Chapter Five

Inventing the Testing Station

The desert is starting to show some small signs of activity.

–Bill Johnston, July 1949–

Settling into the fourth floor of the Rogers Hotel on July 16, 1949, the IDO staff, now grown to twenty-five members, suddenly found themselves needing to execute some sort of "party plan" of their own. They had to reassure a number of eastern visitors with second thoughts about Idaho. A rumor had surfaced in Oak Ridge that "bubbles in the lava beds" made it unsound for the reactor building's foundation. John Huffman, one of the Oak Ridge scientists responsible for one of the proposed reactors, came to have a look. The Idaho group took him to the reactor site, where a careful examination alleviated his concerns. They also made sure he understood the nature of the superb fishing country just up the road past Arco, a trick they may have learned from the Idaho Falls Chamber of Commerce.[1]

Aside from bursting bubble rumors, Johnston had to deal with waves of doubt coming from AEC Headquarters in Washington. Despite the AEC's apparently irrevocable decision in February, resistance to the idea of a testing station was growing: it would cost too much money, the Navy wanted to keep its property, the estimates of safety hazards were overblown and a testing site really wasn't needed. Scientists continued to propose that reactors be built at their Argonne or Oak Ridge labs.[2]

Worse, a turf war had erupted. Walter Zinn learned that Hafstad intended for Johnston and other AEC field managers to wield a controlling amount of authority. They would select the contractors to design and build the reactors, thereby retaining direct AEC control over reactor research. Zinn cared little for this idea. Not one to say diplomatically what he could say bluntly, he wrote Hafstad, "I believe it would be unsatisfactory to ask unqualified people to take responsibility for approvals." In the ensuing tussle, Zinn threatened to withdraw the breeder reactor, but Hafstad made compromises favoring Argonne's choice of contractors and calmed the waters.[3]

Courtesy of the Winfield Marvel Family

Leonard "Bill" Johnston

Zinn vs. AEC Managers was only the first eruption to set the ideals of scientists at odds with the ideals of administrators at the NRTS. Scientists thought administrators had little appreciation for scientific sensibilities or the creative process; managers thought scientists had no public relations moxie and an insufficient devotion to budgets and schedules.

The conflict played out strictly within the AEC family, but it delayed firm decisions about the Idaho reactor program. It had seemed in April that three reactors were slated for the proving ground, but in June the number was up in the air again. With Washington in a shuffle, Johnston used his podium time before Rotary clubs and other local groups to provide general updates on the purpose of the Site, but couldn't announce a construction start on the first project until September. Eventually, the hash and rehash in Washington at last dissolved into decisions to build four major pro-

The excavation for EBR-I began in 1949.

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A Memoir of the Rogers Hotel

In the early years, the fourth floor of the Rogers Hotel provided an unusual environment for an office. The available rooms were generally small with an adjoining bathroom. The toilets were of the noisier power-flush rather than the gravity type. This made for embarrassing incidents, such as when you were on a long distance call and the unknowing caller would comment about the sound of a flushing toilet. In the summer when windows and doors were open you could hear even more flushing sounds from adjoining rooms, across the hallway, and across the narrow break between building sections.

Since filing space was at a premium, the secretaries put file cabinets and boxes in the bathtubs, which sometimes produced complicated traffic problems. Sometimes you'd have to go, and you'd find blueprints and plans spread out all over the fixtures. Window screens weren't tight, and the secretaries didn't appreciate the dead flies that greeted them in the tub every morning. The downtown eateries were overwhelmed at lunch hour, so many employees brought lunches, and that certainly helped attract the flies.

Air conditioning was very limited, so the major saving feature of the place during the very hot days of summer was the existence of the White Horse Bar in the lower level of the hotel, where a cool beer was always available at the end of a long hard day.

Anonymous

INEEL 0133

Drill rig crew takes core sample from spillway on an old irrigation canal.

jects: Zinn's Experimental Breeder Reactor (EBR, later called EBR-I), the Materials Testing Reactor (MTR), the Idaho Chemical Processing Plant (ICPP, or Chem Plant), and the Submarine Thermal Reactor (STR, later named S1W).[4]

Johnston pressed forward, even though the Navy continued to occupy the site through most of 1949. The Naval Proving Ground families gradually moved away, but the last one didn't leave until the night before the Navy's last official day of possession on December 1, 1949. Johnston carried on as though the testing station were a going concern. He moved his staff into the Rogers Hotel and moved his family to Idaho Falls from Schenectady.[5]

Johnston's effort to secure a dependable supply of electricity brought him into the middle of a regional struggle between public and private suppliers of power. The Idaho Power Company was willing to cooperate only if the AEC paid for every bit of the investment and guaranteed a ten-year contract. The company feared that the Bonneville Power Administration (BPA) would step in and offer public power at cheaper rates, wiping out Idaho Power investments. The negotiation, which also included Utah Power and Light (UP&L), extended well into 1950. Before it was over, Johnston's and AEC's legal counsel, Bigelow Boysen, went so far as to prepare a case against the two private companies condemning all or part of each company's properties.

But before the AEC carried out that unfriendly step, it compromised by paying for new transmission lines and capitulating to a ten-year contract.[6]

Finding satisfactory reactor sites was the immediate priority. Each would need water, electricity, access, and security. As many as ten reactors might be built eventually. Although the desert seemed vast, the reactors couldn't go just anywhere. Above all else, reactor buildings would be dense and weighty. Each needed a rock-solid earthquake-proof foundation for reinforced concrete basements, lead and concrete shields, and heavy steel frames. Some of the desert's windblown soils lay rather thinly on the lava rock, and no one wanted to spend a lot of money blasting basalt.[7]

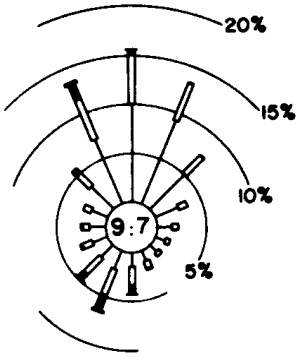
The U.S. Army Corps of Engineers sent two core drilling crews to Idaho, one from each of its Sacramento and Walla Walla district offices. The Navy had not needed to explore below the surface at the proving ground, so it was uncharted territory. Core samples revealed the depth of the soils overlying the lava rock and profiled the alternating layers of sediments, basalt, and water-bearing gravels. The crews also evaluated spillway and bridge structures already on the Site.[8]

When they tested the land east of the Big Lost River, the drillers discovered that the depth to bedrock was greatest near the creekbed and diminished with distance. Therefore, once the architects had decided on the desired depth of a basement, they could put the building where the depth of overlying gravels matched the basement depth, minimizing the blasting of lava rock. The civil engineers bragged for years about how this procedure had helped to save money. Other areas proved suitable as well, including one near the place where the new highway from Idaho Falls was expected to intersect with the road from Blackfoot.[9]

The reactor sites had to meet safety criteria. The Reactor Safeguards Committee, which had recommended the remote testing station in the first place, required that two concentric zones surround any reactor site. The near zone would be a controlled-access area where an accident might pose severe danger. The radius of this area was determined by a formula based on the reactor's power level. The second zone would be determined by a combination of reactor type, meteorology, hydrology, and seismology. Danger within this zone was low, but nevertheless should contain only a limited population. To make sure this secondary zone was large enough, the AEC arranged to buy additional land east and west of what the Navy had withdrawn from the public domain. Finally, an informal practice had evolved during the Manhattan Project of siting reactors no closer than five miles from one another when this was feasible. This may explain why the MTR and the S1W were located five miles apart.[10]

The safety principle of isolation applied to all future reactor experiments (if not always at five-mile increments), establishing the testing station's characteristic land-use pattern of widely separated clusters of buildings. Each project settled into its own "desert island," connected to central services by roads and utility lines.

A site was good only if water could be brought to it. Idaho geologists familiar with the desert area of which the proving ground was only a small part had told the Detroit consultants that a few dry wells had been drilled here and there along with some productive ones but the data was scant. They spoke of an "underground stream" flowing between



Courtesy of National Oceanic and Atmospheric Administration/INEEL 60-1100

Above. National Oceanic and Atmospheric Administration wind rose depicts wind patterns at the north end of the Site. Right. In the early years, U.S. Weather Bureau employees launched helium-filled balloons twice a day to measure the upper level wind speed, direction, temperature, pressure, and humidity.

the mountains to the north and the Snake River to the southwest and told the Detroit consultants that water would be plentiful if the wells tapped the stream.[11]

In May Johnston announced that the first civilian contract would go to A.J. Schoonover and Sons of Burley, Idaho, to drill a well at the site selected for Zinn's breeder reactor. Johnston had told local business leaders that most of the IDO contracts would be for amounts less than $100,000, intentionally within the capability of Idaho's small businesses, and he was as good as his word. The well was exploratory but, if successful, would convert to a production well. By August, it had proven itself. Johnston was pleased. "Each new development to date," he said, "has indicated that the Idaho site will meet every expectation of the AEC as an ideal location for the reactor testing station."[12]

Finding water was far easier than anyone had imagined. The "underground stream" proved to be more like an underground ocean, and the IDO was never at a loss to find water for building sites. It did, however, have to blast lava rock at times. Bill Johnston along with his driver, Marvin Walker, witnessed one of them at the Chem Plant:

I was still Johnston's driver and document courier when they started the basement for the Chem Plant. They flew an expert in from somewhere to oversee the blasting of the rock. There must have been a carload of explosives in that blast. Just placing the charges had taken several days, and when it was ready to go, Johnston and I watched. We were directed to a spot quite a distance away, and Johnston's AEC car, a black 1950 Buick, was parked between us and the blast. We were at least 50 yards beyond the car. The expert hadn't expected much to come up, and all that did come up was dust and small debris and one very large surprise boulder that must have been encased in the lava. It flew towards the Buick. "Another hundred yards, and you'd have made a direct hit on my car," said Johnston to the expert. Later, when we examined the results, the lava looked as clean as if a saw had cut it. He did a beautiful job.[13]

In August 1949, the USSR detonated an atomic device. The news shocked the citizens of the United States. At AEC Headquarters, a sense of urgency infused the reactor program. Priorities clearly had to favor defense goals. President Truman ordered the AEC to develop a hydrogen bomb, also known as the Superbomb. With 1950 came the Korean War. The U.S. Army sent military advisors to the NRTS to facilitate procurement and otherwise move the construction schedule as rapidly as possible. The MTR and the Chem Plant, aside from their major research missions for peaceful purposes, also had subsidiary defense-related missions of urgent interest to Los Alamos weapons researchers.[14]

Johnston continued master planning the Site, enlisting other federal agencies for help. The U.S. Soil Conservation Service advised on the re-seeding of disturbed construction sites. The U.S. Weather Bureau studied wind and weather patterns across the Site. Exhaust stacks would soon become part of the landscape, and the architects would need to know how high to build them and which directions were downwind and upwind. The winds would play a major role in diluting the gases and particulates that would exit the stacks.[15]

The U.S. Geological Survey (USGS) analyzed the structure of the Snake River Plain aquifer and layers of lava rock beneath the site, drilling thirty-three test wells. At a meeting of the Rotary club in Pocatello, someone asked Johnston about the projected use of water and if the wastes might contaminate the underground supply. He replied, "Waste water returned to the desert drainage will be clear and [as] free of foreign matter as pure spring water." It was the thinking at the time that the soils would absorb "atom waste" long before the water that might contain it could reach the aquifer.[16]

The U.S. Army Corps of Engineers, with the Bureau of Land Management, helped with the purchase of surrounding state and private lands. With new acquisitions, the AEC would control a total of 400,000 acres, more than doubling the Navy's holding.[17]

In October Johnston reported to his various Idaho audiences that three reactor sites had been selected. Hanford was dismantling its concrete batch plant and shipping it to Idaho. The engineers had found good sources of sand and gravel not far from the Navy's circle of small white houses. Cement would arrive by rail and be conveyed conveniently to the mixing vats. The pace began to quicken. Johnston hired another local firm to excavate the basement for Zinn's breeder, even before Bechtel had been selected as the construction contractor.[18]

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Above. The batch plant from Hanford is reassembled at the NRTS and nearly ready for action in November 1949. Middle. Inherited from the Navy, houses like CFA 609 were later used as offices. Below. By January 1952, a new cafeteria was operating at Central. The kitchen included a pastry section.

When the Navy handed over the proving ground on December 1, they left it mostly as it had been, and the AEC reaped the cost savings that the Detroit consultants had predicted. The Navy buildings became the staging area for the construction that began in earnest in 1950. The area continued to expand as a central service area for the NRTS. Eventually it acquired the name "Central," or more officially, "Central Facilities Area (CFA)." Its functions grew to include a fire station, dispensary, technical library, cafeteria, warehouses, offices, laboratories, and a maintenance shop for the fleet of buses that would take workers to and from the Site. The contractors quickly appropriated the houses, marine barracks, magazines, cranes, roads, and utilities for service. The industrial odds and ends lying about the Navy's storage yards supplied treasures for scrounging scientists for many years to come.[19]

Whether Johnston ever was under any illusions about the true status of the road from Idaho Falls to the Site is lost to history. One day in the spring, not long after he had arrived, he had his driver take the Buick past the point where the county's roadwork had ended. The car bumped along on an old stock trail that wound westward through the mix of lava fields and grazing lands. Johnston met one of the ranchers, and they talked about the road. "Just tell the engineers to fill, don't cut," warned the rancher. Snow drifted badly in the winter and would fill low spots. Johnston kept it in mind.[20]

First, the road had to be financed. Johnston told the Governor Robbins that the project would be handicapped without good roads. He needed a new road to connect the Site to what Bonneville County had already graded and graveled west of Idaho Falls. Also, the shoulderless road between Blackfoot and Arco, which probably followed the meandering path of an old wagon road, needed to be upgraded to a standard, two-lane condition. Robins replied that Idaho would devote some money to the roads if the federal government would accept them into the Federal Aid Primary System and help with federal funds. Johnston pressed, "I will appreciate any special expediting methods your staff can use..."[21]

Johnston's program director, J. Bion Philipson, took over the conversation with the governor. The road had to be available by the end of summer in 1950, he said. If the state would prepare bid specifications in the winter of 1949, this would be possible. Philipson suggested that the state hire several contractors, each to build one section of the road. In that way the job would get done faster than if only one contractor were hired to do the entire job. He offered the AEC's own survey parties to work under state supervision, and he said the AEC would supply at least $700,000 from its own funds for the road, over-matching Idaho's $500,000.[22]

But the negotiation between the AEC and the State of Idaho was only beginning. Governor Robins became far less easy-going than the gentleman Lilienthal had met. He complained that the AEC schedule "makes a stiff demand" on the state. It would upset previous budget plans and "will certainly strain us to the limit" and "expose us to considerable maneuvering in the

handling of funds and arouse some community criticisms." The highway department had obligations in other parts of the state, and "can't go higher than $300,000." The state intended to relocate most of the Blackfoot road and thought the actual cost of all the work would exceed early estimates. Still, the governor asserted that the state would do its best to meet "reasonable" demands.[23]

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The dickering continued through 1950 and into 1951 and beyond, engulfing the three counties through which the roads would pass (Bonneville, Bingham, and Butte), Idaho's congressional delegation, the federal Bureau of Public Roads, and a host of chamber of commerce committee members, the Idaho highway commissioners, contractors, and others. Resentment flared in Blackfoot as the IDO seemed to favor the Idaho Falls road at the expense of the Blackfoot road, on which ninety percent of the freight to the site was hauled. "They wined and dined those [AEC/IDO] people," accused Blackfoot, hinting of legal lapses.[24]

Struggles over right-of-way and who would pay what and when strained the political skills of the Idaho Falls civic leaders to the utmost. When the winter of 1950-51 arrived, the new road was not ready, and the Blackfoot road had not been improved. Site employees from Idaho Falls had to travel south to Blackfoot and then dogleg west on the Blackfoot road to get to the Site. The road opened finally on October 8, 1951.[25]

The AEC ended up spending $1,141,000 for the road from Idaho Falls, while the State of Idaho's share was $337,000 and a promise to improve the Blackfoot road. The federal Bureau of Public Roads contributed $563,000, an amount widely perceived as a "higher-than-usual percentage in relationship to Idaho's portion." In 1952 the state managed to grade about twenty miles of the new Blackfoot road but announced that if Idaho funds were the only ones brought to bear on the problem, the state would have to piece the repairs over the next three years, and even then not necessarily get the job done by 1955. Meanwhile, the road continued to deteriorate dramatically under heavy Site traffic.[26]

Prodded by an indignant Blackfoot, which wondered all over again why the AEC had chosen Idaho Falls as its home city, Johnston promised to persuade AEC headquarters to support a special federal appropriation through the Bureau of Public Roads. This he did, with the Idaho congressional delegation backing the proposal "to the hilt."[27]

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Above. Excavation for MTR in October 1950 shows concrete work in progress and location of future fuel-storage canal. Left. The CFA in 1999 was the home of Site support services such as environmental monitoring and calibration laboratories, communication systems, security, fire protection, medical services, warehouses, cafeteria and laundry services, vehicle and equipment pools, and bus operations.

By early 1953 a more comprehensive approach to road planning was evident. The IDO was getting ready to open a new reactor complex at the northern edge of the Site. State and federal road authorities prepared to extend a new road west from Rexburg towards the Terreton and Mud Lake area, as well as make other improvements to the connections from the Site to Arco, Idaho Falls, and Blackfoot.[28]

Although anticipating new roads, the IDO decided early that it would bus employees to the Site from surrounding towns. Considering the thousands of employees on the way—and the narrow condition even of new roads—it was the safest alternative. Bus service began early and continued, the fare always set so low that most employees would find the buses far more attractive than carpooling. Although Johnston had passed along to the engineers the rancher's warning about snow drifts, the message was lost. During the first winter of the new road, drifting snow closed it, forcing employees to go the long way once more.[29]

Thus, the first transactions between the AEC and the State of Idaho involved long haggles over who would pay the cost of infrastructure. The accommodation from Boise was reserved, perhaps unavoidably stinting. Equally, the AEC made clear that it intended to avoid as much off-site expense as possible, and not only for roads. Asked if the AEC could help impacted school districts cope with rapidly rising enrollments, the answer was an unequivocal "No."[30]

Johnston, however firm his private demeanor during negotiations, often emphasized more harmonic chords in public. "We have here in our western country," he would say, "a project which is destined to bring to life some of the great things that the atomic age holds for the world."[31]

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Right. Governor C.A. Robins. Below. On October 8, 1951, the road linking Idaho Falls to the Site was officially opened, ending long months of negotiations.

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