DECONTAMINATION DECOMMISSIONING AND REUTILIZATION DIVISION

SPRING 2007

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DISCLAIMER

The DDR Newsletter is a publication prepared by the DDR Division Newsletter Editor with input from various information providers for each issue for DDR Division Community review and use. Access to the newsletter is a benefit of membership in the ANS DDR Division. It is a semi-annual publication normally issued in the Spring and Fall of each year. Please encourage colleagues who may have an interest in our newsletter and other DDR activities to join us in the ANS, and especially the DDR Division. Membership details for joining the DDR Division can be located at the division's website: ***http://ddrd.ans.org***.

CONTRIBUTIONS

If you would like to contribute news or an article to the DDR newsletter, please contact Mr. Steve Horvath, the DDR Newsletter Editor, at (865) 481-6312 or via e-mail at: ***shorvath@energysolutions.com***. *If you have any recommendations regarding any aspect of the newsletter, these are welcome as well.*

THE CHAIR'S MINUTE FOR THE SPRING 2007 NEWSLETTER

Welcome to the Spring 2007 edition of the ANS-DDR Division newsletter. Steve Horvath and the newsletter staff appreciate the input from the various organizations that help to 'flesh out' our newsletter. Thanks for all of our news reporters and to Steve and his organization for assisting us with the newsletter. We hope to be able to compile and issue our second newsletter of this calendar year in early September before we all converge in Chattanooga, Tennessee for the DDR2007 conference.

Membership - We are always looking for new ideas to further develop our membership roster and for ways to further diversify our membership. The price for annual membership is well less than $1 a work day. We are again pursuing several new marketing leads to draw out some new members that might not be aware that we are out here. Tell others about our DDR website. Don't be shy to tell others about what a great deal the ability to network with industry peers and to get on the inside track can do for them by becoming a member of and becoming active in the DDR division. We are planning on continuing our on-going new member incentive programs as well. Sue Aggarwal (saggarwal@nmg.org) is the Membership Chair; please share your ideas with Sue – she would love to talk to you.

DDR2007 Topical Conference – Jim Byrne (jbyrne4424@comcast.net) and Joe Carignan (jecarignan@aol.com) are busy getting all things in order for the DDR2007 Conference. ANS-HQ is supporting the administrative needs for the meeting and Jim and Joe are assuring me we will have a great time.

DDR Elections – The Nominating Committee did a very nice job this year on assembling a strong variety of candidates for our Division Officers and Executive Committee ballot. When the ballot arrives please take the time to place your vote - every vote counts. I will be in touch with everyone with the results via a DDR wide email broadcast message as soon as I get the results from ANS-HQ.

Transitions - Yes – the only thing that's constant is change and with that the DDR Chair handoff will occur in June 2007 at the end of the Summer Meeting in Boston to the current Vice-Chair John Parkyn – he'll do a great job. The time has flown by and I have learned a lot and established many new friendships from this process. I intend to still be around and active in the decommissioning area of the nuclear industry. Thanks to all of you for your willingness to support DDR, please - get involved in the DDR workings – it's a blast - and I hope to see you in Chattanooga at DDR2007!

Larry Boing
DDR Division Chair, 2006-2007

2007 DDR TOPICAL MEETING

Don't miss the upcoming Decommissioning Topical Meeting scheduled for September 16 – 19, 2007 in Chattanooga, Tennessee. The theme of the meeting is capturing lessons learned from projects throughout the world. With many large projects either completed or near completion, now is an excellent time to gather the best practices and capture them for use in future decommissioning projects.

The DD&R, the Environmental Sciences and the Fuel Cycle and Waste Management Divisions of the American Nuclear Society sponsor the DD&R meeting. The Atomic Energy Society of Japan, British Nuclear Energy Society, Canadian Nuclear Society, Japanese Society of Mechanical Engineers, Korean Nuclear Society and the Mexican Nuclear Society cosponsor it.

We have over 120 domestic and international papers submitted in support of this meeting. Participants not only include local talent such as from Oak Ridge, Tennessee and Savannah River, South Carolina but we also have support from as far away as the Ukraine and Australia. In addition to the Technical Program, Oak Ridge National Laboratory has kindly agreed to a tour of the U.S. DOE's K-27 site in Oak Ridge, Tennessee on September 20th.

It promises to be an interesting and informative conference. Plus a great place for networking and meeting old friends.

The meeting website, which is found at **www.ans.org/meetings/ddr** provides the preliminary program and information on registering for the meeting; if you have any questions contact Jim Byrne at **jbyrne4424@comcast.net**.

D&D PROGRAMMATIC AND PROJECT-SPECIFIC DECOMMISSIONING UPDATES

PROGRAMMATIC

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA) Contributed By: M. Laraia and P.J.C. Dinner [m.laraia@iaea.org]

Long-Term Preservation of Information for Decommissioning Projects

This IAEA report—close to the publishing stage—aims to provide Member States planning to carry out long term decommissioning projects, guidance on the approaches and technologies that can be used for the organization, maintenance, and later use of records that span a wide range of time and operating environments. The report was prepared as a follow-up to Technical Report Series No. 411 (2002), which dealt with the management and organization of records for decommissioning.

The report draws on the growing body of experience, both positive and negative, related to the preservation of documentation and the retention of essential skills required to successfully plan and carry out decommissioning activities. In capturing and organizing "lessons learned", the document provides a timely reminder to decision makers and practitioners alike, that a lack of attention to record keeping may result in a costly misallocation of resources and may also present problems of safety.

To protect human health and the environment during the long-term decommissioning period of a facility, many types of individuals will need to know about the hazards that remain on the site, including those individuals:

- responsible for maintaining protective measures on-site (“Site Stewards”),
- using the site or portions thereof for other purposes (e.g. tenants),
- living/working offsite that might be affected by remaining hazards, and,
- responsible for planning and management, e.g. national officials.

The objective of final decommissioning should be considered from the earliest stage of the life cycle of a facility. In particular, detailed planning for the permanent shutdown of a facility requires a strategy for the selection, acquisition and maintenance of relevant records. Published information and guidance on record-keeping relevant to nuclear decommissioning is relatively scarce; therefore, this report focuses on the means to address this “gap”.

When there are significant delays between permanent shutdown and the completion of dismantling, arrangements must be put into place to ensure that the necessary information is preserved and the necessary conditions for its transfer established. Figure 1 (on the next page) illustrates the process. The process involves not only the physical preservation of information, but its legibility, the skills needed to understand its technical meaning and a commitment to act in time.

Thus the process should emphasize both the human and the physical aspects associated with the transfer of knowledge. For the physical aspects, strategies elaborated in the document include the means to ensure record preservation over time, such as adequate planning and budgeting, use of proven electronic records management tools, provision of safe secure storage facilities, and duplication of stored copies of records. To address the human aspects, future strategies need to ensure that the knowledge-records, skills, techniques, languages, tools and experience needed by future generations to use the core information are available. In particular, the means to appropriately recruit and train the necessary knowledge-workers needs to be addressed. This step is required to respond to issues which depend on region and country, but involve a combination of aging workforce, declining student enrollment, erosion of accumulated “nuclear knowledge”, the need for capacity building to ensure transfer of knowledge, and the need to re-enforce cultural values which underpin knowledge sharing and networking.

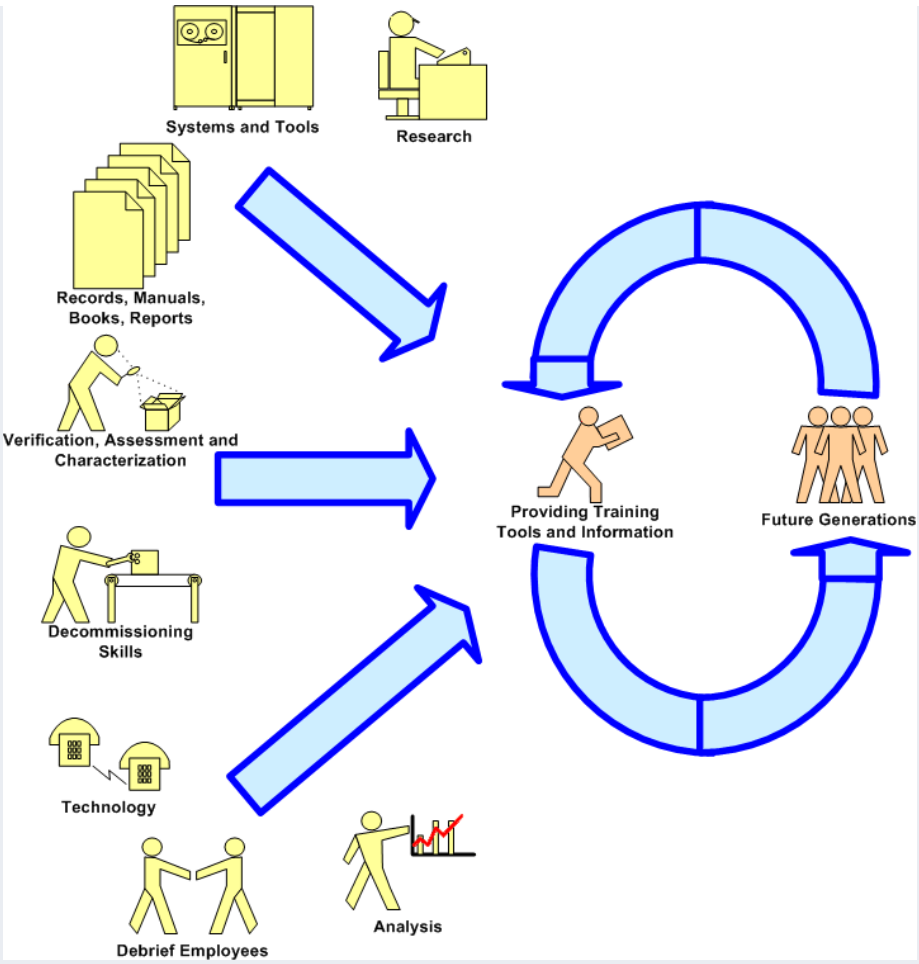


Figure 1: Knowledge Management and Transfer Relevant to Decommissioning

To ensure the long-term survival of records and the systems to support their retention, management initiatives need to consider:

- long term preservation characteristics when selecting records management tools and technologies, and,
- periodic audits and inspections of systems, applications, media and processes as an integral aspect of facility quality assurance programmes.

Characteristics of appropriate Records Management Tools are considered in the document. The features and benefits of alternative records strategies including both (a) all-electronic approaches, and (b) Document Management Applications (DMA) which work with mixed formats are discussed and the desired characteristics of a preferred system combining attributes of both are outlined. Figure 2 illustrates the linkage of typical records relevant to decommissioning using a computer-based system.

A number of examples of records-keeping failures are discussed in the “lessons-learned” section, and factored into the development of preferred solutions. These include insufficient/inadequate records backup, failed electronic media (magnetic media and CDs), software and hardware obsolescence in records storage/retrieval, improperly executed records destruction initiatives, and inadequate labelling of stored nuclear waste materials. Noteworthy examples include:

- the Atucha Nuclear Power Plant (NPP) in Argentina. This is a Siemens (German) design, and the construction drawings are in German. This is already a problem for the existing primarily Spanish-speaking employees and will likely get worse over time, and,
- CD ROM failure, an increasingly common experience where the surface coating delaminates making the medium unreadable. By way of contrast the authors of the report point out the longevity of the “Doomsday Project” records that have lasted 1,000 years on vellum (animal skin)!

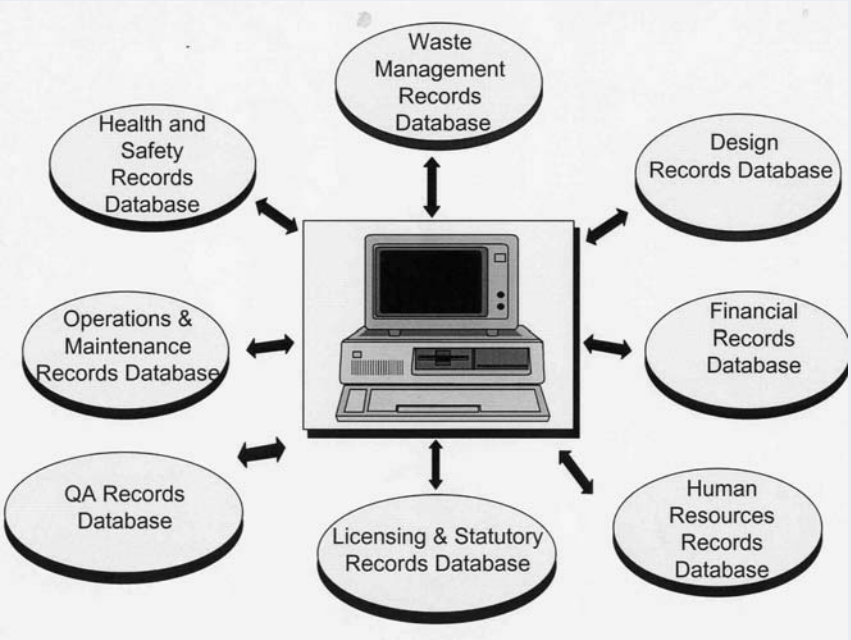


Figure 2: A schematic illustration of the computer based Integrated Management Information System

It is anticipated that this document will be used by policy makers, regulators, owners, operators, decommissioning contractors and other interested parties who are involved in or who need to prepare for the process of decommissioning. Information presented should also be useful to those addressing the various scientific, technical and non-technical issues that affect decisions relating to the long term preservation of information.

D&D PROGRAMMATIC AND PROJECT-SPECIFIC DECOMMISSIONING UPDATES

COMMERCIAL NUCLEAR UTILITIES

LACROSSE ..... Contributed By: Roger E. Christians [rec@dairynet.com]

LaCrosse Boiling Water Reactor (LACBWR) Decommissioning Update

The LACBWR project to remove the Reactor Vessel, package it for shipment, and transport it to the Barnwell, South Carolina low level radioactive waste disposal facility, is nearing a successful completion. In late autumn of 2006, an opening was cut into the side of the Reactor Building and a bi-parting door installed.

This door allows for the installation of a gantry crane, which will travel inside the building, pick up the vessel and bring it outside to be deposited into a specially built canister.

During the winter months, a pathway through the biological shield, surrounding the Reactor Vessel, was cut away using a diamond wire saw technique.

This shield wall removal will allow for the necessary clearance to lift the Reactor Vessel only 20 feet before exiting the building.

When the vessel has been placed in the canister outside of the Reactor Building, the annulus between the vessel and the canister will be filled with grout, the top installed and welded, and the remaining voids filled with grout. The vessel will then be down ended onto a heavy haul vehicle and transported approximately ¼ mile to the on-site rail siding where it will be transferred to the rail car and shipped to the Barnwell disposal facility. This project will be completed by June 30, 2007. The used fuel disposition effort will then begin, followed by the ultimate decommissioning.

Rancho Seco Decommissioning Update

The following summary provides an update for the Rancho Seco Nuclear Generating Station decommissioning activities since late 2006.

Reactor Vessel

The vessel has been segmented and packaged for disposal. The method used was robotically controlled high-pressure water/grit cutting (not underwater cutting). All pieces except beltline pieces have been shipped in sealand containers. The six beltline pieces have been placed in two boxes and grouted for shipment by rail to the Energy*Solutions* low level radioactive waste disposal site in Utah. No DOT exemptions are needed for the shipment. The boxes should be shipped within the month. The pictures below show the Reactor Vessel sidewall piece being removed and loaded.

Containment Building

Disposition of the concrete in the reactor building is about to begin under a contract from a team consisting of Demco subcontracted to Energy*Solutions* (prime). Concrete removal should be complete in early 2008. When complete the building will be empty to the liner with final decontamination and final survey by SMUD.

Spent Fuel Building

Decontamination is currently in progress for the concrete surfaces that were behind the pool liner. Some areas were significantly contaminated due to liner leakage.

Auxiliary Building

Room decontamination is in progress and is expected to continue for the next year.

Embedded Pipe

Cleaning of embedded drainpipe in the Spent Fuel Building is nearly complete using a grit blast system that vacuums the debris and grit out of the end of the pipe. Work is also complete in the Reactor Building and Auxiliary Building. Piping remains to be cleaned in the Turbine Building. This work should be completed this summer.

Outside Components

All of the contaminated outside components and underground pipes have been removed except for the liquid effluent line that will be removed in 2007 with the effluent basins.

License Termination Plan (LTP)

The LTP was submitted in April 2006. Derived Concentration Guideline Levels (DCGLs) have been determined using the industrial worker scenario due to the ongoing use planned for the site. Requests for Additional Information (RAIs) were received in October with responses submitted in November after consultation with the NRC. The LTP Public Meeting was held on November 14, 2006. Additional environmental RAIs were received and answered in March 2007.

Final Status Surveys

Final Status Surveys are in progress based on the methodology submitted in the LTP. While this work is "at risk" until approval of the LTP, successful submittal of the RAIs makes the FSS methodology and activities low risk.

Schedule

All current decommissioning activities are expected to be completed by the end of 2008. At that time a partial release of the site from the 10 CFR 50 license is expected. The remaining portion (the waste storage building) will be completed once waste disposal is complete. The Independent Spent Fuel Storage Installation (ISFSI) is under a Part 72 License and will remain until the U.S. Department of Energy (DOE) takes the fuel. No date for final site release has been determined.

SONGS I ..... Contributed By: Peter T. Rahme [Peter.T.Rahme@sce.com]

San Onofre Nuclear Generating Station (SONGS) Unit 1 Decommissioning Update

As Phase 1 of the San Onofre Nuclear Generating Station Unit 1 (SONGS 1) decommissioning project enters its eighth year, the removal of the large buildings and structures is nearing completion. Since the Fall 2006 Progress Report, the project has dismantled the Containment Sphere, and removed the Fuel Storage Building, the Ventilation Building, and three other support facilities. Structures that remain include the Radwaste Building (emptied of all equipment), and a portion (Zone 4) of the Sphere Enclosure Building wall. To date, 128 million pounds of demolition debris have been removed and disposed of. Of that amount, sixteen (16) million pounds have been shipped in lift liners (synthetic bags) or intermodal containers to a burial site by rail and/or truck during the past six (6) months. Phase 1 of the project is approximately 72% complete, and completion continues on schedule for 2008.

Figures 1 and 2 below highlight the removal of the Containment Sphere.

(1) San Onofre Nuclear Generating Station (SONGS) Unit 1 Containment Sphere prior to the dismantling of the one-inch thick 140-ft diameter steel plate structure.

(2) San Onofre Nuclear Generating Station (SONGS) Unit 1 Containment Sphere foundation after sphere removal

Short Term Forecast

Looking forward, the project's focus will be to survey and free release the containment foundation below elevation 8 feet. This will allow the open excavation to be backfilled and allow for construction of the second Independent Spent Fuel Storage Installation (ISFSI) pad that will be used to support fuel movement from the two operating units.

Independent Spent Fuel Storage Installation (ISFSI)

The first pad of the SONGS Independent Spent Fuel Storage Installation contains 31 Advanced Horizontal Storage Modules (AHSM). Eighteen (18) AHSMs have been used to store SONGS 1 fuel assemblies and Greater-Than-Class-"C" (GTCC) waste. The remaining thirteen (13) modules will be used to store fuel assemblies from Units 2 and 3. A fuel transfer campaign is currently in progress.

Looking Ahead

During the next twelve (12) months, the project will focus on completing the following decommissioning activities:

- Removing the Radwaste Building, and,
- Soil remediation, compaction, and grading to construct the next ISFSI pad.

D&D PROGRAMMATIC AND PROJECT-SPECIFIC DECOMMISSIONING UPDATES

DEPARTMENT OF ENERGY

NEVADA TEST SITE DECOMMISSIONING UPDATE .....Contributed By: Jerel Nelson [jnelson@polestar.com]

Excerpted from DOE/NTS SiteLines, "Partial Closure of Disposal Facility Planned"

Partial Closure of Disposal Facility Planned

Efforts have increased to close a 92-acre area at the Area 5 Radioactive Waste Management Complex (RWMC), which represents approximately 60 percent of the 160 acres currently used for the storage and permanent disposal of low-level, mixed low-level, and transuranic waste at the Nevada Test Site (NTS).

Low-level waste operations have consumed all available space within a 92-acre area.

In 1961, low-level waste generated by the nuclear testing program at NTS was first disposed at what eventually became the Area 5 RWMC. Following the establishment of a formal Waste Management program at the NTS, the first U.S. Department of Energy (DOE) off-site generated low-level waste shipment was disposed in 1978.

More than 30 generators and nearly 15 million cubic feet later, low-level waste operations have virtually consumed all available space within existing disposal cells in the 92-acre area – necessitating its closure.

Closure of the 92 acres involves placing a "vegetated, monolayer evapotranspiration (ET) cover," which is soil with native plants, over the disposal cells. The monolayer soil cover is designed to meet the closure requirement of DOE Order 435.1; it will also provide the equivalent protection of a standard Resource Conservation and Recovery Act (RCRA) cover, while offering superior performance with respect to subsidence. Currently, a 13-foot thick monolayer soil cover is being proposed.

Because both low-level and mixed low-level disposal cells exist in the area, each individual cell must meet the requirements of U.S. Department of Energy Order 435.1 and associated manual M-435.1-1. Additionally, disposal cells that contain hazardous constituents (such as mixed low-level waste) are regulated by the NTS RCRA Part B Permit issued by the State of Nevada Division of Environmental Protection.

A closure plan will be prepared after a characterization report is accepted by the state.

In order to conform to these regulations, a characterization report is being prepared and will be completed by Sept. 30, 2006. Once this report is accepted by the State of Nevada Division of Environmental Protection, a closure plan will be prepared.

This plan will detail how closure is to occur and will include engineering drawings of the final closure cover and site drainage. Other information used to develop the closure plan will be based upon the results of the Area 5 RWMC Performance Assessment. The objective of this systematic analysis, which uses computer models, is to identify any potential release of contamination due to the facility's geo-hydrological disposal system performance over 1,000 years.

Following permanent closure of the area, maintenance and monitoring will continue to ensure the safety of the public and the environment.

Area 5 RWMS Disposal Background

The Area 5 Radioactive Waste Management Complex is located in the southeast portion of the Nevada Test Site, within Frenchman Flat near the dry-lake bed. Categorized as an arid environment, rainfall in Area 5 is minimal, averaging between four and six inches per year, and groundwater is more than 750 feet beneath the surface.

Approximately 730 acres are designated for radioactive waste management activities in Area 5, of which approximately 160 acres are currently used for storage and disposal. Only nine of the 32 engineered disposal cells in Area 5 are active; three are within the area designated for closure by the year 2011.

In general, disposal activities in Area 5 are conducted by placing drums and boxes in shallow, excavated disposal cells which range from 12 to 48 feet deep.

Once delivered to the pre-designated disposal cell, waste containers are carefully stacked and methodically arranged in a grid system to facilitate tracking. Typically, as each disposal cell fills with waste, an 8-foot thick layer of native soil is placed over the waste.

Depending on the specifics of the low-level waste, additional soil may be needed.

What is Evapotranspiration?

Evapotranspiration is the process through which extremely dry air pulls moisture from plants as well as from the desert soil. This process effectively prevents water from migrating to the groundwater.

Evapotranspiration is critical to environmental protection in Area 5. It ensures that any surface water does not infiltrate waste containers in disposal cells and transport contaminants to groundwater.

It's a bird ... it's a plane ... It's Super K!

Clean up of the Super Kukla facility is underway at the Nevada Test Site, leaving behind the legacy it played during the Cold War.

Constructed in 1964, its mission was to determine how any enemy countermeasure would affect the performance of a nuclear warhead during a weaponry exchange.

The key component to the Super Kukla facility was the reactor, which provided the environment to bombard materials (placed inside) with radiation in the form of intense bursts of neutrons and gamma waves. Following the facility's closure in the late 1970s, the reactor core was disassembled. Decontamination and decommissioning activities were conducted on three of the four structures – the Reactor Building, Reactor High-Bay, and Mechanical Building. The entire two-acre facility was then fenced to protect workers and the environment until a more comprehensive cleanup could be accomplished.

Twenty-five years, Environmental Management contractors representing the Stoller-Navarro Joint Venture (SNJV) with support from NSTec, began conducting extensive site research and characterization activities which led to the development of a plan to close the site to eliminate or reduce risks to human health and the environment.

SNJV is accomplishing cleanup in the following six phases:

- Prepared the site by installing temporary power, an office trailer, lighting, and ventilation
- Collected samples (such as concrete and paint chips) and conducted radiological surveys, health and safety swipes, and air monitoring. In addition, the material and debris in each building was inventoried.
- Established data quality objectives and developed a plan to close the facility in place.
- Removed polychlorinated biphenyls (PCB) and non-PCB oils, lead and mercury components, asbestos, and other hazardous materials as necessary. In this phase, debris from the Mechanical Building and Wooden Shed was placed into the Reactor Building for entombment in a later phase.
- The Mechanical Building and the Reactor High Bay were demolished down to the slab, and the Wooden Shed was completely removed since there is no concrete slab. After the three buildings were demolished and disposed, samples were taken and surveys were performed on the remaining slabs.
- The Reactor Building will be entombed with grout. Super Kukla will be the first Decontamination and Decommissioning site to be entombed in place with restrictions. All sumps, the Basement Reactor Room, and the Access Tunnel will be included in this process. In addition, the surrounding vicinity will be graded to ensure that any possible surface water will flow away from the area. The final part of this phase is to apply appropriate use restrictions to the area.

Field work at Super Kukla is scheduled to be completed in March 2007. The final closure report is due to the State of Nevada in September 2007.

Who Regulates Industrial Sites?

Super Kukla, an Industrial Sites clean-up project, is regulated by the Federal Facility Agreement and Consent Order. Documents proposing the clean-up strategy for each Industrial Site are prepared by the Nevada Site Office and submitted to the Nevada Division of Environmental Protection (NDEP) for approval. When the documents are scheduled for submittal, a public notice is posted to the Nevada Site Office Internet website at http://www.nv.doe.gov/emprograms/environment/restoration/ffaco.htm. Additional information on the Federal Facility Agreement and Consent Order can be obtained by visiting the NDEP Internet website at http://ndep.nv.gov/BOFF/ffco.htm.

FLUOR HANFORD ..... Contributed By: Michele Gerber, Fluor Hanford [Michele_S_Gerber@RL.gov]

Hanford Site Decommissioning Update

241-Z Plutonium Liquid Waste Treatment Facility Readied for Demolition

Fluor Hanford achieved a major success at the Plutonium Finishing Plant (PFP) by completing cleanout of the 241-Z Liquid Waste Treatment Facility in early April 2007 and beginning demolition of the structure and two small ancillary facilities. Crews at the PFP finished cleaning out the fifth (and last) tank and vault area under the 241-Z Facility in February 2007. They then disconnected building utilities, sealed and capped penetrations to below-grade spaces, removed contaminated ductwork and portions of the building's air-filtration system, and performed other tasks to ready the structure for demolition. They also prepared two small contaminated ancillary facilities for demolition.

Cleaning out the tanks and vaults under the Waste Treatment Facility (241-Z), and readying the old structure for demolition was one of the most challenging jobs in the aging, highly contaminated 15-acre PFP complex. Workers had to labor below grade in confined spaces, donned in two pairs of full personal protective clothing with supplied-air respirators. They had to climb down ladders to scrape and remove waste from the tanks and vaults, and even had to cut holes in the sides of the tanks with plasma-arc torches and remove the waste inside.

The 241-Z Facility was part of the original PFP construction during 1947-49. The “D” tanks in the below-grade vaults collected liquid wastes – acids and corrosive chemicals contaminated with plutonium – from plutonium-finishing operations throughout the Cold War. Radiological waste from process buildings drained via underground lines into large steel pipes that ran through tunnels under the main (234-5Z) Building into the 241-Z system. From the “D” tanks, the wastes were sampled, neutralized and pumped out to disposal. Each of the 4,600-gallon “D” tanks, about 10 feet high and 10 feet wide, was inside a concrete pit or vault 22 feet deep and 17-feet square.

To perform the cleanout work, Fluor Hanford assembled a support team of nearly 20 people to assist the two-to-five employees who actually entered the vaults at any one time. Each entry was called a “dive.” Cleaning out the first two tanks, D5 and D8, began in November 2005 and was completed in June 2006. It took the team 223 dives to clean them out, but building on the experience led to significant efficiencies: they finished the D4 and D7 tanks and vaults in early October 2006, after just 145 dives. Tank D6, the last tank and vault area, was accomplished in just 60 dives, even though it entailed significant extra work scope. Fluor workers also became much more proficient in using plasma-arc tools to cut the holes in the tanks. While the first cut took two shifts, later cuts were done in just one hour.

Tank D6 had failed in 1972, spreading radioactive and hazardous constituents. The spill etched the vault’s concrete floor with acids, and eventually corroded metal grating attached around the tank at nine feet above the floor. In autumn 2006, PFP workers had to add support to the grating before they could stand on it to safely perform cleanout work.

Cleaning the vaults involved removing dirt, debris and abandoned equipment, and size-reducing this material as necessary to support packaging and loading into waste drums. Workers carefully cut up the solid waste and placed it in bags that were hoisted up to support team members who then surveyed it and placed it in 55-gallon drums for disposal. Between 920 and 1,720 pounds of piping and equipment were removed and packaged from each vault, for a total of more than 7,500 pounds. Along with an 800-pound overflow tank that was removed, and other debris, the waste volume filled 873 drums (55-gallon size).

Most of the waste that came out of the 241-Z tanks and vaults was transuranic (TRU), and will be shipped to the Waste Isolation Pilot Plant in New Mexico. TRU waste contains more than 100 nanocuries per gram of alpha-emitting TRU isotopes with half-lives greater than 20 years. Transuranic isotopes are those higher than uranium on the Periodic Table of the Elements. A nanocurie is a unit of radioactivity one-billionth of a curie. To support demolition, workers had to clean the tanks and vaults to much lower waste levels established as part of regulatory end points for the PFP complex.

In a nearly amazing feat, the 428 dives made to clean out the “D” tanks and vaults were completed with no exposures, only one skin contamination, and no recordable injuries. In addition, although high contamination levels rubbed onto the outside of protective suits and air lines, contamination did not spread to areas outside the pits.

At the beginning of the job, surface contamination levels in the pits were often too high for instruments to read - reaching millions of disintegrations per minute (dpm). Dpm measures how much energy is being emitted. Estimates from historical information showed that working in the vaults and disturbing contaminated surfaces for 15 minutes could generate derived air concentration (DAC) levels of 130,000 - 300,000. A “DAC” is a measure of radioactivity in air established to determine the potential dose to an individual.

Fluor Hanford crews applied fogging aerosols before entry and hand-held foggers during the work. They also developed and modified various “point-source ventilation” devices to direct air flow. They took portable, flexible ducting into the pits and attached it to the exhaust ducts that provided negative air pressure in the vaults, helping them capture and remove air contamination. Together, these techniques allowed the workers to keep airborne contamination levels below the 800 DAC control point.

In addition, workers developed new techniques for donning and doffing protective clothing and gear. All workers dressed and taped their suits exactly the same way every time. Then, when support team members helped them remove the gear, they followed specific sequences that brought no surprises when dealing with each piece of tape. They also established a special, assisted step-out procedure that effectively contained contamination.

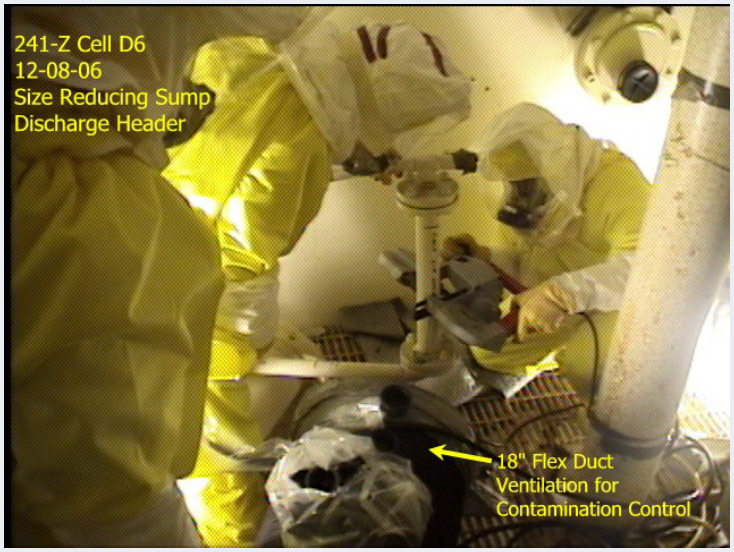


Figure 1 -Fluor Hanford crews cut up contaminated piping in a deep, narrow vault underneath the 241-Z Liquid Waste Treatment Facility, December 2006.

The 241-Z Facility should be down this June. Some of the same management team and crew members who successfully tore down Hanford's Plutonium Incinerator in 2006 are executing the job (see the ANS DD&R Newsletter, November 2006 issue). Demolition of the 241-Z Liquid Waste Treatment facility will be reported in the next edition of the DD&R Newsletter.

Current milestones in Hanford's Tri-Party Agreement call for the PFP complex to be razed to "clean slab-on-grade" status by 2016. Currently, equipment is being removed from gloveboxes in the main PFP building. In recent months, Fluor Hanford's PFP Closure Project also packed and disposed nearly 800 mixed oxide pins as waste; packed and disposed of nearly 700 large, contaminated "product solution cans"; and completed a three-year campaign that removed hundreds of miscellaneous radioactive sources and standards from the PFP complex.

To view a video about 241-Z Facility cleanout, go to www.hanford.gov then click on Videos on the left side of the screen, and then click on "241-Z Cleanout Work Evolution."

Difficult Cleanout of 212-N Building Progressing

In November 2006, Fluor Hanford's Central Plateau Deactivation and Decommissioning (CP D&D) Project began working in the 212-N Storage Building in north central Hanford, uncovering, surveying and removing 15 large crates of historically contaminated equipment, as well as the barrier material that encased it. The World War II structure, formerly known as a "lag storage" building, had stored (in pools of water) irradiated uranium fuel elements ("lags") from Hanford's original reactors. After temporary storage, the lags were transported to Hanford's chemical-reprocessing facilities to be dissolved and purified. In the 1950s, the interim storage period in the lag buildings was discontinued from the production cycle.

In the early 1970s, part of the 212-N Building was reactivated to store 15 large wooden crates containing contaminated items: gloveboxes, furnaces, presses, saws and other waste from Hanford's 308 Plutonium Fuels Laboratory. The 308 Facility, which manufactured mixed oxide (MOX) fuel for experimental purposes, was being cleaned out to support new development missions.

The crates were tightly packed into the 212-N Building, on both sides of rail track that traverses part of the structure. Large quantities of rockwool insulation were blown in as a fire retardant around all sides, tops and in some cases, the bottoms of the crates. Rockwool is a mineral product containing about 50

percent silicon dioxide along with aluminum and other minerals.

Then large steel walls and part-wall partitions were built as further barriers around the crates. The presence of gloveboxes that had handled MOX fuel raised the hazard level of the 212-N Facility to nuclear Hazard Category 3. When Fluor Hanford suggested the idea of removing enough contaminated materials from the 212-N Building to downgrade it to a "radiological" facility, the Department of Energy (DOE) authorized the work.

The work is valuable because it allows the waste to be uncovered, overpacked and brought to waste-handling programs and facilities that are equipped to survey and eventually dispose of it. Packed behind the steel walls and surrounded by impenetrable insulation, the crates had not been assayed with accuracy since they were placed in the building more than 40 years ago.

Today, about 40 percent of the crates have been removed from the facility and are being prepared for overpacking in certified, steel transportation containers. The waste is being assayed to determine if it is transuranic. The engineering aspects are daunting. One crate is 17 feet high and weighs nearly 75,000 pounds. Others are nearly as massive, with even the smallest, tipping the scales at about 4,000 pounds. The crates are packed very closely together, in some cases actually leaning against each other. The building had deteriorated and its roof had leaked so that much of the insulation and crates have water damage.

Figure 2 - Workers uncover and remove a large crate containing transuranic waste at a degrading World War II structure, as part of facility cleanout, November 2006.

Fluor Hanford's nuclear chemical operators, radiological control personnel, riggers and carpenters are challenged at every step, figuring out how to shift and move the crates in close quarters without further damaging or toppling others and spreading contamination. Some of the crates are on a mezzanine, and the facility's bridge crane is inoperable.

In addition, workers vacuuming the insulation into large bags have found that the rockwool becomes very heavy when wet, but is flighty and dispersible when dry. The Hanford desert provides its own challenges, as scorpions, rattlesnakes and black widow spiders have made their homes in the old building. Workers wear special shin guards and heavy rubber boots sometimes known as "British leggings" for protection.

The 212-N Building cleanout project will continue into autumn 2007, and will be reported in the next edition of the DD&R Newsletter.

Ten Industrial Buildings Demolished in Record Time

Fluor Hanford's Central Plateau (CP) D&D Project set records this past winter by quickly tearing down 10 industrial structures during January and February 2007. The demolitions occurred during extremely

cold weather, making everything more difficult. Crews first removed free liquids and fire extinguishers from the structures; inspected for and removed legacy chemicals; drained oils from gear drives, motors, door actuators and air conditioning units; pulled out light bulbs and ballasts, and removed asbestos. Many old Hanford buildings contain floor tiles, linoleum, caulk and mastic compounds, and siding (called transite) containing asbestos.

Other D&D Progress at Fluor Hanford

K Basins

At the K Basins – two highly contaminated, indoor concrete pools of approximately 1.3-million gallons each – Fluor Hanford continued to make progress in removing sludge and debris. The sludge in the K Basins is a highly radioactive combination of dirt, sand, rust, chemicals, fuel corrosion products, and decay or fission products. Workers transferred the contents of one of four underwater sludge tanks in the K East Basin to the K West Basin through a hose-in-hose (HIH) transfer system. Emptying the K East Basin first is important because it is the more contaminated and leak-prone of the two K Basins.

In the K West Basin, a new sludge collection system passed its Readiness Assessment and began operations. Currently, about 45 percent of the sludge in the K West Basin has been collected in containers. Fluor Hanford's K Basins Closure Project also completed nearly all the designs in a complex system that will treat the K Basins sludge for disposal.

Waste Management

In addition, Fluor Hanford retrieved approximately 3,500 drum-equivalents of buried solid waste suspected of being TRU, and made more than 30 shipments of TRU waste from the Hanford Site to the DOE's Waste Isolation Pilot Plant (WIPP).

Groundwater Remediation

Fluor Hanford also completed injecting a band of ten wells in the Site's 100-N Area with a chemical compound designed to trap strontium 90 (Sr-90) before it travels from contaminated soil into the Columbia River. The Soil and Groundwater Remediation Project expanded its efforts to mitigate chromium 6 contamination in areas near the Columbia River by initiating a major, three-pronged effort in the 100-D Area, and completing and starting up a new treatment system in the 100-K Area. In central Hanford's 200 Areas (chemical reprocessing areas), multiple new wells were drilled to explore, extract and treat carbon tetrachloride, technetium and uranium contamination in groundwater. Fluor also completed high resistance surveys at significant contaminated soil sites in the 200 Areas.

Crews at the Fast Flux Test Facility (FFTF) continued to deactivate reactor systems as part of facility shutdown. FFTF workers placed the Fuel Storage Facility into a "cold and dark" condition by removing combustibles, draining fluid systems, isolating water and sewer systems, and deactivating support systems. They also removed an additional transformer contaminated with polychlorinated biphenyls (PCBs), reaching 10 of 19 removed. FFTF staff worked with the staff of PFP to consolidate all sodium bonded fuel at FFTF in preparation for off-site shipment for final disposition.

DOE Excess Facilities Disposition Update
Excerpted and Summarized by S. Horvath, ANS DDR Newsletter Editor, From DOE/CF-017, Volume 4, *2008 Congressional Budget Request*, Pages 429-431
February 2007

Description

The Excess Facilities Disposition (EFD) subprogram removes excess facilities at the DOE's Office of Science (SC) laboratories to reduce long-term costs and liabilities in support of programmatic initiatives (e.g. making land available for new programs). In addition to removal of excess facilities, the subprogram also supports cleanup of facilities for reuse when such reuse is economical and provides needed functionality.

Supporting Information

SC has a current backlog of facilities being considered for demolition or cleanup. The EFD subprogram evaluates and prioritizes this backlog based on footprint reduction, risk reduction (e.g. removal of

hazards), availability of space/land for research activities and cost savings (e.g. elimination of surveillance and maintenance costs).

D&D Activities at the Lawrence Berkeley National Laboratory (LBNL)

In Fiscal Year (FY) 2008, the EFD subprogram will continue funding for decontamination and demolition (D&D) of Building 51 and the Bevatron at the Lawrence Berkeley National Laboratory (LBNL). This effort, whose total project cost is estimated to range from $65 million to $75.3 million, will by FY 2011, eliminate a legacy facility which ceased operation in 1993, and free up 125,040 square feet – approximately 7.5% of the total usable land at the LBNL site – for programmatic use.

Both laboratory and office space are in critically short supply at LBNL. Continued reliance on an aged and decaying physical plant impedes research, reduces productivity, and makes recruitment and retention of top-quality scientists and engineers much more difficult. Removal of Building 51 and the Bevatron will free up land for re-development to support on-going and new mission activities.

The original D&D approach for Building 51 and the Bevatron was to use the existing 50 year old crane in Building 51, which covers the Bevatron, to remove the shielding blocks and beam line. The speed of the crane meant the project would take four to five years. A review team proposed an alternative approach of first removing Building 51 entirely and then employing two or more modern cranes to remove the shielding blocks and beam line quickly and efficiently. This new approach which was selected at Critical Decision 1 – Approve Alternative Selection and Cost Range – allows the removal portion of the project to be completed over a two year period, reducing project costs 10 to 20% and increasing safety.

Other Legacy Facilities

The EFD subprogram will also fund demolition of legacy facilities at Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), and Oak Ridge National Laboratory (ORNL), whose continued deterioration presents an increasing risk to the workers and the environment, and for which SC can "bank" space to meet the requirement for offsetting new construction with elimination of excess space.

The EFD subprogram does not fund projects that replace currently active and occupied buildings. Such building replacement projects are funded under the DOE's Laboratories Facilities Support (LFS) subprogram, and would include removal of the old buildings as part of the justification for the projects.

Summary of Excess Facilities Disposition

In FY 2006, funding supported the projects listed below and allowed for the cleanup/removal of an estimated 107,000 square feet of space:

- Ames Laboratory – Completion of the closeout and demolition of the Waste Handling Facility and the Hydrogen Test Cell Facility (9,900 square feet)
- Argonne National Laboratory (ANL) – Demolition of Buildings 374A, and 40, Phase II, and Site Beryllium Remediation, Phase I (approximately 11,000 square feet)
- Brookhaven National Laboratory (BNL) – Completion of demolition of Buildings 197, 527, 933B and 934, and demolition of Buildings 86, 422A (partial), 482, 628, 649, and 650, Phase I (approximately 19,000 square feet)
- Fermi National Accelerator Laboratory (FNAL) – Demolition of Trailers T-017, T-024, T-025, and T-069 (approximately 1,440 square feet)
- Lawrence Berkeley National Laboratory (LBNL) – Surveys and planning activities required to execute the total removal of the Building 51 and the Bevatron complex, including: preparation of project documentation, engineering plans and specifications, waste management plan, characterization plan, health & safety plan, and community relations plan.
- Lawrence Livermore National Laboratory (LLNL) – Demolition of SC Trailer 4325 and Building 363 (approximately 3,700 square feet)
- Oak Ridge Institute of Science and Education (ORISE) – Demolition of SC-2, Isotope Laboratory, and SC-5, Large Animal Containment Facility (approximately 6,600 square feet)
- Oak Ridge National Laboratory (ORNL) - Demolition of Solway and Freels Excess Facilities

(approximately 50,000 square feet)

In FY 2007, funding will support the projects listed below, allowing the cleanup/removal of an estimated 22,000 square feet of space:

- ANL – Building 205 F-111 Vault Cleanup & Hood Demolition (Phase 3 Vault/Corridor Cleanup)
- BNL – Continued demolition of Building 650 Hot Laundry Facility
- LBNL – Continued demolition of the Bevatron
- ORNL – Cleanout and deactivation of Building 3503, and demolition of Buildings 3008, 3111, and 2018 (approximately 22,000 square feet)

FY 2007 funding also includes monies to conduct External Independent Reviews (EIRs) of Science Laboratories Infrastructure (SLI) construction projects.

In FY 2008, funding will support the projects listed below, allowing the cleanup/removal of an estimated 41,000 square feet of space:

- ANL – Demolition of Building 40 Calibration Lab (approximately 4,900 square feet)
- BNL – Demolition of Building 130 Office Facility (approximately 20,000 square feet)
- LBNL – Continued demolition of the Bevatron
- ORNL – Demolition of multiple small buildings and trailers (e.g. Museum Office Trailer-XC1405, ESD/NOAA USAF Instrument Trailer-822, Temporary Waste Storage Facility-7020B and Temporary Waste Storage Facility-7020C (approximately 23,000 square feet)

FY 2008 funding also includes monies to conduct EIRs of SLI construction projects.

Note: Individual EFD projects and amounts are subject to revision based on evolving program priorities, including risk reduction (e.g. removal of hazards), footprint reduction, cost savings (e.g. elimination of surveillance and maintenance costs), and availability of space/land for new research activities.

D&D PROGRAMMATIC AND PROJECT-SPECIFIC DECOMMISSIONING UPDATES

DEPARTMENT OF DEFENSE

NAVAL NUCLEAR PROPULSION PROGRAM – DOE S1C REACTOR DECOMMISSIONING UPDATE

Contributed By: Lukas McMichael [Lukas.mcmichael@navy.mil]

Naval Reactors Program Reactor Site Returned to "Green" Field Conditions

Background

The S1C Site is situated on approximately 11 acres of land in the Town of Windsor, Hartford County, Connecticut. Naval Reactors established the S1C Site in 1957 to test a new submarine propulsion plant design and to train naval personnel for service in the Nation's nuclear-powered warships. The facility, known as the S1C Prototype, included one pressurized water reactor, a prototypical shipboard propulsion plant, and nuclear support facilities. The facility was operated by the Knolls Atomic Power Laboratory under contract with the U.S. Department of Energy, Division of Naval Reactors.

The S1C Prototype was permanently shut down in March 1993, reflecting the end of the Cold War and projected downsizing of the U.S. Naval fleet. In total, over 14,000 Naval personnel were trained at the S1C Site, representing more than 17% of the total nuclear personnel trained at the time of site closure. In 2000, all of the buildings, structures, and systems were removed, in accordance with a Record of Decision resulting from the National Environmental Policy Act process. Through a partnership with the State of Connecticut—Department of Environmental Protection, the Environmental Protection Agency—Region I, the Naval Reactors Program, and the public, unrestricted radiological release occurred in 2001 and unrestricted chemical release occurred in September 2006. The surplus property has been turned over to General Services Administration (GSA) for disposition.

Significance

- First-ever “green” field of a nuclear reactor site to include both unrestricted radiological and chemical release. — *“I…know that it (the radiological release report) will be the standard to which similar projects are measured in the future.”* - J.J. Cherniak, Radiation Program Manager, EPA Region I
- Permanently eliminates a nuclear liability for future generations — the 11 acre site is suitable for any future use.
- Over 14,000 tons of materials recycled and over 12,000 tons of regulated waste removed, almost all of which was materials from deconstruction of site infrastructure.
- Extensive surveys and sampling — over 144,000 environmental sample results analyzed and reported.

National Security mission supported by the Naval Reactors Program is dependent on a strong commitment to the environment and safety — this cleanup effort reaffirms that commitment to our “cradle-to-grave” responsibilities.

Figures 1 and 2 below shows the S1C Prototype Reactor Site prior to and after decommissioning activities. A Press Release regarding the commemoration of the return of this reactor site to Green Field has also been provided.

Before — The S1C Prototype Reactor Site and Support Facilities

After* — An 11-acre site suitable for any future use

*The buildings shown belong to a neighboring business and are not part of the S1C Site.

Press Release

Naval Nuclear Propulsion Program
Washington, DC

October 30, 2006

DOE Reactor Site Returns To Green Field Conditions,

A New Standard in Environmental Stewardship

On Wednesday, October 18, 2006, the U.S. Naval Nuclear Propulsion Program commemorated the first-ever chemical and radiological release of a U.S. nuclear power reactor site for unrestricted future use – the Department of Energy S1C Prototype Reactor Site in Windsor, Connecticut. "This is the benchmark that everyone should strive for" remarked Windsor Mayor Donald Trinks following the ceremony.

The ceremony concluded twelve years of facility dismantlement and environmental characterization and restoration associated with returning the site to "Green Field" conditions. Working in cooperation with the Connecticut Department of Environmental Protection and the U.S. Environmental Protection Agency, the Naval Nuclear Propulsion Program conducted an extensive environmental characterization of the 11 acre site which resulted in over 140,000 sample results. These agencies also provided independent oversight of the project.

The current Windsor Site "Green Field" condition makes it suitable for any future use, without restriction, from economic development to recreation. "You can build a home here, your kids could play here, or they [town of Windsor] can leave it as beautiful grassland open space for natural resource

purposes" remarked Connecticut Department of Environmental Protection Commissioner Gina McCarthy.

The event was hosted by Admiral Kirkland H. Donald, Director of the U.S. Naval Nuclear Propulsion Program, a joint Department of Energy and Navy program. Guest speakers included Connecticut Department of Environmental Protection Commissioner Gina McCarthy, EPA Regional Administrator Robert Varney, and Windsor Mayor Donald Trinks. At the completion of her remarks, Commissioner McCarthy presented Admiral Donald with a certificate of completion, certifying that the State of Connecticut considers the Site released without restriction.

In his key note address, Admiral Donald reflected on the past service performed by the Windsor Site. Throughout the Cold War, the S1C Prototype nuclear submarine propulsion plant at the Site supported the submarines and surface ships of the Navy's nuclear fleet by testing new equipment and training over 14,000 Naval propulsion plant operators, including Admiral Donald.

At the conclusion of his remarks and on behalf of the Naval Nuclear Propulsion Program, Admiral Donald presented commemorative plaques to Mayor Trinks, Commissioner McCarthy, and Administrator Varney. The plaques contained pictures of the Windsor Site, both while in operation and in the current green field condition. Admiral Donald also expressed his appreciation to the Town, the Connecticut Department of Environmental Protection, and Environmental Protection Agency, both during Site operation and during the completion of the Site release effort.

The Naval Nuclear Propulsion Program is responsible for all aspects of the design, construction, operation, maintenance and disposal of the Navy's nuclear reactors, including selection and training of the nuclear-trained operators. Over the past 50 years, Navy warships have safely steamed more than 135 million miles on nuclear power in support of the Nation's defense, accumulating over 5,800 reactor-years of operation.

CTDEP Commissioner Gina McCarthy and Admiral Kirkland Donald

For further information please contact Lukas McMichael at Lukas.mcmichael@navy.mil

D&D PROGRAMMATIC AND PROJECT-SPECIFIC DECOMMISSIONING UPDATES

OTHER GOVERNMENT FACILITIES

NASA Plum Brook Reactor Decommissioning Update

Contributed By: Sally V. Harrington [sally.v.harrington@nasa.gov]

NASA Plum Brook Reactor Decommissioning Gets Closer to Completion

NASA is getting closer to the completion of the decommissioning of the Plum Brook Reactor Facility in Sandusky, Ohio, which is located at Plum Brook Station, a satellite facility of the NASA Glenn Research Center in Cleveland. According to Decommissioning Program Manager Keith Peecook, "We can see the end of the road," which he said will involve issuing a Request for Proposal for a Decontamination and Shipping Contract. This contract's scope will cover the major steps leading to completion of all remaining tasks to prepare the site for Final Status Survey (FSS). These include completing all

decontamination work; excavating and assaying an estimated 50 million pounds of soil; shipping for disposal the existing on-site waste, any contaminated soil, and the waste generated by remaining decontamination work; removing the bioshield; and physically preparing all building surfaces for FSS. Peecook described the FSS as a test that will demonstrate to the U.S. Nuclear Regulatory Commission that NASA has met its project cleanup goals.

Contractors got a look at the upcoming work during a Decommissioning "Industry Day" at the Waste Management Conference in Tucson, Arizona on February 27. NASA opened a hotel suite to potential bidders that day, supplying them with a wide variety of data presented by Decommissioning Team members. The information included a Draft Statement of Work (SOW) to be performed and a CD that provided contractors with a "virtual tour" of the facility's Waste Handling Building. A total of 39 companies requested an SOW and 33 attended an "open session" for contractors while 15 attended "one-on-one sessions." A PowerPoint presentation on the SOW and a list of "Industry Day" attendees is posted on the Decommissioning Project Website at www.grc.nasa.gov/WWW/pbrf. Peecook observed, "We've gotten good feedback" from the potential contractors, who said they enjoyed the "virtual tour" and all the information.

Decommissioning began in March 2002 and, by summer 2005, NASA had removed 98% of the radioactive inventory on-site before the project began. Work included the removal and segmentation of a 60-megawatt test reactor and a 100-kilowatt mock-up reactor, which had operated from 1962 to 1973. Since 2005, NASA has made substantial progress on cleaning and surveying embedded piping, decontaminating and surveying the Hot Cells and characterizing radiation throughout the Reactor Facility. To date, NASA has successfully cleaned and surveyed nearly three of the estimated four miles of embedded piping–pipes encased in concrete and as much as 46 feet below ground in Reactor Facility buildings. This work will be complete this summer, 2007 . NASA will then focus on cleaning and surveying 33,000 feet of buried piping–covered with dirt, but not concrete.

The Hot Cells are seven rooms once used to analyze the results of experiments conducted when the reactor was operational. The largest and most contaminated cell was successfully decontaminated in late 2006. Workers had also removed all fixed equipment from the cell, including four 20-ton concrete slabs that comprised its roof. These roof slabs were decontaminated and surveyed as cleaned and sent to a demolition contractor. NASA has since removed fixed equipment from the other Hot Cells and decontaminated all the rest. In one cell, workers removed three more roof slabs for decontamination and "free-release" (cleaning to levels that allow for recycling). Work on removing and cleaning the other roof slabs continues.

NASA expects to have a Draft Request for Proposal (RFP) ready by June, 2007, the final RFP released in August, and the contract awarded this fall. Peecook noted, "I think there is potential for collaboration among contractors and for economies and new approaches" to completing major project tasks. Work could begin by early 2008 with the project completed by 2010.

INTERNATIONAL

CEA (COMMISSARIAT A L'ENERGIE ATOMIQUE), FRANCE'S ATOMIC ENERGY COMMISSION.....Lead Contributor: Jean-Louis Garcia [jean-louis.garcia@cea.fr]

UP1 D&D Program – Decontamination and Dismantling of Process Facilities

1 – Introduction

The UP1 plant was commissioned at Marcoule, France in 1958 to reprocess spent fuel removed from three Natural Uranium-Graphite-Gas (UNGG) reactors designated G1, G2, and G3. Reprocessing was performed to separate the plutonium from the spent fuel for French defense purposes. Beginning in the 1970s, UP1 also reprocessed fuel from other electricity producing UNGG reactors. After 40 years of activity, production ceased in the plant at the end of 1997 and decontamination and dismantling operations began immediately at the beginning of 1998.

The operations referred to below as the "UP1 Program" covered the following:

- Decontamination and Dismantling (D&D) of process facilities:
    - the G1, G2/G3, and MAR 400 decladding units,
    - the UP1 plant,
    - the Marcoule vitrification facility (AVM) and the fission production storage unit (SPF), and,
    - nuclear support facilities, which are currently in operation and scheduled for final shutdown and decommissioning in 2035-2040.
- Legacy waste retrieval and repackaging operations, comprising two subprograms:
    - bituminized waste drums produced by treatment and conditioning of radioactive effluents in the Liquid Effluent Treatment Station (STEL),
    - all other non-bituminized waste.

Figures 1 and 2 below highlight the facilities and main legacy waste streams covered by the UP1 D&D Program.

Figure 1 – Facilities Covered by UP1 D&D Program

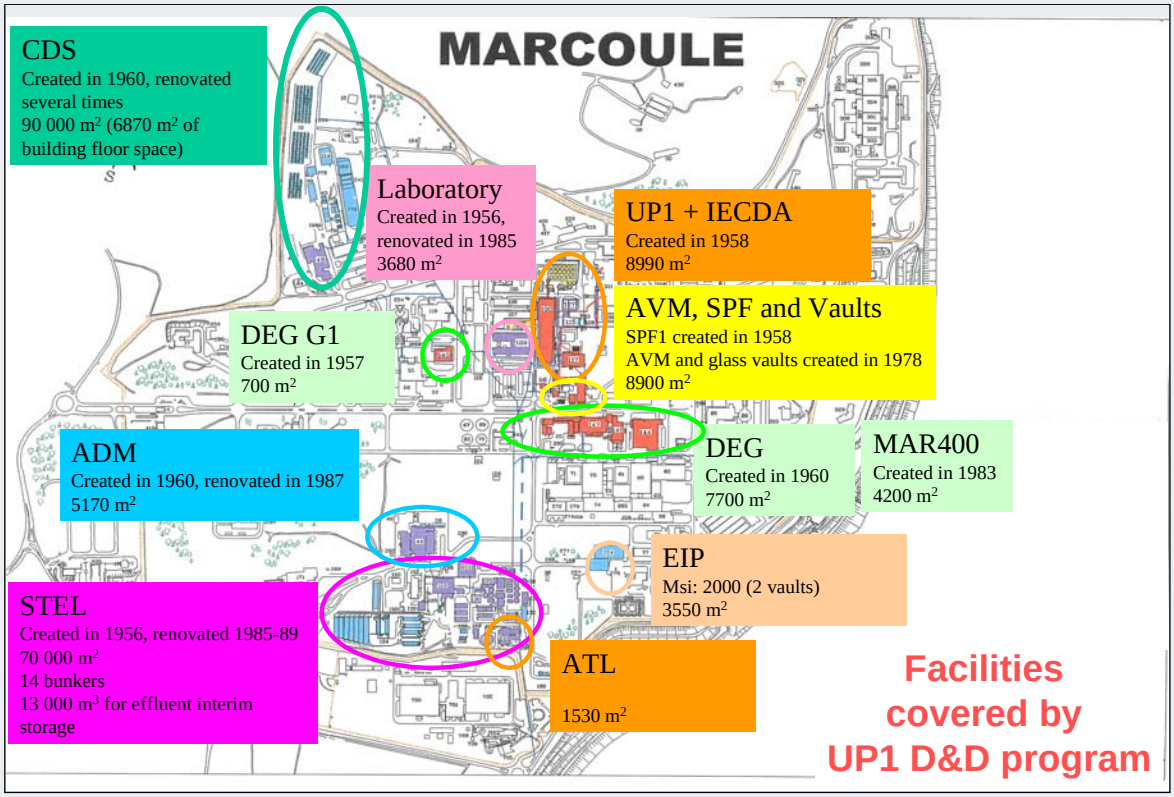
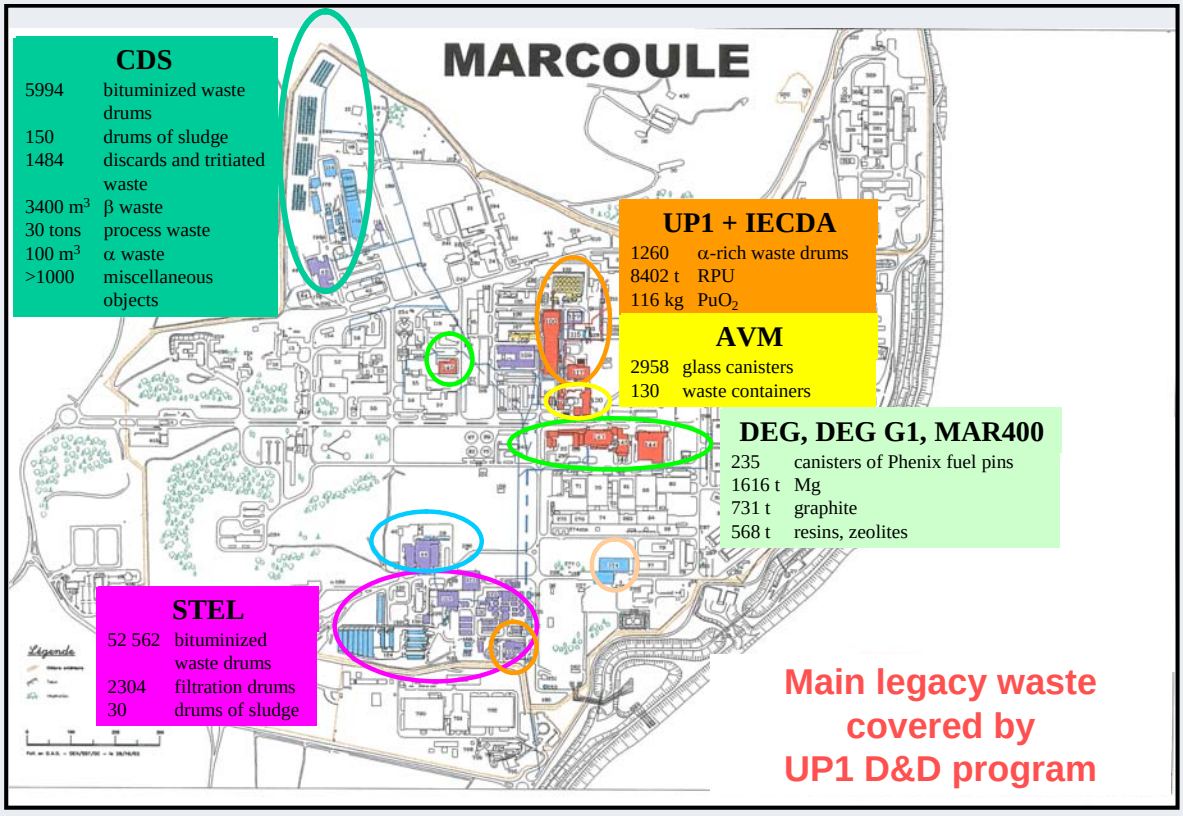


Figure 2 – Main Legacy Waste Covered by UP1 D&D Program

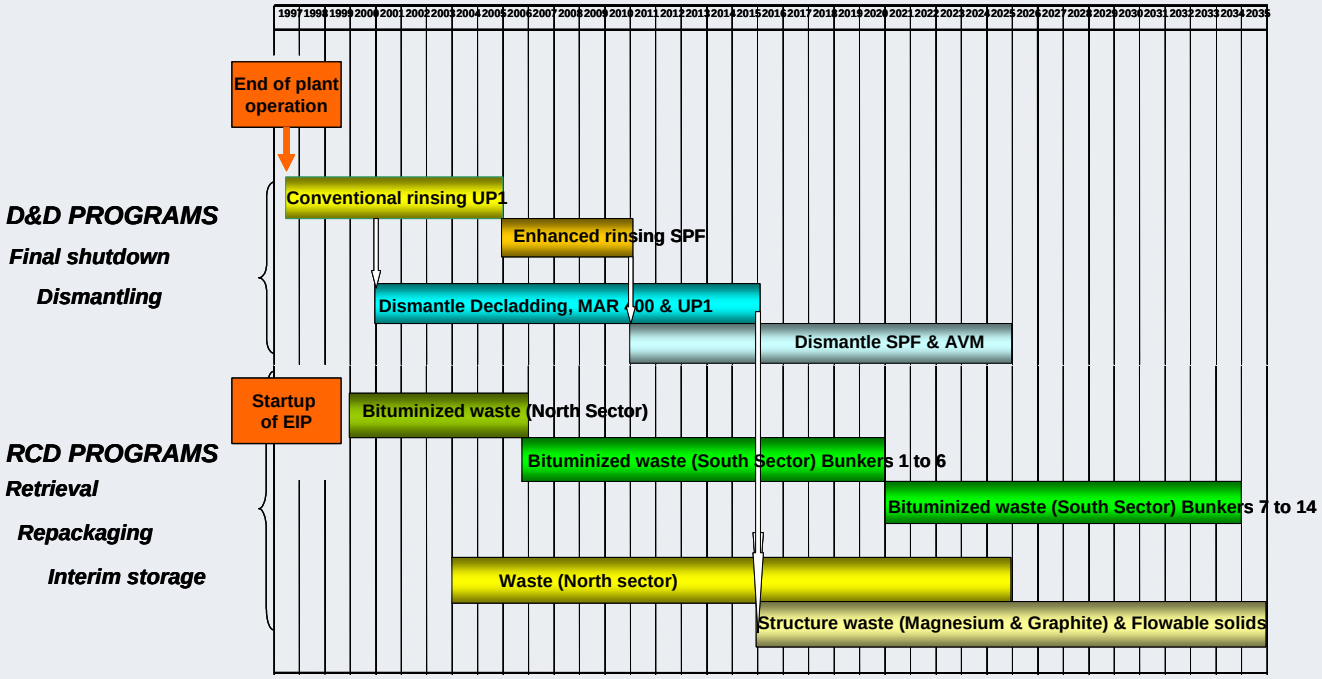


The scope of the D&D program can be summarized in the following figures:

- D&D operations in the UP1 plant, the decladding facilities and the AVM/SPF facilities include 1,000 rooms to be dismantled, representing 140,000 m^3 of contaminated and irradiated zones
- Operations are expected to generate 26,000 metric tons of low- and very low-level waste and will require 4,300,000 person-hours of work and 1,000,000 person-hours of preparation and engineering studies
- As of the end of 2006, 6,100 tons of equipment items had been dismantled and 1,075,000 person-hours of work completed.

These operations are scheduled for completion around 2040, in accordance with the program schedule shown in Figure 3.

Figure 3 – UP1 Operations Schedule



2 – Organizations

Initially the contracting authority for the operations undertaken in 1998 and managed by COGEMA was ensured by an “Economic Interest Group”, CODEM, created in 1996 at the request of the French government as a joint venture between the CEA, EDF, and COGEMA.

The following modifications were implemented to simplify and clarify the roles of each entity:

- CODEM was dissolved in 2004 and the contracting authority for these operations was assigned to the CEA alone, and,
- The CEA was given the necessary financial means via a dedicated fund (the Marcoule Defense Fund, FMD). The amount of the FMD was based on the estimated work to be completed between 2004 and 2040.

Nuclear liability for the Marcoule Secret (Defense) Basic Nuclear Installation (INBS) was also transferred from AREVA NC to the CEA on 17 March 2006, following the publication of a decree with the consent of the nuclear regulatory authority.

The ownership of the buildings, facilities and land was transferred from AREVA NC to the CEA at the end of 2006.

Within CEA, the contracting authority is entrusted to the Nuclear Energy Division; the delegated contracting authority is the Valrho Center/Delegated Decommissioning Contracting Authority; and cleanup operations are conducted by a temporary joint-liability consortium of enterprises (GMES) from the AREVA Group, with AREVA NC as the Prime Contractor, in the frame of contracts between CEA and GMES for the period 2005 - 2010.

3 – An Example of D&D Program Operations: D&D of the Decladding Facilities

This section discusses the following aspects of the D&D program operations for the decladding facilities:

- extent of the facilities to be dismantled,
- technical difficulties specific to the program,
- current state of progress, and,
- principal future milestones.

Beyond the technical difficulties themselves, the UP1 plant and the decladding facilities are subject to a general problem arising from the fact that these facilities were built and operated at a time when the notion of as-built and updated drawings was not systematically applied, and that they were used extensively for forty years.

3.1 – Scope and Technical Difficulties

The decladding program covers three facilities:

- the G1 decladding facility commissioned in 1957 for decladding of G1 reactor fuel and interim storage of magnesium scraps,
- The G2/G3 decladding facility commissioned in 1960 for the receipt, interim storage, and preparation of spent fuel for dissolution (G1, G2/G3, and other UNGG reactors, as well as the Phenix fast neutron reactor, etc.), and,
- MAR 400, for the receipt, interim storage, and preparation of spent UNGG fuel for dissolution, and for interim storage of magnesium and graphite.

The main technical difficulties for decontamination and dismantling include:

- the high irradiation level, requiring remote operation—although this difficulty is partially offset by the preexisting teleoperation equipment,
- the existence of areas that were subject to operating incidents making them physically inaccessible, and,
- the execution of decontamination and dismantling operations simultaneously with the operation of interim waste storage facilities.

Dismantling operations in the decladding facilities are expected to generate 10,300 metric tons of waste to be removed:

- 2,500 tons of process and handling equipment,
- 400 tons of piping,
- 400 tons of cables and electrical equipment,
- 3,400 tons of lead and steel or cast iron plates,
- 1,000 tons of steelwork, and,
- 2,600 tons of barite concrete bricks and rubble.

3.2 – Program Status and Major Upcoming Milestones

The following operations have been performed to date:

- removal of waste stored in pools: CANDU hulls, MAR 400 spent fuel racks,
- cleanup of all the pits except for the waste interim storage pits: sludge removal and

decontamination,

- cleanup of several pools formerly used for interim storage of spent fuel prior to reprocessing,
- decontamination or complete dismantling of several cells: CELOX, DMC, AG, BUGEY, etc., and,
- dismantling of a large fraction of the process equipment: intermediate screw conveyor and main conveyor channel.

Figures 4 and 5 below show examples of the effectiveness of cleanup operations for areas such as pits and decladding conveyor channel.

Dismantling of the electromechanical equipment will be completed by 2010–2011, and the remaining hot spots will have been eliminated from the rooms.

This state is designated by the term “Decommissioning phase 1” and is compatible with reduced surveillance and thus with lower operating cost. This is an important point, as extensive legacy waste retrieval and repackaging operations must then be carried out in the decladding facility; they can begin only when a suitable disposition route will be available for this type of waste. Final dismantling will be carried out once these operations have been completed.

Figure 4 – Example: Cleanup of Pits B1 and B2

Pit B2 before …

… after

Figure 5 – Example: Cleanup of Decladding Conveyor Channel

Initial condition **Current condition**

14 weeks of work by divers
4 weeks of draining
11 weeks of decontamination

71 120 person-hours in all

4 – Summary

The CEA has commenced with an ambitious program to decommission the former UP1 reprocessing plant and related facilities as well as removal of legacy waste. These operations, conducted as the "UP1 D&D Program" will involve the resolution of technical difficulties such as high radiation levels and accessibility and the management of the tens of thousands of metric tons of low- and very low-level waste. Progress has been made with the cleanup of various pools, pits, and cells within the decladding facilities and a program is in place for the expected completion of all cleanup operations around 2040.

NOMINATIONS FOR DDR DIVISION AWARDS

The deadline for nominations for the DDR Division Awards – "Lifetime Achievement Award" and the "Award for Excellence" – has been extended to June 30, 2007. The decision was made to consolidate the nominations and extend the "open nomination" period until the end of June. This will allow for the presentation of the awards at DDR2007 in Chattanooga with a much larger, focused and international DDR community in attendance – similar to the very same setting used at the Denver DDR2005 conference to present the initial awards. So please consider submitting any nominees you feel would be worthy of consideration for these awards between now and June 30. The nomination forms are available from the DDR website and nominators should submit those completed forms to the DDR Chair at lboing@anl.gov by June 30.

2007-2008 DDR SCHOLARSHIP AWARD

..... By: Sue Aggarwal, Chair, DDR Scholarship Committee [saggarwal@nmg.org]

The recipient of the 2007-08 DDR Scholarship is Lisandro Vazquez II. He is currently a sophomore majoring in Nuclear and Radiological Engineering at the Georgia Institute of Technology in Atlanta, GA where he is enrolled in the Navy ROTC program and would like to pursue a career in the US Navy Nuclear Program. He has a strong academic background, strong references and seems to know where he wants to go with his life. He is hoping to be accepted into either the Navy's Nuclear Research & Development program or into the Naval Submarine Program. He plans to pursue a Masters degree in Nuclear, Mechanical or Electrical Engineering in the future.

Lisandro Vazquez II submitted an essay: "The Soviet Nuclear Fleet and its Impact on the Future of the Nuclear Field". Here is an excerpt from that essay which he submitted with his scholarship application:

"…..While the stricken Russian submarine fleet poses the greatest threat to the nuclear field, it may also be a diamond in the rough. The large sums of capital needed for the proper disposal of radioactive material cannot be funded solely by Russia. The international community must vastly increase its resolve to right this wrong for the security of free nations and the future of the nuclear field. It is in the highest interest of the United States to secure the timely decommissioning and decontamination of the Russian fleet."

We look forward to meeting Lisandro and talking with him about what we are doing in DDR, help him to even more fully understand the DDR nuclear component and to learn more about his plans for his future in the nuclear field. Sue Aggarwal will be working to get him up to our meeting in Chattanooga. I would also like to thank all of those involved in supporting this important work for their efforts.

DDR NEW MEMBER PROMOTION AWARD WINNER

The drawing for the winner of the second half of the CY2006 promo for all new members was held January 20, 2007. There were 41 new DDR member names entered in the drawing. Those eligible for this drawing were new DDR members added to the roster according to ANS between July 1 and December 31, 2006. The winner of the drawing was: **Alison Arrowsmith** of **Perma-Fix Environmental Services** of Oak Ridge, TN

Alison will receive a copy of the 2004 Decommissioning Handbook edited by Taboas, Moghissi and LaGuardia.

ANS MEMBER, MARY GERRY WHITE, DECEASED

Mary Geraldine (Mary Gerry) White, 82, ANS member since 1972; received her bachelor's degree in biology and her master's degree in radiation biology from the University of New Mexico in 1960 and 1964, respectively; during her lengthy career, worked for a number of private companies and government organizations, including Sandia Corporation, the U.S. Environmental Protection Agency, the U.S. Department of Energy, Stone & Webster Engineering Corporation, the University of Arizona, and Argonne National Laboratory; died January 23 at her home in Albuquerque, N.M. Mary Gerry was an active DDR Division member and friend.

BLUEGRASS STOCK CAR SPONSORSHIP ..... By: Lisa Mullen [lmullen@bluegrassbit.com]

Now here's an example of DDR really getting into the mainstream of our American culture. Lisa Mullen, DDR member and the Business Development Manager of Bluegrass Bit Company (BBC) of Greenville, AL, sent us a photo of their company sponsored late-model, dirt-track race car (see the rear spoiler on the car) that competes in the Crate Late Model Storm Pay circuit across the Southeast. Lisa tries to make it to all of the races to cheer on the team and hopes to see lots of trophies with this car during the 2007 season. The BBC office in Greenville, AL is only about 100 miles from the world famous high-banked track of the Alabama International Motor Speedway in Talladega, Alabama. So you just never know what might happen to this racing team in the future – perhaps NASCAR will call them up to the big-time. Good luck to Lisa, the driver Curt Ryals (who just happens to be Lisa's son-in-law) and the entire BBC racing team for this season! Thanks for sharing this with us Lisa.

MEMBERSHIP UPDATE

During the past 6 months (October 2006 through April 2007), the membership of the ANS DDR division has increased by **114 new members**. A listing of these new members and their respective organizations is presented below. When convenient and as we deal with them, please welcome them to our Division. Thanks to **Sue Aggarwal**, **DDR Membership Chair**, and others for their ongoing efforts to promote Division membership.

Mr. David Alley Anna, Inc.	Mr. James A. Fennema, PE Self Employed	Ms. Sherry W. Lewis Defense Nuclear Facilities Safety	Mr. Marshall M. Seaman United States Military Academy
Mr. Scott D. Ambers University of Michigan	Dr. Jean Fontaine CEA	Mr. Roy L. Lightfoot Bartlett Services, Inc.	Dr. Der-Jhy Shieh Institute of Nuclear Energy
Ms. Alison Arrowsmith Perma-Fix Environmental Services	Mr. Reuben R. Garrett Mahai Company	Mr. Gregory A. Love Western Michigan University	Mr. Chieng-Liang Shih Institute of Nuclear Energy
Mr. James C. Ayoub	Dr. David Giefer, PE Harrisburg Area Community College	Mr. Donald N. Mackenzie U.S. Department of Energy	Miss Erika K. Short BWXT Y-12
Mr. David C. Ayres University of Florida	Dr. Rosa A. Gonzalez R. Gonzalez Consulting, Inc.	Mr. Samuel J. Maggio ICM – International Climbing Machines	Mr. John A. Simmons, PE Washington Group International
Mr. Roger T. Baldwin Xenogenesis	Mr. John S. Greenwood General Atomics	Mr. Timothy I. Martinson Canberra Industries, Inc.	Mr. Bradley A. Smith Washington Closure Hanford, LLC
Mr. William A. Ball, III Dominion Power	Mr. Craig F. Grochmal Shaw Environmental & Infrastructure	Mr. Gurcharan S. Matharu Entergy Operations, Inc.	Mr. William W. Smith, III Enscicon Corporation
Miss Brandalyn Bassett University of Utah	Mr. Magnus Groth Studsvik AB	Mr. Edward J. McLellan Laser Decontamination, Inc.	Mr. Travis R. Snapp Oregon State University
Mr. Darryl Borland Vanderbilt University	Mr. Hiruy L. Hadgu University of Michigan	Mr. Charles I. McVicker, PE Indus International, Inc.	Ms. Annie R. Spears Southern Nuclear – Farley
Mr. Donald A. Brown Techcom International	Mr. Harold M. Hedge, Jr. Geosyntec Consultants	Mr. Norman M. Meinert, PE	Mr. Scott R. Stanton, PE TRI Tool, Inc.
Mr. Raymond Burke Entergy	Mr. Mark E. Hickman MEH Consultants	Ms. Margaret A. Melberg CH2M-Hill	Mr. Gary J. Storr Bullard
Mr. Gyungsun Chae SAE-AN Engineering Corporation	Mr. Robert I. Hill LATA Inc.	Mr. Eric A. Menjivar Oregon State University	Mr. Frederick P. Straccia Radiation Safety and Control
Mr. Xiang Chen University of Illinois	Mr. David W. Hillyer Stone & Webster, Inc.	Mr. Donald F. Mershon Nexus Technical Services Corporation	Ms. Melissa M. Suda Jefferson College
Mr. Antonio Ciriello Politecnico Di Milano	Mr. Jack S. Hobbs Penhall Company	Mr. Stephen I. Miller AFRRI	Mr. Bill Sundeen American DND, Inc.
Mr. Jeffry L. Clark Washington Safety Management Solutions	Mr. Ian S. Howard DeNuke Services	Mr. Mark A. Mitchell	Mr. Bryan Swinson BIL Solutions, Inc.
Mr. Todd R. Clark Pro2Serve, Inc.	Mr. Jung-Chun Hsieh Institute of Nuclear Energy	Mr. Thomas F. Moore U.S. Army Nuclear & Combat WMD	Mr. Evgeny A. Taskaev Analytics, Inc.
Mr. Michael J. Crouse WSMS/NCS	Mr. Nathan H. Hurt, PE	Mrs. Donna S. Moser, PE Veterans Affairs	Mr. Kevin E. Taylor Energy*Solutions*
Miss Jennifer L. Dalzell Ohio State University	Mr. Mehmet Husnu Cardinal Health	Mr. Robert Mullens AEA Technology Engineering Services	Mr. Jeffrey S. Telman Barnhart Nuclear Services

Dr. Musa B. Danjaji South Carolina State University	Mr. Gerald T. Jannik WSRC/SRNL	Mr. Ryan F. Murdock Idaho State University	Mr. Andrew H. Thatcher NEXTEP Environmental, Inc.
Mr. George M. Davis Hukari Technical Services, Inc.	Mr. Phillip David Pears Jones Three Rivers Community College	Mr. Robert Neibecker Bechtel Power Corporation	Mr. Jean-Christophe P. Trama, PE CEA
Mr. Matthew J. Deacon University of Pittsburgh	Mr. Graham H. Jonsson Nexia Solutions	Mr. Ralph A. Palmieri Lockheed Martin Global	Mr. Stephen H. Turnmire University of Idaho
Mr. Brandon Michael deGraaf University of Cincinnati	Mr. Manjeshwar N. Kamath, PE Black & Veatch	Mr. Mark W. Peres, PE Fluor Government Group	Mr. John R. Twarog Entergy Nuclear – Vermont Yankee
Mr. John C. Devine, Jr. Polestar Applied Technology	Ms. Marisa Kane KI Pills, Inc.	Dr. Martin G. Plys Fauske & Associates, LLC	Mr. David M. Wagner, PE Bechtel Power Corporation
Ms. Georgette A. Diab General Electric	Dr. Joseph F. Kanney Sandia National Laboratories	Mr. Dwaine R. Pucket, Jr. BWXT/Y-12 Plant	Mr. Jai-Baau Wang Institute of Nuclear Energy
Mr. Alan Dimond TSSD	Mr. William E. Kirby AEGIS Engineering, LLC	Ms. Deborah A. Ramsey, PE Hanson Professional Services, Inc.	Mr. Eric K. Weingarten Baker Botts, LLP
Mr. Brian K. Donahoe Rigging International	Mr. Christopher Kovach Fidelity	Mr. Stephen J. Reutcke Reutcke Engineering Services	Mr. Gary T. Wolfram University of Florida
Mr. Konstantin V. Dorofeyev Mining & Combine	Mr. Benjamin J. Kupka MPW Industrial Services	Mr. Michael J. Rhodes Atomic Energy of Canada, Ltd.	Mr. Greg Wood Canal Barge Company
Mr. Joel W. Duling BWXT Services, Inc.	Mr. Sung Hwan Kwon, PE KOPEC	Mr. David G. Ruscitto, PE	
Mr. John P. Englert, Esq. Kirkpatrick Lockhart Nicholson	Mr. Ding-I Lee Institute of Nuclear Energy	Mr. David P. Scowcroft, PE British Nuclear Group	