

COMING *of* AGE:

**Idaho Falls and the Idaho
National Engineering Laboratory**

1949-1990



Ben J. Plastino

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Ben J. Plastino, the son of Italian immigrants who were early pioneers of marker Lake, Idaho, became a newspaperman and community leader in southeastern Idaho, then returned to Idaho Falls, Idaho, to write the University of Idaho's first history, a reporter on the Legislature, a reporter on the city council, and then as reporter and city editor, and then as managing editor, and executive editor.

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by Ben J. Plastino

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Ben felt it was an obligation for every citizen to contribute to his community. He was a member of many organizations in southeastern Idaho, receiving significant awards and honors for his work. Among them were the Seventh Judicial District's Liberty Bell Award, and the Idaho Statesman's Distinguished Citizen Award.

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Coming of Age

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Coming of Age

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Ben J. Plastino

Ben J. Plastino, the son of Italian immigrants who were early pioneers of Market Lake, Idaho, made his mark on Idaho as a newspaperman and community leader for fifty years. A native of southeastern Idaho, Ben returned to Idaho Falls after graduating from the University of Idaho in 1932 in journalism and spending nine years as a reporter on the Lewiston Morning Tribune. He joined the Idaho Falls Post Register in 1942 where he remained for forty-one years, first as a reporter and city editor, and then rising to managing editor, political editor, and executive editor.

Ben relished his life as a journalist, and his devotion to that profession was evident in his four decades of coverage of the Idaho Legislature; his interviews of every United States president since Franklin Roosevelt, with the exception of Eisenhower, and of nearly all presidential and vice presidential candidates and top congressional and political leaders; and his ringside coverage of such regional events as the establishment of the INEL, the Yellowstone earthquake, and the Teton Dam failure. To commemorate his retirement, the Idaho Legislature passed a resolution honoring his fifty years of reporting.

Ben took his obligation to newspaper readers seriously, believing readers were smart and that his job was to present the news fairly and completely so his readers could make up their own minds about the important issues of the day. He felt very lucky to have the opportunity to devote his work life to something he loved. Ben maintained an abundant zest for life and an enthusiastic enjoyment of people, and felt it paramount to treat people fairly and with respect.

Ben felt it was an obligation for every citizen to contribute to his community. He was a member of many organizations in southeastern Idaho, receiving significant awards and honors for his work. Among them were the Seventh Judicial District's Liberty Bell Award, and the Idaho Statesman's Distinguished Citizen Award.

This book was his last written project. He died in May 1995, in Idaho Falls.

To Margaret

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Preface

Idaho Falls and the Idaho National Engineering Laboratory grew up together. Which one benefited the most is arguable since this truly was a symbiotic relationship. The details of this courtship and ensuing life together are chronicled by longtime Idaho Falls newspaperman Ben J. Plastino. From his perspective in 1990, he traces the creation of the INEL project and highlights the local and national personalities that charted and maintained its success from 1949 until 1990.

This task included interviews held in 1989 and 1990 of more than one hundred persons, including early NRTS arrivals, present and past members of Idaho's congressional delegation, governors and many other political leaders, Idaho Atomic Energy Commission and Department of Energy operations managers, contractor supervisors, and others who had a prime hand in the site's operation.

A person who greatly enjoyed people, Plastino focuses on the human aspects of this facility and its inseparable relationship with the progressive community of Idaho Falls. A fan of both the INEL and Idaho Falls, he pays tribute through this book to the innovation, fortitude and brilliance of those responsible for the success that began in 1949.

The story of the Idaho National Engineering Laboratory (INEL) began on August 1, 1946, when President Harry S. Truman signed the Atomic Energy Act of 1946. The purpose of this act, which became effective at midnight, December 31 of that year, was to shift the administration of atomic energy from the military sector to the civilian Atomic Energy Commission (AEC). The AEC would replace the military branches that had developed the atomic bomb, inheriting from the Manhattan Engineer District the massive research and production facilities built during World War II to secretly develop the bomb under the direction of General Leslie R. Groves and the Army Corps of Engineers. The laboratory experiments of the Italian-born scientist Enrico Fermi, and other American and European scientists had been transformed into these operating plants where the scientists constructed the world's first atomic bombs, initially dropped by the United States on Hiroshima on August 6, 1945, and again three days later on Nagasaki.

Truman appointed David E. Lilienthal, a lawyer and former head of the Tennessee Valley Authority, as the first AEC chairman. The other four commission members were Sumner T. Pike, a New England businessman; William T. Waymack, an Iowa farmer and newspaper editor; Lewis L. Strauss, a conservative banker and reserve admiral; and Robert F. Bacher, a physicist from Los Alamos and the only scientist on the commission. Carroll L. Wilson, a 36-year-old engineer who had helped organize the National Defense Research Committee during World War II, had been appointed general manager by Truman just eight days previously.

Two floors of the new War Department Building in Washington, D.C. provided the commission's first temporary home. A few months later, the commission found more permanent headquarters in the former wartime offices of the Joint Chiefs of Staff at 19th and Constitution, N.W.

The new board held its first meeting on a dismal Thursday afternoon January 2, 1947, in the cramped and drab office on the sixth floor of the new War Department Building. With Lilienthal presiding, the session was confined to an aging graduate school dean, Richard C. Tolman, of the California Institute of Technology; and a young Army officer, Colonel Kenneth E. Fields. They explained the intricacies of releasing wartime technical data without endangering national security. One of the first steps was to transfer a sprawling complex of men and equipment from Army to AEC

control. This included 37 installations in 19 states and Canada. It involved the shifting of 254 military officers, 1,688 enlisted men, 3,950 government workers and about 37,000 contractor employees. The entire project, representing a wartime investment of more than \$2.2 billion, would cost an additional \$300 million during the current fiscal year.

Lawrence R. Hafstad, with a long history as a physicist and director of research, was appointed by the new commission January 12, 1949, as director of reactor development. Hafstad's first assignment from Lilienthal was to examine the plans for a reactor testing station. Originally some 70 sites throughout the nation had been surveyed and studied but the final selection was trimmed to Fort Peck, Montana, and the Lost River Desert of east Idaho. To help in the final choice between Idaho and Montana, Roger Warner, AEC director of engineering, hired the architectural and engineering firm of Smith, Hinchman and Grylls, of Detroit, Michigan, to make a survey. This firm in February 1949 issued an opinion favoring the so-called "Pocatello site", and said a formal report containing more data would follow.

The Idaho location was originally identified by the Detroit firm as the "Pocatello site," mainly because it was the largest city then near the area. Locally it became more familiarly known as the Lost River site for the name applied to the vast sagebrush desert with a river and adjoining mountain range of the same name. Others called it the "Arco desert" after the name of the town closest to the installation.

Previously, the most promising location seemed to be Fort Peck, and Secretary of the Interior Julius A. Krug saw no objection providing the reservoir and adjacent creek would not be contaminated. Senator Brien McMahon, D-Connecticut, new chairman of the Joint Committee on Atomic Energy, and the entire Montana congressional delegation deplored the Idaho location. Dr. Walter H. Zinn, the new director of Argonne National Laboratory (ANL), and Canadian-born, was dissatisfied and originally wanted the site near Chicago, or a location closer to Los Alamos, New Mexico, to correlate better with the reactor testing.

Dr. Edward Teller, who chaired the Reactor Safeguards Committee, said later in an Idaho Falls Post Register interview that he disagreed with Zinn's preference for a location near Chicago, and that it should not be situated closer than five miles from a populated area. Dr. Teller had been a physicist with the Manhattan Engineer District during World War II which had developed the atomic bomb. In 1990 and at age 81, he was active in his Stanford, California, base at the Hoover Institute.

The survey report by the Detroit engineering firm, signed by H. W. Grubb, and sent to Warner, concluded the Idaho location was superior to Fort Peck in every way except for the isolation, but even that was strongly acceptable. The survey noted that much of the area included the Naval Proving Grounds and adjacent sagebrush areas of U.S. Bureau of Land Management land could be transferred to the AEC and not cost the federal government. The extensive study of more than 200 pages, replete with many maps and diagrams, said the Lost River location was superior to Fort Peck in climate, geology, available manpower, land, materials for construction, transportation and local economy. It also affirmed that fuel, electric power, water and construction costs would be less.

The report concluded that the Fort Peck construction cost would amount to \$50 million more and operating costs \$4 million more annually than the Idaho site. "There would be less economic disturbance at the Pocatello site," said the report. It observed that the Idaho site would provide homes, recreational and shopping facilities in a much simpler fashion than Fort Peck.

The report listed population and other demographic figures of surrounding cities but, strangely, largely omitted Idaho Falls. In east Idaho, it did include Pocatello, Rexburg, St. Anthony, and Driggs. The puzzling apparent oversight of Idaho Falls is heightened by the fact Idaho Falls was later selected as the headquarters city.

Accurately enough, the report predicted that the underground water table was adequate at a time when the capabilities of the Snake River aquifer were largely one of conjecture. As an alternative, the report added that if underground water was not adequate a 36-inch pipeline could be constructed from near Idaho Falls to pump water from the Snake River 41 miles west to what is now the Central Facilities. It placed the cost at \$20,417,000 for the pipeline, plus \$41,700 annual power costs and \$1,030,000 for a filter plant.

The report also mentioned that another site south of the Blackfoot-Arco highway, State Highway 26, was a possibility. However, it recommended the Lost River location further east because of superiority in all geological factors.

The Montana congressional delegation fought the Idaho selection briefly but AEC officials agreed the Lost River site was never seriously threatened.

An official history of the AEC listed March 1, 1949, as the date of the first announcement by the AEC of selection of the National Reactor Testing Station (NRTS) in Idaho. But if that was the case there was an unexplained delay because the announcement was not received for nationwide

publication until three weeks later, March 23. An account of the activities was listed by Richard G. Hewlett, AEC historian, in collaboration with other authors, in three volumes of the History of the United States Atomic Energy Commission. He joined with Oscar E. Anderson, Jr. in The New World, Volume 1, covering the period 1939-1946; with Francis Duncan in Atomic Shield, Volume 2, for the period 1947-1952; and with Jack M. Holl, Atoms for Peace and War, Volume 3, for the period 1953-1961.

Another press release followed on April 4 with the announcement that Leonard E. "Bill" Johnston, manager of the Schenectady, New York, office, would be the new Idaho AEC manager. The AEC also announced it had to acquire about 400,000 acres, of which nearly half, or 173,000 acres, was still held by the Navy for its gunnery range. Also on April 4, the Idaho Office of the Atomic Energy Commission was formed to assist in the acquisition of the site for the reactor testing station and, by contract or direct AEC operation, to provide for the design, construction and operation of reactors, facilities and services as needed. It was also authorized to manage the NRTS and, in this connection, administer contracts for development and operation of reactors assigned by the director of reactor development and such other facilities as needed.

Construction of several development facilities was authorized, including a high-flux material testing reactor (MTR), an experimental fast breeder reactor (EBR-I), and a prototype pressured water reactor (STR), the latter for submarine propulsion. The AEC decided all three of these first facilities would be located at the NRTS.

The Post Register announced May 5 that Johnston would soon establish his headquarters at the Rogers Hotel; while on May 14 the first contract award went to A. J. Schoonover and Sons, Burley, for drilling of the first EBR-I well. On June 1, the Idaho Operations Office was officially established in Idaho Falls with the first cadre of about a dozen administrative and security personnel temporarily occupying the second floor of the City Building for a couple of months.

After Johnston had set up his own office at the Rogers Hotel in June 1949, he immediately swung into action when he authorized drilling wells and started work on access roads. On June 15, the AEC staff established temporary headquarters in the new annex of the Rogers Hotel; on August 12, the first water was produced from the EBR-I well; on August 24, 1949, Public Law 266 authorized the National Reactor Testing Station and money was appropriated; on October 24, additional offices were rented and occupied at the Jennie Rogers Building. On November 2, the first excavation occurred

for EBR-I even before Dr. Walter Zinn had selected Bechtel Corporation as construction contractor for the breeder reactor, and the first reactor complex was started at the NRTS; and on January 31, 1950, the first concrete was poured for EBR-I, which would produce electricity by nuclear fission on December 20, 1951.

Milestones concerning acquisition of the "site"—which became the colloquial name for the NRTS— included December 1, 1949, when the AEC took custody of the Naval Proving Grounds; April 1950, when Public Land Order 637 withdrew 240,000 acres of public lands, reserving them for use by the AEC; and May 19, 1959, when title to the Naval Proving Grounds Lands was transferred to the AEC. While the 173,000 acre Arco Naval Proving Grounds was part of the approximately 400,000 acres originally required for the station, it eventually grew to the present 572,000 acres.

The AEC reported in its board proceedings from 1949-51 that the EBR-I completion by Bechtel Corp., San Francisco, was slated for 1951 with an estimated cost of \$3.3 million; that Fluor Corp., Los Angeles, would be the contractor for the MTR for \$18 million; that F. H. McGraw Co., Hartford, Connecticut, and M. J. Brock and Sons, Los Angeles, major contractors, and Rust Engineering Co., Pittsburgh, subcontractor for Westinghouse Electric, would handle the Submarine Thermal Reactor costing \$25 million; and that Foster Wheeler Corp., New York City, would design the Idaho Chemical Processing Plant (ICPP) to cost \$18 million. But east Idaho's harshest winter on record stopped construction for several months in 1949-1950.

Bechtel turned to construction of the Idaho Chemical Processing Plant. Originally intended for processing fuel elements from the MTR, the plant would now be employed to process uranium 235 fuel slugs used in the Hanford, Washington, reactors to produce tritium. The need to recover the relatively large inventories of uranium 235 for weapons made construction of the ICPP the first order of business.

Dr. Richard L. Doan, formerly at the Metallurgical Laboratory, headed Philips Petroleum Company, headquartered at Bartlesville, Oklahoma, as the first prime operating contractor at the Idaho site January 1, 1951. Meyer Novick was the first of the Argonne staff to arrive in Idaho Falls, also in January 1951. Harold V. Lichtenberger and seven others of Argonne joined him in March. At Argonne, 70 scientists and technicians were directly involved in research on the Submarine Thermal Reactor. Many others, including half the metallurgy division, were performing research related to the Navy project. Design of the Materials Testing Reactor, which would contribute directly to the naval and aircraft propulsion projects, still

took most of the time of 20 members of the Argonne staff. Others investigated possibilities of modifying the design of the MTR.

The submarine reactor was the center of labor efforts in early 1950. The newly formed Naval Reactor Branch, under Harold Etherington's direction, had spent most of the preceding six months preparing a reference design for the submarine propulsion plant. A March 1, 1950, report established the general specifications which Argonne and Westinghouse Electric Corp. would follow in designing and developing components for the Mark-I reactor, a land-based prototype to be built at the Idaho test station, and Mark-II, the first plant to be installed in a submarine. Months of study had confirmed the tentative decision that the reactors would use pressurized water as both moderator and coolant. Navy Admiral Hyman G. Rickover and Johnston clashed frequently over plans for the building of the Mark-I plant. Rickover wanted Westinghouse responsible for the operation and Electric Boat for construction. Johnston did not fully agree.

Lawrence Hafstad, who had announced Bill Johnston's appointment in a news release April 4, 1949, emphasized that the commission did not plan to construct a community for operating personnel at the station. This was a wide departure from the government housing at the Oak Ridge, Richland, Los Alamos, and Savannah River installations. He said the AEC expected operating personnel to be absorbed by surrounding communities, and indeed they were. He said growth of the Idaho station, unlike Hanford and other wartime single-purpose production centers, would be gradual, that the rate of construction and employment would depend on the progress made in scientific and technical research and development then underway or yet to be initiated in the nuclear reactor field.

Reactor problems the commission would attempt to solve, said Dr. Hafstad, included the development of special structural materials and operating components capable of withstanding extremely high temperatures and radiation, development and refinement of engineering techniques utilizing those materials, and development of new chemical separation processes.

When J. Bion Philipson, an advisor to President Franklin D. Roosevelt, was sent to what appeared a bleak Idaho in the 1940s to look at a location for a sprawling atomic installation, he thought it would be only a few weeks stay, maybe a few months at the most. He was wrong. He retired to live at Boise but spent some 21 years in Idaho Falls.

Fresh as a physicist graduate from Iowa State University, he entered government service in 1934. He was surprised to be called by President

Roosevelt to work with a small group of six advisors and given the task for six weeks, as described by young Philipson, to find out "what are the problems of this country and how to tackle them." It was an awesome job and Philipson recalled only four survived, with two dropping out "because they couldn't take it."

"I wrote my ideas," he said in an interview at his Boise home in 1990. "Anybody who worked for two-bits an hour as I did knew what was the matter. Roosevelt had no understanding of what people did for a living. One of the things that came out of our study was to use atomic power for cheap power for civilian use." The upshot was that Philipson was delegated to pick an isolated spot to work specifically "for developing atomic power for peaceful use."

When it was learned the government was planning such a project, several states clamored for the site, Philipson recalled. "I was to pick the site and the headquarters city," Philipson said with a glint in his eye. "There were only two places seriously considered — the Lost River Desert of east Idaho and Fort Peck in northern Montana." Of the two, Philipson said he strongly decided on Idaho because it had the isolation needed at that time, a huge aquifer for an adequate water supply and enough cities fairly close to provide the housing needed for the people to work on the project. The Montana site, Philipson decided, "was too far away from civilization. We wanted an isolated place because if anything went wrong not many people would be hurt, maybe only those at work. Of course, we know now that we didn't need all that room."

Philipson hired an airplane and pilot to view the sites from the air to help make the selection. "It was then that I showed up on the Idaho site," he said. "I was at Pocatello at the time. The location on the desert had been used by the Navy for target practice. I found out a national reactor testing station would be perfect. There was only one farmer owning land we wanted. All the other was public land owned by the state or federal governments." Philipson said after much dickering the farmer was paid \$10 per acre for land that was developed and \$1 per acre for undeveloped land. About 100 acres were acquired.

Then came the task of picking the headquarters city. Idaho Falls, Pocatello, Blackfoot and Arco competed. Philipson said Blackfoot and Arco were far too small and were never seriously considered, even though they were closer to the site. Philipson said he decided on Idaho Falls because, in his own words, "it was a nicer town in which to live." Pocatello, he decided, was too far away. "I felt Idaho Falls could do the better job in providing

housing and utility services," he said. "The first thing we did was to make plans to build a road from Idaho Falls to the site and this we did." The state cooperated by providing the rights-of-way for the new road leading from Idaho Falls 41 miles west to the NRTS headquarters. The federal and state government approved the necessary money for highway construction.

Philipson supervised drilling of the first well. When a huge stream of water spewed up, he remarked, "That's the wettest desert I've ever seen."

Philipson talked with city officials, headed by Mayor Tom Sutton and later Mayor E. W. Fanning, the Bonneville County commissioners led by Chairman Chet G. Taylor and later Harold West, and many state officials. These included Governor C. A. Robbins and then Attorney General Robert E. Smylie, who later became governor in 1955-67, inclusive.

"I thought I would go back to Washington right after that, but didn't," said Philipson, "so I called my wife, Doris, in Washington and asked her how she would like to live in Idaho. She replied, 'Idaho, where is that?' I said it was just like Cheyenne with which she was somewhat familiar. She then sold the house and furniture and came."

As program coordinator starting in May 1949, Philipson recalled he developed the overall functional program for operations. He furthered the policies and carried out a program of housing, transportation and community integration which made it possible for the AEC to establish its first major field operation without becoming involved in government housing. He said, "The savings to the commission of no government housing amounted to millions of dollars and the benefits in community relations and personnel morale were incalculable."

In April 1951, he became assistant manager for operations where he advised and assisted the manager in management of the reactor and chemical processing operations at the NRTS. In this connection, he developed programs and organizations necessary to guard the health and insure radiation protection of employees of the AEC and its contractors, and also of the nearby public.

In November 1953, Philipson was reassigned as the director, operations division, supervising the MTR and ICPP. The units, he said, "established enviable records throughout the commission for reliable, effective and economical operations. Unique new chemical processing systems were developed which were capable of handling large volume though at extreme cost savings and some of which used new types of reactor fuels and materials not heretofore processed in any recovery plant." Under his cognizance, the world's largest and most powerful test reactor, the Engineering Test

Reactor (ETR), also was developed.

Philipson stayed in Idaho Falls from 1949 until 1960, leaving to work for Aerojet at Sacramento, California. He came back to Idaho Falls as president of Idaho Nuclear Co. He lived in retirement in Boise near three of his children. Another, Jim, was pastor at St. Paul's Methodist Church in Idaho Falls for several years. Philipson died in Boise in 1994.

The files of the Post Register the first half of 1949 generally portray the opening actions for establishing the National Reactor Testing Station. Actually, the first story hinting the Lost River Desert would be the site for the U.S. Atomic Energy Commission's new western reactor station broke on March 22, 1949. The news item quoted a group of Montanans who said they had been told by David Lilienthal, the AEC chairman, that "the new western atomic plant will be built near Pocatello, Idaho." Montana's congressional delegation and Governor John W. Bonner immediately called and urged Lilienthal and President Truman to locate the site near Fort Peck. A black-faced bulletin from the Associated Press preceding the main story quoted the AEC as saying that it planned "to locate a new western plant at Arco, near Pocatello." It added the proposed site would include 173,000 acres of the Naval Proving Grounds on the Snake River Plains of Idaho." The commission added negotiations were underway with the Navy to obtain the grounds. The bulletin stated "the total area for the new plant, which may cost \$300 million, will be about 400,000 acres. All but approximately 20,000 acres of the area are government owned."

Then on March 23 followed the widely-publicized announcement that "the AEC plans to take over 400,000 acres west of Idaho Falls for a \$500 million atomic energy reactor testing station." The story went on to say surveys were being made to determine the needs for housing, schools, and other community facilities for personnel of the station. The AEC predicted 6,000 would be employed at peak construction, and when completed the operating personnel would reach 2,000.

Other stories that day expressed the thrill of Arco residents closest to the site; another of plans for building a new road directly from Idaho Falls to Arco; and another describing the government-owned wasteland east of Arco as a suitable location. A story quoted Joe Call, Idaho Falls hatchery owner and president of the Idaho Falls Chamber of Commerce, calling a meeting of civic leaders that night to discuss the impact of the surprise new development.

Other stories followed in rapid order. On March 24 was a report of a

mass meeting the preceding night in which leaders stressed the need to plan a paved road from Idaho Falls to the Arco desert and to promote the Idaho Falls community in the development of the new atomic plant. Call announced the Chamber's board of directors had approved a special atomic committee made up of Ralph Albaugh, K.D. Rose, E.F. McDermott, Don Kugler, Worth D. Wright, J. Earl Evans, David M. Sweeney, Forde L. Johnson, William S. Holden, Delbert V. Groberg, Ken P. Slusser, B.L. Harris, George W. Watkins, Sterling W. Jensen, Aden Hyde and Call. Later named as chairman was E.F. McDermott, pioneer publisher of the Idaho Falls Post Register; with Rose, president of Rogers Brothers Seed Co., as treasurer; and Cy Davis, Chamber secretary-manager, as secretary. The Idaho Falls Chamber of Commerce also took the lead in fundraising, with each past and current president and other prominent individuals and businesses contributing about \$100 each in behalf of the enterprise to name Idaho Falls as headquarters. The Chamber chipped in another \$1,200 in matching funds, bringing the total to about \$2,400 raised in this fashion. Most city, INEL, state and other leaders shake their heads in disbelief when they look back and realize what a comparatively small amount was spent to bring the mammoth installation and headquarters to Idaho Falls.

The leaders in the movement were William S. Holden, pioneer attorney, who led delegations to Washington to speak to AEC officials; McDermott; Call; and Mayor Tom Sutton, but there were many others. "This is a great opportunity for Idaho Falls," said Holden. "The influx into our city of the nation's top scientists and technicians will contribute much to the cultural and social advancement of our city."

A story on March 29 said an executive committee made up of McDermott, Rose, Harris, Holden, Johnson and Slusser would spearhead the activities for the city's cooperation with the atomic site. The committee would meet weekly. Another story said the Bonneville County leaders headed by Chairman Taylor, Thomas Weeks and J. W. Kintner of the county commission would heartily back proposals to pave the road to the site, known commonly then as the Twin Buttes Road. On April 1 appeared a story of the Greater Idaho Falls Chamber of Commerce naming six special committees to help plan for the coming of the reactor project.

A feature story April 3 highlighted the end of Arco's "desert solitude" with the coming of the atomic project. Arco had named a special committee made up of Frank Monson, chairman of the village board, Dick Boyer, Dr. I. R. Egbert, Oscar Hiller and Roy Kuhn to cope with the new development. Arco leaders were basking in the limelight nationally as the village's

name was more often mentioned in connection with the new project, not Pocatello, and certainly not Idaho Falls.

On April 7, a story reported leaders of Arco, Idaho Falls, Pocatello and Blackfoot, in a meeting in Idaho Falls the preceding evening, would plan joint cooperative efforts towards resolving problems expected to be brought about by the proposed project. At that time, the mayor of Arco, C. A. Bottolfsen, a former governor, also tried to interest the AEC to establish its Idaho headquarters there. This cooperation, however, was short-lived after Idaho Falls was named the headquarters city.

A story on April 11 quoted Roger Warner, AEC director of engineering, as saying the plans would be slow and orderly with nearby cities likely to absorb most of the plant employees. An Associated Press story datelined Washington, April 12, told of Holden and Sutton meeting with Leonard E. "Bill" Johnston at the nation's capital. Holden was quoted in an AP story from Washington as saying, "We went over every phase of possible cooperation activity: housing, schools, hospital facilities, office space and the like." Sutton said Johnston was "very pleased and very patient" in going over plans for the undertaking as far as they have been developed.

Another front page story April 13 told how the Greater Idaho Falls community was making plans for a prospective industrial expansion. On April 19, a banner-headline story told of Johnston meeting with Governor C. A. Robbins at Boise, telling him the administrative headquarters had not yet been picked. A story April 22 reported a special committee made up of McDermott, Slusser and Davis said they had a delightful and harmonious meeting with Johnston and Robbins at Boise. Holden and Sutton also met with Johnston and Robbins at Boise along with Warner while en route from Washington.

Then the following day a news story reported an AEC delegation made up of Johnston, Warner, and Philipson toured Idaho Falls, Arco and Blackfoot to talk about the three cities' roles in the coming project. The April 24 edition carried a picture and story of Johnston and his party being greeted in Idaho Falls with a 21-gun salute.

Most of the front page of the Post Register on May 18 was devoted to the atomic project when it was announced by the AEC that Idaho Falls would be the headquarters city. A jubilant Sutton, Holden and McDermott were pictured clasping hands in joy over the selection. Johnston announced the selection was made on the basis of proximity, combined with availability of housing, educational and hospital facilities for AEC personnel. Other stories gave selection sidelights and told of accelerated plans for completing

the road from Idaho Falls to the site.

When the AEC announced that Idaho Falls would become the headquarters city, it brought a euphoria of jubilation for the vast majority of local residents. An editorial written by McDermott in the Post Register a day after the announcement pointed out correctly that the city was on the "threshold of a great opportunity," but added, "we must provide the leadership that will carry east Idaho and Idaho Falls to its destined place in the economic sun ... there is little doubt that the huge installation will be the forerunner of the greatest development Idaho has yet seen. It will bring thousands of people within the borders of the state, and may set the stage for a great industrial upsurge.

"The coming of this half billion dollar enterprise presents a virile challenge to the leadership of this whole section of the state, and particularly Idaho Falls, to rise to its full stature, and prepare now to fit its economy into the changing conditions that are bound to come with the establishment of this nuclear reactor test station to this area.

"The second impact of the plant may prove of greater significance than the first. This is not a war installation. Instead it is a plant where experiments will be centered to harness atomic power for use in every day life."

A story from Dick Georgi, AEC chief of the security division, asked for 100 applications from war veterans for security guards.

The May 19 edition of the Post Register carried a front page editorial by McDermott stressing the city's responsibilities and the need to cope with new growth. A follow-up editorial Sunday, May 22, took a more somber note. "Now that we have the headquarters of this mammoth project located here, we are confronted with the greatest civic project that we have undertaken. There's a real job of planning ahead."

Other stories appearing included those of: May 20, concerning plans to locate the new headquarters at the Rogers Hotel Annex; June 1, formation of a Greater Idaho Falls corporation to bring early construction of 50 new rental units and a prediction by Johnston while in the city that the reactor project would have a working family of 200 by the end of the year; and June 8, a charge by a taxicab driver to the Senate Appropriations Committee that an engineer investigating the Fort Peck site didn't go anywhere near the site. However, AEC officials responded the Idaho site selection was based largely on the survey report by a Detroit firm. Call predicted in a newspaper story June 15, 1949, that the site eventually would employ as many as 6,000.

In 1952, the three-story headquarters building erected by Robert Johnson Associates of Portland, Oregon, at Second and Holmes Streets in

Idaho Falls was completed and the AEC headquarters staff occupied it. (This facility was replaced by a new Department of Energy [DOE] building northeast of Freeman Park at 785 DOE Place, August 9, 1985.)

Arco, the closest town to the site with a population of 780 in 1949, initially had prepared for a boom. Property values doubled and tripled. A Post Register feature story April 3, 1949, predicted the town's solitude would end. But the boom never came to Arco. Its population in 1988 was listed at 1,164, a drop from 1980 of 1,241. The boom followed the headquarters to Idaho Falls which zoomed from 19,000 to 50,000 in 1990.

Chet Taylor, Bonneville County commissioner, who had plugged for a road directly west to Arco, said then, "It shows more than ever that we weren't shooting in the dark when we started work on the road west of here toward Arco more than two years ago."

Some did not welcome the move, even 40 years later. Lynn Crandall, the district watermaster who later lost a bid to be elected a city councilman, expressed fear the installation might be subject to an air attack. "All in all," he said then, "I think Idaho Falls is a more desirable place to live in now than it will be when the atomic energy plant is built."

Highly important to AEC employees working at the site was the completion of what then was called the Twin Buttes Road, now known as Highway 20, for 41 miles between Idaho Falls and Central Facilities, and its connection with Highway 26 to the west. It was dedicated October 8, 1951, near its intersection with Highway 26. Among those participating were Joe Call, Idaho Falls Chamber of Commerce president, as master of ceremonies; Johnston; W. Fisher Ellsworth, Idaho Falls, auto firm owner and new member of the State Highway Board, who cut the ribbon; Roscoe Rich, Burley, State Highway Board chairman; Lt. Governor Edson H. Deal, representing Governor Len B. Jordan; and State Senator O. J. Buxton, Driggs.

One of the humorous aspects of this ceremony was the unscheduled appearance of a Butte County cattle truck. The astonished driver saw the paved road ahead and rumbled past as dignitaries watched with mouths agape.

Johnston had been a successful high school coach when he came to Idaho Falls. After serving at the start of World War II in 1941 he went into business for himself, buying the Idaho-Idaho Hatchery in Hinesburg and Capital where the First National Bank is located, and then sold it in 1970 when he left for California to engage in a highly successful real estate business.

Local business leaders were not the only ones to be optimistic about the economic impact within the region the atomic energy project would have. They were sure the Arco area would benefit and that the headquarters would be located in one of the larger neighboring cities and that all employees would be based to and

When the AEC announced it was considering east Idaho for its western reactor testing station, the Idaho Falls Chamber of Commerce immediately swung into action. Joe Call, then the Chamber president and later a resident of Sonoma, California, recalled those hectic days when the entire business community banded together to persuade the AEC to name Idaho Falls as headquarters. "We all agreed the Chamber should carry the ball, rather than an independent group," said Call. "So I called a meeting of the board and a motion by Marshall Keyes was passed to that effect." W. W. Christensen, the veteran superintendent of the Idaho Falls School District, was in the forefront for Chamber action, said Call.

In the frenzied activity that followed, all of the past Chamber presidents were named to a special committee to spearhead the movement. Much of the money raised, \$2,400, was used to send William S. Holden to Washington, and to contact Idaho's congressional delegation and Atomic Energy Commission officials. "I guess you might say we wined and dined the AEC officials," said Call. A number of AEC leaders came to Idaho Falls for meetings, dinners, and socials. They were shown city facilities such as the Pinecrest Golf Course, parks, and schools. "We had a lot of activities in this connection," said Call. "Of course, it was a beehive of action after Idaho Falls was named the headquarters city. The Chamber, business community, and city officials threw their full support to the projects. We knew at that time it would help our city and it is no surprise to me to know that Idaho Falls has passed Pocatello as the second largest city in the state. Many of us predicted that at the time," he said. Call recalled the city unleashed its efforts to provide fast zoning for the housing boom. Obstacles were hurdled by the city, county, state, and federal government to accommodate the influx of workers and to build the new road between Idaho Falls and the NRTS.

Call had been a successful high school coach when he came to Idaho Falls in 1928, but at the start of World War II in 1941 he went into business. He established the Utah-Idaho Hatchery at Broadway and Capital where the present Valley Bank is located, and then sold it in 1979 when he left for California to engage in a highly successful real estate business.

"The announcement was to the effect the atomic energy project would be located in the Arco area and that the headquarters would be located in one of the larger neighboring cities and that all employees would be bused to and

from nearby communities," recalled Call. He said a meeting was called of leaders and it was unanimous that the Chamber should make it the number one goal for 1949. "It was a solid community support for the project," said Call. "The road to Arco was a stumbling block. With the city and county united, we were able to provide the pressure to the State Highway Commission to approve Highway 20 that made possible the headquarters for Idaho Falls. It was a real struggle at the time but a great boost for Idaho Falls. The committee did a great job and Holden deserves much credit for its success."

Call said Bonneville County commissioners had a crew and equipment to plow out the road west of the city. A group took Johnston to see the road, and he remarked "the road would look beautiful." "It was then I knew they had decided Idaho Falls was to be the headquarters city," Holden was heard to say.

Call's business neighbor was Glen W. Royce, who operated a bakery and succeeded Call as Chamber president in 1950. L. L. Branthover, a potato executive was vice president to Call and became president in 1951, followed by Ray Groth, oil dealer, in 1952. All were active in supporting the AEC project. Other Chamber presidents in the '50s also lending their avid support to the NRTS were Bill Kyle in 1953; Marshall Keyes in 1954; Ray Lundahl in 1955; Karl Page in 1956; Alex Creek in 1957; Vince Mullin in 1958; Jack S. Gamble in 1959; and Ruland E. Williams in 1960.

Idaho Falls was the beneficiary when William Holden was picked by the community in early 1949 to lead the effort to persuade federal leaders to choose Idaho for its proposed national reactor testing station and Idaho Falls for the headquarters city. He had been president of the Idaho Falls Chamber of Commerce in 1942, and held a wide range of positions on the national, state, and local level, particularly on legal and water issues. He ran second to U.S. Senator Herman Welker in 1956 in a five-way Republican primary race. His main activities centered on water matters, and, besides his AEC efforts, he also helped bring about Palisades Dam. He died of cancer May 20, 1988, at age 81.

His thrust for the NRTS included many conferences with government leaders at the nation's capital, as well as hosting meetings locally with AEC leaders. In reminiscences shortly before his death, he recalled key battles that were fought in the U.S. Senate to designate Idaho over Montana as the nuclear research site. Then came fierce struggles against Pocatello, Blackfoot, and Arco. Pocatello was the chief contender to Idaho Falls, mainly because it had the U.S. Naval Ordnance Plant which relined battleship guns.

His wife, Ida Holden, recalled that in April 1949 she was asked by

her husband, who was en route home from Washington, to set up a social at their colonial-style home at 291 S. Ridge Avenue in Idaho Falls to entertain a half dozen AEC executives who were accompanying him from the nation's capital. That group included Johnston, Philipson, and Dick Georgi, AEC security director, and others. Wives of several leading Idaho Falls businessmen attended the party which lasted much of the afternoon. "They had a glorious time," recalled the bubbly Mrs. Holden. "They later in the day went to Pocatello for a meeting with Pocatello leaders. We were told it was attended only by a few men and it was a rather stiff affair."

Delbert V. Groberg was in the middle of the activities that followed the NRTS selection. He established the real estate company bearing his name in 1929, and remained its owner-manager ever since. He also was one of the leading home developers in those early years. "The AEC said at that time we couldn't build homes fast enough to supply the needs," recalled Groberg. "Actually, most of our duplex apartments went vacant for nearly a year before Westinghouse came."

Almost as if anticipating the coming of the AEC, Groberg said he helped develop 160 acres east of Holmes Avenue in the early 1940s. He said he did this with the knowledge the new Idaho Falls High School and adjacent city-owned Civic Auditorium would be built on Holmes. "Real estate experts told us that when a new high school was built it would be a wise investment to build within a short radius," said Groberg. It was Stanley Crowley, a pioneer accountant and school board member, who had devised the idea of building the city-owned Civic Auditorium adjoining the new high school.

Groberg said Earl Hockett, who was the Chamber secretary in the mid-'40s, first heard the rumors that the federal government was thinking of using "wasteland in east Idaho for chemical and scientific uses." He said there was an idea for using some material "that would produce more than it used," not knowing about atomic energy. "We figured the government could use this wasteland and that Idaho Falls would be a good community in which to live," said Groberg.

Groberg had served as the Chamber president in 1943 and was one of 16 to make up the special committee to promote the nuclear project and designate Idaho Falls as the headquarters city. Groberg went on to become one of the city's leading building developers. He built 35 homes in Linden Park Addition along Linden, Holbrook, Lincoln and Syringa. Later came 100 units of duplexes in the same area. Housing later spread to Henderson, Edgemont Gardens, and Woodruff Park. He also built 150 condominiums,

including Three Fountains. This was followed by 100 homes at Southwick Addition in Ammon.

Groberg said in the mid-'40s he and Bonneville County commissioners headed by Lyle Anderson, Ammon farmer, rode in a truck with a blade in front to see the so-called "wasteland" west of the city. A rough dirt road went only a half dozen miles west of the city at that time, and beyond that was just a vast expanse of sagebrush. "We rode over the bumpy sagebrush to what was then known as Midway," said Groberg. "We saw some building that had been used as headquarters for the naval gunnery range. We even found a lost sheep and Mr. Anderson put it in the truck and brought it back to his ranch. I guess that was the first maiden trip for that paved road now leading to the site. I believe the new road roughly follows the route we took years before."

Born in Idaho Falls at 599 H Street, February 14, 1906, Groberg was the only survivor of the past Chamber presidents before 1949 who lived in Idaho Falls in 1990.

"The city of Idaho Falls went full force trying to get the AEC to establish its headquarters here for the new reactor testing station," said Donald R. Foote, who served as city councilman 14 years from 1951-1965. Foote was the last survivor of elected city officials in those two years following the coming of the NRTS. "We promised the atomic energy people we would expand our recreational facilities, such as the golf course, and parks, and schools," said Foote. "At that time we had started building the new Civic Auditorium connected with the new Idaho Falls High School. Many people objected to building the auditorium and high school on Holmes Avenue because it was too far east. Holmes was the eastern boundary of the city and there were few homes east of there at the time."

He recalled Idaho Falls was in 1949 a sleepy western town of some 19,000. It rocketed to more than double that in the next decade. It was then the fastest growing city in the state and one of the fastest in the nation. Even now some old-timers regret the transformation. "We sold Idaho Falls," recalled Foote. "It was decided on its merits, not politics. It proved to be the right choice."

Foote was elected the new councilman in 1951, along with Councilman Russell A. Freeman, and Mayor E. W. Fanning, who reversed an election defeat by Tom Sutton two years earlier. The holdover councilmen were John Rogers and Vernon Johnson. "Our city electrical system then provided all of our power," said Foote. "But, we soon had to buy power from private utilities to meet the demands. We were lenient in our zoning and building

specifications to provide housing and other city facilities in a hurry," said Foote. "We tried to accommodate the AEC in every way and I believe we did."

The AEC, records showed, had 25 employees in Idaho Falls by the end of 1949. This surged to 218 in 1950, 2,924 in 1951, 5,450 in 1958, and 10,962 in 1990.

The city fathers received a letter from Bill Johnston May 5, 1951, expressing concern that the city should take no action to deprive the AEC of adequate housing which was necessary for site personnel. This was to urge the timely development of housing at the Bel Aire addition. Johnston pointed out the Housing and Home Finance Agency and the National Production Authority had declared the area as a critical defense area for the NRTS. It called for production of 250 housing units each for sale and for rent, primarily in the moderate price range. Foote said the housing needs were met.

The first low-cost housing was at Bel Aire Addition on the northeast side where many of the early AEC workers lived for a time. It was affordable and convenient housing for them at the time, Foote said. Then other so-called low-cost and moderate housing came, such as Columbia Heights on the southeast, Willowbrook, Hillcrest and Rappleye on the north, and Temple View on the west. Later came better-built homes at Homer and other additions on the east and west. Most workers for the AEC and its contractors at that time were not paid exorbitant wages, many getting about \$400 monthly. Even the modest Bel Aire housing looked good when compared to the bleak government housing of other AEC installations, such as Hanford and Oak Ridge. New city wells, streets, sewer and water pipelines and electric lines were installed almost overnight. Then followed in a few years the new grade and junior high school and expansion of the airport and improvements of arterial streets.

Foote, who had a street named after him near the airport, died May 19, 1991.

The City of Idaho Falls was in the throes of meeting the expanding needs of the Atomic Energy Commission when George C. Petersen, Jr. was elected city councilman in 1951. Petersen, now a senior partner in an Idaho Falls law firm made up of five attorneys, was a member of the City Council for two four-year terms. "Those were all good people that we dealt with," Petersen said in referring to the Idaho AEC leaders. "They were good at public relations, top of the line. They didn't ask for anything that wasn't fair."

At that time, Fanning was the mayor and the councilmen were, be-

sides Petersen, Freeman, Foote, and Rogers. When Fanning died in office a year later, Rogers was elevated to mayor and Vernon S. Johnson, Realtor, filled the council vacancy. At that time, there were only four councilmen compared to the six at present. Petersen said the council was busy rezoning various sections of the city to accommodate the increasing influx of AEC workers. Low-cost housing was in full swing. Among those early developers were A. W. (Bill) Brunt, Dave Sweeney, and Groberg. Also drawing the attention of the city was expansion of the airport, enlarging and adding parks and many of the city utilities, such as sewer, water, and electric.

The councilmen, Petersen recalled in 1990, were paid \$50 a month and worked about as hard as the councilmen of today who earn about \$6,000 a year. He said the city operated on only 23 mills, probably one of the lowest in Idaho, and perhaps in the nation. "We didn't have much tax money coming in but we did the best we could to meet the demands," said Petersen. "Many of us worked many hours overtime, night and day, but I believe we met the responsibilities."

Petersen recalled the mayor and city councilmen meeting on several occasions with such AEC leaders as Bill Johnston; Wes Funk, assistant manager; and J. Bion Philipson. Among the busiest city officials were Claud R. Black, engineer, planning street expansions; and Lloyd Stalker, architect, who designed the expansion of the airport terminal.

Present Idaho Falls Mayor Tom Campbell was only a junior high school student when the AEC came in 1949, but he remembered it created much excitement. "From all I could hear, it was all positive," said Campbell. "Nothing has happened since to change my mind. I remember my dad and mother were very excited about the nuclear power. They believed then it would solve our power problems."

Campbell said in his 12 years as mayor, and in the start of a new four-year term in 1990, he found INEL workers a pleasure to work with. This was especially true for those on the executive level. "The INEL," he said, "has been a driving force of our economy in this area. It has had a direct bearing." He pointed out that of some 11,000 INEL workers in 1990, about 70 percent lived in the Idaho Falls area. "Multiply this by their families and close friends it is easy to see they have tremendous influence on city life," he said. He pointed out the INEL people have been active in all facets of community life. This has included education, arts and theater, and a wide range of activities in recreation programs and civic improvements. He said they also have been a leading force in respect to minorities, such as efforts to recognize the Martin Luther King Day.

All of the DOE managers have been excellent to work with, such as Charles Williams, Troy Wade, and Don Ofte. For example, said the mayor, it was Williams who was directly involved in getting the seed money of \$7 million for the city's new \$48 million hydroelectric plant. "This was upfront money which was a tremendous help," said Campbell.

The mayor pointed to the outstanding safety record and advanced laboratory achievements at the INEL as reasons for rejoicing. "I'm sorry the people of Idaho Falls didn't fully understand the great achievements that have taken place at INEL," said Campbell. He pointed to such projects as recovery of copper, the Boron brain cancer research, and other steps in the fields of metallurgy, space, electrical and a wide variety of power programs. "All INEL leaders have given me private briefings in advance of major new projects and developments," said Campbell. "They have always answered any questions we might have. The people of Idaho Falls should stand up and cheer the INEL and be proud of these accomplishments."

When Harold West, an Idaho Falls farmer and welder, was appointed as Bonneville County commissioner in November 1949, little did he realize that he would have a hand in the development of the National Reactor Testing Station. West served as Bonneville County commissioner 1949-1955, including the last five years as chairman. Besides West, a Republican, other members of the commission were Democrat Chet G. Taylor, chairman, and Republican Thomas Weeks, Swan Valley rancher. West had been appointed by Governor Robbins to replace Democrat J. W. Kintner, who had died. He was then appointed by Governor Jordan as state commissioner of agriculture and served 1955-57. He became administrator of the Idaho Wheat Commission for 18 years, and for six years served as a consultant with the Idaho Bean Commission.

Shoved into the forefront was the need to build a road from Idaho Falls directly west to the site of the proposed nuclear reactors. "Counties were in charge of roads at that time and the Bonneville County Commission was asked to take the first steps," West said. "There were two main questions: (1) Just where the road was to go; and (2) getting the rights-of-way." West enlisted the help of William Holden, Mayor Sutton, E.F. McDermott, and Jack Gobble, secretary of the Idaho Falls Chamber of Commerce, to get the necessary state and federal funds. West and other community leaders worked closely with Philipson in the early development of the proposed installations.

At that time, highway funds were supervised by the Public Works Department. "We needed to do something to get money for the road," said

West, "and it had to be done by the end of the fiscal year which was then June 30, 1950. We needed about \$600,000 for that road." Governor Robbins at first was reluctant and West recalled asking Robbins in a frantic telephone call to approve state matching funds before the deadline. This was done while the governor was in Chicago en route back from a National Governor's Conference at Sulphur Springs, West Virginia. "It was a close call but the funds were promised just before the deadline," said West. Some Idaho Falls leaders threatened Robbins at that time they would withhold support for his announced U.S. senatorial aspirations unless he approved the funds. As it turned out, Herman Welker was elected U.S. senator and Len B. Jordan became governor.

Then came the trying task of getting rights-of-way for the new road between Idaho Falls and the site. There were negotiations with Bingham County and Butte County commissioners. The Bingham officials were none too cooperative because they had hoped Blackfoot would have been picked as the headquarters city. Jay E. Painter was the Bonneville County engineer, and, in fact, the only county engineer at that time in Idaho. He had a key hand in helping plot the rights-of-way. He first suggested directing the road due west from John's Hole bridge, but this plan was discarded when it was found it would cost exorbitant amounts of money to buy the rights-of-way. As a result, the road was extended on its present route from the terminus on West Broadway. Barnhart and Wheeler, Pocatello, got the contract and the road was finally completed in the summer of 1951. Before that time, the only highway egress to the site was via Blackfoot and Highway 26 between Blackfoot and Arco. Painter said the road was built for about \$4 million. Under a separate project with the county, the first mile was built with U.S. funds.

The first Idaho Falls Planning and Zoning Commission was formed in 1951 with Wally Burns, Idaho Falls highway contractor, as the first chairman. West was a member of that commission. At one point, the planning and zoning commission members all threatened to resign when the City Council sought to overturn the commission's rejection of the Columbia Heights Addition plan because it did not meet sewer and water specifications. The City Council reconsidered and followed the commission's recommendations.

R. Vern Kidwell, attorney-at-law, came to Idaho Falls just about the time Idaho Falls community leaders were agog over prospects of the nuclear installation. Kidwell had just won his law degree at the University of Idaho College of Law in June 1948, and was preparing to join the FBI when the

elder Holden invited him to come to Idaho Falls "to give it a try." Kidwell, a native of Council, accepted the invitation. As an associate of Holden, he accompanied pioneer AEC officials. "I remember we took Johnston and Philipson for a fishing trip to the South Fork where Johnston was overjoyed to catch a large trout," recalled Kidwell. Johnston never forgot, and during his retirement in the '70s he occasionally returned to Idaho for fishing.

The Federal Housing Administration didn't want to finance government town housing but it did this for private city housing in the city, said Kidwell. He said the Holden law firm was involved in the legal transactions. The Idaho Falls housing actually was the first for atomic installations. "The government was at first fearful that new workers would not mingle well with the locals," said Kidwell, "but that was not the case. They eagerly became part of the community and participated in many local activities and have done so ever since." The AEC officials also were highly pleased that the new Idaho Falls High School and abutting Civic Auditorium were being built.

Kidwell recalled officials of Newport News, Virginia, sent word it would buy a dozen of the better homes for its employees who were to build the submarine prototype. The company bought these homes outright in scattered parts of the city. A. W. Naegle, Idaho Falls Realtor, who later became Idaho Senate president pro tem, negotiated the housing purchased for the Newport News firm. The employees lived there two or three years and some even longer.

Kidwell retired in 1987 after 40 years with the Holden law firm.

When Richard I. "Dick" Clayton, now Idaho Falls' leading downtown business developer and president of Wackerli Realty Co., one of the largest in the city, heard that the city was designated headquarters for the new reactor testing station, he was more than elated. Clayton was then owner of the Topper Club, a leading restaurant and night club, on South Yellowstone Avenue. That site is now occupied by a mattress company. "We felt it would be a big boom for Idaho Falls and we were right," said Clayton. "I guess you can see what has happened in these last 40 years. We had about 19,000 people then, now it's near 50,000." He recalled that Art Goerig, a promoter with the Robert F. Johnson Co., was a catalyst in building low-cost housing at Bel Aire Addition, and also built the three-story building on Second Street in 1952 which served as the Idaho AEC headquarters for many years.

Clyde A. Burtenshaw, chairman of the Bonneville County commission, stressed his strong support for the burgeoning INEL. Burtenshaw said he was a young man farming at Shelton, northeast of Idaho Falls, when word

was received of the coming of the national reactor facility to east Idaho. "I was excited at the time and I believed we were fortunate to get it, and I still think that," he said. "I was young then and was not as active in the community. However, I did support it then and I have remained a strong supporter ever since. I think it is doing a wonderful job for the community and for the nation. It is a good thing those people are doing in the way of research."

Burtenshaw served as county commissioner 13 years, 11 of them as chairman. "The Bonneville commissioners don't have a great deal of relationship with the DOE and its contractors but what they do they have cooperated," said Burtenshaw. "We have worked on some projects for mutual benefit," he said.

Burtenshaw's father, John R. Burtenshaw, who died in 1994, also served as Bonneville County commissioner 12 years, 1957-69. He expressed strong support as commissioner and as a private citizen for the INEL.

J. Robb Brady, who was managing editor of the Post-Register at the time of the AEC appearance, recalled that the first Idaho manager, Bill Johnston, who looked deceptively frail, was very determined and forceful. "The vast majority of people, of course, were delighted over the coming of the facility. There were a few who were fearful that the city would lose its small town flavor, and I guess a few still do. They didn't want to see growth too fast as a result of the influx of AEC people. The coming of the AEC brought an enriching leavening in the social fabric in the Idaho Falls society and economy. I'm sure the many engineers and scientists enriched the community. I felt it made Idaho Falls much more diversified," Brady said.

Brady covered the AEC news in most of those early years but it was a matter of what was disseminated in news releases by the AEC because the installation was highly secretive and continued to be for many years. Brady received a number of calls both at his home and the newspaper from feisty Admiral Hyman G. Rickover, director of the naval reactor program, on community activities. He recalled Rickover constantly stressed the need to upgrade education, not only in Idaho but throughout the nation. Rickover expressed fears this nation was falling behind the more advanced nations of the world, particularly those in Europe and Russia. Rickover was especially upset that Idaho Falls area schools released students in the fall to help in the potato harvest, and urged that this practice be stopped. The school break was halted many years later in Idaho Falls and larger schools—but not because of Rickover. It was largely due to the harvest being taken over by machines. "Rickover had a mission and he was fearful the United States was losing in technological science to the Europeans," said Brady. "He felt the United

States must reassert its basic education program." At one time Brady, in an editorial, disagreed with Rickover on a naval reactor program. After that, Rickover's frequent talks with Brady came almost to a standstill.

Brady recollected at one time that Johnston decreed that all those who visited AEC installations must have passes. Rickover sometime thereafter arrived in the middle of the night and drove a car from Idaho Falls to the Naval Facility unannounced, as he did frequently. He was shocked and highly angered when he was refused entrance to the Naval Facility without a pass. He was forced to drive back to Idaho Falls and get a pass before he could enter the plant. It was probably one of the few times the admiral did not get his way.

Brady's employment with the Post Register came naturally, as his father with the same name bought the paper in 1924 but died within a year and left a legacy for his son to follow. He first began part-time work with the newspaper in the summer of 1941, then continued on a full-time basis in early 1942. A journalism graduate of Notre Dame University, he has taken keen interest in community affairs and the university to the present time. He served as managing editor for 10 years, then became general manager until the publisher, E.F. McDermott, died in 1977. Brady then served as publisher 11 years until the end of 1988. In 1990, he became the minority stockholder and served as a member of the editorial board.

A. W. Naegle, a Realtor and state senator, remembered the excitement that embraced most Idaho Falls residents when the coming of the NRTS was announced. Naegle said he was working at that time for Howard Daugherty at his heavy machinery shop on North Yellowstone Avenue, a building which is presently occupied by the Post Register at 333 North Yellowstone.

"We all felt great," recalled Naegle. "I was going to go into the real estate business and we felt it would be a boom and indeed it was. I guess we saw the possibilities of many new homes to be built, but we really didn't have the full vision of how the station was to develop to its present capacity. At that time, it was believed the project would be only for a few years but even that was welcome."

He said his activities in behalf of the NRTS were modest at the start, but he became very active after he entered the real estate business and became more community minded. Naegle served 10 years in the state senate, 1953-63, including minority leader in 1959-60, and the top spot of president pro tem in 1961-63. He lost his only election in a race for lieutenant governor in 1962. As a state senate leader, he took a leading role in working in

behalf of the atomic installation. "Most of the state gave its support to the project as another shot in the arm to the Idaho economy," he said. "I found this feeling prevalent all the time I served in the senate."

Naegle recalled that in 1952 there was a top seminar which attracted leading world scientists to Idaho Falls. Naegle was then chairman of the Idaho Falls Chamber of Commerce atomic energy committee and served as the seminar chairman. "I didn't know much about atomic energy but I was enthusiastic," he recalled.

Naegle played a prominent role in community affairs until a detached retina forced him to move south in 1975 to Borrego Springs, California, 90 miles southwest of Palm Springs.

Dean F. Wilkie, former Bonneville County sheriff, is probably the last surviving elected Bonneville County official when the Atomic Energy Commission first came in 1949. Active with senior citizens and heading his band, Dean's Combo, Wilkie remembered the excitement generated by the nuclear station announcement. "It made a deep impression on the community," said Wilkie. "Of course, I was interested because we wondered how the influx of new workers would affect crime."

Wilkie said he needn't have worried. There was a slight rise, such as burglaries, some influx of drugs, and traffic violations. Wilkie and the city chief of police, C. Algol Carlson, joined hands to prepare for what law enforcement problems would arise. "There was no big-time crime, such as homicides and violent cases," said Wilkie. "The new NRTS workers for the most part were upright citizens. What rise in crime took place can be laid mostly at the doorstep of those criminal-type persons who follow the influx of workers."

Wilkie and other local law enforcement officers attended FBI seminars to beef-up security if it was needed. At that time there was considerable secrecy surrounding the atomic program, he pointed out. Wilkie said as the Bonneville population grew it was necessary to add two deputies. Wilkie's chief deputy was Joe W. McNeil, who served many years. There was close cooperation among law enforcement officers of Bonneville, Bingham, and Butte counties.

Wilkie said that in 1948-49, law enforcement officers also chased away some 15 prostitutes from Idaho Falls, but this was just before it was known the NRTS would come to Idaho. "We even had two cattle rustling cases but they were minor compared to the commercial cattle rustling of today," said Wilkie. "In these cattle rustlings the people slaughtered the cattle for their own use to eat." Wilkie also headed a Civil Air Patrol of six which

often flew over the area to observe if there was anything unusual. "We even found some lost planes," he said.

Jack G. Gamble, pioneer Idaho Falls grocer, frankly admitted that in 1949 when the Atomic Energy Commission picked the National Reactor Testing Station for east Idaho and named Idaho Falls as its headquarters city he didn't visualize the tremendous growth it would bring. "I guess most of us in the business community didn't understand the use of that base," said Gamble. "Yes, we believed there would be some growth to a degree but it proved to be far more than we realized. Also, you must understand the AEC was far more secretive than it is today. They did not give us very much information about what they were doing."

Gamble said he was mildly interested in the business sector but he became more involved later. He became more active with the Idaho Falls Chamber of Commerce and served as its president in 1959. Gamble was born in Idaho Falls and lived there most of his life except for a few short stretches. He first operated the old O. P. Skaggs grocery store at West Yellowstone in 1947, then later at Ashton. In early 1948, he operated the store at Broadway and Shoup Streets in Idaho Falls where is now situated the Eagles Hall. He next built a new store at 14th Street and Holmes in 1952 and operated it until 1961.

Gamble credited Naegle as grasping the enormity of the atomic venture. It was Naegle who spearheaded movements for rushing low-cost housing in the city, particularly the first large one of the Bel Aire Addition, but there were others, Gamble said. "I remember E.F. McDermott was very active in helping to bring the headquarters to the city," he said.

Ray Groth, Idaho Falls oil wholesaler, served as Chamber of Commerce president in 1952, and remembered vividly the excitement that greeted the announcement of the coming of the atomic installations to Idaho three years earlier. "We all expected great things would come to the Idaho Falls area and it has exceeded my fondest expectations," he said. "I only hope there will be no letdown. All of us went along with the project. We were thrilled to work with the AEC people and helped in any way we could."

Groth said as Chamber president he and other Chamber and city leaders met frequently with the top Idaho AEC officials on a number of occasions to help smooth the way for the project in providing housing, schools, and increased utilities. "It has been a great boon to this community," said Groth, who retired and spends his time between his homes in Idaho Falls and Hebgen Lake in the summer, and in California in the winter.

Idahoans throughout the state viewed the Idaho Falls community as

one of the most progressive as a result of the operations of the Idaho National Engineering Laboratory, said Alex D. Creek. Creek, who traveled throughout much of the state by virtue of his 17 years as a member of the State Department of Commerce and with the State Council on Vocational Education, said he found "people curious about what was happening here as a result of the site work. They admired the Idaho Falls community for its rapid growth, its growing employment rolls, the lowest electrical rates in the state, and what it has brought to the state in boosting the economy and the tax base." Creek said the vast majority of Idahoans are boosters for the INEL.

Creek came to Idaho Falls as an oil dealer in 1948, a year before the NRTS, the predecessor of the INEL, was established. He became well acquainted with all of the Idaho managers from Bill Johnston to Don Ofte. He praised all of them for their efforts. He said he was particularly impressed by Dr. Richard Doan, manager of Phillips Petroleum Co., the first prime operating contractor at the site, because of his community interest. As an oil wholesaler, Creek said his company served many of the reactors with its oil products, including the Aircraft Nuclear Project (ANP) before it was terminated in 1961. "I had the opportunity of going to these reactors to see the activities going on and was much impressed," he said.

Creek served as city councilman 1959-63, and also president of the Chamber of Commerce in 1957. He was active with numerous civic groups. He remembered the community-wide efforts to get state highway funds to build the highway between Idaho Falls and Central Facilities, completing it within two years after the AEC came to Idaho. In 1960, he recalled, there were some 4,500 employees working on seven major reactors.

Creek was active in urging Idaho congressional members and other state leaders to strongly support the site. "The INEL has brought such a tremendous economic boost in the use of construction material, hiring people, and enhancing the educational and cultural life of the community," he said. "It has helped bring about a regional airport and a regional hospital." Creek agreed the handling of spent nuclear waste would be a big job for the INEL in the next few years, along with many research programs.

All of Idaho's political leaders, present and past, have warmly supported the Idaho National Engineering Laboratory. Particularly influential were U.S. Senators Frank Church and James A. McClure, and U.S. Representative Orval Hansen.

Both Democrat Church and Republican McClure were members of the U.S. Senate Energy and Natural Resources Committee and the Senate Subcommittee on Energy, Research and Development which had a prime hand in legislation affecting the nuclear industry in general and the INEL in particular. They served simultaneously on these committees in the mid-'70s, giving bipartisan support. They worked closely in energy matters, particularly the nuclear phases, because they felt it would help the nation. Each firmly believed in nuclear energy, thus giving strength to the sprawling INEL with its cluster of nuclear reactors.

Hansen sat on the special Joint Committee on Atomic Energy, 1971-75, which supervised atomic installations, including the INEL. He served six years, 1969-75, in the U.S. Congress.

McClure, the ranking minority member and former chairman of the Senate Committee on Energy and Natural Resources, waxed enthusiastic over the INEL. "The INEL," he said, "has served as a landmark in the field of research. It has now gone into the approach of pure research, not necessarily nuclear. It has been a benefit for the nation's defense in many fields. The [nuclear] airplane didn't fly but as a result of that research it has helped in development of our present model and large airplanes of today. In Idaho, it has brought immense benefits in drawing people of high scientific and engineering expertise. They are highly paid. Idaho Falls is a unique community. It is hard to find this kind of climate of such highly-skilled people in the technical field. This is only found in university towns. This has helped this area, the state, and the nation. The INEL has seen a remarkable evolution over the past four decades, from a piece of eastern Idaho desert that was once an artillery range for the Army and Navy, into a state-of-the-art research facility.

"From a political perspective, I've had an opportunity to observe the INEL from three different positions: as a state legislator, as a member of the U.S. House of Representatives, and as a United States senator. Working with the managers at the site, as well as with the Department of Energy, it

has been interesting to watch how the site has changed over the years.

"Back in the '60s, when the site was known as the NRTS, there was political support but a certain indifference to some of the site's activities. That's partially because there wasn't a lot of public understanding of what was going on at the site, and partially because some of the projects being performed were classified by the government.

"The '70s brought not only a growing public understanding of the site's role and importance, but also a changing in name: from NRTS to the Idaho National Engineering Laboratory. The change wasn't made simply because "INEL" is a better sounding acronym than "NRTS"; it was a deliberate step to reflect the changing nature of the site and its activities.

"That diversification continued into the 1980s, culminating with the opening of the Idaho Laboratory Facility, known as the Idaho Research Center. No longer just a test bed for different types of reactors, the site had branched out into a full-fledged national laboratory, on par with — and in some areas better than — facilities like Los Alamos National Laboratory in New Mexico and the Lawrence Livermore Laboratories in California. Scientists and researchers working at the INEL are involved with such varied projects as converting an old test reactor into a treatment center for certain types of cancer, developing batteries that could power the electric vehicles of the next century, and creating materials that can be substituted for strategic uncritical minerals we now have to import from foreign suppliers.

"Throughout the nearly three decades that I've been involved in public service, there has been almost universal support of the site and its activities by elected officials. On both sides of the political aisle, legislators at the state and federal level have understood the importance of the work being done at the site, as well as the significant economic impact the site has on our state and local economies.

"But the late '80s not only brought diversity to the INEL; they brought criticism of the site and opposition to some of its activities. It is my view, however, that the INEL during this period was tarred with the broad brush of concern over nuclear waste and mismanagement at other DOE sites. A review of the record shows that INEL's safety record is far better than other Energy Department facilities, and work is well underway on cleanup that needs to be done at INEL.

"I do think it's important that we maintain a diverse research base at INEL for the long-term stability of the site. Not only will that help keep employment levels stable at the site, but it will help INEL in its overall mission of maintaining our standard of living and our quality of life well

into the 21st Century."

Church, who served 24 years in the U.S. Senate, 1957-81, had a prime hand in fostering the funding and development of many facilities at the site as chairman of the Senate Subcommittee on Energy and Research. During the late '70s, while he was the subcommittee chairman, his colleague, McClure, was the ranking minority member. They constantly joined hands in backing nuclear projects in general, and those for INEL in particular. They were senior members of the full Senate Energy and Natural Resources Committee.

It was Church who led the liberal forces in thwarting President Carter's policy of downgrading nuclear energy, saving the processing plant in South Carolina and the Clinch River Breeder Reactor at Oak Ridge from utter elimination. They also helped to kill many of Carter's energy proposals that would have trimmed nuclear research and production. Church on many occasions said that while fiercely supporting INEL projects he frankly believed nuclear power was one of the brightest hopes to meet the nation's energy crunch.

Church placed many of his historical papers with Boise State University. A space of 2,500 square feet in the university library was assigned to what is known as the Church Room. Included in the vast collection are papers from the Energy and Natural Resources Committee, 1977-80; and the Department of Energy, and its predecessors, the AEC and ERDA, relating to Idaho. In all, there are 748 boxes, 20 notebooks, 42 volumes, 740 audio recordings, more than 400 separate films and video recordings, and 1,500 photographs.

Orval Hansen likely was among the most diligent in the time and energy he spent in behalf of the INEL than any of his Idaho congressional colleagues. Now director of the Columbia Institute, a research organization at Washington, he said as a member of the JCAE for four years he visited the Idaho site several times each year and developed close relationships with AEC officials in Idaho and representatives of the major contractors. His goal also was to encourage his colleagues to visit the Idaho facilities.

The first visitor in 1971 was U.S. Representative Melvin Price, D-Illinois, JCAE chairman. On that trip was Admiral Rickover, who had arranged for an airplane to fly the group to and from Idaho. Other members of the JCAE who visited Idaho and the NRTS on Hansen's invitation were Congressmen Craig Hosmer of California and John Anderson of Illinois, and Senator Howard Baker of Tennessee. Members of the Atomic Energy Commission who visited the Idaho site for the first time at Hansen's invita-

tion were Chairmen James Schlesinger, William O. Doug, Will Kriegsman and William Anders.

To prepare for the Schlesinger visit, many of the Navy personnel were required to work long hours late into the evening. The wives of Navy personnel revolted and threatened to picket when Chairman Schlesinger arrived to show their displeasure over the extra work their husbands had been required to perform, for which they believed Admiral Rickover was responsible. To avoid embarrassment and head off the picketing, Hansen met with the women the evening before and promised to see that their complaints were dealt with by appropriate officials. But the women didn't promise to forgo the picketing. "At the airport the next morning the situation was tense as I arrived to meet Dr. Schlesinger. The Navy wives were all lined up along the fence as the small jet rolled up to the parking area. As Schlesinger stepped out of the plane, the women displayed a large sign which said, 'Welcome Dr. Schlesinger'. There was a collective sigh of relief among many of us on hand at the time," Hansen recalled.

Hansen said the Doug visit was on the occasion of the 20th anniversary of EBR-I. Governor Andrus was also on hand at a dinner celebrating the event.

Hansen said during the last two years on the JCAE, his major goal was to change the name of the NRTS to more accurately reflect the changed and broadened mission of the facility. The two most important objectives were to designate the facility as "national" and "laboratory." Hansen took the request to Dixy Lee Ray, then the AEC chairman. Hansen said his preference was to name the facility as the "Idaho National Energy Laboratory" but there were objections because other laboratories were also involved in energy-related work. The "engineering" name was substituted.

Hansen said he had arranged for Vice President Gerald Ford to visit the site in August 1974, on the tenth anniversary of EBR-II achieving full power. "The week proved to be historic," said Hansen. "Within two days of the election, President Nixon had resigned and Ford was president. The trip to Idaho was canceled. I lost in the Republican primary in Idaho which meant that my service would end on January 2, 1975. I returned to Idaho for the ceremony August 14 which included the announcement of the name change. Commissioner Anders was there representing the AEC, and he asked if I would like to make the announcement. I was still feeling the effects of the election loss and suggested that it would be more appropriate for him to make the announcement, which he did, to an enthusiastic and approving audience. It was an important milestone for the Idaho nuclear energy opera-

tions," he said.

U.S. Senator Steve Symms described the sprawling INEL as "the real gem of the U.S. Department of Energy." He said, "Basically, it is the touchstone of nuclear installations in the United States. It has the best record of accomplishment, such as for national nuclear safety and technology, and its achievement in laboratory technology." He pointed out it was the basic installation for the nation's nuclear Navy. "The brand of engineers there has been a national treasure," Symms said. It has been an immense benefit to Idaho, he added, and its 11,000 workers in 1990 represented 6 percent of the state tax base, and 4.5 percent of the work force.

"In politics," Symms said, "it is a credit to our state for political leadership. We have a good work force. My concern now is for a political posture." He pointed out some people in other sections of the state, such as the Magic Valley (Twin Falls) and the Boise areas, are still fearful over nuclear waste. He said, "Their fear is overstated but this is a high risk game."

Symms also pointed out the site has a bright future ahead. Some of the best technology in nuclear capabilities were being developed at the INEL. This included a wide range of activities, such as naval reactors, high technology such as the Boron projects on cancer research, treatment of waste management and many other activities. He pointed out the vast space of some 572,000 acres offers ample room for development of many experiments. He also noted that as other fuels, such as coal, oil, gas and hydro-power become exhausted or pollute the air, eventually this nation would need to turn to nuclear power. This has been the case in many European and Asiatic countries. "This nation has vast nuclear possibilities," he said, "and nuclear power reactors of variable sizes could be built." He pointed out that eventually some state will step forward to take the nuclear waste for storage. "Of course," he concluded, "if we get fusion power, then that will pretty well solve our power problems."

The INEL was hailed by U.S. Representative Richard Stallings as a facility that in different ways helped the nation, Idaho and the Idaho Falls community. "It has helped the nation to develop nuclear technology. I think every reactor in the nation has been influenced by what has been done at INEL," said Stallings.

"As far as Idaho is concerned, the impact has been tremendous in an economic as well as a scientific way. That also has been true for the area. The dollars have amounted to billions. The money spent on construction and operations have multiplied four or five times over as it changes hands."

"One of the significant things is the expansion it has brought to the

Idaho Falls community. The site has diversified the economy. Idaho Falls, like many of the other larger cities of the state, has in the past depended almost wholly on agriculture. Such is not the case any longer. Idaho Falls is now a scientific center. We have a number of agriculture centers in Idaho so that when agriculture suffers, these cities also suffer. That is not the case for the Idaho Falls community.

"Another area is the quality of people attracted to Idaho. These are people of scientific and engineering skills. With that skill comes the demand for more cultural development." Stallings pointed out these people have taken the lead in such activities as the Idaho Falls symphony, opera, and other musical and theater development.

"The impact on education is almost taken for granted," he said. "These people by their training have helped in the educational field. Many of the spouses are teachers in the local schools." Stallings pointed out these people also have brought about the need for college classes. This has resulted in engineering, scientific, and other technical classes on a higher education level sponsored by the University of Idaho, Idaho State University and Brigham Young University-Ricks College.

Looking toward the future, Stallings saw a different trend in activities than what had taken place the past 40 years. These included waste management where considerable money will be spent to clean up not only nuclear waste but other types of waste, such as toxic and chemical; further work in such projects as Boron and others that will help in the medical field; and, in the long-term, further activities in energy and research.

"One of the failures of the Reagan administration was the lack of an energy policy," said Stallings. "We will run out of coal, oil, gas, hydro, and other forms. Burning of fossils will create the greenhouse factor. That means there will be only one form of energy available, and that's nuclear power. The INEL has become the center of research in this. Frankly we will have to change our standard of living." He lauded INEL managers such as Troy Wade and Don Ofte who furthered the INEL with their outgoing and progressive policies.

"INEL, along with many other DOE sites, is at a critical crossroads," said Stallings. "Growing public concerns about nuclear waste, protection of the Snake River aquifer and two proposed defense-related projects have prompted citizens to pay attention to the facility. It is no secret that we face an enormous and difficult challenge in tight budget environments. Cleanup, safety concerns, regulatory compliance and modernization of an aging defense complex are issues that confront Congress."

U.S. Senator Larry E. Craig, who sat on the House Energy and Environment Subcommittee, saw a solid future for the INEL. Representing the Idaho First Congressional District from 1981 to 1991, he said his work on the subcommittee brought him in close touch with the INEL, which he visited a number of times. He became senator in 1991.

"I am opposed to a compromise to the environment," he said. "But no way will it affect my support to the INEL. I think we will see a change in the Special Isotope Separation (SIS) project as reflected in changes in eastern Europe," said Craig. "I also believe nuclear energy will play a major role in the future of the nation. It is pushing the frontiers. I don't see diminishing the effort to get a diversity in employment at INEL. The INEL has bright people in research and development. In the area of nuclear research we need their technology. I also see Idaho positive in the technology transfer program." He pointed to the Boron project that could be a major cancer research effort as an example.

His former subcommittee of the full House Interior and Insular Affairs Committee had oversight on regulations of nuclear activities. He said he worked on rewriting the federal insurance program to assure a liability response in case of nuclear accidents.

He expressed interest in opening the waste isolation plants near Carlsbad, New Mexico, and at Yucca Flats, Nevada. He said the openings were certain and it was only a question of when. "I am a strong advocate of nuclear power," he said. "To assure its presence we must have public trust. The nuclear industry lost some of this." He said two points stand out: the ability to handle and deposit waste; and the ability to license and build nuclear plants at a reasonable cost and time.

Idaho Governor Cecil D. Andrus foresaw a bright INEL future. "The INEL," he said, "today, as in the past, is the strongest single magnet of the state. Its research and development far exceeds the military. If we ever get peace in the world, the site will be very important on civilian aspects. Its safety and research, medical and energy transfer will beneficially affect all civilian uses. It's a long-term deal. The laser technology, for example, is critically important. These advances at the INEL will go on whether we have the SIS or not."

Andrus said he had always been impressed at the dedication of scientists, engineers, and technicians at the INEL. He cited the achievement of the Experimental Breeder Reactor I in producing the first electricity from nuclear power in the world in 1951 and BORAX III in lighting the city of Arco in 1955 as impressive illustrations of what has been done. The high

technology and financial outlays at the site, he noted, have brought immense benefits to the state in an educational, political and economic way.

"We are concerned about the waste, to get it out below and above the ground. This will return confidence, to see that no contamination goes into the aquifer and endangers people downstream," he said. He foresaw heavy involvement by the INEL to help clean up radioactive waste. "It will serve as a laboratory for the rest of the world in creation of a method to clean the waste," he said. "If the military decreases, it will not reduce the nuclear submarines. But basically the site will continue on civilian work."

The Idaho governor said he foresaw an increase of 1,500 technicians to help clean up waste. "I see the INEL as continuing to prosper," he said. "INEL is basically a clean site. There is no other nuclear site that is as clean as this one."

John V. Evans, who served as Idaho governor 10 years, 1977-87, lauded the INEL for what he called "its tremendous contribution in the field of scientific and engineering research in Idaho, the nation and the world." Evans said, "The INEL has had programs that developed nuclear power as a viable energy source."

He added the east Idaho site has provided what he called "marvelous opportunities of employment for many years." He noted the employment rolls have generally increased since the site was established in 1949, and in 1990 reached a peak employment of 11,000. "It has been a rich source of jobs for the people of Idaho," said Evans, "and it appears it will continue in that role. I think in terms it will continue to provide opportunities because of the research facilities of this kind of operation."

Evans said that while governor he was in frequent contact with the Idaho DOE managers, first with Charles E. Williams and then with Troy E. Wade. "I had close contact with Williams on a number of programs and then with Wade it was even more fruitful," said Evans. Evans said it was Wade who first acted on what the INEL could do to work closely with the state, such as ceasing operation of the injection well and disposal of nuclear waste. "It was Wade who brought about the eventual closing of the injection well," said Evans. "He came to my office when he first became manager and asked what he could do to improve relations and the image of the INEL in Idaho." Evans said it was at that time the first steps were taken to bring about closure of the well. This was done in a formal ceremony with Governor Cecil D. Andrus November 20, 1989, but the spade work had been done previously. "The scientists assured us that there was little contamination from the well but the people living downriver were nervous," Evans said. Evans said he

also worked closely with Wade to remove the radioactive waste from the INEL. "However," he added, "the time schedule for the removal continued to slip." When Andrus announced he would stop further nuclear waste shipments from Rocky Flats in 1989, Evans said he commended Andrus in a letter.

Evans, who headed banks in Burley and Rupert, also served as lieutenant governor for four years. He served 14 years in the Idaho Senate as well, including two years as the majority leader and six years as minority leader.

Robert E. Smylie, Idaho governor for 12 years, 1955-67, and state attorney general six years before that, saw the tremendous impact the INEL would have on Idaho. "It was obvious we would have a population explosion," said Smylie, one of four former governors still living in 1990, "we could see it coming."

Smylie's first contact with what was then known as the National Reactor Testing Station was as attorney general in helping to oversee the legal work for the rights-of-way for the new road leading from Idaho Falls to the proposed nuclear project and in handling the transfer of state land to the new federal installation in 1949-52. "The state had about 60,000 acres of land involved in the transfer," he said. "It consisted mostly of a pile of rocks with a teaspoonful of dirt." Smylie said the state sold the land for a modest \$6 an acre.

During this time as attorney general and governor, he met frequently with Dr. Richard L. Doan, then manager of the Atomic Energy Division of Phillips Petroleum, the original prime contractor at the NRTS. It was primarily to strengthen cooperation between the state and the new east Idaho atomic installation.

Smylie also conferred from time to time with Idaho Falls civic leaders and legislators on the impact. At that time, State Senator A. W. Naegle and State Representatives Orval Hansen and Don Pieper, Idaho Falls, who all served in leadership, were the Bonneville County legislative delegation and avid boosters for the site.

Smylie said the state also was keenly interested in expanding educational opportunities for the influx of new citizens that the NRTS brought. Smylie was on hand on a number of occasions to represent the state at NRTS events, including giving the address of welcome when President Johnson came August 26, 1966, to designate EBR-I as a Registered National Historic Landmark.

Don Samuelson, who served as Idaho governor 1967-71, consid-

ered himself one of the most avid backers of the NRTS. "We worked closely with the atomic people at that time as I felt then and still do that the program was of immense benefit to Idaho, not only for the business it brought but for the good of the nation," he said. Samuelson, noted for his staunchly conservative approach for tight state budgets and business backing, said he visited the site on a number of occasions while head of the state government. "I was always impressed by what was being done there," he said.

Samuelson said he went to Washington in an effort to get a thorium project for NRTS which was considered of major import at that time. Much to his dismay, the AEC designated the project for Hanford. "Senator Warren Magnusen, of Washington State, told me he was surprised the thorium project was given to Hanford as the Washington state congressional delegation hadn't even tried for it. I worked hard for it but got nothing."

Samuelson served as state senator for six years from Sandpoint before pulling off two startling upsets that left their mark on state politics: He upset three-term Smylie in the 1966 Republican primary, then defeated Democrat Andrus in the general election. After his defeat in the 1970 election by Andrus, Samuelson took a job for six years as regional director with the U.S. Department of Transportation in Seattle, but has been retired ever since at his home in Sandpoint, Idaho. He has spent much of his time in a hobby of cutting gems and casting gold and silver into jewelry items; spends his winters in Apache Junction, Arizona; does some traveling; and has written a book of his life, The Hand of God.

"We need nuclear power," he said, "and I'm glad the INEL is going ahead. I thought it was an important project for Idaho then and upon learning what I know now it is even more valuable." Samuelson admitted he had not followed the INEL closely since his retirement but that he felt it would expand, and expressed pleasure that it had even more so than he expected.

U.S. Representative George Hansen, who served seven terms in Congress, best remembered the INEL for the unified support it received on the national, state, and local levels. Hansen, later a consultant for conservative political action groups at Washington, held the Idaho Second Congressional seat 1965-69, and again 1975-85 inclusive. Hansen said that he, along with Senators Church and Jordan, worked as a team in behalf of the rapidly expanding site. They also cooperated closely with Idaho governors and city officials during that time so that there was little dissent on the operations. "We didn't allow any division to develop," he said, "but after I left Congress controversies began over nuclear waste and radioactivity." He blamed the Snake River Alliance and other small but vociferous minority groups for

creating controversies.

Hansen visited the INEL on many occasions to show his support. He remembered riding in U.S. Air Force One with President Johnson when they came August 26, 1966, to dedicate EBR-I as a National Historic Landmark for developing the first fission electricity. Johnson has been the only president to come to the site to bring nationwide recognition, recalled Hansen. He spoke to more than 6,000 at the Central Facilities.

Hansen also remembered accompanying Admiral Hyman Rickover to the INEL a number of times. Rickover, in charge of the nuclear Navy, was extremely temperamental on progress of the naval operations in Idaho, Hansen said. "I know we had to stroke him carefully to keep the naval facilities," said Hansen. "Rickover was very sensitive and even threatened to pull out the naval facilities if there were labor disputes." Hansen said he also worked closely with U.S. Representative Chet Holifield of California, then chairman of the Joint Committee on Atomic Energy, on nuclear issues. "Those were the golden years at the site," said Hansen. "We had developed the prototype for submarines and ships."

He lauded INEL technicians for effectively handling the waste problem at the Three Mile Island accident in Pennsylvania. Hansen also remembered during the Cuban crisis, when the Cubans deprived the American base at Guantanamo of light and power, it was planned to ship a portable nuclear reactor to provide these services. However, a diesel engine was used instead, but a nuclear unit was placed on a standby basis. "It was frightening when we were at Guantanamo to see the Cuban forces on the hill with guns pointed at us, and Russian ships passing close by in the harbor," said Hansen.

Hansen also joined most nuclear scientists in predicting that clean and abundant nuclear power would eventually furnish the major power for the nation.

One of the highlights that Ralph R. Harding remembered is bringing leading personages to the Idaho National Engineering Laboratory during the time he served as Idaho congressman in 1961-65, the foremost being President Lyndon B. Johnson. "It was the time I was running for the U.S. Senate in 1966," said Harding, "and President Johnson asked me when I was in the Rose Garden if he could help. I asked him to come to Idaho and he did, coming to the site and giving a major talk. He also helped in my campaign at that time." Harding, however, lost that race to Republican Len B. Jordan, who had served previously as governor.

After Harding became a congressman in 1961, he said it was a constant battle to keep the site funded. He said he and then Senators Henry

Dworshak and Frank Church called on the White House in early 1961 to appeal to President John Kennedy to keep the Aircraft Nuclear Propulsion project funded, but Glenn Seaborg, then AEC chairman, explained it wasn't feasible because the cheaper and less hazardous intercontinental ballistic missiles would perform the same mission. Kennedy eventually terminated the project March 28, 1961, by presidential order.

Harding said he also had a hand in helping to bring President Harry S. Truman to Idaho in 1962; two Joint Committee on Atomic Energy chairmen, Representatives Melvin Price, of Illinois, and Chet Holifield, of California; Senator Clinton Anderson, of North Carolina; and other influential members of Congress and AEC officials. "We avoided making our efforts partisan and I believe we succeeded," said Harding. Harding said he also worked closely with state political leaders to foster warm relations on the state level. "The INEL has never been partisan as we all realized it was good for the nation and the state," he said.

Harding, since leaving Congress, was a lobbyist at the nation's capital, most recently for Filipino sugar interests. He decided in August 1989 to leave Washington and took residence in Pocatello to study for masters and doctoral degrees to prepare for teaching on the college level.

The hysteria and excitement that greeted the 1949 announcement that a national reactor station would be located in east Idaho was well remembered by Hamer Budge. Budge was the newly elected Second District congressman starting in 1951 and served 10 years. He retired at Palm Desert, near Palm Springs, California. "People around Arco were all buying land, some as far as 10 miles away in belief it would become valuable," said Budge. "There was much excitement in the area and much of what was predicted has come true." The land boom and high expectations for Arco, however, never came after Idaho Falls was designated the headquarters city.

In 1951, Budge met with a number of Idaho Falls and a few Arco leaders to help in development of the infant NRTS. He remembered meeting in Washington with William S. Holden, pioneer Idaho Falls attorney, the leader in furthering the project. Also on hand were John Gobble, an Idaho Falls shoe store owner, and Idaho Falls Chamber of Commerce secretary; Mayor Sutton; and others. Budge said there were a couple of appearances at the White House with Presidents Truman and Eisenhower, and also with congressional committees.

"My greatest effort was to try to get federal appropriation for the site," said Budge. "Idaho was in a favorable position because both Senator Henry Dworshak and myself were members of appropriation committees.

There was a lot of competition for federal funding from other states, such as at Hanford, Washington; Oak Ridge, Tennessee; and Los Alamos, New Mexico." Budge said when the NRTS scientists produced the first electricity from nuclear energy at EBR-I and then lit up Arco it made it much easier to get federal funding. Budge was at EBR-I when the first string of globes was lit December 20, 1951 and experienced the excitement of the scientists. "The site also kept getting into new areas and this helped in getting funds," said Budge.

He said Senator Herman Welker also helped in the early planning before he was replaced by Church. The group met with the first chairman of the Atomic Energy Commission, David Lilienthal, and other commission members on a number of occasions, Budge added. "I can't help but see a continued expansion of INEL," said Budge. He was surprised to learn the employment had bounded to 11,000 in 1990 from its modest beginning of only a few hundred at the start in 1949.

He said he and his wife Mabel, who guided the NRTS in its early days, were staying with a cadre of 20 people. They first occupied space on the fourth floor of the City Building, and in July when two weeks later took over the entire fourth floor of the Rogers Hotel Annex as more staff members arrived, it was also Mabel who stayed along with Phillips, who authorized the first construction of well pads, roads, and building construction, even while Mentzeng was continuing to try to get the studies at West Peck.

Johnston often told associates how he loved the country and he spent his free time at Henry's Fork, at Pond's Lodge, Mabel's Inn, and other favorite haunts. His son, Dr. William J. Johnston, who became director of medical services in North Seattle Hospital, recalled his father often said the time he spent in Idaho was one of the happiest in his life, that it was "exciting and challenging."

After leaving Idaho Falls, Johnston became works manager of Erie Steel in Southern Minnesota, then to Cleveland, Canada, in 1960 as general manager of Wabash Iron Co., and in 1965 as acting vice president of the Pittsburgh Steel Corp., a pipe plant at St. Louis. He retired in 1977 and moved to Florida where he had his wife Esther, peak time covering the country, including Idaho. He died in November 1986 from heart disease.

Johnston was the last of the 10 who have served as managers of the Idaho Operations of the AEC or its successor from 1949 to 1990. The succession of managers was as follows: Office managers after Johnston's term from April 1949 to

and the area. "People were getting excited about it with the promise to not develop any other areas and have the equipment right there," he said. "It was a good standard to set, but it was a difficult one." Budge said he worked hard to keep the project down to the size it was and the size it grew to, and he was able to get the standard set with the help of the congressional leaders and the state legislature. "It took this resolution to keep the 1981, '82 reductions down," about getting in line with the national standard, he said. Budge said he came to Idaho in 1961, two years before Congress on Atomic Energy, and he quickly found other nuclear energy managers there. "He did not have an advanced technical background, but he had a good attitude and a good work ethic," said his wife, Linda, 61, a retired teacher. "He was a good employee and a good husband," she said. Budge died May 15, 2005, at the age of 88, following a long battle with dementia and Alzheimer's disease. "He was a good man," Linda said. "He was a good husband and a good father." Budge's wife, Linda, and son, Michael, 56, a nuclear engineer, are his survivors.

Standing, since leaving Congress, was a lobbyist at the national level, most recently for Filigenz sugar interests. He decided in August 1961 to leave Washington and took residence in Pocatello to study for nuclear doctoral degrees to prepare for teaching on the college level.

The hysteria and excitement that greeted the 1949 announcement that a national reactor station would be located in east Idaho was well remembered by Harry Budge. Budge was the newly elected Second District congressman starting in 1951 and served 16 years. He resided at Palm Desert near Palm Springs, California. "People around Arco were all excited, some as far as 10 miles away in relief it would become valuable," Budge said. "There was much excitement in the area and much of what was predicted has come true." The land boom and high expectations for Arco, however, never came after Idaho Falls was designated the headquarters city.

In 1953, Budge met with a number of Idaho Falls and a few local leaders to help in development of the initial NRTS. He remembered meeting in Washington with William S. Nolden, former Idaho Falls attorney, in order to further the project. Also on hand were John Gobble, an Idaho Falls sugar cane owner, and Idaho Falls Chamber of Commerce attorney, George Budge, and others. Budge said there were a couple of appearances to the White House with Presidents Truman and Eisenhower, and also a congressional committee.

"My greatest effort was to try to get federal appropriations," said Budge. "Idaho was in a favorable position because both my father, Harry Budge, and myself were members of appropriation committees."

The new National Reactor Testing Station was fortunate to have Leonard E. "Bill" Johnston as the first Idaho AEC manager. That's because his congenial personality and scientific knowledge made friends with both the local citizenry and the hundreds of new employees who flocked to east Idaho to work on the first nuclear reactor programs in 1949. Johnston served as manager from April 1949 to April 1954 and in that time the site emerged from its swaddling clothes to a full-fledged nuclear installation, one of the major ones in the nation. Wesley C. Funk was the assistant manager, and J. Bion Philipson was the assistant manager for operations.

Johnston was a native of Bradley, South Dakota, and was in charge of the AEC's Knolls Atomic Power Laboratory in Schenectady, New York, when he took the Idaho position. It was Johnston who guided the NRTS in those first trying weeks with a cadre of a dozen. They first occupied space on the second floor of the City Building June 1, 1949, then two weeks later took over the entire fourth floor of the Rogers Hotel. Two weeks later, they occupied the Rogers Hotel Annex as more staff members arrived. It was also Johnston, along with Philipson, who authorized the first construction of well diggings and building construction, even while Montana was continuing desperately to get the station at Fort Peck.

Johnston often told associates how he loved the country and he spent time fishing on Henry's Fork, at Pond's Lodge, Mack's Inn, and other favorite recreational spots. His son, Dr. William T. Johnston, who became director of emergency services in North Seattle Hospital, recalled his father often saying that the time he spent in Idaho was one of the happiest in his life, that his Idaho work was "exciting and challenging."

After leaving Idaho Falls, Johnston became works manager at Erie Mining Co. in northern Minnesota, then to Quebec, Canada, in 1960 as general manager of Wabash Iron Co., and in 1966 as senior vice president of the Sverdrup and Parcel Corp., a pipe firm at St. Louis. He retired in 1977 and moved to Seattle where he and his wife Helene spent time exploring the Pacific Northwest, including Idaho. He died in November 1986 from heart disease.

Only nine others have served as managers of the Idaho Operations Office of the AEC or its successors from 1949 to 1990. The succession of Idaho Operations Office managers after Johnston's term from April 1949 to

April 1954 included Allan C. Johnson, April 1954 to December 1961; Hugo N. Eskildson, January 1962 to November 1963; William L. Ginkel, March 1964 to September 1973; R. Glenn Bradley, September 1973 to March 1976; Charles E. Williams, May 1976 to June 1983; Troy E. Wade, July 1983 to June 1987; Don Ofte, June 1987 to December 1989; Phil Hamric (acting manager), January 1, 1990, to February 2, 1990; and Augustine Pitrolo, February 1990 to February 1994. (John Wilcynski became acting manager and then was named manager in November 1994.)

When Allan C. Johnson came to Idaho Falls in 1950 to become director of engineering and construction for four years with Idaho's AEC office he found plenty of challenges. The NRTS was an innovation in many ways. It was designed to develop nuclear energy into peaceful uses and indeed it did that in a sensational way, such as producing the first electricity from nuclear energy in 1951. Johnson was promoted to manager in April 1954 and served in that top position until December 1961.

Johnson said the main problems at that time were in dealing with what he called the "heavy handed actions of the AEC headquarters at Washington, D. C. It seemed there was a tendency on their part to transfer many of their field people to Washington and I certainly didn't want to go there. Still, the time I spent in Idaho was among the best years of my life." At that time, he said, there were about 4,800 employees besides the AEC staff. Johnson said the highlights were the tremendous progress made by most of the early reactors, such as the first ones, EBR-I, MTR, the Advanced Test Reactor (ATR), ICPP, and the Experimental Test Reactor. The latter one was finished on schedule and within budget, he said.

He lived with his wife, Evelyn, in retirement at San Luis Obispo, California.

William L. Ginkel held the job of manager the longest, more than nine years, 1964-73. Ginkel liked the job so well that he refused a transfer to Washington and chose to remain as a special assistant to the manager for the next three years. He was one of many scientists who had come to the Idaho site and previously worked on different phases of the atomic bomb as an industrial engineer for the Tennessee Eastman Corp. at Oak Ridge, Tennessee, in 1944-47. He knew it was work on the atomic bomb because he was designated to keep track of fissionable materials the scientists were processing. "I was involved in the materials end," he said, "but we didn't know how close we were to producing a bomb until it was exploded at Los Alamos in 1945."

He left the contractors and went to work with the federal govern-

ment and was there until his retirement. He worked for the AEC at Oak Ridge 1947-50, then came to Idaho Falls as a chemical engineer for the AEC in 1950, just a year after the NRTS was established. After five years in Idaho Falls, Ginkel took a position for a year as director in the technical administration division with the AEC outside of Idaho, but he didn't like it. He returned to Idaho in 1956 as assistant director in the operations division. He took retirement in 1976 but decided he still wanted to continue work in his management specialty and did so from 1978 to 1985 with the prime operating contractor, EG&G Idaho, Inc. Since 1985 he was a consultant with the same company.

Ginkel waxed eloquent in praising the achievements of the INEL in the 38 years he worked there, the majority of the time in executive management positions. He pointed to such projects as the waste calcining, ATR, Loss-of-Fluid Test Facility (LOFT), and a number under Argonne which have contributed so much to the nation in nuclear achievement. "I think of the dynamic nature of activities," he said. "Nothing stands still. We always have new projects. Yes, we also have a whole range of problems to solve."

"I came to Idaho because it was a new station and I felt there were many opportunities," he said. "I was right." Indeed he was, because his career record showed a meteoric rise to the top. Maybe contributing to this was the fact he got bachelor of science degrees in such diverse subjects as chemical engineering and business administration in 1942 from the University of Rochester. He used both of these skillfully.

When he arrived in Idaho Falls in 1950, there was an operating staff of only a half dozen. A small lab was installed at a warehouse on South Utah Street. He worked for a time in the cramped offices of the old Rogers Hotel until the personnel moved to the three-story frame headquarters on Second Street two years later. The Rogers was previously a hotel so each room had a toilet. There was an overabundance of restroom facilities but it infringed on working space, Ginkel humorously recalled. Of course, there was little space for car parking. "We had to travel by bus via Blackfoot for a time because the road direct from Idaho Falls to the site had not been completed," Ginkel said.

Ginkel recalled working under J. Bion Philipson, then Idaho AEC director of operations, a hard-driving executive who likely was a leading force in getting the young site working in the early days. "He was different to deal with," Ginkel said, "but he had many responsibilities." Another leading luminary with which he dealt was Rickover, who was demanding and abrasive in his remarkable efforts to build a nuclear Navy ahead of the rival

Russians.

Ginkel looked on the visit of President Lyndon B. Johnson August 26, 1966, as one of the highlights. Ginkel was the master of ceremonies and introduced dignitaries, of which there were many. These included John A. Carver, undersecretary of the Department of the Interior; and Dr. Glenn T. Seaborg, the USAEC chairman. In fact, there were four AEC commissioners at the occasion, and many other luminaries. One of the embarrassing incidents was the failure of the loudspeaking system to function for the early third of Johnson's talk north of the Central Facilities. Both Johnson and his wife, Lady Bird, were visibly upset. The White House staff was in charge of the loudspeaking facilities and it was finally discovered that one of the national networks had inserted a recording tape into the unit so that the loudspeaker was deadened. Johnson was the only president to give a formal talk at INEL, and it boosted the posture of the facility. He also helped affix the plaque that dedicated EBR-I and made it a National Historic Landmark. This was the reactor that produced the first electricity created from nuclear energy December 20, 1951.

A visit by a team of Russian scientists headed by the chairman of Russia's atomic energy program, the State Committee for Utilization of Atomic Energy, Andronik Petrosyants, in 1963 also was a benchmark, Ginkel noted. "The Russians were amazed at what we had accomplished in the nuclear field," said Ginkel.

Ginkel fingered as highly significant the effort to change the scope of the site from reactor testing to a national laboratory. Actually, the designation from the NRTS to INEL was not made until 1974, a year after he stepped down as manager, but he had put in a lot of spadework during his last years as manager to help bring it about. "This was a major effort," said Ginkel, "because people looked on us as just a test station when we were actually expanding to a laboratory. It broadened our horizon. It meant we would look at other scientific and technical work. That proved to give us a more mixed bag. It really widened the scope of activities."

Ginkel and his wife, Inez, lived at 2751 Parkway in Idaho Falls. They have three sons.

R. Glenn Bradley was the fifth manager of the Idaho Operations Office of the Department of Energy or its predecessors, serving from September 1973 to March 1976. He said the NRTS figured very favorably in future AEC program planning. He noted many community officials informed AEC officials of their continued enthusiastic support for the site and its capabilities.

He recalled in a talk he gave in Idaho Falls in 1974 that there was a great opportunity to broaden the horizons of the NRTS, both in size and diversity. This prophetic statement was underscored within three months when the NRTS was renamed the INEL. The Eastern Idaho Nuclear Industrial Council went on record to rename the NRTS as the Snake River National Laboratory and a copy of such a resolution, approved May 4, 1974, was forwarded to U.S. Representative Orval Hansen, R-Idaho, a member of the Joint Committee on Atomic Energy. Hansen later decided to broaden the name to the INEL to indicate the widened scope of the site.

Bradley cited nuclear waste management development programs, new breeder and gas-cooled reactor safety programs, modest non-nuclear energy programs, and environmental research as potential areas for increased activity.

Charles E. Williams, who served as the sixth manager of the Idaho DOE office for seven years, May 1976 to June 1983, saw tremendous growth ahead for the Idaho National Engineering Laboratory.

"I foresee that with a scientific base and the support from the community, there will be no cap on growth at INEL," said Williams. "As far as I'm concerned the INEL has the best contractors and best office in the U.S. Department of Energy. I think the site grew up in development of reactor and chemical processing. I think the technology base is uniquely a development program. But there will be emphasis in remediation, such as the nuclear cleanup."

Williams counted as some of his achievements while Idaho DOE manager getting the Fluorinel Dissolution and Fuel Storage Facility (FAST), a new storage pool for spent fuel, fuel reprocessing upgrade, the start of the new Idaho laboratory program and "fun getting government people involved." He placed high his success in getting EG&G as the prime contractor.

Williams ruefully recalled he strongly did not want to come to Idaho from a weapons program at Las Vegas, Nevada, but that the move turned out to be one of the happiest periods of his career. In fact, his son, Eric, liked Idaho so much that after he finished college he returned to Idaho Falls to work for EG&G Idaho, Inc., in the waste management program. Williams became senior group president of advanced technology for Kaiser Engineers at San Francisco, but acknowledged he still missed Idaho.

Troy E. Wade, who served as the Idaho Department of Energy manager from July 1983 to June 1987, best remembered the warm relationships that were fostered in the community and state. "My best memory is that during the four years I got everybody talking to everybody else. We had a

good relationship with the governor, legislators and congressional delegation. We also had first class contacts with the city," Wade said.

Wade remembered some of the milestones as the final tests of LOFT and PBF (Power Burst Facility), and shutting down the controversial injection well. The adjacent lake was named for Jack Barraclough, local pioneer U.S. geologist and an Idaho legislator. Wade said he was especially pleased in bringing some new programs, citing the Specific Manufacturing Capability military project as one of these. The project's mission was to produce armor for army tanks and brought the employment of 500 at the site's Test Area North (TAN).

An array of small research and defense programs replaced many of the reactor safety projects while Wade was in charge. Employment zoomed to the highest level since the NRTS inception of more than 10,000. Wade started emphasizing the defense role of the INEL over the objections of many INEL executives. He said the INEL received more than 50 percent of its funding from defense programs and that defense growth was the future. Wade said he felt he accomplished most of his goals, but would have liked to have built a reactor.

In the four years at the helm of INEL, Wade made it one of the most popular and best known employers in the state. His emphasis on openness and promoting the site for new projects along with Idaho's congressional delegation turned what many felt a previously dark future to a bright one.

After he left, Wade released a statement urging the community to stand together and work for the best interest of the site. He pointed out that INEL's budget was larger than the state's general fund budget. He observed that in the small state of Idaho was located one of only 14 national laboratories of high caliber. It had an international reputation in reactor safety and reactor physics, was the only place in the nation that reprocessed uranium from reactor fuel and touted a preeminent basic research facility at the research center that had a growing reputation in the scientific community. It had a national reputation for its work in handling nuclear waste, now a major program at the INEL. Wade said such a project as Boron for treatment of a virulent form of brain tumor, using PBF, was one of the most promising new prospects.

"As long as this nation has nuclear weapons in its arsenal — and I hope it gets rid of some — we need the infrastructure to support those weapons. I think it would be a shame not to introduce new state-of-the-art technology to support the nation's nuclear needs," he said. A shutdown of the INEL, he added, would bring a catastrophic economic blow to Idaho. "The

relationship of the INEL and the state of Idaho, one to the other, is truly unique," he said. "There is no other place in the entire country where the partnership is as strong. Both the INEL and Idaho are indeed national treasures, so let's keep it that way."

Wade, a native of Cripple Creek, Colorado, first worked at the Lawrence Livermore National Laboratory in 1958, then went to the Nevada Test Site in 1968. In 1981 he became deputy assistant energy secretary of defense programs before coming to INEL. After Wade left in late June 1987, he took over his former position as deputy assistant secretary and held this job until the George Bush administration took charge in 1989. He later became associated with a Rockville, Maryland, and George Washington University scientific research program engineering firm.

Don Ofte served only a comparatively brief time as manager of the Idaho Operations Office of the Department of Energy, but in that span he left a deep impression. Not only was he personally highly popular with Governor Cecil D. Andrus, all members of the Idaho congressional delegation and other high public officials on the local, state, and national level, he also marked achievements in the DOE field.

Ofte served as the eighth Idaho DOE manager from June 1987 to December 31, 1989, the second shortest of any of his predecessors, when he surprisingly took retirement. He explained he wanted to retire while he was riding high and also to relax while comparatively young after turning 60. Jovial in his new life, Ofte said he took a job as a consultant with a consortium of national firms but would take some of his time to travel.

While at the helm in the last year, he pointed out the INEL's budget topped a billion dollars for the first time, even exceeding Idaho's general fund budget of \$850 million. The employment had flattened out at 10,000 when he first came, but zoomed to a record of 10,962 shortly after he left.

Ofte cited a number of other accomplishments covering a wide spectrum in the field of education and monitoring, in cooperation with other agencies, of any contamination underground, above ground and in the air. The DOE approved millions of dollars for the various programs. Agreements were negotiated with the University of Idaho and Idaho State University for granting nuclear engineering doctoral degrees. A masters degree in environmental waste management was also created with the two universities, the only one of its kind in the nation. Agreements also were placed in effect with such agencies as the EPA, USGS, and the state for monitoring the air, wells, soil, and environment for any contamination. Members of the National Academy of Science were invited to review the matter of transu-

ranic waste.

Before he left, Ofte put together a document that laid out the laboratory's goals for the next 20 years, and they looked sparkling to say the least. It set out not only to put the \$4 billion New Production Reactor into full-fledged operation but to attract other Department of Energy and Department of Defense facilities. "It is designed to enhance the biological effect, much in the matter of waste management," he said. "It will focus on the promotion of growth."

"The INEL enjoys a bright future," said Ofte. "It is one of the brightest stars in the DOE's lab network and all the signals are very favorable for the future. The increase in activity for waste management is a certainty. There will be large budgets for this for many years. Also to be addressed will be the handling of large stockpiles of plutonium which will be freed now that the tensions with the USSR are rapidly abating."

Before Ofte came to Idaho Falls, he had worked in various executive and management positions in a half dozen facilities, including the controversial Rocky Flats. A native of Brooklyn, he received a bachelor of arts degree in chemistry from Dana College at Blair, Nebraska.

During his three years in DOE's Washington office, Ofte discovered that the INEL enjoyed a good national reputation, particularly in resource management. It was noted for its quality of work and its ability to complete contracts on time and under budget.

For Augustine Pitrilo, it was a matter of feeling cautiously along, knowing the key personnel and looking for new horizons. Pitrilo officially took over as manager February 3, 1990, the ninth manager of the sprawling INEL since the installation was established in 1949. He didn't arrive on the job until April 15, 1990. In interviews he stressed the need for hard work, saying his values are "a good work ethic, very conscientious, wanting to be the best and having a real love for the outdoors." He described the installation in Idaho as a solid one that was well-run, staffed by a hard-working, talented workforce, and not in need of any major overhaul. He described environmental compliance as a top priority, that is, to see the INEL fully comply with environmental laws.

Looking to the future, he believed the \$3-6 billion New Production Reactor's technology was solid but skirted questions about its future; had reservations about the Boron Neutron Capture Therapy Project to cure a virulent form of brain cancer; felt that waste management would be one of the major tasks for the next 20 years; and saw a bright future for the Idaho Chemical Processing Plant and the Advanced Test Reactor (ATR.)

"I think the INEL is one of the cleanest institutions in the department and I think it's because of the people out here in the west," he said. "I think the main issue is to bring us into total and complete environmental compliance. That's got to be done—the sooner it's behind us, the better. Then we can start going forward again."

He pointed out that the way of doing business 10 years ago was not the same way of doing business in 1990. He thought that has changed because of public awareness of sensitivity for the environment, safety and health. "I think the key to our strength right now is to be highly diverse. I'd like to see us develop more joint ventures, 50-50 participation with industry. For this laboratory, there's a lot of potential. There are enough projects and enough diversity here that our future will automatically stay strong. I absolutely support innovation. And I'll support all the research that goes with it to make it happen," he said.

Pitrolo, 58, is a native of Fairmont, West Virginia. He graduated from West Virginia University, and worked 19 years for General Electric Co. (GE) as engineer and manager of the Gas Turbine and Space Divisions. This included working on the Apollo Space Program that successfully landed men on the moon. Pitrolo was then a manager for 15 years with the Morgantown, West Virginia, Energy Technology Center of the U.S. Bureau of Mines Laboratory. In the 15-year managership with a \$7 million budget, he transformed it into the top DOE fossil fuel research site with a \$250 million budget, \$1.8 billion in private contracts and 600 federal and contractor personnel. This was far less, however, than the INEL with its 11,000 employees and yearly billion dollar budget.

Both Warren Nye and George Hersey believe that Pitrolo deserves high praise for DOE for his recent selection. Pitrolo is "a skilled, experienced ABC manager" who "certainly deserved" the award. "He has been instrumental in helping to keep the NPPS business in the hands of those who know him well. He was a man of vision, a leader. He has ABC's support for the U.S. nuclear industry. He has a vision, a desire to keep the industry safe, to keep it improving, to develop and vision in "conducting a complex program to bring an exceptional success in a new field."

Pitrolo first headed staff of the NPPS from January 1971 until his retirement in December 1982. He then became a consultant with the ABC and the Nuclear Regulatory Commission 1983-86. After two years of

The first of the prime operating contractors, Phillips Petroleum Co., Atomic Energy Division, was headed by Dr. Richard L. Doan, who was reputed to be both an astute business executive and a keen scientist. Dr. Doan, said those who knew him best, left a legacy of achievement that sent the embryonic NRTS off to an auspicious start.

He earned his degrees in physics from Indiana University and the University of Chicago. His original activities dated back to the Manhattan Project under the U.S. Army Corps of Engineers during World War II, which developed the atomic bomb. He engaged in work at the University of Chicago, at the famous "West Stands Reactor".

After coming to Idaho Falls in 1951, Doan was able to attract a number of projects to the NRTS through his administration of Phillips which directed the operations of the Materials Testing Reactor, Engineering Test Reactor, Chemical Processing Plant, the SPERT (Special Power Excursion Reactor Test) family of reactors, and a number of central services. He also participated in the operations of LOFT, PBF, and the Reactivity Measurement Facility.

The contractor-community relationship that has been so favorable throughout the history of the Lost River desert installation was given an early boost by Doan, according to the many who worked closely with him. Those who were hired by Doan said they were told to fit into the community and participate in activities, and if they couldn't, not to come. As a result, many former Phillips employees became community leaders in a wide range of activities.

Both Warren Nyer and George Herman Hanson, longtime scientists, heaped praise on Doan for his accomplishments. William L. Ginkel, the former Idaho AEC manager, also credited the first prime operating company manager with helping to keep the NRTS humming with a myriad of projects. Those who knew him said he was a relentless advocate of reactor safety. The AEC awarded him the U.S. Atomic Energy Commission Citation, saying "his inspiring leadership and vision in coordinating a complex organization brought exceptional progress in a new field."

Dr. Doan headed Phillips at the NRTS from January 1951 until he retired in September 1962. He then became a consultant with the AEC and the U.S. Nuclear Regulatory Commission 1963-80. After two years of full

retirement, he died in Arizona June 5, 1982.

Langdon L. Leedy, who came with the first contingent of Phillips Petroleum, was among those hardy pioneers who helped get the NRTS off to an auspicious start. "It was all new but we were thrilled to start such a new project on the desert," Leedy recalled. Leedy was one of Dr. Doan's lieutenants, and held the title of manager of administration, which included accounting, auditing, personnel, security, and special services which embraced such tasks as the mail and cafeteria.

"There were close to 2,000 people working at that time and virtually everything they did was new. Many of the leading scientists had worked on developing the atomic bomb, including Doan, but they were anxious to put nuclear energy to commercial use. Doan was a terrific scientist as well as a practical businessman," said Leedy. "I remember he had one favorite saying: 'If it ain't in writing, it ain't so'. I recall he often said that he told his wife when he kissed her good-bye to go to work that he might not get back." Under Dr. Doan, Phillips' atomic project thrived, recalled Leedy. Others who were trusted assistants of Doan in those early days included John Lyon, manager of operations; and Dr. John Huffman, manager of technical services.

Leedy worked for 14 years at the Phillips headquarters at Bartlesville, Oklahoma, and put in 16 more years in the Idaho projects before he retired August 1, 1969.

Charles M. Rice, former head of one of the prime operating companies at the NRTS, believed that in about a dozen years or so nuclear power will step to the front. "In terms of industry," he said, "the utilities will be ordering nuclear power and heavily fabricated units to produce them." Rice said he believed the small reactors would be built of 500 to 1,000 megawatts, rather than 1,000 and 1,500. "They will be less expensive and can be built in a far shorter time," said Rice. He pointed out, for example, that Seabrook took about 15 years to build while the smaller plants he envisioned could be erected in probably three to four years and be safer. Argonne-West, he said, is presently developing such a project in its Integral Fast Reactor.

Rice took over as president of the Idaho Nuclear Corp. in February 1969, which succeeded Phillips Petroleum Co. In fact, the company took over some 600 of the former Phillips staff to join 2,500 others. It supervised all of the installations except the Naval Reactor Facility (NRF). Then in 1971, Allied Chemical split from Idaho Nuclear and supervised the ICPP, but later was replaced by Westinghouse. Rice left in 1972 and formed Energy, Inc. with the idea that the commercial nuclear industry had better ca-

pabilities in quality assurance. He stayed with Energy Inc. until 1980 when he became an almost full-time consultant specializing in management of nuclear power plants on a nationwide basis. He formed a company named Rice, Inc. with a half dozen people and an office at 369 S. Eastern.

Rice remembered during his presidency with Idaho Nuclear what he called a major breakthrough of moving office personnel from the site to Idaho Falls in 1969-70; the visit by the head of the Russian AEC, Andronik Petrosyants, in 1970; the vicious blizzard in 1971 which stranded some thousand NRTS workers; and the first layoffs in 1969.

"Moving people who did not need to work on reactors, such as those in design, computer, analytic and other office duties, to Idaho Falls set a trend," said Rice. "It was only logical to eliminate two hours of bus rides to the site, making it more convenient, efficient and economical. This policy has been followed ever since at tremendous savings in money." Rice said only some 70 were affected in this first move, but ever since then office buildings in Idaho Falls have been provided for those who did not actually need to work in reactors. Clearance for this was given by the Washington AEC office at that time. Rice said he persuaded Dick Clayton, a leading Idaho Falls downtown developer, to remodel the second and third floors of the Rogers Hotel to accommodate the office personnel.

Rice said the Russian delegation was shown through the water reactor facilities, such as LOFT, PBF, and Semiscale, and even the abandoned ANP. He said he asked Petrosyants what safety features they had built into their reactors, and Petrosyants responded, "We design them right, build them right, and run them right." This view now contrasts with the disastrous 1986 Chernobyl accident. Rice said he later received a beautifully bound booklet from the Russian delegation thanking him for the visit.

The 1971 blizzard stranded the AEC buses on the Idaho Falls-AEC stretch of Highway 20. Rice said the Central Facilities cafeteria was opened and all were fed steaks during the long night. Even some non-NRTS people caught in the storm were fed. "It helped further cement the warm relations between the AEC contractors and the community," said Rice.

The shocking layoffs in 1969 were the first ones for the site personnel and came from the Washington headquarters, Rice said. It awoke people to the fact that such a cutback could come. Rice said only some 70 were affected and this was reduced by attrition and transfers. "We had set up a careful program to soften the impact of such personnel reductions," said Rice. At that time there were some 3,300 employed, plus personnel at the Naval Facilities.

Other highlights Rice listed as significant during his management were the Advanced Test Reactor going critical December 25, 1969, and completing its first full year of full power in 1970; and the PBF completing its first full year of full power October 20, 1970.

Rice said while he headed Idaho Nuclear Co. he set up programs to inform local businesses how they could do business with the site. In that regard the company had training sessions that brought in local people to learn about contracting with the government. "I understand that local businesses do about \$20 million in contracts with the Idaho DOE annually," he said. In addition, he also set up a program for minority businesses. This included the Shoshone-Bannock tribes at Fort Hall and the Blackfeet Indians based at Browning, Montana. Later when he headed Energy, Inc., he said it was the company's policy not to do business with the INEL but to shop on a nationwide and even international level.

Ronald W. Kiehn became the first manager of EG&G Idaho, Inc., when it won the prime operating contract in 1976, serving until he retired January 1, 1983. He saw a bright future for nuclear energy, saying "there is no question that nuclear power will come back and be the clean alternative." He pointed out that other forms of energy—coal, oil, gas, and electric power—eventually will be exhausted or be environmentally unacceptable. "I feel it is only a question of time when there will be a surge for nuclear power," he said. He pointed out that many nations of Europe and Asia are increasing the use of nuclear power.

Kiehn came to Idaho from the Las Vegas, Nevada, project where he had been for 15 years. At that time, the company employment rolls reached about 3,000 and when he left they had surged to nearly 4,000. The centerpiece of work was LOFT which was engaged in some of the important research work of that period. Research in many of the other reactors was diminishing, he observed. He later engaged in consulting work on a national scale, hinging on general management of government contracts, primarily for the U.S. Air Force. He estimated it took about 20 percent of his time. He is a graduate of the South Dakota College of Mines and Technology.

Jim Zane was Kiehn's chief deputy and succeeded him when he left. Zane graduated from the University of Wyoming with a mechanical engineering degree and later earned a masters degree in nuclear science. He first came to the Idaho site in 1960, left to work on a reactor facility in Colorado, returned to the NRTS in 1967, and then stayed in Idaho. When EG&G took over the NRTS contract in 1976, Zane served as deputy manager at the Power Burst Facility. He was named deputy general manager in 1983, later that

year succeeded Ronald Kiehn as general manager, and became a corporate vice president in 1986. Zane's lone customer was the Department of Energy.

Zane knew the Idaho station was the cleanest of any similar federal installation in the nation and believed it held the same enviable standing of any industry in Idaho. "Lots of people here work hard to clean up the waste," he said. He added the INEL stored much of the Rocky Flats waste, but questioned whether this waste was as dangerous as it has been pictured by such anti-INEL groups as the Snake River Alliance, a vociferous minority of some 800 members. Looking down the road for the next six years he believed some 1,200 of the 4,500 EG&G employees would be working on waste management.

Zane said the key to good management was promoting quality, cost efficiency, and safety with emphases that meet the requirements of the task and DOE. "Scientists need their freedom to create and discover," said Zane. "One thing you'll find about scientists, they never have enough knowledge and time; they always want to know more."

Ron J. Teunis came to the NRTS to work for Argonne National Laboratory's Idaho site in May 1971, and saw many great landmarks before he left in late 1989 to become the chief operations officer for the laboratory in its main Chicago office. He visited the Idaho site from time to time as the top officer in charge, and can't forget the many good times he had in Idaho, including participation in many community activities. He became manager of Argonne's Idaho Operations in 1975 over a complex employing some 700, a force which has remained fairly constant in recent years.

Standing vividly in his mind was construction of the Hot Fuel Examination Facilities (HFEF) which was dedicated in 1972 and went into production in 1973. James Schlesinger, who headed the Energy Research and Development Administration (ERDA) at the time, was among those on hand for the event along with many other leading ERDA and state leaders.

Teunis also took a lead in opposing the proposed shutdown of EBR-II in 1982, contending it was valuable in its research. Its performance, he pointed out, justified his stand. Teunis also pointed to the innovative design for an advanced nuclear power plant, dubbed the Integral Fast Reactor (IFR). It appeared to be inherently safe and less expensive to build and operate than previous reactors. Much of the technology for IFR is based on EBR-II, the first pool-type liquid-metal reactor. Technology developments of the '80s radically improved the outlook for metallic fuels. "I think Argonne will be on the cutting edge of technology," said Teunis. "The IFR is a premier reactor. It is pretty exciting."

Teunis also said a significant development is a plan to burn up nuclear waste in which Argonne has a large part to play. Reactors can be built in such a way to consume their long-lived nuclear waste, as well as those of other reactors, he said.

Three foreign-born scientists had a prime hand during 1939-42 in the first nuclear reactor development that eventually brought the Idaho National Engineering Laboratory to eastern Idaho. In 1939, Dr. Walter H. Zinn, a Canadian immigrant, joined Leo Szilard, a Hungarian physicist, in experiments that demonstrated that a nuclear chain reaction could be achieved. Zinn later joined the team of Szilard and Enrico Fermi, the Italian-born genius who had earlier immigrated to America. They achieved the first nuclear chain in 1942. It was during this time the Fermi team first recognized that breeding more nuclear fuel in a reactor than it consumed was a theoretical possibility.

In 1945, Zinn and a small group of associates at the University of Chicago Metallurgical Laboratory were given approval to design a breeder. Activities were delayed until the windup of World War II, however. Zinn preferred to build a test reactor near Chicago, but Dr. Edward Teller, chairman of the AEC's Advisory Committee on Safety, wanted a remote place, and the Idaho site was established in 1949. "We did not want to have people who had nothing to do with it come closer than five miles to a reactor," Teller said. The nuclear topic was highly secretive until the early '60s but regulations did not slow down projects. "Things were more direct," Zinn said in a 1971 Post Register interview. "You could get things done."

An accident at Argonne's lab in Lemont, Illinois, June 2, 1952, where Zinn's team was headquartered at the time, showed that the aftereffects of a control rod accidentally pulled out of a reactor were milder than expected. The scientists theorized that the boiling of the water might be a controlling factor. They decided to test their theory in the first Boiling Reactor Experiment (BORAX) reactor at the NRTS in 1953. The success of the BORAX experiments proved that light water reactors could be safe. It laid the groundwork for the entire nuclear power industry. Admiral Hyman Rickover, who had pushed the development of the nuclear Navy in Idaho, was also advocating the use of light water reactors over the liquid metal breeders that Zinn was developing. Zinn and Rickover, both temperamental, often clashed. Rickover, who carried tremendous political influence in Washington and Idaho, triumphed.

Zinn arrived in Idaho late in May 1951, as head of Argonne's team and attempted to reach reactor criticality. He had been preceded in January

by a cadre of Argonne scientists including Meyer Novick, followed in March by Harold V. Lichtenberger and seven others. On December 20, 1951, at 9:50 a.m., Zinn first started the EBR-I reactor and leveled off at low power. The reactor cooling system was connected and sodium potassium alloy started circulating through the reactor. Zinn's record in the log book said: 1:23 p.m.—load dissipator connected to generator, electricity flows from atomic energy; rough estimates indicate 45kW. It was a practical demonstration in the world that the atomic nucleus could serve mankind as a source of power.

MTR became operational on March 31, 1952. Within a month, the reactor was up to full power of 30,000 kilowatts and on August 5 began to fulfill the function of a testing reactor. Not far behind were the submarine thermal reactors. President Truman June 14, 1952, laid the keel for the *Nau-tilus*, the world's first nuclear powered submarine.

"It is gratifying today to see the breeder reactor which we developed 20 years ago coming into its own," said Zinn. "It was always a good idea, we were just 20 years too early. I am sure that it will not only become a viable commercial power industry in itself, it will have its complete roster of supplies, too, as we have in the water reactor field." Dr. Zinn said in the 1971 Post Register interview, at the 20th anniversary ceremony for EBR-I, that he wanted the EBR reactor near the proposed new Highway 20, but the Idaho Highway Department changed the route and put it further away.

Zinn, in 1990, was retired and living in Clearwater, Florida.

Kirby Whitham had a long and notable career as a chemical engineer but when the flicker of lights glowed in four globes at Experiment Breeder Reactor I on the afternoon of December 20, 1951, it forever cemented his mark in his chosen fields. An ANL team headed by Zinn had brought the historic reactor to criticality (a controlled, self-sustained chain reaction with a core) on August 24. The scientists were embarking on a new field and they were enthralled at what was happening. They continued to toil on low-power operations while they studied their new creation. Then on that historic day four months later, the reactor started up and gradually increased over several hours. At 1:23 p.m., the first electricity ever generated from nuclear heat began flowing from the reactor's turbine generator.

Whitham was one of the pioneers and his name is one of sixteen chalked on the wall of the generator room to commemorate the historic occasion. "We were all exuberant but we also were too busy with the equipment to give it much thought," recalled Whitham, who was retired in Idaho Falls. "I know it was in the late afternoon and we were so happy to demonstrate that we could generate electricity." It wasn't until that evening the

elated scientists took time out to celebrate in a small way. "I know we had some champagne but we didn't drink much. You must remember that this was classified," he said. Dr. Zinn then announced the achievement to Argonne's main office at Chicago.

The scientists lived in a state of euphoria for some time but they were too busy to pursue their success in a project that was the forerunner to the worldwide nuclear electricity of today. Whitham laughingly recalled that day, adding, "Dr. Zinn probably saw the significance more than we did, but we were busy trying to get the turbine going and tending to other equipment."

That first historic event in 1951 was then followed by the Boiling Water Reactor Experiment III July 17, 1955, when nuclear power first lit the town of Arco. Whitham also played a key role in this. It was anticlimactic. "We knew it was going to work," said Whitham. But it wasn't always that easy. The EBR-I scientists spent many hours in their pioneer effort. In their pilot plant they looked at pressured boiled water, helium controlled, and others. "There were too many features to make hot gas desirable. I was a chemist and looked on the organic side. After much study, we finally settled on liquid metal cooled reactor coolant which was sodium potassium, or eutectic. They breed more fuel than they can consume. We also chose stainless steel piping. Yes, we knew about hazards at that time," he said. They built many safety features. They also had to make many instruments from scratch. Whitham also worked on all five BORAX reactors, and was construction and operation manager of EBR-II which produced electrical power August 1964.

Whitham, like many other nuclear scientists, was disappointed the United States and other advanced countries of the world have not progressed further in developing more nuclear power reactors. Since the 1986 Chernobyl accident, building of nuclear power reactors has slowed to a walk. But the scientists are patient.

Whitham was born at Bozeman and received his bachelor of science degree from his hometown Montana State University in chemistry in 1943. His first stint was working at the University of California in the nuclear program to separate uranium 235 from 238, then at Oak Ridge, Tennessee, 1944-47. Indirectly he also participated in producing the first atomic bomb while with Argonne National Laboratory in Chicago on the Manhattan Project. He retired in November 1985 from full-time work but then engaged in some consulting tasks with Argonne. Many of those scientists who helped produce the first electricity still lived in the Idaho Falls community in 1990.

Cyril Slansky was impressed when he viewed the Lost River Desert with its three eye-catching buttes and vast sagebrush plains in 1952. That was just as the Idaho Chemical Processing Plant was preparing its myriad of nuclear engineering and research tests. He was then a young scientist, really a pioneer in the budding field of nuclear science. "I was fascinated to believe that I would be working in this primitive area in the nuclear age," he said.

Slansky had received a bachelor of science degree in chemical engineering from the College of Idaho, and a doctoral degree in the same field from the University of California at Berkeley. He had toiled five years at the Hanford Works at Richland, Washington, 1947-52, before he accepted an offer to head a crew of some 15 at the rapidly expanding Chem Plant. It was indeed a modest beginning in what he called a "work lab" consisting of two rooms in the basement. It was February 1, 1952, when he started, and he stayed for 26 years before a mandatory retirement from full-time work in 1978. But he did continue to work as a consultant for various contractors for four years.

Slansky had stars in his eyes as he began research in applying separation technology to the recovery of highly enriched uranium from the fuel used in federal reactors. Most of the team had no experience in the new radioactive processes, but with diligence and study the lab reached out to adapt the plant processes to new kinds of fuel from various reactors being planned or operated at the NRTS.

The lab, with radiation safety foresight, was built of cast concrete, several feet thick. A special shield cell was designed and built for experiments using large quantities of radioactivity. In spite of uncertainties in this new field, the lab maintained an excellent safety and radiation exposure record. The team expanded to the new process technology and novel applications and instrumentation.

American Cyanamid Co. was the first operator of the plant and Slansky was to work under three other successors, Phillips Petroleum, Idaho Nuclear Co., and Allied Chemical, before he turned in his final time slip. There were many labs at the Chem Plant and personnel expanded from 300 to more than 1,500. Emphasis was placed on safety and security.

"There was no plant that did fuel processing," said Slansky. "We did special things that were not done anywhere else. Besides handling fuel from many, we recovered radioactive krypton or noble gas. We had a process for recovering radioactive barium. These were all pioneer efforts. We had a job to do and that was the recovery of enriched uranium from spent fuel. We pioneered in the field of chemistry and engineering. Today's em-

phasis at the site is in chemistry, not reactors. We had an interesting atmosphere and did all sorts of things. We met frequently with scientists at Oak Ridge, Tennessee, Argonne at Chicago, and Brookhaven in New York. There was a feeling of openness," he said.

The scientists had stainless steel tanks to hold the wastes. This waste was later converted from liquid to calcine. "We had an atmosphere at the site of innovation," he said. "It also was important to educate the politicians."

Slansky had interesting international exposure. Among others from the Chem Plant, he presented papers at the first international meeting in Brussels, Belgium, in 1957 for the peaceful application of nuclear power. The formation of the International Atomic Energy Agency in Vienna, Austria, emphasized the future of nuclear power. In 1969, he was given two years leave to serve in Vienna as head of the Nuclear Waste Disposal Section. He also served as scientific secretary to the largest symposium on nuclear energy at the United Nations in 1970, with the main theme on safety aspects of nuclear power.

The developing countries wanted power at any cost because they wanted to upgrade their economies. Slansky handed a bouquet to President Dwight D. Eisenhower for initiating the "Atoms for Peace" Program.

What started as a highly classified and secret military program turned out to be a boon to mankind. There was a continuous stream of visitors, many from foreign countries, to the ICPP. They wanted to see the progress in unclassified work on separation processes and on radioactive waste management, particularly the calcination of high-level radioactive waste. "This site," he said, "has offered a great deal of benefit to foreign countries. That spread of information has been solid." As a result, France has gotten more than half of its power from nuclear plants. Other countries also getting huge chunks of nuclear power have been Russia, Czechoslovakia, Spain, West Germany, Italy and others. The United States has fallen behind and has not licensed a nuclear plant for 25 years, Slansky ruefully observed. "I think it is important that we do not let fear overcome reason," he emphasized.

Many of the scientists have not limited their efforts to science. Many have pioneered in the development of outdoor recreation. They led in organizing the Ski Club and Alpine Club. Slansky was among the originators of the local chemical society and was one of its early presidents. He even ran for state senator in 1980 as a Democrat but lost. He devoted much of his time to senior citizens affairs, served on the state legislative committee for the American Association of Retired Persons, and was active in mountain recre-

ation. Slansky built his home at 2818 Holly Place in the Hughes Imperial Addition, and lived there with his wife, Elvera.

When Ray Haroldsen, a Bonneville County native and electrical engineer, flipped a switch at about 11 p.m. July 17, 1955, at BORAX III, world nuclear power for peaceful use established a notable landmark. That's when nuclear power streamed over the lines to light up Arco, a forerunner of the nuclear power generated in much of the world today. As Haroldsen recalled it, some 500 kilowatts went to Arco, 500 to the BORAX facilities and 1,000 to Central Facilities.

Even today, Arco boasts it is the first city in the world to be lit by atomic power. BORAX, of which there were eventually five, was the classified name given to the Boiling Reactor Experiment. "The idea for the experiment grew out of an unplanned nuclear excursion that happened at a critical assembly at Argonne National Laboratory in Illinois," said Haroldsen. In 1952 at Chicago's ANL, one of the operators of the critical assembly (a zero-power mockup of the reactor for the first nuclear submarine), without thinking, manually yanked a control rod out of the critical assembly. The result was a nuclear excursion that caused an explosive steam bubble to form in the bottom of the critical assembly.

At the first operation of BORAX in June 1955, there followed a series of transient experiments in which the BORAX reactor was purposely slugged with excess reactivity, causing spectacular geyser-like eruptions from the top of the reactor tank. "These streams of water reached between 50 and 150 feet high," said Haroldsen. "In fact, there were humorous reports from startled tourists traveling on Highway 26 claiming that they had seen something like Old Faithful erupting on the horizon in the Arco desert."

Next was a rush to locate a suitable steam turbine generator to connect BORAX. One was wanted to run on wet steam, not the widely used new dry steam model. It was found in an abandoned state at a remote sawmill near Albuquerque, New Mexico, of 3.75 megawatts which had been manufactured by Westinghouse in 1925, and barely acceptable. It was a contrast that such a decrepit generator was used to help boost power to the nuclear age, Haroldsen mused. "Here we were, the forefront of knowledge, trying to get the old 1925 turbine going," said Haroldsen.

Utah Power and Light employees gave their help, and without them, said Haroldsen, lighting Arco would have been almost impossible. They found a desperately needed transformer in a stockyard near Central Facilities. It was loaded on a Morrison Knudsen-Ferguson flatbed truck, hauled to BORAX and wired without unloading. "It was a transmission line that caused

the lighting of Arco to be delayed about two days," said Haroldsen. "We also lost about as much sleep. Engineers blew out several lines before successfully lighting the town. Those two sleepless days are something we will always remember."

Haroldsen recalled he had the privilege of adjusting the speed and voltage of the BORAX to match the UP&L system and to close the circuit breaker that made the connection to Arco. The connection was made complete when a UP&L operator in a mobile substation at Central Facilities disconnected the UP&L from the Arco supply, leaving BORAX the only source to Arco.

Haroldsen observed few if any Arco residents knew they were getting free power for about one and one-half hours because it was near midnight. "Some who may have been up late might have wondered if something was going on as there were some company television people around," said Haroldsen. "The morning after the lighting of Arco, some international visitors toured the BORAX site and found the reactor and power plant in casual operation as if those tests had been routine."

The ANL-West team headed by Harold Lichtenberger went the following week to Geneva, Switzerland, to attend the International Conference on Atomic Energy. They packed the evidence of past experiments, along with some spectacular film of the transient test and the lighting of Arco. They had heard rumors that the USSR was going to present a paper on its new five megawatts civilian nuclear power plant. As it turned out, the United States delegation got wide attention. The Soviets said they didn't believe the experiments had worked but the international observers testified that the reactor had indeed generated enough electrical power to light Arco.

Haroldsen scoffed at the radiation danger, adding, "I don't know of anyone who was involved who died of radiation." He recalled he and many others got large doses and experienced no ill effect. He said he got 15 rems of ionized radiation at one time, as compared with 5 considered safe for one year. "I guess I should have been dead but I don't feel any effects," he said. "Maybe we are just lucky. It is a clean industry and I'm a big booster for it. It would help the Greenhouse effect."

"This group of dedicated engineers and technicians have the satisfaction of knowing that they contributed a vital step in developing the modern boiling reactor. Some still live in the Idaho Falls area. Several have died. As far as I know, only one died of other than natural causes and that was in a mountain climbing accident. As far as I'm able to determine, none of the first group who were exposed to much higher than normal levels of radioac-

tivity have developed cancer."

Haroldsen first began work in 1950, just a year after the NRTS was established, as a construction engineer for Bechtel in building the Idaho Chem Plant. After more than a year of this, he joined Argonne-West and was with that company or its successor most of the time ever since. He missed the first lighting of nuclear power at the old EBR-I by just two weeks in 1951.

Haroldsen was born on the family farm on St. Leon Road four miles northeast of Idaho Falls. He is the father of four sons and three daughters. He attended Idaho Falls public schools, received a bachelor of arts degree in metallurgical engineering from the University of Utah in 1950, and a masters degree in electrical engineering from the University of Idaho in 1961. He took early retirement in 1987, but then served as a consultant, mostly with EG&G.

Warren E. Nyer was in on the ground floor in helping develop the awesome atomic bomb which abruptly ended World War II before he came to the NRTS. He was just a graduate of Tilden High School in Chicago, but in November 1941, just two weeks before Pearl Harbor, he began working on weapons research at the University of Chicago. That was even before there was the now well-known Manhattan Project which eventually built the atomic bomb. Nyer worked with a small group of scientists on the atomic project and it became common knowledge, although top secret. Nyer was recruited by Dr. Arthur Compton, who was a Nobel prize winner in physics and head of the University of Chicago physics department. At that time, the metallurgical laboratory was formed and Nyer became a research assistant. Compton soon consolidated the entire operation.

With that early background, Nyer then worked at Oak Ridge, Tennessee; Hanford, Washington; and Los Alamos, New Mexico, before he came to Idaho Falls. He was recruited by Dr. Doan. He brought his family to Idaho on Thanksgiving Day, 1951, and stayed in Idaho ever since.

He vividly recalled witnessing with his wife near Alamogordo, New Mexico, the plutonium bomb test from a distance of about six miles. "It was indescribable," he said. "There was elation. We all knew the war would soon be over." Nyer said the American scientists knew beforehand they were in a race with the Germans on atomic power. "But we completely outclassed the Germans," said Nyer. "They were thinking of the short-term effect." The atomic bomb, he observed, has deterred a nuclear war since World War II. It also probably saved a million lives, both American and Japanese, in precluding the invasion of Japan.

Nyer's work in 1951 started on the first research of what was known

as nuclear cross-section instrument. "We began receiving research assignments from the AEC involving nuclear work and reactor safety," he said. "They are continuing to the present day." He worked for Phillips 17 years, 14 of them on nuclear research.

Nyer worked on three Special Power Excursion Reactor Tests (SPERT), and the related Loss-of-Fluid Test program. "Regarding SPERT," Nyer said, "we found it could be easily designed to be much safer in respect to runaway accidents than previously thought." One aspect of reactor safety was to observe and study the behavior of reactor systems under adverse operating conditions. It was to discover points of design weakness, and to learn what inherent safety mechanisms contribute most of the self-safety so as to capitalize on them.

SPERT conducted the first tests in 1955 and three other SPERT reactors and LOFT were operated through 1970. Research concentrated on the major safety concern at the time, "runaway power." It was found, to the scientists relief, that reactors in general have a strong tendency to shut themselves down if excessive fission occurs, and that "runaway" accidents were less likely to happen than once thought.

Nyer was in charge of the LOFT program which he had suggested in a previous letter to AEC headquarters. He was the first vice president of Idaho Nuclear Co., which followed Phillips Petroleum as the prime site contractor. "I think the real thing we did at Phillips was to establish the laboratory concept operated to the present day by EG&G," said Nyer.

In 1972, Nyer became a consultant for nuclear utilities and power plants. It kept him fully occupied, along with many trips in the country. In the late 1980s, his work took about three-fourths of his time, and he also took frequent trips to Texas.

John R. Horan, who served as director of the health and safety division, U.S. Atomic Energy Commission, at the NRTS 1957-71, could see when he first came to Idaho in October 1951 the vast potential of nuclear energy. He first became interested while attending Vanderbilt University at Nashville. This led to a meaningful and productive career to the present day. He retired from full-time work August 1, 1983, and served as a consultant but picked what he wanted to do.

A native of Chicago, born April 3, 1923, he graduated with an AEC fellowship in health physics at Vanderbilt in 1951, then engaged in cancer research at the Cancer Research Hospital at Oak Ridge, Tennessee, in 1951-52. He was first employed as senior health physicist with American Cyanamid Co. at the Idaho Chemical Processing Plant in 1952-53. The ICPP was

the third project built at the NRTS.

"The best opportunities for a young man, I felt, were at a new place and the Idaho project seemed the best," he recalled. In retrospect, he said he never dreamed he would settle in Idaho, but he became a permanent resident. He said he liked what he saw in Idaho and Montana when he first traveled in a troop train while in the Air Force during World War II. He came to Idaho Falls with his family in October 1951, living at a home in Bel Aire Addition, the first major housing project springing up in Idaho Falls to accommodate the influx of new workers.

He first was paid \$440 a month as a health physicist, which was then thought a handsome salary. Housing at Bel Aire was considered by the atomic workers as affordable and suitable. Horan was favorably impressed by the reception given to the new workers. He recalled the warm cooperation of Mayor E. W. Fanning and veteran Councilman Russell A. Freeman.

Horan, like all the workers, had to travel via Blackfoot, then narrow Highway 26 in those early days. "It was a long drive," recalled Horan, particularly during severe winter weather when vehicles were hampered, sometimes blocked, by blowing snow.

The Chemical Processing Plant was basically completed and the first operation known as the "cold run" occurred in January 1953. Horan's primary job was to oversee radiation protection. "Even at that time we were concerned with radiation fallout but we found we were super clean," said Horan. "We showed people could live near a nuclear reactor without much danger."

Horan made an exhaustive study of INEL from its inception in March 1949, to 1990. One of the momentous events took place on the evening of January 3, 1961, when the Stationary Low Power Reactor No. 1 (SL-1), a small U.S. Army reactor at the southwestern end of the site, blew up. It was the first nuclear accident in the world which caused fatalities. The SL-1 actually was a small-scale reactor because it produced electricity and space heat. Horan called it a Class 1 disaster, one that would not affect other INEL facilities or areas outside the site. It was, however, of worldwide impact. Nuclear scientists and writers from throughout the nation and foreign countries flocked to the scene. One New York Times reporter was even amazed that Idaho Falls citizens were not in a panic but calmly went about their work as if nothing had happened.

Killed were John A. Byrnes, 27, U.S. Army specialist; Richard L. McKinley, 22, U.S. Army specialist; and Richard C. Legg, U.S. Navy electrician, who all lived in Idaho Falls.

The SL-1 facility was being used by the Army to realize the potential of portable reactors for remote field use, particularly in the Arctic and Antarctic. One of the workers apparently had pulled the central control rod 20 inches from the reactor, setting off a surge of steam that broke the reactor. A nine-foot column of water slammed against the reactor vessel, propelling it 10 feet off the ground into the ceiling. There were later rumors that one of the crewmen may have intentionally moved one of the rods for a murder-suicide, but investigations, including one by the Post-Register, failed to uncover an iota of evidence.

AEC firemen found rubble once inside the sheet-covered reactor. To limit their exposure to radiation, crewmen took turns carrying victims from the building. One of the bodies was impaled on the ceiling by the force of the explosion. The bodies of the SL-1 victims were buried in standard military coffins which were fitted with lead shielding to prevent radiation leakage. Eight civilians who participated in the SL-1 rescue efforts were later given bronze medals by the Carnegie Hero Fund Commission.

The \$4.4 million damage to the reactor was irreparable and General Electric crews finished the task of entirely razing it six months later. As an aftermath, widows and families of two of the victims filed suits in U.S. District Court, one for \$1.5 million. The AEC special investigation board on September 24, 1962, issued a formal report saying the blast appeared to have been caused by one of the men withdrawing the central control rod blade from the limit specified, but why that happened is yet unanswered.

(Two other fatal accidents have occurred at the INEL, but they were of construction origin. Harry L. Stephens, 49, was killed in 1969 when scaffolding he was working on at the Flight Engine Testing Building was blown over, and he died from severe head injuries after he struck the concrete floor. Marlowe G. Herbst, Blackfoot, and Joe Dale Alton, Arco, were killed in 1977 when they were buried in a cave at an excavation site at a new facility at the Idaho Chemical Processing Plant area.)

"I was not surprised that the first major accident involving a reactor happened at the INEL facilities because that was the nature of our work," said Horan. He said the accident was a "classic example" of doing the right thing. Firefighters had been trained to monitor themselves for radiation exposure. "This is what kept the firefighters from being overexposed and possibly even killed," said Horan. "It was a lesson the Soviets did not learn from the 1986 Chernobyl reactor accident." No rescue personnel received over 27 rems of radiation. Even the nurse who administered mouth-to-mouth resuscitation absorbed only 17 rems.

Evening winds at the time blew from the northeast, rather than the usual southwest, in the direction of Atomic City, American Falls, Burley and Rupert. A sheep was purchased from a rancher east of Atomic City, but tests showed it had absorbed no radioactivity. The plume of radioactive iodine floating southwesterly was found to be harmless. Most of the radioactivity was confined near the site. Traffic on Highway 20, only a half mile from the ruined facility, was not even stopped, although barricades were in place if they were needed.

Horan was especially proud that safety advances were constantly made, and that the INEL operations prevented the kinds of fires that caused millions of dollars of damage to other AEC sites. The AEC hierarchy was committed to safety, even in those early days, Horan said. And that's why the INEL stands as a beacon of safety, achievement and excellence in the Department of Energy program to this day.

Probably one of the feats at the Idaho National Engineering Laboratory that proved a success but was terminated for monetary and safety reasons was a proposed nuclear aircraft. One of the pioneers of that mammoth project was Robert Drexler, later a senior engineer specialist in the mechanical engineering department of EG&G. Drexler, a soft-voiced technician and a native of Idaho, well remembered the day he came to the NRTS March 17, 1955. Previously he had been at Hanford in 1952-53, and in the Army special weapons group a couple of years later before returning to his native Idaho. He was a 1952 graduate of mechanical engineering at the University of Idaho.

Drexler recalled it was an exciting time when the Aircraft Nuclear Propulsion project was inaugurated to design a nuclear aircraft that would fly as long as 30 days without refueling. He was assigned to his specialty of remote handling operations. He and other dedicated engineers, scientists and specialists built three huge Heat Transfer Reactor Experiment units to transport and hold reactor cores. These units were some 30 feet wide, 33 feet high and 60 feet long. They were moved by a shielded locomotive. Each weighed some 400 tons. The units were different in design but they all were intended to prove that nuclear powered jet engines could be run for days or weeks at a time. "And we did that," said Drexler. HTRE-I (Heat Transfer Reactor Experiment No. 1) had a single core, HTRE-II had a removable center, and HTRE-III had a horizontal core. The reactors were tested in a specially-constructed site called FET that cost about \$6 million. They used atomic piles to heat compressed air, and the reactors produced enough heat to equal a 44,000 horsepower engine. Used in this project was a hydraulic "master-

slave" two-armed machine, developed by General Mills' Mechanical Division; and a 3-D color television. Operators worked behind a glass shield five feet thick and sometimes were 100 feet away from the machinery they worked on. The ANP technicians worked closely with Lockheed Aircraft Operators Co. at Evendale, Ohio, north of Cincinnati.

After a dozen years and perhaps \$1 billion, the project was canceled by President John F. Kennedy March 28, 1961. Many of the people stayed with General Electric Co., the company holding the contract on the project, but others drifted elsewhere. GE was engaged later in the complicated cleanup following the SL-1 explosion January 3, 1961, and in other projects before it left for good July 1, 1969. "The ANP," said Drexler, "was a backup for our ICBM program. When the missile program achieved success, a lot of us could see the handwriting on the wall." Drexler explained that with missiles sitting in silos ready to go, the nuclear aircraft project could not be competitive, even though those who designed it knew it would fly.

Yet, the ANP left a legacy of technological advances. The X2-11 jet engine built for nuclear power was the forerunner of the large engines of today. The 51 foot long engine was the biggest in existence and provided technology applied to the later larger and supersonic engines. Tremendous strides were made in remote maintenance and material development, both in metals and ceramics. Drexler said it was the plan to run the nuclear aircraft by using faster and safer chemical engines on land, then switch to the nuclear jets over seas, a small fleet at a time, for the nation's defense. But it would have been far more expensive than the ICBMs. There is a book dealing with shielding and remote handling, to which Drexler has contributed, that documents the technological steps used in the ANP.

Two of the HTRE assemblies are presently on exhibit at EBR-I but the diesel engine was still in use at Test Area North by Rockwell, which engaged in an Army test. There is also a large hangar which, when first built, was reputed the largest in Idaho.

The NRTS was established March 1, 1949, but Dr. George Herman Hanson worked on projects, including the Materials Test Reactor, destined for the Idaho site at least three years before that at the Oak Ridge National Laboratory, previously called the Clinton Laboratory after the neighboring town of Clinton, Tennessee.

Hanson was born in Alpena, Michigan, attended public schools there and received his doctoral degree in chemical engineering from the University of Michigan in 1942. After World War II, he was a member of the Oak Ridge National Laboratory staff which was dedicated to the development of

the high-flux experimental reactor later called MTR, and a chemical process to recover the unfissioned U-235 from the fuel assemblies used in this reactor. This took place in 1946-47. The AEC in 1949 ordered moving the MTR and the Chemical Processing Plant to the NRTS. In fact, there were plans to pour concrete for the early reactor structures at Oak Ridge before the AEC moved them to the NRTS.

In 1948-51, Hanson served as assistant section chief in charge of developing the separation process for petroleum and petrochemical operations; and in 1951-54 he was engaged in reactor engineering and physicist support for MTR. In 1954-56, he was a company representative for the Rocky Mountain Nuclear Power Study Group. He was an employee of Phillips 1942-69 in various nuclear research programs, and, when Phillips left, he transferred to the successor, Aerojet Nuclear Co., 1969-76, then EG&G in 1976 until retiring in 1983. Since 1983, he worked part-time as a nuclear and chemical consulting engineer.

Hanson recalled such pioneer scientists as Dr. Doan and Dr. John R. Huffman, both Phillips leaders; and R. Murphy Jones, Don Reid, and Klem Kennedy were among those associated with the early reactor project. Dr. Miles C. Leverett was the leader. Hanson also recalled the early history of what turned out to be the nuclear Navy in 1946-47. It originated at Oak Ridge in 1946-47 headed by the work of five naval officers and three naval civilians. The leader of this group was Hyman Rickover, then a captain.

Two of the post-war activities concentrated on the power reactor training for senior engineers and scientists from industry and universities. They also emphasized civilian applications of nuclear technology. They found that nuclear power was practical for naval propulsion and the MTR core was an excellent power source for naval propulsion. Rickover in 1948 was placed in charge of both the nuclear division of the U.S. Navy Bureau of Ships and the Naval Reactor Division of the AEC.

Hanson recalled formation of the Rocky Mountain Nuclear Power Study Group in November 1954 under the leadership of Utah Power and Light Co. headed by George Gadsy, board chairman, and Dr. Doan. Some of these went on to build their own power reactors.

Hanson and his wife Jean, whom he married May 19, 1945, at Ann Arbor, moved to Idaho Falls in 1951 and lived there ever since, lastly at 444 7th Street. He was issued seven patents and wrote numerous articles and reports on nuclear subjects. He died in 1994.

When Harold Schnuckel came to Idaho Falls to take a security job at the NRTS July 13, 1949, he was only one of four uniformed officers. His

badge, number 27, was the lowest of any employee except for the three top Department of Energy Idaho managers. He stayed at the INEL, retiring January 31, 1989, after nearly 40 years service with DOE or one of its operating contractors.

Schnuckel was a native of Central, Illinois, where he attended schools and later the University of Tennessee. At 18, he enlisted in the U.S. Army at the start of World War II, serving three years active duty, most of the time in the Southwest Pacific, and attaining the rank of major. He was at Oak Ridge before he came to Idaho Falls, and later learned he had worked on the atomic bomb project.

Security 40 years ago was vastly different than the present. There were about a dozen security officers in those early days. That compared with more than 400 in 1990, combining defensive and offensive security force members with aviation and administrative staff support.

Schnuckel was a sergeant with the original security force, and they were first stationed in two rooms above the city mayor's office at the City Building for a few weeks in the summer of 1949 before moving to the annex at the rear of the old Rogers Hotel. Most AEC employees lived conveniently at the Rogers Hotel at that time. The security force did not go to the site in the first few weeks because the present INEL site near the Central Facilities area was a naval gunnery range. The U.S. Marines were then guards.

Like most of the early site employees, Schnuckel moved into the new low-cost homes in Bel Aire Addition. Genial E. W. Fanning was the mayor, and Schnuckel remembered frequently talking to him while at the City Building. At that time, the mayor's job was only part-time in a city of 19,000. Fanning had founded the wholesale house which bore his name and which is still in operation.

Schnuckel was proud that there had never been a serious breach of security at the INEL and he credited this largely to its isolation, a dedicated security staff, and the absence of radicalism which often prevails in larger centers. The security jobs in those early days centered on protecting the site from theft, property damage, misuse and loss of classified material. At that time, there also was surveillance and espionage activities because Russia still didn't have the atomic bomb.

The Idaho State Police also had only 33 patrolmen, and the AEC security officers were deputized by the state to help in traffic control on the state highway on or near the site. "Yes, we issued traffic tickets when it became necessary," said Schnuckel. "I remember one woman driver who wanted to argue, but I told her to talk to the judge at Arco. To her credit she

admitted to the judge her guilt and what I had told her.

"We had some odd cases. One site employee insisted there was an unidentified flying object and was really scared. We found that the spotlight atop the roof of his car had turned skyward and was creating an eerie illusion on a heavy layer of clouds above. Another was terrified that there was a snake in his car." Schnuckel also remembered finding Indian arrowheads and other relics of early frontier life on the sagebrush desert.

Much of the more serious duties shifted from espionage to terrorism. Electronic detection, and equipment and computers made the work vastly easier. Yet the primary responsibility remained basically the same in protecting government property, classified material matters and nuclear material.

Schnuckel actually retired from DOE in September 1976, but remained on the security force with contractors. Inspection and clearances of personnel and equipment were some of his main duties. He retired with the title of physical security agent for Protection Technology of Idaho, Inc. (PTI), the main security contractor of Idaho DOE. PTI was formed October 1, 1988, to perform security services at the INEL. It was a subsidiary of Day & Zimmerman, Inc., whose corporate offices were in Philadelphia. A transition team of key personnel moved to Idaho Falls in July 1988 to prepare for the changeover from American Protective Service.

Most of the original cadre have died or moved away but Schnuckel enjoyed blissful retirement at this home east of Idaho Falls. He dabbled in his prime hobby of video-audio. His wife was the former Jacqueline Bumgartner of Shelley. About traveling during retirement, he pointed out he had done much of that while in the military, extending from Berlin on the east to Japan on the west. He remained in the U.S. Army Reserves after his active military duty.

Perhaps the first employee at the NRTS was Al Anselmo who retired from full-time work January 31, 1990, as traffic manager. He carried badge number 100, the second lowest aside from the ones automatically given the top managers of the Idaho office of the Department of Energy.

Anselmo staked his employment claims to the site as early as August 1946, almost three years before the NRTS was established. He was then an employee of the Navy Department in naval ordnance as warehousing manager for three years, 1946-49, embracing the present Central Facilities and adjacent ground as the naval gunnery range. The site at that time consisted of only a few buildings to house close to 200 employees, of which about a quarter were military and the remainder civilian, Anselmo recalled.

Even now, brick building No. 696 which housed the Marine barracks has been converted to offices adjacent to the Central Facilities Cafeteria.

The word came that the U.S. Navy was to decommission the site on October 10, 1949. Anselmo never missed a step. He began working in October 1949 as traffic manager for the AEC and followed those duties ever since with the prime operating contractors until his retirement. He served in transportation management for the Idaho AEC, 1949-53; Phillips Petroleum Co., 1953-67; Idaho Nuclear Corp., 1967-71; Aerojet Nuclear Co., 1971-76; and EG&G Idaho, Inc., 1976 to retirement. Still not missing a stride, after retirement he began working as a part-time consultant along the same lines. Anselmo was in charge of a dozen employees in those early days, but this increased to some 120 by the time he retired in 1990.

Previous to beginning his work career, Anselmo graduated from Pocatello High School. He married his wife, Loeda, August 23, 1946, and they have two sons and three daughters.

After working in the first AEC office at the Rogers Hotel Annex, the Idaho AEC also established a small office at the Old McKenzie Building at Shoup Avenue and D Street before moving to its three-story headquarters on Second Street east of Holmes in 1952. Anselmo moved to the present transportation office at Central Facilities in 1952 and it has been there ever since.

In all those years, he rode the bus for much of the time. He recalled that he and three carpool companions decided to drive on the road under construction between Idaho Falls and the site in the winter of 1950. They followed auto tracks, so they believed they were safe, but what they didn't know was that the tracks were made by a rugged four-wheel jeep. After a dozen miles, their car stalled in snow, so Anselmo and another companion built fires in their lunchboxes for warmth while the other two hiked to Idaho Falls. The pair found a construction vehicle which amazingly contained the ignition keys and they rescued the two left behind. State police and even a helicopter had been searching frantically for the four.

One of Anselmo's main duties was supervising the shipment of the damaged Three Mile Island reactor core from Middletown, Pennsylvania, to the INEL. It necessitated frequent travel, and at one time he and his wife lived at Harrisburg, Pennsylvania, for nearly a year to work on the transit plans. For shipment, he had to notify the governors of 10 states of the railroad routes that would be taken. This task occupied much of his time during the 10 years before retirement. "The cost for each of these shipments ran about \$100,000," said Anselmo. He estimated he spent an average of two weeks a month in travel.

He also was a member of TRUPACT, an acronym for a program to transport uranic waste to the Waste Isolation Pilot Plant in New Mexico, but this had not gotten off the ground before his retirement.

Anselmo remembered the site was originally scheduled for about 10 years of work and just a few reactors. But that was more than 40 years ago.

When the idea of a nuclear submarine was hardly considered, J. William (Bill) Jones, Jr., was an apprentice for \$14.50 a week at Electric Boat, a division of General Dynamics in Groton, Connecticut. He was born at Corning, New York, attended public schools at Flint, Michigan, and received a bachelor of science degree in mechanical engineering from Lehigh University in 1933. "It was the Great Depression then," he said, "and any kind of a job was welcome."

Jones, in many ways, though, was fortunate. He had a close but frequently rocky relationship with Hyman Rickover, who he described as a cantankerous but brilliant father of what is now America's nuclear Navy. Jones still had a merry twinkle in his eye as he recalled his first meeting with Rickover. When Electric Boat was asked to pick 10 names to come to remote and little-known Idaho to build the Nautilus prototype in 1950, Jones did so, then added his own name. Only he and another person who was director of operations were chosen to go. The other man didn't want to go, so Jones took the trip alone.

That was December 1950, and it wasn't exactly a pleasant experience. His plane was stuck at Rock Springs, Wyoming, by a winter storm. Rickover met him at Logan, Utah, and they traveled by car to Salt Lake City to check out a company that built structures of some 33 feet in diameter for the submarine prototype. "He was a stiff-necked guy, all business," recalled Jones of Rickover. They flew from Salt Lake City to Idaho Falls during that severe winter day and what Jones saw at the NRTS was not exactly imposing. EBR-I, the first NRTS structure built at the site, was near completion but there was only a hole in the ground at what was to become S1W, the Nautilus prototype.

"Rickover was very nasty and liked to upset people," said Jones. "We had a working relationship for 17 years, but it was never one of warm friendship. He often called meetings on weekends, early in the mornings, or other difficult times. I can't ever remember him going to or enjoying himself at a social function. It was all work for him."

Jones remembered one early meeting with Rickover in 1951 at a stormy luncheon at the NRF cafeteria. He aggravated me so much that I called him an S.O.B.," said Jones. "I thought then it would take him less

than 15 minutes to make a telephone call and get me fired. Instead, as he left he said, 'Yeah, Jones, but they never called me a dumb S.O.B.'"

Jones even now asserted Rickover was the right man in the right place for the nuclear submarine and later nuclear ships. "Without him, our country would have taken 20 years longer," he said. "We took the lead and still hold it."

Jones, whose wife and four children stayed in Groton, returned to his eastern headquarters where it was more practical to work on the submarine prototype. He figured he must have made a couple of hundred trips on the project between Groton and Idaho Falls. The project in Idaho was then managed by Joe Milliken. "For some reason," said Jones, "the Rickover gang wanted me, so we moved to Idaho in 1960. At that time, we built another prototype, S5G." About one and one-half years later, when the S5G was three-fifths completed Jones was named president of Electric Boat and returned to Connecticut. He headed a company of about 19,000 workers. Jones humorously recalled that his first job on the submarine prototype in 1950 was to build the foundation for the submarine's toilet. "I guess you might say I started below the bottom and then got to the top," said Jones.

Jones also liked to tell this story:

It seemed Rickover was interviewing a young, frightened lieutenant candidate when Rickover asked if he had hobbies. The young man replied that he did not, but that he did like cats.

In his usual abrasive style, Rickover shouted, "Cats! My wife makes the best cat stew you ever ate. How long do you think it will take you to get a cat?"

The shaken lieutenant replied, "About 20 minutes."

Rickover, in a rage, shouted, "Get out."

Jones said the proper reply should have been: "Admiral, when do you want the cat?"

When Jones said he was being considered as Electric Boat president, he left work at headquarters with a message: "Admiral, when do you want the cat?" Two days later, Jones was back in Connecticut. He got the job.

Jones said in 1967 he took early retirement. He went to California and engaged in various businesses. He and his wife, Barbara, then returned to Idaho in 1982 after he felt rising housing costs and traffic congestion became intolerable in California. He became a Realtor for Wackerli Realty and project manager for North Park Village. "I'm 77, going on 60," said Jones. "I have to keep busy." He later retired in his old state of Connecticut.

Earl S. Grimmett came to the Idaho Chemical Processing Plant in January 1952, but little did he realize he would play an important hand in helping keep that facility going full blast to 1990.

Grimmett was proud that he was an Idaho product in every way. He was born at Paris, barely in Idaho from the Utah border, got bachelor and masters degrees in chemical engineering from the University of Idaho and lived in the state most of his life. He even went to the University of Utah for a year and worked in Wyoming and California designing mining and milling equipment and working with a private chemical company, but he always yearned to live in Idaho.

When he arrived in Idaho Falls on that cold January day in 1952, only the EBR-I, MTR, and ICPP buildings had been erected but in most cases not fully equipped. He was part of a cadre which helped design pilot plants that would convert radioactive liquid waste into solids, such as in a granular form. "By developing the process of turning the liquid radioactive waste to solids, it saved the Chem Plant to the present day," was the way Grimmett succinctly put it.

Grimmett's name is attached to several patents for processes the team developed while experimenting to solidify the highly radioactive wastes which were being stored in stainless steel tanks in underground concrete vaults. "We never considered them to be totally safe," said Grimmett. "We always had the feeling the tanks might leak." The technical director of the ICPP, Charles Stevenson, sent Grimmett to examine Argonne's laboratory process. "Argonne agreed to run our waste through its small pilot plant and it appeared the process would work," said Grimmett.

There were many tests that followed, Grimmett recalled, and in 1959 the team was confident it could design a workable process. Other nuclear plants were also working on the process, but the fluidized bed calciner was the process funded for a demonstration with radioactive waste at NRTS. The new Demonstration Waste Calcining Facility was constructed in 1962. It was the nation's first plant-scale production facility and was operated for 18 years. The new Waste Calcining Facility became operational in 1982.

Grimmett also spent a short time at Malta, Idaho, where pilot geothermal electrical generation was being tested, among them a liquid fluidized bed heat exchange. It never proved economically feasible and was terminated, he said. From experiments made by Grimmett and his team, a fluidized bed was developed to burn waste in the wood products industry that had pollution-free emission. Revolutionary heat exchanges and heat recovery systems were made from technology developed at the Malta tests. Ex-

periments with the fluidized bed process Grimmett developed also have been used to try to economically desalinate sea water.

Grimmett's father built the house he has lived in at 1085 Syringa in 1953 where there were few residents in the surrounding area at the time. He and his wife, Emma Rose, whom he married in 1942, lived there ever since.

By many he is looked on as the father of the waste calcination process. He retired as safety engineer January 1, 1981. He served as a part-time consultant with various companies, specializing in the fluidized bed procedures, and tinkering with his computers.

Dr. C. Wayne Bills came to the NRTS in May 1959, and his first major task was in cleanup of the environment. "They were active days even at that time in making nuclear waste as safe as possible," said Bills. Bills took over the title of deputy director of the health and safety division of Idaho's AEC. His initial efforts were to monitor reactors for safety, such as the ANP, the naval program, and others.

On January 3, 1961, he was called by the NRTS fire department and notified the Stationary Low Power Reactor I had exploded and released radioactive material. "I called Horan, then director of the health and safety division; Dr. John Spickard, doctor; and George Wehmann, health physicist; to rush to the site and start the cleanup of a blowout. The mishap caused the death of three servicemen and destroyed the reactor." Combustion Engineers was the contractor in charge and it helped in the initial cleanup. General Electric, which had just been released from work at the terminated ANP three months earlier, was then hired to finish the cleanup. This job entailed not only the removal of the heavily irradiated bodies, but the placing of television cameras to photograph the destruction, and the razing of the reactor facilities. "The SL-1," said Bills, "was only one of two such reactors in the world that could go critical by moving a rod."

Bills also served on a special state committee that worked closely with then Governor Robert E. Smylie to monitor the waste problem at the site. "We had a good relationship with Smylie and the state," said Bills.

Bills also was interested in the experiments of organic coolant reactors but they proved unsuitable. "The gas-cooled worked well," he said.

Bills first worked for three years at Los Alamos in 1947-50, then in 1954 worked at various jobs at Richland. From there he transferred to the NRTS in 1959. He spent 18 years there in various capacities but primarily in health and safety involving waste management. He wound up his career as assistant general manager to Ron Kiehn with EG&G in 1972-77 before retiring.

A native of Meeker, Colorado, he received his bachelor of science degree in chemistry at Colorado State University and masters and doctoral degrees in chemistry at the University of Colorado. He has lived at 1090 21st Street, the house he first built when he came to Idaho Falls.

George K. Cederberg, a Firth native, was one of a handful of chemists and engineers who were housed in cramped bungalows at the Central Facilities area to await the completion of the Idaho Chemical Processing Plant in 1952. He also was one of the first—and perhaps the first—to get a masters degree in chemical engineering from the University of Idaho's education program in Idaho Falls in 1961.

Cederberg, a graduate of Firth High School, attended Idaho State University and got his BA degree in chemical engineering in 1952 at the University of Michigan. An American Cyanamid representative, Tom Clapper, told him of the NRTS job opening in his native Idaho and he promptly applied and got accepted after graduation in 1952. He first worked for American Cyanamid, 1952-53; Phillips Petroleum, 1953-61 in Idaho Falls and 1961-1969 at Bartlesville; Idaho Nuclear and Aerojet, 1969-72; Allied Chemical Corp., 1972-77; Exxon Nuclear, 1977-84; and since 1984 with Westinghouse Idaho Nuclear Co.

The newly hired staff members of Dr. Cyril Slansky worked at writing plant description and operating manuals for a couple of months before they finally got into the new chemistry plant. Actually, Cederberg's first assignment was to provide assistance to solve the filtration problems that arose when the production department, managed by Don Reid, tried to filter the suspended solids out of the dissolver solutions prepared in the new batch dissolvers in C cell and D cell. ICPP was still wrestling with solids problems in 1990—this time from the FAST FDP.

During 1953 to 1955, Cederberg and the growing technical staff under Dr. Slansky developed a RaLa process to recover Barium 140 from the highly irradiated MTR fuel assemblies that had only a few days of cooling before they were dissolved in the RaLa Process.

After getting his masters degree in 1961, Cederberg took a job with Phillips Petroleum at Bartlesville, Oklahoma, which required learning new ways to complete chemical engineering calculations, such as learning to use IBM computer programs to calculate the large spreadsheet-type of material balances to design the most efficient new petrochemical and refinery processes. His experience with computers in doing process design calculations opened the door for him to return to Idaho. He came back to Idaho in 1969 to work on RELAP computer calculations for simulating the blowdown of a

large nuclear power plant. His office was then at the old Rogers Hotel. This work on LOFT safety analysis in the section managed by Joe Dugone and later by Hal Johansen provided a basis for moving from LOFT to ICPP to do studies on ICPP safety analysis—still a growing discipline at the ICPP.

Through the years he changed companies and titles, but his task remained primarily in nuclear safety. He worked on nuclear technology that involved the reprocessing of reactor fuels to recover the unfission of U-235. "It has been interesting to be a part of the plant safety analysis work over the last 15 years," said Cederberg. "The supervision of the safety analysis group during eight of those years provided many exciting weeks trying to meet some of the dates we had to get specific sections of the PSD published. It has been satisfying to have a part in getting the plant ready to run each time we started it up for a new campaign."

"Nuclear technology has been in the vanguard," said Cederberg. "We can be proud of the history of our plant and our work. A lot of credit has been given to the people who have been instrumental throughout our history and who were dedicated to doing a good job."

Cederberg also owned and managed the 75-acre Firth farm that his father and grandfather worked on, carving it out of sagebrush in the early 1900s. He and his wife, Mavis, have two sons. He was active in the Assembly of God church at Firth and also enjoyed fishing, hunting, gardening, and photography as hobbies.

When Tom Stickley, a physical science administrator, arrived in Idaho Falls October 10, 1949, to take over his new job at the NRTS, he didn't mind the hardships. He arrived in Idaho Falls in a 1947 Chrysler, delayed one day by a snow blizzard in Wyoming. He rented a house on Whittier Street to await the arrival of his wife, Vera, and infant daughter from Mt. Vernon, New York, a month later.

He had worked for the Atomic Energy Commission in Schenectady, New York, but the job force was reduced by the AEC. He had heard of the AEC establishing the NRTS in Idaho where nuclear reactors, allied plants, and equipment could be tested and operated to prove that the atom could be safely used to generate electric power. He got the job from Allan Johnson, the AEC director of operations, who later became the second manager of the Idaho Operations Office.

Idaho Falls was then a city of some 19,000, but undergoing a building explosion to accommodate the workers expected to flock to the city. Stickley and his family had to sleep on the floor for a time until the furniture arrived a couple of weeks later. He recalled the hardship but neighbors were

helpful in furnishing some bedding and makeshift furniture.

Only a narrow, two lane highway led to the site via Blackfoot and it often was blocked by blowing snow. Stickley said he was used to that because the transportation from his home to the Schenectady plant wasn't any better, and, in some respects, worse. Stickley recalled it was a long ride from Idaho Falls to Blackfoot and then to the site, and there was jubilation when the new road going directly from Idaho Falls to the site was completed in October 1951. Some vicious snowstorms brought travel hardships and at one time he rode a caterpillar tractor.

Stickley worked at the headquarters in the city for a time, but later his job required the bus ride to the ICPP, and he didn't mind it a bit. The ICPP had just been opened and required his services to monitor its operation for safety. "I felt we did a good job," said Stickley. "We often shouted at each other, but when we finished we had a plan. And when we did, we went ahead with it."

Stickley worked at ICPP for five years, then for seven years with the test reactor and later at the Central Facilities. At the time of retirement in July 1986, he was with EG&G Idaho, Inc., Safety Standards. He lived with what he called retirement at 290 N. Bellin Road with his wife Vera.

Bill Dyer, who followed the construction trade all of his life along with his recreational penchant for rodeo contests, was one of the early arrivals at the NRTS. After following construction projects over much of the country, this Oregon native made his home in Arco. "I love small towns and this suits me fine," he said. "I don't like the larger cities and this includes Idaho Falls."

He started work August 1, 1949, as a laborer for Puget Sound and MACCO to build the old cement batch plant north of Central Facilities. He worked on construction for Bechtel on EBR-I, the first building erected at the site. He remembered fleeing to California in January when temperatures skidded to the minus 40s, but returned later in the year.

He worked on a multitude of projects at INEL, including the ICPP batch plant, the ATR reactor, and the Aircraft Propulsion Reactor, helping build the large hangar there. He also was going to help build the runway which was proposed to be nine miles long for the heavy nuclear aircraft, but this project was terminated in 1961.

He helped set up the rig for cleanup of the historic SL-1 reactor which blew up in 1961. "We set up a rig with a sling to remove the bodies from an open door," he recalled. "We wore three pairs of overalls and double respirators for protection against radiation."

He married his wife, Claudene, who shared his enthusiasm for rodeo riding and the two frequently competed in horse riding contests and still do. He first met his prospective bride when both were competing at a Kalispell, Montana, rodeo.

Peggy Strain is now retired, but she looked with pride at having a key hand in the growth of the University Relations Program with the Department of Energy's Idaho Office. The program had faltered in 1984 with only \$9,000 funding and three or four students, but it zoomed in 1988 to \$410,000 and 122 students and faculty. She came up with the master contract concept, but modestly claimed it was a team effort. "That program really boomed," she said.

A lifelong Upper Snake River Valley resident living at Teton City, Teton County and Idaho Falls, she became interested in the program when she took INEL higher education classes. W. D. "Del" Miller, former personnel manager, described her as an outstanding student. She was the first woman to graduate with a special management certificate from the University of Idaho higher education program in December 1974. Having first worked at the NRTS with the Aircraft Nuclear Propulsion program in a clerical capacity from 1956-59, she said that was the turning point of her career. She moved to non-clerical jobs and advanced until she became manager of the university program in September 1988, but was forced to retire because of health reasons July 26, 1989. Don Ofte, DOE Idaho manager, presented her with a retirement plaque.

She said the program she headed also increased its research activities. Troy Wade, then INEL manager, wanted to establish closer ties to universities, and research was emphasized. "We would provide educational opportunities to the public in any way we could," she said. "There was a real need for younger people to go into the sciences and technologies. We were doing everything we could to help that happen."

Her husband, Jack, was a manager with WINCO.

Bob Green was one of the few workers at the Idaho National Engineering Laboratory who was among the first employed there and whose residence is near the INEL's northern boundaries. You might say the INEL was almost at the backyard of his 600-acre farm located one and one-half miles north of Roberts.

Green had graduated from Idaho Falls High School and took a laborer's job in September 1949, six months after the NRTS was established. "I was just a young kid. I felt it was just a temporary job as it was not believed the operations would last more than a few years," said Green. "I re-

member it was very hot when we unloaded lumber from a train for building at the Central Facilities. I lived in Idaho Falls then and we traveled by way of Blackfoot by bus."

Green worked about 10 months and in 1950 joined the Navy for four years. In that time he learned to overhaul and maintain diesel engines, sailing on Far East waters during the Korean conflict. "I figured I would be drafted anyway so I decided the Navy was the best for me," he said. On his return he talked to Joseph I. Hart, Idaho Falls FBI agent, who suggested he seek a job as a security guard at the site because he could get the required "Q" clearance.

He worked for AEC Security from 1954 to 1955, then switched to the high profile Aircraft Nuclear Propulsion project as a boiler operator, working under Bart Wing in the "Hot Shop." He operated all the equipment, such as the remote manipulator, cranes, locomotive, and pool equipment. Green said, "About 10 guys worked in that shop. We all were young and new. There was a lot of on-the-job training. We called one of the remote manipulators 'the old man', but I don't know why. We were convinced the nuclear airplane would fly and we were excited and looking forward to this." Green recalled General Electric sent an actor-spokesman to talk with workers about the company. He was Ronald Reagan, who was president in 1981-89.

A large hangar was built and work was started on a nine mile long runway. Then on March 28, 1961, the blow came: President Kennedy canceled the project. Green stayed with General Electric which was later given the contract to help clean up SL-1 which blew up in 1961. This work lasted until 1962.

Green bought the Roberts farm, raised beef cattle and sheep and did well enough to pay for the farm. But in 1983, the price of sheep plummeted and he returned to the INEL, and was even given back his old security number of 1166. He took a job servicing and maintaining site vehicles at Central Facilities. His wife, the former Glenda Rammel of Driggs, became a secretary for Rockwell at TAN.

Bernie Schroeder started in 1950 working at the Rogers Hotel Annex in Idaho Falls, and his life was intertwined ever since with the INEL and its desert setting. Schroeder, who was the procurement manager for Morrison Knudsen-Ferguson of Idaho Company, worked for seven different contractors at the INEL, including himself. For six years he owned and operated Blackfoot Greenhouse and Nursery, subcontracting with the site until 1967, when he returned as administrative assistant in the construction liaison group

working on a gas-cooled loop at TRA.

He studied for five years to become a certified contract administrator, then took a new job with Aerojet. Although he'd requested some small projects to begin with, his first assignment was a major procurement task for the LOFT project, and his boss told him, "sink or swim." Schroeder swam, and in 1990 he still enjoyed his job. "Construction contracting is fascinating to me," he said. "It gives you the opportunity to deal with people face to face and there's something new every day."

A major improvement in his field was the INEL jurisdictional agreement. "It resolved all the issues before you got out in the field," said Schroeder, and it calmed the labor unrest of the '60s by answering the question, 'Whose work is this?' That's been a real positive and it still is a real positive," he said.

Schroeder's long career at the NRTS had a lot of positives. He always remembered the first day he went out to the desert—a sunny day in May, when he and his friends worked all morning unloading reinforced steel from open railroad cars and spent their lunch hour sunning on a stack of Navy buoys piled next to the tracks. That morning he'd caught a little bus at the Cottage Hotel in Blackfoot at 6:30 a.m. He remembered thinking he wouldn't last long in his job if he had to catch a bus every morning for a long, boring ride. "And here I am forty years later still doing it," he laughed. "You get ingrained in that pattern." In those days, said Schroeder, employees used the old Taber Highway, which is now a farm road that follows the railroad tracks to Arco and through Atomic City (then called Midway). "It's just amazing to me we didn't have more accidents," says Schroeder, describing how cars had to pull off onto the shoulder when they passed, sending dust and rocks flying. He was on a subcommittee investigating whether to use buses for transportation, and remembered starting the fleet with about a dozen old school buses.

The same day that Schroeder made his first trip to the desert, he made a once-in-a-lifetime acquaintance—C. L. Reseigh, known as "Rosie" to everyone on-site. He was Schroeder's boss at the warehouse, and loved to joke and pull pranks. "When you're young and just entering the working world, you really remember and appreciate people who are older than you and take you under their wing," said Schroeder.

His work at the warehouse gave him unique opportunities, like taking supplies to Dr. Zinn at EBR-I on the day he first lit the light bulbs inside the building with atomic energy. He also delivered supplies at the building site of the S1W Nautilus prototype. His work always took him to the excit-

ing, active areas of the INEL. "One of the things I always remember fondly is maintaining the in-place progress of projects on the site," says Schroeder. From Big Butte all the way up to Birch Creek on the north end, and from the Twin Buttes to Howe Peak, he investigated numerous construction sites, working closely with geologists since flood control was a primary concern.

He wrote project completion reports for many of the projects on-site, but he was disappointed that he was never able to write one for the Aircraft Nuclear Propulsion project. Like many of the employees through the 1950s, he'd watched with anticipation as the hangar and the huge engines were built and tested. "It was a disappointment because I'd always looked forward to seeing a nuclear plane fly," says Schroeder.

Schroeder was considering retirement in a few years, but with some reluctance. "I'm really looking forward to the new projects, and I know I won't see them all to fruition," he said.¹

John X. Combo, counsel and management executive with the Department of Energy for 20 years, saw many accomplishments during his long tenure. A native of nearby Butte, Montana, Combo came to the site in 1962 and served as chief counsel until 1977, then took the post of deputy manager to Charles Williams from 1977 until he retired in 1981. Since then he has joined a law firm with which his family is associated.

Combo remembered how diligent the station health physicists and other scientists were in stressing extensive safety and health standards. It was the beginning of such efforts that won an envied top place for the INEL in the nation's nuclear family. By 1990, 52 reactors had been placed in operation, with fourteen in active service. "Our safety code has been a standard for others to follow," said Combo. He pointed out that as a result of this there have been no nuclear deaths at the INEL except for the SL-1 explosion in 1961 which claimed the lives of three servicemen. "Our health hazards have been very minimal," said Combo, pointing out that cases of serious radiation have been almost non-existent. He also placed high on the health and safety list the success of the Idaho Chemical Processing Plant calcining radioactive waste and giving a hefty safety boost to handling nuclear waste.

Combo saw in the future an increase in non-nuclear programs, such as those exercised in the laboratories. Recent examples of these were testing of metals for wear on airplanes and producing armor for army tanks. "We have a concentration of people on the cutting edge of technology," said Combo. He pointed out these scientists, many with doctoral degrees, were

¹ Liz Bush Williams and Amy Siedenstrang, "INEL News" Idaho National Engineering Laboratory, May, 1989), pages 11-12.

engaged in research in many new fields. Some of the most notable advances were underway in the naval programs, Argonne and production reactors. "Another program is the safety code and verification of test data for the Nuclear Regulatory Commission," he said. He noted LOFT testing also has lent a boost in a variety of nuclear fields.

Like so many other INEL scientists, present and past, he also predicted a tremendous surge in nuclear power use as many other forms of energy decline. "At some point in time," he said, "the government must get involved in standardization of electricity. It must cut down time in issuing nuclear licenses and get nuclear reactors on the line. The nuclear power utilities can borrow from the national policy to regenerate the nuclear production."

Combo extensively researched the history of the INEL site and gave a comprehensive history during the mammoth 40th anniversary at the Holt Arena in Pocatello May 25, 1989, before an audience of 6,000. Among those on hand were Governor Cecil D. Andrus, all members of the Idaho congressional delegation, many other high state and local officials, and past and present INEL managers and leaders. In his talk, much of it illustrated by video, he recalled only 200 were employed in 1950 while in early 1989 it bounded to 10,700.

Among the highlights, he mentioned Dr. Walter Zinn, the first Argonne director, headed the team that brought the history-making epic of fission electricity December 20, 1951. Other points given by Combo noted that BORAX tested destruction to find out its operating limits, June 1953; the EBR-I demonstrated the first principle of "breeding", that a reactor can produce more fuel than it consumes, in July 1953; the MTR, becoming operational March 31, 1952, was the grandfather of a generation of reactors; that the Army developed a small transportable nuclear power plant at the ill-fated SL-1 in the early '60s; the SPERT program in 1955-70 contributed to reactor safety; in 1953, the Engineering Test Reactor filled the need for radiation tests; and in 1963 the Semiscale test of the pressurized-water reactor system helped in research of the Three Mile Island incident in 1979. He also said the ICPP in 1953 began recovering uranium from spent reactor fuel elements. It recovered more than one billion dollars of uranium for reuse in government reactor programs. The facility employed a staff of 1,500. Combo said the Waste Calcining Facility converted more than four million gallons of highly radioactive liquid into safer solid form. The new facility started in 1982 and was larger and used vastly improved technologies.

Combo added that in the 1950s, work was done on the first proto-

type nuclear aircraft engine and three were tested before President Kennedy canceled the program in 1961. During the aircraft testing program, Combo said he was told that a sign was put up which read, "We'll have an airplane in the ocean before the Navy gets a submarine in the air."

He said few knew that the NRTS was involved in space research in the '60s in a program called SNAPTRAN, acronym for Systems for Nuclear Auxiliary Power Transient. The test showed that the space reactor would immediately destroy itself without building up dangerous levels of fission products.

Also mentioned was Argonne's Zero-Power Plutonium Reactors and one known as the Zero-Power Physics reactor which operates at almost no power, yet can be configured to demonstrate the physics of any kind of fast-neutron reactor, from tiny reactors for space applications to breeder reactors.

A highlight of the INEL administrative history was the designation of Charles E. Gilmore, former director of the Office of External Affairs, Idaho DOE, as liaison for six months in 1988 with state government at Boise. His presence enabled settling amicably any possible bickering between the state and federal government, particularly Idaho DOE. He sat at a desk in the newly created Idaho Department of Commerce, paid entirely by DOE as the federal agency's share in furthering a warm relationship with state government. There were two areas of importance that were fostered: the technology transfer program where there was a spin-off of technology provided to industry; and serving as liaison with the Department of Health and Welfare on environmental regulatory matters. Besides close discussions with Governor Andrus on several occasions, he also attended and spoke at times on INEL matters to legislative committees, such as the Senate Commerce and Labor Committee, House Environmental Affairs Committee, and Joint Finance-Appropriation Committee.

The upshot enabled Gilmore to participate with the planning and implementation of a new program for technology upgrade and diversification of Idaho's economy; helped establish the Technology Transfer Committee which included assisting participants in transferring technology developed at INEL and universities into the private sector; assisted in activities at national trade shows aimed at recruiting high-tech companies to Idaho; and provided technical evaluation of potential high-tech economic development projects proposed for Idaho.

It also provided expert information on technology transfer and hazardous waste transportation to legislative committees during the 1988 ses-

sion; provided liaison assistance to the state in its evaluation of environmental issues involving the INEL; and represented the Idaho Department of Commerce and the INEL in presentations to several communities around the state explaining the new technology development programs.

Gilmore is a nuclear engineer and has an extensive background in physics. He holds a masters degree from the University of Oklahoma and first came to Idaho Falls in 1963 to work for Phillips Petroleum Co., then the site's prime operating contractor. He transferred to DOE in 1970 and was there until his retirement.

Idaho Falls and Rich's College 25 miles to the north and Idaho Falls High School to the south were the only major post-secondary educational facilities available.

That was in 1969 but the situation was vastly different in 1990 and was to improve in the years ahead. The Idaho Falls Center for Higher Education, more familiarly known as University Place, offered in 1990 a variety of courses in engineering, science, technology, business, mathematics, and general education. A consortium of three universities, University of Idaho, Idaho State University, and Brigham Young University-Ricks, provided an ever-expanding curriculum. From the 12 courses in engineering for 50 students in 1962-63 there were in 1990 some 130 courses in science, mathematics, technology, engineering, business, and education over semesters, serving 5,000 students a year. Granted since 1967, over 79 bachelor degrees, 390 masters and 10 doctorates. UI provided 60% in the technical subjects while ISU offered 73 courses in business and 30 in general education. BYU-Ricks did not yet offer any degrees. There was a faculty staff of 130 and one of those were away from UI in 1990.

Directing this burgeoning educational program from the start was Harry Tingey, who got a doctoral degree in mathematics statistics at the University of Washington in 1954, first took a job with Phillips Petroleum Co. under Dr. Richard Dean in 1957, and then took a year to work in San Jose, California, but came back and has been at Idaho Falls ever since, retiring in 1995. Tingey recalled when he was hired by Dean he was told he was to conduct community activities along with his regular work and so, serving on the Idaho Falls School Board of Trustees, he did, seven as chairman.

There was lots of volunteerism those days. Tingey, following the 1960s, Tingey and the program was using classroom space at Falls High School and O.A. Bell Junior High School. Then along

government to nuclear power in state offices, studies in nuclear debris, and environmental issues. Other members of the commission included former energy secretary James Schlesinger, and the chairman of the commission was former representative John W. McCormack of Massachusetts. The commission's report was submitted to Congress in 1980, and the report recommended that Congress establish a national energy policy, and that the Department of Energy be given authority to regulate energy imports and exports. The commission also recommended that Congress establish a national energy policy, and that the Department of Energy be given authority to regulate energy imports and exports.

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The upbeat enabled Gilmore to participate with the planning and implementation of a new program for technology transfer and diversification of Idaho's economy; helped establish the Technology Transfer Committee which included assistance participants in transferring technology developed at INEL and universities into the private sector; helped plan two national trade shows aimed at recruiting high-tech companies to locate and provided technical evaluation of potential high-tech economic development projects proposed for Idaho.

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One of the most significant spin-offs that came from the Idaho National Engineering Laboratory was the development of higher education in Idaho Falls. Idaho Falls was picked for the headquarters city primarily because of the municipal and secondary education and labor services it offered, but the higher education possibilities were considered a definite minus. The privately owned Ricks College 25 miles to the north and Idaho State University 45 miles to the south were the only major post-secondary educational institutions readily available.

That was in 1949 but the situation was vastly different in 1990 and was likely to improve in the years ahead. The Idaho Falls Center for Higher Education, more familiarly known as University Place, offered in 1990 a wide variety of courses in engineering, science, technology, business, mathematics, and general education. A consortium of three universities, University of Idaho, Idaho State University, and Brigham Young University-Ricks College provided an ever-expanding curriculum. From the 12 courses in engineering for 50 students in 1952-54, there were in 1990 some 170 courses offered in science, mathematics, technology, engineering, business, and education in two semesters, serving 5,000 students a year. Granted since 1952 have been 79 bachelor degrees, 390 masters and 10 doctorates. UI provided the courses in the technical subjects while ISU offered 13 courses in business and six in general education. BYU-Ricks did not get subsidies but offered some 20 courses. There was a faculty staff of 130 and six of these were in residency from UI in 1990.

Directing this burgeoning educational program from the start was Fred Tingey. Tingey, who got a doctoral degree in mathematics statistics from the University of Washington in 1954, first took a job with Phillips Petroleum Co. under Dr. Richard Doan in 1957. He then took a year to work at Monterey, California, but came back and has been in Idaho Falls ever since, retiring in 1995. Tingey recalled when he was hired by Doan he was urged to participate in community activities, along with other Phillips workers. He did so, serving on the Idaho Falls School District Board of Trustees nine years, seven as chairman.

"There was lots of upheaval in those days," recalled Tingey, referring to the 1960s. Tingey said the program was leasing classroom space at Idaho Falls High School and O. E. Bell Junior High School. Then along

came University Place with its rather interesting and stormy history. Built in 1975-77 by a non-profit corporation as a bicentennial project to showcase scientific research and technology, it came on hard times with a \$240,000 debt. It was then called the Intermountain Science Experience Center, or Intersec. A covenant required the building be used for education or recreation. "The building was just about to go under," said Tingey. The new Eastern Idaho Vocational Technical School also had an eye on it.

The University of Idaho, which maintained strong connections with the Idaho Falls community despite the vast transportation distances, saw the opportunity. The UI Foundation paid off the debts to the city and a local bank, and it repaid the portion of debts to others that was negotiated by Intersec. "Part of the solution was to get the university more involved in management," said Tingey. "It eventually made the Idaho Falls branch actually a part of the University of Idaho." Tingey worked closely with Richard Gibb, then the University of Idaho president. Also involved in that planning were city officials; Charles Williams, then the DOE Idaho manager; Ron Kiehn, manager of EG&G Idaho, Inc., the prime operating contractor; the State Board of Education; and even the State Board of Land Commissioners which owned land surrounding the education complex. The Idaho Falls higher education program formally took over the building in October 1979. The building was remodeled from a museum to classroom facilities.

The present rambling, multi-windowed structure overlooking the ponderous Snake River at the city's northern flank north of Freeman Park that now houses University Place actually is situated on the city's only dumpgrounds in the '40s and '50s. And that's what it was called, not the more fancy title of "sanitary landfill" of today. It was the ugly duckling that turned out to be a beautiful swan. "It turned out to be the best thing possible," said Tingey. "The Intersec board provided a service to this community that could not have been realized in any other way. It could never have been built as a university facility."

The original education program was funded by DOE contractors. The Department of Energy subsidized \$600,000 for higher education in 1988. In the four years from 1984-88, INEL pumped in some \$9 million dollars. The Energy Research and Development Administration, ERDA, the immediate predecessor of the present Department of Energy, allocated \$1 million for a construction addition.

The University of Idaho Foundation in 1986 also bought the former Rogers Co. building at Sunnyside Road and Rollandet. In 1990, it contained 12 classrooms, with 14 others at University Place, and some courses still at

Idaho Falls High School and Eagle Rock Junior High School.

W. D. "Del" Miller, the third employee to be hired by the first prime operating contractor at the NRTS, played an important role in getting higher education to become an integral part of the site activities. He died in 1994 and was believed to be the oldest Phillips retiree from point of service. He received his doctoral degree from the University of California at Berkeley and worked for a time in California colleges before he took the job of assistant manager of personnel for Phillips, then headed by Dr. Doan. He later became personnel manager but spent much time promoting the site's education program. At that time no Atomic Energy Commission funds could be spent for higher education. Overcoming obstacles on his own time, Miller opened the program in 1954 and managed it until he retired twenty years later.

Miller pinpointed three reasons why the higher education program grew: the new site grew from a few hundred employees to almost 11,000 in 1990; students at the site were allowed to enroll; and the DOE and contractors helped pay for the cost of the program, either by subsidies or by reimbursing students.

Miller was involved in many tasks during those early days, such as hiring, recruiting, keeping records, and training. Employed were engineers, scientists, mathematicians, chemists and physicists. Then working with an old mentor, Tingey, agreements were made with the University of Idaho and Idaho State University on the higher education program. ISU had the lower college divisions while UI "had everything else," as Miller put it. "The education job was on my own time," said Miller, "but we were progressing in the program. The AEC money came from different places."

Miller looked back with pride on what was done to help keep employees by offering a higher education program. In the 1950s, NRTS contractors could hire engineers for about \$400 a month, and those with doctorates in engineering or physics for about \$1,000. "We kept some of those employees but we also lost some," said Miller. Employees or prospective employees would look at the NRTS and see no place where they could go to school, and look elsewhere, but the program helped stop the trend, Miller explained. "The University of Idaho," said Miller, "is the best college there is in the state and is one of the best colleges that one can get for his dollar."

Even in the '50s, the NRTS had some 100 scientists who held doctoral degrees, so finding on-site faculty was not a problem. Students paid \$20 tuition, plus a \$5 University of Idaho fee and textbook costs. Three-hour evening classes were initially held at Idaho Falls High School or O. E. Bell

Junior High, and for a short time later at Skyline High School. Higher education in Idaho Falls grew in 1990 to three buildings: the two at University Place and the other at the former Rogers Building at Rollandet and Sunnyside Road.

The bus transportation system at the INEL had a rather humble beginning in 1951, but grew to likely haul more year-round passengers daily than any other in Idaho. Mervin J. Gardner, the unit manager of bus operations, was uniquely one of only two in active service in 1990 of the first hardy pioneers who began driving buses, and eighth in seniority. The only other was Richard "Dick" Stephens, later the system safety engineer, and 13th in seniority.

When the National Reactor Testing Station began operating in 1949, there were no buses. Most of the site workers used their own vehicles. Those who lived in Idaho Falls had to travel via Blackfoot and Highway 26 before the new Idaho Falls-Arco highway opened in 1951. Howard Davis, who retired at Portland, Oregon, was the first bus manager. Gardner succeeded him in 1969 and was still in charge in 1990. "It was all new to us," said Gardner, "but we got along just fine."

The first bus office was located at an old service station at Cliff Street and Chamberlain Avenue and the buses were parked at what was then known as the old Riverside Garage on Lindsay Avenue. Both buildings have long since disappeared. The first bus transportation began May 21, 1951, with an initial cadre of 27 drivers. There were 24 buses.

The vehicles were what Gardner described as "green school-type buses," with the Oregon Motor Stages holding the first contract. The name of the company was known as the Lost River Transportation Co. The Western Equipment Co. and Ninco were among those early bus contractors for a short time, but in 1953 the bus system generally was directed by the prime operating contractors: Phillips Petroleum Co., Idaho Nuclear, Aerojet Nuclear and EG&G.

From that modest beginning, the fleet grew to 131 buses in 1990, all of 48-passenger capacity. They hauled 4,000 passengers daily, and sometimes a few more. In 1990, there were 95 bus routes, making 124 runs. There were also buses used for shuttle services within the different INEL site facilities. About 145 drivers were employed.

Eighty of the buses parked at the INEL Terminal on Chatham Avenue west of Woodruff Avenue and south of 1st Street. Grandview Investment Inc., was awarded the contract in 1980 to build the present bus terminal. Prior to this location, most of the buses parked south of the old AEC

headquarters building on Second Street at Freeman Avenue. The other INEL buses included 15 at Pocatello, 12 at Blackfoot, six at Rigby, three at Rexburg, three at Arco and two at Mackay. The main bus transportation office is located at Central Facilities. Bus drivers generally worked an eight-hour shift every five days, but some pulled off an 11 1/2 hour shift at times.

The INEL Technical Library was founded in 1952, and in 1990 was operated by the prime operating contractor, EG&G Idaho, Inc., for the DOE. The main office is located on the ground floor of University Place, 1776 Science Center Drive, just north of Freeman Park. It has three branch offices: one at the Idaho Chemical Processing Plant primarily for chemists, another at the Test Reactor Area (TRA) specifically for physicists, and a classified library at the Willow Creek Building. The Naval Facility also has its own library.

In the early days of the '50s and '60s, the library had several locations at the site but in 1977 it assumed a more permanent mien. That fall, the library was located on the ground floor of the new Idaho Falls Public Library on Broadway and Capital where it stayed until it moved to its present location in January 1981.

The library in 1990 contained 40,000 volumes, 1,000 scientific and technical periodicals obtained through subscriptions, 140,000 technical reports and over 800,000 microfilm items, 600,000 known as microfiche. The library provides a wide variety of services ranging from circulation of publications to computer-based literature. As can be expected, it emphasizes technical subjects, in a wide range of scientific and engineering fields. The library manager, Brent Jacobsen, received a masters degree in library sciences in 1974 from Brigham Young University, and became the library manager soon after graduation. Jacobsen had a staff of 18 in 1990.

The Snake River Plain on which the INEL is located is classified in the Pleistocene epoch, estimated by geologists to have begun one million years ago. It is postulated that there were camels, mastodon, and maybe even giant bison, sloth and saber-toothed tigers during the latter part of the Pleistocene epoch, about 35,000 years ago. A fossil taken during well drilling some 100 feet deep was determined to be over 40,000 years old.

Recent archaeological investigations disclosed evidence that man has been in eastern Idaho for perhaps 10,000 to 12,000 years. Fur trappers were the first white men to enter the area. Thyery Godin, a French-Canadian trapper representing the English Northwest Co., discovered what was thereafter known as Godin River in 1820. Later it became known as the Big Lost River because of the phenomenon of the river's disappearance among the fissured lava rocks. Alexander Ross, representing the Hudson Bay Co., visited Godin River in 1824 and mentioned the "Three Pilot Knobs," which could have been the Three Buttes in the immediate area, or maybe the three Teton peaks to the east. The Lost River Sinks and the Three Buttes were shown on map sketches made by Captain Bonneville, U.S. Army, in 1832-34. In the 1832-33 winter, he referred to the Snake River Plain as the "Great Plain of the Three Buttes."

In the 1870s, the Lost River Desert was crossed by a trail used for large cattle herds moving eastward from Oregon to the eastern markets. Ranges were made available in Wyoming by treaties with the Indians. Two stagecoach lines also crossed the plain near the Twin Buttes, which long served as a landmark for early gold seekers. A branch of the Oregon Short Line Railroad Co. was constructed in 1910. Cerro Grande, now only a location name at the site's southern boundary, was the terminus until the rails were extended to Arco and Mackay, then a lively mining town.

Also in the area was the Big Lost River Irrigation Projects, one of the historically colorful reclamation projects in the West. It was authorized under the Carey Act of 1894 to provide land suitable for irrigation if the states did the reclaiming. Idaho accepted the application on the basis that private capital could be induced to construct the works and that the state would provide supervision. A dam on the Lost River was started in 1909 to provide storage to irrigate some 100,000 acres, of which 30,000 were known as the Powell Tract lying within the present boundaries of the site. In 1910,

canals, ditches and channel structures were built. The project, however, was plagued with serious errors of engineering, financing, and legal and political controversies. Construction was discontinued in the spring of 1911 but the old canals and structures are still landmarks.

A similar project on the Little Lost River embraced a small tract on the northwest side of the site. The Mud Lake Project to the northeast also was started. Both projects were the result of overly optimistic estimates but the dry canal systems can still be seen.

During World War II, the U.S. Navy utilized 270 square miles as a gunnery range. An area southwest of the naval area was once used by the U.S. Army Air Corps as an aerial gunnery range.

The INEL is largely sagebrush land. It is located near the central part of the semi-arid Snake River Plain and has an average altitude of about 4,900 feet. The land is bordered on the north and west by the snow-capped Lost River and Lemhi mountain ranges, and on the south by the three buttes. What is known as the Snake River Plain is a structured basin about 200 miles long and 30 to 70 miles wide, comprising about 12,000 square miles. It extends from the northeastern corner of Idaho southwest towards Hagerman, which is west of Twin Falls. It consists of a sequence of basalt lava flows and sediments, perhaps in excess of 10,000 feet thick.

The INEL site is nearly 39 miles long, north to south, and 30 miles wide at the broadest part, west to east. The site boundaries that are nearest populated areas are 22 miles west of Idaho Falls, 23 miles northwest of Blackfoot, 44 miles northwest of Pocatello, and seven miles southeast of Arco. The average annual temperature is 42 degrees Fahrenheit with ranges of 103 degrees and -47 degrees.

The huge natural underground reservoir in basaltic lava rock is familiarly called the Snake River aquifer. The aquifer is described as about 200 miles long by 30 to 60 miles wide and comprises an area of about 9,600 square miles. Lithologically, it is composed of a series of thin basalt flows, generally 10 to 75 feet thick with interbedded layers of fluvial, lacustrine, windblown and pyroclastic sediment. Most evidence indicates that the aquifer is between 1,000 and 10,000 feet thick. The deepest well at INEL is 1,500 feet.

A booklet issued by J. B. Robertson, Robert Schoen and Jack T. Barraclough, geologists, in 1976, "The Influence of Liquid Waste Disposal on the Geochemistry of Water at the NRTS, 1952-70," presented a summarized evaluation of the geology, hydrology and water geochemistry of the NRTS. It gave associated influences of subsurface liquid-waste products

discharged from the facilities. The TRA, ICPP and NRF discharge over 90 percent of the total liquid waste. The 1976 report noted the INEL liquid waste which reached the Snake River aquifer either by percolation from ponds or by direct injection through wells was received only into the upper surface of the aquifer.

About 6.5 million acre-feet is discharged by the aquifer annually, most as springs in the Hagerman area and a region west of Pocatello. Depth of the aquifer at the INEL varies from about 200 feet in the northeast corner to 900 feet in the southeast portion. The average hydraulic gradient is about five feet per mile to the southwest.

A report prepared by the Idaho Water Resources Research Institute, University of Idaho, and the Idaho DOE office noted almost eight million acre-feet of water enters the aquifer yearly. The water stored is estimated to be greater than the entire flow of the Snake River for over 400 years and the aquifer can store five million acre-feet of water which is almost equal to the annual Snake River flow. It has an estimated recoverable storage capacity of over 100 million acre-feet, or 20 years of the river flow. Water from the aquifer provides for irrigation, power generation, recreation, fisheries and wildfowl throughout southern Idaho.

A booklet prepared by Dr. Bill Hackett, Idaho State University; Dr. Jack Pelton, Boise State University; and Dr. Chuck Brockway, University of Idaho; entitled "Geohydrologic Story of the Eastern Snake River Plain and the INEL" estimated the aquifer has a potential storage capacity of about 200 million acre-feet. This report contended the total thickness of the lava flows and interbedded sediment ranges from about 2,000 to 10,000 feet.

The report also noted that although several large shocks have occurred during historic times, earthquakes beneath the eastern Snake River Plain are rare and have small magnitude. It suggested the passage of the "Yellowstone Plume" has somehow "cured" the rocks deep beneath the plain, making them more resistant to fracturing. Or perhaps the rock at that depth is still so hot that it flows like putty instead of fracturing to produce earthquakes.

On October 28, 1983, a magnitude 7.3 earthquake hit the area. The epicenter was about halfway between Challis and Mackay, and faulting broke the surface for 25 miles along the western base of the Lost River Range near Mt. Borah, the highest point in Idaho. Damage was estimated at \$12.5 million. Two children were killed in Challis when masonry from a building fell on them while they were walking on the street below en route to school. It was the latest of several damaging earthquakes that have affected Idaho in

historic times. The quake, however, brought little or no damage to INEL when it struck at 8:05 a.m. As a safety measure, however, the INEL's nuclear reactors and support facilities were shut down. The reactors were soon restarted without difficulty. Some INEL buildings sustained only cosmetic damage, such as small cracks in cinderblock walls. Later analysis showed that the ground beneath the INEL moved very little and the acceleration of the ground was only about one-tenth of that which the INEL buildings were designed to withstand.

The geologists decided the fracture basalt lava flows do not transmit waves very well, and serve to muffle seismic shocks from earthquakes through careful siting and design of structures. The report figured that five to six million years ago, explosive rhyolite volcanism occurred beneath the INEL, but the calderas are now dead and buried beneath basalt lava flows.

The youngest rhyolite dome, the Southern Butte, is figured at 30,000 years old, and the East Butte at 600,000 years. The report noted rhyolite volcanism has shifted to Yellowstone National Park, and the likelihood of a future rhyolite dome eruption near the INEL is considered to be remote. Based on geologic mapping and on dating of prehistoric lava flows, geologists estimated that volcanism may recur every 3,000 years within the Arco-Big Southern Butte and Lava Ridge Hell's Half Acre rift zones. In addition to lava flows, future INEL facilities on those rift zones could be affected by earthquakes associated with volcanism, or by ground deformation in the vicinity of volcanic vents.

The environmental affairs wildlife subcommittee of the Idaho Falls section of the American Nuclear Society, made up of 15,000 members, found varied and abundant wildlife at the INEL, including at least 211 species, numbering 159 birds, 37 mammals, nine reptiles, five fish and one amphibian. In 1975, the INEL was designated as a National Environmental Research Park (NERP), the largest in the DOE system. Because it is closed to the public, the INEL provides a safe refuge for animals. The NERP is a field laboratory set aside for ecological research on the environmental impacts of energy development.

The dominant vegetation consists of big sagebrush and rabbitbrush, and the most abundant grass species consist of bottle brush, squirreltail, needle and thread grass, Indian racegrass, Great Basin wildrye, wheat grass and sandberg bluegrass. Species considered endangered include the bald eagle and the American peregrine falcon. Game animals include 34 species, the most common of which are the pronghorn, mourning dove and sage grouse.

When the NRTS was established in 1949, one of the burning ques-

tions posed was whether there was enough water for the facility. One of the alternates pondered was to pump water from the Snake River. They needn't have worried. Jack Barraclough, the research project chief for the U.S. Geological Survey, Water Resource Division, was one of a cadre of geologists early on the scene. At that time he was engaged in stream gauging in Idaho. He spent his time on the desolate Lost River Desert in 1950-53 to survey the site's geological features and to determine if there was enough water. "Those were interesting days," said Barraclough. "Our role was to drill wells to find out how much water was available and also the minerals present. We didn't believe there was enough water available in the Big Lost River so we had a contingency plan to build a pipeline of maybe 18 or 24 inches from the Snake River near Idaho Falls. It was just talk then."

The first well drilled south of the Central Facilities in the summer of 1949 tapped water at 1,045 feet. Barraclough said there were in 1990 some 130 monitor wells and 30 production wells.

He also headed the efforts to sink the first disposal well in September 1951, now well known for the fanfare that accompanied its operation because of fear of contamination to the aquifer. This well was capped in a formal ceremony in which Governor Cecil D. Andrus took part November 20, 1989, and Barraclough was among those present. "You might say I was there at the beginning and end of that now famous well," said Barraclough with a chuckle.

Barraclough was diligent in checking for any water pollution and became known by many as "the underground conscience" of the INEL. Actually, said Barraclough, the contamination to the aquifer was minor but there was a fear. The well was not used after February 1984. Barraclough previously suggested ponds to handle the low-level radioactive waste and termination of the well. These ponds of some six acres are now situated south of the Central Facilities, and Troy Wade, then INEL's Idaho DOE Operations manager, named them "Barraclough Lake". There is a sign there to that effect.

There were no roads connecting the various facilities in the early '50s. Barraclough drove a rough-terrain vehicle from the Central Facilities to TAN during those days, fording the Lost River which had about one and one-half feet of water. There are now four bridges within the INEL that span that mysterious stream which is dry much of the time. He also bought a couple pair of skis to slush over heavy snow in the winters to test snow depth and other climactic features. Barraclough and his geological team stayed at an Arco motel. He remembered what was then lush fishing and hunting in

the nearby country.

He was transferred to Florida for 10 years, but even gave up a promotion to return to Idaho. He was never sorry. "The INEL was such a challenge in so many ways geologically," he said. "There were so many things to study. I have been very happy."

"I am aware of the Department of Energy's commitment to study the Snake River Plain aquifer and waste projects in the aquifer," said Barraclough. "DOE has sponsored these independent studies for 40 years. The most mobile waste products from the INEL have moved south from their injection point about nine miles in 36 years. Waste concentrations are greatly reduced by dilution and radioactive decay. Only tritium is within the INEL boundary, and it is below drinking water limits.

"The aquifer is a 10,000 square mile underground reservoir stretching from Island Park on the north and southwesterly to Hagerman. It is considered one of the largest in the nation and contains water about equal to Lake Erie. It has a potential storage capacity of about 200 million acre-feet, enough to cover Idaho with four feet of fresh water. I have had 40 years experience and even in the early days we were concerned with disposal of waste," said Barraclough. "I believe we were the most open site. Much of the work was classified between 1949 and 1957 but after that we were diligent in showing the extent of contamination."

Barraclough concentrated on research projects for the 35 years he worked for the U.S. Geological Service between 1948 and retirement in 1983. After this, he took temporary consulting tasks. But in recent years he became a full-time certified hydrological scientific specialist for EG&G. He primarily educated the public on the INEL waste operations at innumerable seminars and meetings, and with the media.

Born in Salt Lake City, the family moved to Boise when he was only a boy. He got his bachelor of science degree in hydraulic engineering from the University of Idaho in 1951. He and his wife, Elaine, a native of Leadore, live in Idaho Falls.

Naval Operations 9

An abrasive but brilliant personality, Admiral Hyman G. Rickover left in his wake at INEL, as well as throughout the nation, a vivid impression for his successful efforts to create what is today America's powerful nuclear fleet. Rickover was 86 when he died of apparent natural causes July 8, 1986, in Arlington, Virginia, a Washington suburb. Earlier, he had suffered a stroke and heart attacks.

Rickover was frequently referred to as the father of this nation's nuclear fleet, a moniker that is likely well deserved. His persistent if bombastic efforts led to the building of the nuclear powered submarine launched in 1955. Most historians believe he, more than any other single leader, guided the United States to dominance in naval nuclear propulsion in the '50s and '60s until the Soviets caught up in the early '70s.

Rickover battled both his superiors and subordinates in the post-war era for his dream of a powerful nuclear fleet. He served in the Navy 63 years and under 13 presidents, longer than any other naval officer in history. It took an act of Congress to enable him to serve nearly 20 years past the retirement deadline, much to the annoyance of many high-ranking officers, including some at INEL. He survived many attempts to oust him, mainly because of powerful friends in Congress, led by Idaho's U.S. Senator Frank Church and Washington State's Henry Jackson, both powerful committee chairmen. Even now, hundreds of sailors who roam the seven seas in the nuclear crafts were trained at the Naval Reactor Facility, and the vessels they man also can trace their origins to the Idaho site. Rickover repeatedly challenged the authority of every chief of naval operations, secretary of defense, and even presidents, except Carter who remained a loyal protégé to the end. Rickover was quoted as saying, "I obeyed all orders I agreed with," but it was apparent he didn't agree with many. In response to the many honors coming his way, he replied, "I do not believe I have done enough for my country. I did what I wanted and was paid well for my work." Congress twice awarded Rickover a rare gold medal for exceptional service.

The temperamental Rickover curtly rejected repeated requests for interviews from many prestigious newspapers. He said "they never get things right anyway." Actually, he resented news media criticism, no matter how trivial. But he amazingly asked to be interviewed by the Post Register's executive and political editor, Ben J. Plastino, October 7, 1979, during one

of his last visits to the INEL. Rickover actually wanted the interview to praise Frank Church, then chairman of the Senate subcommittee on energy and development, and chairman of the prestigious Senate Foreign Relations Committee. In the bitter 1980 campaign which captured national attention, Church lost anyway to Republican Steve Symms, then a First District congressman.

In the interview, Rickover accurately predicted work at the NRF would continue to increase. He reported there were then about 900 civilians, 550 naval staff, and a training class of about 600 at NRF. A stickler for details, he even typed answers to questions he felt were going to be asked. His favorite expression in Idaho, including the one in 1979, was "the (Navy) boys can't resist the beauty and tenderness of the girls from Idaho." He was right, as many have married the Navy men stationed in Idaho.

President Ronald Reagan brusquely replaced Rickover January 31, 1981, with Admiral Kinnard McKee who, in October, was succeeded by Admiral Bruce DeMars. A deceptively frail-looking man, Rickover expressed frank resentment at a congressional hearing in 1982 over his forced retirement. He curtly rejected being kicked upstairs with little or no power and duties as a White House naval advisor. In 1983, three former presidents, Richard Nixon, Gerald Ford and Jimmy Carter, and 500 others paid \$1,000 each to honor the admiral but President Reagan was noticeably absent.

Many INEL naval officers were candid in saying they breathed sighs of relief when Rickover was forced to retire because they would not have to face his sharp tongue any longer. Although NRF was one of Rickover's favorite projects he made sure the Navy ran a tight ship.

It was Rickover who once interviewed young Navy officer Jimmy Carter for the Navy's new nuclear submarine program. Carter, a lieutenant and graduate of the U.S. Naval Academy often visited NRF and the INEL. In Idaho Falls interviews, he often mentioned coming to the naval facilities on a number of occasions as part of his duties. INEL's Idaho boosters believed that when Carter became president in 1977 he would promote the station because of his close association with Rickover and the site. But the opposite was actually the case. Carter adopted an anti-nuclear policy to the disappointed surprise of INEL backers.

Three other presidents besides Carter have had personal relationships with the INEL. The foremost was President Lyndon B. Johnson who delivered a major policy speech before 12,000 at the NRTS and dedicated the designation for EBR-I, August 26, 1966. Ford's son, Jack, served with the Navy contingent at the INEL for a short time but it was never publicized.

Reagan was a glib salesman for General Electric when he appeared in 1961 to visit the Aircraft Nuclear Propulsion program operated by his company and addressed a dinner meeting in Idaho Falls.

Riding the first nuclear submarine under the polar ice cap can be a tingling experience, but when you don't know exactly where you are it's indeed frightful. That's what happened to Frank Fogarty who later took the more calming job of EG&G's Idaho manager of power reactor programs in Idaho Falls.

The Nautilus, which was pioneered at the National Reactor Testing Station, went on a classified mission on its first trip in 1955. In 1957, Fogarty was one of the first five officers to sail on the historic vessel. A generator failure decommissioned the submarine's gyro and the crewmen didn't know exactly where they were. The vessel was 180 miles south of the North Pole and churning in waters under polar ice that was often 90 feet thick with the ocean floor often just a short distance below. They navigated the vessel by "bouncing sound waves off the Arctic Ocean floor and comparing it with sea charts." Feeling their way forward, they finally emerged into open water near the northern tip of Greenland. "We were glad to see the open sea again," said Fogarty, which must have been the understatement of the year.

The Nautilus had a colorful history. It was born in a prototype power plant, a land version of the seagoing variety. It was the world's first nuclear powered submarine, developed by the Atomic Energy Commission at the NRTS. Now all of the nations' submarines are nuclear powered. The land-locked version of the atomic submarine was brought to full power at the NRTS, May 1953. The Post Register carried a front page story June 4, 1953, that told of the historic successful breeding of atomic fuel. This meant the projection of at least as much, or more, new fissionable material than it burned up in the process of making it. It meant that atomic energy could enable a submarine to travel many thousands of miles without refueling and could stay submerged for great lengths of time. The Nautilus was completed and launched from Groton Harbor in Connecticut by Electric Boat Co. January 21, 1954. It made more than 2,500 dives. On March 3, 1980, the worn-out submarine was decommissioned at Mare Island, California. President Carter signed an order to berth it at Groton, Connecticut, later in 1980.

Fogarty had been named to the Naval Academy from Great Falls, Montana, in 1944. He served on the Sea Wolf, a companion ship of the Nautilus, and also on another sister ship, the Skyjack. Fogarty, who commanded the Nautilus from 1963 to 1967, then became technical program manager of the Navy's Undersea Warfare Program at the Pentagon. He re-

tired in 1970 and later came to Idaho Falls. Fogarty, who sported a van dyke beard over a ruddy countenance, liked the slower pace in Idaho Falls, although he said his job was a demanding one. His work was concentrated at TRA and he worked closely with the Naval Facility.

Fogarty said he hoped to eventually become involved with the Boron Neutron Capture Therapy Project. This is a process to use boron and radiation from the standby Power Burst Facility in a focused beam to kill cancer cells in a heretofore inoperable brain tumor known as "glioblastoma multiforme." He saw a bright future for commercial nuclear power, even though this nation is lagging behind some European and Asiatic nations.

Of his old boss, the temperamental Admiral Rickover, Fogarty said, "He was a remarkable individual and indeed tremendously dedicated. He had high standards and had little patience for those who did not meet them. Rickover was an exacting task master but nobody else could have made the nuclear Navy happen." Rickover personally interviewed officer candidates and often had a third person present to bolster his frequent biting interrogations.

Part of the vast expanse of sagebrush land where the National Reactor Testing Station was established in 1949 had a federal military agency already on the scene. It was the U. S. Navy which used it for a gunnery range during World War II. The U.S. Naval Ordnance Station at Pocatello relined guns from warships operating in the Pacific, and then the guns were shipped by rail to the area near what became the Central Facilities. These guns, some of 16-inch caliber, were test fired by civilian personnel under Navy direction, not only for alignment but for projectiles of various designs. They were fired from 50 feet to 35 miles and many had to be recovered and examined because they were in the development stage. Ballistics and other pertinent data were recorded by electrical timing devices and high-speed cameras. At the close of the war in 1944-45, larger types of explosives were tested. The largest non-nuclear explosion containing 250,000 pounds was set up August 29, 1945. The explosion opened a crater 200 feet long, 100 feet wide, and 15 feet deep, and observers nine miles away said they saw a mile-wide cloud of dust rise 6,000 feet above the desert floor.

A Navy captain named Scoville developed the proving grounds, and a rail siding near the vicinity still bears his name. Most of the houses there were built in 1942 and were the homes of civilian personnel and their families. Those north of the railroad siding even had their own fenced gardens and some had private garages. The base commander was quartered in the building designated as CF 607 and the gun emplacements and concussion

wall were located adjacent to CF 646.

During the war years, a garrison of U.S. Marines kept a tight security guard around the gun emplacement area. The garrison of about 20 Marines were quartered in the building CF 606. Marines even used trained dogs to patrol the area and their kennels may still be seen near Central Facilities.

For entertainment, residents of isolated Scoville went to parties in the building where a garage, fire station, and locomotive shed were combined. This happened four or five times a year. Twice a week, the locomotive was pulled out and first run movies were shown. Hunting was a favorite pastime, and, because of its remote location, it was open nearly the year around. Fishing at nearby streams and reservoirs also was a popular form of entertainment.

Site residents reported that in one severe winter they were isolated for 29 days and were running low on food. They finally used two bulldozers and a truck to make the trip to Arco for supplies. Also, a woman at the site who was expecting a baby soon was transported to Arco barely in time.

Four major installations comprised the Naval Reactor Facility. These were the Submarine Prototype (S1W), the Large Ship Reactor (A1W), the Natural Circulation Submarine Prototype (S5G), and the Expended Core Facility (ECF). The facility was operated for DOE and the U.S. Navy by Westinghouse Electric Corporation under jurisdiction of DOE's Pittsburgh Naval Reactors Office.

It was in the S1W, originally called the Submarine Thermal Reactor or STR, that the United States' nuclear Navy was born. The project, aimed at freeing naval vessels from their need for refueling at sea or frequent returns to port, achieved success with the initial power run in the USS Nautilus prototype on March 31, 1953. Later followed attainment of a simulated non-stop voyage from Newfoundland to Ireland, "submerged" and at full power. This proved atomic propulsion of ships was feasible, and that the Nautilus, long before it set out to sea, could do remarkable things, such as a later accomplishment of subnavigating the polar cap from the Pacific to the Atlantic. In addition, the S1W plant continued to be a training center for Navy personnel who manned present and future naval nuclear powered ships. Due to age and the continued high cost of operations, the S1W Prototype began defueling and decommission operations in 1989.

In the late 1950s, the A1W attained criticality and full power operation of both reactors. The A1W was a prototype facility consisting basically of a dual pressurized water reactor plant within a portion of a steel hull, built to prototype the aircraft carrier Enterprise. All components were of a type to

withstand seagoing use. Started up in 1958, this was the first nuclear plant to have two reactors powering one ship propeller shaft. This plant had the capability of reactor plants of two different reactor designs operating independently. From continuing tests came new and advanced reactors and cores for naval surface ships.

The aircraft carrier USS Enterprise and the missile cruiser USS Long Beach were the first ships powered by the A1W type plants. One of the A1W reactor plants was modified in 1972 to provide test and prototype operation of a new type of reactor design which has since been used in the newest aircraft carriers, the USS Nimitz, USS Eisenhower, and USS Vinson.

Started up on September 12, 1965, the S5G Prototype was a pressurized water reactor having the capability to operate in either a forced circulation or a natural circulation flow mode where cooling flow through the reactor is caused by thermal circulation, rather than by pumps. Using the natural circulation capability improved plant safety, simplified plant design, increased reliability, and reduced the plant noise level.

To prove the new design concepts would work in an operating ship at sea, the prototype plant was installed in an actual submarine hull section capable of simulating the rolling motions of a ship at sea. This training was geared to provide new personnel with all of the tools they would require to perform their responsibilities, as well as to keep experienced personnel proficient in their duties. All nuclear propulsion plant operators were carefully screened and were required to meet stringent academic standards.

The Expended Core Facility (ECF), also operated for DOE and the U.S. Navy by Westinghouse, received, examined, and prepared naval expended cores for shipment to the Idaho Chemical Processing Plant to recover enriched uranium in the spent fuel. Another ECF activity was to handle and examine irradiation tests (small-scale representations of current or future core designs) in the INEL's Advanced Test Reactor, providing test information for design personnel at the Bettis and Knolls Atomic Power Laboratories. Part of the building contained deep, water-filled pits for safe underwater disassembly, examination, and preparation for analysis of radioactive components and irradiation tests. Portions of the disassembled components were sent to hot cells within the building for further examination and testing.

One of the long-standing foundations of the Naval Nuclear Propulsion Program was the extensive training operators received, both before reporting to a ship and while at sea. After completion of basic recruit training and selection for the nuclear program, enlisted personnel were assigned to Nuclear Field "A" School in Orlando, Florida, for initial in-rate instruction.

In addition to preparatory courses in math and physics, each student received extensive hands-on training in equipment laboratories specially designed to teach required technical skills. Nearly 5000 machinist's mates, electrician's mates, and electronics technicians completed this training each year and proceeded to Nuclear Power School where they started their "nuclear" training.

The 24-week Enlisted Nuclear Power School course provided enlisted personnel with the basic academic knowledge necessary to understand the theory and operation of a nuclear propulsion plant in general, and specifically the equipment for which they were responsible. The curriculum was presented at the first-year collegiate level, and course work included math, physics, chemistry, thermodynamics, materials, reactor principles, radiological fundamentals, and specialized in-rate subjects.

Following commissioning, or upon acceptance into the program from the fleet, officers reported directly to Officer Nuclear Power School, also taught in Orlando. The officer curriculum, also 24 weeks in length, was taught at the graduate level, although it began with basic principles. This highly technical course of instruction provided the officer with the theoretical background necessary to commence training on an operational plant.

Since 1963, the INEL has grown to be a major contribution to Idaho's economy. The INEL payroll surpassed \$100 million, and, directly and indirectly, INEL generated more than \$600 million in wages and salaries. A summary of an Idaho State University report on the socioeconomic impacts for the INEL, revealed significant figures. It showed that the estimated impact of 10,702 jobs at the INEL in 1987 provided 18,351 total jobs and a population supported by the INEL of over 55,100 in the impact area. In 1990, nearly 25,000 Idaho workers were supported by INEL activities.

The INEL primary and secondary employment accounted for 20.9 percent of total employment in the area. INEL primary employees alone paid an estimated \$2.9 million in taxes of \$70,477,000 collected statewide. The state average compensation for an INEL employee was \$14,433, compared with \$11,613 for the remainder of the state.

Nearly 40 percent of the workers at the INEL were born in Idaho and over half of the remaining workers had lived here for more than five years. Seven of every ten INEL employees are married and have children.

Of the 52 reactors built at the INEL since the start of their kind, fourteen were designed to operate only one day or year or not after completion of their research mission. The Alcohol Fuels Plant, and River Levee Thermal Project, water Conditioning Facility and Semiconductor Test

The National Reactor Testing Station, established officially March 1, 1949, and renamed the Idaho National Engineering Laboratory August 14, 1974, to better identify its role in scientific and engineering research, wrote its history in the nuclear and scientific field through unsurpassed achievement. Since the beginning of the NRTS, there have been 52 reactors placed in operation, the largest cluster of any place in the world. Fourteen were still in operation in 1990. In March 1990, 10,962 were employed, the most in the INEL's history to that date. This included 3,223 in 22 buildings in Idaho Falls and 7,739 at site facilities, and represented about 2.5 percent of Idaho's 406,000 workers. About 350 were employed by the Department of Energy's Idaho office.

The INEL work force in 1990 comprised the largest concentration of technical professionals in the northern Rocky Mountain Region with more than 1,300 holding engineering degrees, 600 science degrees, and more than one employee in three had a college degree.

Since 1949, the INEL has grown to be a major contributor to Idaho's economy. The INEL payroll surpassed \$400 million, and, directly and indirectly, INEL generated more than \$800 million in wages and salaries. A summary of an Idaho State University report on the socioeconomic impacts for the INEL revealed significant figures. It showed that the estimated impact of 10,702 jobs at the INEL in 1987 provided 18,351 total jobs and a population supported by the INEL of over 55,100 in the impact area. In 1990, nearly 25,000 Idaho workers were supported by INEL activities.

The INEL primary and secondary employment accounted for 20.9 percent of total employment in the area. INEL primary employee households in 1990 paid an estimated \$2.9 million in taxes of \$76,647,063 collected statewide. The total average tax burden for an INEL employee was \$2,435, compared with \$1,618 for the remainder of the state.

Nearly 40 percent of the workers at the INEL were born in Idaho and over half of the remaining workers had lived there for more than five years. Seven of every ten INEL employees owned property locally.

Of the 52 reactors built at the INEL, most of them the first of their kind, fourteen were operating or operable while the others were phased out after completion of their research mission. The Alcohol Fuels Plant, Raft River Geothermal Project, Waste Calcining Facility and Semiscale Test Fa-

cility were facilities that were dismantled, transferred or placed on standby status. The 14 reactors operating or operable were the Advanced Reactivity Measurement No. 1, Advanced Test Reactor, Advanced Test Reactor Critical, Argonne Fast Source Reactor, Coupled Fast Reactivity Measurement Facility, Experimental Breeder Reactor II, Large Ship Reactor A, Large Ship Reactor B, Natural Circulation Reactor, Neutron Radiography Facility, Submarine Thermal Reactor, Transient Reactor Test Facility, Zero-Power Physics Reactor and Power Burst Facility.

The governmental agency in charge had undergone three name changes. The civilian Atomic Energy Commission was formally designated January 1, 1947, in a meeting in Washington. That was its name when it came to Idaho to test reactors. The AEC was named the Energy Research and Development Administration January 19, 1975, until October 1, 1977. It was then named the Department of Energy and carried that title ever since. However, the Nuclear Regulatory Commission also was part of the governing family in the regulatory field.

There have been a number of changes in the operating contractors. The first prime operating contractor over most of the facilities was Phillips Petroleum Co., which arrived January 1, 1951. It was then replaced by Idaho Nuclear Co. July 1, 1966. Aerojet Nuclear took over most of the operation until EG&G, the acronym for Edgerton, Germeshausen and Grier, assumed the prime role October 1, 1976. (It held the contract to 1994, when, in October 1994, Lockheed Martin Idaho Technologies Co. became the operating contractor.)

American Cyanamid operated the Idaho Chemical Processing Plant at the start in 1951. Allied Chemical took over the Chemical Plant January 1, 1971, and was later succeeded by Exxon (ENICO), and then by Westinghouse Nuclear Electric Co. (WINCO), which was replaced by Lockheed Martin Idaho Technologies Co. Westinghouse Electric Atomic Power Division was the first and only prime operator at the Naval Reactor Facility, initiating its administration in 1951. Electric Boat Co. and Bettis Atomic Power Laboratory also had a hand in the NRF operations. Argonne National Laboratory was the directing company for EBR-I, EBR-II, and associated facilities ever since they went into operation in 1951.

General Electric Co. was the operator of the ill-fated Aircraft Nuclear Propulsion plant at Test Area North at its start in the early '50s, but the project was discontinued by presidential order March 28, 1961. It was then determined that ballistic missiles would perform the aerial surveillance work far cheaper and with less hazards. However, other defense-related programs

were assigned to the area after that. Combustion Engineers and the U.S. Army directed operations of the ill-fated Stationary Low Power Reactor I before it blew up January 3, 1961, killing three servicemen. Combustion Engineers also directed the ML I.

Functioning in 1990 under DOE were EG&G, Idaho, Inc.; Argonne National Laboratory West; Westinghouse Idaho Nuclear Co. (WINCO) at ICPP; Westinghouse Electric Atomic Power Division at NRF; Rockwell- INEL-Human Services; Kaiser Engineers, Inc.; Protection Technology of Idaho, Inc., for security; and Ralph M. Parsons Co. Construction management services were provided by Morrison Knudsen-Ferguson Company which signed a five-year contract beginning January 1, 1989. Project construction ranged between 500 and 1,000 workers, and \$35-\$50 million was awarded annually in construction contracts, primarily to Idaho firms. Others included the Inspector General Office of Investigation; Bureau of Mines; Pittsburgh Naval Reactors, Idaho Branch; and the Idaho Falls Center for Higher Education.

The first reactor was the Experimental Breeder Reactor I which chalked up one of the most historic achievements of the century in producing the first use of nuclear fission electricity December 20, 1951. It also demonstrated the principle of breeding, producing more fuel than consumed, in June 1953 and later underwent tests for the first use of plutonium and proving that consequences of a core meltdown were not necessarily catastrophic.

The Materials Testing Reactor was the second built and went into operation in late March 1952. Of notable achievement, it produced the most intense neutron flux. The Boiling Water Reactors Experiments, constructed in 1953, was the first of five reactors to pioneer intensive work of boiling water reactors.

INEL scientists tested new fuels and materials in the Advanced Test Reactor for improving water-cooled reactor design and operation. The tests determined how fuels and materials—relatively unaffected in more conventional environments—reacted when bombarded with streams of neutrons and gamma rays. It was the world's largest test reactor and began operating in July 1967 with nuclear experiments starting December 25, 1969.

The Special Power Excursion Reactor Test concentrated on so-called “runaway” accidents, a situation where excessive nuclear fission occurs in the core. Four SPERT reactors were operated through 1970. They showed that “runaway” accidents were less likely to happen than once thought, and that they could be predicted and modeled.

The Engineering Test Reactor achieved nuclear startup in 1957 and was the most advanced materials test reactor in the world with a power level of 175 megawatts. It provided irradiation facilities for development of reactor components for military and civilian reactors. It went into retirement in 1982.

The nuclear Navy at the site was inaugurated March 31, 1953, with the initial power run of the Submarine Thermal Reactor, a land-based prototype of the nuclear engine for the nation's first atomic-powered submarine, the USS Nautilus. Powered by STR Mark-II, the USS Nautilus traveled in excess of 25,000 miles, most of the time submerged. The submarine also cruised under water at an average speed of about 16 knots. September 12, 1965, the Navy's newest submarine prototype reactor, the S5G, became operational. The S5G improved safety and reliability over old seacraft and was installed in a real submarine hull that could simulate actual conditions at sea.

The Naval Reactor Facility was one of the oldest areas at the INEL with more than 35 consecutive years of operation. It was operated for the Navy by the U.S. Department of Energy. Over the years, thousands of naval officers and enlisted personnel received Navy training in Idaho's desert, at the rate of 5,000 a year.

Work began on the first prototype power plant for a nuclear airplane in the 1950s—the Aircraft Nuclear Propulsion project. The ANP project was commissioned to develop a nuclear reactor aircraft engine capable of powering an airplane for extremely long periods. The program involved building and testing three heat transfer reactor experiments which proved the feasibility of operating an aircraft turbojet engine with nuclear heat. Three low-power reactors also were operated to support the ANP program: the Shield Test Pool Facility Reactor, the Critical Experiment Tank, and the Hot Critical Experiment. These reactors served to test materials, components, and reactor designs. The ANP project was canceled by presidential order on March 28, 1961, long before the developmental engines were sufficiently refined to install on actual aircraft. Work on the project did leave researchers with a knowledge about high temperature reactor materials technology, however, which has been used in the design of all reactors built since then.

Work in the Army Reactor Experimental Area on the site in 1957 was aimed at developing a family of small reactors that could meet a number of military requirements, including being compact, lightweight, and mobile. The stationary Gas-Cooled Reactor Experiment was the initial stage in developing nuclear power plants that could be moved without disassembly. An

offspring, the Mobile Low Power Reactor Plant No. 1, was designed to be carried by a single airplane, truck-trailer, or ship for operation in remote areas. Both the ANP project and the Army's mobile reactor experiments provided technology that was being used in 1990, specifically in the planning and design of the Modular High Temperature Gas-Cooled Reactor (New Production Reactor) once proposed for Idaho.

The Loss-of-Fluid Test, constructed from 1963-75, purposely melted the core in a test July 9, 1985, and was the 38th nuclear powered experiment conducted in the facility; and the Power Burst Facility, beginning its first test September 22, 1972, compiled data on high priority safety issues relevant to nuclear fuel and cladding behavior under certain accident conditions. The PBF was held on a standby basis for new programs, one of which was the Boron Neutron Capture Therapy for treatment of a brain cancer called glioblastoma multiforme, which kills 4,500 people a year in the U.S.

Construction on the Fuel Processing Restoration (FPR) project at the ICPP began in July 1988. Total project cost, including research and development, project support, engineering, design, and construction, was estimated at \$365 million. The FPR project was the final phase of a major facilities upgrade at the ICPP. It was to replace the uranium extraction plant constructed in 1951. When finished, FPR was to have substantially improved the ICPP's ability to process spent fuels through the year 2035. State-of-the-art engineering design would have allowed the FPR to provide safe and reliable uranium recovery, minimize chances of plant personnel receiving radiation exposure, and further reduce the risk of releasing radioactive materials to the environment.

The Idaho Office of the Department of Energy operated two significant laboratories: the Idaho Research Center (IRC) and the Radiological and Environmental Science Laboratory. The INEL Research Center on North Boulevard in Idaho Falls has been a multidisciplinary research center and a cornerstone for government-based technology research in materials science, physical sciences, chemistry, biotechnology, environmental sciences and electronics development. Customers included the DOE, Bureau of Mines, Department of Defense, National Science Foundation, Electric Power Research Institute, National Park Service, Environmental Protection Agency, National Aeronautics and Space Administration, United Nations, and industry and universities. The IRC's seven technological systems were named among the top 100 scientific or technical achievements in the prestigious R&D-100 competition sponsored by "Research and Development Magazine."

IRC was deemed the focal point in transferring technology to the

private sector via INEL's Technology Transfer Program. An example was an ongoing project between IRC researchers and seven national steel-related industries whereby a process developed at the IRC for rapid casting of steel would be used by the companies to make metal for car bodies and structural pieces.

IRC was housed in four buildings, which included individual laboratory units. It was staffed by some 400 scientists, engineers and support personnel employed by EG&G Idaho, Inc., and Westinghouse Idaho Nuclear. Its \$18 million facility was dedicated April 17, 1984, by U.S. Senator James A. McClure and Donald Hodel, who then was secretary of energy.

The Radiological and Environmental Sciences Laboratory, one of only three operated by DOE, was renowned for its pioneering work in radiation monitoring, ultrasensitive methods for radiochemical analysis and radiation safety research and development. It administered and documented tests for all DOE and DOE contractor programs for measuring radiation exposure to employees. As an official reference laboratory, it was responsible for preparing standards to test the capabilities of the Nuclear Regulatory Commission Regional Laboratories and companies applying for NRC operating licenses. It also conducted environmental research in cooperation with universities and with atmospheric, geologic and hydrologic experts employed by the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The scientists carried on continual programs for studying and monitoring the air, water, food-stuffs, soil and ambient radiation levels in an adjacent area of 6,000 square miles.

In addition, DOE-ID administered the West Valley Project Office near Buffalo, New York, where researchers demonstrated safe and effective methods for solidifying and disposing of high-level radioactive liquid waste; the Butte Project Office in Butte, Montana, where researchers at the Magnetohydrodynamics Component Development and Integration Facility developed equipment to generate electricity from coal-fired gases; and the Denver Support Office in Denver which managed DOE grants and energy conservation programs in the Rocky Mountains region.

It also administered research work at the Three Mile Island Project Office near Harrisburg, Pennsylvania, on the damage caused by the accident March 28, 1979, of the TMI Unit 2 commercial reactor. DOE-ID also had jurisdiction over the Grand Junction Area Office in Grand Junction, Colorado, on portions of the National Waste Terminal Storage Program, and Uranium Mill Tailings Remedial Action Programs.

The INEL site has been a National Environmental Research Park,

one of only five in the nation. All lands on the site have been a protected outdoor laboratory where scientists from DOE, other federal and state agencies, universities and private research foundations conduct ecological studies.

Employees at the INEL conducted water reactor safety research programs for DOE and the Nuclear Regulatory Commission. The purpose was to study the behavior of nuclear power plants during other-than-normal operating conditions. EG&G personnel studied equipment, procedures, and operator performance to reduce the possibility of reactor accidents and to reduce the extent of damage should an accident occur. The research supported the national policy of continually working to improve reactor design, licensing, and operation.

Under the breeder reactor program, INEL researchers worked to develop power plants that not only generate electricity but create more fuel than they burn. Scientists at Argonne National Laboratory-West built on the accomplishments of the historic Experimental Breeder Reactor I, which produced the first usable electrical power from the atom in 1951 and later proved the feasibility of fuel breeding. The successor to EBR-I, Experimental Breeder Reactor II, began operation in 1964 and played an important role in testing fuels and materials for future breeder reactors. It also provided power to the INEL.

The primary functions of the ICPP have been spent fuel recovery and conversion of liquid waste to a solid waste for storage. The ICPP recovered valuable "unburned" uranium from used nuclear fuel elements. Most of the fuel came from government-owned reactors, although a very small amount comes from power plants.

Various facilities at the INEL have processed or stored radioactive waste. One of the more important of such facilities was the Radioactive Waste Management Complex (RWMC), where solid radioactive waste generated from national defense and research programs was stored. Techniques used at the RWMC include some of the most advanced and innovative in the radioactive waste management field. It was started in 1952 as a 13-acre area and expanded to 144 acres.

From 1952 until 1970, most of the transuranic (TRU) waste (waste contaminated by plutonium-239) arriving at the RWMC was buried—that was the accepted practice in the nuclear industry at the time. Since 1970, however, TRU-contaminated wastes have been stored above ground in steel drums, fiberglass-covered wooden boxes, and steel bins. Tests were underway to determine how best to deal with the buried waste. A major objective

of the Department of Energy's radioactive waste management program was to eventually retrieve the stored TRU waste from the INEL and place it in the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. WIPP was being established as a research and development facility to demonstrate the safe disposal of radioactive waste in cavities mined in bedded salt 2150 feet below ground.

Visits by leaders of the Soviet Russian Atomic Energy Commission on at least three occasions underlined the worldwide importance of INEL. Appearing were Professor V. W. Emelyanov, November 8, 1959, primarily at Argonne National Laboratory facilities, and by Adronik M. Petrosyants, chairman of the State Committee for Utilization of Atomic Energy, November 24-25, 1963, and a second time in 1970. In each case, there were a number of Russian scientists accompanying the Russian leaders.

The tours were interspersed with briefings and social functions. Norman Hilberry, ANL director, was the host leader for the Emelyanov visit. After the visit, Emelyanov was quoted as telling The New York Times that the National Reactor Testing Station at the INEL "is a college for all people who will design and build reactors in the future."

W. L. Ginkel, then acting manager of the DOE office, headed the host group for the Petrosyants visit in 1963. For the most part, the Russian scientists visited the water reactor safety projects.

The 1970 visit followed the fifth meeting of the U.S.-USSR Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy, held at the nation's capital June 1970. It provided for cooperation in research involving fast breeder reactors, fusion and fundamental properties of matter.

The forecast in effect in 1990—entitled, "Nuclear Power, 1973-2000", was the first AEC projection to consider the impact of fast breeder and high temperature gas-cooled reactors. The report stated that about one-fourth of U.S. energy consumption was then electrical energy. By the end of the century, the U.S. would, it was forecasted, be using over twice as much total energy as at present, and half of that would be electrical—nearly five times the amount currently used.

According to the forecast, based on conservative assumptions of population growth and energy consumption, U.S. nuclear generating capacity would grow to 1,200,000,000 kilowatts by the end of the century.

Over 400,000,000 kilowatts of breeder capacity was expected to be installed by the year 2000, equivalent to the total electric generating capacity installed in the United States in 1990. The high-temperature, gas-cooled reactor was forecast to account for about 10 percent of all the nuclear power plant additions beginning in the early 1980s.

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Chairman of the U.S. Congress' House Select Committee on Energy, Mr. George H. Mahon, visited the INEL on December 10, 1985, and a second time on January 12, 1986. In each case, there were two briefings on plutonium production at the Breeder Reactor. On the second visit, Mahon also visited the INEL's Environmental Affairs Subcommittee. After the visit, Mahon was quoted as saying, "I am very impressed by the progress that has been made in plutonium production. I am also very impressed by the attitude of the people who will design and build reactors in the future."

W. L. Criner, then acting manager of the DOE's Office of Nuclear Energy, Science and Technology, told Mahon that plutonium production would be the "key to the future" of plutonium utilization. The 1986 visit followed the fifth meeting of the U.S.-USSR Plutonium Committee.

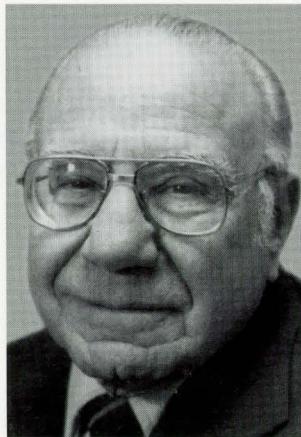
The INEL's "Advanced Breeder Reactor", (Advanced Breeder Reactor-2000), was the first Advanced Breeder Reactor (molten salt) plutonium and high temperature gas-cooled reactor. The report stated that by the year 2000, plutonium reactors would be needed to meet one-third of the world's energy needs. By the year 2000, the U.S. would be the largest plutonium producer in the world. It was forecasted that plutonium would supply 20% of total energy as it is present, and half of that would be electrical. By 2010, the U.S. would be the largest plutonium producer in the world, with 10% of the world's energy needs met by plutonium.

Over 400,000,000 kilowatts of breeder capacity will be installed by the year 2000, equivalent to the total electric power in the Soviet Union, Great Britain, and France combined. By 2010, 100,000,000 kilowatts of plutonium power will be installed in the U.S. and 100,000,000 kilowatts in the Soviet Union. By 2020, plutonium power will be equivalent to 100,000,000 kilowatts in the U.S. and 100,000,000 kilowatts in the Soviet Union.

Acronyms

AEC	Atomic Energy Commission
ANL	Argonne National Laboratory
ANP	Aircraft Nuclear Propulsion
ATR	Advanced Test Reactor
BORAX	Boiling Reactor Experiment
BYU	Brigham Young University
DOE	Department of Energy
EBR	Experimental Breeder Reactor
ECF	Expendable Core Facility
ERDA	Energy Research and Development Administration
ETR	Engineering Test Reactor
FAST	Fluorinel Dissolution and Fuel Storage Facility
FBI	Federal Bureau of Investigation
FPR	Fuel Processing Restoration
GE	General Electric Company
HFF	Hot Fuel Examination Facilities
HTRE	High Temperature Reactor Experiment
ICBM	Intercontinental Ballistic Missile
ICPP	Idaho Chemical Processing Plant
IFR	Integral Fast Reactor
IRC	INEL Research Center
ISU	Idaho State University
JCAE	Joint Committee on Atomic Energy
LOFT	Loss-of-Fluid Test Facility
MTR	Materials Testing Reactor
NERP	National Environmental Research Park
NPR	New Production Reactor
NRF	Naval Reactor Facility
NRTS	National Reactor Testing Station
PBF	Power Burst Facility
PTI	Protection Technology of Idaho, Inc.
SIS	Special Isotope Separation
SL-1	Stationary Low Power Reactor
SNAPTRAN	Systems for Nuclear Auxiliary Power Transient
SPERT	Special Power Excursion Reactor Test

STR	Submarine Thermal Reactor
TAN	Test Area North
TRA	Test Reactor Area
UI	University of Idaho
USGS	United States Geological Survey



Ben J. Plastino

Ben J. Plastino, the son of Italian immigrants who were early pioneers of Market Lake, Idaho, made his mark on Idaho as a newspaperman and community leader for fifty years. A native of southeastern Idaho, Ben returned to Idaho Falls after graduating from the University of Idaho in 1932 in journalism and spending nine years as a reporter on the *Lewiston Morning Tribune*. He joined the Idaho Falls *Post Register* in 1942 where he remained for forty-one years, first as a reporter and city editor, and then rising to managing editor, political editor, and executive editor.

Ben relished his life as a journalist, and his devotion to that profession was evident in his four decades of coverage of the Idaho Legislature; his interviews of every United States president since Franklin Roosevelt, with the exception of Eisenhower, and of nearly all presidential and vice presidential candidates and top congressional and political leaders; and his ringside coverage of such regional events as the establishment of the INEL, the Yellowstone earthquake, and the Teton Dam failure. To commemorate his retirement, the Idaho Legislature passed a resolution honoring his fifty years of reporting.

Ben took his obligation to newspaper readers seriously, believing readers were smart and that his job was to present the news fairly and completely so his readers could make up their own minds about the important issues of the day. He felt very lucky to have the opportunity to devote his work life to something he loved. Ben maintained an abundant zest for life and an enthusiastic enjoyment of people, and felt it paramount to treat people fairly and with respect.

Ben felt it was an obligation for every citizen to contribute to his community. He was a member of many organizations in southeastern Idaho, receiving significant awards and honors for his work. Among them were the Seventh Judicial District Liberty Bell Award, and the Idaho Statesman Distinguished Citizen Award.

This book was his last written project. He died in May 1995, in Idaho Falls.

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