Provisional Joint Health Statement Summary

The Zeneca and UC Richmond Field Station Sites

Contra Costa County Health Services Department and California Department of Health Services

As the Bay Area population increases, there are increasing controversies over land use. Efforts to recycle Richmond land for new uses will create community development controversies that include concerns for current human health, ecological health, community prosperity, and unwanted impacts on future generations. Two contiguous sites in Richmond, Zeneca (formerly Stauffer Chemical Company) and the University of California (UC) Richmond Field Station (RFS), exemplify these controversies.

This joint interim health statement of the Contra Costa County Health Services Department and the California Department of Health Services (CDHS) is based upon available information about current exposure from these sites. New information may warrant revision of this statement and changes in recommended actions. A more complete report will be drafted over the next year.

We recognize that impacts on health are critical factors, but not the only factors, in decisions about community development. Regardless, individuals in the community as well as community officials need this information for risk management. Our statement is based upon the following actions:

1. Reviewing historic land use patterns and regulatory agency documents as they may affect current exposure.
2. Speaking with the relevant agencies and stakeholders concerned about the sites.
3. Identifying current contaminants of concern (COCs).
4. Examining current pathways for chemicals to move from a source location to people.
5. Identifying sensitive or heavily impacted subpopulations.
6. Determining the current health risks associated with completed exposure pathways.
7. Exploring ways to eliminate or reduce future exposures.

Because of the limitations in current knowledge, our statement cannot adequately incorporate impacts of cumulative exposures from other sources or sites. It also cannot address the concerns we all share about exposures to mixtures of chemicals and their byproducts with the potential for chemical and biological interactions. When there is insufficient information, but there is reason to suspect the effects could be severe, we support a precautionary approach that would favor protection over risk taking.

We realize that individual health and community health is affected by more than direct exposure to toxic chemicals associated with these sites. When hazardous materials are discovered to have been on these sites, sometimes for many years, there are a number of psychological and community stressors:

1. Fear and uncertainty over the possible effects of exposure.
2. Feeling a loss of control over the present situation and future.
3. Anger over loss of security and safety within the community.
4. Confusion over agency roles.
5. Community conflict over who is to blame and what actions to take.

The long history of these sites and the lengthy political process required to resolve issues, along with uncertainty about exposures and subsequent latent health effects, may lead to social and political turmoil, which in turn leads to more stress.

Brief Site Descriptions and History

Zeneca

Stauffer Chemical Company began sulfuric acid production at the site in 1897. Sulfuric acid production generated a large volume of cinder waste from the roasting of iron pyrite ore. Cinders were deposited into low lying areas on the site over the many years of operation. Pyrite cinders are generally acidic and contain high concentrations of metals. In the 1950s, Stauffer began making a variety of pesticides and herbicides. Stauffer operations continued on the site until 1985. Between 1986 and 1992, the property was transferred between several owners. In 1992, Zeneca, Inc. took over operations on the site. Contaminants detected on the Zeneca site include metals, pesticides, herbicides, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and petroleum hydrocarbons. The property is presently owned by Cherokee/Simeon/ Campus Bay land developers.

Site buildings were destroyed in 2002. Recent remediation work has included excavating approximately 50% of the East Stege Marsh sediments from October 2004 through April 2005. In addition, a surface cap covering contaminated material has been installed over a large portion of the site.

Richmond Field Station (RFS), 1301 South 46th Street

The property includes uplands (facilities and open prairie grasslands), tidal mudflats, and marsh. The marsh area, approximately nine acres, is now known as Western Stege Marsh. Much of the property belonged to California Cap Company from 1870 to 1950. Up until 1948, the California Cap Company manufactured explosives on the site. Mercury fulminate was manufactured on site for blasting cap production. From 1897 to 1950, pyrite cinder waste (which includes arsenic, lead, zinc, selenium, cadmium, and copper) from Stauffer Chemical Company (see above) was deposited on the site. In 1950, UC purchased 150 acres of this land along the Richmond shoreline. The land, now RFS, is used by UC Berkeley as an academic research and teaching facility and by the UC Office of the President as the site for the Northern Regional Library Facility. Approximately 400 UC researchers and employees work at the site. The federal Environmental Protection Agency's (EPA) regional laboratory is also located at the RFS.

Three phases of excavation and removal of contaminated material from RFS have occurred. Cleanup work is prohibited during the months of February through August, due to the presence in the marsh of the endangered California Clapper Rail. From August 2002 to January 2003, 28,000 cubic yards of contaminated soil and marsh sediment were removed from an area bordered by Zeneca on the east and East Bay Regional Park Bay Trail to the south. From August 2003 to March 2004, 31,000 cubic yards of contaminated material were removed. In addition,

PCBs were removed from an area at the outfall of a storm drain in Meeker Slough. From August 2004 to November 2004, 3,300 cubic yards of soil contaminated with metals and PCBs were removed from upland areas.

Exposure Pathway Assessment

Exposure pathways through ambient air, groundwater, and marsh sediments/soils, along with potential risks to selected subpopulations for each pathway, were considered. These generally were based upon high-end exposure assumptions.

Air

Zeneca

During remedial operations from October 18, 2004, to April 23, 2005, Zeneca subcontractors, RGA Environmental (RGA), collected air data at four air monitoring stations and two particulate matter stations (PM10-particles less than 10 microns in diameter) around the perimeter of the Zeneca site. The four air monitoring stations collected total suspended particulates (TSP) and samples to be archived and analyzed later. The samples with highest TSP for a given week at a given station were analyzed for 42 COCs associated with the Zeneca site, including 8 metals, 23 pesticides, 6 PCB arochlors, 2 VOCs, hydrogen sulfide (H_2S), carbon disulfide, and formaldehyde. RGA also collected weather data during remedial activities. Data was collected only during work hours, except for the PM10 monitors, which collected 24-hour samples. This data is shown on the Campus Bay website http://www.campusbay.info/index.html.

Of the 42 contaminants tested in the air samples, 7 COCs were detected. CDHS compared the maximum detected value for the seven detected analytes to see if any of the COCs were detected at levels above health comparison values. Health comparison values are levels set by regulatory agencies that take into account structural, toxicological, and epidemiological information about the chemical (available upon request). Four of the COCs detected (lead, nickel, carbon disulfide, and formaldehyde) had maximum detections below health comparison values. Therefore, these four COCs are not considered to pose any public health risk. Two of the COCs detected (zinc and copper) have no appropriate health comparison value. Zinc is a necessary nutrient and at the levels detected, does not appear to pose any public health risk. The health departments do not have enough information to assess the potential health effects of the copper air concentrations. Hydrogen sulfide levels were occasionally detected at concentrations that could cause adverse health effects.

While the average hydrogen sulfide concentration of 23 micrograms per cubic meter ($\mu g/m^3$) over the 180-day period was below the intermediate Minimal Risk Level (MRL) of 27.9 $\mu g/m^3$, there were 15 days in which hydrogen sulfide levels exceeded the MRL. There were also 10 days where hydrogen sulfide concentrations exceeded the California Air Resources Board (CARB) 1-hour threshold of 42 $\mu g/m^3$. Potential exposure to homeless people, workers, and children playing near the site are above the inhalation Reference Concentration (RfC) of 0.00002 $\mu g/m^3$

for hydrogen sulfide. Health effects from hydrogen sulfide exposure include irritation of mucous membranes and the respiratory tract, nausea, headaches, skin and eye irritation.

CDHS assessed potential impacts from particulates (PM10) and total suspended particulates (TSP). The maximum TSP detected (167 $\mu g/m^3$) was slightly above the National Ambient Air Quality Standard (NAAQS) of 150 $\mu g/m^3$. However, the average of approximately 555 detections of total particulates was 38 $\mu g/m^3$. While these levels do not appear to pose a significant health risk, there is the possibility that particulate spikes could cause some respiratory irritation, especially for people with pre-existing respiratory conditions. The maximum detection of particulates less than 10 microns (PM10) was 56 $\mu g/m^3$, which is below the NAAQS of 65 $\mu g/m^3$, but slightly above the California standard of 50 $\mu g/m^3$. Two additional samples were detected at the California standard of 50 $\mu g/m^3$. However, the average PM10 for all samples collected was 18 $\mu g/m^3$. This is below the 24-hour California PM10 standard and below the California annual standard of 20 $\mu g/m^3$. Therefore, particulates do not appear to present a current public health risk at the site.

The data reviewed for this assessment was not in a final report, but was preliminary data provided on the Campus Bay website.

UC Richmond Field Station (*Revised based on additional data)*

Air monitoring of dust and mercury vapor was conducted during phase 1 and phase 2 remedial activities at the RFS. Phase 1 and phase 2 activites consisted of removal and treatment of soils from the marsh and upland areas of the RFS. Dust concentrations were monitored and recorded continuously at six locations along the site perimeter to monitor airborne dust leaving the remedial area of the mercury contamination. Dust monitors were placed on the site perimeter for the duration of each workday. Average and maximum dust data was downloaded to personal computers at the end of each workday.

Between November 21, 2002 and December 6, 2002, URS Corporation (URS) conducted air monitoring for dust and mercury vapor during the phase 1 remedial work at the RFS. Dust concentratins did not exceed the site-specific dust action level[1] of 2 mg/m^3. Mercury levels in the air at the work site were monitored using a Jerome Mercury Vapor Analyzer with a detection limit of 3 ug/ m^3 (0.003 mg/m^3). According to a URS summary statement (data not provided), mercury was not detected above the detection limit.

Between August 2003 and February 2004, URS and Blasland, Bouck & Lee, Inc. (BBL) performed air monitoring for dust and mercury during the phase 2 remedial construction work conducted at the RFS. During powdered activated carbon reagent addition, there were some detections of carbon dust outside the work area. Carbon dust levels did not exceed 2 mg/m^3. However, some of this dust did deposit on structures in the area.

[1] Site-specific dust action level is based on the permissible exposure level (PEL) for dust (5 mg/m^3), which was modified to be protective of the highest mercury level in soil. The level at which dust becomes visible (dust visibility threshold) is approximately 2 mg/m^3.

From September 12, 2003 to September 23, 2003, UC health and safety personnel monitored for mercury levels in the air at the work site using a Jerome Mercury Vapor Analyzer with a detection limit of 3 μg/ m^3 (0.003 mg/m^3). Of the 125 samples collected during this sampling effort, 15 samples (collected at various times during each day) had detectable concentrations of mercury, ranging from 0.003-0.006 mg/m^3 (3-6 $\mu g/m^3$). While this instrument is appropriate for monitoring worker exposures to mercury vapor, non-worker (residential) exposure standards are set at lower levels. For example, the chronic MRL (minimal risk level)[2] for mercury is 0.0002 mg/m^3 (0.2 $\mu g/m^3$). It is difficult to determine the level of mercury outside of the Phase 2 work area, either off-site or in other areas of the RFS, since dilution with the ambient air would occur. In an effort to gain a better understanding of airborne mercury levels outside of the work area, we obtained data collected by the EPA Region 9 Laboratory, which is located on south west portion of the RFS.

From August 26, 2003 to September 28, 2003, USEPA conducted air monitoring at the laboratory using a Tekran Mercury Vapor Analyzer with a detection limit of 0.0001 $\mu g/m^3$. The location of the excavation areas in relation to the laboratory ranged from approximately 150 feet to several hundred feet. Mercury was detected in air on several days at concentrations ranging from 0.01 $\mu g/m^3$-0.9 $\mu g/m^3$. Mercury levels exceeded the MRL on two days (September 10 and September 12), for time periods of less than an hour. While these data do not provide information about levels in other areas of the RFS, particularly areas predominately downwind of the excavation, they do show a decrease in airborne mercury levels outside the work area, at the USEPA laboratory. The highest value (0.9 $\mu g/m^3$) was measured on September 10, 2003, and cannot be compared with data collected at the work area because there were no samples reported for that day.

Qualitatively, exposures to airborne mercury may have occurred in the vicinity of the Phase 2 work area. Based on the available data, short-term exposures at the levels measured in air during the remedial work would not be expected to result in noncancer adverse health effects.

This air pathway assessment has limitations. The data was collected to monitor short-term remediation worker exposures, not off-site residential or nearby worker exposures. There are data gaps that limit the applicability of this data set for assessing human health impacts for non-remediation worker populations. Future remediation activities on the site should include air quality monitoring along the perimeter of the site to ensure safe air quality for off-site workers, on-site non-remediation workers, residents, and recreators in the area. Detection limits in future sampling should be set as low as feasible to allow for the best opportunity to understand the air quality in the area and the potential impacts on people.

[2] The chronic MRL is a level at which exposure occurring 24 hours per day, 7 days per week, for 365 days or more would not be expected to result in noncancer adverse health effects.

Groundwater/Soil Gas Vapors Entering Indoor Spaces *(Revised based on additional data)*

Zeneca

It is possible for indoor air in Building 240 (used for the youth after school program, Making Waves Education Foundation[3]) on the Zeneca site, and nearby workplaces on South 49th Street to be affected by groundwater contaminated with volatile organic chemicals (VOCs) in those areas.

In cases when the groundwater is close to the surface (within 30 feet), VOCs in the groundwater can be pulled into buildings. This is known as soil gas migration/vapor intrusion. Groundwater in the Zeneca area is shallow, ranging from 6-15 feet below ground surface (bgs) (depending on location and the time of year), creating the potential for soil gas to migrate from VOC-contaminated groundwater into buildings. Once inside the building, these gases or vapors can be inhaled. While soil gas can be an important source of in-building air contaminants, it is only one of several contributors to the total air contaminants found inside a building. Typical indoor air is not considered healthy and contains many chemical constituents, which come from various sources, such as household products, cooking, building materials, and influences from the outdoors.

Several types of environmental data can be used to evaluate the potential for soil gas to migrate into buildings. These data include indoor air, groundwater, soil, and soil gas sampling. The Johnson and Ettinger (J&E) model can be used to evaluate the potential for soil gas migration into indoor air and whether risk-based exposure levels could be exceeded. The J&E soil gas model estimates indoor air concentrations from soil gas data. The J&E groundwater model estimates indoor air concentrations from chemicals measured in groundwater. The model does not predict precise concentrations to be used for interpretation of potential health effects, but rather concentrations for screening purposes to determine the need for further action

CDHS reviewed available information to determine whether soil gas is impacting the indoor air quality in Building 240, in nearby businesses located on South 49th Street at levels posing a health risk. At the time of this writing, the available data is not adequate to evalute the potential impacts to indoor air in business on South 49th Street. Contractors for the Department of Toxic Substances Control will be conducting soil, groundwater and soil gas sampling along South 49th and South 50th Streets. CDHS will evaluate these data once the investigations are completed. Thus, the following discussion focuses on the potential for soil gas to be entering Building 240 on the Zeneca site

In March 2005, indoor air sampling was conducted in Building 240. Samples were analyzed for limited number of contaminants (benzene, chlorobenzene, formaldehyde, hydrogen sulfide, and

[3] Making Waves has been holding its after school program in Building 240 on the Zeneca site since 2002. Approximately 250 children participate in the program, which is held on weekdays and Saturdays. The program will be moving to another location in September 2006. (Michael McCanta, Making Waves Education Foundation, personal communication October 4, 2005)

tetrachloroethylene (PCE)). Formaldehyde was the only contaminant detected above laboratory detection limits. The laboratory method used for the analysis was not very sensitive, resulting in relatively high detection limits. The limitations with these data prohibit our ability to make comparisons with concentrations of VOCs typically found in indoor air and those that may be due to soil gas migration. However, these data are adequate for assessing potential health risk. A number of site-related contaminants were not analyzed during the indoor air sampling event. Therefore, CDHS used soil gas data to augment the indoor data.

In August 2005, contractors for Cherokee Simeon conducted soil gas sampling around Building 240. A number of VOCs were detected in soil gas. Benzene was the only VOC detected above soil gas screening values[4]. Benzene was not detected during the indoor air sampling conducted in March 2005. However, since the detection limit was not very sensitive and benzene was detected above soil gas screening values, we estimated the concentration in indoor air using the J&E soil gas model.

To evaluate whether soil gas is in indoor air at levels posing a long-term health threat, CDHS compared the concentrations measured and estimated in indoor air to health comparison values (data provided upon request). None of the measured VOCs exceed health comparison values, even if it is assumed that all of the VOCs analyzed were measured at the detection limit, which they were not. Even the combined estimated exposure from all of the VOCs analyzed in the indoor air would be unlikely to cause noncancer health effects (more information on the methods used provided upon request).

For VOCs considered carcinogenic (cancer-causing), CDHS calculated the theoretical lifetime increased cancer risk for staff and children spending time in the Making Waves program located in Building 240, using the measured indoor air concentration (formaldehyde, the only VOC detected) and the J&E soil gas model derived indoor air concentration for benzene (the only VOC detected in soil gas above the screening value). CDHS assumed an 11-year exposure scenario (time period a child age 7-17 could attend the program) in the calculations. The theoretical lifetime increased cancer risk for staff at Making Waves is 5 in 1,000,000 and 3 in 1,000,000 for a child/teenager. These are considered no apparent increased risks.

In conclusion, on the basis of limited available data, it does not appear that indoor air in Building 240 and in nearby businesses is being impacted by soil gas from Zeneca at levels that would result in noncancer adverse health effects. There is no apparent theoretical lifetime increased cancer risk for children and staff from long-term exposure to indoor air in Building 240. Additional sampling of groundwater on South 49th Street is warranted to ensure that there is an adequate understanding of the extent of the VOC-contaminated groundwater plume and potential for impacts to indoor air due to soil gas.

[4] Screening values are used to determine the need for additional actions.

UC Richmond Field Station

Based upon available site information for the RFS site, VOC contamination in groundwater is not likely to affect indoor air in buildings on the majority of RFS site. VOCs are present in groundwater on the Zeneca site, adjacent to the east and northeastern boundary of the RFS. Limited soil gas sampling in this area (on the Zeneca site) has measured VOCs that exceed soil gas screening values (near RFS Building 178). Additional groundwater sampling on the RFS is needed to thoroughly evaluate the potential for soil gas to be impacting the indoor air in buildings located on the east and northeast side of the RFS.

Marsh Sediments and Soil

Zeneca Sediments

In 1992 – 2004, sampling of the East Stege Marsh and lower lagoon showed the sediments to be contaminated with heavy metals, pesticides, and PCBs. Between December 2004 and March 2005, contaminated sediments from about 50% of the East Stege Marsh were removed and replaced with dredged and terrestrial materials imported from other areas (Port of Sonoma, Martinez Marina, and Brentwood). The imported material was screened[5] for contaminants. As of this writing, CDHS has not reviewed sampling data for the imported material and thus cannot draw conclusions about the presence or absence of contaminants.

Evaluating potential exposure to contaminants remaining in the East Stege Marsh is complicated by a number of factors, including 1) the potential for mobilization of contaminants to other areas during excavation; 2) sedimentation rates and elevation changes that occur in a tidally influenced environment as it relates to current conditions versus historic data; and 3) potential concerns about contaminants in dredged materials used for backfill. These factors add to the uncertainty inherent in evaluating exposure.

CDHS estimated potential current and future exposure from skin (dermal) contact and incidental ingestion of contaminants in the remaining surface sediments for three populations: 1) a youth (age 7-17) who plays in the marsh; 2) an adult who recreates (walks, hikes, etc.) in the marsh; and 3) a homeless person who spends time in the marsh. We used the highest contaminant concentration detected in areas not excavated to estimate a dose for each contaminant present in sediment. None of the estimated doses exceed health comparison values for any of the populations evaluated. Combined exposure from all of the contaminants in the marsh would not be likely to cause noncancer health effects for youths who play in the marsh, adults who recreate in the marsh, or a homeless person spending time in the marsh. We did not estimate exposure to surface water because data is historic and does not represent current conditions in the marsh.

[5] A sample was collected for every 3,000 yards of dredge material and analyzed for PCBs, pesticides, volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), petroleum hydrocarbons, and metals.

For contaminants considered carcinogenic, CDHS calculated the theoretical lifetime increased cancer risk for a youth who plays in the marsh for 2.6 hours per day, 2 days per week for 11 years, an adult who recreates in the marsh 2.6 hours per day, 1 day each week for 30 years, and a homeless person who spends 2.6 hours in the marsh every day for 10 years. The theoretical lifetime increased cancer risk is 2.7 in 100,000 for the youth, 1.6 in 100,000 for an adult, and 3.1 in 100,000 for a homeless person. These are considered very low increased risks.

UC Richmond Field Station/Western Stege Marsh

CDHS estimated exposure to an adult or youth working on a restoration project in the excavated area of the UC marsh (e.g., planting native species). CDHS assumed the person came into contact with the soil/sediment along the bank of the marsh. They could be exposed to some contaminants through skin absorption or accidental and incidental ingestion. To estimate exposure, we assumed the person worked in the marsh 2 days per week, for 2.6 hours per day.

An adult or youth working as described above in soil/sediment that contains the maximal amount of contaminants found in the excavated area should not experience noncancer health effects. A cancer risk was not calculated since the marsh remediation began recently and cancer risks cannot be appropriately calculated for short-term exposures of less than 7 years.

Though working in the excavated area of the marsh does not appear to have any current noncancer health impact, it appears that contamination may be migrating from the unexcavated areas of the marsh, thus at some time in the future it may pose a noncancer health hazard.

CDHS evaluated exposure to an adult and youth (old enough to play unattended, 8-15 years of age) playing in the contaminated, non-excavated marsh/lagoon area. Exposure depends on how often that person was near to, or in contact with, the marsh/lagoon. Exposure also depends on the types of activity, i.e., splashing, wading, etc. If an adult or youth played along the bank and splashed in the water, they may have absorbed through the skin, inhaled, and ingested some of the chemicals in the soil/sediment and surface water. To estimate exposure, we assumed the person played 4 times a week, 1 hour at a time in the marsh/lagoon during the warmer months (May to October). We assumed the adults may have been exposed for the past 24 years and children for 8 years.

An adult or youth playing on a regular basis in marsh sediment/surface water that contains the maximally contaminated amount of chemicals found in the non-excavated areas, may experience skin rashes from arsenic due primarily to ingestion of unfiltered marsh water.

An adult or youth playing in the non-excavated areas accumulates cancer risk. The adult scenario described above would be associated with a cancer risk of approximately 1 in 10,000. This is considered a low increased risk. The youth playing in the non-excavated area of the marsh as described above, would have a cancer risk of approximately 1 in 100,000. This is considered a very low increased risk. The potential risk is primarily due to incidental ingestion of arsenic in

the surface water and/or sediment. Arsenic is considered a known human carcinogen by the inhalation route and exposure can lead to lung cancer.

UC Richmond Field Station Soil

CDHS reviewed the available soil data and evaluated possible exposure for the RFS worker who might dig in the soil in an area where contamination still exists.

Soil investigations in the past focused on those parts of the site associated with past manufacturing processes or storage areas: The California Cap Company explosives storage area, Cap Company test pit area, forest products area, Cap Company shell manufacturing area, Zeneca-related pyrite cinders area, mercury-bearing area; Heron Drive area, and the western storm drain. Contractors for UC remediated soils from five of these areas in 2004.

Most of the soil samples were analyzed for metals and PCBs (measured as Arochlor mixtures). The main COCs in surface to near surface soils on the RFS are arsenic, copper, lead, mercury, Arochlor 1242, Arochlor, 1248, Arochlor 1254, and Arochlor 1260.

CDHS assumed that the RFS worker dug a trench or holes in the soil in an area that was contaminated with the highest concentrations of chemicals detected in the Field Station surface and near surface soil. CDHS assumed that they dug without protection for 6 hours a day, 100 days per year (600 hundred hours per year), and that during the digging they were exposed through the skin and through incidental ingestion of the soil. An inhalation route, which could be significant, could not be quantified. CDHS estimated exposure for two lengths of employment: long-term (over 20 years) employment and the last 7 years of employment. We assumed the short-term worker would not have worked in any of the "hot spots" since these were already identified, while we assumed the long-term worker had worked in the hot spot areas before they were identified. The assumptions used in the exposure evaluation are meant to be health protective and likely overestimate exposure. CDHS uses this approach to ensure that potential health effects are identified and appropriate actions taken. Additional assumptions and calculations can be provided upon request.

The field station worker routinely digging in soil that contained the **maximal** amount of contaminants found in the **non-excavated areas** may experience noncancer health effects. The main noncancer endpoints include skin rashes (arsenic), immune changes, kidney damage (mercury), and behavioral changes, reproductive and developmental effects (PCBs). The field station worker who routinely digs in soil that contains the **average** amount of contaminants found in the **non-excavated areas** would not experience noncancer health concerns.

CDHS estimated that a worker digging in the non-excavated areas in the past had a cumulative risk of cancer ranging from 1 in 10,000 to 1 in 100,000. Current digging would add a cancer risk from 1 in 100,000 to 1 in 1,000,000, depending upon whether maximum or average exposure is used in the calculation. The chemicals which are associated with a cancer risk are arsenic and PCBs. Arsenic is considered a known human carcinogen by the inhalation route and exposure

can lead to lung cancer. PCB is considered a probable human carcinogen based on limited human evidence and sufficient animal studies. PCB exposure can lead to liver, biliary tract, intestinal, and skin (melanoma) cancer.

Recommendations

Additional Information

1. DTSC should conduct additional sampling of ground water on South 49th Street to ensure that there is an adequate understanding of the extent of the VOC-contaminated ground water plume. DTSC plans to collect this data by fall 2005.
2. DTSC should sample more frequently the imported surface sediments used in recent (2004 – 2005) East Stege Marsh remediation to ensure clean fill materials are used to backfill the marsh.
3. DTSC and UC should sample surface water in the marsh to better understand current conditions.
4. UC should characterize the groundwater at the east and northeast side of the RFS to better understand the potential for soil gas to be affecting the indoor air in buildings in this area.

Actions

1. Future activities on the site should be monitored for air quality along the perimeter of the site to ensure safe air quality for workers, residents, and recreators in the area.
2. Local workers and residents should be notified of remediation activities before they begin.
3. Detection limits in future air sampling at both sites should be set as low as feasible to better understand the air quality in the area and the potential impacts on people.
4. DTSC should fence and post the East Stege Marsh and lower lagoon to reduce the potential for exposure to unremediated parts of the marsh. *(Action completed)*
5. UC should fence and post the West Stege Marsh to reduce the potential for exposure to unremediated parts of the marsh.
6. UC should draft a letter to RFS staff as promised that assures them of no reprisals or recrimination for asking questions about environmental quality at the site.
7. UC should review past worker practices on the site to determine which workers were digging in unexcavated areas and how often to better inform their health and safety plan.
8. UC health and safety plans should assume that contamination could be found at any location on the site until it is shown to be "safe." Staff on the RFS grounds should be instructed what to do if they encounter cinders when digging.
9. UC should develop a health and safety plan for restoration work in the excavated areas of the UC marsh that takes into account the current and future exposures from chemicals migrating from non-excavated areas of the marsh.
10. UC should provide all RFS staff access to updated computer-based maps demonstrating locations of historic structures and where soil samples have been obtained, along with the associated contaminant level measurements.

11. UC should offer Hazardous Waste Operations and Emergency Response (HAZWOPER) training to workers whose work may involve handling or digging in soils on site.

Ongoing Actions

1. Contra Costa County Health Services Department and the Environmental Health Investigations Branch of CDHS will continue to review data provided by DTSC, UC Field Station, and Zeneca and their contractors.
2. We will reevaluate this health statement and share our findings every 6 months with the Community Advisory Group (CAG) or in another public context unless new information warrants emergency action.
3. Upon reviewing all available data on past and future exposure pathways (exposures not reviewed in this statement), we will issue a final health statement and recommendations.
4. We will consult with local health care providers and offer technical assistance to Richmond city officials as needed.
5. In addition, we propose to schedule an interagency process evaluation for February 2006. We will ask involved agencies to describe what was done well, what still needs to be done, and what regulatory or policy changes may be needed.

DTSC, the lead state agency for Zeneca, and RFS, will complete the site characterization and develop plans for remediation. They will set the cleanup levels that must be achieved. They will share all data with Contra Costa County Health Services Department and CDHS. They will provide support for the development and maintenance of the Community Advisory Group (CAG). The purpose of the CAG is to provide regular and timely opportunities for the Richmond community to be informed and to provide input to DTSC regarding the regulatory oversight of cleanup activities. The 25 volunteer members act as liaisons to the communities they represent. The CAG will be able to address ongoing issues for the two sites in an open community process.

The UC Environment, Health and Safety Office will continue to respond to RFS staff inquiries and complaints and will relay concerns about activities on the Zeneca site to DTSC. They will maintain a log of all inquiries and complaints that will be available for inspection. They will work with the Tang Health Clinic to assess and treat staff health problems.

FOR MORE INFORMATION

Health Statement

Contra Costa County Health Services Department
Wendel Brunner, MD, PhD (925) 313-6712 Wbrunner@hsd.co.contra-costa.ca.us

California Department of Health Services
Rubi Orozco (510) 620-3671 Rorozco1@dhs.ca.gov

Zeneca Site Characterization and Remediation

Department of Toxic Substances Control
Barbara Cook (510) 540-3843 BCook@DTSC.ca.gov or
Nancy Cook (510) 540-3923 NCook@DTSC.ca.gov or
Lynn Nakashima (510) 540-3839 LNakashi@DTSC.ca.gov

UC Richmond Field Station Site Issues

UC Environmental Health and Safety Office
Karl Hans (510) 643-9574 or
Greg Haet (510) 642-4848 Khans@berkeley.edu / GJHaet@berkeley.edu