



# County of Santa Cruz

## HEALTH SERVICES AGENCY

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ENVIRONMENTAL HEALTH

## Human Health and Ecological Risk Assessments in Santa Cruz County

The Santa Cruz County Environmental Health Services Site Mitigation Program is responsible for reviewing technical reports, providing regulatory oversight, and approving mitigating measures associated with contaminated sites. Some sites cannot be cleaned up to background levels or established regulatory standards. In these rare instances, a Human Health and Ecological Risk Assessment (HRA) may be appropriate. Because of the specialized nature of HRAs, a qualified professional may be retained by the County to assist the Health Officer in determining the adequacy of the HRA and any potential engineering and/or institutional controls proposed to protect human health and/or the environment. The cost of the services provided by the County's qualified professional will be at the sole expense of the Responsible Party (SCCC, Chapter 7.100.340).

The technical review of HRAs shall be done in accordance with United States Environmental Protection Agency (USEPA) guidelines (1989) and associated USEPA and California Environmental Protection Agency (CalEPA) guidance (see References Cited). The review components may include, but may not be limited to the following:

Analysis of Site Data Used in HRA – The site characterization data employed in the HRA will be reviewed to ensure that data needs for risk assessment (e.g., sample number, location, analytical detection limits, and quality assurance criteria) are met. Appropriate application of site data in the estimation of exposure concentrations and chemical doses will be assessed. Conformity with USEPA HRA data usability evaluation criteria (USEPA, 1992a) will be evaluated.

Conceptual Site Model – The conceptual site model (CSM) will be evaluated for thoroughness and relevance to the site. The CSM supports the identification of sources of contamination, chemicals of potential concern (COPCs), environmental media of interest, potential exposure pathways and receptors and adequacy of site characterization data (USEPA, 1988, 1989).

Identification of Chemicals of Potential Concern (COPCs) – The selection criteria applied to identify COPCs will be evaluated for consistency with risk assessment guidance (CalEPA/DTSC, 1992; USPEA, 1989). Methods for characterizing background distributions, if used as a selection criterion for COPC selection, will be evaluated for consistency with CalEPA/DTSC and USEPA guidance (CalEPA/DTSC, 1997; USEPA, 2002a).

Exposure Assessment – The following exposure assessment components will be evaluated in accordance with USEPA guidance (USEPA, 1989, 1996, 1997, 2000, 2002b):

- Identification of, and rationale for, exposure scenarios (e.g., current/future, baseline/remedial action scenarios)
- Identification of potential receptors
- Identification of, and rationale for, complete (or potentially complete) exposure pathways
- Dose equation for each complete (or potentially complete) exposure

- Exposure point concentrations (methodology, including fate/transport modeling and statistical analysis of site data)
- Exposure parameters used in dose calculations (including chemical-specific bioavailability values), and exposure input values for fate/transport models and lead uptake models).

Calculation of exposure point concentrations (EPCs) will be evaluated. The statistical methods applied as the basis for EPCs shall be evaluated for concurrence with USEPA guidance, which recommends the use of bootstrapping methods to estimate the 95 percent upper confidence level (UCL) on the mean concentration (e.g., EPC) if data distributions are not normally distributed.

Toxicity Assessment – The CalEPA Toxicity Criteria Database (CalEPA/OEHHA, 2007) and USEPA Integrated Risk Information System (IRIS) (USEPA, 2007) will be accessed to ensure that current toxicity criteria (i.e., cancer slope factors and reference doses) are used in the HRA. Other data sources relied on will be evaluated in accordance with the USEPA “Hierarchy of toxicity information” (USEPA, 1989). Toxicity profiles, if provided, will be reviewed for accuracy and relevance to the HRA (e.g., specification of effect-level doses when discussing toxicological endpoints).

Risk Characterization – Methods for characterizing cancer and noncancer risk, and interpretation criteria for lead uptake model results, will be evaluated in accordance with relevant guidance (i.e., USEPA, 1989, 1995). Dose (average daily dose and lifetime average dose) and risk characterization (incremental lifetime cancer risk and noncancer hazard index) values will be recalculated for key COPCs to evaluate if errors were made in the HRA. Fate/transport model and lead model results will also be evaluated.

Risk characterization uncertainties, including identification of contributions of chemicals and assumptions of total risk (i.e., identification of drivers) will be evaluated in accordance with USEPA guidance (1922b, 1995).

The County’s qualified professional will perform site visits and make additional inquiries if needed for an appropriate understanding of the specific site conditions.

The County’s qualified professional will prepare and submit a technical memorandum to Santa Cruz County Environmental Health summarizing the components of the review and providing technical comments regarding the HRA. Comments will be presented as explicitly as possible (e.g., suggestions or examples may be provided) to ensure that all comments are successfully addressed by the HRA authors. The County’s qualified professional will be available to discuss memorandum and/or attend meetings as needed with the County, Responsible Party, Responsible Party’s consultant, the public, and/or others regarding the HRA and technical review.

## REFERENCES CITED

CalEPA/DTSC, 1992. Supplemental Guidance for Human Health Multimedia Risk Assessment of Hazardous Waste Sites and Permitted Facilities. DTSC, October 7.

CalEPA/DTSC, 1997. Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessment at Hazardous Waste Facilities. Final Policy. Human and Ecological Risk Division, DTSC.

CalEPA/OEHHA, 2007. Online Toxicity Criteria Database, Office of Environmental Health Hazard Assessment

USEPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. Office of Emergency and Remedial Response, October.

USEPA, 1989. Risk Assessment Guidance for Superfund, Vol I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response.

USEPA, 1992a. Guidance for Data Usability in Risk Assessment (Part A), Final. Office of Emergency and Remedial Response, April.

USEPA, 1992b. Guidance on Risk Characterization for Risk Managers and Risk Assessors. Memorandum by F.H. Habicht II, Deputy Administrator, USEPA. February.

USEPA, 1995. Guidance for Risk Characterization. Science Policy Council. February.

USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response, May.

USEPA, 1997. Exposure Factors Handbook, Update to Exposure Factors Handbook, May 1989. Office of Research and Development.

USEPA, 2000. Child-Specific Exposure Factors Handbook. National Center for Environmental Assessment, June.

USEPA, 2002a. Guidance for Comparing Background and Chemicals Concentrations in Soil for CERCLA Sites. Office of Emergency and Remedial Response. September.

USEPA, 2002b. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, Peer Review Draft. Office of Solid Waste and Emergency Response, December.

USEPA, 2007. Integrated Risk Information System (IRIS). Online database of USEPA Toxicity Criteria.