

## Risk Assessment

### Background

In February 1997, the Environmental Quality Commission, the DEQ's governing body, issued environmental permits to the Army to build and operate the Umatilla Chemical Agent Disposal Facility (UMCDF) to destroy the chemical weapons stockpile stored at the Umatilla Chemical Depot (UMCD) near Hermiston, OR.

This fact sheet describes how DEQ conducts human health and ecological risk assessments and how the results are used.

### What is a risk assessment?

A risk assessment uses scientific methods to estimate the risks of a chemical by identifying the type of harmful effects a pollutant might cause (its "toxicity") and evaluating how someone might be exposed to that chemical. A risk assessment is one of the tools that DEQ uses to make sure that UMCDF will not cause any harmful health or environmental effects when it begins operations to destroy the chemical weapons.

The goal is to estimate how much (if any) harm to human health or the environment will occur due to air emissions from the incinerator stacks during normal, day-to-day operation of the incinerators. Risk assessments also try to account for the temporary increase in emissions that can occur during non-normal operating conditions, called "upset" conditions. The environmental part of a risk assessment includes evaluating whether there are risks to ecological resources such as critical fish and wildlife habitat, or endangered species.

### The steps in a risk assessment

The four basic steps in risk assessment are:

- 1) **hazard identification**
- 2) **dose-response assessment,**
- 3) **exposure assessment**
- 4) **risk characterization.**

### STEP 1 – Hazard identification: Is there a hazard and if so what is it?

**Hazard identification** indicates whether exposure to a substance causes a harmful health or environmental effect and the nature of the effect.

Hazardous substances are identified by analyzing the wastes that will be fed into the incinerators to determine what kind of air pollutants might be produced during the incineration process, and by collecting emissions information during trial burns.

DEQ reviews information on each pollutant to determine if the chemical substance has been identified as harmful, and what type of harm it might cause. Hazard identification also helps the DEQ determine what types of pollutants to monitor for during the incineration trial burns.

### STEP 2 Dose Response Assessment: How much is harmful and what are the harmful effects?

**Dose response assessment** relates the dose size to the risk involved. The dose of a harmful chemical is directly proportional to the amount of harm it causes. As the dose increases, the amount of harm increases. Some people, such as pregnant women, children, or the elderly, might be more sensitive to a chemical than others. Long term health effects are assessed for individuals who live, fish, or farm in the area.

### STEP 3 – Exposure Assessment: Can a person be exposed through eating, breathing and/or skin contact?

**Exposure assessment** uses computer models to calculate the probable path of emissions from the incinerator stacks to determine the size of the area exposed. The emission paths determine who might be exposed to the pollutants, how long they would be exposed, and how much of the pollutant they might be exposed to. Exposure assessment then uses a variety of exposure "scenarios" to account for people's different lifestyles. For example, someone who lives close to the incinerators and grows their own food and raises animals might be exposed to stack emissions not only through breathing, but also from eating plants or animal products that have been exposed. Another scenario assesses exposure of small children because children breathe faster than adults and are more likely to come in contact with soil that has been exposed to stack emissions.



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**STEP 4-Risk Characterization:  
What are the possible harmful effects  
and what is the likelihood a harmful  
effect will occur?**

**Risk characterization** combines the information collected during the first three steps and determines the likelihood that humans or animals will experience any of the health effects associated with a substance, or that the environment will be harmed. Risk characterization involves assigning a value to a risk, such as “there is a one in a 100,000 chance that someone who lives near the site might get cancer from exposure to the chemicals.” A different risk value (called a “hazard index”) is calculated for those chemicals that cause harmful effects other than cancer. But some risks cannot adequately be assessed because valid scientific data are not available.

**Are Risk Assessments reliable?**

Risk assessments involve assumptions and thus include some degree of uncertainty. When information is limited (or not available), “professional judgment” decisions are usually made to err on the side of safety to overestimate risk. A risk assessment is a scientific tool used to determine the potential for risk—it does not determine actual risk.

To protect the most sensitive people in a population (such as young children, pregnant women, or the elderly) the risk assessment process uses a number of very conservative assumptions. Risk assessments generally tend to overestimate risks by assuming “worst-case” conditions, even though it is unlikely these conditions will occur. When the risk is calculated to be “one in a million,” risk assessors are really saying that exposure to a chemical will add no more than one excess cancer case per one million people exposed. The actual number may be quite less (e.g. one in ten million), but is not expected to be greater than one in one million.

**How will DEQ use the Risk Assessment?**

The risk assessment is one of the tools that DEQ uses to establish operating conditions and stack emission limits for UMCDF. DEQ first conducted a risk assessment of UMCDF emissions in 1996 (before the permits were issued) using emissions information collected at other chemical weapons incinerators. After the first chemical agent trial burns are completed DEQ will conduct a “Post-Trial Burn Risk Assessment” using emissions data gathered during the tests.

Trial burns are incineration tests designed to test each furnace system and gather data to make sure that UMCDF will be able to comply with the conditions of its permits.

The Post-Trial Burn Risk Assessment will use up-to-date guidance available from the U.S. Environmental Protection Agency (EPA) on how to conduct a risk assessment. The DEQ will use the results of the risk assessment to decide whether any changes are needed in the operation and management of UMCDF, to assure that the facility will not pose any health or environmental risk to the community.

DEQ has prepared a workplan describing how the Post-Trial Burn Risk Assessment will be conducted. The workplan was released for public comment in October, 2003 and will be finalized in February, 2004.

**Where to get more information**

Contact Shelly Ingram at the DEQ office in Hermiston, 256 East Hurlburt (Suite 105) or call (541) 567-8297 ext. 25 (toll-free in Oregon 1-800-452-4011).

**Alternative formats**

*Alternative formats of this document can be made available. Contact DEQ, Shelly Ingram at (541) 567-8297 ext. 25. People with hearing impairment may call DEQ’s TTY at (503) 229-6993.*

**Related fact sheets available from DEQ:**

- | Trial Burn Operations
- | Summary of Risk Assessment Workplan