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City of San Diego

The
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Waste Age

San Diego's Miramar Landfill
Environmentally Mindful

Financial Update, Part Two

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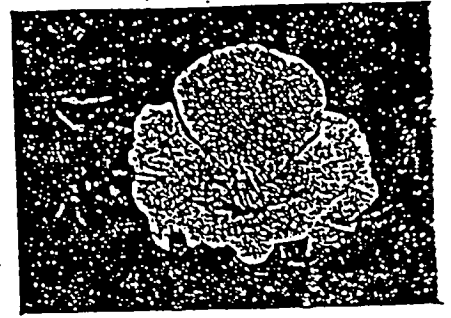
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A FULL-SCALE
WASTE MANAGEMENT—AND
ENVIRONMENTAL—EFFORT



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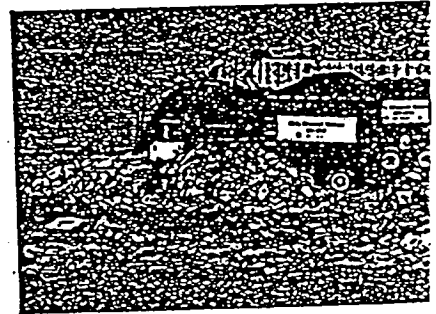
San Diego's famous zoo isn't the only place in the city where natural vegetation and wildlife prosper—the local landfill is also home to some of the finest environmental sights in the city.

Walking along the San Clemente Canyon in San Diego, you can see a variety of interesting flora and fauna. Endangered wetlands and vegetation dot the landscape; you might see a standing-water vernal pool, or a rare barrel cactus along the trail. You could see a rabbit, deer, quail, or even a lizard. You might be surprised to find out, however, that you are walking through the Miramar landfill—where most of the city's wastes are disposed every day.

With progressive city leadership that starts at the top level, and through aggressive environmental and economic programs, the city has made a crusade of preserving the native species—and the space—in its 1,430-acre landfill. Now, as long as officials can find the funds in a tough economy, the city is about to pull off another feat. San Diego is embarking on a large-scale effort to handle its wastes and preserve its natural habitats; with a series of public-private partnerships that could please local citizens, environmentalists, haulers, contractors, and even the U.S. military.

A department of environmentalists

San Diego generates about 1.45 million tons per year (tpy) of municipal solid waste (MSW), and that number has been growing steadily with the city's population. Most of the city's waste has been landfilled at the huge Miramar facility since 1959. About 15 years ago, the city decided to site a waste-to-energy plant. The facility was in the planning stages for about 10 years, but in 1987, as the environmental movement grew in California, citizens voted to kill the idea. That left San Diego with a landfill that was scheduled to close in 1995, ambitious state recycling goals, and a "green" pub-



BY KATHLEEN MEADE



Through the use of "fire ecology," closed portions of the landfill were revitalized.

lic that wasn't going to give in on waste management.

Until recently, waste collection and disposal was handled by the city's General Services Department. In 1987, the city manager created the City of San Diego Waste Management Department. That department now oversees the landfill operations and refuse collection for 330,000 single-family homes in the city with a fleet of 150 rear- and side-loaders—most of which are Crane Carriers—and 540 employees.

Ask any city waste management employee what makes the department work, and each one will likely tell you the same name—Richard Hays. As director of the young department, Hays has tried to seek out and instill an environmental and economical ethic in all of his employees. He asks workers to view each of the materials at the landfill as commodities, and he expects all employees to be environmentally conscious as well. "[This hiring strategy] has really paid off, because you find people going the extra mile—and it has bought us credibility," Hays says.

One such strategy included hiring an environmentalist as a manager of the Miramar landfill. John Howard, with a background in biology and zoology, has helped fulfill Hays's philosophy of returning the landfill to its original, natural habitat. "We came in and disturbed this area [around the Miramar landfill]," Howard says. "Now we want to restore it to a natural area."

Restoration includes revitalizing closed portions of the landfill with wildlife and plants indigenous to San Clemente Canyon. To do this, however, Howard and his colleagues devised a plan that most environmentalists would scoff at—they burned the canyon.

"Fire ecology," as it is called, is actually a common practice in parts of California. In order for some types of vegetation to reseed in long-barren areas, they must be burned and reapplied to the soil. San Diego, Howard explains, burned controlled fires on 60 acres of natural vegetation from a finger of the canyon, then spread eight to 10 inches of the burned material over closed, barren portions of the landfill with scrapers.

Results from this controlled burning and reseedling are already starting to appear on the old landfill sections, as small bursts of green pop up among the barren soil. Pointing to a shrub only a few inches high, Howard reveals that eventually, that spot of green will be a huge oak tree. The department is doing monthly surveys on the closed area to catalog each plant and track the progress of revegetation; Howard is also following animals such as rabbits that are coming back into the area. "We're going to monitor their regeneration, too," he says. San Diego is even planning to build a biological study facility when the landfill eventually closes.

Other environmentally sensitive items on the landfill include endangered plant species and wetlands, which make the facility seem more like a nature preserve than a disposal site. A series of vernal pools are protected by fencing and close monitoring, Howard says. These pools are home to the environmentally sensitive mesa mint, a plant native to San Diego that the department is working to preserve. The department also preserved some rare barrel cactus plants from San Clemente Canyon.

The barrel cactus is considered a Class II plant, which means it is being considered for the endangered species list. Howard and his colleagues excavated 250 cacti from the canyon before the controlled burn, and replanted them in the closed portion of the landfill. All 250 cacti survived the move, he notes.

Keeping the Navy happy

All these efforts may impress environmentalists, but San Diego has even more important eyes watching the Miramar landfill. The land Miramar is on is owned by the U.S. Navy, which has a major air base—Naval Air Station Miramar—next door; the movie *Top Gun* was filmed there. Naval bases generate one fifth of San Diego's trash, and they receive free disposal at the landfill. Still, as a matter of national security, the Navy keeps a close watch on its neighbor. As a result, San Diego must carefully monitor its disposal methods, truck traffic, leachate—and especially birds.

Bird control is an issue at any landfill, but for a facility that's near the ocean and next to a major Naval air base, bird control has become a matter of national security. A couple of seagulls caught in the engine of a plane could cause a major disaster. So staff environmentalists devised a program to deal with seagulls that has not only kept the birds away, but has also won national recognition as a model for other landfills.

Howard and his colleagues conceived of a plan using bioacoustics to simulate the sounds of distress that a bird makes. By strategically placing seagull models in pre-death positions throughout the landfill, and by broadcasting the sounds of distressed birds, the environmentalists were actually able to trick the birds into staying away from the landfill. The department has shooting rights on the seagulls, but Howard says he has not had to use them. And as part of its on-going environmental efforts, the department continues to monitor the flight patterns of mourning doves around the area and provides that information to the Navy.

As another precaution to minimize bird traffic, the working face on Miramar is kept very small, Howard notes. Trash

is compacted constantly with eight or nine Caterpillars on site. Litter is controlled by county probation workers, who come to pick up stray trash four times a week. Dust is kept to a minimum by watering the landfill roads a few times a day, and an on-site tire shredder, operated by a contractor, keeps tires from popping out of the trash. The department has even built siltation dams to catch excess water and dirt that might run down into the canyon, fill up crevices, and kill the lizards that live there.

Leachate at Miramar is sampled and monitored regularly, but the landfill's clay-type soils act as a natural barrier. "We've never had a leachate problem here," Howard says. "We're very fortunate in that our underground aquifers are very deep, and the trash doesn't get anywhere near the underground aquifers." Methane gas is currently not recovered, he adds, but any gas generated actually belongs to the Navy, which has gas and mineral rights at the landfill.

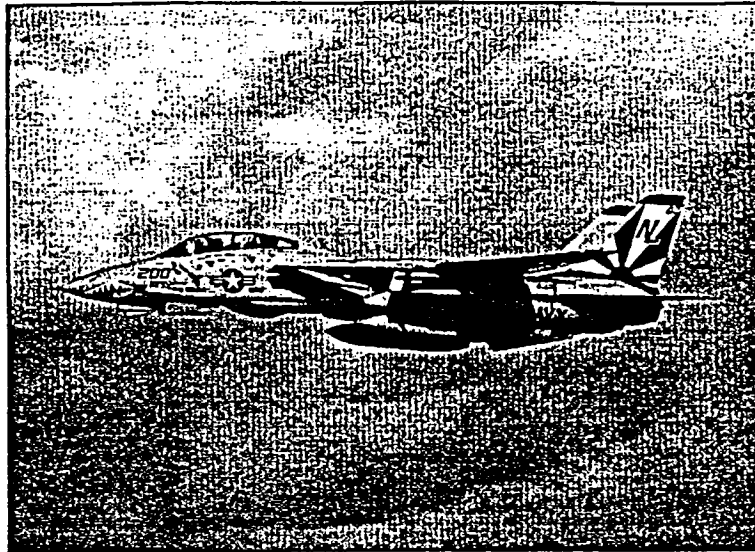


Photo courtesy of Naval Air Station Miramar

The Navy is taking advantage of its mineral rights, however, and is making money from rocks in the landfill. As part of Phase II of the west portion of Miramar landfill, the city needs to excavate 20 million cubic yards of rock material to make room for more trash. The Navy keeps strict height regulations on the facility, so the department has contracted a private contractor to excavate a large amount of rock aggregate and dirt—some two million cubic yards per year. Some dirt is being sold to San Diego County, which is using the material for cover at its own landfill; the rest is used for cover at Miramar. The rocks are being sold as aggregate; the Navy keeps 85% of the money from that material, and the city keeps the rest. "We're commodities brokers at the landfill," waste management director Hays says.

Recycling—when it's economical

Some other efforts at Miramar are making money and saving landfill space. A privately owned buy-back station, the Miramar Recycling Center, is located near the entrance to the landfill on an area leased by the Navy. City operators at the tipping fee booth send commercial haulers with potentially recyclable loads back to the recycling center, and citizens bring

their recyclables in for cash. Common materials such as paper, glass, cans, and plastics are accepted, as well as uncommon recyclables such as old appliances and mattresses. Household hazardous wastes from periodic collection drives are also stored at the landfill, and some are recycled; the department offers a mixture of usable old paint for

graffiti eradication around the city.

Curbside recycling collection is available to about 83,000 single-family homes in San Diego. Participation has not been a problem; in curbside pilot programs, 80-90% of residents will participate. City workers have volunteered to go door-to-door passing out recycling bins and explaining the program,

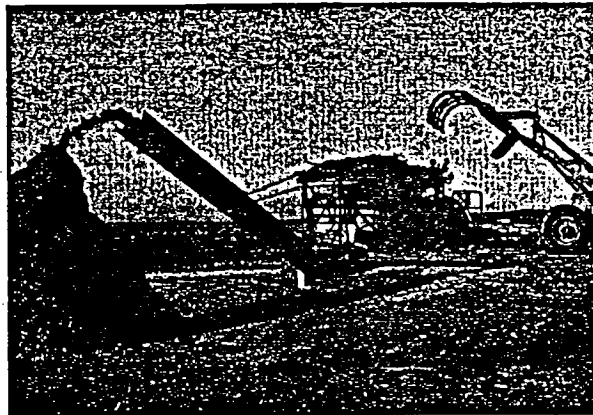
Green All Year Round

San Diego's landfill isn't the only impressive show of green in the city. The waste management department has developed a "greenery" recycling program that includes separate curbside collection of yard wastes and a large on-site mulching operation at the landfill that avoids the time-consuming efforts of composting. By diverting more than 60,000 tons per year of green material, this program should also help the city meet its recycling goals. More than 15% of San Diego's waste stream comes from wood and yard waste, the department estimates.

About 80,000 of San Diego's 330,000 single-family homes now receive curbside collection of greenery material. Residents can put out grass, leaves, brush, and shrub materials in a regular trash container, on the same day as trash collection. The waste management department uses existing city personnel and trucks to collect the material. A city employee conceived the idea of a greenery decal to designate pick-ups; residents affix the sticker to their standard curbside trash containers, then place the containers away from the regular trash with the decal turned toward the street when they have yard wastes to be collected. Those homes alone recycle about 1,200 tons per month of green waste.

That material is taken to the Miramar landfill, where two tub grinders turn it into mulch. After going through the tub grinders, the piles of green material are screened. Fines go to a soil company, and the larger pieces are sold as fuel to a co-generation plant in Mecca, Calif., for about \$7-10 per ton.

Wood wastes, including branches, fence posts, lumber, and old pallets, are also accepted at the greenery recycling area, where they receive a discount on the landfill's tipping fee. Some of the big pieces of



wood can be pulled out before the tub grinder and sold as firewood, according to John Howard, the landfill's environmentalist. "Spotters" also check the incoming material for metals, plastics, and other contaminants, such as palm tree fronds, which contain leaves so fibrous they can damage the grinders.

Christmas trees are also accepted at the greenery facility. Through a cooperative effort with San Diego County and the "I Love a Clean San Diego" group, the city gets residents to pledge to recycle their trees after the holidays. Cut trees are put through the tub grinders, but live trees are often replanted. Across the county, more than 140,000 Christmas trees were recycled last year. San Diego even helped nearby Tijuana, Mexico, start its own Christmas tree recycling drive by sending one of the city's own tub grinders across the border.

Before last year's Christmas tree drive, San Diego ran into a little problem. Although the greenery program had been processing a lot of material, it wasn't selling very well. The landfill actually had about 120,000 tons worth of surplus mulch on the site at the end of the year, and Christmas trees were about to start pouring in—so the city held a Christmas sale of its own.

In what is known as a "salvage sale," the

city often sells such things as equipment "as is," and the buyer takes them off the city's hands. Officials decided they would try to do the same thing with green waste, and it worked. A local company, Southwest Salvage, agreed to buy all of San Diego's surplus mulch for \$7-12 per ton. This not only cleared the greenery area for Christmas trees, but it earned \$500,000 to \$750,000 for the waste management department's enterprise fund.

At this point, the city is making a little bit of money off the greenery program, says Paul Gagliardo, San Diego's deputy director of refuse disposal. It costs about \$8-10 per ton to process the material, the landfill charges a \$15-per-ton tipping fee for green loads, and the finished mulch brings in \$7-10 per ton. This year, however, the city plans to lower the greenery tipping fee to encourage more green and wood waste recycling. "We want as much of this stuff as we can get," Gagliardo says. If the material was processed a little more, the city could get as much as \$35 per ton for the finished product, he adds.

For now, San Diego will have to count on lower greenery tip fees and Christmas trees to increase its yard waste recycling efforts, rather than curbside collection. "Because of the economy, we have stopped expansion of our greenery and curbside recycling," says Richard Hays, director of the city's waste management department. The greenery program was supposed to reach 125,000 households by the end of this year, but that won't happen unless the city finds more sources of revenue, he says. Neighborhoods without curbside collection, however, will still be able to recycle their green waste at bins the city has placed in 48 parks and recreation sites around San Diego.

and the city's "Can Man" recycling character is so popular that he has appeared at San Diego Padres games.

Bringing the entire city on-line with recycling, however, is proving to be an economic challenge. Half of the city's refuse collection is paid for out of San Diego's general fund, and the other half comes from landfill tip fee revenues. About one third of the landfill's waste comes from the city, and the rest is dumped by private haulers, who pay \$23 per ton. While this fund supports much of the department's activities, curbside recycling is another story. The program costs a lot of money, and citizens want it, but no one is very eager to foot the bill.

In order to fund recycling, the city manager recommended charging residents in single-family homes a \$9-per-month fee. According to city law, however, San Diego must pay for its refuse collection from the general fund, and only a two-thirds majority vote from the city council, or a public referendum can change that fee structure. When the question of putting the issue to a public vote came before the council, it was defeated.

As a result, the department has put all expansion plans for curbside recycling on hold, "unless we identify more revenue to expand," Hays says.

Recycling in existing areas is still going full force, however. The department uses 15 recycling vehicles, most of which are Crane Carriers, to collect materials that residents place in three stackable bins: one for old newspapers (ONP); one for commingled aluminum, glass, and plastics; and one for mixed waste paper. Since San Diego has no materials recovery facility (MRF), a local contractor, CR&R, takes the materials north to Los Angeles for processing. Some materials bring in revenue for the city, but CR&R is currently charging the city to take mixed waste paper. With ONP, the city is more fortunate; Louisiana-Pacific (Portland, Ore.) is building a cellulose insulation plant in San Diego and has contracted with the city to buy ONP for \$20 per ton.

To spur more market development in the area, the waste management department has joined with another city agency—the Economic Development Corp.—and San Diego County to apply for "enterprise zone" status. Under California's recycling plan, certain parts of the state will be desig-

nated enterprise zones that can offer tax and economic incentives to new businesses that will use recyclables in the area.

San Diego is already counting on a number of private companies to help with recycling. The city has contracted with Waste Management, Inc. (WMI, Oak Brook, Ill.), to take some of the curbside recyclables; WMI takes that material to the local San Diego recycling facility. After WMI's contract expires, the department plans to conduct a comparative analysis between public and private recycling collection in order to determine whether privatization might be a viable recycling alternative for the city.


WMI and four other local haulers are helping San Diego bring recycling to residents in multi-family dwellings, which make up about 45% of the city's population. Recycling is not mandatory in apartment buildings, but the city is conducting a \$120,000 demonstration project; the haulers provided \$20,000, the city provided \$40,000, and the rest came from a U.S. Department of Energy grant. That project is collecting materials from another 2,000 units in the San Diego area that aren't served by curbside recycling.

A master plan

While those efforts may increase recycling in small increments, the city is still looking for a way to divert much more material from the landfill. Instead of focusing on curbside recycling, though, the department is considering a low-tech approach to separation at the landfill, says Paul Gagliardo, the city's deputy director of refuse disposal.

"Because we can't charge citizens for collection, we don't have the money to do curbside throughout the whole city," Gagliardo explains. "So we're looking at a mixed MSW process that has composting at the back end." This facility, a combination MRF/MSW processing facility, would be located right on the landfill, he adds.

In order to add such a facility to the Miramar landfill, the city needs the Navy's approval. As part of the application process, the Navy asked the department for a comprehensive master plan that includes all expansion activities. The department came up with a plan that includes not only the MRF, but a sludge processing facility, a recycled pulp plant, a co-generation facility for landfill gas, a demolition waste recycling site,



In essence, the city could have an entire environmental/ industrial complex right on the landfill, maintaining the area's natural habitats while it makes the most of the materials coming into the landfill.

an aggregate processing plant, a household hazardous waste transfer station, an environmental laboratory complex, and a number of additional expansions to existing landfill facilities. In essence, the city could have an entire environmental/industrial complex right on the landfill, maintaining the area's natural habitats while it makes the most of the materials coming into the landfill.

"What I see when I look at the landfill is a series of commodities—what things need a minimum amount of processing so we can turn them over," Gagliardo says. "We're trying to identify commodities that are easily separated out and can be easily processed and marketed. We will direct the vehicles that we think have the most stuff in them to be recovered or composted."

The MRF/composting facility, which would have the capacity to handle 300,000 tpy, would process about 22% of what's currently going to the landfill, Gagliardo explains. The city has already negotiated with Daneco, a solid waste composting company, to build such a plant. Between recycling and composting, Daneco guarantees 50% diversion, at a cost of about \$35 to \$40 per diverted ton. At that rate, he says, the city would be saving about 150,000 tpy, or 11% of what's currently going to the landfill. "This will give us half of the state's mandated diversion goal," he adds.

The planned sludge facility could also provide compost material; this could mean that the city would be producing some 200 tpd of finished compost product. According to Gagliardo, studies on the area have shown that there are

plenty of agricultural uses and other end markets for the material. "We want to create the market for San Diego's materials in San Diego," he notes.

Another part of the master plan, the pulp processing plant, would provide a market for the difficult-to-market mixed waste paper from San Diego's curbside recycling program. The facility would use steam explosion deinking technology to process 65,000 tpy of waste paper into marketable secondary fiber. That recycled pulp could be sold to some of the 21 mills in the Los Angeles area that make toweling and other paper products. The city is currently negotiating with a deinking vendor to run the facility.

While private operators would run these plants, the city is looking to own the facilities, as part of its "public enterprise" ethic. The whole master plan would cost at least \$150 million to \$200 million, Gagliardo says, but most of that cost is from the sludge processing facility, which would handle two thirds of the city's sludge. The city is looking at some sort of equity selling to finance the project. In the meantime, the Navy must still give its okay with an official record of decision; the department expects that to happen sometime this fall. If the San Diego city council then approves the plan, construction could begin in phases. The MRF/composting plant, one of the first facilities, could be operating by the middle of 1993, Gagliardo estimates.

With 11% diversion from the MRF, and other recycling efforts throughout the city, San Diego could keep the Miramar Landfill open until about 2017, Gagliardo predicts. The city

is already looking for new landfill sites and has joined the county to identify three possibilities. "Eventually we will have to site a new landfill in San Diego—there's no question," says Terri Steele, a spokesperson for the waste management department. "But by siting these facilities at the landfill, we're saving the taxpayers an incredible amount of money."

When Miramar closes, the waste processing plants could still be used, but the landfill itself would revert back to a natural plant and wildlife preserve. Even the remaining industrial facilities would blend into the area's environmental image: The city is already planning to make the signs for the plants out of recycled materials and the pipelines carrying the landfill gas in the shape of endangered species. ■

Rock 'n' Roll—and Landfills—Never Die

Some of the strangest items in history can be found in a landfill.

That's what San Diego officials found when they participated in a landfill excavation project earlier this year. The city's Department of Waste Management was helping a developer who had purchased an old landfill next to the city's current facility to excavate trash that had been buried since 1959.

The city wants to see if any material in that old landfill, which has been closed since the 1970s, is usable, says Paul Gagliardo, San Diego's deputy director of refuse disposal. "This would be an experiment to see if excavation could work on other parts of the landfill," he explains. "It [the buried trash] won't be totally decomposed because it's so arid in this region."

Not surprisingly, an entire newspaper from 1959 was recovered, still intact and

still readable. While not the first non-decomposed newspaper that has been found in a landfill excavation, this 30-year-old copy of the *San Diego Union* did reveal some rather startling information. According to an article dated Nov. 28, 1959, rock 'n' roll is dead.

"Death Knell Tolls for Rock 'n' Roll," reads the headline of an article claiming that the music craze is going the way of the Charleston. The piece quotes popular music experts as saying that rock 'n' roll began fading away early in 1959, after riding high on the jazz wave for five years. These experts, citing "new favorites" such as Paul Anka and Conway Twitty, saw the popular musical trend switching to slow ballads with "a slight rock 'n' roll beat."

Thirty years later, not only is rock 'n' roll still alive, but this newspaper is proof that landfills never die.