



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10

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Seattle, WA 98101-3140

OFFICE OF
ENVIRONMENTAL CLEANUP

18 April 2011

SUBJECT: Action Memorandum for the Oregon City Mercury Emergency Response Action,
Oregon City, Clackamas County, Oregon

FROM: Jeffrey A. Fowlow, On-Scene Coordinator
Emergency Response Unit *Jeffrey A. Fowlow*

THRU: Chris D. Field, Unit Manager
Emergency Response Unit

TO: Daniel D. Opalski, Director
Office of Environmental Cleanup

I. Purpose

The purpose of this Action Memorandum is to document the decision to initiate the emergency response action described herein for the Oregon City Mercury Site located in Oregon City, Clackamas County, Oregon (Site).

II. Site Information

A. Site Description

Site Name: Oregon City Mercury
Superfund Site ID (SSID): 10KH
NRC Case Number: N/A
CERCLIS Number: ORN 001002921
Site Location: 909 Washington Street, Oregon City, OR
County: Clackamas
Lat/Long: latitude: 45.3582359; longitude -122.6034892
Potentially Responsible Party (PRP): Mrs. Nancy Roberts
Access: Unrestricted
NPL Status: Not listed nor proposed for listing
Removal Start Date: TBD

B. Site Background

1. Removal Site Evaluation

March 24, 2011

The U.S. Environmental Protection Agency (EPA) received a report of a potential mercury spill on a driveway outside a vacant rental home in a historic residential area of Oregon City,

Clackamas County, Oregon (Figure 1). A prospective tenant who visited the property observed what appeared to be visible beads of mercury and reported this observation to the Clackamas County Fire Department. The City of Gresham Hazmat Team #3 and Clackamas Fire Department responded to the report and stabilized the Site. During the response, the Operations Manager of Oregon City coordinated response efforts with the Oregon Department of Environmental Quality (ODEQ) and the potentially responsible party (PRP), Mrs. Nancy Roberts, a non-resident homeowner who lives in Santa Fe, New Mexico. The suspected source of the mercury is an 80-year old boiler that was recently removed from the basement of the home by a heating contractor who replaced it with a new boiler between February 11 and February 16, 2011. ODEQ also contacted the homeowner, who then hired an asbestos abatement contractor to respond and clean up the Site. Although the contractor later reported the mercury removed, Oregon City officials inspected the Site, observed the presence of what appeared to be significant amounts of mercury on the ground, and reported this to ODEQ. On March 29, 2011, ODEQ reported that the cleanup was not complete, that mercury was still visible at the Site, and requested EPA's assistance in assessing the Site. EPA mobilized On-Scene Coordinator (OSC) Richard Franklin and the EPA START-3 response contractors to the Site on March 29-30 to conduct an investigation and site assessment.

March 30, 2011

EPA conducted air monitoring at the Site and adjacent property using two Lumex Mercury Vapor Analyzers (MVA) (Figures 1-2 and 1-3). Free beads of elemental mercury were observed over a wide area directly in front of the house's detached garage, but were concentrated in a distinct area measuring approximately 4 x 4 feet. Mercury vapors were detected along the ground south/southeast of the garage and near the northwest corner of the house at 1000 nanograms per cubic meter (ng/m^3). Mercury beads and vapors up to $1000 \text{ ng}/\text{m}^3$ were also observed in the house's basement directly adjacent to a new boiler, and mercury vapors were detected in a nearby basement floor drain and one further away. Mercury was detected nowhere else in the basement or first floor of the house. Mercury vapors were also detected in only one location at low levels ($100 \text{ ng}/\text{m}^3$) on a walkway leading along the outside of the house from the basement door. No mercury vapors were detected along the other 3 sides of the house, or the backyard.

Along the alleyway and drive dividing the two homes, mercury vapor levels were observed to be from 100 to $200 \text{ ng}/\text{m}^3$. No mercury vapors were detected in the front portion of the alleyway drive near Washington Street, or the sewer drain on Washington Street. Similarly, no mercury vapors were detected in a storm drain in the middle of the drive near the garage. None of the area of the drive or adjacent church parking lot beyond the rear of the property was evaluated, although mercury vapors were detected at low levels ($100 \text{ ng}/\text{m}^3$) on the drive at the property's rear edge.

EPA detected mercury vapors on the concrete pad and driveway in front of the adjacent home's detached garage owned by the Schweiger family, 911 Washington Street. Concentrations detected on the surface of the concrete and the expansion joints ranged from 400 to $6500 \text{ ng}/\text{m}^3$. Mercury vapors inside the Schweiger's garage were detected along tire tracks at levels from $200 \text{ ng}/\text{m}^3$ to $1200 \text{ ng}/\text{m}^3$. These concentrations exceed the Agency for the Toxic Substances Disease

Registry (ATSDR) suggested action level of 1,000 ng/m³ (or 1.0 microgram/cubic meter) which is the level acceptable for occupancy of any structure after a spill (also called the residential occupancy level).

At the time of the March 30, 2011 Site visit, it was apparent to EPA that mercury contamination was localized in a relatively small area, and at that time there was no indication that the mercury had migrated to other public areas. The local hazmat team had attempted to secure the localized mercury from further migration by placing a large tarp over the main area of concern and placed sandbags around it. The city also blockaded the rear access to the drive, and placed warning cones around the Site. EPA also placed danger signed tape around the spill area.

April 9, 2011

EPA learned that Mrs. Roberts had arrived in Oregon City and had begun conducting cleanup activities at the Site. START and EPA mobilized to the Site to confirm the effectiveness of the cleanup work conducted by Mrs. Roberts. Because Mrs. Roberts had not yet given EPA consent for access to her property, the START began by surveying the Schweiger driveway and the city right-of-way (ROW) (Figures 1-4 and 1-5). In the city ROW, responders found concentrations of mercury in seven of eleven sample locations in excess of the suggested 1,000 ng/m³ ATSDR action level, with a maximum concentration of 20,000 ng/m³. In the Schweiger driveway, seven of 34 sample locations had mercury concentrations in excess of the ATSDR action level, with a maximum concentration of 14,000 ng/m³ (see attached figures).

From the city ROW, the EPA and START could observe that Mrs. Roberts had been spreading a yellow powder (assumed to be sulfur) across her driveway in an apparent effort to absorb or encapsulate the mercury that had been located on her property. Footprints stained with the yellow powder were evident leading from the mercury contamination area of the Roberts' driveway onto the city ROW and the Schweiger property. The START screened one footprint on the Schweiger property and a concentration of mercury was 9,000 ng/m³. With the yellow powder footprints leading from areas of high contamination across to areas of relatively lesser contamination and with the presence of high mercury concentrations detected in the city ROW and the Schweiger property, it was apparent that Mrs. Roberts was attempting to conduct cleanup on her property without regard to basic hazardous waste removal protocols for site contaminant control or decontamination,

At 7:30 PM on Saturday night, April 9, OSC Fowlow contacted Ms. Roberts to ask about what cleanup activities she had conducted during the day. Mrs. Roberts stated that she had spread sulfur onto areas of her driveway which had been covered by the tarp. This area was the area known to have the greatest amount of mercury contamination, including dozens of visible mercury beads. Mrs. Roberts said she spread the sulfur onto the pavement, observed the yellow powder turn brown (which she believed indicated the absorption of mercury into the sulfur) and then scraped up the powder with a plastic dust pan. Mrs. Roberts stated that she placed the scraped up sulfur/mercury mix into a five gallon bucket and then reapplied additional sulfur powder. She continued to scrape and then re-apply a sulfur coating 3 or 4 times. All of the scraped up sulfur/mercury waste was

placed into the single five gallon bucket which she then transported to a nearby "Hazardous Waste" facility. She did not have a receipt from the waste facility, but said she told the technician what the material was. Mrs. Roberts stated she did not wear any protective clothing such as neoprene booties or any other standard personal protective equipment while she walked across the mercury contaminated surface while trying to scrape up the sulfur/mercury mixture. She admitted to the OSC that she walked from the most contaminated area directly across the city ROW and into her neighbor's property to speak to him and that she tracked the contaminated sulfur onto his property.

OSC Fowlow requested Mrs. Roberts' consent for access to her property to peel back the tarp which had been placed back over the contaminated area for the purpose of screening the area with the Lumex MVA to determine the residual concentrations of mercury remaining on the driveway. Mrs. Roberts agreed to allow EPA access to perform the survey with the Lumex. Upon removal of the tarp, the asphalt driveway was revealed to be heavily stained by the sulfur powder. In the center of the tarped area there is a storm water drain covered with sandbags to prevent water and contaminants from entering the storm water discharge system. The EPA and START did not investigate the drain system because of concern about allowing any additional contaminants from entering the storm water system. The START used an MVA to collect mercury vapor concentrations at 18 locations on the Roberts' driveway. Of the 18 locations, one location was less than the recommended ATSDR action level of $1,000 \text{ ng/m}^3$, twelve locations had concentrations between $1,000$ and $10,000 \text{ ng/m}^3$, and five locations had concentrations between $10,000 \text{ ng/m}^3$ and $55,000 \text{ ng/m}^3$. There was one area with a sufficient number of mercury beads remaining as to be visible through the sulfur powder. After conducting the survey, the tarp was replaced and was weighted down with sand bags.

April 10, 2011

OSC Fowlow contacted Mrs. Roberts to ask for access to the inside of the house to screen the basement with the Lumex MVA. Mrs. Roberts consented to providing access to EPA and EPA's contractors for the limited purpose of investigation. At 1:15 PM, OSC Fowlow and the START arrived at the Roberts' house and Mrs. Roberts allowed the EPA representatives inside to screen the basement. The new boiler was installed and was operating and a heavy coating of sulfur powder had been spread around the floor under the boiler where EPA's START contractor and EPA (OSC Franklin) and others had previously observed the mercury beads. The START conducted a survey with an MVA and concentrations exceeding the suggested ATSDR action level were not exceeded at any of the sampled locations inside the Robert's house.

2. Physical location and Site characteristics

The Site is located at 909 Washington Street, Oregon City, Clackamas County, Oregon, and surrounding areas where mercury contamination has come to be located. The Site is located in a historic residential neighborhood, one of the oldest in Oregon, and is a short distance (less than 1/2 mile) from the Willamette River. The house at 909 Washington Street is currently vacant and being used as a rental property. Immediately adjacent to the house is a narrow city drive that is used by the adjacent residents, and which connects the city street (Washington) with a church

and church parking lot behind the Robert's property. There is a sump drain in the middle of the spill Site driveway and one in the city drive, bottom of which drain storm water to the city storm sewer drain on Washington Street.

3. Release or threatened release into the environment of a hazardous substance, pollutant or contaminant.

Mercury is a hazardous substance as defined by section 101(14) of CERCLA, as amended, 42 U.S.C. §9601(14).

4. Pictures and other graphic representations

Refer to attached Figure 1 (Aerial Photograph), Figure 1-2 (Draft Mercury Vapor Assessment Results 3-30-11), Figure 1-3 (Draft Mercury Vapor Assessment Results, Tarped Area 3-30-11), Figure 1-4 (Draft Mercury Vapor Assessment Results 4-9-11), and Figure 1-5 (Draft Mercury Vapor Assessment Results, Tarped Area (4-9-11).

III. Threats to Public Health, Welfare or the Environment

A. Nature of Actual or Threatened Release of Hazardous Substances, Pollutants or Contaminants

The predominant threat to human health or welfare is the potential for exposure by inhalation of mercury vapors, although dermal contact with free mercury is also a serious threat to humans. EPA representatives observed mercury beads in the basement of the Robert's house and in the driveway in front of the Robert's garage. Mercury beads have also been observed by EPA representatives on the neighbor's property (the Schweigers) where two adults and four children live. Furthermore, screening of the Roberts' property and the neighboring property with a Lumex MVA showed mercury levels of up to 55,000 ng/m³. These concentrations exceed the suggested ATSDR action level of 1,000 ng/m³. EPA estimates that 4 fluid ounces of mercury was spilled. The presence of mercury was confirmed both by visual identification of very characteristic physical traits, and by screening with the MVA.

EPA documented the release of mercury during the March 30, 2011 investigation and Site assessment. Since that time the area of heavy mercury contamination appears to have spread and now impacts the city ROW and the Schweiger property – mercury has been detected in the mud room of the Schweiger house. The Schweiger family has 4 children living at the home and the areas of heaviest contamination are not isolated or fenced off in any way. The city ROW provides access from busy Washington Street to a church parking lot. There are 2 storm water drains in close proximity to the area of heaviest contamination. One of the storm water drains is on the Roberts' driveway and is less than 5 feet from areas of observed mercury beads.

B. Applicable factors (from 40 CFR 300.415) which were considered in determining the appropriateness of a removal action:

1. Actual or potential exposure to nearby human populations, animals or the food chain from hazardous substances or pollutants or contaminants [300.415(b)(2)(i)]

Elemental mercury beads have been observed at the Site. Contamination on the driveway at the Roberts' property has been measured at concentrations as high as 55,000 ng/m³. The city ROW and the neighboring Schweiger property also have been contaminated by mercury at levels as high as 14,000 ng/m³ and 20,000 ng/m³, respectively. Additionally, the Site is unsecured and children and other area residents use the city ROW to travel between streets and to use the church parking lot.

Mercury primarily causes health effects when it is breathed as a vapor where it can be absorbed through the lungs. These exposures can occur when mercury is spilled or products that contain mercury break and expose mercury to the air, particularly in warm or poorly-ventilated indoor spaces. Dermal contact with free mercury is also a serious threat to humans and mercury has been detected in the mud room of the Schweiger house where the family removes their shoes. Mercury is known to cause irreversible damage to the developing nervous system. Most at risk are women who are pregnant, may become pregnant, nursing, and young children. Other common health effects in adults include various neurological dysfunctions such as tremors, changes in vision, loss of hearing, muscle coordination, loss of sensation, and difficulties with memory

2. The availability of other appropriate federal or state response mechanisms to respond to the release [300.415(b)(2)(vii)].

ODEQ requested EPA assistance because it is not capable of providing the appropriate resources in a prompt manner needed to address the potential human health risks associated with the mercury described herein.

IV. Endangerment Determination under CERCLA Section 104: Pollutant or Contaminants

This section is not applicable because this emergency response action is not driven by a need to respond to known pollutants or contaminants.

V. Selected Removal Action and Estimated Costs

A. Situation and Removal Activities to Date

1. Current Situation

There is mercury contamination on the Roberts' driveway up to and including visible mercury beads. Contamination in excess of the ATSDR suggested action level has also been documented in the city ROW and on the Schweiger driveway. Due to the PRP's attempt to conduct cleanup activities, the mercury contamination appears to have spread. Beads of mercury have been observed within 5 feet of a storm water drain. (The drain has been blocked by sand bags.) Mercury has been tracked into the Schweiger garage and mud room.

2. Removal activities to date

On March 24, initial response actions and stabilization of the Site were taken by the Gresham Hazmat Team #3, Clackamas County Fire District #1, and Oregon City Operations department. The property owner hired IRS Environmental to respond to the Site and conduct clean-up activities. These were deemed to be inadequate by response agencies.

On Saturday, April 9, the PRP attempted use sulfur to absorb the mercury and generated a 5 gallon volume of mercury-contaminated sulfur that she claimed to have disposed of at a municipal waste station.

The removal efforts undertaken by the PRP has been inadequate and may have resulted in spreading the contamination.

3. Enforcement

See attached confidential enforcement addendum.

B. Planned Removal Actions

1. Proposed action description

Indoors

Wherever found, visible mercury will be cleaned up using a mercury vacuum or similar functioning device. Thereafter, the affected areas will be screened using a MVA. If the MVA readings are less than the ATSDR suggested action level of 1,000 ng/m³ no further action is necessary; however, if the readings exceed the ATSDR action level additional cleanup will be required such as cleaning with a mercury decontamination solution. After all decontamination is completed, confirmatory air sampling will be conducted to assure acceptable levels are achieved.

Out-of-Doors

Wherever found, visible mercury will be cleaned up using a mercury vacuum or similar functioning device. Thereafter, the affected areas including asphalt, concrete, or soil may be excavated to an approximate depth to be determined in the field. Confirmation of contaminant removal will depend on the nature of the substrate. If the substrate is asphalt or concrete, the area will be visually examined for the presence of mercury and any observed mercury will be removed. Thereafter, the affected area will be screened using a Lumex MVA. If the MVA readings are less than the ATSDR suggested residential occupancy level no further action is necessary; however, if the readings exceed the suggested action level EPA will evaluate the concentration of mercury vapors and the exposures at the location and will consider additional cleanup actions. If the substrate is soil, a composite surface soil confirmation sample will be collected from the bottom of the excavation and the sample will be analyzed for mercury. The soil data will be compared with the ODEQ residential soil cleanup level of 23 mg/kg, and dependent on this comparison additional excavation may be appropriate. EPA's

response may include efforts to restore the Site, including the property, to safe uses as EPA determines is necessary.

Disposal of Mercury Contaminated Materials

All mercury contaminated materials will be properly handled, packaged, and transported to an approved facility. The contaminated materials will only be disposed of at a facility in compliance with the Off-Site Rule set forth in the NCP at 40 C.F.R. 300.440.

Best Management Practices

Temporary Best Management Practices (BMPs) will be implemented during cleanup activities to protect workers and the public from short-term construction impacts such as fugitive dust and other similar potential impacts.

2. Contribution to remedial performance

The proposed actions will, to the extent practicable, contribute to the efficient performance of any long-term remedial action at the Site.

3. ARARs

The NCP requires that removal actions attain Applicable or Relevant and Appropriate requirements (ARARs) under federal or state environmental or facility siting laws, to the extent practicable. (40 CFR § 300.415[j]) In determining whether compliance with ARARs is practicable, EPA may consider the scope of the removal action and the urgency of the situation. (40 CFR § 300.415[j]) The following are requirements that may be ARARs for this removal:

Oregon Environmental Cleanup Rules (OAR 340-122) are potentially applicable for the establishment of cleanup levels and selection of response actions for soil at the Site. OAR 340-122-0040(2) requires that hazardous substance response actions achieve one of four standards: 1) acceptable risk levels, 2) generic soil numeric cleanup levels, 3) remedy-specific cleanup levels provided by Oregon DEQ as part of an approved generic remedy, or 4) background levels in areas where hazardous substances occur naturally. The Oregon Hazardous Substance Remedial Action Rules require consideration of treatment of hot spots to the extent feasible (OAR 340-122-0040).

Oregon Hazardous Waste Regulations and federal RCRA (40 CFR Parts 260 to 268; OAR 340-100 to 340-106). Federal regulations promulgated under RCRA, and corresponding state law, provide standards for the identification, management, and disposal of solid and hazardous waste. The regulations pertaining to determining whether a waste is hazardous are potentially applicable, and if any waste is determined to be hazardous, then requirements relating to disposal will be ARARs.

Oregon Solid Waste Management Rules (OAR 340-093 through -097) are potentially applicable to any treatment and disposal of solid waste that may be generated at the Site during conduct of the response action.

Oregon General Emission Standards for Particulate Matter (OAR 340-208-0100 through -0210) are potentially applicable to visible emissions and nuisance conditions that may be generated by conduct of the cleanup action.

4. Project Schedule

Once access to the property is secured, the removal action is anticipated to take one to two weeks to conduct. Mobilization of personnel and equipment will take 1-2 days, removal of the Roberts' driveway and ROW 1-2 days, testing soil/additional excavation if necessary 1 day, treating and decontaminating Schweiger's driveway 3-4 days (concurrent), reconstruction of surface water drains 1 day, restoration of driveways and ROW 1-2 days.

C. Estimated Costs*

Contractor costs (ERRS/START staff, travel, equipment)	\$90,000
Other Extramural Costs (Strike Team, other Fed Agencies)	\$0
Contingency costs (10% of subtotal)	\$9,000
Total Removal Project Ceiling	\$99,000

*EPA direct and indirect costs, although cost recoverable, do not count toward the Removal Ceiling for this removal action. Liable parties will be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA. "

VI. Expected Change in the Situation Should Action Be Delayed or Not Taken

A delay in action or no action at this Site would increase the actual or potential threats to the public health and/or the environment.

VII. Outstanding Policy Issues

None.

VIII. Approvals

This decision document represents the selected removal action for this Site, developed in accordance with CERCLA as amended, and is consistent with the National oil and Hazardous Substances Contingency Plan (NCP). This decision is based on the administrative record for the Site.

Conditions at the Site meet the NCP section 300.415(b) criteria for a removal action and through this document I am approving the removal action described herein. The total project ceiling is \$99,000. Of this, as much as \$40,000 comes from the Regional removal allowance.



Jeffrey Fowlow

Federal On-Scene Coordinator

4/28/11
Date

IX. Endangerment Determination under CERCLA Section 106: Hazardous Substances

Actual or threatened releases of hazardous substances from this Site, may present an imminent and substantial endangerment to public health, or welfare, or the environment.



Chris D. Field, Unit Manager

Emergency response Unit

4/20/11
Date

Source: Google Earth Pro 2011.



ecology and environment, inc.
 Global Specialists in the Environment
 Seattle, Washington

OREGON CITY Hg ER
 Oregon City, Oregon

0 20 40
 Approximate Scale in Feet

Figure 1
 AERIAL PHOTOGRAPH

Date:
 4/11/11

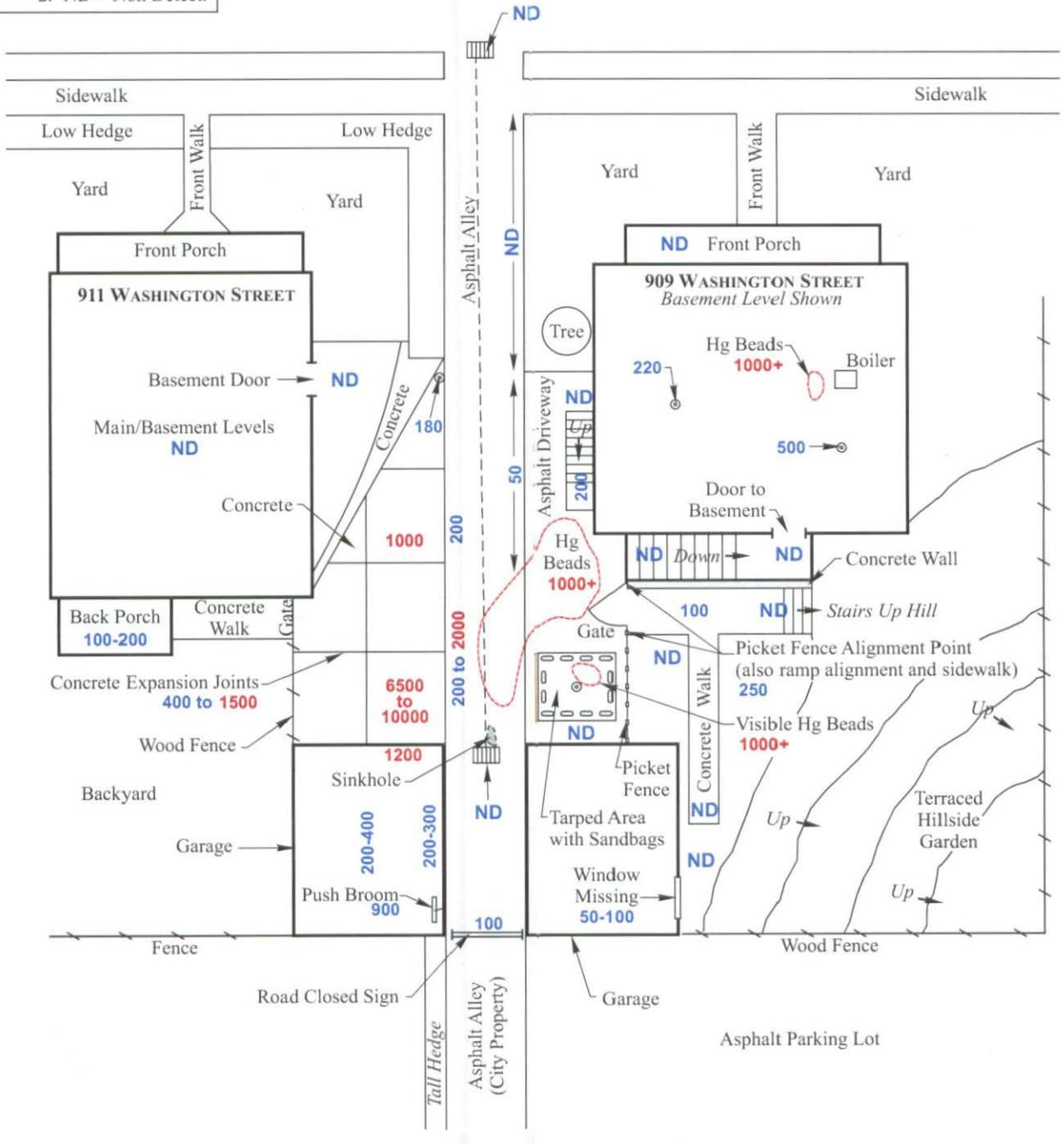
Drawn by:
 AES

10:START-3\00000000\fig 1

Key:

-  Catchment Basin
-  Drain
- 130** Hg < 1000 ng/m³
- 1000** Hg > 1000 ng/m³

Note: 1. All units in ng/m³.
2. ND = Non Detect.



OREGON CITY Hg ER
Oregon City, Oregon

Figure 1-2
DRAFT MERCURY VAPOR
ASSESSMENT RESULTS 3-30-11

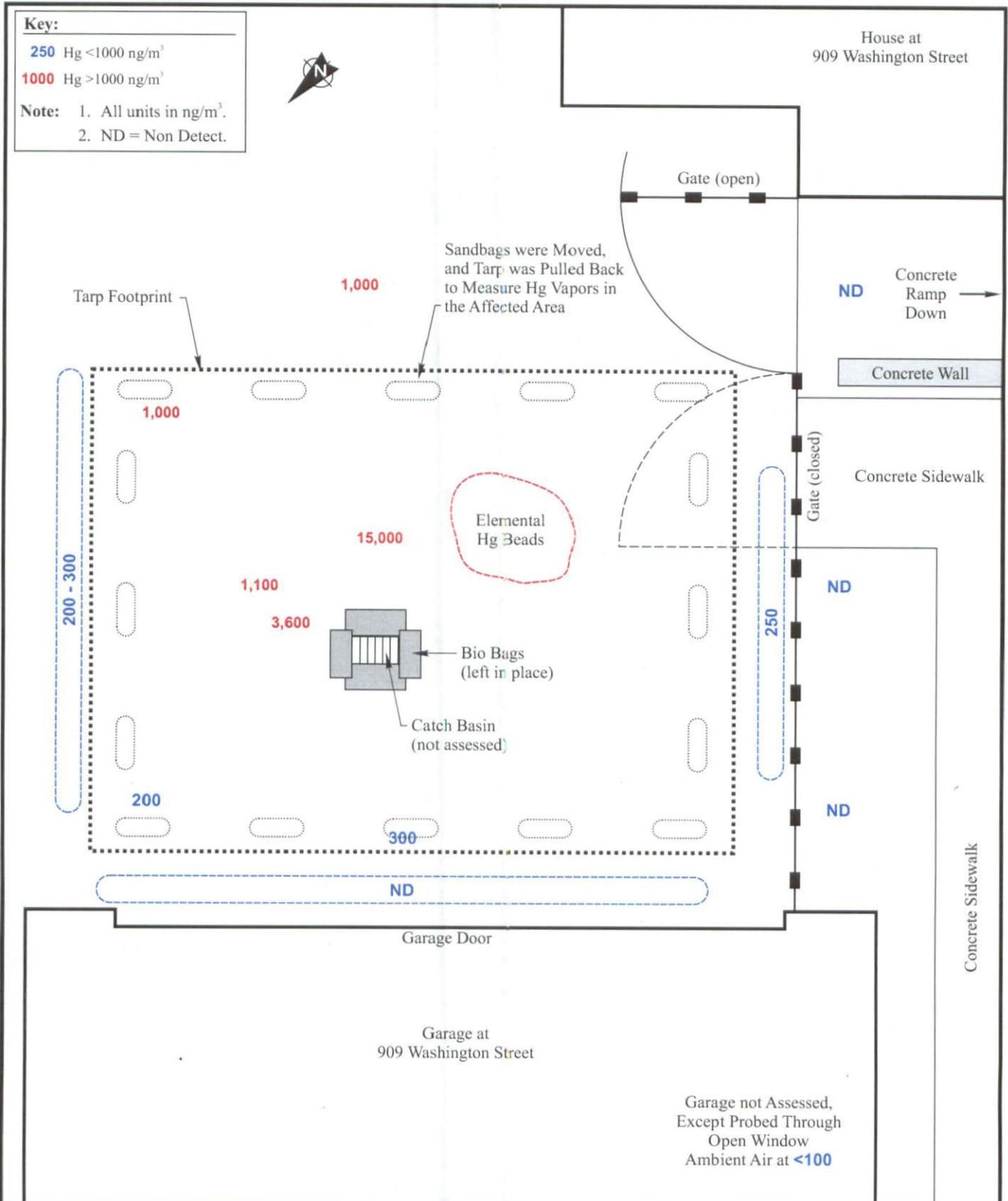
Not to Scale

Date:
4-11-11

Drawn by:
AES

10:START-3\00000000\fig 1-2

Key:
 250 Hg <1000 ng/m³
 1000 Hg >1000 ng/m³
Note: 1. All units in ng/m³.
 2. ND = Non Detect.

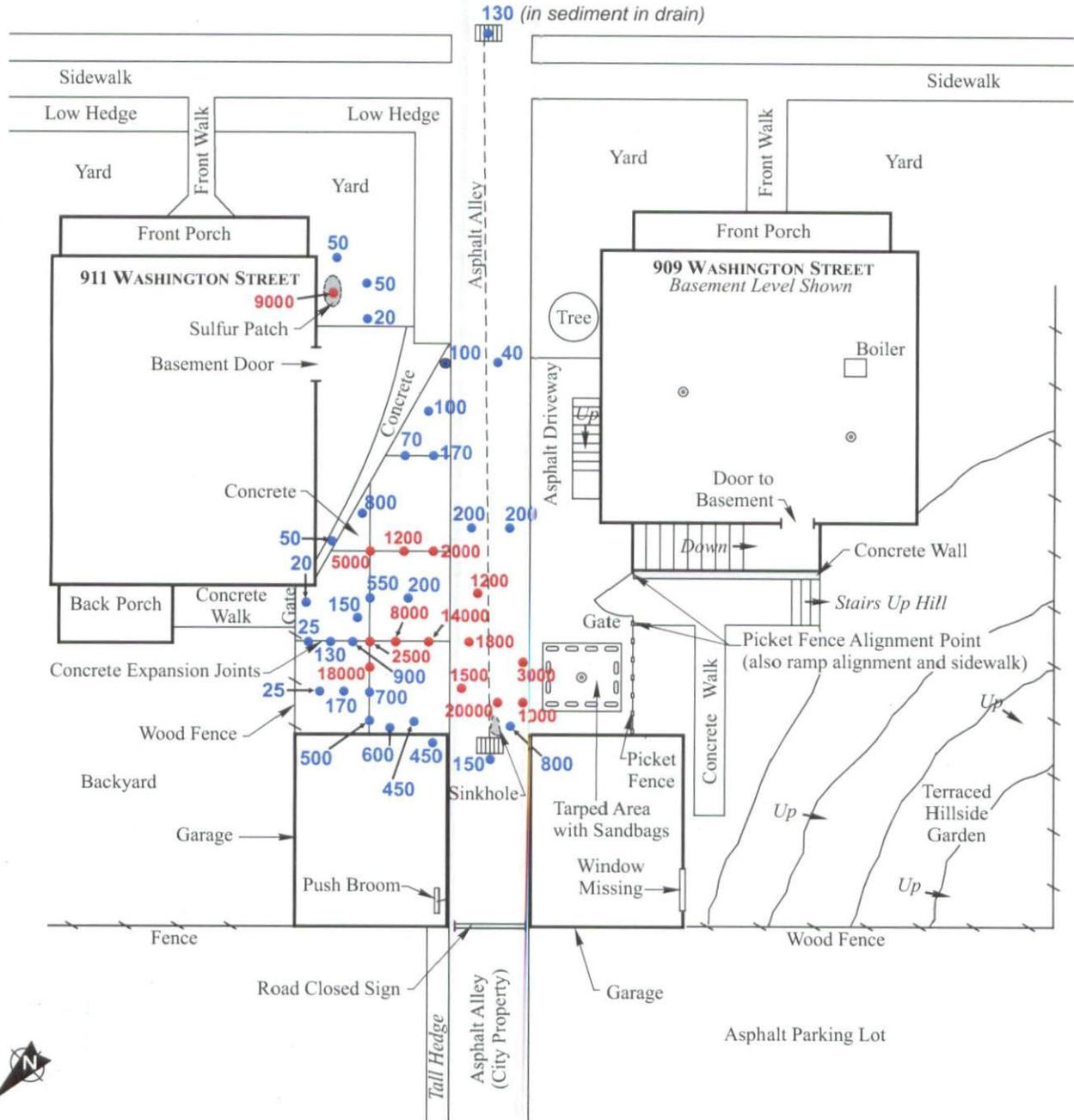


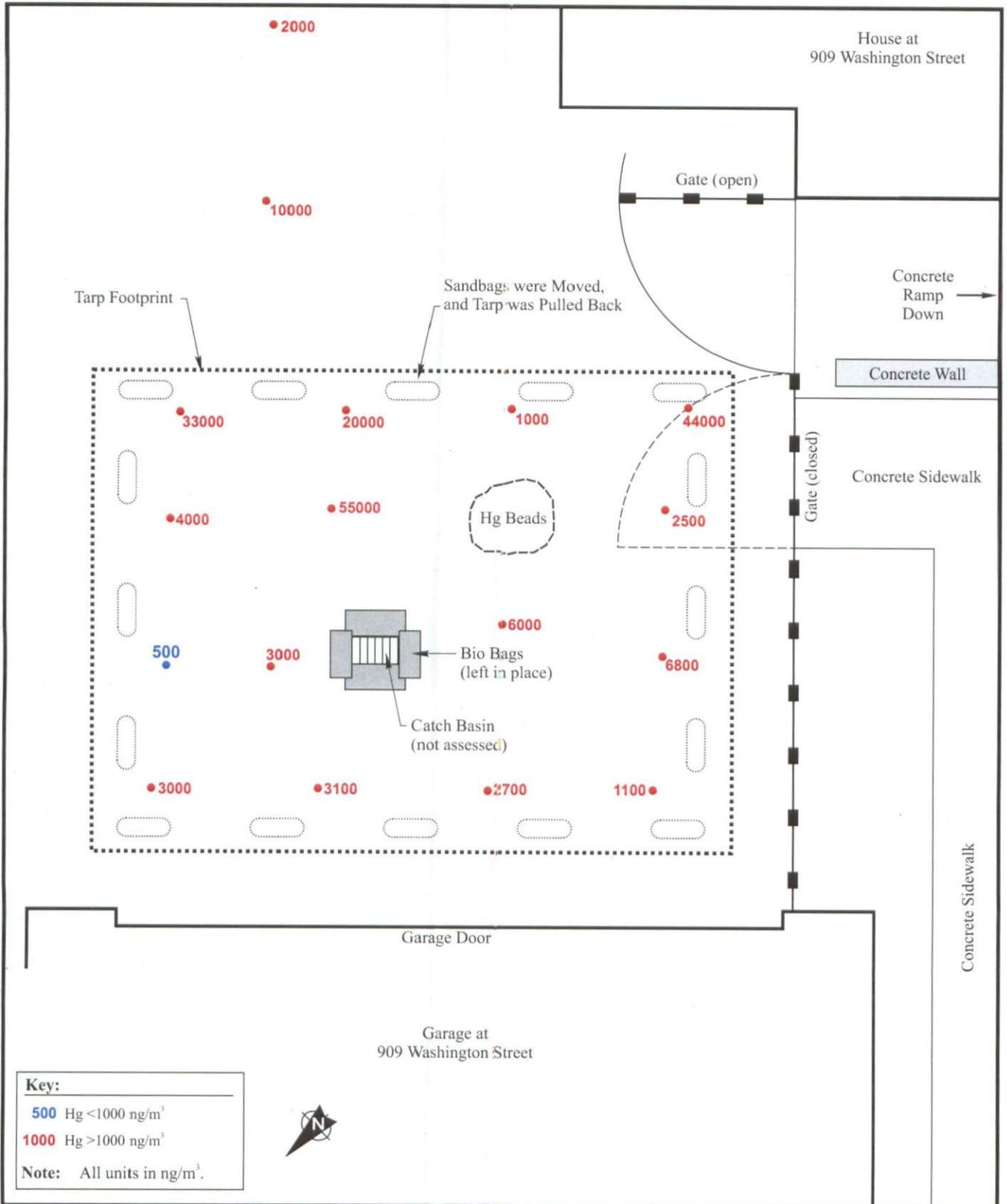
 ecology and environment, inc. Global Specialists in the Environment Portland, Oregon	OREGON CITY Hg_{ER} Oregon City, Oregon	Figure 1-3 DRAFT MERCURY VAPOR ASSESSMENT RESULTS, TARPED AREA 3-30-11		
	Not to Scale	Date: 4-11-11	Drawn by: AES	10:START-3\00000000\fig 1-3

Key:

-  Catchment Basin
-  Drain
- 130 Hg < 1000 ng/m³
- 1000 Hg > 1000 ng/m³

Note: All units in ng/m³.





Key:
 500 Hg <1000 ng/m³
 1000 Hg >1000 ng/m³
Note: All units in ng/m³.



 <p>ecology and environment, inc. Global Specialists in the Environment Portland, Oregon</p>	<p>OREGON CITY Hg ER Oregon City, Oregon</p>		<p>Figure 1-5 DRAFT MERCURY VAPOR ASSESSMENT RESULTS, TARPED AREA 4-9-11</p>	
	<p>Not to Scale</p>		<p>Date: 4-11-11</p>	<p>Drawn by: AES</p>