

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



A Global Provider of Nuclear Services & Waste Management

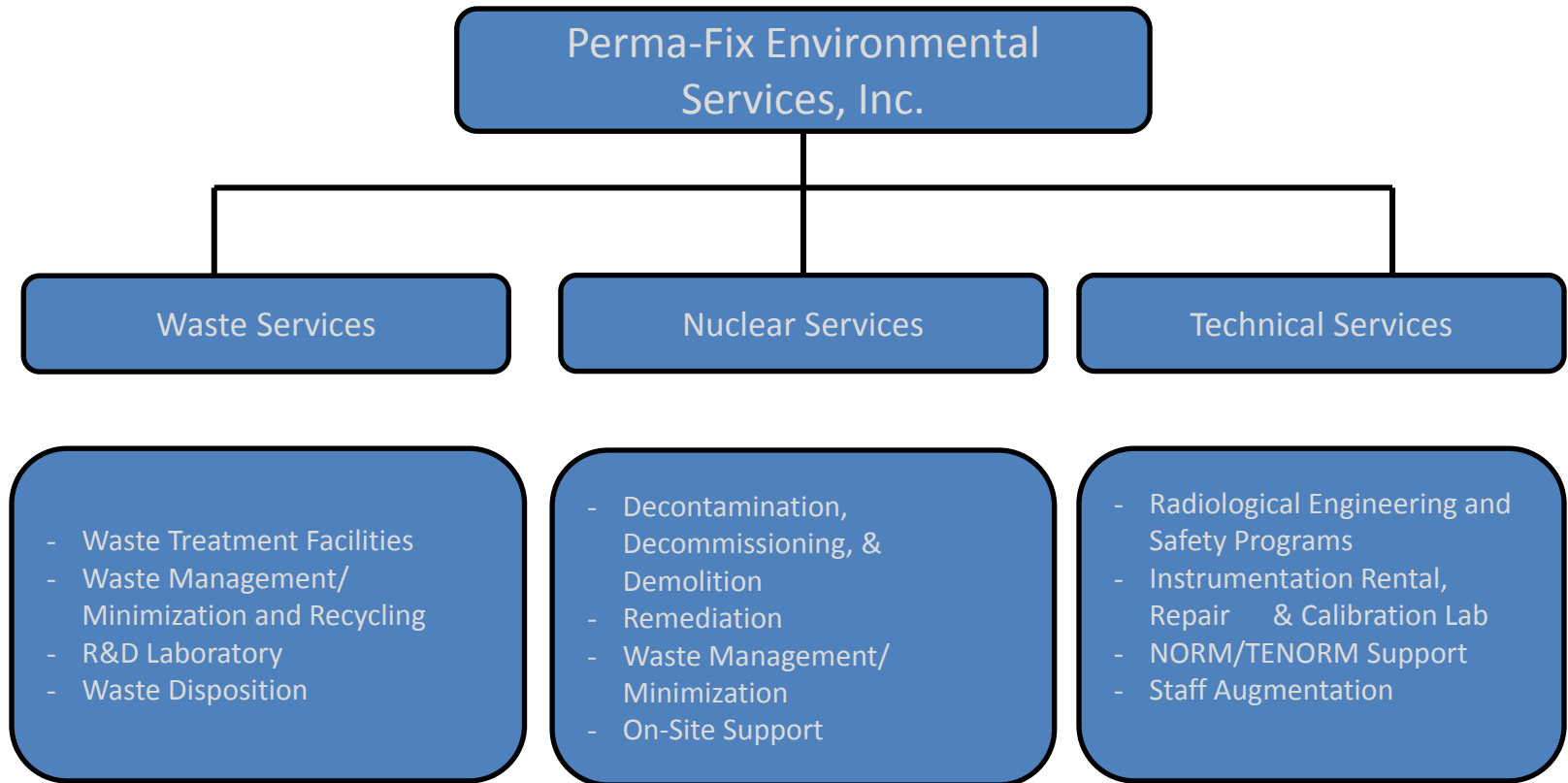
Presented by John H. Hagan
Director, Western Sales

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



- 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 -- \$165M / Employees – 400

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
- Certified to dispose of MLLW and LLW at all major disposal units within the United States
- Nevada National Security Site (NNSS) certified for disposal of DOE generated wastes.

Perma-Fix Facilities



Perma-Fix Northwest - Richland, WA



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.



DSSI - Kingston, TN



M&EC - Oak Ridge, TN



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**
- **Material Free-Release & Recycling Services**

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

Benefits to the Generator

- ISO 14001 Green Credit
- Perma-Fix assumed the risk of material release
- Cost Savings
- Material was recycled for future re-use
- Minimized the amount of LLW for disposal at 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

- 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

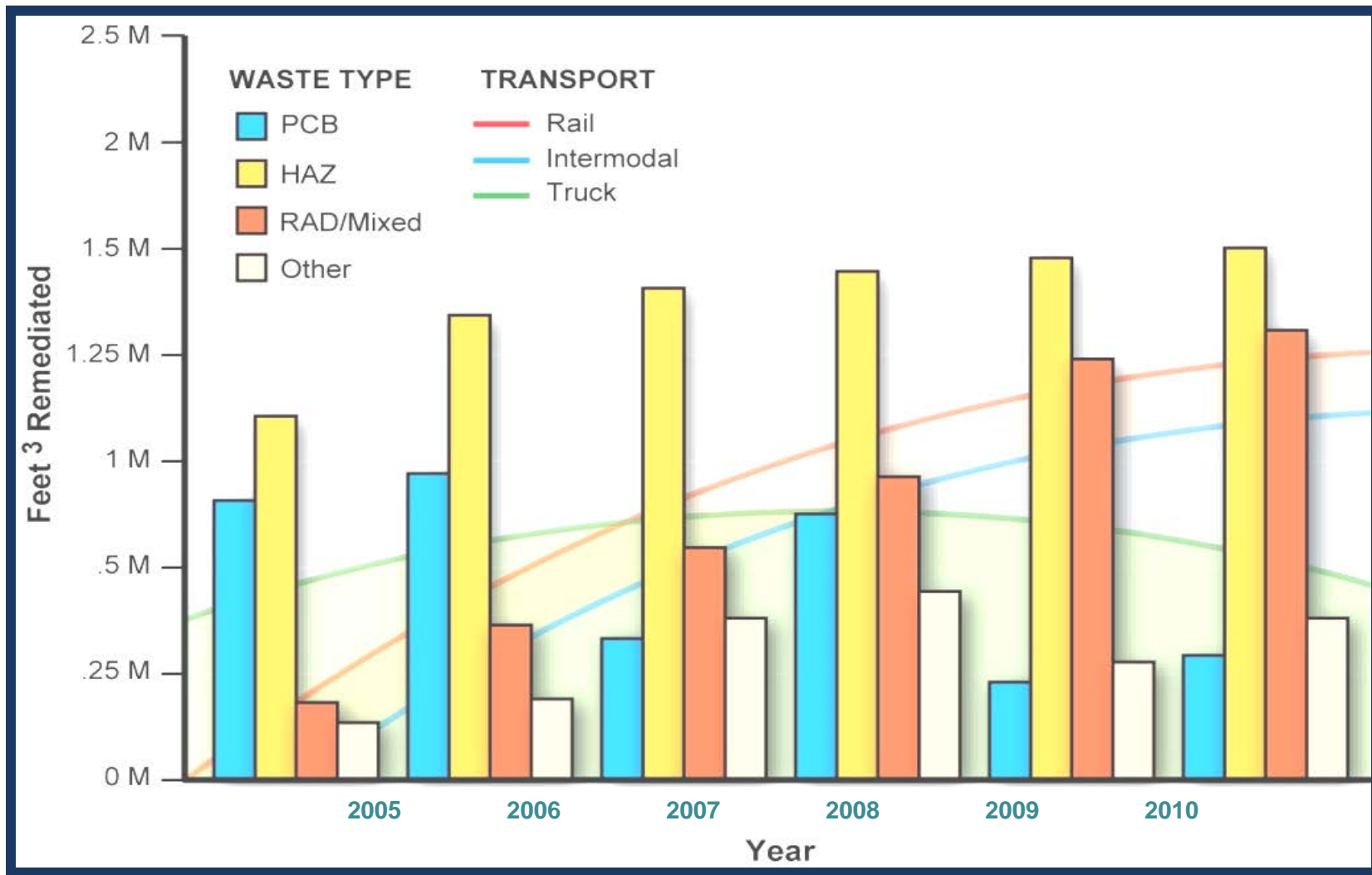


Nuclear Services – Onsite Service Offerings

- 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

- 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