



## *The Nut Island Effect*

# When Good Teams Go Wrong

*They were hardworking, uncomplaining, and dedicated beyond the call of duty. Yet the extraordinary team that ran a vital wastewater treatment plant actually brought about disaster. How could such well-intentioned people produce such perverse results? They fell prey to an organizational pathology that can strike any business.*

by Paul F. Levy

**T**HEY WERE EVERY MANAGER'S dream team. They performed difficult, dirty, dangerous work without complaint, they put in thousands of hours of unpaid overtime, and they even dipped into their own pockets to buy spare parts. They needed virtually no supervision, handled their own staffing decisions, cross-trained each other, and

ingeniously improvised their way around operational difficulties and budgetary constraints. They had tremendous esprit de corps and a deep commitment to the organization's mission.

There was just one problem: their hard work helped lead to that mission's catastrophic failure.

The team that traced this arc of futility were the 80 or so men and women who operated the Nut Island sewage treatment plant in Quincy, Massachusetts, from the late 1960s until it was decommissioned in 1997. During that period, these exemplary workers were determined to protect Boston Harbor from pollution. Yet in one six-month period in 1982, in the ordinary course of business, they released 3.7 billion gallons of raw sewage into the harbor. Other routine procedures they performed to keep the harbor clean, such as dumping massive amounts of chlorine into otherwise untreated sewage, actually worsened the harbor's already dreadful water quality.

How could such a good team go so wrong? And why were the people of the Nut Island plant—not to mention their supervisors in Boston—unable to recognize that they were sabotaging themselves and their mission? These questions go to the heart of what I call the *Nut Island effect*, a destructive organizational dynamic I came to understand after serving four and a half years as the executive director of the public authority responsible for the metropolitan Boston sewer system.

Since leaving that job, I have shared the Nut Island story with managers from a wide range of organizations. Quite a few of them—hospital administrators, research librarians, senior corporate officers—react with a shock of recognition. They, too, have seen the Nut Island effect in action where they work.

Comparing notes with these managers, I have found that each instance of

the Nut Island effect features a similar set of antagonists—a dedicated, cohesive team and distracted senior managers—whose conflict follows a predictable behavioral pattern through five stages. (The path of the Nut Island effect is illustrated in the exhibit “Five Steps to Failure.”) The sequence of the stages may vary somewhat from case to case, but in its broad outlines, the syndrome is unchanging. In a dynamic that is not so much a vicious circle as a vicious spiral, the relationship between the two sides gradually crumbles under the weight of mutual mistrust and incomprehension until it can hardly be called a relationship at all.

The consequences of this organizational pathology are not always as vivid and unmistakable as they were in the case of the Nut Island team. More frequently, I suspect, its effects are like a slow leak—subtle, gradual, and difficult to trace. Nevertheless, the Nut Island story should serve as a warning to managers who spend the bulk of their time on an organization's most visible and obvious shortcomings: sometimes the most debilitating problems are the ones we can't see.

### The Nut Island Effect Defined

The Nut Island effect begins with a homogeneous, deeply committed team working in isolation that can be physical, psychological, or both. Pitted against this team are its senior supervisors, who are usually separated from the team by several layers of management. In the first stage of the Nut Island effect, senior management, preoccupied with high-visibility problems, assigns the team a vital but behind-the-scenes task. This is a crucial feature: the team carries out its task far from the eye of the public or customers. Allowed a great deal of autonomy, team members become adept at organizing and managing themselves, and the unit develops a proud and distinct identity. In the second stage, senior management begins to take the team's self-sufficiency for granted and ignores team members when they ask for help or try to warn of impending trouble. Management's apparent indifference

breeds resentment in the team members, reinforces its isolation, and heightens its sense of itself as a band of heroic outcasts. In the third stage, an us-against-the-world mentality takes hold among team members. They make it a priority to stay out of management's line of sight, which leads them to deny or minimize problems and avoid asking for help.

This isolation leads to the fourth stage of the conflict. With no external input on practices and operating guidelines, the team begins to make up its own rules. The team tells itself that the rules enable it to fulfill its mission. In fact, these rules mask the deterioration of the team's working environment and deficiencies in the team's performance. In the fifth stage, both the team and senior management form distorted pictures of reality that are very difficult to correct. Team members come to believe they are the only ones who really understand their work. They close their ears when well-meaning outsiders attempt to point out problems. Management tells itself that no news is good news and continues to ignore the team and its task. Only some kind of external event can break this stalemate. Perhaps management disbands the team or pulls the plug on its project. Perhaps a crisis forces the team to ask for help and snaps management out of its complacency. Even then, team members may not understand the extent of their difficulties or recognize that their efforts may have aggravated the very problems they were attempting to solve. Management, for its part, may be unable to recognize the role it played in setting in motion this self-reinforcing spiral of failure.

That, then, is an outline of the Nut Island effect. Here is how it played out at a small sewage treatment plant on the edge of Boston Harbor.

### The Nut Island Story

Nut Island is actually a small peninsula in Quincy, Massachusetts, a mostly blue-collar city of 85,000 located about ten miles south of Boston. Sitting at the southern entrance to Boston Harbor, Nut Island was a favorite landmark for

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*Paul F. Levy is the executive dean for administration at Harvard Medical School in Boston. From 1987 until 1992, he was the executive director of the Massachusetts Water Resources Authority.*



ILLUSTRATION BY LASZLO KUBINYI

Nut Island is a small peninsula in Quincy, Massachusetts, a city of 85,000 located about ten miles south of Boston. The rickety Nut Island sewage treatment plant was decommissioned in 1997 and its core team was disbanded, after 30 years of efforts that left Boston Harbor no cleaner than it was when the team came together in the late 1960s.

seventeenth-century sailors, who savored the scent of what one early European settler called the “divers aromaticall herbes, and plants” that grew there. “Shipps have come from Virginea where there have bin scarce five men able to hale a rope,” the settler wrote, “untill they come [near Nut Island], and smell the sweet aire of the shore, where they have suddainly recovered.”

By 1952, when the Nut Island treatment plant went into operation, the herbs and sweet air were long gone. Before the plant came on line, raw sewage from much of Boston and the surrounding area was piped straight

into the harbor, fouling local beaches and fisheries and posing a serious health hazard to the surrounding community.

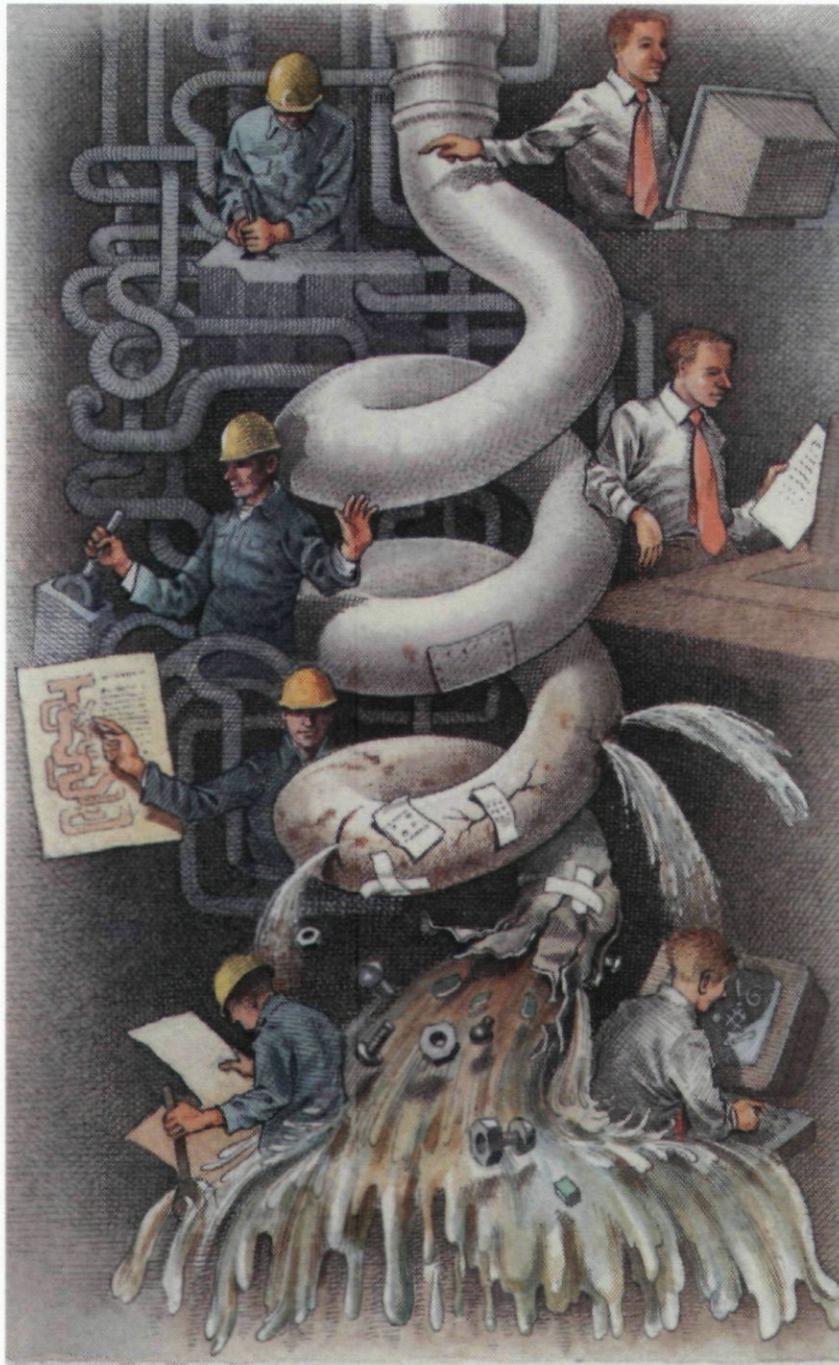
The Nut Island plant was billed as the solution to Quincy’s wastewater problem. Hailed in the local press for its “modern design,” it was supposed to treat all the sewage produced in the southern half of the Boston metropolitan area, then release it about a mile out into the harbor. From the first, though, the plant’s suitability for the task was questionable. The facility was designed to handle sewage inflows of up to 285 million gallons per day, comfortably above the 112 million gallons

that flowed in on an average day. But high tides and heavy rains could increase the flow to three times the daily average, straining the plant to its limits and compromising its performance.

During most of the 30 years covered in this article, the team charged with running the plant was headed by superintendent Bill Smith, operations chief Jack Madden, and laboratory head Frank Mac Kinnon. The three joined me recently for a reunion at Nut Island, which has been converted to a headworks that collects sewage from the southern Boston region and delivers it north through a tunnel under Boston Harbor

## Five Steps to Failure

The Nut Island effect is a destructive organizational dynamic that pits a homogeneous, deeply committed team against its disengaged senior managers. Their conflict can be mapped as a negative feedback spiral that passes through five predictable stages.



1. Management, its attention riveted on high-visibility problems, assigns a vital, behind-the-scenes task to a team and gives that team a great deal of autonomy. Team members self-select for a strong work ethic and an aversion to the spotlight. They become adept at organizing and managing themselves, and the unit develops a proud and distinct identity.
2. Senior management takes the team's self-sufficiency for granted and ignores team members when they ask for help or try to warn of impending trouble. When trouble strikes, the team feels betrayed by management and reacts with resentment.
3. An us-against-the-world mentality takes hold in the team, as isolation heightens its sense of itself as a band of heroic outcasts. Driven by the desire to stay off management's radar screen, the team grows skillful at disguising its problems. Team members never acknowledge problems to outsiders or ask them for help. Management is all too willing to take the team's silence as a sign that all is well.
4. Management fails in its responsibility to expose the team to external perspectives and practices. As a result, the team begins to make up its own rules. The team tells itself that the rules enable it to fulfill its mission. In fact, these rules mask grave deficiencies in the team's performance.
5. Both management and the team form distorted pictures of reality that are very difficult to correct. Team members refuse to listen when well-meaning outsiders offer help or attempt to point out problems and deficiencies. Management, for its part, tells itself that no news is good news and continues to ignore team members and their task. Management and the team continue to shun each other until some external event breaks the stalemate.

to the city's vast new treatment plant on Deer Island. The men's affection for each other is evident, as are the lingering remnants of plant hierarchy. When someone has to speak for the entire group, Mac Kinnon and Madden still defer to Smith.

The three friends don't need much prompting to launch into reminiscences of their years at Nut Island, which they still view as the happiest time of their working lives. They laugh often as they tell stories about the old days, featuring characters with nicknames like Sludgie and Twinkie, and they seem cheerfully oblivious to the hair-raising conditions that were part of daily life at the plant. When Smith talks about once finding himself neck-deep in wastewater as he worked in the pump room, he speaks without a hint of horror or disgust. It's just a good story. "It was fun," Smith says, and his two friends nod in agreement. Holding an old sewer plant together with chewing gum and baling wire really is their idea of a good time.

Throughout our talk, the men frequently refer to themselves and their coworkers as a family. But Nut Island had not always been such a harmonious place. When Smith arrived there in 1963, fresh out of the navy, he walked into a three-way cold war among operations, maintenance, and the plant's laboratory. Each side viewed its own function as essential and looked down on the other groups' workers as incompetents. "The maintenance guys thought the lab guys were a bunch of college boys," says Smith, a short, powerfully built man who at age 63 still has more black than gray in his long, ponytailed hair and thick beard. "And the guys in the lab said the maintenance guys were just grease monkeys."

For the next few years, Smith did what he could to "get a little cooperation going." By 1968, he had gained Madden and Mac Kinnon as allies. Before long, they had weeded out most of the plant's shirkers and complainers and assembled a cohesive team. The people they hired

were much like themselves: hardworking, grateful for the security of a public sector job, and happy to stay out of the spotlight. Many were veterans of World War II or the Korean War, accustomed to managing frequent crises in harsh working conditions—just what awaited them at the aging, undersized, underfunded plant. Tony Kucikas was typical of the breed. He signed on in 1968 after being discharged from the navy, where he had worked as an engineer and machinist. When he walked into the plant on his first day, even the smell of oil was familiar, he recalls. "It reminded me so much of the engine room," he says, smiling at the memory. "I can remember walking down those first stairs and saying to myself, 'I'm going to like this,' because I felt right at home."

Nut Island's hiring practices helped create a tight-knit group, bonded by a common cause and shared values, but they also eliminated any "squeaky wheels" who might have questioned the team's standard operating procedures

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or alerted senior management to the plant's deteriorating condition. That was fine with Smith and his colleagues. Assembling a like-minded group made it easier for them to break down inter-departmental animosities by cross-training plant personnel. The team leaders also made job satisfaction a priority, shifting people out of the jobs they were hired to do and into work that suited them better. These moves raised morale

and created a strong sense of trust and ownership among plant workers.

Just how strong the sense of ownership was can be seen in the sacrifices the team made. Few people on Nut Island made more than \$20,000 a year, low wages even in the 1960s and 1970s. Yet when there was no money for spare parts, team members would pitch in to buy the needed equipment. They were equally generous with their time. A siz-

able cadre of plant workers regularly put in far more than the requisite eight hours daily, but they only occasionally filed for overtime pay. In fact, several of the Nut Island alumni I interviewed seemed almost embarrassed when the subject came up, as if there was something slightly shameful about claiming the extra time.

From 1952 until 1985, the Nut Island plant fell under the purview of the Met-

## How to Stop the Nut Island Effect Before It Starts

What forms of preventive medicine can we prescribe to help organizations avoid the Nut Island effect? Managers need to walk a fine line. The humane values and sense of commitment that distinguished the Nut Island team are precisely the virtues we want to encourage. The trick is to decouple them from the isolation and lack of external focus that breeds self-delusion, counterproductive practices, and, ultimately, failure.

On Nut Island, the workers' focus paralleled their reward system. That system evolved by default as a result of MDC headquarters' lack of interest and by explicit action from dedicated local managers. It rewarded task-driven results – avoid grit in the sedimentation tanks, keep the sludge pumps from seizing up, keep the digesters alive –

rather than mission-oriented results – maximize flows to be treated through the plant, produce fertilizer-quality sludge. The Nut Island crew were heroes, but unfortunately they were fighting the wrong war. As in combat, the generals were to blame, not the enlisted personnel.

The striking persistence of the syndrome – which lingered on Nut Island until the plant was shut down in 1997, despite a decade of structural and management changes that afforded the team greater financial resources, new career options, top management support, and other opportunities – should send a strong message to corporate managers. While there are probably ways to counteract the Nut Island effect in your company, you are far better off to avoid it in the first place.



The first step is to install performance measures and reward structures tied to both internal operations and company-wide goals. The internal links are necessary to help build the team's sense of local responsibility and camaraderie; the link to external goals ensures the proper calibration of internal operations to the corporate mission.



Second, senior management must establish a hands-on presence by visiting the team, holding recognition ceremonies, and leading tours of customers or employees from other parts of the organization through the site. These occasions give senior management a chance to detect early warnings of problems and they give the local team a sense that they matter and are listened to.



Third, team personnel must be integrated with people from other parts of the organization. This exposes the local team members to ideas and practices being used by colleagues elsewhere in the company or in other organizations. It encourages them to think in terms of the big picture.



Finally, outside people – managers and line workers alike – need to be rotated into the team environment. This should occur every two to three years – not so often as to be disruptive but often enough to discourage the institutionalization of bad habits. So as not to appear punitive, this rotation must be a regular feature of corporate life, not a tactic aimed at a particular group.

ropolitan District Commission (MDC), a regional infrastructure agency responsible for Greater Boston's parks and recreation areas, some of its major roads, and its water supplies and sewers. (In 1985, the Massachusetts state legislature, under pressure from a federal lawsuit, shifted responsibility for water and sewers to a new entity, the Massachusetts Water Resources Authority.) Throughout the early and mid-1900s, the MDC had been known for the quality of its engineers and the rigor of its management. It had constructed and operated water and sewer systems that were often cited as engineering marvels. By the 1960s, though, the MDC had become the plaything of the state legislature, whose members used the agency as a patronage mill. Commissioners rarely stayed more than two years, and their priorities reflected those of the legislators who controlled the MDC budget. The lawmakers understood full well that there were more votes to be gained by building skating rinks and

swimming pools in their districts than by tuning up the sewer system, and they directed their funding and political pressure accordingly. As a result, control of Greater Boston's sewer system fell into the hands of political functionaries whose primary concern was to please their patrons in the statehouse. If that meant building another skating rink instead of maintaining Nut Island, so be it.

The attitude of the MDC's leadership toward the sewer division can be gauged by a story that became a staple of plant lore. As it was passed around, the story took on mythic power. It became a central component of the Nut Island team's self-definition.

It seems that one day, James W. Connell, Nut Island superintendent in the 1960s, went to Boston to ask the MDC commissioner for funds to perform long-deferred maintenance on essential equipment. The commissioner's only response: "Get rid of the dandelions."

Startled, the superintendent asked the commissioner to repeat himself.

"You heard me. I want you guys to take some money and get the dandelions off the lawn. The place looks terrible."

The story speaks for itself, but I would point out that it was something of a miracle that the commissioner had even laid eyes on the lawn and its dandelions. Visits to Nut Island by the MDC's upper management were so rare that when one commissioner did show up at the plant, workers there failed to recognize him and ordered him off the premises. For the most part, Smith says, "We did our thing, and they just left us alone."

At this point, the first stage of the Nut Island effect is in place. We have a distracted management and a dedicated team that toils, by choice, in obscurity. They are isolated not only from management but from their customers—in this case, the public. Team members, who share a similar background, value system, and outlook, have enormous trust in each other and very little in outsiders, especially management. Now, an egregious display of indifference from

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management is all it takes to set the downward spiral in motion.

On Nut Island, this display came in January 1976, when the plant's four gigantic diesel engines shut down. The disaster was predictable. Since the early 1970s, the workers at Nut Island had been warning the top brass in Boston that the engines, which pumped wastewater into the plant and then through a series of aeration and treatment tanks, desperately needed maintenance. The MDC, though, had refused to release

want to give them credit for *anything*," one worker told me recently.)

It became a priority among the Nut Islanders to avoid contact with upper management whenever possible. When the plant ran short of ferrous chloride, a chemical used for odor control, no one from Nut Island asked headquarters for funds to buy a new supply. Instead, they would contact a local community activist and ask her to complain to her state representative about odors emanating from the plant. The rep would

version to fertilizer.) A former sewer division scientist tells me he suspects the releases of tainted sludge account for the high concentration of oil in Boston Harbor's sediments, compared with other harbors on the East Coast.

## Rules of Thumb

A team can easily lose sight of the big picture when it is narrowly focused on a demanding task. The task itself becomes the big picture, crowding other considerations out of the frame. To counteract this tendency, smart managers supply reality checks by exposing their people to the perspectives and practices of other organizations. (For other suggestions, see the sidebar "How to Stop the Nut Island Effect Before It Starts.") A team in the fourth stage of the Nut Island effect, however, is denied this exposure. Isolated in its lonely outpost, its stock of ideas limited to those of its own members, the team begins to make up its own rules. These rules are terribly insidious because they foster in the team and its management the mistaken belief that its operations are running smoothly.

On Nut Island, one such rule governed the amount of grit—the sand, dirt, and assorted particulate crud that inevitably finds its way into wastewater—that the plant workers considered acceptable. Because of a flaw in the plant's design, its aeration tanks would become choked with grit if the inflow of sewage exceeded a certain volume. The plant operators dealt with this problem by limiting inflows to what they considered a manageable level, diverting the excess into the harbor. Reflecting the distorted perspective typical of teams in the grip of the Nut Island effect, these diversions were not even recorded as overflows from the plant because the excess wastewater did not, strictly speaking, enter the facility.

Another rule of thumb governed the use of chlorine at Nut Island. When inflows were particularly heavy, even the sewage that flowed through the plant did not always undergo full treatment. The plant's operators would add massive amounts of chlorine to some

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any funds to maintain them. Make do with what you have, plant operators were told. When something stops working, we'll find you the money to fix it. In essence, the MDC's management refused to act until a crisis forced their hand. That crisis arrived when the engines gave out entirely. The team at the plant worked frantically to get the engines running again, but for four days, untreated sewage flowed into the harbor.

The incident propelled the conflict between the Nut Island team and senior management from the second stage to the third—from passive resentment to active avoidance. The plant workers viewed the breakdown as a mortifying failure that they could have averted if MDC headquarters had listened to them instead of cutting them adrift. In ordinary circumstances, management's indifference might have killed off the team's morale and motivation. It had the opposite effect on the Nut Islanders. They united around a common adversary. Nut Island was *their* plant, and its continued operation was solely the result of their own heroic efforts. No bureaucrat in Boston was going to stop them from running it the way it ought to be run. (To this day, the workers at Nut Island deny that their cohesiveness stemmed from their shared disdain for headquarters; "I don't

then contact MDC headquarters, and Nut Island would receive a fresh supply of ferrous chloride. In part, this was a case of shrewd "managing upward" by Bill Smith and his colleagues. But it also shows how far the team would go to avoid dealing with management.

Another way the Nut Islanders stayed off management's radar screen was to keep their machinery running long past the time it should have been overhauled or junked. Their repairs often showed great ingenuity—at times they even manufactured their own parts on-site. Ultimately, though, the team's resourcefulness compromised the very job they were supposed to accomplish.

Among the plant's most troublesome equipment were the pumps that drew sludge—fecal matter and other solids—into the digester tanks. Inside the tanks, anaerobic bacteria were added to eliminate the pathogens in the sludge, reduce its volume, and render it safe for release into the harbor. Years of deferred maintenance had degraded the pumps, but instead of asking Boston for funds to replace them, the Nut Islanders lubricated the machinery with lavish amounts of oil. Much of this oil found its way into the digester tanks themselves. From there, it was released into the harbor. (Beginning in 1991, treated sludge was shipped to a nearby facility for con-

of the wastewater and pipe it out to sea. The chlorine eliminated some pathogens in the wastewater, but its other effects were less benign. Classified by the Environmental Protection Agency as an environmental contaminant, chlorine kills marine life, depletes marine oxygen supplies, and harms fragile shore ecosystems. To the team on Nut Island, though, chlorine was better than nothing. By their reckoning, they were giving the wastewater at least minimal treatment—thus their indignant denials when Quincy residents complained of raw sewage in the water and on their beaches.

In its fifth stage, the Nut Island effect generates its own reality-distortion field. This process is fairly straightforward in management's case. Disinclined in the first place to look too closely at the team's operations, management is easily misled by the team's skillful disguising of its flaws and deficiencies. In fact, it wants to be misled—it has enough problems on its plate. One reason MDC management left Nut Island alone is that even as it was falling apart, the plant looked clean, especially compared to the old Deer Island plant, which suffered a very public series of breakdowns in the 1970s and 1980s. Reassured by Nut Island's patina of efficiency, the MDC's upper management focused on business that seemed more pressing.

The manner in which team members delude themselves is somewhat more complicated. Part of their self-deception involves wishful thinking—the common human tendency to reject information that clashes with the reality one wishes to see. Consider, for instance, the laboratory tests performed at the plant. These tests were required by the EPA, which issues to every sewage plant in the country a permit that spells out how much coliform bacteria and other pollutants can remain in wastewater after it has been treated. A former scientist with the Massachusetts Water Resources Authority tells me the staff in the Nut Island lab would simply ignore unfavorable test results. Their intent was not to deceive the EPA, the scientist hastens to add. "It was more like they looked at

the numbers and said, 'This can't be right. Let's test it again.'" This sort of unconscious bias is common in laboratory work, and there are ways to correct for it. On Nut Island, though, the bias went uncorrected. As long as Nut Island's numbers appeared to fall within EPA limits, MDC management in Boston saw no reason to question the plant's testing regimen. To the Nut Islanders themselves, "making the permit" was proof in itself that they were alleviating the harbor's pollution.

Maintaining the alternate reality that prevailed on Nut Island required more than wishful thinking, however. It also involved strenuous denials when outsiders pointed out inconvenient facts. Consider what I learned from David Standley, who for several years was an environmental consultant to the city of Quincy. Tall and spare, with the methodical manner of a born engineer, Standley told me about the state of the plant's digester tanks in 1996.

Under the best of circumstances, sludge is nasty stuff—it scares even sewer workers—and it must be carefully tended and monitored to make sure the treatment process is on track. But everything Standley saw at the plant led him to conclude that the sludge was being handled in the most haphazard, ad hoc manner imaginable, with little concern for producing usable material. Indeed, in 1995 and 1996, the company contracted to convert Boston's sludge to fertilizer rejected 40% of the shipments from Nut Island. Clearly, there was a problem with the digesters. "I remember taking one look at the tanks' operating parameters and saying, 'This is going to die soon,'" Standley says. "When you've got volatile acids in the tanks rising and falling by 20% or more on a daily basis, with no apparent pattern, by definition something is very wrong."

Predictably enough, these misgivings found an unfriendly reception on Nut Island. "Their initial reaction," Standley says, "was hostility—they didn't like me sticking my nose into their business." Besides, they insisted, there was nothing seriously wrong with the digesters. The wide fluctuations in acidity were just

one of their little idiosyncrasies. Instead of addressing the root causes of the variances, the team would improvise a quick fix, such as adding large amounts of alkali to the tanks when sample readings (which may or may not have been reliable) indicated high acidity levels.

If external events had not intervened, conditions on Nut Island would probably have continued to deteriorate until the digesters failed or some other crisis erupted. The plant's shutdown in 1997 forestalled that possibility. As part of a large-scale plan to overhaul Greater Boston's sewer system and clean up the harbor, all sewage treatment was shifted to a new, state-of-the-art facility on Deer Island. The Nut Island team was disbanded, after 30 years of effort that left the harbor no cleaner than it was in the late 1960s when the core team first came together.

The field of organizational studies is a well-established discipline with an extensive literature. Yet as far as I can determine, the syndrome that I call the Nut Island effect has, until now, gone unnamed—though not unrecognized, as I learned when I described it to other managers. Perhaps the lack of a name indicates just what a subtle and insidious thing it is; the Nut Island effect itself has flown under the radar of managers and academics just as the actions of team members go unnoticed by management. A common and longstanding feature of many public agencies and private companies, the Nut Island effect is often seen not as a pathology but as part of the normal state of affairs. I am convinced, though, that when good people are put in a situation in which they inexorably do the wrong things, it is not normal or unavoidable. It is tragic. It is a cruel waste of human passion and energy, and a deep-seated threat to an organization's mission and bottom line. That is why it is incumbent upon management to recognize the circumstances that can produce the Nut Island effect and prevent it from taking hold. 

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