Executive Summary

At the request of several groups from the Bayview Hunters Point community, the U.S. Environmental Protection Agency (EPA) Region 9 reviewed the dust control measures and possible exposures to dust and naturally occurring asbestos near the development at Parcel A of the former Hunters Point Naval Shipyard. EPA also evaluated the dust control measures and air monitoring for naturally occurring asbestos, radiation and metals at the Navy cleanup sites at the former Shipyard.

Parcel A was originally used by the Navy primarily for housing, and as such, there were only small amounts of contamination on the property. The Navy completed environmental cleanup work at Parcel A to residential standards and transferred it to the City of San Francisco in 2004. Development work at Parcel A began in 2006. The Navy plans to finish its work on Parcels B and G this year and transfer those parcels to the City in 2011. The remaining parcels will follow in the next few years.

Many regions of California, including areas in San Francisco such as Hunters Point, sit on soil containing naturally occurring asbestos. Because naturally occurring asbestos in construction dust is a widespread concern in California, the State of California requires that all large construction projects in such areas work under an Asbestos Dust Mitigation Plan (ADMP) enforced by the local Air District. The goal is to control the dust in order to minimize possible exposure to asbestos. EPA reviewed the ADMP for the Parcel A development and found that strict best management practices for dust and asbestos monitoring and mitigation are in place to protect the community and keep exposure to asbestos in dust within acceptable levels. The current practice of daily inspections by the Bay Area Air Quality Management District (“Air District”) and the City of San Francisco Department of Public Health provide appropriate oversight and enforcement.

The Air District requires air monitoring for asbestos as part of the ADMP for the Parcel A development project to provide feedback on the effectiveness of the dust mitigation efforts. While the Air District did not intend the asbestos air monitoring program to be used to evaluate exposure or health risk in the neighborhood, EPA calculated potential risk using the daily air monitoring data as a screening evaluation of what is in the air directly at the monitoring stations. The results were within EPA’s defined acceptable risk range of between a one-in-one-million and one-in-ten-thousand chance of developing an asbestos related cancer.

The daily analysis of asbestos at the site is done by the method required by the California Air Resources Board (CARB), which counts all asbestos fibers. EPA re-analyzed 34 asbestos monitoring filters using a different method that provides a specific count of the longer asbestos fibers that correlate with asbestos health effect studies. EPA found lower levels of the “long” asbestos fibers. The results confirm previous conclusions by the Air District, the San Francisco
Department of Public Health, and the California State Department of Public Health that the daily monitoring results are within acceptable risk levels.

While EPA’s analysis focused primarily on naturally occurring asbestos, some community groups also asked EPA to evaluate whether metals and radiation might be in the dust at Parcel A and the Navy portion of the Shipyard. The monitoring data indicate that naturally occurring metals in dust at Parcel A and the Navy portion of the Shipyard do not pose an unacceptable risk. The radiation measured at all Navy excavations is below levels set for residential exposure. The Navy completed its cleanup at Parcel A to EPA’s unrestricted residential standards, so the development work is not releasing Navy-related chemicals, metals or radiation to the community.

EPA will continue to coordinate with the Air District to ensure that both the developer and the Navy meet all the requirements of their Dust Mitigation Plans and that any releases of dust, asbestos and other possible contaminants remain at acceptable levels.

Introduction

Parcel A at the former Hunters Point Naval Shipyard is located in the Bayview Hunters Point neighborhood of San Francisco and covers approximately 75 acres (see Figure 1). Parcel A is being developed by the City of San Francisco and its developer, and the construction involves excavating and grading large amounts of soil and bedrock. The rock and soil in the Bayview neighborhood is partially comprised of the mineral serpentine, which contains naturally occurring asbestos and metals such as manganese and arsenic. Construction projects larger than one-acre in size in areas with naturally occurring asbestos are required to file an Asbestos Dust Mitigation Plan (ADMP) with the Air District under a state law called the Airborne Toxics Control Measure.

Review of the Asbestos Dust Mitigation Plan for Parcel A

EPA reviewed the ADMP for Parcel A prior to its reauthorization by the Air District in 2009. EPA found that the plan contained strict dust control measures, including requirements for wetting work areas, controlling soil stockpiles, covering truck loads, controlling dirt track out (e.g., washing wheels), and cleaning streets. The goal of the plan is to allow no visible dust to leave the site and no dirt track out onto neighborhood streets. This is in line with lessons learned from other sites with naturally occurring asbestos -- the best way to minimize exposure is to minimize dust generation. The plan is enforced through daily inspections by the Air District and separately by the City Department of Public Health under a city ordinance (Article 31).
Review of Dust and Asbestos Monitoring Plans and Practices at Parcel A

As part of the ADMP, the Air District required the developer to install five stationary air monitors on and around the site (Figure 2). The locations of the Air District monitors (HV-1, 2, 4, 5 and 6) were determined by geophysical modeling based on terrain and meteorological information to present the best locations to evaluate asbestos levels at the fence line.

Samples are generally collected for each 24 hour period on work days. The monitors work by pumping air in through a filter, which catches the asbestos fibers. The filters are collected in the morning and sent to an independent certified laboratory which counts the fibers using an electron microscope.

The Air District established a trigger level of 16,000 total asbestos structures per cubic meter (s/m$^3$) of air. Under the ADMP, a reading at any monitor above the trigger level requires that the developer stop work for the day and subsequent days until all monitors are below the trigger level. The purpose of the work stoppages is to decrease asbestos releases by forcing the developer and Air District to re-evaluate procedures and methods to reduce dust and asbestos levels before work resumes. It is important to note that the trigger level established by the Air District for this project is not a legal standard and that results above the trigger level do not constitute a violation. The monitors and the trigger level are part of the specific ADMP for the development project and are intended to help minimize generation of asbestos from construction activities, not as a method to assess health risks in the community.

Due to concerns from the community about the problems with the monitors in the early summer of 2006, the City required the developer to install an additional five monitors. The filters are analyzed using the same protocol as the Air District monitors. Three of the City monitors (HV-7, 9, and 11) are generally sampled every work day. Similar to the Air District, the City required that work stop on days that results are above the trigger level. HV-8 is located upwind of the project and is sampled one day per week at random, though its results are also compared to the trigger level and used in the stop work process. HV-12 is located the furthest distance from the project and is sampled on work days. It was originally included in the stop work process, but because HV-12 is located on a dirt shoulder adjacent to a roadway and its results do not correlate with grading and excavating activities, the City now simply collects the data for informational purposes. The Air District formally added City monitors HV-7, 8, 9, and 11 to the ADMP in the latest update, finalized in August 2009.

The City Department of Public Health also requires continuous measurements for dust, with a minimum requirement that there be one dust monitor upwind of the project and two downwind. Currently, the City requires dust monitoring at five stations (HV-1, 2, 5, 7, and 11).

EPA found that the asbestos and dust monitors are the appropriate types of equipment for the project and provide the necessary information to monitor and control the worksite.
General Analytical and Risk Calculation Methods for Asbestos in Air

Asbestos hazard assessments are based on epidemiological studies conducted several decades ago on occupational exposures to asbestos. The best method available at that time for measuring asbestos was phase contrast microscopy (PCM) which uses a magnification of 400X. The epidemiological studies correlated risk with asbestos fibers measured with the PCM method, which was able to measure fibers longer than 5 micrometers (µm) and with an aspect ratio (length divided by width) greater than 3. Such fibers are called the PCM equivalents.

The current method used to count asbestos fibers is transmission electron microscopy (TEM) which has a magnification of 20,000X. TEM can resolve fibers as small as 0.5 µm in length, as well as definitively determine the asbestos type and provide a more accurate fiber size distribution. However, the specific asbestos fiber type and size associated with disease is not known, therefore the PCM equivalents are used as a surrogate for exposure. This leads to a problem with utilizing the newer data in risk assessments since TEM can resolve both the short and long fibers, but the epidemiological data are based only on the longer fibers.

One approach to work around this problem is to convert the total fiber counts from the current TEM measurements back to the original epidemiologic measures. This is the approach that the California Air Resources Board (CARB) requires in their asbestos regulations. CARB utilizes a modified version of the procedures outlined in the Asbestos Hazard Emergency Response Act (AHERA) published in 1987 in response to asbestos material in schools. The CARB procedure counts all the fibers greater than 0.5 µm in length, then converts the total count to PCM equivalents by applying a conversion factor of 320 total fibers/1 PCM equivalent. This is based on observations that with chrysotile asbestos, a common commercial mineral form, the fiber distribution is heavily weighted to fibers shorter than 5 µm in length. However, site specific conversion factors may vary in situations with naturally occurring asbestos.

EPA prefers to use the International Organization for Standardization (ISO) 10312 method published in 1995. This method also uses TEM but provides a count of both the total number of fibers as well as a count of the strict PCM equivalents. The PCM equivalents count can then be used directly in the risk calculations. Another significant difference between the CARB and the EPA procedures is in how individual fibers are categorized and tabulated. The ISO 10312 method allows the analyst to identify and tabulate any distinguishable fiber that meets the dimensional requirements regardless of the complexity, while the CARB procedure counts a complex of fibers as a single entry. This means that the CARB method reports a clump of fibers as one, while the EPA method attempts to count all the fibers in the clump. Both the CARB method and the ISO 10312 method use similar sample collection methods, preparation, instrumentation and resolution. However, the fiber dimensions of concern are different and the procedures for how individual fibers or complexes are tallied can result in differences in the totals based on the complexity of the asbestos structures and size distribution. Therefore, the results from the two methods cannot be directly correlated.
Analysis of Air Asbestos Data at Parcel A

In the health studies that form the basis for evaluating potential health effects from asbestos exposures, cancer was correlated with cumulative average lifetime exposure. Since the perimeter sampling is designed to assess the level of airborne asbestos at the fence line and not represent a continuous individual exposure, it is not appropriate to calculate an overall risk number. However, as a screening measure, EPA calculated a potential risk number at each of the monitoring stations using the 7,000 plus data points collected and analyzed by the CARB method from mid-2006 through 2009. The result at each monitoring station is below a one-in-one-hundred-thousand potential risk. This calculation was based on exposure beginning in infancy to provide the most conservative estimate. Again, this does not represent the risk in the community, but rather is a measure of what is in the air directly at the fence line monitoring stations.

More than half of the filters originally analyzed by the CARB method over the life of this project were non-detect -- that is, no asbestos fibers were measured in 4,153 out of 7,278 filters. In the original CARB analysis, approximately two percent of the filters had results above the trigger level.

EPA oversaw the re-analysis of 34 filters – including at least one from each monitoring station that had results above the detection limit. EPA selected filters over the complete range of detected fiber concentrations and with a majority representing filters with high counts from the CARB method. EPA’s re-analysis employed both the CARB and EPA procedures and fiber counting rules and definitions. The filters available for selection were from days between December 2008 and August 2009.

The monitor locations and dates are shown in the table below, along with the original CARB result and the PCM equivalents re-analysis results. The results in bold denote filters whose original CARB results were above the trigger level of 16,000 structures/m³.

<table>
<thead>
<tr>
<th>Monitor</th>
<th>Date</th>
<th>Original CARB Total (s/m³)</th>
<th>PCM Equivalents (EPA re-analysis) (s/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV-4</td>
<td>2/27/2009</td>
<td>non-detect</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-2</td>
<td>4/2/2009</td>
<td>800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>5/7/2009</td>
<td>800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-8</td>
<td>3/2/2009</td>
<td>900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-5</td>
<td>5/15/2009</td>
<td>900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-9</td>
<td>4/9/2009</td>
<td>1,000</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>5/5/2009</td>
<td>2,000</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-7</td>
<td>3/10/2009</td>
<td>2,800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>4/21/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-4</td>
<td>3/20/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-2</td>
<td>5/1/2009</td>
<td>2,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-9</td>
<td>6/5/2009</td>
<td>3,900</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-1</td>
<td>5/1/2009</td>
<td>4,800</td>
<td>non-detect</td>
</tr>
<tr>
<td>HV-11</td>
<td>4/13/2009</td>
<td>5,900</td>
<td>non-detect</td>
</tr>
</tbody>
</table>
Seventy-four percent of the filters re-analyzed by the EPA method did not have any detectable PCM equivalents fibers, even though the CARB method results for these filters were frequently above the trigger level. The data indicate that a high CARB result may or may not correlate with the presence of PCM equivalents fibers, but a low CARB result does correlate with low PCM equivalents results.

A true risk calculation cannot be done with only 34 data points and with so many non-detects. However, as a point of reference, the highest value measured by EPA, 3,800 structures/m$^3$, corresponds to a potential risk of one-in-ten-thousand if that were the concentration that a person was continuously exposed to. All of the PCM equivalents data in the above table were either non-detect or below this level indicating that the risk is at acceptable levels. In addition, we can conclude that if the trigger level were based on the PCM equivalents fiber counts, the result would be far fewer shut-down days than required using the CARB method.

**Malfunctioning Monitors Around Parcel A in 2006**

There was a period of approximately three months at the beginning of earthmoving activity in 2006 when the perimeter asbestos air monitors were not functioning properly. The Air District assessed a penalty for this violation and the problem was fixed in early August of 2006. The only data available from this time period are several worker safety monitors worn by equipment operators on Parcel A and Navy monitors located downwind near Navy excavations on Parcels B-G. The asbestos levels measured in worker safety monitors at Parcel A and at Navy monitors during this time period are below limits set for worker exposure. The measurements for the worker safety monitors use different methods than the perimeter monitors and thus may not be directly compared or averaged with the perimeter monitors for risk analysis. EPA believes that
the three plus years of data taken daily at the perimeter monitors since 2006 provide the best representation of conditions at the site and thus used this data in our assessment.

**Radionuclides and Metals Dust at Parcel A and the Navy Portion of the Shipyard**

EPA, California EPA and the Air District enforce a similar Dust Mitigation Plan for the Navy’s Shipyard remediation work as the Air District requires at Parcel A. In addition to asbestos and dust, the Navy also monitors for radiation, manganese and lead immediately adjacent to all of its work sites at the Shipyard.

The average monitoring result for radiation is $10^{-13}$ microcuries/milliliter of air for both alpha and beta activity. These reported levels include both potential Navy sources and naturally occurring sources native to the soil. This corresponds to a dose less than EPA’s limit of 5 millirems per year for residential exposure. Thus, EPA sees no elevated risk to the community from radioactivity related to Navy cleanup activities. At Parcel A, EPA scanned the entire surface of the parcel prior to transfer and found no radiation above natural background levels. Thus, the construction activity at Parcel A should also pose no threat to the community from radionuclides.

For metals, manganese poses the highest potential risk of the naturally occurring metals and lead poses the highest potential risk of possible Navy contaminants. Other metals, such as arsenic, chromium, nickel, etc., are present in the soil at concentrations with lower potential risks than manganese and lead. The following table shows that the concentrations for these two metals measured in airborne dust adjacent to Navy excavations are less than the EPA Schools Air Toxics screening levels.

<table>
<thead>
<tr>
<th>Metal</th>
<th>Average Navy Measurement (micrograms/m$^3$)</th>
<th>Schools Air Toxics Screening Level (micrograms/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>0.0076</td>
<td>0.15</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.028</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Because the San Francisco Department of Public Health and the Air District only require monitoring for dust and asbestos at Parcel A, EPA compared the dust levels measured at Parcel A with dust levels measured by the Navy. The dust measurements are of particulates with a diameter smaller than 10 micrometers, called PM-10. Since the soil type is the same at both sites, the concentrations of naturally occurring metals in dust would be expected to also be the same. The average dust concentration measured by the Navy is 35 micrograms/m$^3$. The annual averages at the five dust monitors at Parcel A are in this same range, typically between 30 and 60 micrograms/m$^3$. Therefore, we expect that the concentrations of metals in dust at Parcel A are below the screening criteria. Finally, EPA’s national standard for PM-10 is 150 micrograms/m$^3$ in ambient air, meaning the general air in a region. The dust concentrations directly at the construction site at Parcel A are below this level.
Minimizing Exposure to Dust and Asbestos

Because naturally occurring asbestos is found throughout Bayview Hunters Point, it is important to minimize all potential exposure pathways. EPA will continue to work with the Air District and the City Department of Public Health on improving the dust mitigation efforts. However, there are also a number of non-construction activities that can release asbestos. Based on research in other locations with naturally occurring asbestos, EPA has developed recommendations for how individuals can minimize their exposure. The recommendations include:

- Cover areas of rock and soil with clean soil, rock, vegetation, or other material
- Pave over unpaved walkways, driveways, or roadways containing naturally occurring asbestos (NOA)
- Landscape areas with vegetation and add a layer of organic mulch or NOA-free soil
- Water garden areas before digging
- After gardening or other activities in the dirt, remove boots and gloves outside and take dirty clothes directly to the laundry
- Keep windows and doors closed on windy days
- Limit track-in by using door mats, and wipe down pets before they enter buildings to reduce the amount of soil tracked indoors
- Allow children to play in outdoor areas only if the area has a ground covering, such as wood chips, mulch, sand, pea gravel, grass, asphalt, shredded rubber, or rubber mats
- Relocate outdoor activities to areas that do not contain NOA. Walk, run, hike, and bike only on paved trails
- Avoid dusty areas, especially in windy conditions

Conclusion

The Air District effectively oversees and regulates the developer’s construction activities at Parcel A under the Asbestos Dust Mitigation Plan. Dust generation is minimized by the dust mitigation measures and the monitoring and inspection procedures, thus keeping asbestos and metals exposures within acceptable risk levels. At the same time, EPA, California EPA and the Air District oversee the Navy’s dust and asbestos mitigation efforts. Navy monitoring results for metals, radiation and asbestos are all below health based screening levels.

Additional Resources

EPA factsheet on naturally occurring asbestos:
http://www.epa.gov/superfund/health/contaminants/asbestos/noa_factsheet.pdf

EPA website on the former Hunters Point Naval Shipyard Superfund site:
http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/db29676ab46e80818825742600743734/23b69b19b13d34c488257007005e9421!OpenDocument
San Francisco Department of Public Health webpage with fact sheets and a spreadsheet with the daily asbestos monitoring data:  
http://www.sfdph.org/dph/EH/HuntersPoint/default.asp

Navy webpage with dust data and documents related to Navy remediation at the Shipyard:  
Figure 1: Location Map of Hunters Point
Figure 2: Asbestos Air Monitor Locations Around Parcel A
U.S. EPA Response to Comments from the Technical Assistance Services for Communities (TASC) Independent Contractor on the “Draft Technical Summary of EPA’s Analysis of Hunters Point Air Monitoring Filters for Asbestos, December 22, 2009”

The comments below were received in a report from E² Inc., which provided independent technical assistance to the community under EPA’s TASC program. Comments from E² were developed based on input from Dr. James Millette of MVA Scientific Consultants, a national expert on asbestos, and on input from community groups.

Note that in finalizing the report, EPA changed the title from “Draft Technical Summary of EPA’s Analysis of Hunters Point Air Monitoring Filters for Asbestos” to “U.S. EPA Review of Dust/Naturally Occurring Asbestos Control Measures and Air Monitoring at the former Hunters Point Naval Shipyard” to better reflect the new content.

Comments included in the body of the text of the TASC Report:

Comment 1: The Draft Technical Summary does not specifically address dust generation.

Response: The comment is correct; EPA did not specifically address dust in the draft report. EPA added a discussion on dust to the final report and clarified the differentiations between dust and asbestos.

Comment 2: During the site visit on March 1, Sample Site HV-8 equipment was not present, suggesting that no sampling is taking place at HV-8. The EPA Draft Technical Summary lists this monitor as being sampled one day per week at random. It is uncertain if sampling is not taking place at this site at all or if the equipment is moved when not actively sampling. Examination of the 68 results from the HV-8 monitor (12/05/06 – 2/26/10) shows the same trends as the other sets of monitor data. Most of the time, no asbestos was detected. A few times the level was above the trigger level, but below the EPA risk level for continuous exposure.

Response: HV-8 has been present during every EPA inspection. HV-8 is located within a fenced perimeter and is not easily visible from outside the site.

Comment 3 (related to Recommendation 3 below): The EPA Draft Technical Summary did not attempt to address the exposure to the community between April and August 2006 when mass grading/earthmoving activities occurred on Parcel A. There are no perimeter monitoring data from that period. It may be possible to estimate exposures with other data or by use of a modeling study. There are several different approaches that could be used for modeling. A combination of approaches may also be appropriate. Three approaches are:

a. Data extrapolation: There is some perimeter data collected on August 17, 2007 during work activities similar to those occurring during the April-August 2006 period.
The perimeter air sampling values for that day (8/17/07) were 0.0019, 0.0010, 0.0029, 0.0057, 0.0009, <0.0010, 0.0460, <0.0010, <0.0010, and 0.0038 structures per cubic centimeter.

**Response:** The comment suggests looking at data from a day when monitoring was functional and field operations were out of compliance (the commenter suggests a specific day with an inspection that led to a Notice of Violation). As the comment notes, nine out of ten monitors were well below the trigger level on that day, and one monitor was at three times the trigger level. While this may qualitatively suggest that monitoring results are not necessarily high on dusty days, it only represents a single day and risk should be estimated from exposure measurements over a long time period. EPA prefers to focus on the three plus years of existing data. There is no way to recreate the missing data, but the monitoring during the last three years of construction activity are the best estimate of what conditions may have been like during the early summer of 2006.

**b. Data calculation:** It may be possible to use a modeling study to estimate the community exposures during that period at the site. A key parameter needed to perform this calculation is the amount of asbestos released by the grading/earth moving and truck related activities during the time period of interest. There is some data from personal monitoring at the site that was conducted in May 2006 that can be assumed to reflect the levels of fibers released during the grading/earth moving activities. The highest values from the personal samples were (all in fibers per cubic meter):

- Scraper moving dirt: 30,000
- Blade operator: 40,000
- Compactor: 50,000

All of the fibers in these samples are longer than five micrometers. These are Phase Contrast Microscopy (PCM) data which may contain some non-asbestos fibers.

**Response:** The data from the worker safety monitors ranges from non-detect to the highest levels noted in the comment. Also, as noted in the comment, the worker PCM data includes non-asbestos fibers so the results should not be correlated with the perimeter monitoring results. Modeling could be done to estimate the dispersion and dilution as the fibers move from the source area out into the neighborhood. However, that is beyond the scope of EPA’s assessment of ongoing operations and exposure. However, the levels measured at the worker source area are within worker safety limits and would be lower at the project boundary. Also, as stated in the response above, EPA believes that the three plus years of perimeter monitoring data collected during construction are the best indicators of conditions at the site.

**c. Collect new or research similar activity samples:** There is a database of information about activity-based asbestos fiber release from naturally occurring asbestos (NOA). Eldorado Hills, Clear Creek, Garden Valley, and Slow Dusty Road are sites that have been studied. An investigation into whether any of the data collected for those sites is applicable to Hunters Point grading/earth moving and truck related activities.
undertaken between April and August 2006 should be undertaken. If these data are not applicable, an activity-based sampling of grading/earth moving and truck related activities on another part of the Hunters Point site should be considered if the activities and soil/rock characteristics are similar to the situation in Parcel A.

Response: EPA and the State of California have done research in the past at the sites listed in the comment and lessons learned about dust mitigation and asbestos monitoring were used in developing the dust and asbestos control measures at Hunters Point. However, each site has unique work conditions, geology and weather. Thus, the data from those sites are not as applicable to an evaluation of conditions at Hunter Point as the three plus years when grading, excavating and earth moving activities were occurring with proper monitoring.

Comment 4: Asbestos fibers are not connected to the community health outcomes reported, such as headaches, bloody noses, adult onset asthma, respiratory symptoms, nausea and vomiting. In 2007 the California Department of Public Health (CDPH) stated the following in a public health report (CDPH, September 10, 2007):

“CDPH has reviewed the equipment being used to monitor dust and a limited set of the dust data. According to the manufacturer, the instrument that has been used to monitor dust at Parcel A is designed for personal/breathing zone monitoring, plant walk-through Hunters Point Asbestos Technical Advisor Report 4 surveys, remediation site worker exposure monitoring, and indoor air quality. The instrument being used is sensitive to moisture and is a passive sampler. Dust monitors that are approved for PM 10 ambient air standards by the California Air Resources Board are all active samplers. Further, there are dust monitors available that are designed for outdoor applications where moisture is present. Due to the novel application of the equipment for fence line monitoring, CDPH is not able to interpret whether dust exposures in the community occurred that would explain some of the community health complaints such as headaches, bloody noses, adult onset asthma, respiratory symptoms, nausea, and vomiting. We recommend using dust monitors that have been certified for fence line monitoring.”

Response: EPA called the manufacturer of the dust monitoring equipment and the equipment is appropriate for outside use at this site. The only effect of moisture would be to make the equipment report a result that is higher than the true value. This is because the dust monitoring equipment uses a light beam to measure changes in opacity due to incoming particulates, and moisture would increase the opacity. Thus, the only error would lead to more protective and conservative results. EPA agrees with the comment that asbestos would not be expected to cause any of the effects claimed by several members of the community.

Comment 5: It is uncertain whether additional air monitoring was performed for dust or other non-asbestos contaminants. The community has shared metal concentrations analyzed from wipes reportedly taken near the site in 2007. Some of the metals concentrations are above the reporting limits listed on the data sheets. Data for these and other contaminants might explain the health consequences reported by community members.
**Response:** The TASC contractor provided results to EPA from a community supplied wipe sample taken from a car parked near Parcel A. EPA has no information what process was followed to collect the samples. The samples were analyzed by Micro Analytical Laboratories, which is a certified lab. EPA developed screening criteria for evaluating home wipe sampling as part of the 9/11 response. The comparison below shows that all of the results from the Hunters Point wipe sample except lead are far below EPA’s health screening criteria. The lead in this sample is not likely to be related to development work because lead concentration in the soil is much lower than several other metals such as arsenic and nickel, and those metals are present in the wipe sample at concentrations less than the lead concentration. The lead is also not likely to be related to Navy excavations because the Navy monitors airborne dust at all excavations for lead and the results are below health based screening criteria. The Detection Limit listed in the Table represents the lowest concentration that the laboratory is capable of detecting and is not related in any way to a health based screening level. Note that EPA has changed the term Reporting Limit from the comment to Detection Limit.

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Analysis Results ug/sq. ft</th>
<th>Detection Limit ug/sq. ft.</th>
<th>EPA Screening Criteria ug/sq. ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>&lt;5.0</td>
<td>5.0</td>
<td>36</td>
</tr>
<tr>
<td>Barium</td>
<td>24</td>
<td>5.0</td>
<td>10,219</td>
</tr>
<tr>
<td>Chromium</td>
<td>7.9</td>
<td>5.0</td>
<td>437</td>
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<tr>
<td>Copper</td>
<td>19</td>
<td>2.5</td>
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<td>Nickel</td>
<td>11</td>
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</tr>
<tr>
<td>Lead</td>
<td>14</td>
<td>2.5</td>
<td>2.3</td>
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<tr>
<td>Silver</td>
<td>4.5</td>
<td>1.3</td>
<td>728</td>
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<tr>
<td>Vanadium</td>
<td>2.7</td>
<td>0.5</td>
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</tr>
<tr>
<td>Zinc</td>
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<td>Mercury</td>
<td>0.07</td>
<td>0.05</td>
<td>42</td>
</tr>
</tbody>
</table>

**Specific Recommendations from the TASC Report:**

**Recommendation 1:** Further investigate community concerns regarding work stoppages not occurring when exceedence alarms were triggered. The failure to follow and implement the protocols established in the Asbestos Dust Mitigation Plan could limit its effectiveness and seriously impacts the community’s perceptions about the effectiveness.

**Response:** EPA confirmed with the Air District inspector that the work stoppages are enforced when samples results are above the trigger level. To clarify the process: The asbestos filters are in place collecting asbestos for 24 hours. They are collected daily and sent to an off-site laboratory for analysis. The results then come back one day after the measurement. EPA has investigated shortening this timing but because of the complexity of measuring asbestos, there is no way to speed this process. Work stops when the results above the trigger level come back from the lab and may not start again until there is a day when all monitoring stations in the Asbestos Dust Mitigation Plan are below the trigger level. Even though the work stoppage occurs after the event, the sampling still serves the intended function of enforcing the Asbestos
Dust Mitigation Plan by providing feedback on the effectiveness of the dust mitigation efforts and providing a strong incentive for compliance. As a side note, there are no alarms on any of the monitors.

**Recommendation 2:** Review the monitoring frequency for each station to ensure that the mitigation plan is being followed. Whether monitoring should take place during periods when no official work is being done on the site (including weekends) should also be reviewed.

**Response:** Nine out of the ten stations are monitored daily during work activities. One station, HV-8, is monitored one day per week on a random basis. This is specified in the Asbestos Dust Mitigation Plan because HV-8 represents up-wind conditions. The data tables show that the monitors are operating on the required days. EPA agrees with the Air District that monitoring is appropriate during work days and is not necessary on non-work days. Even on work days, the vast majority of results are non-detect and 98% of the results are below the trigger level. EPA’s expectation is that non-work days would have a lower possibility of dust and asbestos generation. While there is no monitoring on non-work days, the requirements for soil management such as stockpile control are still the same as on work days.

**Recommendation 3:** Using one of the procedures outlined above (community air sampling, modeling or extrapolation), estimate asbestos fiber release from the grading/earth moving and truck related activities that occurred between April and August 2006.

**Response:** EPA believes that use of the three and a half years of existing data to represent the three month data gap is the most representative of conditions at the site. See the Response to Comment 3 above for additional detail.

**Recommendation 4:** Revise the conclusions of EPA’s Draft Technical Summary (last paragraph) to more specifically reflect what is supported by the analysis.

**Response:** Agreed, this comment is addressed in the final version of the Report.

**Recommendation 5:** Investigate asthma and nosebleed concerns raised by local residents and determine whether these health issues may be related to non-asbestos contaminants (particularly metals and particulates).

**Response:** Residents in the BVHP neighborhood experience higher rates of asthma hospitalization and emergency room visits than most other neighborhoods in San Francisco. These higher hospitalization rates have been observed for about 15 years that data have been collected and pre-date the development work at Parcel A. There are a variety of social and environmental conditions in the community outside the shipyard that contribute to these disparities. While the asthma rates in Hunters Point are relatively higher than the rest of the city, the rates have also decreased in BVHP substantially over the last fifteen years due to coordinated City asthma policy and action on clinical and environmental factors.
There are no health data available concerning nosebleeds in Hunters Point. Members of the community have asked about chromium and nosebleeds at public meetings. Workers in plating shops exposed to chromic acid mist can develop deterioration in nasal tissues. However, this effect is caused by industrial exposure to high levels of chromic acid mist and chromium in soil has not been found to cause this problem. Finally, the chromium in soil at Hunters Point is the type called Cr(III). This is much less hazardous than hexavalent chromium, or Cr(VI). The particulate concentrations measured at the work site are less than EPA’s national ambient standards.

**Recommendation 6:** On a minor note, it is also recommended to use the same units for expressing asbestos quantities in reports. There is some confusion caused by the various ways in which the air sample data are presented. Asbestos air monitoring data is usually expressed as asbestos structures per cubic centimeter (str/cc). Exceedence reports use structures per cubic meter and the EPA Draft Technical Summary uses scientific notation. An example of the conversion is: 16,000 str/cubic meter = 0.016 str/cc = 1.6E-2 str/cc. It would be much clearer if all used the same method of expressing the data.

**Response:** Agreed, this comment is incorporated in the final version of the Report.