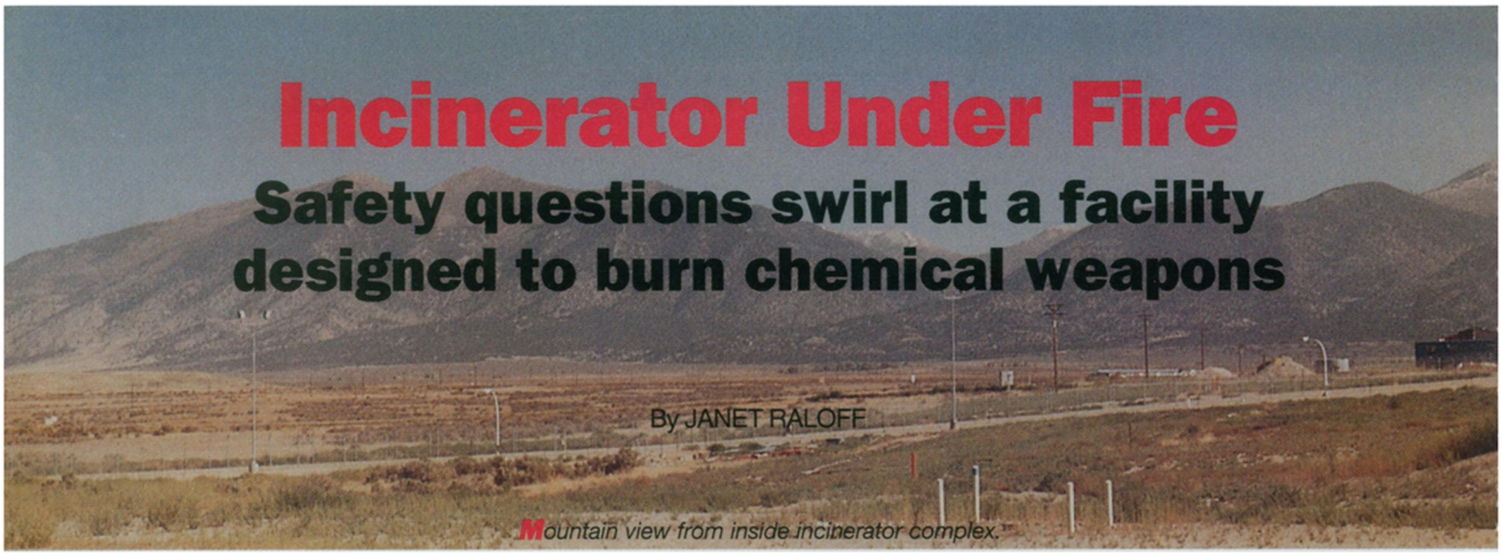


Incinerator Under Fire

Safety questions swirl at a facility designed to burn chemical weapons

By JANET RALOFF

Mountain view from inside incinerator complex.

Bordering the Great Salt Lake, Tooele County covers about 7,000 square miles of Great Basin territory in northwest Utah — a largely desert land that is home to rabbitbrush, sagebrush, and a range of creatures that appreciate wide-open spaces, including rattlers, tarantulas, wild horses, and antelope.

Roughly 30,000 people — many of them ranchers and dryland farmers — also live in Tooele (pronounced too-ella), on the 11 percent of the county not owned by the state or federal government.

Four years ago, the Department of Defense (DOD) broke ground inside the Tooele Army Depot for a plant to incinerate the toxic mustard gas and nerve agents it maintains there. Housed in bunkers and bulk tanks at the depot's 19,000-acre southern site, the stockpile accounts for 42 percent of the nation's estimated 30,000 tons of chemical weapons.

Since its completion in April 1993, the new incineration complex has been undergoing testing. Some 600 engineers, technicians, and safety analysts are currently linking its four functionally discrete incinerators and their pollution controls into an integrated system.

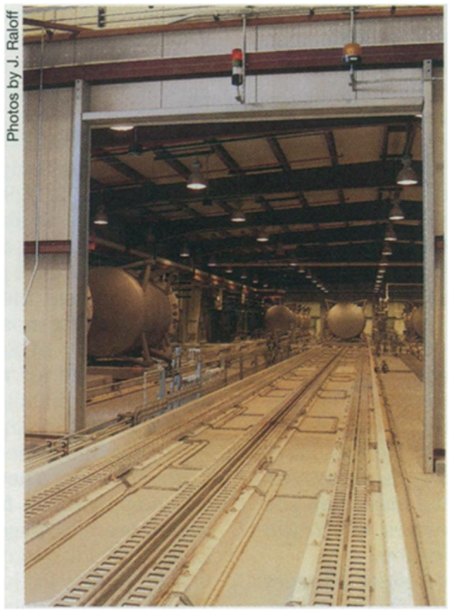
By next September, DOD hopes to put this sprawling, 19-acre facility into full operation. And if all goes as planned, it will burn a gallon of potentially lethal chemicals every minute it operates — perhaps 5 to 7 years — at an estimated total cost of $1.23 billion.

But Steven W. Jones, hired June 27 to manage plant safety, contends that the project cannot proceed on schedule or on budget without the risk of exposing workers and the public to potentially catastrophic releases of toxic agents.

Jones voiced repeated concerns about safety to his managers at EG&G Defense Materials, a contractor hired to test and operate the incinerator complex. EG&G fired him.

On Oct. 13, Jones filed a whistle-blower complaint with the Labor Department, arguing that his dismissal was a reprisal for refusing to ignore numerous safety problems at the plant. The Army and EG&G deny this.

At a minimum, the charges and countercharges that followed Jones' dismissal point out the challenges associated with trying to rid the world of such toxic munitions. As one Tooele officer explained to a group of journalists in October, even the engineers who designed the weapons don't know how to eliminate them safely: "They told us these [weapons] weren't built to be disposed of, they were built to blow up."



Photos by J. Raloff

Munitions move from bunkers to dismantling area in large, cylindrical casks. Here, garaged casks await an elevator ride to unpacking area.

But under the January 1993 Chemical Weapons Convention — which, pending Senate ratification, could achieve treaty status within a year — ratifying nations have 10 years to obliterate their supplies of chemical warfare agents.

That's not long, considering that the United States decided in 1984 to incinerate its entire stockpile by 1994. To date, it has eliminated just 310 tons — and that work was carried out at a pilot facility that opened in June 1990 on Johnston Island, a U.S.-owned Pacific atoll.

Public opposition in each of the eight stateside communities where the Army stores chemical weapons has made licensing incinerators difficult and has virtually guaranteed that none will become a regional facility — designed to dispose of weapons stockpiled elsewhere. So the Army feels pressured to get started and prove to Tooele County — and the seven other communities slated for similar complexes — that its $10 billion program is both safe and environmentally benign.

Jones believes that's difficult, given the problems he says exist at the Tooele and Johnston Island facilities. And because of his credentials and his reputation among his peers, his concerns are being taken seriously. Five state and federal investigations have delved into his charges.

During his career as a DOD safety officer, Jones inspected or visited every Army chemical and nuclear weapons site in the nation. He therefore felt qualified and excited to oversee safety at Tooele, Jones told SCIENCE NEWS. "I expected this place to be perfect. Every word coming out of the plant was that it was wonderful."

Hired 7 weeks before his old shop — the office of the Army Inspector General (IG) — conducted a safety audit, Jones surveyed the complex for systems that might not pass muster. He found many areas of concern, he says, including:

- Negative pressure problems. To keep airborne chemicals from escaping "hot" rooms — areas where toxic agents are removed from their containers — portals are fitted with negative-pressure airlocks. These draw clean air into a room when a door opens, rather than letting dirty air escape. But Jones says some airlocks actu-

Control room's workstation shows schematic of plant with computer-relayed sensor displays (middle screen) and closed-circuit video (left). Jones says the computer's data were so unreliable, operators at Johnston Island had to turn to cameras to learn when chemical agent tanks were overflowing.

ally blew air out — from areas designed to be contaminated to those that weren't.

● Poorly sited monitors. With automation, workers needn't enter a hot room except during an emergency or certain cleanup operations. On the off chance that some chemical agent might seep into and expose workers in "clean" areas, gas chromatographs monitor the air continuously. But Jones says some of the samplers sit too high up; nerve gas would probably settle close to the floor. (At the later audit, Army inspectors also found that some gas monitors sampled areas scheduled to be hot, then spewed what would be dirty air into clean zones.)

● Unmarked gas pipes. Jones says he found that lines carrying hydrogen — an explosive gas — were not labeled.

● Unshielded equipment. In some rooms that would become hot once the plant became operational, exposed cables and gears could rip through the protective clothing and skin of anyone working there. This could give a lethal agent direct access to the bloodstream.

● Procedural violations. When servicing dangerous areas, crews should "lock out" the zone. For instance, during an electrical repair, crews should turn off the electricity and padlock the circuit-breaker box that powers affected lines. Then they should hang a tag explaining the condition at the breaker box and log that tagging at the plant's control room.

But sometimes the repair crews didn't receive the necessary padlocks, Jones says. "And almost without exception," he adds, "when I compared the lockout log in the control room — which governs what equipment the computer people turn on and off — with what was actually done on the shop floor, it was wrong. The log said it was locked when it wasn't, or vice versa."

Many problems he identified might have been avoided if the Army had transferred "lessons learned" at the Johnston Island prototype to its plant at Tooele, Jones says.

Hoping to spur a quick fix of problems, Jones prepared a list of the hazards or operational deficiencies he had observed and gave a summary to Henry Silvestri, the plant's general manager. But according to Jones' whistle-blower complaint, Silvestri's first response was to chastise Jones, telling him never to put anything negative about the plant in writing.

It wasn't that management was unaware of problems, Jones says. "Parts were falling apart like crazy" — so much so that the plant had set up a 100-person Mod (as in modify) Squad before he arrived. The group did "nothing but repair stuff that breaks," he says. But many fixes didn't work because of faulty design, he charges.

A number of design flaws were apparent even before construction on the plant began. In 1989, based on design drawings and documentation, the MITRE Corp. prepared a safety assessment report for the Army Chemical Matériel Destruction Agency.

A 1,141-page update of that analysis now lists 3,013 separate hazards at Tooele, classifying 491 of them as either "unacceptable" or "undesirable." Though completed in late May by Science Applications International Corp. (SAIC), this updated document is still referred to as "the MITRE report."

EG&G didn't receive SAIC's update until mid-August, Jones says. And as plant safety manager, he didn't see it until Sept. 13, when he says it arrived with "this innocuous letter saying implement this into your system-safety plan."

Jones recalls asking his supervisors, "What are you telling me to do? And they said, 'We want you to sign a document to say you find these risks reasonable and acceptable.' "

EG&G had resolved or corrected some of the hazards, Jones says. Indeed, the Army now says that only 16 remain unresolved and none of these falls into the unacceptable or undesirable category. But without visiting each workstation and discussing current operations with the crews, Jones says, no one could validate that each problem had been addressed adequately.

More important, he claims, "none of them [the listed hazards] have been resolved in accordance with the law." Here he refers to an Occupational Safety and Health Administration (OSHA) regulation drawn up in response to the December 1984 disaster in Bhopal, India, a chemical accident that killed 2,000 people.

OSHA requires a chemical processing facility using any agent listed in the regulation to develop a "hazards analysis" and to review or update it annually. One of the two nerve agents Tooele will burn — known either as "GB" or sarin — appears on that OSHA list. The facility also must form a multidisciplinary team to analyze the entire plant as a system and document potential hazards, their likelihood of occurring, and how they have been addressed.

Because no one had ever performed this OSHA-mandated analysis for the Tooele facility, Jones says, he refused to sign off on hazards listed in the updated MITRE report.

"The next day," he says, "I was fired."

In his whistle-blower complaint, Jones says EG&G dismissed him "for the convenience of the company." That complaint also says Jones' supervisors charged him with being confrontational, "not a team player," and unwilling to do whatever it takes to keep "the customer" — the Army's Program Manager for Chemical Demilitarization (PMCD) — happy.

Jones told Science News he figured "they were setting me up to take the fall." If some catastrophic accident occurred, company supervisors and PMCD would have in hand a paper showing that a safety expert had signed off on the hazards responsible. And as that certified safety professional, he says, "I'd be liable. It's my title and credentials they were going to hide behind."

EG&G and the Army tell things differently. For instance, both assert that Tooele conforms to all applicable state and federal regulations, including those administered by OSHA. The Army also flatly refutes Jones' charge that Tooele hasn't benefited from lessons learned at the Johnston Island prototype incinerator.

"You know what the Mod Squad does mostly?" asks engineer Mark Evans, a special assistant to the PMCD manager at Aberdeen Proving Ground in Edgewood, Md. It "implements those lessons learned that Mr. Jones alleges aren't happening. There have been hundreds upon hundreds of lessons learned from [Johnston Island] that have been incorporated [at Tooele]."

The staff at Aberdeen analyzes every engineering change approved for the prototype incinerator to see whether it reflects something unique about that facility. If it doesn't, Evans says, the change is immediately logged onto a "punch list" —

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an inventory of equipment, software, and procedural changes that EG&G must incorporate at Tooele.

Indeed, Evans argues, the Mod Squad's continuing activity "shows that the testing program is thorough. And we're going to continue to modify, refine, polish, and buff the system until we are confident that it is in the best possible condition before we put agents into that facility." Eliminating bugs, he adds, "is why we schedule 18 months to 2 years of testing before we go into operation."

Adds an independent defense analyst who asked not to be identified, "there is also a strong economic motivation for [EG&G] to institute each and every little [lesson learned], because as a contractor, it runs up their bill."

On Nov. 21, the Army Safety Center released results of its investigation into 119 allegations made by Jones. The first of at least five such probes initiated since early October, it confirmed all or some aspects of about half Jones' charges — especially those alleging training deficiencies, problems with lockout-tagout warnings, spotty documentation of hazardous chemicals brought to Tooele, and lack of labeling or inspections.

However, it refuted or could not confirm almost half of the charges — in some cases owing to a lack of documentation for past practices or what may have been recent modifications.

But most important, argued Brig. Gen. Thomas W. Garrett, who directs Army safety, was his group's finding that "the most serious allegations . . . that [Tooele] personnel were exposed to toxic chemical agents and other hazardous materials. . . were unfounded." He added, in a cover letter to the report, that several validated allegations "were technically true, but of little or no consequence to human health or safety."

A second Army report was completed on Sept. 6, describing what its IG observed at Tooele in August. Though never publicly released, the report was obtained last week by the Berea, Ky.-based Chemical Weapons Working Group, a public interest group critical of the Army's incineration program.

Only 14 pages long, this report presents a less sanguine picture of safety at the new incinerator complex, but one that reflects the situation during Jones' brief tenure there. Indeed, says attorney Joanne Royce of the Government Accountability Project in Washington, D.C., which has spent months unsuccessfully trying to obtain the IG report in support of Jones' Labor Department complaint, it "provides strong ammunition for Jones' claim that he was fired for legally protected whistle-blowing."

The IG lists numerous deficiencies in safety, training, and reporting rules, violations of standard Army procedures, and a failure to capture or relay to Tooele "all lessons learned (in particular, environmental) from [Johnston Island's] operations and design."

For instance, the IG found "inherent environmental problems associated with the design and operation" of Tooele's brine-reduction system — one that the report noted has also caused problems at Johnston Island. During tests of this system at Tooele, spilled brine exceeded the capacity of the vessel designed to collect it. Had this occurred once the plant went on line, the IG noted, "this may have resulted in a violation of the Utah RCRA [hazardous-waste] regulations."

Privy to both Army reports, Robert M. Walker, an assistant secretary of the Army, announced on Nov. 21 that he was directing the Army Corps of Engineers to review Tooele's design — including its operations and risk-management measures. "Be assured," he concluded, "the plant will not be operated if it is not fully protective [safe]."

According to a report on the Army's prototype incinerator, released in April by the National Academy of Sciences, "although the Johnston Island facility did experience numerous problems during Operational Verification Testing, the [report's authors] see no 'show stoppers' in these problems. No such system can be completely without problems, and the baseline system has been properly designed with multiple levels of safety to contain problems before they become hazards to the workers or surrounding communities."

However, it recommended some additional safety and environmental areas that could and should be improved before the Tooele plant goes hot.

Amy E. Smithson of the Henry L. Stimson Center — a nonprofit, defense policy institute in Washington, D.C. — also analyzed the Tooele facility while studying the Army's incineration program. Her report, published in September, notes that incineration seems the safest, most efficient way to destroy chemical weapons.

Though the Army can't prove a catastrophic accident will not occur, she notes, it has built numerous safeguards and redundancies into the Tooele facility, such as backup afterburners to attack any chemical agent residues in incinerator exhaust emissions.

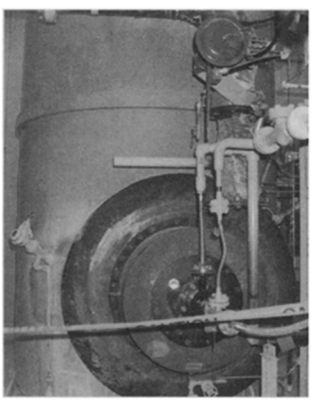
Moreover, Smithson adds, while she doesn't feel competent to address Jones' specific technical complaints, in general she found that as problems have emerged, the Army "has reacted constructively, investigating the causes and instituting remedial procedures, whether in refining equipment design or operator training."

Jones worries, however, that the skyrocketing cost of the incineration program — it's climbed to eight times the original estimate in 10 years — may sometimes elevate the importance of cost controls over safety.

But Smithson's report challenges the Army's response to public criticism of weapons incineration. An "absence of trust is the crux of many problems related to [this program]," she says. She attributes this to the Army's initially secretive and sometimes patronizing relationship with communities where stockpiles now exist; to persuasive, though scientifically misleading criticism of the program by some activists; and to a less-than-satisfactory mechanism for involving local citizens in its plans.

While the Army can't rewrite its historical relationship with the eight communities near existing stockpiles, Smithson says it could do better in refuting spurious technical arguments by its critics.

She notes that PMCD has been actively working to improve its communications with the public. Indeed, it has opened the Tooele facility recently to all comers for prearranged tours. But she believes that's not nearly enough.



Tooele's chemical agent incinerator during test firing in October — without agent. Reliability of its firebrick lining has sparked controversy.

For instance, she recommends that the 12-member Citizen Advisory Commissions (CACs) that the Army established 2 years ago in each stockpile community be strengthened, better financed, expanded in size, and perhaps allowed to hire technical consultants to evaluate engineering documents.

To prevent "the fox from guarding the henhouse," Smithson also recommends that the Army hire one contractor to run an incinerator complex and another to monitor for off-site toxic releases. She suggests CACs might even be given funds to hire contractors to monitor emissions from their local facility.

Finally, she argues that trust should not play a pivotal role in a community's willingness to accept incineration of chemical weapons. Quoting Charles Baronian, a former PMCD chief, she concludes: "Insist that your local people are in the plant, doing the required oversight to make sure the Army will live by its word. . . but do not trust the Army." □