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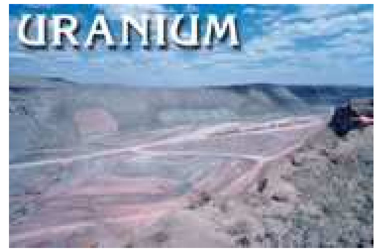
Uranium



Recent Uranium Industry Developments, Exploration, Mining and Environmental Programs in the U.S. and Overseas

by
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The American Perspective

Any report on the industrial aspects of uranium must address the status of the nuclear industry in the United States today in light of the effect the 1979 Three-Mile Island incident had on the development of the nuclear power industry. Because Americans still vividly remember the "nuclear solution" to end World War II with a recalcitrant Japan, lingering fears of unseen radioactivity have led to the belief that nuclear energy, and the waste it produces, can not be controlled or managed. Cold War fears of nuclear war, especially at a time when the Soviet Union invaded Afghanistan, compounded by the hostage crisis in Iran, taken all together, stampeded the press, the politicians, and the general public into wholesale abandonment of any further expansion of nuclear energy in the U.S. since the early 1980s. These fears, much like those resulting from the Twin Towers attacks, the Anthrax Postal attacks, or just after you have learned of a robbery in your neighborhood, another form of terrorism, are generalized and not easy to deal with, although they are real and understandable responses to uncertain security, something we have learned over the decades to expect without question.

How does the American nuclear-industry safety record stack up against other real dangers? How does it compare with the accident rates of the coal-mining industry, the air-travel industry, or in highway travel, tobacco use, or other such activities that threaten our lives? In short, it is well-known that the American nuclear industry consistently out- performs all of the other industries and activities each year by a large measure.[5] [6] and [7] Not one person has died as a result of a nuclear industry accident or incident in the U. S. over at least the past 40 years.

Americans must learn to deal with the perceived residual fears associated with the nuclear industry, and to put these into a new perspective of risk this time around. Assessing risk deals with evaluating the likelihood of such events happening to you, your family, or your friends. Although almost 3,000 people perished on September 11, 2001 in New York City, Washington, and in the fields of Pennsylvania, and more than 10 died or were injured by touching or opening an Anthrax-soaked letter or parcel, more than 30,000 people die each year on the American highways, and thousands die in train accidents, airline accidents, coal-mining accidents, and more than 600 Americans die operating ATV vehicles in recreational activities and other industrial accidents in America every year.

Waterborne outbreaks of disease in drinking water from bacterial, viral, or protozoan pathogens (e.g., E. coli (O157:H7), Cryptosporidium, Giardia, and a variety of other protozoan (e.g., Naegleria fowleri)) cause more than 1,000 deaths each year in the U.S., many of which are likely misdiagnosed and under-reported.(11) The United States Geological Survey (USGS) recently reported that accidental exposure in drinking water to pathogenic leptospires occurring in a natural setting has known or suspected links to kidney disease including cancer of the renal pelvis. This pathogen, well-known in eastern European areas containing lignite resources, now appears to be present in ground- water sources derived from lignite aquifers of the Wilcox group in northwestern Louisiana, which places the population living along the entire geographic trend from southern Texas to western Alabama on notice as well.(46)

There are threats around Americans every day from a variety of sources, but should the fear of radioactive gases escaping from a nuclear plant be any different than an ammonia or cyanide gas escaping from a local chemical plant? Both could, and do, kill, sooner or later. We have come to live with the latter, why not the former as well? The answer, of course, is that we should be willing to tolerate a calculated risk because we need the products in our society.

So placed in an appropriate perspective, even the safety records of the hundreds of operating nuclear power plants located in various parts of the world are notable and outstanding.(42) Today, some 30 countries produce electricity using nuclear power. Worldwide, 441 nuclear plants are in operation and 27 are being built.(47) This record, combined with the American record, which is guided by even more restrictive regulations in the U.S. than overseas, should not be ignored when assessing the risk of having nuclear reactors located in the general community.

The Nuclear Imperative

There is no doubt that without nuclear power expansion to support increasing demands on electrical generation, the cost of electricity will climb. If the power base is not expanded, lights will sooner or later begin to dim in America. Impeded by the indomitable citizens' movements formed by otherwise well-meaning folks, like unnecessary lawsuits by Plaintiffs' attorneys promoting problematic impacts of toxicological human damage, pitched to a sympathetic jury, designed to dip into industries' "deep pockets", are part of the complex web of fears that the general press and other print media, and segments of the legal community publicize for the purpose of serving their own agendas, i.e., to sell any news, to sell books (such as by Michael Crichton, entitled State of Fear, which makes fun of adversarial environmentalism), and to generate large revenues for a certain group of attorneys. A balance is needed now in the Courts to determine which movements and which lawsuits are righteous, because in the final analysis, there are always some movements and lawsuits that are justified -- this being the nature of a democracy working within capitalism as we know it today.

In 1986, the Chernobyl disaster seemed to confirm American fears and the Russian people paid dearly while the West looked on in horror. The international community had warned the Soviet nuclear industry that the Chernobyl reactors were poorly designed and accidents were likely. One of the plants did fail, more because of failures in operational management than because of systems failure. Interestingly enough, the Three-Mile Island plant, although of superior design, also failed because of the plant management's inability to cope with operational conditions as a result of a lack of reliable sensors and monitoring software and hardware. Even with the technology of the day that incident was brought under control without exposing the population to harmful radiation.

So, what has changed in the past 25 years? Technology has made substantial advances in assisting operational management of complex systems such as are involved in nuclear power plants. Significant developments in software and hardware, combined with improvements in operator training and sensor and associated monitoring technology, neural networks, complex adaptive systems, and so-called "smart" statistics used commonly today in American industry, have made nuclear power operations orders of magnitude more reliable than 25 years ago.

As the new technology has developed, hundreds of nuclear power plants in the U.S. (103 at present) and overseas (337 at present) have benefited directly and have as a result been operating exceptionally well over the past 40 years. Revitalizing nuclear power is beginning to be perceived by the general population as an answer to our still growing need for the generation of electrical power.

Confidence in the nuclear-power industry of the American grass-roots support by the populations living in the small towns of America is growing because they apparently can see that if this power source is not utilized, there will be power-shortfall problems ahead. The availability of new jobs and of increased gasoline prices paid at the pump for local transportation are altering these attitudes from outright hesitation to growing support for nuclear power.[(42) and (43)]

These problems also involve continuing conflicts in numerous overseas areas of the world that produce oil and gas [and the continued polarization of cultures in the Middle East and elsewhere in the world], as well as increasing prices and potential shortages of these reserves. All these peripheral issues are present because fusion research is lagging behind, requiring more time to bring online than previously anticipated. (22) Because other alternative sources of energy for power generation, such as solar energy, wind energy, wave and tidal energy, or other energy sources, are growing only slowly, the construction of new nuclear power plants in the U.S. becomes the logical solution to the energy problem in producing electricity.

These new plants will have to be built with improved operational management systems consisting of professional managers, not technicians as characterized on the TV program, The Simpsons, where "Homer" is a factory-class worker acting as a buffoon at the helm of the local nuclear plant. This not-so-subtle propaganda continues to reinforce the public fear of the nuclear industry.

Current World Trends

Outside the U.S., the nuclear industry is being maintained with Lithuania and France still leading the way in the percentage of total power generated,(1)(42) although strong anti-nuclear movements in Europe are being fueled by the lingering memories of the Chernobyl disaster. Many European nuclear industries have struggled just to survive.(29) Great Britain, Germany, and China now appear to be on the verge of restarting the nuclear industry by mustering public and government support for building new nuclear plants.(6) and (41) The United Nation's IAEA is projecting that at least 60 more nuclear plants will come online over the next 15 years to help meet global electricity demands. (47)

The popular press continues to grab readers' attention with negatively spun articles on the admittedly difficult safety aspects of using nuclear power to generate electricity at economic prices to consumers in the U.K. and the U.S.(3) However, even in the U.S., the press may be coming around to the realization that the U.S. can no longer depend on potentially unreliable overseas sources of oil and gas to supply its ever growing energy requirements, despite the investments by multinational corporations in oil and gas sources all over the world. Even these companies have started to privately shift their own paradigms toward other sources of reliable cost-effective energy to generate electricity, such as nuclear energy.(6)(8)(9) and (10)

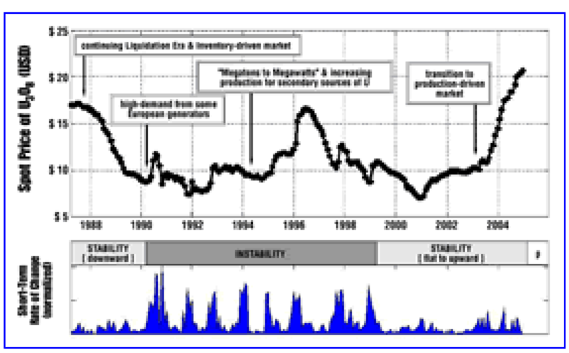
Globally, production from uranium mines now supplies only 55% of the requirements of nuclear-power utilities.(35) Worldwide, there are 440 reactors with a combined capacity of some 360 GWe, which require 77,000 tons of uranium-oxide concentrate containing 66,000 tons of uranium from mines, stockpiles, or secondary sources each year. Secondary sources include the "Megatons to Megawatts" agreement between the U.S. and Russia, which began in 1994, to use recycled uranium and plutonium from spent fuel, and to use re-enriched nuclear material from depleted uranium tailings. Stockpiles are dwindling worldwide and China, India and Russia plan to build new reactors. Demand from generators such as British Energy Plc and Iberdrola SA of Spain have exceeded mine output since 1990, with the shortfall met by inventories and weapons-grade material from the former Soviet Union.[35] These secondary uranium supplies also are declining rapidly.

Funding for exploration was difficult to find between 1996 and 2002 when uranium prices languished. During these years, virtually no exploration was being conducted. Because the spot price of uranium has doubled in the past year, exploration activity has begun to increase. Most of the large exploration projects being conducted are outside the United States on prospects that have proven shows but were not fully explored before the spot price fell again in the 1990s. Canadian companies are exploring in the U.S. Areas of present interest outside the U.S. include:

- Athabasca Basin of northern Saskatchewan, Canada
- Arnhem Land region in Northern Territory, Australia
- Deer Lake Basin of Newfoundland and Labrador, Canada
- Saddle Hills Uranium Basin, Mongolia
- Russia

History of the Uranium Market and its Future

The USGS indicates that the initial commercial uranium market in the United States started in 1964 with the expectation for widespread use of nuclear power for production of electricity.[13] In the period 1970-1984, uranium production resulted in a huge commercial utility inventory to operate existing nuclear plants in the U.S. and overseas. The spot price of uranium during this era ranged from $30 to $45 per pound of U_3O_8.[12] and [20] From 1985 to 2003, the market was driven by liquidation of this very large utility inventory.[13] The spot price of uranium during the liquidation era was as low as $7 to $10 per pound (see Figure 1).



During the liquidation era, world production fell far below the reactor requirements, to a total shortfall of 339,000 tons of uranium.[14] At the end of 2002, primary world uranium production of 36,042 tons provided only 54% of the world reactor requirements of 66,815 tons.[14] The remainder was provided by secondary sources, such as utility inventory, downgrading from military weapons, and reprocessing spent fuel. Many mines were closed and exploration was minor. In the U.S., only three in situ leach (ISL) mines were in operation and exploration was nonexistent.[14]

World production was largely from high-grade ores in Canada and Australia. By 2003, the inventory had declined to the point where its influence on the market was no longer viable. For example in 2001, the U.S. utilities inventory decreased to 15 percent below the 1998 level.[14]

Then the price of uranium began to climb. In January 2002, the price was $10 per pound; and by the end of 2003, it was nearly $13. At the end of January 2005, it had risen to $21, the highest price since 1984.[20] Thomas Neff, Center of International Studies, MIT, at the World Nuclear Association Annual Symposium, in London, August 2004, suggested the price would attain the $30 to $50 level in the foreseeable future.[15] and [37] A consensus reached at the Symposium was that the inventory-driven market has shifted increasingly to a production-driven market.[16] In turn, exploration has increased in the past year, especially overseas.[36][38][39] and [40]

Increasing uranium prices have resulted in renewed activity in production and interest in exploration as predicted by T.C. Pool.[16] In the first half of 2004, in situ leach (ISL) mining at two mines in Texas has restarted, several underground mines in western Colorado are being reopened, and staking of new claims has been reported in western states by Odell.[17] Building of corporate holding of uranium properties is underway (inquiries at USGS office; and Odell).[17] These actions, along with probable construction of new plants in the US within the next decade [12] and 30 already under construction in other countries, portends a new boom cycle in uranium industry activities. These include increases in uranium exploration, production, and demand prices, a forecast that has not been seen for more than 25 years, before the beginning of the Three-Mile Island incident in Pennsylvania in March 1979.

The tenor in industry today now appears to be focusing on revitalizing nuclear power as a substitute for fossil fuels in order to mitigate the environmental impact of coal and the economic impact of unreliable overseas oil and gas resources.[18][42] and [43] Because of its contribution to greenhouse gas emissions, coal's long-term continuing use now seems far less likely than previously assumed, although use of the cleaner coal from the western U.S. may continue to provide energy for electrical generation for years to come, unless the economics of production and utilization favors nuclear power even more over the years of operation to come.

In addition, nuclear energy is one of the few readily-available technologies that does not produce greenhouse gases in significant volumes. If a "Hydrogen Economy" becomes a viable alternative to a petroleum-based economy in the years ahead, nuclear power is also one of the principal sources of inexpensive hydrogen.[48]

The biggest hurdle to overcome in the industry is the long-held view that new nuclear plants cost more to build than fossil-fuel plants, and that in order to improve its advantages in mitigating greenhouse gas effects, the uranium industry would have to lower its plant construction costs. Toward this end, improvements in nuclear power plant designs have been developed that not only offer lower costs but also improved safety features.

Other long-term concerns include economic disadvantages and safety concerns inherent in spent-fuel management and plant-decommissioning, both of which have to be built into the initial costs of construction. One impediment in earlier years that is no longer in place is that the industry no longer needs to inflate the cost of new plants to add to their capital costs (which determines the amount of profit they could ask regulators) for determining the rates they could charge their end-customers, the general public.

The principal guide to the status of the nuclear industry is the price of uranium. As the price increases new exploration programs are begun. Detailed information on the uranium market can be found in USGS reports [13]; Pool;[16] and from the Ux Consulting Company, which LLC was founded as an affiliate of The Uranium Exchange Company (Ux).[19 and 20] In order to provide fuel for existing nuclear power plants, as well as for those already under construction worldwide, additional uranium reserves will need to be located, established, and developed in the U.S. and wherever they can be found in the world.

Uranium Exploration

Classic exploration techniques used for Tertiary deposits in Texas are discussed by Campbell and Biddle.[23] Rackley[44] and Rubin[45] discuss exploration guides for mineralization in other parts of the western U.S. Older, redistributed deposits have been found in favorable depositional environments throughout the geologic record. During the last boom in exploration (ending in 1979), the literature documenting advanced techniques in evaluating new prospects, in re-evaluating old producing areas, and in developing frontier areas for exploration expanded significantly in the U.S. and worldwide.[27] Since the late 1970s, many publications on techniques and prospects have been made available on the Internet covering uranium deposits in various types of geologic environments, occurrences, and ages. Exploration departments will have to be re-staffed and trained, and the portfolios of prospects prepared during the 1970s will have to be re-discovered and readied for implementation by new groups around the country. Much of the exploration and land acquisition for developing new reserves to drive possible mining in the U.S. over the past few years have been conducted by Canadian companies, which, driven by cartel-size production in Canada, have the funds to support exploration, while the American companies continue to slumber, waiting for the next business cycle that would provide such exploration funds. If exploration is not re-started soon by American companies, much of the more prospective land in the U. S. will be under the control of Canadian companies, which could eventually escalate uranium prices if the Canadian-controlled U. S. deposits are withheld from production in favor of the existing mines in Canada (and Australia).

Uranium Mining

I. Domestic Uranium Production

U.S. uranium production continued to decline in 2003. The number of underground mines increased from zero to one from 2002 to 2003; during the same period, the number of ISL mines decreased from three to two. Production decreased from 2.4 million pounds of U_3O_8 in 2002, to 2.0 million pounds in 2003, but increased in 2004 to 2.3 million pounds. By the end of 2004, there were three U.S. facilities in production.[(28) and (30)]

Most uranium mining is now by ISL methods because it is the most cost effective and environmentally acceptable method of mining. In situ leaching, or solution mining, involves leaving ore where it was formed naturally in a subsurface hydrochemical cell, and pumping liquids through it to recover the ore by dissolving (or leaching) the uranium minerals into a solution for transport to the surface for processing.

The orebody must consist of permeable sediments that readily transmit fluids. In a four-spot development configuration, with an injection well in the center adding acidic solutions to dissolve the uranium minerals, surrounded by four production wells, the uranium-rich solution is captured in a cone-of-depression created by the pumping- production wells. The cone must be maintained so that the ore-bearing solution captured by the pumping wells does not contaminate ground water in areas surrounding the orebody. A series of 5-spot units are installed over and along the surface trace of the orebody below, and a number of monitoring wells are installed around the periphery of the production area to monitor for any fluids that might escape the hydraulic controls.[(25) and (26)]

Processing at the surface involves concentrating the uranium solution into "yellow cake," which is easily transported to plants where it is further processed into fuel pellets for use in nuclear reactors. Consequently, there is little surface disturbance and no tailings or waste rock are produced. Transportation of "yellow cake" to fuel-processing plants around the country is no more hazardous than other types of hazardous materials shipped daily on highways and railways in the U.S. today. Extensive research over the years on container safety has provided rugged containers for shipment over public transportation of both low-grade and high-grade nuclear fuels and waste by-products.

ISL mining was first attempted on an experimental basis in Wyoming during the early 1960s. The first commercial mine began operating in 1974. Today, about a dozen projects are licensed to operate (in Wyoming, Nebraska, and Texas[25]), and most of the operating mines are less than 10 years old. Most of these deposits are small and low-grade, but they supply some 85% of the U.S. uranium production. About 13% of world uranium production is by ISL (including all Kazakhstan and Uzbekistan output).

ISL Uranium Deposit Characteristics

Uranium deposits suitable for ISL occur in permeable sand or sandstones, confined above and below by fine-grained, low-permeability sediments, below the water table. They may either be flat, or "roll front" in cross section, C-shaped deposits within a permeable sedimentary layer (see Figure 2).[23] They were formed by the lateral movement of oxidizing uranium-bearing ground water through the aquifer, with precipitation of a suite of minerals occurring under hydrochemically-reducing conditions, along extensive oxidation-reduction interfaces. The uranium mineralization is usually comprised of uraninite (oxide), coffinite (silicate) and other mineralized coatings on individual sand grains. The ISL process essentially reverses this ore genesis in a much shorter time frame. Geologic controls in south Texas orebodies are discussed in detail by Dickinson and Duval.[26]

Ground-water technologies supporting the various techniques used in the ISL process have evolved to the point where it is a controllable, safe method of mining that can operate under strict environmental controls. ISL mining offers significant cost advantages over surface and underground mining.[24]

ISL Well Field - An Overview

Design: Relatively shallow, small-diameter wells are drilled, cased and screened to ensure that fluids only flow to and from the ore zone. Submersible electric pumps draw from near the bottom of the production wells. A well-field design is typically a grid with alternating production and injection wells. The spacing between them usually ranges from 50 to 90 feet. As discussed earlier, each production well's cone-of-depression is maintained throughout the well field to ensure that the ISL fluids do not migrate outside the mining area. A series of monitor wells surrounding the well field provides regulatory evidence that fluids do not move outside the mining area.

Production: The production life of an individual ISL well field is usually less than three years, typically 6-10 months. Most uranium is recovered during the first six months of the well field's "four-spot" operations. The most successful operations have achieved a total recovery of about 80% of the recoverable uranium. Over time, production flows decrease as clay and silt plug permeable sediments. These can be dislodged to some extent by higher-pressure injection or by reversing flow between injection and production wells. [(21)(25) and (26)]

ISL Activity

ISL activity is growing in the U.S. and will likely be applied to deeper deposits. The methods are usually economics and the environmental controls are straight forward and well understood. The World Information Service on Energy (WISE) is a primary source of operational information in uranium mining, whether it is by surface mining, underground mining, or the new ISL methods. A recent WISE report [(30)] indicates there are currently five operating uranium mines in the U.S.:

Colorado — Cotter Corp Western Slope uranium and vanadium mine (several mines reopened in 2004 in Montrose County).

Nebraska — Cameco Crow Butte ISL project in western Nebraska.

Texas — Uranium Resources, Inc. Vasquez project in Duval County.

Wyoming — Cameco Highland ISL (operations recently suspended), Cameco (Power Resources, Inc.) Smith Ranch ISL project.

Status of Mining Project Decommissioning

Arizona: Navajo Indian Reservation. Aerial survey of abandoned uranium mines on the reservation determined that only 15 square miles of 1,144 square miles surveyed (approximately 1.3%) had bismuth indications above a minimum reportable activity. The tribe has also urged the cleanup of radioactive home sites that were built from mine waste by miners many decades ago.[(30)]

California: U.S. Forest Service closed the Juniper uranium mine site in the Stanislaus National Forest because of radiation emitted from waste rock. Cleanup of the site will require about two years and will cost about $2 million.

Colorado: Durita Heap Leach Site, Montrose County. The Colorado Department Health and Environment has issued a draft statement that the Hecla Mining Company's site has met "all applicable standards and requirements" and awaits NRC approval for termination of its radioactive material license.

Coming out of an UMTRA Title 1 Project, five acres at a former Durango uranium mill site have been designated as an off-leash dog park. The Colorado Department of Public Health and Environment has announced that the last uranium mill-tailings reclamation site in Colorado has been cleaned up and transferred to the City of Rifle.[30] and [31]

The EPA announced the partial deletion of 9.84 acres within the Uravan Superfund Site, Montrose County. Former Uravan residents are suing Umetco Minerals Corp. over illnesses and deaths they claim are related to past Uravan operations.

Montana: High levels of radioactivity found at abandoned mines in the Pryor Mountains have prompted the Custer National Forest to close one area and the Bureau of Land Management to consider closures at nearby sites.

New Mexico: Homestake was granted a nine-year extension of reclamation milestones for the Grants uranium mill tailings site. The NRC has granted a three-year delay of decommissioning the Ambrosia Lake Mill site and a two-year extension of the reclamation deadline for Ambrosia Lake tailings. The U.S. Department of Energy is now the long-term custodian of the L-Bar Uranium Mill Tailings Site near Seboyeta, N.M., and the Sohio Western Mining Company Source Materials License for the site has been terminated. Similarly, the NRC has terminated the license of Atlantic Richfield Company (ARCO) for a uranium mill near Grants, and has placed the site under the purview of the U.S. Department of Energy.[31]

Utah: The Utah Division of Oil and Gas and Mining plans to reclaim abandoned uranium mines near Blanding, and in the San Rafael Swell area.

Wyoming: U.S. NRC has terminated the Source Materials License of U.S. Energy Corp. for the Green Mountain ion exchange facility.

Additional information on mine decommissioning is available online.[30] and [31]

II. Foreign Uranium Production

Information on foreign production is also available online.[39]

Mine Reclamation Projects

Texas: Cogema Mining Inc.'s Holiday -- E1 Mesquite ISL Project in Duval County -- reclamation ongoing.[31]

Wyoming: Cogema Mining Inc.'s Christensen Ranch/Irizarry ISL Project -- reclamation ongoing.[31]

Additional information on mine reclamation is available online.[31]

Radioactive Waste Disposal

Low-level radioactive (LLRAD) waste disposal is regulated by the NRC or Agreement States (i.e., those States that have agreed to assume the responsibility to enforce federal regulations). At present, there are three existing low-level waste disposal facilities in the U.S., all in Agreement States. The Low-Level Radioactive Waste Policy Amendments Act of 1985 gave the states responsibility for disposal of their own LLRAD waste. Although most states have entered into compacts, no new LLRAD sites have been built in the last 20 years (since 1985).(32)

High-Level Waste Disposal

Congress has approved the Yucca Mountain site for high-level waste disposal, and the U.S. Department of Energy may now submit a license application to the U.S. Nuclear Regulatory Commission.(33) Spent nuclear fuel is stored on site at nuclear reactors around the country. It is projected that on-site spent fuel pools will be at capacity by 2015.(34) In many respects, a coherent and socially acceptable, long-term strategy for managing nuclear waste remains to be developed. However, movement is now underway that will allow the stockpiled wastes to be transported to a more- permanent storage site in Nevada. Research at the Los Alamos National Laboratory, for example, is pursuing a number of waste-handling alternatives that are now in the demonstration stage of development.(49)

Conclusions

The nuclear power industry appears to be entering a period of resurgence, this time with increasing support of the general population because of the advantages offered by generating electricity with nuclear power, because the industry continues to have an outstanding record of improvement in operational management, and because the industry offers an unparalleled industrial safety record over the past 25 years. The American population seems to be coming to grips with nuclear power by understanding more fully the risks involved, and by putting away their residual fear of radioactivity with a new perspective of the actual risk.

With the increased price of uranium on the spot markets, uranium exploration in the U.S. and the world also appears to be increasing in order to supply fuel within the next few decades to the hundreds of nuclear plants around the world. New in situ leaching methods have generally replaced surface mining in the U.S. with methods that more economically produce "yellow cake" than the often environmentally-unfriendly method, surface mining. Deep uranium ore deposits, once considered too deep for conventional mining, will be developed in the future by ISL methods.

Programs sponsored by the U.S. DOE for the transportation and storage of nuclear waste are progressing with various degrees of success. The low-level waste programs are progressing well in New Mexico, while the high-level waste programs in Nevada and Washington continue to be contentious with adversarial environmental groups. With the demonstrated need for safe nuclear power to produce electricity, combined with the growing support by the general population of a revitalized nuclear industry to provide jobs, to help reduce the balance-of-payment problems for foreign petroleum, and to help eliminate the use of high-sulfur coals to generate electricity, the future seems clear for a new period of nuclear power expansion in the U.S.

Fear, transformed by sound knowledge and perspective, can turn the American attitude into a personal awareness of the dangers around them and prepare Americans for living in a bright technological age of the 21st Century. We have to be willing to assume and tolerate a calculated risk, with well-considered safety features built in, because we need the benefits of nuclear power in our society. We place our faith in technology each day by flying in planes, driving cars, riding elevators, and by improving our health through medical procedures and operations. This faith in technology should now be extended to nuclear power on the basis of its 30 years of nuclear-reactor history in the power industry and in Navy ships and submarines. This will require an enlightened government supported by an enlightened, informed population to offset their residual fears in order to move ahead in revitalizing the American nuclear power industry, an action that seems to be more attractive now than over the past 25 years.[10][42] [43] and [47]

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Note: FOR ADDITIONAL TECHNICAL INFORMATION ON URANIUM EXPLORATION, MINING, AND ENVIRONMENTAL CONTROLS, SEE MEMBERS ONLY PAGE