The U.S. Nuclear Sector and USW

History of U.S. Uranium Enrichment

Uranium enrichment began in the United States as part of the World War II Manhattan Project to produce nuclear weapons. The first uranium enrichment operations were set up at what is now the Oak Ridge Nat'l. Laboratory (Tennessee) in 1942. In the 1950's the U.S. government set up two additional enrichment plants, in Paducah in 1952 and in Piketon, Ohio.

The major technology used at Oak Ridge for the weapons program was gaseous diffusion, an energy intensive process by which large volumes of uranium hexafluoride gas are forced through membranes separating heavier and lighter atomic particles. The Paducah and Piketon plants also were gaseous diffusion plants. USW and its predecessor unions have represented workers at all three sites from early on.

In the mid-1960's, as the United States wound down the production of enriched uranium for nuclear weapons, the three plants shifted their focus to producing enriched uranium for civilian use in nuclear power plants. The plant at Oak Ridge shut down in 1987. The operations of the two remaining plants at Piketon and Paducah were privatized in 1998.

U.S. Enrichment Corp. (USEC) was set up by Congress in the early 1990's as a government-run corporation and sold to the public via an Initial Public Offering (IPO) in 1998. USEC shut down the enrichment plant at Piketon in 2001 and concentrated most of its operations at the Paducah site. Cleanup operations at Piketon are ongoing, but USEC has been replaced as the contractor there by a consortium of Fluor Corp and a unit of Babcock & Wilcox Co.

USW continues to represent the workers at the Piketon cleanup site. However serious problems have emerged in the transition between USEC and the new contractors. Most relevant among these for USW is the fact that because of flawed interpretation of the underlying law by the U.S. Dept. of Energy (DOE), the new contractor has chosen not to give the workers their correct wages and benefits, in spite of statutory language that guarantees the wages and benefits. USW and its local are working on numerous fronts to correct this situation. Litigation by the local union to enforce the statutory rights of the workers is a distinct possibility.

In most of the world uranium enrichment is carried out by a gas centrifuge process. The uranium hexafluoride gas is spun in cylinders at a very high rate of speed in which the lighter enriched uranium hexafluoride gas goes to one end of the cylinder, where it can be separated from the less-enriched gas at the other end.

The gas centrifuge process uses significantly less energy than the gaseous diffusion process still used at Paducah. Renewed interest in the use of gas centrifuge processes in the United States began in the early 2000's. USEC itself partnered with DOE to begin a pilot plant in Piketon, near the closed gaseous diffusion facility there.

Several additional gaseous diffusion projects were proposed during the decade. Louisiana Energy Services partnered with British nuclear conglomerate Urenco Ltd., to begin construction of a new gas

centrifuge plant near Eunice, N.M., in 2006. The plant began operations in June 2010, even though construction will not be complete there for several more years.

French nuclear behemoth Areva has announced plans to begin constructing its own gas centrifuge plant near Idaho Falls, Idaho. On its web site it states it hopes to begin construction by the end of 2011 with a possible completion date of 2014. However, construction does not appear to have begun as of June 2012.

The USEC gas centrifuge project ran aground in 2009 after DOE did not grant a $2 billion loan guarantee the company had applied for the previous year. The loan guarantee still is caught up in DOE processes and it is not clear when it will be granted.

In 2013, USW and the local union at the former Piketon plant announced that they had organized successfully the workers at the USEC ACP site. This puts the union in a position that if the ACP site becomes fully operational it will be run and maintained by USW members.

Plutonium Production

Early U.S. nuclear scientists discovered the trans-uranic (heavier than uranium) element plutonium in 1941 at the University of California--Berkeley. This element, like uranium, has fission potential and unlike uranium it does not need to be enriched to have explosive potential. For that reason, U.S. military planners incorporated research on plutonium into the Manhattan Project.

Plutonium is made in special nuclear reactors, where the fission products of un-enriched uranium include plutonium. The first plutonium reactor was constructed at the Oak Ridge site in 1943. Once the design was verified, three such reactors were constructed at the Hanford, Wash., site. Several additional plutonium reactors were built at Hanford as the 1940's turned into the 1950's. Also, beginning in the early 1950's, several plutonium reactors were constructed at the Savannah River site in South Carolina.

Plutonium production in the United States began to end even before the end of the Cold War. The reactor at Oak Ridge shut down in 1963, and the site was converted into the Oak Ridge National Laboratory. The reactors at Hanford began shutting down in the late 1960's and the last ones shut down by the end of the 1980's. Reactors at Savannah River kept going for longer and the last of these shut down in the very early 2000's. In all, the U.S. has produced about 100 metric tons of plutonium.

The Hanford shutdowns are permanent, but several reactors at Savannah River are being kept in a state from which they could in theory be re-started. Hanford is now a cleanup site, and most Savannah River activity is devoted to clean-up as well.

USW and the Nuclear Industry

Unionization began in the U.S. nuclear complex in the 1940's. Organizing in this sector took place along the AFL and CIO jurisdictional cleavage. Chief among the unions organizing workers in this sector was the CIO's Gas, Coke and Chemical Workers, which merged with the Oil Workers in 1955 to form the Oil, Chemical & Atomic Workers Intl. Union (OCAW).

The member unions of the Metal Trades Department of the AFL and the AFL's International Chemical Workers Union (ICWU) were involved, along with additional craft unions, in organizing along AFL

jurisdictional lines, while Gas, Coke and the CIO were interested in wall-to-wall plant-wide units. In the 1940's and 1950's, workers organized throughout the atomic energy complex, including the facilities at Paducah, Piketon, and Oak Ridge instrumental in the nuclear fuel cycle.

Organizing in the atomic energy industry initially was confined to the operational sites owned by the United States government within the scope of the Atomic Energy Commission (folded in the 1970's into DOE). These sites included Hanford, Wash.; Idaho Falls, Idaho; Las Vegas, Nev.; the Pantex complex in Amarillo, Texas; Miamisburg, OH; Fernald, OH; Rocky Flats, Colo; and West Mifflin, Pa. USW or its predecessor union, OCAW, represented workers in wall-to-wall maintenance and operations units at all of the locations mentioned except Hanford, Fernald, Las Vegas, and Amarillo, which were under the Metal Trades.

The ICWU local at Hanford later affiliated with OCAW, but continues to bargain under the aegis of the Metal Trades Council at the site. At Fernald, workers were divided between a Metal Trades Council representing maintenance groups and OCAW representing production workers. OCAW also organized workers at the Argonne National Laboratory and the Brookhaven National Laboratory in Upton, N.Y., on Long Island. USW retains a presence at the Brookhaven location.

Over time, the organizing expanded to privately owned facilities most of which have been there to serve the needs of the federal atomic energy complex, and ultimately to the private commercial production of nuclear energy in electrical generating plants. Examples of the former category are Nuclear Fuel Services in Erwin, Tenn.; the Honeywell plant in Metropolis, Ill., where uranium hexafluoride gas is produced for use in uranium enrichment; and the former Kerr-McGee plutonium fuel plant in Cimarron, Okla. (where Karen Silkwood worked). Workers at the transuranic waste facility in Carlsbad, N.M., decided to join OCAW in 1998.

In addition workers at Squibb Corp. (now Bristol-Myers Squibb) in northern New Jersey joined OCAW. These workers remain USW members and are engaged in the development and production of radioactive isotopes for medical use. Representation in the nuclear electric power sector largely was undertaken by the Intl. Brotherhood of Electrical Workers (IBEW), though some units are represented by the Utility Workers. The USW local at Hanford represents a nuclear power plant located on-site, and USW also represents a group of radiation waste technicians at a nuclear power plant in eastern Pennsylvania.

As health and safety consciousness grew in the 1960's and '70's, OCAW initiated a major push to make the nuclear sector a safer place to work and to ensure that workers were fairly compensated for the numerous and often deadly hazards to which they were exposed.

The effort continued after the 1999 merger that created the Paper, Allied-Industrial, Chemical and Energy Workers Intl. Union (PACE) and culminated in the passage later that year of the nuclear workers' compensation bill, which created a compensation fund for hundreds of thousands of nuclear workers and retirees to assist them in dealing with job-related illnesses and disabilities. Over the intervening years a massive effort has been undertaken to make sure the law is implemented in a way that is fair to the intended beneficiaries. Even now, more than a decade later, a great deal remains to be done. The work continues to this day.

In the early 1990's after the fall of the Soviet Union, Russian uranium began appearing on the market and substantial amounts of the material made its way to the United States selling for bargain basement

prices. The union pushed for and strongly supported a major trade case against Russia in 1991 for illegal trade practices. The trade case resulted in a "suspension agreement" between the U.S. and Russia under which enriched uranium imports from Russia have been strictly limited.

The suspension agreement must be renewed periodically. Even with the suspension agreement the union has had to fight over the years both to prevent cheap Russian uranium from undercutting the market and to prevent USEC from importing the Russian uranium and prematurely closing the enrichment facility at Paducah.

Uranium Mining and Other Sources of Uranium

Uranium mining has had a boom-and-bust history in the United States. At first in the 1940's and '50's there was a massive boom driven by the U.S. push to build a large stockpile of nuclear weapons. Later uranium demand was driven by the electric power industry.

Several uranium mines and mills have been represented by the union and its predecessors over the years, including a unit in Grants, N.M., another in Casper, Wyo., and a group at the closed mill site owned by Cotter Corp in Cañon City, Colo., that continues to be represented by USW.

The United States remained the world's largest producer of uranium until the early 1980's. Sharp price declines beginning in the late 1970's caused the first uranium bust, forcing the closure of most mines in the U.S.

This was caused by several factors. By the early 1970's the United States had completed its stockpiling of weapons-grade uranium (uranium that had been enriched to a sufficient degree to be usable in nuclear bombs). In 1979 the Three Mile Island accident ended the U.S. boom in civilian nuclear power.

In the mid-1980's nuclear material from U.S. and Soviet nuclear weapons, decommissioned as a result of compliance with arms reduction treaties, became available. After the end of the Cold War in the early 1990's decommissioning increased because of nuclear proliferation fears that intensified after the breakdown of the USSR. The United States signed an agreement with Russia that it would begin down-blending (essentially a partial de-enrichment process) additional military-grade uranium from that country for use in commercial nuclear reactors. This work served to keep the price depressed through the earliest years of the 21st Century.

By the end of 2003 the weapons decommissioning programs began to decline in importance. Concerns about fossil fuel and climate change on the one hand and the rise of China and India and the revival of the Russian economy led to increased demand and a squeeze on supply. Prices began a run-up, topping out at nearly $140 per pound of uranium oxide in mid-2007.

The economic downturn, beginning in 2008, along with a steady increase in world-wide uranium mining caused prices to fall, reaching $40 per pound in 2009 and early 2010. In recent years several countries, most notably China, India, and Russia began taking steps to lock up long-term supplies of the metal. Partly because of this, prices have increased somewhat since then and as of this writing are between $50 and $55 per pound.

Also uranium mining has begun to pick up in the United States. As of May 2012 the US Energy Information Admin. (EIA) showed five uranium mining complexes in operation. Two of these, Crow Butte

in western Nebraska and the Smith Ranch/Highland operation in Wyoming, are owned by Cameco. The largest, Willow Creek in Wyoming, is owned by independent producer Uranium One. Two additional operations are in south Texas. Numerous groups in the West, in Texas, and elsewhere in the United States are at various stages in the permitting and startup process.

Current Enrichment Operations in the United States

Globally most uranium enrichment occurs in centrifuge plants. Centrifuge plants use about one-fiftieth of the energy per work unit of uranium as do gaseous diffusion plants. Currently almost all enrichment in the United States is carried out at the Paducah facility. The Piketon plant was shut down on cold stand-by in 2001 and was shut down for good in 2011. Paducah has been operating in recent years at well under half its capacity.

In 2012 DOE announced an arrangement with Energy Northwest, a utility consortium in Washington State, and the Tennessee Valley Authority (TVA) by which depleted uranium "tails" stored at U.S. nuclear sites will be re-enriched at Paducah for use by the two entities. This project will keep Paducah operating until mid-2013.

Currently the Urenco/LES New Mexico facility is incomplete, even though it is operating; testing continues at the USEC American Centrifuge Project at Piketon; and construction to all appearances has not even begun on the Areva plant in Idaho. The only full-scale enrichment plant in the US remains the Paducah gaseous diffusion plant.