PCB Congener Study Preliminary Results Discussion
December 16, 2009 3:00 pm
Kettleman Community Center

Agenda

1. Introductions
2. Overview – PCB Congener Study (multi-media investigational framework)
3. Preliminary soil results of the PCB Congener Study*
4. Future Data Presentations
5. Open Discussion
6. Late January/February Coordinated Public Workshop

*At this time, we only have evaluated the "raw data" for the PCB soil sampling. The results of the Risk Assessment are currently under review so we will not be presenting information on the Risk Assessment at this time.

Kettleman Hills Facility - PCB Disposal Activity Impact Analysis
A site-specific, multi-media investigational framework.

Issue: The Chemical Waste Management, Inc. - Kettleman Hills Hazardous Waste Landfill Facility is seeking renewal of their regulatory permits for disposal of hazardous waste under the Resource Conservation and Recovery Act (RCRA) and disposal of polychlorinated Biphenyls (PCBs) under the Toxic Substances Control Act (TSCA). The lead regulatory agency for the RCRA permit decision on whether or not to grant or deny the hazardous waste permit is the State of California Department of Toxic Substances Control (DTSC). US EPA is the lead regulatory agency for the TSCA permit decision on whether or not to grant or deny the PCB waste permit. TSCA regulations call permits "approvals".

TSCA regulations allow for PCB permits (approvals) that are granted by EPA to be based upon an underlying permit or decision issued by another regulatory agency that covers PCBs (this is called a "Coordinated Approval"). In that case, the coordinated approval would incorporate those requirements from the underlying permit or decision that are no less stringent than the corresponding TSCA requirements, and could become conditions of the TSCA Coordinated Approval after an appropriate notice-and-comment process and possible issuance of the final decision.

Objective: Collect sufficient data to assess potential human and ecological impact to off-site receptors from PCB disposal activities at the Kettleman Hills Facility. Several lines of multi-media and complementary scientific evidence should be pursued to better evaluate the degree of potential impact.

I. Ambient Air Monitoring Strategy

The Kettleman Hills Facility has been participating with DTSC in an existing ambient air and depositional monitoring program for PCB releases to air. Three stationary air monitoring stations and one mobile monitoring station have been collecting air samples over the past two years and subjecting the samples for PCB Aroclor analysis. To date, all sample results have been non-detect for PCB Aroclors.

A technical review of the methods and results of that analysis have revealed a number of data gaps and uncertainties in the air monitoring approach. These data gaps principally involve the ability of the sampling devices to collect and allow detection of the most-relevant suite of PCBs mixtures or congeners at limits of detection germane to adverse health impacts, and the siting or location of the sampling devices relative to on-site operational disposal activity. Therefore, additional studies should be conducted to collect sufficient air monitoring and depositional data to assess the potential degree of off-site impact.

a) Obtain sufficient data for assessment of PCB airborne and depositional impacts from landfill disposal activities. To the extent that investigational activities can characterize the degree of potential impact to the buffer-zone immediately adjacent to the facility, a sound rationale can be developed and shared with the community and stakeholders that more distant human and ecological receptors are then subject to a relatively *de minimus* level of impact from PCB disposal activities at the landfill.

i) Human Health Assessment

Collect additional air samples from a limited number of high-volume sampling devices specifically located in the facility's buffer zone to assess the degree of PCB depositional impact associated with landfill disposal activities. These samples should be collected over a 1 year window of time, with 12 sampling events occurring throughout that time period. While the sampling devices will collect air samples over the entire month, contaminant analysis will occur but once a month. Sampling devices should be located in generally upwind and downwind locations based, in part, upon historical on-site meteorological patterns. In addition, the releases from on-site landfill disposal activities should be subjected to analysis by an air dispersion & transport model to better predict the potential locations of maximum depositional impact. Air monitoring devices siting and location should remain considerate of these results. Finally, any available retrospective or more-recent buffer zone surficial soil sample results should also be reviewed and considered when selecting the location of the air sampling devices to maximize the likelihood of detecting impacts.

ii) Ecological Assessment

The results from the air sampling approach described above will also be used to assess the degree of impact to ecological receptors. Although direct inhalation impacts are not an exposure pathway currently considered in ecological risk assessments, the depositional impacts on soil and vegetation supporting the food web of ecological receptors remains a indirect pathway of contaminant exposure which should be characterized.

iii) Analytical Framework

PCB samples should be subjected to high-resolution analysis to provide specific data regarding the prevalence of the dioxin-like or co-planar PCB congeners (EPA Method 1668a). In addition, the concentration of total PCBs should be reported from analysis of these samples and, where pattern matches can be made, Aroclors should be specifically identified.

II. Surficial Soil Sampling Strategy

a) A series of composite soil samples should be collected from the facility buffer zone to characterize the degree of PCBs potentially impacting off-site receptors.

i) Human Health Assessment

A composite soil sampling plan should be developed to assess the degree of PCB impact in the off-site buffer zone. Results from this sampling and analysis effort will be used to assess the magnitude of human health impact from the direct pathways of human exposure. All composited samples should be retained following analysis such that the specific-contribution from any discrete sample can be retrospectively assessed. A composite sampling approach enjoys the advantage of expanding the areal extent of buffer zone characterization while also minimizing resource allocations. Soil sample locations should be informed by results from the air dispersion and modeling results, proximity to disposal activity and TBD based upon a site visit reconnaissance. Samples should be collected from the surficial lens of soil to characterize the pathways of direct exposure. A limited effort should also be made to characterize potential impacts from soil run-off pathways. Results from surficial soil samples should also be used to assess potential impacts to the food-chain by characterizing the exposure potential and uptake into livestock grazing in the buffer zone. The bioaccumulation and resultant health impacts posed by consumption of impacted livestock can be modeled via algorithms developed to support the indirect pathways of human exposure. Finally, a limited number of background or non-impacted locations should be sampled for purposes of comparison with sampling results from potentially impacted locations.

ii) Ecological Assessment

The results from the surficial soil sampling approach described above will also be used to support characterization of potential impacts to ecological receptors and habitat.

iii) Analytical Framework

PCB samples should be submitted for high-resolution analysis to provide specific data regarding the prevalence of the dioxin-like or co-planar PCB congeners (EPA Method 1668a). In addition, the concentration of total PCBs should be reported from analysis of these samples and, where pattern matches can be made, aroclors should be specifically identified.

III. Biota/Vegetation Sampling Strategy

a) A limited number of vegetative cover samples, and a limited number of biota samples should be collected and analyzed to assess the degree of direct and indirect ecological impact in both the buffer zone and discrete on-site locations. In addition to the direct pathway of ecological exposure via ingestion, results from this sampling effort will be used to model impacts to higher trophic-level organisms via the food chain.

Limited on-site vegetative cover and limited on-site biota samples (lower trophic-level prey animals) will allow more robust characterization of potential impacts to site-specific ecological receptors (threatened or endangered). The number of on-site and off-site or buffer zone vegetative and biota samples, their location, and the type of biota sampled were based upon a site visit reconnaissance.

i) Analytical Framework

PCB samples should be submitted for high-resolution analysis to provide specific data regarding the prevalence of the dioxin-like or co-planar PCB congeners (EPA Method 1668a). In addition, the concentration of total PCBs should be reported from analysis of these samples and, where pattern matches can be made, aroclors should be specifically identified.

Kettleman Hills Facility
PCB Congener Sampling
March 31 – April 1, 2009

1 meter grid and sample ID

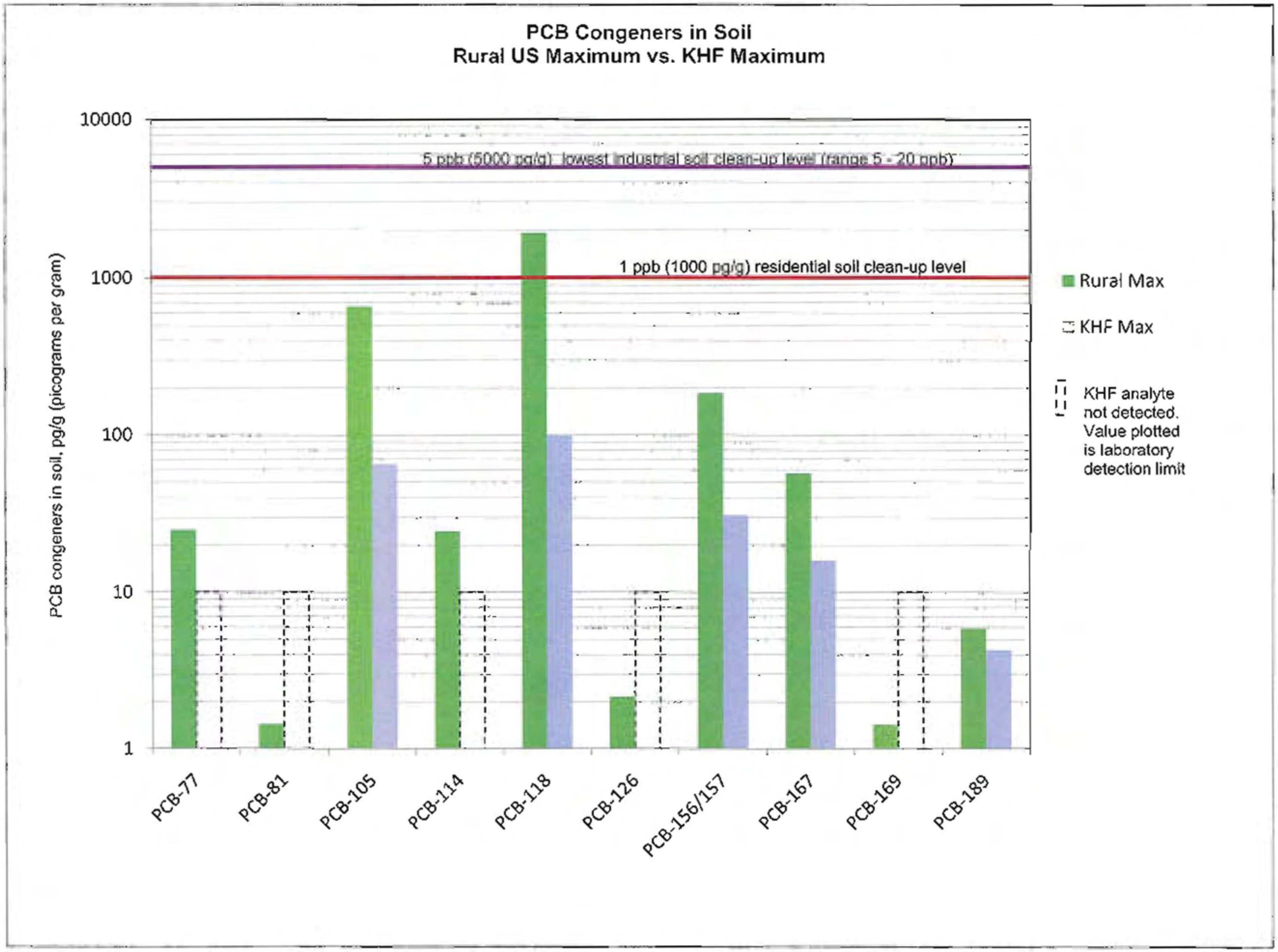
Soil sampling

Drainage swale below B-18 landfill

Vegetation sampling

Vegetation sample

Rattlesnake at location NW-8



PCB Congeners in Soil
Rural US Maximum vs. KHF Maximum
10000
1000
100
10
1
PCB congeners in soil, pg/g (picograms per gram)
5 ppb (5000 pg/g) lowest industrial soil clean-up level (range 5 - 20 ppb)
1 ppb (1000 pg/g) residential soil clean-up level
Rural Max
KHF Max
KHF analyte not detected. Value plotted is laboratory detection limit
PCB-77
PCB-81
PCB-105
PCB-114
PCB-118
PCB-126
PCB-156/157
PCB-167
PCB-169
PCB-189

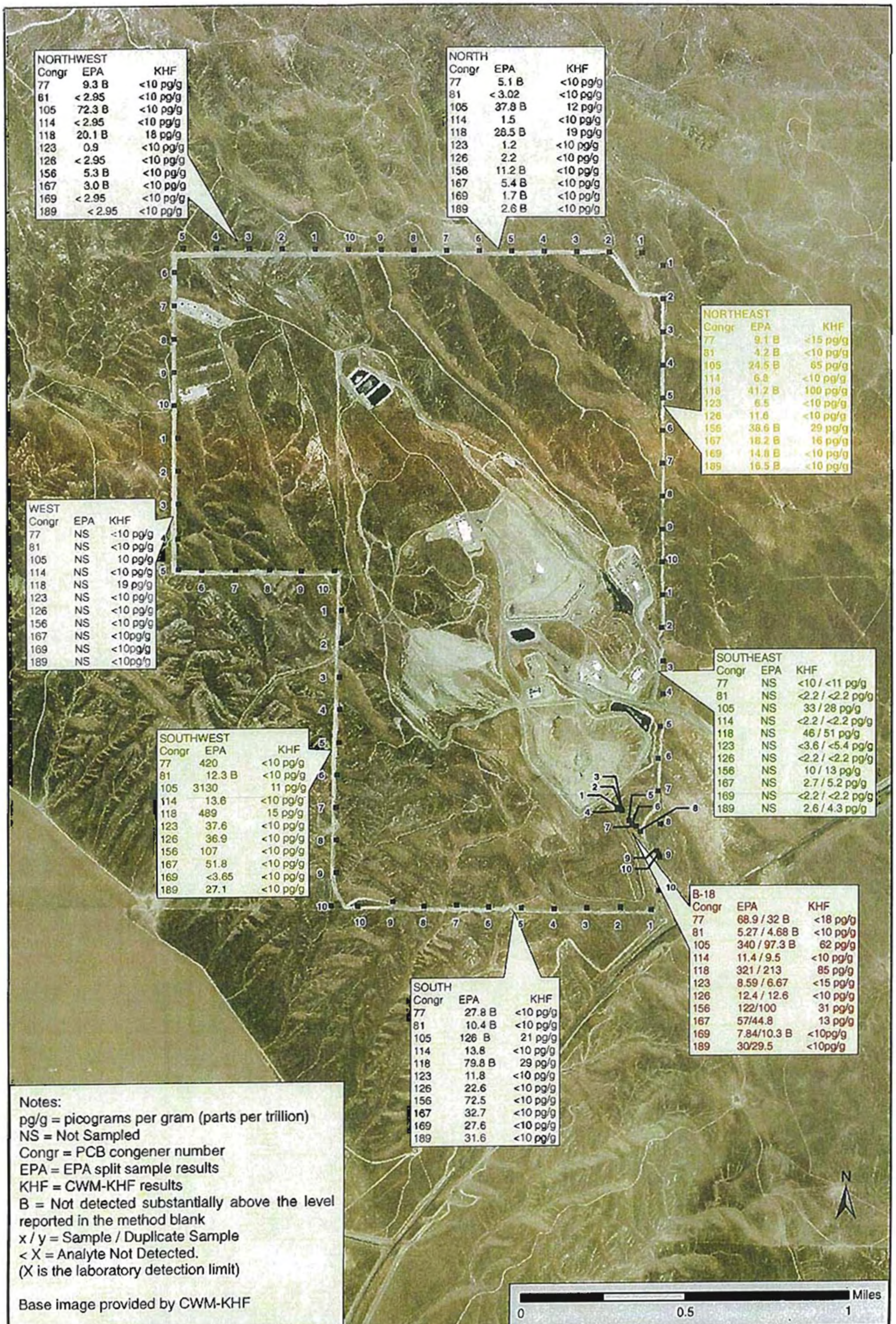


Figure 5. Soil PCB Analytical Results

Figure 12. Particle Bound Phase Annual 1st High Total Deposition Results

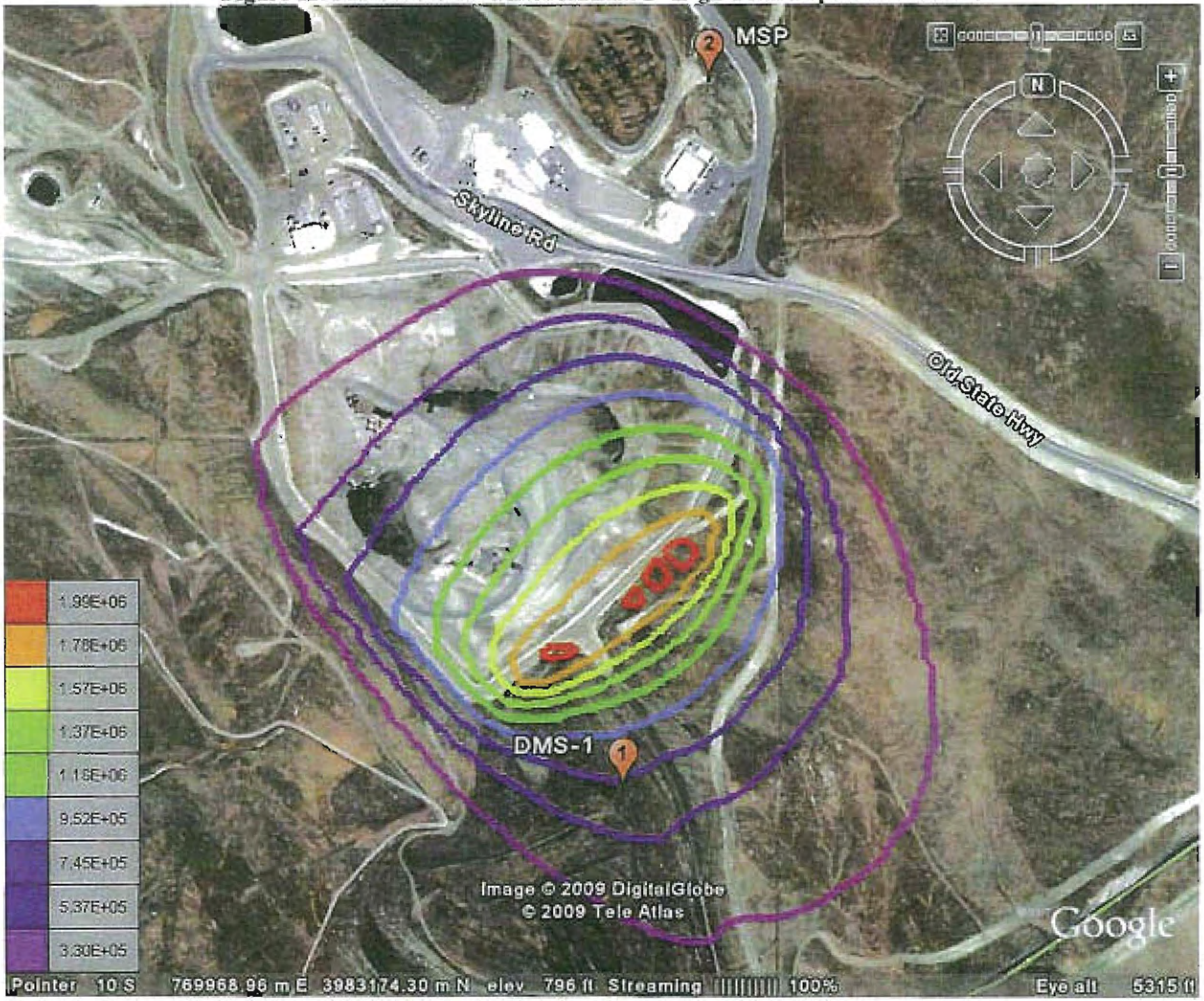
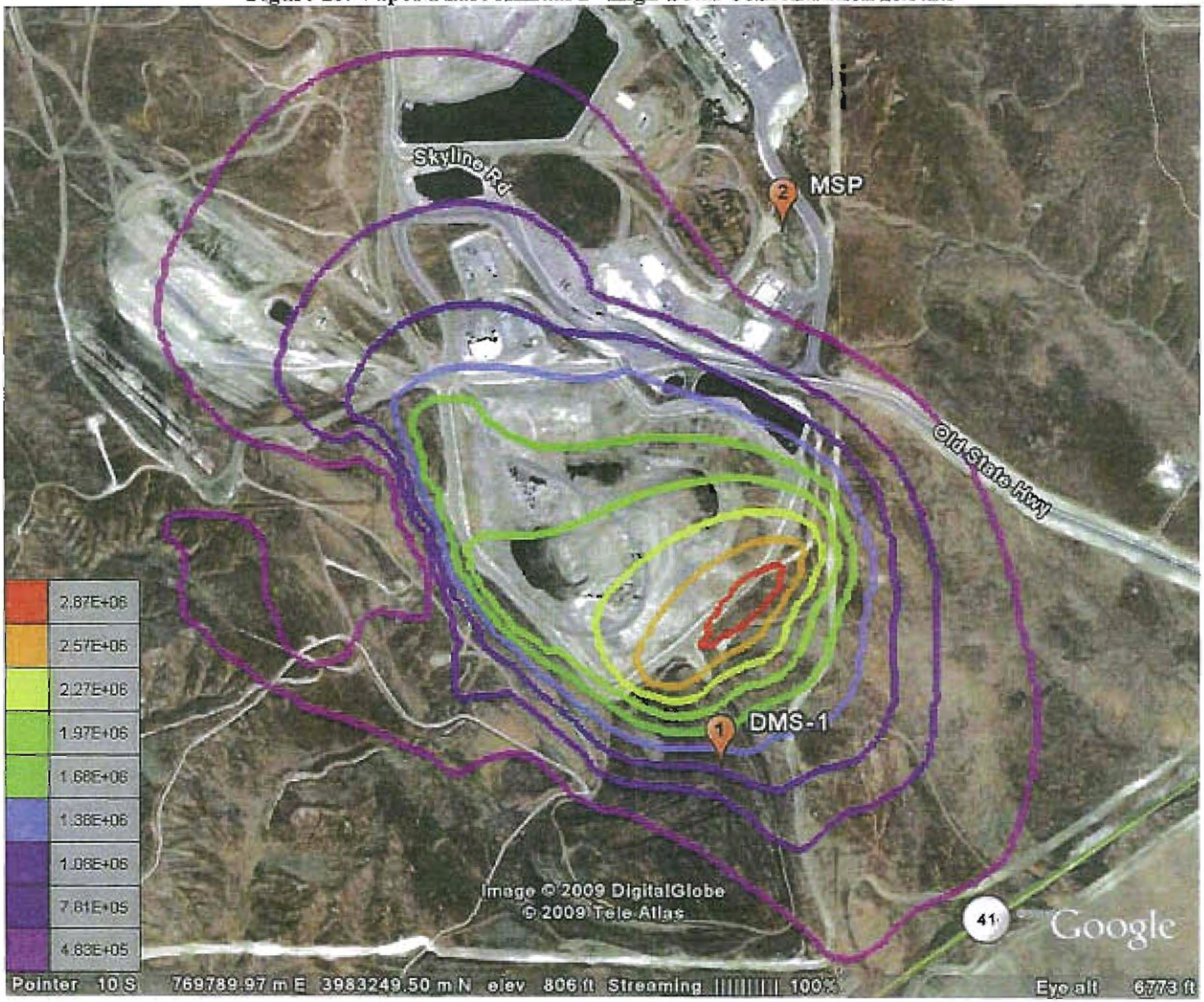


Figure 15. Vapor Phase Annual 1st High Total Concentration Results



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Part Per Million Equivalency:

1 second in 11.6 days
1 second in 11 days, 13 hrs., 46 min, 33 sec (about 11 1/2 days)
1 minute in 1.9 years
1 inch in 15.8 miles
13 inches compared to the distance between New York and Boston
1 foot in 189.4 miles
1 sq. inch in 771.6 yards
6 sq. inches in an acre
1 sq. ft. in 23 acres
1 drop in 17 gallons (drop = 0.0649mL, cooking measure)
1 grain of sand in 0.73 pounds of sand
1 person in the population of Detroit or Dallas
1 cent in $10,000
1 penny in a stack 4,921 feet high
1 pancake in a stack 4 miles high
1 letter of the alphabet in a 500 page book
1 facial tissue in a stack taller than the Empire State Building
1.1 gm needle in a ton of hay
1 ounce in 62,500 pounds of sugar
1 large mouthful in a lifetime of food eaten
the concentration of 1 teaspoon of DDT spread on 5 acres of alfalfa
1 drop of vermouth in 17 gallons of gin -a "dry martini"
1 automobile in bumper to bumper traffic from Cleveland to San Francisco
1 drop of gasoline in a full sized car gas tank
1 bad apple in 2000 barrels
1 oz. in 31 tons
a shot of bourbon in a tanker truck full of water

Part Per Billion Equivalency

1 sec in 31.7 years
1 inch in 15,738 miles
15 inches compared to the mean distance to the moon
1 foot in 189,400 miles
1.25 feet in the distance to the moon
1 sq. in. 771,600 sq. yards
1 sq. inch in 120.5 football fields
1 drop in 17,000 gallons
1 drop in a swimming pool
1 drop in 312 55-gallon drums
1 grain of sand in 730 pounds of sand
1 person in mainland China
6 people in the world population
1 cent in $10,000,000
1 penny in a stack of pennies 932 miles high
1 letter of the alphabet in 1000 500-page books (enough to fill 6 bookcases)
2 breathes in a lifetime of breathing
1 silver dollar in a roll of silver dollars stretching from Detroit to Salt Lake City
1 kernel of corn in enough corn to fill a 45-foot-silo, 16 feet in diameter
1 sheet in a roll of toilet paper stretching from New York to London
a pinch of salt in ten tons of potato chips
1 sq. ft in 36 sq. miles
1 bad apple in 2,000,000 barrels
1 bogey in 3,500,000 tournaments
1 second in the lifetime of a 32 year old person
1 drop of water in 500 barrels of water

Part Per Trillion Equivalency:

1 sec in 31,710 years
1 inch in 16 million miles
1 foot in 189 million miles
0.5 feet in distance to the sun
a hairsbreadth compared to twice the distance around the world
1 sq. inch in 249.1 sq. miles
1 sq. ft in the State of Indiana
1 drop in 17,000,000 gallons
1 drop in 2 days water use in Washington, DC
1 grain of sand in 730,000 pounds of sand (enough to cover a football field with 1.5 in of sand)
1 cent in $10 billion
1 square foot of floor tile on a kitchen floor the size of Indiana
1 drop of detergent in enough dishwasher to fill a train load of railroad tank cars 10 miles long

PCBs at a GLANCE

- PCBs or Polychlorinated Biphenyls are a group of synthetic chlorine-containing chemical compounds which are colorless, odorless, viscous liquids or solids with low electrical conductivity, a low ability to evaporate (vapor pressure), and a high potential to bioaccumulate up the food chain.

- PCBs are often identified as "Aroclors". PCB Aroclors are one of nine different commercial PCB mixtures. Some PCB mixtures have a greater percentage of chlorine than other mixtures.

- PCBs have been more recently - and more accurately - identified as "Congeners". A PCB congener is one of 209 different possible forms of PCBs.

- The manufacture of PCBs was banned in the United States in August 1977. This ban was based in part, because there was widespread scientific evidence that PCBs accumulate in the environment and may cause a broad range of both acute and chronic impacts to human health.

PCB's a Primera Vista

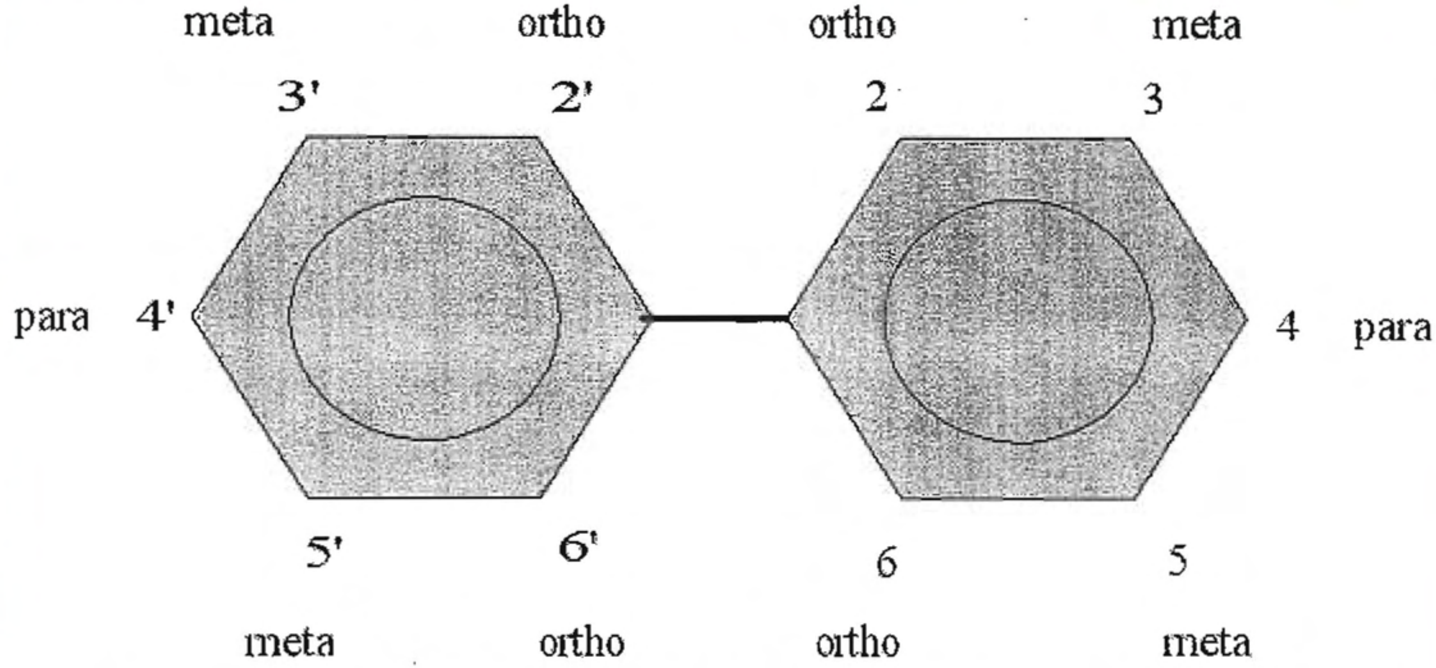
- PCB's o bifenilos policlorados son un grupo de compuestos químicos sintéticos que contienen cloro y no tienen color, ni olor. Son líquidos viscósos o sólidos con baja conductividad eléctrica, con habilidad baja de evaporarse (la presión de vapor), y una potencial alta de bioacumularse en la cadena alimentaría.

- La mayoría de las veces PCB's son identificados como "Arocloros." Arocloros PCB, son una de las nueve distintas mezclas de PCB's comerciales. Algunas mezclas de PCB's tienen un porcentaje mayor de cloro que otras mezclas.

- Recientemente PCB's han sido identificados más precisamente como "Congéneros." Un Congénero PCB es una de las 209 formas distintas de PCB's.

- La fabricación de PCB's fue prohibida en los Estados Unidos en Agosto del 1977. Esta prohibición fue basada en parte, porque hubo amplia evidencia científica que los PCB's se acumulan en el medio ambiente y podrán causar un amplio rengo de impactos tonto crónicas y agudos a la salud humano.

Estructura Molecular del PCB
PCB Molecular Structure



Estructura de una molécula bifenilo policlorado (PCB)

Structure of Polychlorinated Biphenyl (PCB) Molecule