



PHOTOGRAPHY BY MARK HOBSON

It's not a **pretty** subject, but it's **not** going to go away. Whether Pittsburgh is going to **continue** to burn its sludge (that's sewage, folks) or begin to **recycle** it is the question that Alcosan **must** answer in the next two months. Join us **now** (hip boots are optional) as we **journey** behind the lines in the

# BATTLE OF THE SLUDGE

By Harry Kloman



## THE DILEMMA

**T**here's something in the air over Brighton Heights, and it isn't the cool refreshing mist of the Ohio River. It's the foul smell of teeming sewage, and it comes from the 50-acre plant on Preble Avenue owned and operated by the Allegheny County Sanitary Authority. Each day the plant treats 600 wet tons of everything you flush down your toilets and pour down your drains. Out of sight, out of mind—except for the people who live near the plant. Then, when Alcosan finishes treating your sewage, it has to get rid of it. So the authority sends half of it directly to a landfill in Findlay Township—not in your backyard—and the other half to an incinerator, where it burns to an ash and, in the process, pumps legally acceptable limits

of particulates and gases out of the smokestack and into the air. Your air.

Two years ago, Alcosan's administration and board of directors began to fall like dominoes amidst allegations of job-selling, abuse of expense accounts and indifference to the problems of its neighbors. The purge led to the board chairmanship of Ira Weiss, a Pittsburgh attorney who bluntly says that Alcosan can and will clear the air. Weiss, along with new Executive Director William Trefz, are particularly sensitive to comments that ally current Alcosan leadership with its troubled past. In March, Alcosan signed a consent decree with the county that details the steps the authority will take during the next few years to install new odor controls and to monitor odors at the plant. It's a big change from the leadership of the past, which Weiss says "was basically designed to fend off solutions as long as could be done."

But there's something else. Something big. By year's end, Alcosan plans to make a multi-million-dollar decision about how to dispose of its treated sewage, choosing between some shiny new technology and the reliable old combination of incinerators and landfills. Alcosan's five board members sit poised—at the power and the mercy of the experts—as they near their own end-of-December deadline on deciding how to take county sewage disposal well into the next century. Will Alcosan embrace any of a number of high-tech "green" proposals to convert its treated sewage into fertilizer for farms and gardens or a nutrient to enrich the tattered land of abandoned strip mines? Or will it reject the new technology and build two more incinerators that turn sludge into ash for burial in landfills and continue to pump even more soot and smoke into Pittsburgh's clearing skies?

**T**ough questions, indeed, as dumping costs soar, as landfills drop like the flies that infest them, and as the federal government toys with a proposal that could add literally dozens of regulations to any sludge disposal process. It's a high-stakes decision, both financially and environmentally, on a subject that isn't pretty to think about, and the players are a mixed lot of scientists, politicians, administrators and business people. Two of the alternatives would make fertilizer pellets from Pittsburgh sludge; one wants to make a nutritious landfill cover; and one wants to use it to enrich and reclaim an area strip mine. Still, the decision comes down to a clear choice: We can continue to burn our sludge, or we can recycle it.

Some things are certain:

—More than 1000 Pennsylvania landfills have closed since 1970, leaving only 70 to 75 currently taking household garbage and treated sewage both from Pennsylvania and from neighboring states, which have even fewer active landfills. Not all of these Pennsylvania landfills have permits to take sewage, and the

state has no sites which can take sewage alone. Alcosan also has no control over a landfill's compliance with state regulations. So if a landfill closes upon orders from the state, Alcosan could find itself without a place to dump its sludge and incinerator ash, the end products of sewage treatment.

—Alcosan's cost of dumping a "yard" (equal to 1800 pounds) of sludge or ash into a landfill—called, much too elegantly, a "tipping fee"—has risen from \$2.50 five years ago to \$4 in-between to the current \$8, with further hikes guaranteed. That doesn't include the per-yard taxes totaling \$4.30 and levied by the state, by West Allegheny School District and by Findlay Township, where the mammoth Browning-Ferris Industries, the nation's second largest landfill operator, takes most of Alcosan's sludge and ash.

—In Wisconsin, the Milwaukee Sewerage

the mandate.

Though EPA calls incineration and landfilling "costly, wasteful practices that provide minimal environmental benefit," the agency's proposed regulations for sludge fertilizer worry some people. EPA says it merely wants to insure safe land-application use of sludge and claims to have proposed "extremely stringent" rules for incineration. Peter Ruffier, an official of the national Association of Metropolitan Sewerage Agencies, says 503, as currently proposed, would make burning sludge less restrictive than reusing sludge products and, therefore, more attractive to municipal authorities. "Given EPA's own assessment that existing practices [of reusing sludge] don't pose a threat," Ruffier says, "there's no need for the extensive stringent regulations they're proposing."

But the distant thunder of EPA regulations

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Commission has turned its sludge into the fertilizer Milorganite since 1926 and sold it to a hungry marketplace. During the past decade, more than a dozen municipal sewer authorities have, at last, followed Milwaukee's fertile lead and adopted similar technology, including the besieged Boston and its sewage-ridden harbor.

Meanwhile, the U.S. Environmental Protection Agency (EPA) has said it will issue its final "Section 503" guidelines, now under revision, by 1991. The rules will state the number and quantity of pollutants that can legally spew from the stack of a sludge incinerator. The proposed guidelines took some harsh criticism before the Aug. 7 deadline for public comment arrived, and EPA officials admit that agencies like Alcosan face confounding uncertainties as they prepare to invest in new incinerators. Sludge-to-fertilizer processes also face a challenge: 503 currently calls for raising the number of monitored elements in sludge-based fertilizer from four to 25. Again, no one knows how much purity EPA will finally mandate in sludge fertilizer or incineration—or when it will issue

faded in March when Alcosan signed an accord with the county health department, agreeing to build two new sludge-burning furnaces by 1992 and to install a \$3 million system to control odors in its dewatering chamber, the foulest-smelling process in Alcosan's malodorous system. The rigorous consent decree says Alcosan must pay \$750 a day to the county's Clean Air Fund if it fails to meet any of the order's deadlines, which include: by November 30, 1989, begin to install an odor control system for the dewatering building, and complete the system by July 31, 1990; by December 31, 1991, complete installation of a new sludge incinerator; and by December 31, 1992, complete installation of a second new incinerator. The order also sets deadlines for building and operating a system to monitor odors at all parts of the Alcosan plant. To meet its deadlines, Alcosan has hired an engineering firm, at a cost of up to \$200,000, to design two new incinerators and estimate the cost of operating them; once designed, Alcosan will seek bids to construct them, with the contract

going to the lowest reliable bidder.

This, however, is only one option. At the same time, Alcosan has accepted proposals from four companies offering alternatives to incineration. Weiss and Trefz both say the authority will decide by the end of the year whether to accept a new technology or to reject the alternatives and seek bids to build the new incinerators. Formal action will come no later than the board's January 16 public meeting.

### THE "GREEN" ALTERNATIVES

**ENVIRO-GRO TECHNOLOGIES**—"Working for Philadelphia and Boston"

Ken McFall is a businessman who sounds like an environmentalist. In the past year, he has come to know the city and its sanitary authority well. McFall owns and operates Rensa International of Tomkins Cove, N.Y., a consulting firm hired to represent Enviro-Gro Technologies (EGT), a Baltimore company that turns sludge into commercial fertilizer pellets. "Alcosan has a tremendous opportunity right now that I hope they don't let slip through their fingers," says McFall. "If they do, it won't come again for 25 years, and in the meantime you'll have the consequences of not doing it." Those consequences include paying increasingly high landfill dumping fees coupled with the uncertainty of whether the state or the country will have enough landfill space available into the next century. "Landfills don't mark up their prices by inflation," he says. "Their costs keep going up by multiples of inflation. They've got everyone by the short hairs."

But EGT hasn't proposed a system to make commercial fertilizer pellets from Alcosan sludge despite initial and extensive research in that direction. A few weeks before Alcosan's August 15 deadline for proposals, EGT agronomist Robert Pepperman made a key judgment call: He decided that Alcosan's sludge had too low an organic nitrogen content to make it marketable as a fertilizer. Instead, EGT wants to take lime-treated cake sludge from Alcosan and use it to enrich and reclaim a 3800-acre strip mine owned by Aloe Mining of Pittsburgh and located near Greater Pitt airport.

Pepperman proposed a mine reclamation plan for Alcosan because the authority already adds lime to the non-incinerated cake sludge it sends directly to a landfill. The additive gives the sludge a 30 percent calcium carbonate content, which makes it a good nutrient to grow grass, millet or other "cover crops" at the Aloe strip mine.

Alcosan would give EGT enough sludge every day to cover about one acre of land, according to Pepperman. The Aloe site reclamation would take EGT through the 10-year period Alcosan established in its request for proposals, and during that time, Pepperman says EGT would continue to seek new markets to sell more sludge. EGT currently takes about

40,000 tons of sludge annually from Philadelphia for mine reclamation work in Western Pennsylvania and other locations, so Pepperman thinks he'll have no trouble getting the required state permits to reclaim the Aloe mine. In addition, EGT will buy consulting and hauling services from two area minority firms: the woman-owned En-Com Consulting, and the minority-owned Edmonds Trucking. Alcosan had requested proposals which included minority participation in subcontracts.

EGT had once hoped to convince Alcosan to sell its sludge to an EGT fertilizer pellet plant that would serve not only Alcosan but communities throughout the region. Now, the company wants to build a pelletizing plant in Monessen as a private enterprise venture in contract with other regional waste water treatment authorities. "There are literally

will operate it and market its product.

**SLUDGE MANAGEMENT INC.**—"The Seattle Solution"

From his newly invigorated company in Seattle, Bart T. Lynam bluntly but respectfully disagrees with EGT's Pepperman on the fertilizer value of Pittsburgh sludge. Lynam says H.J. Baker and Bro, one of the nation's largest fertilizer companies, has shown interest in marketing pellets made from Pittsburgh sludge by Lynam's Sludge Management Inc. (SMI). And Baker may not have to wait for Pittsburgh to get sludge fertilizer pellets: On August 17, five years of salesmanship came to fruition for Lynam when Seattle City Council accepted SMI's process for its Metro sewage treatment facility. SMI will provide the technical expertise and create the facility in partnership with a division of Riedel International, which will construct and finance the venture.

Metro Seattle will become the first pelletization facility operated by the 7-year-old SMI, but Lynam is a big-city veteran of sludge-to-fertilizer technology. From 1959 to 1978, he worked for Chicago's municipal sewer authority, the last six of those years as general supervisor of a Chicago treatment plant which the Guinness Book of World Records calls the largest in the world. According to Lynam, Chicago turned its sludge into fertilizer from 1939 to 1970, when it decided to adopt a new process of turning sludge into

nutrients for farms and landfills. Lynam left Chicago after 19 years and has since been a construction company executive in Seattle. For three months ending in November, Riedel/SMI has operated a pilot program of its sludge treatment system to allow Metro Seattle to test the procedure at 11 different checkpoints. All tests are being done by Metro Seattle, and once SMI makes the grade, it will begin to construct its facility in stages, gearing up to pelletize all of Seattle sludge by the mid-1990s. Currently, Seattle uses its sludge in agriculture and as a soil amendment for trees.

In the Riedel/SMI process proposed for Alcosan, dewatered cake sludge goes into a drier which takes the cake from about 88 percent water to 40 percent water. The cake then

What Other Cities Are Doing

City and population in millions	Incinerate and Landfill	Land Application	Landfill Cover	Fertilizer	Other
NYC (7 million)					✓+
LA (2.9)	✓	✓			
CHICAGO (3)		✓	✓		
HOUSTON (1.5)				✓	
DETROIT (1.2)	✓				
SAN FRANCISCO (.678)		✓			
PHILADELPHIA (1.2)		✓			
CLEVELAND (.574)	✓				
DENVER (.492)		✓			
BOSTON (.502)					✓#
BALTIMORE (.774)	✓	✓			
MILWAUKEE (.636)				✓	
SEATTLE (.493)		✓		✓	

+ CURRENTLY OCEAN DUMPING—SEEKING ALTERNATIVES  
# CURRENTLY OCEAN DUMPING—JUST ADOPTED PELLETIZATION  
SOURCE: EPA AND AMSA

dozens upon dozens of waste water treatment plants that have no long-term sludge disposal options," McFall says. EGT's market research has found 29 sewer authorities outside of Alcosan's current service area that say they want to join a regional facility and send their sludge to an EGT plant, whether privately or municipally owned. According to McFall, none of these smaller communities can afford to construct an EGT plant on its own.

By 1991, EGT will go on-line with the biggest and most lucrative facility in its seven-year history: a plant that will stop the dumping of sludge into the filthy Boston Harbor and turn Boston's 145 dry tons of daily sludge into fertilizer. Though Massachusetts Water Resource Authority will own the plant, EGT

enters an indirect rotary steam drier — indirect because the steam heats disks in the drier and never comes in contact with the sludge. In this drier, the natural bumping of sludge against sludge causes it to form pellets. A double-deck screen allows properly sized pellets, now a negligible 5 percent liquid, to enter a storage tank to await shipment; particles that are too large or too small go back into the drier system to collide with fresh cake sludge and enhance the initial drying process.

As the drier pumps out pellets, four separate units in the system's complicated odor-control system will cleanse the dusty, smelly vapor created in the pellet-making chamber. This almost-obsessive concern with odor control distinguishes Riedel/SMI's Pittsburgh proposal. "I'm extremely sensitive to the odor problem," Lynam says. "There's a lot of money in our bid to control odors. We're really going to extra precautionary measures to make sure we have nothing going into the atmosphere." Lynam says he would build his facility on a one-acre plot of land, adjacent to Alcosan's dewatering building, which the authority has offered to prospective bidders.

Pepperman says the 3 percent organic nitrogen content of Pittsburgh sludge makes it only marginally marketable as a fertilizer; Lynam says that if all the sludge produced every day in the U.S. — 7.6 million dry tons, says EPA — became fertilizer pellets, it would make up less than 1 percent of the nation's total fertilizer needs. His point: even pellets with a 5 or 6 percent organic nitrogen content — like the rich product made in Milwaukee — would be a mere supplement to a myriad of other fertilizer products. Natural organic nitrogen is a valuable element in fertilizer because it stays in the soil and nourishes a crop in a sort of time-released way; inorganic nitrogen dissolves in water and, before long, washes away. Synthetic organic nitrogen is expensive; natural organic nitrogen is cheap and abundant in fertilizer made from human waste.

#### ENVIRONMENTAL DISPOSAL SYSTEMS — "Another Fertilizer Option"

The Virginia-based Environmental Disposal Systems (EDS) has also proposed making fertilizer pellets from Alcosan sludge at a facility it would build on Alcosan property, according to William Messer, a geologist and engineer who serves as EDS's project manager. But though it offers a system much like Lynam's, EDS currently has neither a municipal facility in operation nor a contract to build one. Formed in 1986, EDS is wholly owned by Rapocah Coal Co. of Richmond, Virginia. According to Messer, EDS has submitted or will submit proposals to turn New York City sludge into fertilizer and Richmond sludge into a product suitable for land application.

EDS's proposal to Alcosan uses gas-fired rotary drum driers to form its pellets and a two-

stage system to scrub and purify the air stream that comes from the drier. The system is strikingly similar to SMI's, except that the steam heat used to dry the sludge and form the pellets in the EDS system comes in contact with the sludge in the drier, while in SMI's system it does not. Messer says EDS put together its sludge-to-pellet system after looking over other systems and adapting what it found to be their best features. Like Pepperman, Messer says marketing Alcosan's low-nitrogen sludge is a judgment call, and though "it may not get top dollar [as a] top-grade, class-one fertilizer," he says EDS can market it as a soil enhancer to farmers, growers and wholesalers. An EDS system would not have screens to control particle size because its product would be sold in bulk. Messer says screens could easily be added if EDS decides to market its fertilizer in smaller commercial

place once landfill matter is covered, according to Tracy Faulkner, an environmental biologist and project development manager for Chemfix. The company would build its local plant in partnership with a consulting division of Air and Water Technologies Inc.

Alcosan, with its 600 cake tons of sludge a day, would be Chemfix's biggest client if the company gets the local contract. Chemfix now takes 450 cake tons a day from Los Angeles — about one-third of the daily output there — and uses it as daily landfill cover in Ventura, California. The company has three smaller facilities in Massachusetts: since 1984, in Salem, where it takes all of the city's 2000 cake tons a month; and since 1988, in Lawrence and Springfield, which create a combined total of 300 cake tons a day. Faulkner says Chemfix sells its Naturite to Ventura and only makes "pennies" from its

sale; at its other plants, the company gives the product away to landfill operators and makes its money from contracts with authorities like Alcosan, which would pay Chemfix or its competitors to take and treat its sludge. Chemfix has used its process in industrial settings since the early 1970s, Faulkner says.

Chemfix also began making Naturite last year from 150 wet tons of sludge a day at a three-county plant in Philipsburg, New Jersey, and sending the New Jersey product to a landfill in Bethlehem, Pennsylvania, as an intermediate cover — that is, a cover on top of a full landfill, but not the final cap on the site.

Of course, the company had to receive approval from the state's Department of Environmental Resources to use its product in Pennsylvania. Faulkner says Chemfix has never sought permits to use Naturite as a landfill cap, only as daily and intermediate cover.

The Alternatives			
Company	110 dry tons/day 10-yr. contract	110 dry tons/day 20-yr. contract	Proposed Method to Determine Price Hikes
ALCOSAN (landfilling and incineration)	\$140+	—	No hikes for two years; annual reviews thereafter; documentation of operating cost increases required
ENVIRO-GRO Technologies	\$176	—***	No hikes for one year; semi-annual reviews thereafter; hikes linked to national consumer and producer price indexes
ENVIRONMENTAL DISPOSAL SYSTEMS	\$183	—***	No exceptions to Alcosan method
SLUDGE MANAGEMENT/ RIEDEL	\$208	\$182	Essentially no exceptions to Alcosan method; named four specific factors to use in determining higher operating costs: insurance, energy, taxes and loan interest rates
CHEMFIX TECHNOLOGIES	\$290	—***	No hike for one year; link hikes to national prices indexes and its own higher operating costs
*** PROPOSAL OFFERS NO FIGURE + CURRENT ESTIMATE. NO GUARANTEED PRICE INCREASE MECHANISM FROM LANDFILL OPERATORS. DOES NOT INCLUDE COST OF BUILDING TWO NEW INCINERATORS.			

quantities, where uniform particle size is important.

#### CHEMFIX TECHNOLOGIES INC. — "Taking a Third of Los Angeles' Waste"

Finally, there's Chemfix Technologies Inc., a Louisiana company that has proposed to turn Alcosan cake sludge into Naturite, the product it markets as daily and intermediate cover for active landfills. Chemfix's patented process adds a dry calcium-based substance and a liquid soluble silicate to create a clay-like material which can substitute for the more expensive soils placed every day on landfills. The Chemfix product is a better daily landfill cover than soil because it's less permeable and, therefore, minimizes the erosion that takes

#### THE DECISION

There is fear among the "green" alternative companies that Alcosan has already made up its mind to incinerate Pittsburgh's sludge. Ken McFall says Alcosan decided to examine alternatives to incineration only after he made an August 1988 presentation on EGT pelletizing; Trefz says that over the last few years, he and other Alcosan professionals had seen new technologies worth considering. When the

August 15 deadline for proposals passed, only three of 11 companies that had originally expressed interest submitted plans, with one other company, EDS, joining the fight. The companies that passed on Alcosan did so for a variety of reasons, but one reason kept resurfacing.

"Alcosan is not really interested in receiving proposals," says Mike Tagneri of Ad+ Soil, one of the initial 11. He says Alcosan will use alternative proposals to "do nothing but justify incineration," and he points to the authority's contract to design new incinerators as evidence of its true agenda. "Alcosan is convinced in its own mind that there is only one way, and that's incineration," echoes Patrick Nicholson, who invented a pelletizing process which he markets through his N-Viro Technologies Inc. And though PPG in Pittsburgh decided it had enough sludge from other sources for a key land reclamation program, Steve Webber says he thinks Alcosan has "pretty well made up their mind" to stick with incineration. He says it's "going to take some very big players" to convince the authority to accept a new technology.

**A**lcosan's detractors probably haven't talked with Ira Weiss, the Pittsburgh attorney who chairs the authority's board of directors. "I for one do not send staff on fools' errands," he says in his naturally gruff but unruffled voice. "If you don't intend to do something, you might as well not look at it. We're not going to put our engineers through a lot of hoops for no reason. This is not sophistry, not window dressing." He says the authority decided to spend \$200,000 on incinerator design because of the looming consent decree and because "it's not a lot of money when you compare it to the cost of not doing anything, which is sanction of the [county] health department for one thing."

He also recites, without much prodding, the litany of landfill dilemmas, such as "the well-known problem that society is running out of places to dump its waste," which makes costs soar and begins "geographical battles" over landfill space. Chambers Development, which hauls city garbage to a Monroeville landfill, also takes garbage, at a hefty price, from trash-ridden New Jersey—and this at a time when Pennsylvania's few remaining landfills grow fuller and fuller. Says Weiss: "What you have is a classic lesson in economics. You have a resource that's in limited supply and expanding demand for it, so obviously the price is going to go up. We don't want to be in a position of being at the mercy of landfill operators, some of whom may have no sympathy for the fact that we're operating a vital facility. When you take all that together, it makes a lot of sense to see if the technology is catching up with some of the problems."

**I**t's a powerful argument, but will three of five Alcosan board members, including Weiss

himself, go for it when they examine the four proposals in detail? Many of the nation's biggest cities, as well as cities comparable in size to Pittsburgh, turn their sludge into a beneficial, or "regenerative" product (see chart A, Page 68), though slightly more than half still burn their sludge and only about 25 percent reuse it. Will Alcosan's board embrace technology which, though not really "new," is nonetheless new to Pittsburgh and, in some cases, to the companies offering to do it locally? Choosing a new technology also leaves Alcosan at the mercy of the marketplace. What happens, for example, if a private contractor goes out of business or can't market its product? Alcosan must weigh this possibility against the knowledge that landfills are closing at a rapid rate amidst soaring costs and increasing competition to use them. Each of the four proposals is two or three inches thick with documentation, and Alcosan's final decision certainly will come down to a series of judgment calls. So consider these key circumstances:

■ Though EGT has a track record in pellet-making, it hasn't proposed the process locally.

■ SMI's Lynam has experience in sludge-to-fertilizer processes from Chicago, but SMI only won its first contract three months ago in Seattle.

■ Until 1984, the young, now-successful EGT had never owned or operated a pelletizing plant. SMI formed in 1982, EDS in 1986.

■ Chemfix and EGT currently have approval to use their end products at sites in Pennsylvania.

■ Neither of the two companies offering to make fertilizer pellets operates a full-scale plant, though Riedel/SMI has the Seattle Metro contract. But Lynam says of pelletizing, "This is not a nuclear reactor. It's very simple. We put the sludge in a drier and it tumbles around and comes out. It's not very exciting."

■ EGT has not proposed a process. It will merely remove Alcosan's lime-treated sludge to a strip mine for reclamation, which Alcosan could do itself if it hired a trucking service and signed a contract with a mine owner. In fact, Alcosan now sells a small amount of its lime-treated sludge for land application and as landfill cover.

And so on, with one big uncertainty hanging over any consideration: What will the EPA mandate for incineration, landfilling, pelletizing or mine reclamation when it finally revises and adopts its 503 regulations? Alcosan's four bidders say their products and processes can meet the strictest state or federal standards. With his characteristic blunt confidence, Lynam says, "If a heat-dried pellet which is pathogen-free cannot be used, then nothing can be used."

Between now and the end of the year, Alcosan will put itself and the four bidders through the rigors of its decision-making process. The

authority will first decide whether each proposal is environmentally sound and whether each bidding company is economically secure. Any company that fails these two tests immediately falls from consideration; the ones that pass will win interviews with Alcosan and, perhaps, an Alcosan visit to their plants currently in operation. Then, officials will compare the survivors' proposed fees with the estimated future cost of burning and landfilling.

Alcosan itself will have to pay to build new incinerators, while any hardware that goes with an alternative method will be built and financed by the company that proposed it. Each company has offered a per-ton price to Alcosan for taking its sludge and disposing of it for at least the next 10 years (see chart, Page 69). Then, Alcosan will factor in company experience, process reliability and the environmental strengths or weaknesses of each method. The Alcosan board will have to decide whether it wants to risk paying more money for a system that recycles sludge at guaranteed prices or one that burns it and then sends it to landfills that charge ever-rising fees. It's a decision of green fields versus greenbacks.

Of course, the companies' price offers include capital recovery—that is, some money to get back the cost of building its facility. The prices could also increase if Alcosan agrees to various exceptions raised by the companies to Alcosan's request for proposals. But the bids also promise, as Alcosan requested, to link rate hikes to an agreed-upon formula that specifically forbids the companies to pass on the cost of higher managerial salaries to Alcosan. Against Alcosan's wishes, some of the companies have linked price hikes to national price indexes. Michael Flamang, Alcosan's chief engineer, says the authority has been trying to avoid such links, which would not reflect specific operating cost increases of a local facility. Still, the authority has no price-control promises at all from its landfill contractors at a time when tipping fees far exceed inflation.

Alcosan's board of directors took a first look at the four alternatives at its well-orchestrated September 26 public meeting. The board depends heavily on its professional staff, but before approving a bevy of contracts recommended by Trefz and Flamang—including almost \$600,000 for phase one of the dewatering building odor control system—board members also perused a piece of paper that briefly outlined the four plans. On October 4, they met with representatives of the four companies, which also described their technologies to the press and public at an October 5 session arranged by the authority. Weiss admits that he and other board members will be much more personally involved in researching the four proposals than they are regarding more routine Alcosan business.

"This is probably the most significant, long-term issue the board will be confronted with in a long time," Weiss says. "We have made it very clear to the staff that we don't want a self-fulfilling prophecy here. In no way is this a pre-ordained decision. I for one, and I think I speak for the board, am not married to the incineration system, and anyone who tells you that is just making an excuse for not getting involved."

While the board members do their homework, Trefz and others will analyze every word of every exception the four companies took with Alcosan's request for proposals. Some of the companies want the cake sludge

delivered to their proposed facilities by Alcosan, and some will pick it up themselves from Alcosan. One wants lime-treated sludge, the others don't. If Alcosan's lawyers can live with the exceptions, then the staff will decide how much more each plan will cost the authority per dry ton of sludge beyond the bid price. At the same time, the staff will firm up the estimated cost of building two new incinerators and guess at the next decade's landfill cost increases to determine the long-term cost of incineration.

The factors that will go into picking an alternative system over the comfort of incineration seem almost endless. In the final moments,

then, it will come down to a judgment call on the part of Alcosan's five board members—a weighing of many factors, a sense of what's right future. One of the five, City Councilman agner, says he and his colleagues will have to consider the cost and the reliability of the alternatives, but they won't be afraid to chart an affordable new course. "I think Alcosan, when it was created, ventured into the unknown with a new technology to make sure raw sewage was not dumped into our rivers," he says. "I know Alcosan is very receptive to new ideas, but we cannot expend large sums of money for new ideas unless they are proven ideas. We have a responsibility to our ratepayers." □

**I**n addition to the city of Pittsburgh, all or part of 77 other county municipalities send their sewage and waste water to Alcosan's 50-acre treatment plant, located on Preble Avenue along the Ohio River about one mile from the Point. Alcosan treats every substance that people pour down drains or flush down toilets in their homes and businesses. When a substance leaves its source, it enters underground sewage pipes that use some pumps but mostly gravity to push it along to the Preble Avenue plant. It enters the plant at 110 feet below the ground; then, pumps lift it into the plant's circulation system, where gravity again helps to move it. Each day, 180 million gallons of waste—most of it liquid—enter the facility. Large solids are removed during the first two steps of the process, called the "rack room" and the "grit chamber." In the grit chamber, a crane operator, suspended above the square pool, scoops out heavy solids that settle. Alcosan then begins "primary treatment" of sewage. In long rectangular tanks, air is initially pumped into the brownish liquid to keep odor-releasing anaerobic ("without oxygen") bacteria from forming. When the air is removed, inorganic and some organic solids settle in the tank. Solids that settle in primary go on to the disposal steps of the process; liquids from primary go on for further treatment.

Until 1973, Alcosan's treatment of sewage ended at the primary tanks. But under a state order for all Pennsylvania sewage treatment plants, Alcosan began using "secondary treatment" in 1973. After primary treatment, the remaining liquid sewage now goes into another set of long rectangular tanks that pump massive

amounts of air into the mix. The air allows aerobic bacteria—which occur naturally in human waste—to thrive and feed on organic material in the sewage. As the process continues, the hungry bacteria grow fat and settle to the bottom of the tank. This is called "activated sludge" and is a thick, soupy substance. Air is then removed from the mix to make the bacteria sluggish. Some of the fattened bacteria stay in secondary treatment to reactivate the system—in effect, going back to the start to be fed more oxygen. But most of the activated sludge goes back into the primary tank, where it settles with other primary solids and then gets conveyed to the disposal process. The water that remains after secondary is treated with chlorine in a separate chamber and discharged into the Ohio River at a rate of about 175 million gallons a day.

Next, the activated sludge goes on to "dewatering," where liquid is first dripped out and then pressed out. The dewatering process turns activated sludge into 600 daily tons of "cake" made up of about 23 percent solid matter; the liquid squeezed out during dewatering goes back into the plant, and is mixed with incoming sewage for retreatment.

Finally, Alcosan is ready to dispose of its cake solid. Half of it goes to the incinerator, which kills remaining bacteria and turns the cake into ash, reducing its volume by 75 percent. The ash then goes to a landfill. The other half is treated with lime and goes to a landfill as cake solid. In addition, a small amount of the lime-treated cake solid is sold for land application or landfill cover.

### SUMMARY CHART for Alcosan's current and proposed methods of disposal.

