



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Mr. Theodore J. Taylor
Program Manager
Department of Energy
Los Alamos Area Office
Los Alamos, NM 87544

Dear Mr. Taylor:

The Environmental Protection Agency (EPA) has reviewed the document entitled Draft Ecotoxicological Screening Methodology for Los Alamos National Laboratory. Enclosed is the outline of a procedure which should be considered for the screening risk assessment at Los Alamos. In addition, the method proposed should be revised to address the following concerns.

- 1) It is acceptable to divide up the facility into ecological habitats which may contain or be effected by contamination of more than one SWMU instead of dealing with SWMU's on an individual basis. The initial habitat pre-screening proposed is appropriate if used properly, i.e. it answers the following three questions:
 - A. Is a contaminant present?;
 - B. Is a receptor present?; and,
 - C. Can the receptor be exposed to the contaminant for a sufficient time to cause an effect?
- 2) Chemicals of potential concern can be screened out using the UTL procedure accepted for human risk assessments at Los Alamos. The risk due to background contaminants must be calculated and presented in the final report.
- 3) The ESAL screening procedure presented does not appear to be appropriate. Uncertainty associated with the approach seems far too variable to be used. The full reference for the citation Ebinger et al. 1994 should be provided.



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Should you have any questions, please contact Barbara Driscoll at (214) 665-7441 or Jeff Yurk at (214) 665-8309.

Sincerely,


David W. Neleigh, Chief
New Mexico - Federal
Facilities Section

Enclosure

cc: Mr. Benito Garcia
New Mexico Environment Department
Mr. Jorg Jansen
Los Alamos National Laboratory, MS M992

**PROCEDURE FOR CONDUCTING AN
ECOLOGICAL RISK ASSESSMENT SCREEN
FOR LOS ALAMOS NATIONAL LABORATORIES**

*Does this
process evaluate
actions if
no receptor is
present — ?*

Three Step Process

- 1) Problem Formulation
- 2) Analysis
- 3) Risk Characterization

PROBLEM FORMULATION

Purpose: To establish the environmental setting and contaminants at a site.

1) Environmental Setting

A. Previous Studies

- Site History
- Preliminary Assessments
- State or Federal Studies

B. Checklist for Ecological Assessment

- What are land uses (e.g. industrial, residential, undeveloped)
- Describe and delineate natural (e.g. forest, lake) and disturbed (e.g. waste lagoons) areas
- Determine habitats within the extent of contamination
- Determine plant and animal species inhabiting the contaminated area (information obtained from U.S. Fish and Wildlife Service, National Biological Survey, site visit)
- Endangered and threatened species and their suitable habitat in the contaminated area should be noted
- Some habitats may require special consideration under State and Federal laws (e.g. Clean Water Act, Endangered Species Act)

2) Contaminants

A. Chemicals of Concern established in Screening Guidance

1. Fate and Transport Considerations (Use highest chemical concentrations measured or predicted in each media for the screening assessment)

2. Simple models can be used to predict contaminant transport (e.g. SESOIL, EXAMS)
3. Fate data (e.g. hydrolysis, photolysis, biodegradation) obtained from databases (e.g. ENVIROFATE) and literature

B. Toxicity Information

1. Determine toxic mechanism for each chemical of concern (obtained from literature)
2. Determine toxic concentrations of chemicals of concern for the various organism groups in the contaminated area (obtained from databases)
 - AQUIRE: Aquatic toxicity values
 - TERRATOX: Terrestrial toxicity values
 - PHYTOTOX: Plant toxicity values
3. Establish complete exposure pathways for each receptor group and each media (conceptual model)
 - Terrestrial Animals: Ingestion, Inhalation, Dermal Absorption
 - Terrestrial Plants: Root Absorption
 - Aquatic Animals: Direct Contact, Ingestion
 - Aquatic Plants: Direct Contact
4. Determine assessment and measurement endpoints
 - Assessment endpoint: Ecologically significant endpoint incorporating both adverse biological effects on receptors and societal values. Should be established up front with risk manager
 - Measurement endpoint: Used to evaluate assessment endpoints. Based on mechanisms of toxic action

ANALYSIS PHASE

Purpose: To characterize ecological and exposure effects

1) Ecological Characterization

- A. Develop ecotoxicity benchmarks for each ecologically significant exposure route

1. Utilize most sensitive species
2. Use chronic/long term study
 - NOAEL
 - LOAEL x 0.1
 - LD50 x 0.01

2) Exposure Characterization

- A. Conservative assumptions should be used to establish exposure
 1. Use highest measured or predicted concentration on a media-specific basis to estimate exposure
 2. Receptor is assumed to reside 100% of the time in the contaminated area
 3. Bioavailability of the contaminant is assumed to be 100%
 4. The most sensitive life stage of the receptor is assumed for the exposure assessment
 5. Minimum receptor body weight to maximum ingestion rate is assumed

RISK CHARACTERIZATION

Purpose: To determine whether there is either 1) little or no risk associated with a site or 2) information is not adequate to make a decision.

1) Calculation of a Hazard Quotient (HQ)

$$HQ = \text{Dose}/\text{NOAEL} \quad \text{or} \quad HQ = \text{EEC}/\text{NOAEL}$$

Where:

Dose = estimated contaminant intake (e.g. mg/kg-day) obtained from literature or estimated by the following equation

$$\text{Dose (mg/kg-day)} = \text{Diet (mg/kg)} \times \text{Ingestion Rate (kg/day)} \times \frac{1}{\text{Bodyweight (kg)}}$$

EEC = Estimated Environmental Concentration (e.g. mg/L)

NOAEL = No Observed Adverse Effect Level

2) Evaluation of HQ

- A. HQ = 1 is the risk management decision point
- B. HQ's are additive across chemicals with the same mechanism of toxic action for a particular receptor

3) Conclusions

- A. Biased conservatively
- B. Data gaps in chemical toxicity or on complete exposure routes results in insufficient data to make a decision and results in moving forward in the risk assessment process
- C. 2p [Screening concentrations should not be used as clean-up goals as they are much more conservative than is necessary