

NEWSLETTER

DECONTAMINATION DECOMMISSIONING AND REUTILIZATION DIVISION OCTOBER 2005

NEWSLETTER CONTENTS

INTRODUCTORY INFORMATION

Chair's Message	Page 1
Upcoming Meetings and Conferences	Page 2

GENERAL DD&R INFORMATION

Final Report - Denver Topical Meeting on DD&R	Page 3
Membership	Page 4
Division 5 Year Plan	Page 4
Awards and Honors	Page 5
Publicity and Public Policy	Page 8
Division Scholarship	Page 8
Decommissioning Musings	Page 9
DD&R Web Page	Page 10
Site Cleanup and Restoration Standards	Page 10

DECOMMISSIONING PROJECTS

Fernald	Page 10
Saxton	Page 11
Rancho Seco	Page 13
Connecticut Yankee	Page 16
Yankee Rowe	Page 17
Maine Yankee	Page 19
SONGS Unit 1	Page 21
Rocky Flats	Page 23
Big Rock Point	Page 27
West Valley	Page 29
Fermi 1	Page 32
Hanford Decommissioning Update	Page 33
INL Decommissioning Projects	Page 38
United Kingdom Decommissioning	Page 38
Sellafield	Page 41
Private Fuel Storage	Page 51
Innovative Sampling Techniques	Page 51
RADWASTE SOLUTIONS Magazine	Page 52

CHAIR'S MESSAGE

I am pleased to assume the duties as the Chair of the DD&R for 2005-2006. It has been an exciting time for our industry as we enjoy success after success in cleaning up nuclear facilities in the United States and internationally. We have proven we can safely decommission nuclear sites in a cost effective manner while at the same time, address spent fuel storage issues. As I am sure you are aware, Trojan has just completed license termination for site release and Rocky Flats successfully completed its project, paving the way for new and innovative approaches to site closeout of government decommissioning projects. I am also pleased to note we are seeing more and more cross pollination between the United States, Europe and Asia as we truly begin addressing decommissioning related issues on a global scale, sharing information, resources and experience.

CHAIRS MESSAGE (Continued)

Our division has contributed to the successes in the DD&R area and has been actively involved in many aspects of programs for over ten years. We continue to provide annual scholarships to students studying in the nuclear and environmental fields, sponsoring or supporting D&D conferences and workshops, such as the recent highly successful DD&R Topical in Denver, Colorado, as well provide a vehicle to share information, such as in this newsletter. In addition, many of our members are actively involved in various D&D related activities from project management, support of ANS committees, policy issues, as well as other activities such as D&D training for industry personnel. This year, the our division implemented a program to recognize decommissioning projects and personnel who have contributed to the success of our industry and demonstrate the viability of safe and cost effect Decommissioning and site reutilization. This year, we had the distinct honor of recognizing two very successful decommissioning projects as well as awarding an ANS-DD&R Division Lifetime Achievement Award to one of our colleagues, Mr. Jon Stouky. We celebrated their success by presenting these awards at the opening plenary session at DD&R Topical Meeting held in Denver, Colorado this year.

Enjoy our newsletter and please take the time to visit our website often. More importantly, whether you work in the United States or are one of our international neighbors involved in decommissioning activities, I encourage you to become actively involved in our division and the ANS. You can do this by attending the DD&R Division events, presenting papers at ANS and other conferences/workshops as well as submitting articles to the newsletter. By sharing your experience and becoming involved in our efforts, I believe you will find it to be a rewarding experience as you continue working in the decommissioning and environmental cleanup areas of nuclear facilities.

Thank you for your consideration and please feel free to contact me or any of our members for additional information.

Joe Carignan

UPCOMING MEETINGS AND CONFERENCES

ANS 2005 Winter Meeting and Nuclear Technology Expo “Talk About Nuclear Differently: A Good Story Untold” in Washington, D.C. – November 13-17, 2005

DD&R has four sessions planned under Track 6 – “Fuel Cycles, Materials, and Decommissioning”. These Sessions and Chairs are as follows:

- Hot Topics and Emerging Issues – John Parkyn
- Regulatory Update – Tracy Goble
- Lessons Learned from Near-Complete Commercial Decommissionings – Joe Carignan
- U.S. Department of Energy Cleanup Program Update – Mark Morton/Bill Franz

For more information, check the ANS website at <http://www.ans.org/meeting/annual>

UPCOMING MEETINGS AND CONFERENCES (Continued)

ANS 2006 Annual Meeting “A Brilliant Future: Nexus of Public Support in Nuclear Technology” in Reno, Nevada – June 4-8, 2006

DD&R will be participating with 4 Panel (P) sessions and 1 Invited/Contributed (I/C) session under the “Waste Management and Decommissioning Technologies” track. These sessions are as follows:

- DOE Cleanup Program Update (P)
- DD&R Technological Advancements (P)
- DD&R Hot Topics and Emerging Issues (P)
- Clearance of Solid Materials: Federal and Industry Update (P)
- DD&R General (I/C)

For more information, check the ANS website at <http://www.ans.org/meeting/annual>

ANS 2006 Winter Meeting and Nuclear Technology Expo “Securing the Future in Times of Change” in Albuquerque, New Mexico – November 12-16, 2006

Sessions to be determined.

DD&R Topical Meeting – Late Summer 2007

Based on the success of the August '05 Topical Meeting in Denver, tentative planning is underway for another Topical in late Summer 2007. Several local sections have been solicited to determine interest in hosting the Topical Meeting. If you are interested, this is an excellent opportunity to get closely involved with DD&R activities. Visit the DD&R website for updates and contact information at <http://ddrd.ans.org>

FINAL REPORT - DD&R TOPICAL MEETING, DENVER, AUGUST 2005

This year's Topical Meeting in Denver in August was a huge success, hosting over three hundred registered participants. Three and one-half days of insightful technical presentations covering commercial and government projects were presented. The plenary sessions remarks by Mr. Michael Owen, Director of DOE's Office of Legacy Management, keynoted the theme of the conference, “The Transition to Legacy Management”. International interest in this conference was unexpectedly large with representation from England, Romania, Bulgaria, Japan, Austria, Switzerland, France, Germany, Belgium, Taiwan, Canada, Republic of Korea, Israel, and Spain.

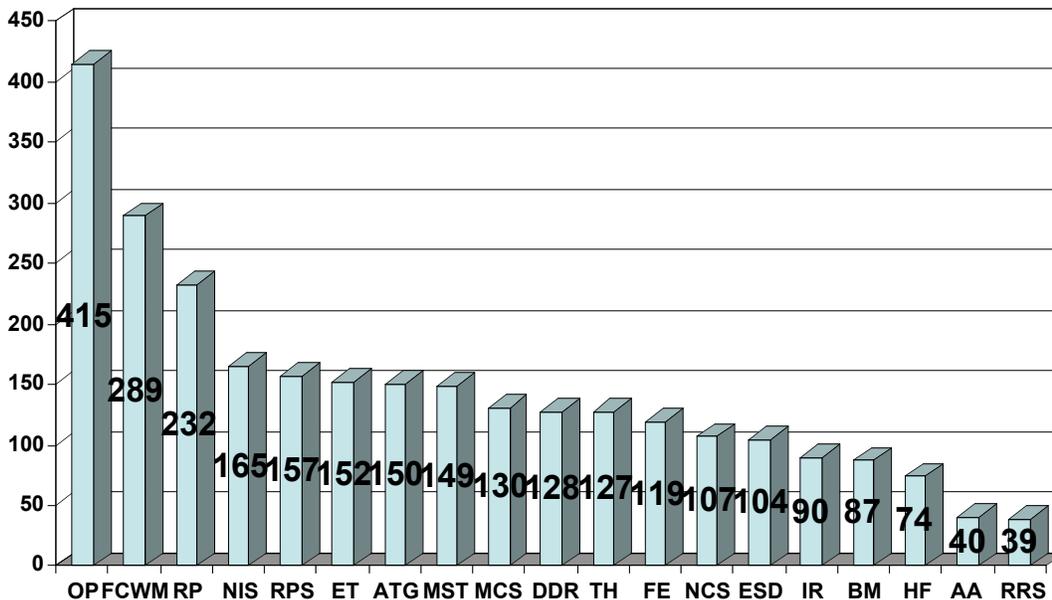
Denver was a great setting for this conference and provided the backdrop of exciting social events including a special dinner at the Denver Museum of Science and History, a Colorado Rockies baseball game, and two networking receptions. Twenty-five companies provided exhibit booths with new and innovative D&D resources. Fifty-five participants closed the conference with a technical tour of the nearly-complete Rocky Flats Closure Project. Participants got to watch the demolition of the final tower of the last nuclear facility at that site.

Planning is underway for DD&R 2007 – if you are interested in being part of this meeting please contact Russ Mellor (Technical Program Chair) at russ.mellor@wvnsco.com

MEMBERSHIP

Membership in DDR Division has continued to climb over the last 6 months albeit at a slower rate from an April figure of 1036 members to a September figure of 1097 members. (The figures cited here in this report are based on the ANS Member Directory as of 9-13-05.) The first four months of the calendar year saw an increase of 67 members or about 16 new members per month, but the last 6 months have seen that rate tail off to just about 10 new members per month on average. This is not really unexpected what with the late renewals of dues having now tapered off. It is hoped that the Denver topical meeting we held in August will attract some new DDR members. For comparisons sake - in September 2004 DDR division had 1195 members. So we have seen an overall decrease in our membership by about a little under 10% - which reflects the impact of the DOE sites undergoing closure, the associated staff transitions and the NPP decommissioning projects, which are winding down too.

As a division, DDR ranks 10th of the 19 divisions/TGs in membership increase since the start of the calendar year. We have gained 128 new members since the start of the year. For comparisons sake, the greatest gain by any division has been 415 members and the least gain has been 39 members.



Please encourage colleagues and friends in the industry to join us in the DDR division of ANS and to support the DDR activities! Thanks.

DD&R DIVISION 5 YEAR PLAN

The five year plan has been developed and approved by the Executive Committee. The Five Year Plan is available by contacting the Secretary of the DD&R Division, Mr. Jon Parkyn."

AWARDS AND HONORS

During the recent DD&R Division Topical Meeting in August in Denver, Colorado the DD&R Division presented special awards and awards for the best daily papers.

DD&R Division Lifetime Achievement Award

The Lifetime Achievement Award was presented to: R Jon Stouky of Mega-Tech Services.

Mr. Stouky received the award in honor of his more than 44 years of experience in the nuclear field, including decommissioning, waste management, spent fuel management, remote tools and applications and safety. The award citation also noted that he has been involved with ANS for 43 years and continues an active involvement; was instrumental in the formation of the DD&R Division in the mid-1990s; has held virtually all the officer positions of the Division and was chair in 1997; has been involved with numerous decommissioning projects, including many that have been completed and are nearing completion; was instrumental in establishing and supporting an immensely successful round of DD&R Executive Conferences held at Trojan, Big Rock Point, and Connecticut Yankee; and continues his active involvement in the industry.



The Lifetime Achievement Award was presented by Russ Mellor (left) and Joseph Carignan (center), immediate past Chair and current Chair, respectively, of the DD&R Division to R Jon Stouky.

AWARDS AND HONORS (Continued)

DD&R Division Project Excellence Award

THE ANS DD&R DIVISION presented two Awards of Excellence to two U.S. decontamination and decommissioning projects.

One Award of Excellence went to the 233-S Plutonium Concentration Facility Demonstration Project<\#209>Fluor Hanford, the first open-air demolition of a highly-contaminated plutonium facility at Hanford and the first plutonium facility in the DOE complex to have been demolished without first decontaminating surfaces to near “free release” levels. This project utilized an excavator with concrete shears, diamond circular saws, water misting and fogging equipment, commercially available fixatives and dust suppressants, conventional mobile crane and rigging services, and near-real-time modeling of meteorological and radiological conditions. The facility was demolished in six months.



Mike Lackey (right), from Fluor Hanford, accepts the award from Russ Mellor (right) and Joseph Carignan (center), of the ANS DD&R Division

AWARDS AND HONORS (Continued)

The other Award of Excellence was presented to the East Technology Park Project--BNG America, which was designed to decontaminate and decommission three gaseous diffusion plants built during the Cold War Era. These plants were Category 2 Nuclear Facilities, encompassing 5 million square feet, and were under full criticality safety and Authorization Basis controls. The project includes the removal and dismantlement of over 3000 converters and compressors, decontamination of over 22 million square feet of surface area that included 150 million measurements, removal of over 400 miles of contaminated piping, disposition of 360 million pounds of contaminated materials, unconditional release of 15 million pounds of scrap metal, over 800 000 lifts and 10 000 critical lists. With over 1400 workers at its peak, the project is preparing these buildings for reindustrialization.



Jeff Stevens (right) accepts the photo on behalf of BNG America from Russ Mellor and Joseph Carignan.

AWARDS AND HONORS(Continued)

DDR2005 Best Daily Papers/Presentations Awards

It is interesting to note that International, DOE and non-DOE papers all won the awards on different days !!

Monday - Jean Fontaine, CEA - "Orientations for Final Decommissioning of the RAPSODIE Fast Breeder Reactor"

Tuesday - Elaine Hammick, ABB - "Addressing Environmental Issues during D&D of a Former Fuel Cycle Facility"

Wednesday - Ray Geimer, Kaiser-Hill, "Methods and Solutions for Difficult Radioactive Waste Streams at the RFETS"

Thursday - Marc-Konstantin Steifenstand, Kernkraftwerk Gundremmingen, "Practical Experience in Decommissioning Plant KRB A Gundremmingen Germany"

Congratulations to all of the winners !!!!!

PUBLICITY AND PUBLIC POLICY

A proposal to combine the Public Policy Committee with the Regulatory Interface Committee is being considered. The Regulatory Interface Committee (RIC) will replace a previous special committee and continue the regulatory input to the federal rulemaking process that is most relevant to the DD&R activities. The committee will also continue the work on the site and material release issues and criteria as well as the development of the Position Statement 64.

The RIC would be responsible for proactive input on behalf of the DD&R and the ANS to federal rulemaking efforts in areas related to decommissioning of nuclear facilities, license termination, and restoration of contaminated sites. The committee is also involved in policy statement preparation on related activities.

DIVISION SCHOLARSHIP

This year's scholarship winner, Taylor Moulton of the University of Florida, will be attending the ANS Winter Meeting in Washington, DC, and attending the executive committee meeting of the DD&R Division on Sunday, November 13, 2005. This will give us the opportunity to get to know this young man, and to interest him further in the goals and objectives of the DD&R Division.

Looking into the future, scholarship applications for the next academic year will be due to ANS by February 1, 2006. Any students (preferably sophomores or juniors this year) that you know who would be candidates for the DD&R Scholarship, a \$2000 value, should be encouraged to apply. Application information is found on the ANS web site -<http://www.ans.org/honors/scholarships/ddrd.html>

DECOMMISSIONING MUSINGS

Decommissioners Musings by Larry Boing lboing@anl.gov

This section is intended to point readers to sources of available information that they might find useful in their DD&R work. There is much information in the DDR newsletter about on-going DD&R projects/activities at various sites, in various countries, regions and on all of the various technical aspects of our work. I would like to focus this column on just a few of these websites you might not be aware of and which you might find useful in your work.

I am sure that many of you may periodically search for a handy source of readily accessible technical literature on progress in some facet of the decommissioning technical areas. Ones that are available at no cost to the community are everyone's favorites and there are several that I would like to point out to you for your consideration.

The **first** of these is the International Atomic Energy Agency (IAEA) publications website. The Agency used to sell many of their publications but recently due to a variety of reasons it has shifted to more web based postings of many of its documents. Remember that the Member State contributors to the work of the IAEA are what allows for this work to be done – so get something in return for those funds allocated to the IAEA. The IAEA has both technical series reports and safety series reports posted at their website and are downloadable for FREE. The website is

<http://www-pub.iaea.org/MTCDD/publications/publications.asp>

The **second** of these is a personal favorite website of mine – the archived past papers presented at the last several granddaddy of conferences – the Waste Management Conference in Tucson, AZ, USA. Papers are posted for the conference period 2000 to 2004 (2005 to be up soon). The posting of these papers on their website is very useful and thanks to the WM Symposia for their work in helping out the community with this feature at their website. The website is

http://www.wmsym.org/archive_proceedings.asp

The **third** of these websites is actually several websites and provide examples of site utilization following completion of the decommissioning process. Many people forget about this part of the process. For many of the DOE sites undergoing closure as a result of the end of the Cold War, there has been significant progress made in the follow-on reuse of those sites after clean-up and closure. In some cases the assets of DOE sites can be transferred to the communities for development and re-use. These websites are

The Community Reuse Org of East Tennessee

<http://www.croet.com>

The Rocky Flats NWR

<http://www.fws.gov/rockyflats/>

The Mound Advanced Technology Center

<http://www.mound.com>

Please let me know if you have a suggestion for an interesting topic for the next newsletter section. That's all for now and pleasant decommissioning!

DD&R WEB PAGE

The DD&R web site (ddrd.ans.org) continues to be an excellent resource for Division Members. It provides a convenient way to identify and contact Division Officers and/or members of the Executive Committee so that you can readily provide your input to them. The web site also provides notices of upcoming meetings of interest to the Division, and includes other miscellaneous material such as the Mission, Bylaws, Operating Manual, and Five Year Plan for the Division. The DD&R Newsletter is also accessible through the web site.

The web site has been updated to include current officers and other timely material, and continues to be (one of?) the best and current Division web sites within the ANS organization

SITE CLEANUP AND RESTORATION STANDARDS

By Dr. Jas Devgun, Past Chair, ANS Special Committee on Site Cleanup and Restoration Standards

The Special Committee on Site Cleanup and Restoration Standards (ANS/SCRS) was closed at the national level on June 21, 2005 after several years of service to ANS in the areas related to decommissioning, site cleanup, bulk materials disposition and clearance issues. The intent is to transfer the ongoing activities and expertise to a committee within the DD&R Division.

FERNALD DECOMMISSIONING UPDATE

The Fernald Closure Project goal to decontaminate, dismantle, and disposition (D&D) 316 physical structures and facilities is nearing completion. In order to complete the clean up of the DOE Fernald facility, a total of 316 facilities required safe shutdown, decontamination, dismantling, and disposition. These facilities included 255 production-era legacy process buildings, structures, and administrative facilities as well as D&D of additional processing and treatment facilities which were constructed to stabilize and treat the materials on site.

Prior to D&D each building required a type of safe shutdown. This work entailed removal of materials remaining in process lines, piping, and salvageable equipment; removal of gross contamination; and isolation or disconnection of utilities from the structure. Fluor successfully completed the safe shutdown process two years ahead of schedule and \$7 million under budget. On average, Fluor planned and performed 60 major utility isolations and 12 utility redistribution projects annually without affecting ongoing operations.

An initial wash down of a building's interior was performed prior to the start of dismantlement. The purpose was to remove visible dust, loose debris, and biohazards from building surfaces, walls, and floors. Building penetrations were sealed to prevent animal access and to minimize the potential for migration of loose contamination to the environment. Particulate lockdown paint was applied to all interiors and equipment surfaces to minimize particulate release. In addition, dust suppression was used to further control airborne emissions during dismantlement, and asbestos abatement areas were established to remove asbestos containing materials. Interior equipment that remained in the building and the above-grade structures were typically dismantled using hydraulic shears, and size reduced to the appropriate size for placement in the On-Site Disposal Facility.

FRENALD DECOMMISSIONING UPDATE (Continued)

The peak of D&D work utilized 848 construction craft, making Fernald the largest employer of construction craft in and around the Cincinnati, Ohio area. Construction craft worked more than 7 million work hours in 10 years at Fernald without a single lost-day work injury. In addition to self-performing D&D and managing D&D contractors to performance-based specifications, Fluor has also overseen Wise Construction, a small business labor-hour contractor, in the performance of 661 task orders, valued at \$42 million. These task orders include a wide variety of construction projects including, small building demolition, utility redistribution, renovation of buildings to support new processes, piping system upgrades, trailer installation, soil excavation, grading and paving.

As a result of these activities, Fluor improved the overall Fernald closure schedule by 20 years from the previous 31-year target. The D&D project achieved the 20 year improvement by bundling the 316 legacy, new buildings, and structures into 19 logical complexes. Each complex had a specific implementation plan, schedule, and stand-alone work completion report. Facilities were grouped based on; relative location, current and future use of the facility, types of wastes to be generated, the availability of the facilities for demolition, and minimization of conflicts with other ongoing site operations.

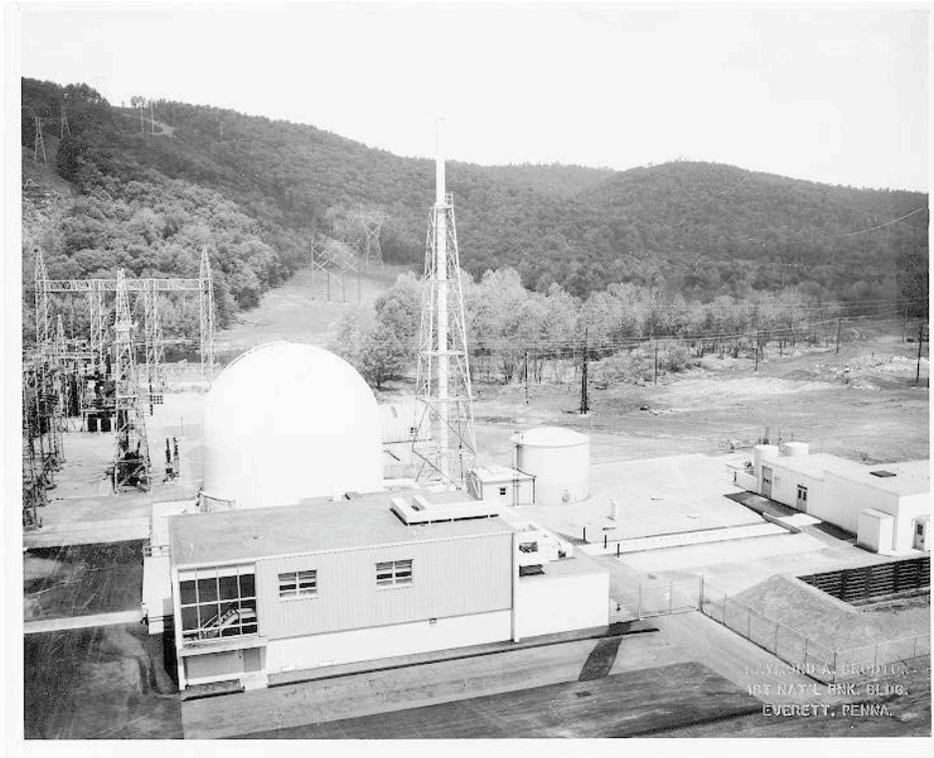
This strategy of grouping similar work activities and processes simplified project-specific and area-wide environmental monitoring and facilitated the accuracy of project estimating. The resulting cost and schedule improvements were the result of optimizing such aspects as; contracting, work plans, health and safety plans, other field procedures, subcontractor training, establishment of control zones, mobilization and demobilization of crews and equipment, as well as air monitoring. The overall advantage of this process was significant cost reductions from 20 man-hours per ton to 6.1 man-hours per ton for a similar work scope.

Input provided by Bill Taylor and Jennifer McCloskey

SAXTON DECOMMISSIONING UPDATE

The Saxton Decommissioning Project has completed its Final Status Survey and the Final Status Survey Report has been submitted to the Nuclear Regulatory Commission as of July 27, 2005. The NRC has completed review of the Final Status Survey Report and although there are several comments on data presentation there has not been a challenge to the conclusion. We anticipate addressing the NRC's issues by mid-September and based on this schedule the NRC anticipates terminating the license this fall. Following license termination it is anticipated that the property will revert back to the Penelec and the Saxton Nuclear Experimental Corporation will be dissolved.

SAXTON DECOMMISSIONING UPDATE (Continued)



Saxton 1962



Saxton, July 2005

RANCHO SECO DECOMMISSIONING UPDATE

Vessel Internals - Mechanical cutting and milling (and brute force) have been used to remove internals underwater. Core baffles and formers (>Class C) were placed in a fuel-type canister for storage in the ISFSI. The plenum (mostly Class A) was cut out of the water using diamond wire with the Class C portion returned to the water for further cutting. Final cutting on the plenum pieces will be done mechanically and with plasma. Class B and C internals are being mechanically cut and will be stored in liners onsite until disposal is arranged. Class A waste will be shipped to Envirocare once cutting and packaging is complete.

Large Components – Planning is in progress for vessel segmentation. The most likely method to be used is high-pressure water/grit cutting (not underwater). All pieces except beltline pieces will be shipped in sealand containers. The six beltline pieces will be placed in two boxes and grouted, then shipped by rail to Envirocare of Utah. No DOT exemptions are expected to be needed for shipment.

Containment Building – Planning is in progress for the removal of all of the concrete in the building to the liner. This is believed to be cost effective as opposed to cleaning surfaces and chasing cracks.

Embedded Pipe – Flushing is completed for the embedded pipe in the Turbine Building and surveys are in progress. No cleaning beyond this flushing is expected in the Turbine Building due to low sample activity levels. Flushing is in progress in the Auxiliary Building where much higher activity levels are expected. A large amount of debris was removed in both locations. Cleaning, where needed, will be with a grit blast system that vacuums the debris and grit out the end of the pipe.

Outside Components – The plant ventilation stacks were removed to allow access to underground piping below. A stack is no longer required for the Auxiliary Building but a small temporary Reactor Building stack was added to allow removal of the original Reactor Building stack. Much of the contaminated underground pipe has been removed with the remainder to be completed next year. Work is ongoing to remove temporary (non concrete) buildings and structures.

License Termination Plan – Work on the LTP is in progress. Meetings with the NRC have been held to discuss dose modeling, groundwater sampling and characterization. Characterization work is ongoing to support the LTP. DCGLs have been determined using the industrial worker scenario due to the ongoing use planned for the site. LTP submittal is planned for the end of the year.

RANCHO SECO DECOMMISSIONING UPDATE (Continued)



Plenum Piece (Class A)

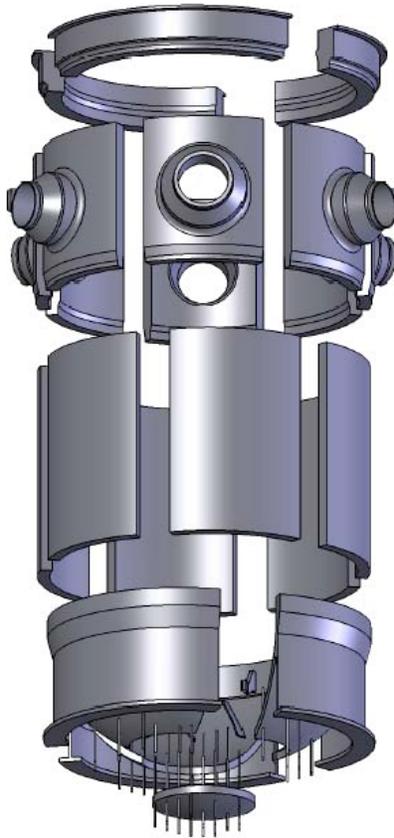


Vessel Internals – Piece of Core Support Shield (Class A)

RANCHO SECO DECOMMISSIONING UPDATE (Continued)



Underground Pipe Removal



Reactor Vessel Cut Plan

CONNECTICUT YANKEE DECOMMISSIONING UPDATE

Connecticut Yankee continues to make excellent progress in demolition activities in addition to ongoing decommissioning work at the Haddam Neck Nuclear Power Plant. Physical decommissioning is scheduled to be completed by the end of 2006. The plant site has accumulated more than 5.3 million work hours and gone over five years since its last lost time accident.

The demolition of the former turbine, north service/control room, and terry turbine buildings is complete. The demolition of the ion exchange system and the demineralized water storage tank is also complete. The demolition of the intake/screen house is nearing completion. The decontamination of the interior of the containment building is complete and interior demolition is well underway. Demolition of the containment building is scheduled for 2006. The removal of contaminated bedrock in the ion exchange system area continues. Soil remediation in the area of the PAB is complete and backfilled.

Integrated Site Closure activities continue to focus on groundwater characterization and monitoring, final status survey of miscellaneous land areas, and RCRA Corrective Action Program implementations. Characterization of the soil/bedrock removed from the area of the ion exchange system is in progress to allow backfill activities to begin. The site domestic and septic systems have been permanently disconnected.

In August, the NRC approved revisions to the License Termination Plan (revisions submitted in December 2004). NRC approval of the second partial release of a portion of the site property is expected before the end of the year.

The transfer of spent fuel from wet to dry storage was completed in March 2005. The removal of the spent fuel racks from the spent fuel pool is complete and the clean up of the spent fuel pool and water continues. The removal of equipment from the spent fuel building continues.



Turbine Building Demolition

CONNECTICUT YANKEE DECOMMISSIONING UPDATE (Continued)



Plant Site August 2005

YANKEE ROWE DECOMMISSIONING UPDATE

Structural demolition of the Yankee Rowe plant was successfully completed on June 30, 2005. Below-grade demolition work, site grading and contouring, and Final Status Survey work is scheduled to be completed by the end of 2005.

Demolition of the reactor support structure (RSS) was completed in May 2005. Shipment and disposal of various radiological and non-radiological waste streams continue. Soil contaminated with PCB-containing paint chips is being remediated with thermal desorption equipment, with over 31 million pounds of soil successfully processed to date. Paint used on plant structures, such as the former vapor container, during the 60's and 70's contained PCB's, with resulting concentrations in excess of allowable limits.

The NRC approved Yankee's License Termination Plan (LTP) on July 28, 2005. Yankee's LTP was submitted to the NRC in November 2003 with supplemental information submitted in early 2004. Yankee and Citizens Awareness Network also reached a settlement agreement in July, which terminated a pending ASLB hearing on the LTP.

YANKEE ROWE DECOMMISSIONING UPDATE (Continued)

Yankee and the town of Rowe, MA, are continuing to explore the possibility of the town leasing the majority of Yankee's 1800 acres with an option to purchase the entire property when the spent fuel is permanently removed. Approximately 90 acres surrounding the two-acre ISFSI would be reserved for fuel storage activities and not available for lease or public use until the fuel is removed. In deciding the future of the property, Yankee will continue to satisfy all state and federal standards regarding clean up, remediation, and long-term monitoring of the former plant site and safe spent fuel storage.

The Yankee Rowe Community Advisory Board (CAB), which was established in April of 1998 and represents local communities and organizations, will transition to a Spent Fuel Storage and Removal CAB this fall. The new board is an outgrowth of its successful predecessor, which served an integral role in addressing community issues and monitoring the decommissioning of the Yankee Nuclear Power Station.

The Yankee Rowe Spent Fuel Storage & Removal Community Advisory Board approved a new charter in June 2005 establishing the board as a non-regulatory body to promote and enhance open communication, public involvement and education on the interim storage of spent fuel and high-level waste at the former Yankee Rowe plant site and to advocate for its prompt removal as required by federal statute and contract with the U.S. Department of Energy. The CAB plans to meet twice a year.



Soil Remediation with Thermal Desorption

YANKEE ROWE DECOMMISSIONING UPDATE (Continued)



Yankee Rowe Site from Across Pond – August 2005

MAINE YANKEE DECOMMISSIONING UPDATE

Maine Yankee Decommissioning is nearing a successful conclusion. The U.S. Nuclear Regulatory Commission on August 15 accepted and approved the remaining Maine Yankee radiological Final Status Survey packages. The next step in the process is for NRC to formally amend Maine Yankee's license to reduce the approximately 180-acres of Bailey Point peninsula now under the license to the roughly 12-acre footprint of the Independent Spent Fuel Storage Installation (ISFSI). The license amendment will signify that Maine Yankee has successfully completed the decommissioning of the former nuclear power plant in accordance with NRC procedures. The license amendment is expected by the end of September.

Project safety was outstanding with more than 2 million safe hours worked since the last lost time injury more than three years ago. Also, radiological dose for the project was less than half the NRC limit of 1115 person-Rem.

Successful completion of Maine Yankee's decommissioning will mark the first time a commercial nuclear power plant in the United State has been fully decommissioned with all plant buildings removed. The nearly eight year project was performed safely, to a significantly higher radiological cleanup standard than federal regulations require and within the \$500 million cost estimate to Maine Yankee's electric customers.

MAINE YANKEE DECOMMISSIONING UPDATE (Continued)

Among the accomplishments of Maine Yankee's decommissioning:

- Radiological cleanup of the site to a level significantly lower than the 10 millirem target;
- Zero lost time injuries in over three years;
- Completing decommissioning for less than half the NRC's allowed radiological dose limit;
- First ever use of explosives to safely demolish a containment building;
- Approximately 450 million pounds of waste safely removed from the site by rail, truck and barge;
- Largest single campaign to move spent nuclear fuel from wet to dry storage;
- Creation of an upland marsh area;
- Donation of 200 acres of plant property for conservation and environmental education;
- Sale of approximately 400 acres of plant property for economic development.

Going forward Maine Yankee's primary purpose will be the safe storage of the plant's spent nuclear fuel and Greater than Class C waste at the 12-acre Independent Spent Fuel Storage Installation on Bailey Point in Wiscasset in accordance with its NRC license and all applicable regulations while pursuing opportunities with the State and others for its removal from the site as soon as practicable.

Maine Yankee's decommissioning began in August 1997 when the plant was no longer economically viable. Maine Yankee began operating in 1972. During 25 years of operation the plant safely produced about 119 billion kilowatt-hours of electricity for its New England customers.



Maine Yankee Site

SONGS UNIT 1 DECOMMISSIONING UPDATE

Southern California Edison continues to make excellent progress in the decommissioning of San Onofre Nuclear Generating Station Unit 1 (SONGS 1). The demolition of the administration/control building, diesel generator building, most of the containment sphere enclosure building and the turbine building is complete. All SONGS 1 spent fuel on site has been moved to the ISFSI. The removal of nearly 80 million pounds of material from the site along with other plant demolition activities result in the project being nearly 65% complete from a cost and schedule perspective. Large component removal was completed in the fall of 2002 and all structures inside containment above 17' elevation (ground level) have been demolished. SONGS 1 Spent Fuel Pool has been drained and the spent fuel racks have been removed from the pool and shipped to Envirocare. Key activities for the remainder of this year are completing a material handling system to remove the crushed concrete and rubble from inside containment and finishing inside containment demolition, completing below grade demolition of the turbine building structure and shipping waste materials from site.

The SONGS Independent Spent Fuel Storage Installation contains 31 Advanced Horizontal Storage Modules (AHSM). Of these, eighteen AHSMs have been used to store 395 SONGS 1 fuel assemblies and the GTCC waste removed from the reactor pressure vessel during the RVI project. Fuel transfer of SONGS 1 fuel from wet storage to dry storage completed in the spring of 2005. The remaining 13 modules in the ISFSI will be used in the future to store fuel assemblies from the two SONGS operating units.

Work to finish containment demolition is nearing completion. Remaining work includes removing the remaining structures and systems below 17' elevation and hauling the crushed concrete and steel from containment for transport off site and cutting up the containment sphere. This work is forecast to complete in the summer of 2006.

The SONGS 1 Spent Fuel Pool has been drained and the spent fuel racks were removed from the pool. These activities resulted in no further need for the radwaste system. It has been placed in Cold & Dark and its demolition has begun.

During the next twelve months, the project will focus on completing the following decommissioning activities:

- Dismantling the Unit 1 Spent fuel pool and building
- Dismantling the north turbine deck extension (located in front of the spent fuel building)
- Removing the remaining containment internals
- Dismantling the containment sphere and
- Removing, packaging, and shipping waste materials from the site

SONGS UNIT 1 DECOMMISSIONING UPDATE (Continued)



SONGS 1 Turbine Deck Demolition



SONGS 1 Remaining Structures as of September 2005

ROCKY FLATS DECOMMISSIONING UPDATE

Kaiser-Hill will complete the Rocky Flats Closure Project in October 2005, decades sooner and for billions of dollars less than 1995 estimates. Heavily contaminated structures have been demolished. Hundreds of thousands of cubic meters of radioactive waste have been shipped. Large areas of contaminated soil have been cleaned up to levels set by federal and state regulators and endorsed by local communities. All surface water leaving the site meets stringent water quality standards.

Soon, most of the 6,200-acre reservation will be transitioned from the Department of Energy to the U.S. Fish and Wildlife Service to be managed as a national wildlife refuge. DOE will retain approximately 1,000 acres for long-term surveillance and stewardship. When complete, the site will look pretty much the way it did prior to construction of the plant.

When the Kaiser-Hill team took over the Rocky Flats project in 1995, it inherited:

- A 500-acre industrial area containing more than 800 structures, including five of the most radioactively contaminated buildings in the country.
- Twenty-one tons of weapons grade nuclear material, much of it improperly stored as a result of the sudden termination of operation in 1989.
- More than 100 tons of residues containing high levels of plutonium with no plans for treatment or disposal.
- 30,000 liters of plutonium and enriched uranium solutions – stored in aging tanks and building piping.
- 360 potentially contaminated areas requiring investigation, including dozens of acres known to be contaminated with plutonium or other hazardous materials that posed public risk.
- 550,000 cubic meters of low-level radioactive and low-level radioactive mixed waste, enough to fill a 70-mile-long string of railcars.
- 15,000 cubic meters of transuranic waste that must be disposed of in a special, underground repository in New Mexico.
- 512,000 tons of miscellaneous waste (clean concrete, asphalt, masonry, wood, etc.) for disposal in nearby sanitary landfills.
- 13 “infinity” rooms – sealed and abandoned rooms in plutonium processing buildings so highly contaminated that they couldn’t be measured by radiation detection equipment used at Rocky Flats 20-30 years ago.
- 1,457 contaminated production glove boxes – large stainless steel enclosure where workers handled nuclear materials and processing equipment. Some glove boxes were the size of 18-wheel tractor-trailers.
- Nearly 700 contaminated tanks, some as tall as three story buildings with capacities of more than 30,000 gallons.
- Strained employee relations, community mistrust, no integration between the site and regulatory agencies, lack of leadership.
- No credible plans to clean up and close the site.

ROCKY FLATS DECOMMISSIONING UPDATE (Continued)

Keys to Rocky Flats Cleanup Success

- ***New contracting models:*** DOE awarded the Kaiser-Hill team the first of its new contracting models in 1995. The performance-based contract rewarded the contractor only for completion of specific, measurable units of work rather than general management of a site. In 2000, DOE and Kaiser-Hill signed the first DOE “closure contract” to complete the closure of Rocky Flats at a target cost and completion date. It featured strong incentives for minimizing cost and severe penalties for unsafe performance.
- ***The Rocky Flats Cleanup Agreement:*** State and federal agencies and DOE, with Kaiser-Hill participation, created a new regulatory framework for planning and executing work that resulted in consultation and teamwork. The agreement outlined a unified vision of the Rocky Flats end-state, clear roles and responsibilities, set site-wide standards and streamlined the decision-making process. The idea was to move waste, not piles of paper.
- ***The Closure Project Plan:*** Kaiser-Hill developed a detailed, multi-year closure plan that provided a highly aggressive yet credible road map for accelerating Rocky Flats closure. The plan was an example of the company’s willingness to stretch for goals that some believed to be nearly impossible.
- ***The Innovative Use of Proven Technologies:*** Kaiser-Hill employees, with support from DOE’s Office of Science and Technology, worked to adapt existing technologies to approach nuclear cleanup in ways never before attempted. For example, workers and a vendor modified a spray-on coating, the type used to protect pickup truck beds, to become the over-the-road packaging for large pieces of contaminated equipment. The success of ideas like this created an atmosphere of creativity and propagated workforce competition to find cheap, fast and safe solutions.
- ***Engaging the workforce:*** The Rocky Flats work force was demoralized from the end of the weapons mission and a future that asked them to work themselves out of jobs by closing the site. To motivate employees, Kaiser-Hill established a close relationship with the site’s unions, shared profits and provided incentives for outstanding performance. Workers performing hands-on work were involved in all stages of work planning, allowing the company to capitalize on institutional knowledge and skill of the craft while creating employee ownership. Kaiser-Hill also recognized early on that the success of safe operations depended on employees who were focused on their work. To that end, the company created a successful workforce transition program to help the 4,000+ workers prepare for life after Rocky Flats.
- ***Engaging the Community:*** Kaiser-Hill and DOE created a new era of openness with citizens and local elected officials by routinely involving them in the details of site cleanup operations. Public understanding of the cleanup decisions allowed issues to be resolved early and created public support for Rocky Flats’ goals.
- ***Safety:*** Kaiser-Hill viewed safety and operational rigor as the key to productivity. For example, prior to Kaiser-Hill’s arrival, procedural non-compliance shut down for nearly a year the attempt to begin draining high-concentration actinide solutions from tanks. The Kaiser-Hill team minimized work stoppages through Integrated Safety Management, workforce involvement, procedure compliance and frequent communications. Industrial safety statistics during the 10-year period dropped from more than 7 accidents per 200,000 hours to less than 1.

ROCKY FLATS DECOMMISSIONING UPDATE (Continued)

Rocky Flats Timeline

1951	Ground broken
1952-1989	Factory in operation – top-secret manufacturing of plutonium and enriched uranium components for nuclear weapons.
1989	FBI raid – nuclear operations shut down for safety and environmental concerns and allegations of criminal activities; Rocky Flats placed on EPA National Priorities list.
1992	President Bush announces termination of missile program, effectively ending any hope of Rocky Flats restart; Department of Energy announces new Rocky Flats mission of environmental cleanup.
1995	The Department of Energy awards a first-ever performance-based contract (Integrated Management Contract) to Kaiser-Hill, LLC (CH2M HILL and Kaiser Engineering). Major subcontractors include Westinghouse, B&W Federal Services, Morrison-Knudsen, BNFL and Dyncorp.
1996	The Rocky Flats Cleanup Agreement is signed between the Department of Energy, the Environmental Protection Agency and the Colorado Department of Public Health and Environment.
1995-1999	The Kaiser-Hill team reduces most pressing risks, starts facility decontamination and decommissioning and begins detailed planning for accelerated closure.
1999	Building 779 is demolished, the first of Rocky Flats’ major plutonium-contaminated facilities to be cleaned up and dismantled.
2000	First-ever DOE “closure contract” awarded to Kaiser-Hill. Contract includes a target cost of \$3.9 billion, a target schedule of December 2006, and incentives for safe, cost-effective, accelerated closure.
2001	Congress passes legislation declaring Rocky Flats a national wildlife refuge upon closure.
June 2005	Demolition of Building 371 begins (last major plutonium facility).
October 2005	Project completion

ROCKY FLATS DECOMMISSIONING UPDATE (Continued)



Rocky Flats, June 27, 1995



Rocky Flats, September 22, 2005

BIG ROCK POINT DECOMMISSIONING UPDATE

Following demolition of Big Rock Point's turbine and administration buildings, workers focused their efforts on excavating the foundations of the former buildings. Following completion of that work a final status survey (FSS) of the excavation was completed in September. FSS are performed to ensure that all criteria for unrestricted release have been satisfied prior to returning the area to a grade elevation. Backfill activities began in late September.

Several important "people" events also occurred in the past quarter:

The majority of the plant's union utility employees accepted positions at other Consumers Energy facilities or chose to retire. The departing employees represented more than 557 years of nuclear experience.

Both the plant's Restoration Safety Review Committee (RSRC) and Citizen Advisory Board (CAB) held meetings and conducted reviews of decommissioning activities. The RSRC is comprised of nuclear and construction experts who provide an independent assessment of decommissioning activities. The CAB received a decommissioning update from plant personnel and a performance assessment from the Nuclear Regulatory Commission. The NRC inspector told the CAB that, "The project has done an extremely good job from a regulatory requirements standpoint," and that the NRC uses Big Rock Point as an example for others to follow.

A decommissioning update was held for Big Rock Point retirees and their spouses. Retiree support was solicited for a Big Rock Point exhibit planned for next year by the local historical society and for participation in a video currently in production that will capture the history of the plant. Two members of the plant's original crew (1962) attended the meeting.

The activity drawing the most attention the last quarter is the scheduled "demolition" of the concrete monolith located inside containment. Following is a story detailing the project that appeared in Big Rock Point's community newsletter, "From the Point."

They've brought down Seattle's Kingdome, Pittsburgh's Three Rivers Stadium, the J. L. Hudson building in downtown Detroit, and an abandoned building in the Hollywood thriller "Enemy of the State" starring Will Smith and Gene Hackman. Now they're ready to help bring down Big Rock Point. "They" are Controlled Demolition, Inc. (CDI), likely the world's leading explosive demolition experts. Their job, however, at Big Rock Point is not to "blow something up," but rather to "soften" the concrete monolith located inside the containment sphere.

"Earlier demolition of the turbine building and its foundations with a wrecking ball and backhoe proved just how solidly the plant was constructed," said Ray Flowers, Big Rock Point containment demolition project manager. "It took us longer than anticipated to bring down those structures because of the strength and resistance of the concrete and steel rebar." Subsequent investigation into methods to improve concrete demolition productivity uncovered CDI's work at other nuclear facilities.

BIG ROCK POINT DECOMMISSIONING UPDATE (Continued)

“In addition to holding several world demolition records, CDI is well known and respected in the nuclear industry,” said Bill Trubilowicz, Big Rock Point decommissioning costs and projects manager. “CDI has very safely and successfully used similar methods – although on a much larger scale – at the Rocky Flats, Maine Yankee and Yankee Rowe nuclear sites.”

CDI personnel arrived at Big Rock Point in July and began drilling a total of 257 two-inch diameter vertical and horizontal holes measuring almost 4,000 feet in length into the concrete. The holes range in length from a few feet to 60-feet long. A specialized drilling machine and a hand driller that resembles a jackhammer have been used depending on the location and depth of the hole. Later this year each hole will be loaded with the appropriate amount of explosives to fracture – but not drop - the structure. “We call this soft shooting,” says Jesse McClees, CDI project manager at Big Rock Point. “The explosives will leave the structure in place but fracture it in a manner that allows easier demolition by wrecking ball and excavator.”

As expected, safety plays the leading role in a project such as this. For the past few months workers have been cleaning the concrete to remove contamination and filling embedded pipes with grout to lock in place any contamination that could not be removed. “We’ve consulted with other nuclear facilities that have utilized a similar process, developed safety and contingency plans, and will even place protective curtains of chain link fence and fabric over the concrete structure to prevent flying debris,” said Flowers.

CDI has an extensive safety plan that is implemented at all sites it works. “In addition to well established safety protocols in our industry, we strictly limit access to the area to authorized personnel and establish a safety perimeter prior to the blast,” said McClees.”

Flowers says CDI will perform two separate denotations. The first, scheduled for later this year, will soften the monolith down to ground level. The wrecking ball and excavator will then perform their jobs, which will be to level the softened concrete and rebar, and then remove it for disposal. Once the area has been cleared down to ground level, a second denotation will be performed to soften the concrete located below grade.



Turbine Building Foundation Removal

BIG ROCK POINT DECOMMISSIONING UPDATE (Continued)



The Concrete Monolith located inside containment was once home to the plant's reactor vessel. It will be "softened" using explosives to ease demolition. The brown "lines" on the upper half of the containment sphere indicate where the metal will be cut and then lowered to the ground.

WEST VALLEY DECOMMISSIONING UPDATE

Remediation work at the West Valley Demonstration Project (WVDP), the site of the only commercial nuclear fuel reprocessing center to ever operate in the United States, is focused on risk, waste, and infrastructure reduction. Under the direction of the U. S. Department of Energy (DOE), Washington Group International subsidiary West Valley Nuclear Services Company, Inc. (WVNSCO) has made tremendous progress toward accomplishing DOE's mission at the site. WVNSCO completed one of the Project's primary missions in 2002 – successful completion of the vitrification of more than 600,000 gallons of high level radioactive liquid that was stored at the site from past activities. Follow-on activities are underway.

Safety – Safety, a top value at the WVDP, is maintained through the successful application of safety principles in all aspects of work at the project. WVNSCO continues to maintain an industry lead with its safety record. With a Total Recordable Case Rate (TRC) of 0.2 and a Days Away/Restricted/Transferred (DART) rate of 0.0, the WVDP site recently surpassed 1,000 consecutive work days without a lost time work accident or illness. The safe consecutive work hours now total more than 3.5 million. The WVDP is a DOE Star site in the Voluntary Protection Program (VPP) and is scheduled for VPP recertification later this year.

WEST VALLEY DECOMMISSIONING UPDATE (Continued)

Risk Reduction – WVNSCO completed the dismantlement of the equipment in the Vitrification Facility in July 2005. The two-year effort involved the massive undertaking of safely packaging, removing, and preparing for the disposal of several large-scale and highly contaminated pieces of equipment. The 54-ton Joule-heated vitrification melter, which remained operational until the system underwent a planned shutdown in September 2002, was among the large pieces of equipment packaged and removed intact. Four other large components were also packaged and removed, as part of the more than 200 individual waste packages removed from the 100,000 ft³ facility. Virtually all the in-cell work was conducted by remote means due to dose readings as high as 1500R/hr and significant contamination levels within the cell. Remote tooling, such as the MegaTech ShearTM and the track driven BrokkTM demolition robot proved instrumental at freeing, size reducing, and packaging materials removed from the cell. A final sweep of the floor of the cell cleared it of residual loose debris. A limited amount of equipment remains operational in the cell to support the facility's possible future reuse.

Within the past year, WVNSCO has completed the internal decontamination of the General Purpose Cell and the Process Mechanical Cell, both “head end” cells in the reprocessing process. The cells contained remnants of spent fuel from reprocessing, including the fuel shear, bits of fuel hulls, and fuel collection baskets. Also completed was the decontamination of Extraction Cell – 2, a cavernous cell containing 35 process vessels and nearly two linear miles of process piping.

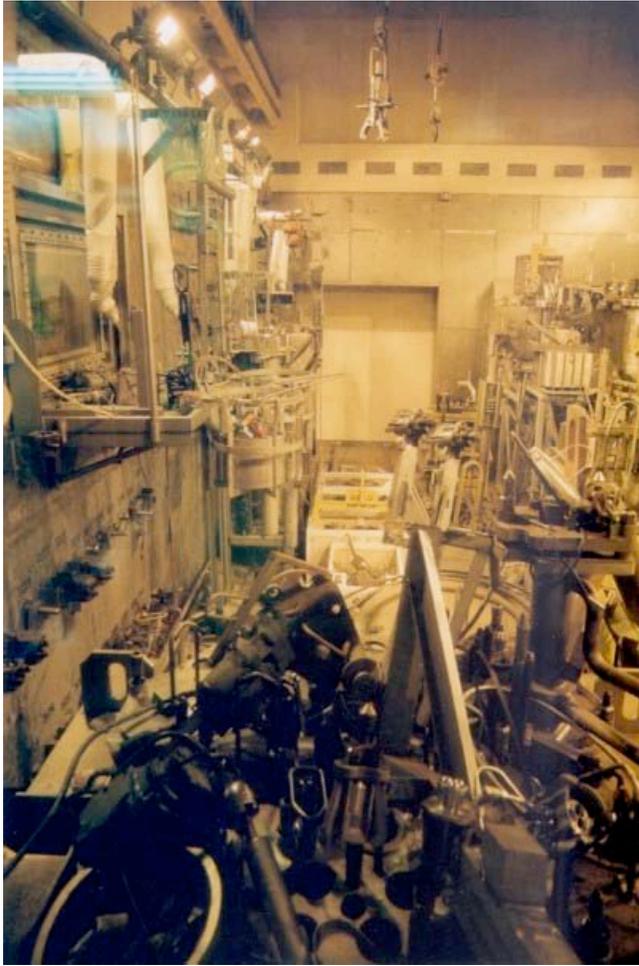
Waste Processing and Shipment – With an ambitious schedule to ship low-level waste with a pathway for disposal, WVNSCO expects to ship for disposal as much as 400,000 ft³ of waste off site for disposal in 2005. Truck and rail shipments are being used to dispose of legacy and recently generated wastes from a variety of routine and decontamination activities at the site. Disposal is taking place at the Envirocare facility in Utah and the Nevada Test Site located near Las Vegas, Nevada.

The wastes being prepared and shipped include filter resins, soil, concrete, and general debris. Waste preparation has involved hands-on size reduction and detailed package inspection for prohibited items, the use of a track mounted manipulator and cutting head, and spray coating. Packaging methods range from drums and boxes to special packages. By the end of this year, WVNSCO will have significantly reduced the amount of legacy low-level waste in storage at the WVDP.

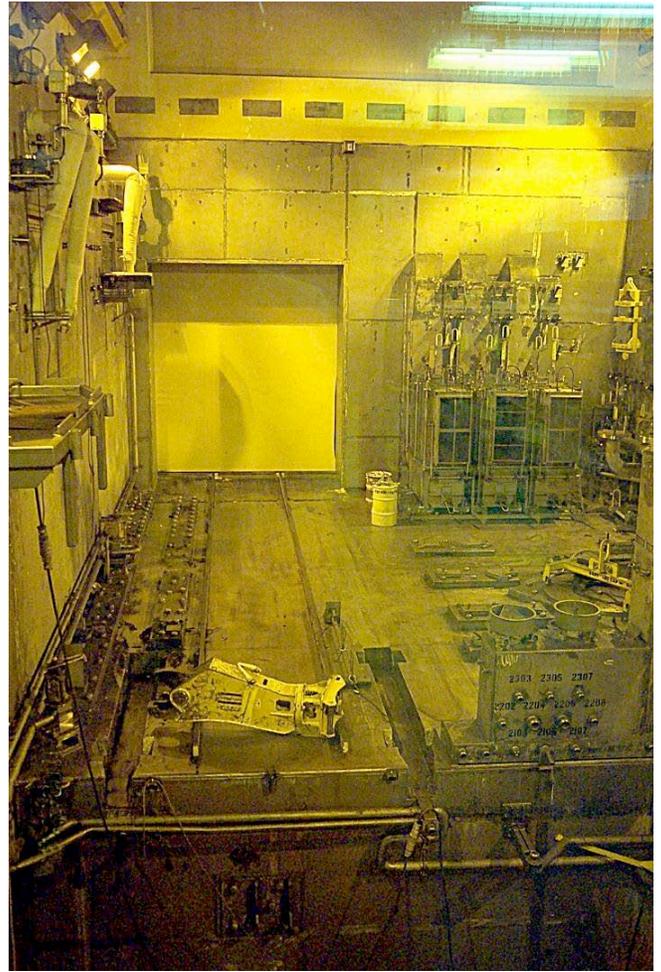
WVNSCO's success at reducing the radiological risks at the West Valley Demonstration Project is expected to result in the downgrading of the facility to a DOE Category 3 Nuclear Facility, the lesser of three types of DOE nuclear facilities. The categorization is based upon the amounts, types, and configuration of nuclear materials at the site and the potential risks that they pose. DOE approval of the new classification is pending.

Infrastructure Reduction – As a result of continued progress at the WVDP site, the Project has also experienced a significant reduction in infrastructure needs. Office space consolidation activities began in earnest in the latter portion of 2004, resulting in the removal and dispositioning of 40 temporary office trailers. The office personnel remaining in trailers were moved to an off-site office building or relocated to permanent offices on the site in 2005, eliminating the need for another 116 office trailer units. Benefits of the relocation include a centralized location for nearly all administrative employees and significant cost savings due to reduced utility and maintenance costs. The trailers are being dispositioned according to U.S. Department of Energy requirements for disposing of excess equipment.

WEST VALLEY DECOMMISSIONING UPDATE (Continued)



Vitrification cell before Dismantling



Vitrification Cell after dismantling



Dismantling using the Brokk

FERMI 1 DECOMMISSIONING UPDATE

Decommissioning activities continued at Fermi 1. Setup for processing the first primary sodium loop to react remaining sodium residues was completed. The planned process involves inerting the system with nitrogen, heating portions with electric heat to melt sodium residues, then adding steam in a controlled fashion mixed with nitrogen. The steam reacts with the sodium, forming hydrogen gas and sodium hydroxide. The gases are vented to a scrubber to remove sodium hydroxide particulates and then filtered through a HEPA unit. Gaseous effluent is monitored for hydrogen and oxygen and sampled for tritium and radioactive particulates. It is very important that no oxygen enters the system, because of the hydrogen produced during the reaction. After the reaction is complete, the system will be flooded with water to ensure any remaining sodium is reacted.

Setup is complex because it includes multiple injection and vent lines to deliver the steam to possible sodium residue locations in the primary pump, intermediate heat exchanger, and piping. The system was disconnected from the reactor, so the primary loop could be processed separately. The pictures show some views of the processing setup to provide a flavor for the work involved. They show the control panel, nitrogen and steam injection hoses, vent lines, scrubber and part of the piping and heater setup for the heat exchanger and pump. Since the primary loop equipment is in the Reactor Building basement, much of the work was in a confined space.

Processing of the first primary loop did start this summer, but was halted. A new chiller system is being installed for the scrubber due to overheating experienced during the processing. The majority of steam was reaching the scrubber rather than being used up by reacting with sodium residues. Processing is expected to resume later this year after the chiller system is complete.

Installation of a new process vessel for reacting batches of small bore sodium containing pipe was completed this summer. Also, the rotating plug on top of the reactor was rotated for the first time in about 30 years in preparation for removing mechanisms on top of the reactor. The evolution was well planned and worked like a charm!



HANFORD DECOMMISSIONING UPDATE

Hanford's River Corridor – 300 Area

In a significant step toward cleaning up Hanford's Columbia River Corridor, workers removed the last of 20 million pieces of uranium fuel manufactured at the site ahead of schedule and under budget. The project began in November 2004 and was completed 16 months before a regulatory milestone and two million dollars under budget.

Crews with contractor Fluor Hanford removed more than 80,000 low-enriched fuel rods from fuel-fabrication facilities located in Hanford's 300 Area, part of the Columbia River corridor north of Richland, Wash. The material was packaged and disposed of in a lined disposal facility at Hanford.

Hanford workers continued to make progress in taking down the "skyline" on the Hanford Site. Twenty excess structures were removed from Hanford's 300 Area--where nuclear fuel rods were manufactured for Hanford's production reactors. Additional structures were demolished near Hanford's U Plant, which dissolved irradiated fuel rods in order to obtain plutonium.]

During Hanford's production era—from the 1940s to the 1980s—the 300 Area manufactured more than 20 million pieces of fuel for Hanford's nuclear reactors along the Columbia River. Fuel irradiated in the reactors was processed to obtain the tiny amount of plutonium in each fuel rod.

Now that the last of the uranium fuel has been removed, the Department of Energy can continue to accelerate the demolition of facilities in the 300 Area without the inherent risk of this stored radioactive material. In the past year, Fluor Hanford has demolished 20 excess facilities in Hanford's 300 Area. Two hundred facilities are scheduled for final decommissioning and demolition by 2015.

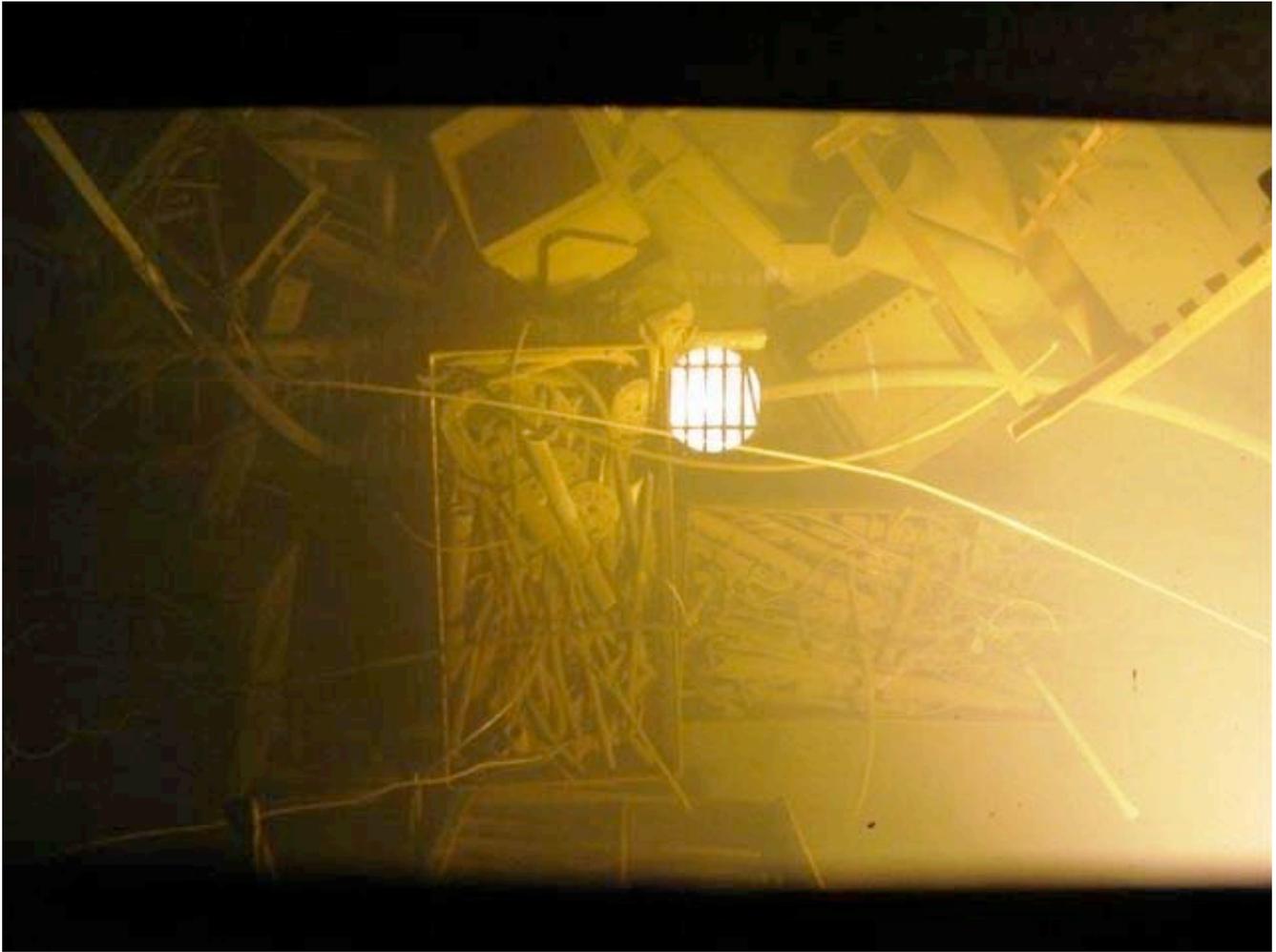
Hanford's River Corridor – K Basins Closure

The scope of work for closing Hanford's K Basins includes removing and treating approximately 50 cubic meters of radioactive sludge, draining water as the basins are partially filled with grout, and removing the basins themselves. The basins are approximately 400 yards away from the Columbia River, one of the country's major waterways.

Fluor Hanford crews continued to make steady progress in vacuuming radioactive sludge from the floors of Hanford's K Basins. The pair of million-gallon spent fuel pools had stored 2,300 tons of fuel assemblies from the 1970s and 1980s until the 105,000 fuel assemblies were removed, dried, and placed into storage on Hanford's Central Plateau.

Fluor Hanford workers began vacuuming the residual radioactive sludge from the floors of the basins shortly after fuel-removal activities were completed in October 2004. The sludge is being consolidated in large underwater containers in the basins. As of the end of August, crews had consolidated more than 80 percent of the estimated 42 cubic meters of sludge in the K East Basin. Poor water visibility and an unexpectedly large amount of debris continue to slow work progress.

HANFORD DECOMMISSIONING UPDATE (Continued)



Debris encountered in the K East Basin during sludge retrieval consists of a variety of material used or dropped in the basin since its construction in the 1950s. The debris includes welding blankets, water hoses, used equipment and tools, fuel spacers, and old containers used decades ago to move fuel.

Construction began on a hose-in-hose pipeline that will move sludge from the K East Basin into underwater containers in the K West Basin. The K East Basin is being emptied of sludge first because it is more contaminated and leak-prone than the K West Basin. As of September, construction of the sludge transfer pipeline was more than 75 percent complete.

The double-walled pipeline is constructed of steel-reinforced rubber. The transfer system will use pumps to maintain a high velocity needed to keep tiny particles of uranium in the sludge suspended for the half-mile journey between the basins.

In July, crews finished installing all six, large underwater containers in the K West Basin to receive sludge vacuumed from both basins. Workers began vacuuming the estimated eight cubic meters of sludge from the floor of the K West Basin in August.

HANFORD DECOMMISSIONING UPDATE (Continued)

As a further sign of decommissioning progress, workers began removing approximately 100,000 gallons of water from the spent-fuel discharge chute between the K West Reactor and the K West Basin to begin filling the chute with approximately 500 cubic yards of grout this fall.

Fast Flux Test Facility (FFTF): Fuel assembly and sodium removal continues

In June, Fluor Hanford finished draining an estimated 140,000 gallons of liquid sodium from the reactor's primary cooling system. As of the end of August, crews had washed and removed 325 of 375 fuel assemblies from the reactor and had finished working on the second of five assemblies that require special processing to identify failed fuel pins and separate sodium-bonded pins. By September, crews had finished draining one of FFTF's two spent-fuel pools—the Fuel Storage Facility, which held 31,000 gallons of liquid sodium coolant.

Hanford's Central Plateau

Closing the Plutonium Finishing Plant

In July, Fluor Hanford workers completed a regulatory milestone to remove plutonium “hold up” in processing systems and equipment more than a year ahead of schedule.

Crews with cleanup contractor Fluor Hanford removed and packaged more than 500 drums of plutonium “hold-up” more than a year ahead of the milestone. The milestone called for removing significant quantities of plutonium held up in glove boxes, equipment, processing ventilation systems and canyon areas to reduce security requirements.

A formal security program with access controls and clearance requirements for personnel remains in place. At the same time, large portions of the facility are now more readily accessible to crews conducting decommissioning work. Security alarm systems and personnel access controls have been reconfigured to focus on supporting and facilitating the remaining work.

Removing the plutonium hold-up material reduces the risk to employees and allows the Department of Energy and Fluor Hanford to get more work done safely, less expensively and more efficiently.

The hold-up material containing trace amounts of plutonium is being treated and packaged as transuranic waste, and will be shipped to the Waste Isolation Pilot Plant in Carlsbad, New Mexico for permanent disposal. A portion of the material, because of its higher concentration, was stabilized and packaged in triple-lined “3013” cans. The material will be stored on site until a decision is made on its final disposition.

For decades during Hanford's historical defense mission, the Plutonium Finishing Plant and supporting facilities purified and converted plutonium solutions to a more useable form for weapons fabrication. In 2004, workers completed the daunting task of removing, stabilizing and packaging approximately 20 tons of plutonium-bearing material to prepare the facilities for cleanup and demolition. As a result of that campaign, Hanford has shipped about 1,800 drums of transuranic waste to the Waste Isolation Pilot Plant (WIPP), and packaged more than 2,100 “3013” cans for long-term storage.

HANFORD DECOMMISSIONING UPDATE (Continued)

Cleanup activities in the Plutonium Finishing Plant complex include deactivating and decommissioning 63 facilities, encompassing 231 glove boxes and laboratory hoods, 21 vaults, 4 process cells, and 4 major chemical storage areas. To date, 10 support facilities have been decommissioned and demolished. As of the end of August, Fluor Hanford workers had decontaminated 44 of 231 glove boxes in the 15-acre complex to low-level waste status.

Decommissioning U Plant Structures

In August, Fluor Hanford crews finished demolishing 11 contaminated facilities next to Hanford's U Plant Processing canyon seven months ahead of schedule and \$5.5 million under budget. The project started in August 2004 and was scheduled to be finished in March 2006.

The ancillary facilities comprised an administrative building, shops, warehouses, storage buildings, storage tank enclosures, two 100,000-gallon tanks, and steam lines formerly used to deliver heat to the buildings. Crews first tackled a maze of aboveground steam lines to clear space for a staging area where demolition debris would be loaded into containers for disposal at Hanford's low-level waste disposal facility, the Environmental Restoration Disposal Facility.

The steam lines were covered by insulation containing asbestos, exemplifying a common practice of past decades. Plastic portable glovebag systems were placed over the lines to protect the workers removing the insulation. After the insulation was removed, the lines were coated to fix any remaining asbestos contamination before they were taken down.

The six remaining ancillary facilities are scheduled for demolition after fiscal year 2006.

Refurbishing water lines

Hanford's former processing areas (known as the 200 East and 200 E West Areas) rely on several miles of water lines to supply potable and raw water for ongoing D&D and environmental restoration projects. Many of the water lines are old and leaking—with some dating back to the 1940s, when reactors and processing facilities were built as part of the Manhattan Project.



A Hanford water line before and after refurbishing: several miles of raw and potable water lines are being cleaned to remove scale buildup and lined with mortar to prevent leaks that can drive contaminants in the surrounding soil deeper toward groundwater

HANFORD DECOMMISSIONING UPDATE (Continued)

Water leaks—both large and small, can drive contaminants in the soil from past releases of processing liquids deeper toward groundwater. In an effort to reduce the potential for water leaks and to help protect Hanford's groundwater, the Department of Energy is refurbishing 30 miles of water lines, starting with about eight miles of water lines that are closest to high-risk waste sites. Contractor Fluor Hanford is managing the project and completed the first four miles of high-priority water lines in high-risk areas in September.

Traditionally, water lines were replaced. After doing research and investigating alternatives, the DOE and Fluor decided to refurbish the lines using a mortar-lining technique. Crews excavate down to the water lines every 300 to 500 feet and push a series of scrapers, called 'pigs,' through the line. After scale buildup is removed from the inside of the pipes, high-strength cement mortar is applied inside the lines. A drag trowel produces a dense, smooth finish, and the lines are inspected and checked to ensure water quality standards are met before they are placed back in service.

The method offers several benefits. Pipes can be refurbished at about half the cost of installing new water lines through contaminated soil. Excavating the pipes at intervals, rather than along the full length of a water line, protects Hanford workers by limiting the potential for exposure to contaminated soil.

Transuranic Waste Retrieval and Shipments to WIPP

In July, Hanford workers again met a regulatory milestone for retrieving waste from Hanford burial grounds months ahead of schedule. Deputy Secretary of Energy Clay Sell visited the site in August and announced that crews had retrieved the first 1,200 cubic meters of waste four months ahead of schedule in 2004 and an additional 1,500 cubic meters of waste five months ahead of the 2005 regulatory milestone.

The Department of Energy and Fluor Hanford met the regulatory milestone for retrieving buried waste drums months ahead of schedule for the second year in a row in July. Even as the project encountered drums that were more corroded, by using a methodical process to remove and check drums, workers were able to maintain an outstanding safety record, with no recordable injuries.

The Tri-Party Agreement between DOE, Washington State and the U.S. Environmental Protection Agency calls for DOE to retrieve all contact-handled, suspect transuranic waste (expected to be the equivalent of 75,000 drums) by the end of 2010, with interim milestones each year.

In October 2003, Fluor Hanford began retrieving drums and boxes of waste from low-level burial grounds in Hanford's 200 West Area. The waste is in the form of contaminated debris, tools, clothing, and other materials generated in the 1970s and 1980s.

The waste containers were stacked on asphalt pads, covered with plywood, draped with tarps, and then covered with dirt. Once the drums are retrieved, workers determine whether they contain low-level waste, which can be disposed of in a lined, permitted facility on the Hanford Site, or transuranic waste, which is then prepared for shipment to WIPP.

Pulling the containers out of the trenches eliminates the threat they pose to the surrounding environment and allows the DOE to increase the number of shipments of transuranic waste out of Washington State for disposal. As of the third week of September, DOE and Fluor Hanford were poised to make the 100th shipment to WIPP in fiscal year 2005. That brings the total number of shipments to more than 215 and the total number of drums shipped to more than 6,200 (since shipments began in fiscal year 2000).

INL DECOMMISSIONING UPDATE

Decommissioning work continues at a fast pace at the INL under the direction of the new cleanup contractor, CH2M-WG, Idaho. Major projects are being worked at the Engineering Test Reactor (ETR), the Idaho Nuclear Technology and Engineering Center (INTEC), Loss of Fluid Test (LOFT) facility, and at Test Area North (TAN) facilities.

At INTEC, a very old analytical laboratory (Building CPP-627) is now nearly completely dismantled. This facility represents one of the more highly contaminated facilities at the INL and thus presented one of the major challenges for the D&D program here. Auxiliary facilities or buildings associated with the ETR reactor are currently undergoing decommissioning in the program to decommission that historic reactor.

Work has also begun on the LOFT facility. Although the reactor, which was mounted on a double wide rail car, was removed and decommissioned a number of years ago, the reactor containment building is now being removed. The TAN facility, which is the location of the original Aircraft Nuclear Propulsion project, is being decommissioned and many of the support facilities for that historic program have now been successfully removed.

UNITED KINGDOM DECOMMISSIONING UPDATE

Nuclear Decommissioning Authority

The Nuclear Decommissioning Authority (NDA) issued their strategy draft for consultation on 11 August 2005. The NDA welcomes input to help them finalise their strategy; the consultation period ends on 11 November 2005 and the proposed strategy can be found at www.nda.gov.uk. ANS DD&R members are encouraged to send NDA their comments.

Key scope considered in NDA's draft strategy is:

- Focus on the reduction of potential high hazards, especially at the Sellafield reprocessing plant. This is NDA's number one clean up priority.
- Seek to accelerate significantly the decommissioning of the Magnox power stations. NDA proposes to defuel, decommission and release the 11 Magnox sites, containing 26 power reactors in total, for alternative use within 25 years. This compares with the current UK strategy of site clearance in around 100 years.

The UK Government has set NDA a target of completing competitions for clean up of at least 50% of their 20 sites by the end of 2008. To meet this, NDA plan to award management and operation contracts for the LLW sites at Drigg and Dounreay in 2006, for all the decommissioning Magnox sites (split into two bundles) in 2007, for Dounreay, Harwell and Winfrith (currently operated by UKAEA) in 2008 and for Sellafield in 2010. The currently operating Magnox sites Wylfa and Oldbury will not be competed until 2011, after they have both closed.

UNITED KINGDOM DECOMMISSIONING UPDATE (Continued)

Committee on Radioactive Waste Management

The Government has initiated a review of the management of ILW (broadly, waste >12GBq/te) and HLW. This is being carried out by the Committee on Radioactive Waste Management (CoRWM), which is due to report its findings to Government in July 2006. At that time, Government will need to take a view on CoRWM's recommendations and decide whether to press ahead with construction of disposal site(s) or to construct interim storage for these waste types.

CoRWM is committed to extensive stakeholder consultation to elicit the option most favoured within the UK. The committee has produced a short list of options for ILW and HLW management:

- Long term interim storage
- Deep geologic disposal
- Phased deep geologic disposal (monitorable and retrievable)
- Non-geologic disposal of reactor decommissioning wastes

These options, together with the assessment methodology and stakeholder engagement plan, are described in detail at www.corwm.org.uk.

Reactor site decommissioning progress - defuelling

Defuelling a Magnox reactor is a time consuming process: each unit holds 25,000 fuel elements that have to be withdrawn from the reactor individually and then sent to Sellafield, for reprocessing, in fuel transport flasks that hold about 200 elements per trip. Verifying that the reactors have been totally defuelled is not straightforward - each of the 3,000 fuel channels must be inspected individually, typically by CCTV, to ensure it is empty. All fuel has been dispatched from Berkeley, Hunterston A, Trawsfynydd and Hinkley Point A power stations. One of the two reactors was finally defuelled at Bradwell early in September 2005 and the other unit will be defuelled in a few weeks time. The fuel routes at the shutdown stations Calder Hall and Chapelcross are being extensively modified to allow these four unit sites to be defuelled faster. Work has started to empty the dry fuel stores at Wylfa, including development of techniques to retrieve a small number of fuel elements that accidentally became wet, corroded and consequently became stuck in the tube store.

Pressure to close the Magnox sites, defuel them and stop reprocessing at Sellafield comes from the requirements of the OSPAR treaty that requires cessation of discharges to the north Atlantic by 2020.

Input Provided by
Paul B Woollam
Chief Decommissioning Strategist
British Nuclear Group

UNITED KINGDOM DECOMMISSIONING UPDATE (Continued)

Defuelling the Trawsfynydd Magnox reactors



Trawsfynydd was a two-unit power station uniquely located in a National Park in North Wales. The site is now fully defuelled, with the fuel dispatched to Sellafield, and the fuel machines have been dismantled.

UNITED KINGDOM DECOMMISSIONING UPDATE (Continued)

Fuel dispatch from the defuelling Magnox sites



Flask leak testing before transport



Transferring the 50 ton flask containing around 200 fuel elements to a railway flatrol

SELLAFIELD DECOMMISSIONING UPDATE

1. CLEANUP AT SELLAFIELD

The UK nuclear industry has recently undergone massive reform. A new Government body called the Nuclear Decommissioning Authority (NDA) has been established. It now owns all the UK nuclear liabilities, assets and sites, and is charged with overseeing accelerated decommissioning and ensuring value for UK taxpayers.

In response to this reformation, BNFL formed a new business called British Nuclear Group, which has a clear focus on intelligent nuclear cleanup. During 2005 British Nuclear Group established a dedicated and experienced cleanup organization to deliver decommissioning at the Sellafield group of sites. This organization has recently been enhanced with a number of key personnel from Fluor, to blend the highly technical and historical expertise at Sellafield with US cleanup experience.

With over 200 nuclear facilities Sellafield is the largest and most complex nuclear cleanup site in the world. It comprises activities that cover the entire nuclear fuel cycle. British Nuclear Group is the primary contractor for this site, which includes a complete spectrum of redundant plants and waste streams to manage. The scope-of-work is valued at \$49 billion and encompasses over 60% of the entire NDA national cleanup program.

What follows is a concise update of recent progress delivered by the British Nuclear Group Cleanup organization, at the Sellafield group of nuclear sites.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

2. LEGACY PONDS PROJECT

2.1 Pile Fuel Storage Pond

Constructed and commissioned between 1948 and 1952, this open-air pond provided storage and cooling for irradiated fuel and isotopes originating from the Windscale Pile Reactors. This military operation pre-dated the civil nuclear mission at Sellafield. Skip movements at the pond ceased in 1970 and the building was left in a dormant state. The pond contains oxide fuel, various isotopes, Magnox fuel cladding, fuel cartridges, contaminated scrap and activated material, and a significant quantity of ILW Sludge.

Recent progress has been made by: removing 15 uranium flasks that had remained on the pond wall for 45 years, completing a campaign of debris removal from the pond, demolishing the east winch house, and installing and commissioning new handling equipment for the retrieval of oxide fuel.

Work is about to begin to demolish adjacent office and changing facilities to create space for constructing a new sludge treatment plant. Also about to commence is a significant project to retrieve 17 consignments of oxide fuel, using the new handling equipment and a bespoke transport flask.

Within the next 12 months a new pond water cleanup system will be installed along with equipment to remove pond skips and facilitate sludge removal operations. An update will be provided in future newsletters.

2.2 First Generation Magnox Storage Pond

Work continues at this facility on many fronts to improve the condition of the building and prepare the plant for the challenge of retrieving the historic inventory. Constructed in the early 1950's, this building played a vital role in the UK Magnox program by storing spent nuclear fuel and removing fuel cladding prior to reprocessing. Unexpected reprocessing outages resulted in fuel residing in the open-air pond for longer than expected, leading to increased corrosion resulting in significant quantities of ILW sludge. This facility is a high priority on the NDA national agenda.

A recent achievement has been the design, manufacture and testing of the Gantry Refurbishment System (GRS), conducted by Wellman Booth in conjunction with British Nuclear Group and ACKtiv Nuclear. The system will be installed over the pond to support equipment and worker access while refurbishing the gantry rails on which the Skip Handler travels.

Refurbishing the Skip Handler and its rail system is a vital enabler to allow recommencement of pond management activities and accelerating the retrieval of skips and sludge from the pond. Challenging and important work to refurbish the steelwork trestles that support the Skip Handler is currently underway and is expected to be completed later this year.

A significant milestone has also been achieved on the adjacent Sludge Settling Pond. Extending support rails over this facility is a significant step toward removing the remaining waste inventory from the pond using a Sludge Retrieval Machine (SRM).

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

At the same time, engineered platforms and staircases to improve human access were installed. All work was completed without incident, with the project team overcoming significant challenges from the radiological conditions, and the precision required for mobile crane operations in a congested city center style environment.

The completion of work to extend the rails now allows the SRM to access the pond's western sub-chambers. Removing the remaining sludge from the pond is a full-scale trial for the more challenging task of de-sludging other ponds at Sellafield.

Over 180 cubic meters of sludge has already been successfully pumped from the pond in the past, a massive achievement especially when taking the ponds age and challenging radiological conditions into account.

With the decommissioning of such facilities being a key priority for the NDA, the ability to empty the pond is a major step forward in the cleanup process. This will ultimately be the first open-air pond at Sellafield to be fully decommissioned and remediated.

There is much other vital and exciting work taking place at this facility, including a number of trial retrieval projects that, when completed, have the potential to enable significant acceleration. Details of this and other work will be reported in future newsletters.

3. LEGACY SILOS PROJECT

3.1 Pile Fuel Cladding Silo

Commissioned in 1952 to store waste from military reprocessing operations, this legacy facility was the first solid waste store at Sellafield. It was filled by 1965 with mixed ILW in the form of: aluminum fuel cladding, magnesium oxide fuel cladding, graphite, miscellaneous and chemically reactive waste, and contaminated wood, paper and organic material. This is another facility at Sellafield that is high on the NDA national agenda.

In view of the deteriorating condition of the facility, a strategy was developed for progressive improvement to fire resistance, structural integrity, and seismic performance as a precursor to removal of the stored waste. This phased and systematic risk reduction program aligned to regulatory needs was implemented in the late 1990's, and has now significantly reduced the silo risk by a hundredfold.

The initial phase was to install an argon fire-fighting system to mitigate the potential for a uranium hydride fire in any of the silo's 6 storage compartments. This system was commissioned in 2001 and reduced the overall silo risk by 70%. The argon plant effectively inerted the silo compartments and Transfer Tunnel to a level of less than 2% oxygen, and opened up the possibility for waste disturbance for the first time.

Following on from silo inerting, the second phase of work addressed the issue of structural damage and preparations for sealing the compartment charge holes. Part of this work involved dealing with the radioactive waste that had become lodged above some silo compartments within the waste Transfer Tunnel. Radiation levels within the tunnel were 6.5 R per hour. The waste was safely and successfully displaced into the compartments using a simple, ingenious and cost effective technique, reducing radiation levels to 0.2 R per hour. 26,400 lbs of radioactive waste were cleared along with 5,940 lbs of contaminated decking and scaffold.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

The reduction in radiation and contamination levels enabled human access into the tunnel for the more complex phase of plugging the 6 charge holes, through which waste had been introduced into the compartments. Extensive rehearsal and simulated testing directly ensured this challenging phase was completed safely and successfully. The important work to seal the charge holes was completed in 2004.

Once the seals on the silo had been proven, natural ventilation of the tunnel was established by drilling circular holes through the brick structure. The tunnel roof was then safely removed, followed closely by complete demolition of the tunnel, the most seismically challenged part of the structure. An unexpected difficulty presented during tunnel demolition was the sheer strength of the bricks, made in nearby Whitehaven during the war years. The crushing machine employed for the task had difficulty dealing with the strength of the bricks and quickly broke. A more powerful tool was procured which successfully continued the demolition task. Tunnel demolition was completed in June 2006 signifying the achievement of a major milestone.

The major work packages at the Pile Fuel Cladding Silo have been accelerated by up to 3 years. Throughout the project many combined hazards have been safely managed and overcome in this congested city center style environment: adverse radiological conditions, work/demolition at height, manual waste handling, and the potential for asphyxiation by argon. The overall success of the project proves that British Nuclear Group can successfully manage old plant and accelerate cleanup in the most hazardous environments Sellafield has to offer.

For further details of this exciting project see the article *Tunnelling out at 20.85 Meters* in the July/August issue of Radwaste Solutions.

3.2 Magnox Swarf Storage Silos (Swarf = result of removing cladding from Magnox fuel)

This is another facility at Sellafield that is a key priority for the NDA and British Nuclear Group. Construction of the original silo was initiated in the mid 1960's as the Pile Fuel Cladding Silo reached its storage capacity. This silo was filled by 1972. A further 3 silos were constructed, up until the mid 1980's, as extensions to the original building.

The silos contain a mixed waste inventory comprising: cladding from Magnox fuel – most of which has corroded into sludge, irradiated uranium metal, solid beta-gamma waste, and zirconium/stainless steel hulls. The activity of the inventory ranges from 27 to 2,700 Ci per cubic meter. Hydrogen generated by the corrosion of the fuel cladding presents constant ventilation and cooling challenges.

From the mid to late 1990's a prototype retrieval machine called the Swarf Retrieval Facility (SRF) safely removed nearly 1.3 million lbs of non-corroded swarf for downstream treatment and encapsulation. The remaining swarf within the silos has corroded beyond the Condition for Acceptance (CFA) of the downstream treatment facility, the Magnox Encapsulation Plant (MEP).

British Nuclear Group in conjunction with Rolls Royce, have designed and built 3 new generation retrieval machines called the Silo Emptying Plant (SEP); these will be utilized to remove the remaining bulk inventory. The machines are currently being tested and improved off-site before they are installed and commissioned in the building.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

Prior to the challenging work to install the Silo Emptying Plant and commence waste retrievals, it has been necessary to conduct an extensive program of preparatory and upgrading work on the silos.

The SRF and 3 redundant waste tipping machines - totalling 732,600 lbs - have been fully decommissioned, removed, and disposed of to the LLWR. This was necessary to create space for installing the SEP. The internals of these machines had been in direct contact with silo liquor and waste; the tipping machines had each tipped roughly 2,000 cubic meters of waste during operational service. All 4 machines were split into modules to be within the capacity of the building crane. They were then decontaminated and decommissioned in a way that makes the machine the primary containment. All machine modules were taken to the LLWR by road because they were too heavy for rail transportation.

One of the major challenges faced by the decommissioning team was to reinstate the capability to apply cooling to the waste inside the silos. This is an important component of the plants safety case because the waste generates heat and this increase the temperature of the cooling water. At increased temperatures the swarf corrosion rates are increased and hydrogen can be generated in larger quantities, and due to this the reestablishment of cooling is very important. Direct cooling has recently been reinstated to 2 silo compartments by welding engineered connections. One of these welds was performed in a fully remote manner due to a contact dose of 200 R per hour on the pipe flange.

Another impressive achievement was the cleanup of a contaminated area on the operations floor (the roof of the silos). Contamination occurred in 1999 when silo liquor was inadvertently ejected from a redundant pipe following start-up of a cooling system. The liquor became absorbed by the concrete floor and levels were recorded at 200 R per hour. The event delayed preparation for retrieval projects because the contaminated floor prevented installation of the massive support rails for the SEP. A standard concrete shaver was modified by the project and remotely controlled to remove 10 millimeters of floor surface. The resulting contaminated concrete dust was mixed with water to form slurry in a special waste handling facility, which discharged the mixture back into the silo.

The current focus of the project is to replace an old building crane. A new crane is required for the challenging work of installing the SEP and supporting bulk waste retrievals. The replacement of crane rails throughout the building has recently been completed. A 1.76 million lb mobile crane will be utilized to remove roof sections, remove the old crane, and then introduce the new crane to the building. This hazardous operation will be undertaken by British Nuclear Groups very experienced decommissioning team within the next few weeks.

4. DECOMMISSIONING PROJECT

4.1 Calder Hall Nuclear Power Station

Work is progressing well to prepare for the controlled demolition of the 4 Cooling Towers later this year. Removal of the internal materials from the towers has commenced.

The internal materials comprise of 6,000 cubic meters of plastic packing, 57,200 lbs of wood, and 1.6 kilometers of asbestos cement piping in each tower.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

The towers are approximately 88 meters high, with top, throat and bottom diameters of 32.5, 32 and 58 meters respectively. The towers operated from the late 1950's until generation ceased in March 2003.

Potential demolition methods have been under assessment since the towers became redundant in 2003 and strategy development began in earnest during June 2004. Over the past 30 years, more than 200 similar structures have been successfully demolished using the proposed technique.

The proposed demolition technique requires that approximately 60% of the circumference of the shell and legs are removed. This will cause the towers to tilt and collapse approximately 5 degrees from vertical. It is likely that a small area of the shell will land outside the pond area up to a distance of 10 meters.

The Preliminary Safety Report, completed in January 2005, indicated that additional assessments were required to determine potential impacts of the demolition activity on the surrounding buildings. These additional and ongoing assessments include: debris and collapse mechanism, noise, air overpressure, projectiles, ground vibrations, dust release, and radiological assessment.

Preliminary indications are that most of the impacts are limited to the Calder Hall Power Station and are readily addressed through engineered controls. An extensive internal and external stakeholder engagement plan has been implemented to ensure that potential coordination issues are captured for inclusion in the project implementation strategy.

4.2 Caesium Extraction Plant

A major project milestone has been achieved in decommissioning the Caesium Extraction Plant, removing 27 vessels from Cell 2 ahead of schedule.

The Caesium Extraction Plant comprises 4 cells, each of which requires decommissioning. Developed in a building void above the site's high active liquor buffer storage tanks in the early 1950s, it was used to produce kilocurie Caesium 137 (Cs137) isotopes for use as medical radiotherapy sources and operated between 1955 and 1958. Radiation levels within the cells have been measured up to 370 R per hour.

Radiation levels in the cells are above those permissible for human entry. To overcome this, an 800-ton free standing mobile decommissioning module was designed and constructed. This houses a remote access manipulator, whose remote tool change was able to exchange the 20 tools that were adapted from the propriety equipment, identified as being required for dismantling tasks. Total decommissioning of Cell 2 is due for completion by autumn 2006.

4.3 Beta-gamma ILW Retrieval

Phase 1 retrieval of Intermediate-level Waste from an historic store has been completed safely and successfully nearly 1 month ahead of schedule. The storage consists of 8 cells that were used historically for storing beta-gamma waste. Phase 1 involved removing the remaining material that was stored between the cell walls, known as inter-space waste. 76 drums of waste were retrieved in total along with 10 filter box units. Confirmation by assay that 69 of the drums were Low-level Waste reduced the overall project schedule. All 76 drums were decanted to ensure they contained no free liquor. This was necessary because liquor was detected in waste drums arising from the facility during 2004. Phase 2 of the project involves the installation of new decommissioning plant and equipment, and the retrieval and packaging of waste stored within the 8 cells. An update of Phase 2 will be provided in a future newsletter.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

4.4 First Generation Uranium Purification Plant

Commissioned in 1953 this original reprocessing plant operated successfully, using tri-butyl phosphate as the extracting solvent, until 1964 when it became redundant. Following this the plant was reutilized for a variety of purposes: uranyl nitrate storage, converting out-of-specification uranium trioxide, recovering neptunium 237 from reprocessing waste streams, and also housed 2 inactive test rigs for developing oxide fuel reprocessing technology.

The process plant and equipment was located within 4 process cells, all of which have now been fully decommissioned. Contamination levels within the cells averaged at 420 pCi, with levels inside the process vessels over 9,331 pCi. Plant and equipment within the process cells had experienced varying levels of corrosion and general deterioration. Therefore, the decommissioning program had to take account of increasing difficulty in accessing plant and equipment, as it deteriorated further with time.

The facility is located in a sensitive and congested part of the Sellafield site in close proximity to: legacy storage facilities, operational reprocessing plant, redundant reprocessing facilities, piping bridges carrying medium and high active liquors, the site rail network, roads, and pedestrian walkways.

This successful decommissioning program has an impressive record of waste minimization and free release spanning over 10 years. Commercial off-the-shelf equipment and simple techniques were utilized wherever possible. All waste minimization and decommissioning facilities were transferred to other projects for reutilization. The final decommissioning of this building has been accelerated by 69 years and demolition will begin in early 2006.

4.5 Pilot Reprocessing Facility

This facility ceased operation in 1960. Located within the Sellafield Analytical Laboratories it comprises of 4 cells: dissolver facility, metal cutting cell, primary separation cell, and high active cell. Limited post-operational clean out had been performed, leaving contaminated process equipment and irradiated fuel to be dealt with.

The decommissioning program has been implemented in 3 phases: installation of the waste route, decommissioning of each cell, and demolition of the large concrete plinths that supported the process equipment. Radiation levels within the cells were 200 R per hour, meaning that most of the dismantling operation had to be carried out remotely. In fact this was the first decommissioning project in the world to utilize fully remote Brokk technology.

Phases 1 and 2 have been successfully completed using a range of remote solutions to dismantle equipment and recover spent fuel and fuel debris. Phase 3, the remote demolition of the cell plinths, is currently being progressed using the larger Brokk 180 machine.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

4.6 Recovery of Sea Discharge Pipelines

The beach adjacent to Sellafield was fully reinstated and handed back to the local community in May 2005. This milestone followed on from a major project to remove the redundant sea discharge pipes that involved sub-sea cutting operations. The pipelines carried treated process liquids and rainwater from the Sellafield site, discharging at 1 kilometer from the high water mark. The beach reinstatement phase involved the removal of man-made structures that had supported the pipelines for over 50 years. Approximately 3.3 million lbs of concrete and steel utilized for locating the pipes on the beach has also been removed.

The next phase of the project, which has already commenced, involves refurbishing the bridge that carries the discharge pipes over the River Ehen and the West Coast Rail Line. The bridge was constructed in 1949 and this project will completely refurbish it by replacing the bridge piers and deck edge, and installing state-of-the-art corrosion protection. It has been necessary to work closely with Network Rail to ensure there is no disruption to the normal rail service.

4.7 Plutonium Purification and Residues Recovery Plant

This facility operated from 1954 through to 1987 utilizing a solvent extraction process to purify the plutonium stream from fuel reprocessing. The plant comprises of 2 mirror image cells constructed of bare brick. This cell structure provides secondary containment, with the process vessels and piping providing primary containment. During the long operational lifetime of the plant, the primary containment deteriorated to such an extent that the process cell structure eventually became the main containment, with contamination levels in excess of 9,331 pCi alpha.

The decommissioning program has been implemented in 3 phases: installation of a new filtered ventilation system, removal of equipment from the cell annulus and in-cell process vessels/piping, and removal of the highly contaminated redundant ventilation system along with removing the most grossly contaminated process vessels.

Phases 1 and 2 have been successfully completed. Phase 3 is progressing well with the removal of 11 highly contaminated process vessels so far this year.

4.8 Recent Demolition Activity

A number of buildings and structures have been fully demolished this year at Sellafield. A former explosives and latterly thorium store that pre-dated the Sellafield nuclear mission was successfully demolished in February 2005. In early March 2005 the sites first fire station was also safely reduced to rubble. Following on from these were the demolition of the sites historic criticality reception building, dismantling of numerous large vessels for the treatment of water utilized in the Calder Hall operation, and the shaft base access building at one of the Windscale Pile Chimney's, that also housed a fan room and electrical switch room.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

5. WASTE PROJECT

5.1 LLW Progress and Efficiency Improvements

Reducing radioactive waste and increasing the amount of recyclable and free release material is vitally important to cleaning up the Sellafield site. As the cleanup process accelerates, and redundant buildings are decommissioned and demolished, it will inevitably generate a higher volume of waste for disposal.

One of the challenges facing the site is minimizing the volume of this waste and ensuring that it is disposed via the most cost effective route. In response to this, the Waste Project team has implemented an extensive program of work. An excellent example is the re-categorization of suspected historic ILW in an area adjacent to a legacy fuel storage pond. The team performed a full investigation of the waste and found that 4 cubic meters were actually LLW. This allowed the material to go to the Low-level Waste Repository (LLWR) for safe disposal, resulting in a massive lifecycle cost saving of \$776,082.

Another key step forward this year is to get a new metals recycling facility operational. This facility will remove the outer surface of contaminated metals using an abrasion process, resulting in greater volumes of free release that can be sold as scrap metal on the open market. Initially this facility will be used to decontaminate 400 redundant ISO containers; it will then be used to process increasing quantities of metals from demolition and decommissioning operations.

A key driver for implementing these improvements is to enhance the capacity of the LLWR. Traditionally waste has simply defaulted to LLW because of where it was generated. The Waste Project now engages in more accurate and upfront waste characterization and segregation, enabling the utilization of cheaper free release routes, and in some cases the recycling, reutilization, and resale of the material.

Waste that is not suitable for compaction at the Waste Monitoring and Compaction Plant (WAMAC) is sent for direct disposal to LLWR. Traditionally, a very poor packing fraction of approximately 30% has been achieved. Using simple waste sorting techniques the packing efficiency has increased to 60% and further initiatives are underway to give even greater improvement.

WAMAC is utilized for the radiological assessment, sorting and compaction of a range of LLW. It processes waste generated at Sellafield, other UK nuclear sites, hospitals, universities, and other commercial organizations prior to disposal at the LLWR. A major focus for this facility this year is to compact 65 backlog containers of LLW. This is legacy waste contained in storage drums that are in very poor condition. British Nuclear Group has a regulatory commitment to process all of this waste into a passive form by 2007. The poor condition of the waste makes processing rather difficult. This contract target is progressing extremely well with 56 containers compacted so far and it is confidently expected that the overall regulatory target will be achieved.

SELLAFIELD DECOMMISSIONING UPDATE (Continued)

5.2 Treatment and Storage of Plutonium Contaminated Material (PCM)

PCM can be directly compared to the US waste stream TRU and forms part of the UK waste characterized as ILW.

The Waste Treatment Complex (WTC) at Sellafield is a modern facility, utilized for compacting PCM storage drums, to enhance storage capacity in the 3 Engineered Drum Stores at the site. A baseline review of the WTC mission in 2004 showed that the facility needed to achieve a fourfold throughput improvement over a 4 year period to meet regulatory requirements pertaining to the passive storage of PCM waste. The plant recently set a new weekly record of 79 drum compactations. This takes the yearly total to 1,051 compactations against a plan of 906, keeping the facility on track to meet this throughput challenge. Successful operations continue at the complex in its vital mission to support the cleanup at Sellafield.

Over 7,000 individual drums of PCM have been transferred from old and degrading storage buildings to the sites modern Engineered Drum Stores. This impressive achievement was accelerated by redeploying workers from plants experiencing outages to assist the core team. Demolition of the old PCM storage buildings will be performed in the near future.

6. DISPOSAL AND STORAGE PROJECT

6.1 Plutonium Contaminated Material (PCM) Retrievals

The Gemini transport container was successfully transferred from the LLWR at Drigg on 10 August, and delivered to an Engineered Drum Store at Sellafield. This is the first movement since the recent issue of the Transport Licence extension. Regularly planned Gemini transports are part of British Nuclear Group's project to fulfill our pledge made to the local community to remove all PCM from the LLWR by the end of 2006.

Removal of the wall of Magazine 4 represents another significant step in the safe removal of PCM from the LLWR site. The Magazines contain PCM waste brought to the site for storage in the 1960's which was then 'walled-in'. Retrieval facilities have been built for each magazine. Removing this wall between the Magazine and the retrieval facilities is the last step prior to the start of active retrieval operations. Of the original 5 magazines, 3 are now empty of PCM. Retrievals from Magazine 4 have now commenced ahead of schedule and good progress is being made. To date, as part of the retrievals project and to meet our commitment to the local community, we have successfully made 1,866 PCM transport moves, all without incident.

PRIVATE FUEL STORAGE

Private Fuel Storage Licensed

A landmark decision by the US Nuclear Regulatory Commission occurred on September 9th. For the first time in over a decade a new license application (1997) went all the way to completion and a Commission vote. PFS was licensed to store 40,000 MTU at an interim storage site on the Skull Valley Reservation in Utah. This represented landmark progress in the process of licensing which will eventually be applied to new units.

For decommissioning, this site represents the first general off site destination for spent fuel since the late 1970's. It will break the logjam and allow final decommissioning and license termination for many closed sites. It also provides an economical solution for the continuing operation of existing and new reactors. The integrated cost will nearly move the decimal point in dealing with the damages from the delay of Yucca Mountain when the Congressional figures provided by DOE are compared to PFS costs.

For many it brings closure to a painful era in our industry when the back of the fuel cycle was put on hold. Public surveys list "no place to send spent fuel" as one of the two leading reasons the public opposes siting of new nuclear generating stations. Let's hope we can now move forward into the future with a more optimistic outlook.

Input from John Parkyn, Private Fuel Storage, La Crosse, Wisconsin

INNOVATIVE SAMPLING TECHNIQUES

Innovative Sampling & Characterization of Materials at the University of Illinois TRIGA Research Reactor Utilizing the *TruPro*[®] Technology & Approach



July 18th 2005 – *New Millennium Nuclear Technologies, LLC (NMNT)* and *Scientech, LLC* announce the deployment of *TruPro*[®] a unique and patented sampling and characterization technology developed by *NMNT*. Rapid representative sampling and characterization of sub-surface matrices including concrete, graphite, metals, and sub-slab surface soils, was required for immediate analysis of activation and tritium contamination at the University of Illinois's Nuclear Research Laboratory TRIGA Nuclear Research Reactor. The *TruPro*[®] technology very effectively accomplished this important task in conjunction with radiometric instrumentation to

INNOVATIVE SAMPLING TECHNIQUES (Continued)

produce contamination profiles through the material being studied. The drill head is used under hammer action to penetrate hard surfaces from several inches to several feet in depth. The bulk material is pulverized as the drill travels through the radioactive media sequentially collecting all incremental material from the hole to the sampling unit. A representative sample of powdered bulk material or metal shavings are collected. All samples (except metals) on-site were analyzed within 10 minutes for tritium using a calibrated portable liquid scintillation counter (LSC) and analyzed for gamma activation products using a calibrated ISOCS. Improved sample collection with near real time analysis along with more historical hazard analysis enhanced significantly over the baseline coring approach the understanding of the depth distribution of contaminants. The water used in traditional coring can result in a radioactive liquid waste that needs to be dealt with. This would have been an issue at University of Illinois.

Sciencetech has been tasked with the development of a full characterization and decommissioning plan for the TRIGA facility and employed this surgical and dynamic approach to help validate and eliminate historical unknowns. Kevin Taylor, Project Manager for *Sciencetech* used the technology in place of traditional coring techniques to provide a cleaner, more efficient approach to sampling solid materials, and said, "It is a quick and clean sample collection system and the on-site analysis ability of material samples using liquid scintillation counting and gamma spectroscopy allowed us the ability of make quick decisions on additional characterization needs." Ultimately, the information gained from the characterization effort will be used to estimate radioactive waste volumes and disposal cost. According to Richard Holm, Assistant Dean of the University Engineering Department said, "It is a no brainer compared to coring a great choice of sampling tool."

The University of Illinois in Champaign-Urbana has an advanced TRIGA reactor facility which was built in 1960 and operated until August 1998. Originally a 100 KW TRIGA Mark II reactor, it was upgraded in 1969 to 1.5 MW with a forced cooling system. The facility was shutdown for a variety of reasons, primarily due to a lack of usage by the host institution. In 1998 the reactor went into SAFSTOR and finally shipped its fuel in 2004. *Sciencetech* is currently completing the characterization and decommissioning plan which are to be submitted to the NRC in early 2006.

Radwaste Solutions

THE MAGAZINE OF RADIOACTIVE WASTE MANAGEMENT AND FACILITY REMEDIATION

First Annual Buyers Guide

Are you aware that *Radwaste Solutions* is about to publish its 1st Annual Buyers Guide exclusively for the radwaste segment of the industry?

Unlike the *Nuclear News Buyers Guide*, the *Radwaste Solutions* directory will cover only products and services that relate directly to work at the DOE cleanup and remediation sites and civilian decommissioning projects, as well as to waste management in the utility and niche nonpower/nongovernmental segments of the industry.

The discounted ANS Member subscription rate remains only \$40. If you subscribe by October 12, you can receive the 1st Annual Buyers Guide (November/December 2005 issue) with your subscription at no additional charge! Just call the ANS Membership Department and ask for the RSDDR subscription special at 708-579-8266.



A publication of the American Nuclear Society