

Chemical warfare report: How accurate?

A U.S. Department of State report released in late March on "Chemical Warfare in Southeast Asia and Afghanistan" has sparked both renewed concern by some over alleged Soviet involvement in such tactics and skepticism by others. The report is a declassified version of all evidence that has led the U.S. government to conclude that a variety of chemical weapons has been used since 1975 on the H'Mong tribespeople in Laos, on Democratic Kampuchean troops and Khmer villages in Kampuchea and on the *mujahidin* resistance forces in Afghanistan. The chemical agents allegedly used include irritants, nerve agents, phosgene oxime, toxic smokes and the trichothecene fungal toxins that presumably constitute "yellow rain."

But there are those such as Fred Swartzendruber who cast doubt upon the allegations at a special Senate Armed Services Committee session held in response to the 32-page State Department report. Swartzendruber and his wife Jan, representing the Mennonite Central Committee in Laos, traveled the Laotian countryside from 1979 to 1981. They engaged in various

relief projects that brought them in contact with refugee camps of the H'Mong who had resisted control of their villages in the 1970s. The H'Mong, Fred Swartzendruber said, said nothing of chemical warfare. "I kept my eyes open and asked about it," he said, "but I just didn't come across anything."

The State Department apparently saw it differently. The chemical agents identified in the report are said to have been used in nearly 400 attacks that killed more than 10,000 persons. Most of the State Department's supporting evidence comes from the testimony of doctors and refugee workers—who are unnamed in the report—analyses of a few physical samples from attack sites and "intelligence derived from 'national technical means.'" Bits and pieces of the evidence have been released in previous State Department reports (SN: 10/17/81, p. 251; 2/20/82, p. 122). A major purpose of the latest report was simply to assemble all those bits and pieces "in one place." In addition, unlike most previous reports that have merely implied Soviet involvement in the alleged use of chemical agents, the latest document directly

charges the USSR with repeatedly violating international laws and agreements that ban their use. "The conclusion is inescapable," the report states, "that the [yellow rain] toxins and other chemical warfare agents were developed in the Soviet Union, provided to the Lao and Vietnamese either directly or through the transfer of know-how, and weaponized with Soviet assistance in Laos, Vietnam and Kampuchea."

But Swartzendruber says that, at least in the case of yellow rain, such an accusation requires "a very far-reaching conclusion on data that is still very thin." Says Swartzendruber, "... the search for the truth about 'yellow rain' is advanced by charges which are not backed up by adequate, scientifically sound data."

For example, he says the autopsies referred to in the State Department report did not always involve "bonafide procedure." In fact, one autopsy consisted of a Lao tribesman cutting open a pig. Moreover, says Swartzendruber, "No one has done a systematic analysis to determine, for example, what percentage of refugees know about chemical warfare and if there is any correlation between yellow rain reports and geographic location or ethnic group." As a result, he says, "There really is no context in which to view this report."

The same day the Senate Armed Services Committee heard such testimony, it also held a session on the proposed plans to restock U.S. supplies of nerve gas. While government spokespersons deny any link between this proposal and the State Department reports on alleged chemical warfare in Asia, political analysts have suggested that it is the perceived Soviet build-up of and willingness to use chemical agents that justifies to some members of Congress the end of a 13-year moratorium on U.S. chemical weapons production.

An end to that moratorium would mean U.S. production of binary chemical weapons—agents that consist of two relatively harmless compounds that mix en route to the target to create the desired potency. Last May, the Senate narrowly (50-to-48) approved a \$20 million appropriation for construction of a binary weapon plant at the Pine Bluff Arsenal in Arkansas. Then, on February 8, President Ronald Reagan included in his budget request a certification for the army to proceed with its binary nerve gas plans.

But Congress must give another go-ahead signal, and there now is some in-house activity to prevent that. Senators Gary Hart (D-Colo.) and Thad Cochran (R-Miss.) plan to offer an amendment to the Fiscal Year 1983 Defense Authorization Bill that would eliminate the \$30 million requested by Reagan to begin production of binary artillery shells of nerve gas. The vote on the Hart-Cochran amendment is expected by the end of this month.

—L. Garmon

Study: Reactor risks have been exaggerated

"Aerosols and gases don't behave the same way," notes Harry Morewitz. And that, in part, says the senior staff engineer at Rockwell International Corp. in Canoga Park, Calif., explains why predictions of radioactive releases from catastrophic nuclear accidents are flawed.

The Nuclear Regulatory Commission and its safety analysts have calculated radioactive releases for catastrophic—reactor containment rupturing—accidents as though all material exiting a reactor's core were gaseous, Morewitz says. In fact, many of the most worrisome radionuclides would be emitted as an aerosol—a suspension of fine liquid droplets or solid particles carried within a gas. "As a result," Morewitz told SCIENCE NEWS, "many of the offsite consequences that are calculated [for major nuclear accidents] are gross exaggerations of what would really occur." Based on calculations he published in the February HEALTH PHYSICS, the true emission of respirable aerosols from a reactor containment building (RCB) operating at design pressure could be "a reduction of more than four orders of magnitude from the case where the aerosol is assumed to leak as a gas."

As aerosols spew through a crack, Morewitz explains, they "attach to the walls or to previously deposited aerosols. Some of these agglomerates break off and are resuspended in the airstream so that the sizes of aerosols exiting from short length leaks are substantially increased."

Eventually the aerosols will plug a hole,

even one 30 inches in diameter, he says. Morewitz's mathematical model, confirmed by a host of experimental studies in this country and Europe, predicts that the mass of an aerosol entering a duct—such as an RCB crack—is, prior to plugging, proportional to the cube of its diameter. And tables he's published indicate how plugging relates to the aerosol mass and duct diameter.

For instance, even though 10 to 20 milligrams of an aerosol may enter a one-millimeter-diameter RCB-wall crack, the crack will plug before even 1 mg has exited. He notes that that's far less than the 10 to 600 grams per day (depending on RCB aerosol concentration) that NRC design criteria would indicate. For larger holes, proportionately more will escape before plugging. With a 26.5-centimeter (10.4-inch) diameter duct, Morewitz predicts 67 kilograms would exit before plugging occurred.

What this means, explains Morewitz, also a consultant to the Electric Power Research Institute's Nuclear Safety Analysis Center, is that people living downwind of a nuclear plant might breathe easier when considering ramifications of a catastrophic accident. NRC, which is just beginning to investigate the aerosol-transport phenomenon as it relates to risk-assessment calculations, agrees its current radioactive-release estimates are probably too high by a factor of 2 to 10 but doesn't expect to make any regulatory changes based on them.

—J. Raloff