Environmental Defense Institute
www.environmental-defense-institute.org

Nuclear Weapons and Civilian Nuclear Power – Two Dangerous Interdependent Peas in a Pod #2.3

by Chuck Broscious

Attachment A

Idaho University Participation in DOE/INL Programs

Below is a list of some Idaho universities that have DOE/INL programs in their curriculum that in a time of significant federal/state cuts in funding for higher education helps supplement their budgets. This is an entirely deliberate effort to force universities into the government mission control.

INL also acknowledges these additional "University Partners: MIT, The Ohio State University, North Carolina State University, University of New Mexico, and Oregon State University, University of Idaho, Idaho State University, and Boise State University."
https://www.inl.gov/about-inl/general-information/organization/

Idaho State University ISU

Technological Marketing Summary Nanoparticles includes a team of researchers from Idaho National Laboratory and Idaho State University was attempting to produce nanoparticles using the traditional method in which a supercritical fluid is used as a solvent to dissolve source material.

"POCATELLO – Idaho State University has been recognized by three national organizations for its excellent support of military-bound students and veteran students**.** Todd Johson, director of ISU's Veteran Student Services Center, displaying awards the center has received for 2018. ISU was included in the Military Times Best: 2018 College Rankings, Military Advanced Education and Training (MAE&T) 2018 Guide to Colleges and Universities, and an award for being Military Friendly for 2018 by Victory Media. In the Military Times Best, ISU was ranked 125 out of 218 schools. More than 600 colleges and universities applied for this distinction. December, 5, 2017."
https://isu.edu/headlines/stories/idaho-state-university-earns-three-military-friendly-designations-for-2018.php

University of Idaho

DOE Office of Science Graduate Student Research Program SCGSR program provides doctoral dissertation/thesis research opportunities for graduate students at DOE national laboratories. Details about the program and online application can be found at http://science.energy.gov/wdts/scgsr/.
https://www.uidaho.edu/~/media/UIdaho-Responsive/Files/research/About/Legislative/FY18_FedPriorities/D%20DOE%20NEUP%202-4-2017.ashx

DOE Nuclear Energy University Program NEUP in Idaho Idaho's public universities and the Idaho National Laboratory (INL), through collaborations fostered by the Center for Advanced Energy Studies (CAES), are conducting research and educating the future workforce that supports the nation's and world's increasing demand for affordable, safe, reliable and environmentally sound nuclear energy.

Support from the highly competitive. NEUP has enabled the revitalization of the universities' nuclear engineering, science, and related program research and educational programs. Over the past seven years, Idaho universities have been awarded $18.9 million through the NEUP, including $16.9 million for research development, $1.5 million research infrastructure development, and $932,500 for student scholarships and fellowships. With this funding, Idaho's universities are engaged in science and engineering research leading to the development of new innovative technologies, providing creative solutions to current nuclear energy challenges and enabling future nuclear power development and deployment. University of Idaho (UI) researchers have six active NEUP projects totaling more than $3.4 million."
https://www.uidaho.edu/~/media/UIdaho-Responsive/Files/research/About/Legislative/FY18_FedPriorities/D%20DOE%20NEUP%202-4-2017.ashx

UI Nuclear Energy University Program; "Current and past NEUP project topics at UI include recycling and storing used nuclear fuel, designing intelligent control systems for next-generation reactors, improving the service life of concrete, and recovering uranium resources from sea water. Background; Through NEUP, the DOE designates up to 20 percent of its annual nuclear energy research and development budget to fund university-based projects and research infrastructure development activities through an open, peer-reviewed competition. These competitions address both the near-term specific needs and long-term general needs of DOE nuclear energy R&D programs, as well as infrastructure improvements that support the educational and research missions of the participating universities. The Center for Advanced Energy Studies is a consortium among Boise State University, Idaho State University, the University of Idaho, the University of Wyoming and the Idaho National Laboratory, which is managed by the private entity Battelle Energy Alliance. Recent Accomplishments UI researchers led by Batric Pesic, a professor of chemical and materials engineering, began a two-year, $350,000 project on advanced electrochemical separation in spent nuclear fuel in October 2016. UI researchers led by Indrajit Charit, an associate professor chemical and materials engineering, began a three-year, $800,000 project to develop science-based guidelines to select dopants for fast reactor fuel compositions in October." 2016."http://www.uidaho.edu/news/news-articles/faculty-staff-news/2017-february/022317-doeresearchapplications

Center for Advanced Energy Studies Department of Energy Microlab; The Center for Advanced Energy Studies (CAES) 1 is leveraging investments by the Idaho National Laboratory (INL) and the states of Idaho and Wyoming, via four universities, to promote energy security and drive regional economic growth. Significant capacity for innovation is housed in the nation's universities and national laboratories, and effectively tapping this potential is a key to increased technology-based economic growth. Although the CAES universities and INL have offices and programs promoting technology transfer, authorization and funding of a Microlab2 program would accelerate their impacts on regional economic development. A Microlab program open to all U.S. Department of Energy national laboratories would encourage and fund labs to team with their local universities to create small-scale "outside-the-fence" Microlabs that facilitate technology transfer and regional economic development. Microlabs would integrate investments and capabilities of a national laboratory with its university partners to make available to regional industries and business of all sizes:

- Simple and reasonably priced access to university and national laboratory capabilities and infrastructure,
- Accelerated and simplified transfer of technology to the private sector and
- Educational programs (especially in the STEM disciplines) that address the technical workforce needs of the region. A CAES Microlab would bring together and make available the combined capabilities of the universities and INL through the state of Idaho owned and operated "outside-the-fence" CAES

research facility located adjacent to the INL Idaho Falls campus, as well as at university campus locations throughout Idaho and Wyoming. In addition, the CAES Microlab would build upon and leverage ongoing investments in people and infrastructure by Idaho, Wyoming and INL to promote technology-based economic development within the region."
https://www.uidaho.edu/~/media/UIdaho-Responsive/Files/research/About/Legislative/4%20FY17%20DOE%20CAES%20Microlab%202-2-2016.ashx

Idaho Regional Mathematics Centers | College of Education | Idaho
Teaching. Learning. Mathematics. About the IRMC. In an effort to carry forward and advance the work begun with the Idaho Math Initiative, the State Department of Education and Idaho's Institutions of Higher Education have partnered, thanks to funding from the Idaho Legislature, to support the Idaho Regional Mathematics.
http://ed.isu.edu/irmc/irmc_index.shtml

Boise State University

DOE Again Funds Boise State Industrial Assessment Center | UPDATE
Dec 15, 2016 **...** The **Department of Energy's** Office of Energy Efficiency and Renewable Energy has announced regional Industrial Assessment Centers (IACs) at 28 higher education institutions from 25 states across the country, including one at Boise State University. This represents the second time Boise State has won. https://news.boisestate.edu/.../**doe**-funds-boise-state-industrial-assessment- center/

Boise State Student Tapped for **DOE** Nuclear Energy Fellowship;
May 12, 2016 **...** On May 7, Kiyo Fujimoto graduated with a bachelor of science degree in biochemistry. In June, she'll begin a materials science doctoral program under the direction of assistant professor David Estrada. Her doctoral project was recently selected for a three-year fellowship from the Department of Energy**.**
https://news.boisestate.edu/.../boise-state-student-selected-**doe**-nuclear-energy- fellowship/

BSU Register for the DOE Competitively Funded Programs Informational :July 20, 2017 **...** Registration is open for the FY 2018 Consolidated Innovative Nuclear Research (CINR) Funding Opportunity Announcement (FOA) webinar. The webinar will be available three times during the dates of Aug. 8-10. The Department of Energy- Nuclear Energy (DOE-NE) anticipates discussing the Nuclear.
https://research.boisestate.edu/.../register-**doe**-competitively-funded-programs -informational-webinar/

DOE EPSCoR Implementation grant preparation 2017. Dec 7, 2016 **...** At this time there has been no announcement about the due date for the next round of **DOE** EPCOR Implementation grant applications. Each EPCOR jurisdiction is allowed to submit one proposal per round of competition to the Implementation program. This announcement will begin the process in Idaho.
https://research.boisestate.edu/.../**doe**-epscor-implementation-grant- preparation-2017/

Materials Science and Engineering Student Wins Award; Aug 26, 2014 **...** Ph.D. student Matthew Swenson is one of 20 recipients of the 2014 Innovations in Fuel Cycle Research Award. The U.S. **Department of Energy** (**DOE**) selected him for his research paper "Correlation Between the Microstructure and Mechanical Properties of Irradiated Fe-9Cr ODS," which he presented this .
https://go.boisestate.edu/.../materials-science-engineering-student-wins-award/

FY 2017 **DOE** Early Career Research Program - Office of Sponsored; Aug 5, 2016 **...** Office of Science, U.S. **Department of Energy** has posted the Early Career Research Program. Eligible

Principal Investigators are within 10 years of having received a Ph.D. (no earlier than 2006) and are either untenured assistant professors on the tenure track, untenured associate professors on the tenure .https://research.boisestate.edu/.../fy-2017-**doe**-early-career-research-program/

Boise State University (continued)

US Department of Energy (DOE) Office of Science Idaho National Laboratory (INL) Internship Opportunities. Application period begins October 13, 2011. To apply visit website: http://science.energy.gov/wdts/. The mission of the Workforce. Development for Teachers and. Scientists program is to provide a continuum.
https://stem.boisestate.edu/.../INL-FLYER_-_OFFICE_OF_SCIENCE_2012. pdf

"DOE CWC Micro Wind Turbine Team 3" by Michael Sansom, Cody; Apr 21, 2014 **...** With the goal of increasing the national capacity for wind energy from 4% to 20%, the Department of Energy issued a challenge for undergraduate students to develop and build a marketable micro wind turbine capable of producing at least 10 watts of power. In order to meet the competition requirements. http://scholarworks.boisestate.edu/eng_14/55/

Collage of Southern Idaho

CSI web page
DOE Pages;"Public access gateway for energy & science"
http://www.osti.government.pages

Attachment B

Idaho National Laboratory Community Outreach

Below are examples of community outreach into the Idaho Falls where DOE/INL have their offices and where most workers live. This is a significant effort to generate a constituency that will support INL nuclear programs. https://factsheets.inl.gov/FactSheets/Community_Outreach.pdf

- COMMUNITY & EDUCATION OUTREACH; INL is dedicated to improving the quality of life in our community and region. We provide support to the community through employee volunteer service, employee charitable contributions, grants and corporate donations. INL provides tours and onsite speaker presentations. INL also conducts outreach for K-12 STEM education initiatives.
  CHARITABLE GIVING Battelle Energy Alliance employees contributed more than $610,000 to charitable giving." [1]INL, on behalf of corporate funds provided by Battelle Energy Alliance, funds philanthropic projects from nonprofit agencies that focus on health and human services, disadvantaged youth, environmental projects, civic affairs, or culture and the arts. The priority of INL's community giving program is to give to organizations that support the basic needs of children and the underprivileged.
  CHARITABLE DONATION REQUESTS; INL's community outreach donation process is conducted on an annual basis. Guidelines for donation requests can be found at www.inl.gov/partner.
  TEAM INL VOLUNTEERS; Team INL is an employee-driven volunteer program supporting causes in the communities where INL employees live. INL employees along with their team of volunteers have completed over 400 volunteer projects since 2006. If you have an idea for a Team INL volunteer project, please call Lori Priest at (208) 526-9154.
  INL GROUP TOURS; INL offers guided group tours that can be tailored to your group's interests. From school groups to civic and professional organizations, more than 3,000 people tour INL every year to learn more about INL facilities, research, operations and history. Request a tour at (208) 526-0050
  SPEAKER PRESENTATIONS; INL offers speakers of interest to visit your school, civic organization, or community group. The professionals at INL are interested in meeting you and sharing their knowledge on science, national energy issues, new technologies, career opportunities, safety education and a variety of other subject. Request a speaker at (208) 526-0442.
  EDUCATION OUTREACH: K-12 STEM EDUCATION Developing a skilled, talented and prepared science, technology, engineering and mathematics (STEM) literate workforce in order to fill the pipeline of potential future INL employees with scientists, engineers, and technicians. INL supports the Idaho STEM (i-STEM) initiative and also funds grants to enhance K-12 classrooms. In addition, educators work with INL scientists and technical experts during the summer to come up with research projects relevant to the classes they teach.

  K-12 STEM EDUCATION GRANTS Helping to educate the next generation of scientists and engineers by increasing engagement in science and math in today's classrooms. Guidelines for STEM education grants can be found at www.inl.gov/partner

[1] "Idaho National Laboratory a major contributor to Idaho's economy", January 4, 2018.https://www.id.energy.gov/

TECH-BASED ECONOMIC DEVELOPMENT GRANTS INL's Technology Based Economic Development donation process is conducted on an annual basis. Guidelines for Technology Based Economic Development donations can be found at: www.inl.gov/partner.

INL Technology Transfer

"Licensing INL Technologies Continued next page Battelle Energy Alliance (BEA), the management and operating contractor at Idaho National Laboratory (INL), makes available for licensing contractor-owned inventions for commercialization by U.S. and foreign companies and organizations. INL usually licenses its intellectual property terms similar to universities, other research organizations and industrial firms. Grant of Rights Various licensing terms may be negotiated, including both exclusive and nonexclusive license grants. Exclusive licenses may be in certain fields of use, geographic areas, or according to other terms. Coexclusive and partially exclusive licenses, where exclusive rights to commercialize a technology may be shared by several organizations or restricted by area of use, territory or other terms, also may be granted. For example, one company may obtain exclusive rights to use an invention in the energy industry, while another exclusively licenses the same invention for application in the food industry. **Royalties and Payments INL licensing royalties are comparable to those charged by universities, other research organizations and the private sector. Licenses usually require an upfront, nonrefundable payment, royalty payments based on sales, and a minimum annual royalty**. The fees will vary depending on the number of patents licensed, the demand for the technology and the exclusivity of the license.

INL University Partnerships

https://factsheets.inl.gov/FactSheets/University_Partnerships.pdf

"UNIVERSITY PARTNERSHIPS; INL develops and implements collaboration-based programs that meet INL's short- and long-term workforce needs by investing in strategic regional and national education and research partnerships. We support college undergraduate interns, graduate students, and university research efforts. Academic institutions and researchers benefit from access to INL resources, capabilities and expertise. University partnerships help INL advance energy research, production and safety. INL provides students, teachers, and professors the opportunity to learn how to solve real-world problems under the tutelage of world-renowned scientific and technical experts. INL has strong relationships with schools throughout the United States and actively encourages its scientists and engineers to collaborate with their university peers on research and other projects. To foster those relationships and make it easier for INL researchers to collaborate, the following programs are offered:
EMPLOYEE EDUCATION; INL is committed to ensuring our employees have the knowledge and skills necessary to succeed at work by supporting educational opportunities in areas related to laboratory missions, needs, and strategic goals. The program allows qualified employees to take courses form accredited colleges and universities for the following purposes: degree seeking, continuing education, or professional licenses and certifications.
EXCHANGES; Academic visitor and international researcher exchanges promote an interactive culture and enhance research collaboration between INL and outside researchers.
INTERNSHIPS; A robust paid internship program for high school through graduate students to gain experience by working on real world projects under the guidance of mentors who are experts in their field.
SUPPORTING THE NEXT GENERATION OF SCIENTISTS AND ENGINEERS JOINT

APPOINTMENTS; Enabling INL and university staff researchers to enhance R&D collaboration by developing and conducting research at both INL and university facilities. Joint appointees contribute to the mission of both their home and host institutions.
NATIONAL UNIVERSITY CONSORTIUM; Engaging in collaborative research that strengthens the portfolios of INL and the partner universities to further the nation's strategic nuclear energy objectives.
POSTDOCTORAL RESEARCH; Postdoctoral appointments are reserved for individuals that have recently received their qualifying doctorate degree and are provided a mentored research experience that enables these individuals the opportunity to gain hands-on laboratory research and development experience and the highest quality of training to prepare for transition to research independence."
www.inl.gov/partner

"K-12 STEM EDUCATION OPPORTUNITIES; INL's K-12 STEM education and outreach program focuses on developing a skilled, talented and prepared science, technology, engineering and mathematics (STEM) literate workforce in order to fill the pipeline of potential future INL employees with scientists, engineers, and technicians. At Idaho National Laboratory, students and teachers do more than just read about science and technology. They experience it firsthand through INL's various K-12 education programs. They can work alongside our scientific and technical experts. Teachers can apply for money to buy equipment and tools for use in their classroom.
INL K-12 OPPORTUNITIES; INL's core education programs include: • Student outreach • High school internships • Teacher professional development programs • Teaming with teachers • INL education corporate investment • Resource investment – student, informal STEM, teacher grants, and STEM classrooms • Corporate – teacher resources and development • Employee children scholarships
TEAMING TEACHERS WITH INL; An eight- to 10-week summer program that teams teachers with INL scientific and technical experts. Teachers are exposed to the "real world" of science, technology and research.
INDEEDS; Industry's Excellent Educators Dedicated to STEM (INDEEDS) is an award program that honors Idaho educators dedicated to teaching science and technology. It was created by the governor's office and is sponsored by INL and other members of the Science and Technology Roundtable.
DEVELOPING A SKILLED, TALENTED AND PREPARED STEM LITERATE WORKFORCE K-12 STEM GRANT PROGRAMS; These programs are designed to enhance elementary, middle school and high school science, technology, engineering and math (STEM) curriculum. Informal STEM fund experiences beyond the traditional classroom and teacher-directed lessons. These include museum and exploratorium visits, field trips, club sponsorship, camps, guest speakers or student participation in STEM competitions. Classroom Mini Grants fund equipment, materials, and supplies that enhance the teaching and learning of STEM. Extreme Classroom Makeover are large awards that fund classroom or laboratory renovations. i-STEM A coordinated effort by INL, the state Department of Education, educators, businesses and industries to support K-12 STEM education. Regional STEM resource centers, Information Technology services, hands- on materials and classroom tools are provided to support teachers, workshops and training.

HIGH SCHOOL INTERNSHIPS; An eight-week summer program that provides high school students an opportunity to learn from INL's scientific and technical experts.
INL SCIENCE BOWL; The INL Scholastic Tournament is a quiz bowl competition that tests high school students' math and science knowledge. The tournament season starts in February and March with teams competing weekly in league play competition to prepare for meets. In April, teams advance to the

championship in Idaho Falls to compete for their respective state titles. The winners compete in the National Science Bowl in Washington, D.C. in May. Prizes include domestic and international trips to facilities where cutting-edge science and engineering technologies are experienced first-hand by the winners." www.inl.gov/partner

"ECONOMIC & WORKFORCE DEVELOPMENT; INL helps nurture a fertile environment for bringing technology to market by creating and accelerating new tech-related industries. INL is leading regional and national efforts to ensure a new generation of technicians and engineering technologists is trained to replace the aging energy workforce.
TECH-BASED ECONOMIC DEVELOPMENT GRANTS; Battelle Energy Alliance corporate funds provide grants for projects aimed at spurring technology-based economic development, entrepreneurship and innovation in the region. Priority is given to projects that focus on connecting industry partners, universities, start-ups and economic development organizations that drive job growth. INL works through existing groups to establish a strong climate for tech-based economic development. Available funds are leveraged by challenging other groups to match contributions for the start of techbased projects.
Examples of INL's efforts include: • Helping start-up companies develop business plans, providing strategic planning training, and offering highly-specialized technical assistance. • Working with economic and technology development organizations to identify opportunities and resources. • Providing services to tech-based incubators and science & technology parks. • Supporting seed/venture capital activities.
Donation Request: INL's Technology Based Economic Development donation process is conducted on an annual basis. Guidelines for Technology Based Economic Development donation requests can be found at www.inl.gov/partner.
TECHNICAL ASSISTANCE PROGRAM; This is a technical support program for small business and state and local governments where INL scientists and engineers provide, without fees, assistance which is not normally available to a community or small business. It helps in areas where organizations may find their problems too complex or technical to solve on their own. This program is authorized by federal law, and DOE has allocated limited funding for this support activity and provides policy guidance directing the screening and selection of projects. • Requested services cannot substantially compete with services available from the private sector. • The requested assistance must fall within INL areas of expertise. • Requests to support projects in nuclear energy, national and homeland security, and clean energy are given higher emphasis. • No more than 40 hours of assistance are allowed per request. To submit your request for consideration, complete the Request for Technical Assistance form.
WORKFORCE DEVELOPMENT; INL is leading regional and national efforts to ensure a new generation of technicians and engineering technologists is trained to replace the aging energy workforce. We do this by supporting technical colleges, universities, and graduate programs." www.inl.gov/partner

Report recommends INL changes to boost profile

"Idaho National Laboratory might be starting to show attributes of a "world-class" research institution. But fundamental changes in how the lab operates and engages with the public must be made over the next decade to maintain its elite status. The report's recommendations include:

- Increasing international engagement. The committee talked to 20 foreign nuclear industry experts who generally said the lab needed "more effective engagement with the global nuclear community." INL has in place an international outreach program, but the report indicated the international community is "largely unaware" of it.

• Boosting cooperation with other national labs. Cooperation between INL and other nuclear research labs such as Oak Ridge and Argonne "is improving," the report states. But the labs still sometimes compete for work, and there isn't a "formal framework for collaboration that establishes a reasonably stable, accepted role for each lab," the report said. More teamwork between nuclear institutions is needed, it said.
• Better explaining to nuclear companies what INL does. INL might be on the radar of international research institutions, but "there is a lack of knowledge and understanding of INL capabilities in industry," which thwarts potential research and development partnerships, the report said." [2]

[2] Report recommends INL changes to boost profile, February 21, 2017 By Luke Ramseth, Post Register

Attachment C

Price-Anderson Act

https://en.wikipedia.org/wiki/Price%E2%80%93Anderson_Nuclear_Industries_Indemnity_Act

The **Price-Anderson** Nuclear Industries Indemnity **Act**(commonly called the **Price-Anderson Act**) is a United States federal law, first passed in 1957 and since renewed several times, which governs liability-related issues for all non-military nuclear facilities constructed in the United States before 2026.

The **Price-Anderson Nuclear Industries Indemnity Act** (commonly called the **Price-Anderson Act**) is a United States federal law, first passed in 1957 and since renewed several times, which governs liability-related issues for all non-military nuclear facilities constructed in the United States before 2026. The main purpose of the Act is to partially compensate the nuclear industry against liability claims arising from nuclear incidents while still ensuring compensation coverage for the general public. The Act establishes a no fault insurance-type system in which the first approximately $12.6 billion (as of 2011) is industry-funded as described in the Act. Any claims above the $12.6 billion would be covered by a Congressional mandate to retroactively increase nuclear utility liability or would be covered by the federal government. At the time of the Act's passing, it was considered necessary as an incentive for the private production of nuclear power — this was because electric utilities viewed the available liability coverage (only $60 million) as inadequate.[1]

In 1978, the Act survived a constitutional challenge in the Supreme Court case *Duke Power Co. v. Carolina Environmental Study Group* (see below). The Act was last renewed in 2005 for a 20-year period.

Public law	85-256
Statutes at Large	71 Stat. 576
Codification	
Titles amended	42 U.S.C.: Public Health and Social Welfare
U.S.C.sections created	42 U.S.C. ch. 23

Funding and procedures

Power reactor licensees are required by the act to obtain the maximum amount of insurance against nuclear related incidents which is available in the insurance market (as of 2017, $450 million per reactor). Any monetary claims that fall within this maximum amount are paid by the insurer(s). The Price-Anderson fund, which is financed by the reactor companies themselves, is then used to make up the difference. As of September, 2013, each reactor company is obliged to contribute up to $121,255,000 per reactor in the event of an accident with claims that exceed the $450 million insurance limit. As of 2013, the maximum amount of the fund is approximately $12.61 billion ($121,255,000 X 104 reactors) if all of the reactor companies were required to pay their full obligation to the fund. This fund is not paid into

unless an accident occurs. However, fund administrators are required to have contingency plans in place to raise funds using loans to the fund, so that claimants may be paid as soon as possible. Actual payments by companies in the event of an accident are capped at $18,963,000 per year until either a claim has been met, or their maximum individual liability (the $121,255,000 maximum) has been reached. This results in a maximum combined primary + secondary coverage amount of up to $13.06 billion for a hypothetical single-reactor incident.

If a coverable incident occurs, the Nuclear Regulatory Commission (NRC) is required to submit a report on the cost of it to the courts and to Congress. If claims are likely to exceed the maximum Price-Anderson fund value, then the President is required to submit proposals to Congress. These proposals must detail the costs of the accident, recommend how funds should be raised, and detail plans for full and prompt compensation to those affected. Under the Act, the administrators of the fund have the right to further charge plants if it is needed. If Congress fails to provide for compensation, claims can be made under the Tucker Act (in which the government waives its sovereign immunity) for failure by the federal government to carry out its duty to compensate claimants.

Price-Anderson also covers Department of Energy (DOE) facilities, private licensees, and their subcontractors including the USEC uranium enrichment plants, national laboratories and the Yucca Mountain nuclear waste repository. Any payments from the fund for accidents arising at DOE facilities come from the US treasury. The fund size for such installations is set by legislation (also at $12.6 billion), rather than being based upon the number of plants contributing to the fund.

Since Price-Anderson was enacted, nuclear insurance pools have paid out about $151 million ($70 million of which was related to the 1979 Three Mile Island accident) in claims, while the Department of Energy has paid out $65 million.

Alterations to normal civil court procedures]

The Act makes a number of changes to typical civil court procedures:

- Jurisdiction is automatically transferred to federal courts no matter where the accident occurred.
- All claims from the same incident are consolidated into one Federal court, which is responsible for prioritizing payouts and sharing funds equitably should there be a shortfall.
- Companies are expressly forbidden to defend any action for damages on the grounds that an incident was not their fault.
- An open-ended time limit is applied, which allows claimants three years to file a claim starting from the time they discover damage.
- Individuals are not allowed to claim punitive damages against companies. (The act makes no provision for punishing companies responsible for an incident, but nuclear licensing regulations specify fines for breaches of safety regulations and criminal charges apply unaffected.)

Origins[edit]

The Price-Anderson Act is named for Representative Charles Melvin Price (D-Ill.) and Senator Clinton Presba Anderson (D-N.M.), both of whom eventually chaired Congress's Joint Committee on Atomic Energy.

The Atomic Energy Act of 1946, which followed the development of nuclear technology during World War II, had created a framework for operation of nuclear plants under government control. The intention of the government was to apply this technology to civilian industry, especially in using nuclear plants to generate electricity. In 1954 the Atomic Energy Act Amendments Act removed the government monopoly on operating nuclear plants by creating a licensing system for private operators. The structure of the insurance industry as it existed until 1955 was incapable of providing the extent of coverage needed

to adequately address the risks of nuclear power. The "amount of insurance required could not be underwritten at the time by any single or joint company effort".

A power plant, Shippingport, was eventually constructed, but electric utility executives expressed concerns about limited size of liability coverage offered by the insurance market ($60 million). A nuclear accident of privately held nuclear power appeared to be an impossible barrier since the possible magnitude of claims could bankrupt any electric utility held responsible. Nor could an insurance company offer insurance policies with limits beyond its own resources to pay. **Because of these difficulties, it looked like it would be extremely unlikely that electric utilities would want to enter the nuclear power industry.**

The potential magnitude of worst-case accidents has been the subject of several major studies, such as WASH-740, WASH-1400, CRAC-II, and NUREG-1150. The Nuclear Regulatory Commission (NRC) is currently developing State-of-the-Art Reactor Consequence Analyses (SOARCA), which is examining potential safety failures with probabilities of "occurring more than once in a million reactor years, or more than once in ten million reactor years for accidents that may bypass containment features"

To address these issues, Congress introduced the Price-Anderson Act in 1957. **The Act required companies to obtain the maximum possible insurance cover against accidents, determined to be $60 million, and provided a further government commitment of $500 million to cover any claims in excess of the private insurance. Companies were relieved of any liability beyond the insured amount for any incident involving radiation or radioactive releases regardless of fault or cause**. The act was intended to be temporary, and to expire in August 1967 as it was assumed that once the companies had demonstrated a record of safe operation they would be able to obtain insurance in the private market. At the same time, Congress encouraged the insurance industry to develop a way that power plant operators could meet their financial protection responsibilities. The insurance industry responded by creating an insurance pool called American Nuclear Insurers (ANI), which today includes 60 U.S. property and casualty insurance companies who represent some of the largest insurance companies in the country.

Extensions

By 1966 it had become apparent that the industry would still be unable to obtain adequate private insurance, so the act was extended until 1976. A provision was added to the Act which prevented companies from offering certain defenses to damages claims (particularly defenses which claimed that the accident had not been their fault). A minimum time limit was also introduced (which could be surpassed by state law), giving claimants three years after discovering harm in which to make a claim. The alterations were intended to make the process of obtaining funds from reactor companies easier, and to remove discrepancies in different states where different laws applied. The new provisions only applied to incidents where a significant escape of radioactive material was deemed to have occurred (an ENO, extraordinary nuclear occurrence).

In 1975 the act was extended for 12 years, up until 1987. The total amount of insurance remained the same, but a provision was added requiring each of the 60 or so reactors then in existence to contribute between $2 million and $5 million in the event of an uninsured accident. The insurance ceiling for each individual company was increased to $140 million. These measures eliminated the contribution of the federal government to the insurance pool. However, an explicit commitment was made that in the event of a larger accident, Congress would take whatever actions were necessary to provide full and prompt claims to the public. This included the possibility of additional charges to reactor companies above and beyond the prescribed limits set forth in the Act.

In 1988 the act was extended for 15 years up to August 2002. Individual insurance for each generator was increased to $200 million, and the total fund to $9.5 billion. For each reactor owned, the reactor company was liable to contribute up to $63 million towards compensation for any claim against any company,

though this could only be recovered at a maximum rate of $10 million per year. Assessments were to be adjusted for inflation every 5 years. The same level of indemnity was provided for government DOE facilities, while small reactors (education and research oriented) were required to obtain $250,000 insurance and have a government-backed pool of $500 million in the event of accident. This extension provided that all cases resulting from a nuclear accident to be heard in a federal court, rather than local courts.

In February 2002 the act was temporarily extended to December 2003. After some debate in 2003, the Act was extended to 2017. The individual insurance for each site was increased to $300 million while fund contributions per reactor were increased to $95.8 million. In 2005 it was extended again through 2025 via the Energy Policy Act of 2005.

Usage

Over the first 43 years of the Price-Anderson Act to 2000, the secondary insurance was not required. A total of $151 million was paid to cover claims (including legal expenses), all from primary insurance, including $71 million for Three Mile Island. Additionally, the Department of Energy paid about $65 million to cover claims under liability for its own nuclear operations in the same period.

Constitutional challenge

The constitutionality of the Price-Anderson Act was upheld in June, 1978 by the Supreme Court in the case of *Duke Power Co. v. Carolina Environmental Study Group* link. The lawsuit challenged the act on two grounds — first, that it violated the Fifth Amendment because it did not ensure adequate compensation for victims of accidents, and that it violated the Fourteenth Amendment because it treats nuclear accidents differently from other accidents.

The court concluded:

- *It is clear that Congress' purpose was to remove the economic impediments in order to stimulate the private development of electric energy by nuclear power while simultaneously providing the public compensation in the event of a catastrophic nuclear incident.*
- *The record supports the need for the imposition of a statutory limit on liability to encourage private industry participation and hence bears a rational relationship to Congress' concern for stimulating private industry's involvement in the production of nuclear electric energy.*
- *The Price-Anderson Act does, in our view, provide a reasonably just substitute for the common-law or state tort law remedies it replaces.*
- *The District Court's finding that the Act tends to* ***encourage irresponsibility in matters of safety*** *and environmental protection cannot withstand careful scrutiny, since nothing in the liability-limitation provision undermines or alters the rigor and integrity of the process involved in the review of applications for a license to construct or operate a nuclear power plant, and since, in the event of a nuclear accident the utility itself would probably suffer the largest damages.*
- *We view the congressional assurance of a [then] $560 million fund for recovery, accompanied by an express statutory commitment, to "take whatever action is deemed necessary [438 U.S. 59, 91] and appropriate to protect the public from the consequences of" a nuclear accident, 42 U.S.C. 2210 (e) (1970 ed., Supp. V), to be a fair and reasonable substitute for the uncertain recovery of damages of this magnitude from a utility or component manufacturer, whose resources might well be exhausted at an early stage.*
- *There is no equal protection violation, since the general rationality of the Act's liability limitation, particularly with reference to the congressional purpose of encouraging private participation in the exploitation of nuclear energy, is ample justification for the difference in treatment between those injured in nuclear accidents and those whose injuries are derived from other causes.*

Compared to other industries

US law requires payment of 8 cents per barrel of oil to the Oil Spill Liability Trust Fund for all oil imported or produced. In exchange for the payment, operators of offshore oil platforms, among others, are limited in liability to $75 million for damages, which can be paid by the fund, but are not indemnified from the cost of cleanup. As of 2010, before payouts related to the Deepwater Horizon drilling rig explosion, the fund stood at $1.6 billion.

The hydroelectric industry is not generally held financially liable for catastrophic incidents such as dam failure or resultant flooding. For example, dam operators were not held liable for the 1977 failure of the Teton Dam in Idaho that caused approximately $500 million in property damage.

While many industries have no explicit liability cap, in practice, liability in such industries may be limited to the assets of the company held to be at fault. In addition, liability can be disputed in the absence of strict liability laws. As a non-power example, after the 1984 Bhopal disaster, the Union Carbide Corporation claimed the accident was caused by sabotage and settled for only $470 million.

Criticisms

See also: Cost of electricity by source § External costs of energy sources

The Price-Anderson Act has been criticized by various think tanks and environmental organizations, including Union of Concerned Scientists, Greenpeace International, Public Citizen and the Cato Institute. Public Citizen has been particularly critical of Price-Anderson; it claims that the Act understates the risks inherent in atomic power, does not require reactors to carry adequate insurance, and would therefore result in taxpayers footing most of the bill for a catastrophic accident. An analysis by economists Heyes and Heyes (1998) places the value of the government insurance subsidy at $2.3 million per reactor-year, or $237 million annually. In 2008 the Congressional Budget Office estimated the value of the subsidy at only $600,000 per reactor per year, or less than one percent of the levelized cost for new nuclear capacity. All such calculations are controversial, as they rely on the difficult assessment of extrapolating what the "true" probabilities are of a catastrophic event at the extreme cost brackets. Due to the structure of the liability immunities, as the number of nuclear plants in operation is reduced, the public liability in case of an accident goes up. However going in the other direction, the Nuclear Waste Fund was/is used to transfer $750 million in fee revenues each year from utilities to the Government and this is hard currency, unlike the conceptual insurance/indemnity Act.

The Price-Anderson Act has been used as an example of corporate welfare by Ralph Nader.

Price-Anderson has been criticized by many of these groups due to a portion of the Act that indemnifies Department of Energy and private contractors from nuclear incidents even in cases of gross negligence and willful misconduct (although criminal penalties would still apply). "No other government agency provides this level of taxpayer indemnification to non-government personnel". The Energy Department counters those critics by saying that the distinction is irrelevant, since the damage to the public would be the same.

These beyond-insurance costs for worst-case scenarios are not unique to nuclear power, as hydroelectric power plants are similarly not fully insured against a catastrophic event such as the Banqiao Dam disaster, or large dam failures in general. As private insurers base dam insurance premiums on limited scenarios, major disaster insurance in this sector is likewise provided by the Government.