Cutting corners to save money: Safety Compromises at the UPF

There are lots of ways to look at a project as big and complex as the new nuclear bomb plant proposed for Oak Ridge, and they give rise to a host of questions: How big does it have to be? What mission will it have? Will new technologies work? How safe does it have to be? How much will it cost?

Answering some of those questions involves trade-offs. The size of the Uranium Processing Facility[UPF] depends on how many bombs you want to build in a year— the "production capacity." A building that produces five warheads a year can be 35% smaller than a building producing 80 warheads a year. The future mission may or may not involve Life Extension Programs for the B61 and W78/88 warheads—the cost estimates for those LEPs may not permit major overhauls and the limited required work may be done at Pantex in Amarillo rather than Y12.

When it comes to safety, trade-offs are not acceptable.

The UPF, if it is built, will be a signature target for terrorists. Those of us who are used to living around Oak Ridge may prefer to live in denial, but we do so at our peril. The Plowshares incursion into Y12 last year shows how easy it is to penetrate the outer defenses of Y12; had those nonviolent peace activists been a team of operatives with medium or heavy artillery, Y12 would now be a sealed off de-construction site. Efforts to account for and recover highly enriched uranium would be ongoing, operations to clean up other toxic contaminants would be slowed by the priorities placed on maintaining classified materials and production processes.

Depending on wind direction, it is likely that significant portions of the Scarboro community or communities stretching along Union Valley would be evacuated.

A special Department of Energy Task Force [known internally as the Overskei Report, after the lead author] that evaluated construction plans for a range of nuclear weapons facilities in July 2005 (in the earliest stages of UPF design) said, "[U]nderground facilities will prevent an adversarial force from surveying the site or from targeting particular facilities with weapons of choice. Going underground will simplify and greatly reduce operating costs for security.…We recognize that the design-basis threat (DBT) will evolve over time as the character, methods, and actions of potential terrorist threats continue to evolve. Therefore, it is imperative that the site incorporates an inherent flexibility to meet future security requirements, preferably through technological innovation. Clear buffer zones and underground facilities would provide high degrees of flexibility for the future."

A report from the Department of Energy's Inspector General's office criticized plans for above-ground facilities as well, noting increased life-time security costs.

That's right—the UPF would be safer if it were built below grade. The Task Force report was supported in Con-

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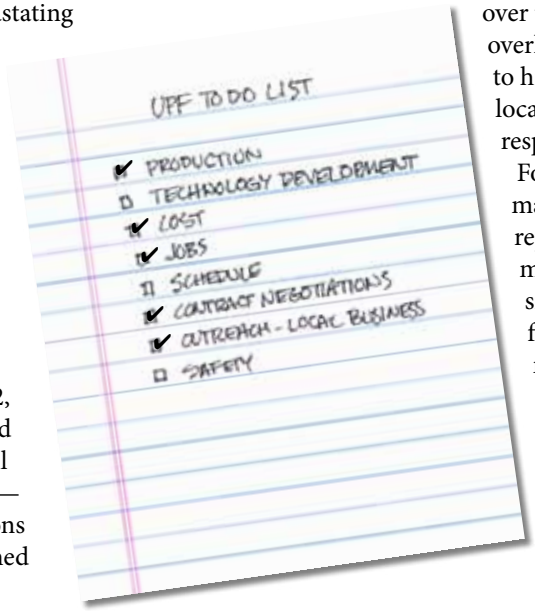
gressional testimony by security experts from the Project on Government Oversight (POGO) who had solicited opinions from military Special Forces personnel and reached the same conclusion. In a letter to the Administrator of the National Nuclear Security Administration, POGO pointed out the Department of Energy raised its Design Basis Threat levels (a measurement of the kind of attacks a facility must be able to withstand) after September 11, 2001. But Y12 was unable to met the new requirements, so Energy Secretary Samuel Bodman waived the new requirements. POGO was writing about the UPF's sister facility, the Highly Enriched Uranium Materials Facility then being built at Y12. It's concerns apply even more to the UPF which will be an active production facility, with uranium present in less stable forms and more vulnerable conditions than in the HEUMF.

POGO documents the effects of a successful terrorist attack by suicide attackers who are able to enter Y12 facilities and procure a relatively small amount of highly enriched uranium, quoting Princeton physicist Dr. Frank von Hippel, who notes setting off a Hiroshima-size nuclear explosion would simply require dropping one 100-pound block of HEU onto another from a height of about six feet. (A 100-pound block of HEU would be considerably smaller than a toaster oven.) POGO cites a Natural Resources Defense Council analysis that concluded a 10-kiloton explosion of an improvised nuclear device would result in 5,000 immediate fatalities and 60,000 casualties—not taking into account the workers present at the site at the time. Eventually, the fatality count would likely total around 18,000.

A terrorist attack on Y12 may sound far-fetched, but until July 28, 2012, a breach of the highest security zone by an 83 year old nun and two middle-aged companions seemed unthinkable. The reality right now is that security in the inner zone has been tightened, but the outer security perimeter is as porous and unguarded today as it was then. Terrorists today would have an easy time attacking Y12 facilities from the ridge top above the plant, and in the resulting havoc could achieve even more devastating results. It is unthinkable, but once one begins to think about it, it is suddenly, terribly conceivable. Absent a nuclear explosion, though, an attack at Y12, from the ground or air, could still be catastrophic—the release of tons of highly enriched uranium into the environment; dust—the most toxic form for humans—would be carried in large quantities for miles. Where it lands depends only on wind direction and speed. With a half-life of 410,000,000 years, highly enriched uranium remains threateningly radioactive for 4.1 billion years. Low-enriched and depleted uranium are dangerous for an even longer period.



If the government was cutting corners on safety to save money on their new bomb plant, they'd tell you, right?

Right?

The radioactive uranium Y12 uses to build thermonuclear weapon cores is not the only contaminant to worry about. A plume of anhydrous hydrogen fluoride, a highly acidic gas, would corrode tissue, metal, rubber, and most everything in its path. Ingestion of as little as 1.5 grams could cause immediate death; it could also produce highly flammable hydrogen gas.

Safety = Security = Safety

Security, from the standpoint of those who worry about it on a regular basis, has to do with protecting special nuclear materials and protecting vital infrastructure. The integrity of structures is one key component; others include protective forces and security technology.

The Overskei report says critical facilities should be sub-surface to make targets more difficult to map and access; they are also more readily defended with one exposed surface rather than five. Other factors include remoteness—so prospective attackers can be detected long before they reach the controlled area; suitability for aerial surveillance over the detection area (no overhead canopy of leaves to hide attackers); and co-located or nearby military response capability.

For remote decision-makers—those who write reports and those who make funding decisions—addressing these factors may satisfy the need for security.

For those who live close to a nuclear weapon production facility, though, security is not only about protecting the nation's special nuclear materials from attack or keeping them away from "bad guys." For us, security is also safety; a breach of security by hostile attackers is a direct threat to the health and safety of workers and those who live in the surrounding communities, even as far as twenty to thirty miles away when airborne contaminants are considered.

When talking about the UPF at Y12, there is a considerable overlap of safety and security issues—any compromise of UPF security is at the same time a safety compromise. When decisions are made to reduce the size of protective forces or build an above-ground facility, or locate a facility in a narrow, shallow valley beneath adjacent wooded ridges, these decisions are not only security decisions, they are safety decisions.

How much safety is worth it?

As the Department of Energy refined its standards for security, pressures to relax security standards (by easing the Design Basis Threat) came primarily from the budgeteers; Congress reduced security budgets, according to POGO, and DOE decided not to increase protective forces

at Y12 and to exempt Y12 from the most stringent security requirements.

Absent demands from the local community, questions about safety undergo a transformation as they move up the budget chain to Congress. There, instead of being questions about the nation's responsibility to protect the workers and communities that provide services to the government, they become questions about how much money is being spent and what do we have to show for it. Too often, safety takes a back seat to production quotas and delivery schedules. Communities are placed at risk when they shouldn't be—because reducing the risk means adding to the budget. And the reality is there is no urgency to the nuclear weapons work being done at Y12 today—the US stockpile is certified reliable for decades to come; none of the bombs are wearing out tomorrow; Y12's life extension work is simply pushing the retirement date out even farther into the future. Even if national policy in the Cold War days, when the arms race was anything but cold, required a "Production is Job One" mentality, those days are over. We have the time now to build safe facilities and operate them safely; to do any less is unconscionable.

You can sum up the safety commitment at the new bomb plant in Oak Ridge in one word.

Denial.

When B&W Y12 was building the HEUMF, this reality was displayed without apology. The argument for an above-ground HEUMF was not that it was safer or more secure (that would have been indefensible) but that it could be built more cheaply above-ground—though the Inspector General's office questioned whether even that was true over the life of the facility. There may have been other factors—the high water table and subsurface geology in Bear Creek Valley may make below-grade facilities impractical, but the answer to that problem is consideration of other locations, not loading the local community with preventable risks.

Safety and the UPF

Safety has been an issue at the UPF since it was first proposed. The Defense Nuclear Facilities Safety Board [DNFSB], the most effective oversight agency for NNSA nuclear plants, raised numerous safety issues as far back as 2007, everything from the seismic stability of the plant to hiring personnel with the right skill set.

They were also concerned with the process adopted by NNSA and the contractor, B&W Y12, that proposed to do an end run around safety at the UPF by consolidating two Critical Decision points and skipping the preparation of a Preliminary Safety Design Report required by DOE Orders.

The Safety Board warned NNSA this was a mistake waiting to happen, and they were right. As though following a script (and in fact such a script exists in DOE guidance that says efforts to rush a project forward will likely lead to increased cost and delayed schedules), NNSA pushed forward until they hit a wall in September of last year. When they came to the Safety Board meeting on October 2, 2012 in Knoxville they announced the space/fit fiasco—not enough room in the UPF to fit everything needed. Much of that "everything" was safety related. Putting processes in gloveboxes to protect workers and contain HEU takes room. Thickening the walls to assure seismic performance takes space. All of it could have been thought of five years and half a billion dollars earlier if the Safety Board had been heeded. Instead, in October 2012 NNSA admitted it *still* had not complied with at least five of the key recommendations the Safety Board made in 2007.

It is incredible that NNSA and B&W Y12 management has not been held accountable for the waste of half a billion dollars—a fiasco that will also extend the time needed to complete the UPF by nearly 20 years and will more than double the cost of the project—the Army Corps of Engineers says the UPF will cost $11.5 billion dollars to build if the project stretches out. We say it will cost even more than that—if it is built.

Put on your big boy pants

One possible response to safety concerns is embodied in a complaint captured in the Parsons report. It echoes sentiments from years ago at the Oak Ridge nuclear facilities. I have had workers tell me about how they were part of the "nuclear cowboy" culture that prevailed in the old days. A nuclear cowboy would receive

8 Things You Should Know if you live near* Oak Ridge

1. The government has decided not to make the new bomb plant, the UPF, as safe as it should be in order to save money.
2. Y12 facilities, located in a shallow valley between two heavily wooded ridges, are a tempting terrorist target; the new UPF will up the temptation level considerably.
3. It could happen here.
4. A completely successful terrorist attack could result in a 10-kiloton (Hiroshima size) nuclear explosion; estimates of casualties range as high as 18,000 dead and 60,000 injured/exposed with impacts felt as far away as Knoxville.
5. A moderately successful terrorist attack could wipe out Y12 production capacity, render Bear Creek Valley and the immediately surrounding neighborhoods uninhabitable, and result in the loss of accountability for quantities of highly enriched uranium.
6. A partly successful terrorist attack could shut down Y12 operations, release enriched uranium and other highly toxic contaminants, and kill scores of workers.
7. It could happen here.
8. See #1 above.

* within 25 miles

his dosimeter badge—the device worn to measure how much radiation a wearer was being exposed to—and would take it into the changing room and put it in his locker before going out to work. Real men don't measure radiation.

When the Parsons company analyzed the path to the space/fit issue, they were trying to figure out what went wrong. As it turns out, most everything that went wrong was due to terribly bad management by B&W Y12 and their NNSA overseers. One line in the report, quoted by Frank Munger, sounds like a complaint: "There were conflicting requirements for space and safety: 'There was constant pressure to reduce radiation exposure levels to ALARA (as low as reasonably achievable) without regard to impacts to operational workflow and throughput, design complexity and risk, and cost,' the report states. 'This emphasis led to the decision to make extensive use of gloveboxes, which was a significant factor in the space/fit issue since they took up considerable space.'"

This sentiment accurately characterizes the reality on the ground in Oak Ridge. In some minds, safety considerations are in competition with production demands and project costs. These minds are in the heads of people who are either 1] nuclear cowboys in denial; or 2] people who aren't raising their children in Oak Ridge.

Some years ago, at a public hearing on a nuclear project, a gray-haired East Tennessee native listened to the concerns voiced by members of the public about safety and finally rose to speak. Turning to face the audience, patting his chest, he said in his most grandfatherly tone, "Any of you people worrying about what would happen if there was a nuclear bomb to go off around here, you just climb up here in my shirt pocket and I'll take care of you." The sincerity of his effort to provide some assurance to his neighbors was matched only by his simple ignorance about nuclear explosions.

Some things are hard to think about. When you live near a nuclear weapons plant, those are the things you have to think about.

Safety without illusions

To say Oak Ridge operations should not compromise on safety requires one significant caveat—Y12 cannot be made completely secure or totally safe. Certain risks are inherent in the work being done at Y12. Some of them are common to all major industrial operations. Others are peculiar to nuclear operations, and still others are unique to nuclear weapons operations.

The pertinent questions are: Are risks avoidable or not? Can we afford to make the UPF as safe as possible? Where is the pricepoint, and who is paying? If it costs two hundred million dollars to make the facility secure against a terrorist attack that could cost 5,000 lives, is it worth it? In other words, will the taxpayer pay in dollars, or will residents pay in lives and sickness? What if it costs $500 million—the amount wasted so far on an unusable design for the UPF with no repercussions for the responsible parties—is $500 million negligible? What if it would add a billion dollars to the cost of the facility—a facility which has already seen its pricetag go from $1.5 billion to $11.5 billion with no apparent hesitation by those in Congress who decide whether to pay the bill or not? Would it be worth a billion dollars to add a significant measure of safety, maybe averting a human and environmental catastrophe?

Everyone should have a chance to weigh in on these questions, and those who stand to bear the brunt of safety compromises should have some weight attached to their voices. But being able to join the conversation first requires being informed—if we don't realize these decisions are being made on our behalf, and if we don't understand the possible repercussions, we are being effectively shut out of the conversation.

It Just Won't Happen. Right?

After the surprising security breach in July 2012, NNSA and B&W Y12 assured Congress and others that they were taking all the necessary steps to secure Y12. Those assurances were followed by the revelation four and a half months later that the outer perimeter fence had still not been repaired from the July incursion, and then in March a bicyclist inadvertently took a path onto the Y12 site and cycled for twenty minutes or more undetected, and soon after a disoriented driver was waved through security and drove the length of Bear Creek Road—this after security personnel were caught preparing for their exam by reading the answer sheet in advance, a practice commonly known as cheating.

NNSA and B&W Y12 officials knew the right things to say when they testified to Congress, but their actions make it clear they either do not care or do not know how to address security and safety at Y12. Instead, they rely on the delusion that Y12 remains impregnable. That it "just won't happen." This denial depends on hostile attackers being 1] not very smart; 2] not very patient; and 3] not well prepared. It would appear any lessons learned from September 11, 2001 have since been forgotten in Oak Ridge.

As it is now, people should be aware that decisions about the design and cost of the UPF have compromised safety and security in ways that could have a dramatic and terrible impact on the lives and property of people living around the Y12 complex.

New Report on UPF: When You're in a Hole, Just Stop Digging

The Project on Government Oversight released a new report on September 25 calling for the government to stop all funding for the UPF. POGO says no money should be spent until it is clear we actually *need* the UPF—that weapons secondaries need to be replaced, and that a new facility at Y12 is required to do the work. "Congress should cancel funding until the spending is justified," POGO's report says. The report was covered in the L*os Angeles Time*s and on ABC's *Good Morning America*.

POGO made use of previous OREPA reports and did a lot of digging on its own. The report points out government contradictions and notes important information is withheld from the public. You can find the report at: http://www.pogo.org/our-work/reports/2013/20130925-uranium-processing-facility.html