

# WESTINGHOUSE SAVANNAH RIVER COMPANY Annual Report 2003





The year 2003 marked the 14<sup>th</sup> year that the Westinghouse Savannah River Company has had the privilege of operating the Savannah River Site for the U.S. Department of Energy.

That time period has seen a tremendous evolution take place at SRS, and the pace of change increased in 2003. We have begun a dramatic acceleration of the environmental management mission at the site, an acceleration that will benefit the government, the taxpayer, the state and the community. We've continued our work in support of the nation's defense, and made additional progress on facilities and programs that will strengthen our role in national security for the long term. We've conducted important research, demonstrating the role we can continue to play in areas such as hydrogen, homeland defense, environmental technology and others.

Most of all, we've done our work safely, continuing a tradition of safety excellence that has defined the Savannah River Site for decades.

I'm proud of our accomplishments, and grateful for all of the effort and support that's behind each one. We pledge to continue to earn your trust and confidence as we work together for the good of our employees, communities and nation

A handwritten signature in black ink, appearing to read 'Bob Pedde'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Bob Pedde, President

Westinghouse Savannah River Company

**2 SAFETY**

Safety  
Environmental Monitoring

**4 ACCELERATED CLEANUP/MEETING COMMITMENTS**

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Liquid Waste Disposition  
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Cleanup Beyond 2006

WESTINGHOUSE SAVANNAH RIVER COMPANY  
Annual Report 2003

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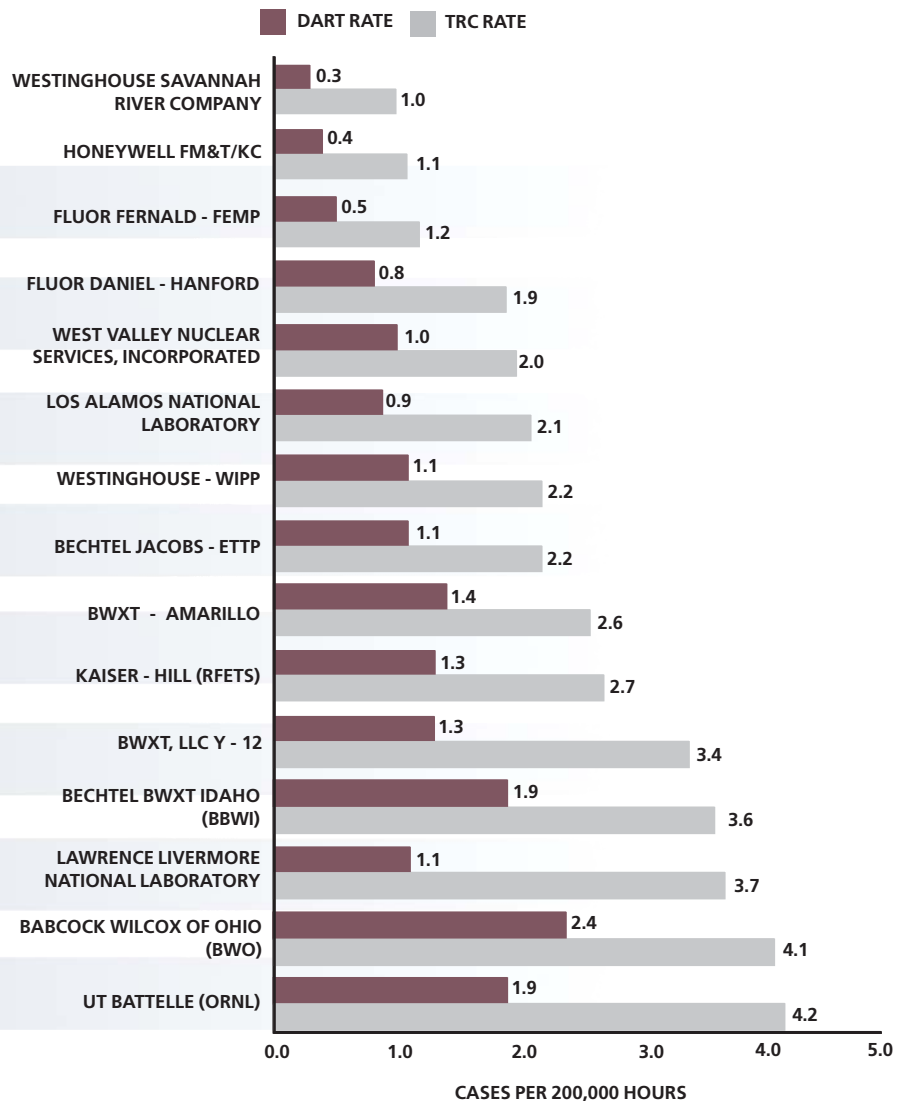
*Fact:*

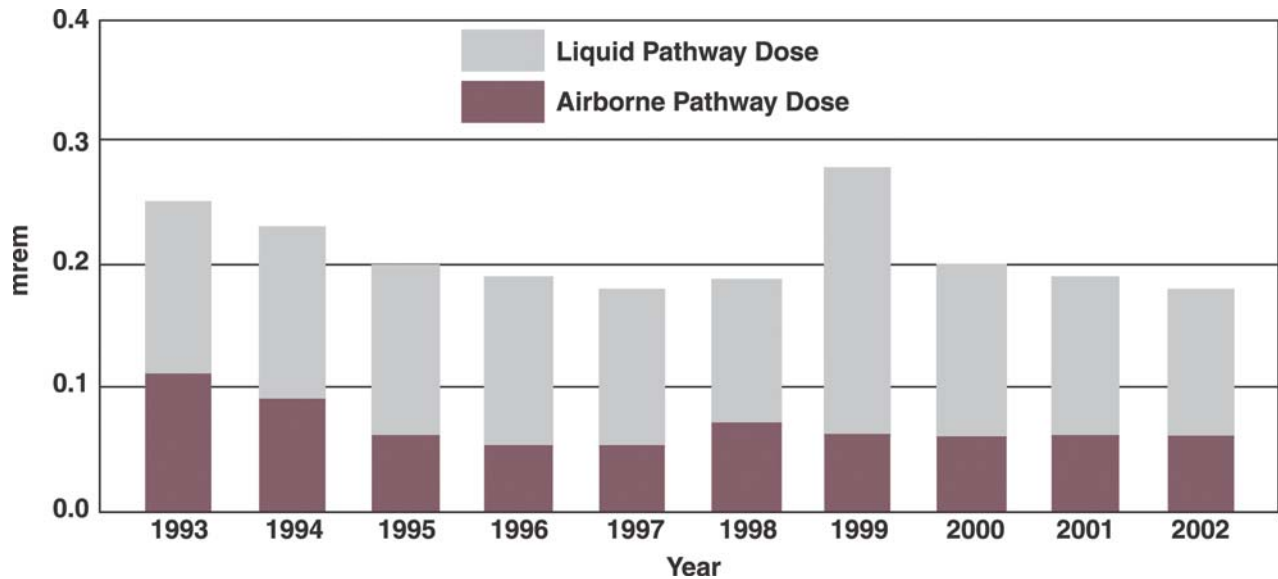
As missions have changed and the focus turns to accelerated clean up, one aspect of WSRC that has not changed is the commitment to maintaining the safety and well-being of SRS employees.

### *Injury and Illness Ranking Within the DOE Complex*

January - December 2002 (Ranked by TRC)

Last year, WSRC achieved another safety milestone by surpassing 10 million hours without an injury that required an employee to miss a day from work. That's a tremendous achievement – three years in a row (2001, 2002, 2003) WSRC Team employees have achieved over 10 million hours without a lost time injury. In addition, our Construction employees worked more than 2.5 million hours seven times since 1993 without an injury resulting in time away from work – a performance almost unheard of in the construction industry. They also achieved last year more than 12 million hours without an injury resulting in time away from work, the site's second best Construction safety record since SRS was founded.





**Potential Impact of SRS on the Public Remains Low**

The potential impact of the Savannah River Site (SRS) on the off-site public continues to be far below the U.S. Department of Energy (DOE) all-pathway dose standard of 100 millirem per year, according to the *SRS Environmental Report for 2002*.

The largest radiation dose that any single offsite individual could have received from SRS operations in 2002 is estimated to be 0.18 millirem (a millirem is a standard unit of measure for radiation exposure), which is only 0.18 percent of the 100 mrem DOE standard. This estimated dose also is well under the natural average dose of about 300 millirem per year to people in the United States—and slightly less than the revised 2001 dose of 0.19 millirem.

Compliance with environmental regulations and with DOE orders related to environmental protection provides assurance that onsite processes do not impact the environment adversely.

SRS had a National Pollution Discharge Elimination System (NPDES) compliance rate of 99.8 percent in 2002, slightly higher than the 99.6 percent rate reported in 2001. The NPDES program protects streams, reservoirs, and other wetlands by limiting all nonradiological releases. Discharge limits are set for each facility to ensure that SRS operations do not impact aquatic life negatively or degrade water quality.

Effluent monitoring and environmental surveillance are conducted

extensively within a 2000-square-mile network reaching 25 miles from SRS – with some monitoring performed as far as 100 miles from the site, including the Savannah River. The area includes neighboring cities, towns, and counties in Georgia and South Carolina. Thousands of samples of air, rainwater, surface water, drinking water, groundwater, food products, wildlife, soil, sediment, and vegetation were collected and analyzed for radioactive and nonradioactive contaminants.

## SHIPPING WASTE FOR PERMANENT DISPOSAL

**Fact:**

All of the site's stored inventory of transuranic waste is now expected to be shipped to New Mexico by 2006, approximately 28 years ahead of the original schedule.

An important part of SRS' strategy for safely and cost-effectively managing wastes is the use of qualified off-site treatment and disposal facilities for wastes that are technically or economically unsuitable for on-site disposal. Since 2001, the site has been sending portions of its low-level radioactive waste to the Nevada Test Site (NTS) and Envirocare of Utah (EOU), mixed waste to EOU and transuranic waste to the Waste Isolation Pilot Plant (WIPP) in New Mexico.

### Transuranic (TRU) Waste

The Waste Isolation Pilot Plant (WIPP) is the Department of Energy's facility for disposing of transuranic (TRU) waste from across the DOE Complex. SRS began shipping its TRU waste to WIPP in 2001, initially making about one shipment a month.

In 2003, SRS dramatically accelerated its TRU waste shipping schedule, and is now making 24 shipments per month, compared to eight shipments per month the previous year. A total of 185 shipments were made in FY03, a ten-fold increase over FY02.



*SRS employees prepare a load of transuranic waste for shipment to the Waste Isolation Pilot Plant in New Mexico.*

At this rate, the site expects to finish shipping the remaining 10,000 cubic meters of currently stored waste by 2006, compared to the original target date of 2034.

Transuranic waste consists of clothing, tools, rags, residues, debris and other items contaminated with small quantities of radioactive elements heavier than uranium - hence the term "transuranic." SRS TRU waste primarily includes items with trace amounts of plutonium.

### Depleted Uranium

Efforts to ship depleted uranium (DU) metals and oxides off site and out of South Carolina met with significant success in 2003.

In early June, the last DU metals left M Area, the former reactor fuel manufacturing area, where they had been stored since those facilities shut down more than a decade ago. The 50-year-old buildings were emptied in preparation for demolition, leaving more than 2,600 metric tons of DU material in the area's warehouses.

All the material was shipped to Envirocare in Utah in 145 shipments for disposal.

Disposition of DU oxide (DUO) material is ongoing from F Area, where more than 36,000 drums of the material were stored. In summer 2003, a pilot project to ship one tenth of this material - 3,270 drums containing 1,815 metric tons of DU oxide - to Envirocare was completed successfully. DUO is also stored at other locations around SRS. Plans are under way to send the remaining 33,000 drums, an effort that will continue over the next few years.

DUO, a byproduct of F Area operations, is a powder-like, low-level radioactive material. It has been safely stored in 55-gallon drums, awaiting disposition.



*Since 2001, SRS has been shipping certain portions of its low-level and mixed low-level wastes to facilities in Nevada, Utah and elsewhere for treatment and disposal.*

## Low Level Waste

In July 2001, SRS began shipping some of its low-level radioactive wastes (LLW) to DOE's Nevada Test Site (NTS) and to Envirocare of Utah (EOU). Initiation of this shipping program, which is expected to continue throughout accelerated cleanup and beyond, represented a major accomplishment in the cleanup of legacy waste materials at SRS.

In FY03, SRS shipped 336 cubic meters of LLW to NTS. This included environmental restoration waste, job control waste and natural uranium slugs.

In addition 360 cubic meters (including debris waste from the

Old Tritium Facility such as equipment, piping, ductwork, wood and plastic) was shipped to EOU. LLW shipments are expected to increase significantly over the next few years.

## Mixed Low Level Waste

In 2001, SRS made its first ever shipments of mixed waste for treatment offsite, and continues to decrease the inventory of mixed waste using available Resource Conservation and Recovery Act-regulated treatment and disposal vendors.

In 2003, SRS shipped 15 cubic meters of Saltstone cement

waste to Materials and Energy Corporation for treatment. The treated waste is subsequently shipped to Envirocare of Utah for disposal.

Also in 2003, SRS made its first shipment of liquid waste, 20 cubic meters of zinc bromide solution, to Envirocare for stabilization and disposal. A campaign to treat lead and debris at Envirocare began in August of 2003, and 236 cubic meters of waste was shipped in August and September. This campaign will continue into 2004 and 2005.

## WASTE MANAGEMENT

*Fact:*

Typical low-level waste consists of used protective clothing, rags, tools and equipment, used resins and residues, dirt, concrete, construction debris and scrap metal.

### **Safe, Cost-effective Disposal of the Site's Waste**

SRS has set a goal for disposing all of the legacy low-level radioactive waste currently stored on site by the end of Fiscal Year 2006. By the end of FY03, the site had disposed of 88 percent of the stored legacy waste and was two years ahead of schedule. At the same time, the acceleration of Deactivation and Decommissioning (D&D) activities is resulting in increasing quantities of new low-level waste (LLW), which is being managed in a timely manner.

In recent years, SRS has been using engineered trenches to dispose of solid low-level radioactive waste with extremely low radioactive content. Approximately 65 percent of the waste that was originally stored in the existing Low Activity Waste Vault (LAWV) is a candidate for removal to the trenches. This approach, which reserves the more robust – but expensive – LAWVs for higher activity low-level waste, is expected to enable the vaults to



**Low Activity Waste Vaults provide safe disposal for certain types of solid low-level waste.**

have enough capacity to continue accepting waste until 2024. In FY03, 10,700 cubic meters had been moved from the LAWV to an engineered trench.

In 2001, SRS implemented a new method of disposal for equipment that is physically too large for vault disposal, but contaminated at high enough levels to require vault type isolation. This method, called

“components-in-grout,” is suitable for items such as empty tankers that had been used to transport radioactive waste. The item is placed on a one-foot thick grout base in a trench, filling any void space in and around the item with special formulation grout, and grouting around the item to completely fill the trench. In FY03, 1,000 cubic meters had been disposed using this method.



*Fact:*

The liquid waste system at SRS is three miles long, including a 2.2-mile-long inter-area transfer line.

**Tank Farms See Net Decrease in Volume in 2003**

SRS has 49 high-level waste tanks in use today, and 2003 was a year of managing available tank space and steadily decreasing waste volume in those tanks.

Innovation and fresh thinking were keys to success, as new ways of getting work done were identified and implemented. During the year, Americium/Curium (Am/Cm) waste was transferred directly from F Canyon to H Tank Farm. This extraordinary accomplishment required the intricate coordination of eight control rooms, demonstrating excellence in teamwork and safe operation of the facilities.

Also during the year, the first above-ground transfer of high-gamma waste was safely completed. This transfer of 210,000 gallons of waste, which was drained from a low curie salt tank, marked the first-ever transfer of a liquid bound in saltcake from a high level waste tank and, at the same time, allowed parallel operations in the Tank Farm.



**F Area's tank farm contains the first two closed tanks, with two more slated to be closed before the end of 2006.**

Other key tank farm accomplishments in 2003 included:

- Completed all work to achieve Removed from Service status for a high level waste tank; two additional waste tanks were previously closed in 1997.
- Prepared enough high-level waste feed to DWPF to achieve glass canister production goals through the end of fiscal year 2006.
- Completed preparations to return Tank 50 to service as a high level waste tank, which required that 61,000 gallons of solids be removed from the bottom of the tank.

- Completed the replacement of specialized equipment to enable significantly improved transfer flexibility needed for accelerated waste cleanup.



**Inside a high-level waste tank.**

## CANYONS

**Fact:**

By the end of 2006, only a handful of buildings in F Area will remain standing.

### F Canyon, FB Line Finishing

#### Up, Closing Down

In F Area facilities, which historically enriched plutonium solution and produced plutonium metal, efforts are under way to deinventory plutonium materials and deactivate the facilities.

The focus is on closure. F Canyon and FB Line completed their production mission in the spring

of 2002; now, F Canyon is flushing systems in preparation for deactivation. FB Line recently started up its new Packaging and Stabilization (P&S) project, which will stabilize and package plutonium to DOE standards for long-term storage and eventual disposition.

Much of the closure work completed in F Area this year was accomplished by deactivation teams. These cross-functional teams each own a piece of the project schedule and execute the work from planning to package closure. Using this approach has not only increased the efficiency of the work force but has also improved safety.



**F Canyon is engaged in deactivation efforts that will end with the facility "cold, dark and dry" by the end of 2006. FB Line, situated on top of the canyon, is slated to complete its packaging and stabilization work by early 2005.**

Key accomplishments in F Canyon and FB Line in 2003 included:

- Successful transfer of americium/curium materials – the last highly radioactive material in F Canyon – to the tank farms.
- Deactivated the Old Hot Crane – the first portion of F Canyon to be deactivated.
- Deactivated the canyon's "Frames" process, which was shut down in May of 1983.
- Deactivated the Multi-Purpose Processing Facility 14 months ahead of schedule.
- In just 23 days, replaced a key evaporator system in the Low Activity Waste process.
- Deactivated six tanks in the canyon's Head End area, eight weeks early.
- Completed processing of the Rocky Flats Classified Metal through bagless packaging.
- Finished installation and startup of the 3013 outer can welder.
- Began operating the new outer can welder and furnaces in FB Line's P&S project.
- Completed installation and startup of two new plutonium stabilization furnaces, part of the process to package and stabilize plutonium for long-term storage.
- Shipped the first 9975 containers of plutonium to the K Area Material Storage facility.

**Fact:**

With the deactivation of F Canyon, H Canyon will represent the United States' only chemical processing capability for nuclear materials.

## H Canyon, HB Line

### Processing Legacy

#### Materials

In H Area, the focus is on completion of nuclear materials processing, but not closure of facilities. Both H Canyon and HB Line are producing materials that are being sent to Tennessee for further use – one in commercial power reactors, the other by NASA.

The HEU Blend Down process started up in H Canyon and began shipping low-enriched uranium (LEU) to the Tennessee Valley Authority to be used to make fuel for their power reactors. In the process, highly enriched uranium (HEU), once used in SRS reactors, is blended down into LEU in a sword-to-plowshares effort that has the added benefit of making the material unusable in nuclear weapons.

In HB Line, dissolution of plutonium, depleted uranium and natural uranium continued on schedule throughout the year. Start-up of a Neptunium oxide process has begun and is scheduled to begin shipment of material to Oak Ridge in August 2004 for eventual use in the space program.

Key accomplishments in 2003 in support of these important missions in H Canyon and HB Line included:

- Conversion to material formerly used in SRS reactors to ensure criticality safety for plutonium solutions, resulting in less waste than the previous process and fewer glass logs to be produced in the Defense Waste Processing Facility.
- Finished dissolving all 677 containers of Sterling Forest Oxide (SFO) spent nuclear fuel two weeks early.
- Completed Pu oxide dissolution in HB Line; began dissolving enriched uranium materials.
- Completed major upgrades to aged equipment such as the instrumentation in the High Activity Waste (HAW) process and the controls systems for the H Canyon Cranes.



**H Canyon is one of two chemical separations facilities at SRS, and the only one still operating.**



**Workers wear protective clothing to perform certain radiological operations.**



**To ensure safe operations, work is handled remotely in separations facilities.**

## DEACTIVATION AND DECOMMISSIONING

**Fact:**

By the end of 2006, as many as 243 buildings are planned to be demolished.

### Reducing the Footprint – One Square Foot at a Time

#### D&D at SRS

Across the site, efforts are under way to reduce the footprint left by 50 years of operations. A new partner, CH2SRC, has been added to the WSRC Team to manage facility disposition efforts.

Work is concentrated in T Area (TNX), D Area, M Area, A Area and F Area, where dozens of buildings have already come down. These areas are being emphasized because, except for F Area, they are all around the periphery of SRS.

In T Area, workers reached a significant milestone last year – all 22 “clean” buildings in the area were demolished. Work is under way on the rest of the area, with the goal of having the entire area closed by the end of 2006.

In D Area, the only large structure that will be left will be the power house, which will continue to



**Building 313-M, one of many reactor materials facilities in M Area, is demolished.**

generate electricity for SCE&G. Planning is being done to demolish everything else.

In M Area, major strides were made toward an initial project to raze six buildings, encompassing 150,000 square feet, in 18 months. In A Area, preparations are being made to demolish 703-A and the 708-A cafeteria, with many more buildings to follow in the near future.

Demolition efforts in F Area center around 52 support buildings, and the 247-F (Naval Fuels) complex, called Project 247. A major step was taken in September with the removal of the first major piece of equipment from 247-F, which

meant that plans and procedures that have been developed are safe, effective and efficient.



**Roger Duke (left) and DOE-SR Manager Jeff Allison review the progress of D&D in M Area.**

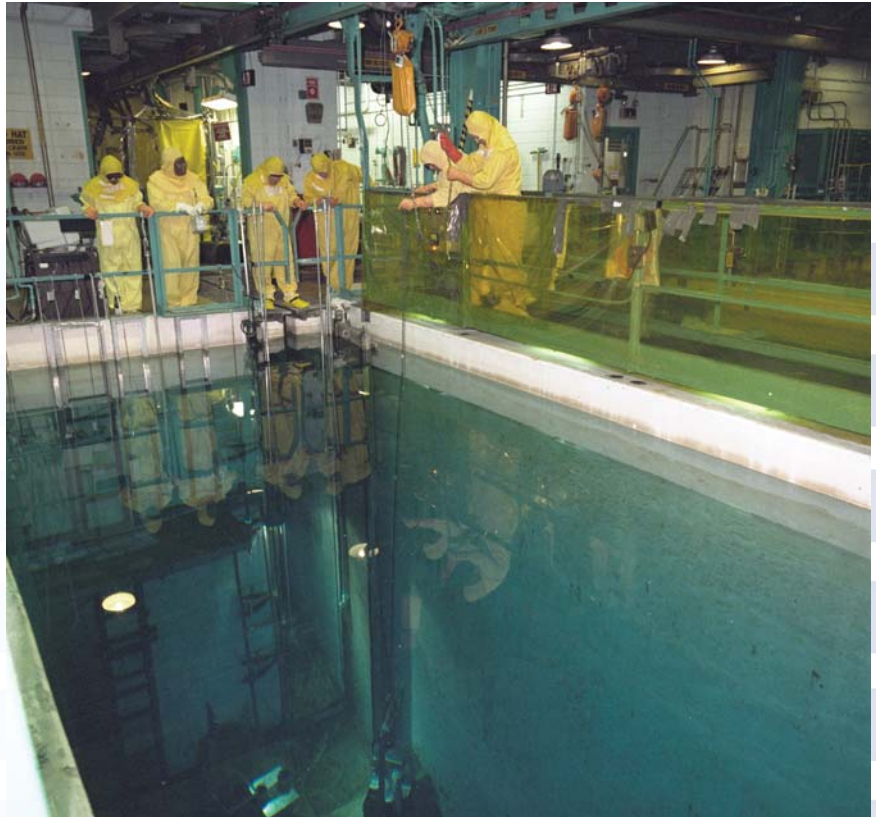
*Fact:*

The Receiving Basin for Offsite Fuels was constructed in the 1960s to store spent nuclear fuel from SRS, as well as from foreign and domestic research reactors.

**Safe, Secure Storage for Spent Nuclear Fuel**

Since 1998, SRS has been working toward the consolidation of all stored spent nuclear fuel into the L Area Basin for interim storage prior to final disposition. By the beginning of FY03, all of the fuel previously stored in K Basin had been moved to the chemical separations facilities for processing or L Basin for storage, and movement of spent fuel from the Receiving Basin for Offsite Fuels (RBOF) was well ahead of schedule.

The original plans had called for all fuel to be removed from RBOF no later than September 2007, with a goal of completing the move by March 2006. In 2002, when SRS adopted aggressive new targets for speeding the cleanup of the site, that goal was moved to September 2004. By the end of FY03, the deinventory was 99 percent complete, and the task was finished just after the end of the fiscal year – almost a full year ahead of the accelerated schedule.



*The Receiving Basin for Offsite Fuels provided nearly 40 years of safe receipt and storage of foreign and domestic spent fuel. Final deinventory of the basin, originally scheduled for 2007, was completed last year.*

Among the accomplishments that made this possible:

- The design and fabrication of new square bundles for certain types of fuel. These new bundles, which allowed fuels to be stored in the existing L-Basin racks, eliminated the need for a new insert for the shipping cask and a new fuel rack in L-Basin.
- The development of a submersible deionizer system, which, when placed in the basin water, effectively captured radioactivity, allowing employees to more safely sample and repackage certain types of fuel.

## DEFENSE WASTE PROCESSING FACILITY AND SALTSTONE

*Fact:*

DWPF is the world's largest radioactive waste glassification plant.

### *DWPF Makes Major Strides in Production, Efficiency*

The Defense Waste Processing Facility (DWPF) made major progress in 2003, in several very different areas.

After eight years of continuous operation – more than three times its design life – DWPF's original melter was retired. The melter produced more than 1,300 glass canisters, about 27 percent of the facility's projected total.

During a successful six-month outage, the 65-ton, \$20 million melter was replaced, along with obsolete equipment, improving DWPF's health and making it more viable for long-term operations. Because the melter's life was safely extended four times its design life, millions of dollars were saved.

Melter No. 2 was installed and began pouring radioactive glass shortly thereafter.

DWPF also began increased waste loading, which means more waste can be put in fewer canisters, reducing future operations by as much as 25 percent, or 1,000 canisters. A 1,000-canister reduction means saving as much as \$1 billion in repository costs and a shorter overall program.



*DWPF's shielded transporter maneuvers into place in the Glass Waste Storage Building.*

In DWPF, high-level waste from the tanks is mixed with a sand-like substance, called frit, and melted to produce glass. Increased waste loading also means the mixture will consist of more waste and less frit.

Other key accomplishments at DWPF and sister facility Saltstone included:

- Reclaimed 450 storage positions in the Glass Waste Storage Facility 13 months ahead of schedule; this will allow storage of about two more years' worth of canisters.
- Ahead of schedule in converting a facility for use as part of the waste removal process from the high-level waste tanks, which will support accelerated cleanup.

- Completed modifications necessary to process higher-curie materials in the Saltstone facility, which turns low-level waste into grout.
- Processed 671,000 gallons of low-level waste into Saltstone (a cement-like waste form).



*The Defense Waste Processing Facility.*

### Fact:

In 2003, SRS reached a major milestone in nuclear nonproliferation efforts with the first shipment of uranium from SRS to Tennessee, where it will be prepared for use producing electricity to help meet the nation's energy needs.

### Converting Weapons into Plowshares

At SRS, highly enriched uranium (HEU), a weapons-usable form of uranium, is blended with natural uranium to make low enriched uranium (LEU), which cannot be used in weapons. This LEU will be fabricated into fuel for use in Tennessee Valley Authority's nuclear power reactors. Other HEU is shipped directly to the vendor for blending and processing before fabrication into fuel.

During FY03:

- SRS received the Secretary of Energy's Excellence in Acquisition Award for excellence in project management for the HEU Blend-Down Project, which included the construction and modifications needed to purify the uranium, blend it down and prepare HEU for shipment.
- The site began shipments to Tennessee, and will continue shipping through 2007.



*Highly enriched uranium is blended down to make low enriched uranium, which will be prepared for use as a fuel for nuclear power reactors.*



*In July 2003, SRS made its first-ever shipment of low enriched uranium to Tennessee, beginning a new era of converting weapons into plowshares.*

## ENVIRONMENTAL RESTORATION

**Fact:**

Closure of entire areas and integration with Site D&D will complete remediation 15 years sooner than previously planned, deleting whole areas from the Superfund's National Priorities List.

### Environmental Restoration at SRS

In 2003, the Soil and Groundwater Closure Projects adopted an accelerated cleanup plan by area closure and integration with Site D&D. The regulators agree with the integrated approach and accelerated plan.

Significant closure accomplishments included remediation of the Ford Building Seepage Basin, the 300<sup>th</sup> closure of 515 waste units in the program. A total of 23 waste units were completed, exceeding the goal of 13, and all regulatory milestones completed on schedule.

Remediation of many waste sites is well under way in the focus areas of A/M, E (old radioactive waste burial ground), D, and T Areas. In the A/M Areas, construction of the Dynamic Underground Stripping project has begun and is expected to start up next fall. DUS, which recently completed a successful pilot, is expected to remove over a million pounds of solvents from subsurface soil and groundwater in a three year period. Previous technologies have

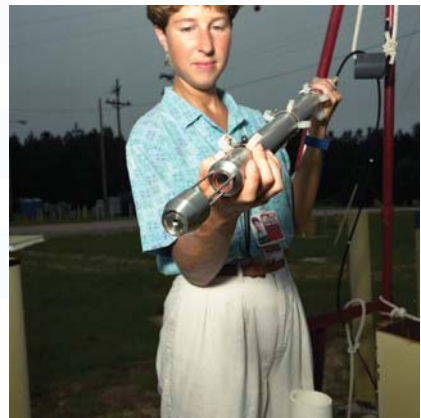
already cleaned about 1 million pounds during the past 17 years.

Work is under way to complete an engineered cover over the Old Radioactive Waste Burial Ground. The 22 underground solvent tanks were grouted and closed in 2003, and work is now focused on consolidating contaminated soils from three nearby waste sites into the E Area effort as one closure project.

Because of its close proximity to the Savannah River, T Area will be the first area completely closed and removed from the National Priorities List in 2006. In D Area, installation of a soil cap over the inactive 488-D Ash Basin and remediation of the Rubble Pit are also targeted for completion in 2006.



*Many millions of pounds of contaminants have been removed from groundwater at SRS by air strippers.*



*Many SRS scientists contributions have led to environmental restoration excellence.*





Cleanup and D&D work at SRS will continue until 2025.

**After 2006**

A great deal of emphasis is being placed on 2006, since the current SRS operating contract expires at the end of that fiscal year. However, cleanup efforts will be far from over; in fact, the work will be less than half complete.

Of the projects currently being worked in WSRC's Closure Business Unit, only F Area Closure Projects is projected to be completely closed by the end of 2006.

In the Defense Waste Processing Facility, although 2,200 canisters

will be complete by the end of the FY06 contract period, about 2,800 will remain. Work at DWPF is scheduled to continue until 2020.

In the tank farms, 35 of 52 tanks will remain to be closed, also with an anticipated completion date of 2020. Of the current 16 million gallons of salt waste, 9.7 million will remain to be dispositioned.

In D&D, although about 3 million square feet will be dispositioned by the end of 2006, about 7 million square feet will remain,

with a scheduled completion date of 2025.

In the soil and groundwater cleanup program, a full third of SRS's waste sites will still remain to be closed, with work expected to continue until 2025.

And, in H Area, processing capability is expected to be maintained for the foreseeable future, as H Canyon will be the United States' last remaining chemical separations facility.

Project	Complete	To Go	Completion Date
Waste Solidification	~2200 Canisters	~2800	2020
Liquid Salt Waste	12 tanks closed	35	2020
	6 million gallons	9.7 million gallons	2020
D&D	~3 million feet <sup>2</sup>	~7 million feet <sup>2</sup>	2025
Soil & Groundwater	55 percent	1/3 to go	2025
H Area Completion	Maintain continuing processing capability		

## PERFORMANCE EXCELLENCE SAVES TAXPAYERS' MONEY

**Fact:**

In Fiscal Year 2003, our project management methods were directly responsible for saving approximately \$50 million in capital costs.

**Project Management**

Saving the government money when possible, without sacrificing safety or quality, is a primary objective of WSRC's Project Management approach. This disciplined approach seeks a balance between cost, scope, schedule and risk. WSRC also employs acquisition strategies that result in sound procurement and subcontracting approaches, including fixed price, unit price, best value, performance based and design-build.

However, the most telling feature of any project management program is bottom-line performance. Since the site's project management program has been implemented, the line item projects completed have come in on or ahead of schedule and on or under budget. In FY 2003, the project management methods at SRS were directly responsible for saving over \$50 million in capital costs.

During the past year, WSRC reorganized in order to look at the entire business as a set of projects. The goals of today's project management work include:

- Stripping away those factors that do not lead to project management excellence and adding in those proven techniques that do.



**World-class project management reduces risk to the lowest level attainable.**

- Reducing risks to the lowest level that world-class project management can attain.
- Eliminating all but the best practices in managing our projects.
- These objectives have helped achieve project management excellence in the building redesigns or building construction of major site facilities, including K Area Materials Storage, Tritium Facilities Modernization and Consolidation, Plutonium Packaging and Stabilization, and Tritium Extraction.



**To reach project excellence, workers are eliminating all but the best practices in managing projects.**

**Fact:**

In nearly half a century of service, the SRS Tritium Facilities have never missed a shipment.

### ***A Tradition of Meeting the Nation's Need for Tritium***

The tritium facilities at SRS continue to be the nation's only center for processing tritium, a vital component in the nuclear stockpile.

In FY03, the site upheld its record of meeting its commitments for delivering tritium component exchanges to the Defense Department.

Other FY03 achievements:

- One of the site's responsibilities as part of the stockpile surveillance program is to test the Defense Department's tritium reservoirs to ensure their reliability. Last year, the site completed several projects to modify the function test stations ahead of schedule, adding new surveillance capabilities.
- SRS established capability to exchange design information with the Kansas City Plant electronically, in real-time.



***SRS plays a crucial role in the nation's national defense as the only center for processing tritium.***

Previously, design data were exchanged in hard copy; the new method has improved operational lead time.

- The preliminary planning and conceptual design were completed for the Capability for Advanced Loading Missions (CALM) project, a modernization initiative that will give the site's

Defense Programs increased operational flexibility. This project will allow cleaning and loading operations to be performed in the same location.

## BUILDING FOR THE FUTURE (TEF, TCON)

*Fact:*

The new Tritium Extraction Facility, scheduled to begin full operation in FY07, will restore the nation's capability to produce new tritium.

### **Projects to Assure our Ability to Meet Future Tritium Needs**

SRS has undertaken two major projects to enable the site to meet the nation's future need for new tritium and for continued tritium processing.

The Tritium Extraction Facility (TEF) will give the nation the capability to produce new tritium for the first time since 1988 by safely and efficiently extracting tritium gas from Tritium Producing Burnable Absorber Rods that had been irradiated in Tennessee Valley Authority's nuclear reactors

The Tritium Facilities Modernization and Consolidation (TCON) project is designed to consolidate all of the tritium processing and handling activities into two buildings, allowing the deactivation of the 50-year-old 232-H building. This consolidation will improve safe operations, reduce environmental releases, improve productivity and significantly reduce future operating costs.

As of the end of FY03:

- Construction of TEF is ahead of schedule, and approximately 50 percent complete. The exteriors of the two major buildings are

complete, and outfitting the interior of both buildings is under way.

- The first two of nine TEF gloveboxes were completed in June 2003, more than three months ahead of schedule.
- TCON construction work was completed, and startup testing is under way.
- WSRC successfully completed its own "tiger team" review of TCON's physical facilities,

procedures and personnel training to ensure that everything would be ready before the WSRC and NNSA Operational Readiness Reviews, the formal reviews that validate a facility's readiness to safely accept radioactive materials. The ORRs began shortly after the end of the fiscal year.

- Full operation of the TCON facilities is expected in FY04, several months ahead of schedule.



**Construction of the Tritium Extraction Facility began in 2000 and is approximately 50 percent complete.**

*Fact:*

KAMS is located in 105-K, the building that formerly housed K Reactor, which produced nuclear materials to support the United States in the Cold War for nearly four decades.

**Safe, Secure Storage for the Nation's Plutonium**

SRS is working to reduce risks nationwide by consolidating DOE's excess plutonium in preparation for final disposition. The K Area Material Storage (KAMS) facility, located in the building that formerly housed K Reactor, was designed to safely store, manage and protect the nation's plutonium until it can be processed through the future Mixed Oxide Fuel Fabrication Facility or another disposition facility.



*The K Area Material Storage facility is located in the building that housed K Reactor.*

FY03 was an important year for the facility, seeing such achievements as:

- Completing the deinventory of the Rocky Flats Environmental Technology Site (RFETS). KAMS received over 2,000 shipping containers from RFETS as part of the site's de-inventory process in support of returning the former pit production complex to greenfield status. This included approximately 275 containers of RFETS material that was repackaged in SRS' 235-F facility before being transferred to KAMS for storage.
- These shipments were completed ahead of the RFETS site closure baseline schedule which enabled the DOE to save over \$300 million from the cost of closing the site.
- Placing one metric ton of plutonium under International Atomic Energy Agency safeguards.
- Placing one metric ton of stored plutonium oxide under International Atomic Energy Agency (IAEA) safeguards. These safeguards include performing ongoing surveillance, along with conducting regularly scheduled inventories and reviews of Tamper Indicating Devices. The IAEA visits KAMS monthly to verify that the site meets its stringent requirements for the storage of these materials.

MOX AND PDCF



MOX and PDCF will be located near the site's F Area Separations facility, which handled most of the site's plutonium.

**Turning Surplus Weapons Material Into a Source For Energy**

SRS has been designated as the site for the National Nuclear Security Administration's future plutonium disposition missions, which will convert surplus weapons plutonium to a fuel suitable for use in commercial nuclear power reactors.

The two key facilities will be the MOX Fuel Fabrication Facility (MFFF), which will blend plutonium oxide with uranium oxide to form a mixed oxide fuel, and the Pit Disassembly and Conversion Facility (PDCF), which will supply most of the feed for the MFFF by disassembling surplus nuclear weapons pits and converting the weapons-usable plutonium to oxide.

A Waste Solidification Building (WSB) will also be built to process PDCF and MFFF waste streams.

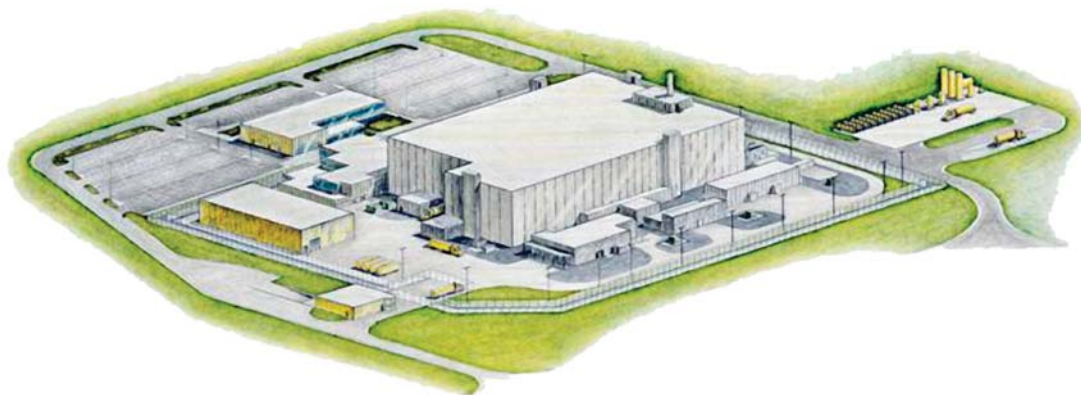
WSRC provides the Design Authority function for the PDCF project and will eventually operate and maintain the facility.

A consortium formed by Duke Engineering Services; COGEMA, Inc.; and Stone & Webster (DCS) has a contract to design and license the MFFF, with future options to construct, operate, and deactivate the facility, as well as use the MOX fuel in Duke's commercial reactors.

• By the end of FY03, DCS was about 75 percent complete with

the final MFFF design. Fuel expected to begin production is about 2009 and continue for approximately 12 years.

- In FY03, NNSA completed 60% of the detailed design of the PDCF and preliminary design and estimate of the WSB. Site clearing for PDCF will begin in FY05, and construction of WSB in FY06.
- Development and testing of process equipment for the PDCF continued at Los Alamos National Laboratory.



*The future Mixed Oxide Fuel Fabrication Facility.*

**Fact:**

SRTC has over 80 scientists and engineers who are leaders in hydrogen technology.

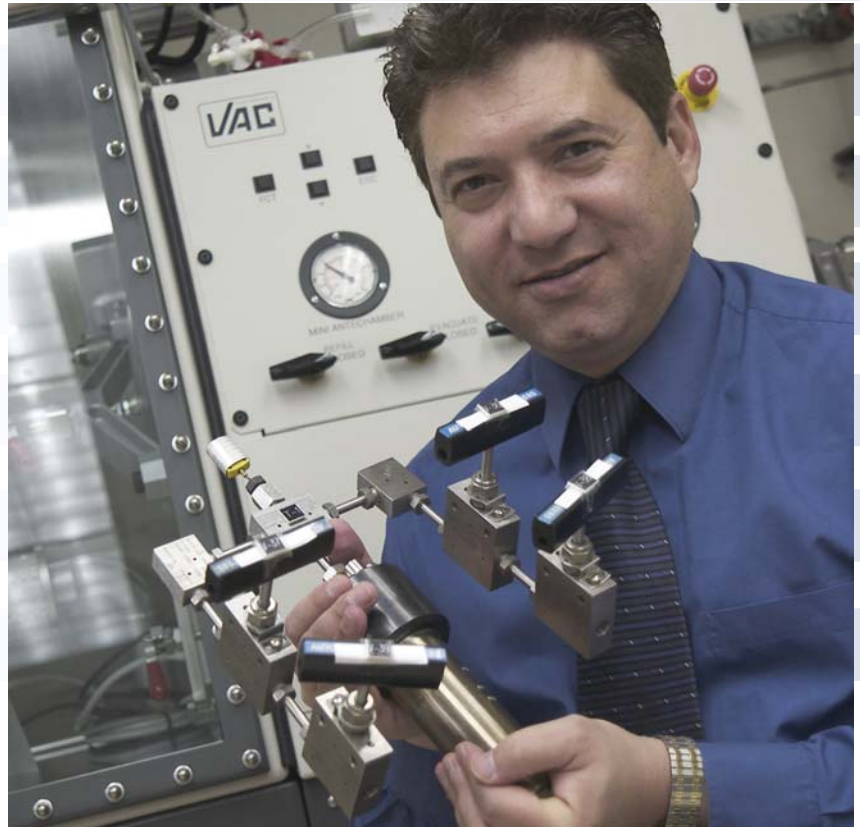
## ***Driving Force in Alternative Energy***

SRS has been producing, recycling and purifying tritium to support the national defense since the late 1950s. SRTC has played an integral role in this program and is continuously developing more efficient techniques for separating and storing tritium. As part of its work with tritium, an isotope of hydrogen, SRTC has developed a broad skill set that is being directly applied to the utilization of hydrogen as an energy source.

SRTC has partnered with Aiken and Edgefield counties' Economic Development Partnership and the University of South Carolina in Columbia to form the South Carolina Hydrogen Coalition. The coalition is working on ways to better store hydrogen for long-term use. The project has attracted interest from more than 10 companies, most from the automotive industry.



***The proposed Hydrogen Technology Research Laboratory would provide world-class laboratories for the work being performed by SRTC researchers, while acting as a catalyst to draw universities and industries conducting hydrogen research.***



***Dr. Ragaiy Zidan and his SRTC colleagues explore the potential of complex hydrides as a hydrogen storage material - a key for making hydrogen vehicles possible.***

## SRTC: PUTTING SCIENCE TO WORK

**Fact:**

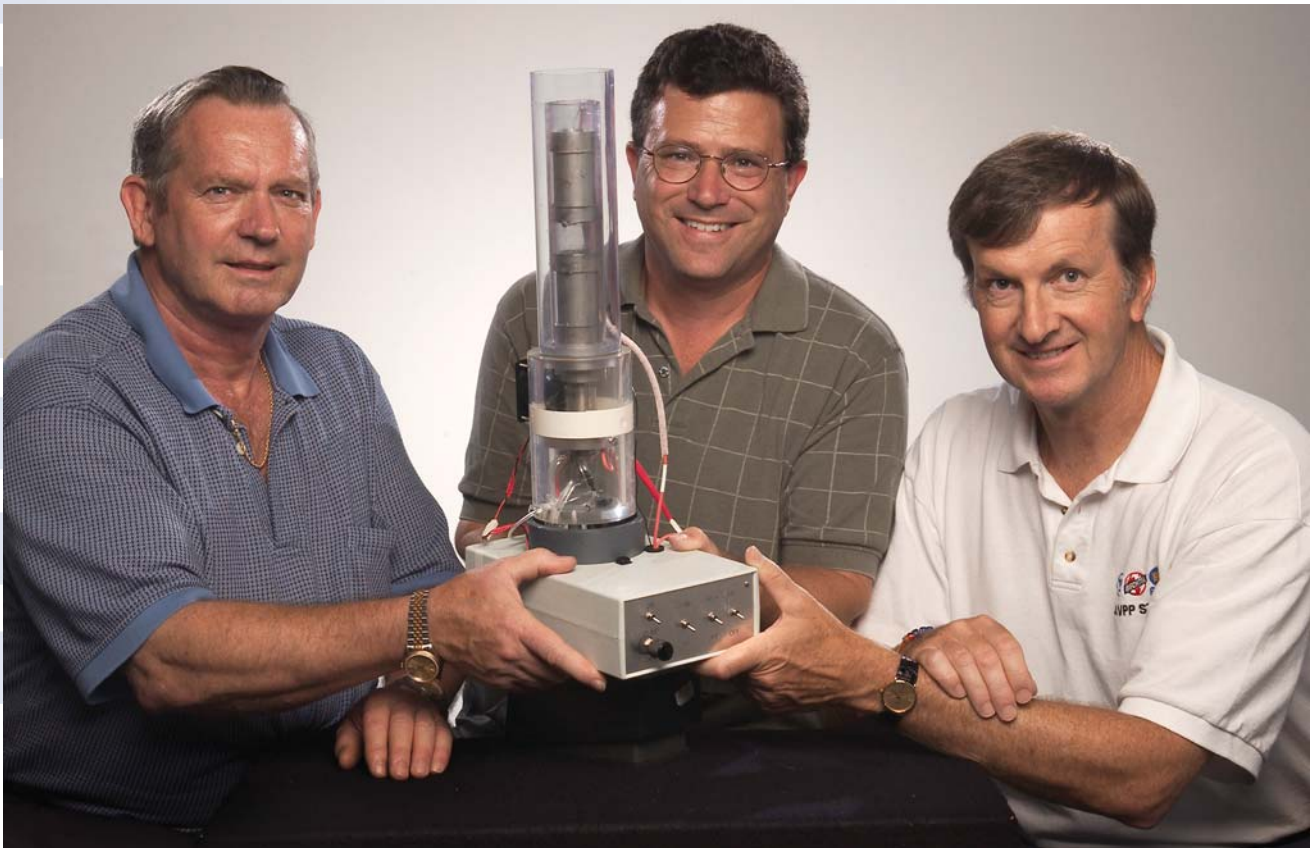
SRTC researchers received the prestigious R&D 100 Award for Aerosol-to-Liquid Particle Extraction System

***SRTC Puts Science to Work***

The Savannah River Technology Center, acknowledged as one of the premier applied R&D laboratories in the DOE complex, supports the Savannah River Site's missions through the development and deployment of high value technologies.

This year researchers at SRTC won one of the nation's top awards for applied research and development for a portable device that could aid homeland defense authorities in detecting airborne nuclear, chemical and biological material. The researchers received

the R&D 100 Award for their Aerosol-to-Liquid Particle Extraction System (ALPES), a highly efficient, portable device that collects airborne particles and concentrates them into a liquid for scientific analysis.



*SRTC's inventors of the Aerosol-to-Liquid Particle Extraction System, from left, Dr. Cliff Carlson, Jeff DeGange and Dr. Justin Halverson received the 2003 R&D 100 Award, which recognizes the top technological products of the year*



*Fact:*

SRTC-developed BritePrint, a small lightweight, hands-free, high-intensity light source, can reveal otherwise invisible, fingerprints, footprints and other latent markings at a crime scene.

**Keeping Our Nation Secured and Prepared**

SRTC researchers are transforming developments in fields such as radiation detection, multispectral thermal imagery, remote systems and atmospheric technologies into homeland security initiatives. From directing the nation's research in nuclear weapons, the SRTC developed technologies and approaches to verify nonproliferation treaties and monitoring nuclear materials production. Now it is mobilizing against a newer threat — terrorism.

SRTC's contributions to Homeland Security include:

- Presented terrorism preparedness classes on Nuclear Warfare Materials and Biological Warfare Agents during a training session at the Federal Law Enforcement Training Center in Brunswick, Georgia.
- Lead National Institute of Justice sponsored workshop on urban search and rescue needs.
- Trained the FBI on the use of high intensity packaging.
- Developed and provided an instrument testing and evaluation program for the U.S. Coast Guard.



**An Aiken Public Safety officer uses the SRTC-developed BritePrint to reveal fingerprints and other markings that may have gone undetected using conventional methods.**

- Unique, fiber-optic, nuclear detectors developed by SRTC allow fast, efficient detection of nuclear contraband in large cargo containers onboard ships or in storage.
- SRTC developed equipment used in biotechnology detection and identification of ultra trace biological agents in environmental samples.

## SECURITY

**Fact:**

The site has three fire stations, operated by certified firefighters, emergency medical personnel and line officers.

### ***Safeguards, Security & Emergency Services***

In 2003, the Safeguards, Security and Emergency Services (SS&ES) Department reviewed current security threats and potential vulnerabilities, and consequently implemented new protective measures to maintain a robust security posture at SRS. SS&ES worked closely with area project managers to support the changing missions across the site. SS&ES' year of achievement includes:

- Satisfactorily completed a comprehensive safeguards and security review conducted by

DOE Headquarters' Office of Independent Oversight and Performance Assurance.

- Relocation of the SRS Joint Information Center (JIC) to the Washington Center for the Performing Arts in downtown Aiken. SS&ES' Emergency Services is presently acknowledged as the complex leader in emergency management.
- Remote monitoring of the Fernald (Ohio) site's fire alarms was initiated by the UL Listed SRS Security and Fire Alarm System (SFAS) in April 2003.

SRS is capable of serving the entire DOE complex as the Central Alarm Station.

- Revision of the site fire systems testing protocol put the site in line with commercial practices. New test documents were adopted allowing for minimal disruption to the test schedule, creating a cost savings estimated to be in excess of \$1.8 million and yielding a 25 percent reduction over previous test costs.



*The site uses a state-of-the-art emergency preparedness facility to ensure safe operations.*

**Employee Volunteerism**

In 2002, Site employees continued to generously support the United Way, giving more than \$2.2 million, raising the amount given to the United Way to more than \$40 million since the mid-1950s. Also, additional contributions of more than \$12 million has been sent to communities through the WSRC corporate philanthropy program. Employees last year donated the equivalent of 81,115 pounds of food in the Site's Holiday Food Drive, which will provide 54,908 meals. During last year's SRS blood drives, over 3,250 units of blood were donated. Finally, WSRC reached over 55,000 students the past year through various programs aimed to encourage learning, especially science and math. In addition, WSRC helped over 200 teachers with their classroom presentations.



*SRS workers take time to do volunteer work in the community.*

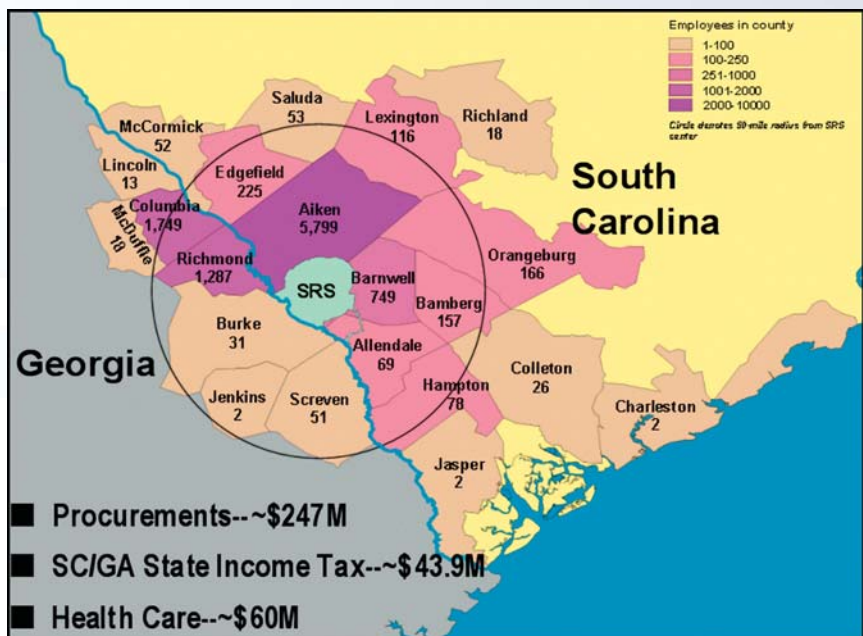
**SRS Employment**

SRS is the second largest private employer in South Carolina, with more than 13,000 employees on the payroll.

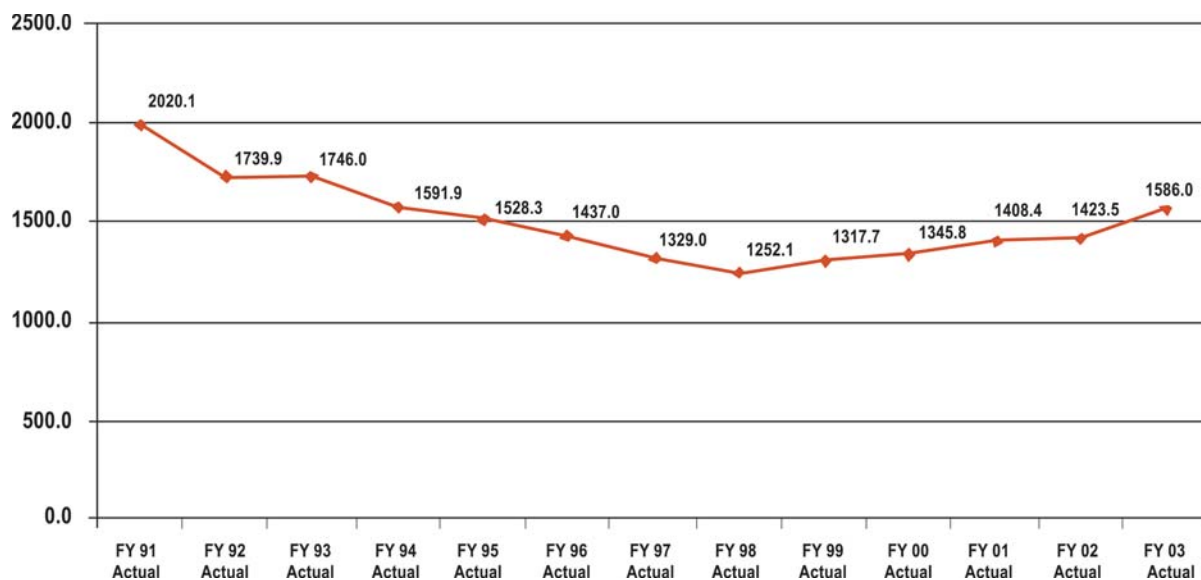
**Regional Economic Impact**

The site's economic impact makes quite a difference across the South Carolina-Georgia area. Currently, the site's overall budget is approximately \$1.6 billion. Of that, about \$1 billion is payroll. Last year, the site purchased over \$200 million in goods and services in South Carolina and Georgia combined. The site's overall economic impact is about \$2.6 billion a year.

FY '03	PERFORMANCE	GOAL
Small Business	58%	51%
Small Disadvantaged Business	13.6%	9%
Woman Owned Small Business	14.5%	8%
Local Area Commitment	37.5%	25%
FY 03 Commitments for:		
Georgia	\$73,976,972	
South Carolina	\$146,596,772	



## BUDGET SINCE 1991



## HEADCOUNT

### Savannah River Site Force Report

Date: December 31, 2003

	Permanent	Temporary	Subcontractors	Total
<b>Department of Energy, SR</b>	<b>388</b>	<b>0</b>	<b>0</b>	<b>388</b>
<b>DOE-SR Contractors</b>				
<b>WSRC/BSRI/BNFLSR/BWXT-SR</b>	<b>10,578</b>	(a) <b>1,046</b>	<b>111</b>	<b>11,735</b>
<b>U.S. Forest Service</b>	<b>85</b>	<b>0</b>	<b>0</b>	<b>85</b>
<b>SREL</b>	<b>129</b>	<b>49</b>	<b>0</b>	<b>178</b>
<b>WSI</b>	<b>896</b>	<b>0</b>	<b>0</b>	<b>896</b>
<b>Other (b)</b>	<b>21</b>	<b>4</b>	<b>11</b>	<b>36</b>
<b>DOE-SR Contractor Subtotal</b>	<b>11,709</b>	<b>1,099</b>	<b>122</b>	<b>12,930</b>
<b>SRS Total</b>	<b>12,097</b>	<b>1,099</b>	<b>122</b>	<b>13,318</b>

Notes:

(a) Includes 1,017 BSRI Construction Craft Employees and 29 Limited Service Employees.

(b) Other DOE-SR Contractors include American Services Technology, Inc. (ASTI/MRC) Team, Systematic Management Service, Inc. (SMS), and Wastren.



# NOTES







WESTINGHOUSE SAVANNAH RIVER COMPANY Annual Report 2003

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THE WSRC TEAM

Westinghouse Savannah River Company LLC · Bechtel Savannah River, Inc. · BNFL Savannah River Corporation  
BWXT Savannah River Company · CH2 Savannah River Company · Polestar Savannah River Company