



# The Revised Hazard Ranking System: An Improved Tool for Screening Superfund Sites

Office of Emergency and Remedial Response  
Hazardous Site Evaluation Division (OS-230)

Quick Reference Fact Sheet

The U.S. Environmental Protection Agency (EPA) has revised the Hazard Ranking System (HRS) in response to the Superfund Amendments and Reauthorization Act of 1996 (SARA). The HRS is the scoring system EPA uses to assess the relative threat associated with the release or potential release of hazardous substances from a waste site. The HRS score is the primary criterion EPA uses to determine whether a site should be placed on the National Priorities List (NPL). The NPL identifies sites that warrant further investigation to determine if they pose risks to public health or the environment. Sites on the NPL are eligible for long-term "remedial action" financed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by SARA. SARA authorizes a "Hazardous Substances Superfund" totalling \$8.5 billion over 5 years to pay costs not assumed by those responsible for problems at a site. The HRS uses data that can be collected relatively quickly and inexpensively, thus allowing most Superfund resources to be directed to remedial actions at sites on the NPL.

## Original HRS

The original HRS, adopted in 1982, evaluated the relative threat of a site over five pathways. The HRS score was based on the evaluation of the following migration pathways: ground water, surface water, and air. The two other pathways, direct contact and fire/explosion, were evaluated to determine the need for immediate removal (emergency) action. HRS scores ranged from 0 to 100. Sites that scored 28.50 and above on the original HRS were eligible for the NPL.

## Revised HRS

The revised HRS retains the same cutoff score and basic approach as the original HRS, while incorporating SARA requirements as well as improvements identified as necessary by EPA and the

public. The revised HRS retains the ground water, surface water, and air pathways, drops the direct contact and fire/explosion pathways, and adds a fourth pathway, soil exposure.

Several key provisions of the revised HRS make it more comprehensive. They:

- # Evaluate new exposure pathways or threats that assess direct contact of people with contaminated soils, and contamination of the aquatic food chain.
- # Expand how toxicity is evaluated, considering not only acute health effects, but both carcinogenic and chronic noncarcinogenic effects.

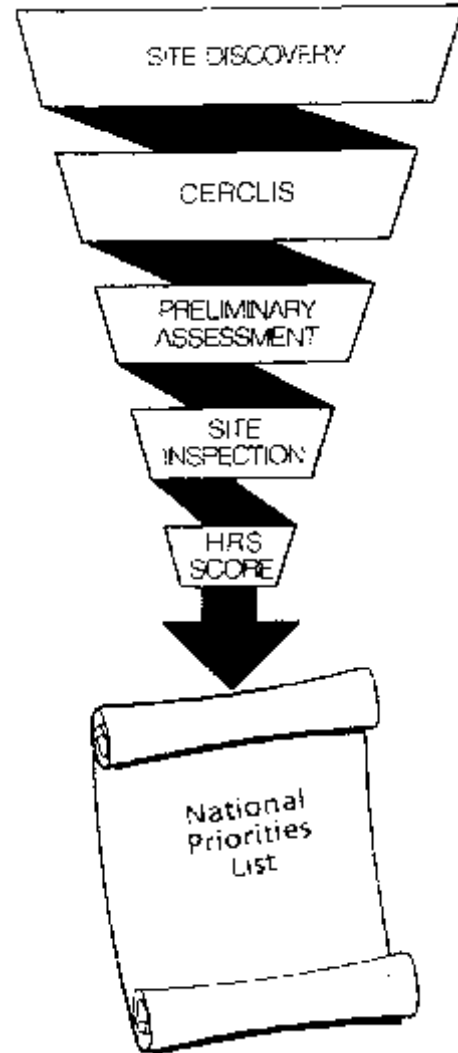
- # Increase the sensitive environments considered from just wastland and endangered species to environments designated by various Federal and State agencies.
- # Evaluate the potential for air to be contaminated and for contaminated groundwater to enter surface water.

Other provisions make the revised HRS more accurate:

- # Allow use of concentration data to determine the quantity of waste at a site.
- # Assign higher scores when people are actually exposed to contamination than when they are potentially exposed.
- # Assign higher scores to potentially exposed people and sensitive environments closest to a site, with scores decreasing as distance from a site increases.

The complexity and scope of the issues involved in revising the HRS required EPA to get widespread input. EPA sought information from a number of sources such as its Science Advisory Board and, on three occasions, requested public comment: before drafting the revisions, after proposing the revisions in the *Federal Register*, and after publishing a Field Test report describing how the revisions scored actual hazardous waste sites. These procedures generated over 2,500 comments (from approximately 145 commenters). The majority of the commenters believed that the revised HRS represented an improvement over the original HRS. Other commenters, however, believed that the data required were too extensive for a screening tool and raised numerous technical issues. EPA made significant changes based on these comments, as well as on the Field Test. The result is a revised HRS that is a practical and effective tool in identifying the nation's worst hazardous waste sites.

## CERCLA SITE ASSESSMENT PROCESS



## THE REVISED HRS...

- # Adds a fourth pathway, soil exposure, similar to the direct contact pathway of the original HRS. EPA experience indicates exposure to contaminated soils or wastes is often important in selecting remedial action for a site.
- # Modifies the surface water pathway to:
  - consider contamination of the aquatic human food chain
  - consider recreational use
  - evaluate the potential risk of flooding of the site
  - add a new ground water to surface water component to permit scoring of sites where surface water has been contaminated by ground water.
- # Modifies the air pathway to include the potential of a site to release contaminants to the air. In the original HRS, the air pathways was scored only if an observed release could be documented.
- # Allows the flexibility to use data on concentrations of hazardous constituents in wastes, if available, to calculate the hazardous waste quantity factor. (The original HRS used only the quantity of hazardous waste as deposited). A new tiered system uses constituent data, waste quantity data, volume, and area, providing greater accuracy by allowing use of the best available data.
- # Modifies the waste characteristics factor category to multiply the hazardous waste quantity, toxicity, and other waste characteristics factors, to make the HRS more consistent with risk assessment principles.
- # Changes the toxicity factor in all four pathways, basing it not only on acute toxicity but carcinogenic and chronic toxicity as well.
- # Adds mobility factors to the ground water and air pathways to evaluate the ability of specific substances to migrate and reach potential targets. Mobility, in combination with toxicity, should more accurately assess the relative risks posed by specific substances.

## **THE REVISED HRS... (Continued)**

- # More accurately assesses target populations and sensitive environments by giving greater weight in all pathways to:
  - those exposed to documented contamination from the site than those potentially exposed. (The original HRS treated potential and actual contamination equally.)  
and
  - those exposed to contamination above health-based benchmarks (for example, Federal drinking water standards) or ecologically-based benchmarks
  
- # Weights target populations and sensitive environments potentially exposed in the ground water, air, and soil exposure pathways based on distance, so that the people and environments closest to the site receive the highest score, with scores decreasing as distance from the site increases. Dilution weights target populations and sensitive environments in the surface water pathway.
  
- # Increases the number of sensitive environments evaluated and the weights given them in the surface water, air, and soil exposure pathways.
  
- # Adds specific instructions for scoring radioactive substances.

### **FOR FURTHER INFORMATION, CONTACT:**

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