

# The Role of Risk Assessments in Proposed CERCLA Decision Documents for Hanford River Corridor

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# Risk Assessments in CERCLA

- Assess risk
- Establish the basis for action
- Identify risks that need to be mitigated
- One of the tools used to establish cleanup levels

Risk Assessment:

assess risk  
establish basis for action  
identify risks that need to be mitigated

Waste Site or  
Groundwater  
contamination  
information



Risk  
Assessment



What is the risk?  
Is risk within  
acceptable limits?

Risk Assessment:

determine protective cleanup levels

Waste Site or  
Groundwater  
cleanup level



Risk  
Assessment



What is an  
acceptable  
risk?

# 100-K & 300 Area

- Risk Assessments in early 1990s  
Interim Actions
- RCBRA River Corridor Baseline Risk Assessment 2011/12
- Remedial Investigations/Proposed Plans 2011/12  
Conclusions and some content rolled up into the 100-K and 300 Area Remedial Investigations & Proposed Plans. RI/FS added additional GW risk assessment.

# Cleanup Levels

- Environmental Laws and Regulations – ARARs

Applicable Relevant and Appropriate Requirements

Examples: Clean Water Act, Safe Drinking Water Act, Air Emissions Regulations

- Policy
- Risk Assessment
- Risk Management
- Proposed final actions – no backsliding from interim actions

# 100-K Proposed Cleanup Level

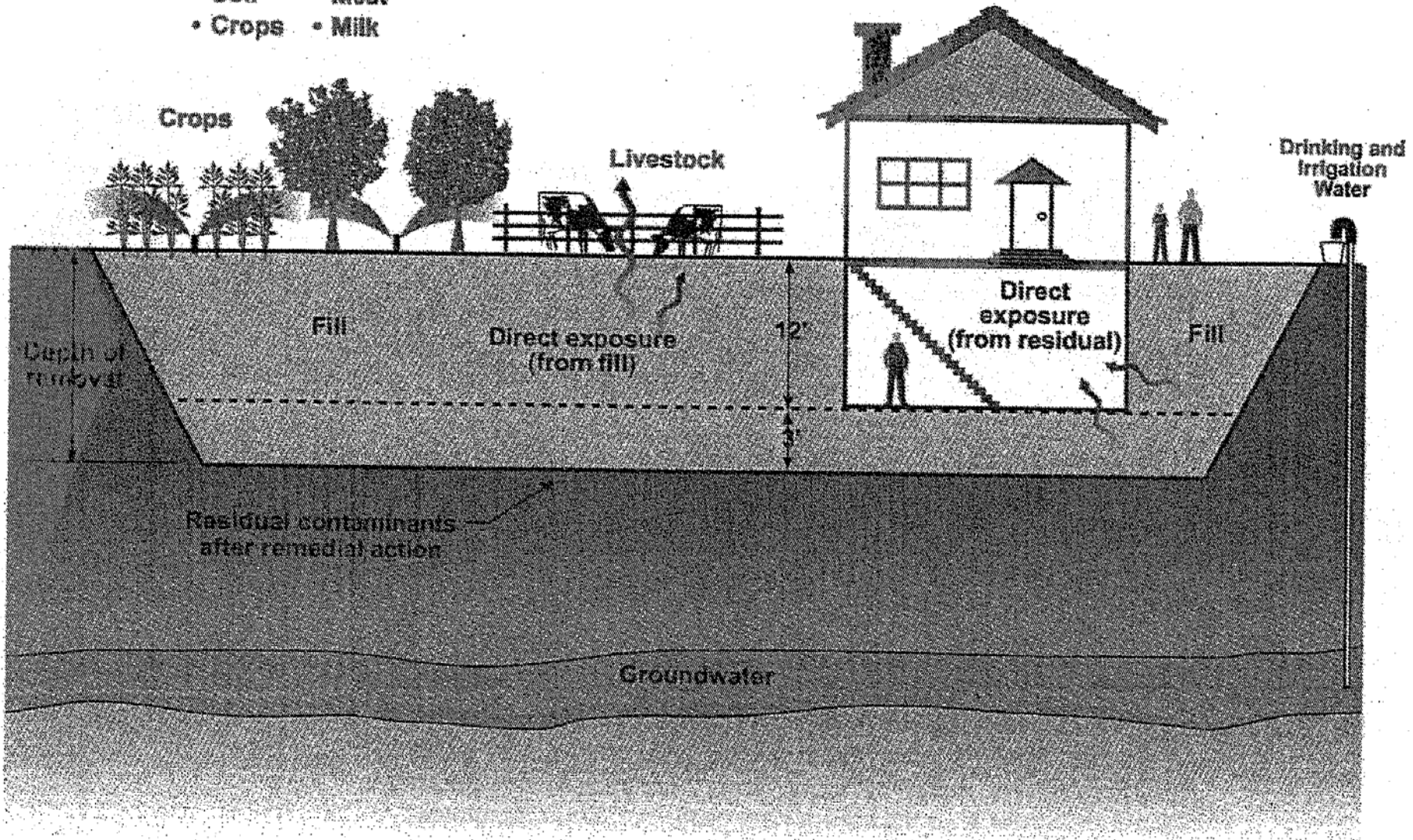
## Most Restrictive of:

- MTCA method B “unrestricted” – chemicals
- Rural Residential – radionuclides
- Interim Action
- Groundwater Protection
- Surface Water Protection
- Ecological - Plants, Invertebrates, Birds, Mammals

# Hanford Subsistence Farmer Scenario

Inhalation  
+  
Ingestion

- Soil
- Meat
- Crops
- Milk



| Input Parameters            | MTCA Method B Unrestricted (chemicals)         | Hanford Subsistence Farmer (radionuclides)           | Hanford Industrial (radionuclides) | MTCA Standard Method C Industrial (chemicals)  |
|-----------------------------|--|--|------------------------------------|--|
| Exposure Period             | 6 years – 365 days/yr                          | 6+30 years – 350 days/yr                             | 25 years 250 days/yr               | 20 years 146 days/yr                           |
| Food&water                  | Not from site                                  | All from site  | Not from site                      | Not from site                                  |
| Soil ingestion              | 200 mg/day                                     | 200 mg/day first 6 years<br>100 mg/day next 30 years | 100 mg/day                         | 50 mg/day                                      |
| Carcinogens acceptable risk | 1 in 1,000,000 each chem<br>1 in 100,000 total | 1 in 10,000 total                                    | 1 in 10,000 total                  | 1 in 1,000,000 each chem<br>1 in 100,000 total |

Noncarcinogens all use the same Hazard Quotient of one for all contaminants combined.



| Contaminant                             | Human Health or Interim Action |   | Terrestrial Ecological Risk |                      |
|---|--------------------------------|---|-----------------------------|----------------------|
|   | Cleanup Level                  | Basis                                   | Cleanup Level               | Basis                |
| 100 Area Common Contaminants            |                                |   |                             |                      |
| Arsenic                                 | 20 ppm                         | Interim Action(Human) & MTCA-A (Policy) | 127-128 ppm                 | Mammals-Plants-Birds |
| Chromium-VI                             | 2.1 ppm                        | Interim Action (Aquatic Eco)            | 1,250 ppm                   | Mammals              |
| Lead                                    | 250 ppm                        | MTCA-B                                  | 156 ppm                     | Birds                |
| Mercury                                 | 24 ppm                         | Interim Action(Human) & MTCA-B          | 0.3 1.6 2.0 ppm             | Plants-Mammals-Birds |
| PCB-1254/1260                           | 0.5 ppm                        | Interim Action(Human) & MTCA-B          | 1.47 ppm                    | Mammals              |
| Carbon-14                               | 8.7 pCi/g                      | Interim Action(Human)                   | 31.6 pCi/g                  | Mammals              |
| Cesium-137                              | 4.4 pCi/g                      | Risk - Human                            | 924 pCi/g                   | Mammals              |
| Europium-152                            | 3.3 pCi/g                      | Interim Action(Human)                   | 1,740 pCi/g                 | Birds-Mammals        |
| Strontium-90                            | 2.3 pCi/g                      | Risk - Human                            | 91 pCi/g                    | Mammals              |
| Tritium                                 | 459 pCi/g                      | Interim Action(Human)                   | 420 pCi/g                   | Mammals              |
| 300 Area Additional Common Contaminants |                                |   |                             |                      |
| Beryllium                               | 10 ppm                         | Interim Action(Human)                   | 10 ppm                      | Plants               |
| Uranium-235 & 238                       | 2.7 & 26.2 pCi/g               | Interim Action(Human)                   | 4,360 & 5,150 pCi/g         | Birds                |

# Conclusions

- Key parts of the RCBRA are brought into the RI/FS report.
- Additional data and analysis contained in the RI/FS.
- The RI/FS and Proposed Plan present the preferred and other alternatives and must explain the basis. These documents which include risk assessment must be approved by the lead regulator to go to public comment.
- Subsequent Record of Decision is based on all information in the administrative record.