Restoration Advisory Board Fact Sheet

The Remedial Investigation: Characterizing the Type and Size of the Problem

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This fact sheet is one of a series prepared for RAB members about the Travis Air Force Base (AFB) Installation Restoration Program (IRP).

Each of the four Operable Units (OUs) at Travis AFB will undergo a separate Remedial Investigation (RI) to characterize the types of contaminants present, and the concentrations of those contaminants, if any, are found. The types of contaminants are sometimes called the ***nature*** of the contamination, the concentrations called the ***magnitude***, and the area affected by contamination called the ***extent***.

WHY ARE REMEDIAL INVESTIGATIONS NECESSARY?

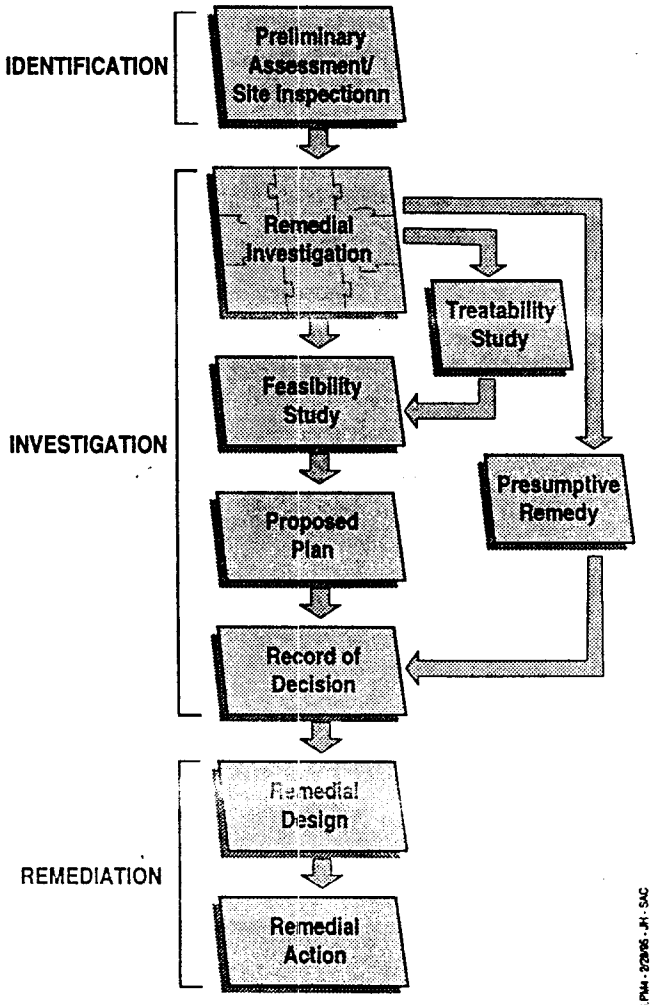
Waste disposal practices used in the past sometimes allowed chemicals to be released to the environment. While these practices are no longer used, the chemicals may still be present in the environment and may pose risks to human health or the environment. One of the purposes of the IRP at Travis AFB is to identify areas where such contaminant releases may have occurred, and investigate them to confirm whether or not any contamination exists. If contamination is found, the risks posed by that contamination are calculated, and any necessary cleanup actions are taken to address those risks. If no contamination is found, the site can be recommended for no further investigation and eliminated from further actions.

WHAT DOES A REMEDIAL INVESTIGATION CONSIST OF?

An RI has several parts. First, a field sampling plan (FSP) is prepared. The FSP specifies what kinds of samples will be collected, how they will be analyzed, and the decisions to be made based on the results. FSPs target areas where contamination is suspected. Samples can be surface soil samples, subsurface soil samples, soil gas samples, or groundwater samples, among others. Once the FSPs are approved by the regulatory agencies, sample collection begins. Field efforts can last several months. Results are evaluated by several methods (see below). An RI can also include tests to determine whether cleanup technologies work at a given location. These tests are called Treatability Studies.

HOW ARE RESULTS EVALUATED?

Investigators evaluate the analytical results of the sampling effort in several different ways. The pur-



The RI is one step in the remedial process.

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poses of these evaluations are to:

- Determine if contaminants are present in the environment, and in what quantity; and

- Determine if remediation is required.

To make these determinations, investigators seek to answer the following questions:

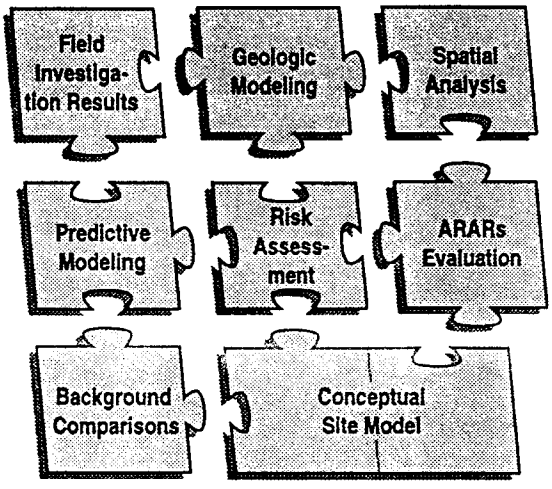
- **Are the analytical data of sufficient quality and quantity to characterize the contamination?** Analytical data must meet rigorous standards set by the Air Force and the U.S. EPA for accuracy and precision to be useful.

- **Do the data indicate contamination?** For manufactured compounds, such as solvents or fuel-related compounds, a positive analytical result is generally considered to indicate contamination. But for naturally occurring substances, such as metals, an additional question must be answered: does the amount of metal present in the sample exceed the amount one would expect to be present naturally? Arsenic is a good example. Arsenic is a poison and even naturally occurring quantities can result in a health risk calculation that exceeds the criterion for cleanup. But unless the arsenic exceeds background or reference concentrations—that is, the amount that would be in the soil or groundwater naturally—it is not considered contamination and does not require cleanup.

- **Do the contaminant concentrations exceed** established regulatory levels? For example, the U.S. EPA and California Department of Toxic Substances Control have established Maximum Contaminant Levels (MCLs) for drinking water for many compounds. If contaminants in drinking water exceed their respective MCLs, they may require remediation.

- **Are the contaminants in an exposure pathway?** This is the first step in determining if any contaminants pose a risk to human health or the environment. Examples of exposure pathways are the ***groundwater pathway***, groundwater that could be used for drinking water, or ***air pathway***, the air humans or animals breathe at the site. A pathway is ***complete*** if contaminants are present in the groundwater, for example, AND humans or animals could be exposed to the contaminants. For example, at Travis AFB, groundwater is not used for drinking water; therefore, the groundwater pathway would be incomplete even if contaminants are present in the groundwater because no one is being exposed to the groundwater. Finally, just because a pathway is complete does not mean that the contaminants pose a risk. The question of risk is addressed below.

- **Do the contaminants in a completed pathway pose a risk to human health or the environment?** Risks to human health and the environment are calculated in the risk assessment (RA) section of the RI report. The RA calculates risks posed by contaminants in several scenarios, such as a residential scenario for humans. All RAs are conservative: that is, they try to find the worst case risk by assuming, for example, that a resident spends his or her entire life at a site, eating food grown on the site and drinking groundwater from that site. Cancer risks are expressed in terms of "one in one million" excess cancer risk. A one in one million excess cancer risk would mean that, out of one million people, less than one additional person might develop cancer in their lifetime due to exposure to the compounds at the site than would be expected to develop cancer from other causes. One in one million (also expressed as 1.0×10^{-6}) risk is generally used as the criterion for requiring cleanup of a contaminant.



The RI itself is composed of many parts, the purpose of which is to identify areas that may require remediation.

THE NEXT STEP

At the end of the RI, investigators will make recommendations as to which sites should be carried forward into the Feasibility Study (FS). These sites will be those where contaminants exceed regulatory criteria and/or pose a risk to human health or the environment. The FS will evaluate various remediation technologies for effectiveness, implementability, and cost to determine which is the most appropriate method of remediating contamination.