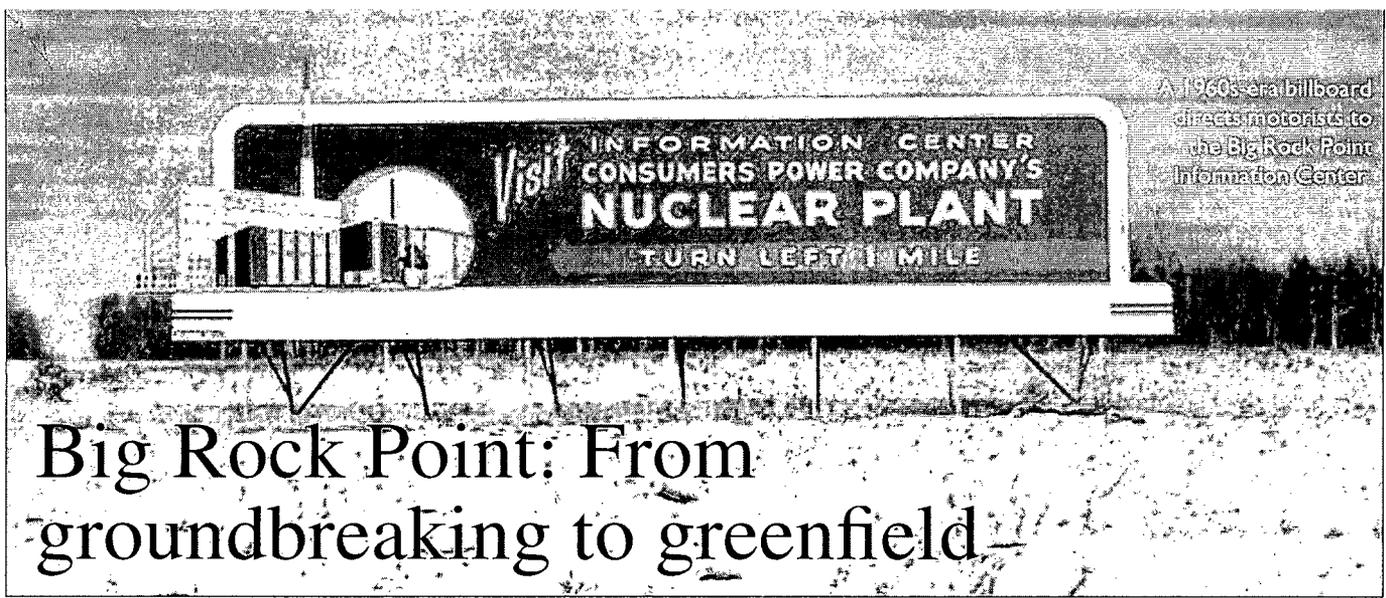


COMMISSION BRIEFING SLIDES/EXHIBITS

**BRIEFING ON STATUS OF
DECOMMISSIONING ACTIVITIES**

DECEMBER 11, 2006



Big Rock Point: From groundbreaking to greenfield

BY BETSY TOMPKINS

IN THIS AGE of commercial nuclear power plant license renewal, there are not many stories of plants' going full circle, from site selection, to planning, to construction, to operation, to shutdown, to decommissioning, to site restoration. But there is one that has gone through all of those steps: Big Rock Point, in Charlevoix, Mich. Owned and operated by Consumers Energy (formerly Consumers Power Company), "Big Rock," as it is commonly known by those who have worked there or live nearby, a 67-MWe General Electric boiling water reactor, started life as a research and development facility designed to demonstrate that nuclear plants could produce electricity economically, and also to study the reduction of fuel fabrication costs and how to increase the life of fuel. In 1965, it began producing electricity for the surrounding communities, becoming the

Many thanks to Tim Petrosky and Pam Gibson, of Consumers Energy/Big Rock Point, for their able assistance to me in pinning down many of the details for this article. Photos are courtesy of Consumers Energy/Big Rock Point.—B.T.

Both sadness and pride were evident at the celebration of the life of Big Rock Point.

United States' fifth commercial nuclear power plant and Michigan's first.

The plant's name came from the "big rock"—or "Kitchiossining," in Anishinaabemowin, the official language of the Little Traverse Bay Band of Odawa Indians—that still sits at the edge of the lake, not far from the former power plant site. Considered a sacred site and serving as a navigational aid and meeting place for generations of Native Americans, the rock was left behind by a retreating glacier at the end of the last Ice Age. At about 30 feet around and eight feet tall, the rock stands as a symbol of the plant site's return to its natural state.

In the beginning

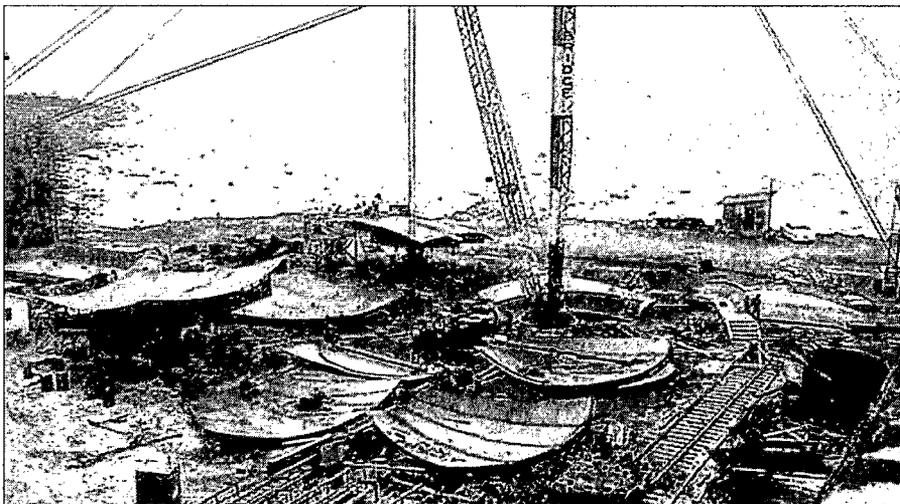
Consumers Power had an early interest in nuclear power. Jim Campbell was the utility's vice president at the time President Dwight Eisenhower signed the Atomic Energy Act of 1954, the first major amendment of the original Atomic Energy Act, which allowed for the private use and development of nuclear power in the United

States. Campbell, with the backing of the utility's president, Dan Karn, was instrumental in Consumers' participation, along with Detroit Edison and 24 other corporations, in establishing the Power Reactor Development Company, which built the experimental Enrico Fermi plant, intended for breeder reactor R&D.

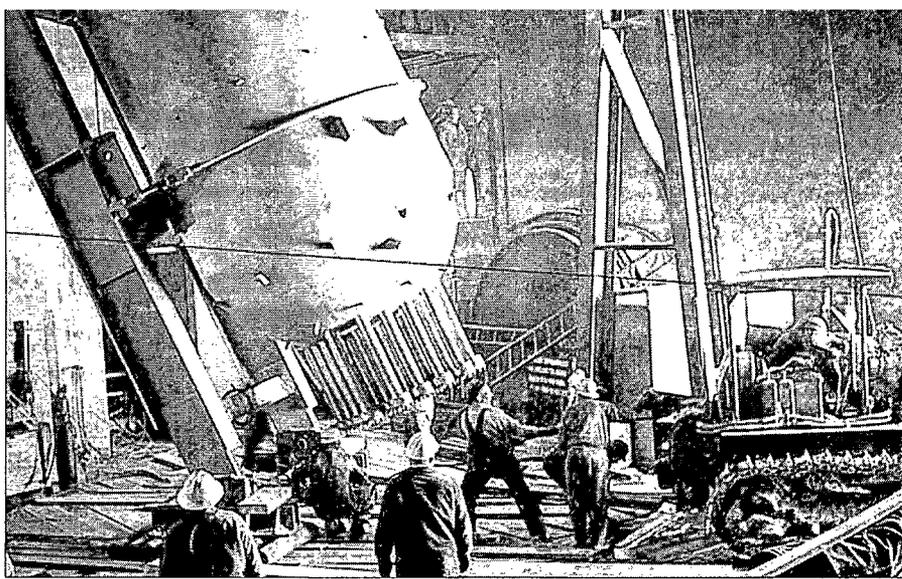
Named senior vice president of Consumers in 1956, Campbell was convinced of the feasibility of using boiling water reactors for the production of electricity. This notion, however, was not without controversy within the utility's ranks, mainly because of financial uncertainties. The utility ultimately devised a plan, according to *Future Builders: The Story of Michigan's Consumers Power Company* (by George Bush, McGraw-Hill, 1973), the official history of Consumers Power, that would "allow the project to finance itself to the extent that the facility produces power for the system, basing this capital amortization on what the plant's cost would have been had it been coal-fired." Big Rock was planned as part of the Atomic Energy Commission's (AEC) Power Demonstration Reactor Program, which had been initiated in 1955 to promote AEC/industry cooperation in building and operating experimental nuclear power reactors.

In 1959, the utility signed contracts for Big Rock Point, with Bechtel Corporation as the prime contractor and General Electric as equipment supplier. Ground was broken at the site, on the shore of Lake Michigan north of downtown Charlevoix, on July 20, 1960, and the plant was completed in 29 months (yes, "months" is correct!) at a cost of \$27.7 million. The AEC awarded the plant its operating license on August 29, 1962, and it achieved its first sustained chain reaction about a month later, on September 27.

Even considering the plant's short construction time relative to those that were



Pieces of the plant's trademark sphere, at the site and awaiting assembly



The reactor vessel being lifted to a vertical position inside the reactor building in February 1962.

built later, the safety of Big Rock's employees—and of its contract personnel—was always Consumers' top priority. That safety ethic was carried on through all the phases of Big Rock's life.

The operating years

From the beginning, Big Rock Point was a high achiever. For its first four and a half years, Big Rock was available to the AEC for R&D activities. The plant—the first BWR direct-cycle, forced circulation, high power density nuclear facility in the world—was used for a number of full-scale tests of various fuel designs over its lifetime, including the following:

- The Department of Energy-sponsored Fuel Performance Improvement Program, which involved Battelle Northwest Laboratory and Exxon in exploring alternative fuel designs in power reactors.
- The Fuel Burnup Program, to demonstrate the feasibility of extending Exxon BWR fuel burnup from 27 gigawatt-days per metric ton (GWd/t) to 35–40 GWd/t.
- The Corner Rod Program, with GE, to

study the effects of reactor environment on various reactor materials, such as Zircalloy and stainless steel.

- The Cladding Ductility Program, with Exxon and the Electric Power Research Institute (EPRI), to produce high-ductility cladding.

- The Unetched Fuel Rod Program, to determine the feasibility of not etching and autoclaving Exxon fuel rods.

- The testing of Exxon fuel contained in Zircalloy-2 cladding furnished by Vallourec, of France.

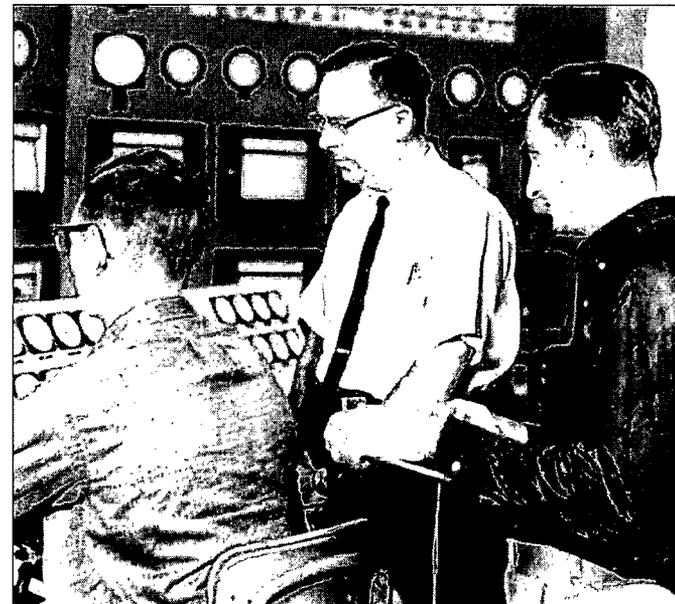
- Various studies involving control rod drive designs, fuel channels, thermal shield stability, in-core detectors, neutron sources, core spray components, fasteners, and other miscellaneous components.

From 1969 to 1977, Big Rock was also licensed to use

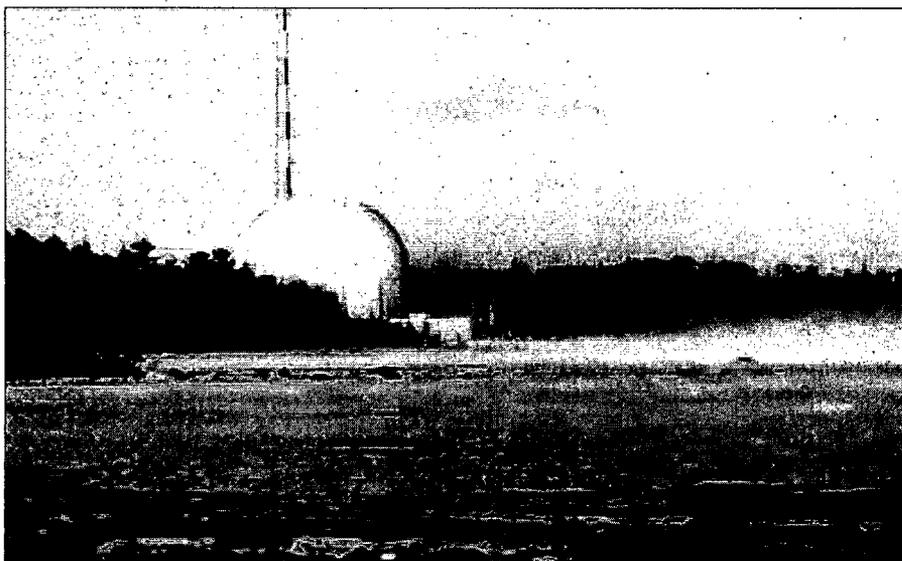
mixed-oxide fuel through a cooperative R&D program that included GE, Exxon, and Consumers Power and was sponsored by the Edison Electric Institute.

Consumers Power declared Big Rock Point commercial on November 1, 1965. The plant was a reliable source of electricity for the surrounding communities for 35 years. As if that weren't enough, from 1971 to 1982, the corner rods of the fuel bundles were used to produce cobalt-60 for the treatment of cancer patients. It is estimated that more than 120 000 patients received treatments using that Co-60.

Big Rock achieved numerous milestones during its operating life. In July 1977, it completed 343 days of continuous operation, setting a world record for BWRs. Between 1979 and 1981, after the accident at Three Mile Island-2, the plant performed



Lee Hausler (center), first plant manager at Big Rock, oversees the initial criticality of the reactor on September 27, 1962.



Big Rock, in its scenic location on the shore of Lake Michigan

one of the first voluntary risk assessments following the publication of the 1975 WASH-1400 Reactor Safety Study. The modifications that Big Rock proposed to enhance the safety of the plant drew approval from the Nuclear Regulatory Commission as meeting the intent of the recommendations of the study.

At the end of 1983, Big Rock's employees completed 1.5 million hours of work without a lost-time accident, earning the National Safety Council's Award of Merit. In June 1987, GE honored the plant for its achievement in 1986 of the best availability—95.5 percent—of any GE-designed plant worldwide. And in August 1987, employees achieved 10 years without a lost-time accident.

The plant reached the 10-million megawatt production level on March 3, 1991, and was named a Nuclear Historic Landmark by the American Nuclear Society in

June that same year. In November 1991, Big Rock Point's simulator—the nuclear industry's first site-specific simulator built by employees using personal computer-based technology—was dedicated.

In February 1992, Big Rock officially became the oldest operating nuclear power plant in the United States, and in August 1992, with safety still at the forefront of operations, employees achieved 15 years without a lost-time accident. The end of June 1993 saw Big Rock become the longest-running nuclear plant in the United States.

The plant's list of amazing accomplishments continued as it generated a record 516 209 megawatts in 1995, and its employees achieved 20 years without a lost-time accident through August 1997.

The end of a great run

In 1997, Big Rock Point had another three years to go before its operating license would expire. But with the atmosphere in the industry at that time (before all of the current buzz about a nuclear renaissance and the start of license renewal submissions) and increasing costs of operation, plant management made the decision to shut down Big Rock Point. It was determined that the cost of improvements that would be needed to meet future regulatory requirements would make continued operation uneconomical.

A celebration by some 1000 attendees of the plant's operating life, accomplishments, and contributions to the commercial nuclear power industry was held on August 29, 1997, "A sweet, sad moment," said Josh

Barnes, mayor of Charlevoix at that time. The plant was officially tripped by reactor operator Andy Loe at 10:33 a.m., with his final tribute: "Good-bye, Big Rock. Sorry to see you go."

On September 19, Consumers Energy submitted its post-shutdown decommissioning activities report (PSDAR) outlining decommissioning activities that would start immediately and were to be completed by September 2002 (this time frame was revised in early 1998, extending the completion date to August 2005). No time was wasted in transferring the fuel from the reactor vessel to the plant's spent fuel pool, a task that was completed on September 20, 1997.

Thus began the decommissioning phase of Big Rock's life cycle. Along with this phase came a new name: the Big Rock Point Restoration Project.

Taking it all apart

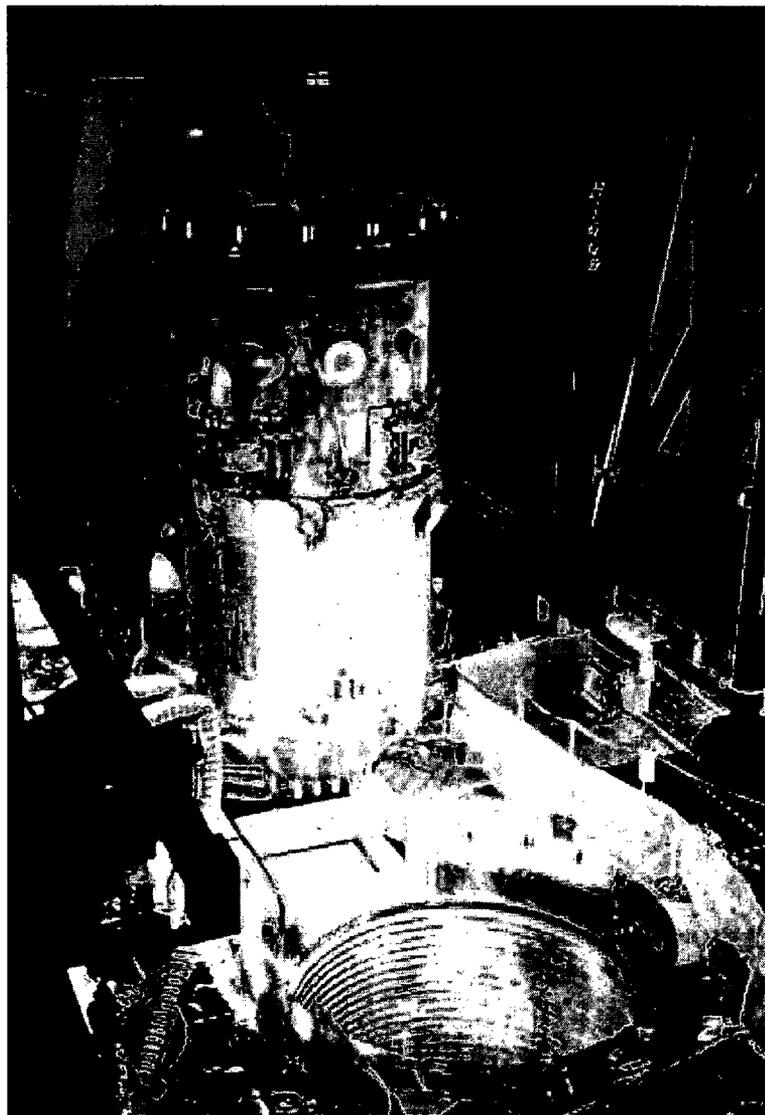
Consumers chose the NRC's DECON option for Big Rock Point. The NRC defines this as "immediate dismantlement," whereby the equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to the point of allowing the release of the property and termination of the plant's operating license. When it filed its decommissioning plan, in February 1995 (five years before the end of the plant's license, as allowed by regulations at that time), however, the choice was to implement SAFSTOR—in effect, "delayed DECON"—under which a nuclear facility is maintained and monitored for a period of time to allow the radioactivity to decay, and then it is dismantled. At that time, there was still hope that the DOE would be taking the spent fuel from commercial nuclear power plants by the designated January 31, 1998, date.

After the actual closure of the plant, Consumers advised the NRC of its change in plans and revised its decommissioning plan—its PSDAR—to reflect its desire to immediately decontaminate and dismantle the plant. This new plan was approved by

the NRC, which conducted inspections during all phases of the decommissioning process.

What proved to be vital to the success of the decommissioning process was the retaining and retraining of Big Rock employees to do the actual decommissioning work, alongside the contractors signed on to the job. This allowed them to remain on the job, albeit one that would end, and helped the utility keep its base of knowledgeable personnel through this last phase of the plant's life. All workers, whether employees or contractors, received green hardhats imprinted with the site logo, symbolizing site pride and a community atmosphere.

Before the plant could be dismantled, the areas and components that had been exposed to radioactivity had to be decontaminated. Consumers chose a process called Decontamination for Decommissioning (DfD), developed by EPRI. The process uses fluoroboric acid to dissolve contamination—in Big Rock's case, mostly Co-60—that was activated in the reactor core and deposited throughout the



The reactor vessel is hoisted from its concrete cavity. (August 2003)



Reactor operator Andy Loe flips the switch to shut the plant down for the last time on August 29, 1997, with the words, "Good-bye, Big Rock. Sorry to see you go."

primary system. The process effectively removed about 96 percent of the contamination, resulting in lower exposure to plant workers and allowing for a significant reduction in radioactive material requiring disposal during the dismantling of the plant. Big Rock was the first plant to use the DfD process, earning Consumers, EPRI, and Westinghouse's PN Services Division, which applied the process, an R&D 100 award from *R&D Magazine* for one of the most significant technology developments of 1998.

With the used fuel removed to the plant's spent fuel pool and the decontamination process complete, dismantlement began. The control room was closed in February 1999 and gauges and controls were removed. A new, separate electrical system was installed specifically for the decommissioning process to avoid potential electrical hazards that might be hidden within walls, floors, ceilings, or machinery, earning the plant a Project of the Year 2000 award from *Power Engineering* magazine for the enhanced safety it provided to workers and for serving as a model for future decommissioning projects.

In early 2000, the largest item from Big Rock Point designated for reuse—the main transformer—was transported to Consumers' Thetford electric substation near Flint, Mich. Among other items designated for reuse at other sites were the plant's standby and emergency diesel generators. And later that year, the plant achieved 23 years without a lost-time accident. (That 23-year stretch ended unceremoniously several months later when an engineer, walking on a pavement covered with a light dusting of snow, on his way to—of all things—an on-site safety meeting, slipped and broke his ankle. An on-site safety inspector responding to the accident also slipped on a grating wet from the snowfall, and broke his ankle.)

Demolition of the Alternate Shutdown Building, the first structure at the site to undergo a radiological survey with the pronouncement that it was "clean," was completed in April 2001. The building, constructed to withstand earthquakes, tornadoes, and floods, was just a pile of rubble within three days of the start of demolition.

Over a less-than-six-month period from mid-November 2002 to early May 2003, all spent fuel at the site, consisting of 441 fuel bundles, was removed from the pool where it had been stored, placed in eight appropriate dry storage casks, and moved to Big Rock's independent spent fuel storage installation.

The next big step was the removal of the reactor internals and reactor vessel. Removal of the internals involved Big Rock employees and contractor personnel and was done while the vessel was flooded.

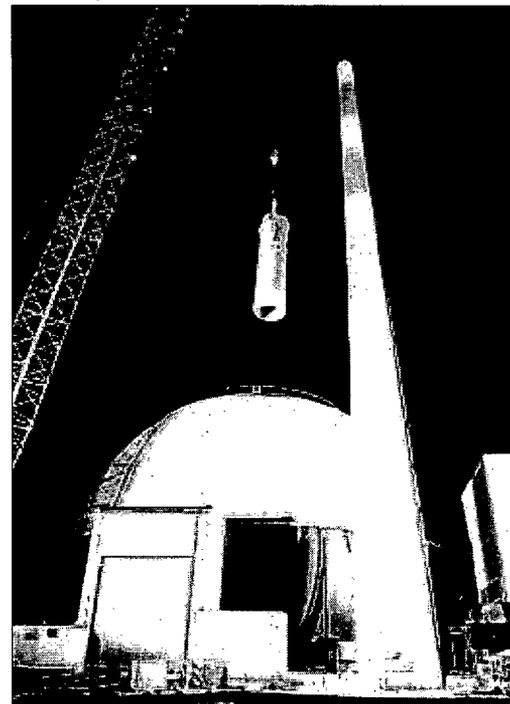
Specially designed equipment was required in order to accomplish this process remotely, because of the Greater Than Class C radioactivity level of some of the materials. This special equipment served as a prototype for later versions used in other decommissioning projects. On August 25, 2003, the reactor vessel itself was removed whole, also with the use of some custom-designed equipment, and was placed into the transportation container, which was welded shut and filled with a grout consisting of low-density cellular concrete through injection ports in the container's top cover plate. The vessel package, weighing about 565 000 pounds, was loaded onto a special trailer for hauling to a designated rail siding for transfer to a special railcar for the 1400-mile, eight-day journey to the Barnwell, S.C., low-level radioactive waste disposal facility. The vessel head was shipped separately to the Envirocare of Utah (now EnergySolutions) disposal site.

The next large component to be removed and shipped for disposal was the steam drum, weighing in at 200 000 pounds and measuring 41 feet long and 10 feet in diameter. The shipment involved three rail companies and passed through seven states on its 1800-mile, 13-day trip, also to the Envirocare site.

As hazards and conditions changed during decommissioning, site general manager Kurt Haas in 2004 issued a safety challenge. All employees and contractors were asked to sign a pledge to demonstrate their commitment to safety, and they were also asked to add their names to a large sign that read, "We are personally and emotionally committed to safety," which was mounted at the entrance to the work site as a daily reminder of the continuing importance of working safely.

During the spring and summer of 2004, the concrete reactor cavity inside the green containment sphere of the plant was cut into pieces, some weighing as much as 20 tons. And in October 2004, the dismantlement of the familiar red-and-white-striped ventilation stack was begun. The 240-foot stack was taken apart in sections, rather than taken down by explosives, allowing for better control of dust and debris. Removal of the stack segments, some weighing as much as 30 000 pounds, required the use of a 300-foot-tall crane, which was shipped to the site in 15 separate truckloads. Because of the crane's extreme height, special permission had to be obtained from the Federal Aviation Administration to erect it.

All that remained of the plant in 2005 were the containment sphere and turbine building. With the interior surfaces of the structures removed, assessed, and sorted for appropriate disposal, the outer shell of the containment sphere was taken apart in



Dismantlement of the plant's red-and-white stack begins. (October 2004)

pieces and the turbine building's walls were removed, leaving just its metal skeleton. The concrete monolith that housed the reactor inside the containment dome was "softened" with explosives, but it still required some major impacts from a 16 000-pound wrecking ball. Demolition of these structures was completed in April 2006.

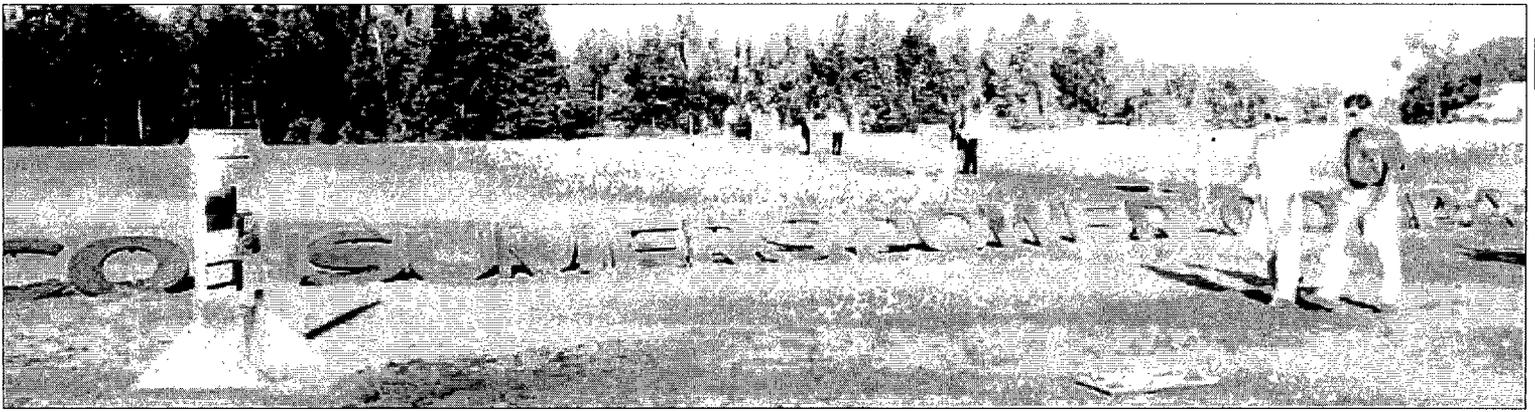
In the end, at a cost of approximately \$390 million, more than 53 million pounds of low-level radioactive waste were shipped to off-site disposal facilities in South Carolina, Tennessee, and Utah, and more than 1000 shipments of more than 59 million pounds of nonradioactive building materials were surveyed, packaged, and shipped to an industrial landfill. All shipments were accomplished safely and in accordance with federal, state, and local regulations.

This carefully choreographed process of decontamination, dismantlement, demolition, and component and debris removal was all set out in detailed plans before work began. The team involved in the decommissioning, parts of which required the development of first-of-a-kind tools, equipment, and processes, included the following major contractors: EnergySolutions, Bierlein Demolition, PMC Constructors and Technical Services, Bartlett Nuclear, Securitas, MOTA, and Sargent & Lundy.

Back to nature

What took less than three years to build took approximately nine years to deconstruct. What remains at the site of the Big Rock Point nuclear power plant is a flat span of approximately 500 acres of ground—which I was told "looks so small"

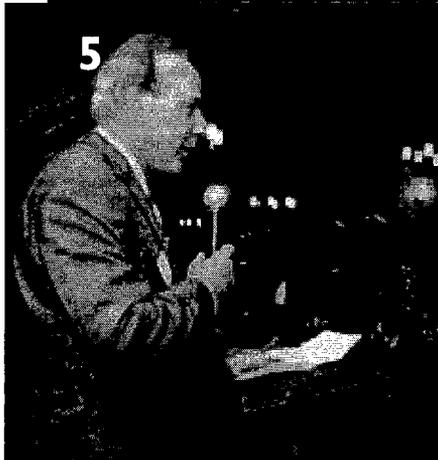
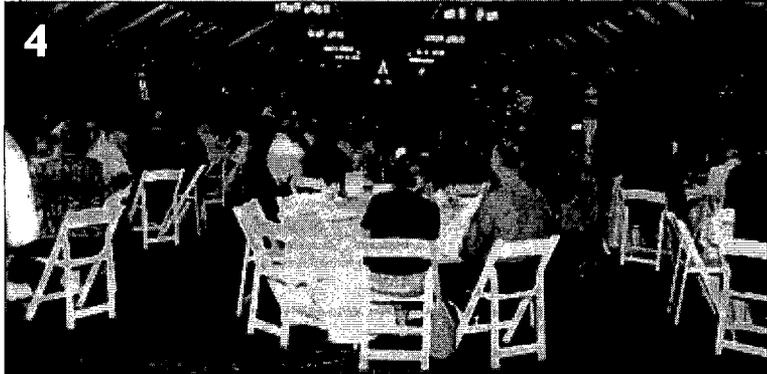
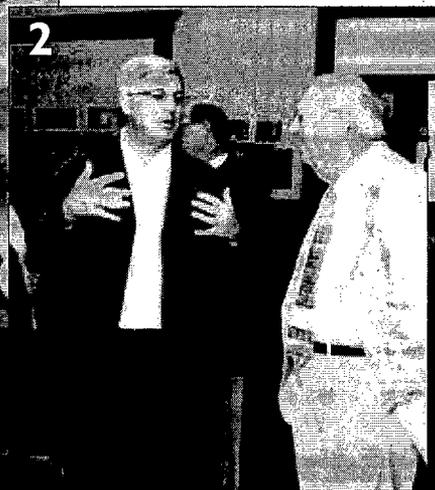
Continued on page 42



Visitors stroll the walking path around the site of the former Big Rock Point nuclear power plant at the Greenfield Celebration. The Consumers Power Company sign was removed from the administration building before its demolition. (Photo: Betsy Tompkins)

Big Rock Point: Going out in style

Monday, August 28 – The exhibit and dinner

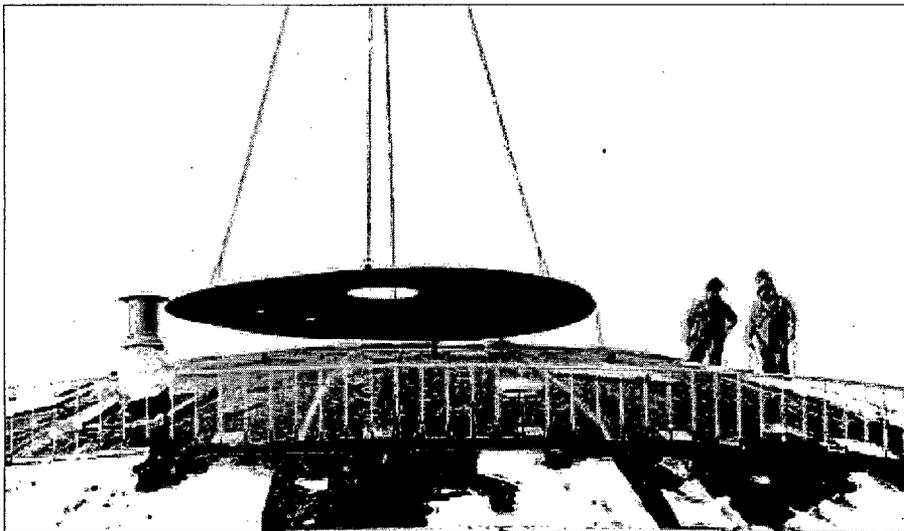


1. Guests at the Big Rock Point exhibit/reception enjoy Michigan wines and hors d'oeuvres outside the Charlevoix Depot Museum. **2.** Inside the depot, Bob Fenech, senior vice president of Nuclear, Fossil, and Hydro Operations for Consumers Energy, chats with Lee Hausler, the first plant manager of Big Rock Point (1960–1966). **3.** A mother and daughter examine a display of controls retrieved from the plant's control room. **4.** Guests assemble for dinner at Castle Farms. **5.** Tim Petrosky, area manager/public information director for Consumers Energy, welcomes dinner guests. **6.** Representatives of the major contributors to the greenfield events were presented with a framed aerial photo of Big Rock Point. From left to right: Kurt Haas, Big Rock Point site general manager; Steve Lajoice, Securitas site manager; Bob Shilander, president, PMC Constructors and Technical Services; Larry Bean, president, energy services, Securitas; John Mageski, vice president, business development, MOTA; Bob Fenech, senior vice president, Consumers Energy; Paul Genoa, public policy director/assistant to the president, Nuclear Energy Institute; Dave Joos, president and CEO, Consumers Energy; Bud Wendorf, CEO, Sargent & Lundy; Myron Kaczmarzsky, vice president, business development, Bartlett Nuclear; Steve Creamer, CEO, EnergySolutions; and Mike Bierlein, president and CEO, Bierlein Demolition.

Tuesday, August 29 – The Greenfield Celebration



7. Attendees received these mementos, made from the plant's containment steel. 8. Photo collages of plant employees participating in various charitable and company activities drew the attention of families and friends. (Photo: Betsy Tompkins) 9. Gary Vroman, an employee of contractor PMC, grabs a handful of grass seed before embarking "on the road to green." 10. Kurt Haas welcomes celebration attendees. 11. Farrah Tulley, daughter of Greg Tulley, an employee of contractor BNG America (now part of EnergySolutions), sang the national anthem at the opening of the program. Speakers included (from left to right): Bob Fenech and Dave Joos, Consumers Energy; U.S. Rep. Bart Stupak; state Reps. Gary McDowell and Kevin Elsenheimer; state Sen. Jason Allen; Frank Ettawageshik, chairman, Little Traverse Bay Band of Odawa Indians; Paul Genoa, NEI; and Keith McConnell, NRC. 12. Ken Pallagi, environmental services and radiation protection manager at Big Rock Point and a member of the Big Rock Point Historical Committee, talks about the permanent landmark being established to honor those who have worked at Big Rock. The artist's conception of the landmark (13.) is unveiled by Big Rock employees Pam Gibson (left), administrative specialist, and Tracy Goble, environmental superintendent. 14. Pam Gibson, who led the planning of the events, prepares to cut into the Big Rock Point cake (note the cupcake replicas of the plant alongside).



The 9000-lb cap, the first of 90 pieces to be removed and lowered to the ground, is lifted from atop the containment sphere. (September 2005)

Continued from page 39

with the plant gone—with a grand view of Lake Michigan.

In celebration of the return of Big Rock's site to its natural state, events were held on August 28 and 29 (see photo spread on pages 40 and 41) for employees, contractors, tribal leaders, local and state officials, and various other VIPs, as well as the editor and publisher of *Nuclear News*.

A reception was held on August 28 at the Charlevoix Depot Museum, where an exhibit documented the plant's entire life cycle. Included in the carefully arranged and captioned photographs (which started out in black and white and ended in full color), graphics, and displays were interesting details about the plant. One gentleman pointed out to me his image in one of the photos, with clear emotion and pride that he had participated in the early work at the plant. Another photo showed a young Ronald Reagan in his role as spokesman for General Electric, Big Rock's turbine generator manufacturer, as narrator of a 1962 film, *Headstart on Tomorrow*, that welcomed "hundreds of thousands of people" to Big Rock's information center, according to Pat Kujawski, an employee who greeted visitors from 1962 to 1970. Yet another photo showed a plane flying what looked to be precipitously close to the plant's ventilation stack. The stack, it was explained, was used by the Strategic Air Command for target practice (using an "electronic load") from 1963 to 1985. Paul Genoa, public policy director and deputy assistant to the president at the Nuclear Energy Institute (NEI), as well as a former Big Rock employee, noted the display explaining Big Rock's production of Co-60 for cancer treatment. A later series of photos documented the phases of decommissioning that the plant had been through in more recent years.

No part of the plant's history was left out by the Big Rock Point Historical Committee—consisting of Big Rock employees Pam Gibson, administrative specialist (chair); Tracy Goble, environmental superintendent; Ken Pallagi, environmental services and radiation protection manager; and Tim Petrosky, area manager/public information director—charged with assembling the fascinating exhibit along with Charlevoix Historical Society members Steve Goslee, Karen Lewis, and David Miles. (The exhibit, I was told the next day by Jerry Corley, who worked on the decommissioning team and was involved in preparing Big Rock's license termination plan, took 14 months to put together. He was one of many who volunteered their time to the preparation of the exhibit.) A dinner followed in a lovely setting at Castle Farms, in Charlevoix, where contributors to the events and to the completion of work at Big Rock were honored.

A program and luncheon were held on August 29 for some 700 of Big Rock's closest friends to mark not only the return of the Big Rock site to a greenfield, but also the completion of the decommissioning project, the 44th anniversary of the plant's obtaining its operating license, and the 9th anniversary of the shutdown of the plant. Employees and former employees and contractors were there with their families. Local government and law enforcement, the Citizen Advisory Board and Restoration Safety and Review Committee, and the Charlevoix Chamber of Commerce were all represented. People had traveled to Charlevoix from around the country to honor the legacy of the plant that was truly a pioneer in the nuclear industry.

At the site, photo collages that conveyed the family spirit among plant employees—the faces of Big Rock Point—were displayed. Among the activities Big Rock workers participated in were blood drives,

charitable fundraising, toy collection for the Salvation Army, the collection of nonperishables for local food pantries, and many volunteer hours in support of Charlevoix, Petoskey, and other surrounding communities. Awards from the Red Cross, United Way, Occupational Safety and Health Administration, and other organizations related to community activities were also displayed. Over the years, Consumers was the largest employer in the Charlevoix-Petoskey area, and so was a major contributor to numerous community organizations.

A wood-mulch walking path around the site featured posters describing plant operations, with plaques at the locations of the particular offices and departments that had existed there. Attendees were encouraged to take a handful of grass seed from the small Big Rock plant replicas at the start of the path to toss along the path in a gesture of helping to initiate the greening of the site.

Kurt Haas, the tenth and current site general manager, served as master of ceremonies. "Thank you for a job well done," he said to the contractors and employees who had contributed to the decommissioning process. During the course of the program, he introduced not only the scheduled speakers, but also the six past plant managers who were in attendance—Lee Hausler (#1), Russ DeWitt (#2), Dave Hoffman (#4), Tom Elward (#5), Bill Beckman (#6), and Pat Donnelly (#7). (Cy Hartman was #3, Bob Addy, on loan from the Institute of Nuclear Power Operations, was #8, and Ken Powers was #9.) "Who says radiation isn't good for you?" he quipped. He also thanked the families of those who had worked at the plant over the years.

Among the guest speakers was Frank Ettawageshik, chairman of the Little Traverse Bay Band of Odawa Indians. A traditional song honoring Mother Earth and the creator was his fitting contribution to the ceremonies. He noted the completion of the plant's circle of life, and that the end of the plant's existence was also the beginning of a new life for the land.

Bob Fenech, senior vice president of Nuclear, Fossil, and Hydro Operations for Consumers Energy, spoke about the key contributions of the independent Citizen Advisory Board, established in 1995 and made up of community leaders from the surrounding counties, which provided input and recommendations on decommissioning plans to plant officials. He also noted the Restoration Safety and Review Committee (RSRC), another independent organization, formed in 1998, whose members were recognized nuclear industry experts. He introduced Bill Mannion, chairman of the RSRC, who is known as the "father of decommissioning" for his more than 45 years of contributions to the field. "If there were a nuclear hall of fame," Fenech said to him, "you'd be in it."

NEI's Paul Genoa represented the nu-

clear industry. He spoke of his pride at having been a part of the Big Rock family (he started his nuclear career there as a radiation protection and health physics technician), and noted the plant's "unrelenting focus on safety" as probably its biggest contribution to the industry. "On behalf of the nuclear industry," he said, "thank you."

Others who spoke were state Rep. Kevin Elsenheimer and Sen. Jason Allen, who presented a legislative tribute; Rep. Gary McDowell, who read a letter from Michigan Gov. Jennifer Granholm; U.S. Rep. Bart Stupak, who shared Big Rock's achievements in his entry in the *Congressional Record*; Keith McConnell, of the NRC, who praised Big Rock for helping to build confidence in the decommissioning process; Dave Joos, Consumers Energy's president and chief executive officer, who praised plant employees for carrying their pride in their work through the entire decommissioning process; and Ken Pallagi, representing the plant's Historical Committee, who is the driving force behind a historical marker that will be located on or near the plant site as a permanent testimonial to those who have worked at Big Rock Point. An artist's rendering of the marker was unveiled during the ceremony.

All stakeholders were represented in a ceremonial planting of the first tree on the newly cleared site. And just when it seemed



The Big Rock Point nuclear plant is gone, but its namesake remains.

that the program must be over, a daytime fireworks display began—likely more noise than ever emanated from the plant during its operating years—to applause from all.

The luncheon that followed included a cake replica of the Big Rock Point plant, as well as cupcakes with green frosting and a candy cane inserted in them, representing the plant's spherical containment and red-and-white stack.

The end of the journey

All that remains on the plant's property (not visible from the cleared site) is the spent fuel storage facility. If the anticipated purchase of Consumers Energy's Palisades

plant in South Haven, Mich., by Entergy Corporation is completed successfully, the deal includes Entergy's taking over possession of Big Rock's spent fuel. This would mean an exit from the nuclear business for Consumers Energy. The purchase is expected to be completed in the first quarter of 2007.

There is still some work to be done at the plant site. "In the next few months," said Haas, "we will finish the status surveys, complete the final grading, and seed the area. Then we will turn it over to Mother Nature, who will put the finishing touches on our journey."

And a beautiful job she will surely do. **■**

[Statement for the record: Briefing on Status of Decommissioning Activities, 12/11/06, 1:30 p.m. Public meeting]

The Organization of Agreement States (OAS) appreciates the opportunity to provide comments to the Commission on Agreement State perspectives on complex decommissioning actions. Remarks at this time were originally scheduled to be delivered by Mr. Gary Butner, Acting Branch Chief, California Radiologic Health Branch. Unfortunately, OAS found out late Friday afternoon that Mr. Butner was not able to attend this briefing today, so the remarks have been provided by the Organization of Agreement States Chair, Mr. Paul Schmidt to be read into the record.

While Agreement States face the same technical issues the NRC faces in decommissionings, States also face jurisdictional and political issues that can be considerably different in degree than the issues faced by NRC.

Jurisdictional issues arise, for example, at DOE facilities. While Agreement States, under their Atomic Energy Act status, clearly do not have jurisdiction over DOE activities, jurisdictional questions arise with respect to residual contamination remaining at the site once DOE leaves the facility and the land reverts to private ownership. There are also questions as to the jurisdiction over potential off-site contamination resulting from legal or accidental effluent releases, and from operational releases of small amounts of radioactively contaminated materials using criteria similar to that in NRC Regulatory Guide 1.86. While state agencies may have jurisdiction in these latter instances under EPA delegated authority or state law, this matter is not clear and can cause significant delays in a decommissioning action, as well as undermine the public confidence.

On the political front, state and local political bodies, and therefore regulatory agencies, are much more susceptible than their larger federal counterparts to the influence of special interest groups. Although such "local control" is one of the benefits of our federalist system, it can be a weakness as well, when what are essentially technical issues become re-packaged as policy issues, which are often driven by special interests and may not be based on sound science.

As an example, the California program has experienced considerable opposition to its decommissioning process within the local and legislative communities resulting to a large extent from the disparity that exists among EPA, DOE and NRC decommissioning approaches and philosophies. It was this issue that influenced the introduction of a series of legislative bills in California in 2001-2004 calling for very conservative restrictions on the transfer or disposal of debris or soil, including soil left in place if there were any measurable residual radioactive contamination. The bills failed, but the controversy has continued.

A major contributing factor to this ongoing controversy is the lack of consensus at the federal level, primarily with respect to the appropriate level of acceptable dose and risk. While the NRC regulations contain a normal upper bound of 25 millirem per year on decommissioned facilities, the NRC-EPA 2002 Memorandum of Understanding (MOU) appears to create a default limit of essentially 5 millirem per year, and the EPA in independent actions relies on the risk range of 1E-6 to 1E-4, which is essentially 0.05 to 5 millirem per year. EPA also uses a different approach to achieving its cleanup criteria than NRC and DOE. These differences have been exploited in the public and legislative arenas by special interests to demonstrate that there is no agreement on what is "safe," and the special interests have urged that only the most conservative agency criterion, which is 1E-6 risk, or 0.05 mrem per year, be considered acceptable. The continued lack of consensus among federal agencies tends to undermine public and legislative confidence in the decommissioning process overall.

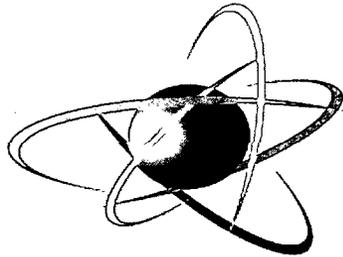
Understanding that it does not necessarily fall to the Commission to solve these problems, we nevertheless suggest that NRC may contribute to the solution by continuing to engage its federal partners in discussions on the topic of decommissioning, and also on codification of solid material release criteria. If the federal agencies cannot achieve reasonable consensus on what is safe for unrestricted use in the public domain, and how that determination is made, the public and legislators will continue to be susceptible to arguments to accept only the most conservative of the conflicting criteria.

The Multi-agency Radiation Survey and Site Investigation Manual (MARSSIM) process is a good example of a sensitive technical issue in this area that was well coordinated among numerous federal agencies. Likely because of this coordination, the technical

process addressed by MARSSIM has not been subject to a divide-and-conquer effort to sway public and legislative opinions, at least not in our experience.

We appreciate the protracted negotiations that resulted in the MOU between the EPA and NRC on decommissionings, but we believe the MOU did not bring the clarity and finality to the decommissioning process that was originally intended. We respectfully submit that it's time for all of us to go back to the table, and try to come to national consensus on these issues.

Thank you



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

DECOMMISSIONING VIEWS - ACNW

December 11, 2006

Michael T. Ryan

James H. Clarke

Recent Activities

- **Working Group Meeting on License Termination Rule Guidance (March 2006)**
- **Briefing on Proposed Rulemaking and Guidance for Prevention of Legacy Sites (July 2006)**
- **Working Group Meeting on Using Monitoring to Build Model Confidence (September 2006)**

Proposed License Termination Rule Guidance Revisions

- **Expert panel – “comments addressed”**
- **Graded approach is risk-informed**
- **On-site disposal not a favored option**

Prevention of Legacy Sites

- **Focus on prevention of releases, early release detection, and incentives for early remediation**
- **Incentives - reduced financial assurances**

Effectiveness Factors

- **Early involvement with staff**
- **Participation in stakeholder workshop**
- **Expert panel participation in several working groups**
- **Sustain communication with staff**



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, DC 20555 - 0001

ACNWR-0242

June 9, 2006

The Honorable Nils J. Diaz
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: REVISED DECOMMISSIONING GUIDANCE TO IMPLEMENT THE LICENSE TERMINATION RULE

Dear Chairman Diaz:

The Advisory Committee on Nuclear Waste (Committee) has been following the U.S. Nuclear Regulatory Commission (NRC) staff's revision of decommissioning guidance to implement the License Termination Rule (LTR). In support of this effort, the Committee participated in an April 2005 decommissioning workshop organized by the NRC staff. The entire Committee attended this workshop. A one-day working group meeting was held on June 15, 2005, during the 160th meeting of the Committee at which the NRC staff presented its approach to the guidance revisions.

The NRC staff published the proposed guidance revisions in September 2005 and requested public comments on the draft revisions. Following the public comment period, the Committee re-convened the working group and held another one-day meeting on March 22, 2006, during the 168th meeting of the Committee. At this working group meeting, the staff presented its proposed responses to the substantive public comments received on the proposed guidance revisions and its approach to finalizing the guidance.

In this second working group meeting, the Committee benefited from the continued participation of invited experts selected to provide the perspective of experienced practitioners in decommissioning. This working group was comprised of four of the members of the June 2005 working group and a fifth member who had participated previously in Committee activities on the West Valley Demonstration Project in New York.¹ This provided continuity on the review of the revisions to the guidance from the June 2005 working group.

OBSERVATIONS AND RECOMMENDATIONS

The Committee has the following observations and recommendations based on the working group meeting held on March 22, 2006.

¹ The invited experts were Eric Abelquist, Director of the Radiological Assessments and Training Program, Oak Ridge Institute for Science and Education; Eric Darois, Radiation Safety and Control Services in New Hampshire; Tracy Ikenberry, Associate and Senior Health Physicist, Dade Moeller & Associates; Thomas Nauman, Vice President, Shaw Environmental and Infrastructure; and David Kocher, SENES Oak Ridge, Inc.

- The staff has adopted the recommendations provided in the Committee's letter of August 12, 2005. Also, the expert panel unanimously agreed that the staff had factored the panel's input into the proposed guidance.
- The Committee believes that the graded approach adopted by the staff for both engineered barriers and institutional controls are risk-informed.
- Onsite disposal remains controversial and is best approached on a case-by-case basis. Several of the commentors perceived a link between onsite disposal and the creation of legacy decommissioning sites. The staff needs to address this issue in either this guidance revision or the guidance being developed to address the prevention of legacy sites.
- The staff should determine and track the potential impact of onsite disposal on the ability to achieve unrestricted release through the operational and decommissioning phases of a facility's lifetime.
- The long-term performance of engineered barriers in specific environmental settings remains a source of uncertainty, given the relatively short time that currently favored designs of barriers have been in service, as the guidance indicates.
- The proposed guidance provides a menu of potential institutional controls that could have merit for low- and high- risk sites. As experience is gained with the controls that function best under specific site conditions, the staff should incorporate more specific guidance for specific site conditions.
- During decommissioning, potentially contaminated soil can be characterized by soil excavation followed by radiation surveys to identify and remove soil that exceeds applicable limits. The soil that does not exceed applicable limits can be returned. The Committee believes that this practice should be allowed and not interpreted as intentional mixing.
- Decisions on license termination for restricted release sites would be based primarily on compliance with dose criteria for two cases: assuming that institutional controls will remain effective for the duration of the hazard, and assuming that institutional controls are no longer in effect. This LTR requirement is appropriate and risk-informed. However, the potential differences in approaches to institutional control of sites terminated under the LTR and the associated decommissioning guidance with other regulations (e.g., 10 CFR Parts 40 and 61) have been identified as a source of concern in the public comments and by the expert panel. The staff should ensure that these differences are explained in the decommissioning guidance.
- The differences between the technical and regulatory approaches used in decommissioning power reactors as compared to complex materials sites can be confusing when using NUREG-1757. For example, all three volumes of NUREG-1757

apply to materials site decommissioning while only Volume 2 of NUREG-1757 applies to reactor decommissioning. The Committee recommends that the staff expand the flowchart included in the guidance into a "roadmap" that points out the distinctions in the approaches for these two kinds of decommissioning projects to address this in a constructive manner.

- The Committee learned that the staff is working with Agreement States and industry groups to capture lessons learned from past decommissioning efforts. The Committee believes this initiative will provide valuable information that can be incorporated into the designs of new facilities in ways that facilitate future decommissioning. The Committee strongly supports these efforts to capture lessons learned.
- Both the Committee and staff recognize the relationship between modeling and monitoring to achieve confidence in regulatory decisions. The Committee is planning a working group meeting in the near future to address the modeling/monitoring interface and invites the staff's participation in the session.

The Committee believes this experience of early involvement and continued interaction with staff provides a useful model for Committee evaluation and assistance that can be used in other areas as well. The Committee looks forward to early interactions with the staff on the development of the proposed rulemaking and related guidance to prevent legacy sites.

Sincerely,

/RA/

Michael T. Ryan
Chairman

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Sincerely,

Michael T. Ryan
Chairman

* See previous concurrence.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, DC 20555 - 0001

ACNWR-0249

October 17, 2006

The Honorable Dale E. Klein
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Klein:

SUBJECT: PREVENTION OF LEGACY SITES

At its 172nd meeting on July 17-20, 2006, the Advisory Committee on Nuclear Waste (the Committee) heard a presentation from the U.S. Nuclear Regulatory Commission (NRC) staff on preliminary plans for the development of rulemaking and guidance for the prevention of legacy sites. A legacy site is defined as a site having insufficient financial resources needed for decommissioning. The rulemaking is needed to address this issue and its application to all licensees.

BACKGROUND

The proposed rulemaking and associated guidance present opportunities to enhance capturing lessons learned from decommissioning projects and incorporating lessons learned into the design and operation of new facilities.

10 CFR Part 20.1406, Minimization of Contamination, states that

“Applicants for licenses, other than renewals, after August 20, 1997, shall describe in the application how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.”

This regulation includes several requirements that are important to risk-informed and performance-based decommissioning, namely, “facilitate eventual decommissioning,” “minimize to the extent practicable contamination of the facility and the environment,” and “minimize, to the extent practicable, the generation of radioactive waste.” Specific guidance to licensees and NRC staff with respect to how these requirements can be met will be important to the overall objective of preventing legacy sites.

The Committee learned of several cases where actual decommissioning costs greatly exceeded initial estimates. The root causes of these discrepancies will provide insights that will be helpful in preparing the rulemaking and guidance.

The Committee provides the following observations and recommendations:

OBSERVATIONS

- The NRC staff stressed the importance of adequate financial assurance and the need for periodic reviews and updates, given experience with sites where actual decommissioning costs greatly exceeded initial estimates.
- The NRC staff also stressed the need for early remediation of decommissioned sites. The Committee concurs that early remediation can be a major factor in the prevention of legacy sites and notes that early detection of releases is needed as well. Caution is needed, however, in the formulation of a remediation plan. In some cases, premature action in the absence of adequate understanding of the site and system behavior may be inappropriate or even counter productive to remediation goals.
- The Committee learned that the NRC staff is considering setting "action limits" as threshold conditions at which remediation may be required. The Committee notes that generic action levels are not necessarily risk-informed and may not apply at different sites. An alternative approach that communicates the benefits of early release detection and remediation, and that is risk-informed may be preferred. For example, there is a large body of information from sites where releases to the subsurface have occurred. The timing of remedial activities can have a large impact on both the difficulty and the ultimate cost of remediation. The guidance could provide information on factors that result in increasing remediation costs with time.
- While the Committee agrees with the need to provide adequate financial assurance to manage legacy sites, the Committee believes that the guidance should focus on good practices designed to prevent releases, early release detection capabilities in the event that releases do occur, and incentives for early remediation.
- The NRC staff expressed an interest in the use of trusts to meet financial assurance requirements. The Committee notes that experience with trusts is being gained by other agencies, such as the Department of Defense (DoD), and Federal and state environmental protection agencies, for sites that cannot meet the requirements for remediation to unrestricted use.

RECOMMENDATIONS

- The Committee encourages the NRC staff to draft the rulemaking and guidance within the broad framework of contaminant release prevention, early release detection and timely remediation.
- The guidance should provide information focused on causes of increased decontamination and decommissioning costs, and how to avoid them.
- The Committee recommends reduced financial assurance requirements for licensees who effectively implement the guidance and requirements, and are responsive to the need for release prevention, early release detection, and remediation.

- The Committee recommends that the NRC staff include in the guidance information regarding the major drivers of decommissioning costs, so that licensees can better evaluate their facilities and licensed activities.
- Given the number of decommissioning projects that will occur in Agreement States, the Committee encourages the NRC staff to provide for significant Agreement State participation in the rulemaking and guidance development process.
- The Committee recommends that the staff collect information from the DoD, the U. S. Environmental Protection Agency, and state environmental protection agencies concerning their experience with trusts.

The Committee appreciates the opportunity for early involvement in the development of rulemaking and guidance for the prevention of legacy sites, and looks forward to further updates from the staff.

Sincerely,

/RA/

Michael T. Ryan
Chairman

References:

1. Report dated August 12, 2005, from Michael T. Ryan, Chairman, ACNW, to Nils J. Diaz, Chairman, NRC, Subject: Draft Revised Decommissioning Guidance to Implement the License Termination Rule,
2. Report dated June 9, 2006, from Michael T. Ryan, Chairman, ACNW, to Nils J. Diaz, Chairman, NRC, Subject: Revised Decommissioning Guidance to Implement the License Termination Rule.

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A Touchstone Energy* Cooperative 

La Crosse Boiling Water Reactor

December 11, 2006

Chuck Sans Crainte – VP Generation

Michael Brasel – Project Manager

Dairyland Power Cooperative

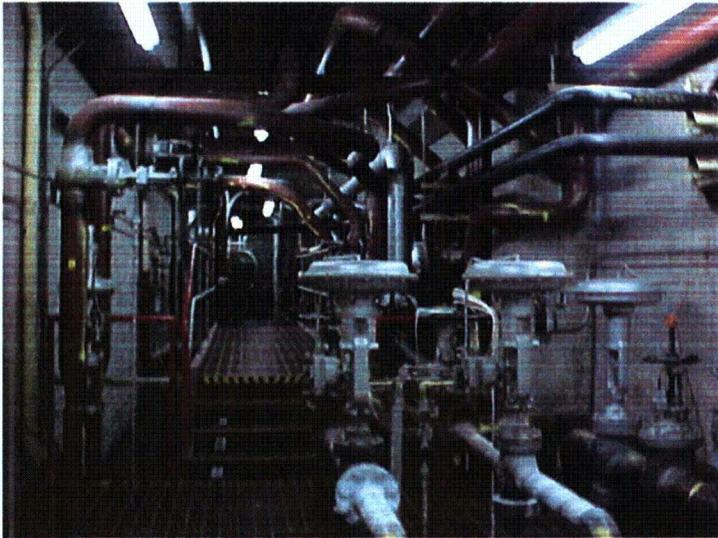
LACBWR



Plant Status

- April 1987 - Permanently shutdown
- Decommissioning Orders
 - August 1991
 - September 1994
- 1998 - Began limited dismantlement with current staff
- 1.32 million pounds of material removed

Limited Dismantlement



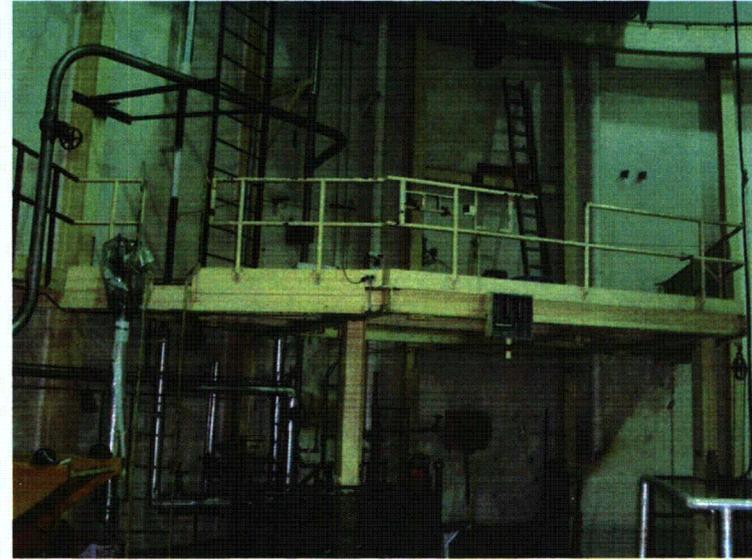
Steam and feedwater piping

Limited Dismantlement



Steam and feedwater piping

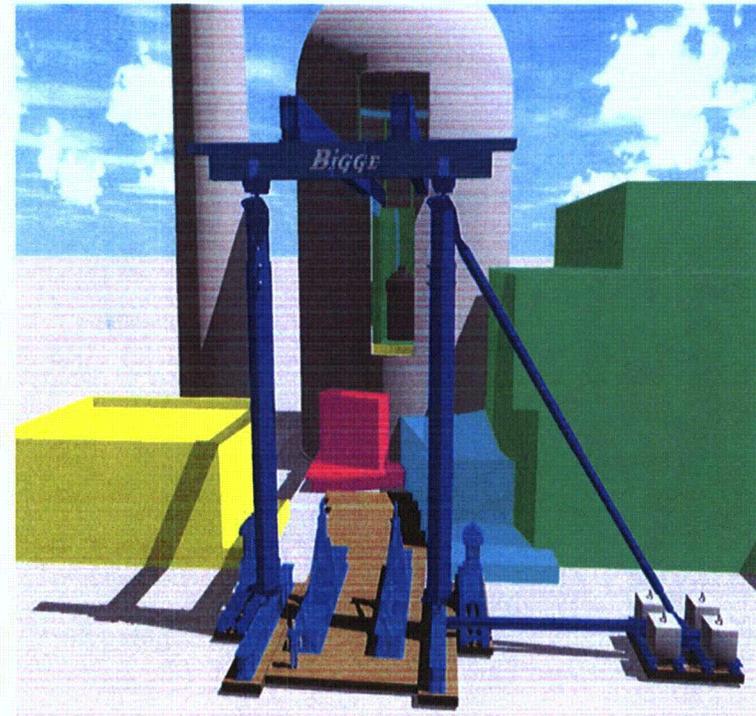
Limited Dismantlement



Shutdown condenser

Reactor Vessel Removal

- Communications with Region 3 early & often in project
- Reactor building access complete
- Bioshield concrete cutting in progress
- April 2007 lift



Used Fuel Status

- Wet storage
- Planning Dry Cask Storage Project
- Unique challenges
- Plan early communications with NRC
- Anticipate canister loading 2009
- DPC has pursued alternative solutions

Decommissioning

- Security – decommissioning sites
- Planning and scheduling
- Aging work force
- Waste disposal processing

Lessons Learned

- Utilizing other plants' lessons learned
- Communications with NRC and community
- Asbestos/lead/PCB identification
- Limited dismantlement
 - Economic and dose benefits
 - Scheduled two days per week

Decommissioning Experience
Formerly Utilized Sites Remedial Action Program (FUSRAP)
Nuclear Regulatory Commission Meeting
Rockville, Maryland
11 December 2006

Patricia A. Rivers
Chief, Environmental Community of Practice
U.S. Army Corps of Engineers

In Fiscal Year (FY) 1998 Congress directed the U.S. Army Corps of Engineers (Corps) to execute the Department of Energy's (DOE) FUSRAP. This created overlapping missions for the Corps and the Nuclear Regulatory Commission (NRC) at some sites. In recognition of this overlap, our agencies have negotiated and implemented a Memorandum of Understanding (MOU) to coordinate activities affecting the health and safety of the public and common defense and security. Maintaining safety is paramount, and within that context, our agencies have been cooperating to control costs by minimizing dual regulatory efforts and identifying and implementing risk-informed management practices. Ongoing dialogue between our agencies to identify and resolve unique issues is important to the safe, economical, and timely cleanup of the licensed FUSRAP sites.

Background

Compared to the broad authorities given to the DOE under the Atomic Energy Act, the Corps' authority under FUSRAP is limited. In FY 1998 Congress tasked the Corps with cleaning up contaminated sites formerly used by DOE and its contractors in the pre-1974 time frame for activities related to development of the nation's early atomic energy program. Congress gave the Corps lead agency authority to select the necessary and appropriate response action and to apply the cleanup subject to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9601 *et seq.*) (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300) to the FUSRAP cleanup process. A yearly appropriation funds this work.

In 1999 DOE and the Corps entered into an MOU to define the roles and responsibilities between the two agencies. DOE continues to retain overall responsibility for the program, and identifies any new sites to be considered for addition, and the Corps is responsible for evaluating sites and executing cleanup activities. Congress also adds sites from time to time. By policy, DOE does not include in FUSRAP any sites with active licenses or sites that are eligible for cleanup under other programs. A few sites that are contrary to this policy have, however, been added by statute. Four of the FUSRAP sites are in some way related to licensed sites. One is contained within a licensed site (Combustion Engineering site, Windsor, Conn.), one overlaps a licensed site (St. Louis Downtown Site), and two are wholly or partially licensed (Shallow Land

Disposal Area Site, Parks Township, Penn. and the Maywood Site, Maywood, N.J.). This creates a situation where both CERCLA and the NRC decommissioning processes could be used to clean up the sites. This situation is further discussed under Challenges. Some sites, such as the Sylvania Corning Plant Site (Verizon) in Hicksville, N.Y., were formerly licensed, and current standards require additional cleanup, but this has not resulted in dual jurisdiction

The Program comprised 46 sites in FY 1998, with 21 sites in eight states remaining to be cleaned up. An additional five sites have been added to the program. The active sites range in size and scope from a few acres with one or two abandoned buildings, up to tens of acres with ongoing industrial processes, some for nearly 100 years. Some sites include densely populated neighborhoods where contaminated sediments were deposited around private residences and businesses as a result of flooding or other activities, while other sites are totally contained within secured industrial facilities. A limited number of sites are either entirely or partially owned by the DOE. The residuals from processing ore for uranium or thorium make up the majority of the contaminants on these sites, although each site is unique and other materials, including special nuclear material, source material and byproduct material, as well as naturally occurring radioactive material (NORM) and hazardous wastes under the Resource Conservation and Recovery Act (RCRA) are also present.

Accomplishments

The Corps has disposed of 1.3 million cubic meters of contaminated materials from FUSRAP sites in either NRC licensed or RCRA permitted offsite disposal facilities from FUSRAP sites since FY 1998; has completed remediation at five sites; is actively cleaning up eight more sites; and is studying the remaining sites to identify contaminated areas and evaluate cleanup alternatives. One remediated site owned by DOE, the Wayne Site in Wayne, N.J., was recently transferred to the local community for use as a recreation area. A remediated site near Buffalo, N.Y., the Ashland 2 site, is now part of an industrial park that will help to promote economic development. Stakeholders, including NRC and local communities, are kept informed of our progress and given opportunities to participate throughout the process. Consultation and coordination with the stakeholders at all stages of the cleanup process helps to ensure that our activities are compatible with the plans of local communities.

In addition to smoothly negotiating an MOU between our agencies for coordinating activities on licensed FUSRAP sites, cooperation between the NRC Staff and the Corps has enabled use of a select few RCRA hazardous waste facilities for disposal of the large volumes of soils contaminated with low-activity ore residuals found not only on FUSRAP sites but also on some Superfund federal lead sites managed by the Corps for the U.S. Environmental Protection Agency. Adding two RCRA hazardous waste facilities as disposal options for the majority of FUSRAP materials created competition among disposal sites, significantly reduced disposal costs, and assured adequate disposal capacity without compromising safety. This helped the Corps make

significantly more cleanup progress than would otherwise have been possible in the same timeframe within constrained budgets.

Challenges

The NRC, EPA, and multiple state regulatory agencies may all be stakeholders for any given licensed FUSRAP site. Our challenge is to identify and understand each stakeholder's requirements and to determine how to address these requirements within the Corps' limited cleanup authority under FUSRAP. This is especially challenging where an NRC license dominates the regulatory environment at a FUSRAP site. The challenge is to ensure the health and safety of the public, protect the environment, minimize dual regulation and adhere to license requirements while cleaning up within a limited budget.

Under the terms of the Corps' MOU with the NRC, the licensee and the NRC step back from their normal roles in the decommissioning process to allow the Corps to proceed with its CERCLA cleanup, while satisfying the NRC health, safety, and security responsibilities. Though the Corps is exempt from actual licensing under CERCLA § 121(e), we must meet substantive requirements of the applicable or relevant and appropriate requirements that establish the cleanup standard for the site. This process helps to minimize dual regulation while also ensuring safety.

As earlier discussed, the Corps depends on limited congressional appropriations to fund FUSRAP activities. We must, therefore, maximize use of taxpayer dollars by finding safe, effective and efficient ways to execute our mission. A recent report by the National Academies, *Improving the Regulation and Management of Low-Activity Radioactive Wastes*, March 2006, addresses regulatory processes for safe and efficient disposal of low-activity waste. The overall intent of the Academy's recommendations is regulating disposal of low-activity waste based on its health and safety characteristics, such as activity or toxicity, and not its pedigree, such as whether produced by one industrial process or another. The Academy recommends reform of the current practice of regulating similar wastes generated by different industries under multiple legal structures having similar safety results but widely differing costs and administrative burdens. The processes recommended by the Academy can all be implemented by cooperating agencies within the current regulatory structure.

I would like to endorse two of the Academy's five recommendations as guiding principles for the Corps and the NRC in working on FUSRAP. The first is the recommendation to use risk informed regulation of low-activity material through integrated strategies. The Corps values the NRC's willingness to consult with us on difficult issues and to consider alternative management options, given that the Corps is not a licensee, and recognizing that our unique relationship may require innovative solutions. The complexities of the history of some of the FUSRAP sites when coupled with the complexity of the laws and regulations controlling management of radioactive materials requires continued cooperation between our agencies to ensure our joint efforts

are safe, legally compliant, and result in real increased protection of the public at the best possible cost.

Although I think that all the Academy report recommendations are valuable, the second one that I would like to highlight today is recommendation three that says “government agencies should continue to explore ways to improve their efforts to gather knowledge and opinions from stakeholders, particularly the affected and interested public, when making LAW (low-activity waste) risk management decisions.” I completely agree that the “public stakeholders play a central role in a risk-informed decision process.” The public places a lot of trust in federal and state agencies to do the right things when protecting their health and safety and protecting the environment. Our challenge as federal agencies is to interact in such a way that reinforces the public trust. This requires federal and state agencies working together and engaging in healthy discussion geared toward finding real solutions that involve the public and meet their expectations. A part of this is making sure that we communicate with the public in ways that help them to understand the risk imposed by these sites and our measures to help control those risks. The Corps uses many methods to involve the public and other stakeholders in the cleanup process. We commonly employ a technical planning process that helps us to quickly identify the significant interests and concerns of the regulators, land owners, and local governments. We regularly keep stakeholders informed of our progress through a yearly programmatic newsletter and quarterly site specific newsletters and notices. We also hold public meetings and/or information sessions at key points throughout the cleanup process. We have also sponsored community training sessions to help people understand site risks and the ways in which they can participate in opportunities to inform our decision making. The Corps takes the CERCLA requirement for public involvement and information sharing very seriously.

Although the NRC and the Corps have similar mandates to protect the health and safety of the public under the Atomic Energy Act, or FUSRAP/CERCLA, respectively, the Corps executes cleanup and disposal, and has an additional responsibility to recover its costs of execution. Accordingly, the Corps seeks to recover costs, under CERCLA, from parties responsible for contributing to the contamination cleaned up under FUSRAP. Once the Corps identifies responsible parties, the Department of Justice and the Corps seek a settlement or other appropriate legal remedy, including participating in the cleanup. This is always a sensitive matter and requires thoughtful Program execution. Preparing for settlement or litigation adds a time consuming dimension to FUSRAP projects, which doesn't exist in NRC decommissioning.

Despite these challenges I believe that with the continued support of the NRC and the other involved federal and state agencies we will continue to make progress toward remediating all of the FUSRAP sites in a safe and effective manner.

I would like to end by noting that the Corps regularly uses NRC guidance to implement FUSRAP. The revised NUREG-1757, *Consolidated Decommissioning Guidance, Decommissioning Process for Materials Licensees, Final Report*, published in September 2006 which includes guidance on intentional blending, will be particularly

helpful in safely managing contaminated soils in a cost effective manner. The Corps also looks forward to publication of the procedure for reviewing 10 CFR § 20.2002 requests as referenced in SECY-06-0056, *Improving the Transparency in the 20.2002 Process*. Even though the Corps executes FUSRAP under the CERCLA permit exemption and is not a licensee, we look forward to continuing to work with the NRC staff to find ways to use the regulatory flexibilities available to licensees.



Commission Meeting: Briefing on
Status of Decommissioning

HEMATITE – FORMER FUEL
FABRICATION FACILITY

December 11, 2006

E. Kurt Hackmann
Director, Hematite
Decommissioning Project

Hematite Site

- **Special Nuclear Material license (SNM-33)**
- **Former Fuel Fabrication Facility**
- **228 Acre Site, 10 Acre Central Tract**
- **Complex site with buried chemical & radiological waste and contaminated groundwater**
- **Regulated by NRC & Missouri Department of Natural Resources (MDNR)**

Primary Site Conditions/Issues

- **On-site waste disposal**
 - 40 Documented burial pits (1965 to 1971)
 - Potential undocumented pits (pre- 1965)
- **2 Evaporation ponds (1958 to 1978)**
- **Groundwater contamination**
- **Large Volumes of Low Concentration/Diffuse Material**

Timeline

1956 Plant opened

1974 Government operations ceased (high and low-enriched U), manufacturing of commercial nuclear fuel only (low-enriched U)

2000 WEC Acquired Business

2001 Manufacturing terminated

2001 to 2006 Uranium, Waste Equipment Removal Projects

Timeline

**6/30/06 NRC approval for building
demolition**

**9/16/06 Decommissioning Plan Conditionally
accepted for technical review**

12/2007 Decommission Plan Approval

Lessons Learned

- Continuity of NRC Project Management to maintain consistent regulatory strategies
- Electronic submittal of documents needs to be more clear or user friendly
- More flexibility of approaches for issues outside normal situations (i.e. Characterization of Buried Waste)

Lessons Learned

- Increased Physical Security concerns due to former Government operations
- Ability to perform D&D projects under License, prior to approved Decommissioning Plan

Lessons Learned

- Good Management/Team Communications
 - Standing bi-weekly conference call
 - Open discussions of issues and regulatory strategies
- Good cooperation of NRC, MDNR and Project to host public meetings with local community and stakeholders

Opportunities

- Need for Regulatory Exemptions for Low Concentration/Diffuse Fissile Material (Regulations based on mass, not concentration)
- Expand Waste Disposal Options

Opportunities

- Early acceptance of site decommissioning programs and release criteria
 - Project control programs incorporated into license, then referenced in DP
 - DCGL derivation reports – early approval (even prior to ceasing operations) would help project planning

**STATEMENT OF RAYMOND C. VAUGHAN
ON BEHALF OF THE WEST VALLEY CITIZEN TASK FORCE**

December 11, 2006

We, the West Valley Citizen Task Force (CTF), thank you for this opportunity to review the decommissioning status of the West Valley site. As you know, the site is a complex site with multiple jurisdictions, encompassing a former reprocessing plant, underground waste tanks that contain residual high-level waste, two old burial grounds, and various ancillary facilities. Decommissioning has not yet formally started and cannot do so until the decommissioning Environmental Impact Statement (EIS) and Record of Decision (ROD) are issued. This process is unfortunately stalled due to serious disagreements between the U.S. Department of Energy (DOE) and New York State Energy Research and Development Authority (NYSERDA).

As you know, the U.S. Nuclear Regulatory Commission (NRC) has a dual role in the West Valley decommissioning process, involving both the completion of DOE's activities under the West Valley Demonstration Project Act and NYSERDA's subsequent termination or conversion of its Part 50 license for the site. NYSERDA will deal with NRC as a licensee under the License Termination Rule (LTR). DOE's relationship is governed by the terms of the West Valley Demonstration Project Act, including the part of that Act that requires DOE to decontaminate and decommission certain facilities in accordance with requirements set by NRC. These requirements, based generally on the LTR, have been published by NRC in its West Valley Final Policy Statement (67 Fed. Reg. 5003, February 1, 2002).

The CTF commends NRC for its attention to the West Valley site and for some of the specific steps taken by NRC. At the same time, we urge NRC to consider or reconsider certain steps that will be needed for safe closure of the site.

Most of the site, including the major facilities that dominate the decommissioning decisions, sits on erodible glacial fill (not on bedrock) in an area being downcut by steep-gradient streams that flow to the Great Lakes. Deep ravines, ranging up to 80' deep within a few hundred feet of the main facilities and up to 160' within a fraction of a mile, illustrate the long-term erosion threat to site integrity. Studies have confirmed this threat, the only question being when, not whether, waste containment would be lost to uncontrolled erosion. The answer, depending on the study, ranges from hundreds to thousands of years based on historical precipitation. Extreme precipitation events associated with climate change are likely to accelerate the erosion.

Given the site's unusual susceptibility to failure due to uncontrolled erosion, given the quantities of long-lived radionuclides in the onsite tanks and burial grounds, and given the general recognition by involved agencies that the site is vulnerable to erosion, *the CTF remains convinced that radioactive material at the West Valley site cannot safely be left onsite. Wastes will need to be removed from the site to protect local residents, the regional environment, and the Great Lakes.* Some involved agencies, even though they recognize that the erosion threat is real, appear willing to leave wastes onsite under marginal circumstances. The argument appears

to be that recognizably serious consequences would not occur before time “x” but would occur by approximately time “y,” giving some future element of society the option of doing something between times “x” and “y.” An alternative argument is that, even though recognizably serious consequences would occur at about time “y” under certain exposure scenarios, the scenarios can be “tweaked” to reduce the predicted exposures to acceptable limits. We cannot agree that either of these would be a responsible way to decommission wastes. In our interpretation, the LTR would prohibit the former, and no responsible agency would allow the latter without insisting on probabilistic risk assessments and sensitivity analyses. We hope NRC will not condone either of these arguments.

We recognize that some delay in decommissioning activities (e.g., exhumation of buried wastes) might be warranted, if it could be shown that the reduction in source term due to near-term decay would significantly reduce worker exposure and overall risk. However, if shown to be warranted, such delayed action should be built into a decommissioning plan and schedule that would be adopted now, i.e., within the next few years. It should not be an excuse for indefinitely deferring the adoption of a decommissioning plan.

Our specific comments and concerns that relate to NRC’s role in decommissioning are:

1. We do not necessarily agree with NYSERDA that NRC should establish a concurrent, rather than sequential, process under which the West Valley decommissioning activities of DOE and NYSERDA would be conducted. However, if the process is sequential, we consider it crucial that a) the decommissioning requirements be uniform for DOE and for NYSERDA, and b) the question of license continuity and/or license reestablishment be handled appropriately by NRC. The latter question is not likely to be simple, especially in view of the fact that the existing site license is “in abeyance” and lacks technical specifications. A recent NRC letter to NYSERDA indicates that “NYSERDA is subject to the LTR after NYSERDA’s NRC license is reactivated” at the conclusion of the West Valley Demonstration Project (Martin Virgilio letter to Peter Smith, October 25, 2006, page 4 of Enclosure). This statement is literally true but glosses over what “reactivated” means. We doubt that NRC could create new technical specifications without an administrative process that includes public notice and comment, nor does it seem appropriate for reprocessing or burial to be authorized by reinstating old technical specifications. The question of uniform requirements for DOE and NYSERDA may also present some challenges, especially given the overarching need for those requirements to be protective against long-term unraveling of the site due to uncontrolled erosion.

2. NRC must ensure that all evaluations of erosional processes and long-term radiological impacts are carried far enough into the future to identify peak doses. As stated by NRC in its West Valley Final Policy Statement (page 5006), “information will need to be evaluated to determine if peak doses might occur after 1000 years and to define dose consequences and impacts on long-term management of residual radioactivity at the site.” Such long-term evaluations are especially important for assessing proposals that would leave wastes onsite under the types of marginal circumstances outlined above, especially where differences in assumptions

and exposure scenarios affect the timing and severity of peak doses. In general, NRC staff will need to look closely at underlying assumptions, including future climate, durability of assumed barriers, and locations of dose receptors. Staff must ensure that appropriate tools (e.g., probabilistic risk assessment) are used to evaluate decommissioning plans in which changes in assumptions produce widely varying results. Where uncertainty is large, staff must require either formal analysis or an equivalently conservative approach.

3. NRC needs to maintain an appropriate distinction between decommissioning and disposal, in accordance with the West Valley Demonstration Project Act's separate requirements for decommissioning and disposal. A recent NRC letter to NYSERDA (id., page 5 of Enclosure) seems to dismiss this distinction by stating that "Residual radioactivity remaining at a licensed site is not considered low-level waste subject to Part 61...." This statement, however, does not take into account a) the prevailing authority of the West Valley Demonstration Project Act of 1980, b) the generally accepted distinction between decommissioning and near-surface disposal, either now or in 1980, and c) the absence of any explicit authorization in the LTR for licensees to construct elaborate barriers or containment vaults as a means of complying with the LTR. Compliance with the LTR is explicitly tied to "reductions" of residual radioactivity, and some credit is taken for barriers, but the construction of elaborate new containment systems would generally be construed as disposal. DOE's proposals for in-place closure of the West Valley high-level waste tanks raise this type of question.

4. NRC should not authorize or condone waste reclassification at the West Valley site – such as Waste Incidental to Reprocessing (WIR) reclassification for residual high-level waste in tanks – that is inconsistent with the West Valley Demonstration Project Act.

5. We continue to be concerned that NRC does not assert authority over the growing plume of strontium-contaminated groundwater that is daylighting to one of the onsite creeks. Part of the rationale for putting the West Valley site license into abeyance 25 years ago was that DOE had the expertise to deal with radiological issues for the duration of the West Valley Demonstration Project. However, DOE has been unwilling to deal effectively with this plume that came from a reprocessing plant leak prior to DOE's arrival at the site. With no party asserting authority, and no effort having been made to remediate the concentrated source area when the plume was much smaller, the plume has continued to spread into additional acres of previously uncontaminated soil. It is a decommissioning issue due to the increasingly large amount of contaminated soil.

These are serious points that we raise and hope can be resolved. We recognize the complexity of the West Valley site, and we recognize NRC's ongoing commitment to closure of the site. There are many good reasons to work together for site closure that will be truly protective of public health and the environment. The site is located in a beautiful area, in a watershed that the U.S. Environmental Protection Agency has ranked the highest of any in the eastern Great Lakes based on ecological criteria. We who live downstream, whether we be residents of western New York State, members of the Seneca Nation of Indians, or residents of nearby Canada, enjoy this area as our home; we should not be subject to an unresolved long-term threat to our health and

wellbeing. Again, we welcome NRC's interest in working together on these issues and look forward to a time in the near future when decommissioning decisions can be made and site closure can proceed in earnest.

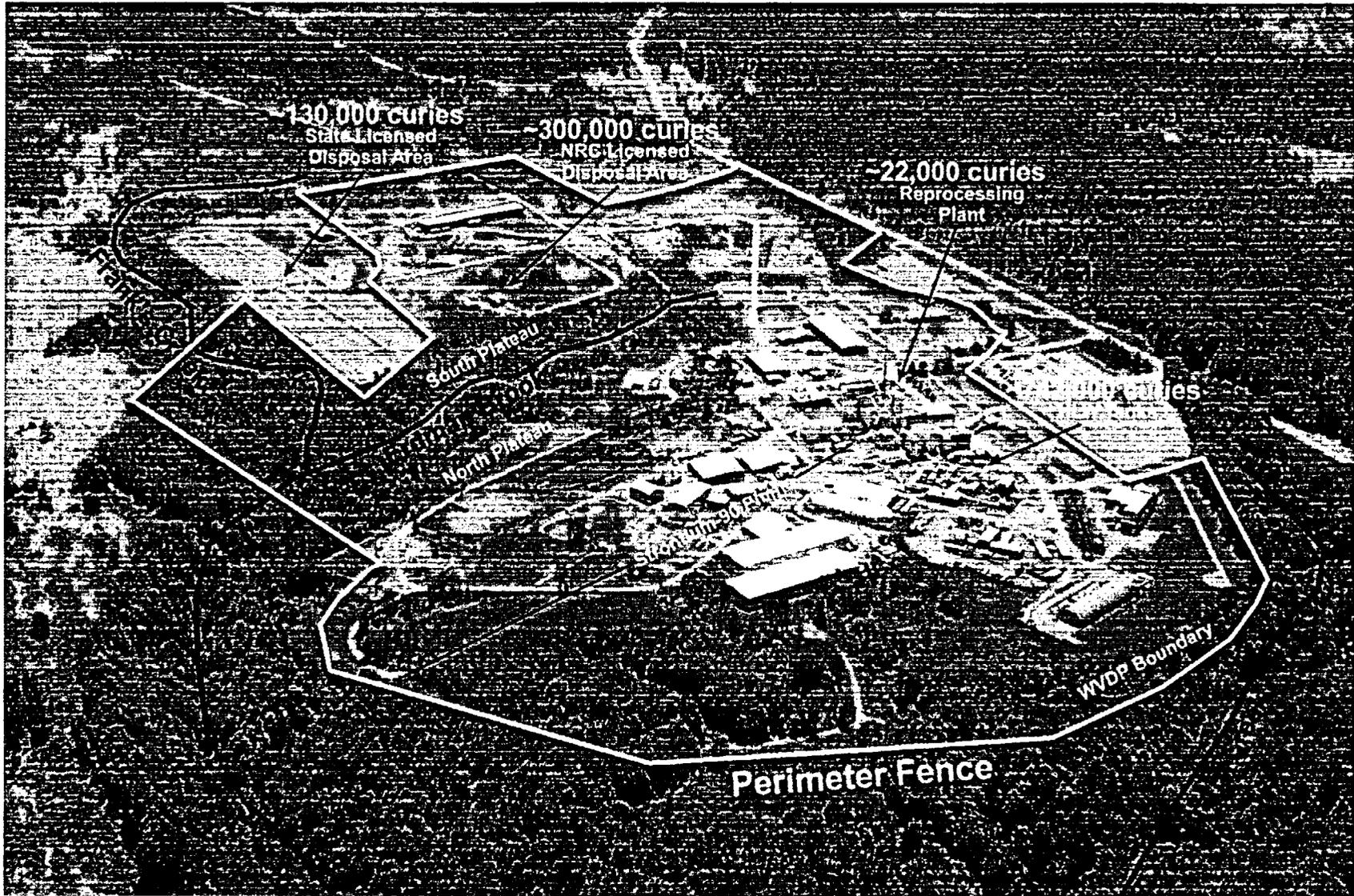
STATUS OF WEST VALLEY SITE DECOMMISSIONING

NRC briefing, Rockville MD

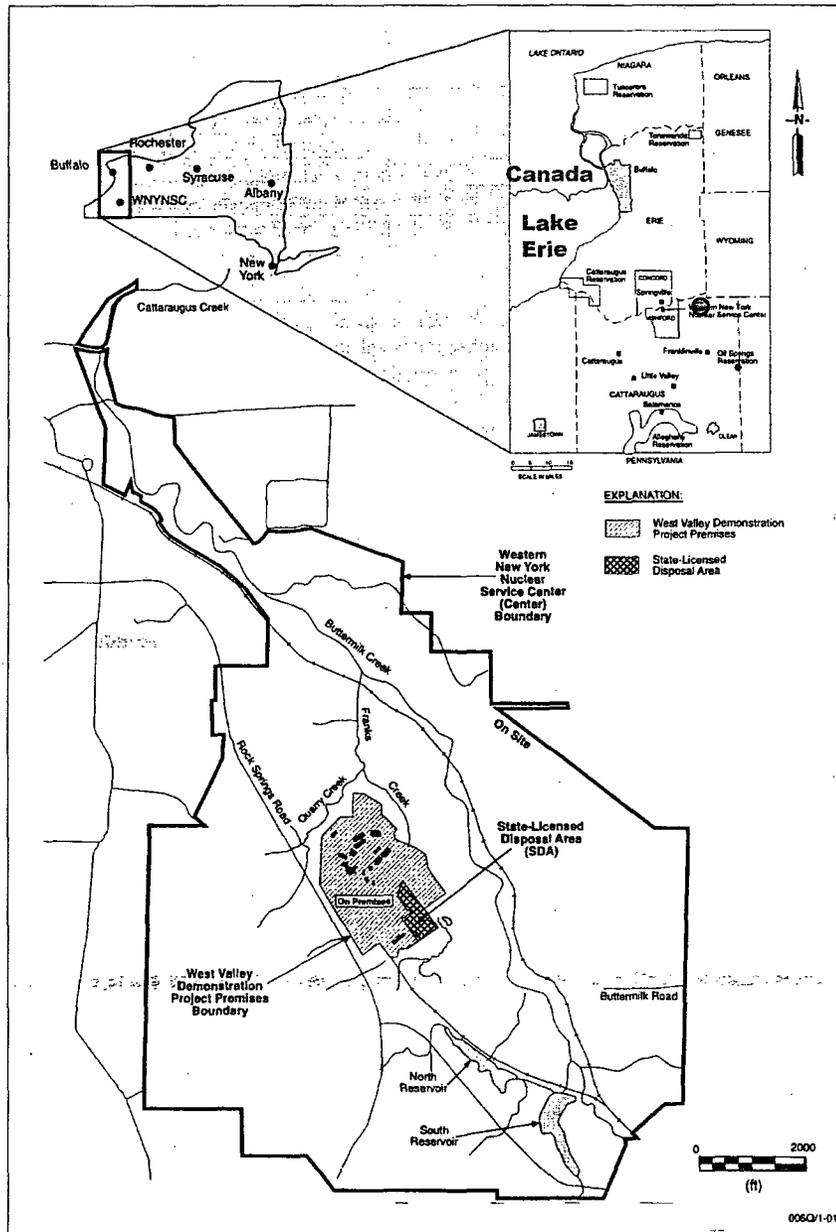
December 11, 2006

Raymond C. Vaughan

West Valley Citizen Task Force

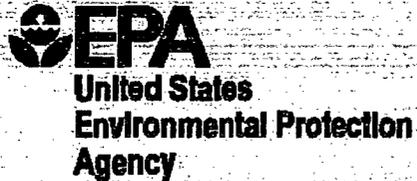


West Valley site, main facilities



Site is south of Buffalo in WNY (western NY state)

Surface drainage descends 700 feet in 40 miles to Lake Erie; flows through rural/wild areas, WNY communities, and Seneca Nation of Indians



New Index of Environmental Condition for Coastal Watersheds in the Great Lakes Basin

INTRODUCTION

The Great Lakes is the largest system of surface freshwater on the earth. It contains about 20% of the earth's fresh water and about 90% of the freshwater in the United States. The wealth of natural resources has made this area a center of economic activity for the United States. From mining, forestry, and agriculture to recreation and shipping, human activities have taken a toll on the natural environment. In response to the continued degradation of the Great Lakes, the United States and Canada signed the Great Lakes Water Quality Agreement in 1972. The goal of this agreement was "restoring the chemical, physical and biological integrity of the waters of the Great Lakes Basin ecosystem" to achieve healthy populations of plants, fish, and wildlife and to protect human health. To monitor progress towards this goal, measurements of human-caused stress must be made over a period of time to evaluate changes in environmental condition.



West Valley site overview

Complex, interrelated site closure responsibilities:

- Former reprocessing plant, two burial grounds, etc.**
- U.S. DOE under WV Demonstration Project Act**
- NYS Energy Research and Development Authority (NYSERDA)**

Complex, interrelated law/regulation/oversight:

- **NRC, EPA, NYS DEC, NYS DOH**
- **WV Demonstration Project Act (1980)**
- **Part 50 license in abeyance during Demonstration Project**
- **LTR, WV Final Policy Statement, RCRA, etc.**

Separate closure endpoints for DOE and NYSERDA

- Decommissioning decisions still being made (EIS process approaching 20 years, still not complete)**
- Current impasse between DOE and NYSERDA re: their respective responsibilities, validity of erosion modeling, etc.**

EROSION

- **Uncontrolled erosion recognized as main threat to site integrity (Hundreds of years? Thousands of years?)**
- **Uncontrolled erosion will undercut site and will episodically deposit parcels of waste inventory into steep-gradient streams that flow to Lake Erie**

1: Should DOE & NYSERDA Decommissioning Plans be concurrent or sequential?

If sequential, as NRC prefers:

- Need uniform requirements for DOE and NYSERDA**
- How can/should Part 50 license be reinstated during interim period?**

2: Evaluation of erosion and radiological impacts

- All evaluations need to be carried to peak dose (>1000 yr, as needed) (WV Final Policy Statement)**
- All underlying assumptions, models, and methods of calculation need close attention**
- Marginally acceptable impacts??**

3: Distinction between decommissioning and disposal

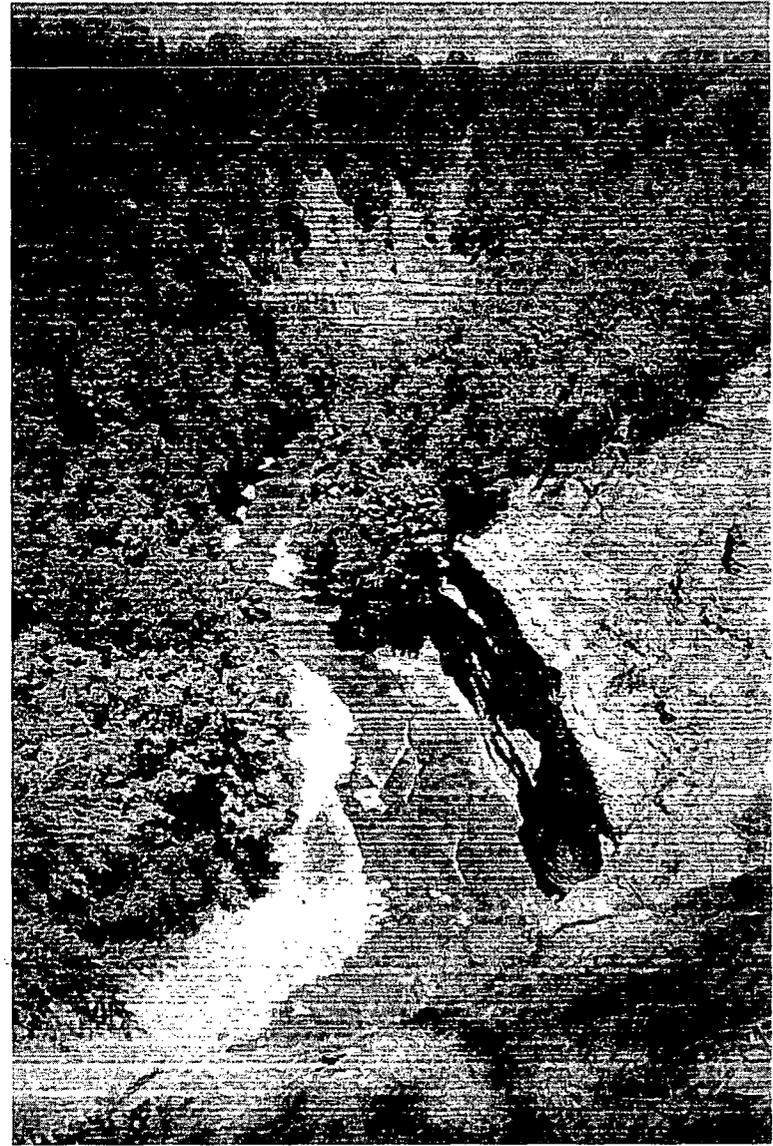
- **WV Demonstration Project Act sets separate requirements for each**
- **Distinction may depend partly on the extent of barrier or vault construction (how elaborate, how essential?)**

4: NRC should not authorize or condone reclassification (e.g., WIR) if contrary to law

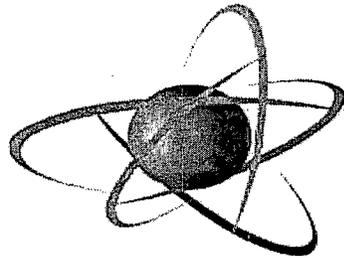
- **WV Demonstration Project Act defines waste categories: HLW, LLW, TRU**

5: Sr-90-contaminated groundwater plume!

- **No apparent regulation (license in abeyance); plume keeps growing**
 - **DOE won't deal effectively with it**
 - **NYSERDA and NRC say they can't**
- **Is creating an increasingly large amount of soil that will need decommissioning**



South Branch, Cattaraugus Creek



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

2006 DECOMMISSIONING PROGRAM BRIEFING

December 11, 2006

Keith I. McConnell

DWMEP/FSME

Topics

- **Decommissioning Program Overview**
- **Decommissioning Program Status**
- **Programmatic Activities**
- **Strategic Goals**

NRC's Integrated Decommissioning Program

- **FSME**
- **Regions**
- **NMSS**
- **OGC**
- **RES**

NRC Decommissioning Sites

- **16 Power/Early Demonstration Reactors**
- **14 Research and Test Reactors**
- **32 Complex Materials Sites**
- **12 Uranium Recovery Sites**
- **3 Fuel Cycle Sites undergoing Partial Decommissioning**

Agreement State Decommissioning Sites

- **48 Materials and Uranium
Recovery Sites in 12 States**

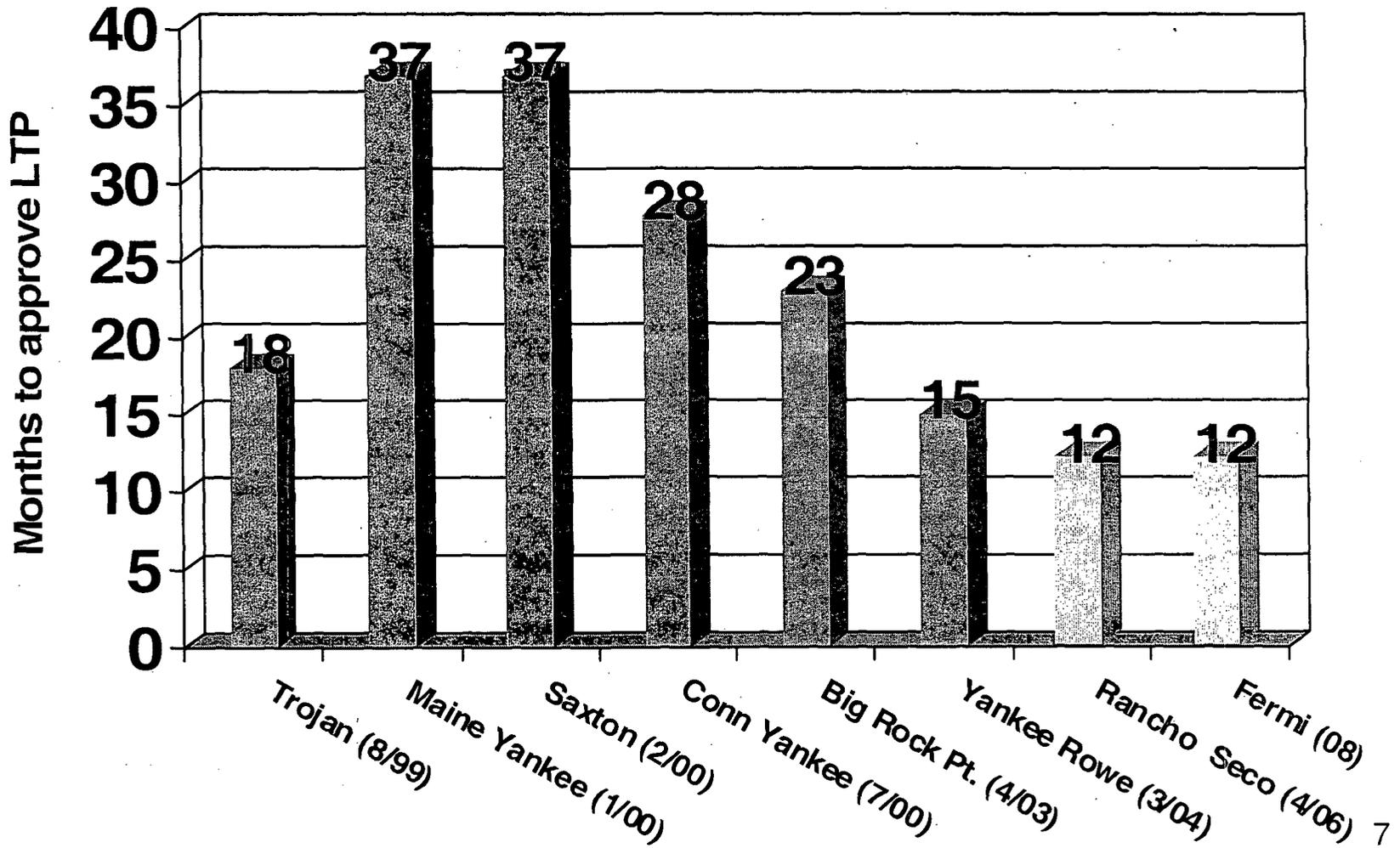
Power Reactors

- **FY 2006 Accomplishments**
 - **Terminated Saxton license (NRR)**
 - **Released non-impacted portions of Yankee Rowe license**

- **FY 2007 Outlook**
 - **Complete decommissioning at Big Rock Point**
 - **Complete review of Rancho Seco License Termination Plan**

Timeliness - Reactors

Site (LTP submitted)



Research & Test Reactors

- **FY 2006 Accomplishments**
 - **Terminated 3 licenses (NRR)**
 - **Transition to Division of Waste Management & Environmental Protection**

- **FY 2007 Outlook**
 - **Complete integration of program**
 - **Complete decommissioning at up to 3 sites**

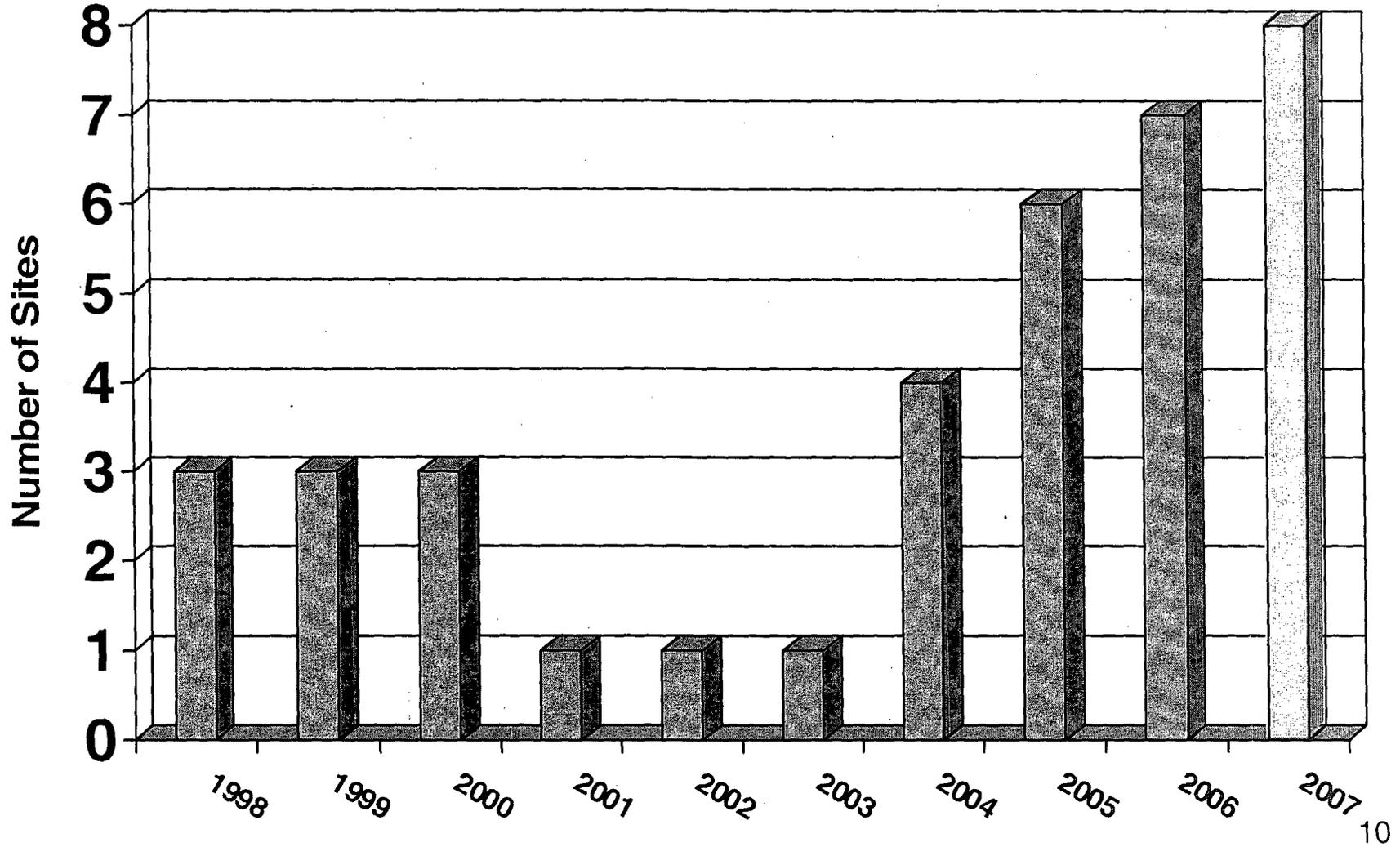
Complex Materials Sites

- **FY 2006 Accomplishments**
 - **Completed actions at 7 sites**
 - **Number of sites with inadequate financial assurance reduced**

- **FY 2007 Outlook**
 - **Complete decommissioning at 8 Sites**
 - **Initial consideration of Restricted Release options**

Operational Effectiveness

Year site removed from SDMP/Complex site list



Uranium Recovery Sites

- **2006 Accomplishments**
 - **Completed 30 licensing actions (NMSS/FCSS)**
 - **Transition to DWMEP**

- **2007 Outlook**
 - **Expect 1 License Termination**
 - **Continue developing ISL rule**
 - **Initiate review of DOE Draft Remedial Action Plan for Atlas Tailings**

Programmatic Activities

- **Continuous Improvement - IDIP**
- **OMB Review - PART**
- **Consolidation of
Decommissioning**
- **International Activities**
- **Interface with Agreement States**
- **Interface with other Federal
Agencies**

Safety

- **25 Financial Assurance reviews**
- **2 Decommissioning Plan approvals**
- **85 Inspections**
- **13 Final Status Survey reviews**
- **11 Terminations**

Openness

- **62 Inspection reports**
- **Annual Report**
- **Revised decommissioning guidance**
- **8 Public meetings**
- **Numerous meetings with stakeholders**
- **Website Enhanced**

Effectiveness

- **Acceptance Reviews Completed within Operating Plan Milestones**
- **Decreasing Time Required for DP/LTP Detailed Reviews**
- **Increasing Numbers of Sites Completing Decommissioning**

Summary

- **Substantial investments in improving the NRC's decommissioning process over the past several years have borne fruit as evidenced by increased effectiveness in the program.**
- **Future challenges remain: managing reductions in resources, ensuring seamless implementation of newly acquired programs, and maintaining momentum on process improvements.**

Acronyms

- **DWMEP - Division of Waste Management & Environmental Protection**
- **FSME - Office of Federal & State Materials & Environmental Management Programs**
- **OGC - Office of General Counsel**
- **NMSS - Office of Nuclear Material Safety & Safeguards**
- **RES - Office of Research**
- **NRR - Office of Nuclear Reactor Regulation**
- **DOE - Department of Energy**
- **OCFO - Office of the Chief Financial Officer**
- **FCSS - Division of Fuel Cycle Safety & Safeguards (NMSS)**
- **RTR - Research & Test Reactors**
- **LTP - License Termination Plan**
- **SDMP - Site Decommissioning Management Plan**
- **ISLs - *In-Situ* Leach Uranium Recovery facility**
- **UR - Uranium Recovery**
- **IDIP - Integrated Decommissioning Improvement Plan**
- **PART - Performance Assessment Rating Tool**
- **DP - Decommissioning Plan**
- **FSSR - Final Site Survey Report**
- **NMA - National Mining Association**