California Environmental Protection Agency

Proposed Exposure Assessment for Kettleman City

March 25, 2010

In partnership with the Office of Environmental Health Hazard Assessment; Department of Pesticide Regulation; the Air Resources Board; the Department of Toxic Substances Control; and, the State Water Resources Control Board

KETTLEMAN CITY EXPOSURE ASSESSMENT OUTLINE

FOR REVIEW AND COMMENT

PURPOSE

On January 29, 2010, Governor Arnold Schwarzenegger directed the California Department of Public Health (CDPH) and the California Environmental Protection Agency (Cal/EPA) to take aggressive action to investigate the birth defects in Kettleman City, California. He directed the CDPH to conduct a health investigation of the families whose children were born with birth defects and Cal/EPA to assess possible environmental contaminants in the air, groundwater and soil that could potentially cause birth defects. This document outlines a draft work plan for the Cal/EPA portion of the investigation. We are soliciting review and comment on this outline from the community and other interested parties.

STATUS

On February 9, 2010, CDPH and Cal/EPA staff met with residents of Kettleman City to provide a preliminary description of the investigation that the state is planning. Following the February 9 meeting, Cal/EPA formed an exposure assessment team that includes members from each of the five boards, departments and office within Cal/EPA -- the Office of Environmental Health Hazard Assessment (OEHHA), the Department of Toxic Substances Control (DTSC), the Air Resources Board (ARB), the Department of Pesticide Regulation (DPR), and the State Water Resources Control Board (SWRCB). The Cal/EPA entities worked in conjunction with CDPH. Staff from the boards and departments are developing the work plan and will analyze samples from the air, soil, and water in Kettleman City. What follows is an overview of the plan; a description of the list of chemicals proposed for monitoring; a summary of the sampling and analysis plan; and, milestones for completion of the investigation.

BRIEF OVERVIEW

The Kettleman City community (population 1,500) is located in southwestern Kings County along State Highway 41 just north of Interstate 5. It is approximately 118 acres in size and consists of a commercial area along State Highway 41 immediately north of Interstate 5 and a residential area located along State Highway 41, north of the commercial area. There are two municipal wells serving the residents of the city that contain elevated levels of benzene and arsenic, although two units have been installed to remove the benzene. North and east of the city, the land is farmed with rotating crops, while orchards are found immediately west. Commercial properties include a gas station, two very small convenience stores, an auto parts dealer, and two towing companies. The Kettleman Hills hazardous waste management facility is located three miles southwest of the city, and there are naturally occurring petroleum deposits as well as oil pipelines, wells, pump stations, and a bulk storage facility in the area. Finally, the California Aqueduct and local canals are located close by and may be the source of fish

eaten by some of the residents.

DRAFT OUTLINE QUESTIONS

In developing this outline, the technical group considered the following questions: First, which chemicals potentially found in Kettleman City are known to cause or might cause birth defects in humans? What are the possible sources of these chemicals? How can we sample and analyze for them? These questions and answers are found below:

Which chemicals potentially found in Kettleman City are known to cause or might cause birth defects?

Experts from OEHHA prepared a list of chemicals that are known to cause birth defects and other developmental effects – especially facial clefts. Next, OEHHA consulted with its sister Cal/EPA boards and departments and added to the list other chemicals that should be investigated that might cause birth defects or other developmental effects. The compiled list is included with this document as Table 1.

What are the possible sources of these chemicals?

As part of the chemical-identification process, work group members considered the possible sources of these chemicals in the Kettleman City area. In some cases, these chemicals may be present as a result of past activities, or they may be currently used and emitted. Possible sources of these chemicals include:

1. Agricultural operations.
2. The Kettleman Hills hazardous waste storage, treatment and disposal facility.
3. Petroleum sources, including naturally occurring petroleum deposits, a petroleum pipeline and former natural-gas wells in the vicinity of the town, gas stations, and an oil-storage facility. Sporadic, unrecorded dumping of oil wastes during the early- to mid-20th century may have occurred.
4. Illegal dumping of automobiles and household trash that has taken place periodically throughout the area.
5. Groundwater contamination stemming mainly from naturally occurring arsenic, or from benzene and petroleum compounds.
6. Contamination from former industrial/commercial operations that might be identified through records searches.

Some of the forms in which chemicals from these sources conceivably could be present in Kettleman City are:

- Air pollutants originating from the Kettleman Hills waste management facility, agricultural pesticide applications, diesel trucks and motor vehicles, and other sources.
- Drinking water contaminants, particularly arsenic.
- Contaminants in soil as a result of past releases or dumping of oil waste, industrial waste and household waste.

A list of chemicals that are associated with developmental effects and could be associated with the sources listed above are found in Table 1. We ask that the community review this list as well as comment on other potential sources of contamination. We also anticipate that the results of the CDPH health investigation may add additional chemicals or sources to our list. For example, if the CDPH investigation reveals that many individuals eat fish from the aqueduct or associated canals we may need to determine if fish from those sources contain hazardous contaminants.

How can we sample and analyze for these chemicals?

Methods for sample collection for the chemicals listed in Table 1 may differ depending on the chemical and on whether it appears in the air, soil, or water. After obtaining samples of the air, soil and water, Cal/EPA will apply standardized laboratory-approved methods to test for the specific chemicals. The following describes how air, soil and water samples will be obtained:

Air

ARB will conduct outdoor air monitoring for non-pesticide chemicals in the community of Kettleman City. Twenty-four (24) hour samples will be collected twice weekly from mid-April through mid-July 2010 for a total of 24 discrete sampling periods. ARB is pursuing a right-of-entry agreement with the Kettleman City Elementary School to set up an air monitoring site on school grounds. Weather data and quality controls for the air monitoring sampling will be conducted according to standard operating principles.

ARB will also conduct concurrent air sampling at the Kettleman Hills hazardous waste facility.

Laboratory analyses for most of these chemicals will be performed by the ARB laboratory. ARB will also collect air samples for polychlorinated biphenyls (PCBs) that will be analyzed by the U.S. Environmental Protection Agency (U.S. EPA).

The Department of Pesticide Regulation (DPR) is analyzing records of pesticide use within five miles of Kettleman City for the years 2007 and 2008. DPR staff will estimate the airborne concentrations within Kettleman City of the pesticides listed in Table 1 to evaluate if any may have been high enough to raise health concerns. If an estimated air concentration raises health concerns, DPR would likely monitor for that pesticide in Kettleman City.

Soil Gas Assessment

The Department of Toxic Substances Control (DTSC) will select locations to determine if volatile chemicals are present in the soil below or near residences. Soil gas samples will be analyzed for the volatile chemicals listed in Table 1. Final locations, number and depths of sampling will be determined in the field or

during a site visit. If elevated levels of volatile chemicals are detected, DTSC will estimate the concentrations of the chemicals that may be in the air inside residences.

Soil Sampling
DTSC plans to collect soil samples from commercial and residential properties to analyze for contaminants, including organochlorine pesticides and metals.

Water Sampling
DTSC plans to collect and analyze drinking water samples for the chemicals listed in Table 1. This includes one groundwater sample from each of three water wells, one surface water sample each from the California Aqueduct and the irrigation canal along Highway 41, and one faucet water sample each from several randomly selected residential properties.

The Central Valley Regional Water Quality Control Board will also be analyzing groundwater samples to determine if the benzene in the groundwater is naturally occurring from oil-bearing, sub-surface rock under Kettleman City or is the result of a leak or spill of refined petroleum.

Most of the analytical methods for the chemicals listed in Table 1 will pick up additional chemicals other than those identified as being associated with developmental effects. If any of these chemicals are detected in high concentrations, we will report those results to the community.

Other Sampling
Cal/EPA may work in conjunction with CDPH and residents to obtain samples from other locations, in or around Kettleman City, including inside homes. Cal/EPA could conduct additional sampling if CDPH's investigation were to produce information on other potential chemical sources that merit investigation.

NEXT STEPS / PUBLIC INVOLVEMENT

We are requesting comments on this draft work plan by April 8, 2010. Cal/EPA is preparing a technical support document that will contain more detail on the activities discussed in this outline document. In addition, the U.S. EPA has agreed to peer review the plan. Next, we will prepare a final work plan and begin the sampling, analysis, and evaluation of the air, soil, and water samples along with the evaluation of the pesticide data.

The sampling results (or DPR's estimates of air concentrations of pesticides) will be evaluated to determine if the levels of any chemicals are high enough to raise health concerns. Drinking water standards and soil-contaminant screening levels that already exist for some chemicals will likely be used in this evaluation. For other chemicals, including pesticides and other air pollutants that may be present in Kettleman City, DPR and OEHHA, respectively, will develop health criteria that will be used to evaluate the results.

As with any investigation, definitive answers to the cause(s) of the birth defects may not be found. But, when the Cal/EPA investigation is completed, Kettleman City's residents will know whether these chemicals are in their air, water and soil. The final Cal/EPA report will contain recommendations as appropriate for further actions, such as follow-up investigations or mitigation measures to reduce or prevent future chemical exposures. Community members and policymakers will also be able to use this information to plan their next steps.

Achieving scientific accuracy requires time and cooperation. Cal/EPA thanks the community for its assistance, patience, and interest during this investigation.

TENTATIVE SCHEDULE

03/25/10	Meet with the community to solicit comments on draft work plan outline
04/08/10	Comment period ends
04/19/10	Finalize the work plan and begin collection of air, soil, and water samples
06/17/10	Meet with the community to discuss progress and provide updates
07/31/10	Complete data collection and pesticide modeling analysis
09/30/10	Issue a draft report and meet with the community
10/14/10	Comment period on draft report ends
11/1/10	Finalize the report with recommendations

Table 1. Chemicals to be investigated

Chemical	Monitored Media			Air Model[1]	Use(s)
	Soil	Air	Water		
Arsenic	X	X	X		industrial
Azoxystrobin				X	pesticide
Benzene	X	X	X		industrial
Boscalid				X	pesticide
Bromoxynil				X	pesticide
Cadmium	X	X	X		industrial
Carbaryl				X	pesticide
Carbon Disulfide		X			industrial & pesticide
Chlorpyrifos				X	pesticide
Chromium	X	X	X		industrial
Clethodim				X	pesticide
Diazinon				X	pesticide
DDT (Dichlorodiphenyl-trichloroethane), DDE	X				pesticide
Diflubenzuron				X	pesticide
2,4-D				X	pesticide
Endrin	X				pesticide
Ethylbenzene	X	X	X		industrial
Flumioxazin				X	pesticide
Lead	X	X	X		industrial
Maneb				X	pesticide
MCPA ((4-chloro-2-methylphenoxy)acetic acid)				X	pesticide
Mercury and mercury compounds	X	X	X		industrial
MITC (methyl isothiocyanate)				X	pesticide
Nickel	X	X	X		industrial
Oxyfluorfen				X	pesticide
Polychlorinated biphenyls	X	X	X		industrial
Pyraclostrobin				X	pesticide
Toluene	X	X	X		industrial

[1] Amounts of pesticides in the air will be estimated using computer models by DPR. This will allow DPR to estimate public exposure in Kettleman City from pesticide applications on nearby fields. If an estimated air concentration raises health concerns, DPR would likely monitor for that pesticide in Kettleman City.