other) water. Moreover, they escape the frequent criticism that the cost of desalted water should not be compared with the actual price currently paid for water, or that the present price of water is an irrelevant object of comparison, since it must be judged in a multi-purpose use context.

On the basis of this range of American experience, it seems most unlikely that irrigation water delivered to the farm on the schedule the farmer wants it, for the production of staple crops, can attain a value greater than $30 per acre foot (10 cents per 1000 gallons), and a value of $10 per acre foot (3 cents per 1000 gallons) is a much more reasonable planning standard.

The conclusion is inescapable: the full and true costs of the proposed desalting projects, now and for the next 20 years, are at least one whole order of magnitude greater than the value of the water to agriculture. The specifics of both cost and value will vary, depending upon the location of the plant and the myriad of factors associated with that location, upon what desalting costs actually are in practice, upon crop possibilities (costs and markets, especially), and upon other variables. But it is impossible to bring planned costs and prospective values for agriculture together or even close.

Nothing we have said with regard to the prospects for desalting seawater should be construed as an argument against continued research, including the construction of a rather large pilot plant. The Oak Ridge study both merits and needs attentive reading and critical review. Such research must not stop at the farm gate nor bypass the broader implications of such programs with a few passing sentences. There is more involved here than either "truth in advertising," the discovery of a new input, or a new means of fighting hunger. The present mirage may indeed have an oasis within it, and we as a nation have the resources to pursue the matter much further. But let us not delude ourselves or the rest of the world that an early and practical solution is at hand.

References and Notes

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11. Interestingly, the same is true for the desalting phases. The "far-term" technology (combined flash-vertical-tube) requires more capital than the "near-term" (multistage flash) does.
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NEWS AND COMMENT

Naval R&D: Conversion Sought for Radiological Defense Lab

Several West Coast University scientists and a bipartisan group of San Francisco Bay area congressmen have been trying to win a reprieve for the Naval Radiological Defense Laboratory, which has been scheduled for "disestablishment" in December.

The object of the campaign is not to win a reversal of the Department of Defense decision, but to delay dispersal of the NRDL staff and instruments so that a new base of federal patronage can be formed and the lab continued at its San Francisco location, preferably as a federal environmental research laboratory.

Congressional critics of the closing have been especially harsh in questioning recent Navy investments in equipment and facilities at NRDL—in particular, a $6-million cyclotron which has been in full service only in the past year. The incident seems likely to provide fuel for the arguments of those who have been demanding more effective government-wide policies on the utilization of federal research facilities.

Nine area congressmen* petitioned Secretary of Defense Melvin Laird to extend the closing date for 6 months to give other federal agencies who might utilize the skills of the NRDL staff time to act. As this was written, no decision by Laird on the request had been made public.

The Department of Defense informed area congressmen on 22 April

* They are William S. Mailliard, a San Francisco Republican who took the lead in the effort; Republicans Paul N. McCloskey, Jr., Don Clausen, and Charles S. Gubser; and Democrats Phillip Burton, Jeffery Cohelan, George P. Miller, Jerome R. Waldie, and Robert L. Leggett.

of its intention to close NRDL. Staff members say news of the closing was a bombshell, although there had been rumors in the past that NRDL was in for some major changes. NRDL was one of 36 military installations—four of them R & D facilities—affected by the order to "consolidate, reduce or realign" activities.

NRDL employs some 500 civilians and has about 61 military personnel; according to the Navy, 316 of the civilian positions are to be eliminated and some 200 technical personnel, including over 60 Ph.D.'s, are scheduled to be transferred to other labs. NRDL operated on a total budget of $11.3 million for fiscal year 1969; the Navy budget amounted to $6.2 million of that. The Navy estimates that the closing will result in savings of about $4 million a year.

Non-Navy research performed at NRDL is sponsored in large part by agencies with military interests. The Defense Atomic Support Agency ranks next after Navy, with $1.5 million in contracts at NRDL for the current year. Other clients are the Advanced Research Projects Agency, the Army, the Air Force, the Arms Control and Disarmament Agency, the Atomic Energy Commission, and NASA.

NRDL grew out of a radiological safety group which dealt with decontamination problems associated with nuclear testing immediately after World War II. The lab grew and its functions ramified, so that organizationally it came to be divided into five main divisions—biological and medical sciences, radiation physics, military evaluation, nuclear technology, and physical sciences.

Those who would transform NRDL into an essentially nonmilitary research facility argue that the versatility and competence of the staff are attested by the usual evidence of publications and professional honors, and that the staff's expertise gained in research—much of it basic research—on radiological damage and nuclear weapons effects is directly transferable to the study of general pollution problems. NRDL scientists themselves have come up with a prospectus of research possibilities that would be relevant to agencies practically across the federal spectrum.

NRDL scientists over the two decades of the lab's operations have established ties with their counterparts in San Francisco area universities, and many of these colleagues obviously feel that breaking up NRDL would, as one Stanford research scientist put it, make a "drastic difference in the scientific ecology of the region."

The Navy's case for closing NRDL is based not only on the need for economies but also on a reorientation of Navy research facilities toward the concept of larger "centers" of research, concentrating on single areas such as air-to-air weapons, antisubmarine warfare, or ship design. In line with this concept, NRDL's nuclear warfare effort, involving 102 "personnel spaces," would, for example, be moved to the Naval Ordnance Lab at White Oak, Maryland; a military systems analysis group with 63 "spaces" would be moved to the Naval Underseas R & D Center at San Diego; and the biological and chemical warfare effort, with 29, would be moved to the Naval Weapons Laboratory at Dahlgren, Virginia.

In fact, it appears that a number of the specialists scheduled for transfer will choose not to move and will presumably leave Navy employ, being unwilling to give up educational and other benefits of life in California.

Holifield's Criticisms

Congressman Chet Holifield, another California Democrat, has used his chairmanship of the House Government Operations Committee's subcommittee on military operations as a platform for criticism. In recent hearings Holifield asked about the soundness of Navy planning which permitted an investment in a major piece of equipment like NRDL's cyclotron in a facility which the Navy then decided to shut down. In testimony before the subcommittee on 5 May, Admiral A. S. Goodfellow, deputy chief of Naval Development, admitted that "the cyclotron frankly is a matter of embarrassment," and traced briefly the history of the decision to build the cyclotron. The major flaw in planning seems to have been the planners' original failure to anticipate the appearance of several cyclotrons, now available, that are of higher flux and even better adapted to the research for which the NRDL machine was designed. The NRDL cyclotron could well be declared excess and sold off by the General Services Administration at a big markdown.

In addition to speaking sharp words about past Navy planning, Holifield pointed out in the hearings that, in a time of student unrest, "it seems that university after university is now pulling out of defense research." And Holifield prophesied that the Navy might well have to open NRDL once again.

Time appears to be running out on the "convert-the-NRDL" forces. Navy "disestablishment teams" are already on the base, and many professional staff members are already looking for jobs.

Though no consolation to NRDL staff, the incident is a reminder that there is no effective process for evaluating the work of a federal lab or its overall value to the public interest.

Holifield, among others, has suggested that Presidential Science Advisor Lee A. DuBridge and the Office of Science and Technology which he heads might make a recommendation as to whether NRDL might be used as a "national resource." But OST, as things stand, can do little more than act as an honest broker among agencies.

Representative Emilio Q. Daddario (D–Conn.), chairman of a House Space Committee subcommittee on science, research, and development, has received a stack of mail on the NRDL issue, largely because of his panel's report on "Utilization of Federal Laboratories" (*Science*, 25 October 1968), which argued for greater interagency use of federal labs and greater responsiveness on the labs' part to national problems such as crime, transportation, and pollution. Daddario is interested in the NRDL problem, but at this point can do little more than point at the case as a practical example of what he is talking about.

The interagency Federal Committee on Federal Laboratories, made up of the directors and administrators of major government labs, tends to be concerned with immediate practical problems such as personnel ceilings and seems unready to deal with a problem such as salvaging NRDL. There is, it should be noted, one school of thought which holds that federal labs have life cycles, and that it is better to start a new lab for a specific purpose than to convert an existing one.

NRDL no doubt owes its impending demise in part to the accident that radiological research has been somewhat out of fashion in recent years. But the record shows that bigger federal labs tend to march on, so long as budgets remain buoyant.

It is an unfortunate fact of federal life that an economy drive causes cutbacks in activities like NRDL's at a time when, whatever the merits of the case, other agencies, because of the same financial stringencies, find it difficult to take over the orphan activities.

—JOHN WALSH