should be handled is too value-laden. At present, the importance of civil rights for prisoners (the current thrust, according to Alvin Bronstein of the National Prison Project, is toward preventing "debilitation" caused by bad living conditions and idleness) has superseded concern with the more positive notion of "rehabilitation."

Although Patuxent cannot prove through statistics that its programs do more than prevent debilitation, Rappeport and others believe the public is of a mind to overlook the fact that it *has* changed lives for the better. "I think Patuxent was a very brave experiment," he says. "The basic concept of attempting to treat seriously dangerous, antisocial individuals under some form of coercion is a valid concept. Regardless of what statistics show, Patuxent has accomplished a great deal in terms of 'quality of life' for those who succeeded in getting out of the institution.* The country has to be willing, if they want to protect themselves in the long run, to make certain sacrifices in terms of human rights, and in terms of cost."

That last assumption is not widely accepted these days. And so, as Lion asserts, Patuxent is operating pretty much "in a vacuum" with little chance of going beyond an "experimental, voluntary status."

Yet, as Lion goes on to say, Patuxent "is one of the few places where people grapple with the most difficult issues in society—anger, violence, retribution. . . ." The current retrenchment, in which emphasis has shifted from punishing the person to punishing the crime, is part of what Lion sees as public failure to confront the really tough questions: How much should society spend on trying to change criminals? How much effort should be invested in rehabilitating an individual before giving up on him? Are there not some people who pose such a menace that humanity would best be served by executing them? "No one's tackling these questions," asserts Lion. And furthermore, society is unwilling to take a few rudimentary steps—such as gun control and increased auto safety—that would significantly reduce the level of violence in the country.

As Peter Lejins, of the University of Maryland wrote, in a recent issue of the AAPL *Bulletin*, "Patuxent Institution went out of existence as it had been visualized by its founders not as the result of objective findings with regard to (its) effectiveness . . . but as a result of the change in the attitudinal climate" that has affected corrections in the past decade.

As long as society as a whole continues to ignore the big questions, a place like Patuxent is likely to remain an anomaly rather than an example.

—CONSTANCE HOLDEN

*Rappeport says a program, run through the University of Maryland, for repetitively violent and sex offenders illustrates the unquantifiable changes made. Some patients who have gone through the program show no difference in psychological tests before and after; nor have their therapists perceived any change. Nonetheless, the lives of many have improved in terms of jobs, education, and family relationships.

Virginia Refinery Battle: Another Dilemma in Energy Facility Siting

The intense controversy that has flared over a proposal to build a large oil refinery in southeastern Virginia on a tributary of Hampton Roads and the lower Chesapeake Bay is witness to the widely acknowledged fact that the nation lacks an effective policy for the siting of major energy facilities. Absent such a policy, proposed projects may involve needlessly acute conflicts with environmental and resource values, and, as a consequence, invite opposition that leads invariably to long delays for the projects if not to their cancellation. The controversy in Virginia over the refinery poses a stark dilemma for the officials who must pass on the project and reveals with particular clarity the weaknesses of the existing system of energy facility siting. Unless corrected, these weaknesses could lead to much worse trouble in the years ahead when production of oil and natural gas is ready to begin in newly developed provinces of the Atlantic and Pacific outer continental shelf (OCS).

For the Virginia project, 1978 could be the make or break year. The outcome may depend on whether the Chief of the U.S. Army Corps of Engineers—a key authority for an undertaking of this kind—decides to go with the Department of Energy, which supports the project, or with the Environmental Protection Agency (EPA), which does not.

The refinery, with an initial capacity to process 175,000 barrels a day of high sulfur Middle Eastern crude oil, would be built by the Hampton Roads Energy Company (HREC), a newly created firm backed financially by Cox Enterprises, Inc., an Atlanta-based communications company.

HREC has been engaged in the tortuous process of obtaining all of the necessary state and federal permits for the project since early 1975. Proposed for a 620-acre site on the Elizabeth River, in the middle of the Norfolk-Portsmouth metropolitan area and within several miles of the rich shellfish grounds of the lower James River, the refinery project has inevitably given rise to troublesome issues related to air and water quality and the protection of estuarine resources.

At this point, HREC has obtained all of the state permits required of it, although the validity of the effluent discharge permit granted by the State Water Control Board (SWCB) is being strongly challenged in both state and federal courts. The company still has to obtain a permit from the Corps of Engineers for the channel dredging and other work that would be necessary in building a marine terminal where crude oil from incoming tankers would be received and refined products would be loaded aboard outgoing tankers and barges. If one makes the risky assumption that the SWCB permit will be upheld, the Corps of Engineers decision now pending represents the one big remaining hurdle facing the project.

But this is a very high hurdle indeed, and there are few, if any, people familiar with the project who would bet confidently how the decision will go. In truth, the decision-maker in this case, Lieutenant General John W. Morris, the Chief of the Engineers, faces an agonizing choice.

On the one hand, General Morris must consider the nation's energy supply needs as perceived by the Department of Energy (DOE), which says that the increasing dependence of the United States on petroleum products refined

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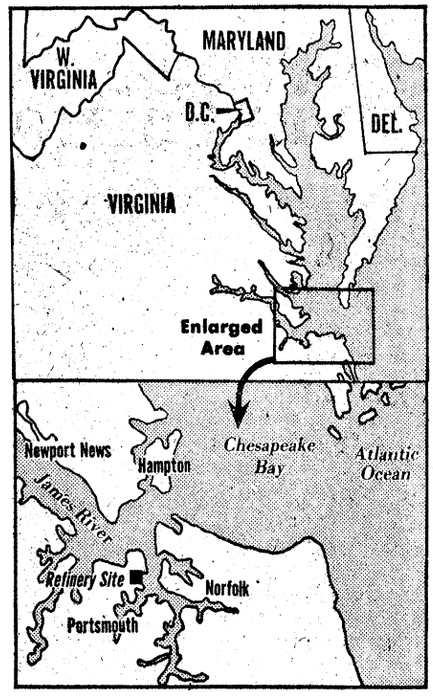
abroad is highly detrimental in terms of balance of payments, national security, and domestic employment. Moreover, DOE has stated, in a letter to the Corps of Engineers, that the HREC venture is one of only two significant refinery projects now being actively pursued in the United States. The other one, a plan to build a refinery at Eastport, Maine, faces probably insuperable obstacles, including what appears to be the impossibility of obtaining a permit from Canada for passage of tankers through its waters.

Also, Morris must take into account the fact that the city of Portsmouth, the predominantly blue-collar town within whose boundaries the refinery would be built, regards the $550 million project as a godsend. Construction of the refinery would increase the local tax base by about half and help the city, which says it is nearing the edge of a fiscal abyss, stay out of bankruptcy.

On the other hand, General Morris must also weigh the fact that three federal agencies—EPA, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service—have recommended that the permit be denied. A principal concern is that oil spills associated with the tanker and barge traffic that the refinery would generate could ruin the seed oyster beds in the lower James River.

Although these beds cover only a few hundred acres, they are uniquely productive and are a mainstay of the Chesapeake Bay shellfish industry—indeed, the seed for more than three-fourths of the $50 million worth of oysters harvested in Virginia annually comes from these beds. That EPA and the other two federal agencies assign such importance to the seedbeds and the threat to them posed by the refinery project is in part a reflection of assessments made by the Virginia Institute of Marine Sciences at Gloucester Point, which is run by the state, and by the Bureau of Shellfish Sanitation of the State Department of Health.

Another objection to the project which Chief of Engineers Morris must consider is that, while the refinery is designed to meet all air emissions standards, its hydrocarbon emissions would contribute at least marginally to the formation of ozone or smog. EPA regards the smog problem in the Norfolk-Portsmouth metropolitan area as already serious inasmuch as the primary health standards with respect to ozone are violated many days of the year. The Virginia Air Pollution Control Board has proposed that the reduction in hydrocarbon emissions being achieved through a change in the type of asphalt used in highway work in



Map by Milton Clipper—The Washington Post

the eastern part of the state be accepted as an adequate offset to the refinery emissions. But this plan does not yet have EPA approval.

The Chief of Engineers' dilemma points up what to some who have struggled with the problem of energy facility siting seems a fundamental weakness in the way sites are now chosen. It is that the selection of sites or right-of-way corridors for major refineries, pipelines, and other energy projects, is generally left to industry even though the projects in question are often promoted as important to the national interest.

Understandably, industry is guided in these selections primarily by considerations of profit and operational convenience. As a result, the sites chosen not infrequently pose, as in the case of the HREC project, inevitable conflicts with environmental quality and conservation of resources such as fisheries, resort beaches, prime farmland, and the like.

In such situations, proponents of the projects usually look to advancing pollution control technologies and the environmental protection agencies to keep the damage to an acceptable minimum if it cannot be prevented altogether. This is precisely the expectation entertained by Mayor Richard J. Davis of Portsmouth and the City Council.

But this trusting attitude is not shared by the groups that have been opposing the HREC project. These are principally the trade organizations representing the Virginia shellfish industry and a Norfolk-based group that calls itself Citizens Against the Refinery's Effects (CARE).

In their view, pollution control technologies are anything but foolproof—and are in fact subject to breakdowns, operator error, and conditions with which they simply cannot cope. CARE and the Virginia Oyster Packers and Planters Association have raised many questions as to the effectiveness of the effluent treatment system which the refinery would employ and the ability of the Coast Guard, HREC, and the tanker and barge operators to clean up spills of crude oil or refinery products.

Also, in CARE's view, these agencies are under such political pressure not to bear down too hard on polluters or interfere with industrial development, they would be hard put to carry out their jobs effectively under even the best of circumstances. When the potential for environmental harm has been greatly increased through energy siting decisions that would put energy facilities and sensitive resources in juxtaposition, the chance of the agencies' failing in their mission is seen to be all the greater.

The Kepone disaster, which has led to the closing of the James River to most commercial fishing from Richmond to Hampton Roads, has not bolstered public confidence in the SWCB. This agency's failure to react to breakdowns of the city of Hopewell's sewage treatment plants—Kepone was killing the bacteria in the digesters—as an early warning signal has been noted in particular. [Mayor Davis of Portsmouth acknowledges, "The Kepone incident hurt us a lot, although the two (Kepone and the refinery) are unrelated. People say, 'If the regulatory process is so good, how did it fail in this instance?' "]

The state agencies have not always appeared in the best light in their handling of the HREC permit requests either. For instance, the lawsuits brought by CARE and the oyster packers against the SWCB are based partly on procedural mix-ups that were pure opéra bouffe. And, whereas the permit granted by the board calls for HREC to develop a plan for the prompt containment, cleanup, and removal of oil spilled in local waters by vessels in transit to or from the refinery, even HREC and its consultants seem to acknowledge that this condition is virtually meaningless. "The best we can say is that we would help the Coast Guard [in trying to cope with a spill]," says Frederick C. Spreyer, an HREC consultant.

(However controversial, the permits issued by the SWCB and the Virginia Air Pollution Control Board have not given rise to objections on the part of EPA.

The agency has acknowledged that insofar as it has been able to determine up to this point, the refinery will meet all applicable effluent and emissions standards. The EPA recommendation that the Corps of Engineers permit be denied is based on a judgment that the regional environment is already "stressed" and that the refinery can only contribute to its further degradation, especially in light of the potential for oil spills.)

In a letter to the Corps of Engineers at the end of the year, Virginia Governor Mills E. Godwin, Jr., gave the refinery project his approval a few weeks before completing his term of office. But Godwin indicated he was not approving it out of a sure conviction that no serious harm would come to the seed oyster beds, although he said the environmental safeguards for the refinery would be "stringent and meticulous." His purpose was to ensure that the Corps of Engineers review and decision process would run its full course and not end with the Norfolk district engineer, Colonel Newman A. Howard, Jr., making the final ruling. Howard could himself have killed the project had the governor taken no position. Further, he would have had really no choice but to kill it had the governor—who had been told confidentially of the colonel's inclinations in the matter—recommended that the permit be denied.

Thus, Governor Godwin left it to General Morris to face the dilemma that became unavoidable once HREC selected the refinery site near the oyster beds and set the state and federal permitting process in motion. Although the environmental impact statement issued by the Corps of Engineers discusses the possibility of building the refinery elsewhere, this discussion of alternatives comes after the fact (HREC invested $6 million in the site 4 years ago) and appears to be largely from the permit applicant's point of view. Furthermore, it is so brief as to appear pro forma. No mention whatever is made of the pros and cons of building such a refinery at an inland location well away from Chesapeake Bay, with the crude oil and refined products to be transported to and from the facility by pipeline.

Is there no better way by which sites for refineries and other major energy facilities could be selected and approved? Under the 1976 amendments to the Coastal Zone Management Act of 1972 the coastal states are receiving federal financial help to develop a capability for assessing the need for energy facilities and the impact that energy development would have. But there is no statutory requirement for the states to decide where various facilities should go. Also, while the 1976 amendments authorized planning grants for interstate bodies, actual appropriations for this purpose have been nil.

The Carter Administration is now developing some new legislative proposals having to do with energy facility planning and siting. But land use planning and regulation is politically explosive and the Administration does not intend to set off a battle in Congress by proposing to have the federal government direct the states to prepare energy facility siting plans and rewrite any state plans that are found wanting.

The federal role would be limited to having DOE offer the states grants and review their plans on a purely advisory basis. But, even if many of the states respond to energy planning grants held out

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Xylitol: Another Sweetener Turns Sour

When the National Institute of Dental Health (NIDH) announced last November that it was abruptly ending a study of the artificial sweetener xylitol because of preliminary data in England indicating that the substance caused cancer, there was at the Food and Drug Administration (FDA) in Washington a strong sense of déjà vu. Similar findings by foreign researchers only 8 months earlier had prompted the FDA to announce a ban on saccharin (*Science*, 10 June 1977), provoking a public outcry, protracted debate in Congress, and an eventual—if temporary—emasculation of the FDA's authority to remove saccharin from the marketplace.

The NIDH-sponsored experiment, which was designed to determine if xylitol helped to prevent cavities in school children, was halted because of unknown possible risks to the participants. Since the study's end, the FDA has been briefed by the English researchers with an eye toward determining how extensive those risks might be. The English work is still going on at Huntingdon Research Center there, under the sponsorship of Hoffman-La Roche, the Swiss pharmaceutical manufacturer. But several FDA officials have said that the preliminary results they were shown did little to suggest that the case of xylitol would be much different from that of saccharin. The data showed that several mice in a group fed a diet of 10 to 20 percent xylitol developed bladder stones and tumors, and some of the group of rats fed xylitol developed tumors in their adrenal glands.

The results were announced just as the FDA was about to limit its previous general approval of xylitol to the only current domestic use—in chewing gum. According to Charles Kokoski, the chief of the FDA's food additives evaluation branch, the limitation would have been the result of a compromise between Hoffman-La Roche, which wanted to use the sweetener in jams, jellies, candy, and other products, and the FDA, which had wanted to ban the substance entirely in 1971 after it caused several deaths in Australia and New Zealand following intravenous administration as a glucose substitute. There was no indication, Kokoski added, that digestion of the substance from chewing gum, and at lower dosage levels, was harmful.

If the final report from England confirms the preliminary findings there, the FDA will not have the opportunity to go through with its compromise. The Delaney clause of the Food, Drug, and Cosmetic Act is firm about substances shown to cause cancer in animals at any dosage. Under Delaney provisions, Orbit, a xylitol-sweetened chewing gum now marketed by the Wrigley Company, would have to be taken off the market.

Wrigley, however, does not think that is going to happen. "We think it is a good sweetener and have no intention of stopping the use of it in Orbit," a spokesman told *Science*. "We believe the press has panicked. The researchers used massive, too-high doses that clearly exceeded the toleration limit."

Should officials at the FDA be forced to initiate regulatory action as a result of the English study, it will be interesting to see how they do it. After the agency abruptly announced its proposed ban on saccharin in a statement that noted the high dosage used in the Canadian tests, there were widespread charges that it had misrepresented the validity of the experiments in order to set up the Delaney clause for a fall in Congress. The agency's actions on xylitol under Commis-

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by DOE and officials of the coastal zone program, there will be no assurance whatever that their individual plans will constitute, in the aggregate, a workable national plan to guide industry in facility siting.

As chairman of the Council on Environmental Quality in the early 1970's, Russell E. Train, who later became head of EPA, put forward the idea that the federal government itself should take the initiative in drawing up a list of suitable locations for major energy facilities such as deepwater ports and refineries. But he met with an ideological stone wall. "The reaction within the Administration, as I recall, was that that kind of approach was just totally opposed to the free market approach to decision-making," Train says.

He still thinks that the idea is sound and that, even without new legislation, much could be done. For instance, he says, DOE, with the cooperation of the oil industry, could assess the need for additional refining capacity to serve particular geographic markets and then draw up a list of possible coastal and inland refinery sites. At this point, the DOE list, which would reflect largely economic criteria, could undergo review by other agencies, state and local government, industry, environmental groups, and other interested parties.

"From all this, you would come out with a range of possibilities that would merit positive consideration by industry," Train says. "It seems to me that, with such a process, you would have a far better chance at expeditious siting."

As Train is well aware, the approach he proposes would not free energy facility siting from controversy even if it led finally to a list of alternative sites that were widely acceptable. What it would no doubt do is bring on the controversy earlier, at the stage during which various sites or regions are being considered for facilities of a particular kind.

But, once the controversy at this stage was basically resolved through a determined sorting out and refining of alternatives, the worst might be over. The permitting agencies would not have to worry that, from an environmental and resource management standpoint, the sites chosen are all wrong.

An energy company could choose to ignore the list of recommended locations and select one that either had been rejected or not considered at all. But if a bitter controversy over the appropriateness of the site then flared during the permitting process, the company could find itself in a position difficult to defend.

Train is perhaps optimistic in thinking that, without new legislation, the government could marshall the analytical competence and carry out the elaborate process of interagency and public review necessary to arrive at a list of widely acceptable energy sites. Nevertheless, what he suggests, or something like it, appears worth a try. Such an initiative could be especially timely inasmuch as the impending exploration and development of the OCS oil and gas provinces will surely lead to demands for numerous major new energy facilities. As Train points out, to continue with the present purely "reactive" system, in which industry selects the sites and the state and federal regulatory agencies merely respond to permit requests, is inefficient, not very rational, and conducive to delay and the shaping of awkward, uncomfortable choices.—LUTHER J. CARTER

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sioner Donald Kennedy could either add fuel to those charges or put them to rest for the immediate future.

Weather 5, Government 0—So Far

In the midst of numerous snowstorms and bitter cold across much of the nation in the past few weeks, including what the National Weather Service termed an "extra-tropical cyclone" that swept across the Midwest on 26 January, the superlow temperatures of last winter may no longer seem that significant. Last winter *was* abnormally cold, however, and a lack of preparation for it led to shortages in natural gas and other disruptions of the economy.

This year, the government has resolved to increase its efforts to understand and predict such seasonal climate variability, and one of the major cross-agency initiatives highlighted in the President's budget proposals for 1979 (*Science*, 3 February 1978) was a national program on climate research.

Next year will not be the first that climate research has been undertaken: Five federal departments (Defense, Commerce, Agriculture, Energy, and Interior) and three federal agencies (the National Science Foundation, National Aeronautics and Space Administration, and the Environmental Protection Agency) will spend $76 million on it this year. But next year will be the first time that the research will be coordinated under a national plan by a single agency; the White House has designated the National Oceanic and Atmospheric Administration (NOAA) as the lead agency for climate research. Moreover, the level of spending on climate research is slated to rise 37 percent—or 32 percent above inflation—to $104 million in 1979.

The framework under which NOAA will coordinate the research efforts is the "U.S. Climate Program Plan," which was developed in June 1977 by a subcommittee of the Federal Coordinating Council for Science, Engineering, and Technology. The issue was initially taken up because of concerns in Congress and elsewhere that climate variability was increasing, and that such climate-related problems as the wheat shortage in the Soviet Union, the famine in Southeast Asia, and the drought in the American West might have been minimized by early understanding.

The program that NOAA will be coordinating is four-pronged:

- The relationship between climate variability and national activities will be assessed through studies of carbon dioxide, crop yields, land and water resources, and coal use.
- Efforts to provide early warnings of short-term climate fluctuations will be made through a variety of observation systems.
- Basic research to gain a better understanding of climate processes will be carried out on the oceans and the atmosphere.
- Long-term climate variations will be studied from space, and by monitoring subsurface ocean temperatures and snow levels.

NOAA will not have the authority to approve or reject the climate program proposals of participating agencies, but it will be empowered to consolidate them into a single budget proposal to be reviewed by the White House each year. Because the way this is done by NOAA officials will undoubtedly carry special weight with OMB budget analysts, as one NOAA official pointed out, the agency can properly be characterized as having "a heightened influence" in the climate research area.

R. Jeffrey Smith