



USAF COUNTERPROLIFERATION CENTER
CPC OUTREACH JOURNAL
Maxwell AFB, Alabama

Issue No. 278 , 31 July 2003

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Welcome to the CPC Outreach Journal. As part of USAF Counterproliferation Center's mission to counter weapons of mass destruction through education and research, we're providing our government and civilian community a source for timely counterproliferation information. This information includes articles, papers and other documents addressing issues pertinent to US military response options for dealing with nuclear, biological and chemical threats and attacks. It's our hope this information resource will help enhance your counterproliferation issue awareness. Established here at the Air War College in 1998, the USAF/CPC provides education and research to present and future leaders of the Air Force, as well as to members of other branches of the armed services and Department of Defense. Our purpose is to help those agencies better prepare to counter the threat from weapons of mass destruction. Please feel free to visit our web site at www.au.af.mil/au/awc/awcgate/awc-cps.htm for in-depth information and specific points of contact. Please direct any questions or comments on CPC Outreach Journal Jo Ann Eddy, CPC Outreach Editor, at (334) 953-7538 or DSN 493-7538. To subscribe, change e-mail address, or unsubscribe to this journal or to request inclusion on the mailing list for CPC publications, please contact Mrs. Eddy. The following articles, papers or documents do not necessarily reflect official endorsement of the United States Air Force, Department of Defense, or other US government agencies. Reproduction for private use or commercial gain is subject to original copyright restrictions. All rights are reserved

Los Angeles Times
July 26, 2003

N. Korea Reportedly Ready For Nuclear Test

By Reuters

TOKYO — North Korea says it is prepared to conduct a nuclear test unless the United States responds positively to its proposals for resolving concerns over Pyongyang's weapons ambitions, Japanese and North Korean sources were quoted as saying today.

The Japanese newspaper Asahi Shimbun said this had been conveyed to U.S. special envoy Jack Pritchard by a North Korean official in a secret meeting this month.

Earlier this week, sources in Tokyo said the North was ready to declare itself a member of the "nuclear club," opening the way for possible tests and increased production of weapons, unless the crisis is resolved by Sept. 9, the 55th anniversary of the Communist nation's founding.

North Korea withdrew from the Nuclear Nonproliferation Treaty in January.

Asahi Shimbun said a North Korean official told Pritchard: "If the United States continues its policy of pressure against us, we may be forced to take opposing measures. Such as, for example, a nuclear test." It added that a test could take place by Sept. 9.

Pyongyang has said it has finished reprocessing spent nuclear fuel that could allow it to make about half a dozen atomic bombs, but doubts persist about the accuracy of its claims.

<http://www.latimes.com/news/nationworld/world/la-fg-norkor26jul26,1,4564877.story>

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Washington Post

July 28, 2003

Pg. 21

Unready For Anthrax

By Lawrence M. Wein and Edward H. Kaplan

In any attempted terrorist attack against this country, smallpox and anthrax would be the only two biological agents capable of causing mass casualties. And while the government has invested considerable effort in planning for a potential smallpox attack, no equivalent plan exists for anthrax.

In a recently completed study, we looked into various emergency responses to an airborne anthrax attack and concluded that the United States is woefully unprepared. Two pounds of weapons-grade anthrax dropped on a large American city could result in more than 100,000 deaths, even if early cases were successfully diagnosed, antibiotics were distributed broadly and drug adherence was high. The reason for the catastrophic death toll: Not enough people would receive antibiotics quickly enough to prevent symptoms from developing, and those who developed symptoms would overwhelm the medical facilities.

Any plan to cope with this scenario must include (1) immediate intervention, (2) rapid distribution of antibiotics to everyone in the affected region, (3) aggressive education to ensure adherence to the full course of treatment and (4) creation of "surge capacity" to treat the sudden influx of patients.

While a response to smallpox can be measured in days, the response to anthrax needs to be measured in hours. As soon as the first case is diagnosed, intervention must be initiated. The risks of a false alarm, which include out-of-pocket costs and perhaps some panic and reduced confidence in the nation's response infrastructure, are dwarfed by the risks of waiting too long to act: an estimated 10,000 deaths per day.

Although the U.S. government promises to get antibiotics to any local airport within 12 hours, cities vary widely in their ability to move these antibiotics from their airports into the mouths of their citizens. There are several options for rapid distribution of antibiotics. We could distribute them within six hours of an attack -- after all, if we can vote in a day, we should be able to hand out pills in a day -- through pre-processing of contraindication data and disclaimer forms, local storage of antibiotics and police-escorted mail workers (or having points of distribution partially manned by nonmedical professionals).

Or we could distribute them prior to an attack. Pre-attack distribution of antibiotics might save 10,000 lives for every day that it would take to hand them out post-attack, and it could also significantly reduce the panic.

These benefits of distributing the antibiotics before any attack need to be balanced against the costs and risks: the possibility of exhausting our antibiotic supply and the chances of generating drug resistance in the population through misuse of the antibiotics. Such problems could be mitigated by distributing only a few days' supply in advance, which would also reduce the losses caused by perishability of the drugs.

The third element of an effective response is education about drug adherence. In the 2001 postal attack, only 40 percent of postal workers who were told to take a 60-day course of antibiotics actually adhered to the full regimen. The government needs to educate people now -- before an attack -- about the importance of adherence. And if an attack occurs, public health workers need to go into the neighborhoods and make it clear that adherence is a life-or-death matter.

The most challenging aspect of the response plan is the creation of surge capacity for medical care of anthrax victims. Even if we distribute antibiotics rapidly and make full use of local, federal and military medical personnel, tens of thousands of people could die.

The only way that we can see to avoid such a catastrophe is to tap into the pool of brave and selfless medical workers in this country by starting a national volunteer system of pulmonary specialists, which would behave in much the same way as a volunteer fire department in rural areas. For example, if there were an anthrax attack in New York City, a small fraction of specialist doctors from other major cities would jump on the next airplane with their ventilators, ingest antibiotics and arrive six hours later ready to save lives.

Our analysis also suggests that deployment of biosensors could act as a substitute for rapid antibiotic distribution, but it would be a much more expensive and less reliable measure. If we distribute antibiotics rapidly, the additional savings from biosensors are quite incremental.

Because an anthrax attack seems more likely than a smallpox attack, and its consequences appear to be more difficult to manage in terms of both loss of life and widespread contamination of assets, a stronger case can be made for voluntary pre-attack mass vaccination for anthrax than for smallpox.

Unfortunately, this option is not viable for at least the next few years: The only producer of an anthrax vaccine is having difficulty satisfying the military's requirements, and the vaccine requires a series of six shots over 18 months, along with annual boosters.

We have already dodged one bullet: Had the 10 grams of weapons-grade anthrax from the 2001 attack been airborne rather than mailborne, 10,000 people could have died, even with rapid antibiotic distribution. It is time for a credible national response to anthrax. The government must close this window of vulnerability in our homeland.

Lawrence M. Wein is a professor of management science at the Stanford Graduate School of Business. Edward H. Kaplan teaches at the Yale School of Management and in the department of epidemiology and public health at Yale Medical School.

<http://www.washingtonpost.com/wp-dyn/articles/A54429-2003Jul27.html>

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Longer Anthrax Therapy May Be Needed

Associated Press

Tuesday, July 29, 2003; Page A05

People exposed to high levels of anthrax may need more than the 60 days of antibiotics currently recommended, researchers say.

A team at Johns Hopkins University developed a mathematical analysis of the time needed for anthrax spores to germinate in the lungs and the speed at which antibiotics eliminate them.

Their conclusion, published in yesterday's online issue of the Proceedings of the National Academy of Sciences, is that in some cases antibiotics should be taken for up to four months.

When anthrax in the mail threatened thousands of postal workers and others in 2001 -- killing five people -- health authorities offered 60 days of antibiotics. After that, exposed people were given the choice of continuing antibiotics, taking a vaccine or ending treatment. Many chose to end treatment.

Last year the Centers for Disease Control and Prevention recommended that in any future outbreak, vaccine be given to exposed people after 60 days of antibiotics.

The new study, led by Ron Brookmeyer, concluded that larger doses of the germs take longer to clear from the lungs and said that, while 60 days of antibiotics is adequate in low-level exposures, in cases of higher exposure, treatment may be needed for up to four months.

"During the 2001 U.S. anthrax attacks, many people failed to take the recommended 60-day course of antibiotics. Full compliance was about 60 percent or less in some cases. Our model showed that the reason they didn't get sick, even without the antibiotics, was because the anthrax spore exposure levels were very low. If the exposure levels were higher, there would have been more casualties," Brookmeyer said in a statement.

<http://www.washingtonpost.com/ac2/wp-dyn/A59075-2003Jul28?.html>

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Korea Herald

July 30, 2003

Bolton To Discuss Nuclear Tension In Seoul

By Seo Hyun-jin

John Bolton, U.S. undersecretary of state for arms control and international security, will hold talks with senior South Korean officials in Seoul today to discuss measures for ending North Korea's nuclear ambition and other issues pertaining to the North's weapons development.

The senior American diplomat arrived in South Korea from China yesterday on the second leg of his three-country tour to discuss North Korean issues. He will fly to Japan tomorrow.

Bolton's visits to the Asian countries come at a time when international diplomatic efforts have been stepped up to accelerate the resumption of dialogue to resolve the nuclear standoff between Washington and Pyongyang.

During his three-day stay here, Bolton will meet with Foreign Minister Yoon Young-kwan, National Security Adviser Ra Jong-yil, Presidential Adviser for Foreign Policy Ban Ki-moon and Deputy Foreign Minister Lee Soohyuck.

They will exchange thoughts on how best to plot a future course between the United States and South Korea in regard to the North's possible response to the U.S. proposal for holding a second round of trilateral nuclear talks and subsequent expanded talks.

Working as an intermediary between the United States and North Korea, China has "very recently" conveyed the U.S. plan to the North that Washington, Pyongyang and Beijing open their second round of trilateral nuclear talks and immediately enlarge them to include Seoul, Tokyo and possibly Moscow, according to Seoul officials.

"China conveyed the U.S. proposal to North Korea through the North Korean Embassy in China very recently, though the process has been delayed more than we originally expected," a government official said.

The official said he believes North Korea is in the phase of contemplating the U.S. proposal.

Foreign Minister Yoon said Monday that the process for holding nuclear talks has bogged down because North Korea-China negotiations concerning the matter have been moving unexpectedly slowly.

Observers said, however, they might gain some momentum again with the latest contact between North Korea and China.

In another development, Chinese Foreign Minister Li Zhaoxing will visit Seoul Aug. 13-15 to discuss the proposed nuclear talks, diplomatic officials said.

Wrapping up his stay here, Bolton will hold a news conference at the U.S. Information Resource Center in Seoul tomorrow.

http://www.koreaherald.co.kr/archives/result_contents.asp?id=200307300069&query=John%20Bolton

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Long Island Newsday

July 29, 2003

Snags For Bioterror Drug Plan

Congress wants cap on funds to industry

By Thomas Frank, Washington Bureau

Washington - An innovative administration plan to protect against bioterrorism by inducing companies to develop new vaccines and treatments has run into problems in Congress and faces skepticism from some experts.

Project BioShield, announced by President George W. Bush in January, sought to allow the government to buy and stockpile a vast arsenal of bioterrorism countermeasures made by biotechnology and drug companies under government contracts.

A key and unusual feature was that government spending would be unlimited. The Department of Health and Human Services would sign long-term contracts that would guarantee payment, easing companies' fears that Congress might reduce funding before work, which often takes years, is complete.

But with many in Congress opposing a new "entitlement program" whose costs would be beyond their oversight, the House recently capped spending at \$5.6 billion over 10 years. Senate sponsor Judd Gregg (R-N.H.), seeing opposition to the indefinite, unlimited funding in his chamber, said he would accept the House's funding plan and drop the administration's plan.

A spending cap raises new questions about a program aimed at creating an artificial market with the government as the sole buyer. "It's sort of like the Russian economy," said Dr. James Baker Jr., director of the University of Michigan's Center for Biologic Nanotechnology. "They're probably going to support a lot of development that's not really well-directed."

The administration won't comment on Congress shunning its funding plan, although Health and Human Services Secretary Tommy Thompson said in March, "We definitely have to have that appropriation mandatory because that is what the companies are going to look at."

Officials and some experts say BioShield, even with a funding cap, would be a breakthrough in getting the private sector to work in the biodefense field it has shunned for lack of a profitable market.

"I think BioShield is a good first step. I don't think anybody thinks it's the silver-bullet answer," said Dr. Tara O'Toole, director of the Johns Hopkins University Center for Civilian Biodefense Strategies.

Limited government funding has yielded biodefenses that Thompson said "may not be enough." The Strategic National Stockpile, situated at 12 sites around the country, includes antibiotics for anthrax, plague and tularemia (rabbit fever), smallpox vaccine and an antitoxin against botulism, all produced through government contracts.

But Thompson said many treatments "have improved little in decades." Smallpox vaccines are almost unchanged since the 1960s. The Ebola virus, considered one of six bioterror agents of serious concern, has "never had an effective medical countermeasure," Thompson said.

BioShield would create a market for companies to develop countermeasures, said Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases. "You know when you deliver a product, you are going to get the money."

But BioShield may be hindered because drug companies are accustomed to high profit margins the government probably wouldn't match, and the biodefense industry is wary of the government. Industry executives have testified before Congress in support of the program, and they also called for mandatory funding and strong liability protections.

"The real problem is the private sector does not think the government is a reliable business partner," O'Toole said. The \$5.6 billion may produce only a handful of countermeasures. It costs \$897 million on average to develop a new drug, according to the Tufts Center for the Study of Drug Development. Administration officials say government contractors would spend much less because of a truncated approval process.

<http://www.newsday.com/news/health/ny-usbio293392443jul29,0,1953319.story>

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Washington Post

July 31, 2003

Pg. 1

Scientists Still Deny Iraqi Arms Programs

U.S. Interrogations Net No Evidence

By Walter Pincus and Kevin Sullivan, Washington Post Staff Writers

Despite vigorous efforts, the U.S. government has been unsuccessful so far in finding key senior Iraqi scientists to support its prewar claims that former president Saddam Hussein was pursuing an aggressive program to develop nuclear, biological and chemical weapons, according to senior administration officials and members of Congress who have been briefed recently on the subject.

The sources said four senior scientists and more than a dozen at lower levels who worked for the Iraqi government have been interviewed by U.S. officials under the direction of the CIA. Some scientists have been arrested and held for months, others have made deals in return for information and at least one has agreed to be interviewed outside Iraq.

No matter the circumstances, all of the scientists interviewed have denied that Hussein had reconstituted his nuclear weapons program or developed and hidden chemical or biological weapons since United Nations inspectors left in 1998. Several key Iraqi officials questioned the significance of evidence cited by the Bush administration to suggest that Hussein was stepping up efforts to develop new weapons of mass destruction programs.

The White House, for instance, has cited the case of nuclear scientist Mahdi Obeidi, who recently dug up plans and components for a gas centrifuge that he said he buried in 1991 at the end of the Persian Gulf War. The White House has pointed to the discovery as a sign of Hussein's continuing nuclear ambitions, but Obeidi told his interrogators that Iraq's nuclear program was dormant in the years before war began in March.

The sources said Obeidi also disputed evidence cited by the administration -- namely Iraq's purchase of aluminum tubes that various officials said were for a new centrifuge program to enrich uranium for nuclear bombs. Obeidi said the tubes were for rockets, as Iraq had said before the war.

CIA analysts do not believe he has told the whole truth, said one Bush administration official. Obeidi has left Iraq under CIA auspices after being arrested briefly by U.S. Army troops.

Jaffar Dhari Jaffar, who once was jailed by Hussein for not working on the nuclear program and later came back to head it in the 1980s, was also interviewed recently by CIA personnel outside Iraq, and he, too, denied the nuclear program had been restarted.

Bush administration officials have hoped that extensive debriefings of former top officials of Hussein's government would provide some of the backing for its prewar assertion that Iraq posed an imminent threat to the United States. So far, the United States has discovered no undisputed physical evidence that Hussein had stocks of chemical or biological weapons or was reconstituting his nuclear weapons program.

David Kay, the CIA's representative in Iraq to coordinate the search for weapons of mass destruction, returned to Washington this week and met with President Bush on Tuesday. Kay is scheduled to appear today before the Senate Armed Services Committee and the Senate Select Committee on Intelligence.

Administration officials said they expect Kay to tell the senators there have been no breakthroughs but that progress is being made in understanding Hussein's weapons programs and research that could be associated with them. The United States is still interviewing lower-level Iraqi security and intelligence officials associated with the programs, but the searching of alleged weapons sites has all but halted, officials said.

Bush indicated yesterday that he still expects evidence of weapons of mass destruction to surface in Iraq. He said Kay described a complex process that includes the need to "analyze the mounds of evidence, literally the miles of documents that we have uncovered."

"It's going to take awhile, and I'm confident the truth will come out," Bush said.

As described by government officials and their families, the United States has used aggressive tactics to find and question key Iraqi scientists. Amir Saadi, Iraq's 65-year-old chief liaison with United Nations weapons inspectors since last year, has been held incommunicado since his voluntary surrender in Baghdad to U.S. military police more than three months ago, according to his wife, Helma.

The night before he gave himself up, Saadi saw himself listed on BBC satellite television as one of the men being sought by U.S. forces. In a recent interview at her home in Baghdad, Helma Saadi said that he told her, "I want to surrender. I want to cooperate. It will be just a matter of a few hours, and I'll be back."

Just hours before his April 12 surrender, Saadi gave a television interview to a German television reporter during which he said, "There were no weapons of mass destruction, and time will bear me out." It is the same sentiment he sent to U.N. chief weapons inspector Hans Blix in a message that arrived at U.N. headquarters on March 19.

Saadi's surrender encouraged the wife and daughter of Gen. Hossam Amin, head of Iraq's National Monitoring Directorate, to get him to surrender, and he, too, has not been heard from since, Helma Saadi said.

Helma Saadi said her husband was a chemical engineer who worked on Iraq's rocket programs, not chemical weapons. He served in the military during his career and reached the rank of general, though after the Gulf War he was acting minister of oil and later minister of industry. After his retirement in 1994, when she said his position went to a Baath Party member, he was given the honorific title of science adviser to Hussein. She described that as a "way of keeping him and others on the payroll even after retirement and using them when needed."

Since her husband's arrest, Saadi said she has had no official notification of where he is being held, although she believes it is somewhere near Baghdad International Airport. She has had one communication with him, a June 15 letter delivered by the Red Cross that stated: "Today the Red Cross visited me and I was happy just to talk to someone. I am in good health and being treated correctly . . . love and kisses, Amer."

Helma Saadi believes he is being kept in solitary confinement, because he said in his letter he was glad to have someone with whom to talk. U.S. sources familiar with the process say Saadi may have knowledge of Hussein's chemical weapons program, and perhaps is being held to give testimony about that. His wife said she suspects her husband is being held out of sight because "he is telling the truth. . . . They have realized there are no weapons of mass destruction and the quagmire they have created. They want to hold someone as a scapegoat."

After hiring a lawyer, Helma Saadi sent a written request to L. Paul Bremer, the U.S. administrator for Iraq. She did not receive an answer from Bremer to that letter or to one sent more recently. She did receive a response to a letter she sent asking whether her husband could be represented by a lawyer. On June 27, Col. Marc L. Warren of the U.S. Army Judge Advocate General's Corps, assigned to Bremer's office, said her husband's status "is being investigated" under the Geneva Conventions to see whether he is entitled to prisoner of war status or some other category.

Meanwhile, former government officials, scientists and professionals are still being arrested.

Family members of Abdel Ilah Hameed, the former Iraqi minister of agriculture, were interviewed in Beiji and described his arrest. Hameed, a native of Hussein's home town, Tikrit, tried twice to surrender after he saw how U.S. troops were searching all homes, according to his son, Usama. On April 15 and 16, he was turned back by U.S. officers at checkpoints, although one took his name after the second attempt.

On April 22 at 3 a.m., soldiers backed by helicopters overhead knocked down the door, searched the house and took Hameed away, leaving his two older sons in plastic handcuffs that had to be cut away by a younger brother, Usama said. They have had no direct contact with their father since.

Two weeks ago, a professor whose expertise is satellite communications and who is the father of an Iraqi interpreter employed by Bremer's office was seized, according to another employee. "Coalition snatch-and-grab guys busted their door in at 2 AM and turned the house upside down for an hour, then hauled him off in handcuffs," this employee wrote in a message home. The wife told a friend that the troops did not say the reason for the arrest, and it took a day for other U.S. officials to find that the man was being held at the airport and being interrogated.

Sullivan reported from Baghdad.

<http://www.washingtonpost.com/wp-dyn/articles/A5497-2003Jul30.html>

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Washington Times

July 31, 2003

Pg. 14

Seoul Prefers Delay Of U.N. Talks

By Sang-hun Choe, Associated Press

SEOUL — South Korea yesterday said it opposed an early discussion of North Korea's nuclear threats at the U.N. Security Council, and urged the United States to first exhaust diplomatic efforts to bring the communist state to negotiations outside the United Nations.

Security Council deliberations on the nuclear threats could lead to economic sanctions against the North — an action Pyongyang has said it would consider a "declaration of war."

Undersecretary of State John Bolton met with South Korean Foreign Minister Yoon Young-kwan yesterday amid signs that U.S. efforts to engage the North in talks on its suspected nuclear weapons development were stalling.

Mr. Yoon and Mr. Bolton agreed "that the North Korean issue should be handled in the U.N. Security Council, but what's important is the timing on when the council deals with the issue," said Oh Joon, a senior South Korean Foreign Ministry official.

"Our view is that we should wait a little bit more, since international efforts are focused on finding a way to resume multilateral talks," Mr. Oh told reporters.

Mr. Bolton, Washington's top arms-control official, told reporters in Beijing earlier this week that he could not predict when a new round of talks would take place because of Pyongyang's recalcitrance, and suggested that the Security Council might have a role to play in the dispute. He did not clarify when Washington would take the matter to the council.

The diplomat said Tuesday after arriving in Seoul that Washington's plan to discuss the North Korean nuclear threat at the U.N. Security Council would be "complementary" to efforts to bring the communist state to the negotiating table.

Mr. Oh said Washington and Seoul had no fundamental differences on this matter. Mr. Bolton is expected to hold a news conference today.

China, North Korea's closest ally and a permanent member of the Security Council, has thwarted previous U.S. attempts to have the council condemn Pyongyang over its nuclear ambitions.

North Korea says it will not give up its nuclear ambitions unless the United States agrees to a nonaggression treaty and provides economic aid. It also says its nuclear program is aimed at deterring what it calls "hostile" U.S. policy and demands a one-on-one meeting with Washington.

The United States considers the North's nuclear programs a regional threat and insists on multilateral talks. With China working as an intermediary, Washington recently proposed holding three-party talks including North Korea and China, on the condition that the meetings quickly expand to include South Korea, Japan and Russia, according to officials in Seoul.

In Washington, President Bush said he reiterated the need for multilateral talks in a conversation yesterday with Chinese President Hu Jintao.

"We're actually beginning to make serious progress about sharing responsibility on this issue in such a way that I believe will lead to ... an attitudinal change by [North Korean leader] Kim Jong-il, which will be very positive for peace in the region," Mr. Bush said at a news conference.

<http://www.washtimes.com/world/20030730-093823-1091r.htm>

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Washington Times

July 31, 2003

Pg. B3

Aberdeen Radiological Waste Site Set To Be Cleaned Up

EDGEWOOD, Md. (AP) — The Army is set to begin a multimillion-dollar cleanup on land contaminated by radioactive waste at the Aberdeen Proving Ground, even as officials work to destroy more than 1,600 tons of mustard agent stockpiled there.

Base officials held three meetings last week to update residents on their efforts to clean the radiological waste yard and the site of the mustard agent stockpile.

The site on the Edgewood peninsula was the East Coast collection point for Army radioactive medical and research waste in the 1950s and 1960s. Until the early years of World War II, it also stored canisters of mustard agent and other dangerous chemical weapons.

The Army is spending millions every year to clean up the toxic legacy of the military research and testing site.

The Environmental Protection Agency has a list of priority cleanup sites on the Edgewood peninsula, including a 1,621-ton mustard agent stockpile, dumps of old chemical weapons, lab leftovers and radiological waste.

Restoration workers at the proving ground's former radioactive waste processing facility are set to begin the first phase of a long-term cleanup that will take years to complete and cost millions.

The proving ground collected waste from East Coast Army sites and prepared it for deep-sea dumping, a designated disposal method during the 1950s and 1960s, said Don Green, an environmental scientist at the Aberdeen base. Mr. Green said the \$1.9 million first phase of the cleanup will remove about 11,000 cubic yards of soil on the 3.1-acre site, which is contaminated by cesium-137 and arsenic.

Contaminated soil will be removed, tested and sorted, with contaminated dirt shipped to Envirocare, a low-level radioactive waste handler in Utah, he said.

A study outlining options to clean deeper contamination in the soil and groundwater will be finished later this year, Mr. Green said.

It's expected to cost \$6.9 million to clean the Edgewood landfill, while the radioactive waste facility cleanup could cost about \$6.6 million, Mr. Green said.

Since the installation began destroying its stockpile of mustard agent, a banned carcinogenic blistering agent, in April, it has been beset by minor problems.

Workers are destroying the stockpile by mixing the mustard agent in a large tank with hot water to break it down into treatable, less-dangerous byproducts.

To speed up the destruction timetable by a year, the Army retooled the robotic plant that was being built, creating a smaller plant that uses workers instead of a fully automated assembly line. Workers reach inside separately vented gloveboxes to empty the 1-ton containers of the agent. The containers are then closed and later shipped to Rock Island, Ill., to be destroyed.

In the past couple of months, the retooling has led to a power outage and low-level releases of vapor.

Members of the Maryland Citizens Advisory Committee, which has worked closely with the Army on chemical agent destruction, said they haven't received any phone calls from concerned residents.

Joseph Lovrich, site project manager of the destruction plant, said the plant is operating round-the-clock and had destroyed about 71 tons of mustard agent. He said no agent has been released outside the plant.

<http://www.washtimes.com/metro/20030730-093802-3727r.htm>

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Artificially evolved protein destroys nerve gas

Bacterial enzyme tweaked to dismember chemical-warfare agent.

31 July 2003

PHILIP BALL

Chemists in the United States have modified a common bacterial enzyme so that it pulls apart a lethal nerve agent manufactured as a chemical weapon.

Frank Raushel, of Texas A&M University in College Station, and colleagues tuned the enzyme phosphotriesterase to destroy the nerve gas soman¹. A more efficient version could form part of a mask to protect against nerve agents, Raushel suggests.

Phosphotriesterase naturally breaks down soman, but slowly. Raushel's team has increased its activity by a factor of 1,000. This is still not fast enough to be useful, but the researchers anticipate that further tweaks should make the enzyme work even better.

In bacteria, phosphotriesterase severs chemical bonds between phosphorus and oxygen atoms. It has been investigated before for cleaning up pollution from toxic organophosphorus pesticides and herbicides.

The natural phosphates that the enzyme attacks look rather like the phosphorus-containing chemical-warfare agents sarin and soman. Sarin was used in a 1995 terrorist attack on a Tokyo subway station; soman was thought to be the main agent in the Soviet Union's chemical-weapon stockpiles, and may have been used by Iraq in its war with Iran in the 1980s.

Directed evolution

To improve the enzyme's activity, Raushel and his colleagues are using a technique called directed evolution. This mimics the way natural selection improves the molecular mechanics of cells. The team make small random changes to the enzyme's chemical structure and then screen the resulting library of mutants to identify the best ones for the job.

Phosphotriesterase, like all enzymes, contains an active site, which sticks to and modifies its chemical target. Small changes in the site's chemical structure can have big effects on the enzyme's behaviour.

Raushel's group reports that substituting just three of the amino acid building blocks in the enzyme's active site with different ones generates a mutant that is much better at latching onto and breaking apart the most lethal form of soman.

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