when 'old' technologies are involved; it is hardly prudent to try to estimate the costs of innovative technologies before a much more detailed analysis (not to mention extensive pilot testing) is performed." (D. Truitt and J. Caldwell; "Evaluation of Innovative Waste Treatment Technologies," Waste ***Management Conference-Focus on the West,*** Colorado State University, June 1987.) At Crystal City, the big difference between the RIFS obligation ($726,000) and the actual money spent ($218,000), if the data are correct, may also indicate that less work, such as treatability studies, was done than could have been done and should have been done to better evaluate cleanup alternatives.

Case Study 5
Industrial Excess Landfill, Uniontown, Ohio, EPA Region 5

Capsule OTA findings.—Providing alternate water to houses that have or are likely to have contaminated wells was a satisfactory interim remedial action. However, actions to address the source of contamination and to stop and treat contaminated groundwater are taking a very long time.

Key dates:

- Entered Superfund system: 12/1/80
- Preliminary Assessment: 12/1/83 (from CERCLIS); 12/9/83 (ROD)
- Site Inspection: 8/1/84 (CERCLIS); 3/5/84 (ROD)
- National Priorities List
  –proposed date: 10/1/84
  –final date: 6/1/86
  —site rank: #164 out of 770
- RIFS start and completion: 12/28/84 to 8/87 (final focused FS)
- Public comment period before Record of Decision: 8/12/87 to 9/10/87
- Signing of ROD: 9/30/87

Estimated complete remediation: **12/89** for this interim remedial action. (According to the ROD, it will take 5 years to design and implement an aquifer restoration remedy. If a ROD for the final cleanup is issued by October 1988 as scheduled, the complete remedy would end in late 1993, but this estimate maybe optimistic.)

Total time.—13 years

Brief description of site.—This ROD addresses an operable unit or interim remedial action of the overall remedy. "The Industrial Excess Landfill is a closed sanitary landfill . . . From 1968 to 1980 the site was operated ., . for the disposal of a variety of solid waste materials. During this time, the landfill accepted municipal, commercial, industrial, and chemical wastes of substantially undetermined and unknown composition, primarily from the rubber industry in Akron, Ohio. Large quantities of chemical and liquid waste were dumped onto the ground either from 55-gal@ drums or from tanker trucks. Although much of the liquid wastes were listed as latex and oil at the time of disposal; witnesses have described the disposal of solvents and volatile industrial chemicals with foul odors. " The county ordered a stop to the dumping of chemical wastes in January 1972. It was not until 1980 that a court ordered closure and a closure plan was engineered and implemented; the site was covered and seeded.

"The IEL [Industrial Excess Landfill] site is located on a tract of approximately 30 acres which had previously been the site of mining operations (sand and gravel and possibly coal). The landfill has a relatively pervious soil cover."

Major contsfnination/environmental threat. -''About 80 percent of the site is believed to be underlain by buried solid waste materials. There are over 400 residential homes located within a 0.5 mile radius of the landfill. . . . over long periods of time, the sand and gravel and immediately underlying bedrock at IEL will act as a single aquifer." The landfill "is located in permeable soils without an impermeable liner."

Citizen complaints prompted testing in 1983 that verified contaminated drinking water. " . . . EPA discovered contamination of several private drinking water wells near the site. The Agency determined that the cause of the contamination was the migration of hazardous substances from the Industrial Excess Landfill. . . . contaminants have migrated approximately 600

feet from the western edge of the landfill, impacting the groundwater of 10 homes. Some of the residential wells sampled contained organic contaminants (vinyl chloride and chloroethane) which are attributable to the landfill and inorganic contaminants (barium, copper, cadmium, and nickel) above background levels, also attributable to the landfill. In March 1987, U.S. EPA found levels of vinyl chloride and barium exceeding federal drinking water standards in approximately ten residential wells near the landfill."

Contamination was also found in samples from shallow monitoring wells onsite near the site borders at "levels which exceed standards the observed levels of vinyl chloride [2 to 7 parts per billion (ppb)] in 3 of the 51 wells sampled are equal to or exceed the Safe Drinking Water Act Maximum Contaminant Level (MCL) of 2 ppb ..."

A risk assessment found risks greater than 1 in 1 million excess lifetime cancer risk.

HRS scores.—groundwater 88.46; surface water 0.00; air 0.00; total 51.13.

Removal actions.-EPA performed interim emergency actions to protect residents in the short term. The Superfund Comprehensive Accomplishments Plan (SCAP) showed **that** work started on **12/2/85 at a cost of $973,000.** The ROD contained no summary description of exactly what was done, but there were indications of several actions, including air stripper treatment for contaminated groundwater, methane venting, and some evacuation of houses. "While the air strippers effectively deal with vinyl chloride contamination, they will not remove other hazardous substances, such as heavy metals and semi-volatile organics, which threaten to migrate from the IEL site. . . . the Agency determined to go forward with a permanent alternative water supply, rather than continuing to proceed on a piecemeal basis with air strippers, whose long-term liability to protect public health cannot be guaranteed."

Cleanup remedy selected.–''Provide alternate water to an area comprised of approximately 100 homes . . " The **cost was** estimated to be around $2 million.

"The primary objective . . . is to protect human health by providing a reliable supply of safe, potable water to residents whose groundwater is currently contaminated or has the potential for being contaminated by IEL before the site itself is remediated. If unchecked, contamination will continue to migrate westward, affecting the groundwater of approximately 100 homes in a 15 year time period. U.S. EPA expects to implement a remedy for the IEL site before contaminants can migrate beyond this projected area."

Satisfaction of SARA statutory requirements:

I) Selection of permanent cleanup.—Because of its goal to provide alternative water as an interim measure, this ROD did not examine or select treatment technologies. "A permanent remedy at IEL will almost certainly involve some sort of groundwater treatment to reduce the level of contamination."

To support the plan to provide new water for homes not yet contaminated, the ROD correctly stated that " . . . groundwater flow and contaminant migration predictions are not exact sciences, and that predictions concerning the timing and effectiveness of remedial action are not always fulfilled ., . "

But why wasn't anything done to stop the movement of the contaminated groundwater? Beyond actual source control or treatment and groundwater treatment, several interim measures would have been consistent with a final, permanent remedy. Examples include: 1) vacuum extraction and destruction of volatile organic chemicals from the site, 2) testing for and excavation of hot spots of contamination, 3) installation of a containment wall or barrier, 4) plume stabilization pumping, and 5) placement of a more impermeable cap or cover. Land use restrictions could also have been considered. Such actions might well have been taken earlier; the site has contaminated local water supplies since it was closed by court order in 1980. The site's HRS groundwater score, determined in 1984, is exceptionally high.

The ROD granted that "The statutory preference for treatment is not satisfied because this action constitutes an operable unit for the overall site remedy. Treatment alternatives for the overall site will be addressed in the comprehensive RI/FS documents."

z) ***Accurate assessment of land disposal and containment alternatives.—The*** ROD did not consider these types of alternatives, except that a de facto no action on the buried wastes meant that the original land disposal remained in effect.

RIFS contractor.—Camp Dresser and McKee; about $1 million obligated.

State **concurrence.**—The State of Ohio concurred with the selected remedy.

Community acceptance.—It was the community that called on government officials to take serious action in the first place. For this ROD, intense community concerns focused on getting new water for more houses and on identifying the exact source of the water.

A local newspaper, the Akron Beacon Journal, November 15, 1987, reported: "Recently the EPA agreed to connect 110 homes in Uniontown to a new water supply when 1,500 were in possible danger. Fortunately, Gov. Celeste saw no reason to threaten the rest and agreed to spend state money to build a new water system for all the homes. Gov. Celeste rightly saw that any error should be on the side of safety. The federal EPA's approach seems to be the opposite. A telling example was the release of documents showing the air tests had been bungled. The documents became public only after citizens invoked the federal freedom of information law to obtain them. Information about mistakes in the air tests had been know to the EPA since Oct. 21. A responsible EPA would have informed the public immediately. "

Special comments.–Any ROD signed on 9/30/87, the end of the Federal fiscal year, may have been a rush job; the ROD for IEL may have suffered accordingly. It contained an incomplete summary of the administrative record, and it did not decide on the actual alternate water source, a contentious issue locally. EPA was responding to community concerns by deferring the water decision.

In the responsiveness summary, EPA made a very interesting statement on cost-effectiveness: "U.S. EPA is required to select the less expensive alternative, given that effectiveness and ***implementability*** are equal" (emphasis added). Adding some factor other than effectiveness is new. It could, however, ***act*** against selecting newer cleanup technologies, which usually have not been used on a large scale.

The argument for not relying on air strippers was technically sound in view of the chemical complexity of the site contaminants.

General conclusions.—It probably will be closer to 20 years than 13 between the time the IEL site was closed and the time some form of source control and groundwater treatment is applied to the site. Is EPA correct that the selected interim remedy "is fully consistent with a permanent remedy?" Although the ROD referred to aquifer restoration, it does not mention removal of the source of contamination. While providing alternate water does not stand in the way of a permanent remedy, neither does it do anything to make the permanent cleanup easier, Indeed, this ROD acknowledged that the groundwater contamination ***will*** get worse. Thus, because additional interim measures would stop or slow down the migration and help to alleviate the source of the problem, this interim measure is not fully consistent with an ultimate permanent remedy.

The assertion that it will take 5 years to design and implement an aquifer restoration remedy was probably too optimistic and is not likely to build community confidence. Experience at similar sites suggests that groundwater cleanup can take considerably longer. For example, at the Seymour Recycling site in Indiana the groundwater treatment was estimated