

# **A Report on Emergency Response and Remediation of the Mercury Release at Lawn Terrace Apartment Complex, Pawtucket, Rhode Island, 2004**

by  
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## Summary

This report focuses on actions in response to a mercury release at the Lawn Terrace apartment complex in Pawtucket, Rhode Island in the Fall of 2004. It presents lessons of that experience, with an eye to the future: How did it go? Which elements of the response in this case should be repeated or improved if a comparable crisis arises in the future?

The answer is based on the experience of those who were directly involved. They are Lawn Terrace residents and neighbors, as well as authorities from more than a dozen government, contracted, and volunteer agencies who worked in cooperation with the responsible party (RP), the New England Gas Company (NEGC).

The volume of mercury released at Lawn Terrace was limited – likely about 10 of the 20 pounds that was apparently taken from a nearby NEGC facility (Tidewater). Remediation, however, was extraordinarily complex, chiefly because the site was residential. 55 households had to be vacated and about 150 people moved to alternative housing for two months.

Many of the other characteristics of this incident would be familiar to any emergency responder. The first hours or even days are hectic, while incident command, site safety and security are established, assessments and communications are sorted out, plans are adapted, responsibilities distributed, and routines elaborated. Potentially competing urgencies are prioritized. In this case, also per usual, successfully moving in that direction required a mixture of well-directed activity and luck. By nearly all accounts, this incident had plenty of both and to good effect.

In particular:

- Public health was protected. Everyone who was vulnerable to exposure was informed and provided free protection, state-of-the-art tests of exposure, and clinical follow-up. Not one test indicated toxic levels of exposure.
- The environment was protected. Mercury contamination at Lawn Terrace was immediately contained and then cleaned to state and federal standards. In light of news from the Pawtucket spill, supplementary mercury collections were extraordinarily successful (more than 100 pounds). The net effect, then, was not only the remediation of a hazardous site but also a statewide reduction in the risk of mercury spills in the future.
- The response was cooperative. Within 48 hours of the discovery of the release at Tidewater, the response was conducted in a coordinated, cooperative fashion. When mercury was discovered at Lawn Terrace (three-and-a-half days after Tidewater), the RP publicly accepted responsibility for the costs of protecting the public and the environment from related contamination.

- Public information was extensive and consistent. Oversight agencies, the RP, as well as local print and broadcast media circulated a steady, substantial, and consistent stream of public communications about the mercury release, related health and environmental risks, and clean-up operations. Mass media featured regular updates on the incident. In that stream of public information, there were no major rifts among journalists, the RP, and oversight authorities.
- The worksite was safe. With as many as 40-50 people working on the site, often seven days per week for two months, there was not one OSHA-recordable incident.

By these standards, the remediation effort was a success: thorough, cooperative, safe, and protective of public health and the environment.

There were also disappointments. Although evacuees generally gave the response and remediation effort high marks, they wished that the whole incident had never happened. Evacuation and then two months of dislocation were tough – “inconvenient” at best. Normal routines had to be reassessed or rearranged apart from the environs in which people normally cope. And since the center of dislocation was an affordable housing complex, those who were most affected were already bearing significant socio-economic as well as individual burdens. But nearly all of them expressed gratitude to responders, the RP, oversight agencies, and support contractors. With very few exceptions, there was a consensus that “Everyone did their best.”

Bottom line: the Lawn Terrace mercury release was deeply regrettable, but the response was good, certainly short of perfect but also close to it. The rest of this report details what happened and ways that a response to a similar event might be similarly successful or even better in the future.

## Scope of This Study

This study was chiefly based on interviews with supervisory personnel in government, contracted, and volunteer organizations that participated in the response to the mercury release at Lawn Terrace. In most cases, these supervisors used their field journals and notes to refresh their memories. As circumstances permitted, there were also interviews with staff as well as Lawn Terrace residents and neighbors. To maximize peoples' opportunity to contribute, every Lawn Terrace household was provided a bilingual questionnaire.

Since engineering operations (assessment and cleanup of the mercury contamination) entailed established procedures and has been thoroughly documented in other public records, this report emphasizes human services (logistical, medical, social, and psychological support of evacuees) as well as the more subtle and subjective aspects of response.

The chief engineering firms (Burns and McDonnell and VHB) prepared and distributed several massive reports on this incident. They include not only summaries but also documentation of every test of contamination, every test result, and every major step in remediation. See:

- Remedial Action Closure Report – Mercury Release, Lawn Terrace Apartments, Pleasant Street, Pawtucket, RI*, prepared for the New England Gas Company, Providence, RI, by VHB (Vanesse Hangen Brustlin, Inc.), December 2004.
- Assessment/Remediation/Clearance Sampling Completion Report: Mercury Cleanup Activities, Lawn Terrace Apartments, Pawtucket, RI* (Project No. 37857), prepared for New England Gas Company by Burns and McDonnell Engineering Company, Inc., February 2005.
- Mercury Assessment/Remediation/Clearance Sampling Completion Report: Offsite Properties* (Project No. 37857), prepared for New England Gas Company by Burns and McDonnell Engineering Company, Inc., March 2005.

These reports were prepared in consultation with subcontractors and oversight agencies, none of whom has to date taken issue with any of their contents. With the exception of Clean Harbors, the engineering firms and subcontractors would not, however, agree to interviews for this report, apparently on the advice of NEGC counsel.

## After-Action Report

### Overview

In the Fall of 2004, about twenty pounds of elemental mercury were released in Pawtucket, Rhode Island. The incident posed a serious threat to public health and the environment. Remediation was successful only with the forbearance of more than 150 local residents who were evacuated from their homes for two months, with the concerted, coordinated effort of state, local, and federal agencies, their contractors, neighboring schools, businesses, and charitable organizations, and with the cooperation and millions of dollars from a responsible party (RP), the New England Gas Company (NEGC).

In general, when considering mercury hazards, risks from consumption of impacted fish or inhalation of fossil-fuel emissions leap more readily to mind. Such indirect exposures represent a more likely and larger cumulative threat than spills. But incidents requiring cleanup and disposal of elemental mercury are hardly unusual, even in Rhode Island. For example, the DEM Office of Emergency Response recovers an average of 90 pounds per year, chiefly from old industrial sites or hospitals and schools where instruments that contain mercury break. The Pawtucket spill, though, was distinctly hazardous because it spread from a single point of concentration to dozens of nearby homes.

In a residence, elemental mercury tends to gravitate into crevices, where it is very difficult to remove. It can cling to furniture, pets, and especially carpets. Foot traffic can carry it out to public walkways and then into cars, buses, and far-flung public facilities. What is potentially worse, residents are apt to spend many more hours at home, near those contaminated belongings, than they would anywhere else. Exposures may be sustained and reach those who are most vulnerable: pregnant women and children. In residences, then, even minuscule amounts of liquid mercury and attendant vapors can pose a serious threat to occupants' health.

Ironically, mercury accumulated in one place in Pawtucket (specifically, a storage building at a New England Gas Company property on Tidewater Street) through efforts associated with environmental protection. Since the 1980s, when the risks of mercury were well publicized, utility companies have collected mercury from old gas pressure regulators and thermostats, thermometers and whatnot that customers volunteered. Given safer alternatives, these companies helped reduce potential sources of spills. In this case, though, state and local officials did not know that there was any elemental mercury stored at Tidewater. Authorities had no ready records of related collection, storage, security, and disposal activities. They could not know that a risk was there.

The first people outside of NEGC to discover mercury at Tidewater were vandals. Sometime "just after Labor Day" (the first week in September, 2004), they broke into a storage building inside the gated NEGC property. They grabbed several bottles and began playing with the liquid mercury that they contained. Judging from the amounts that were recovered during the following days and weeks of cleanup, about ten pounds were spilled in and around the storage building at Tidewater, and another ten pounds

were carried back to a nearby affordable housing complex, Lawn Terrace, where the alleged perpetrators lived. Mercury was splashed about the parking lot, then thrown and tracked around the complex.

The break-in and release of mercury went undetected until Tuesday morning, October 19. During routine maintenance work at Tidewater, a NEGC employee discovered evidence of the break-in. News of the spill spread from NEGC to cleanup contractors and state, local, and federal emergency responders.

Emergency responders focused on four initial priorities:

- 1) Notify members of the local community that mercury may have been spilled in their neighborhood;
- 2) Secure and clean-up the Tidewater site;
- 3) Investigate circumstances surrounding the Tidewater release, both as a potential crime and a potential source of off-site contamination; and
- 4) Track, secure, and remediate mercury contamination that may have extended beyond the Tidewater site.

Within the next few days (by the end of Friday, October 22) mercury contamination was both cleaned up around the storage site at Tidewater and discovered at the nearby Lawn Terrace apartment complex. One entire unit at Lawn Terrace with twenty-two residents was immediately evacuated, and three alleged perpetrators were apprehended. Soon thereafter (October 23-25), environmental monitoring revealed more widespread contamination than first responders had found. The entire Lawn Terrace apartment complex (five buildings with a total of about 150 residents) as well as two other off-site apartments was evacuated.

Unified Command (the Rhode Island Department of Environmental Management, the City of Pawtucket, and the New England Gas Company) initially estimated that evacuees might return to their homes within a week or two. As the assessment of the complex continued it became apparent that the residents would be displaced for a longer period of time. In fact, assessment and remediation kept them out of their homes for two months. The number and duration of residential evacuations rank the Pawtucket incident as one of the most complex mercury spills in recent American history.

Cleanup was complex and costly. It entailed removing and replacing the entire parking lot, grassed areas, sidewalks, all of the carpeting, and much of the core (plumbing, furnaces, doorways, whole stairways) of the five buildings in the Lawn Terrace complex. Contaminated debris totaled more than 30 rolloffs (including one just for tenants' belongings), 300 cubic yards of asphalt, and 180 cubic yards of topsoil, plus two vehicles. More than 440 tons of mercury-impacted pavement and 2,300 tons of soil were trucked out-of-state for proper disposal. The total cost of assessing damages, caring for evacuees and their belongings, removing contaminants, and restoring Lawn Terrace property was about \$6.6 million (the largest source of lost operating income in the second-half of 2004, about four cents per share, for Southern Union Company, parent to NEGC). Only after both exteriors and interiors passed stringent tests were evacuees advised that it was safe for them to return.

The dislocation was especially stressful for Lawn Terrace tenants, most of whom were already enduring challenges that attend poor, immigrant, or minority status. Many lost

valued possessions as well as the comfort, privacy, and security of normal daily life. The cleanup of interiors that began with evacuations on October 22 lasted until December 10, when the Department of Health declared Lawn Terrace interiors free of mercury contamination. It took another few days for DEM to find that on-site exteriors areas were free of other lingering construction hazards, such as risks from tripping where reconstruction had been in process. Everyone was free to go home, and nearly everyone did by December 18, a week before Christmas. A couple of tenants requested and received extra nights at the hotel, but these individuals were also back in their homes by December 27.

Despite extensive testing and publicized assurances, some neighbors remained anxious about cross-contamination of their public spaces and facilities. Fortunately, contamination off-site appears to have been extremely limited. Mercury measurements were below action levels downwind of the site and wherever Lawn Terrace residents and their frequent visitors lived and worked as well as in school buses, hallways, and classrooms. There were just a couple of exceptions (possibly from other sources) in nearby schools, and even then the RP provided remediation services.

Anyone who expected that they might have been exposed was encouraged to accept free blood screening. October to December, a total of 92 off-site properties as well as 53 apartments at Lawn Terrace and 255 people were screened. Not one person – tenant, visitor, first responder, or remediation contractor – showed symptoms of mercury poisoning and not one had toxic levels in a sample of his or her blood. Only ten people had blood tests sufficiently high in mercury (again, possibly from other sources such as diet) that physicians recommended follow-up testing. Specimens from every reported follow-up fell to normal levels within one more month.

## Recommendations

In general, the response to the Lawn Terrace spill can be considered a model for such incidents – when contaminated residences require emergency evacuation and remediation and when response engages local, state, federal, and private sectors as well as inter-agency cooperation.

There were, of course, many different perspectives on both the release and the response. Generally, however, they could easily agree that, insofar as possible, such events should be avoided in the future. They also generally agreed that, insofar as such incidents may be unavoidable, the response strategies for Lawn Terrace incident bear repeating.

Successes that responders particularly recommend include:

- Rapid identification of the contaminant and exposure back tracking.
- Vigorous public notifications, criminal investigation, and site security.
- Rapid establishment of cooperative emergency response with a diverse and inclusive but thoroughly unified Incident Command, including engineering, occupational and public health, and social and psychological service expertise.
- Effective coordination of public information.
- Protection of public health and occupational health on-site.
- Orderly evacuation of exposed residents to a central location with maximum continuity of schooling, health, and other social services.
- Sufficient budgeting for food, shelter, clothing, and utilities for evacuees.
- Thorough cleanup of the site to well-established defensible standards for safety, field tested and then independently confirmed with minimal re-cleaning and retesting.
- Public outreach to reduce risks of future exposure.

In short, amidst the diversity of viewpoints on the incident, there is broad agreement that the response strategies that were deployed in Lawn Terrace could contribute to success in responses to future emergencies.

There were, in fact, few complaints about the response to the spill, and even fewer that, in hindsight, seem substantial in consequence or avoidable. For example, most concerns centered on actions of the RP, vandals, or regulators that occasioned the spill in the first place, rather than on the remediation. Nearly everyone wishes that the cleanup were quicker but next to no one would want it less thorough or methodical.

The only exceptions to these generalizations with potentially broad significance were in

regard to the delivery of some human services to evacuees. For example, better procedures for accepting, allocating, and documenting emergency support to evacuees (e.g., food or clothing vouchers) might have better discouraged abuse. In general, initial coordination on the human-services side of the response might have been more proactive and better organized. More specifically, this report recommends that in future incidents of this time, Incident Command consider designating individuals within ICS for two specific functions:

#### 1) A Liaison for Schools

- Members should have authority to represent all potentially affected schools, including:
  - City schools, with at least one representative designated by the local Superintendent(s) of Schools;
  - Charter Schools, designated by their Principal(s);
  - Independent or parochial schools.
- Role:
  - Liaise with Incident Command, either directly or through the Liaison Officer or the Planning Section Chief;
  - Receive continuing input from school administrators, teachers, students, and parents;
  - Keep schools and their constituents informed about assessment and remediation procedures;
  - Coordinate plans for actions that affect more than one school at a time (e.g., to accommodate displaced students or temporary loss of facilities);
  - Oversee documentation and cost accounting.

#### 2) A Resident Relocation Team

- Members should have authority to represent:
  - Emergency services (e.g., Red Cross, State and Local EMA);
  - Social services and case management, (e.g., Family Service of RI);
  - Public health services (e.g., Department of Health);
  - Clinical health services (e.g., primary care, hospital and laboratory);
  - Psychological services (e.g., MHRH).
- Role (see also following checklist):
  - Liaise with Incident Command, either directly or through the Liaison Officer or the Planning Section Chief;
  - Coordinate the assessment of residents' needs;
  - Receive continuing input from residents;
  - Keep residents informed about relocation procedures;
  - Oversee notification and consent procedures;
  - Identify, recruit and coordinate human service providers (e.g., local and state agencies, contractors, and volunteer organizations);
  - Coordinate the planning of resident relocation and return;
  - Oversee documentation and cost accounting.

## Checklist of Relocation Issues

Judging from the Lawn Terrace experience and recent, relevant EPA documents, certain issues seem likely to warrant consideration in future plans for a temporary relocation of residents. The following checklist is recommended for consideration in planning human services for evacuees:

- Scale and duration of the relocation.
- Needs of residents.
  - Information about the relocation process, risks, and resources;
  - Eligibility for relocation support;
  - Number in eligible household;
  - Number of school-age children, elderly, or disabled;
  - Pre-existing problems (e.g., medical conditions, limitations on mobility, financial hardship, contested guardianship or citizen status, marital problems, domestic violence, truancy, outstanding warrants, substance abuse, maintaining or establishing relations with public assistance, human services, or criminal justice agencies);
  - Maintenance of regular medications, therapy, adaptive equipment, or diet restrictions;
  - Pets (e.g., kennels, pastures, feeding, exercise, veterinary care);
  - Transportation (e.g., to supportive or dependent family and friends, job, school, church, day-care, public transit, vehicles);
  - Precious possessions (e.g., documents, religious/ritual objects, family memorabilia, house plants).
- Support of local organizations (schools, churches, Red Cross, Salvation Army, Veteran's Administration, community coalitions, Elder Services, United Way organizations).
  - Liaison specifically between Unified Command and nearby or otherwise affected schools, both for the protection of students and staff and for community outreach.
- Adequacy of temporary housing.
  - At minimum, "decent, safe and sanitary," adequate in size, utilities, and housekeeping services;
  - Security of site from fire, crime, noise, dust, odors, and cross-contamination (guards, attendants, locks, safe deposit boxes, insurance);
  - Proximity to original site – and hence opportunity for continuity of school, church, family and friend relations and familiar environs, especially if the duration is apt to be long);
  - Proximity to public transit and shopping;
  - Potential for extended families to use adjoining rooms;
  - Furnishings (bed, crib, linen, chairs, tables, dresser, stove and/or microwave, refrigerator, clock/radio, television, lamps, utensils);
  - Access for people with disabilities;
  - Amenities (e.g., laundry, parking, Internet, pool; policies on supplemental furnishings, smokers, pets, damages, and cooking in the room);
- Clear, consistent, and continuing information exchange with residents and property owners (including contact information for follow-up questions and feedback), with appropriate translators available.

- Documentation of informed consent of residents and property owners for procedures that affect them.
- Documentation of the state of the residence prior to evacuation.
- Orderly screening of evacuees and belongings that they take with them.
- Emergency replacement of clothing, medicine, vital papers, or other necessities.
- Secure storage, decontamination, or removal and disposal of personal property that was left behind.
- Placement of pets in kennels or pastures.
- Alternative school bus routes, as necessary.
- Well-identified and readily available sources of social, psychological, legal, and medical services.
- Vouchers for expenses (food and other staples, clothing, laundry, transportation, incidentals).
- Child-care.
- Forwarding of mail.
- Disconnecting of unnecessary utilities and maintenance of necessary ones.
- Transportation of residents.
- Transportation of personal possessions.
- Rental of extra furniture or appliances, as needed.
- Documentation and cost accounting.

Issues to consider in planning residents' return

- Restoration of mail service and utilities;
- Information and consent of residents and property owners;
- Return transportation of residents;
- Return of property from the temporary housing;
- Return of stored personal possessions and displaced pets;
- Documentation and cost accounting.

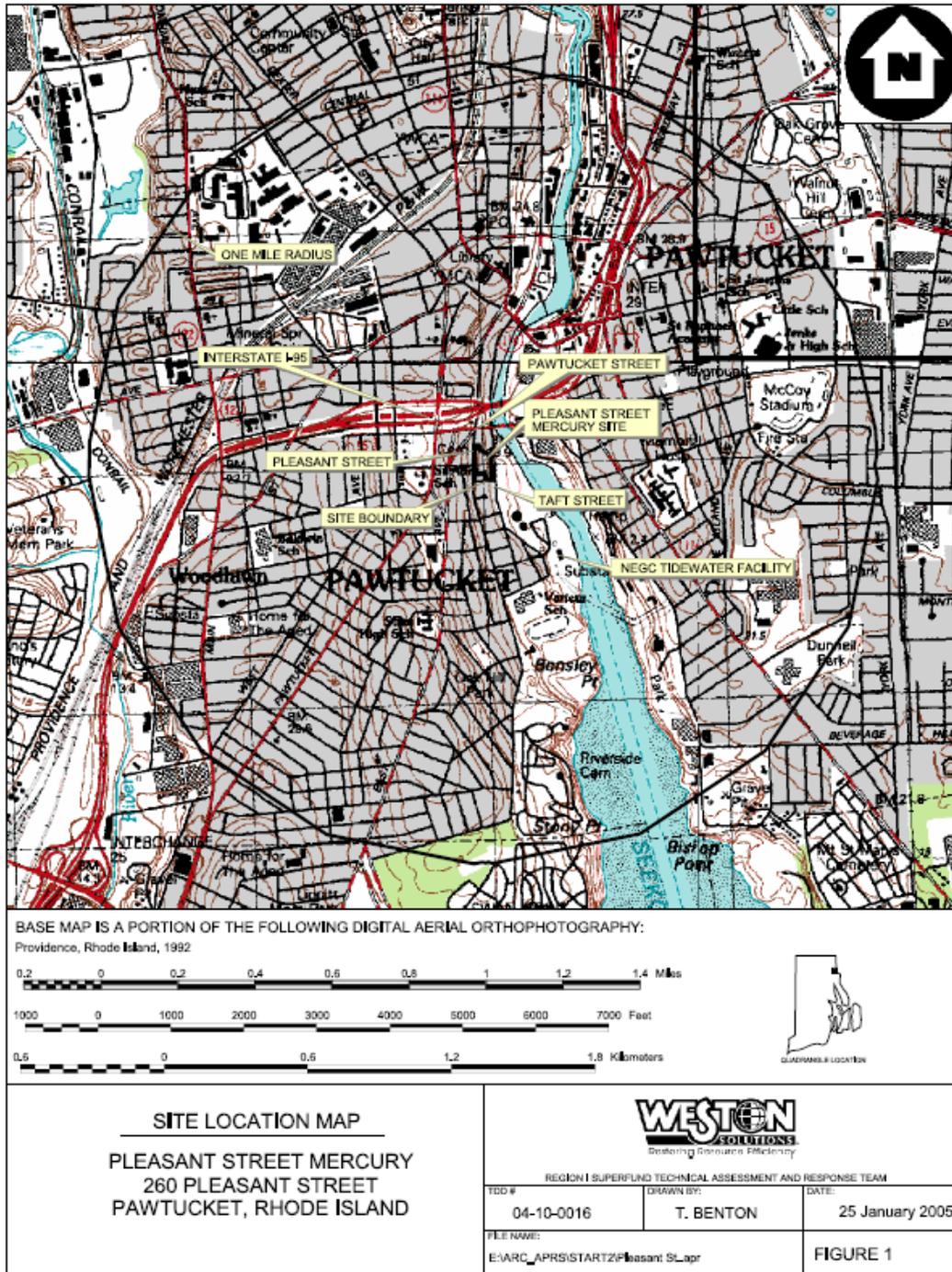
For more detail and forms, see:

U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Superfund Response Actions: Temporary Relocations Implementation Guidance* OSWER Directive 9230.0-97 (Washington, DC: April 2002) <<http://envinfo.com/may02/tempreloc.pdf>>.

Family Service of Rhode Island, *Family Assessment* (2005) and *The Critical Incident Stress Management System Policies and Procedures Manual* (2005).

American Red Cross of Rhode Island, "Annex F: Disaster Action Team Handbook," *Disaster Response Plan* (2005).

Site Maps and Plans



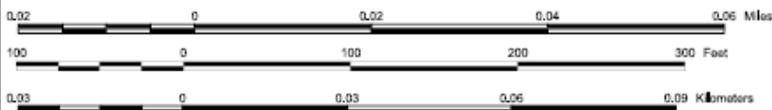
Location map for Pawtucket site, prepared for EPA by Weston Solutions



Aerial view of the Pawtucket neighborhood, with the Tidewater site outlined lower center/right and Lawn Terrace upper left.



BASE MAP IS A PORTION OF THE FOLLOWING DIGITAL AERIAL ORTHOPHOTOGRAPHY:  
Northeast Rhode Island, 1997



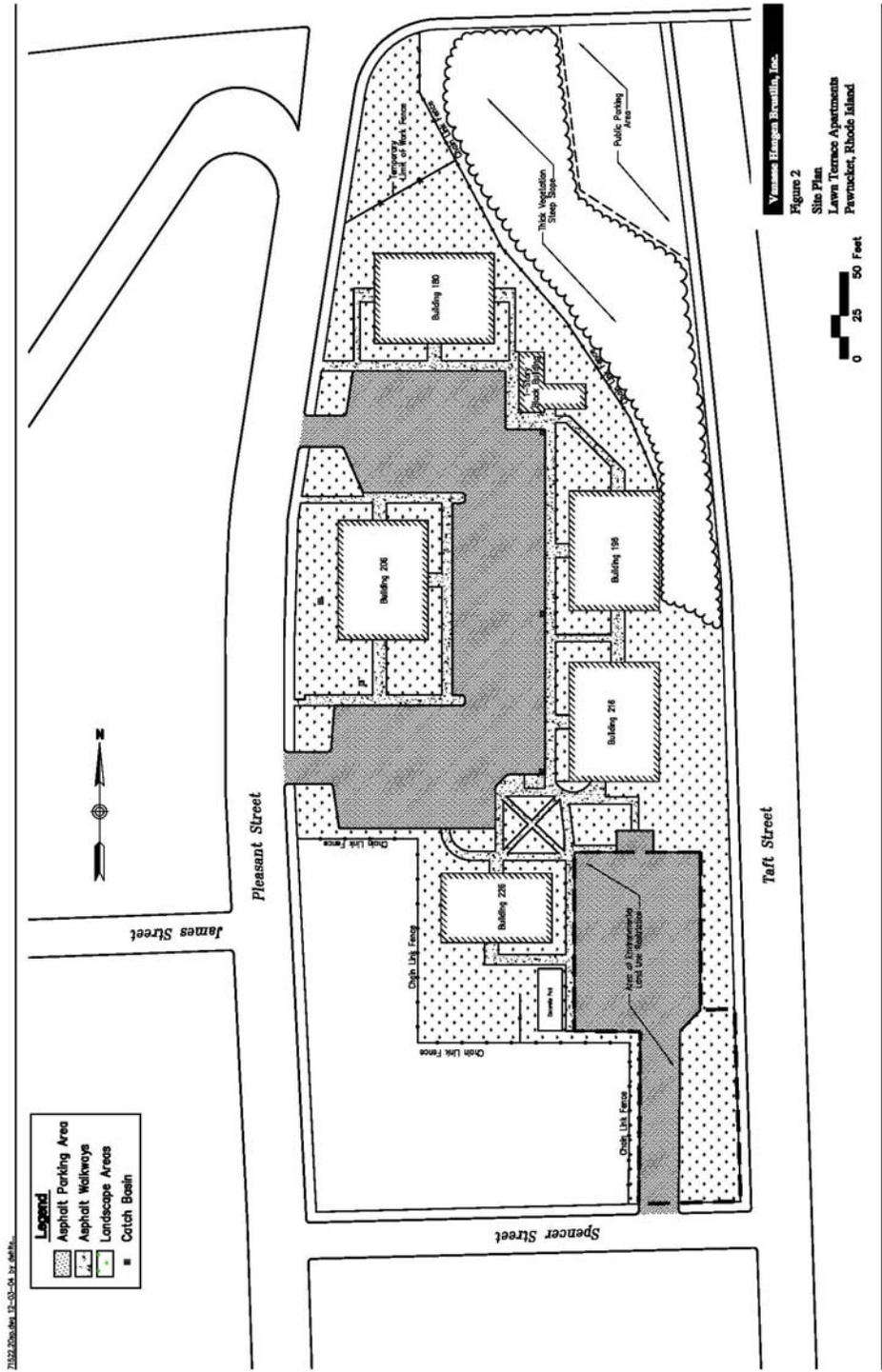
**AERIAL SITE  
LOCATION MAP**  
**PLEASANT STREET MERCURY  
260 PLEASANT STREET  
PAWTUCKET, RHODE ISLAND**



REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TSD #	DRAWN BY:	DATE:
04-10-0016	T. BENTON	25 January 2005
FILE NAME:		FIGURE 2
E:\ARC_APRS\START2\ Pleasant Slapr		

Aerial view of the Lawn Terrace complex.



Site map of the Lawn Terrace apartment complex.

## Chronology of the Lawn Terrace Incident<sup>1</sup>

- On an undetermined date, possibly “just after Labor Day” (9/06/04) but in any case before 10/19/04,
  - Vandals entered the New England Gas Company facility on Tidewater Street in Pawtucket and broke into a brick storage shed. Although some officials suspected that the break-in occurred on October 18, the night before it was discovered, the police report alleged that the larceny occurred on September 8. The property was surrounded by a six-foot, chain-link fence, and buildings were padlocked, but the fence was in disrepair, and the property was apparently otherwise unguarded. Police reports support local belief that trespassing was persistent and common (as evidenced, for example, in graffiti on buildings, smoldering fires, and scattered personal belongings, as if left by squatters). Inside the storage shed, a trespasser broke into a cabinet in the old blacksmith room (in the southeast corner of the first floor of the shed) that contained about six bottles of liquid mercury. (The precise amount is unknown.) Apparently (and ironically) in connection with an unregulated mercury reclamation program, NEGC employees had been removing elemental mercury from outdated gas regulators plus customers’ volunteered thermostats, gas meters, and thermometers. They stored the mercury in sundry containers in the cabinet, apparently for more than a year, awaiting proper disposal. As the entity that generated and stored the supply of mercury, NEGC was the “Responsible Party” (RP). The persons eventually charged with breaking and entering with malicious intent and larceny were two adults and one juvenile, all from 196 Pleasant Street in the nearby Lawn Terrace apartment complex. According to Pawtucket Police Reports (11 PM to midnight, 10/22/04), when apprehended and questioned, the alleged perpetrators said and signed statements confirming that they entered the Tidewater property with a crow bar and baseball bats. They forced open padlocks, kicked in doors, and shattered a plastic jug of mercury, spilling the contents on the ground in and around the shed. “They then took two glass jars of the substance back to 196 Pleasant Street where they played with the mercury and spread it on the ground, in puddles, stepped on it, and reportedly put a lit cigarette into it.” Elsewhere in the police report: “They put their hands in the mercury, spread it on the pavement, stepped on it, put it into puddles, and threw it against a motor vehicle.”
  
- Tuesday, October 19
  - About 9 AM – A NEGC employee, discovered that there had been a break-in and mercury spill at NEGC storage site (“Tidewater”), along the Blackstone River on Tidewater Street. As part of his routine duties, Gendron operated a backhoe for NEGC and on rainy days cleared overgrowth shrubs and brush in the Tidewater Facility. Gendron notified Rob Steere of maintenance, who

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<sup>1</sup> This chronology tracks events following the discovery of mercury released at the Tidewater facility. It emphasizes human issues in response, especially in the first days. Times can only be considered approximate and sequences subject to the fallibility of recollections and public records, some of which were produced well after the events but in advance of independent confirmation. A more fine-grained and better documented chronology of sampling and remediation activities is contained in the engineering reports.

instructed Gendron to stay away from the mercury until other NEGC officials arrive.

- About 11 AM – John Jackson (NEGC Facilities Manager) contacted Marc Viera (New England Gas Environmental Services) who, in turn, contacted Clean Harbors Environmental Services, Inc., NEGC's usual contractor for cleanup of minor spills. A Clean Harbors truck and crew (under supervision of Peter Joseph) arrived at Tidewater, and began to cleanup spilled mercury.
  - About 1 P.M. – Marc Viera of NEGC left an office voice mail message for Jim Ball (DEM ER). Since Jim was out of the office for two days of training in Woonsocket, he did not receive the voice-mail message until he returned to the office on Thursday, October 21. (Standard procedures for spill reporting do not include voice-mail messaging. There are well-publicized 24/7 options for reporting releases to DEM.)
  - 5:08 PM – Tim O'Connor (Director of Environmental Services at the consulting firm Vanasse Hangen Brustlin, Inc.) notified the National Response Center (NRC) that "Some vandals broke [into?] a mercury reclamation storage area causing a release onto the concrete and soil."
  - About 6 PM – Peter Joseph (Clean Harbors) reached Jim Ball (DEM ER) by cell phone. Joseph asked if DEM was notified of the release, since "you might want to be here." Since the spill occurred on a contained, inactive site that could be readily secured, and since it was getting dark, Peter Joseph (Clean Harbors) and Jim Ball (DEM Emergency Response) agreed to wait till the morning for consultation on-site. With no light (apparently, no ready electrical service) on-site, working after dark would require staging better left for the next day.
  - About 6:15 PM – After US EPA Region 1 and the Coast Guard in Providence received the NRC's FAXed notification of a mercury release on Tidewater Street in Pawtucket, Tom Carpentier (USCG Marine Safety Officer, Providence) called Tom Campbell (DEM ER) to ask about the release. Since Campbell had not before heard about the release, he requested a copy of the complaint from the NRC, but the NRC report did not identify the facility name, street address, or RP. Campbell began further inquiries.
  - About 6:30 PM – Tom Campbell (DEM ER) called Bill Cullinan (hazmat inspector for the Pawtucket Fire Department) and the Pawtucket Police Department for information. The Police Department had no record of a break-in and the Fire Department (Cullinan) had heard nothing about the incident. Cullinan reviewed Fire Department records and found no record of reportable hazardous materials stored at Tidewater. Since a clean-up contractor was already on-scene and darkness was falling, he determined that more investigation could wait till the next morning. .
  - About 9:30 PM – Clean Harbors left the site till the next morning.
- Wed., October 20
    - Beginning 7:00 AM – Tom Campbell (DEM ER) tried repeatedly to reach Tim O'Connor (Vanasse Hangen Brustlin, Inc) but did not succeed in reaching him till about 8:15 AM.
    - 8:15 AM – O'Connor (Vanasse Hangen Brustlin, Inc) allegedly told Campbell (DEM ER) that the spill was likely only about 1 pound, that the site was secure, and that Clean Harbors was cleaning it up.
    - About 8:20 AM – Tom Campbell (DEM ER) phoned in an update to USCG MSO Providence.

- About 8:30 AM – Peter Joseph of Clean Harbors contacted Tom Campbell (DEM ER) requesting DEM presence. Joseph reported that Clean Harbors had already recovered about 10 pounds of mercury and was still cleaning.
- About 9:30 AM, Tom Campbell (DEM ER) arrived at the Tidewater site and continued investigating the release.
- About 10 AM – Bill Cullinan (Hazmat Inspector for the Pawtucket Fire Department) arrived at the Tidewater site with a Battalion Chief, aiming to investigate the release. The Clean Harbors truck was visible only in the back of the site. A security guard initially denied the Fire Department access, while he awaited NEGC instructions, supposedly following legal consultation.
- 11:24 AM – The Pawtucket Fire Department notified Pawtucket Police dispatch that there had been a break-in at the Tidewater facility.
- 11:30 AM – Pawtucket detectives (chiefly William Magill, and John McIlmail) began an on-scene criminal investigation. Clean Harbors told the detectives that mercury can be hazardous if it is in the form of vapor or if it is not handled properly; so the officers stayed outside the hot zone that was established by Clean Harbors.
- DEM issued a press release under the lead: “DEM, Pawtucket Fire and Police Respond to Mercury Spill In New England Gas Co. Facility: Missing Mercury Poses Health Concerns; Anyone With Knowledge About the Material Asked to Contact Pawtucket Police or Fire Departments.” The press release included a report that the “Pawtucket Police and Fire Departments believe the vandals may have taken some of the mercury from the site. The Departments are trying to locate the material in an effort to minimize human health and safety concerns. Anyone who has seen the mercury or has any knowledge of the whereabouts of the material should contact the Pawtucket Police Department by calling Detective Jack McIlmail . . . Individuals may also contact the Pawtucket Fire Department at 725-1423 with information concerning the mercury.” Since no one seemed to know how much mercury was originally stored at Tidewater, the amount of missing mercury, if any, was unknown.
- The *Providence Journal* published the first of many articles (one per day for a week). The first carried the headline: “Toxic Mercury Feared Stolen From Pawtucket Gas Facility.”
- Thursday, October 21
  - AM – responding agencies (DEM, Pawtucket EMA, NEGC and the Mayor) met in the Mayor’s Office and agreed to provide unified public information via a press conference.
  - Afternoon – A press conference was held in the Pawtucket Mayor’s Office, including a request for help in locating mercury that may have been removed from the Tidewater site.
- Friday, October 22
  - AM – Al Arujo (Pawtucket EMA), Harvery Goulet (the Pawtucket Mayor’s Office) and Chief McClaughlin (Pawtucket Fire Department) went to the Tidewater site and asked NEGC to secure it (fence, post, and deploy guards).
  - About 4 PM via Fire dispatch radio – Norman Menard (Red Cross) learned that mercury was found at Lawn Terrace.
  - 4:05 PM – Pawtucket Police issued a report that mercury was discovered in the parking lot for the 5 buildings of Lawn Terrace Apartment complex at the

- corner of Pleasant and Division Street in Pawtucket, just a few blocks from the NEGC Tidewater break-in.
- 4:15 PM – The Pawtucket Fire Department confirmed the presence of mercury at Lawn Terrace and notified DEM, which in turn brought in a clean-up contractor. DEM began screening the site with Jerome meters. Site security was initially established.
  - By 6 PM, the Pawtucket Emergency Response Administrator (Al Arujo) learned of the likely need for support of an evacuation at Lawn Terrace.
  - About 6:15 PM – Arujo (Pawtucket EMA) alerted the Red Cross (Menard) of the potential need to evacuate Lawn Terrace residents. Menard headed to Lawn Terrace to meet with Tim McClaughlin, Fire Chief and incident commander. Incident Commander McClaughlin told Menard (Red Cross) that Building #196 must be vacated and the residents sheltered, due to apparent contamination in building. (Indicated by mercury vapor readings in excess of 1,000 nanogram per cubic meter – the lower detectable limit of Jerome meters – in common areas.)
  - DEM ER (Mike Mulhare) contacted the On-Scene Coordinator (OSC) for EPA Region 1, Gary Lipson. Lipson requested that Weston Solutions Inc., the contracted Superfund Technical Assessment and Response Team (START) provide additional support, chiefly in surveying the extent of contamination at Lawn Terrace (i.e., the federal “OSC activated the START”).
  - Early evening – a Pawtucket Police patrol officer reported sighting suspicious youth, potentially connected to the Tidewater break-in and larceny.
  - About 6 PM police apprehend three alleged vandals: Jason Smith (age 18) Stephen Carberry (20) and a juvenile. They were questioned at the Pawtucket Police Station. Their cases were referred to the Attorney General, for violating two state laws: C 11-8 (breaking and entering with felonious intent) and C 11-41 (Larceny, under \$500). The two adults were released on their own recognizance, and the juvenile to a parent. (Note: Allegedly because the investigation was still in process, the police reports include different dates for each allegation: 10/20 for the break-in and 9/8 for the larceny. Ultimately the police reports suggested that the break-in and larceny were probably closer to the first week of September than the third week in October. Later, DEM checked the interrogation area of the police station for contamination and found none.)
  - About 6:45 – Menard (Red Cross) and Arujo (Pawtucket EMA) met with Chris Medici (NEGC), and NEGC agreed to take responsibility for the displaced tenants. Red Cross field supervisor Gaines arrived at Lawn Terrace with a Red Cross truck and evacuation team. Red Cross called the Pawtucket Comfort Inn and (based on their pre-existing merchant agreement) got rooms for residents of the 12 units in #196 (a total of 22 people, actually from just 10 units, since 2 of the units were vacant). The most contaminated apartments of #196 were #6 and #10, where the alleged perpetrators lived.
  - 6:45-7:00 PM – Red Cross and the city of Pawtucket cooperated in the evacuation of Building #196. 22 residents moved to the Comfort Inn, just a couple of blocks away from Lawn Terrace.
  - Later in the evening, contamination was traced from the alleged vandals to two additional residences: 52 Ashburne Street and 172 Division Street. These two households (5 persons) were screened and evacuated.
  - Later in the evening – Fatima Hospital was among the first medical and laboratory facilities brought into the incident by way of chance meetings at the

Bishop's Ball (at the Crowne Plaza in Warwick), the annual black-tie fundraiser for Saint Joseph's Health Service. (In attendance was Richard Beretta Jr., a partner in the law firm Adler, Pollack, and Sheehan. Beretta is a dentist, specialist in healthcare litigation, and long-time supporter of Fatima, as well as other Catholic charities and general counsel of New England Gas Company. During the dinner Beretta asked Otis Brown (Vice President of Development and Public Affairs for St. Joseph's) if he knew about handling potential health issues related to the Tidewater release. Brown in turn involved Dr. David Kennedy in a hallway discussion of medical response to the contamination. Kennedy began follow-up inquiries.

- Saturday, October 23
  - Unified Command determined an action level (e.g., field instrument reading for evacuation of space or screening of personal belongings in a bag) of  $.001\text{Mg}/\text{M}^3$  (or 1,000 ng per  $\text{M}^3$ )
  - EPA's START (Superfund Technical Assessment and Response Team, Weston Solutions Inc), in cooperation with Vanasse Hangen Brustlin, Inc. (VHB), began screening the Lawn Terrace site for mercury vapor. Weston detected no mercury vapor readings above ambient background conditions downwind of the Lawn Terrace complex, but Mercury Vapor Analyzers (VPA – Jerome and Lumex meters) did detect elevated vapor on-site, especially in the maintenance building. Measurements were negative next to an adjacent mailbox, around the nearby International School, and in the adjacent public playground area.
  - About 11 AM – Due to elevated interior measurements, Unified Command decided to evacuate a second building in the Lawn Terrace complex: #206. In this evacuation and subsequent ones (unlike the evacuation of #196), residents were allowed to bring possessions for "a few days," if field tests showed that those possessions were not contaminated. They were placed in a plastic bag, and Lumex readings had to be below 1,000 nanograms per cubic meter. At that point the number of evacuees exceeded the Red Cross threshold for opening a city shelter (a school), but since neighbor evacuees were already in the Comfort Inn, Red Cross decided to move everyone there. (Red Cross crews were stressed, because they responded to five other calls after this evacuation, the same day.)
  - In coordination with the Pawtucket Schools, Red Cross arranged for school bus pick-up at the Comfort Inn. Note: some of these students – chiefly from Varieur Elementary – were not normally bused, but a heavily trafficked road lay between Comfort Inn and the school.
  - 4 PM – A second press conference occurred at the Mayor's Office.
  - In consultation with NEGC and the Department of Health, Dr. Kennedy and Otis Brown of Fatima began planning medical support. They consulted with Mark Antemann, Director of Laboratory Services who formerly worked for the laboratories at the Mayo Clinic, with which St. Joseph's had a "Reference Lab" relation. Kennedy and Antemann developed a protocol for testing tenants for mercury exposure. At the Mayor's press conference, Kennedy addressed mercury hazards, testing, and treatment.
  - About 8-10 PM – Red Cross began to relocate residents of #206.
  - Given variation in Lumex readings, some members of Unified Command were inclined to evacuate the rest of the complex. It was soon apparent that contamination had been tracked from the parking lot, the laundry room (in

Building #216), the maintenance shed, or other public areas into other units. Additional evacuations would indeed be prudent, but probably best done in a single, well-managed operation (e.g., to limit cross-contamination). Evacuation would be delayed until Monday, when residents would be likely to be home from work or school, and there would be more opportunity for planning a smooth, safe, and less stressful operation.

- Sunday, October 24
  - Meetings continued, including a meeting at Varieur School on Pleasant Street, the school for most of the elementary students in the complex.
  - Lumex screening in and around the apartment complex showed higher levels of contamination than previously recorded. (Lumex = Portable Zeeman RA-915+ or RA915 light mercury spectrometer)
  - 3-4 PM – Response agencies met at the Comfort Inn. Menard (Red Cross) met with Unified Command (Al Arujo for the city, Pawtucket Police and Fire departments, DEM, NEGC). They settled on a plan to evacuate the entire complex on Monday. Residents would not be notified until Monday, to provide time to organize the relocation, to minimize concerns, and to deter rumors. The interim would also provide some relief for Red Cross crews, who had been out on calls since 2:30 AM.
  
- Monday, October 25
  - Many meetings occurred. These meetings included:
    - 1) A meeting at the International Charter School (close to the spill, between Varieur Elementary and Lawn Terrace), including officials from four neighboring schools and one nursing home. Blackstone Academy Charter, International Charter and Varieur School requested monitoring, after children had left for the day. Shea High would be monitored on Tuesday afternoon.
    - 2) Representatives of incident command met with displaced Lawn Terrace residents at the Comfort Inn.
  - NEGC asked and Family Service of RI agreed to facilitate the delivery of social services to families relocated to the Comfort Inn.
  - 9 AM – NEGC began shuttling evacuees from the Comfort Inn to a clinic in the Auditorium at Fatima, where they were registered, and 3-4 phlebotomists drew blood samples for screening. 62 people were tested on the first day.
  - About 10 AM – NEGC met with all the stakeholder agencies. Authorities from NEGC, the city, and the state explained the situation, and NEGC's determination to do whatever is necessary to remediate the release. NEGC recommended that anyone with concerns (certainly Lawn Terrace tenants) be tested for mercury.
  - 11 AM – Medici, Menard, and Murphy agreed to pass-through billing, whereby Comfort Inn would bill NEGC directly for lodging and feeding evacuees at the Red Cross rate.
  - Late afternoon – Mercury vapor levels at Blackstone Academy Charter, International Charter, and Varieur School were determined to be below action level.
  - Beginning about 4:30 PM, in earnest 6-9 PM (after work and school, when residents were more likely to be home, and after the 4 PM shift change for Pawtucket Police) – Red Cross evacuated the 3 remaining buildings in the Lawn Terrace Complex (#180, #216, #226). Evacuees from Lawn Terrace

reached a total of 147 tenants from 53 one-, two-, or three-bedroom apartments. With the exception of part of one household (whose off-site relatives were unresponsive), everyone had their personal items screened and either returned or disposed of. Since no one knew how much time assessment and remediation would take, residents were told to “bring enough personal possessions for 3-4 days.” The plan was to evacuate one building at a time with enough crew for each floor. Red Cross and DEM worked together, with DEM screening possessions, resulting in a steady flow. Possessions that tested positive were returned to the tenant’s apartment inside the hot zone.

- On Monday or Tuesday (10/26) – following friction among evacuees, 2 households that included alleged perpetrators of the spill were moved from the Comfort Inn in Pawtucket to out-of-town lodging.
  - During screening, others who walked the Lawn Terrace site (a postal worker and 10 members of news crews) requested and received screening. Their shoes were in fact contaminated, but contamination did not extend any further (e.g., tests of vehicles were negative). Tests at Comfort Inn confirmed that most screened shoes from Lawn Terrace were contaminated. Also at Fatima Hospital, Pawtucket Police detectives were screened for contamination during investigation. Those tests were negative, too, but henceforth, responders better recognized the role of shoe traffic in picking up and potentially spreading contamination.
- Tuesday, October 26
    - 9 AM on – Fatima registered and drew blood samples for mercury testing of 39 people. NEGC provided shuttle service between the Comfort Inn and Fatima.
    - More meetings occurred, including staff meetings at neighboring schools.
  - Wednesday, October 27
    - 9 AM on – Fatima registered and drew blood samples for mercury testing of 24 people. NEGC provided shuttle service between the Comfort Inn and Fatima.
    - Two small areas of mercury contamination (although of uncertain origin) were isolated at Shea High School and cleaned up. One 4x6’ section of carpeting by the library entrance and one 4/6’ mat by a side entrance to the school were removed.
  - Thursday, October 28
    - A project status meeting formally set the action level for field instruments at 300 nanograms per cubic meter (rather than 1,000 nanograms per cubic meter), to take advantage of the greater sensitivity of Lumex than Jerome meters and to increase confidence that the 1,000 nanogram level would not be exceeded in the more elaborate, confirmatory laboratory tests. This extraordinarily low field requirement helped minimize the time and expense that would have been expended repeating laboratory tests on spaces otherwise too readily cleared in the field. 300 nanograms per cubic meter is the mercury non-carcinogenic inhalation reference concentration (RfC) recognized by the US EPA Office of Health and Environmental Assessment Integrated Risk Information System (IRIS, 2004 – see <http://www.epa.gov/iris/index.html>.) Re-occupation would require laboratory

tests (National Institute for Occupational Safety and Health (NIOSH) Modified Method 6009 protocol) to confirm a Residential Occupancy Level (ROL) of 1,000 nanograms per cubic meter. 1,000 nanograms per cubic meter is the ATSDR standard – NIOSH Method 6009 protocol, using sorbent tubes with Hopcalite media. (See Center for Disease Control, National Institute of Occupational Safety and Health, 1994. Method 6009, Issue 2 for Mercury. <http://www.cdc.gov/niosh/nmam/pdfs/6009.pdf>.)

- 9 AM on – Fatima registered and drew blood samples for mercury testing of 15 people. NEGC provided shuttle service between the Comfort Inn and Fatima.
- Friday, October 29
  - 9 AM on – Fatima registered and drew blood samples for mercury testing of 8 people. NEGC provided shuttle service between the Comfort Inn and Fatima. This was the last day of regular screening clinic and shuttle service, but NEGC encouraged anyone who felt they might have been exposed to get free testing at Fatima. Fatima eventually tested a total of 225 people, of whom 10 had slightly elevated but none toxic levels of mercury in their blood.
  - Clean Harbors began removing and discarding perishable items from each unit and finished by the next day.
  - International Charter School requested a general community meeting, which turned long and contentious.
- Saturday, October 30
  - With exception of a few emergency requests, henceforth residents could not access their apartments.
- Sunday, October 31
  - To date, a total of 67 off-site locations of potential contamination were identified (60 residences and 7 commercial sites). 41 were inspected; 15 were scheduled for inspection; 4 were yet to be scheduled.
  - Contamination was found and remediated among personal items, but none was detected in the ambient atmosphere in Apt. 2, 129 Garfield Street in Central Falls.
- Monday, November 1
  - DEM inspected Family Service of RI and the Goodwill School.
  - A sampling team inspected the dorm room (120 Weldon Hall) of a URI student who had visited Lawn Terrace. The only discovered contamination was to a roll-away bag that was then bagged and removed for disposal.
  - After high-levels of contamination were found, Unified Command determined that it was necessary to remove the entire asphalt parking lot and driveway of the Lawn Terrace Apartment Complex.
- Tuesday, November 2
  - Contamination was found and remediated among personal items (2 pairs of shoes, but not extending to the ambient atmosphere) in Apt. 22, 211 Adelaide Street, Providence. There were similar results from the reinspection of 121 Garfield Street.
  - To date, 69 off-site properties were tested. Only 4 structures (schools and

apartments) were found to contain contamination.

- Sunday, November 7
  - SET Environmental Inc. (SET) began remediating Building #196. SET removed all carpets, rugs, and molding. Personal items were transferred to Clean Harbors, who later helped with remediation of plumbing. Extensive removals were required in public areas, including doorways, whole stairwells and subfloors, and some concrete steps. SET used negative air machines/scrubber units with activated carbon filters to remove mercury vapors from ambient air in the building.
  - 3 more off-site properties were targeted for decontamination: Apartment #1 at 49 Warren Ave, 52 Ashburne Street, and 172/174 Division Street in Pawtucket.
  - Removal of the asphalt parking lot on the side of #206 and 226 began.
- Monday, November 8
  - Clean-up began at 52 Ashburne Street
  - #226 and #206 were scanned with Lumex, and all readings were below 200 ng/M<sup>3</sup>.
  - Hopcalite testing (NIOSH Method 6009) of #206 was delayed due to elevated ambient mercury levels, likely because of asphalt work outside.
- Tuesday, November 9
  - 52 Ashburne Street was cleaned and subjected to a Hopcalite test.
  - Cleanup of 49 Warren Avenue began.
  - To date, 92 off-site calls were initiated (to 25 institutions, 59 residences, and 9 commercial sites). 80 were inspected/monitored (24 institutions, 49 residences and 7 commercial sites).
  - Cleanup of Buildings #180, 226, 216, and 206 was complete, but final Hopcalite testing of #216 and #206 was delayed until outside cleanup was completed.
  - Afternoon – Removal of topsoil began via vacuum truck. Contractors expected to remove 500 cubic yards of soil in addition to 300 cubic yards of asphalt.
  - The shoes of Channel 10 news crew were discovered to be contaminated and they were secured.
- Wednesday, November 10
  - Lipson (EPA) briefed a total of 40-50 students and teachers in two neighboring schools. Many of the people were concerned about more long-standing contamination of other sorts in nearby Tidewater soils or in river sediments, where arsenic is allegedly present.
- Thursday, November 11
  - Unified Command determined that all 17 units at 49 Warren Avenue should be cleaned.
  - The Tidewater site was cleaned and rolloffs of contaminated materials were secured. At this point, there were a total of 31 rolloffs filled with contaminated material and asphalt. Lesser contaminated soil totaled 80-100 tons.

- Sunday, November 14
  - The number of rollofs at Tidewater totaled 36 and the amount of soil, 180 cubic yards. Four rollofs of asphalt along with hazardous materials (such as recovered mercury) were moved from the Tidewater temporary storage site to Braintree, MA facility (a permitted hazardous waste Subtitle C facility) for disposal. Another 65 tons of non-hazardous waste from the buildings went to the Turnkey Landfill in Rochester, NH (a permitted non-hazardous Subtitle D waste facility).
  - Fueled by scattered news reports, questions began to mount about the upcoming Thanksgiving Holiday: would tenants be home for the holiday? Despite initial hopes, it became apparent that too much work remained to be done to permit re-occupancy.
  
- Tuesday, November 16
  - Clean Harbors began removing material that had been excavated from Lawn Terrace, moved to a concrete pad at Tidewater, surrounded with hay bails, and covered with plastic sheeting. For the next three week, Clean Harbors transported a total of 441 tons of mercury-impacted asphalt pavement and 2,300 tons of soil to Turnkey Landfill in Rochester, NH. Transport was completed in the first week of December. Four contaminated vehicles remained at Tidewater, rapped in plastic.
  
- Thanksgiving, November 25
  - With the help of volunteer organization and response agencies, NEGC hosted a Thanksgiving dinner for displaced residents.
  
- Tuesday-Wednesday, November 26-27
  - On behalf of EPA and DEM, Weston Solutions Superfund Technical Assessment and Response Team (START) returned to Lawn Terrace for air sampling in Buildings #196 and 216 to independently confirm clearance sampling by the consultants for the Responsible Party (RP), including Rich Bowen of FLI Environmental and Tom Hamilton of Occuhealth. In conjunction with RI DEM (Don Squires) and EPA OSC (Gary Lipson), these contractors oversaw equipment calibration and air sample collection for NIOSH Method 6009 analysis. Mercury was not detected at or above the reporting limit at any sample stations in Building 196 or 216.
  
- December 3-4
  - In partnership with RI DEM, the Regional Poison Center, the Pawtucket and Woonsocket Fire Departments, and NEGC, the RI Department of Health (HEALTH) held a thermometer and thermostat exchange. In this case, publicity was tied to the Lawn Terrace release and it was extraordinarily successful. At 7 sites in all of 2004, HEALTH collected 92 pounds of mercury; more than a third of that total (36 pounds) came from just 2 sites in December. Similarly, publicity from the Tidewater and Lawn Terrace incidents also helped DEM recover an extraordinary amount of mercury at-large. From the end of October through the middle of December, DEM collected nearly four times as much as mercury from elsewhere around the state as from the incident itself.

- December 8
  - Remediation and restoration were nearly complete, and Unified Command advised residents to expect to move back in about one week, especially if the weather cooperated.
- December 9
  - From December 9 to 18, residents of Building #196 (who, unlike the others, did not have the opportunity to return to their apartments for belongings that could be screened for safe removal to Comfort Inn) were given the opportunity to view possessions that were stored in rolloff containers and allowed to retain them for additional cleaning or authorize their disposal. Items requested for further cleaning amounted to less than one full rolloff, and they were cleaned January 10-14.
- December 10
  - RI Department of Health issued a letter, permitting residents to re-occupy their apartments, once reconstruction activities were complete. So, risks from mercury contamination indoors were no longer an obstacle. Since there were on-going reconstruction activities, Unified Command just needed to be sure that risks of tripping, slipping, and whatnot were over, too.
- December 15
  - RI Department of Environmental Management issued a letter indicating that the paved and landscaped areas had been remediated. So risks from mercury contamination outdoors were no longer an obstacle.
  - At a public meeting, all residences were declared safe for reoccupation. Residents of all buildings except #196, where reconstruction continued, began scheduling and returning to their homes. NEGC presented each household with gifts, including a check for \$2000 in gratitude for residents' patience.
  - Screening of all rooms and public areas in Comfort Inn and Ground Round confirmed that they were free of mercury contamination.
- December 18
  - Reconstruction work inside Lawn Terrace was complete.
  - Residents of all buildings except #196 had returned.
- December 20
  - Residents of Building #196 began returning to their homes.
- December 27
  - Most of the Lawn Terrace residents were in their homes by December 18 (a week before Christmas), and by December 27, all had returned.
- February 3, 2005
  - In response to the Pawtucket incident, State Representatives J. Patrick O'Neill and Peter F. Kilmartin of Pawtucket, along with co-sponsors Representatives Raymond C. Church, Edwin R. Pacheco, and Raymond J. Sullivan, introduced House Bill No. 5316A, "An Act Relating to the Public Utilities and Carriers" to prohibit passing to the consumer the cost of any

mercury spill cleanup that occurred after January 1, 2004. .

- February 14-15, 2005
  - The last of contaminated items that had been retrieved from rollofs were either treated and returned to residents or disposed of.
- March 16, 2005
  - Southern Union Company issued a financial report that noted a \$13.5M decrease in operating income (.08 per share) during the last six months (July 1 to Dec 31) of 2004. The largest share (about half) of the decrease was attributed to the cost of environmental remediation (\$6.6M, .04 per share) following the release of mercury from New England Gas (a subsidiary) in Pawtucket.
- May 25-26, 2005
  - The state House of Representatives passed House Bill 5316A, prohibiting NEGC from passing mercury cleanup costs onto customers. On May 26, the bill was referred to the state Senate, but at the end of the 2005 legislative session, the RI General Assembly had not acted on House Bill No. 5316A.

## Appendices

### Appendix I: Alert Notice



**IMPORTANT !**

Vandals may have taken highly toxic mercury from our building on Tidewater Street.

#### Important Information about the Mercury

- The mercury may be in a glass jar.
- It is a silver liquid that forms shiny beads and may be a tempting play toy.
- If mercury is spilled on a floor, you may see very small, shiny balls of mercury.
- Even very small amounts of mercury can be harmful especially to infants, children and pregnant women.

#### Do not touch it.

If you find any mercury call the Pawtucket Police Department at 727-9100  
or the Pawtucket Fire Department at 725-1423.

- Remove everyone from the area.
- If you are indoors, close all doors and windows when leaving.
- Do not try to clean it up.

New England Gas Company. For more information, call 272-3330

Aviso importante. Faca favor de traduzir imediatamente.

Avis important. Veuillez traduire immédiatement.

Aviso importante: por favor tradúzcalo inmediatamente.

Notice posted in the vicinity of the NEGC Tidewater facility, October 21-22, 2004

**Appendix II Mercury Response Guide for Indoor Air (Draft)**

Rating	Level	Basis	Response
Background	< 0.2 µg/m <sup>3</sup> (0.024 ppb)	ATSDR chronic MRL	
Safe	0.3 ug/m <sup>3</sup> to 1 µg/m <sup>3</sup> (<0.12 ppb)	EPA RfC  ATSDR Action Level	Identify location and nature of source of mercury (instantaneous readings)  Reoccupancy (8 hour reading)
Moderate	>1 µg/m <sup>3</sup> – 25 µg/m <sup>3</sup> (0.12 – 3 ppb)	OSHA standard (Adjusted for continuous exposure)	Identify location and nature of source of mercury. Consider need for relocation of tenants.
Unhealthy	25 µg/m <sup>3</sup> – 100 µg/m <sup>3</sup> (0.12 – 3 ppb)	OSHA standard	Immediate relocation of occupants.
<b>Very Unhealthy</b>	<b>&gt; 100 µg/m<sup>3</sup></b> <b>(12 ppb)</b>	OSHA standard	<b>Evacuate and secure area; ensure respiratory protection of workers.</b>

Draft guide to responding to the 10/20/04 incident of potential elemental mercury contamination of indoor residential environments. Rhode Island Department of Health, October 25, 2004.

### Appendix III: News Headlines

<b>Date<sup>2</sup></b> (2004-5)	<b>Providence Journal<sup>3</sup></b>	<b>Pawtucket Times<sup>4</sup></b>	<b>TV Channel 12</b> (WPRI - CBS) <sup>5</sup>	<b>TV Channel 10</b> (WJAR - NBC) <sup>6</sup>	<b>TV Channel 6</b> (WLNE - ABC) <sup>7</sup>
Oct 20	Toxic Mercury Feared Stolen From Pawtucket Gas Facility				
Oct 21	Pawtucket Fire Chief Slams Gas Company For Not Reporting Mercury Storage; Vandals Spill Mercury, DEM Warns of Danger			Official Says Gas Company Exposed Firefighters to Health Risks	
Oct 22	New England Gas Under Fire After Vandals Dump Mercury – The company never notified authorities about its storage of the toxic substance, and can't say how much spilled	Mercury Scare Hits City – Earlier this week, vandals ransacked a mercury repository at New England Gas Company's Tidewater Street facility, smashing and overturning several 13-ounce jars of the neurotoxic liquid metal			Residents Tested for Exposure to Toxic Mercury
Oct 23	Mercury Found in Apartment – Twenty-one families are forced to stay	Mercury Probe – At least two state agencies are investigating the New			

<sup>2</sup> Date and time are from the on-line archives of each news source. The actual moment of news release may differ by as much as 24 hours.

<sup>3</sup> *The Providence Journal* is the newspaper of record for the state of Rhode Island. In 2004, its average daily circulation was 234,202; on Sundays, 234,202.

<sup>4</sup> *The Pawtucket Times* is the newspaper of record for the city of Pawtucket, RI. In 2004, its average daily circulation was 13,500.

<sup>5</sup> Channel 12 is licensed to TVL Broadcasting of Rhode Island. In November 2004, daily broadcasts of the six-o'clock news reached an average of 43,700 households where there was a total of 38,900 adults.

<sup>6</sup> Channel 10 is licensed to NBC Telemundo License Company. In November 2004, daily broadcasts of the six-o'clock news reached an average of 83,000 households where there were a total of 119,000 adults.

<sup>7</sup> Channel 6 is licensed to Freedom Broadcasting of Southern New England Licensee. In November 2004, daily broadcasts of the six-o'clock news reached an average of.

	in a hotel after the toxic substance, plundered from a storage shed, is detected in one unit and the parking lot	England Gas Co. after a break-in at a Pawtucket facility where mercury was stored			
Oct 24	Mercury Incident Results in 4 Arrests – The police say the suspects caused contamination that resulted in a group of Pawtucket apartment residents being evacuated from their homes.			Four Arrested In Connection With Pawtucket Mercury Leak; Mercury Cleanup At Pawtucket Apartment Complex Continues	
Oct 25	Spill Mercury Spurs Hospital Tests – Tests will be conducted this morning on the 27 people who were evacuated from the affected Pawtucket neighborhood	Alleged Mercury Bandits Not Too Swift – Following an investigation that lead police to an apartment complex in this city Friday night, four people were arrested for allegedly stealing mercury from the storage shed at the New England Gas co. facility on Pleasant Street		Mercury Spill Forces Total Evacuation of Complex	
Oct 26	Mercury Scare Prompts Additional Evacuation – Nearby schools are also being checked for contamination	Mercury Spill Takes Toll On City Residents – By Monday night, 66 people had been tested for toxic exposure, state and local agencies had been put through the proverbial wringer, and as many as 100 pleasant Street residents had been left temporarily homeless by the threat of liquid mercury.			More Residents Evacuated From Complex Where Mercury Spilled
Oct 27	Tests find No Mercury Contamination at Schools – Vandals had brought the	Gas Company, Vandals Equally Responsible for Mercury Mess – Who is			State Senator Asks AG Lynch to Look Into Mercury Spill

	<p>toxic metal back to their apartment complex near two schools on Pleasant Street;  Elevate Mercury Levels At Shea Not enough to Close School</p>	<p>responsible for potential endangering Pawtucket residents by exposing them to toxic mercury? The New England Gas Co. that stored the mercury in an apparently unsecured shed on its property? Or the four suspects who allegedly broke in the shed, stole the mercury and then haphazardly scattered it about?</p>			
Oct 28	<p>It's Unclear Who'll Pay Mercury Tab – New England Gas hasn't decided whether the costs of the clean up in Pawtucket will be passed to customers;  Mercury Found at Shea, Apartment Buildings – Only trace amounts are detected at the school, which remains open, but families are evacuated from homes on division street and Ashburne Street</p>				
Oct 29			<p>Residents Evacuated Due to Mercury Spill;  More Residents Evacuated From Complex Where Mercury Spilled;  State Senator Asks AG Lynch to Look Into Mercury Spill;  Two Schools Test Negative For Mercury Contamination;</p>		

			Pawtucket High School Tests Positive For Mercury Contamination		
Nov 4	Tests Reveal Mercury in Some evacuated Pawtucket Tenants				
Nov 5	10 Tenants Test Positive For Mercury – the contamination is so low that no sicknesses have been reported, although further testing is advised	Residents Still Tangled After Mercury Spill – More than 100 Pleasant Street residents who were displaced due to potential mercury contamination of their homes, will be on the move from their temporary quarters at a local hotel this weekend			Tenants in Pawtucket Apartment Complex Test Positive for Mercury
Nov 8			Teens In Pawtucket Complex Test Positive For mercury; Residents Displaced By Mercury Spill Losing Patience		
Nov 11		Gas Co. Feels the Heat – Just a week after winning a seat in the General Assembly, J. Patrick O'Neill threw himself in the fray over last month's mercury spill on New England Gas Co. property			
Nov 18	Families Can't Go Home For Holiday – On thanksgiving, tenants of the mercury-contaminated Lawn terrace apartments will complete their fifth week stranded in hotel rooms			Apartments Tainted With Mercury Still Off Limits	
Nov 20	Mercury Spill Could Lead				Stolen Mercury

	To Steep Fines – New England Gas Co – which an EOA official says was improperly storing the hazardous material – could face fines of more than \$30,000 a day				Update
Nov 22		NEGC Could See Steep Fines for Spill - Two months after mercury was stolen from its storage facility two months ago, New England Gas Company could face hefty fines, federal officials say			
Nov 23	Restaurant Plans Dinner For Tenants				
Nov 24		State: Displaced Residents Can Return Home Before Christmas – It wasn't in time for Thanksgiving but Tuesday night the displaced residents of the Lawn Terrace apartment complex go the welcome news that they should be back home for Christmas			
Nov 25			Governor presents awards for mercury reduction, education		
Nov 26	Displaced tenants Enjoy Thanksgiving – Uprooted Oct. 22 from a Pawtucket apartment complex because of mercury contamination, the residents receive a free holiday meal	Not Home for the Holiday – Heedless young vandals who spilled and spread 20 pounds of toxic mercury last month, polluting the Lawn Terrace apartment complex in the process, didn't just create an extensive, expensive			

		environmental mess			
Nov 30		Officials: Turn in Your Mercury Thermometers – Mercury, a toxic substance has also become a dirty word around the city after four young vandals last month spilled 10 pounds of the liquid heavy metal at the Lawn Terrace apartment complex			
Dec 8	Mercury Gone From Pawtucket Apartments – Tenants, 147 of whom have been staying in hotels, have been told that, barring bad weather, they will be able to move back next week				
Dec 9		Displaced Tenants to Move Back Home – the beleaguered tenants of the Lawn Terrace apartment complex on Pleasant Street should be able to move back into their homes next week, after a nearly two-month evacuation, state officials said			
Dec 15		Home Sweet Home – the ordeal of 150 Lawn terrace apartment residents is almost at an end; Group Warns Against Mercury in Toys – the blinking, twinkling toys and novelties – things like Holiday Musical Antlers, Flashing Icy Spike Necklaces and the		Residents of Contaminated Apartments Move Back Home	Residents of contaminated Apartments to Return Home

		Snoop cell Phone Candy Dispenser – look clever and attractive on the store shelves			
Dec 17			Pawtucket Residents Are Back After Mercury Spill; Residents of Contaminated Apartments To Return Home		
Mar 17 (2005)	Mercury Spill Cleanup Costs Gas Firm More Than \$6M – More than 2,300 tons of contaminated soil had to be removed from the Pawtucket apartment complex property, according to an engineering company report			Mercury Cleanup Cost New England Gas Co. \$6 Million; Utility Could Be Fined for Alleged Storage Violations	Mercury Spill Cost New England Gas Co. \$6 Million
Mar 19 (2005)		City Residents Still Dealing With Impact of Mercury Spill			

## Appendix IV: Survey of Tenants on Support During the Evacuation

At the end of April, 2005, a one-page questionnaire in English and Spanish (appended to this report) was mailed to 57 addresses, including every household that was evacuated from the Lawn Terrace apartment complex.

In accordance with a protocol for the protection of human subjects (approved by the URI Institutional Review Board, IRB ID #HU0405-087, on January 19 and revised April 18, 2005), a cover letter advised recipients that participation was purely voluntary, with no significant risks or benefits, and that responses would be kept confidential. The survey provided a 7-point scale – from “very bad” (1) to “very good” (7) – for rating “how well” various kinds of agencies “supported your household during the evacuation.” Hence, ratings over 4 (the midway point on the scale) can be considered “good” and under 4, “bad.” The survey also provided space for respondents to describe the composition of their households and to answer open-ended questions about the best and worst of the support they received.

The survey appears to have been effective, with two important exceptions. One was confusion among respondents about the kinds of agencies they were being asked to evaluate. For example, since pre-tests showed that the public found their roles difficult to distinguish, the survey did not allow respondents to distinguish oversight agencies (e.g., DEM and EPA) from clean-up contractors (e.g., Clean Harbors). Future surveys of this sort should provide more fine-grained analysis. The second deficiency, related to the first, was the small absolute number of responses involved. Only a small share of distributed surveys were actually completed and returned: 9 of 57, representing only 17% of the units in the Lawn Terrace complex. This small number complicates interpretation of the results. Just one extreme response could significantly skew averages for the whole. In fact, one respondent did assign much more negative ratings than anyone else, with great effect on means. But as a whole, responding households also included about a quarter of the total evacuees (about normal for pencil-and-paper surveys), and the characteristics of those households (e.g., members’ ages and mother tongues) resembled the complex as a whole. For example, about one quarter of the members were reportedly more comfortable in Spanish than English. With these caveats – in particular a negative skewing of means – it is reasonable to treat the survey as representative of evacuee opinion.

In general, marks for the response effort were high. In all, respondents rated the support that they received “good” or better than “good” 84 percent of the time. The average rating was 6.0. As less systematic but more probing interviews confirm, tenants generally approved of the help that they received.

The “overall” rating that tenants assigned (average: 5.7, well more than simply “good”) includes an implicit weighting of the significance of categories of support. If each category were of equal significance, ratings would average even higher (6.0, just one point short of the highest possible score). The lower but still high “overall” rating, then, suggests that the categories of support with slightly lower scores were, from the perspective of evacuees, more important. Answers to the open-ended questions provide some explanation. They include specific complaints about the restaurant (which evacuees were likely to encounter several times per day) as well as the insurance

adjuster and authorities who took responsibility for residents' personal belongings and transportation. There are also ample reminders that everyone wishes that the whole episode had never happened. Nevertheless, not one respondent characterized the "overall" response efforts as "bad."

The ratings of support in every category were much more positive than negative. Social and health services were singled out for special praise. With few, albeit strong objections, most people said that, most of the time, they were well-treated: "They did their best. They should carry on with good reputation. And God bless."

**Table: Summary of Tenant Ratings of Support**

Kinds of Support	“Bad” Ratings (<4)	“Good” Ratings (>4)	Average Rating
Public Safety Officers (Pawtucket police and fire fighters)	1 of 8	7 of 8	6.0
Social Services (Family Service of RI, Red Cross)	0 of 9	9 of 9	6.8
Environmental Services (Contractors, RI DEM, EPA)	2 of 7	5 of 7	5.1
Schools (teachers, administrators, bus drivers)	1 of 6	5 of 6	5.8
Health Services (doctors, RI Dept. of Health, hospitals)	0 of 8	8 of 8	6.6
Hospitality (motel, restaurant)	1 of 8	6 of 8	5.6
Responsible Party (gas company, insurance adjuster)	1 of 9	7 of 9	5.8
Partial Sum (total for all kinds of support listed)	6 of 55	47 of 55	6.0
“Overall” (with implicit tenant weighting)	0 of 9	7 of 9	5.7
Total of all responses	6 of 64 (9%)	54 of 64 (84%)	6.0

Note: Tenants were asked to check a circle on a scale:

Very Bad O—O—O—O—O—O—O Very Good

For this tabulation, responses were coded by the position of the check:

1—2—3—4—5—6—7

and non-responses were not counted.

## Appendix V: Tennant Questionnaire (English Version)

April 27, 2005

Greetings,

I write to ask your help in preparing a report on responses to the mercury release at Lawn Terrace. The purpose of the report is to help agencies improve the way that they support evacuees in the future. I am trying to consult everyone who was affected this time, whether we had the chance to meet before or not. That is what the attached questionnaire is for. It should not take more than a few minutes to fill out.

In deciding if you will respond to the questionnaire, please bear in mind:

- Your responses will be kept confidential. No one should be able to use anything in the questionnaire for you or against you. To assure that it is not even possible, please do not write your name or address on the questionnaire or return envelope.
- The risks to you are minimal. The memories may be unpleasant, but you are free to decline to answer any or all questions. If you prefer, just throw this away.
- Although there are no direct benefits of the study, your answers should help increase knowledge of emergency response. I hope that is satisfying.
- The decision to fill out the questionnaire is entirely your own. It's up to you.

If you agree, please answer the following questions, either in Spanish or English, and send the page back to me in the enclosed, pre-addressed and stamped envelope.

Please let me know if there is more I can do to help.

Thanks,

Richard Horwitz

Research Associate, University of Rhode Island  
Contract Consultant, RI Department of Environmental Management  
Phone: (401) 289-0198; E-mail: rhorwitz@cox.net

**Survey of Displaced Tenants (Pawtucket Mercury Release, 2004)**

(Note: Please do not identify your name or address)

How many people in all were living in your household at the time of the evacuation? \_\_\_\_

How many children (under 18 years old)? \_\_\_\_

How many of you were more comfortable in a language other than English? \_\_\_\_

Which language(s)? \_\_\_\_\_

How many were evacuated to a motel? \_\_\_\_

How well did the following agencies support your household during the evacuation?  
(Check a circle, ranging from "very bad" to "very good.")

Public Safety Officers (Pawtucket police and fire fighters)

Very Bad        Very Good

Social Services (Family Service of RI, Red Cross)

Very Bad        Very Good

Environmental specialists (RI DEM, EPA, their contractors)

Very Bad        Very Good

Schools (school teachers or administrators, bus drivers)

Very Bad        Very Good

Health Services (doctors, Department of Health, Fatima Hospital, Mayo)

Very Bad        Very Good

Hospitality (the motel and restaurant)

Very Bad        Very Good

The Potential Responsible Party (gas company, insurance adjuster)

Very Bad        Very Good

Overall (support as a whole, all things considered)

Very Bad        Very Good

Judging from your experience, what were the one or two best things that these agencies did? What strategies should they remember to use again?

The worst? What one or two strategies most require improvement?

Any other comments or suggestions?

## Appendix VI: Tennant Questionnaire (Spanish Version)

Abril 27, 2005

Saludos,

Escribo para pedir su ayuda en la preparacion de un reporte que responda al derrame de mercurio que ocurrio en Lawn Terrace. La idea principal de este reporte es el de ayudar a un numero de agencias a que mejoren su ayuda a las personas que tengan que ser evacuadas en el futuro. Estoy tratando de comunicarme con todas las personas que fueron afectadas esta vez, nos hallamos conocido o no. Esta es la razon de adjuntar el presente cuestionario, que solo le tomara unos minutos para contestar.

Para decidir si ud respondera el cuestionario, tenga en cuenta lo siguiente:

- Sus respuestas seran confidenciales. Nadie podra usar algo del cuestionario para ud ni contra ud. Para asegurarse que esto sea posible, por favor no escriba su nombre ni direccion de casa en el cuestionario o en el sobre de carta.
- Los riesgos son minimos para ud. Las memorias podrian ser desagradables, pero ud esta libre de no responder a cualquiera o a todas las preguntas. Si lo prefiere, puede botar esto a la basura.
- Aunque no hay un directo beneficio de este estudio, sus repuestas pueden ayudar a incrementar el conocimiento de como responder en casos de emergencia. Espero que sea satisfactorio para uds.
- La decision de llenar este cuestionario es totalmente suya.

Si ud estad de acuerdo, por favor responda a las siguientes preguntas, en español o ingles, y devuelva la pagina con las respuestas en el sobre proveido con estampilla y direccion.

Por favor dejeme saber si hay algo mas en que puedo servirle.

Gracias

Richard Horwitz  
Investigador Asociado, Universidad de Rhode Island  
Contratador Especialista, RI Departamento del Medio Ambiente  
Telefono: (401) 289-0198; E-mail: rhorwitz@cox.net

**Encuesta de Rentadores Desplazados (Derrame de Mercurio en Pawtucket, 2004)**

(Nota: Por favor no escriba su nombre o direccion de casa)

Cuantas personas en total estaban viviendo en su casa durante el tiempo de evacuacion? \_\_\_\_

Cuantos niños (bajo la edad de 18)? \_\_\_\_

Cuantos de uds se sentian mejor hablando otra idioma que no fuera ingles? \_\_\_\_

Que idioma (s)? \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Cuantos personas fueron evacuadas a un motel? \_\_\_\_

Que bien las siguientes agencias ayudaron su familia durante la evacuacion?  
(Marque un circulo, desde "muy malo" a "muy bueno.")

Oficiales de Seguridad Publica (Policia y bomberos de Pawtucket)

Muy malo O--O--O--O--O--O--O Muy bueno

Servicios Sociales (Servicio Familiar de RI, Cruz Roja)

Muy malo O--O--O--O--O--O--O Muy bueno

Specialistas del Medio Ambiente (RI DEM, EPA, sus contratistas)

Muy malo O--O--O--O--O--O--O Muy bueno

Escuelas (profesores o administradores, choferes de buses)

Muy malo O--O--O--O--O--O--O Muy bueno

Servicios de Salud (doctores, Departamento de Salud, Hospital Fatima, Mayo)

Muy malo O--O--O--O--O--O--O Muy bueno

Hoteleria (el motel y restaurante)

Muy malo O--O--O--O--O--O--O Muy bueno

La posible empresa responsable (compañia de gas, compañia de seguros)

Muy malo O--O--O--O--O--O--O Muy bueno

En general (total ayuda, considerando todas las cosas)

Muy malo O--O--O--O--O--O--O Muy bueno

Basado en su experiencia, cuales fueron la una o dos mejores cosas que estas agencias hicieron? Que estrategias ellos deberian recordar la proxima vez?

Lo peor? Que estrategias necesitan ser mejoradas?

Otros comentarios o sugerencias?