regulated MLLW Liquids/Solids		✓	✓		
Thermal Treatment of high-special nuclear material (SNM) MLLW Liquids		✓	✓		
Macroencapsulation of MLLW Debris		✓		✓	✓
Deactivation of MLLW (D003 wastes)		✓	✓	✓	✓
Non-TSCA Regulated MLLW Labpacks		✓	✓	✓	✓
TSCA Regulated MLLW Labpacks		✓			
MLLW Aerosols		✓	✓		
High Activity/Dose waste streams		✓	✓	✓	✓
TRU waste processing					✓
Treatment of radiologically contaminated Mercury (Hg)	Elemental Hg (Amalgamation)	✓		✓	
	Hg<260ppm	✓	✓	✓	✓
	Hg>260ppm	✓	✓		



# Waste Services - Research & Development



- Perma-Fix of FL has a R&D laboratory that is used to develop new treatment technologies for solving complex waste treatment challenges.

# Waste Services -Applicable Waste Streams

- **EDTA solutions**
- **Debris and dry active waste (paper, plastics, trash)**
- **Blast media from paint removal**
- Chromium and cadmium plating sludge
- Hazardous and non-hazardous wastewater
- TSCA regulated PCBs for storage and treatment
- Listed Waste Codes including F, P, and U
- Mercury (soluble form) contaminated wastes <260 ppm
- Elemental mercury and mercury contaminated wastes >260 ppm
- Characteristic Waste Codes:
  - D001 ignitability
  - D002 corrosivity
  - D003 reactivity
  - D004 through D043 toxic metals and organic compounds
- High organic wastes such as spent activated carbon, oily sludge, still bottoms, etc...
- **Radioactive aqueous wastes**
- Radioactive corrosives, reactives, oxidizers, and metal bearing waste
- Caustic cleaners
- Solvents
- Chlorinated and nitrated wastes
- **Water insoluble oils and greases**
- Incinerator chars and graphite
- Spent acid sludge
- Lead bearing wastes
- Beryllium waste
- **Freon (Still Bottoms)**
- Liquid scintillation vials
- **Radioactive oils and sludges**

# Waste Services -Major Treatment Processes



# Waste Services -PCB Treatment

- DSSI began combusting PCB liquids in April 2009
- M&EC and PFNW authorized to treat PCB solids and debris
- Perma-Fix has only capability for destruction of radioactive PCBs
- PCB Transformers – Drain/Rinse



# Waste Services -Tritium Processing

Successful Treatment Campaigns of high-tritium (thousands of curies) waste streams

Los Alamos National Laboratory  
Savannah River Nuclear Solutions

- Designed and built Tritium Treatment enclosure in March 2010
- Tritium Capture System, a closed loop system that ensures no release of Tritium
- Captured Tritium can then be shipped as LLW to NNSS for disposal
- Challenges M&EC addressed with these waste streams:
  - Containment of Tritium
  - Capture of Tritium
  - Deactivation of reactive metals
  - Collection of Mercury (in some cases)
  - Stabilization/Solidification
  - Shipment for disposal



Tritium Treatment Enclosure

# Waste Services -High Dose Waste Management



# Waste Services – Large Components



- PFNW recently upgraded it's LLW Processing Facility for receipt and treatment of large components from nuclear utilities. This new capability facilitated our first large component project valued over \$4.1M:
  - Condenser tube replacement project at Energy Northwest Columbia Generating Station;
  - Cost effectively decontaminate and recycle and/or dispose ~3 million pounds of condenser tubes;
  - Large components – 11' x 50' x 14' weighing ~225,000 pounds requiring specialty transport, large crane and facility modifications at PFNW.

# Waste Services - Large Components

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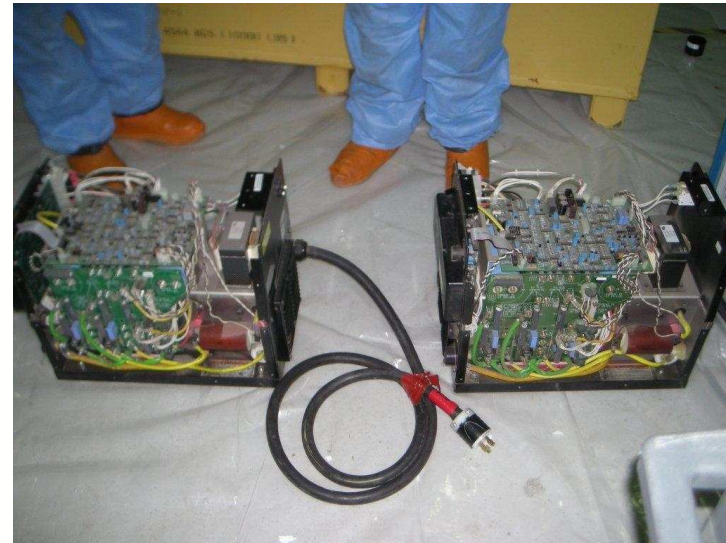
## Benefits to the Generator

- ISO 14001 Green Credit
- Perma-Fix assumed the risk of material release
- Cost Savings
- Material was recycled for future use



# Decon and Free Release

- Condenser Tubes and Plant Components
- Electrical Components and Equipment



# Nuclear Services – Experience Highlights

- Provider of complex hazardous, radioactive, and nuclear waste management services to the government and commercial sectors.
- Specializes in the identification, removal, and remediation of radiological and hazardous materials (strong emphasis on nuclear materials).
- Holds a Radioactive Material license from the State of Tennessee (No. R-47161-J11) and from Kentucky (No. 201-650-90).
  - Allows Perma-Fix to receive, acquire, possess, and transfer radioactive materials, and conduct radiological remediation on projects nationwide.

# Nuclear Services – Experience Highlights

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- Experience with compliant disposal of millions of pounds of wastes annually at radioactive waste disposal facilities, as well as Subtitle C and D landfills.
- Licensed by the U.S. Department of Transportation to transport hazardous materials to disposal sites.
- Negotiated agreements with all major transportation companies to provide the lowest cost to transport (including rail) to treatment and disposal facilities.

# Nuclear Services – Onsite Service Offerings

- Decontamination of hazardous or radiological contaminated surfaces, equipment, & piping
  - Conventional tooling
  - Chemical
  - Hydro-Lasing
  - Large area floor scarification



# Nuclear Services – Onsite Service Offerings

- Equipment / Component removal, decontamination, transport, & disposal
  - Dismantling
  - Heavy lift removal
  - Waste stabilization / management

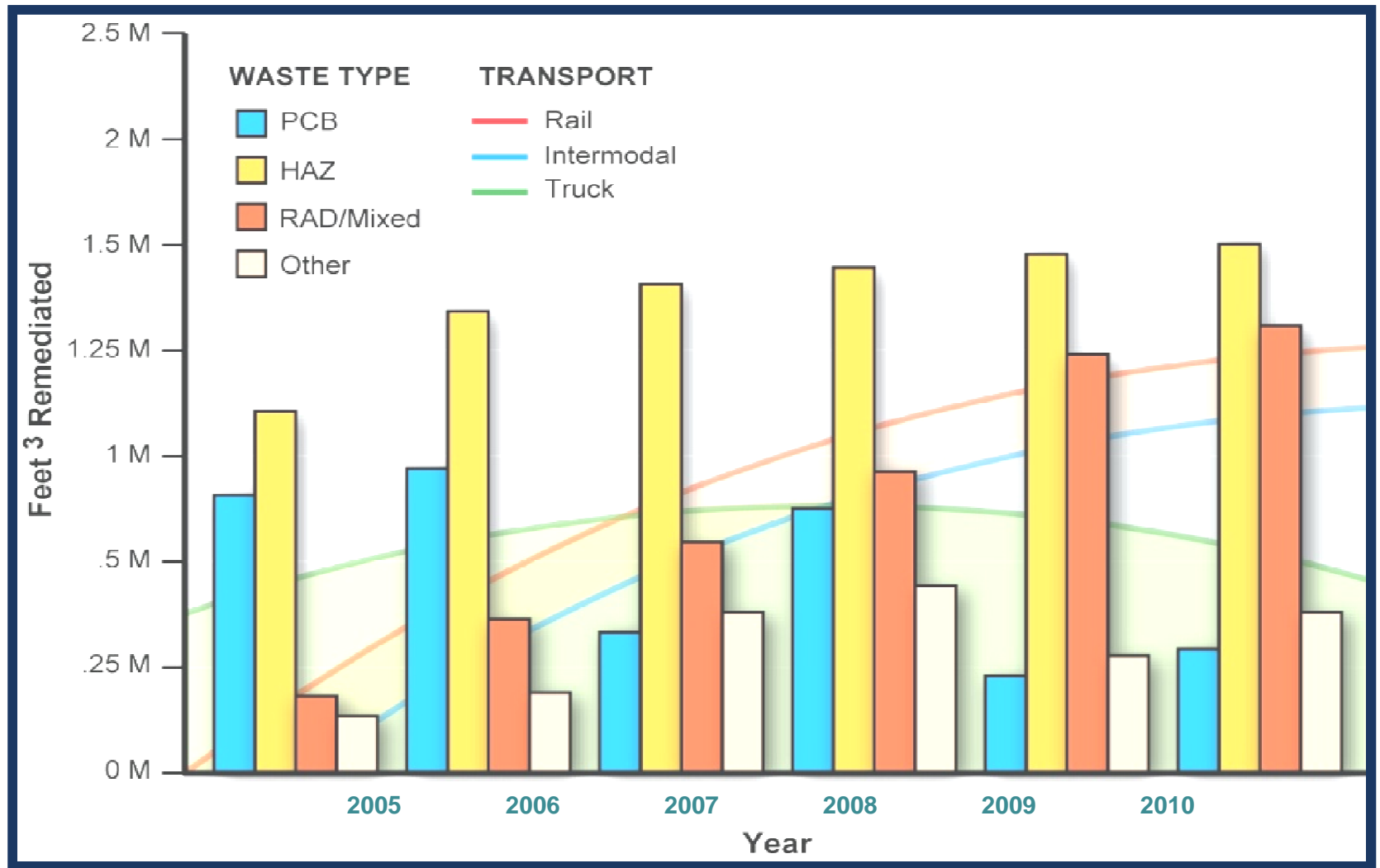


# Nuclear Services – Onsite Service Offerings

- Nuclear & hazardous waste management
  - Characterization
  - Planning
  - Sorting
  - Certification
  - Processing & Shipping
- Onsite engineered solutions for waste over-packing, down blending, batching or repackaging



# Nuclear & Environmental Services – Waste Disposal Experience



# Nuclear Services – Onsite Service Offerings

- Environmental Engineering, Consulting & Remediation

- Radiological survey & sampling
- Exposure assessments
- Site characterizations / final site release surveys (MARSSIM or NUREG 5849 survey protocols)
- Turnkey radiological and hazardous waste remediation (design, planning, execution & reporting)

***Perma-Fix – Licensed  
Environmental  
Contractor***

- S-A (asbestos material handling / removal)
- S-B (underground storage tanks)
- S-C (lead-based paint abatement)
- S-D (air, water & soil remediation)



# Nuclear Services – Onsite Service Offerings

- Environmental Engineering, Consulting & Remediation
  - Waste management /minimization
    - Sorting
    - Segregation
    - Treatment & Disposal Options
  - Licensing and permitting
  - Regulatory compliance
  - Environmental monitoring / compliance



# Nuclear Services – Soil Survey / Sorter / Segregator

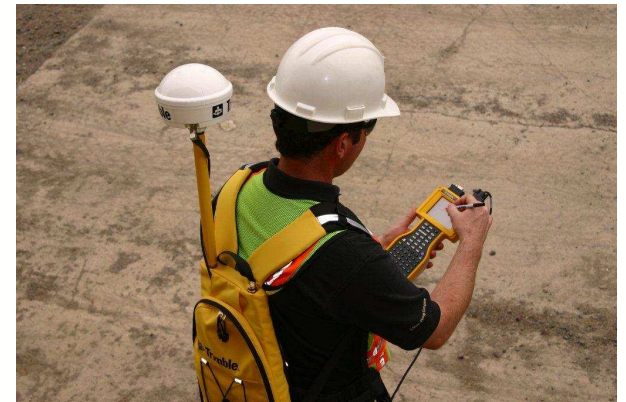


# Technical Services – Overview

- One of the largest turnkey radiological support services contractor in the U.S.
  - Extensive in-house expertise in all aspects of radiological protection (CHP's, CSP's, and Radiological Engineers / Technicians)
  - Owns / Operates commercial Radiological and Industrial Hygiene Instrumentation Laboratory (rental, repair, and calibration)
- Specialize in utilization of extensive in-house health physics expertise to define waste treatment technologies and advanced engineering techniques to minimize sampling requirements while reducing waste quantities.

# Technical Services – Overview

- Currently managing one of the world's largest Nuclear Radiological Controls Program (Oak Ridge RADCON)
- Specializes in the development of new technologies to provide integrated solutions for specific project applications (partner with instrumentation manufactures to modify commercial “off-the-shelf” equipment).
  - Gamma Walkover Survey Systems
  - Real Time Radiological Mapping System (GPS)
  - Global Environmental Material Management System (GEMMS)
    - tool to manage life-cycle data for complex hazardous & radioactive materials and waste operations



# Technical Services – Service Offerings

- Radiological Engineering & Safety Programs
  - Radiological Risk Assessments (multiple codes) including DBA Analysis of Radiological Consequences
  - Radiation Safety Programs
  - Dose Reconstruction
  - ALARA Shielding Design
  - Radiological Monitoring and Control
  - NUREG-1575 MARSSIM Final Status Survey
  - NUREG-1757 Decommissioning Plan Development
  - NORM / TENORM Support
  - Emergency Response Plan Updates

# Technical Services – Instrumentation Services

- Radiological & Industrial Hygiene Instrumentation (Rental, Repair, & Calibration)
  - Lab Location – Knoxville, TN
  - Over 6,000 instruments
  - Long-term or short-term lease options
  - Calibration & repair of all makes & models
  - Professional consultation for custom instrumentation application & development

## Types of Instruments

### *Industrial Hygiene*

Multi-Gas  
PID  
Noise  
Air Velocity  
Indoor Air Quality  
Water Quality

### *Air Sampler*

Low / High Volume  
Lapel Samplers

### *Radiological*

Scintillator  
Geiger-Muller Tube  
Gas Proportional  
Low Background Counters  
Personal Contamination Counters  
Portable MCAs

### *Dose Rate*

Ion Chambers  
Micro R Meters  
Stretch Scopes  
SRD  
Solid State

# Technical Services – Service Offerings

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- Staff Augmentation Services
  - Certified Health Physicists (CHP)
  - Radiological Engineers
  - Radiological Technician Coordinator / Supervisor
  - HP / RP Technicians (350)
  - Certified Safety Professionals (CSP)
  - Safety Engineers
  - FME Attendants
  - QA Engineers / Inspectors
  - Engineers (mechanical, electrical, civil, environmental, etc.)
  - Primavera Schedulers / Planners