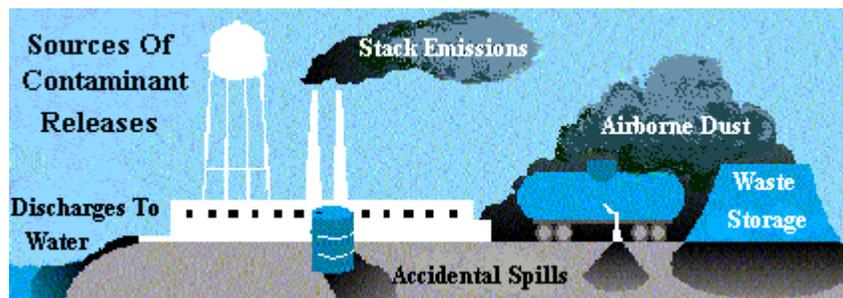


SOURCE TERM ESTIMATES



What is a source term estimate?

A source term is an estimate made by researchers of the amount and chemical form of a contaminant released to the environment from a specific source over a certain period of time. The phrase "source term" is used in risk assessment studies and refers to estimates of toxic chemicals and radioactive materials released from a source such as the Rocky Flats Plant. For example, contaminants released from Rocky Flats include the radioactive materials plutonium and tritium and the chemicals carbon tetrachloride and beryllium.

What is the meaning of the phrase "source term?"

In the phrase "source term," *source* identifies the nature and origin of the release; that is, how and where the substance was released from the facility. *Term* refers to the first part of a calculation to estimate how much of the substance was released to the environment over a specified time period.

What types of releases lend themselves to source term estimates?

At the Rocky Flats Plant, the types of releases for which source terms are estimated include wastewater discharges, emissions from exhaust stacks, contaminants released during fires or other unplanned incidents, and spills or leakage from waste storage areas.

How are source term estimates used in reconstructing doses to offsite residents?

Calculating or defining source terms, the release histories of the contaminants, is the first stage in the series of calculations to determine the radiation and chemical doses received by people who were exposed to materials released from the Rocky Flats Plant in the past. Based on the source terms and other information about the ways people were exposed to the contaminants, doses or quantities that individuals could have received can be estimated along with the potential health risks.

How are source terms identified and calculated?

Researchers begin with a thorough review of the facility's operations to identify radioactive or hazardous materials that were used or stored on the site, waste-handling practices at the facility and incidents that occurred in the past. Source term estimates rely heavily on a variety of information from historical records on routine emissions. Original data like those in logbooks and analytical notebooks are more valuable than summary data in monthly or annual reports. Environmental sampling and monitoring data can be used to check source term estimates or to validate source term calculations.

Interviews with current and former employees can help supplement written information. The researchers use these multiple information sources to identify possible release points and develop estimates of the amounts of contaminants released during a particular time period, or as a result of an unintentional incident.

How are source terms described in a study?

Each source term identifies a specific radioactive or hazardous material with unique physical and chemical properties. The estimated amounts of each radioactive substance released from a source are expressed in units of radioactivity, such as curies or becquerels, released over a specified time period (by year or for the duration of a release incident). Releases of non-radioactive contaminants are given in units of weight per time period (grams per second, tons per year).

Can every source term be identified?

Unfortunately, no. Reconstructing contaminant releases that occurred in the past is similar to assembling a puzzle that may have missing pieces. Even the best-kept records may not provide all the data in the form needed to identify and calculate accurate source terms. However, experienced researchers use a combination of available data sources and scientific methods to develop realistic estimates for most source terms.

If source terms cannot be directly calculated, can data from similar facilities be used?

Yes, this approach can be used when data on contaminant releases from comparable facilities are available. For example, average release rates and contaminant concentrations in air emissions from production facilities similar to Rocky Flats could be used for comparison or to fill in missing information in a source term calculation.

What happens after source terms are estimated?

After estimating the source terms, the researchers reconstruct how the contaminants were dispersed and moved through the environment in air, water or on the soil. They evaluate the ways in which people could have been exposed to various contaminants at different locations and estimate the amounts that individuals may have received.