

# InSite



protecting people and the environment from radiation and radioactive waste

## GTS Duratek and Waste Management Nuclear Services: Joining Forces to Provide Total Radwaste Management

*“Waste Management Nuclear Services adds dimension in everything we do.”*

Bob Prince, President and CEO, GTS Duratek

On June 9, 2000, GTS Duratek completed the acquisition of Waste Management Nuclear Services (WMNS), which includes Chem-Nuclear Systems and Waste Management, Inc.’s Federal Services group. This acquisition extends GTS Duratek’s capabilities to provide total radioactive waste management from client site to disposal, providing customers with a single source for all their radwaste needs.

The complementary capabilities of the two companies mesh to enable the “new” GTS Duratek to better meet its clients’ radioactive waste management needs in many ways:

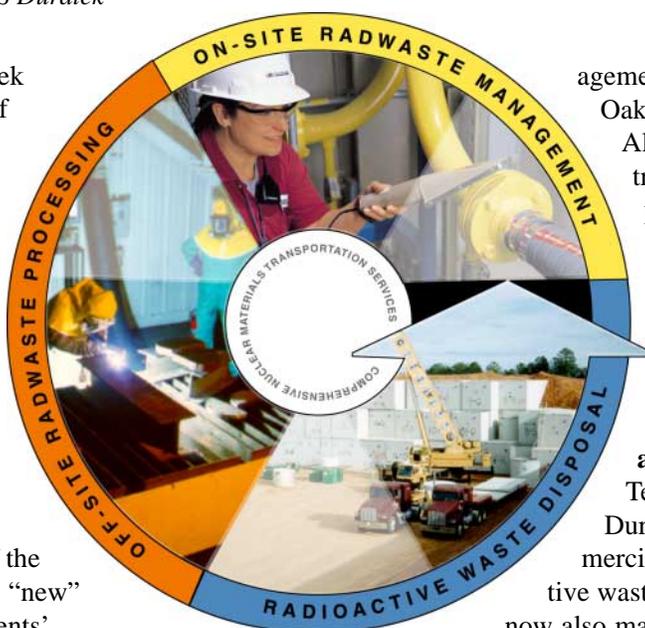
**On-Site Waste Management:** Both GTS Duratek and WMNS have a long history of supplying technologies and services to commercial and government clients throughout the U.S. The addition of WMNS significantly expands the Company’s presence at U.S. Department of Energy’s (DOE) sites and adds strength in on-site commercial liquid waste treatment. GTS Duratek now operates 34 major federally owned radioactive waste treatment, storage, and disposal facilities and provides waste man-

agement services at DOE’s Hanford, Oak Ridge, Rocky Flats, and Los Alamos sites; provides on-site water treatment systems for 24 nuclear power plants, and has served as the radioactive waste manager for all of the major commercial nuclear power plant decontamination and decommissioning (D&D) projects to date.

**Off-Site Radwaste Processing and Disposal:** With its four Tennessee fixed-base facilities, GTS Duratek is the nation’s largest commercial processor of low-level radioactive waste. WMNS disposal operations now also make the company a major radwaste disposal provider. Chem-Nuclear operates the

Barnwell low-level radioactive waste disposal facility for the State of South Carolina, a particularly important advantage for GTS Duratek in helping waste generators work within the new South Carolina legislative limits on the volume of waste to be accepted at Barnwell. In addition, the WMNS Federal Services group operates the nation’s biggest radioactive waste disposal facility, the Environmental Restoration Disposal Facility at DOE’s Hanford Site.

**Transportation Services:** GTS Duratek’s subsidiary, Hittman Transport Services, is one of the premier transporters of low-level radioactive waste in the United States. Its fleet logs over six million miles per year, often carrying shipping casks from Chem-Nuclear’s fleet of over 60 licensed containers. WMNS is a leader in radioactive waste transportation system design and recently fabricated the first 10-160B cask licensed by the Nuclear Regulatory Commission. In addition, the combined company have vast experience transporting large, heavy and/or highly irradiated



### What's Inside:

- 2 Liquid Waste Processing
- 3 Hanford Waste Receiving and Processing Facility
- 4 Memphis Facility Receives Maine Yankee Steam Generator for Processing
- 5 Oak Ridge Projects Implement Integrated Safety Management System
- 5 Hanford Disposal Facility Doubles Capacity
- 6 Expanded Transportation Services
- 7 Commercial Low-Level Radioactive Waste Disposal at Barnwell
- 7 River Protection Project Update

... continued on page 6

## Liquid Waste Processing

by Greg Austin

**G**TS Duratek provides on-site liquid waste processing services to nuclear power generators throughout the United States and Mexico.

Three separate technologies are utilized to meet the customer's liquid waste processing requirements:

THERMEX™, ALPS™, and Dewatering. GTS Duratek successfully processes over 70 million gallons each year, and its liquid waste processing staff is highly qualified and respected in the industry. GTS Duratek also has an experienced staff of engineers and technical professionals that support its field services.

THERMEX™, a membrane-based water processing system, is utilized primarily at Boiling Water Reactor (BWR) sites to produce high purity reactor grade water from plant liquid waste. There are currently five THERMEX™ systems in service at commercial nuclear facilities in the U.S. that process approximately 50 million gallons of liquid waste annually. Benefits of this system include:

- minimized environmental impact by significantly reducing, or in some cases, completely eliminating liquid discharges;
- reduced solid waste generation by as much as 80 to 90 percent over alternative processing systems; and
- substantially reduced overall liquid waste processing and disposal costs.



**Left:** Since its inception, ALPS™ has processed in excess of 500 million gallons of liquid waste.

**Top right:** The Rapid Dewatering System provides customer assurance that solid waste will meet strict disposal site criteria.

**Bottom right:** With the THERMEX™ system, the treated water is returned to the reactor at a conductivity of less than 0.06 micro Siemens/centimeter, nearly theoretically pure water.

*GTS Duratek is the only company in the United States that has successfully applied advanced membrane technology to process wastewater at BWRs.*

The ALPS™ (Advanced Liquid Processing System) is an ion exchange/filtration system that is utilized primarily at Pressurized Water Reactor (PWR) sites for the removal of radioactive impurities from plant liquid waste. Since the early 1980s, over 30 ALPS™ systems have been employed at various nuclear facilities throughout North America. ALPS™ processes approximately 20 million gallons annually at multiple customer sites. Benefits of ALPS™ applications include:

- reduced radioactive contaminant levels in liquid waste stream by factors of 5000 or greater, enabling PWR operators to minimize the amount of radioactive contaminants released through liquid discharges;
- minimized solid waste generation, the typical ALPS™ generating less than 100 cubic feet of solid waste for every one million gallons liquid waste processed while alternate processing technologies, such as evaporation, can generate 10 times that amount of waste; and
- reduced overall liquid waste processing and disposal costs by minimizing waste generation.

Solid waste generated by the THERMEX™ and ALPS™ processes, as well as solid waste generated by other plant systems, must be packaged to meet the strict requirements imposed by the Low-Level Radioactive Waste (LLRW) disposal facilities. GTS Duratek accomplishes this by utilizing Standard Dewatering Systems (SDS) and Rapid Dewatering Systems (RDS-1000) to efficiently remove residual water from the solid waste containers prior to their shipment to the disposal facilities.

GTS Duratek has recently been awarded three new long-term ALPS™ contracts; installation and startup will occur in August and September of 2000. In addition, several potential customers for both ALPS™ and THERMEX™ are being pursued. 🌐



# Hanford's Waste Receiving and Processing Facility

## A "Couldn't Be Done" Success Story

by Leila Crawford

**E**mployees at the Hanford Waste Receiving and Processing (WRAP) facility recently celebrated a major accomplishment: four years without a lost-time accident. This is a particularly significant milestone because the period covers WRAP's completion, startup, and first two years of operation on an accelerated schedule that was considered by many to be impossible.

The \$90-million WRAP facility contains equipment and processes to characterize, repackage, and ship transuranic (TRU) waste for disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico. WRAP is one of 15 radioactive, hazardous, and mixed waste treatment, storage, and disposal facilities at the U.S. Department of Energy's (DOE) Hanford Site where Federal Services provides the management team for prime contractor Fluor Hanford Inc.

WRAP operations begin with receipt of drums containing solid TRU and low-level waste. The drums are subjected to x-ray, gamma energy assay, and neutron assay to confirm their contents and determine acceptability for disposal. Drums that are found to contain only low-level waste are released for disposal on the Hanford Site. Drums containing TRU waste are certified and marshalled for shipment to WIPP.

If the characterization process detects prohibited items in a drum, the drum is sent to one of the facility's processing lines where workers use manipulators to remotely open the drum and repackage and/or treat the contents to comply with waste acceptance criteria.

Federal Services took over responsibility for WRAP in October 1996, at the end of the construction phase and during equipment installation. The next year was one of nearly insurmountable challenges. WRAP's operating systems and software programs couldn't communicate, as the various equipment vendors had not been required to interface their systems. The processing enclosures were found to have numerous design and fabrication problems. Extensive rework was required as the deadline for startup drew closer – a regulatory milestone of great importance to DOE.

Through strong leadership, hard work, and innovation, Federal Services employees solved the equipment problems and completed the complex start-up process, all in less than 12 months. The first drums were assayed two weeks ahead of schedule, the feat that many people had said "couldn't be done."

While WRAP was being readied, other Federal Services employees managing Hanford's TRU Waste Program were

*The first drums were assayed two weeks ahead of schedule, the feat that many people had said "couldn't be done."*

establishing the protocols for regulatory approval of waste packaging and shipment. After months of preparation, the program passed its final audit and on July 12, Federal Services employees saw the first shipment of waste ever to leave the Hanford Site start its journey to WIPP. Over the next 30 to 35 years, about 80,000 drums of TRU waste will be shipped to WIPP from the WRAP facility.

Safe performance on a demanding schedule is the rule, rather than the exception, at Hanford facilities under the direction of Federal Services employees. The Waste Characterization and Sampling Facility has also gone without a lost-time accident during its full operational history, and the entire Hanford Waste Management Project recently marked 1,000,000 hours without a lost-time accident. 🌍



**Top:** The processing line in WRAP provides worker protection for opening and repackaging drums of low-level and TRU waste.

**Right:** Waste drums undergo nondestructive examination and assay to confirm their contents and determine acceptability for disposal.



## Memphis Facility Receives Maine Yankee Steam Generator for Processing

by Ellen Gray and Scott Dempsey

**G**TS Duratek, the largest radioactive waste management company in the U.S., has a fifteen-year history of managing, processing, and disposing of radioactive waste from nuclear power plants, both those undergoing decommissioning and those still producing power. GTS Duratek is currently responsible for waste from the three largest decommissioning power plants: the Haddam Neck plant in central Connecticut, the Big Rock Point nuclear plant in northern Michigan, and the Maine Yankee site on the coast of Maine.

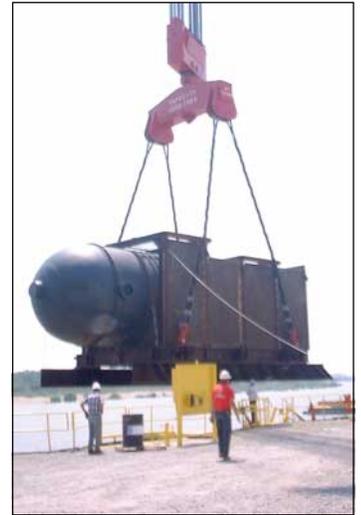
In July 2000, GTS Duratek completed the shipment of a 336-ton steam generator from the Maine Yankee nuclear power plant. The steam generator was safely transported, following all applicable Department of Transportation (DOT) mandates, by barge from the Maine Yankee site, up the Mississippi River to the Port of Memphis, and received at the GTS Duratek facility in Memphis for processing. GTS Duratek conducted an engineering study to ensure the safety and stability of the barge shipment and worked with regulators to ensure safety for the public, the environment, and its workers throughout each step of our transporting and processing plan.

GTS Duratek's Memphis facility, one of its four permitted processing facilities, is licensed to receive and process radioactively contaminated metals and other types of radioactively contaminated materials generated at nuclear power plants and other sites. GTS Duratek obtained license amendments specifically for modifying its facility and for accepting steam generator lower assemblies. The facility is located on a 13-acre industrial site at President's Island near the Port of Memphis on the Mississippi River. President's Island is home to numerous industrial businesses, including refining, cement, and manufacturing companies. The Memphis facility has maintained an excellent record of compliance with its State of Tennessee regulators, and has experienced no opposition to its ongoing radioactive waste processing activities from the local community in Memphis.

At the Port of Memphis, a very large stationary crane with a capacity of 1,250 tons (once the world's largest crane) is used to lift large components off the barge and load them onto a heavy-haul vehicle especially equipped to transport heavy items over the road. After placement on the trailers, the heavy-haul vehicle proceeds a distance of 2.3 miles over the road in the President's Island industrial park to the GTS Duratek facility. The trailers are backed into GTS Duratek's facility and the large components are off-loaded and stored in accordance with the facility's Radioactive Materials License. Inside the facility, GTS Duratek cuts large components into manageable sections, then processes the metals using established, approved processes.

In addition to large metal equipment components such as steam generators, GTS Duratek's Memphis facility is licensed to accept a wide variety of radioactively contaminated wastes which are commonly generated at nuclear power plants throughout the United States. The Memphis facility has safely transported and processed other large components such as turbine rotors (weighing over 100 tons each) from nuclear power plants in Michigan, Illinois, and Pennsylvania. 🌍

*GTS Duratek's processing facilities, in operation since 1985, have accepted, processed, and disposed thousands of radioactive waste shipments from nuclear power plants and other sites throughout the U.S.*



**Top to bottom:** The Maine Yankee steam generator being taken from the barge and loaded onto the heavy haul transport vehicle.

## Oak Ridge Projects Implement Integrated Safety Management System

by Leila Crawford

In 1999, Federal Services was awarded three subcontracts, worth approximately \$120 million over the next five years, by Oak Ridge prime contractor Bechtel Jacobs Company. Under the subcontracts, Federal Services is providing waste treatment and disposal services at the U.S. Department of Energy's (DOE) Oak Ridge National Laboratory, the Y-12 Plant, and the East Tennessee Technology Park. The two projects that are already in the operational stage recently received kudos from Bechtel Jacobs on their implementation of the Integrated Safety Management System. The three subcontracts are:

**Liquid and Gaseous Waste Operations and Maintenance** (top photo): Federal Services operates a low-level waste evaporator, two liquid waste treatment plants, and a gaseous waste collection system used to treat, store, and dispose of Oak Ridge National Laboratory's liquid and gaseous low-level radioactive waste. Project personnel also characterize, package, and ship secondary waste;



maintain unused surplus facilities; and provide other technical support. This project has about 90 employees.

**Y-12 Sanitary Landfill Operation** (middle photo): Federal Services operates five landfills for industrial, construction/demolition, and classified waste. The project, which has 12 employees, also maintains approximately 30 closed disposal sites that are regulated under RCRA and CERCLA.

**Environmental Management Waste Management Facility** (bottom photo rendering): Federal Services is leading a team of companies performing privatized design, construction, startup, and operation of a 1.2 million cubic yard landfill for disposal of radioactive, mixed, and hazardous wastes from Oak Ridge Reservation cleanup. Currently, the project is in the design stage. When construction is complete in 2001, Federal Services will operate the landfill on a fixed-unit price basis. This is a privatized effort, with Federal Services providing capital for landfill construction and startup. 

## Hanford Disposal Facility Doubles Capacity

by Leila Crawford

*Federal Services has proven that the concept can work for DOE by operating the ERDF safely and efficiently, at the lowest costs of any comparable government or private facility.*

A new waste cell at Hanford's Environmental Restoration Disposal Facility (ERDF) opened in June for receipt of additional low-level radioactive and mixed waste from the Hanford Site cleanup. The cell expansion doubles ERDF's disposal capacity to 2.4 million cubic yards. And that's a good thing, because disposal volumes at the facility have far exceeded the original estimates.

... continued on page 8



Two additional ERDF cells opened in June to accept more waste from cleanup of the Hanford Site.

# Expanded Transportation Services

by Mike Sitsch

The link between GTS Duratek's field operations and processing / disposal facilities is its transportation division. The transportation division consists of two primary entities – Hittman Transport Services (HTS) and a cask fleet. HTS has been serving the nuclear industry since 1977. Its drivers safely log over 6.5 million miles per year. HTS transports approximately 350 radioactive shipments per month and has moved more than 48,000 shipments without a radiological incident. A tribute to HTS' excellent safety record are the numerous safety awards received yearly from various industry organizations. All drivers are trained to respond to any type of transportation emergency. HTS trucks are equipped with satellite communication capabilities to ensure efficient and safe operations. The location of any truck can be determined within one-half mile by utilizing the satellite

equipment. The Hittman transportation fleet consists of modern tractors, flatbed trailers, enclosed vans, pan vans, radiologically shielded vans, and specialty heavy-haul equipment.

Hittman transportation services are complemented by GTS Duratek's fleet of 60 casks, which is the largest in the United States. The casks are highly engineered shipping containers that allow safe transport of both liquid and solid radioactive waste. Ten of the casks are heavily shielded and NRC licensed type "B" shipping casks. These casks provide a unique capability to handle virtually any type of radioactive material. The cask fleet is exclusive in that it contains the largest type "B" shipping cask, the 10-160B.

The combination of the transportation services and cask fleet allows GTS Duratek to have transportation capabilities which are unmatched in the nuclear industry. 🌐



**Top:** Hittman maintains the highest safety rating issued by the Department of Transportation.

**Far left:** GTS Duratek has casks that can safely remove irradiated hardware from fuel pools.

**Top left:** The carbon steel, lead shielded 10-160B is more than seven feet tall and over six feet in diameter and weighs 72,000 pounds with its contents.

**Bottom left:** Highly engineered shipping containers allow safe transport of both liquid and solid radioactive waste.

## Acquisition

*continued from page 1*

components to burial or to its Tennessee facilities for processing.

GTS Duratek has established four operating segments that integrate all of these on-site, off-site, and transportation capabilities to most effectively to serve its customers:

The **Radioactive Solutions Group** provides field services and radioactive waste handling, brokering, transporting, processing, licensing, packaging, disposal, and complete D&D waste management services.

The **Commercial Disposal Group** operates the Chem-Nuclear low-level radioactive waste disposal facility at Barnwell, South Carolina.

The **Federal Services Group** provides facility operations radioactive waste handling, transportation, treatment, packaging, storage, disposal, site cleanup, and project management services for federal agencies.

The **Engineering and Technology Group** provides engineering support in areas such as cask design and fabrication, new water treatment designs, large component transportation projects, and fuel pool services. This group also performs new technology evaluations to ensure GTS Duratek maintains and can deploy state-of-the-art technology for any radioactive waste management challenge. 🌐

## Commercial Low-Level Radioactive Waste Disposal at Barnwell

by James Latham

**G**TS Duratek's wholly-owned subsidiary, Chem-Nuclear Systems, LLC, operates a commercial low-level radioactive waste disposal facility in Barnwell County, South Carolina. The Barnwell Facility, in continuous operation since 1971, has the best regulatory, safety, and environmental record of any facility in the nation and enjoys overwhelming support within the local area. The facility has operated over seven years (more than one million man-hours) without a lost-time accident and over 15 years with no regulatory violations. Legislation passed last month by the South Carolina General Assembly places South Carolina in the Atlantic Compact. This legislation also establishes annual volume limits on waste that can be accepted at the site for disposal. The maximum annual volume declines from 160,000 cubic feet to 35,000 cubic feet over an eight-year period. The legislation also places the site under rate control administered by the State of South Carolina. At the end of the eight-year period, the site will remain open for receipt of waste from only the three Atlantic Compact states (New Jersey, Connecticut, and South Carolina). The site will continue to operate into the future with an open-door policy for visitors and with the same high standards of compliance and environmental integrity. Chem-Nuclear's goal is to remain the industry's leader in the safe isolation and disposal of low-level radioactive waste. 🌍

*Barnwell has operated over seven years – more than one million man-hours – without a lost-time accident and over 15 years with no regulatory violations.*



## River Protection Project Update

by Paul Deltete

**O**n April 24, 2000, GTS Duratek's joint teaming partner, BNFL Inc., submitted its fixed price proposal to the U.S. Department of Energy (DOE) for the engineering, procurement, construction, and operation phase of the River Protection Project (RPP) at the Hanford Site in Washington. The BNFL fixed-price proposal, at \$15.2 billion, created considerable controversy within DOE and the Congress due to dramatic increases in the overall cost estimate from BNFL's previous \$6.9 billion estimate in August 1998. GTS Duratek's scope is to provide the vitrification system (converting waste into glass) research and design for both

the high-level waste and low-active waste portions of the overall RPP Waste Treatment Plant. Notably, GTS Duratek's cost to provide this subcontracting scope of work to BNFL remained constant, on a comparable basis, from August 1998 to April 2000.

Although DOE determined that the proposed BNFL technical solution "was sound" and intended to build upon this design, U.S. Secretary of Energy Bill Richardson concluded that the government could not afford the price from the privatization-based proposal. Consequently, on June 29, 2000, DOE terminated BNFL's contract for the convenience of the government, and announced they will re-compete the

engineering, procurement, and construction (EPC) phases of the project later this year.

During the interim, which GTS Duratek believes to be the remainder of 2000, DOE has directed the transition of ongoing research and design activities, including those of GTS Duratek, to CH2M Hill Hanford Group (CHG), the Management & Operating contractor responsible for operations of the Hanford waste tanks. GTS Duratek is currently negotiating this transition contract with CHG. Concurrently, GTS Duratek is working to establish teaming relationships with each of the companies anticipated to submit a proposal for the new EPC contract later this fall. 🌍

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## Hanford Disposal *continued from page 5*

Federal Services has had a contract with Hanford remedial action prime contractor Bechtel Hanford, Inc., to operate the Department of Energy (DOE)-owned low-level radioactive and mixed waste disposal site since its opening in July 1996. A five-year, \$22 million contract extension negotiated in June 1999 provides for continuing operations by Federal Services through 2003.

ERDF was the first “privatized” DOE facility – that is, the first DOE-owned facility to be operated on commercial fixed-unit-price terms, with financial risks borne by the contractor. The company has invested several million dollars in heavy equipment, infrastructure, and facilities and recovers these costs over a fixed-unit rate for waste disposed. Federal Services has proven that the concept can work for DOE by operating the ERDF safely and efficiently, at the lowest costs of any comparable government or private facility (disposal costs of less than \$2.91 per cubic foot).

ERDF employees have developed a reputation for their can-do approach when asked to solve difficult disposal problems. They have efficiently handled waste volumes four times larger than predicted, including such challenges as 2-ton monoliths and mixed

waste streams requiring stabilization. The team has also implemented innovative and proven waste treatment methods to solve mixed waste problems, including macroencapsulation, microencapsulation, and stabilization. What’s more, ERDF has disposed of over 37 million cubic feet of waste with zero lost-time accidents and zero regulatory infractions.

According to Project Manager Jeff Biagini, the biggest challenge of the cell expansion was ensuring that waste operations would not be interrupted by the cell construction. ERDF personnel and the construction subcontractor carefully coordinated their activities, altering schedules when necessary and keeping each other informed about upcoming events. As a result, ERDF was able to maintain its usual fast-paced schedule for receipt of material, accepting an average of 3,032 tons per day, or 150 to 180 truckloads.

ERDF’s excellent operational and safety record helped Federal Services win a new contract in 1999 for design, construction and operation of the Environmental Management Waste Management Facility at DOE’s Oak Ridge Reservation. Lessons learned at ERDF will be used at Oak Ridge to make their operations as efficient and safe as possible. 



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