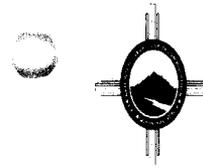




General



Los Alamos National Laboratory/University of California  
Environmental Stewardship (ENV)  
Environmental Remediation & Surveillance Program (ERS), MS M992  
Los Alamos, New Mexico 87545  
(505) 667-0469/FAX (505) 665-4747

National Nuclear Security Administration  
Los Alamos Site Office, MS A316  
Environmental Restoration Program  
Los Alamos, New Mexico 87544  
(505) 667-7203/FAX (505) 665-4504

Date: October 11, 2005  
Refer to: ER2005-0742

Mr. James Bearzi  
NMED – Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505-6303

**SUBJECT: ANNUAL UPDATE/REVISION OF THE LABORATORY'S ECORISK  
DATABASE, VERSION 2.2**



Dear Mr. Bearzi:

Enclosed please find two compact discs (CDs) containing the annual update and revision of the Laboratory's ECORISK Database for your review. Please read the cover letter on the CDs before opening the database files. The cover letter describes what is on the CDs, provides installation instructions for the Access database, and presents several issues pertinent to understanding the information contained within.

The Environmental Stewardship–Environmental Remediation and Surveillance (ENV-ERS) Program maintains and updates this database each year as necessary to ensure that the ecological screening levels (ESLs) used to assess potential ecological risk at sites are representative and current. The reports submitted by ENV-ERS to the New Mexico Environment Department–Hazardous Waste Bureau will use the ESLs presented in Version 2.2 from October 2005 until the next version is published.

If you or your staff have any questions, please contact Richard Miranda at (505) 665-6953 (rmiranda@lanl.gov).

Sincerely,

David McInroy, Deputy Program Director  
Environmental Remediation & Surveillance  
Los Alamos National Laboratory



13957

Mr. James Bearzi  
ER2005-0742

2

October 6, 2005

RM/jk

Enclosure: CDs containing the ECORISK Database, Version 2.2

Cy:(w/o enc)

D. Gregory, DOE LASO, MS A316

L. King, EPA Region 6

P. Reneau, ENV-ECR, MS M992

ENV-ECR File, MS M992

RPF, MS M707

G. Lopez Escobedo, ENV-ERS, MS M992

A. Dorries, ENV-ECR, MS M992

D. McInroy, ENV-ERS, MS M992

R. Miranda, ENV-ECR, MS M992

B. Rich, ADO, MS A104

D. Pepe, NMED-OB

IM-9, MS A150



September 21, 2005

To Whom It May Concern

Enclosed is a CD-ROM that contains files for the Los Alamos National Laboratory Environmental Stewardship Division Environmental Remediation and Surveillance Program Ecorisk Database Release 2.2 (September 2005).

The CD-ROM contains the following folder and files:

- **ECORISK\_R2.2\_092105.MDB**: A MS Office Access 2000, XP or 2003 compatible file that is the Ecorisk Database Release 2.2.
- **CoverLetterR2.2\_092105.doc**: The cover letter you are currently reading.
- **ESLHistorySummary090905.htm**: A document describing all ESL changes since the beta release of the Ecorisk Database to the latest release.
- **ESLs\_R2.2.xls**: A MS Office Excel (XP) file that contains all ESLs from the Ecorisk Database Release 2.2. This file can be accessed either directly or from within the database.
- **NMWQCC2002\_NMAC\_20\_6\_4.pdf**: The State of New Mexico standards for interstate and intrastate surface waters. These values may be useful for local risk assessments. Acrobat Reader software is needed to view this file.
- **GMMTRVDerivationMethods090104b.htm**: Explanations of the content of TRV Summary Reports associated with GMM TRVs derived by LANL based on reviews of primary toxicity studies. This file can be accessed either directly or from within the database.
- **GMMTRVDerivationMethods090104b\_files folder**: Contains two files (filelist.xml and header.htm) to ensure proper function of the **GMMTRVDerivationMethods090104b.htm** file.

***Installation of Program:***

*A directory folder of **C:/EcoriskDb** must be created in the user's hard drive, and ALL of the files in the CD-ROM must be saved to this location. This is necessary in order to ensure functionality of links to outside files from within the database. **If you have files for a previous version of the Ecorisk Db already in this folder, you must delete or move the old files prior to installation***

*The database file **cannot** be opened directly from the CD-ROM due to the user-level security component of the database structure*

*Once the file has been copied to **C:/EcoriskDb**, please make sure that the read-only file property is **NOT** checked for the database (.mdb) file.*

.....

September 21, 2005

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***Data Issues:***

Please refer to the ESL History Summary Report (ESLHistorySummary090905.htm ) for a synopsis of the changes made to the data in the Ecorisk Database since the last release. This report can be accessed from within the Ecorisk Database from the ESL History options on the main Menu. Please refer to the What's New Screen in the Ecorisk Database for specific details on value changes.

***Interface Issues:***

We have made minor modifications to the interface to increase the user friendliness of the database based on input from reviewers.

Note, when using the report option in the database, you will receive a blank report if there is no data for the report criteria you selected. You will also receive a blank report if you do not provide all the report criteria.

***Other Issues:***

This database is a work in progress and although we have reviewed the data within it extensively, we still recommend that you verify the data before use by referring to the actual references cited. The project may be able to assist you in obtaining copies of some of the harder to find documents cited in the database.

***Contact Information:***

Please contact Jill Podolsky at [jpodolsky@eha-inc.com](mailto:jpodolsky@eha-inc.com), if you have any trouble with your copy of the database. If you have any questions and/or comments about the database, please contact me at [pnewell@eha-inc.com](mailto:pnewell@eha-inc.com) or by phone at 505-323-4113.

We encourage you to provide feedback on the database.

Thank you,

Patricia G. Newell  
Senior Toxicologist/ Database Manager  
Environmental Health Associates Inc.

**Los Alamos National Laboratory**  
**Environmental Stewardship Division**  
**Environmental Remediation and Surveillance Program**  
**Ecorisk Database Release 2.2 (September 2005)**  
**ESL History Summary by Ecorisk Database Release**  
**(Draft September 9, 2005)\***

*\* If you have a specific question(s) that this document does not address adequately, you may contact the database manager for additional help answering your question(s).*

[Table 1. ESL Changes by Ecorisk Database Release](#)

[October 1998 – Beta Release](#)

[June 1999 – Release 1.0](#)

[April 2000 – Release 1.1](#)

[September 2000 – Release 1.2](#)

[September 2001 – Release 1.3](#)

[March 2002 – Release 1.4](#)

[September 2002 – Release 1.5](#)

[November 2003 – Release 2.0](#)

[September 2004 – Release 2.1](#)

[September 2005 – Release 2.2](#)

[Table 2. Beta Release \(October 1998\) List of Soil ESLs for Bird Receptors](#)

[Table 3. Beta Release \(October 1998\) List of Soil ESLs for Mammalian Receptors](#)

[Table 4. Beta Release \(October 1998\) List of Soil ESLs for Earthworm Receptor](#)

[Table 5. Beta Release \(October 1998\) List of Soil ESLs for Generic Plant Receptor](#)

[Table 6. Beta Release \(October 1998\) List of Sediment and Water ESLs for Aquatic Community Organism Receptors](#)

[References](#)

## Tables

**Table 1. ESL Changes by Ecorisk Database Release**

<b>Ecorisk Database Release</b>	<b>ESL Changes</b>
<b>October 1998 – Beta Release</b>	<p data-bbox="634 226 1195 262">Original ESL models were as follows:</p> <p data-bbox="634 317 1446 485">Soil ESLs for Bird Receptors: American kestrel (Avian intermediate carnivore), American kestrel (Avian top carnivore), American robin (Avian insectivore) for 46 non-radionuclides and 18 radionuclides (<a href="#">See Table 2</a>).</p> <p data-bbox="634 539 1479 749">Soil ESLs for Mammalian Receptors: Deer mouse (Mammalian omnivore), Desert cottontail (Mammalian herbivore), Red fox (Mammalian top carnivore), Vagrant shrew (Mammalian insectivore) for 102 non-radionuclides and 18 radionuclides (<a href="#">See Table 3</a>).</p> <p data-bbox="634 804 1442 930">Soil ESLs for Invertebrate Receptor: Earthworm (Soil-dwelling invertebrate) for 37 non-radionuclides and 18 radionuclides (<a href="#">See Table 4</a>).</p> <p data-bbox="634 984 1455 1110">Soil ESLs for Plant Receptor: Generic plant (Terrestrial autotroph - producer) for 41 non-radionuclides and 18 radionuclides (<a href="#">See Table 5</a>).</p> <p data-bbox="634 1165 1474 1425">Sediment and Water ESLs for 12 radionuclides for Aquatic Community Organism Receptors: Aquatic snails (Aquatic herbivore - grazer), Daphnids (Aquatic omnivore/ herbivore), Fish (Aquatic intermediate carnivore), and Algae (Aquatic autotroph – producer). (<a href="#">See Table 6</a>).</p> <p data-bbox="634 1480 873 1520"><a href="#">BACK TO TOP</a></p>

**June 1999 – Release 1.0**

Addition of sediment ESLs for 19 radionuclides and or 49 non-radionuclides for the new bird receptor, Violet-green Swallow (Avian aerial insectivore).

Addition of sediment ESLs for 19 radionuclides and or 106 non-radionuclides for the new Mammal receptor, Occult little brown myotis bat (Mammalian aerial insectivore).

Addition of 85 sediment ESLs for non-radionuclides ESLs for the new aquatic community organism receptor.

Addition of 7 radionuclides (Cesium-134, Cobalt-60, Europium-152, Radium-228, Sodium-22, Thorium-228, Thorium-230) for sediment and water for aquatic community organism receptors.

Addition of non-radionuclide and radionuclide ESLs (19 rad, 48 non-rad) for soil for the new Bird receptors, American robin (Avian omnivore) and American robin (Avian herbivore).

Addition of non-radionuclide and radionuclide ESLs for water for all bird (19 rad, 48 non-rad) and mammal (19 rad, 106 non-rad) receptors.

Addition of 3 ESLs for soil for Boron, Fluoride and Radium-228 for all applicable bird receptors.

Addition of 3 ESLs for soil for Boron, Fluoride, Strontium (stable), Dichlorobenzene[1,4-], and Radium-228 for all applicable mammal receptors.

Addition of 2 ESLs for soil for Trinitrotoluene[2,4,6-], and Radium-228 for the earthworm receptor.

Addition of 3 ESLs for soil for Amino-2, 6-dinitrotoluene [4-], Boron, and Radium-228 for the generic plant receptor.

Numerous ESL updates. Documentation of specific reasons for updates not available at this time. General documentation of reasons for ESL updates indicated that the radionuclide ESL models underwent extensive

revisions and the non-radionuclide ESLs were multiplied by a factor of 0.3 per the recommendation of NMED.

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**April 2000 – Release 1.1**

Addition of 5 ESLs for water for Tetrachlorodibenzodioxin[2,3,7,8-], Dinitrotoluene[2,6-], Fluoride, Pentachloronitrobenzene, and Dichloroethene [1,1-] for the aquatic community organism receptor.

Addition of soil and water ESLs for Dinitrobenzene[1,3-] for all applicable bird receptors.

Addition of a soil ESL for Dibenzofuran for the desert cottontail receptor.

Deletion of sediment ESLs for Butanone[2-], Chloroform, Dichloroethane[1,2-], Dichloroethene[cis-1,2-], Dinitrotoluene[2,6-], and Nitrobenzene for the aquatic community organism receptor. The Chloroform ESL was deleted because the toxicity data it was based on was deemed unsuitable. Reasons for other deletions not available at this time.

Deletion of water ESL for Dichloroethene[cis-1,2-] for the aquatic community organism. Reason for deletion not available at this time.

Numerous ESL updates. Documentation of specific reasons for ESL updates is not available at his time. General reasons for ESL updates are described below.

Some ESLs were updated based on reasons documented in the December 1999 Interim ESLs memorandum ([Ref ID 1484](#)) and included: 1) the 0.3 factor was removed from the non-radionuclide ESL equations, 2) a correction to the water ESLs to account for a units conversion problem was made (values were multiplied by 1000), 3) all ESL values were rounded down to two significant figures and 4) the aquatic community organism receptor ESL for chlordane was revised.

Some ESLs were updated due to the availability of new

PTSE derived CS TRVs to replace secondary data source TRVs in ESL calculations. PTSE CS TRVs derived included Amino-2,6-dinitrotoluene[4-]/ Plant, Amino-4,6-dinitrotoluene[2-]/ Plant, Boron/ Bird, /Mammal and / Plant; Chromium (total)/ Bird and /Mammal, Fluoride/ Bird and / Mammal, Manganese/ Bird, / Mammal and / Plant; Nitroglycerine/ Mammal, Strontium (stable)/ Mammal, Trinitrotoluene[2,4,6-]/ Earthworm, /Mammal and /Plant; Uranium/ Bird, / Mammal and / Plant; and Vanadium/ Bird and / Mammal.

Some ESLs were updated due to quality assurance issues including correction of errors in ESL calculations/ parameters, rounding of values or reporting of data.

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## September 2000 – Release 1.2

Addition of soil, sediment and water ESLs for Dichloroethane[1,2-] for all applicable bird and mammal receptors because new PTSE derived TRVs were available.

Addition of soil, sediment and water ESLs for Lead-210, Neptunium-237, Thorium-229, Uranium-233, and Uranium-236 for all applicable bird, mammal, earthworm, generic plant and aquatic community organism receptors.

Addition of soil ESLs for HMX and RDX for the earthworm receptor. Reason for addition not available at this time.

Addition of a water ESL for Dinitrobenzene[1,3-] for the aquatic community organism receptor. Reason for addition not available at this time.

Deletion of soil, sediment and water ESLs for Chloro-3-methylphenol[4-] for all applicable bird, mammal, and aquatic community organism receptors. Reasons for deletions not available at this time.

Deletion of soil, sediment and water ESLs for Tetrachloroethane[1,1,2,2-] for all applicable mammal, and aquatic community organism receptors. Reasons for deletions not available at this time.

Deletion of sediment ESLs for Dinitrobenzene[1,3-], Iron, Polychlorinated Biphenyls, Dimethyl Phthalate, and Phenol for the aquatic community organism receptor.

Deletion of water ESLs for Calcium, Nitrate (expressed as NO<sub>3</sub>), and Dichloroethene[1,1-] for the aquatic community organism receptor. Reasons for deletions not available at this time.

Deletion of the soil ESL of Dibenzofuran for the desert cottontail receptor. Reason for deletion not available at this time.

Numerous ESL updates.

Some ESLs were updated because new PTSE derived CS TRVs were available to replace secondary data source TRVs. PTSE CS TRVs available included Acetone/Bird, Barium Bird, Barium/Mammal, Barium/Plant, HMX/ Invertebrate, HMX/Mammal, Lead/Mammal, Lead/Bird, Lead/Invertebrate, Lead/Plant, RDX/Invertebrate, RDX/ Mammal, Silver/Bird, Silver/Plant, 1,3,5-Trinitrobenzene/ Mammal, Thallium/Plant, Zinc/Bird, Zinc Invertebrate.

Other ESLs were updated for quality assurance issues including correction of errors in ESL calculations/ parameters, rounding of values or reporting of data.

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### September 2001 – Release 1.3

Addition of soil ESL for Chromium (total) for the earthworm receptor due to the availability of a new internally approved secondary data source TRV.

Addition of soil ESL for DDT[4,4'-] for the generic plant receptor due to the availability of a new internally approved secondary data source TRV.

Addition of water ESL for Dichloroethene[1,1-] for the aquatic community organism receptor due to the availability of a new internally approved secondary data source TRV.

Numerous ESL updates.

Some ESLs were updated because new PTSE derived CS TRVs were available to replace secondary data source TRVs. PTSE CS TRVs available included DDE[4,4'-]/Bird, DDE[4,4'-]/Mammal, DDT[4,4'-]/Bird, DDT[4,4'-]/Mammal, DDT[4,4'-]/Plant, Aroclor-1016, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260/Mammal; Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260/Bird; and Aroclor-1254/Plant.

Other ESLs were updated for quality assurance issues including correction of errors in ESL calculations/parameters, rounding of values or reporting of data.

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#### March 2002 – Release 1.4

Numerous ESL updates.

Radionuclide ESLs, except Tritium, were updated due to revision of TF\_plant and TF\_invert from a dry weight basis to a fresh weight basis assuming 85% and 61% moisture content of plant and invertebrate diets, respectively ([Ref ID 0561](#)). This revision was required for units to cancel correctly in the ESL model equations.

Radionuclide ESLs for Tritium were updated due to revision of TF\_plant and TF\_invert to assume equilibrium between the tritium in soil moisture and tissue waters. The value is calculated by dividing the moisture in tissues by the moisture in soil where 61% moisture content of invertebrates is based on beetles ([Ref ID 0561](#), Table 4-1, p. 4-13) and 85% moisture content of plant material is based on leaves ([Ref ID 0561](#), Table 4-2, p.4-14) and soil moisture of 10% is based on an average soil moisture found in the Los Alamos area. This revision was required for units to cancel correctly in the ESL model equations.

Radionuclide ESLs were also updated due to the revision of TF\_flesh, which was revised because it is calculated from TF\_plant and TF\_invert, which were revised as explained above. This revision was required for units to

cancel correctly in the ESL model equations.

Radionuclide ESLs were also update due to the revision of all receptor intake rates from a dry weight basis to a fresh weight basis where the moisture content of invertebrates is assumed to be 61% (beetles ([Ref ID 0561](#), Table 4-1, p. 4-13)), of plant materials is assumed to be 85% (leaves ([Ref ID 0561](#), Table 4-2, p.4-14)), and flesh is assumed to be 68% (mammals - mice, voles, rabbits ([Ref ID 0561](#), Table 4-1, p. 4-13)). This revision was required for units to cancel correctly in the ESL model equations.

Radionuclide ESLs were also updated due to the replacement of TF\_beef with TF\_blood in ESL models. TF(blood) is calculated by multiplying TF(beef) by I (food) or in the case of water intake, I(water). TF(blood) is required in all radionuclide ESL models for wildlife, and TF(beef) was used as a surrogate measure to estimate body burdens for internal dose calculations. TF(beef) has been replaced by TF(blood) in all these models so that the units in these models cancel properly. Internal dose calculations require a TF that models the transfer of radionuclides from food to blood.

Other reasons for ESL updates include the rounding of ESL model parameters to 3 significant digits for reporting consistency as well addressing quality assurance issues.

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## September 2002 – Release 1.5

Addition of soil, sediment and water ESLs for Trinitrotoluene[2,4,6-] for all applicable bird receptors due to the availability of a new PTSE derived CS TRV.

Addition of soil ESL for Tetrachloroethene for the generic plant receptor due to the availability of a new PTSE derived CS TRV.

Numerous ESL updates.

Some ESLs were updated due to the availability of new PTSE derived CS TRVs to replace secondary data source

TRVs in ESL calculations. Applicable PTSE TRVs derived included Tetrachlorodibenzodioxin[2,3,7,8-]/Bird, Mammal, and Plant; Antimony/Mammal, Cadmium/Bird, Mammal and Invertebrate; Copper/Bird and Mammal; Mercury (inorganic) /Bird, Mammal and Invertebrate; Nickel /Bird, Mammal and Invertebrate; Selenim/ Invertebrate, Zinc/Mammal and Plant; Tetrachloroethene/ Mammal, Trichloroethane[1,1,1-]/Mammal, Trichloroethene/Mammal, and Xylene (total)/Bird.

Some ESLs were updated due to quality assurance issues for TRVs. Specific details of issues are not available at this time.

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**November 2003 – Release 2.0**

Addition of soil ESLs for Antimony, Barium, and Beryllium for the earthworm receptor due to the availability of EPA Eco-SSL TRVs.

Deletion of the soil ESL for Trinitrotoluene[2,4,6-] for the earthworm receptor because the toxicity data it was based on was deemed unsuitable.

Deletion of soil ESLs for Aluminum for all applicable bird, mammal and generic plant receptors because EPA Eco-SSL uses a soil pH of less than 5.5 as an indicator of toxicity instead of an Aluminum soil concentration.

Numerous ESL updates.

Some ESLs were updated due to the availability of new PTSE derived GMM TRVs to replace PTSE derived CS TRVs or secondary data source TRVs in ESL calculations. Applicable PTSE GMM TRVs included, Aroclor-1016, Aroclor-1242, Aroclor-1254, Aroclor-1260, DDT[4,4'-], Di-n-Butyl Phthalate, Nickel, RDX, and Tetrachlorodibenzodioxin[2,3,7,8-] for food exposure for Mammals; Antimony, Cadmium, and Lead for drinking water exposure for Mammals; Aroclor-1260, Barium, Boron, Copper, DDE[4,4'-], Nickel, and Zinc for food exposure for Birds; Aroclor-1254, Boron, and Di-n-Butyl Phthalate for soil exposure for Plants; and Zinc for soil exposure for Invertebrates.

Some ESLs were updated due to the availability of EPA Eco-SSL TRVs to replace PTSE or secondary data source TRVs in ESL calculations. Applicable EPA Eco-SSL TRVs available included Antimony, Barium, Beryllium, Cadmium, Cobalt, Lead, and Dieldrin for food exposure for Mammals; Cadmium, Cobalt, Lead, and Dieldrin for food exposures for Birds; Antimony, Barium, Beryllium, Cadmium, and Lead for soil exposure for Invertebrates; and Cadmium, Cobalt, and Lead for soil exposure for Plants.

Some ESLs were updated due to the availability of EPA NRWQC CCC TRVs to replace other secondary data source TRVs. Applicable EPA NRWQC CCC TRVs available included Selenium and Mercury (inorganic) for water exposure for the aquatic community organism receptor.

Other ESLs were updated due to addressing data quality assurance issues or because the previously used toxicity data the ESLs were based on was deemed unsuitable and was revised appropriately to make it suitable. Specific details of issues are not available at this time.

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## September 2004 – Release 2.1

A mammalian screening receptor used in soil and water ESL models for a mammalian insectivore in the database has changed. The vagrant shrew (*Sorex vagrans*) in New Mexico has been reclassified as the montane shrew, also known as the dusky shrew, (*Sorex monticolus*) by Eastern New Mexico University (see [http://fwie.fw.vt.edu/states/nmex\\_main/species/050725.htm](http://fwie.fw.vt.edu/states/nmex_main/species/050725.htm) for more information).

However, this the ESLs for the vagrant shrew are applicable to the montane shrew because the short-tailed shrew data that was used as surrogates for parameters in the vagrant shrew ESL models are applicable for the montane shrew as a mammalian insectivore. As a result, only the ESL screening receptor common and scientific name has changed.

Addition of soil ESL for HMX for the generic plant

receptor due to the availability of a new Tier 2 TRV (PTSE GMM TRV).

Addition of soil ESL for Trinitrotoluene[2,4,6-] for the earthworm receptor due to the availability of a new Tier 3 TRV (PTSE CS TRV).

Addition of sediment and soil ESLs for RDX for all applicable bird receptors due to the availability of a new Tier 2 TRV (PTSE GMM TRV).

Addition of sediment, soil and water ESLs for Thallium for all applicable bird receptors due to the availability of a newly approved Tier 4 TRV (secondary data source CS TRV).

Addition of 16 air ESLs for Acetone, Benzene, Carbon, Tetrachloride, Chloroform, Chloromethane, Dichlorodifluoromethane, Dichloroethane[1,1-], Dichloroethane[1,2-], Dichloroethene[1,1-], Methylene Chloride, Tetrachloroethene, Toluene, Trichloroethane [1,1,1-], Trichloroethene, Trichlorofluoromethane, and Xylene (Total) for the new Mammal receptor, Botta's Pocket Gopher (Burrowing mammal). These ESL were added due to the availability of new Tier 2 TRVs (PTSE GMM TRVs).

Deletion of sediment, soil and water ESLs for Tetrachlorodibenzodioxin[2,3,7,8-] for all applicable bird receptors due to discontinued use of previous Tier 3 (CS) TRV that was deemed unsuitable because it was based on an non-oral exposure (i.p. injection).

Numerous ESL updates.

Naphthalene soil and sediment ESLs for all applicable bird receptors updated due to the previous Tier 4 TRV (secondary data source CS TRV) being replaced by a new Tier 2 TRV (PTSE GMM TRV).

Chromium (+6) soil, sediment and water ESLs for all applicable bird receptors updated due to the previous Tier 4 (CS) TRV being replaced by a new Tier 3 TRV (PTSE CS TRV).

Chromium (total) soil, sediment and water ESLs are based on Chromium (+6) toxicity data and because the oral chromium (+6) TRV for birds was updated (see previous paragraph), the corresponding chromium (total) ESLs for birds were updated accordingly based on the new chromium (+6) data.

HMX soil ESL for the earthworm receptor updated due to the previous Tier 3 TRV (PTSE CS TRV) being replaced by a new Tier 2 TRV (PTSE GMM TRV).

RDX soil ESL for the earthworm receptor updated due to the previous Tier 3 TRV (PTSE CS TRV) being replaced by a new Tier 3 TRV (PTSE CS TRV).

Trinitrotoluene[2,4,6-] soil ESL for the generic plant receptor updated due to the Tier 3 TRV (PTSE CS TRV) being replaced by a new Tier 2 TRV (PTSE GMM TRV).

Plutonium-241 water ESL for the vagrant shrew receptor updated due to the revision of the ESL model parameter, TF\_blood, which was corrected for a previous rounding error.

All ESL for radionuclides in sediment for aquatic receptors were revised based on the guidance of DOE-STD-1153-2002 to not include internal dose for aquatic organisms exposed to radionuclides in sediment. The ESL model parameter, DCF\_int\_fw, was set to 0 to incorporate this guidance.

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**September 2005 – Release 2.2****New ESLs**

- † Sediment and water ESLs for iron for aquatic community organisms due to this analyte being added as a new LANL exposure concern.
- † Water ESLs for perchlorate ion for mammalian and avian receptors due to development of a New Tier 2 (GMM) TRV and New Tier 3 (CS) TRV, respectively.
- † Soil and sediment ESLs for mammalian receptors for BHC[alpha-] due to the development of a New Tier 3 (CS) TRV.
- † Soil ESLs for the earthworm for fluoranthene, phenanthrene and pyrene due to the development of New Tier 3 (CS) TRVs.
- † Soil ESL for the generic plant for naphthalene due to the development of a New Tier 3 (CS) TRV.

**ESL Updates**

Revision of various Transfer Factors (TF) for soil-to-plant and soil-to invertebrate for both inorganic and organic analytes based on the most current EPA EcoSSL bioaccumulation data or models (Ref ID 1401), which resulted in the revision of the calculated soil-to-flesh TF and as well as numerous ESL updates.

- † Inorganic TFs were replaced with more comprehensive empirical values, median values from the empirical data set.
- † Organic TFs for soil-to-invertebrates were revised based on a more appropriate bioaccumulation model ( $BAF_{ww} = (K_{ww}/K_d)/0.16$  where  $\log K_{ww} = 0.87 * \log K_{ow} - 2.0$  and  $K_d = f_{oc} * K_{oc}$  where  $f_{oc}$  is 1%, or 0.01.) cited in the 2005 EPA EcoSSL bioaccumulation data report (REF ID1401, Table 5 and dry to fresh weight ratio (0.16) for earthworms from Ref ID 1574), except for Dieldrin, DDT[4,4'-], and DDE[4,4'-], which were based on the median of comprehensive empirical data sets.
- † Organic TFs for soil-to-plants were revised based on a more appropriate bioaccumulation model ( $BAF = 10^{(-0.4057 \log K_{ow} + 1.781)}$   $r^2 = 0.3226$ ,  $n = 228$ ,  $p < 0.0001$ ) cited in the 2005 EPA EcoSSL bioaccumulation data report (REF ID1401).

Furthermore, various TRVs were also updated and this contributed to the ESL updates. TRV updates include replacement of:

- † Tier 1 TRVs with new Tier 1 TRVs from EPA from EcoSSL 2005 data
- † Tier 3 or 4 TRVs with new Tier 1 TRVs from EPA EcoSSL 2005 data
- † Tier 3 or 4 TRVs with new Tier 2 TRVs
- † Tier 3 TRVs with a more appropriate Tier 3 TRVs

Below is a list of the 99 analytes updated grouped based on type of revisions\* A.) TF revisions only, B.) TF and TRV revisions, and C.) TRV revisions only.

*\*Detailed information on changes available from the "What's New In this Release" screen in the Ecorisk Database - section Change Type, ESLs, Update).*

#### **A.) TF REVISIONS ONLY**

##### **HIGH EXPLOSIVES/ Sediment and Soil ESLs**

- † Amino-2,6-dinitrotoluene[4-]
- † Amino-4,6-dinitrotoluene[2-]
- † Dinitrobenzene[1,3-]
- † Dinitrotoluene[2,4-]
- † Dinitrotoluene[2,6-]
- † HMX
- † Nitroglycerine
- † Nitrotoluene[2-]
- † Nitrotoluene[3-]
- † Nitrotoluene[4-]
- † PETN
- † RDX
- † Tetryl
- † Trinitrobenzene[1,3,5-]
- † Trinitrotoluene[2,4,6-]

##### **INORGANICS/ Sediment and Soil ESLs**

- † Aluminum (sediment)
- † Arsenic
- † Barium
- † Cadmium
- † Chromium (total)
- † Copper
- † Manganese
- † Mercury (inorganic)
- † Nickel
- † Selenium (soil)

- t Silver
- t Strontium (stable)
- t Uranium
- t Zinc

**POLYAROMATIC HYDROCARBONS/ Sediment and Soil ESLs**

- t Acenaphthene
- t Acenaphthylene
- t Anthracene
- t Benzo(a)anthracene (soil)
- t Benzo(a)pyrene (soil)
- t Benzo(b)fluoranthene (soil)
- t Benzo(g,h,i)perylene
- t Benzo(k)fluoranthene (soil)
- t Chrysene (soil)
- t Dibenzo(a,h)anthracene (soil)
- t Fluoranthene
- t Fluorene
- t Indeno(1,2,3-cd)pyrene (soil)
- t Methylnaphthalene[2-]
- t Naphthalene
- t Phenanthrene (soil)
- t Pyrene

**POLYCHLORINATED BIPHENYLS/ Soil ESLs**

- t Aroclor-1016
- t Aroclor-1242
- t Aroclor-1248
- t Aroclor-1254
- t Aroclor-1260

**PESTICIDES/ Sediment and Soil ESLs**

- t BHC[beta-]
- t BHC[gamma-]
- t Chlordane[alpha-]
- t Chlordane[gamma-]
- t DDE[4,4'-]
- t DDT[4,4'-]
- t Dieldrin
- t Endosulfan
- t Endrin
- t Heptachlor (soil)
- t Kepone
- t Methoxychlor[4,4'-]
- t Toxaphene (Technical Grade)

**SEMI-VOLATILE ORGANIC COMPOUNDS/ Sediment and Soil ESLs**

- t Benzoic Acid
- t Bis(2-ethylhexyl)phthalate
- t Butyl Benzyl Phthalate
- t Chlorobenzene
- t Chlorophenol[2-]
- t Dimethyl Phthalate
- t Di-n-Butyl Phthalate

- t Di-n-octylphthalate
- t Nitrobenzene
- t Pentachloronitrobenzene
- t Phenol

**VOLATILE ORGANIC COMPOUNDS/ Sediment and Soil ESLs**

- t Acetone
- t Benzene
- t Butanone[2-]
- t Chloroform
- t Dichlorobenzene[1,4-]
- t Dichloroethane[1,1-]
- t Dichloroethane[1,2-]
- t Dichloroethene[1,1-]
- t Dichloroethene[cis/trans-1,2-]
- t Methylene Chloride
- t Tetrachloroethene
- t Toluene
- t Trichlorobenzene[1,2,4-]
- t Trichloroethane[1,1,1-]
- t Trichloroethene
- t Xylene (Total)

**B.) TF REVISIONS & TRV REVISIONS**

**INORGANICS/ Sediment and Soil ESLs**

- t Antimony (sediment)
- t Barium
- t Beryllium
- t Cadmium
- t Chromium (total)
- t Cobalt
- t Lead
- t Vanadium

**PESTICIDES/ Sediment and Soil ESLs**

- t DDT[4,4'-]
- t Dieldrin

**SEMI-VOLATILE ORGANIC COMPOUNDS/ Sediment and Soil ESLs**

- t Pentachlorophenol

**C.) TRV REVISIONS ONLY**

**DIOXIN/FURANS/ Soil ESLs**

- t Tetrachlorodibenzodioxin[2,3,7,8-]

**INORGANICS/ Sediment, Soil and Water ESLs**

- t Antimony (soil)
- t Arsenic (soil)
- t Barium (soil)
- t Cadmium (soil)
- t Chromium (total) (soil and water)
- t Chromium(+6)
- t Lead (soil)
- t Vanadium (soil)

**POLYAROMATIC HYDROCARBONS/ Sediment and Soil ESLs**

† Fluorene (soil)

**SEMI-VOLATILE ORGANIC COMPOUNDS/ Sediment and Soil ESLs**

† Pentachlorophenol

**Other Changes:**

† Documentation and value for DCF\_int\_fw for aquatic receptors (algae, aquatic snail, daphnid and generic fish) for water Rad ESL model. This change did not affect ESLs, it was only a documentation error after from the previous release that was made after ESLs had been calculated.

† Added TF\_beef\_fw for BHC[alpha-]. Needed to calculate ESL for this new exposure concern.

[BACK TO TOP](#)**Table 2. Beta Release (October 1998) List of Soil ESLs for Bird Receptors**

Analyte Class	Analyte Group	Analyte Name	Analyte Code	ESL Medium	Receptor Group
NONRAD	D/F	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Bird
NONRAD	INORG	Aluminum	AL	SOIL	Bird
NONRAD	INORG	Arsenic	AS	SOIL	Bird
NONRAD	INORG	Barium	BA	SOIL	Bird
NONRAD	INORG	Cadmium	CD	SOIL	Bird
NONRAD	INORG	Chromium (total)	CR	SOIL	Bird
NONRAD	INORG	Chromium(+6)	CR(+6)	SOIL	Bird
NONRAD	INORG	Cobalt	CO	SOIL	Bird
NONRAD	INORG	Copper	CU	SOIL	Bird
NONRAD	INORG	Cyanide (total)	CN(-1)	SOIL	Bird
NONRAD	INORG	Lead	PB	SOIL	Bird
NONRAD	INORG	Manganese	MN	SOIL	Bird
NONRAD	INORG	Mercury (inorganic)	HGI	SOIL	Bird
NONRAD	INORG	Mercury (methyl)	HGM	SOIL	Bird
NONRAD	INORG	Nickel	NI	SOIL	Bird
NONRAD	INORG	Selenium	SE	SOIL	Bird
NONRAD	INORG	Silver	AG	SOIL	Bird
NONRAD	INORG	Uranium	U	SOIL	Bird
NONRAD	INORG	Vanadium	V	SOIL	Bird
NONRAD	INORG	Zinc	ZN	SOIL	Bird

NONRAD	PAH	Naphthalene	91-20-3	SOIL	Bird
NONRAD	PCB	Aroclor-1242	53469-21-9	SOIL	Bird
NONRAD	PCB	Aroclor-1248	12672-29-6	SOIL	Bird
NONRAD	PCB	Aroclor-1254	11097-69-1	SOIL	Bird
NONRAD	PCB	Aroclor-1260	11096-82-5	SOIL	Bird
NONRAD	PEST	BHC[beta-]	319-85-7	SOIL	Bird
NONRAD	PEST	BHC[gamma-]	58-89-9	SOIL	Bird
NONRAD	PEST	Chlordane[alpha-]	5103-71-9	SOIL	Bird
NONRAD	PEST	Chlordane[gamma-]	5103-74-2	SOIL	Bird
NONRAD	PEST	DDE[4,4'-]	72-55-9	SOIL	Bird
NONRAD	PEST	DDT[4,4'-]	50-29-3	SOIL	Bird
NONRAD	PEST	Dieldrin	60-57-1	SOIL	Bird
NONRAD	PEST	Endosulfan	115-29-7	SOIL	Bird
NONRAD	PEST	Endrin	72-20-8	SOIL	Bird
NONRAD	PEST	Heptachlor	76-44-8	SOIL	Bird
NONRAD	PEST	Kepone	143-50-0	SOIL	Bird
NONRAD	PEST	Methoxychlor[4,4'-]	72-43-5	SOIL	Bird
NONRAD	PEST	Toxaphene (Technical Grade)	8001-35-2	SOIL	Bird
NONRAD	SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Bird
NONRAD	SVOC	Chloro-3-methylphenol[4-]	59-50-7	SOIL	Bird
NONRAD	SVOC	Chlorophenol[2-]	95-57-8	SOIL	Bird
NONRAD	SVOC	Di-n-Butyl Phthalate	84-74-2	SOIL	Bird
NONRAD	SVOC	Pentachloronitrobenzene	82-68-8	SOIL	Bird
NONRAD	SVOC	Pentachlorophenol	87-86-5	SOIL	Bird
NONRAD	VOC	Acetone	67-64-1	SOIL	Bird
NONRAD	VOC	Xylene (Total)	1330-20-7	SOIL	Bird
RAD	RAD	Americium-241	AM-241	SOIL	Bird
RAD	RAD	Cesium-134	CS-134	SOIL	Bird
RAD	RAD	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Bird
RAD	RAD	Cobalt-60	CO-60	SOIL	Bird
RAD	RAD	Europium-152	EU-152	SOIL	Bird
RAD	RAD	Plutonium-238	PU-238	SOIL	Bird
RAD	RAD	Plutonium-239, 240	PU-239/240	SOIL	Bird
RAD	RAD	Plutonium-241	PU-241	SOIL	Bird
RAD	RAD	Radium-226	RA-226	SOIL	Bird
RAD	RAD	Sodium-22	NA-22	SOIL	Bird
RAD	RAD	Strontium-90 + Yittrium-90	SR-90/ Y-90	SOIL	Bird
RAD	RAD	Thorium-228	TH-228	SOIL	Bird
RAD	RAD	Thorium-230	TH-230	SOIL	Bird
RAD	RAD	Thorium-232	TH-232	SOIL	Bird
RAD	RAD	Tritium	H-3	SOIL	Bird
RAD	RAD	Uranium-234	U-234	SOIL	Bird
RAD	RAD	Uranium-235	U-235	SOIL	Bird
RAD	RAD	Uranium-238	U-238	SOIL	Bird

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**Table 3. Beta Release (October 1998) List of Soil ESLs for Mammalian Receptors**

Analyte Class	Analyte Group	Analyte Name	Analyte Code	ESL Medium	Receptor Group
NONRAD	D/F	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Mammal
NONRAD	HE	Amino-2,6-dinitrotoluene[4-]	19406-51-0	SOIL	Mammal
NONRAD	HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Mammal
NONRAD	HE	Dinitrobenzene[1,3-]	99-65-0	SOIL	Mammal
NONRAD	HE	Dinitrotoluene[2,4-]	121-14-2	SOIL	Mammal
NONRAD	HE	Dinitrotoluene[2,6-]	606-20-2	SOIL	Mammal
NONRAD	HE	HMX	2691-41-0	SOIL	Mammal
NONRAD	HE	Nitroglycerine	55-63-0	SOIL	Mammal
NONRAD	HE	Nitrotoluene[2-]	88-72-2	SOIL	Mammal
NONRAD	HE	Nitrotoluene[3-]	99-08-1	SOIL	Mammal
NONRAD	HE	Nitrotoluene[4-]	99-99-0	SOIL	Mammal
NONRAD	HE	PETN	78-11-5	SOIL	Mammal
NONRAD	HE	RDX	121-82-4	SOIL	Mammal
NONRAD	HE	Tetryl	479-45-8	SOIL	Mammal
NONRAD	HE	Trinitrobenzene[1,3,5-]	99-35-4	SOIL	Mammal
NONRAD	HE	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Mammal
NONRAD	INORG	Aluminum	AL	SOIL	Mammal
NONRAD	INORG	Antimony	SB	SOIL	Mammal
NONRAD	INORG	Arsenic	AS	SOIL	Mammal
NONRAD	INORG	Barium	BA	SOIL	Mammal
NONRAD	INORG	Beryllium	BE	SOIL	Mammal
NONRAD	INORG	Cadmium	CD	SOIL	Mammal
NONRAD	INORG	Chromium (total)	CR	SOIL	Mammal
NONRAD	INORG	Chromium(+6)	CR(+6)	SOIL	Mammal
NONRAD	INORG	Cobalt	CO	SOIL	Mammal
NONRAD	INORG	Copper	CU	SOIL	Mammal
NONRAD	INORG	Cyanide (total)	CN(-1)	SOIL	Mammal
NONRAD	INORG	Lead	PB	SOIL	Mammal
NONRAD	INORG	Manganese	MN	SOIL	Mammal
NONRAD	INORG	Mercury (inorganic)	HGI	SOIL	Mammal
NONRAD	INORG	Mercury (methyl)	HGM	SOIL	Mammal
NONRAD	INORG	Nickel	NI	SOIL	Mammal
NONRAD	INORG	Selenium	SE	SOIL	Mammal
NONRAD	INORG	Silver	AG	SOIL	Mammal
NONRAD	INORG	Thallium	TL	SOIL	Mammal
NONRAD	INORG	Titanium	TI	SOIL	Mammal
NONRAD	INORG	Uranium	U	SOIL	Mammal
NONRAD	INORG	Vanadium	V	SOIL	Mammal
NONRAD	INORG	Zinc	ZN	SOIL	Mammal
NONRAD	PAH	Acenaphthene	83-32-9	SOIL	Mammal

NONRAD	PAH	Acenaphthylene	208-96-8	SOIL	Mammal
NONRAD	PAH	Anthracene	120-12-7	SOIL	Mammal
NONRAD	PAH	Benzo(a)anthracene	56-55-3	SOIL	Mammal
NONRAD	PAH	Benzo(a)pyrene	50-32-8	SOIL	Mammal
NONRAD	PAH	Benzo(b)fluoranthene	205-99-2	SOIL	Mammal
NONRAD	PAH	Benzo(g,h,i)perylene	191-24-2	SOIL	Mammal
NONRAD	PAH	Benzo(k)fluoranthene	207-08-9	SOIL	Mammal
NONRAD	PAH	Chrysene	218-01-9	SOIL	Mammal
NONRAD	PAH	Dibenzo(a,h)anthracene	53-70-3	SOIL	Mammal
NONRAD	PAH	Fluoranthene	206-44-0	SOIL	Mammal
NONRAD	PAH	Fluorene	86-73-7	SOIL	Mammal
NONRAD	PAH	Indeno(1,2,3-cd)pyrene	193-39-5	SOIL	Mammal
NONRAD	PAH	Methylnaphthalene[2-]	91-57-6	SOIL	Mammal
NONRAD	PAH	Naphthalene	91-20-3	SOIL	Mammal
NONRAD	PAH	Phenanthrene	85-01-8	SOIL	Mammal
NONRAD	PAH	Pyrene	129-00-0	SOIL	Mammal
NONRAD	PCB	Aroclor-1016	12674-11-2	SOIL	Mammal
NONRAD	PCB	Aroclor-1242	53469-21-9	SOIL	Mammal
NONRAD	PCB	Aroclor-1248	12672-29-6	SOIL	Mammal
NONRAD	PCB	Aroclor-1254	11097-69-1	SOIL	Mammal
NONRAD	PCB	Aroclor-1260	11096-82-5	SOIL	Mammal
NONRAD	PEST	BHC[beta-]	319-85-7	SOIL	Mammal
NONRAD	PEST	BHC[gamma-]	58-89-9	SOIL	Mammal
NONRAD	PEST	Chlordane[alpha-]	5103-71-9	SOIL	Mammal
NONRAD	PEST	Chlordane[gamma-]	5103-74-2	SOIL	Mammal
NONRAD	PEST	DDE[4,4'-]	72-55-9	SOIL	Mammal
NONRAD	PEST	DDT[4,4'-]	50-29-3	SOIL	Mammal
NONRAD	PEST	Dieldrin	60-57-1	SOIL	Mammal
NONRAD	PEST	Endosulfan	115-29-7	SOIL	Mammal
NONRAD	PEST	Endrin	72-20-8	SOIL	Mammal
NONRAD	PEST	Heptachlor	76-44-8	SOIL	Mammal
NONRAD	PEST	Kepone	143-50-0	SOIL	Mammal
NONRAD	PEST	Methoxychlor[4,4'-]	72-43-5	SOIL	Mammal
NONRAD	PEST	Toxaphene (Technical Grade)	8001-35-2	SOIL	Mammal
NONRAD	SVOC	Benzoic Acid	65-85-0	SOIL	Mammal
NONRAD	SVOC	Bis(2-ethylhexyl)phthalate	117-81-7	SOIL	Mammal
NONRAD	SVOC	Butyl Benzyl Phthalate	85-68-7	SOIL	Mammal
NONRAD	SVOC	Chloro-3-methylphenol[4-]	59-50-7	SOIL	Mammal
NONRAD	SVOC	Chlorobenzene	108-90-7	SOIL	Mammal
NONRAD	SVOC	Chlorophenol[2-]	95-57-8	SOIL	Mammal
NONRAD	SVOC	Dimethyl Phthalate	131-11-3	SOIL	Mammal
NONRAD	SVOC	Di-n-Butyl Phthalate	84-74-2	SOIL	Mammal
NONRAD	SVOC	Di-n-octylphthalate	117-84-0	SOIL	Mammal
NONRAD	SVOC	Nitrobenzene	98-95-3	SOIL	Mammal
NONRAD	SVOC	Pentachloronitrobenzene	82-68-8	SOIL	Mammal

NONRAD	SVOC	Pentachlorophenol	87-86-5	SOIL	Mammal
NONRAD	SVOC	Phenol	108-95-2	SOIL	Mammal
NONRAD	VOC	Acetone	67-64-1	SOIL	Mammal
NONRAD	VOC	Benzene	71-43-2	SOIL	Mammal
NONRAD	VOC	Butanone[2-]	78-93-3	SOIL	Mammal
NONRAD	VOC	Chloroform	67-66-3	SOIL	Mammal
NONRAD	VOC	Dichloroethane[1,1-]	75-34-3	SOIL	Mammal
NONRAD	VOC	Dichloroethene[1,1-]	75-35-4	SOIL	Mammal
NONRAD	VOC	Dichloroethene[cis/trans-1,2-]	540-59-0	SOIL	Mammal
NONRAD	VOC	Methylene Chloride	75-09-2	SOIL	Mammal
NONRAD	VOC	Tetrachloroethane[1,1,2,2-]	79-34-5	SOIL	Mammal
NONRAD	VOC	Tetrachloroethene	127-18-4	SOIL	Mammal
NONRAD	VOC	Toluene	108-88-3	SOIL	Mammal
NONRAD	VOC	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Mammal
NONRAD	VOC	Trichloroethane[1,1,1-]	71-55-6	SOIL	Mammal
NONRAD	VOC	Trichloroethene	79-01-6	SOIL	Mammal
NONRAD	VOC	Xylene (Total)	1330-20-7	SOIL	Mammal
RAD	RAD	Americium-241	AM-241	SOIL	Mammal
RAD	RAD	Cesium-134	CS-134	SOIL	Mammal
RAD	RAD	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Mammal
RAD	RAD	Cobalt-60	CO-60	SOIL	Mammal
RAD	RAD	Europium-152	EU-152	SOIL	Mammal
RAD	RAD	Plutonium-238	PU-238	SOIL	Mammal
RAD	RAD	Plutonium-239, 240	PU-239/240	SOIL	Mammal
RAD	RAD	Plutonium-241	PU-241	SOIL	Mammal
RAD	RAD	Radium-226	RA-226	SOIL	Mammal
RAD	RAD	Sodium-22	NA-22	SOIL	Mammal
RAD	RAD	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Mammal
RAD	RAD	Thorium-228	TH-228	SOIL	Mammal
RAD	RAD	Thorium-230	TH-230	SOIL	Mammal
RAD	RAD	Thorium-232	TH-232	SOIL	Mammal
RAD	RAD	Tritium	H-3	SOIL	Mammal
RAD	RAD	Uranium-234	U-234	SOIL	Mammal
RAD	RAD	Uranium-235	U-235	SOIL	Mammal
RAD	RAD	Uranium-238	U-238	SOIL	Mammal

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**Table 4. Beta Release (October 1998) List of Soil ESLs for Earthworm Receptor**

Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class
NONRAD	D/F	Tetrachlorodibenzodioxin[2,3,7,8-]	1746-01-6	SOIL	Invertebrate
NONRAD	INORG	Arsenic	AS	SOIL	Invertebrate
NONRAD	INORG	Cadmium	CD	SOIL	Invertebrate

NONRAD	INORG	Chromium(+6)	CR(+6)	SOIL	Invertebrate
NONRAD	INORG	Copper	CU	SOIL	Invertebrate
NONRAD	INORG	Lead	PB	SOIL	Invertebrate
NONRAD	INORG	Mercury (inorganic)	HGI	SOIL	Invertebrate
NONRAD	INORG	Mercury (methyl)	HGM	SOIL	Invertebrate
NONRAD	INORG	Nickel	NI	SOIL	Invertebrate
NONRAD	INORG	Selenium	SE	SOIL	Invertebrate
NONRAD	INORG	Zinc	ZN	SOIL	Invertebrate
NONRAD	PAH	Fluorene	86-73-7	SOIL	Invertebrate
NONRAD	SVOC	Chlorobenzene	108-90-7	SOIL	Invertebrate
NONRAD	SVOC	Dimethyl Phthalate	131-11-3	SOIL	Invertebrate
NONRAD	SVOC	Nitrobenzene	98-95-3	SOIL	Invertebrate
NONRAD	SVOC	Pentachlorophenol	87-86-5	SOIL	Invertebrate
NONRAD	SVOC	Phenol	108-95-2	SOIL	Invertebrate
NONRAD	VOC	Dichlorobenzene[1,4-]	106-46-7	SOIL	Invertebrate
NONRAD	VOC	Trichlorobenzene[1,2,4-]	120-82-1	SOIL	Invertebrate
RAD	RAD	Americium-241	AM-241	SOIL	Invertebrate
RAD	RAD	Cesium-134	CS-134	SOIL	Invertebrate
RAD	RAD	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Invertebrate
RAD	RAD	Cobalt-60	CO-60	SOIL	Invertebrate
RAD	RAD	Europium-152	EU-152	SOIL	Invertebrate
RAD	RAD	Plutonium-238	PU-238	SOIL	Invertebrate
RAD	RAD	Plutonium-239, 240	PU-239/240	SOIL	Invertebrate
RAD	RAD	Plutonium-241	PU-241	SOIL	Invertebrate
RAD	RAD	Radium-226	RA-226	SOIL	Invertebrate
RAD	RAD	Sodium-22	NA-22	SOIL	Invertebrate
RAD	RAD	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Invertebrate
RAD	RAD	Thorium-228	TH-228	SOIL	Invertebrate
RAD	RAD	Thorium-230	TH-230	SOIL	Invertebrate
RAD	RAD	Thorium-232	TH-232	SOIL	Invertebrate
RAD	RAD	Tritium	H-3	SOIL	Invertebrate
RAD	RAD	Uranium-234	U-234	SOIL	Invertebrate
RAD	RAD	Uranium-235	U-235	SOIL	Invertebrate
RAD	RAD	Uranium-238	U-238	SOIL	Invertebrate

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**Table 5. Beta Release (October 1998) List of Soil ESLs for Generic Plant Receptor**

Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class
NONRAD	HE	Amino-4,6-dinitrotoluene[2-]	35572-78-2	SOIL	Plant
NONRAD	HE	RDX	121-82-4	SOIL	Plant
NONRAD	HE	Tetryl	479-45-8	SOIL	Plant
NONRAD	HE	Trinitrotoluene[2,4,6-]	118-96-7	SOIL	Plant
NONRAD	INORG	Aluminum	AL	SOIL	Plant

NONRAD	INORG	Antimony	SB	SOIL	Plant
NONRAD	INORG	Arsenic	AS	SOIL	Plant
NONRAD	INORG	Barium	BA	SOIL	Plant
NONRAD	INORG	Beryllium	BE	SOIL	Plant
NONRAD	INORG	Cadmium	CD	SOIL	Plant
NONRAD	INORG	Chromium (total)	CR	SOIL	Plant
NONRAD	INORG	Chromium(+6)	CR(+6)	SOIL	Plant
NONRAD	INORG	Cobalt	CO	SOIL	Plant
NONRAD	INORG	Copper	CU	SOIL	Plant
NONRAD	INORG	Lead	PB	SOIL	Plant
NONRAD	INORG	Manganese	MN	SOIL	Plant
NONRAD	INORG	Mercury (inorganic)	HGI	SOIL	Plant
NONRAD	INORG	Nickel	NI	SOIL	Plant
NONRAD	INORG	Selenium	SE	SOIL	Plant
NONRAD	INORG	Silver	AG	SOIL	Plant
NONRAD	INORG	Thallium	TL	SOIL	Plant
NONRAD	INORG	Uranium	U	SOIL	Plant
NONRAD	INORG	Vanadium	V	SOIL	Plant
NONRAD	INORG	Zinc	ZN	SOIL	Plant
NONRAD	PAH	Acenaphthene	83-32-9	SOIL	Plant
NONRAD	PAH	Benzo(a)anthracene	56-55-3	SOIL	Plant
NONRAD	PAH	Benzo(b)fluoranthene	205-99-2	SOIL	Plant
NONRAD	PCB	Aroclor-1254	11097-69-1	SOIL	Plant
NONRAD	PEST	BHC[gamma-]	58-89-9	SOIL	Plant
NONRAD	PEST	Chlordane[alpha-]	5103-71-9	SOIL	Plant
NONRAD	PEST	Chlordane[gamma-]	5103-74-2	SOIL	Plant
NONRAD	PEST	Dieldrin	60-57-1	SOIL	Plant
NONRAD	PEST	Endrin	72-20-8	SOIL	Plant
NONRAD	PEST	Heptachlor	76-44-8	SOIL	Plant
NONRAD	SVOC	Dibenzofuran	132-64-9	SOIL	Plant
NONRAD	SVOC	Di-n-Butyl Phthalate	84-74-2	SOIL	Plant
NONRAD	SVOC	Pentachlorophenol	87-86-5	SOIL	Plant
NONRAD	SVOC	Phenol	108-95-2	SOIL	Plant
NONRAD	VOC	Methylene Chloride	75-09-2	SOIL	Plant
NONRAD	VOC	Toluene	108-88-3	SOIL	Plant
NONRAD	VOC	Xylene (Total)	1330-20-7	SOIL	Plant
RAD	RAD	Americium-241	AM-241	SOIL	Plant
RAD	RAD	Cesium-134	CS-134	SOIL	Plant
RAD	RAD	Cesium-137 + Barium-137	CS-137/ BA-137	SOIL	Plant
RAD	RAD	Cobalt-60	CO-60	SOIL	Plant
RAD	RAD	Europium-152	EU-152	SOIL	Plant
RAD	RAD	Plutonium-238	PU-238	SOIL	Plant
RAD	RAD	Plutonium-239, 240	PU-239/240	SOIL	Plant
RAD	RAD	Plutonium-241	PU-241	SOIL	Plant
RAD	RAD	Radium-226	RA-226	SOIL	Plant

RAD	RAD	Sodium-22	NA-22	SOIL	Plant
RAD	RAD	Strontium-90 + Yttrium-90	SR-90/ Y-90	SOIL	Plant
RAD	RAD	Thorium-228	TH-228	SOIL	Plant
RAD	RAD	Thorium-230	TH-230	SOIL	Plant
RAD	RAD	Thorium-232	TH-232	SOIL	Plant
RAD	RAD	Tritium	H-3	SOIL	Plant
RAD	RAD	Uranium-234	U-234	SOIL	Plant
RAD	RAD	Uranium-235	U-235	SOIL	Plant
RAD	RAD	Uranium-238	U-238	SOIL	Plant

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**Table 6. Beta Release (October 1998) List of Sediment and Water ESLs for Aquatic Community Organism Receptors**

Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class	Analyte Class
RAD	RAD	Americium-241	AM-241	WATER and SEDIMENT	Aquatic
RAD	RAD	Cesium-137 + Barium-137	CS-137/ BA-137	WATER and SEDIMENT	Aquatic
RAD	RAD	Plutonium-238	PU-238	WATER and SEDIMENT	Aquatic
RAD	RAD	Plutonium-239, 240	PU-239/240	WATER and SEDIMENT	Aquatic
RAD	RAD	Plutonium-241	PU-241	WATER and SEDIMENT	Aquatic
RAD	RAD	Radium-226	RA-226	WATER and SEDIMENT	Aquatic
RAD	RAD	Strontium-90 + Yttrium-90	SR-90/ Y-90	WATER and SEDIMENT	Aquatic
RAD	RAD	Thorium-232	TH-232	WATER and SEDIMENT	Aquatic
RAD	RAD	Tritium	H-3	WATER and SEDIMENT	Aquatic
RAD	RAD	Uranium-234	U-234	WATER and SEDIMENT	Aquatic
RAD	RAD	Uranium-235	U-235	WATER and SEDIMENT	Aquatic
RAD	RAD	Uranium-238	U-238	WATER and SEDIMENT	Aquatic

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## References

### Ecorisk Database REF ID 0561

United States Environmental Protection Agency (USEPA). 1993h. Wildlife Exposure Factors Handbook, Vol. I and II. EPA/600/R-93/187. United States Environmental Protection Agency.

### Ecorisk Database REF ID 1484

Newell, PG. 1999 (Dec.). Revisions to Ecorisk Database R.1 ESLs. Los Alamos National Laboratory, Environmental Restoration Project, Los Alamos National Laboratory, Los Alamos, NM.

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Year	Month	Day	Time	Location	Activity	Remarks
2018	01	01	08:00	Office	Work	
2018	01	02	08:00	Office	Work	
2018	01	03	08:00	Office	Work	
2018	01	04	08:00	Office	Work	
2018	01	05	08:00	Office	Work	
2018	01	06	08:00	Office	Work	
2018	01	07	08:00	Office	Work	
2018	01	08	08:00	Office	Work	
2018	01	09	08:00	Office	Work	
2018	01	10	08:00	Office	Work	
2018	01	11	08:00	Office	Work	
2018	01	12	08:00	Office	Work	
2018	01	13	08:00	Office	Work	
2018	01	14	08:00	Office	Work	
2018	01	15	08:00	Office	Work	
2018	01	16	08:00	Office	Work	
2018	01	17	08:00	Office	Work	
2018	01	18	08:00	Office	Work	
2018	01	19	08:00	Office	Work	
2018	01	20	08:00	Office	Work	
2018	01	21	08:00	Office	Work	
2018	01	22	08:00	Office	Work	
2018	01	23	08:00	Office	Work	
2018	01	24	08:00	Office	Work	
2018	01	25	08:00	Office	Work	
2018	01	26	08:00	Office	Work	
2018	01	27	08:00	Office	Work	
2018	01	28	08:00	Office	Work	
2018	01	29	08:00	Office	Work	
2018	01	30	08:00	Office	Work	
2018	01	31	08:00	Office	Work	