Plan B for a Nuclear Reactor: After Production Comes Preservation

Date : October 26, 2007

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1. Background

Of the large-scale heritage preservation efforts taking place across the world, the B Reactor is not the easiest sell. Built in just 11 months during World War II, it was the world's first production-scale nuclear reactor. It provided the source of plutonium for the very first "Trinity" test in the New Mexico desert, for the atomic bomb dropped on Nagasaki, and tritium for the first hydrogen bomb. The Hanford complex was instigated in 1943 when a judge confiscated a 1,500 square kilometer area in the state of Washington. Residents received some money, no explanation, and 30 days to move. A construction camp of 50,000 workers then replaced them almost immediately. Of the nine reactors at Hanford, the B Reactor, which ceased operating in 1968, is the last available for consideration for preservation by the National Park Service as a museum. The other eight decommissioned reactors have been fenced off and "cocooned" while radiation in their cores slowly decays. A final decision on the B Reactor, which has received several national awards as a nuclear and engineering landmark, is not expected for several years.

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Figure 1. B Reactor shortly after construction

Approached from a distance, the B Reactor emerges from the sagebrush steppes like a sinister grey hulk. Once inside, it is difficult not to marvel at the building, at least on an engineering level: its reactor core is a five storey high, 1,200 ton graphite cylinder, penetrated horizontally by 2,004 aluminum tubes. Two hundred tons of uranium slugs, each the size of rolls of quarters, were inserted into the tubes. When enough slugs were in place, they would form a “critical mass,” which would initiate the uranium’s transformation into plutonium. Cooling the reactor core required water pumped from the Columbia at the rate of 75,000 gallons per minute. Inside the windowless fortress, the sheer industrial weight of the building feels somewhat menacing. At the same time, there is an uncanny relation between the monumental technical achievement that the building represents – which remains contemporary in consequence – and the antiquated analog dials, gauges, switches, and typewriters within it. Visitors see, for instance, the drafting table where physics Nobel laureate Enrico Fermi worked for three straight days to get the reactor up to speed, using nothing but a slide rule and graph paper.

Figure 2. Workers at the reactor wall

2. Issues

Beyond claims of its historical significance, arguments for its preservation would be significantly weaker if there were few people interested in viewing the reactor. While the site is generally closed to the public, when it is occasionally opened, there's fierce demand for tours – available slots fill up online in about a minute. At this early stage, numbers are bolstered by interest from retired workers and their families, military enthusiasts, and amateur historians. Convincing a broader public is potentially hampered by two elephant-in-the-room-sized problems.

The first is that Hanford is possibly the most polluted site in the world. A difficult legacy of American Cold War operations is that a commitment to obsessive secrecy and relentless production meant that vast toxic waste was produced, with little attention to public health or the environment. Hanford generated the largest single collection of nuclear waste outside the Soviet Union; it was left with 100 times more radioactivity than Hiroshima and Nagasaki after the bomb. About 440 billion gallons of toxic liquid were intentionally dumped into the dry soil, leaving an 80-square-mile plume of contaminated ground water. In addition, 53 million gallons of highly radioactive waste are stored in 177 underground tanks, some of which leak. Cleanup is expected to cost around $50 billion, and will last until 2035. Although the Department of Energy reports that there is no airborne radiation, and no chance of exposure for visitors (as long as they stay behind the ropes), the notion of tourists spending money to visit a contaminated site is unprecedented (well almost – limited tours around the Chernobyl sarcophagus began a few years ago). At the least, health will remain a significant public worry, and may contribute to National Park Service and Department of Energy viability assessments – especially given that the preservation option for the B Reactor is also more expensive than cocooning.

The second problem is the moral issue. Around 75,000 civilians were killed at Nagasaki. From 1945, a variety of thinkers have challenged the myth that the bomb ultimately "saved lives" – and even that it was the deciding factor in the Japanese surrender. For many visitors, the decision to drop the bomb cannot, and should not, be separated from its technical process – since, after all, destruction was the B Reactor's raison d'etre. War memorials, including those erected in victorious nations, have traditionally retained loss and sacrifice as founding values, rather than ingenuity or superiority. While the B Reactor is not a "war memorial" in any usual sense, the point stands that we also do not normally preserve munitions factories. How to explain, then, what the B Reactor, as a monumental artifact, might mean?

3. Artifact

Belief in the existence of "winning the Second World War" or "engaging in the Cold War" can be characterized as "institutional facts" rather than "brute facts." This basic distinction is borrowed from philosopher John Searle. Where brute facts are facts of physical reality, such as that a hydrogen atom having one electron, or that plutonium fissions and chain-reacts, institutional facts, such as paper money, citizenship, property or governments, are sustained by human institutions. They are just as complexly structured as physical reality, but are weightless and invisible.

Museums and heritage sites, I suggest, are often marshaled to give a concrete solidity to institutional facts.
We preserve what we value of the physical past because it specifically embodies our social past. Although social reality is weightless and invisible (including not only living interconnections and communications, but also those we imaginatively relate to the past), it is anchored in physical objects. These objects start with our own living bodies but extend far and deep into the physical world of landscapes, buildings, documents and machines. As Richard Rhodes notes, “finding meaning in the preservation and contemplation of those physical objects isn’t merely sentimental, because the meaning isn’t merely an extra or an add-on. To the contrary, physical facts and social facts can and do occupy the same space at the same time.” The corollary is that the destruction of places of heritage can produce the deterioration of memory. Memorial museums, which I write about in detail here, are based on this premise.

Figure 3. B Reactor today

As an artifact, the hulking size and unsettling stillness of the B Reactor could be said to communicate aspects of the irrational scale and sinister concealment associated with the Cold War. At the same time, this is an interpretation that may be informed by my own sense of the eerie aesthetics of ruins; others may see that same space as gloriously elegiac. Hence, we desire an artifact-specific physical location not necessarily only because it reminds us of the facticity of something (that people really worked at the reactor, that a bomb was built, that thousands were killed), but because it can usefully represent a “screen” for a wide variety of interpretations. Hence, the “brute fact” of nuclear fission, where visitors learn how it works and what daily operations looked like, can serve as a kind of “screen memory” for a range of more ineffable ideas. For Freud, a “screen memory” is the memory of something that is unconsciously used to repress recollection of an associated but distressing event. Heritage can help to construct screen memories, in the sense that they provide a location for physical visitation that appears to get to the heart of an event, but does not necessarily spell out or dictate its potentially painful social significance. Marita Sturken has elaborated on this idea here.

A final thought: while the site-specificity of the B Reactor creates a practical problem (in terms of its remoteness), it also produces interpretive limitations. As an artifact, its physicality gestures in different directions: it was highly technical and physically cumbersome in production, surprisingly light in actual product, devastatingly corporal in its effect on Japan, and undetermined and disputed in cultural and historical meaning. Is it possible that B Reactor can speak to these different mental locations? How can heritage sites that deal with the same overarching topic speak to, or gesture to, one another? The idea of “synchronous heritage” – places related to one another – is one that has seldom been explored fully. Architect Timothy Cowan has this kind of plan in mind: “By adapting current and future technologies within a new facility, the experience could reach far beyond the Hanford boundaries to symbolically heal the wounds of World War II. Imagine viewing historic photos of B Reactor adjacent a satellite-linked video feed of the Trinity Test Site or present-day Nagasaki.” A promising idea, I agree. At present, the legacy of Cold War nuclear politics lives on, thwarting such opportunities; despite reported interest from Japanese tour groups (and other internationals) in visiting Hanford, B Reactor tours are open only to U.S citizens only.