

## NOTICES OF PROPOSED RULEMAKING

Unless exempted by A.R.S. § 41-1005, each agency shall begin the rulemaking process by first submitting to the Secretary of State's Office a Notice of Rulemaking Docket Opening followed by a Notice of Proposed Rulemaking that contains the preamble and the full text of the rules. The Secretary of State's Office publishes each Notice in the next available issue of the *Register* according to the schedule of deadlines for *Register* publication. Under the Administrative Procedure Act (A.R.S. § 41-1001 et seq.), an agency must allow at least 30 days to elapse after the publication of the Notice of Proposed Rulemaking in the *Register* before beginning any proceedings for making, amending, or repealing any rule. (A.R.S. §§ 41-1013 and 41-1022)

### NOTICE OF PROPOSED RULEMAKING

#### TITLE 2. ADMINISTRATION

#### CHAPTER 8. STATE RETIREMENT SYSTEM BOARD

[R06-314]

#### PREAMBLE

**1. Sections Affected**

R2-8-501  
R2-8-502  
R2-8-503  
R2-8-507  
R2-8-508  
R2-8-509  
R2-8-510  
R2-8-511  
R2-8-512  
R2-8-513  
R2-8-513.01  
R2-8-513.02  
R2-8-514  
R2-8-515  
R2-8-516  
R2-8-517  
R2-8-518  
R2-8-519  
R2-8-520

**Rulemaking Action**

Amend  
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**2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rules are implementing (specific):**

Authorizing statutes: A.R.S. §§ 38-714(F)(5), 38-715(C)(3)

Implementing statutes: A.R.S. §§ 8-711, 38-730, 38-742, 38-743, 38-744, 38-745, 38-747, 38-769, 38-921, 38-922

**3. A list of all previous notices appearing in the Register addressing the proposed rule:**

Notice of Rulemaking Docket Opening: 12 A.A.R. 835, March 17, 2006

Notice of Rulemaking Docket Opening: 12 A.A.R. 3194, September 1, 2006

**4. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:**

Name: Nancy O. Johnson, Rules Coordinator

Address: Arizona State Retirement System  
3300 N. Central, 14th Fl.  
Phoenix, AZ 85012

Telephone: (602) 308-5172

Fax: (602) 264-6113

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E-mail: nancyj@azasrs.gov  
or  
Name: Patrick M. Klein, Assistant Director, External Affairs  
Arizona State Retirement System  
Address: 3300 N. Central Ave., 14th Floor  
Phoenix, AZ 85012  
Telephone: (602) 240-2044  
Fax: (602) 240-5303  
E-mail: patk@azasrs.gov

**5. An explanation of the rule, including the agency's reasons for initiating the rule:**

A.R.S. §§ 38-743, 38-744, 38-745, and 38-747 allow a current, contributing member of ASRS to purchase credited service, upon which ASRS benefits are based. The current rules became effective June 30, 2005. Since that time the ASRS has identified several areas in the Purchasing Service Credit rules that need adjustment in order for the program to conform to federal and state law, run more smoothly, and treat all members fairly.

The rulemaking will:

1. Increase the amount of time a member has to return a signed Irrevocable Payroll Deduction Authorization and provide the circumstances under which exceptions to the time limitations will be made,
2. Amend the document requirements for purchasing military service credit,
3. Clarify the difference between terminating and transferring employment,
4. Define additional terms,
5. Adjust various items of procedure in the process for purchasing service credit, and
6. Make technical and clarifying changes to the rules.

**6. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on or not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

None

**7. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable

**8. The preliminary summary of the economic, small business, and consumer impact:**

Annual costs/revenues changes are designated as minimal when less than \$1,000, moderate when between \$1,000 and \$10,000, and substantial when \$10,000 or greater in additional costs or revenues.

The ASRS will bear moderate to substantial costs for promulgating and enforcing the rules. Costs for promulgating the rules include staff time to write, review, and direct the rules through the rulemaking process.

The majority of the rule changes have no monetary impact, as they are changes to clarify language in the rule or processes for purchasing service credit.

One change that does have a financial impact on ASRS members is a change in the way salary is calculated for Presidential Call-Up service. The rule change was made to conform to federal law and a change in A.R.S. § 38-745, that requires the salary calculation to take into account any increases in salary the member would have received had the member not been called to active military service by Presidential Call-Up. That change has a minimal to moderate impact on each employee member, and minimal to substantial impact on each ASRS employer member, depending on how many employee members the employer has called to active duty under R2-8-510, and whether the employee's salary would have increased during their active duty time.

**9. The name and address of agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:**

Name: Nancy O. Johnson, Rules Coordinator  
Address: Arizona State Retirement System  
3300 N. Central, 14th Fl.  
Phoenix, AZ 85012  
Telephone: (602) 308-5172  
Fax: (602) 264-6113  
E-mail: nancyj@azasrs.gov

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Name: Patrick M. Klein, Assistant Director, External Affairs  
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Phoenix, AZ 85012  
Telephone: (602) 240-2044  
Fax: (602) 240-5303  
E-mail: patk@azasrs.gov

**10. The time, place, and nature of the proceedings for the making, amendment, or repeal of the rule, or if no proceeding is scheduled, where, when, and how persons may request an oral proceeding on the proposed rule:**

The ASRS has scheduled an oral proceeding on the proposed rulemaking:

Date: Tuesday, October 3, 2006  
Location: 3300 N. Central Ave., Board Room, 10th Floor  
Phoenix, AZ 85012  
Time: 2:00 p.m.

The close of record is 5 p.m., Tuesday, October 3, 2006.

A person may also submit written comments on the proposed rules no later than 5 p.m., Tuesday, October 3, 2006, to the individuals listed in item #4.

**11. Any other matters prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules:**

Not applicable

**12. Incorporations by reference and their location in the rules:**

Not applicable

**13. The full text of the rules follows:**

TITLE 2. ADMINISTRATION

CHAPTER 8. STATE RETIREMENT SYSTEM BOARD

ARTICLE 5. PURCHASING SERVICE CREDIT

Section

- R2-8-501. Definitions
- R2-8-502. Request to Purchase Service Credit and Notification of Cost
- R2-8-503. Requirements Applicable to All Service Credit Purchases
- R2-8-507. Required Documentation and Calculations for Forfeited Service Credit
- R2-8-508. Required Documentation and Calculations for Leave of Absence Service Credit
- R2-8-509. Required Documentation and Calculations for Military Service Credit
- R2-8-510. Required Documentation and Calculations for Presidential Call-up Service Credit
- R2-8-511. Required Documentation and Calculations for Other Public Service Credit
- R2-8-512. Purchasing Service Credit by Check, Cashier's Check, or Money Order
- R2-8-513. Purchasing Service Credit by Irrevocable Payroll Deduction Authorization
- R2-8-513.01. Irrevocable Payroll Deduction Authorization and Transfer Employment to a Different ASRS Employer
- R2-8-513.02. Termination Date
- R2-8-514. Purchasing Service Credit by Direct Rollover
- R2-8-515. Purchasing Service Credit by Trustee-to-Trustee Transfer
- R2-8-516. Purchasing Service Credit by Indirect IRA Rollover
- R2-8-517. Purchasing Service Credit by Distributed Rollover Contribution
- R2-8-518. Purchasing Service Credit by Partial Lump Sum Retirement Distribution
- R2-8-519. Purchasing Service Credit by Termination Pay Distribution
- R2-8-520. ~~Separation from~~ Termination of Employment and Request Return of Retirement Contributions or Death of Member While Purchasing Service Credit by an Irrevocable Payroll Deduction Authorization

**ARTICLE 5. PURCHASING SERVICE CREDIT**

**R2-8-501. Definitions**

The following definitions apply to this Article unless otherwise specified:

1. "Active duty" has the same meaning as in 32 USC U.S.C. 101.
2. "Active duty termination date" means the day a member:
  - a. Separates from active military duty;
  - b. Is released from active duty-related hospitalization or one year after initiation of active duty-related hospitalization, whichever date is earlier; or
  - c. Dies as a result of active military duty.
- ~~3~~ 3. "Active member" means the same as in A.R.S. § 38-711.
- ~~3~~ 4. "Active reserve duty" means participating in required meetings and annual training in a Reserve or National Guard branch of the United States uniformed service, ~~for which the member receives pay.~~
- 4 5. "Actuarial present value" means an amount in today's dollars of a member's future retirement benefit calculated using the actuarial assumptions in R2-8-123 and the:
  - a. Member's current years of credited service to the nearest month;
  - b. Member's age to the nearest day;
  - c. Amount of service credit the member wishes to purchase to the nearest month, except for the calculation in R2-8-506(A)(2); and
  - d. Member's current annual compensation.
- ~~5~~ 6. "ASRS" means the same as in A.R.S. § 38-711.
- ~~6~~ 7. "ASRS employer" means the same as "employer" in A.R.S. § 38-711.
8. "Authorized employer representative" means an individual who has been delegated the authority to act on behalf of an ASRS employer to provide the ASRS with information.
- 7 9. "Authorized representative" means an individual who has been delegated the authority to act on behalf of a custodian, trustee, plan administrator, or, if applicable, a member.
- 8 10. "Compensation" means the same as in A.R.S. § 38-769.
- 9 11. "Credited service" means the same as in A.R.S. § 38-711.
- ~~10~~ 12. "Current annual compensation" means the greater of:
  - a. *Annualized compensation of the full pay period immediately before the date of a request to ASRS to purchase credited service pursuant to section 38-743 or 38-745.*
  - b. *Annualized compensation of the partial year if a member has less than twelve months total credited service on the date of a request to purchase credited service pursuant to section 38-743 or 38-745.*
  - c. *The sum of the twelve months of compensation immediately before the date of a request to ASRS to purchase credited service pursuant to section 38-743 or 38-745.*
  - d. *The sum of the thirty six months of compensation immediately before the date of a request to ASRS to purchase credited service pursuant to section 38-743 or 38-745 divided by three.*
  - e. *If the member has retired one or more times from ASRS, the average monthly compensation that was used for calculating the member's last pension benefit times twelve.*
- ~~11~~ 13. "Current years of credited service" means the amount of credited service a member has earned or purchased, and the amount of service credit for which an irrevocable payroll deduction authorization is in effect for which the member has not yet completed payment, but does not include any current requests to purchase service credit for which the member has not yet paid.
- ~~12~~ 14. "Custodian" means a financial institution that holds financial assets for guaranteed safekeeping.
- ~~13~~ 15. "Day" means a calendar day, and excludes the:
  - a. Day of the act or event from which a designated period of time begins to run; and
  - b. Last day of the period if a Saturday, Sunday, or official state holiday.
- 14 16. "Direct rollover" means distribution of eligible funds made payable to the ASRS as a contribution for the benefit of an eligible member from a retirement plan listed in A.R.S. § 38-747 (H)(2) or (H)(3).
- ~~15~~ 17. "Eligible funds" means payments listed in A.R.S. § 38-747(H)(2) and (3).
- ~~16~~ 18. "Eligible member" means an active member of the Plan or a Plan member who is receiving benefits under the Long Term Disability Program established by A.R.S. Title 38, Chapter 5, Article 2.1.
- ~~17~~ 19. "Error" means a typographical mistake, incorrect information, or other inaccuracy, whether intentional or unintentional.
- ~~18~~ 20. "Forms of payment" means check, cashier's check, money order, irrevocable payroll deduction authorization, direct rollover, trustee-to-trustee transfer, IRA rollover, partial lump sum distribution, and termination pay distribution.
- ~~19~~ 21. "Forfeited service" means credited service for which the ASRS has returned retirement contributions to the member

under A.R.S. § 38-740.

- 20 ~~22~~. "Immediate family member" means:
- A member's spouse or life partner;
  - A member's natural, step, or adopted sibling;
  - A member's natural, step, or adopted child;
  - A member's natural, step, or adoptive parent; or
  - An individual for whom the member has legal guardianship.
- 21 ~~23~~. "Indirect IRA rollover" means funds already distributed to the eligible member from a retirement plan listed in A.R.S. § 38-747(H)(3) that are then paid by the eligible member to the ASRS as a contribution for the benefit of the eligible member.
- 22 ~~24~~. "IRA" means an Individual Retirement Account or Annuity under IRC § 408.
- 23 ~~25~~. "IRC" means the Internal Revenue Code.
- 24 ~~26~~. "Irrevocable payroll deduction authorization" means a contract between an eligible member, an ASRS employer and the ASRS, that requires the ASRS employer to withhold payments from a member's pay for a specified amount and for a specified number of payments, as provided in A.R.S. § 38-747, and that is irrevocable.
- 25 ~~27~~. "Leave of absence" means the same as in A.R.S. § 38-711.
- 26 ~~28~~. "Life partner" means an individual who lives with a member as a spouse, but without being legally married.
- 27 ~~29~~. "Member" means the same as in A.R.S. § 38-711.
- 28 ~~30~~. "Military service" means active duty or active reserve duty with any branch of the United States uniformed services.
29. ~~"Military call up" means a directive from the President of the United States initiating active duty for personnel of active or inactive National Guard and Reserve branches of the United States uniformed services.~~
- 30 ~~31~~. "Military service record" means a United States uniformed services document that provides proof of active duty or active reserve duty time, including the a military form DD-214 or other military form that provides the following information:
- The member's full name;
  - The member's Social Security number;
  - ~~The member's date of birth;~~
  - ~~c.~~ Type of discharge the member received;
  - ~~e~~ d. Active duty dates, if applicable; and
  - ~~e~~ f Active reserve duty dates, if applicable; and
  - ~~g.~~ Points received for active duty or active reserve duty.
- 31 ~~32~~. "Other public service" means previous employment listed in A.R.S. § 38-743 (A).
- 32 ~~33~~. "PDA pay-off letter" means written correspondence from ASRS to a member that specifies the amount necessary to be paid by the member to complete an irrevocable payroll deduction authorization and receive the credited service specified in the irrevocable payroll deduction authorization.
- 33 ~~34~~. "Person" means the same as in A.R.S. § 1-215.
- 34 ~~35~~. "Plan" means the same as "defined benefit plan" in A.R.S. § 38-769, and administered by the ASRS.
- 35 ~~36~~. "Plan Administrator" means the person authorized to represent a specific eligible plan as addressed in IRC § 414 (g).
- 36 ~~37~~. "Political subdivision" means the same as in A.R.S. § 38-711.
- 37 ~~38~~. "Political subdivision entity" means the same as in A.R.S. § 38-711.
39. ~~"Presidential call-up" means a directive from the President of the United States, Cabinet Secretary or Secretary of the individual uniformed service, initiating active duty for personnel of active military, or active or inactive National Guard and Reserve branches of the United States uniformed services.~~
- 38 ~~40~~. "Public employer" means the United States government, a state of the United States, a political subdivision of a state of the United States, or a political subdivision entity.
- 39 ~~41~~. "Rollover" means a contribution to the ASRS by an eligible member of an eligible rollover distribution from one or more of the retirement plans listed in A.R.S. § 38-747 (H)(2) and (3).
- 40 ~~42~~. "Service credit" means forfeited service under A.R.S. § 38-742, leave of absence under A.R.S. § 38-744, military service and Presidential call-up service under A.R.S. § 38-745, and other public service under A.R.S. § 38-743 that an eligible member may purchase.
- 41 ~~43~~. "SP invoice" means a written correspondence from the ASRS informing an eligible member of the amount of money required to purchase a specified amount of service credit.
44. ~~"Terminate employment" means to end the employment relationship between a member and an ASRS employer with the intent that the member not return to employment with that ASRS employer.~~
- 42 ~~45~~. "Termination pay distribution" means an ASRS employer's payment to the ASRS of an eligible member's termination pay to purchase service credit as specified in § 38-747(B)(2).
- 43 ~~46~~. "Three full calendar months" means the first day of the first full month through the last day of the third full month.

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47. “Transfer employment” means to terminate employment with one ASRS employer with which a member has an Irrevocable Payroll Deduction Authorization:
- a. After accepting an offer to work for a new ASRS employer, or
  - b. While working as an active member for a different ASRS employer.
- 44 48. “Trustee-to-trustee transfer” means a transfer of assets to the ASRS as authorized in A.R.S. § 38-747(I), from a retirement program listed in R2-8-515(A) from which, at the time of the transfer, a member is not eligible to receive a distribution.
- 45 49. “Uniformed services” means the United States Army, Army Reserve, Army National Guard, Navy, Navy Reserve, Air Force, Air Force Reserve, Air Force National Guard, Marine Corps, Marine Corps Reserve, Coast Guard, Coast Guard Reserves, the National Oceanic and Atmospheric Administration, and the Public Health Service.
- 46 50. “United States” means the same as in A.R.S. § 1-215.
- 47 51. “Window credit” means overpayments made on previously purchased service credit by eligible members of the ASRS as provided by Laws 1997, Chapter 280, Section 21, and Laws 2003, Chapter 164, Section 3.

**R2-8-502. Request to Purchase Service Credit and Notification of Cost**

- A. An eligible member may request to purchase service credit verbally, in writing, or electronically. The eligible member shall provide the eligible member’s mailing address and designate which category of service credit the eligible member is requesting to purchase.
- B. The ASRS shall send a letter acknowledging the request to purchase service credit to the mailing address provided by the eligible member. The ASRS shall provide, with the acknowledgment letter, any form specified in this Article that corresponds to the category of service credit the eligible member requests to purchase and indicate in the acknowledgment letter the deadline for providing supporting documentation of service credit to the ASRS.
- C. Except as provided in R2-8-519(A), the eligible member shall provide documentation of service credit as required by this Article within 90 days of the eligible member’s request to purchase service credit. If the ASRS has not received complete and correct documents within 90 days of the request to purchase service credit, the ASRS shall cancel the eligible member’s request to purchase service credit. The eligible member may make a new request to purchase service credit.
- D. Upon receipt of the documentation required by this Article from the eligible member and if the eligible member’s request to purchase service credit meets the requirements of this Article, the ASRS shall provide the following to the eligible member:
- 1. A SP invoice stating the cost to purchase the amount of service credit the member is eligible to purchase and the date payment is due; and
  - 2. A Service Purchase Payment Request form requesting the following information:
    - a. The member’s name;
    - b. The member’s Social Security number;
    - c. The member’s mailing address;
    - d. The member’s daytime telephone number;
    - e. ID number listed on the SP invoice;
    - f. Either the ~~The~~ number of years or partial years of service credit the member wishes to purchase or the cost for the number of years or partial years of service the member wishes to purchase, up to and including the years or partial years, and cost specified on the SP Invoice;
    - g. If the member elects to pay for the service credit by trustee-to-trustee transfer, IRA rollover, distributed rollover contribution, or direct rollover, the anticipated number of rollovers or transfers;
    - h. If the member elects to pay by irrevocable payroll deduction authorization, the amount of money the member wishes to pay per pay period;
    - i. If the member elects to pay for the service credit by check, the check number and amount of the check;
    - j. If the member elects to pay any cost remaining at retirement or termination of employment with a termination pay distribution, the retirement date or last date of work;
    - k. If the member is retiring and wishes to pay by a partial lump sum retirement distribution ~~or termination pay distribution~~, the member’s requested retirement date; and
    - l. The member’s signature and date of the signature; and
  - 3. Other forms the member may need to complete the request for service credit purchase.

**R2-8-503. Requirements Applicable to All Service Credit Purchases**

- A. To purchase service credit at the amount provided in an SP invoice, an eligible member shall purchase the service credit by check or money order, or request an irrevocable payroll deduction authorization, rollover, transfer, termination pay distribution, or partial lump sum retirement distribution as specified in this Article, ~~within 30 days after the date on the SP invoice by the due date specified on the SP invoice.~~
- B. An eligible member may purchase all of the service credit or a portion of the service credit. If the eligible member wishes to purchase only a portion of the service credit, the eligible member shall specify, on the Service Purchase Payment

~~Request form identified in R2-8-502(D)(2); make a new request for purchase and ASRS shall recalculate the cost. A new request to purchase a portion of the service credit initially requested automatically terminates the initial request.~~

- ~~1. The dollar amount the eligible member wishes to purchase, up to the amount specified on the SP invoice, or~~
- ~~2. The number of years or partial years the eligible member wishes to purchase, up to the years or partial years specified on the SP invoice.~~

~~C. If the eligible member selects to purchase only a portion of the service credit, the cost and amount of service credit the eligible member identifies on the Service Purchase Payment Request form is only an estimate and may be more or less than the actual cost or amount of service credit purchased by the eligible member, and~~

~~D. The eligible member shall not request to purchase additional service credit based on the SP invoice until the member has completed the purchase of the previously requested portion of service credit.~~

~~E. ASRS shall not consider more than one active request at a time from a member to purchase service credit in a single category. The categories are:~~

- ~~1. Leave of absence,~~
- ~~2. Military service,~~
- ~~3. Presidential call-up service,~~
- ~~4. Forfeited service, and~~
- ~~5. Other public service.~~

~~F. An eligible member may cancel an active request to purchase a specific category of service credit verbally or in writing, and submit a new request in the same category of service credit for a different amount of service credit.~~

~~G. If an eligible member is entitled to a window credit, the eligible member may apply the window credit to purchase service credit. To apply a window credit to a purchase of service credit, the eligible member shall make a request to the ASRS in writing ~~within 30 days after the date~~ by the due date specified on the SP invoice and include the following information:~~

- ~~1. The amount the member wants to apply,~~
- ~~2. The member's signature, and~~
- ~~3. The date of the member's signature.~~

~~H. The amount of service credit an eligible member may purchase and the benefits an eligible member may receive are subject to the limitations prescribed in A.R.S. § 38-747(E).~~

~~I. On or before the due date specified on the SP Invoice, ASRS shall extend the time for an eligible member to respond to an SP invoice as follows:~~

- ~~1. If the member notifies the ASRS of an ASRS error ~~within 30 days after the date on the SP invoice~~, the time is extended 30 days after the date the ASRS sends notification to the eligible member that the ASRS has corrected the error;~~
- ~~2. If an ASRS internal ~~legal~~ review is made of the member's service credit purchase request, the time is extended 30 days after the date ASRS sends notification to the member that the review is completed;~~
- ~~3. If the member appeals an issue regarding the SP invoice under Article 4 of this Chapter, the time is extended 30 days after the date ASRS sends notification to the member that a decision on the appeal has been made; or~~
- ~~4. If an unforeseeable event occurs that is outside of the member's control, such as an incapacitating illness of the member or death of an immediate family member, and the member notifies the ASRS of the event, the ASRS shall extend the time by up to six months, after a review of the unforeseeable event to determine the length of the extension.~~

**R2-8-507. Required Documentation and Calculations for Forfeited Service Credit**

A. An eligible member who requests to purchase service credit for forfeited service under A.R.S. § 38-742 shall provide to the ASRS:

1. The eligible member's:
  - a. Full name and, if applicable, nicknames or other names used while working for an ASRS employer for which the eligible member is requesting to purchase service credit;
  - b. Mailing address;
  - c. Telephone number, if applicable;
  - d. Social Security number;
2. The name of each ASRS employer, if known, for which the eligible member is requesting to purchase service credit for forfeited service;
3. The year the eligible member began working for each ASRS employer and the year the eligible member left each employment, if known; and
4. The year the eligible member believes the ASRS returned retirement contributions to the member.

B. The amount the eligible member shall pay to purchase service credit for previously forfeited service is the amount of retirement contributions that the ASRS returned to the eligible member, plus interest on that amount from the date ~~of~~ on the return of retirement contributions check to the date of redeposit at the interest rate determined by the Board as specified in A.R.S. § 38-742.

*Arizona Administrative Register / Secretary of State*  
**Notices of Proposed Rulemaking**

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**R2-8-508. Required Documentation and Calculations for Leave of Absence Service Credit**

- A. An eligible member may request to purchase service credit for an approved leave of absence from an ASRS employer under A.R.S. § 38-744. To request to purchase service credit for an approved leave of absence the eligible member shall provide to the ASRS:
1. ~~The items listed in R2-8-507(A)(1);~~ An Approved Leave of Absence form that includes:
    - a. The following information completed by the eligible member:
      - i. The eligible member's full name and, if applicable, nicknames or other names used while working for the ASRS employer;
      - ii. The eligible member's Social Security number;
      - iii. The eligible member's mailing address;
      - iv. The eligible member's daytime telephone number;
      - v. A statement that the eligible member understands that up to one year of leave of absence service credit may be purchased for each approved leave of absence, providing the eligible member returns to work for the employer that approved the leave of absence;
      - vi. A statement that the eligible member understands that the ASRS uses the actuarial Present Value calculation method to determine the cost of the service purchase request;
      - vii. A statement that the eligible member authorizes the ASRS employer to provide any necessary personal information to ASRS in order to process this request; and
      - viii. The member's dated signature; and
    - b. The following information completed by the ASRS employer:
      - i. The beginning date and ending date of the approved leave of absence;
      - ii. The date the eligible member returned to work, or a statement why employment was not resumed;
      - iii. Name of the employer;
      - iv. The authorized employer representative's name;
      - v. The authorized employer representative's telephone number and, if applicable fax telephone number; and
      - vi. The authorized employer representative's dated signature verifying that the approved leave of absence benefited or was in the best interest of the employer; and
  2. ~~The name of the ASRS employer;~~
  3. ~~A written statement from the ASRS employer specifying the beginning and ending dates of the leave of absence and the eligible member's salary on the day before the leave of absence; and~~
  4. ~~A copy of the guidelines referenced in A.R.S. § 38-744, if applicable.~~
- B. The amount the member shall pay to purchase service credit for leave of absence is determined as provided in R2-8-506.

**R2-8-509. Required Documentation and Calculations for Military Service Credit**

- A. An eligible member may request to purchase military service credit under A.R.S. § 38-745(A) and (B). To request to purchase military service credit, the eligible member shall provide to the ASRS:
1. ~~The items listed in R2-8-507(A)(1); and~~
  2. ~~A copy of the eligible member's military service record; and~~
  3. A completed, signed, dated, and notarized Affidavit of Military Service form that contains:
    - a. The member's full name;
    - b. The member's social Security number;
    - c. The branch of the uniformed services the member was in;
    - d. Whether the member was active duty or active reserve duty;
    - e. The years and months by fiscal year that the member was in active duty or active reserve duty for which the member wishes to purchase service credit;
    - f. Acknowledgement that the member has attached:
      - i. Proof of honorable discharge for each type of military service listed on the form; and
      - ii. The member's military service record that supports all of the service listed on the affidavit;
    - g. The following initialed statements of understanding:
      - i. I understand that any person who knowingly makes any false statement, or who falsifies or permits to be falsified any record of the retirement plan with an intent to defraud the plan is guilty of a class 6 felony per Arizona Revised Statutes Section 38-793.
      - ii. I understand this transaction is subject to audit and if any errors or misrepresentations are discovered as a result of this audit, my total credited service with the ASRS will be adjusted as necessary and if I am retired, my retirement benefit will also be adjusted;
      - iii. I understand that the service listed on this affidavit does not include time that I either volunteered or was ordered into active duty military service as part of a Presidential Call-Up. This service is purchased under Presidential Call-up and requires a Presidential Call-Up form to be completed by your employer; and
      - iv. I understand that any time I have listed on this affidavit for Reserve or National Guard time reflects the



months that I attended one drill or assembly for each month listed.

- B. The amount the eligible member pays to purchase military service credit is determined as provided in R2-8-506.
- C. ASRS determines the amount of service credit an eligible member receives for active duty and active reserve duty time by the points the eligible member received from the military while on active reserve duty. Unless the eligible member produces documentation that shows otherwise, four points equals one weekend of active reserve duty time listed on the Affidavit of Military Service form, provided that the service listed is supported by the information contained in the member's military service record.

**R2-8-510. Required Documentation and Calculations for Presidential Call-up Service Credit**

- A. An eligible member or the eligible member's beneficiary ~~may request to purchase~~ who meets the requirements under A.R.S. § 38-745(C) shall receive up to 60 months of Presidential call-up service under A.R.S. § 38-745(C) through (I). To request to purchase service credit for Presidential call-up service, the eligible member's ASRS employer shall provide to the ASRS:-
1. The items listed in R2-8-507(A)(1);
  2. A a copy of the eligible member's military service record; and
  3. A a completed Presidential Call-up form that includes the following:
    - a. 1. The salary received by the eligible member on the day before the eligible member's active military service pursuant to the Presidential call-up. The member's full name;
    2. The member's Social Security number;
    3. The start date of Presidential Call-Up Service;
    4. The end date of Presidential Call-Up Service;
    5. Whether the member received paid leave while on Presidential Call-Up;
    6. The date the member returned to work for the ASRS employer;
    7. The salary for each fiscal year while the member is on Presidential Call-Up, including any salary increases the eligible member would have received had the member not left employment due to Presidential call-up, if applicable;
    8. The ASRS employer's name and address;
    9. The name of a contact individual for the ASRS employer, and that individual's business and fax telephone numbers;
    10. The contact individual's signature and date of signature;
    11. If applicable, and whichever is earlier of the following statements:
      - a. That the member was released from the hospital for injuries sustained as a result of participating in a Presidential call-up; or
      - b. That the member has been hospitalized for one year for injuries sustained as a result of participating in a Presidential call-up;
      - b. Statement that the eligible member returned to employment within 90 days after the active duty termination date, if applicable; and
    - e 12. Member's A copy of the member's death certificate, if applicable.
- B. An ASRS employer shall make the request to purchase service credit for Presidential call-up service within 30 days after the member's active duty termination date.
- B C.** The ASRS calculates the amount the ASRS employer pays to purchase Presidential call-up service by multiplying the eligible member's salary at the time active duty commences, by the contribution rate in effect for the period of active duty, and by the years or partial years of service elapsing from the active duty commencement date through the active duty termination date. The active duty termination date is:
1. The date the eligible member separates from active military duty;
  2. The date the eligible member is released from active duty related hospitalization or one year after initiation of active duty related hospitalization, whichever date is earlier; or
  3. The date the eligible member dies as a result of active military duty.
- Included in the calculation are any salary increases the member would have received if the member had not left work to participate in a Presidential call-up.
- D. The ASRS shall send the ASRS employer a statement of cost for purchase of the Presidential Call-up service credit, based on the calculation in subsection (B). Within 90 days from the date on the ASRS statement of cost, the ASRS employer shall pay to the ASRS the amount on the statement. If the ASRS employer fails to make full payment within the 90 days, interest shall accrue on the unpaid balance at the assumed actuarial investment earnings rate approved by the Board in effect on the date of the statement of cost.
- E.** If an ASRS employer deducts retirement and long term disability contributions from an eligible member's pay while the eligible member is on Presidential call-up service, the ASRS shall return the contributions to the ASRS employer after the ASRS receives the information in subsection (A).
- F.** If an ASRS employer deducts retirement contributions from an eligible member's pay while the eligible member is on Presidential call-up service, and the eligible member does not return to the ASRS employer after separation from active military service, the ASRS shall apply the retirement contributions to the member's credited service.

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**R2-8-511. Required Documentation and Calculations for Other Public Service Credit**

- A. An eligible member who requests to purchase other public service credit under A.R.S. § 38-743 shall provide to the ASRS a completed Affidavit of Other Public Service form, signed and dated by the member, and notarized, that includes the following:
1. The member's full name;
  2. The member's Social Security number;
  3. ~~The member's mailing address~~ Other names used by the member during employment with the other public service employer, if applicable;
  4. ~~The member's home telephone number, if applicable;~~
  5. ~~The member's daytime telephone number;~~
  6. ~~4. The name; and mailing address; and business telephone number of the other public service employer's retirement system employer;~~
  7. ~~5. The position the member held while working for the other public service employer;~~
  6. A contact name and telephone number of an individual in the other public service employer's human resources department who can verify employment, if known;
  8. ~~7. The amount of service to be purchased years and months by fiscal year of other public service the member worked and wishes to purchase;~~
  9. ~~8. If the other public service employer was a non-ASRS employer, a statement of whether the member participated in the non-ASRS employer's retirement plan;~~
  10. ~~9. If the member participated in a non-ASRS public service employer's retirement plan, the name of the retirement plan, identifying whichever one of the following applies:~~
    - a. The approximate date the member took a return of retirement contributions;
    - b. ~~That The plan is non-contributory and the member was not vested and is not eligible for benefits and has waived all rights to any future benefits from the plan; or~~
    - c. That, if not using all of the funds as a pre-tax rollover, the member will request a return of retirement contributions and forfeit all rights to any benefits from the plan; and provide the ASRS with documentation that the member has forfeited all rights to the plan no later than the due date specified on the SP invoice; and
  11. ~~10. Acknowledgement that:~~
    - a. Knowingly making a false statement or falsifying or permitting falsification of any record of the ASRS with an intent to defraud ASRS is a Class 6 felony, pursuant to A.R.S. § 38-793;
    - b. The service purchase transaction is subject to audit and if any errors are discovered the ASRS shall adjust a member's total credited service with the ASRS ~~if any errors are discovered;~~
    - e. ~~Any overpayment is refunded at retirement, or if the member is already retired, adjustments to the member's credited service will affect the member's retirement benefit; and~~
    - d. ~~Any overpayment in pre-tax dollars that is refunded will have tax consequences;~~
    - e. c. If an audit determines that the member is eligible for a benefit from the other public service employer's retirement plan, the member is required to take necessary steps to forfeit the benefit, and if the forfeiture is not completed in a reasonable time, the service credit purchase listed on this application will be revoked and any funds paid will be refunded; and
    - f. ~~If the member cannot provide documentation that the member is no longer eligible for a benefit from the other public service employer's retirement plan, any ASRS service that the member has purchased based on employment with the other public service employer listed on the Affidavit of Other Public Service will be revoked and the money will be refunded to the member.~~
- B. The amount the member shall pay to purchase other public service credit is determined as provided in R2-8-506.

**R2-8-512. Purchasing Service Credit by Check, Cashier's Check, or Money Order**

- A. An eligible member may purchase service credit by check, cashier's check, or money order.
- B. Within 30 days of the issue date on the SP invoice or PDA payoff letter, the ASRS shall receive from the member shall return to the ASRS the completed Service Purchase Payment Request form with the information specified in R2-8-502(D)(2), and a check, cashier's check, or money order made to the order of the Arizona State Retirement System in the amount to purchase the requested service credit.
- C. If an eligible member purchases service credit by check, cashier's check, or money order in conjunction with one or more rollovers, trustee-to-trustee transfers, or termination pay, the member shall make payment within 30 days after the date the ASRS sends written confirmation that the ASRS received the final rollover, trustee-to-trustee transfer, or termination pay payment.

**R2-8-513. Purchasing Service Credit by Irrevocable Payroll Deduction Authorization**

- A. An eligible member may purchase service credit by irrevocable payroll deduction authorization.
- B. ~~Within 30 days of the date~~ By the due date specified on the SP invoice, the ASRS shall receive from the member shall

- return to the ASRS the completed Service Purchase Payment Request form with the information specified in R2-8-502 (D)(2).
- C. If the eligible member elects to pay for service credit by irrevocable payroll deduction authorization, ASRS shall prepare an Irrevocable Payroll Deduction Authorization and send it to the eligible member for signature. The ASRS shall receive from the eligible member ~~shall~~ the signed Irrevocable Payroll Deduction Authorization ~~to the ASRS~~ within ~~14~~ 30 days after the date on the Irrevocable Payroll Deduction Authorization. The signed Irrevocable Payroll Deduction Authorization becomes irrevocable upon receipt by the ASRS.
- D. At the time the eligible member signs the Irrevocable Payroll Deduction Authorization the eligible member may elect to use termination pay towards the balance of the irrevocable payroll deduction authorization if the eligible member terminates employment. If the eligible member chooses this option, the eligible member shall ~~complete a Termination Pay Addendum to the Irrevocable Payroll Deduction Authorization, attach it to the signed Irrevocable Payroll Deduction Authorization, and return it to the ASRS within 30 days after the date on the Irrevocable Payroll Deduction Authorization~~ complete the Termination Pay Addendum to the Irrevocable Payroll Deduction Authorization and return it to the ASRS along with the remainder of the irrevocable payroll deduction authorization that ~~The Termination Pay Addendum to the Irrevocable Payroll Deduction Authorization~~ includes the following:
- ~~1. The member's Social Security number;~~
  - ~~2. The agreement number;~~
  - ~~3~~ 1. A statement that the member:
    - a. Understands and agrees that the member must continue working at least three full calendar months after the date of submission of the form before termination pay may be used on a pre-tax basis,
    - b. Understands that if the termination payment exceeds the balance owed on the Irrevocable Payroll Deduction Authorization, the overage will be returned to the ASRS employer to be distributed to the member; and
    - c. Elects to irrevocably agree to have termination pay that may be payable to the member upon termination of employment sent to the ASRS on a pre-tax basis and used toward any remaining balance of the irrevocable payroll deduction authorization if all scheduled payroll deductions have not been completed upon termination of service; and
  - 4 ~~2.~~ A statement that either all termination pay or a specified amount of termination pay is to be applied to the balance of the Irrevocable Payroll Deduction Authorization.
- E. The ASRS shall:
1. Charge interest on the unpaid balance at the assumed actuarial investment earnings rate approved by the Board in effect at the time the authorization was entered into;
  2. Limit the payroll deduction time period to a maximum of 20 years; and
  3. Require a minimum payment of \$10.00 per payroll period, or payment in an amount to purchase at least .001 year of service credit per payroll period, whichever is greater.
- F. ~~The ASRS employer shall begin payroll deductions no later than six months from the date on the signed Irrevocable Payroll Deduction Authorization. The ASRS shall transmit the Irrevocable Payroll Deduction Authorization to the active member's ASRS employer, and the ASRS employer shall implement the deduction on the first pay period after receiving the Irrevocable Payroll Deduction Authorization.~~
- G. ~~If a deduction is not made under an Irrevocable Payroll Deduction Authorization within six months after the member signs the authorization, the authorization lapses and the member may make another request, which is recalculated based on the new request date unless the failure to begin deductions is due to an ASRS error.~~
- ~~H.~~ H. ~~A member with an irrevocable payroll deduction authorization who takes a period of leave of absence, long term disability, or Presidential call-up shall not cancel the irrevocable payroll deduction authorization. The ASRS employer shall resume deductions immediately upon the member's return to that employment with the ASRS employer that granted the leave. The period during which the member is on leave of absence, on long term disability, or leaves work because of a Presidential call-up is not included in the 20-year payment time limitation under subsection (E)(2). If the member does not return to active working status, whether due to termination of employment or retirement, the member may elect to purchase the balance of unpaid service under the Irrevocable Payroll Deduction Authorization at the time of termination or retirement as specified in this rule.~~
- ~~H~~ I. Deductions made pursuant to an irrevocable payroll deduction authorization continue until the:
1. Irrevocable payroll deduction authorization is completed;
  2. Member retires, whether or not the member continues employment as allowed in A.R.S. §§ 38-766.01 and 38-964(J); or
  3. Member ~~separates from the member's~~ terminates all ASRS employer employment without transferring as stated in R2-8-513.01 as specified in A.R.S. § 38-747 (B).
- ~~I~~ J. If a member retires or ~~separates from~~ terminates employment ~~from all ASRS employers without transferring as stated in R2-8-513.01~~ before all deductions are made as authorized by the irrevocable payroll deduction authorization, the member's purchase of service credit is canceled unless the member notifies the ASRS in writing during the period 14 days before to 14 days after retirement or ~~separation~~ termination from all ASRS employment of the intent to purchase the

remaining amount due in a lump sum.

~~J~~**K.** When the member notifies ASRS of retirement or ~~separation~~ termination from all ASRS employment and requests to pay off the Irrevocable Payroll Deduction Authorization, the ASRS shall send the member a PDA pay-off letter to the mailing address given by the member. The ASRS shall calculate the amount owed by the member and reduce the amount owed by any excess interest that the member has paid.

~~K~~**L.** Within 30 days of the date of the PDA pay-off letter, the ASRS shall receive from the member the completed SP Payment Request form with the information specified in R2-8-502(D)(2). ~~the~~ The member may purchase the remaining service credit by one or more of the following methods:

1. By check, cashier's check, or money order made out to the ASRS under R2-8-512;
2. By making a request to the ASRS for a rollover or transfer under R2-8-514 and completing the rollover or transfer within 90 days of the date of the PDA pay-off letter;
3. By requesting a partial lump sum retirement benefit distribution from the ASRS under R2-8-518; or
4. By termination pay distribution under R2-8-519, if the member authorized this option at the time the member signed the Irrevocable Payroll Deduction Authorization.

**R2-8-513.01. Irrevocable Payroll Deduction Authorization and Transfer Employment to a Different ASRS Employer**

**A. An Irrevocable Payroll Deduction Authorization continues if a member transfers employment.**

**B. An Irrevocable Payroll Deduction Authorization ends if a member terminates employment without having accepted an offer to work for a new ASRS employer, and the member is not already an active member working for a different ASRS employer. The member shall then pay off the Irrevocable Payroll Deduction Authorization as specified in R2-8-513(J).**

**C. If a retirement contribution is due from the new ASRS employer within 120 days from the member's termination date with the previous employer, there is a rebuttable presumption that there is a transfer of employment. After the 120 day period the Irrevocable Payroll Deduction Authorization terminates.**

**R2-8-513.02. Termination Date**

For the purpose of an Irrevocable Payroll Deduction Authorization, the date a member is considered terminated from an ASRS employer is:

1. For a member terminating employment, the member's last pay period end date with that ASRS employer;
2. For a member on Presidential Call-up who does not return to the same ASRS employer:
  - a. Ninety days from the date of separation from Presidential Call-up service;
  - b. Ninety days from the date released from the hospital, if injured while on Presidential Call-up service;
  - c. The date the member has been hospitalized for one year for injuries sustained as a result of participating in a Presidential call-up; or
  - d. The date of the member's death as a result of participating in a Presidential Call-Up;
3. For a member on leave of absence without pay who does not return to the same ASRS employer, the date the ASRS employer required the member to return to work;
4. For a member who is unable to work because of a disability, the later of:
  - a. The date the member's request for long term disability benefits are denied;
  - b. The date the member no longer has sick leave and annual leave; or
  - c. For a member on long term disability who does not return to the same ASRS employer or transfer employment, the date long term disability benefits are terminated.

**R2-8-514. Purchasing Service Credit by Direct Rollover**

**A. An eligible member may purchase service credit or pay off an irrevocable payroll deduction authorization at retirement or ~~separation from~~ termination of employment without transferring as stated in R2-8-513.01 by direct rollover.**

**B. ~~Within 30 days of the date~~ By the due date specified on the SP invoice, the ASRS shall receive from the member ~~shall to~~ the ASRS the completed Service Purchase Payment Request form with the information specified in R2-8-502 (D)(2).**

**C. Upon receipt of the completed Service Purchase Payment Request form, the ASRS shall provide a Direct Rollover/Transfer Certification to Purchase Service Credit form, if the ASRS has not already provided the member with the form.**

**D. The member shall ensure that the member and the plan that is making the distribution complete the Direct Rollover/Transfer Certification to Purchase Service Credit form and ~~return it to the ASRS~~ ensure that the ASRS receives the completed form within 90 days after the issue date of the SP Invoice.**

**E. The information requested on the Direct Rollover/Transfer Certification to Purchase Service Credit form includes:**

1. Member's full name;
2. Member's Social Security number;
3. Member's mailing address;
4. Daytime telephone number;
5. ~~Member's date of birth;~~
- 6 5. The amount of each rollover or transfer, if ~~known~~ applicable;
- 7 6. The account number of each plan, if applicable;

- 8 7. The member's signature certifying that the member understands the requirements, limitations, and entitlements for the rollover/transfer that is being used to purchase service credit, and has read and understands the Direct Rollover/Transfer Certification to Purchase Service Credit form and any accompanying instructions and information sheets;
- 9 8. The date the member signs the form;
- 10 9. The authorized representative's name and title;
- 11 10. The authorized representative's address;
- 12 11. The authorized representative's telephone number;
- 13 12. Certification by the authorized representative that:
- The plan is either:
    - A qualified pension, profit sharing, or 401(k) plan described in IRC § 401(a), or a qualified annuity plan described in IRC § 403(a);
    - A deferred compensation plan described in IRC § 457 (b) maintained by a State state of the United States, a political subdivision of a State state of the United States, or an agency or instrumentality of a State state of the United States;
    - An annuity contract described in IRC § 403(b); or
    - An IRA described in A.R.S. § 38-747(H)(3);
  - That the rollover/transfer specified on the form from which the pre-tax funds are being rolled over or transferred is intended to satisfy the requirements of the applicable section of the Internal Revenue Code;
  - The authorized representative is not aware of any plan provision or any other reason that would cause the plan/IRA not to satisfy the applicable section of the Code; and
  - The funds will be sent to the ASRS as a direct plan rollover, IRA rollover, or a trustee-to-trustee transfer; and
- 14 13. The date and signature of the authorized representative.
- F. The ASRS shall provide the member with written notification regarding the eligibility of the rollover.
- G. The member shall contact the plan administrator to have the funds distributed and transferred to the ASRS. Except as provided in subsection (H), unless the ASRS receives a check for the correct amount from the plan within 90 days of the issue date on the SP invoice, the ASRS shall cancel the request to purchase service credit as specified in R2-8-502(C).
- H. The ASRS shall provide an extension of 60 days in which the check may be received by the ASRS from the plan at the written request of the member, if:
- The member has followed the procedure in this Article for requesting to purchase service credit,
  - The member has responded to the ASRS correspondence within the time-frame set forth in this Article,
  - The eligible plan has not provided to the ASRS the check to pay for the requested service credit purchase within 90 days of the date of the SP invoice, and
  - The member makes the written request for extension before expiration of the 90 days.
- I. The member shall ensure that the ASRS receives a check from the plan, made payable to the ASRS, for an amount that does not exceed the amount specified on the SP Invoice.
- J. If the payment from the eligible plan exceeds the amount specified on the SP Invoice, the ASRS shall return the entire payment to the eligible plan and notify the member that the ASRS has returned the payment.

**R2-8-515. Purchasing Service Credit by Trustee-to-Trustee Transfer**

- A. An eligible member may purchase service credit or pay off an irrevocable payroll deduction authorization at retirement or termination of employment without transferring as specified in R2-8-513.01 by a trustee-to-trustee transfer if the member participates in:
- A deferred compensation plan described in IRC § 457 that is maintained by:
    - The State state of Arizona;
    - A political subdivision, agency, or instrumentality of the State state of Arizona; or
    - A political subdivision entity of the State state of Arizona;
  - An annuity contract described in IRC § 403(b); or
  - A retirement program qualified under IRC §§ 401(a) or 403(a).
- B. ~~Within 30 days of the date~~ By the due date specified on the SP invoice, the ASRS shall receive from the member shall return to the ASRS the completed Service Purchase Payment Request form described in R2-8-502(D)(2).
- C. Upon receipt of the completed Service Purchase Payment Request form, the ASRS shall provide a Direct Rollover/Transfer Certification to Purchase Service Credit form, if the ASRS has not already provided the member with the form.
- D. The member shall ensure that the member and the plan administrator complete the Direct Rollover/Transfer Certification to Purchase Service Credit form, containing all of the applicable information identified in R2-8-514 (E), and return the form to the ASRS ensure that the ASRS receives the form within 90 days after the issue date on the SP Invoice.
- E. The ASRS shall provide the member with written notification regarding the eligibility of the transfer.
- F. The member shall contact the plan administrator to have the funds transferred to the ASRS. Except as provided in subsection (G), unless the ASRS receives the check for the correct amount from the plan within 90 days of the issue date on the SP invoice, the ASRS shall cancel the request to purchase service credit as specified in R2-8-502(C).

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- G. The ASRS shall provide an extension of 60 days in which the check may be received by the ASRS from the plan at the written request of the member, if:
  - 1. The member has followed the procedure under this Article for requesting to purchase service credit,
  - 2. The member has responded to the ASRS correspondence within the time-frame set forth in this Article,
  - 3. The eligible plan has not provided to the ASRS the check to pay for the requested service credit purchase within 90 days of the date of the SP invoice, and
  - 4. The member makes the written request for extension before expiration of the 90 days.
- H. The member shall ensure that the ASRS receives a check from the plan, made payable to the ASRS, for an amount that does not exceed the amount specified on the SP Invoice.
- I. If the payment from the eligible plan exceeds the amount specified on the SP Invoice, the ASRS shall return the entire payment to the ~~eligible plan member~~ and notify the member ~~that the payment has been returned of the correct amount due.~~

**R2-8-516. Purchasing Service Credit by Indirect IRA Rollover**

- A. An eligible member may purchase service credit, or pay off an irrevocable payroll deduction authorization at retirement or termination of employment without transferring as specified in R2-8-513.01, by an indirect IRA rollover if the rollover purchase is completed within 60 days of the date of distribution of funds from the IRA account, as required by IRC § 408(d)(3)(A). The 60 day time limitation is exclusive of any other time limitations prescribed in this Article and the ASRS shall not extend the 60 day period.
- B. ~~Within 30 days of the date~~ By the due date specified on the SP invoice, the ASRS shall receive from the member shall return to the ASRS the completed Service Purchase Payment Request form described in R2-8-502(D)(2).
- C. Upon the receipt of the completed Service Purchase Payment Request form and upon the member's request, the ASRS shall provide an Indirect IRA Rollover Contribution form. The member shall complete the Indirect IRA Rollover Contribution form and it to the ASRS ensure that the ASRS receives the form within 90 days after the issue date on the SP Invoice, along with:
  - 1. A copy of the distribution statement or check stub identifying it as an IRA distribution, showing the date of distribution and amount distributed; or
  - 2. The distribution check endorsed by the member made payable to the ASRS with documentation that it is an IRA distribution.
- D. The information requested on the Indirect IRA Rollover Contribution form includes:
  - 1. The member's full name,
  - 2. The member's social security number,
  - 3. The member's mailing address,
  - 4. The member's daytime telephone number,
  - ~~5. The member's date of birth,~~
  - ~~6~~ 5. The member's signature certifying that the member understands the statements on the form regarding the distribution the member has received from the IRA and the requirements for an IRA rollover to the ASRS and agrees to the statements, and
  - ~~7~~ 6. The date the member signs the form.
- E. The ASRS shall provide the member with written notification regarding the eligibility of the rollover contribution.
- F. After receiving notice from the ASRS that the rollover is an eligible rollover contribution, if the member has not sent payment for the purchase of service credit, the member shall submit payment for the service credit purchase. The member shall make payment by:
  - 1. The distribution check from the IRA made payable to the member and endorsed by the member to make it payable to the ASRS; or
  - 2. Direct payment by the member by check or money order to the ASRS, after the IRA distribution is deposited to the member's account.
- G. Except as provided in subsection (H), unless the ASRS receives payment from the member within 90 days of the issue date on the SP invoice, the ASRS shall cancel the request to purchase service credit as specified in R2-8-502(C).
- H. The ASRS shall provide an extension of 60 days in which the check may be received by the ASRS under subsection (G) at the written request of the member, if:
  - 1. The member has followed the procedure under this Article for requesting to purchase service credit,
  - 2. The member has responded to the ASRS correspondence within the time-frame set forth in this Article,
  - 3. The eligible plan has not provided the ASRS member with the check to pay for the requested service credit purchase within 90 days of the date of the SP invoice, and
  - 4. The member makes the written request for extension before expiration of the 90 days.
- I. The member shall ensure that the ASRS receives a check made payable to the ASRS for an amount that does not exceed the amount specified on the SP Invoice.
- J. If the payment exceeds the amount specified on the SP Invoice, the ASRS shall return the entire payment to the member.

**R2-8-517. Purchasing Service Credit by Distributed Rollover Contribution**

- A. An eligible member may purchase service credit with a distribution from a prior employer's eligible plan that has already been distributed to the member if the rollover purchase is completed within 60 days of the date of distribution to the member, as required by IRC §§ 402(c)(3)(A), 403(b)(8)(B), and 457(e)(16)(B). The 60-day time limitation is exclusive of any other time limitations prescribed in this Article and the ASRS shall not extend the 60 day period. Eligible plans are:
1. A pension, profit sharing, or other qualified plan described in IRC § 401(a) and (k);
  2. A qualified annuity plan described in IRC § 403(a);
  3. A deferred compensation plan described in IRC § 457 maintained by a State state of the United States, or a political subdivision, agency, or instrumentality of a State state of the United States; and
  4. A tax deferred annuity described in IRC § 403(b).
- B. ~~Within 30 days of the date~~ By the due date specified on the SP invoice, the ASRS shall receive from the member ~~shall return to the ASRS~~ the completed Service Purchase Payment Request form described in R2-8-502(D)(2).
- C. When the ASRS receives the completed Service Purchase Payment Request form and upon the member's request, the ASRS shall provide a Certification by Eligible Plan Rollover Contribution form and Rollover Contribution form.
- D. The information requested on the Certification by Eligible Plan Rollover Contribution form includes:
1. ~~Name of the plan~~ The member's dated signature;
  2. Member's full name;
  3. Member's social security number;
  4. Member's mailing address;
  5. Certification by the plan administrator that the plan is one of the plans described in subsection (A);
  6. Certification by the plan administrator that:
    - a. If the plan is described in either IRC §§ 401(a) or 403(a), the plan has received a determination letter from the Internal Revenue Service indicating that the plan is qualified under either IRC §§ 401(a) or 403(a);
    - b. If the plan is described in either IRC §§ 401(a) or 403(a), but has not received a determination letter from the Internal Revenue Service, the plan satisfies the requirements of IRC §§ 401(a) or 403(a) or is intended to satisfy the requirements of IRC §§ 401(a) or 403(a) and the plan administrator is not aware of any plan provision or any other reason that would disqualify the plan; or
    - c. If the plan is a deferred compensation plan described in IRC § 457 or an annuity contract described in IRC § 403(b), the plan or annuity satisfies the applicable requirements of IRC §§ 457 or 403(b) and the plan administrator is not aware of any plan provision or any other reason that would cause the plan or annuity to not satisfy the applicable provisions of IRC §§ 457 or 403(b);
  7. Certification by the plan administrator that the plan permits a direct rollover of an eligible rollover distribution to a defined benefit plan;
  8. The full name, title, and signature of the plan administrator;
  9. The plan administrator's business address and telephone number; and
  10. Date of the signature of the plan administrator.
- E. The information requested on the Rollover Contribution form includes:
1. The member's social security number;
  2. The member's full name;
  3. The member's mailing address;
  4. The member's daytime telephone number;
  5. ~~The member's date of birth~~;
  - 6 5. The member's signature certifying that:
    - a. The member has read the statements on the Rollover Contribution form regarding requirements for a rollover contribution, understands all the statements, and believes the statements, certifications, and any documents attached to the form to be true and correct to the best of the member's knowledge and belief; and
    - b. The member understands that:
      - i. The ASRS assumes no responsibility for ensuring that the member makes a timely rollover contribution to the ASRS or that the amount rolled over constitutes a valid rollover contribution;
      - ii. The member accepts full responsibility for ensuring that the rollover contribution is an eligible rollover contribution before making the contribution to the ASRS;
      - iii. If the ASRS accepts the rollover contribution and it is later determined that the contribution was an invalid rollover contribution, the ASRS will distribute the invalid contribution, ~~plus any earnings~~, directly to the member; and
      - iv. Any invalid rollover contributions returned to the member may decrease the member's benefits and the Internal Revenue Service and state taxing authorities may require the member to pay taxes, penalties, and interest on the returned contributions; and
  - 7 6. The date the member signed the form.
- F. The ASRS shall receive from the member ~~shall return to the ASRS~~ the Certification by Eligible Plan Rollover Contribu-

tion form signed and dated by the plan administrator, the Rollover Contribution form signed and dated by the member, and a copy of the distribution statement showing the:

1. Date of the distribution;
2. Amount of the distribution; and
3. Amount of taxes withheld, if any.

- G. The ASRS shall provide the member with written notification regarding the eligibility of the rollover.
- H. ~~After receiving notice from the ASRS that the rollover is eligible, the member shall submit payment for the service credit purchase.~~ The member shall make payment by:
1. The distribution check from the eligible plan made payable to the member and endorsed by the member to make it payable to the ASRS; or
  2. Direct payment by the member by check or money order to the ASRS, after the eligible plan distribution is deposited to the member's personal financial account.
- I. Except as provided in subsection (J), unless the ASRS receives the check from the plan within 90 days of the issue date on the SP invoice, the ASRS shall cancel the request to purchase service credit as specified in R2-8-502(C).
- J. The ASRS shall provide an extension of 60 days in which the check may be received by the ASRS from the plan under subsection (I) at the written request of the member, if:
1. The member has followed the procedure under this Article for requesting to purchase service credit,
  2. The member has responded to the ASRS correspondence within the time-frame set forth in this Article,
  3. The eligible plan has not provided to the ~~ASRS member with~~ the check to pay for the requested service credit purchase within 90 days of the date of the SP invoice, and
  4. The member makes the written request for extension before expiration of the 90 days.
- K. The member shall ensure that the ASRS receives a check, made payable to the ASRS, for an amount that does not exceed the amount specified in the written notification identified in subsection (G).
- L. If the payment from the eligible plan exceeds the amount specified in the written notification identified in subsection (G), the ASRS shall return the entire payment to the member.

**R2-8-518. Purchasing Service Credit by Partial Lump Sum Retirement Distribution**

- A. An eligible member who retires may purchase service credit or pay off an irrevocable payroll deduction authorization by partial lump sum retirement distribution. The partial lump sum distribution is applied after all other forms of payment are made.
- B. An eligible member who requests to purchase service at retirement by partial lump sum retirement distribution shall make the request to the ASRS before the eligible member's retirement date, and in no case more than six months prior to retirement.
- C. Within 30 days of the issue date on the SP invoice or PDA pay-off letter, the ASRS shall receive from the member ~~shall return to the ASRS~~ the completed Service Purchase Payment Request form described in R2-8-502(D)(2).
- D. The member shall ensure that the Partial Lump Sum Retirement Distribution section of the Application for Retirement Benefit form is completed and ~~returned to~~ received by the ASRS.
- E. For the purpose of purchasing service credit or paying off an irrevocable payroll deduction authorization, the information requested on the ~~Partial Lump Sum Retirement Distribution~~ Application for Retirement Benefit form includes:
1. Member's full name;
  2. Member's social security number;
  3. Member's daytime telephone number;
  4. Member's date of birth;
  5. The number of partial lump sum months the member elects ~~to purchase~~;
  6. ~~A statement the member initials that indicates that the member has read the Special Tax Notice provided by the ASRS regarding the plan payment;~~
  7. ~~Election of a rollover to purchase the service credit;~~
  8. Whether the member authorizes the ASRS to increase the number of elected partial lump sum months to an amount necessary to purchase all remaining service, up to a maximum of 36 months;
  9. Whether the member intends to transfer funds from the member's partial lump sum distribution option to purchase the service credit;
  10. Whether the member intends to purchase a portion of the member's service credit by rollover from another eligible plan, lump sum, or termination pay;
  9. Identification number of the irrevocable payroll deduction authorization, if applicable;
  12. Amount of partial lump sum to be applied to each irrevocable payroll deduction authorization, if applicable;
  13. The years of service to be purchased for each irrevocable payroll deduction authorization, if applicable;
  14. Request ID number listed on the SP invoice, if applicable;
  15. 10. Amount of partial lump sum to apply to each SP invoice, if applicable;
  16. 11. Years of service credit to be purchased for each SP invoice, or all service credit; and



17 12. Acknowledgement that the member knows the member may not choose to rollover to an eligible plan if the member chooses to rollover to purchase ASRS service credit.

F. The member shall return the completed ~~Partial Lump Sum Retirement Distribution~~ Application for Retirement Benefit form to the ASRS.

~~G. The ASRS shall provide the member with written notification regarding the eligibility of the rollover.~~

**R2-8-519. Purchasing Service Credit by Termination Pay Distribution**

A. To purchase service credit using termination pay distribution, an eligible member shall, no ~~later~~ more than six months before the date the eligible member plans to retire or ~~separate from service~~ terminate employment, request to purchase service credit as specified in R2-8-502 and specify that the member wants to use termination pay distribution to pay for the service credit. Upon receipt of the acknowledgement letter identified in R2-8-502, the eligible member shall provide documentation for service credit as required by this Article, within 30 days of the eligible member's request to purchase service credit.

B. Upon receipt of the documentation required by this Article from the eligible member and if the eligible member's request to purchase service credit meets the requirements of this Article, the ASRS shall provide a:

1. SP invoice stating the calculated cost to purchase the requested amount of service credit and the date the payment is due, and
2. Service Purchase Payment Request form as described in R2-8-502(D)(2), ~~and,~~
3. ~~Termination Pay Authorization for the Purchase of Service Credit form.~~

~~C. The information requested on the Termination Pay Authorization for the Purchase of Service Credit form includes:~~

1. ~~Member's full name,~~
2. ~~Member's Social Security number,~~
3. ~~Member's daytime telephone number,~~
4. ~~Member's date of birth,~~
5. ~~The Request ID number listed on the SP invoice,~~
6. ~~Name of ASRS employer,~~
7. ~~Whether the member elects to use all termination pay or a specific amount of termination pay to purchase service credit,~~
8. ~~Signature of the member, certifying that the member understands that:~~
  - a. ~~The member is required to continue working at least three full calendar months after the date the member submits the Termination Pay Authorization for the Purchase of Service Credit form before termination pay may be used on a pre-tax basis;~~
  - b. ~~If the member terminates employment more than six months from the date on the SP invoice, the ASRS shall recalculate the cost for purchasing the service credit and the member is obligated to purchase the service credit at the newly calculated rate and at a possible higher cost;~~
  - e. ~~The Termination Pay Authorization for the Purchase of Service Credit form is binding and irrevocable;~~
  - d. ~~The member's employer is required to make payment directly to the ASRS after mandatory deductions are made, and the member does not have the option of receiving the funds directly from the employer;~~
  - e. ~~The ASRS shall apply service credit to the member's account upon the receipt of payments authorized by the member by the Termination Pay Authorization for the Purchase of Service Credit form;~~
  - f. ~~If the member elects to purchase with termination pay only a portion of the service credit that the member is entitled to purchase, the member may be eligible to use other forms of payment to purchase additional service credit. However, using other forms of payment to purchase additional service credit does not alter, amend, or revoke the terms of the Termination Pay Authorization for the Purchase of Service Credit form;~~
  - g. ~~It is the member's responsibility to ensure that the member's employer properly deducts termination pay, as provided the Termination Pay Authorization for the Purchase of Service Credit form; and~~
  - h. ~~The amount of termination pay the member is allowed to apply to purchase service credit is subject to federal laws.~~

~~D. C.~~ Within 30 days of the date By the due date specified on the SP invoice, the ASRS shall receive from member ~~shall return~~ to the ASRS the completed Service Purchase Payment Request form ~~and the completed Termination Pay Authorization for the Purchase of Service Credit form.~~

D. Upon receipt of the Service Purchase Request form, if the member indicates the member wishes to purchase service credit by termination pay distribution, the ASRS shall send the member a Termination Pay Authorization for the Purchase of Service Credit form to complete and return within the time limitation specified in subsection (E) that includes:

1. Member's full name,
2. Member's Social Security number,
3. Member's daytime telephone number,
4. The Request ID number listed on the SP invoice,
5. Name of ASRS employer.

Notices of Proposed Rulemaking

6. Whether the member elects to use all termination pay or a specific amount of termination pay to purchase service credit.
  7. Signature of the member, certifying that the member understands that:
    - a. The member is required to continue working at least three full calendar months after the date the member submits the Termination Pay Authorization for the Purchase of Service Credit form before termination pay may be used on a pre-tax basis;
    - b. If the member terminates employment more than six months from the date on the SP invoice, the member may purchase the service credit at the newly calculated rate and at a possible higher cost;
    - c. The Termination Pay Authorization for the Purchase of Service Credit form is binding and irrevocable;
    - d. The member's employer is required to make payment directly to the ASRS after mandatory deductions are made, and the member does not have the option of receiving the funds directly from the employer;
    - e. The ASRS shall apply service credit to the member's account upon the receipt of payments authorized by the member by the Termination Pay Authorization for the Purchase of Service Credit form;
    - f. If the member elects to purchase with termination pay only a portion of the service credit that the member is entitled to purchase, the member may be eligible to use other forms of payment to purchase additional service credit. However, using other forms of payment to purchase additional service credit does not alter, amend, or revoke the terms of the Termination Pay Authorization for the Purchase of Service Credit form;
    - g. It is the member's responsibility to ensure that the member's employer properly deducts termination pay, as provided the Termination Pay Authorization for the Purchase of Service Credit form; and
    - h. The amount of termination pay the member is allowed to apply to purchase service credit is subject to federal laws.
  - E. In addition to the other time limitations in this Section, to apply termination pay to a service purchase the eligible member shall complete; and sign the Termination Pay Authorization for the Purchase of Service Credit form, and the ASRS shall receive the Termination Pay Authorization for the Purchase of Service Credit form at least three full calendar months before the member retires or ~~separates from service~~ terminates employment.
  - F. The ASRS shall not apply a termination pay distribution to a service credit purchase covered by an irrevocable payroll deduction authorization in effect at the time of termination unless the eligible member signed a Termination Pay Addendum to the Irrevocable Payroll Deduction Authorization specified in R2-8-513(D) at the time the member signed the Irrevocable Payroll Deduction Authorization.
  - G. If a member elects to use all of the member's available termination pay to purchase service credit, ASRS shall not apply any other form of payment to the service credit purchase until the ASRS receives the termination pay.
- R2-8-520. ~~Separation from Termination of Employment and Request Return of Retirement Contributions or~~ Death of Member While Purchasing Service Credit by an Irrevocable Payroll Deduction Authorization**
- A. If a member ~~separates from~~ terminates employment without transferring as specified in R2-8-513.01 while purchasing service credit by an irrevocable payroll deduction authorization and requests return of retirement contributions, the ASRS shall return any payments made for the purchase of service credit including interest earned on those payments as determined by the Board.
  - B. If a member dies while purchasing service credit, the ASRS shall credit the member's account with:
    1. The service credit for which the ASRS received payment before the member's death,
    2. Interest earned on payment at the valuation rate established by the Board through the date of distribution, and
    3. All service purchase payments.
  - C. If a member dies while purchasing service credit, the survivor cannot purchase the remaining balance.
- € **D.** The ASRS shall not refund interest charged as part of an irrevocable payroll deduction authorization as specified in R2-8-513(E)(1).

NOTICE OF PROPOSED RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 7. DEPARTMENT OF ENVIRONMENTAL QUALITY  
REMEDIAL ACTION

[R06-313]

PREAMBLE

**1. Sections Affected**

**Rulemaking Action**

R18-7-201	Amend
R18-7-202	Amend
R18-7-203	Amend
R18-7-204	Amend
R18-7-205	Amend
R18-7-206	Amend
R18-7-207	Renumber
R18-7-207	New Section
R18-7-208	Repeal
R18-7-208	Renumber
R18-7-208	New Section
R18-7-209	Renumber
R18-7-209	Amend
R18-7-210	Renumber
R18-7-210	Amend
Appendix A	Renumber
Appendix A	New Appendix
Appendix B	Repeal
Appendix B	Renumber
Appendix B	Amend
Appendix C	Repeal

**2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rules are implementing (specific):**

Authorizing statutes: A.R.S. §§ 49-104(B)(4), 49-104(B)(16), 49-152, and Laws 1996, Ch. 151, § 9

Implementing statutes: A.R.S. §§ 49-151, 49-152

**3. A list of all previous notices appearing in the Register addressing the proposed rule:**

Notice of Rulemaking Docket Opening: 12 A.A.R. 3196, September 1, 2006

**4. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:**

Name: Philip McNeely  
Tank Programs Division  
Telephone: (602) 771-7645 or (800) 234-5677, enter 771-7645 (Arizona only)  
E-mail: McNeely.Philip@azdeq.gov

Name: Amanda Stone  
Waste Programs Division  
Telephone: (602) 771-4567; or (800) 234-5677, enter 771-4567 (Arizona only)  
E-mail: Stone.Amanda@azdeq.gov

Fax: (602) 771-2302  
TTD: (602) 771-4829  
Address: Arizona Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007

**5. An explanation of the rule, including the agency's reasons for initiating the rule:**

Summary of the Rule

ADEQ is proposing rules that will update and revise Chapter 7, Article 2, last amended on December 4, 1997, to be consistent with current scientific data and statute. Changes in the rule will: 1) revise and update the existing predetermined Soil Remediation Levels (SRL); 2) replace the Voluntary Environmental Mitigation Use Restriction (VEMUR) requirement with the Declaration of Environmental Use Restriction (DEUR) requirements consistent with A.R.S. § 49-152; 3) expand the determination of compliance with SRLs to include the use of soil gas analyses; 4) revise language regarding the letter of completion to add alternative closure documents consistent with current statute; and 5) require the use of  $1 \times 10^{-6}$  excess lifetime cancer risk level for remediation at sites if the current or currently intended future use is a school or child care facility where children are reasonably expected to be in frequent and repeated contact with the soil.

Overview of the Rule

Introduction. Article 2, Chapter 7 provides the basis for conducting remediation of soil in accordance with A.R.S. §§ 49-151 and 152, A.R.S. § 33-434.01, and other applicable environmental statutes. The last amendment of the rule established predetermined SRLs to protect human health and the environment which were consistent with the methodology used by U.S. EPA and Region 9 EPA guidance for calculation of risk-based screening levels, but deviated from the soil saturation calculation method by allowing an additional one percent saturation of the organic chemical in volumetric soil pore space (see Preamble of December 4, 1997 amendment of Article 2, Chapter 7). This proposed rule retains the practice of utilizing the most current U.S. EPA Region 9 risk assessment practices and methodologies [see "User's Guide and Background Technical Document for U.S. EPA Region 9's Preliminary Remediation Goals (PRG) Table," October 2004, available from <http://www.epa.gov/region09/waste/sfund/prg/index.html>], and updates toxicity data as determined by U.S. EPA and other sources (see OSWER Directive 9285.7-53, December 5, 2004). This section describes how the proposed SRLs have changed as a result of current EPA methodology and data. Any changes from U.S. EPA Region 9 methodology and/or the current soil rule amendment are noted in this section, with rationale provided. Modifications to the proposed rule are also described. Many of these are the result of comments received from the numerous stakeholder meetings held in 2004 and 2005. Stakeholders included members of the business community, the interested public, and regulators, many of whom were involved in the original 1997 rulemaking, and included discussion of administrative and technical issues.

Overall, the proposed predetermined SRLs have been modified with regard to two basic aspects, which are consistent with Region 9 and U.S. EPA. First, during the period since the last rule amendment, toxicity data have been determined to be inappropriate for use, have been newly established, or have been revised based on additional studies conducted. Secondly, the equations for calculating the SRL have been revised to include: greater skin surface contact area with contaminated soils for resident adults and children; less skin surface contact area with contaminated soils for workers; elimination of skin absorption for inorganic chemicals and volatile organic chemicals (semi-volatile organic chemicals remain unchanged); and decreased adherence of soil to the skin of resident adults. ADEQ has elected to deviate from EPA only in the soil ingestion rate for resident adults. EPA based their soil ingestion rate of 100 milligrams per kilogram (mg/kg) on an adult outdoor exposure scenario. ADEQ chose the ingestion rate of 50 mg/kg because this rate is based on an adult indoor exposure scenario, which is more accurate for adults in residential settings.

The proposed predetermined SRLs have been calculated using updated toxicity information as recommended by EPA. In December 2004, EPA established a hierarchy of toxicity data to be used from various available sources. The following hierarchy of sources is recommended in evaluating chemical toxicity for Superfund sites: 1) Integrated Risk Information System (IRIS) and cited references; 2) Provisional Peer Reviewed Toxicity Values (PPRTV) and cited references developed for the EPA OSWER Office of Superfund Remediation and Technology Innovation (OSRTI) programs; and 3) Other toxicity values which include California Environmental Protection Agency (Cal EPA), the Agency for Toxic Substances and Disease Registry (ATSDR) published Minimum Risk Levels (MRLs) for noncancer effects only, the EPA Superfund Health Effects Assessment Summary Tables (HEAST) database and cited references and others as appropriate. All of the studies cited in these toxicity databases have been subjected to scientific peer-review prior to publication. These toxicity databases undergo periodic updates that result in data that is withdrawn or modified. Data withdrawn from a toxicity source are not adequate for use in calculations of SRLs.

The proposed predetermined SRLs remain consistent with existing SRL methodology for determining saturation ceiling limits (100 percent) for chemicals that are not volatile organics, though this deviates from Region 9 EPA application of a saturation ceiling of 10 percent for these chemicals. ADEQ has retained the 100% saturation ceiling for these chemicals when the risk-based standard exceeds a concentration that represents "pure product." For volatile organic chemicals, however, the proposed SRLs have been revised to be consistent with Region 9 and U.S. EPA methodology for determination of saturation. This is revised from the previous SRL determination for saturation which provided for an additional one percent saturation of the chemical in soil.

The definitions for soil and soil remediation level have been revised (R18-7-201), and the provision of R18-7-203(C) has been added to allow the use of soil vapor in calculating the concentration of volatile chemicals in soil. These revisions will keep the proposed rule consistent with the advances in technology and modeling which EPA utilizes in determining site-specific and risk-based cleanup levels. The proposed rule allows the use of soil properties and the

vapor state of chemicals in soil for resolving difficult and complex contamination issues, such as subsurface plume distribution and verification of remediation goals.

The proposed predetermined SRLs have been modified to include additional consideration for cleanup of contaminants that are carcinogenic at schools and child care facilities where children are reasonably expected to be in frequent and repeated contact with the contaminated soil. Previously, both residential and non-residential SRLs were calculated to achieve the same target risk for any given carcinogenic chemical. This target risk was set at 1 in 1,000,000 (or  $1 \times 10^{-6}$ ) excess lifetime cancer risk level when sufficient evidence supports classification of the chemical as a known human carcinogen (formerly Classification A). All other carcinogens with less adequate weight of evidence (formerly probable B1 or B2, or possible C human carcinogens) were assigned a target risk of 1 in 100,000 (or  $1 \times 10^{-5}$ ). The proposed rule does not change this aspect of target risk, except for those sites where property use is currently or is currently intended to be a child care facility or school. For these sites, the applicable residential SRL is set at the  $1 \times 10^{-6}$  excess lifetime cancer risk level [see proposed R18-7-205 (D) and (E)]. Proposed Appendix A now shows residential SRLs at both excess lifetime cancer risk levels, and the known human carcinogens in bold. For instance, a residential property may cleanup carcinogens present in soil to the SRL noted in the  $1 \times 10^{-5}$  risk column, except if the carcinogen appears in bold in Appendix A at which time the SRL in the  $1 \times 10^{-6}$  risk column must be used for this particular chemical. If conditions at this residential site are such that a child care facility or school is intended for development, regardless of the respective concentrations, all carcinogens must be cleaned up to the SRL listed in the  $1 \times 10^{-6}$  risk column. This change reflects the nationwide initiative undertaken by EPA and the National Academy of Science for protection of children's health. Many of the exposures to chemicals which have been evaluated to be protective of human health have not taken into account that childhood behavior and physiology is vastly different from adults, resulting in higher exposures and heightened toxicological susceptibility to their developing systems. The magnitude of these combined impacts is not well understood. Therefore, the objective of the proposed rule is to establish SRLs that serve as adequate safeguards for children due to exposures from a release of chemicals to the environment of schools and child care facilities.

The agency chose the use of  $1 \times 10^{-6}$  risk level for all carcinogenic chemicals for schools and child care facilities. It should be clarified that the weight of evidence for carcinogenic classification is not related to the robustness of studies available for quantifying toxicity. In fact, it is more appropriate to link the degree of confidence in the quantitative toxicity value to the level of target risk. However, this would be nearly impossible to do for nearly 600 chemicals as it would require a chemical-by-chemical review of the toxicity database. As it stands, when a chemical has adequate human and animal data to support a determination that cancer is known to result from chronic exposures, it is also reasonable to minimize the incidence of this known cancer result by selecting the lower of the two target risks for the SRL. The proposed rule did not change the target health hazard quotient for non-carcinogenic exposure estimations in the 1997 SRLs and it remains at one.

Because U.S. EPA no longer continues the alpha-numeric convention of chemical classification for evidence of carcinogenicity, proposed Appendix A reflects only the status of "carcinogen" and "non-carcinogen" for each chemical. Some chemicals can have both carcinogenic and non-carcinogenic effects. It is the weight of toxicological evidence which determines this. As such, the definitions for carcinogenic and non-carcinogenic chemicals have been proposed in lieu of the "cancer group" definition in order to be consistent with U.S. and Region 9 EPA current practices (see proposed R18-7-201). When a chemical has both carcinogenic and non-carcinogenic characteristics, the lower of the SRLs listed under the non-carcinogenic column and under the appropriate carcinogenic risk column is the applicable cleanup level for that chemical [see proposed R18-7-205(F)].

The proposed rule still authorizes the use and determination of site-specific SRLs. These remain as naturally occurring background levels, and levels determined using a site-specific risk assessment methodology meeting the requirements of the Department and has general consensus within the scientific community. The proposed rule does not change the options for selection of residential and non-residential remediation levels, nor increase the reliance upon site-specific risk assessments to determine alternative remediation levels. For instance, industrial properties are not required to remediate to levels that would be protective of children living on the site. The party conducting the remediation can decide to remediate to the more protective residential standards or the less protective non-residential standards, depending on the property's intended use. However, the property must be remediated to residential standards if the land use at the time remediation is complete is residential.

The proposed rule continues to require the use of institutional or engineering controls when site concentrations exceed residential SRLs but meet non-residential pre-determined SRLs. Also, the rule allows the use of an institutional or engineering control to achieve an alternative site-specific SRL. However, due to A.R.S. §§ 49-152 and 49-158 enacted in 2000, the VEMUR is no longer a valid legal mechanism to administer these controls. This legislation clarified available options for property owners who clean up contaminated property for which the remediation is subject to Department approval. Institutional and engineering controls now require a DEUR to be implemented and maintained for sites meeting these criteria, thus replacing the VEMUR (see proposed R18-7-202).

Regardless of the choice to remediate to the pre-determined or site-specific standards, the conditions required for showing compliance with the selected standard have not changed. As before, any contaminants in the soil remaining after remediation cannot: 1) contaminate or threaten to contaminate groundwater or surface water in excess of water

quality standards; 2) exhibit a hazardous waste characteristic of ignitability, corrosivity or reactivity; or 3) cause or threaten to cause an adverse impact to ecological receptors.

#### Applicability and Transition to New Standards

Neither the existing rule nor the proposed amendment requires soil remediation; they only provide standards which must be met in order to successfully complete remediation under Title 49. The requirement to perform soil remediation is found in the specific Title 49 statutes (e.g., the Water Quality Assurance Revolving Fund (WQARF) Program; the Underground Storage Tank (UST) Program; the Hazardous Waste Management Program; the Solid Waste Management Program; the Special Waste Management Program; the Aquifer Protection Permit Program. Additionally, the remediation standards apply to parties who voluntarily conduct soil remediation for the Greenfields Pilot Program and the Voluntary Remediation Program. The appropriate regulatory program, not the soil remediation rule, determines which contaminants require remediation. Once the contaminant has been identified, the soil remediation rule establishes the remediation level for the contaminant.

There are two categories of persons who undertake remediation activities. The first category includes persons who have a legal duty to remediate under the Department's statutory authority (Title 49). Persons required to remediate contaminated soils under Title 49 authorities may be eligible to conduct their remediation under one of the Department's voluntary program, unless the actions are required pursuant to an enforcement action, or other limiting factors identified in § 49-172.

The second category includes those who voluntarily conduct remediation. The Department recognizes that it has no regulatory authority over a person who is either remediating a site which has been contaminated by means not regulated under Title 49, or a person who is not legally responsible for remediating the contamination under Title 49. A person in this category is a "volunteer." Even though there is no legal obligation to remediate, a person may request a letter from the Department indicating that the property has met the soil remediation standards. If these persons perform soil remediation activities under the Department's voluntary program, the requirements of this Article must be met.

The Department is aware of many instances where a person who is not a responsible party decides to conduct remediation outside the Department's jurisdiction. If a person is outside the Department's regulatory jurisdiction and no closure document from the Department is requested, remediation may be conducted without the Department's involvement or knowledge. In such a case, the soil remediation rule can be used as guidance.

This proposed amendment would end the applicability of the SRLs as published under the December 4, 1997 amendment after three years, and end applicability of the HBGLs (Health-based Guidance Levels) promulgated under the March 1996 Interim Emergency Soil Rule, immediately. Characterized sites which have initiated remediation or a risk assessment before the effective date of the proposed rule would have three years to meet the current 1997 SRLs, and the closure requirements of the applicable program. Appendix A of the current soil rule contains the 1997 SRLs and is reproduced in the proposed rule as Appendix B. Proposed Appendix B has only been revised by technical correction of certain Chemical Abstract System (CAS) numbers. The proposed SRLs (listed as Appendix A of this proposed amendment) would apply to all sites not conducting remediation or a risk assessment at the time the rule becomes effective (see proposed R18-7-202). The soil cleanup levels do not extend to activities conducted pursuant to orders or other binding agreements that identify a cleanup standard entered into before the effective date of the rule. These orders and agreements are listed in the proposed rule, and been expanded from the original rule.

#### Specific Detailed Discussion of Proposed Rule Changes

**Chemicals Renamed.** For ease of identifying a chemical with related compounds and of recognition with the more commonly used names for chemicals, the following contaminants listed in the current rule are retained in the proposed SRL list under other names as noted: ethyl chloride is listed under the more commonly recognized name, chloroethane; hydrogen cyanide is listed under "cyanide, hydrogen" for ease of comparison to "cyanide, free"; chloral (CAS # 302-17-0) is present in the current SRL list but absent from the PRG list. Because the IRIS database specifically contains non-carcinogenic oral toxicity information for this compound under chloral hydrate, and there is suggestive evidence of human carcinogenicity when oral exposures occur, this chemical is retained in the proposed SRLs as chloral hydrate, rather than the anhydrous form currently listed; the 1,1- and 1,2- isomers of dimethyl hydrazine are listed under "hydrazine, dimethyl" due to indiscernible segregate toxicities, and methyl hydrazine is listed as "hydrazine, monomethyl" for comparative purposes to the dimethyl form.

**Chemicals Revised Due to Consolidation of Similar Salts or Isomers.** Certain chemicals have their toxicity associated with the form which is available upon exposure to an individual. In the environment, these chemicals may be present as one or more very similar parent compounds with slight variations. An example of this is the variety of chemical forms for cyanides. The current SRLs include nine elemental forms of cyanide that would be consolidated by this proposed rule to a single proposed free cyanide SRL. This change is more practical as it is consistent with the reportable results provided by the laboratory method. The following SRLs are affected as follows: antimony and compounds is proposed to replace the pentoxide, potassium tartrate, tetroxide, and trioxide forms of antimony; free cyanide is proposed to replace the barium, calcium, chlorine, copper, potassium, potassium silver, silver, sodium, and zinc elemental forms of cyanide; thallium and compounds replace the oxide, acetate, carbonate, chloride, nitrate, selenite, and sulfate forms of thallium; and vanadium and compounds replaces vanadium pentoxide and sulfate.

PCBs. In order to be consistent with the latest toxicity studies, the proposed SRLs include PCBs under two categorical groups, for low-risk and for high-risk unspicated mixtures. Previously, PCBs were lumped under a single SRL, and assigned a single toxicity, for all varieties of PCB mixtures, typically referred to as Aroclors. An example of an unspicated, low-risk mixture is Aroclor 1016. Low-risk mixtures are those PCB formulations with low percentage chlorine content, and little to no polychlorinated dibenzofurans. High-risk mixtures are those PCB formulations with high percentage chlorine content, and the presence of polychlorinated dibenzofurans. For releases of multiple Aroclors, or PCBs of varying age subjected to weathering, speciation is an option for evaluating an alternative SRL.

Chemicals Not Listed Due to Impacts Limited to Air and/or Groundwater. ADEQ has determined that ammonia, hydrogen chloride, nitrate, and nitrite, which have a 1997 SRL, do not warrant listing in the soil rule or do not warrant the determination of a single numeric soil cleanup value because they do not pose a significant health risk in soil. For example ammonia is listed in the current 1997 SRLs, but only listed in Region 9 PRGs for ambient air concentrations. Ammonia is highly transient in soil, as it rapidly volatilizes into air in surficial soils, and quickly oxidizes to nitrite and nitrate. Accordingly, ammonia is not listed as a chemical in the proposed rule; however, nitrite and nitrate are regulated under the proposed Section R18-7-207 for groundwater protection. Nitrite and nitrate in water are extremely toxic to newborns and children, and have significant impacts to aquatic organisms, but are a negligible health risk in soil.

Chemicals Deleted Due to Updated Toxicity Information. Since the last rule, toxicity data has been evaluated further or new information made available for some chemicals which do not provide an adequate basis for the quantitation of toxicity and/or the determination of a definitive adverse impact. For these chemicals, the toxicity factors formerly provided have been withdrawn from sources which are currently relied upon for toxicity determination, per U.S. EPA guidance. As a result, retaining these chemicals in the SRLs is not supportable. The following SRLs are no longer listed in Appendix A: acetophenone, acifluorfen, 1,2-dichloroethylene mixture, methyl chlorocarbonate, cacodylic acid, and nitrapyrin. Only cacodylic acid, also known as dimethyl arsenate, has older toxicity data from NCEA still remaining. However, until the toxicity of organic forms of arsenic has been studied more fully, ADEQ will rely upon the arsenic SRL to address protection of human health.

Chemicals Added Due to New Toxicity Information. Since the last rule, additional toxicity studies have been conducted which warranted their use in the development of a toxicity factor, which is integral to the calculation of SRLs. The following new SRLs have been added to the list in Appendix A: aminodinitrotoluene, bromate, bromobenzene, butyl benzene (n-, sec-, and tert-), cyclohexane, 4,4'-dichlorobenzophenone, 1,3-dichloropropane, dicyclopentadiene, diisononyl phthalate, dimethylphenethylamine, *N,N*-diphenyl-1,4-benzenediamine, diphenyl sulfone, dysprosium, 1,6-hexamethylene diisocyanate, 2-mercaptobenzothiazole, 4,4'-methylenediphenyl diisocyanate, methyl mercaptan, methyl phosphonic acid, 3- and 4- nitroaniline, nitroglycerin, 2-nitropropane, o-nitrotoluene, perchlorate, phenothiazine, o-phenylenediamine, p-phthalic acid, polychlorinated terphenyls, n-propyl benzene, 1,1'-sulfonylbis-(4-chlorobenzene), tetrahydrofuran, thiocyanate, titanium, tributyl phosphate, trimellitic anhydride, 1,2,4- and 1,3,5-trimethyl benzene, triphenylphosphine oxide, tris(2-chloroethyl) phosphate, tris(2-ethylhexyl) phosphate, and uranium.

Petroleum hydrocarbons. The proposed rule has eliminated the SRL listing for petroleum hydrocarbon mixtures, range C<sub>10</sub> – C<sub>32</sub>. In the current rule, diesel No. 2 was used as the standard of toxicity for which all types of petroleum products are applied. This is not appropriate for sites other than diesel releases, and even for a diesel release is technically inaccurate once the release has occurred because the hundreds of chemical compounds which make up diesel are significantly altered throughout their migration in soil. Therefore, the proposed rule does not set a single numeric SRL value for the large spectrum of constituent variability encountered at all petroleum product release sites. Rather, the proposed rule provides for the cleanup of petroleum hydrocarbons by requiring cleanup of all the individual petroleum constituents detected in soil which have a proposed SRL. For example, depending on the type of product released, this may include PAHs, trimethyl benzenes, and MTBE. However, not all of the hundreds of chemical constituents have adequate toxicity data to establish an SRL. The agency believes that an adequate number of these petroleum compounds representing the significant portion of attributable toxicity do have proposed SRLs, and this approach is adequately protective of human health and the environment.

Lead. In the proposed rule, the residential SRL remains unchanged at 400 mg/kg. However, the non-residential SRL has been lowered from 2,000 mg/kg to 800 mg/kg. Consistent with the methodology of the current rule and U.S. EPA, the proposed SRL for lead is determined differently than other SRLs using U.S. EPA biokinetic modeling which estimates the blood lead level resulting from repeated exposures to lead. The Integrated Exposure Uptake Biokinetic (IEUBK) model for childhood exposures is still utilized to determine the appropriate residential SRL, which remains as 400 mg/kg. However, U.S. EPA has issued a version of the biokinetic modeling which more accurately assesses the blood level in adults exposed in the working environment. Using the most recent national census and health survey results of blood levels in adult women in the Adult Lead Model (ALM), the level in soil for non-residential uses of property has been revised from 2,000 mg/kg to 800 mg/kg. This change is based on protecting women of child-bearing age in the work environment, since fetuses and newborns are highly sensitive to the effects of lead. This is particularly important because more evidence indicates that early life exposures, even if discontinued, result in later life manifestations of health impacts such as neurological problems. If a site-specific remediation level is desired, the U.S. EPA biokinetic model may be used in conjunction with the data from the national health survey for both racial/ethnic groups and the southwest regional quadrant of the nation, or the ALM adjusted for DEUR restricted exposure

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groups which do not include pregnant working adults. Alternatively, other biokinetic models may be used for shorter duration or highly variable exposures with supporting high quality site-specific data.

Chromium. Based on the lack of sufficient supporting evidence for total chromium to persist in the environment in the assumed 1:6 ratio of the hexavalent and trivalent forms (though it has been demonstrated to occur as such in the fumes and mists generated in the industrial chromium processing workplace), the current SRL for total chromium is proposed to be deleted. The agency believes that chromium toxicity should be based on the known and published toxicity factors determined for each form, rather than an assumed ratio for total chromium. Therefore, retaining the more technically supportable and protective SRLs for trivalent and hexavalent chromium is proposed.

Iron. Though Region 9 EPA has listed iron in the PRG list and it is ADEQ's goal to be consistent with Region 9 EPA practices, the agency believes that development of an SRL for iron is not warranted at this time. Available studies and information indicates limited toxicity, such that risk-based levels are approximately equivalent to levels of saturation in soil and/or naturally occurring background.

Mercury. ADEQ has limited the SRLs for mercury to those for methyl mercury and "mercury and compounds." The 1997 SRL lists mercury under mercuric chloride, elemental mercury, and methyl mercury. However, because elemental mercury exists as a liquid/vapor state, Region 9 EPA does not include it for soil. To simplify, all inorganic mercury compounds, regardless of solubility in soil/water environments, are listed under the proposed SRL for "mercury and compounds." This does not deviate from the manner in which proposed SRLs for other metals are treated. If conditions at a site indicate that the more insoluble forms of inorganic mercury are present, a simple chemical speciation in conjunction with published bioavailability studies for the species present is adequate for demonstrating the protection of human health.

Manganese. Based on ADEQ's evaluation of the available manganese toxicity information, ADEQ has elected to use the toxicity factor provided by the EPA IRIS database adjusted for intake from other sources such as soil. Region 9 EPA uses an approach that does adjust for intake from other sources, but the adjustment is applied by 2 methodologies. ADEQ applies only 1 adjustment method in accordance with EPA's IRIS recommendations.

Perchlorate. ADEQ has selected the most recently available peer reviewed toxicity factor for use in calculating the SRL. At the time of publication of the October 2004 Region 9 PRGs, toxicity information was available only from EPA's National Center for Exposure Assessment (NCEA) based on a health risk assessment conducted in 2002. Because of the widespread presence of perchlorate, previously unknown due to limits in laboratory method technology, and because of potential developmental impacts to the human fetus and newborns by inhibiting thyroid function, EPA requested the National Academy of Science (NAS) to develop a separate risk assessment for perchlorate. NAS issued this risk assessment in January 2002, and the toxicity factor resulting from the NAS evaluation was adopted by EPA and incorporated into the IRIS database of toxicity. The SRL for perchlorate also applies to perchlorate salts, such as ammonium, lithium, potassium and sodium perchlorates.

Trichloroethylene (TCE). The agency has elected to be moderate by choosing neither the most or least stringent of the published TCE slope factors for use in calculating the SRL. A selection is required because EPA has not finalized the TCE toxicity factors. The toxicity factors available include the withdrawn "old" IRIS EPA value (1989), the lower range "provisional" EPA value (2001), the upper range "provisional" EPA value (2001), and the California EPA value (2002). ADEQ has selected California EPA's toxicity value which is closest to that of the old IRIS value, but not as stringent as either EPA provisional value. The agency has made this determination based on the available science, as well as the necessity of proceeding with a determination as the outcome of the current review process does not guarantee a final EPA value without further studies.

Definitions (R18-7-201). The proposed amendment to this Section would remove the definitions for "Cancer Group," "Greenfields Pilot Program," "Voluntary Environmental Mitigation Use Restriction," "Voluntary Remediation Program," and "WQARF Voluntary Program." The proposed amendment would modify the definitions for "Aquifer Protection Program," "carcinogen," "contaminant," "engineering control," "hazard quotient," "nuisance," "repository," "site-specific human health risk assessment," "soil," "soil remediation level," "solid waste management program," "special waste management program," and "water quality assurance revolving fund." In addition, the proposed amendment would add new definitions for "child care facility," "Declaration of Environmental Use Restriction," "non-carcinogen," and "school." Many of the proposed deletions, modifications and additions are clarifications and corrections. Others are discussed earlier in this preamble.

Closure documents (R18-7-209). The proposed amendments to this Section clarify that in addition to a "Letter of Completion," alternative closure documents provided for by statute or rule can be used to document that the soil standards have been achieved. No further action and LUST closure letters are examples of program-specific closure documents authorized by statute.

Notice of remediation and repository (R18-7-210). The proposed amendment to this Section would clarify that a notice of remediation need not be submitted prior to a remediation that addresses a substantial and immediate endangerment to public health or the environment.



**6. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on or not rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

- a. OSWER Directive 9285.7-53; "Human Health Toxicity Values in Superfund Risk Assessments"; USEPA; December 5, 2003; available from ADEQ and at <http://www.epa.gov/swerrims/riskassessment/pdf/hhmemo.pdf>
- b. "Region 9 Preliminary Remediation Goals (PRG) Table"; USEPA; December 28, 2004; available from ADEQ and at <http://www.epa.gov/region09/waste/sfund/prg/index.html>
- c. "PRG User's Guide and Background Technical Document"; USEPA; October 27, 2004; available from ADEQ and at <http://www.epa.gov/region09/waste/sfund/prg/index.html>
- d. U.S. EPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R-99/005. Office of Solid Waste and Emergency Response, Washington, D.C.; available from ADEQ and EPA.
- e. U.S. EPA. 2001. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, Interim Guidance. Office of Solid Waste and Emergency Response, Washington, D.C.; available from ADEQ and EPA.
- f. U.S. EPA. 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. Office of Solid Waste and Emergency Response, Washington, D.C.; available from ADEQ and EPA.
- g. U.S. EPA. 2002. Blood Lead Concentrations of U.S. Adult Females: Summary Statistics From Phases 1 and 2 of the National Health and Nutrition Evaluation Survey (NHANES III). Office of Solid Waste and Emergency Response, Washington, D.C.; available from ADEQ and EPA.
- h. U.S. EPA. 2003. Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA/540/R-03/001. Office of Solid Waste and Emergency Response, Washington, D.C.; available from ADEQ and EPA.

**7. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable

**8. The preliminary summary of the economic, small business, and consumer impact:**

Costs and Benefits Not Fully Quantifiable. The Department believes that this rule amendment's benefits would outweigh its costs. This EIS is intended to fulfill the legal requirement for the current rulemaking. It is not possible to quantitatively estimate the costs and benefits of this amendment. This EIS qualitatively describes the costs and benefits of the amendment and attempts to weigh their relative value to determine whether the benefits are likely to outweigh the costs.

Effect of the Proposed Amendments.

The proposed rule uses the same formulas used to calculate the current SRLs, and keeps the same allowable risk with one exception. A more stringent risk level is required for remediation of contaminated sites used or currently intended to be used as a school or child care facility where children are likely to be in frequent and repeated contact with the contaminated soil.

The proposed rule updates contaminant SRLs with some contaminant levels increasing, and others decreasing. Approximately 65% of the chemicals have a proposed residential predetermined SRL within 20 percent of its current level, and approximately 75 percent of chemicals have a proposed non-residential predetermined SRL within 20 percent of its current level. Only 4 percent (20 out of 520 chemicals) of the proposed residential predetermined SRLs are an order of magnitude lower than their current level. Some contaminants were deleted and others added to the list. The overall impact on the cost and frequency of cleanup is difficult to estimate.

Data Limitations. The ability to conduct a traditional cost-benefit analysis that quantifies and monetizes the impacts of this rule is rendered difficult, if not impossible, by the fact that there is no such thing as a "typical" remediation site from which to draw inferences about the entire universe of existing remediation sites in Arizona. Contaminated sites are highly variable in size, physical and geological characteristics, contaminants, extent and concentration of contamination, the presence or absence of groundwater contamination, planned land use and many other variables that influence the cost of remediation. The availability of options under the rule makes it difficult to predict the standard a party will choose for a particular site, which also could significantly influence the cost of remediation.

Even the impact of different cleanup methods is difficult to predict. For instance, if the remediation approach selected is to excavate and dispose of contaminated soil, it is the mass of contaminated soil, more than the level of contamination that has the greatest influence on cost. Soil disposal usually is based on the tons of soil disposed.

Rather than employ speculative data that cannot be used meaningfully, the Department argues that the most crucial cost determinant is the cleanup standard that is chosen by the remediating party. Even if we assume that, as a rule, remediation to the more stringent standards will be more costly to achieve, it is difficult to estimate how many sites might be impacted. Many sites have more than one contaminant that exceeds the SRLs. The contaminant for which the SRL is most difficult to achieve is referred to as the "driver." The driver determines the remediation decisions, and the other contaminants are cleaned up incidental to the driver. So, while it might be possible to identify how

many sites were contaminated with a given chemical, it would require detailed case-by-case analysis to determine if a new SRL changes the driver, thereby influencing remediation costs.

In addition, it is impossible to identify how the addition of an SRL for a chemical that does not currently have an SRL might impact cleanup costs. The Department has no standard procedure to track these contaminants.

In implementing this rule, ADEQ does not prescribe a particular cleanup standard for a site, unless the site is currently used for residential, but leaves the choice to the remediating party. The remediating party is given five choices to pursue: pre-determined residential or non-residential; site-specific residential or non-residential (through performing a risk assessment); or background. This allows regulated entities to control remediation decisions, considering remediation cost and other factors. Given the variability of site characteristics and the remediation choices available, it is impossible to predict the remediation costs. In the case of a site that is in residential use at the time of closure, the site must be remediated to a residential standard (predetermined or site specific) or to background.

Finally, it is not possible to quantify the impacts to human health or the environment. This rule is intended to result in better protection of human health and the environment. Basing the cleanup standards on updated information should achieve this end by reducing the uncertainty associated with determining risk, and by providing more scientifically accurate screening levels on which the Department can focus on the sites with the greater potential to adversely affect human health or the environment.

However, while the degree of protection provided is indicated by the risk level, the actual reduction in manifestation of health problems depends upon knowledge of the people exposed, the duration and means of exposure, and the concentration of a contaminant at a site. Further, it is difficult to assign monetary value to many of the benefits of this amendment, such as reduced incidence of disease, reduced liability, improved quality of life, and improved community appearance.

The Department believes this rule meets the requirements of statute and that its benefits outweigh its costs.

#### A.R.S. § 41-1055(B) REQUIREMENTS FOR AN EIS

#### B (2) PERSONS DIRECTLY AFFECTED BY THE RULE

Persons directly affected by the rule are:

1. Parties who remediate contaminated sites under A.R.S. Title 49;
2. Private businesses;
3. Landowners, lenders, and prospective purchasers of remediated sites;
4. State agencies involved in administering cleanup programs;
5. Political subdivisions of the state; and
6. Consumers, taxpayers; and the general public.

#### 1. Parties Remediating Sites Under A.R.S Title 49

Responsible parties are persons or entities required to conduct soil remediation under Arizona law. A volunteer is any person who is not required by state law to remediate contaminated property, but wishes to do so voluntarily. Responsible parties and volunteers can be private citizens, businesses, state agencies or political subdivisions of the state. This may include anyone who owns contaminated property or was responsible for the contamination of the property, or anyone selling, buying or developing contaminated property. Some of the same considerations drive cleanup for volunteers and responsible parties; although, responsible parties may be compelled to cleanup as required by law and may be more concerned with liability associated with property they have contaminated.

As described above, because some SRLs are increasing and some decreasing, some chemicals added to the SRL list and others dropped, and because the link between SRL and cleanup cost varies with site characteristics, it is impossible for the Department to estimate the impact of different SRLs on cleanup cost.

Some standards would increase, and others decrease under this proposed rule. It is impossible to determine how many site cleanups might be “driven” by a chemical whose standard has increased or decreased. For this reason, it is impossible to predict the increase or decrease in risk assessments that might result from this amendment. Risk assessments are one option that a party might choose in developing cleanup levels. This choice is based on business considerations, to minimize remediation costs.

Setting more stringent allowable risk levels for remediating school and child care facility sites would likely increase the costs of, and frequency of, cleanups. However, the number of such sites is expected to be very small. As such, the aggregate cost of this change is expected to be small. Its magnitude is impossible to predict, for the reasons described above.

Using cleanup standards that are based on the most recent scientific knowledge will help reduce liability for damages associated with any contamination that may remain on a site after remediation. The Department cannot predict whether this reduced liability will have a significant economic impact on property value, insurance coverage costs or legal costs.

**2. Private Businesses**

Two types of businesses will be most impacted by this rule: 1) private businesses that are remediating sites under Title 49; and 2) private businesses, such as environmental consulting firms and attorneys, providing remediation services. Private businesses remediating sites under Title 49 will incur the same costs and benefits described in the preceding section. The rule does not affect a remediation party's eligibility to receive reimbursement of remediation costs either from other responsible parties under WQARF or from the State Assurance Fund (SAF).

**3. Landowners, Lenders, and Prospective Purchasers of Remediated Sites**

Landowners, lenders, and prospective purchasers of remediated sites will be directly affected if they are remediating a site under Title 49 as described above. Landowners, lenders, and prospective purchasers may be impacted by reduced liability. Any increase in remediation cost is likely to be added to the purchase price of the property. Selling or purchasing property is a business decision, which the purchaser or seller judges will benefit them economically.

Using cleanup standards based on the most recent scientific knowledge will help reduce liability for damages associated with any contamination that may remain on the site after remediation. The Department cannot predict whether this reduced liability will have a significant economic impact on property value, insurance coverage costs or legal costs.

**4. State Agencies**

The Arizona Department of Environmental Quality is the agency responsible for implementation of this rule. The Arizona Department of Health Services (ADHS) provides consulting services on risk assessments under contract to the Department. Other state agencies will be affected if they remediate sites under Title 49 as described below.

The Department has contracted with ADHS to conduct risk assessments for the Department and to review the risk assessments submitted to Departmental programs. No incremental costs and benefits to ADHS are anticipated. The choice of whether to perform a risk assessment is a business decision, which is judged to economically benefit the remediating party. It is impossible to determine whether responsible parties would choose the risk assessment option more frequently or less frequently as a result of the updated SRLs. Both instances are considered in the cost-benefit analyses below.

The Departmental programs that will implement this rule are: the UST Program; the Solid Waste and Special Waste Management Programs; the Hazardous Waste Management Program; the WQARF Program; the Aquifer Protection Permit Program; the Voluntary Remediation Program; the Greenfields Pilot Program; and any other program under Title 49 that regulates soil remediation. The staff in these programs already oversees current remediation efforts in the state. The Department expects that no new program staff will be hired and no new revenues generated as a result of this rulemaking.

However, there are costs to the Department associated with the rule, in informing the regulated community and training Departmental staff.

There are significant benefits associated with the rule. Because the proposed pre-determined SRLs are based on the best scientific evidence available to date, implementation of this rule will enable the Department to accomplish its mission of protecting public health and the environment more effectively. Risk-based standards, based on the best scientific information currently available, enables the Department to focus its efforts and those of the regulated community on remediating sites posing the greatest risk.

**5. Political Subdivisions of the State**

Political subdivisions will be affected if they remediate or compel remediation of sites under Title 49 as described below. In addition, remediated property will enhance development plans and will add value to the tax base.

Whenever soil contamination is remediated to non-residential standards, or an institutional or engineering control is used to meet cleanup standards, the property owner is required to file a DEUR with the relevant County Recorder's Office. County Recorder Offices throughout the state record DEURs. A nominal filing fee, determined by the County under its authority, is charged to the landowner. It is impossible to predict whether the number of DEURs filed will increase or decrease as a result of this proposed rule. In either case, the incremental impacts on County revenue and workload are expected to be small.

**6. Consumers, Taxpayers and the General Public**

Consumers, taxpayers, and the general public may be indirectly impacted by the rule. Any change in the cost of soil remediation resulting from changes to the remediation standards may be passed along to consumers of products produced by companies that are responsible parties or volunteers. Also there may be an incremental increase in overall property costs, but this is expected to be a minor factor when compared to inflation and other real estate market trends.

Taxes will not increase as a result of this amendment. Everyone benefits from using updated risk-based soil remediation standards based on recent scientific knowledge. The proposed SRLs would help ensure protection of human health and the environment and prioritize cleanups. It is difficult to assign a dollar value to such health, environmental and public policy benefits.

**B(3) COST-BENEFIT ANALYSIS**

**COSTS TO THE IMPLEMENTING AGENCY** – One-time costs to the Department for this amendment include the cost of the rulemaking process and the cost of informing staff and stakeholders about the amendment. The Department does not track the time spent on individual rulemakings. The Department estimates that the cost for staff time to promulgate a typical rule could range from \$4,001 to \$15,672. This range does not include non-staff costs such as copies, supplies, postage, transportation to meetings, or phone calls, nor does it include non-Department costs, such as the costs to the Governor’s Regulatory Review Council and the Secretary of State. A typical rule is non-controversial, of average complexity, and follows the standard rulemaking process. This rulemaking is more controversial and complex than a typical rulemaking, and as such, is expected to cost the Department more than a typical rulemaking.

After the rulemaking, the Department anticipates additional costs associated with increased questions from the public regarding the SRLs. The Department cannot predict the number of inquiries that may be received, or the staff resources that might be required to answer the questions. Therefore, the Department cannot estimate the potential costs of such inquiries. The Department may use its web site, fact sheets and other outreach tools to inform the public about the amendments as needed.

**BENEFITS TO THE IMPLEMENTING AGENCY** - The Department has no incremental economic benefit as a result of this rule. Non-economic benefits to the Department result because SRLs based on recent scientific information supports the Department’s mission.

**COSTS TO THE ADHS** - The ADHS, under an Inter-agency Service Agreement (ISA), sometimes reviews risk assessments. Whether the proposed rule results in increased or decreased risk assessments, there are no incremental costs to the ADHS as a result of this amendment, because, under the ISA, the Department must reimburse the ADHS at the rate in the ISA, for all risk assessment reviews.

**BENEFITS TO THE ADHS** - There are no incremental economic benefits to the ADHS, because the rate used by the ADHS, as agreed to in the ISA, does not include a profit margin. The ADHS realizes non-economic benefits by fulfilling its mission.

**COSTS TO POLITICAL SUBDIVISIONS** - It is not possible to quantitatively estimate the costs and benefits of this amendment for subdivisions of the state. Costs or savings to political subdivisions will be incurred if those political subdivisions are responsible parties or volunteers, as described above.

**BENEFITS TO POLITICAL SUBDIVISIONS** – Benefits for taxing subdivisions of the state are an expected and intended result of this amendment. Benefits are likely to include public health benefits, reduced liability and reduced legal costs. The Department cannot predict the magnitude or value of these benefits.

**COSTS TO PARTIES REMEDIATING SITES UNDER TITLE 49** - The economic benefits of this rulemaking may outweigh the costs for some sites, but for others, the costs may exceed the benefits. Many variables could impact this balance, including the property’s characteristics, location, and proposed use and the business acumen of the developer. Projecting the costs and benefits for even one cleanup is very difficult, because many of these features are beyond the Department’s control and ability to predict. Projecting the aggregate costs and benefits of incremental impacts on future cleanups is impracticable.

**BENEFITS TO PARTIES REMEDIATING SITES UNDER TITLE 49** – The Department believes that, in the aggregate, benefits of this amendment outweigh the costs. Cleaning up contaminated sites is typically very expensive, several millions of dollars in some cases. The cost of developing property is likewise relatively expensive. The incremental increases in costs associated with the more restrictive SRLs in this amendment are expected to be small when compared to the overall project budget.

One major benefit of a cleanup that meets the SRLs is the reduced liability for future pollution claims. Benefits might also include increased property market value.

**IMPACTS ON PUBLIC AND PRIVATE EMPLOYMENT**

No incremental changes in public or private employment are foreseen as a result of this rule. The proposed rule itself will not create new jobs or destroy existing ones. Existing Department staff will continue to review and oversee site remediations; therefore, no new public sector employment positions are anticipated as a direct result of this amendment. If the number of risk assessments or DEURs changes as a result of the rule, some consulting companies may adjust their staffing levels. Such changes are difficult to estimate.

Any new jobs created by businesses that may be established, expanded or relocated will be the result of private business decisions. Aside from the employment benefits, other benefits in the form of income taxes paid by the employees, property taxes, sales, and unemployment and other taxes to be paid by the employer will accrue to various levels of government.

**IMPACTS ON SMALL BUSINESSES**

**SMALL BUSINESSES SUBJECT TO THE RULE** -- Some of the responsible parties and volunteers could be small business owners. The statute provides no basis for requiring cleanup to a certain level for some parties, and a different

level for others. Because of this, the Department has not tried to isolate the impact on small businesses or to determine the number of responsible parties or volunteers that might be small businesses.

Some of the lenders, landowners and prospective purchasers could be small business owners. Likewise, some of the consulting firms could be small business owners. The Department believes these businesses would be impacted in the same way as large businesses, and that there would be no disproportionate impact on small businesses. The Department could find no rationale or generate any alternatives for reducing impact on small businesses.

The Department does not expect the incremental changes in cleanup costs due to the changes in the SRLs will be a determining factor in the decision of whether to develop or purchase a site. In general, if a business (small or otherwise) can afford to remediate a contaminated site, it can afford the incremental increase in costs that may occur as a result of this proposed rule.

**ADMINISTRATIVE COSTS TO SMALL BUSINESSES** -- There are no new administrative costs to small and other businesses imposed by this amendment. There are minimal administrative costs to any business subject to this rule, including small business. The administrative costs associated with remediating a contaminated site are not expected to change as a result of this amendment.

**REDUCTION OF IMPACT ON SMALL BUSINESSES** – A.R.S. § 41-1035 requires the Department to reduce the impact of a rule on the class of small businesses, if possible.

The Department has determined that the statutes require the rule to apply to all entities performing remediation whether or not they are small businesses because cleanup levels are set based on adverse health effects from contamination regardless of the size of the responsible party. The Department exercised its discretion to reduce adverse impacts to all businesses, including small businesses by allowing the remediating party the option of selecting a pre-determined standard, a site specific standard, or a background level.

The authorizing statute for this amendment does not provide a basis for promulgating a SRL for small businesses that is different from other entities. The statutory objectives, which are the basis of the rule, require the Department to establish cleanup standards that are protective of human health and the environment. The Department also is required to establish these standards based on the differing potential for occupants of the land to be exposed to contaminated soil at two types of property, residential and non-residential.

The Department is proposing requirements in the rule that are no greater than those identified in the statute.

Individual businesses, including small businesses, may experience differing costs when complying with the rule. These differing costs will result from site-specific remediation characteristics (e.g., type of contaminant, land use). The rule allows all entities, including small businesses, to determine for themselves which standard and which method identified in the rule is the most cost effective to best meet their needs, and requirements given the site-specific remediation characteristics.

#### **COSTS AND BENEFITS TO PRIVATE PERSONS**

It is not possible to quantitatively estimate the costs and benefits of this amendment for the general public. This EIS qualitatively describes the costs and benefits to the general public, and attempts to weigh their relative value to determine whether the benefits are likely to outweigh the costs. The costs of remediation borne by responsible parties and volunteers will usually be passed on to their customers and consumers in general. On the other hand, the potential benefits to consumers are evident. Protective remediation, as is promoted by this rule, carries many public health benefits to people who live and work in the vicinity of contaminated sites. The health risks to exposed populations would be expected to diminish. The integrity of the environment would be maintained and, as such, the economic values of real properties, including those of adjacent property owners and homeowners, would be supported or restored.

#### **PROBABLE EFFECTS ON STATE REVENUES**

No new state revenues are projected. The proposed amendment is anticipated to have no effect on state revenues. Most, if not all, of the cash flow for remediation will occur between responsible parties and volunteers and remediation consulting companies. In the case of ADHS, revenue received for risk assessment services will merely reimburse the agency for costs incurred. No new net revenues are anticipated.

#### **LESS INTRUSIVE OR LESS COSTLY ALTERNATIVES**

No less intrusive or less costly alternatives were authorized by the legislature or contemplated by the Department. The SRL standards are based on principles accepted by the scientific community and EPA. Under the applicable statutory objectives discussed in this preamble and elsewhere, uniform standards must apply to all entities, whether they are public or private, small or large businesses. The question of costs revolves around contamination in site-specific cases, and what it costs to remediate the contamination. The Department has provided alternatives for selecting remediation standards. This flexibility allows parties to choose the option that is most appropriate and cost effective for their individual purposes.

Notices of Proposed Rulemaking

**9. The name and address of agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:**

Name: Philip McNeely  
Tank Programs Division  
Telephone: (602) 771-7645 or (800) 234-5677, enter 771-7645 (Arizona only)  
E-mail: McNeely.Philip@azdeq.gov

Name: Amanda Stone  
Waste Programs Division  
Telephone: (602) 771-4567; or (800) 234-5677, enter 771-4567 (Arizona only)  
E-mail: Stone.Amanda@azdeq.gov

Fax: (602) 771-2302  
TTD: (602) 771-4829  
Address: Arizona Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007

**10. The time, place, and nature of the proceedings for the making, amendment, or repeal of the rule, or if no proceeding is scheduled, where, when, and how persons may request an oral proceeding on the proposed rule:**

Date: October 11, 2006  
Time: 1:30 p.m.  
Location: Arizona Dept. of Administration  
100 N. 15th Ave., Room 300  
Phoenix, AZ 85007

Date: October 12, 2006  
Time: 1:30 p.m.  
Location: Arizona Department of Environmental Quality  
400 W. Congress, Room 444  
Tucson, AZ 85701

Nature: Public hearings on the proposed rules, with opportunity for formal comments on the record. Please call (602) 771-4795 for special accommodations pursuant to the Americans with Disabilities Act.

The close of the written comment period will be at 5:00 p.m., October 13, 2006. Submit comments to one of the individuals identified in item #4 of this proposed rule.

**11. Any other matters prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules:**

Not applicable

**12. Incorporations by reference and their location in the rules:**

<u>Incorporated Material</u>	<u>Location</u>
“Guidelines for Cancer Risk Assessment”	R18-7-201

**13. The full text of the rules follows:**

**TITLE 18. ENVIRONMENTAL QUALITY**

**CHAPTER 7. DEPARTMENT OF ENVIRONMENTAL QUALITY  
REMEDIAL ACTION**

**ARTICLE 2. SOIL REMEDIATION STANDARDS**

Section

- R18-7-201. Definitions  
R18-7-202. Applicability  
R18-7-203. Remediation Standards  
R18-7-204. Background Remediation Standards  
R18-7-205. Pre-Determined Remediation Standards  
R18-7-206. Site-Specific Remediation Standards  
~~R18-7-207. Site-specific Remediation Standards for Nitrates and Nitrites~~  
~~R18-7-207. R18-7-208. Voluntary Environmental Mitigation Use Restriction (VEMUR) Declaration of Environmental Use Restriction (DEUR)~~  
~~R18-7-208. R18-7-209. Letter of Completion or Alternative Closure Document~~  
~~R18-7-209. R18-7-210. Notice of Remediation and Repository~~  
Appendix A. 2006 Soil Remediation Levels (SRLs)  
Appendix A. ~~B. 1997 Soil Remediation Levels (SRLs)~~  
Appendix B. Notice of Voluntary Environmental Mitigation Use Restriction by Owner or Owners Repealed  
Appendix C. Cancellation of Voluntary Environmental Mitigation Use Restriction by Owner or Owners Repealed

**ARTICLE 2. SOIL REMEDIATION STANDARDS**

**R18-7-201. Definitions**

In addition to the definitions provided in A.R.S. §§ 49-151 and 49-152, the following definitions apply in this Article:

1. "Aquifer Protection Permit Program" means the system of requirements prescribed in A.R.S. Title 49, Chapter 2, Article 3 and A.A.C. Title 18, Chapter 9, ~~Article 4~~ Articles 1 through 7.
2. "Background" means a concentration of a naturally occurring contaminant in soils.
3. "Cancer Group" means a category of chemicals listed by a weight of evidence assessment by the United States Environmental Protection Agency to evaluate human carcinogenicity. Based on this evaluation, chemicals are placed in 1 of the following categories: A – known human carcinogen; B1 or B2 – probable human carcinogen; C – possible human carcinogen; D – not classified as to human carcinogenicity; and E – evidence of non-carcinogenicity in humans.
4. ~~3.~~ "Carcinogen" or "carcinogenic" means ~~a contaminant which~~ the potential of a chemical to cause cancer in humans as determined by lines of evidence in accordance with a narrative classification in "Guidelines for Cancer Risk Assessment," EPA/630/P-03/001F, March 2005, (and no future editions) which is incorporated by reference. "Guidelines for Cancer Risk Assessment" is available from ADEQ and at <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=116283>, has a cancer group designation of Class A, B1, B2, or C, but does not include a substance having cancer group designations D or E. The cancer group designation is found in Appendix A to the rule.
4. "Child Care Facility" means any permanent facility on a property or portion of property in which care or supervision is provided for children below the age of 18, unaccompanied by a parent or guardian, for periods of less than 24 hours per day. Child care facility does not include private homes or facilities that care for less than five children.
5. "Contact" means exposure to a contaminant through ingestion, inhalation, or dermal absorption.
6. "Contaminant" means a substance regulated by the programs listed in R18-7-202(A) or R18-7-202(B) and A.R.S. § 49-171(2).
7. "Department" means the Arizona Department of Environmental Quality.
8. "Deterministic Risk Assessment Methodology" means a site-specific human health risk assessment, performed using a specific set of input variables, exposure assumptions, and toxicity criteria, represented by point estimates for each receptor evaluated, which results in a point estimate of risk.
9. "Declaration of Environmental Use Restriction" or "DEUR" means a restrictive covenant as described in A.R.S. § 49-152.
- 9-10. "Ecological Community" means an assemblage of populations of different species within a specified location in

space and time.

- ~~10.~~11. “Ecological Receptor” means a specific ecological community, population, or individual organism, protected by federal or state laws and regulations, or a local population which provides an important natural or economic resource, function, and value.
- ~~11.~~12. “Ecological Risk Assessment” is a scientific evaluation of the probability of an adverse effect to ecological receptors from exposure to specific types and concentrations of contaminants. An ecological risk assessment contains four components: identification of potential contaminants; an exposure assessment; a toxicity assessment; and a risk characterization.
- ~~12.~~13. “Engineering Control” means a remediation method such as a barrier or cap that is used to prevent or minimize exposure to contaminants, and includes technologies that reduce the mobility or migration of contaminants.
- ~~13.~~14. “Excess Lifetime Cancer Risk” means the increased risk of developing cancer above the background cancer occurrence levels due to exposure to contaminants.
- ~~14.~~15. “Exposure” means contact between contaminants and organisms.
- ~~15.~~16. “Exposure Pathway” means the course a contaminant takes from a source to an exposed organism. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, transport/exposure media (that is, air, water) are also included.
- ~~16.~~17. “Exposure Point” means a location of potential contact between a contaminant and an organism.
- ~~17.~~18. “Exposure Route” means the way a contaminant comes into contact with an organism (that is, by ingestion, inhalation, or dermal contact).
- ~~18.~~ “Greenfields Pilot Program” means the system of requirements prescribed in Laws 1997, Ch. 296, § 11.
19. “Groundwater” means water in an aquifer as defined in A.R.S. § 49-201(2).
20. “Hazard Index” means the sum of hazard quotients for multiple substances and/or multiple exposure pathways, or the sum of hazard quotients for chemicals acting by a similar mechanism and/or having the same target organ.
21. “Hazardous Waste Management Program” means the system of requirements prescribed in A.R.S. Title 49, Ch. 5, Article 2 and 18 A.A.C. 8, Article 2.
22. “Hazard Quotient” means the value which quantifies non-carcinogenic risk for ~~± one~~ one chemical for ~~± one~~ one receptor population for ~~± one~~ one exposure pathway over a specified exposure period. The hazard quotient is equal to the ratio of a chemical-specific intake to the reference dose.
23. “Imminent and substantial endangerment to the public health or the environment” has the meaning found in A.R.S. § 49-282.02(C)(1).
24. “Institutional control” means a legal or administrative tool or action taken to reduce the potential for exposure to contaminants.
25. “Letter of Completion” means a Departmental statement which indicates whether the property in question has met the soil remediation standards set forth in this Article.
26. “Migrate” or “Migration” means the movement of contaminants from the point of release, emission, discharge, or spillage: through the soil profile; by volatilization from soil to air and subsequent dispersion to air; and by water, wind, or other mechanisms.
27. “Non-carcinogen” means a chemical that has the potential upon exposure to an individual to cause adverse health effects other than cancer.
- ~~27.~~28. “Non-Residential Site-Specific Remediation Level” means a level of contaminants remaining in soil after remediation which results in a cumulative excess lifetime cancer risk between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$  and a Hazard Index no greater than 1 based on non-residential exposure assumptions.
- ~~28.~~29. “Nuisance” means the activities or conditions which may be subject to A.R.S. §§ 49-141 ~~and 49-104(A)(11).~~
- ~~29.~~30. “Person” means any public or private corporation, company, partnership, firm, association or society of persons, the federal government and any of its departments or agencies, this state or any of its agencies, departments, political subdivisions, counties, towns, municipal corporations, as well as a natural person.
- ~~30.~~31. “Population” means an aggregate of individuals of a species within a specified location in space and time.
- ~~31.~~32. “Probabilistic Risk Assessment Methodology” means a site-specific human health risk assessment, performed using probability distributions of input variables and exposure assumptions which take into account the variability and uncertainty of these values, which results in a range or distribution of possible risk estimates.
- ~~32.~~33. “Reasonable Maximum Exposure” or “RME” means the highest human exposure case that is greater than the average, but is still within the range of possible exposures to humans at a site.
- ~~33.~~34. “Remediate” or “remediation” has the meaning found in A.R.S. § 49-151(~~2~~).
35. “Reference dose” means the toxicity factor expressed as a threshold level in units of (mg/kg-day) at which non-cancer effects are not expected to occur.
- ~~34.~~36. “Repository” means the Department’s database, established under A.R.S. § 49-152(~~D~~) (E), from which the public may view information pertaining to remediation projects ~~for which a Notice of Remediation has been submitted or a Letter of Completion has been issued.~~
- ~~35.~~37. “Residential Site-Specific Remediation Level” means a level of contaminants remaining in the soil after remedia-



tion which results in a cumulative excess lifetime cancer risk between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$  and a Hazard Index no greater than 1 based on residential exposure assumptions.

~~36.38.~~ “Residential Use” has the meaning found in A.R.S. § 49-151(~~3~~).

~~39.~~ “School” means any public or non-public institution under the jurisdiction of the Arizona State Board of Education and established for the purposes of offering instruction to children attending any grade from preschool through grade twelve.

~~37.40.~~ “Site-Specific Human Health Risk Assessment” is a scientific evaluation of the probability of an adverse effect to human health from exposure to specific types and concentrations of contaminants. A site-specific human health risk assessment contains ~~4~~ four components: identification of potential contaminants; an exposure assessment; a toxicity assessment; and a risk characterization.

~~38.41.~~ “Soil” means all earthen materials including moisture and pore space contained within earthen material, located between the land surface and groundwater including sediments and unconsolidated accumulations produced by the physical and chemical disintegration of rocks.

~~39.42.~~ “Soil Remediation Level” or “SRL” means a pre-determined risk-based standard based upon the total contaminant concentration in soil, developed by the Arizona Department of Health Services pursuant to A.R.S. § 49-152(A)(1)(~~a~~) and listed in Appendix A or, as applicable, in Appendix B.

~~40.43.~~ “Solid Waste Management program” means the system of requirements prescribed in A.R.S. Title 49, Ch. 4, ~~Article 4~~ and the rules adopted under those statutes.

~~41.44.~~ “Special Waste Management program” means the system of requirements prescribed in A.R.S. Title 49, Ch. 4, Article 9 and 18 A.A.C. § ~~13~~, Article 3 Articles 13 and 16.

~~42.45.~~ “Underground Storage Tank program” or “UST program” means the system of requirements prescribed in A.R.S. Title 49, Ch. 6, Article 1 and 18 A.A.C. 12.

~~43.~~ “Voluntary Environmental Mitigation Use Restriction” or “VEMUR” means, pursuant to A.R.S. § 49-152(B), a written document, signed by the real property owner and the Department, and recorded with the county recorder on the chain of title for a particular parcel of real property, which indicates that a remediation to a level less protective than residential standards has been completed and, unless subsequently canceled, that the owner agrees to restrict the property to non-residential uses.

~~44.~~ “Voluntary Remediation Program” means the system of requirements prescribed in A.R.S. § 49-104(A)(17).

~~45.46.~~ “Water Quality Assurance Revolving Fund” or “WQARF” means the system of requirements prescribed in A.R.S. Title 49, Ch. 2, Article 5 and 18 A.A.C. ~~7~~, Article 1 16.

~~46.~~ “WQARF Voluntary Program” means the system of requirements prescribed in A.R.S. §§ 49-282.05 and 49-285(B).

#### **R18-7-202. Applicability**

A. This Article applies to a person legally required to conduct soil remediation by any of the following regulatory programs administered by the Department:

1. The Aquifer Protection Permit Program.
2. The Hazardous Waste Management Program.
3. The Solid Waste Management Program.
4. The Special Waste Management Program.
5. The Underground Storage Tank Program.
6. The Water Quality Assurance Revolving Fund.
7. Any other program under A.R.S. Title 49 that regulates soil remediation.

B. This Article also applies to a person who is not legally required to conduct soil remediation, but who chooses to do so under any of the following programs program administered by the Department:

- ~~1. The Greenfields Pilot Program.~~
- ~~2. The Voluntary Remediation Program.~~
- ~~3. The WQARF Voluntary Program.~~

C. The requirements of this Article apply in addition to any specific requirements of the programs described in subsections (A) or (B).

D. This Article is limited to soil remediation.

E. ~~A person who is remediating soil at a site which was characterized before the effective date of this Article shall comply with either the Soil Remediation Standards adopted as an interim rule on March 29, 1996, or the Soil Remediation Standards adopted in this Article. A person who is remediating a site shall comply with the numeric soil remediation standards identified in either Appendix A or Appendix B if both of the following conditions are met:~~

1. The site has been characterized before the effective date of this rule.
2. The site is remediated or a risk assessment has been completed within three years after the effective date of this rule.  
A site is considered characterized when the laboratory analytical results of the soil samples delineating the nature, degree, and extent of soil contamination have been received by the person conducting the remediation. A risk assessment or remediation is considered completed when site closure, that meets the conditions set forth in R18-7-209, has

been requested. If either subsection (1) or subsection (2) is not met, a person who is remediating a site shall comply with the numeric soil remediation standards identified in Appendix A.

- F. Nothing in this Article limits the Department's authority to establish more stringent soil remediation levels in response to:
1. A nuisance.
  2. An imminent and substantial endangerment to the public health or the environment.
- G. This Article does not apply to persons remediating soil to numeric soil remediation levels specified in ~~orders of the Director or orders of any Court that have been entered~~ the following documents and entered into, issued or approved before the effective date of this Article rule:
1. Orders of the Director;
  2. Orders of any Court;
  3. Work agreements approved by the Director pursuant to A.R.S. § 49-282.05;
  4. Closure plans approved by the Director pursuant to R18-8-265;
  5. Post-closure permits approved by the Director pursuant to R18-8-270;
  6. Records of Decision approved by the Director pursuant to R18-16-410;
  7. Records of Decision approved by the Director pursuant to R18-16-413; and
  8. Records of Decision approved by the Director pursuant to 40 CFR 300.430(f)(5).

**R18-7-203. Remediation Standards**

- A. A person subject to this Article shall remediate soil so that any concentration of contaminants remaining in the soil after remediation is less than or equal to ± one of the following:
1. The background remediation standards prescribed in R18-7-204.
  2. The pre-determined remediation standards prescribed in R18-7-205.
  3. The site-specific remediation standards prescribed in R18-7-206.
- B. A person who conducts a soil remediation based on the standards set forth in R18-7-205, ~~or R18-7-206, or R18-7-207~~ shall remediate soil so that any concentration of contaminants remaining in the soil after remediation does not:
1. Cause or threaten to cause a violation of Water Quality Standards prescribed in A.A.C. Title 18, Chapter 11. If the remediation level for a contaminant in the soil is not protective of aquifer water quality and surface water quality, the person shall remediate soil to an alternative soil remediation level that is protective of aquifer water quality and surface water quality.
  2. Exhibit a hazardous waste characteristic of ignitability, corrosivity, or reactivity as defined in A.A.C. R18-8-261(A). If the remediation level for a contaminant in the soil results in leaving soils that exhibit a hazardous waste characteristic other than toxicity, the person shall remediate soil to an alternative soil remediation level such that the soil does not exhibit a hazardous waste characteristic other than toxicity.
  3. Cause or threaten to cause an adverse impact to ecological receptors. If the Department determines that the remediation level for a contaminant in soil may impact ecological receptors based on the existence of ecological receptors and complete exposure pathways, the person shall conduct an ecological risk assessment. If the ecological risk assessment indicates that any concentration of contaminants remaining in the soil after remediation causes or threatens to cause an adverse impact to ecological receptors, the person shall remediate soil to an alternative soil remediation level, derived from the ecological risk assessment, that is protective of ecological receptors.
- C. The Department may estimate total contaminant concentration in soil using soil vapor concentrations.

**R18-7-204. Background Remediation Standards**

- A. A person may elect to remediate to a background concentration for a contaminant.
- B. A person who conducts a remediation to a background concentration for a contaminant shall establish the background concentration using all of the following factors:
1. Site-specific historical information concerning land use.
  2. Site-specific sampling of soils unaffected by a release, but having characteristics similar to those of the soils affected by the release.
  3. ~~A statistical~~ Statistical analysis of ~~the~~ background concentrations using the 95th percentile upper confidence limit.

**R18-7-205. Pre-Determined Remediation Standards**

- A. A person may elect to remediate to the residential or non-residential Soil Remediation Levels (SRLs) set forth in Appendix A. If allowed under R18-7-202(E), a person may also elect to remediate to the residential or non-residential SRLs in Appendix B.
- B. A person who conducts ~~an SRL-based~~ remediation pursuant to this Article shall remediate to the residential SRL on any property where there is residential use at the time remediation is completed.
- C. A pre-determined contaminant standard established by federal law or regulation may be used for polychlorinated biphenyl cleanups regulated pursuant to the Toxic Substances Control Act (TSCA) at 40 CFR 761.120 et seq., however, the Department has no regulatory authority to issue a Letter of Completion in TSCA-regulated cleanups.
- D. A person who elects to utilize a residential or non-residential SRL for the following known human carcinogens shall

remediate to a  $1 \times 10^{-6}$  excess lifetime cancer risk: benzene, benzidine, bis (chloromethyl) ether, chromium VI, diethylstilbestrol, direct black 38, direct blue 6, direct brown 95, nickel subsulfide and vinyl chloride.

- E.** Except as provided below, a person who elects to remediate to a residential SRL, may utilize a  $1 \times 10^{-5}$  excess lifetime cancer risk for any human carcinogen other than a known human carcinogen. If the current or currently intended future use of the contaminated site is a child care facility or school where children below the age of 18 are reasonably expected to be in frequent, repeated contact with the soil, the person conducting remediation shall remediate to a  $1 \times 10^{-6}$  excess lifetime cancer risk.
- F.** For contaminants that exhibit both carcinogenic and non-carcinogenic effects, the numeric standard that is lower shall apply.

**R18-7-206. Site-Specific Remediation Standards**

- A.** A person may elect to remediate to a residential or a non-residential site-specific remediation level derived from a site-specific human health risk assessment.
- B.** A person who conducts a remediation to a residential or a non-residential site-specific remediation level shall use + one of the following site-specific human health risk assessment methodologies:
1. A deterministic methodology. If a deterministic methodology is used, reasonable maximum exposures shall be evaluated for future use scenarios.
  2. A probabilistic methodology. If a probabilistic methodology is used, it shall be no less protective than the 95th percentile upper bound estimate of the distribution.
  3. An alternative methodology commonly accepted in the scientific community. An alternative methodology is considered accepted in the scientific community if it is published in peer-reviewed literature, such as a professional journal or publication of standards of general circulation, and there is general consensus within the scientific community about that the methodology is sound.
- C.** A person who conducts a remediation to a site-specific remediation level shall remediate to the residential site-specific remediation level on any property where there is residential use at the time remediation is completed.
- ~~**D.** With prior approval of the Department, a person may achieve the site-specific remediation levels based on the use of institutional and engineering controls. The approval shall be based, in part, on the demonstration that the institutional and engineering controls will be maintained.~~
- ~~**E.** A person conducting a remediation to a residential or a non-residential site-specific remediation level shall remediate the contaminants in soil to a Hazard Index no greater than 1 ~~to~~ and a cumulative excess lifetime cancer risk between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$  and a Hazard Index of no greater than one taking into account the factors enumerated in this subsection. The person conducting a remediation, and the Department prior to issuing a Letter of Completion, shall select the excess lifetime cancer risk between  $1 \times 10^{-6}$  and  $1 \times 10^{-4}$  based upon the following site-specific factors: The following site-specific factors shall be evaluated when determining the cumulative excess lifetime cancer risk:~~
1. The presence of multiple contaminants.
  2. The existence of multiple pathways of exposure.
  3. The uncertainty of exposure.
  4. The sensitivity of the exposed population.
  5. Other program-related laws and regulations that may apply.

**R18-7-207. Site-specific Remediation Standards for Nitrates and Nitrites**

A person who conducts remediation of nitrates or nitrites shall remediate to a site specific remediation level pursuant to R18-7-203(B)(1), (2) and (3).

~~**R18-7-207. R18-7-208. Voluntary Environmental Mitigation Use Restriction (VEMUR) Declaration of Environmental Use Restriction (DEUR)**~~

- ~~**A.** A person who remediates to the non-residential SRL, or to the non-residential site-specific remediation level shall submit the information listed in R18-7-208(A)(1) through (5) and a VEMUR signed by the real property owner, as set forth in Appendix B, to the applicable Departmental program listed in R18-7-202(A) or R18-7-202(B). The VEMUR shall be formatted in accordance with A.R.S. § 11-480 and any other specific requirements of the County Recorder of the jurisdiction. A property owner who elects to leave contamination on a property that exceeds the applicable residential standard for the property under R18-7-205 or R18-7-206, or elects to use an institutional control or an engineering control to meet the requirements of R18-7-205, R18-7-206 or R18-7-207, shall record a DEUR pursuant to A.R.S. § 49-152 and comply with the related provisions of that statute, and the rules promulgated thereunder.~~
- ~~**B.** The applicable Departmental program listed in R18-7-202(A) or R18-7-202(B) shall evaluate the complete information described in R18-7-207(A) and verify whether the non-residential SRL or the non-residential site-specific remediation level has been achieved. An authorized Departmental representative shall either sign the VEMUR submitted pursuant to subsection (A) of this Section and return the signed VEMUR by certified mail, or request additional information to make the verification.~~
- ~~**C.** A person described in R18-7-207(A) shall record a VEMUR described in R18-7-207(B) with the County Recorder's~~

office where the property is located within 30 calendar days of receipt of the VEMUR signed by the authorized Departmental representative, as evidenced by the return receipt.

- ~~D.~~ A real property owner who remediates to the background concentration of a contaminant, to the residential SRL, or to the residential site specific remediation level and who wishes to cancel a recorded VEMUR shall submit the information required in R18-7-208(A)(1) through (5) and a signed VEMUR Cancellation, as set forth in Appendix C, to the applicable Departmental program listed in R18-7-202(A) or R18-7-202(B). The VEMUR Cancellation shall be formatted in accordance with A.R.S. § 11-480 and any other specific requirements of the County Recorder of the jurisdiction.
- ~~E.~~ The applicable Departmental program listed in R18-7-202(A) or R18-7-202(B) shall evaluate the complete information described in R18-7-207(D) and verify whether the background concentration, the residential SRL, or the residential site specific remediation level has been achieved. An authorized Departmental representative shall either sign the VEMUR Cancellation submitted pursuant to R18-7-207(D) and return the VEMUR Cancellation via certified mail, or request additional information to make the verification.
- ~~F.~~ A person who records a document described in R18-7-207 shall provide a copy of the recorded document to the applicable Departmental program described in R18-7-202(A) or R18-7-202(B) within 30 calendar days of the date of recording.

~~R18-7-208.~~ **R18-7-209. Letter of Completion or Alternative Closure Document**

- A. If a person requests a Letter of Completion or an alternative closure document, a person shall submit, at a minimum, the following information to the applicable Departmental program listed in R18-7-202(A) or described in R18-7-202(B):
  1. A description of the actual activities, techniques, and technologies used to remediate soil at the site, including the legal mechanism in place to ensure that any institutional and engineering controls are maintained.
  2. Documentation that requirements prescribed in R18-7-203(A) and R18-7-203(B)(1) and (2) have been satisfied.
  3. If the Department determines pursuant to R18-7-203(B)(3) that an ecological risk assessment is required, documentation that the requirements prescribed in R18-7-203(B)(3) have been satisfied.
  4. Soil sampling analytical results which are representative of the area which has been remediated, including documentation that the laboratory analysis of samples has been performed by a laboratory licensed by the Arizona Department of Health Services under A.R.S. § 36-495 et seq. and 9 A.A.C. 14, Article 6.
  5. A statement signed by the person conducting the remediation certifying the following: I certify under penalty of law that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.
- ~~B.~~ The applicable Departmental program described in R18-7-202(A) or R18-7-202(B) ~~shall~~ may evaluate the information described in ~~R18-7-208(A)~~ R18-7-209(A), ~~and R18-7-207(F) to verify~~ The Department may request additional information, or if the Department verifies compliance with the soil remediation standards set forth under this Article and closure requirements of the applicable program or programs identified in R18-7-202(A) or described in R18-7-202(B), the Department shall issue a Letter of Completion or request additional information, or an alternative closure document provided for by statute or rule that certifies the soil standards of this rule have been achieved.
- ~~C.~~ The applicable Departmental program ~~listed in~~ described in R18-7-202(A) or R18-7-202(B) may revoke or amend any Letter of Completion or alternative closure document described in R18-7-209(B) if any of the information submitted pursuant to ~~R18-7-208(A) and R18-7-209(A) and R18-7-207(F)~~ is inaccurate or if any condition was unknown to the Department when the Department issued the Letter of Completion or alternative closure document.

~~R18-7-209.~~ **R18-7-210. Notice of Remediation and Repository**

- A. A person conducting soil remediation shall submit a Notice of Remediation to the applicable Departmental program listed in R18-7-202(A) or R18-7-202(B) prior to beginning remediation. A person conducting a soil remediation to address an immediate and substantial endangerment to public health or the environment and during an emergency who has notified the Department in accordance with ~~emergency~~ notification requirements prescribed in A.R.S. § 49-284 is not required to submit a Notice of Remediation prior to beginning remediation. Any person who continues ~~or initiates~~ a soil remediation after the immediate and substantial endangerment has been abated ~~initial emergency response~~ shall submit a Notice of Remediation. A Notice of Remediation shall include all of the following information:
  1. The name and address of the real property owner;
  2. The name and address of the remediating party;
  3. A legal description and street address of the property;
  4. A list of each contaminant to be remediated;
  5. The background concentration, SRL, or site-specific remediation level selected to meet the remediation standards;
  6. A description of the current and post-remediation property use as either residential or non-residential;
  7. The rationale for the selection of residential or non-residential remediation; and
  8. The proposed technologies for remediating the site.
- ~~B.~~ The Department shall ~~establish and~~ maintain a repository available to the public for information regarding sites where soil is remediated. The Repository shall include a listing of sites for which a Notice of Remediation has been submitted or a

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Letter of Completion or alternative closure document has been issued.

1. For sites where a Notice of Remediation has been filed, the Repository shall contain the date the notice was filed and the information submitted as described in R18-7-209(A) R18-7-210(A).
2. For sites where a Letter of Completion or alternative closure document has been issued, the Repository shall contain the following:
  - a. The name and address of the real property owner;
  - b. The name and address of the remediating party.
  - c. A legal description and street address of the property;
  - d. A listing of each contaminant that was remediated;
  - e. The background concentration, SRL, or site-specific remediation level selected to meet the remediation standard;
  - f. A description whether the residential or non-residential standard was achieved;
  - g. A description of any engineering or institutional control used to remediate the site; and
  - h. The date when the Letter of Completion or alternative closure document was issued.
3. The Repository will be available for public review during the Department's normal business hours. A person who wishes to obtain copies of the Repository shall pay a copying fee established by the Department.

**Appendix A. 2006 Soil Remediation Levels (SRLs)**

<u>CONTAMINANT</u>	<u>CASRN</u>	<u>Class</u>	<u>Residential (mg/kg)</u>			<u>Non-residential (mg/kg)</u>
			<u>Carcinogen</u>		<u>Non-carcinogen</u>	
			<u>10<sup>-6</sup> Risk</u>	<u>10<sup>-5</sup> Risk</u>		
<u>Acephate</u>	<u>30560-19-1</u>	<u>ca. nc</u>	<u>63</u>	<u>630</u>	<u>240</u>	<u>2,000</u>
<u>Acetaldehyde</u>	<u>75-07-0</u>	<u>ca. nc</u>	<u>11</u>	<u>110</u>	<u>50</u>	<u>160</u>
<u>Acetochlor</u>	<u>34256-82-1</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Acetone</u>	<u>67-64-1</u>	<u>nc</u>			<u>14,000</u>	<u>54,000</u>
<u>Acetone cyanohydrin</u>	<u>75-86-5</u>	<u>nc</u>			<u>49</u>	<u>490</u>
<u>Acetonitrile</u>	<u>75-05-8</u>	<u>nc</u>			<u>420</u>	<u>1,800</u>
<u>Acrolein</u>	<u>107-02-8</u>	<u>nc</u>			<u>0.10</u>	<u>0.34</u>
<u>Acrylamide</u>	<u>79-06-1</u>	<u>ca. nc</u>	<u>0.12</u>	<u>1.2</u>		<u>3.8</u>
<u>Acrylic acid</u>	<u>79-10-7</u>	<u>nc</u>			<u>29,000</u>	<u>270,000</u>
<u>Acrylonitrile</u>	<u>107-13-1</u>	<u>ca. nc</u>	<u>0.21</u>	<u>2.1</u>		<u>4.9</u>
<u>Alachlor</u>	<u>15972-60-8</u>	<u>ca. nc</u>	<u>6.8</u>	<u>68</u>		<u>210</u>
<u>Alar</u>	<u>1596-84-5</u>	<u>nc</u>			<u>9,200</u>	<u>92,000</u>
<u>Aldicarb</u>	<u>116-06-3</u>	<u>nc</u>			<u>61</u>	<u>620</u>
<u>Aldicarb sulfone</u>	<u>1646-88-4</u>	<u>nc</u>			<u>61</u>	<u>620</u>
<u>Aldrin</u>	<u>309-00-2</u>	<u>ca. nc</u>	<u>0.032</u>	<u>0.32</u>		<u>1.0</u>
<u>Ally</u>	<u>74223-64-6</u>	<u>nc</u>			<u>15,000</u>	<u>150,000</u>
<u>Allyl alcohol</u>	<u>107-18-6</u>	<u>nc</u>			<u>310</u>	<u>3,100</u>
<u>Allyl chloride</u>	<u>107-05-1</u>	<u>nc</u>			<u>18</u>	<u>180</u>
<u>Aluminum</u>	<u>7429-90-5</u>	<u>nc</u>			<u>76,000</u>	<u>920,000</u>
<u>Aluminum phosphide</u>	<u>20859-73-8</u>	<u>nc</u>			<u>31</u>	<u>410</u>
<u>Amdro</u>	<u>67485-29-4</u>	<u>nc</u>			<u>18</u>	<u>180</u>
<u>Ametryn</u>	<u>834-12-8</u>	<u>nc</u>			<u>550</u>	<u>5,500</u>
<u>Aminodinitrotoluene</u>	<u>1321-12-6</u>	<u>nc</u>			<u>12</u>	<u>120</u>
<u>m-Aminophenol</u>	<u>591-27-5</u>	<u>nc</u>			<u>4,300</u>	<u>43,000</u>

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>		<b>Non-residential (mg/kg)</b>	
			<b>Carcinogen</b>			
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
4-Aminopyridine	504-24-5	nc			1.2	12
Amitraz	33089-61-1	nc			150	1,500
Ammonium sulfamate	7773-06-0	nc			12,000	120,000
Aniline	62-53-3	ca, nc	96	960	430	3,000
Antimony and compounds	7440-36-0	nc			31	410
Apollo	74115-24-5	nc			790	8,000
Aramite	140-57-8	ca, nc	22	220		690
<b>Arsenic</b>	7440-38-2	ca, nc	10	10	10	10
Assure	76578-12-6	nc			550	5,500
Asulam	3337-71-1	nc			3,100	31,000
Atrazine	1912-24-9	ca, nc	2.5	25		78
Avermectin B1	71751-41-2	nc			24	250
Azobenzene	103-33-3	ca	5.0	50		160
Barium and compounds	7440-39-3	nc			15,000	170,000
Baygon	114-26-1	nc			240	2,500
Bayleton	43121-43-3	nc			1,800	18,000
Baythroid	68359-37-5	nc			1,500	15,000
Benefin	1861-40-1	nc			18,000	180,000
Benomyl	17804-35-2	nc			3,100	31,000
Bentazon	25057-89-0	nc			1,800	18,000
Benzaldehyde	100-52-7	nc			6,100	62,000
<b>Benzene</b>	71-43-2	ca, nc	0.65	NA		1.4
<b>Benzidine</b>	92-87-5	ca, nc	0.0024	NA		0.0075
Benzoic acid	65-85-0	nc			240,000	1,000,000 **
Benzotrithloride	98-07-7	ca	0.042	0.42		1.3
Benzyl alcohol	100-51-6	nc			18,000	180,000
Benzyl chloride	100-44-7	ca, nc	0.92	9.2		22
Beryllium and compounds	7440-41-7	ca, nc			150	1,900
Bidrin	141-66-2	nc			6.1	62
Biphenthrin (Talstar)	82657-04-3	nc			920	9,200
1,1-Biphenyl	92-52-4	nc			350 *	350 *
Bis(2-chloroethyl)ether	111-44-4	ca	0.23	2.3		5.8
Bis(2-chloroisopropyl)ether	39638-32-9	nc			790 *	790 *
<b>Bis(chloromethyl)ether</b>	542-88-1	ca	0.00020	NA		0.00043
Bis(2-chloro-1-methylethyl)ether	108-60-1	ca, nc	3.0	30		74

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>			<b>Non-residential (mg/kg)</b>
			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
<u>Bis(2-ethylhexyl)phthalate (DEHP)</u>	<u>117-81-7</u>	<u>ca. nc</u>	<u>39</u>	<u>390</u>		<u>1200</u>
<u>Bisphenol A</u>	<u>80-05-7</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>Boron</u>	<u>7440-42-8</u>	<u>nc</u>			<u>16,000</u>	<u>200,000</u>
<u>Bromate</u>	<u>15541-45-4</u>	<u>ca. nc</u>	<u>0.78</u>	<u>7.8</u>		<u>25</u>
<u>Bromobenzene</u>	<u>108-86-1</u>	<u>nc</u>			<u>28</u>	<u>92</u>
<u>Bromodichloromethane</u>	<u>75-27-4</u>	<u>ca. nc</u>	<u>0.83</u>	<u>8.3</u>		<u>18</u>
<u>Bromoform (tribromomethane)</u>	<u>75-25-2</u>	<u>ca. nc</u>	<u>69</u>	<u>690</u>		<u>2,200</u>
<u>Bromomethane (methyl bromide)</u>	<u>74-83-9</u>	<u>nc</u>			<u>3.9</u>	<u>13</u>
<u>Bromophos</u>	<u>2104-96-3</u>	<u>nc</u>			<u>310</u>	<u>3,100</u>
<u>Bromoxynil</u>	<u>1689-84-5</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Bromoxynil octanoate</u>	<u>1689-99-2</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>1,3-Butadiene</u>	<u>106-99-0</u>	<u>ca. nc</u>	<u>0.058</u>	<u>0.58</u>		<u>1.2</u>
<u>1-Butanol</u>	<u>71-36-3</u>	<u>nc</u>			<u>6,100</u>	<u>61,000</u>
<u>Butylate</u>	<u>2008-41-5</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>n-Butylbenzene</u>	<u>104-51-8</u>	<u>nc</u>			<u>240 *</u>	<u>240 *</u>
<u>sec-Butylbenzene</u>	<u>135-98-8</u>	<u>nc</u>			<u>220 *</u>	<u>220 *</u>
<u>tert-Butylbenzene</u>	<u>98-06-6</u>	<u>nc</u>			<u>390 *</u>	<u>390 *</u>
<u>Butyl benzyl phthalate</u>	<u>85-68-7</u>	<u>nc</u>			<u>12,000</u>	<u>120,000</u>
<u>Butylphthalyl butylglycolate</u>	<u>85-70-1</u>	<u>nc</u>			<u>61,000</u>	<u>620,000</u>
<u>Cadmium and compounds</u>	<u>7440-43-9</u>	<u>ca. nc</u>			<u>39</u>	<u>510</u>
<u>Caprolactam</u>	<u>105-60-2</u>	<u>nc</u>			<u>31,000</u>	<u>310,000</u>
<u>Captafol</u>	<u>2425-06-1</u>	<u>ca. nc</u>	<u>64</u>	<u>640</u>	<u>120</u>	<u>1,200</u>
<u>Captan</u>	<u>133-06-2</u>	<u>ca. nc</u>	<u>160</u>	<u>1,600</u>		<u>4,900</u>
<u>Carbaryl</u>	<u>63-25-2</u>	<u>nc</u>			<u>6,100</u>	<u>62,000</u>
<u>Carbazole</u>	<u>86-74-8</u>	<u>ca</u>	<u>27</u>	<u>270</u>		<u>860</u>
<u>Carbofuran</u>	<u>1563-66-2</u>	<u>nc</u>			<u>310</u>	<u>3,100</u>
<u>Carbon disulfide</u>	<u>75-15-0</u>	<u>nc</u>			<u>360</u>	<u>720 *</u>
<u>Carbon tetrachloride</u>	<u>56-23-5</u>	<u>ca. nc</u>	<u>0.25</u>	<u>2.5</u>	<u>2.2</u>	<u>5.5</u>
<u>Carbosulfan</u>	<u>55285-14-8</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Carboxin</u>	<u>5234-68-4</u>	<u>nc</u>			<u>6,100</u>	<u>62,000</u>
<u>Chloral hydrate</u>	<u>302-17-0</u>	<u>nc</u>			<u>6,100</u>	<u>62,000</u>
<u>Chloramben</u>	<u>133-90-4</u>	<u>nc</u>			<u>920</u>	<u>9,200</u>
<u>Chloranil</u>	<u>118-75-2</u>	<u>ca</u>	<u>1.4</u>	<u>14</u>		<u>43</u>
<u>Chlordane</u>	<u>12789-03-6</u>	<u>ca. nc</u>	<u>1.9</u>	<u>19</u>		<u>65</u>
<u>Chlorimuron-ethyl</u>	<u>90982-32-4</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>

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			Carcinogen			
			10 <sup>-6</sup> Risk	10 <sup>-5</sup> Risk		
Chloroacetic acid	79-11-8	nc			120	1,200
2-Chloroacetophenone	532-27-4	nc			0.033	0.11
4-Chloroaniline	106-47-8	nc			240	2,500
Chlorobenzene	108-90-7	nc			150	530
Chlorobenzilate	510-15-6	ca, nc	2.0	20		64
p-Chlorobenzoic acid	74-11-3	nc			12,000	120,000
4-Chlorobenzotrifluoride	98-56-6	nc			1,200	12,000
2-Chloro-1,3-butadiene	126-99-8	nc			3.6	12
1-Chlorobutane	109-69-3	nc			480 *	480 *
1-Chloro-1,1-difluoroethane	75-68-3	nc			340 *	340 *
Chlorodifluoromethane	75-45-6	nc			340 *	340 *
Chloroethane	75-00-3	ca, nc	3.0	30		65
Chloroform	67-66-3	ca, nc	0.94	9.4		20
Chloromethane	74-87-3	nc			48	160
4-Chloro-2-methylaniline	95-69-2	ca	0.94	9.4		30
4-Chloro-2-methylaniline hydrochloride	3165-93-3	ca	1.2	12		37
beta-Chloronaphthalene	91-58-7	nc			110 *	110 *
o-Chloronitrobenzene	88-73-3	ca, nc			1.4	4.5
p-Chloronitrobenzene	100-00-5	ca, nc			10	37
2-Chlorophenol	95-57-8	nc			63	240
2-Chloropropane	75-29-6	nc			170	590
Chlorothalonil	1897-45-6	ca, nc	50	500		1600
o-Chlorotoluene	95-49-8	nc			160	510 *
Chlorpropham	101-21-3	nc			12,000	120,000
Chlorpyrifos	2921-88-2	nc			180	1,800
Chlorpyrifos-methyl	5598-13-0	nc			610	6,200
Chlorsulfuron	64902-72-3	nc			3,100	31,000
Chlorthiophos	60238-56-4	nc			49	490
Chromium III	16065-83-1	nc			120,000	1,000,000 **
<b>Chromium VI</b>	18540-29-9	ca, nc	30	NA		65
Cobalt	7440-48-4	ca, nc	900	9,000	1,400	13,000
Copper and compounds	7440-50-8	nc			3,100	41,000
Crotonaldehyde	123-73-9	ca	0.0053	0.053		0.11
Cumene (isopropylbenzene)	98-82-8	nc			92 *	92 *
Cyanazine	21725-46-2	ca, nc	0.65	6.5		21



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<u>CONTAMINANT</u>	<u>CASRN</u>	<u>Class</u>	<u>Residential (mg/kg)</u>		<u>Non-residential (mg/kg)</u>	
			<u>Carcinogen</u>			
			<u>10<sup>-6</sup> Risk</u>	<u>10<sup>-5</sup> Risk</u>		
<u>Cyanide (free)</u>	<u>57-12-5</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Cyanide (hydrogen)</u>	<u>74-90-8</u>	<u>nc</u>			<u>11</u>	<u>35</u>
<u>Cyanogen</u>	<u>460-19-5</u>	<u>nc</u>			<u>130</u>	<u>430</u>
<u>Cyanogen bromide</u>	<u>506-68-3</u>	<u>nc</u>			<u>290</u>	<u>970</u>
<u>Cyanogen chloride</u>	<u>506-77-4</u>	<u>nc</u>			<u>160</u>	<u>540</u>
<u>Cyclohexane</u>	<u>110-82-7</u>	<u>nc</u>			<u>140 *</u>	<u>140 *</u>
<u>Cyclohexanone</u>	<u>108-94-1</u>	<u>nc</u>			<u>310,000</u>	<u>1,000,000 **</u>
<u>Cyclohexylamine</u>	<u>108-91-8</u>	<u>nc</u>			<u>12,000</u>	<u>120,000</u>
<u>Cyhalothrin/Karate</u>	<u>68085-85-8</u>	<u>nc</u>			<u>310</u>	<u>3,100</u>
<u>Cypermethrin</u>	<u>52315-07-8</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Cyromazine</u>	<u>66215-27-8</u>	<u>nc</u>			<u>460</u>	<u>4,600</u>
<u>Dacthal</u>	<u>1861-32-1</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Dalapon</u>	<u>75-99-0</u>	<u>nc</u>			<u>1,800</u>	<u>18,000</u>
<u>Danitol</u>	<u>39515-41-8</u>	<u>nc</u>			<u>1,500</u>	<u>15,000</u>
<u>DDD</u>	<u>72-54-8</u>	<u>ca</u>	<u>2.8</u>	<u>28</u>		<u>100</u>
<u>DDE</u>	<u>72-55-9</u>	<u>ca</u>	<u>2.0</u>	<u>20</u>		<u>70</u>
<u>DDT</u>	<u>50-29-3</u>	<u>ca, nc</u>	<u>2.0</u>	<u>20</u>		<u>70</u>
<u>Decabromodiphenyl ether</u>	<u>1163-19-5</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Demeton</u>	<u>8065-48-3</u>	<u>nc</u>			<u>2.4</u>	<u>25</u>
<u>Diallate</u>	<u>2303-16-4</u>	<u>ca</u>	<u>9.0</u>	<u>90</u>		<u>280</u>
<u>Diazinon</u>	<u>333-41-5</u>	<u>nc</u>			<u>55</u>	<u>550</u>
<u>Dibenzofuran</u>	<u>132-64-9</u>	<u>nc</u>			<u>140 *</u>	<u>140 *</u>
<u>1,4-Dibromobenzene</u>	<u>106-37-6</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Dibromochloromethane</u>	<u>124-48-1</u>	<u>ca, nc</u>	<u>1.1</u>	<u>11</u>		<u>26</u>
<u>1,2-Dibromo-3-chloropropane</u>	<u>96-12-8</u>	<u>ca, nc</u>	<u>0.53</u>	<u>5.3</u>	<u>1.5</u>	<u>6.5</u>
<u>1,2-Dibromoethane</u>	<u>106-93-4</u>	<u>ca, nc</u>	<u>0.029</u>	<u>0.29</u>		<u>0.63</u>
<u>Dibutyl phthalate</u>	<u>84-74-2</u>	<u>nc</u>			<u>6,100</u>	<u>62,000</u>
<u>Dicamba</u>	<u>1918-00-9</u>	<u>nc</u>			<u>1,800</u>	<u>18,000</u>
<u>1,2-Dichlorobenzene</u>	<u>95-50-1</u>	<u>nc</u>			<u>600 *</u>	<u>600 *</u>
<u>1,3-Dichlorobenzene</u>	<u>541-73-1</u>	<u>nc</u>			<u>530</u>	<u>600 *</u>
<u>1,4-Dichlorobenzene</u>	<u>106-46-7</u>	<u>ca, nc</u>	<u>3.5</u>	<u>35</u>		<u>79</u>
<u>3,3-Dichlorobenzidine</u>	<u>91-94-1</u>	<u>ca</u>	<u>1.2</u>	<u>12</u>		<u>38</u>
<u>4,4'-Dichlorobenzophenone</u>	<u>90-98-2</u>	<u>nc</u>			<u>1,800</u>	<u>18,000</u>
<u>1,4-Dichloro-2-butene</u>	<u>764-41-0</u>	<u>ca</u>	<u>0.0080</u>	<u>0.080</u>		<u>0.18</u>
<u>Dichlorodifluoromethane</u>	<u>75-71-8</u>	<u>nc</u>			<u>94</u>	<u>310</u>

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>			<b>Non-residential (mg/kg)</b>
			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
<u>1,1-Dichloroethane</u>	<u>75-34-3</u>	<u>nc</u>			<u>510</u>	<u>1,700 *</u>
<u>1,2-Dichloroethane (DCA)</u>	<u>107-06-2</u>	<u>ca, nc</u>	<u>0.28</u>	<u>2.8</u>		<u>6.0</u>
<u>1,1-Dichloroethylene (DCE)</u>	<u>75-35-4</u>	<u>nc</u>			<u>120</u>	<u>410</u>
<u>1,2-Dichloroethylene (cis)</u>	<u>156-59-2</u>	<u>nc</u>			<u>43</u>	<u>150</u>
<u>1,2-Dichloroethylene (trans)</u>	<u>156-60-5</u>	<u>nc</u>			<u>69</u>	<u>230</u>
<u>2,4-Dichlorophenol</u>	<u>120-83-2</u>	<u>nc</u>			<u>180</u>	<u>1,800</u>
<u>4-(2,4-Dichlorophenoxy)butyric acid</u>	<u>94-82-6</u>	<u>nc</u>			<u>490</u>	<u>4,900</u>
<u>2,4-Dichlorophenoxyacetic Acid (2,4-D)</u>	<u>94-75-7</u>	<u>nc</u>			<u>690</u>	<u>7,700</u>
<u>1,2-Dichloropropane</u>	<u>78-87-5</u>	<u>ca, nc</u>	<u>0.34</u>	<u>3.4</u>		<u>7.4</u>
<u>1,3-Dichloropropane</u>	<u>142-28-9</u>	<u>nc</u>			<u>100</u>	<u>360</u>
<u>1,3-Dichloropropene</u>	<u>542-75-6</u>	<u>ca, nc</u>	<u>0.79</u>	<u>7.9</u>		<u>18</u>
<u>2,3-Dichloropropanol</u>	<u>616-23-9</u>	<u>nc</u>			<u>180</u>	<u>1,800</u>
<u>Dichlorvos</u>	<u>62-73-7</u>	<u>ca, nc</u>	<u>1.9</u>	<u>19</u>		<u>59</u>
<u>Dicofol</u>	<u>115-32-2</u>	<u>ca</u>	<u>1.2</u>	<u>12</u>		<u>39</u>
<u>Dicyclopentadiene</u>	<u>77-73-6</u>	<u>nc</u>			<u>0.54</u>	<u>1.8</u>
<u>Dieldrin</u>	<u>60-57-1</u>	<u>ca, nc</u>	<u>0.034</u>	<u>0.34</u>		<u>1.1</u>
<u>Diethylene glycol, monobutyl ether</u>	<u>112-34-5</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Diethylene glycol, monomethyl ether</u>	<u>111-90-0</u>	<u>nc</u>			<u>3,700</u>	<u>37,000</u>
<u>Diethylformamide</u>	<u>617-84-5</u>	<u>nc</u>			<u>24</u>	<u>250</u>
<u>Di(2-ethylhexyl)adipate</u>	<u>103-23-1</u>	<u>ca, nc</u>	<u>460</u>	<u>4,600</u>		<u>14,000</u>
<u>Diethyl phthalate</u>	<u>84-66-2</u>	<u>nc</u>			<u>49,000</u>	<u>490,000</u>
<b><u>Diethylstilbestrol</u></b>	<u>56-53-1</u>	<u>ca</u>	<u>0.00012</u>	<u>NA</u>		<u>0.0037</u>
<u>Difenzoquat (Avenge)</u>	<u>43222-48-6</u>	<u>nc</u>			<u>4,900</u>	<u>49,000</u>
<u>Difflubenzuron</u>	<u>35367-38-5</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Diisononyl phthalate</u>	<u>28553-12-0</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Diisopropyl methylphosphonate</u>	<u>1445-75-6</u>	<u>nc</u>			<u>4,900</u>	<u>49,000</u>
<u>Dimethipin</u>	<u>55290-64-7</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Dimethoate</u>	<u>60-51-5</u>	<u>nc</u>			<u>12</u>	<u>120</u>
<u>3,3'-Dimethoxybenzidine</u>	<u>119-90-4</u>	<u>ca</u>	<u>39</u>	<u>390</u>		<u>1,200</u>
<u>Dimethylamine</u>	<u>124-40-3</u>	<u>nc</u>			<u>0.067</u>	<u>0.25</u>
<u>N,N-Dimethylaniline</u>	<u>121-69-7</u>	<u>nc</u>			<u>120</u>	<u>1,200</u>
<u>2,4-Dimethylaniline</u>	<u>95-68-1</u>	<u>ca</u>	<u>0.73</u>	<u>7.3</u>		<u>23</u>
<u>2,4-Dimethylaniline hydrochloride</u>	<u>21436-96-4</u>	<u>ca</u>	<u>0.94</u>	<u>9.4</u>		<u>30</u>
<u>3,3'-Dimethylbenzidine</u>	<u>119-93-7</u>	<u>ca</u>	<u>0.24</u>	<u>2.4</u>		<u>7.5</u>
<u>N,N-Dimethylformamide</u>	<u>68-12-2</u>	<u>nc</u>			<u>6,100</u>	<u>62,000</u>

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			<b>Carcinogen</b>		
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>	
<u>Dimethylphenethylamine</u>	<u>122-09-8</u>	<u>nc</u>			<u>61</u>
<u>2,4-Dimethylphenol</u>	<u>105-67-9</u>	<u>nc</u>			<u>1,200</u>
<u>2,6-Dimethylphenol</u>	<u>576-26-1</u>	<u>nc</u>			<u>37</u>
<u>3,4-Dimethylphenol</u>	<u>95-65-8</u>	<u>nc</u>			<u>61</u>
<u>Dimethyl phthalate</u>	<u>131-11-3</u>	<u>nc</u>			<u>610,000</u>
<u>Dimethyl terephthalate</u>	<u>120-61-6</u>	<u>nc</u>			<u>6,100</u>
<u>4,6-Dinitro-o-cyclohexyl phenol</u>	<u>131-89-5</u>	<u>nc</u>			<u>120</u>
<u>1,2-Dinitrobenzene</u>	<u>528-29-0</u>	<u>nc</u>			<u>6.1</u>
<u>1,3-Dinitrobenzene</u>	<u>99-65-0</u>	<u>nc</u>			<u>6.1</u>
<u>1,4-Dinitrobenzene</u>	<u>100-25-4</u>	<u>nc</u>			<u>6.1</u>
<u>2,4-Dinitrophenol</u>	<u>51-28-5</u>	<u>nc</u>			<u>120</u>
<u>Dinitrotoluene mixture</u>	<u>25321-14-6</u>	<u>ca</u>	<u>0.81</u>	<u>8.1</u>	<u>25</u>
<u>2,4-Dinitrotoluene</u>	<u>121-14-2</u>	<u>nc</u>			<u>120</u>
<u>2,6-Dinitrotoluene</u>	<u>606-20-2</u>	<u>nc</u>			<u>61</u>
<u>Dinoseb</u>	<u>88-85-7</u>	<u>nc</u>			<u>61</u>
<u>di-n-Octyl phthalate</u>	<u>117-84-0</u>	<u>nc</u>			<u>2,400</u>
<u>1,4-Dioxane</u>	<u>123-91-1</u>	<u>ca</u>	<u>50</u>	<u>500</u>	<u>1,600</u>
<u>Dioxin (2,3,7,8-TCDD)</u>	<u>1746-01-6</u>	<u>ca</u>	<u>0.0000045</u>	<u>0.000045</u>	<u>0.00016</u>
<u>Diphenamid</u>	<u>957-51-7</u>	<u>nc</u>			<u>1,800</u>
<u>Diphenylamine</u>	<u>122-39-4</u>	<u>nc</u>			<u>1,500</u>
<u>N,N-Diphenyl-1,4 benzenediamine (DPPD)</u>	<u>74-31-7</u>	<u>nc</u>			<u>18</u>
<u>1,2-Diphenylhydrazine</u>	<u>122-66-7</u>	<u>ca</u>	<u>0.68</u>	<u>6.8</u>	<u>22</u>
<u>Diphenyl sulfone</u>	<u>127-63-9</u>	<u>nc</u>			<u>180</u>
<u>Diquat</u>	<u>85-00-7</u>	<u>nc</u>			<u>130</u>
<b>Direct black 38</b>	<u>1937-37-7</u>	<u>ca</u>	<u>0.064</u>	<u>NA</u>	<u>0.20</u>
<b>Direct blue 6</b>	<u>2602-46-2</u>	<u>ca</u>	<u>0.068</u>	<u>NA</u>	<u>0.21</u>
<b>Direct brown 95</b>	<u>16071-86-6</u>	<u>ca</u>	<u>0.059</u>	<u>NA</u>	<u>0.19</u>
<u>Disulfoton</u>	<u>298-04-4</u>	<u>nc</u>			<u>2.4</u>
<u>1,4-Dithiane</u>	<u>505-29-3</u>	<u>nc</u>			<u>610</u>
<u>Diuron</u>	<u>330-54-1</u>	<u>nc</u>			<u>120</u>
<u>Dodine</u>	<u>2439-10-3</u>	<u>nc</u>			<u>240</u>
<u>Dysprosium</u>	<u>7429-91-6</u>	<u>nc</u>			<u>7,800</u>
<u>Endosulfan</u>	<u>115-29-7</u>	<u>nc</u>			<u>370</u>
<u>Endothall</u>	<u>145-73-3</u>	<u>nc</u>			<u>1,200</u>

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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	<b>Non-residential (mg/kg)</b>
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
Endrin	<u>72-20-8</u>	nc			18	180
Epichlorohydrin	<u>106-89-8</u>	ca, nc			7.6	26
1,2-Epoxybutane	<u>106-88-7</u>	nc			350	3,500
EPTC (S-Ethyl dipropylthiocarbamate)	<u>759-94-4</u>	nc			1,500	15,000
Ethephon (2-chloroethyl phosphonic acid)	<u>16672-87-0</u>	nc			310	3,100
Ethion	<u>563-12-2</u>	nc			31	310
2-Ethoxyethanol	<u>110-80-5</u>	nc			24,000	250,000
2-Ethoxyethanol acetate	<u>111-15-9</u>	nc			18,000	180,000
Ethyl acetate	<u>141-78-6</u>	nc			19,000	37,000 *
Ethyl acrylate	<u>140-88-5</u>	ca	0.21	2.1		4.5
Ethylbenzene	<u>100-41-4</u>	nc			400 *	400 *
Ethyl chloride	<u>75-00-3</u>	ca, nc	3.0	30		65
Ethylene cyanohydrin	<u>109-78-4</u>	nc			18,000	180,000
Ethylene diamine	<u>107-15-3</u>	nc			5,500	55,000
Ethylene glycol	<u>107-21-1</u>	nc			120,000	1,000,000 **
Ethylene glycol, monobutyl ether	<u>111-76-2</u>	nc			31,000	310,000
Ethylene oxide	<u>75-21-8</u>	ca	0.14	1.4		3.4
Ethylene thiourea (ETU)	<u>96-45-7</u>	ca, nc			4.9	49
Ethyl ether	<u>60-29-7</u>	nc			1,800 *	1,800 *
Ethyl methacrylate	<u>97-63-2</u>	nc			140 *	140 *
Ethyl p-nitrophenyl phenylphosphorothioate	<u>2104-64-5</u>	nc			0.61	6.2
Ethylphthalyl ethyl glycolate	<u>84-72-0</u>	nc			180,000	1,000,000 **
Express	<u>101200-48-0</u>	nc			490	4,900
Fenamiphos	<u>22224-92-6</u>	nc			15	150
Fluometuron	<u>2164-17-2</u>	nc			790	8,000
Fluoride	<u>16984-48-8</u>	nc			3,700	37,000
Fluoridone	<u>59756-60-4</u>	nc			4,900	49,000
Flurprimidol	<u>56425-91-3</u>	nc			1,200	12,000
Flutolanil	<u>66332-96-5</u>	nc			3,700	37,000
Fluvalinate	<u>69409-94-5</u>	nc			610	6,200
Folpet	<u>133-07-3</u>	ca, nc	160	1,600		4,900
Fomesafen	<u>72178-02-0</u>	ca	2.9	29		91
Fonofos	<u>944-22-9</u>	nc			120	1,200
Formaldehyde	<u>50-00-0</u>	ca, nc			9,200	92,000

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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
Formic Acid	64-18-6	nc			110,000	1,000,000 **
Fosetyl-al	39148-24-8	nc			180,000	1,000,000 **
Furan	110-00-9	nc			2.5	8.5
Furazolidone	67-45-8	ca	0.14	1.4		4.5
Furfural	98-01-1	nc			180	1,800
Furium	531-82-8	ca	0.011	0.11		0.34
Furmecyclox	60568-05-0	ca	18	180		570
Glufosinate-ammonium	77182-82-2	nc			24	250
Glycidaldehyde	765-34-4	nc			24	250
Glyphosate	1071-83-6	nc			6,100	62,000
Haloxypop-methyl	69806-40-2	nc			3.1	31
Harmony	79277-27-3	nc			790	8,003
Heptachlor	76-44-8	ca, nc	0.12	1.2		3.8
Heptachlor epoxide	1024-57-3	ca, nc	0.060	0.60		1.9
Hexabromobenzene	87-82-1	nc			120	1,200
Hexachlorobenzene	118-74-1	ca, nc	0.34	3.4		11
Hexachlorobutadiene	87-68-3	ca, nc	7.0	70	18	180
HCH (alpha)	319-84-6	ca, nc	0.10	1.0		3.6
HCH (beta)	319-85-7	ca, nc	0.36	3.6		13
HCH (gamma) Lindane	58-89-9	ca, nc	0.50	5.0		17
HCH-technical	608-73-1	ca	0.36	3.6		13
Hexachlorocyclopentadiene	77-47-4	nc			370	3,700
Hexachloroethane	67-72-1	ca, nc	39	390	61	620
Hexachlorophene	70-30-4	nc			18	180
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	ca, nc	5.0	50		160
1,6-Hexamethylene diisocyanate	822-06-0	nc			0.17	1.8
n-Hexane	110-54-3	nc			110 *	110 *
Hexazinone	51235-04-2	nc			2,020	20,000
Hydrazine, hydrazine sulfate	302-01-2	ca	0.18	1.8		5.7
Hydrazine, monomethyl	60-34-4	ca	0.18	1.8		5.7
Hydrazine, dimethyl	57-14-7	ca	0.18	1.8		5.7
p-Hydroquinone	123-31-9	ca, nc	9.8	98		310
Imazalil	35554-44-0	nc			790	8,000
Imazaquin	81335-37-7	nc			15,000	150,000
Iprodione	36734-19-7	nc			2,400	25,000

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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
Isobutanol	<u>78-83-1</u>	nc			13,000	40,000 *
Isophorone	<u>78-59-1</u>	ca, nc	<u>580</u>	<u>5,800</u>		<u>18,000</u>
Isopropalin	<u>33820-53-0</u>	nc			<u>920</u>	<u>9,200</u>
Isopropyl methyl phosphonic acid	<u>1832-54-8</u>	nc			<u>6,100</u>	<u>62,000</u>
Isoxaben	<u>82558-50-7</u>	nc			<u>3,100</u>	<u>31,000</u>
Kepone	<u>143-50-0</u>	ca, nc	<u>0.068</u>	<u>0.68</u>		<u>2.2</u>
Lactofen	<u>77501-63-4</u>	nc			<u>120</u>	<u>1,200</u>
Lead	<u>7439-92-1</u>	ca, nc			<u>400</u>	<u>800</u>
Lead (tetraethyl)	<u>78-00-2</u>	nc			<u>0.0061</u>	<u>0.062</u>
Linuron	<u>330-55-2</u>	nc			<u>120</u>	<u>1,200</u>
Lithium	<u>7439-93-2</u>	nc			<u>1,600</u>	<u>20,000</u>
Londax	<u>83055-99-6</u>	nc			<u>12,000</u>	<u>120,000</u>
Malathion	<u>121-75-5</u>	nc			<u>1,200</u>	<u>12,000</u>
Maleic anhydride	<u>108-31-6</u>	nc			<u>6,100</u>	<u>62,000</u>
Maleic hydrazide	<u>123-33-1</u>	nc			<u>1,700</u>	<u>2,400 *</u>
Malononitrile	<u>109-77-3</u>	nc			<u>6.1</u>	<u>62</u>
Mancozeb	<u>8018-01-7</u>	nc			<u>1,800</u>	<u>18,000</u>
Maneb	<u>12427-38-2</u>	ca, nc	<u>9.1</u>	<u>91</u>		<u>290</u>
Manganese	<u>7439-96-5</u>	nc			<u>3,300</u>	<u>32,000</u>
Mephosfolan	<u>950-10-7</u>	nc			<u>5.5</u>	<u>55</u>
Mepiquat	<u>24307-26-4</u>	nc			<u>1,800</u>	<u>18,000</u>
2-Mercaptobenzothiazole	<u>149-30-4</u>	ca, nc	<u>19</u>	<u>190</u>		<u>590</u>
Mercury and compounds	<u>7487-94-7</u>	nc			<u>23</u>	<u>310</u>
Mercury (methyl)	<u>22967-92-6</u>	nc			<u>6.1</u>	<u>62</u>
Merphos	<u>150-50-5</u>	nc			<u>1.8</u>	<u>18</u>
Merphos oxide	<u>78-48-8</u>	nc			<u>1.8</u>	<u>18</u>
Metalaxyl	<u>57837-19-1</u>	nc			<u>3,700</u>	<u>37,000</u>
Methacrylonitrile	<u>126-98-7</u>	nc			<u>2.1</u>	<u>8.4</u>
Methamidophos	<u>10265-92-6</u>	nc			<u>3.1</u>	<u>31</u>
Methanol	<u>67-56-1</u>	nc			<u>31,000</u>	<u>310,000</u>
Methidathion	<u>950-37-8</u>	nc			<u>61</u>	<u>620</u>
Methomyl	<u>16752-77-5</u>	nc			<u>44</u>	<u>150</u>
Methoxychlor	<u>72-43-5</u>	nc			<u>310</u>	<u>3,100</u>
2-Methoxyethanol	<u>109-86-4</u>	nc			<u>61</u>	<u>620</u>
2-Methoxyethanol acetate	<u>110-49-6</u>	nc			<u>120</u>	<u>1,200</u>

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>			<b>Non-residential (mg/kg)</b>
			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
<u>2-Methoxy-5-nitroaniline</u>	<u>99-59-2</u>	<u>ca</u>	<u>12</u>	<u>120</u>		<u>370</u>
<u>Methyl acetate</u>	<u>79-20-9</u>	<u>nc</u>			<u>22,000</u>	<u>92,000</u>
<u>Methyl acrylate</u>	<u>96-33-3</u>	<u>nc</u>			<u>70</u>	<u>230</u>
<u>2-Methylaniline (o-toluidine)</u>	<u>95-53-4</u>	<u>ca</u>	<u>2.3</u>	<u>23</u>		<u>72</u>
<u>2-Methylaniline hydrochloride</u>	<u>636-21-5</u>	<u>ca</u>	<u>3.0</u>	<u>30</u>		<u>96</u>
<u>2-Methyl-4-chlorophenoxyacetic acid</u>	<u>94-74-6</u>	<u>nc</u>			<u>31</u>	<u>310</u>
<u>4-(2-Methyl-4-chlorophenoxy) butyric acid (MCPB)</u>	<u>94-81-5</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>2-(2-Methyl-4-chlorophenoxy) propionic acid</u>	<u>93-65-2</u>	<u>nc</u>			<u>61</u>	<u>620</u>
<u>2-(2-Methyl-1,4-chlorophenoxy) propionic acid (MCPB)</u>	<u>16484-77-8</u>	<u>nc</u>			<u>61</u>	<u>620</u>
<u>Methylcyclohexane</u>	<u>108-87-2</u>	<u>nc</u>			<u>230 *</u>	<u>230 *</u>
<u>4,4'-Methylenebisbenzeneamine</u>	<u>101-77-9</u>	<u>ca</u>	<u>2.2</u>	<u>22</u>		<u>69</u>
<u>4,4'-Methylene bis(2-chloroaniline)</u>	<u>101-14-4</u>	<u>ca, nc</u>	<u>4.2</u>	<u>42</u>		<u>130</u>
<u>4,4'-Methylene bis(N,N'-dimethyl) aniline</u>	<u>101-61-1</u>	<u>ca</u>	<u>12</u>	<u>120</u>		<u>370</u>
<u>Methylene bromide</u>	<u>74-95-3</u>	<u>nc</u>			<u>67</u>	<u>230</u>
<u>Methylene chloride</u>	<u>75-09-2</u>	<u>ca, nc</u>	<u>9.3</u>	<u>93</u>		<u>210</u>
<u>4,4'-Methylenediphenyl isocyanate</u>	<u>101-68-8</u>	<u>nc</u>			<u>10</u>	<u>110</u>
<u>Methyl ethyl ketone (MEK)</u>	<u>78-93-3</u>	<u>nc</u>			<u>23,000</u>	<u>34,000 *</u>
<u>Methyl isobutyl ketone (MIBK)</u>	<u>108-10-1</u>	<u>nc</u>			<u>5,300</u>	<u>17,000 *</u>
<u>Methyl mercaptan</u>	<u>74-93-1</u>	<u>nc</u>			<u>35</u>	<u>350</u>
<u>Methyl methacrylate</u>	<u>80-62-6</u>	<u>nc</u>			<u>2,200</u>	<u>2,700 *</u>
<u>2-Methyl-5-nitroaniline</u>	<u>99-55-8</u>	<u>ca</u>	<u>17</u>	<u>170</u>		<u>520</u>
<u>Methyl parathion</u>	<u>298-00-0</u>	<u>nc</u>			<u>15</u>	<u>150</u>
<u>2-Methylphenol</u>	<u>95-48-7</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>3-Methylphenol</u>	<u>108-39-4</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>4-Methylphenol</u>	<u>106-44-5</u>	<u>nc</u>			<u>310</u>	<u>3,100</u>
<u>Methyl phosphonic acid</u>	<u>993-13-5</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Methyl styrene (mixture)</u>	<u>25013-15-4</u>	<u>nc</u>			<u>130</u>	<u>540</u>
<u>Methyl styrene (alpha)</u>	<u>98-83-9</u>	<u>nc</u>			<u>680 *</u>	<u>680 *</u>
<u>Methyl tertbutyl ether (MTBE)</u>	<u>1634-04-4</u>	<u>ca, nc</u>	<u>32</u>	<u>320</u>		<u>710</u>
<u>Metolaclor (Dual)</u>	<u>51218-45-2</u>	<u>nc</u>			<u>9,200</u>	<u>92,000</u>
<u>Metribuzin</u>	<u>21087-64-9</u>	<u>nc</u>			<u>1,500</u>	<u>15,000</u>
<u>Mirex</u>	<u>2385-85-5</u>	<u>ca, nc</u>	<u>0.30</u>	<u>3.0</u>		<u>9.6</u>
<u>Molinate</u>	<u>2212-67-1</u>	<u>nc</u>			<u>120</u>	<u>1,200</u>

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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
Molybdenum	<u>7439-98-7</u>	nc			390	5,100
Monochloramine	<u>10599-90-3</u>	nc			6,100	62,000
Naled	<u>300-76-5</u>	nc			120	1,200
Napropamide	<u>15299-99-7</u>	nc			6,100	62,000
Nickel and compounds	<u>7440-02-0</u>	nc			1,600	20,000
<b>Nickel subsulfide</b>	<u>12035-72-2</u>	ca	5,200	NA		11,000
2-Nitroaniline	<u>88-74-4</u>	nc			180	1,800
3-Nitroaniline	<u>99-09-2</u>	ca, nc			18	180
4-Nitroaniline	<u>100-01-6</u>	ca, nc	26	260	180	820
Nitrobenzene	<u>98-95-3</u>	nc			20	100
Nitrofurantoin	<u>67-20-9</u>	nc			4,300	43,000
Nitrofurazone	<u>59-87-0</u>	ca	0.37	3.7		11
Nitroglycerin	<u>55-63-0</u>	ca	39	390		1,200
Nitroguanidine	<u>556-88-7</u>	nc			6,100	62,000
2-Nitropropane	<u>79-46-9</u>	ca, nc	0.0028	0.028		0.061
N-Nitrosodi-n-butylamine	<u>924-16-3</u>	ca	0.025	0.25		0.58
N-Nitrosodiethanolamine	<u>1116-54-7</u>	ca	0.20	2.0		6.2
N-Nitrosodiethylamine	<u>55-18-5</u>	ca	0.0037	0.037		0.11
N-Nitrosodimethylamine	<u>62-75-9</u>	ca, nc	0.011	0.11		0.34
N-Nitrosodiphenylamine	<u>86-30-6</u>	ca, nc	110	1,100		3,500
N-Nitroso di-n-propylamine	<u>621-64-7</u>	ca	0.078	0.78		2.5
N-Nitroso-N-methylethylamine	<u>10595-95-6</u>	ca	0.025	0.25		0.78
N-Nitrosopyrrolidine	<u>930-55-2</u>	ca	0.26	2.6		8.2
m-Nitrotoluene	<u>99-08-1</u>	nc			730	1,000 *
o-Nitrotoluene	<u>88-72-2</u>	ca, nc	0.93	9.3		22
p-Nitrotoluene	<u>99-99-0</u>	ca, nc	13	130		300
Norflurazon	<u>27314-13-2</u>	nc			2,400	25,000
NuStar	<u>85509-19-9</u>	nc			43	430
Octabromodiphenyl ether	<u>32536-52-0</u>	nc			180	1,800
Octahydro-1357-tetranitro-1357-tetrazocine (HMX)	<u>2691-41-0</u>	nc			3,100	31,000
Octamethylpyrophosphoramidate	<u>152-16-9</u>	nc			120	1,200
Oryzalin	<u>19044-88-3</u>	nc			3,100	31,000
Oxadiazon	<u>19666-30-9</u>	nc			310	3,100
Oxamyl	<u>23135-22-0</u>	nc			1,500	15,000



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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	<b>Non-residential (mg/kg)</b>
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
<u>Oxyfluorfen</u>	<u>42874-03-3</u>	<u>nc</u>			<u>180</u>	<u>1,800</u>
<u>Paclobutrazol</u>	<u>76738-62-0</u>	<u>nc</u>			<u>790</u>	<u>8,000</u>
<u>Paraquat</u>	<u>4685-14-7</u>	<u>nc</u>			<u>270</u>	<u>2,800</u>
<u>Parathion</u>	<u>56-38-2</u>	<u>nc</u>			<u>370</u>	<u>3,700</u>
<u>Pebulate</u>	<u>1114-71-2</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>Pendimethalin</u>	<u>40487-42-1</u>	<u>nc</u>			<u>2,400</u>	<u>25,000</u>
<u>Pentabromo-6-chloro cyclohexane</u>	<u>87-84-3</u>	<u>ca</u>	<u>24</u>	<u>240</u>		<u>750</u>
<u>Pentabromodiphenyl ether</u>	<u>32534-81-9</u>	<u>nc</u>			<u>120</u>	<u>1,200</u>
<u>Pentachlorobenzene</u>	<u>608-93-5</u>	<u>nc</u>			<u>49</u>	<u>490</u>
<u>Pentachloronitrobenzene</u>	<u>82-68-8</u>	<u>ca, nc</u>	<u>2.1</u>	<u>21</u>		<u>66</u>
<u>Pentachlorophenol</u>	<u>87-86-5</u>	<u>ca, nc</u>	<u>3.2</u>	<u>32</u>		<u>90</u>
<u>Perchlorate</u>	<u>7601-90-3</u>	<u>nc</u>			<u>55</u>	<u>720</u>
<u>Permethrin</u>	<u>52645-53-1</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
<u>Phenmedipham</u>	<u>13684-63-4</u>	<u>nc</u>			<u>15,000</u>	<u>150,000</u>
<u>Phenol</u>	<u>108-95-2</u>	<u>nc</u>			<u>18,000</u>	<u>180,000</u>
<u>Phenothiazine</u>	<u>92-84-2</u>	<u>nc</u>			<u>120</u>	<u>1,200</u>
<u>m-Phenylenediamine</u>	<u>108-45-2</u>	<u>nc</u>			<u>370</u>	<u>3,700</u>
<u>o-Phenylenediamine</u>	<u>95-54-5</u>	<u>ca</u>	<u>12</u>	<u>120</u>		<u>370</u>
<u>p-Phenylenediamine</u>	<u>106-50-3</u>	<u>nc</u>			<u>12,000</u>	<u>120,000</u>
<u>Phenylmercuric acetate</u>	<u>62-38-4</u>	<u>nc</u>			<u>4.9</u>	<u>49</u>
<u>2-Phenylphenol</u>	<u>90-43-7</u>	<u>ca</u>	<u>280</u>	<u>2,800</u>		<u>8,900</u>
<u>Phorate</u>	<u>298-02-2</u>	<u>nc</u>			<u>12</u>	<u>120</u>
<u>Phosmet</u>	<u>732-11-6</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Phosphine</u>	<u>7803-51-2</u>	<u>nc</u>			<u>18</u>	<u>180</u>
<u>Phosphorus (white)</u>	<u>7723-14-0</u>	<u>nc</u>			<u>1.6</u>	<u>20</u>
<u>p-Phthalic acid</u>	<u>100-21-0</u>	<u>nc</u>			<u>61,000</u>	<u>620,000</u>
<u>Phthalic anhydride</u>	<u>85-44-9</u>	<u>nc</u>			<u>120,000</u>	<u>1,000,000 **</u>
<u>Picloram</u>	<u>1918-02-1</u>	<u>nc</u>			<u>4,300</u>	<u>43,000</u>
<u>Pirimiphos-methyl</u>	<u>29232-93-7</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>Polybrominated biphenyls (PBBs)</u>	<u>NA</u>	<u>ca, nc</u>	<u>0.062</u>	<u>0.62</u>	<u>0.43</u>	<u>1.9</u>
<u>Polychlorinated biphenyls (PCBs), low-risk mixture</u>	<u>12674-11-2</u>	<u>ca, nc</u>			<u>3.9</u>	<u>37</u>
<u>Polychlorinated biphenyls (PCBs), high-risk mixture</u>	<u>11097-69-1</u>	<u>ca, nc</u>	<u>0.25</u>	<u>2.5</u>	<u>1.1</u>	<u>7.4</u>
<u>Polychlorinated terphenyls</u>	<u>61788-33-8</u>	<u>ca</u>	<u>0.12</u>	<u>1.2</u>		<u>3.8</u>

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>		<b>Non-residential (mg/kg)</b>
			<b>Carcinogen</b>		
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>	
Polynuclear aromatic hydrocarbons					
Acenaphthene	83-32-9	nc			3,700
Anthracene	120-12-7	nc			22,000
Benz[a]anthracene	56-55-3	ca	0.69	6.9	21
Benzo[b]fluoranthene	205-99-2	ca	0.69	6.9	21
Benzo[k]fluoranthene	207-08-9	ca	6.9	69	210
Benzo[a]pyrene	50-32-8	ca	0.069	0.69	2.1
Chrysene	218-01-9	ca	68	680	2,000
Dibenz[ah]anthracene	53-70-3	ca	0.069	0.69	2.1
Fluoranthene	206-44-0	nc			2,300
Fluorene	86-73-7	nc			2,700
Indeno[1,2,3-cd]pyrene	193-39-5	ca	0.69	6.9	21
Naphthalene	91-20-3	nc			56
Pyrene	129-00-0	nc			2,300
Prochloraz	67747-09-5	ca, nc	3.7	37	110
Profluralin	26399-36-0	nc			370
Prometon	1610-18-0	nc			920
Prometryn	7287-19-6	nc			240
Pronamide	23950-58-5	nc			4,600
Propachlor	1918-16-7	nc			790
Propanil	709-98-8	nc			310
Propargite	2312-35-8	nc			1,200
Propargyl alcohol	107-19-7	nc			120
Propazine	139-40-2	nc			1,200
Propham	122-42-9	nc			1,200
Propiconazole	60207-90-1	nc			790
n-Propylbenzene	103-65-1	nc			240 *
Propylene glycol	57-55-6	nc			30,000
Propylene glycol, monoethyl ether	52125-53-8	nc			43,000
Propylene glycol, monomethyl ether	107-98-2	nc			43,000
Propylene oxide	75-56-9	ca, nc	2.2	22	66
Pursuit	81335-77-5	nc			15,000
Pydrin	51630-58-1	nc			1,500
Pyridine	110-86-1	nc			61
Quinalphos	13593-03-8	nc			31

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			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
Quinoline	91-22-5	ca	0.18	1.8		5.7
RDX (Cyclonite)	121-82-4	ca, nc	5.0	50		160
Resmethrin	10453-86-8	nc			1,800	18,000
Ronnel	299-84-3	nc			3,100	31,000
Rotenone	83-79-4	nc			240	2,500
Savey	78587-05-0	nc			1,500	15,000
Selenious Acid	7783-00-8	nc			310	3,100
Selenium	7782-49-2	nc			390	5,100
Selenourea	630-10-4	nc			310	3,100
Sethoxydim	74051-80-2	nc			5,500	55,000
Silver and compounds	7440-22-4	nc			390	5,100
Simazine	122-34-9	ca, nc	4.6	46		140
Sodium azide	26628-22-8	nc			310	4,100
Sodium diethyldithiocarbamate	148-18-5	ca, nc	2.0	20		64
Sodium fluoroacetate	62-74-8	nc			1.2	12
Sodium metavanadate	13718-26-8	nc			61	620
Strontium, stable	7440-24-6	nc			47,000	610,000
Strychnine	57-24-9	nc			18	180
Styrene	100-42-5	nc			1,500 *	1,500 *
1,1'-Sulfonylbis-(4-chlorobenzene)	80-07-9	nc			310	3,100
Systhane	88671-89-0	nc			1,500	15,000
Tebuthiuron	34014-18-1	nc			4,300	43,000
Temephos	3383-96-8	nc			1,200	12,000
Terbacil	5902-51-2	nc			790	8,000
Terbufos	13071-79-9	nc			1.5	15
Terbutryn	886-50-0	nc			61	620
1,2,4,5-Tetrachlorobenzene	95-94-3	nc			18	180
1,1,1,2-Tetrachloroethane	630-20-6	ca, nc	3.2	32		73
1,1,2,2-Tetrachloroethane	79-34-5	ca, nc	0.42	4.2		9.3
Tetrachloroethylene (PCE)	127-18-4	ca, nc	0.51	5.1		13
2,3,4,6-Tetrachlorophenol	58-90-2	nc			1,800	18,000
p.a.a.a-Tetrachlorotoluene	5216-25-1	ca	0.027	0.27		0.86
Tetrachlorovinphos	961-11-5	ca, nc	23	230		720
Tetraethyldithiopyrophosphate	3689-24-5	nc			31	310
Tetrahydrofuran	109-99-9	ca, nc	9.5	95		210

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			Carcinogen		Non-carcinogen	Non-residential (mg/kg)
			10 <sup>-6</sup> Risk	10 <sup>-5</sup> Risk		
Thallium and compounds	7440-28-0	nc			5.2	67
Thiobencarb	28249-77-6	nc			610	6,200
Thiocyanate	NA	nc			3,100	31,000
Thiofanox	39196-18-4	nc			18	180
Thiophanate-methyl	23564-05-8	nc			4,900	49,000
Thiram	137-26-8	nc			310	3,100
Tin	7440-31-5	nc			47,000	610,000
Titanium	7440-32-6	nc			310,000	1,000,000 **
Toluene	108-88-3	nc			650 *	650 *
Toluene-2,4-diamine	95-80-7	ca	0.17	1.7		5.4
Toluene-2,5-diamine	95-70-5	nc			37,000	370,000
Toluene-2,6-diamine	823-40-5	nc			12,000	120,000
p-Toluidine	106-49-0	ca	2.9	29		91
Toxaphene	8001-35-2	ca	0.50	5.0		16
Tralomethrin	66841-25-6	nc			460	4,600
Triallate	2303-17-5	nc			790	8,000
Triasulfuron	82097-50-5	nc			610	6,200
1,2,4-Tribromobenzene	615-54-3	nc			310	3,100
Tributyl phosphate	126-73-8	ca, nc	60	600		1,900
Tributyltin oxide (TBTO)	56-35-9	nc			18	180
2,4,6-Trichloroaniline	634-93-5	ca	16	160		510
2,4,6-Trichloroaniline hydrochloride	33663-50-2	ca	19	190		590
1,2,4-Trichlorobenzene	120-82-1	nc			62	220
1,1,1-Trichloroethane	71-55-6	nc			1,200 *	1,200 *
1,1,2-Trichloroethane	79-00-5	ca, nc	0.74	7.4		16
Trichloroethylene (TCE)	79-01-6	ca, nc	3.0	30	17	65
Trichlorofluoromethane	75-69-4	nc			390	1,300
2,4,5-Trichlorophenol	95-95-4	nc			6,100	62,000
2,4,6-Trichlorophenol	88-06-2	ca, nc			6.1	62
2,4,5-Trichlorophenoxyacetic Acid	93-76-5	nc			610	6,200
2-(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	nc			490	4,900
1,1,2-Trichloropropane	598-77-6	nc			15	51
1,2,3-Trichloropropane	96-18-4	ca, nc	0.0050	0.050		0.11
1,2,3-Trichloropropene	96-19-5	nc			0.71	2.3

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<b>CONTAMINANT</b>	<b>CASRN</b>	<b>Class</b>	<b>Residential (mg/kg)</b>			<b>Non-residential (mg/kg)</b>
			<b>Carcinogen</b>		<b>Non-carcinogen</b>	
			<b>10<sup>-6</sup> Risk</b>	<b>10<sup>-5</sup> Risk</b>		
<u>1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)</u>	<u>76-13-1</u>	<u>nc</u>			<u>5,600 *</u>	<u>5,600 *</u>
<u>Tridiphane</u>	<u>58138-08-2</u>	<u>nc</u>			<u>180</u>	<u>1,800</u>
<u>Triethylamine</u>	<u>121-44-8</u>	<u>nc</u>			<u>23</u>	<u>86</u>
<u>Trifluralin</u>	<u>1582-09-8</u>	<u>ca, nc</u>	<u>71</u>	<u>710</u>	<u>460</u>	<u>2,200</u>
<u>Trimellitic Anhydride (TMAN)</u>	<u>552-30-7</u>	<u>nc</u>			<u>8.6</u>	<u>86</u>
<u>1,2,4-Trimethylbenzene</u>	<u>95-63-6</u>	<u>nc</u>			<u>52</u>	<u>170</u>
<u>1,3,5-Trimethylbenzene</u>	<u>108-67-8</u>	<u>nc</u>			<u>21</u>	<u>70</u>
<u>Trimethyl phosphate</u>	<u>512-56-1</u>	<u>ca</u>	<u>15</u>	<u>150</u>		<u>470</u>
<u>1,3,5-Trinitrobenzene</u>	<u>99-35-4</u>	<u>nc</u>			<u>1,800</u>	<u>18,000</u>
<u>Trinitrophenylmethylnitramine</u>	<u>479-45-8</u>	<u>nc</u>			<u>610</u>	<u>6,200</u>
<u>2,4,6-Trinitrotoluene</u>	<u>118-96-7</u>	<u>ca, nc</u>	<u>18</u>	<u>180</u>	<u>31</u>	<u>310</u>
<u>Triphenylphosphine oxide</u>	<u>791-28-6</u>	<u>nc</u>			<u>1,200</u>	<u>12,000</u>
<u>Tris(2-chloroethyl) phosphate</u>	<u>115-96-8</u>	<u>ca, nc</u>	<u>39</u>	<u>390</u>		<u>1,200</u>
<u>Tris(2-ethylhexyl) phosphate</u>	<u>78-42-2</u>	<u>ca, nc</u>	<u>170</u>	<u>1,700</u>		<u>5,400</u>
<u>Uranium (chemical toxicity only)</u>	<u>7440-61-0</u>	<u>nc</u>			<u>16</u>	<u>200</u>
<u>Vanadium and compounds</u>	<u>7440-62-2</u>	<u>nc</u>			<u>78</u>	<u>1,000</u>
<u>Vernam</u>	<u>1929-77-7</u>	<u>nc</u>			<u>61</u>	<u>620</u>
<u>Vinclozolin</u>	<u>50471-44-8</u>	<u>nc</u>			<u>1,500</u>	<u>15,000</u>
<u>Vinyl acetate</u>	<u>108-05-4</u>	<u>nc</u>			<u>430</u>	<u>1,400</u>
<u>Vinyl bromide</u>	<u>593-60-2</u>	<u>ca, nc</u>	<u>0.19</u>	<u>1.9</u>		<u>4.2</u>
<b><u>Vinyl chloride</u></b>	<u>75-01-4</u>	<u>ca, nc</u>	<u>0.085</u>	<u>NA</u>		<u>0.75</u>
<u>Warfarin</u>	<u>81-81-2</u>	<u>nc</u>			<u>18</u>	<u>180</u>
<u>Xylenes</u>	<u>1330-20-7</u>	<u>nc</u>			<u>270</u>	<u>420 *</u>
<u>Zinc</u>	<u>7440-66-6</u>	<u>nc</u>			<u>23,000</u>	<u>310,000</u>
<u>Zinc phosphide</u>	<u>1314-84-7</u>	<u>nc</u>			<u>23</u>	<u>310</u>
<u>Zineb</u>	<u>12122-67-7</u>	<u>nc</u>			<u>3,100</u>	<u>31,000</u>
NA indicates not applicable.						
Class is the classification of the chemical. "ca" indicates carcinogen; "nc" indicates non-carcinogen. Chemicals may be either or both, as indicated.						
* Indicates SRL is based on the chemical-specific saturation level in soil for volatile organic chemicals only.						
** Indicates SRL is based on a 100% saturation ceiling limit for non-volatile organic chemicals.						
Bold indicates adequate evidence to classify the chemical as a known human carcinogen.						
CASRN is the Chemical Abstract System Registry Number.						

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**Appendix A B. 1997 Soil Remediation Levels (SRLs)**

	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
	<b>A</b>				
1	Acenaphthene	83-32-9	D	3900.0	41000.0
2	Acephate	30560-19-1	C	260.0	2200.0
3	Acetaldehyde	75-07-0	B2	39.0	150.0
4	Acetochlor	34256-82-1	D	1300.0	14000.0
5	Acetone	67-64-1	D	2100.0	8800.0
6	Acetone cyanohydrin	75-86-5	D	52.0	550.0
7	Acetonitrile	75-05-8	D	220.0	1200.0
8	Acetophenone	98-86-2	D	0.49	1.6
9	Acifluorfen	62476-59-9	D	850.0	8900.0
10	Acrolein	107-02-8	C	0.10	0.34
11	Acrylamide	79-06-1	B2	0.98	4.2
12	Acrylic acid	79-10-7	D	31000.0	290000.0
13	Acrylonitrile	107-13-1	B1	1.9	4.7
14	Alachlor	15972-60-8	B2	55.0	240.0
15	Alar	1596-84-5	D	9800.0	100000.0
16	Aldicarb	116-06-3	D	65.0	680.0
17	Aldicarb sulfone	1646-88-4	D	65.0	680.0
18	Aldrin	309-00-2	B2	0.26	1.1
19	Allyl	<del>5585-64-8</del> <u>74223-64-6</u>	D	16000.0	170000.0
20	Allyl alcohol	107-18-6	D	330.0	3400.0
21	Allyl chloride	107-05-1	C	3200.0	33000.0
22	Aluminum	7429-90-5	D	77000.0	1000000.0
23	Aluminum phosphide	20859-73-8	D	31.0	680.0
24	Amdro	67485-29-4	D	20.0	200.0
25	Ametryn	834-12-8	D	590.0	6100.0
26	m-Aminophenol	591-27-5	D	4600.0	48000.0
27	4-Aminopyridine	504-24-5	D	1.3	14.0
28	Amitraz	33089-61-1	D	160.0	1700.0
29	Ammonia	7664-41-7	D	2200.0	58000.0
30	Ammonium sulfamate	7773-06-0	D	13000.0	140000.0
31	Aniline	62-53-3	B2	19.0	200.0
32	Anthracene	120-12-7	D	20000.0	200000.0
33	Antimony and compounds	7440-36-0	D	31.0	680.0
34	Antimony pentoxide	1314-60-9	D	38.0	850.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
35	Antimony potassium tartrate	28300-74-5	D	69.0	1500.0
36	Antimony tetroxide	1332-81-6	D	31.0	680.0
37	Antimony trioxide	1309-64-4	D	31.0	680.0
38	Apollo	74115-24-5	C	850.0	8900.0
39	Aramite	140-57-8	B2	180.0	760.0
40	~Arsenic	7440-38-2	A	10.0	10.0
41	Assure	<del>76578-12-6</del> <u>76578-14-8</u>	D	590.0	6100.0
42	Asulam	3337-71-1	D	3300.0	34000.0
43	Atrazine	1912-24-9	C	20.0	86.0
44	Avermectin B1	<del>65195-55-3</del> <u>71751-41-2</u>	D	26.0	270.0
45	Azobenzene	103-33-3	B2	40.0	170.0
	<b>B</b>				
46	Barium and compounds	7440-39-3	D	5300.0	110000.0
47	Barium cyanide	542-62-1	D	7700.0	170000.0
48	Baygon	114-26-1	D	260.0	2700.0
49	Bayleton	43121-43-3	D	2000.0	20000.0
50	Baythroid	68359-37-5	D	1600.0	17000.0
51	Benefin	1861-40-1	D	20000.0	200000.0
52	Benomyl	17804-35-2	D	3300.0	34000.0
53	Bentazon	25057-89-0	D	160.0	1700.0
54	Benzaldehyde	100-52-7	D	6500.0	68000.0
55	Benz[a]anthracene	56-55-3	B2	6.1	26.0
56	Benzene	71-43-2	A	0.62	1.4
57	Benzidine	92-87-5	A	0.0019	0.0083
58	Benzo[a]pyrene	50-32-8	B2	0.61	2.6
59	Benzo[b]fluoranthene	205-99-2	B2	6.1	26.0
60	Benzoic acid	65-85-0	D	260000.0	1000000.0
61	Benzo[k]fluoranthene	207-08-9	B2	61.0	260.0
62	Benzotrichloride	98-07-7	B2	0.34	1.5
63	Benzyl alcohol	100-51-6	D	20000.0	200000.0
64	Benzyl chloride	100-44-7	B2	8.0	20.0
65	Beryllium and compounds	7440-41-7	B2	1.4	11.0
66	Bidrin	141-66-2	D	6.5	68.0
67	Biphenethrin (Talstar)	82657-04-3	D	980.0	10000.0
68	1,1-Biphenyl	92-52-4	D	3300.0	34000.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
69	Bis(2-chloroethyl)ether	111-44-4	B2	0.43	0.97
70	Bis(2-chloroisopropyl)ether	39638-32-9	C	25.0	67.0
71	Bis(chloromethyl)ether	542-88-1	A	0.0002	0.0004
72	Bis(2-chloro-1-methylethyl)ether	108-60-1	C	63.0	270.0
73	Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7	B2	320.0	1400.0
74	Bisphenol A	80-05-7	D	3300.0	34000.0
75	Boron	7440-42-8	D	5900.0	61000.0
76	Bromodichloromethane	75-27-4	B2	6.3	14.0
77	Bromoform (tribromomethane)	75-25-2	B2	560.0	2400.0
78	Bromomethane	74-83-9	D	6.8	23.0
79	Bromophos	2104-96-3	D	330.0	3400.0
80	Bromoxynil	1689-84-5	D	1300.0	14000.0
81	Bromoxynil octanoate	1689-99-2	D	1300.0	14000.0
82	1,3-Butadiene	106-99-0	B2	0.064	0.14
83	1-Butanol	71-36-3	D	6500.0	68000.0
84	Butylate	2008-41-5	D	3300.0	34000.0
85	Butyl benzyl phthalate	85-68-7	C	13000.00	140000.00
86	Butylphthalyl butylglycolate	85-70-1	D	65000.0	680000.0
	<b>C</b>				
87	Cacodylic acid	75-60-5	D	200.0	2000.0
88	Cadmium and compounds	7440-43-9	B1	38.0	850.0
89	Calcium cyanide	592-01-8	D	3100.0	68000.0
90	Caprolactam	105-60-2	D	33000.0	340000.0
91	Captafol	2425-06-1	C	130.0	1400.0
92	Captan	133-06-2	D	1300.0	5500.0
93	Carbaryl	63-25-2	D	6500.0	68000.0
94	Carbazole	86-74-8	B2	220.0	950.0
95	Carbofuran	1563-66-2	E	330.0	3400.0
96	Carbon disulfide	75-15-0	D	7.5	24.0
97	Carbon tetrachloride	56-23-5	B2	1.6	5.0
98	Carbosulfan	55285-14-8	D	650.0	6800.0
99	Carboxin	5234-68-4	D	6500.0	68000.0
100	Chloral ( <u>hydrate</u> )	302-17-0	D	130.0	1400.0
101	Chloramben	133-90-4	D	980.0	10000.0
102	Chloranil	118-75-2	C	11.0	47.0
103	Chlordane	<del>57-74-9</del> <u>12789-03-6</u>	B2	3.4	15.0



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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
104	Chlorimuron-ethyl	90982-32-4	D	1300.0	14000.0
105	Chlorine cyanide	506-77-4	D	3800.0	85000.0
106	Chloroacetic acid	79-11-8	D	130.0	1400.0
107	2-Chloroacetophenone	532-27-4	D	0.56	5.9
108	4-Chloroaniline	106-47-8	D	260.0	2700.0
109	Chlorobenzene	108-90-7	D	65.0	220.0
110	Chlorobenzilate	510-15-6	B2	16.0	71.0
111	p-Chlorobenzoic acid	74-11-3	D	13000.0	140000.0
112	4-Chlorobenzotrifluoride	98-56-6	D	1300.0	14000.0
113	2-Chloro-1,3-butadiene	126-99-8	D	3.6	12.0
114	1-Chlorobutane	109-69-3	D	710.0	2400.0
115	* 1-Chloro-1,1-difluoroethane	75-68-3	D	2800.0	2800.0
116	* Chlorodifluoromethane	75-45-6	D	2800.0	2800.0
117	Chloroform	67-66-3	B2	2.5	5.3
118	Chloromethane	74-87-3	C	12.0	26.0
119	4-Chloro-2-methylaniline	95-69-2	B2	7.7	33.0
120	4-Chloro-2-methylaniline hydrochloride	3165-93-3	B2	9.7	41.0
121	beta-Chloronaphthalene	91-58-7	D	5200.0	55000.0
122	o-Chloronitrobenzene	88-73-3	B2	180.0	760.0
123	p-Chloronitrobenzene	100-00-5	B2	250.0	1100.0
124	2-Chlorophenol	95-57-8	D	91.0	370.0
125	2-Chloropropane	75-29-6	D	170.0	580.0
126	Chloroethalonil	1897-45-6	B2	400.0	1700.0
127	* o-Chlorotoluene	95-49-8	D	160.0	550.0
128	Chlorpropham	101-21-3	D	13000.0	140000.0
129	Chlorpyrifos	2921-88-2	D	200.0	2000.0
130	Chlorpyrifos-methyl	5598-13-0	D	650.0	6800.0
131	Chlorsulfuron	64902-72-3	D	3300.0	34000.0
132	Chlorthiophos	602-38-56-4	D	52.0	550.0
133	Chromium, Total (1/6 ratio Cr VI/Cr III)	N/A	D	2100.0	4500.0
134	Chromium III	16065-83-1	D	77000.0	1000000.0
135	Chromium VI	7440-47-3	A	30.0	64.0
136	Chrysene	218-01-9	B2	610.0	2600.0
137	Cobalt	7440-48-4	D	4600.0	97000.0
138	Copper and compounds	7440-50-8	D	2800.0	63000.0
139	Copper cyanide	544-92-3	D	380.0	8500.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
140	Crotonaldehyde	123-73-9	C	0.052	0.11
141	Cumene	98-82-8	D	19.0	62.0
142	Cyanazine	21725-46-2	D	5.3	23.0
143	Cyanide, Free	57-12-5	D	1300.0	14000.0
144	Cyanogen	460-19-5	D	2600.0	27000.0
145	Cyanogen bromide	506-68-3	D	5900.0	61000.0
146	Cyanogen chloride	506-77-4	D	3300.0	34000.0
147	Cyclohexanone	108-94-1	D	330000.0	1000000.0
148	Cyclohexylamine	108-91-8	D	13000.0	140000.0
149	Cyhalothrin/Karate	68085-85-8	D	330.0	3400.0
150	Cypermethrin	52315-07-8	D	650.0	6800.0
151	Cyromazine	66215-27-8	D	490.0	5100.0
	<b>D</b>				
152	Dacthal	1861-32-1	D	650.0	6800.0
153	Dalapon	75-99-0	D	2000.0	20000.0
154	Danitol	39515-41-8	D	1600.0	17000.0
155	DDD	72-54-8	B2	19.0	80.0
156	DDE	72-55-9	B2	13.0	56.0
157	DDT	50-29-3	B2	13.0	56.0
158	Decabromodiphenyl ether	1163-19-5	C	650.0	6800.0
159	Demeton	8065-48-3	D	2.6	27.0
160	Diallate	2303-16-4	B2	73.0	310.0
161	Diazinon	333-41-5	E	59.0	610.0
162	Dibenz[ah]anthracene	53-70-3	B2	0.61	2.6
163	Dibenzofuran	132-64-9	D	260.0	2700.0
164	1,4-Dibromobenzene	106-37-6	D	650.0	6800.0
165	Dibromochloromethane	124-48-1	C	53.0	230.0
166	1,2-Dibromo-3-chloropropane	96-12-8	B2	3.2	14.0
167	1,2-Dibromoethane	106-93-4	B2	0.049	0.2
168	Dibutyl phthalate	84-74-2	D	6500.0	68000.0
169	Dicamba	1918-00-9	D	2000.0	20000.0
170	* 1,2-Dichlorobenzene	95-50-1	D	1100.0	3900.0
171	* 1,3-Dichlorobenzene	541-73-1	D	500.0	2000.0
172	1,4-Dichlorobenzene	106-46-7	C	190.0	790.0
173	3,3-Dichlorobenzidine	91-94-1	B2	9.9	42.0
174	1,4-Dichloro-2-butene	764-41-0	B2	0.074	0.17

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
175	Dichlorodifluoromethane	75-71-8	D	94.0	310.0
176	1,1-Dichloroethane	75-34-3	C	500.0	1700.0
177	1,2-Dichloroethane ( <u>EDC</u> )	107-06-2	B2	2.5	5.5
178	1,1-Dichloroethylene	75-35-4	C	0.36	0.8
179	1,2-Dichloroethylene (cis)	156-59-2	D	31.0	100.0
180	1,2-Dichloroethylene (trans)	156-60-5	D	78.0	270.0
181	1,2-Dichloroethylene (mixture)	540-59-0	D	35.0	120.0
182	2,4-Dichlorophenol	120-83-2	D	200.0	2000.0
183	4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	94-82-6	D	520.0	5500.0
184	2,4-Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	D	650.0	6800.0
185	1,2-Dichloropropane	78-87-5	B2	3.1	6.8
186	1,3-Dichloropropene	542-75-6	B2	2.4	5.5
187	2,3-Dichloropropanol	616-23-9	D	200.0	2000.0
188	Dichlorvos	62-73-7	B2	15.0	66.0
189	Dicofol	115-32-2	C	10.0	43.0
190	Dieldrin	60-57-1	B2	0.28	1.2
191	Diethylene glycol, monobutyl ether	112-34-5	D	370.0	3900.0
192	Diethylene glycol, monoethyl ether	111-90-0	D	130000.0	1000000.0
193	Diethylformamide	617-84-5	D	720.0	7500.0
194	Di(2-ethylhexyl)adipate	103-23-1	C	3700.0	16000.0
195	Diethyl phthalate	84-66-2	D	52000.0	550000.0
196	Diethylstilbestrol	56-53-1	A	0.0001	0.0004
197	Difenzoquat (Avenge)	43222-48-6	D	5200.0	55000.0
198	Diflubenzuron	35367-38-5	D	1300.0	14000.0
199	Diisopropyl methylphosphonate	1445-75-6	D	5200.0	55000.0
200	Dimethipin	55290-64-7	C	1300.0	14000.0
201	Dimethoate	60-51-5	D	13.0	140.0
202	3,3'-Dimethoxybenzidine	119-90-4	B2	320.0	1400.0
203	Dimethylamine	124-40-3	D	0.07	0.24
204	N-N-Dimethylaniline	121-69-7	D	130.0	1400.0
205	2,4-Dimethylaniline	95-68-1	C	5.9	25.0
206	2,4-Dimethylaniline hydrochloride	21436-96-4	C	7.7	33.0
207	3,3'-Dimethylbenzidine	119-93-7	B2	0.48	2.1
208	1,1-Dimethylhydrazine ( <u>Hydrazine, dimethyl</u> )	57-14-7	B, C	1.7	7.3
209	1,2-Dimethylhydrazine	540-73-8	B2	0.12	0.52
210	N,N-Dimethylformamide	68-12-2	D	6500.0	68000.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
211	2,4-Dimethylphenol	105-67-9	D	1300.0	14000.0
212	2,6-Dimethylphenol	576-26-1	D	39.0	410.0
213	3,4-Dimethylphenol	95-65-8	D	65.0	680.0
214	Dimethyl phthalate	131-11-3	D	650000.0	1000000.0
215	Dimethyl terephthalate	120-61-6	D	6500.0	68000.0
216	4,6-Dinitro-o-cyclohexyl phenol	131-89-5	D	130.0	1400.0
217	1,3-Dinitrobenzene	99-65-0	D	6.5	68.0
218	1,2-Dinitrobenzene	528-29-0	D	26.0	270.0
219	1,4-Dinitrobenzene	100-25-4	D	26.0	270.0
220	2,4-Dinitrophenol	51-28-5	D	130.0	1400.0
221	Dinitrotoluene mixture	25321-14-6	B2	6.5	28.0
222	2,4-Dinitrotoluene	121-14-2	<del>B2</del> D	130.0	1400.0
223	2,6-Dinitrotoluene	606-20-2	D	65.0	680.0
224	Dinoseb	88-85-7	D	65.0	680.0
225	di-n-Octyl phthalate	117-84-0	D	1300.0	14000.0
226	1,4-Dioxane	123-91-1	B2	400.0	1700.0
227	Diphenamid	957-51-7	D	2000.0	20000.0
228	Diphenylamine	122-39-4	D	1600.0	17000.0
229	1,2-Diphenylhydrazine	122-66-7	B2	5.6	24.0
230	Diquat	85-00-7	D	140.0	1500.0
231	Direct black 38	1937-37-7	A	0.052	0.22
232	Direct blue 6	2602-46-2	A	0.055	0.24
233	Direct brown 95	16071-86-6	A	0.048	0.21
234	Disulfoton	298-04-4	E	2.6	27.0
235	1,4-Dithiane	505-29-3	D	650.0	6800.0
236	Diuron	330-54-1	D	130.0	1400.0
237	Dodine	2439-10-3	D	260.0	2700.0
	<b>E</b>				
238	Endosulfan	115-29-7	D	390.0	4100.0
239	Endothall	145-73-3	D	1300.0	14000.0
240	Endrin	72-20-8	D	20.0	200.0
241	Epichlorohydrin	106-89-8	B2	7.5	25.0
242	1,2-Epoxybutane	106-88-7	D	370.0	3900.0
243	EPTC (S-Ethyl dipropylthiocarbamate)	759-94-4	D	1600.0	17000.0
244	Ethephon (2-chloroethyl phosphonic acid)	16672-87-0	D	330.0	3400.0
245	Ethion	563-12-2	D	33.0	340.0

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246	2-Ethoxyethanol	110-80-5	D	26000.0	270000.0
247	2-Ethoxyethanol acetate	111-15-9	D	20000.0	200000.0
248	* Ethyl acetate	141-78-6	D	18000.0	39000.0
249	Ethyl acrylate	140-88-5	B2	2.1	4.5
250	* Ethylbenzene	100-41-4	D	1500.0	2700.0
251	Ethylene cyanohydrin	109-78-4	D	20000.0	200000.0
252	Ethylene diamine	107-15-3	D	1300.0	14000.0
253	Ethylene glycol	107-21-1	D	130000.0	1000000.0
254	Ethylene glycol, monobutyl ether	111-76-2	D	370.0	3900.0
255	Ethylene oxide	75-21-8	B1	1.3	3.2
256	Ethylene thiourea (ETU)	96-45-7	B2	5.2	55.0
257	* Ethyl chloride	75-00-3	D	1100.0	4200.0
258	* Ethyl ether	60-29-7	D	3800.0	3800.0
259	* Ethyl methacrylate	97-63-2	D	210.0	690.0
260	Ethyl p-nitrophenyl phenylphosphorothioate	2104-64-5	D	0.65	6.8
261	Ethylphthalyl ethyl glycolate	84-72-0	D	200000.0	1000000.0
262	Express	101200-48-0	D	520.0	5500.0
	<b>F</b>				
263	Fenamiphos	22224-92-6	D	16.0	170.0
264	Fluometuron	2164-17-2	D	850.0	8900.0
265	Fluoranthene	206-44-0	D	2600.0	27000.0
266	Fluorene	86-73-7	D	2600.0	27000.0
267	Fluorine (soluble fluoride)	7782-41-4	D	3900.0	41000.0
268	Fluoridone	59756-60-4	D	5200.0	55000.0
269	Flurprimidol	56425-91-3	D	1300.0	14000.0
270	Flutolanil	66332-96-5	D	3900.0	41000.0
271	Fluvalinate	69409-94-5	D	650.0	6800.0
272	Folpet	133-07-3	B2	1300.0	5500.0
273	Fomesafen	72178-02-0	C	23.0	100.0
274	Fonofos	944-22-9	D	130.0	1400.0
275	Formaldehyde	50-00-0	B1	9800.0	100000.0
276	Formic Acid	64-18-6	D	130000.0	1000000.0
277	Fosetyl-al	39148-24-8	C	200000.0	1000000.0
278	Furan	110-00-9	D	2.5	8.5
279	Furazolidone	67-45-8	B2	1.2	5.0
280	Furfural	98-01-1	D	200.0	2000.0

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281	Furium	531-82-8	B2	0.089	0.38
282	Furmecyclox	60568-05-0	B2	150.0	640.0
<b>G</b>					
283	Glufosinate-ammonium	77182-82-2	D	26.0	270.0
284	Glycidaldehyde	765-34-4	B2	26.0	270.0
285	Glyphosate	1071-83-6	D	6500.0	68000.0
<b>H</b>					
286	Haloxypop-methyl	69806-40-2	D	3.3	34.0
287	Harmony	79277-27-3	D	850.0	8900.0
288	Heptachlor	76-44-8	B2	0.99	4.2
289	Heptachlor epoxide	1024-57-3	B2	0.49	2.1
290	Hexabromobenzene	87-82-1	D	130.0	1400.0
291	Hexachlorobenzene	118-74-1	B2	2.8	12.0
292	Hexachlorobutadiene	87-68-3	C	13.0	140.0
293	HCH (alpha)	319-84-6	B2	0.71	3.0
294	HCH (beta)	319-85-7	C	2.5	11.0
295	HCH (gamma) Lindane	58-89-9	B2-C	3.4	15.0
296	HCH-technical	608-73-1	B2	2.5	11.0
297	Hexachlorocyclopentadiene	77-47-4	D	450.0	4600.0
298	Hexachlorodibenzo-p-dioxin mixture (HxCDD)	19408-74-3	B2	0.00072	0.0031
299	Hexachloroethane	67-72-1	C	65.0	680.0
300	Hexachlorophene	70-30-4	D	20.0	200.0
301	Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	C	40.0	170.0
302	* n-Hexane	110-54-3	D	120.0	400.0
303	Hexazinone	51235-04-2	D	2200.0	22000.0
304	Hydrazine, hydrazine sulfate	302-01-2	B2	1.5	6.4
305	Hydrocarbons (C <sub>10</sub> to C <sub>32</sub> )	N/A	N/A	4100.0	18000.0
306	Hydrogen chloride	7647-01-0	D	370.0	3900.0
307	Hydrogen cyanide	74-90-8	D	11.0	35.0
308	p-Hydroquinone	123-31-9	D	2600.0	27000.0
<b>I</b>					
309	Imazalil	35554-44-0	D	850.0	8900.0
310	Imazaquin	81335-37-7	D	16000.0	170000.0
311	Indeno[1,2,3-cd]pyrene	193-39-5	B2	6.1	26.0
312	Iprodione	36734-19-7	D	2600.0	27000.0
313	* Isobutanol	78-83-1	D	11000.0	42000.0

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314	Isophorone	78-59-1	C	4700.0	20000.0
315	Isopropalin	33820-53-0	D	980.0	10000.0
316	Isopropyl methyl phosphonic acid	1832-54-8	D	6500.0	68000.0
317	Isoxaben	82558-50-7	C	3300.0	34000.0
	<b>K</b>				
318	Kepone	143-50-0	B, C	0.25	1.1
	<b>L</b>				
319	Lactofen	77501-63-4	D	130.0	1400.0
320	#Lead	7439-92-1	B2	400.0	2000.0
321	Lead (tetraethyl)	78-00-2	D	0.0065	0.068
322	Linuron	330-55-2	C	130.0	1400.0
323	Lithium	7439-93-2	D	1500.0	34000.0
324	Londax	83055-99-6	D	13000.0	140000.0
	<b>M</b>				
325	Malathion	121-75-5	D	1300.0	14000.0
326	Maleic anhydride	108-31-6	D	6500.0	68000.0
327	Maleic hydrazide	123-33-1	D	33000.0	340000.0
328	Malononitrile	109-77-3	D	1.3	14.0
329	Mancozeb	8018-01-7	D	2000.0	20000.0
330	Maneb	12427-38-2	D	330.0	3400.0
331	Manganese and compounds	7439-96-5	D	3200.0	43000.0
332	Mephosfolan	950-10-7	D	5.9	61.0
333	Mepiquat	24307-26-4	D	2000.0	20000.0
334	Mercuric chloride	7487-94-7	C	23.0	510.0
335	Mercury (elemental)	7439-97-6	D	6.7	180.0
336	Mercury (methyl)	22967-92-6	D	6.5	68.0
337	Merphos	150-50-5	D	2.0	20.0
338	Merphos oxide	78-48-8	D	2.0	20.0
339	Metalaxyl	57837-19-1	D	3900.0	41000.0
340	Methacrylonitrile	126-98-7	D	2.0	8.1
341	Methamidophos	10265-92-6	D	3.3	34.0
342	Methanol	67-56-1	D	33000.0	340000.0
343	Methidathion	950-37-8	C	65.0	680.0
344	Methomyl	16752-77-5	D	1600.0	17000.0
345	Methoxychlor	72-43-5	D	330.0	3400.0
346	2-Methoxyethanol	109-86-4	D	65.0	680.0

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347	2-Methoxyethanol acetate	110-49-6	D	130.0	1400.0
348	2-Methoxy-5-nitroaniline	99-59-2	C	97.0	410.0
349	Methyl acetate	79-20-9	D	21000.0	88000.0
350	Methyl acrylate	96-33-3	D	69.0	230.0
351	2-Methylaniline (o-toluidine)	<del>100-61-8</del> <u>95-53-4</u>	B2	19.0	79.0
352	2-Methylaniline hydrochloride	636-21-5	B2	25.0	110.0
353	Methyl chlorocarbonate	79-22-1	D	65000.0	680000.0
354	2-Methyl-4-chlorophenoxyacetic acid	94-74-6	D	33.0	340.0
355	4-(2-Methyl-4-chlorophenoxy) butyric acid (MCPB)	94-81-5	D	650.0	6800.0
356	2-(2-Methyl-4-chlorophenoxy) propionic acid	93-65-2	D	65.0	680.0
357	2-(2-Methyl-1,4-chlorophenoxy) propionic acid (MCPB)	16484-77-8	D	65.0	680.0
358	Methylcyclohexane	108-87-2	D	56000.0	590000.0
359	4,4'-Methylenebisbenzeneamine	101-77-9	D	18.0	76.0
360	4,4'-Methylene bis(2-chloroaniline)	101-14-4	B2	34.0	150.0
361	4,4'-Methylene bis(N,N'-dimethyl)aniline	101-61-1	B2	97.0	410.0
362	Methylene bromide	74-95-3	D	650.0	6800.0
363	Methylene chloride	75-09-2	B2	77.0	180.0
364	Methyl ethyl ketone	78-93-3	D	7100.0	27000.0
365	Methyl hydrazine	60-34-4	B, C	4.0	17.0
366	Methyl isobutyl ketone	108-10-1	D	770.0	2800.0
367	* Methyl methacrylate	80-62-6	D	760.0	2800.0
368	2-Methyl-5-nitroaniline	99-55-8	C	130.0	580.0
369	Methyl parathion	298-00-0	D	16.0	170.0
370	2-Methylphenol	95-48-7	C	3300.0	34000.0
371	3-Methylphenol	108-39-4	C	3300.0	34000.0
372	4-Methylphenol	106-44-5	C	330.0	3400.0
373	Methyl styrene (mixture)	25013-15-4	D	120.0	520.0
374	* Methyl styrene (alpha)	98-83-9	D	890.0	3100.0
375	Methyl tertbutyl ether (MTBE)	1634-04-4	D	320.0	3300.0
376	Metolacolor (Dual)	51218-45-2	D	9800.0	100000.0
377	Metribuzin	21087-64-9	D	1600.0	17000.0
378	Mirex	2385-85-5	B2	2.5	11.0
379	Molinate	2212-67-1	D	130.0	1400.0
380	Molybdenum	7439-98-7	D	380.0	8500.0



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381	Monochloramine	10599-90-3	D	6500.0	68000.0
	<b>N</b>				
382	Naled	300-76-5	D	130.0	1400.0
383	Naphthalene	91-20-3	D	2600.0	27000.0
384	Napropamide	15299-99-7	D	6500.0	68000.0
385	Nickel and compounds	7440-02-0	D	1500.0	34000.0
386	Nickel subsulfide	12035-72-2	A	5100.0	11000.0
387	Nitrapyrin	1929-82-4	D	98.0	1000.0
388	Nitrate	14797-55-8	D	100000.0	1000000.0
389	Nitrite	14797-65-0	D	6500.0	68000.0
390	2-Nitroaniline	88-74-4	D	3.9	41.0
391	Nitrobenzene	98-95-3	D	18.0	94.0
392	Nitrofurantoin	67-20-9	D	4600.0	48000.0
393	Nitrofurazone	59-87-0	B2	3.0	13.0
394	Nitroguanidine	556-88-7	D	6500.0	68000.0
395	N-Nitrosodi-n-butylamine	924-16-3	B2	0.22	0.55
396	N-Nitrosodiethanolamine	1116-54-7	B2	1.6	6.8
397	N-Nitrosodiethylamine	55-18-5	B2	0.03	0.13
398	N-Nitrosodimethylamine	62-75-9	B2	0.087	0.37
399	N-Nitrosodiphenylamine	86-30-6	B2	910.0	3900.0
400	N-Nitroso di-n-propylamine	621-64-7	B2	0.63	2.7
401	N-Nitroso-N-methylethylamine	10595-95-6	B2	0.20	0.87
402	N-Nitrosopyrrolidine	930-55-2	B2	2.1	9.1
403	m-Nitrotoluene	99-08-1	D	650.0	6800.0
404	p-Nitrotoluene	99-99-0	D	650.0	6800.0
405	Norflurazon	27314-13-2	D	2600.0	27000.0
406	NuStar	85509-19-9	D	46.0	480.0
	<b>O</b>				
407	Octabromodiphenyl ether	32536-52-0	D	200.0	2000.0
408	Octahydro-1357-tetranitro-1357- tetrazocine ( <u>HMX</u> )	2691-41-0	D	3300.0	34000.0
409	Octamethylpyrophosphoramidate	152-16-9	D	130.0	1400.0
410	Oryzalin	19044-88-3	C	3300.0	34000.0
411	Oxadiazon	19666-30-9	D	330.0	3400.0
412	Oxamyl	23135-22-0	E	1600.0	17000.0
413	Oxyfluorfen	42874-03-3	D	200.0	2000.0

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	<b>P</b>				
414	Paclobutrazol	76738-62-0	D	850.0	8900.0
415	Paraquat	4685-14-7	C	290.0	3100.0
416	Parathion	56-38-2	C	390.0	4100.0
417	Pebulate	1114-71-2	D	3300.0	34000.0
418	Pendimethalin	40487-42-1	D	2600.0	27000.0
419	Pentabromo-6-chloro cyclohexane	87-84-3	C	190.0	830.0
420	Pentabromodiphenyl ether	32534-81-9	D	130.0	1400.0
421	Pentachlorobenzene	608-93-5	D	52.0	550.0
422	Pentachloronitrobenzene	82-68-8	C	17.0	73.0
423	Pentachlorophenol	87-86-5	B2	25.0	79.0
424	Permethrin	52645-53-1	D	3300.0	34000.0
425	Phenmedipham	13684-63-4	D	16000.0	170000.0
426	Phenol	108-95-2	D	39000.0	410000.0
427	m-Phenylenediamine	108-45-2	D	390.0	4100.0
428	p-Phenylenediamine	106-50-3	D	12000.0	130000.0
429	Phenylmercuric acetate	62-38-4	D	5.2	55.0
430	2-Phenylphenol	90-43-7	C	2300.0	9800.0
431	Phorate	298-02-2	E	13.0	140.0
432	Phosmet	732-11-6	D	1300.0	14000.0
433	Phosphine	7803-51-2	D	20.0	200.0
434	Phosphorus, white	7723-14-0	D	1.5	34.0
435	Phthalic anhydride	85-44-9	D	130000.0	1000000.0
436	Picloram	1918-02-1	D	4600.0	48000.0
437	Pirimiphos-methyl	23505-41-1	D	650.0	6800.0
438	Polybrominated biphenyls (PBBs)	N/A	B2	0.46	2.1
439	Polychlorinated biphenyls (PCBs)	1336-36-3	B2	2.5	13.0
440	Potassium cyanide	151-50-8	D	3300.0	34000.0
441	Potassium silver cyanide	506-61-6	D	13000.0	140000.0
442	Prochloraz	67747-09-5	C	30.0	130.0
443	Profluralin	26399-36-0	D	390.0	4100.0
444	Prometon	1610-18-0	D	980.0	10000.0
445	Prometryn	7287-19-6	D	260.0	2700.0
446	Pronamide	23950-58-5	C	4900.0	51000.0
447	Propachlor	1918-16-7	D	850.0	8900.0
448	Propanil	709-98-8	D	330.0	3400.0

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449	Propargite	2312-35-8	D	1300.0	14000.0
450	Propargyl alcohol	107-19-7	D	130.0	1400.0
451	Propazine	139-40-2	C	1300.0	14000.0
452	Propham	122-42-9	D	1300.0	14000.0
453	Propiconazole	60207-90-1	D	850.0	8900.0
454	Propylene glycol	57-55-6	D	1000000.0	1000000.0
455	Propylene glycol, monoethyl ether	111-35-3	D	46000.0	480000.0
456	Propylene glycol, monomethyl ether	107-98-2	D	46000.0	480000.0
457	Propylene oxide	75-56-9	B2	19.0	79.0
458	Pursuit	81335-77-5	D	16000.0	170000.0
459	Pydrin	51630-58-1	D	1600.0	17000.0
460	Pyrene	129-00-0	D	2000.0	20000.0
461	Pyridine	110-86-1	D	65.0	680.0
<b>Q</b>					
462	Quinalphos	13593-03-8	D	33.0	340.0
463	Quinoline	91-22-5	C	0.37	1.6
<b>R</b>					
464	RDX (Cyclonite)	121-82-4	C	40.0	170.0
465	Resmethrin	10453-86-8	D	2000.0	20000.0
466	Ronnel	299-84-3	D	3300.0	34000.0
467	Rotenone	83-79-4	D	260.0	2700.0
<b>S</b>					
468	Savey	<del>78578-05-0</del> <u>78587-05-0</u>	D	1600.0	17000.0
469	Selenious Acid	7783-00-8	D	330.0	3400.0
470	Selenium	7782-49-2	D	380.0	8500.0
471	Selenourea	630-10-4	D	330.0	3400.0
472	Sethoxydim	74051-80-2	D	5900.0	61000.0
473	Silver and compounds	7440-22-4	D	380.0	8500.0
474	Silver cyanide	506-64-9	D	6500.0	68000.0
475	Simazine	122-34-9	C	37.0	160.0
476	Sodium azide	26628-22-8	D	260.0	2700.0
477	Sodium cyanide	143-33-9	D	2600.0	27000.0
478	Sodium diethyldithiocarbamate	148-18-5	C	16.0	71.0
479	Sodium fluoroacetate	62-74-8	D	1.3	14.0
480	Sodium metavanadate	13718-26-8	D	65.0	680.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
481	Strontium, stable	7440-24-6	D	46000.0	1000000.0
482	Strychnine	57-24-9	D	20.0	200.0
483	* Styrene	100-42-5	C	3300.0	3300.0
484	Systhane	88671-89-0	D	1600.0	17000.0
	<b>T</b>				
485	2,3,7,8-TCDD (dioxin)	1746-01-6	B2	0.000038	0.00024
486	Tebuthiuron	34014-18-1	D	4600.0	48000.0
487	Temephos	3383-96-8	D	1300.0	14000.0
488	Terbacil	5902-51-2	E	850.0	8900.0
489	Terbufos	13071-79-9	D	1.6	17.0
490	Terbutryn	886-50-0	D	65.0	680.0
491	1,2,4,5-Tetrachlorobenzene	95-94-3	D	20.0	200.0
492	1,1,1,2-Tetrachloroethane	630-20-6	C	23.0	54.0
493	1,1,2,2-Tetrachloroethane	79-34-5	C	4.4	11.0
494	Tetrachloroethylene (PCE)	127-18-4	B2	53.0	170.0
495	2,3,4,6-Tetrachlorophenol	58-90-2	D	2000.0	20000.0
496	p,a,a,a-Tetrachlorotoluene	5216-25-1	B2	0.22	0.95
497	Tetrachlorovinphos	961-11-5	C	190.0	790.0
498	Tetraethyldithiopyrophosphate	3689-24-5	D	33.0	340.0
499	Thallic oxide	1314-32-5	D	5.4	120.0
500	Thallium acetate	563-68-8	D	6.9	150.0
501	Thallium carbonate	6533-73-9	D	6.1	140.0
502	Thallium chloride	7791-12-0	D	6.1	140.0
503	Thallium nitrate	10102-45-1	D	6.9	150.0
504	Thallium selenite	12039-52-0	D	6.9	150.0
505	Thallium sulfate	7446-18-6	D	6.1	140.0
506	Thiobencarb	28249-77-6	D	650.0	6800.0
507	2-(Thiocyanomethylthio)- benzothiazole (TCMTB)	3689-24-5	D	2000.0	20000.0
508	Thiofanox	39196-18-4	D	20.0	200.0
509	Thiophanate-methyl	23564-05-8	D	5200.0	55000.0
510	Thiram	137-26-8	D	330.0	3400.0
511	Tin and compounds	7440-31-5	D	46000.0	1000000.0
512	* Toluene	108-88-3	D	790.0	2700.0
513	Toluene-2,4-diamine	95-80-7	B2	1.4	6.0
514	Toluene-2,5-diamine	95-70-5	D	39000.0	410000.0
515	Toluene-2,6-diamine	823-40-5	C	13000.0	140000.0

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	<b>Chemical Name</b>	<b>Cas-CAS Number</b>	<b>Cancer Group</b>	<b>Residential (mg/ kg)</b>	<b>Non-residential (mg/kg)</b>
516	p-Toluidine	106-49-0	C	23.0	100.0
517	Toxaphene	8001-35-2	B2	4.0	17.0
518	Tralomethrin	66841-25-6	D	490.0	5100.0
519	Triallate	2303-17-5	D	850.0	8900.0
520	Triasulfuron	82097-50-5	D	650.0	6800.0
521	1,2,4-Tribromobenzene	615-54-3	D	330.0	3400.0
522	Tributyltin oxide (TBTO)	56-35-9	D	2.0	20.0
523	2,4,6-Trichloroaniline	634-93-5	C	130.0	560.0
524	2,4,6-Trichloroaniline hydrochloride	33663-50-2	C	150.0	660.0
525	* 1,2,4-Trichlorobenzene	120-82-1	D	570.0	4700.0
526	* 1,1,1-Trichloroethane	71-55-6	D	1200.0	4800.0
527	1,1,2-Trichloroethane	79-00-5	C	6.5	15.0
528	Trichloroethylene (TCE)	79-01-6	B2	27.0	70.0
529	Trichlorofluoromethane	75-69-4	D	380.0	1300.0
530	2,4,5-Trichlorophenol	95-95-4	D	6500.0	68000.0
531	2,4,6-Trichlorophenol	88-06-2	B2	400.0	1700.0
532	2,4,5-Trichlorophenoxyacetic Acid acid	93-76-5	D	650.0	6800.0
533	2-(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	D	520.0	5500.0
534	1,1,2-Trichloropropane	598-77-6	D	15.0	50.0
535	1,2,3-Trichloropropane	96-18-4	B2	0.014	0.03
536	1,2,3-Trichloropropene	96-19-5	D	11.0	38.0
537	* 1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	D	10000.0	10000.0
538	Tridiphane	58138-08-2	D	200.0	2000.0
539	Triethylamine	121-44-8	D	23.0	84.0
540	Trifluralin	1582-09-8	C	490.0	2500.0
541	Trimethyl phosphate	512-56-1	B2	120.0	520.0
542	1,3,5-Trinitrobenzene	99-35-4	D	3.3	34.0
543	Trinitrophenylmethylnitramine	479-45-8	D	650.0	6800.0
544	2,4,6-Trinitrotoluene	118-96-7	C	33.0	340.0
	<b>V</b>				
545	Vanadium	7440-62-2	D	540.0	12000.0
546	Vanadium pentoxide	1314-62-1	D	690.0	15000.0
547	Vanadium sulfate	13701-70-7	D	1500.0	34000.0
548	Vernam	1929-77-7	D	65.0	680.0
549	Vinclozolin	50471-44-8	D	1600.0	17000.0
550	Vinyl acetate	108-05-4	D	780.0	2600.0

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	Chemical Name	Cas-CAS Number	Cancer Group	Residential (mg/kg)	Non-residential (mg/kg)
551	Vinyl bromide	593-60-2	B2	1.9	4.1
552	Vinyl chloride	75-01-4	A	0.016	0.035
	<b>W</b>				
553	Warfarin	81-81-2	D	20.0	200.0
	<b>X</b>				
554	* Xylene (mixed)	1330-20-7	D	2800.0	2800.0
	<b>Z</b>				
555	Zinc	7440-66-6	D	23000.0	510000.0
556	Zinc phosphide	1314-84-7	D	23.0	510.0
557	Zinc cyanide	557-21-1	D	3300.0	34000.0
558	Zineb	12122-67-7	D	3300.0	34000.0

\* = 1% free-phase analysis

# = Based on IEUBK Model

~ = Based on natural background

N/A = Not Applicable

CARCINOGENICITY CLASSIFICATIONS:

A = Known human carcinogen

B1 = Probable human carcinogen, with limited data indicating human carcinogenicity.

B2 = Probable human carcinogen, with inadequate or no evidence of carcinogenicity in humans. Sufficient evidence for carcinogenicity in laboratory animals.

C = Possible human carcinogen.

D = Not classifiable as to human carcinogenicity.

E = Evidence of noncarcinogenicity in humans.

Appendix B. ~~Notice of Voluntary Environmental Mitigation Use Restriction By Owner or Owners~~ **Repealed**

When recorded, mail to:

**NOTICE OF VOLUNTARY ENVIRONMENTAL MITIGATION  
USE RESTRICTION BY OWNER OR OWNERS**

Pursuant to A.R.S. § 49-152(B), the owner or owners \_\_\_\_\_ of the following described property:

(Please Print)

*(insert legal description of entire parcel)*

has (have) remediated a portion of the above described property, which remediated portion is described as follows:

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*(insert legal description of remediated portion, the source of the release, and the remaining contaminants)*

The date when the remediation was completed is: \_\_\_\_\_

The undersigned owner voluntarily agrees to limit and restrict the use of the remediated portion of the property to non-residential uses, as defined in A.R.S. § 49-151(A).

\_\_\_\_\_  
Signature of owner

STATE OF ARIZONA

County of \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ (name of signer), whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document, and who acknowledged that he/she signed the above document.

\_\_\_\_\_  
Notary Public

(Notary Seal)

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Signature of owner (if 2nd owner's signature is required)

STATE OF ARIZONA

County of \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ (name of signer), whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document, and who acknowledged that he/she signed the above document.

\_\_\_\_\_  
Notary Public

(Notary Seal)

My commission expires: \_\_\_\_\_

Approved: \_\_\_\_\_  
(ADEQ official)

STATE OF ARIZONA

County of \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ (name of signer), whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document, and who acknowledged that he/she signed the above document.

\_\_\_\_\_  
Notary Public

(Notary Seal)

My commission expires: \_\_\_\_\_

Please make no marks below this line \_\_\_\_\_

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Appendix C. ~~Cancellation of Voluntary Environmental Mitigation Use Restriction By Owner or Owners~~ Repealed

When recorded, mail to:

**CANCELLATION OF VOLUNTARY ENVIRONMENTAL MITIGATION  
USE RESTRICTION BY OWNER OR OWNERS**

Pursuant to A.R.S. § 49-152(B), the owner or owners \_\_\_\_\_

of the following described property:

(Please Print)

*(insert legal description of entire parcel)*

recorded a Notice of Voluntary Mitigation Use Restriction By Owner or Owners in the Office of the County Recorder of \_\_\_\_\_  
County, Arizona on the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ in Document/Docket \_\_\_\_\_ at Page \_\_\_\_\_, affecting the following por-  
tion of the above described property:

*(insert legal description of remediated portion)*

Pursuant to A.R.S. § 49-152(C), the undersigned hereby cancel or cancels the above described notice and declare or declares said notice to  
be of no further force and effect as of this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_

Signature of owner

STATE OF ARIZONA-

County of \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ (name of  
signer), whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document,  
and who acknowledged that he/she signed the above document.

\_\_\_\_\_

Notary Public

(Notary Seal)

My commission expires: \_\_\_\_\_

\_\_\_\_\_

(ADEQ official)

STATE OF ARIZONA-

County of \_\_\_\_\_



*Arizona Administrative Register / Secretary of State*

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On this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me personally appeared \_\_\_\_\_ (name of signer), whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this document, and who acknowledged that he/she signed the above document.

\_\_\_\_\_  
\_\_\_\_\_  
Notary Public

(Notary Seal)

My commission expires: \_\_\_\_\_

Please make no marks below this line

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