weapon such as that under development by the Pentagon.

Defense officials point out that according to present unclassified plans, the U.S. ASAT will be unable to reach Soviet early warning and communication satellites, due to the limited combat radius of the F-15 squadrons based in Washington and Virginia, as well as the limited range of the existing ASAT booster. This could be changed with only slight additional effort, however. The easiest of several options would be simply to station airborne tankers in the Pacific for in-flight refueling so that the existing ASAT squadrons are able to reach the Southern Hemisphere; alternatively, the squadrons themselves could be stationed somewhere in the Southern Hemisphere (a few experts have remarked on the suitability of the Falkland Islands). Another option would be to modify the F-14, which is based on U.S. aircraft carriers, so that it, too, can carry the existing ASAT, and then deploy the carriers in the Southern Hemisphere.* A third option is to extend the range of the ASAT itself. Stansberry notes that this problem "is not so much technical as financial." The Pentagon has already determined that it would cost $1 billion to $2 billion for a better air-launched booster rocket and $2 billion to $6 billion to adapt a long-range Minuteman or Trident booster.

Although potentially expensive or operationally difficult, the benefits of targeting Soviet early warning and military communication satellites are substantial. Deprived of an early look at a U.S. attack, the Soviets could have less than 15 minutes to prepare for retaliation and then encounter enormous difficulties in transmitting orders to its forces stationed around the globe. One Air Force officer who asked to remain anonymous noted that destruction of early warning satellites by either side would in particular "provide an excellent cover for a limited nuclear strike." When the Joint Chiefs of Staff described the technical requirements for the U.S. ASAT in a highly classified document in 1981, they specified that the ASAT be capable of destroying these key Soviet satellites. This requirement was until recently concealed, and references to it in the open literature are somewhat oblique. In recently declassified congressional testimony, however, the Air Force responded to criticism of the ASAT's short range by noting that "the Secretary of Defense has chosen to apply available resources to only a subset of the JCS document at this time. [We] continue to evaluate systems which would provide a higher altitude capability should the Soviets begin deployment of [deleted] satellites in higher orbits."

The Air Force is already taking steps to increase its capability to locate and track Soviet high-altitude satellites. A series of electrooptical cameras, located in Korea, Hawaii, on an island in the Indian Ocean, and in New Mexico, has been upgraded to permit surveillance of objects as high as 30,000 miles above the earth, and to provide instantaneous information to the Space Defense Center in Colorado. Radars in North Dakota and on Kwajalein Island in the Pacific have been modified to complement these cameras. And a series of probes has been launched from a missile range in White Sands, New Mexico, to gather background information on starlight and heated space dust, in preparation for the potential launch in the late 1980's of four advanced infrared tracking and surveillance satellites. Rockwell International, Aerojet-General, the University of Arizona, and A. D. Little are collaborating on development of the components of the satellites, which are designed particularly for tracking Soviet satellites in *Molniya* and geosynchronous orbits. The estimated cost is at least $2.2 billion.

The U.S. ASAT looks at first glimpse like a collection of sophisticated hardware without any place to go. Potential uses listed by the Pentagon are discredited as strategically unnecessary and irrelevant by independent military experts who have been following the program closely. If the real goal is to destroy the sensors that would warn the Soviets of a U.S. attack, the ASAT has the potential to disrupt the present formulation of deterrence; continued ASAT development therefore seems likely to launch the country on a highly uncertain strategic course.—**R. JEFFREY SMITH**

*Noel Gayler notes that the F-14 now carries the Phoenix air-to-ground missile, which is only slightly smaller than the U.S. ASAT.

Carving Up TMI's Class Action Fund

The law firm that sued the utility is now being criticized by local groups for its management of a $5-million research fund

A distinguished Philadelphia law firm with a record of championing liberal and underdog causes now finds itself cast as an overlord at Three Mile Island (TMI), where it has been given charge of a $25-million trust fund for local citizens. The money was awarded by the owners and builders of the TMI reactor in settlement for damages caused by the accident of March 1979. They put up $20 million to pay for economic losses and another $5 million for research and public education on radiation through a "Public Health Fund."

The settlement, issued on 17 February 1981, sets up five areas in which the research and education money may be spent: monitoring radiation from TMI, studying the health-related effects of the accident, educating the public, designing evacuation plans, and doing general research on the effects of low-level radiation. The health studies, which could be politically explosive, must meet the approval of the judge and also a court-appointed science adviser, Baruch Blumberg, winner of the Nobel Prize in 1976 for physiology or medicine. Although he is not an expert in the effects of radiation, he was chosen as an eminent referee acceptable to both defendants and plaintiffs. All expenditures must be cleared by the court.

Some people living near the TMI reactor say that the law firm managing the settlement funds—David Berger, Attorneys at Law—has been slow to develop a research plan and reluctant to explain how it will propose spending the $5 million for science and education (now about $6.5 million, with interest). There are a couple of reasons for concern: with every day that passes, some of the available health data are lost, and every day brings closer a deadline set by the court. Money not committed within 5 years must be returned unspent. The settlement went into effect 2 years ago, in November 1981, and the Berger firm recently estimated that only about $250,000 has been committed thus far.

The initial charges to the fund have been for consultants' fees. The lawyers are required to bill legal fees to the Economic Loss Fund. However, they may bill for administrative work on the Public Health Fund at a later time. Once it was clear that there would be money for research, David Berger asked his scientific adviser, Karl Z. Morgan, the former chief radiation safety official at the Oak Ridge National Laboratory, to help select a standing panel of advisers. The group includes many well-known scientists, among them some eminent critics of the nuclear establishment.* They have been developing a research plan which they hope to submit in late 1983 or early 1984.

The Berger firm has moved more rapidly in dealing with the $20-million Economic Loss Fund. David Berger rattles off the statistics with pride. Eleven thousand small claims, covering 70 percent of those filed, have already been settled, covering lost wages or the costs of evacuating Harrisburg during the accident. In all, about $2.7 million was paid. The larger claims, including those for business and real estate losses, are still being negotiated.

David Berger is one of the nation's most successful antitrust attorneys and a pioneer of class action suits. As he told *Science*, he would like the research funded by the TMI settlement to be "one of the highlights of my legal career, and there are a lot of highlights in my career." Berger has represented such notables as Walter Mondale, Adlai Stevenson, and columnist Drew Pearson. A typical case for the firm is a pending suit for $900 million on behalf of all the schools that suffered losses as a result of using asbestos in construction.

Berger became involved in the TMI litigation on behalf of business clients in Harrisburg who wanted to sue the TMI utility. This was just one of many suits filed in the wake of the accident. The attorneys met and decided to form a single class action covering everyone within 25 miles of the reactor and to appoint one lead attorney. They elected Berger. Later, when the settlement was made, Judge Sylvia Rambo of the U.S. District Court for the Middle District of Pennsylvania named Berger manager of the $25-million trust fund.

Because of its tight control of information about the research fund, the Berger firm has irritated some Harrisburg scientists. It may be customary for lawyers to say little about their briefs before they are filed in court, but it is not customary for funders of public-oriented research to be secretive about their plans and procedures. Thus the local research community—which includes the Middletown branch of Pennsylvania State University—is feeling ignored and suspects that decisions are being made behind closed doors for the benefit of a few insiders.

Mary Osbakken, a radiologist at the Milton S. Hershey Medical Center (which is close to the reactor), says that she and the center's contracting officer wrote to the Bergers asking how to apply for funding. Her office received a polite letter promising more information, but none arrived. She and others at the Hershey Center heard that none of the research money would be spent in the Harrisburg area because people there were considered too "emotional" about the accident.

> It is not just the pace of work on the Public Health Fund that troubles people but the closedness of the proceedings.

That is "preposterous," according to Daniel Berger, one of David's sons, an attorney who serves with his father as "liaison counsel" for the Public Health Fund. No one made such a decision, he says. He confirmed, however, that solicitations for proposals were sent out only once, and only to a handful of people chosen by the Bergers and their scientific advisers.

In the Bergers' view, the complaints come from "disgruntled proposers" who have failed to win funding, or from "antinuclear zealots." It annoys them that people regard the Public Health Fund as "public money." David Berger says, "This is the first time in legal history that private litigation has developed a fund of this kind. There is no precedent. This is not a federal fund: it is private. Are we clear on that?"

One reason it has taken so long to design a spending plan, according to Daniel Berger, is that the firm will propose some imaginative and controversial new projects. For example, the Bergers do not intend to sponsor traditional public education projects such as movies and lectures. Instead, Daniel Berger says, they want to educate local citizens in radiation monitoring. The plan is to equip people to take readings themselves so that they can discuss the technical issues with plant operators. "The only sensible way to go about this," says Berger, is to collect a lot of expert advice beforehand. This is a time-consuming task, he claims, one that would take longer if the deliberations were open. In 6 months the firm hopes to submit several major research programs to the court.

However, it is not just the pace of work on the Public Health Fund that troubles people but the closedness of the proceedings. A couple of decisions rankled. One was the Bergers' choice of Jonathan Berger, Daniel's brother, as chief administrative staffer for the research fund. The other was the hiring of a Colorado "conflict management" group known as Accord Associates to serve as a go-between with the local citizens. As one local scientist put it, "We don't want to be 'handled' or 'managed' by a team of psychologists. We don't want mediation; we just want a little communication."

The Bergers advertised for a research manager in October 1982, seeking a "Ph.D. in some relevant science or engineering discipline," or someone "with an ability to write for and communicate with a concerned public." The Bergers thought long and hard about this, read résumés, and decided to fill the post with another Berger—Jonathan. Daniel says his brother is working on a Ph.D. for the University of Pennsylvania in the field in which he holds a master's degree, environmental planning. In addition to David Berger's sons, the TMI fund also has used the services of David's brother, Harold Berger. Local scientists wonder why, with more than $5 million to spend, the law firm could not reach beyond its own doors for staffers.

The decision to assign this formidable research agenda to a family member had several repercussions. For local citizens like Kay Pickering, a member of an activist group known as Three Mile Island Alert (TMIA), it indicated that the Bergers were not sensitive to public opinion, and that groups like TMIA would not have much input into the use of the Public Health Fund. TMIA and others assembled their own expert panel, known as the Health Issues Committee. This summer the committee began to

*The chairman is Karl Morgan. The other members are Dean Abrahamson of the Hubert Humphrey Institute of Public Affairs at the University of Minnesota; John Cobb of the University of New Mexico School of Medicine; Thomas Cochran, a staff physicist at the environmental group known as the Natural Resources Defense Council; Frank von Hippel of Princeton's Center for Energy and Environmental Studies; Seymour Jablon, the National Academy of Science's liaison with the Radiation Effects Research Foundation; Ian McHarg, landscape architect at the University of Pennsylvania; epidemiologist Edward Radford, who chaired a controversial National Academy of Sciences report on the hazards of radiation; and George Woodwell of the Ecosystems Center at the Marine Biological Laboratory in Woods Hole, Massachusetts.

Ground zero for the class action

TMI's insurance fund put up $5 million for radiation monitoring, research, and education to benefit everyone within 25 miles of the reactor during the 1979 accident.

query the Bergers. They asked about the propriety of choosing staffers and consultants "by word of mouth" rather than through an open selection process. They were troubled by the absence of a review system for approving research proposals, and they expressed concern about the general lack of communication. The suspicion, as one critic put it, is that "they are turning a public trust into a family foundation,"

Daniel Berger says the firm has not charged the Public Health Fund for its services thus far. The initial legal bill was sent to the Economic Loss Fund in 1982. The judge agreed to disburse $2.3 million (half the sum requested) to cover the fees of all ten law firms involved. Daniel Berger insists that the objective has been to get the most substance for the dollar by doing without an administrative staff and working in an informal way with a few consultants. This was the reason for hiring Jonathan. The firm decided that there would be no need for a full-time professional manager.

Sandra Prine-Embury, a psychologist at Pennsylvania State University's campus in Middletown, right next to the reactor, sums it up in this way: "This is a community with a level of stress that is documented as higher than normal. Despite the fact that funding is available [in the health fund], people are not receiving any services." She regards the $5 million as "public money," and says that many people worry that "it is going to slide away into administrative fees without benefiting the community." The least the Public Health Fund could do, Prince-Embury says, is to employ someone to answer peoples' questions. "That way there would be some return to the community, which has been the subject of all this study."

When some local people met with Jonathan Berger and asked what public education programs were planned, according to Prince-Embury, he told them that Colorado's Accord Associates was being hired to handle public education. Daniel Berger confirms that Accord will survey the Harrisburg area to find out what kind of education the public wants.

It is not entirely clear how the Bergers' scientific advisers will influence the use of the Public Health Fund. The members serve at the Bergers' discretion, as "my informal consultants," David Berger says. They meet about once a month. One member, Thomas Cochran, a physicist at the Natural Resources Defense Council (NRDC), declined to discuss the research plan on grounds that it was privileged information which would be presented to Judge Rambo in due course. At that time it will become public. He did say that the Bergers "have a pretty clear idea of how they want to spend it."

Another member, Frank von Hippel of Princeton's Center for Energy and Environmental Studies, said he stopped going to meetings "about a year ago." He was disappointed that the Bergers chose not to hire a professional staff and bored by the "inordinate amount of time" spent on legal strategizing. "The closedness of the proceedings made me uncomfortable," he says now. He did attend a large public forum in March, however. Von Hippel regrets that so little progress has been made because, "It is very infrequently that you get to do public interest science with this kind of money." The Bergers say that von Hippel has not left the panel.

After 2 years of operation, what has the public fund accomplished? Its one major achievement was to finance (for around $40,000) a symposium on the hazards of nuclear radiation. It was staged in March on the fourth anniversary of the accident in the town next to the reactor. Most of the Bergers' science advisers spoke during the 3-day event. The utility, upset by what it viewed as a hostile performance, threatened to go to Judge Rambo to get the program changed. That did not happen. Instead, a couple of pronuclear speakers were added to the list.

At the same time, the Bergers faced a challenge from the antinuclear side, in the form of a court petition filed by Kay Pickering and TMIA. This group claimed that it had tried to get the symposium scheduled for the evening or weekend, when local residents would be free to attend. But, TMIA said, the Bergers only agreed to schedule one summary session—without the principal speakers—for the evening of the last day of the conference. The court refused to order evening sessions. In deference to TMIA's concerns, however, the Bergers did agree to have the proceedings videotaped (for another $10,000) and transcribed so that working people could get something out of all this. Those tapes and transcripts are not yet available. Daniel Berger says editing the transcripts of a long technical conference is a "laborious" chore which he simply has not had time to do. And to save money, the law firm has not hired a technical editor to do the job.

There have been a few other accomplishments. A closed symposium on the effects of low-level radiation was held in December 1982. The public forum in March 1983 was intended to let local citizens learn something about research in this area. A review of radiation monitoring during nuclear accidents has been commissioned and is now 6 months past due. And two literature searches have been completed. Nothing has been published, however.

Perhaps the Bergers will design an excellent research and education program on low-level radiation, and perhaps they will do it without using any of the cumbersome peer review systems that public agencies rely on. However, the program has not had an auspicious launching. Local scientists are eager to see what substantial proposals they will make to the court in the next few months.—**ELIOT MARSHALL**