Appendix **A**

Resources for Building a Partnership, Setting Goals, and Developing a Communication Plan

The links below provide access to both web-based and printed resources for building partnerships, setting goals, and developing a plan for communication. The list of web sites is a only a sample of the resources that are available on the Internet. Each of these sources provides links to additional resources that are available. Please check the Manual web site for updates to these links.

In addition to resources available on the Internet, local libraries and librarians are also an excellent source for information on these topics. Local community organizations and colleges can also be great resources to help you get started and build your organization.

EPA and other federal government resources

Community-Based Environmental Protection
See the tool, resources, and links pages on this site:
http://www.epa.gov/ecocommunity/about.htm

Watershed Information Network
Although focused on watersheds, this site has excellent resources for getting started with a community project:
http://www.epa.gov/win/ and
http://www.epa.gov/win/start.html

Community Involvement Toolkit
This excellent community resource was developed for the Superfund program:
http://www.epa.gov/superfund/tools/index.htm

Public Involvement site
For resources see the tools page on this site:
http://www.epa.gov/stakeholders/

Department of Housing and Urban Development (HUD), Communities site
http://www.hud.gov/community/index.cfm

National Park Service Community Toolbox
http://www.nps.gov/phso/rtcatoolbox/

Other resources

Please note that the following links are not a part of the EPA.gov domain. These links provide additional information that may be useful or interesting and are being provided consistent with the intended purpose of this EPA document. However, EPA cannot attest to the accuracy of information provided by these links or any other linked site. Providing links to a non-EPA web site does not constitute an endorsement by EPA or any of its employees of the sponsors of the site or the information or products presented on the site. Also, be aware that the privacy protection provided on the epa.gov domain may not be available at the external link.

Asset Based Community Development Institute
http://www.northwestern.edu/ipr/abcd.html

Center for Collaborative Planning, Resource Library
http://www.connectccp.org/resources/

Civic Practices Network Tools Community
http://www.cpn.org/tools/manuals/community/index.html

Citizens Handbook, A Guide to Building Community
http://www.vcn.bc.ca/citizens handbook/

Clean Air Counts, Campaigns for Clean Air and Development, Metropolitan Chicago
http://www.cleanaircounts.org/

Appendix A: Resources for Building a Partnership, Setting Goals, and Developing a Communication Plan

Community Campus Partnerships for Health
http://www.futurehealth.ucsf.edu/ccph.html

Community Problem Solving, Strategy for a Changing World
http://www.community problem solving.net/

Community Tool Box
http://ctb.ku.edu/

National Civic League
http://www.ncl.org/

Community Visioning and Strategic Planning Handbook
http://www.ncl.org/publications/online/VSPHandbook.pdf

Partnership for Public Health, Resources
http://www.partnershipph.org/col3/resc/res_index.html

Study Circle Resource Center
http://www.studycircles.org/index.html

Sustainable Communities Network
http://www.sustainable.org/

Appendix **B**

Examples of Projects Communities Have Adopted to Improve Air Quality

Examples of the risk reduction activities or options that have been identified for consideration by community partnerships in Cleveland, Ohio; St. Louis, Missouri; and West Oakland, California, can be found at the web sites provided below. The web site for the Clean Air Counts program from the metropolitan Chicago area is also provided as a resource for risk reduction activities.

In addition, for a list of activities that communities are taking to reduce exposure to diesel exhaust from school buses see the descriptions of the Clean School Bus Demonstration Projects at http://www.epa.gov/otaq/schoolbus/grants_2003.htm.

The web sites listed below do not provide a comprehensive list of activities that communities have used to reduce exposures and risks. At the time of the publication of this Manual, many communities were completing local assessments and beginning to consider options for reductions, so many more examples of reduction activities will be available in the future. As communities complete their reduction strategies, descriptions of their plans will be made available on EPA's **Air Toxics Community Assessment and Risk Reduction Projects Database** at http://yosemite.epa.gov/oar/CommunityAssessment.nsf/Welcome?OpenForm.

For a list of resources and programs for pollution prevention and emissions reduction please see Appendix G.

Please note that the following links are not a part of the EPA.gov domain. These links provide additional information that may be useful or interesting and are being provided consistent with the intended purpose of this EPA document. However, EPA cannot attest to the accuracy of information provided by these links or any other linked site. Providing links to a non-EPA web site does not constitute an endorsement by EPA or any of its employees of the sponsors of the site or the information or products presented on the site. Also, be aware that the privacy protection provided on the epa.gov domain may not be available at the external link.

Clean Air Counts, Campaigns for Clean Air and Development, Metropolitan Chicago
http://www.cleanaircounts.org/

Cleveland Air Toxics Pilot Project
http://www.ohiolung.org/ccacc.htm

St. Louis Community Air Project
http://www.stlcap.org/whatsnew.htm

One of the results of the St. Louis work is a set of curriculum materials developed by the Missouri Botanical Gardens. These educational materials are designed to help learners of all ages understand air toxics and how they can affect health and what can be done to reduce air toxics levels. These materials are developed in five units for kindergarten through adult learners. These curriculum materials will be available in the spring of 2004 at http://www.mobot.org/gatewaycenter/.

West Oakland: Report on Reducing Diesel Pollution
http://www.pacinst.org/diesel/index.html

Appendix C

Resources for Addressing Indoor Air Exposures and Acute Outdoor Air Exposures

The following list of resources is not comprehensive. Please use these resources as a starting point for your work. Please see Appendix G for risk reduction resources for indoor air.

Please note that some of the following links are not a part of the epa.gov domain. These links provide additional information that may be useful or interesting and are being provided consistent with the intended purpose of this EPA document. However, EPA cannot attest to the accuracy of information provided by these links or any other linked site. Providing links to a non-EPA web site does not constitute an endorsement by EPA or any of its employees of the sponsors of the site or the information or products presented on the site. Also, be aware that the privacy protection provided on the epa.gov domain may not be available at the external link.

Indoor Air Resources

Indoor Air Quality Home Page
http://www.epa.gov/iaq/

An Introduction to Indoor Air Quality (IAQ)
http://www.epa.gov/iaq/ia-intro.html

The Inside Story: A Guide to Indoor Air Quality
http://www.epa.gov/iaq/pubs/insidest.html

Fact Sheet: Respiratory Health Effects of Passive Smoking
http://www.epa.gov/smokefree/pubs/etsfs.html

American Lung Association
http://www.lungusa.org/

Community Environmental Health Resource Center (CEHRC)
http://www.cehrc.org/

California Indoor Air Quality Program
http://www.cal-iaq.org/

Indoor Air Quality Association
http://www.iaqa.org/

Sources for Information on Acute Effects of Toxic Chemicals

Agency for Toxic Substance and Disease Registry Minimal Risk Levels for Hazardous Substances
http://www.atsdr.cdc.gov/mrls.html

California Environmental Protection Agency Office of Environmental Health Hazard Assessment Toxicity Criteria Database
http://www.oehha.ca.gov/risk/chemicalDB/index.asp

U.S. EPA Integrated Risk Information System (IRIS) 2003
http://www.epa.gov/ngispgm3/iris/subst/index.html

U.S. EPA Office of Air Quality Planning and Standards Air Toxics Dose-Response Database 2002
http://www.epa.gov/ttn/atw/toxsource/summary120202.html

Technical Background Document to Support Rulemaking Pursuant to the Clean Air Act - Section 112 (g): Ranking of Pollutants with Respect to Hazard to Human Health, U.S. Environmental Protection Agency. 1994. EPA-450/3-92-010, February 1994.

Voluntary Remediation Program (VRP) Risk Assessment Guidance, Virginia Department of Environmental Quality (VDEQ). 2000.

Appendix D

Summary of Lessons Learned by the Baltimore Partnership

Lessons Learned in Baltimore

The work of the Community Environmental Partnership in Baltimore, Maryland, was a learning experience for all of the people who participated. The Partnership tried a lot of new things—some of them worked and some didn't. A few lessons learned from this work are listed below. A complete list of lessons learned by the Baltimore Air Study can be found in the case study at http://www.epa.gov.opptintr/cahp/case.html.

The following are among the lessons learned:

- Bringing community stakeholders and science experts together to address community concerns is a key to success. Both the local knowledge of community residents and the science and tools of experts are needed to understand and to find the most effective ways to improve a local environment. Developing a dialogue between residents and experts also helps to build the consensus that will be needed to take action.
- Don't skimp on the time spent at the beginning of a project clarifying goals. Make sure all the participants are clear about their own goals and communicate them to the other members of the partnership. Make sure participants are clear about how the goals set by the partnership relate to their own goals. If the goals of the project match the participants' goals, the resources and energy will be sufficient to sustain the work.
- Building a strong partnership with a full range of stakeholders and broad community participation is key to mobilizing the new resources that will be needed for detailed local assessments and for implementing local solutions. No single community group or level of government has the resources to address local issues, so building a partnership and learning to work together will be essential. Local community organizations and local government can form the core of the partnership, with others outside the community providing resources not available at the local level.
- Plan for adequate time and resources to build and sustain the partnership. Working in a broad partnership using science at the community level will be a new way of doing business for most of the participants. Take time to build the trust, develop the organization, and provide the information and training that all the participants will need to work effectively in a partnership.
- Once goals for the partnership are clarified, make sure the partnership has the resources and scope to meet the goals. For example, if improving the health of the community is a goal, a broad partnership that can address all of the important factors affecting community health will need to be formed. Any attempt to improve community health by addressing environmental issues by themselves will probably not be able to produce results and will lead to disappointment.
- Be prepared to take a step-by-step approach to building the consensus on environmental issues in your community. Communities may decide to focus on their main concerns first and take on other areas in the future. It will take time to complete a fuller picture of the local environment that everyone can agree with.
- Be prepared to be creative in solving problems. The information, analysis tools, and solutions that communities need to improve their environments do not come ready-made. Your partnership will probably have to find ways to collect data and use and adapt tools designed for other purposes to answer your questions. If it is broad enough, your partnership will have the resources to find answers, but only if it is prepared to be creative. Making progress at the local level will depend on effective

sharing among communities, so when you develop new approaches, please share them so that other communities do not have to reinvent the wheel. If you have ideas you can share with others, send them to us and we will post them on this Manual's web site for others to learn from.

- Communicate and involve the broader community in the work of the partnership on a regular basis. Regular communication gives the broader community an opportunity to provide input into the work of the partnership, participate in partnership activities, and learn from the work. Identifying community needs, taking advantage of community knowledge, and mobilizing the community to take action all will depend on maintaining a close and active relationship between the partnership organization and the community.
- Pay attention to the long-term capacity of the community to address environmental concerns. Identify areas of community capacity that need strengthening and organize the work of the partnership to help build capacity in these areas. In addition to knowledge and training in environmental areas, include other issues that will be important to long-term capacity, such as fund-raising, organizing, and leadership skills.
- Recognize that the work to understand and improve local environments will take a sustained long-term effort, and getting to measurable results will take years. Partnerships should take a long-term perspective and develop plans accordingly. The contributions of outside partners may vary according to their priorities, but those contributions should be adjusted to fit into the Partnership's plan for sustaining a long-term effort.

Appendix E

List of Hazardous Air Pollutants (HAPs)

CAS Number	Chemical
75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorene
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene
156627	Calcium cyanamide
105602	Caprolactam (See Modification)
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether

The original list of Hazardous Air Pollutants can also be found at the EPA Technology Transfer Network Air Toxics web site:
http//www.epa.gov/ttn/atw/188pols.html

Modifications to the 112(b)1 Hazardous Air Pollutants can also be found at the EPA Technology Transfer Network Air Toxics web site:
http//www.epa.gov/ttn/atwsmod/188pols.html

Appendix E: List of Hazardous Air Pollutants

CAS Number	Chemical
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
108394	m-Cresol
95487	o-Cresol
106445	p-Cresol
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
542756	1,3-Dichloropropene
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Diethyl aniline (N,N-Dimethylaniline)
64675	Diethyl sulfate
119904	3,3-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3'-Dimethyl benzidine
79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol

CAS Number	Chemical
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (l-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane
302012	Hydrazine
7647010	Hydrochloric acid

CAS Number	Chemical
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide (See Modification)
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride
67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tertiary butyl ether
101144	4,4-Methylene bis (2-chloroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4-Methylenedianiline
91203	Naphthalene
98953	Nitrobenzene

CAS Number	Chemical
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide
75558	1,2-Propylenimine (2-Methyl aziridine)
91225	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin

Appendix E: List of Hazardous Air Pollutants

CAS Number	Chemical
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
108383	m-Xylenes
95476	o-Xylenes
106423	p-Xylenes
0	Antimony compounds
0	Arsenic compounds (inorganic including arsine)
0	Beryllium compounds
0	Cadmium compounds
0	Chromium compounds
0	Cobalt compounds
0	Coke oven emissions
0	Cyanide Compounds[1]
0	Glycol ethers[2]
0	Lead compounds
0	Manganese compounds
0	Mercury compounds
0	Fine mineral fibers[3]
0	Nickel compounds
0	Polycylic organic matter[4]
0	Radionuclides (including radon)[5]
0	Selenium compounds modifications

NOTE: For all listings above that contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

1. X'CN where X = H' or any other group where a formal dissociation may occur, for example KCN or $Ca(CN)_2$

2. Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol $R\text{-}(OCH_2CH_2)n$ -OR' where
   n = 1, 2, or 3
   R = alkyl or aryl groups
   R' = R, H, or groups which, when removed, yield glycol ethers with the structure: $R\text{-}(OCH_2CH)_n$-OH. Polymers are excluded from the glycol category. (See Modification.)

3. Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral-derived fibers) of average diameter 1 micrometer or less.

4. Includes organic compounds with more than one benzene ring, and a boiling point greater than or equal to 100 °C.

5. A type of atom that spontaneously undergoes radioactive decay.

Modifications to the 112(b)(1) Hazardous Air Pollutants

Glycol Ethers

On January 12, 1999 (64FR1780), the EPA proposed to modify the definition of glycol ethers to exclude surfactant alcohol ethoxylates and their derivatives (SAED). On August 2, 2000 (65FR47342), the EPA published the final action. This action deletes each individual compound in a group called the surfactant alcohol ethoxylates and their derivatives (SAED) from the glycol ethers category in the list of hazardous air pollutants (HAP) established by section 112(b)(1) of the Clean Air Act (CAA). Under section 112(b)(3)(D) of the CAA, EPA may delete specific substances from certain listed categories, including glycol ethers. To implement this action, EPA is revising the definition of glycol ethers to exclude the deleted compounds. This action is also making conforming changes with respect to designation of hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These final rules are being issued by EPA in response to an analysis of potential exposure and hazards of SAED that was prepared by the Soap and Detergent Association (SDA) and submitted to EPA. Based on this information, EPA has made a final determination that there are adequate data on the health and environmental effects of these substances to determine that emissions, ambient concentrations, bioaccumulation, or deposition of these substances may not reasonably be anticipated to cause adverse human health or environmental effects. All information associated with this rulemaking is available at EPA's Air and Radiation Docket and Information Docket, Room M1500, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. The docket is an organized and complete file of all the information considered by the EPA in the development of this rulemaking. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can effectively participate in the rulemaking process. Along with the proposed and promulgated standards and their preambles, the contents of the docket will serve as the record in the case of judicial review. (See section 307(d)(7)(A) of the CAA.) An index for each docket, as well as individual items contained within the dockets, may be obtained by calling (202) 260-7548 or (202) 260-7549. Alternatively, docket indexes are available by facsimile, as described on the Office of Air and Radiation, Docket and Information Center web site at http://www.epa.gov/oar/docket. A reasonable fee may be charged for copying docket materials. A useful reference for the glycol ether category is linked below.

Toxics Release Inventory: List of Toxic Chemicals Within the Glycol Ethers Category (December 2000).

Caprolactam

On July 19, 1993, EPA received a petition from AlliedSignal, Inc., BASF Corporation, and DSM Chemicals North America, Inc. to delete caprolactam (CAS No. 105-60-2) from the hazardous air pollutant list in Section 112(b)(1), 42 U.S.C., Section 7412(b)(1). A Notice of Receipt was published (58FR45081, August 26, 1993) noting that the data filed were adequate to support decision making. After a comprehensive review of the data submitted, the EPA published a proposal to delist caprolactam (60FR48081, September 18, 1995). In order to help address public concern,on March 13, 1995, EPA executed two detailed agreements with AlliedSignal concerning the Irmo, South Carolina, manufacturing facility and another facility located in Chesterfield, Virginia, copies of which are included in the public docket for this rulemaking. AlliedSignal agreed that, if caprolactam was delisted pursuant to the proposal, AlliedSignal would install emissions controls, which EPA believed would be equivalent to the controls which would have been required had EPA issued a standard to control these sources under Section 112. The agreed emissions controls are incorporated in federally enforceable operating permits for the affected facilities, and will be in place years earlier than controls would have otherwise been required. In addition, AlliedSignal has agreed to establish a citizen advisory panel concerning the Irmo facility in order to improve communications with the community and to ensure that citizens have an ongoing role in implementation of the agreed emission reductions. The public requested a public hearing. On November 28, 1995, the EPA published a notice of public hearing and an extention of the comment period (60FR58589). After considering all public comments, the EPA published a final rule delisting caprolactam (61FR30816, June 18, 1996). All information associated with this rulemaking is located in Docket Number A-94-33 at the Central Docket Section (A-130), Environmental Protection Agency, 401 M St. SW., Washington, DC 20460; phone 202-260-7548, fax 202-260-4400, e-mail a-and-r-docket@epamail.epa. gov.

The docket includes a complete index to all papers filed in this docket, a copy of the original petition, comments submitted, and additional materials supporting the rule. A reasonable fee may be charged for copying. The docket may be inspected in person between 8:00 a.m. and 4:30 p.m. on weekdays at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M St., SW, Washington, DC 20460.

Hydrogen Sulfide

A clerical error led to the inadvertent addition of hydrogen sulfide to the Section 112(b) list of Hazardous Air Pollutants. However, a Joint Resolution to remove hydrogen sulfide from the Section 112(b)(1) list was passed by the Senate on August 1, 1991 (Congressional Record page S11799), and the House of Representatives on November 25, 1991 (Congressional Record pages H11217-H11219). The Joint Resolution was approved by the President on December 4, 1991. Hydrogen Sulfide is included in Section 112(r) and is subject to the accidental release provisions. A study (see citation below) was required under Section 112(n)(5).

Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas,
EPA-453/R-93-045,
NTIS (publication # PB94-131224, $36.50 hard copy, $17.50 microfiche).

National Technical Information Services (NTIS)
5285 Port Royal Road
Springfield, VA 22161
703-487-4650 800-426-4791
703-487-4807 8:30-5:30 EST M-F

Appendix **F**

Air Pollution and Your Health

St. Louis Community Air Project (CAP) knows that your health and your family's health are important. It is our goal to reduce the risks to your health by identifying and reducing air pollutants. This will take the cooperation and hard work of everyone. We all contribute to air pollution and we can all do something about it. Visit the St. Louis CAP "What I Can Do" page at http://www.stlcap.org/whatsnew.htm for more information.

The St. Louis CAP Partnership spent several monthly meetings learning about health risk and how the U.S. Environmental Protection Agency calculates cancer and non-cancer health risks. This education process prepared the Partnership to address risk issues concerning:

- Duration of Exposure
- Adopting a Target Level of Risk
- Additivity of Cancer Risk
- Data Evaluation of the Monitors

The Risk Development Team, much like the Community Involvement Team, met outside of the regular monthly Partnership meeting to work on establishing the project's health benchmarks. This small group of Partners developed a list of pros and cons for the different options and offered recommendations to the full Partnership.

David Shanks made the presentation to the Partneship at the February 2001 meeting. and the partners discussed and voted on each recommendation. On every issue the Team and the full Partnership chose what came to be known as the "smorgasbord" approach—that is, to include as much information as possible when our monitoring data is analyzed. Based on these decisions, EPA and MDNR developed the official health benchmarks for the project.

These benchmarks will help the Partnership analyze and respond to the monitoring data. To learn more about the recommendations accepted by the Community Air Project Partnership as well as the methodology adopted for establishing health benchmarks, please review the following documents.

St. Louis Community Air Project Health Benchmark Recommendations

Risk Development Team Recommendations, presented to and accepted by the Community Air Project Partnership, Feb. 29, 2001.

The CAP Partnership will use the following recommendations to set health benchmarks for each of the chemicals we are monitoring. If a chemical we are monitoring poses a health risk according to our health benchmark, the Partnership will work with the community to reduce the risk.

Recommendation Re: Target Level of Cancer Risk

The Risk Development Team recommends a cancer risk level of 1 in 100,000 as the level of risk that would trigger additional activities to reduce exposure.*

Options for target level of cancer risk were:

1. 1 in 1,000,000

2. 1 in 100,000 or 10 in 1,000,000

3. 1 in 10,000 or 100 in 1,000,000

The pros of setting the target level at 1 in 100,000 are:

- It is consistent with most U.S. EPA regulatory programs.
- It allows us to actually estimate the cancer risk for more compounds. (Technology cannot detect most air pollutants at a concentration equal to a cancer risk of 1 in 1,000,000).

The cons of setting the target level at 1 in 100,000 are:

- It does not represent the most protective level for human health, which is 1 in 1,000,000.

*This is an EPA ranking system that classifies the likelihood that a chemical causes cancer in humans. The classification is based on both human and animal studies. Group A are human carcinogens, Group B are probable human carcinogens, and Group C are possible human carcinogens.

Appendix G

Examples of Available Risk Reduction and Pollution Prevention Programs

The resources listed below are only examples of reduction and pollution prevention programs. A more comprehensive list of resources is now under development. Please check the Manual web site for updates to this resource list.

This list contains resources and programs for addressing a wide range of environmental issues, not just outdoor air issues. This more comprehensive list is provided as a resource for community partnerships that may want to address more than outdoor air issues.

Please note that some of the following links are not a part of the epa.gov domain. These links provide additional information that may be useful or interesting and are being provided consistent with the intended purpose of this EPA document. However, EPA cannot attest to the accuracy of information provided by these links or any other linked site. Providing links to a non-EPA web site does not constitute an endorsement by EPA or any of its employees of the sponsors of the site or the information or products presented on the site. Also, be aware that the privacy protection provided on the epa.gov domain may not be available at the external link.

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Large Businesses and Public Facilities	**Identifying Pollution Prevention Opportunities** Encourage large chemical, refining, and manufacturing facilities to institute voluntary pollution prevention programs. Encourage companies to conduct audits to identify pollution prevention opportunities. Identify national industry sector leaders to use as benchmarks for local companies. Organize a community team with independent expertise to help facilities identify pollution prevention opportunities.	http://cfpub.epa.gov/clearinghouse/index.cfm http://www.epa.gov/compliance/assistance/sectors/index.html http://www.epa.gov/opptintr/p2home/resources/index.htm
For Small Businesses	**Design for the Environment Program** EPA partnership program working with individual industry sectors to compare and improve the performance and human health and environmental risks and costs of existing and alternative products, processes, and practices. DfE partnership projects promote integrating cleaner, cheaper, and smarter solutions into everyday business practices. Partnership programs include auto refinishing, printing and publishing, and dry-cleaning businesses.	http://www.epa.gov/dfe/projects/auto/index.htm http://www.epa.gov/dfe/projects/flexo/index.htm http://www.epa.gov/dfe/projects/gravure/index.htm http://www.epa.gov/dfe/projects/litho/index.htm http://www.epa.gov/dfe/projects/screen/index.htm http://www.epa.gov/dfe/projects/garment/index.htm

Appendix G: Examples of Available Risk Reduction and Pollution Prevention Programs

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Small Businesses *(continued)*	**Environmental Results Program** An innovative program designed to assist businesses to improve their performance and address environmental problems. In the Environmental Results Program communities and regulating agencies can combine resources to educate businesses about their environmental impacts and obligations, help them to certify their compliance, and track them to evaluate their environmental performance.	http://www.epa.gov/permits/masserp.htm http://www.epa.gov/compliance/incentives/innovations/programresults.html
	Green Business Program Organize a program like the Bay Area Green Business Program, a partnership of community organizations, environmental agencies, professional associations, waste management agencies, and utilities to work together to recognize and assist businesses that operate in an environmentally friendly manner.	http://www.abag.ca.gov/bayarea/enviro/gbus/gb.html
	Businesses for the Bay Create a voluntary organization of businesses, like the Businesses for the Bay organization in the Chesapeake Bay watershed, committed to helping each other implement pollution prevention in daily operations and reduce releases of chemical contaminants and other wastes to your watershed.	http://www.chesapeakebay.net/b4bay.htm
	Stationary Source Pollution Prevention Fact Sheets for Communities and Small Businesses Multiple fact sheets on topics such as metal operations, electroplating, autobody paint shops, and printers. Includes information designed to help communities identify pollution prevention and reduction opportunities for small businesses. Designed to provide concrete assistance to help small shops implement easy pollution prevention measures and reduce releases of air toxics. Fact sheets now in final production.	Contact Amanda Aldridge at: aldridge.amanda@epa.gov
For Schools	**Tools for Schools** Voluntary, easy-to-use resource kit to help schools identify, remedy, and prevent indoor air quality problems in a cost-effective manner. Schools implement a range of specific guidelines emphasizing reduced pesticide exposure, use, and safe chemical storage, proper ventilation, and more.	http://www.epa.gov/iaq/schools/

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Schools *(continued)*	**Clean School Bus USA** Brings together partners from business, education, transportation, and public health organizations to work to reduce pollution from public school buses. Includes policies and practices to eliminate unnecessary idling, retrofit buses with newer control technologies, and replace older buses.	http://www.epa.gov/otaq/schoolbus/
For Mobile Sources	**Voluntary Diesel Retrofit Program** Develop a program to retrofit older diesel engines with modern emission control technology. Enlist private and/or public fleets for participation.	http://www.epa.gov/otaq/retrofit/
	Anti-Idling Campaigns Develop education campaign and administrative policies to discourage vehicle idling in areas where people congregate.	
	Vehicle Engine and Maintenance Campaigns Sponsor a campaign to encourage proper vehicle and engine maintenance. Could involve a "tune your car today" at a local garage, checklists, and parts giveaways for do-it-yourselfers, etc.	
For Community Surface Waters	**Fish Consumption Surveys and Advisories** Perform surveys to determine whether there should be more fish/wildlife consumption advisories. Make advisories widely available to the public by print, radio, or television in multiple languages with an emphasis on subpopulations with high expected consumption.	http://www.epa.gov/waterscience/fish/
	Watershed Protection A Watershed Protection Approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. This strategy has as its premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual waterbody or discharger level. Major features of a Watershed Protection Approach are: targeting priority problems, promoting a high level of stakeholder involvement, designing integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering.	http://www.epa.gov/owow/watershed/index2.html

Appendix G: Examples of Available Risk Reduction and Pollution Prevention Programs

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Community Surface Waters *(continued)*	**Mercury Reduction in Hospitals** Help hospitals comply with new requirements by providing information and assistance. Encourage hospitals to eliminate mercury sources such as thermometers. Conduct education programs for citizens and hospital staff about mercury reduction.	http://www.noharm.org/mercury/issue
	Household Mercury Thermometer Exchanges Sponsor a trade-in program that provides citizens with new, non-toxic thermometers in exchange for mercury thermometers to reduce risk of mercury contamination in homes and to reduce the risk of water contamination and outdoor air pollution due to improper disposal.	http://www.noharm.org/mercury/issue
	National Estuary Program The National Estuary Program is designed to encourage local communities to take responsibility for managing their own estuaries. Each NEP is made up of representatives from federal, state, and local government agencies responsible for managing the estuary's resources, as well as members of the community — citizens, business leaders, educators, and researchers. These stakeholders work together to identify problems in the estuary, develop specific actions to address those problems, and create and implement a formal management plan to restore and protect the estuary.	http://www.epa.gov/owow/estuaries/about2.htm
	Coastal America Coastal America is a unique partnership of federal agencies, state and local governments, and private organizations. The partners work together to protect, preserve, and restore our nation's coasts.	http://www.coastalamerica.gov/
For Community Homes	**Develop a Community Campaign using Home*A*Syst** Home*A*Syst is an environmental risk assessment guide for the home that helps homeowners identify risks and take actions to protect health and the environment. Organize a community education campaign using the Home*A*Syst program and materials.	http://www.hud.gov/offices/lead/helpyourself/index.cfm
	Radon "Test and Repair" Campaigns Enlist citizens to test their home for radon and provide information and assistance to correct the problem if radon levels are unacceptably high.	http://www.epa.gov/iaq/radon/

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Community Homes *(continued)*	**Home Consumer Products Education Campaigns** Educate citizens in practices they can adopt such as proper solvent storage, vehicle operation tips, landscaping and yard-care options to minimize use of pesticides and polluting equipment, use of lower toxicity home products, etc.	http://www.epa.gov/oar/oaqps/peg_caa/pegcaa07.html http:/www.epa.gov/reg3esd1/garden/index.htm http:/www.epa.gov/greenkit/landscape.htm
	Low Emission Gas Can Exchanges Emissions from portable fuel cans present a significant source of exposure to gaseous toxics such as benzene, especially if the can is stored inside a dwelling or attached garage. Encourage citizens to exchange their old-style containers for new ones meeting higher standards.	http://www.arb.ca.gov/msprog/spillcon/gascanfs/gascanfs.htm
	Campaign for a Lead Safe America Protect community children with an education and testing program to reduce exposure to lead in homes and soil.	http://www.hud.gov/offices/lead/outreach/communityoutreach.cfm#leadsafehome
	Lead in Drinking Water Campaigns Approximately 20% of human exposure to lead is attributable to lead in drinking water. Provide education about ways to reduce exposure to lead in drinking water.	http://www.epa.gov/OGWDW/Pubs/lead1.html
	National Asthma Public Education and Prevention Campaigns Conduct an education campaign in schools and homes to reduce asthma and to increase the asthma awareness and asthma triggers.	http://www.epa.gov/asthma/
	Integrated Pest Management Programs Integrated pest management (IPM) uses habitat modification, biological controls, and chemical controls. IPM protects people from noxious pests and toxic pesticides. Conduct a community Integrated Pest Management (IPM) Education Campaign.	http://schoolipm.ifas.ufl.edu/ http://www.epa.gov/pesticides/
	Household Hazardous Waste Collections Exposure to hazardous household materials can be significantly reduced by collecting old and unused products and disposing of them properly. Conduct a neighborhood drive to collect pesticides, coolants, lubricants, solvents, and other hazardous products, some of which are now banned due to their toxicity.	http://www.epa.gov/epaoswer/non hw/muncpl/hhw.htm

PROGRAM TYPE	PROGRAM DESCRIPTION	WEB SITE OR POINT OF CONTACT
For Community Homes *(continued)*	**Smoke-Free Homes and Cars Campaigns** Making homes and cars smoke-free are an easy and proven ways to protect nonsmokers from secondhand smoke exposure. Conduct a smoke-free campaign using existing materials, including television, radio, and print public service announcements (PSAs), smoke-free home brochures, and the toll-free pledge number, and other materials.	http://www.epa.gov/smokefree/index.html

Appendix **H**

Toxicity Values and Toxicity Sources: Background for the Collection of Information to Calculate Screening-Level Concentrations

Examples of toxicity values for calculating screening-level concentrations

To complete step 2 of Figure 10-2, the technical team collects information that describes each community chemical's potential to cause a long-term, adverse health effect. Depending on what it learns about what kinds of long-term adverse health effects each community chemical may cause, the technical team may have to find one or, for some chemicals, two types of toxicity values. If a chemical has a potential to cause cancer, the technical team needs to find a cancer toxicity value for the chemical. If a chemical has a potential to cause a non-cancer, long-term health effect, the technical team needs to find a non-cancer toxicity value for the chemical. If a chemical has a potential to cause cancer as well as some other non-cancer, long-term health effect, the technical team needs to find both types of toxicity values for the chemical.

Examples of toxicity values for cancer-causing chemicals include the cancer potency slope factor (CSF or simply SF) and the cancer unit risk (UR) estimate.

A **cancer potency slope factor** provides an estimate of increased cancer risk from a lifetime exposure to a given chemical. This estimate is usually derived from a study of oral exposure to the chemical of interest. The unit of expression for the oral cancer potency slope factor is a portion of a population affected per milligram (one-thousandth of a gram) of chemical per kilogram of body weight per day.

A **cancer unit risk estimate** also provides an estimate of increased cancer risk from a lifetime exposure to a given chemical. This estimate is usually derived from an inhalation exposure study. The unit of expression for the cancer unit risk estimate for inhalation exposure is a portion of a population affected per microgram (one millionth of a gram) of chemical per unit (cubic meter) of air breathed. It describes an increased cancer risk that may result from continuous inhalation exposure to a chemical at this air exposure concentration.

The cancer unit risk estimate is the preferred cancer toxicity value for use in the cancer screening-level concentration equation in step 3 of Figure 10-2.

Examples of toxicity values for non-cancer-causing chemicals include the inhalation reference dose, the reference concentration, the minimal risk level, and the reference exposure level.

A **reference concentration (RfC)** is an estimate (with uncertainty spanning perhaps an order of magnitude) of continuous level of inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of adverse effects during a lifetime. EPA generally applies uncertainty and modifying factors to NOAELs, LOAELs, or benchmark concentrations to set RfCs. EPA uses these factors to account for specified limitations of the available chemical toxicity information. The inhalation reference concentration is the preferred non-cancer toxicity value for use in the non-cancer screening-level concentration equation in step 3 of Figure 10-2. The unit of expression for the RfC is milligrams of chemical per cubic meter of air breathed. The unit of expression for the RfC can be converted to micrograms of chemical per cubic meter of air breathed by multiplying the former by 1,000 µg/mg.

A **minimal risk level (MRL)** is an estimate of the daily human exposure level to a hazardous (toxic) substance that has a low risk of adverse non-cancer health effects over a specified duration of exposure. The federal government's Agency for Toxic Substance and Disease Registry (ATSDR) calculates MRLs using an approach similar to the one used by EPA to develop its estimates of reference concentrations and reference doses. The unit of expression for an oral MRL is milligrams of chemical per kilogram of body weight per day. The unit of expression for an inhalation MRL is parts per million (ppm) of a chemical in air. As noted above, the RfC is the preferred non-cancer toxicity value for use in the non-cancer SLC equation in step 3 of Figure 10-2. To translate from ppm to units of mg/m^3 (per RfC convention), the MRL is multiplied by the chemical's MW (mg/mMole) divided by 24.45 (mMole per m^3 at 25 °C and 1 atmosphere pressure).

A long-term (chronic) **reference exposure level (REL)** is an airborne chemical concentration that would pose no significant health risk to individuals indefinitely exposed to that level. The California Environmental Protection Agency (CAL/EPA) calculates the REL, using an approach similar to the one used by EPA to develop estimates of its reference concentrations. The unit of expression for a REL is micrograms of chemical per cubic meter of air breathed. As noted above, the RfC is the preferred non-cancer toxicity value for use in the non-cancer SLC equation in step 3 of Figure 10-2.

Deriving inhalation values from oral values

When an inhalation toxicity value is not available for a chemical of interest, but an oral exposure route value is available, the Technical Team may want to consider extrapolation from the oral to an inhalation value. The Agency considers data from other routes potentially useful to derivation of an inhalation value only when respiratory tract effects and/or "first-pass" effects (a pharmacologic phenomenon) can be ruled out. (See section 4.1.2, USEPA, 1994. Methods for Deriving Inhalation Reference Concentrations and Application of Inhalation Dosimetry.) First-pass effects refer to the metabolism that can take place in the portal-of-entry tissue (e.g., the respiratory tract), prior to entry into the systemic circulation. A first-pass effect can alter the disposition of the parent and metabolite chemicals, thereby affecting the magnitude of the dose to remote target tissues in a route-dependent fashion. In the absence of data to determine dosimetry via inhalation, when a chemical is thought to be susceptible to first-pass effects (e.g., metabolized), or where a potential for portal-of-entry effects is indicated but not well characterized (e.g., respiratory toxicity after acute exposures), then route-to-route extrapolation for derivation of an RfC or inhalation unit risk (IUR) is not appropriate.

For chemicals for which respiratory toxicity and first-pass effects can be ruled out, route-to-route becomes a possibility. Methods for this extrapolation range in accuracy and therefore, inherent uncertainty, with the simplest approach using default absorption values for each exposure route appropriate to the chemical class in question. The general equations for the simplest approach are as follows.

Equation 1. Extrapolation from an oral cancer SF to an inhalation unit risk (IUR) estimate

IUR ($m^3/\mu g$) = CSF (kg-day/mg) * 20 m^3 /day * 1/70 kg * 1mg/10^3 µg

where:

IUR is an inhalation cancer unit risk estimate for the chemical

CSF is the oral cancer potency slope factor for a chemical

20 m^3 is an assumption of the daily inhalation intake

70 kg is an assumption of the body weight

Equation 2. Extrapolation from an oral RfD to an inhalation noncancer reference value

Inhalation RfV (mg/m^3) = RfD (mg/kg-day) * 1/day/ 20 m^3 * 70 kg

where:

Inhalation RfV is an inhalation version of the oral non-cancer reference dose estimate for the chemical

RfD is the oral reference dose for a chemical

20 m^3 is an assumption of the daily inhalation intake

70 kg is an assumption of the body weight

It is noted that the paired values 700kg and 20 m^3/day are standard defaults intended to be protective of humans. The mean daily inhalation intake, presuming a variety of activity levels (rest to heavy activity) during a 24-hour period, would be less than 20 m^3 for all age groups. Given the size of other sources of uncertainty in the route-to-route extrapolation, the small difference (e.g., 15%) that might be obtained through replacement of this default pair of values in the equations, with age-specific body weight and inhalation intake values, is considered insignificant.

Appendix H: Toxicity Values and Toxicity Sources: Background for the Collection of Information to Calculate Screening-Level Concentrations

References for the discussion above can be found on the web site of EPA's National Center for Environmental Assessment at http://cfpub.epa.gov/ncea/cfm/nceapubtopics.cfm?ActType=PublicationTopics.

Sources for chemical toxicity information

The following are sources of chemical toxicity information and chemical toxicity values. The accompanying text and source comparison Table H-1 describe each of these sources relative to the types and quality of information provided. Please see the discussion of the choice of toxicity information sources in the Overview section of this Manual.

- EPA's Office of Air Quality Planning and Standards (OAQPS) Air Toxics Dose-Response Database: http://www.epa.gov/ttn/atw/toxsource/summary.html
- EPA's Integrated Risk Information System (IRIS): http://www.epa.gov/ngispgm3/iria/subst/index.html
- EPA's Health Effects Assessment Summary Tables (HEAST) hard copy prepared by EPA's National Center for Environmental Assessment (NCEA) for EPA's Office of Solid Waste and Emergency Response (OSWER) for use at contaminated work sites.
- Agency for Toxic Substances and Disease Registry's (ATSDR) Minimal Risk Levels (MRLs): http://www.atsdr.cdc.gov/mrls.html
- California's Office of Environmental Health Hazard Assessment (OEHHA) or CAL/EPA Toxicity Criteria Database: http://www.oehha.ca.gov/risk/chemicalIDB/index.asp
- EPA's High Production Volume Toxicity Database : web site available in the future

OAQPS's Air Toxics Dose-Response Database is a compilation of toxicity values obtained from multiple sources both within and outside EPA. EPA uses these toxicity values in the National Air Toxics Assessment (NATA), which range from national- to local-scale applications. Toxicity values in OAQPS Air Toxics Dose-Response Database include those from IRIS and other EPA toxicity information databases, as well as those from ATSDR and CAL/EPA. Toxicity values describe toxic effects for chemicals for inhalation as well as for other exposure pathways. Toxicity values in the Air Toxics Dose-response Database include cancer unit risk estimates, cancer potency slope factors, RfCs, MRLs, and RELs.

The Air Toxics Dose-Response Database contains toxicity information on approximately 190 chemicals and chemical classes. Some chemicals/classes of chemicals in the Air Toxics Dose-Response Database may have toxicity information from more than one source. These toxicity information sources vary in the methodology used to develop their toxicity values, in their selection of sources of information used to develop toxicity values, in their characterizations of uncertainty, and in their levels of peer review. The Air Toxics Dose-Response Database provides a default order of preference (a priority or hierarchy) for different types of toxicity values when more than one type of information is available. OAQPS notes that changes to the hierarchy may be appropriate on a chemical-by-chemical basis.

EPA's **Integrated Risk Information System (IRIS)** is a high-quality, peer reviewed, and frequently updated chemical toxicity information source. Its ease of accessibility, chemical search capacity, and more than 500 chemicals currently within its database make it a good source of toxicity information and toxicity values. IRIS is EPA's official repository of Agency-wide consensus chronic human health toxicity information and toxicity values.

IRIS presents each of its chronic human health toxicity values for the inhalation exposure pathway as reference concentrations (RfCs) for non-cancer chemicals and cancer inhalation unit risk (UR) estimates for cancer chemicals. EPA updates IRIS monthly to provide consistent, up-to-date chemical toxicity information. The Partnership can access information through IRIS's home page. It can access information on IRIS chemicals by highlighting and selecting each chemical's name or CAS number.

EPA's **Health Effects Assessment Summary Tables (HEAST)** provide preliminary EPA chemical toxicity information and toxicity values. The database, prepared by EPA's National Center for Environmental Assessment (NCEA), consolidates toxicity information for chemicals of interest to Superfund, the Resource Conservation and Recovery Act, and EPA in general. The degree of peer review the toxicity information undergoes prior to its entry into HEAST is less than that for information in IRIS. The HEAST database currently contains toxicity information for over 500 chemicals. Unless otherwise stated, EPA considers the toxicity values for the chemicals in HEAST to be provisional. Although the information in HEAST has concurrence of individual

Table H-1.
A Comparison of Toxicity Information Sources

SOURCE	NUMBER OF CHEMICALS	TYPES OF DATA	UNITS	UPDATE FREQUENCY	LEVEL OF PEER REVIEW	COMMENTS
EPA IRIS	over 500	RfD RfC SF UR	mg/kg/day mg/m^3 mg/kg/day $\mu g/L$ (water) $\mu g/m^3$ (air)	Monthly	Values have received Agency-wide consensus	RfD value is for chronic oral exposure only. RfC value is for chronic inhalation exposure only. Slope factor is for oral exposure only. Unit risk is available for drinking water and inhalation.
EPA HEAST	483 RfC (non-cancer) 181 (cancer)	RfD mg/m^3 SF UR	mg/kg/day update $(mg/kg/day)^{-1}$ $\mu g/L$ (oral) $\mu g/m^3$ (inhalation)	Last was July 1997	Have undergone some level of EPA review but have not received final EPA approval	Consisting almost entirely of provisional risk HEAST assessment information. Subchronic and chronic RfD values are provided. Subchronic and chronic RfC values are provided. Oral and inhalation slope factors are provided. Oral and inhalation unit risk values are provided.
CAL/EPA - Toxicity Criteria Database	388	SF UR REL RfC	$(mg/kg\text{-}day)^{-1}$ $(\mu g/m^3)^{-1}$ $\mu g/m^3$ $\mu g/m^3$	Period-ically	RELs undergo review by the public and the Scientific Review Panel (SRP). Cancer potency values were select-ed from a heirarchy list of sources.	Oral and inhalation slope factors are provided. Inhalation unit risk is provided. Reported RELs are for acute and chronic exposure. RELs can be used as surrigates for RfC values when RFCs are not available. RFC values are provided in chemical summaries.
ATSDR	138	MRL	mg/m^3 (particles) ppm (gases)	Period-ically	Rigorous review process Internal and external peer review	MRLs were not based on cancer effects. MRLs were derived using no-observed-adverse-effect-level / uncertainty factor approach Chronic, acute, and intermediate MRLs are provided. MRLs can be used as surrogate for RfC when RfC values are not available.
OAQPS Air Toxics Dose-Dose-Response Database	188	SF UR REL RfC	$(mg/kg\text{-}day)^{-1}$ $(\mu g/m^3)^{-1}$ $\mu g/m^3$ $\mu g/m^3$	Period-ically	Pulled toxicity values from multiple sources and ranked according to data heirarchy	Updated on a periodic basis every 3-6 months. Values are presented in accordance with a default hierarchy of preferred sources, with preference given to those reflective of current knowledge, sound scientific basis, and external peer review. OAQPS notes that deviation from the default hierarchy may be appropriate on a chemical-specific basis. As available and consistent with the default tiered hierarchy, an EPA or CAL/EPA inhalation unit risk value, a chronic RfC, REL, or inhalation MRL, and a chronic RfD or oral MRL are provided.

EPA Program Offices and is supported by Agency references, there is not sufficient peer review of the information for it to be recognized as Agency-wide consensus information. Like IRIS, the HEAST database provides chronic non-cancer toxicity values as reference concentrations (RfCs) and reference dose (RfDs). The HEAST provides cancer toxicity values as potency slope factors and unit risk estimates for the inhalation exposure pathway. HEAST information is currently available in hard-copy format only. The date of the most current version of HEAST is July 1997.

The Agency for Toxic Substances and Disease Registry (ATSDR) within the United States Department of Health and Human Services provides toxicity information and non-cancer toxicity values (known as minimal risk levels or MRLs) for selected chemicals. ATSDR provides its information for chemicals found on the EPA's Superfund National Priorities List. ATSDR does not currently provide cancer toxicity values for cancer-causing chemicals. Currently ATSDR provides non-cancer toxicity information and toxicity values (MRLs) for approximately 150 chemicals or chemical groups. The MRL is an estimate of a daily human exposure to a chemical that has a low potential to cause adverse, non-cancer effects over a specified duration of exposure. ATSDR sets its MRLs below levels that, based on current information, might cause adverse, non-cancer human health effects in the most sensitive of exposed groups. The ATSDR sets its MRLs for various exposure durations and exposure pathways. The MRL of most interest to the Partnership's community air screening-level concentration setting process is the MRL for chronic (365 day or longer) exposure durations for the inhalation exposure pathway.

The method ATSDR uses to develop its MRLs is similar to the one used by EPA to develop its reference dose (RfD) and reference concentration (RfC) toxicity values. Proposed MRLs undergo a comprehensive peer review process. Four separate groups take part in the MRL review process. These groups include the Health Effects/MRL Work Group within ATSDR's Division of Toxicology; an expert panel of external peer reviewers; an ATSDR-wide MRL Work Group with participation from other federal agencies including USEPA; and the public through the toxicological profile public comment period. ATSDR updates its MRLs periodically.

The **CAL/EPA's** (California Environmental Protection Agency's) Office of Environmental Health Hazard Assessment (OEHHA) maintains a toxicity information database. The database contains toxicity values on both cancer-causing and non-cancer-causing chemicals. Toxicity values include those that describe cancer potency slope factors, unit risk values, and chronic inhalation reference exposure levels (RELs). A chronic REL is an airborne chemical concentration that would pose no significant non-cancer health risk to individuals indefinitely exposed to that level. CAL/EPA bases its RELs solely on human health considerations from the best available human and animal toxicity information in the scientific literature. The California Air Pollution Control Officers' Association with consultation from CAL/OEHHA also develops chronic RELs, based on toxicity values previously established in readily available toxicity information sources. CAL/EPA's RELs and other toxicity values support decisions made in CAL/EPA's Air Toxics' "Hot Spots" program.

The CAL/EPA database currently contains toxicity information and toxicity values on approximately 400 chemicals. CAL/EPA updates its database periodically. As it should do with each of the other toxicity information sources, the Partnership should note the dates of latest update that the CAL/EPA database lists for toxicity values for community chemicals. There may be more current toxicity information available. The CAL/EPA web site provides a search engine that allows its users to search for toxicity information by chemical name. The web site provides an option for downloading specific cancer potency support documentation to view tables containing the entire database of cancer potency slope factor and cancer unit risk values. The database also provides an option of downloading related REL documentation to view the tables containing the entire database of RELs as well.

Appendix I

Steps for Calculating a Screening-Level Concentration

What steps can the technical team follow to calculate a screening-level concentration (SLC) value?

Figure 10-2 shows a three-step procedure the SLC Technical Team can use to calculate an air exposure SLC. The procedure for completing each of these three steps is described below. Two examples of SLC calculations are provided: one for a cancer risk-based SLC (for arsenic compounds), the other for a non-cancer risk-based SLC (for acrylic acid). Two alternate procedures are described in which the technical team might be able to derive an air exposure SLC when a chemical toxicity value is not available for one or more of its community chemicals.

Step 1: Set Community Risk Screening-Level Assumption Values

Set a cancer risk screening level and a non-cancer risk screening level for chemicals as appropriate, given their potential toxicities.
Example values: Additional lifetime risk of 1E-06 for a cancer risk screening level; a hazard quotient of 1 for a non-cancer risk screening level. See discussion describing the Partnership's choice of risk screening levels in the Initial Screen chapter of the Overview section.

Step 2: Collect Toxicity Information/Values

The Partnership should establish a toxicity information source hierarchy. The information source hierarchy is important to the consistency and transparency of the Partnership's toxicity information collection process.

Collect toxicity information.
There are two types of chemical toxicity values of interest: one for cancer, the other for non-cancer effects. The SLC Technical Team uses its cancer toxicity values (cancer potency slope factors/inhalation cancer unit risk estimates) to calculate air exposure SLCs for cancer-causing chemicals. The technical team uses its non-cancer toxicity values to calculate air exposure SLCs for non-cancer-causing chemicals. Some chemicals found in the community will require calculations of both cancer and non-cancer SLCs. For these chemicals the technical team collects toxicity values for both cancer and non-cancer effects.

The technical team uses its toxicity information hierarchy to identify an order and uses toxicity data sources and values for its SLC calculations. An example of such an order of preference for non-cancer toxicity values would be: (1)RfC (an inhalation reference concentration), (2) REL (an inhalation reference exposure level), and (3) MRL (minimal risk level). Whichever values the Partnership chooses to use, it is important that the values are current.

Step 3: Calculate an Air Exposure Screening-Level Concentration

Use values for the cancer risk screening-level assumption and the cancer toxicity value assumption to calculate a chemical-specific cancer screening-level concentration.
Not all chemicals cause cancer. For those that may cause cancer, the SLC Technical Team calculates cancer screening-level concentrations. It uses the following equation and assumption values:

$$\text{SLC (cancer) } \mu g/m^3 = \frac{\text{RSL}}{\text{UR}}$$

where:

RSL = cancer risk screening level (e.g., 1.0E-06)

UR = chemical-specific inhalation unit risk estimate (per $\mu g/m^3$)

Appendix I: Steps for Calculating a Screening-Level Concentration

Use values for the non-cancer risk screening-level assumption and the non-cancer toxicity value assumption to calculate a chemical-specific non-cancer screening-level concentration.
Not all chemicals cause non-cancer, long-term health effects. For those that may cause non-cancer effects, the technical team calculates non-cancer screening-level concentrations (it refers to them as its non-cancer SLCs). It uses the following equations and assumption values:

SLC (non-cancer) $\mu g/m^3$ = SHQ * RfC * 1000 µg/mg

where:

SHQ = screening hazard quotient (e.g., 1.0)

RfC = Chemical-specific inhalation reference concentration (mg/m^3)

Compare a chemical's cancer SLC value to its non-cancer SLC value and use the most conservative (lowest) value as the chemical's air exposure screening-level concentration.
Not all chemicals will have toxicity values for both cancer and non-cancer effects. For those chemicals that have both cancer and non-cancer toxicity values, the technical team calculates cancer and non-cancer SLCs. The smaller of the two SLCs represents the more conservative, more protective screening-level concentration. This is the air exposure SLC that the technical team will use to compare to its estimates of ambient air concentrations for community chemicals.

What are some examples of SLC calculations?

The following two examples show how the technical team calculates its air exposure SLCs for cancer (the arsenic compounds example) and non-cancer (the acrylic acid example) chemicals. Toxicity values were found in OAQPS's Air Toxics Dose-Response Database (http://www.epa.gov/ttn/toxsource summary120202.html).

EXAMPLE 1: Arsenic Compounds (cancer SLC example)

$$\text{SLC (cancer) } \mu g/m^3 = \frac{1.0\text{E-}06}{4.3\text{E-}03 \text{ per } \mu g/m^3 \text{ (from IRIS)}} = 2.3\text{E-}04\ \mu g/m^3$$

EXAMPLE 2: Acrylic acid (non-cancer SLC example)

$$\text{SLC (non-cancer) } \mu g/m^3 = 1 * 1.0\text{E-}03 \ mg/m^3 \text{ (from IRIS)} * 1{,}000\ \mu g/mg = 1.0\ \mu g/m^3$$

How can the SLC Technical Team calculate an SLC when toxicity information is not available?

Before considering the use of the following two alternate methods to derive SLCs, the technical team should exhaust **all** of its sources of toxicity information. Existing toxicity information for a chemical may not be in one source but may be available in another. However, if the technical team does not find the necessary toxicity information for one or more of its chemicals, it can use toxicity information for a surrogate chemical or a default chemical to derive the necessary SLCs.

To the extent possible, a chemical used as a surrogate should have a similar chemical structure and similar physical and chemical properties as the chemical of interest. For example, the Virginia Department of Environmental Quality recommends pyrene as a surrogate chemical for phenanthrene and benzo(g,h,i)pyrene. If either of these latter two chemicals were a community chemical for which the Partnership could find no toxicity information, it could use toxicity values for pyrene to calculate an air exposure SLC for either chemical. The technical team should make case-by-case determinations and get Partnership approval for chemicals to be used as surrogates for toxicity information.

If the technical team does not find the necessary toxicity information for one or more of its chemicals or chooses not to use information on a surrogate chemical, it can use toxicity information on a chemical it chooses (and gets Partnership approval) to be its default chemical. The technical team (Partnership) has at least four options to make its choice: (1) It can select its default chemical from among the most toxic of its community chemicals. (2) It can select its default chemical from among the least toxic of its community chemicals. (3) It can select its default chemical from among the moderately toxic of its community chemicals. Or (4) it can select as its default chemical a chemical that may not even be among those identified as community chemicals. The Partnership, with the advice of its SLC Technical Team, will make the final choice. The Partnership's choice will be based on how conservative it wants its air exposure screening-level concentrations for those community chemicals with little or no toxicity information.

Appendix **J**

Methods for Apportioning County Data

Methods for Apportioning County Data

Land use/land cover (LULC)—determine area of different land use categories in census tract and study area. Develop ratio of area of land use category in census tract to area of land use category in study area. Different LULC ratios can be used with different sources (e.g., using commercial LULC ratio with autobody refinishing). LULC data for standard 1:250,000 scale topographic maps can be obtained on the Internet at http://edc.usgs.gov/geodata under the LULC tab. Users should consult the online user's guide and the "read me" file for more information on these files. A user's guide that explains the structure of the LULC data files can be obtained at ftp://map.usgs.gov/pub/ti/LULC/lulcguide.

Users with access to GIS software should download files under the "land_use" heading. These files are in the geographic information retrieval and analysis system (GIRAS) format. This format uses arcs and polygons to define regions on the map.

Otherwise, users should download files in the composite theme grid (CTG) format under the "grid_cell" heading. The CTG format uses grid cells to define locations on a map. The grid cells are actually a regular point sample of the quad where the center point of each cell is 200 meters from other center points in adjacent cells. The cells are mapped to the Universal Transverse Mercator (UTM) projection, oriented in north-south, east-west directions, and sequenced by row from north to south, within each row, by column east to west. More information on these files can be found at the end of this write-up.

CTG files can be opened in any word-processing software. The best view seems to occur when the font has been changed to Courier 10 point, with left and right margins set to 0.9 inches. These files can be very large (thousands of pages) and can be complicated to analyze and manipulate.

Area—ratio of surface area of census tract to surface area of study area. Area data can be obtained using GIS or topographic maps.

Population—ratio of population of census tract to population of study area. Population data can be obtained from the U.S. Census Bureau.

Population density—ratio of population to area for census tracts. Sum population densities for entire study area. Determine ratio of population density for census tract to population density for study area. Population density data can be obtained from GIS, topographic maps, and the U.S. Census Bureau.

Roadway miles—ratio of total roadway miles in census tract to total roadway miles in study area. For use with mobile sources. Roadway mileage data can be obtained from the Department of Transportation, GIS, or topographic maps.

Composite Theme Grid (CTG) Data File Format

Digital data from all the overlays of a given quadrangle also are combined in a raster or grid cell format as a Composite Theme Grid (CTG) file.

CTG files are sequential and consist of fixed-length logical records, and with the exception of header records, all records are of identical internal format, one grid cell per logical record. The grid cells are actually a regular point sample. The attribute codes at the center point of each cell are recorded from each overlay. The points are oriented to the UTM projection and are usually spaced 200 m apart in both east-west and north-south directions. The cell records are first ordered in the file by row from north to south, then within each row, by column west to east.

Character Composite Theme Grid (CTG) File Format

A character-formatted (usually ASCII) CTG file consists of fixed-length 80-character (card image) logical records. There are two parts to the CTG file, first a header then cell records. All records, except the last header record with one text field, consist of fixed-length integer fields; each integer is coded as digits with leading blanks (i.e., right justified). The first five logical records of the file comprise the CTG map header. The header is followed by cell records, one grid cell per 80-character logical record.

In some cases a CTG file may be released without the map header contained in the file. In this case all records in the file are individual grid cell records, and the header information is supplied as a printed listing.

Character CTG Map Header

Record 1:

Bytes 1-10 = Number of rows;

11-20 = Total number of cells x 2;

21-30 = Number of columns;

31-35 = Meaningless field;

36-40 = Cell size (width and length) in meters;

41-45 = Number of overlays merged;

46-50 = Map type code (see below);

51-55 = Projection zone number;

56-60 = Map projection code (should be "1" for UTM);

61-70 = Scale of a plot at one mil per cell width; and

71-80 = Source date of the land use overlay.

Record 2:

Bytes 1-5 = Minimum column index;

6-10 = Minimum row index;

11-15 = Maximum column index;

16-20 = Maximum row index;

21-25 = Column index for SW control point;

26-30 = Row index for SW control point;

31-35 = Column index for NW control point;

36-40 = Row index for NW control point;

41-45 = Column index for NC control point;

46-50 = Row index for NC control point;

51-55 = Column index for NE control point;

56-60 = Row index for NE control point;

61-65 = Column index for SE control point;

66-70 = Row index for SE control point;

71-75 = Column index for SC control point; and

76-80 = Row index for SC control point.

Record 3:

Bytes 1-10 = Latitude of SW control point;

11-20 = Longitude of SW control point;

21-30 = Latitude of NW control point;

31-40 = Longitude of NW control point;

41-50 = Latitude of NC control point;

51-60 = Longitude of NC control point;

61-70 = Latitude of NE control point; and

71-80 = Longitude of NE control point.

Record 4:

Bytes 1-10 = Latitude of SE control point;

11-20 = Longitude of SE control point;

21-30 = Latitude of SC control point;

31-40 = Longitude of SC control point;

41-50 = UTM Easting value of west edge of cells;

51-60 = UTM Northing value of north edge of cells;

61-70 = File creation date (a Julian date); and

71-80 = Meaningless field.

Record 5:

Bytes 1-64 = Title (text characters); and

65-80 = Blank.

Some further explanation is needed for some of the elements in the CTG map header:

1. The map type code (in bytes 46-50 of the first record) indicates which overlays have been included in the CTG data file. The code is formed by the addition (in base 10) of the separate GIRAS map type codes for each of the overlays:

10 = Land Use and Land Cover;

02 = Political units;

04 = Census county subdivisions and SMSA tracts;

10 = Hydrologic units;

20 = Federal land ownership; and

40 = State land ownership.

For example, the map type code for a combination of the first four overlays above would be 17; all six overlays combined have a map type code of 77.

2. The UTM Easting and Northing values given in the fourth record (bytes 41-60) are in whole meters and are values for the west and north edges of the cells, rather than the center point of the first (northwest corner) cell. The Easting and Northing values for a given cell may be calculated thus:

Easting = (XORG CW/2) + (column index)*CW
Northing = (YORG+CW/2) (row index)*CW

where XORG and YORG are the Easting and Northing values in bytes 41-60 of the fourth header record, and CW is the cell width in bytes 36-40 of the first header record.

3. The control points usually define the 1_ x 2_ (for 1:250,000-scale base maps) or 30' x 1_ (for 1:100,000 scale base maps) quadrangle on which the overlay data are based. The latitude and longitude values are given as positive integers of the form DDDMMSS, where DDD is degrees, MM is minutes, and SS is seconds. West longitude values are given as positive numbers, increasing in value from east to west. The row and column values given for the control points are the indices for the cell whose center point is closest to the true position of the control point.

CTG Grid Cell Records

Each grid cell logical record of a standard character-formatted CTG data file is 80 characters in length and consists of nine decimal integers, right justified (with leading blanks) within fixed-length fields:

Bytes 1-3 = UTM zone number (this value should be the same in every record of a given CTG file); the first byte will always be a blank for zones in the northern hemisphere;

4-11 = UTM Easting value, in whole meters, for the sample point of the cell;

12-19 = UTM Northing value, in whole meters, for the sample point of the cell;

20 = Blank;

21-30 = Land Use and Land Cover attribute code;

31-40 = Political unit (FIPS State/county) code;

41-50 = USGS hydrologic unit code;

51-60 = Census county subdivision or SMSA tract code;

61-70 = Federal land ownership agency code; and

71-80 = State land ownership code.

If a given overlay category has not been included within the file, the codes for that category will be zero (0). Since some misregistration of map overlays occurs, some of the cells along the edges of the 1:250,000- or 1:100,000 scale quadrangle may have codes for some overlays, but not others (the “other” codes will be zero). The standard character CTG data file will have only those cell records for which at least one of the categories is coded. This means that, since the 1:250,000 and 1:100,000 scale quadrangles do not form perfect rectangles in the UTM projection (lines of latitude curve and lines of longitude converge), a variable number of cell records will exist for any given row or column.

Binary CTG Data File Format

Each logical record of a binary CTG file is either 32 or 52 bytes in length. A record consists of eight 32-bit (4 byte) binary integers in the following order:

Bytes 1-4 = Row index, where 1 is the index of the northernmost row and index numbers increase by one for each row moving south (NOTE, due to a processing error, CTG files in which the State ownership is not coded will have all zero row index numbers; the row index is then a function of the sequential position of the record within the file);

5-8 = Column index, where 1 is the index of the westernmost column and index numbers increase by one for each column moving east;

9-12 = Land Use and Land Cover code;

13-16 = Political unit code;

17-20 = Hydrologic unit code;

21-24 = Census county subdivision or SMSA tract code;

25-28 = Federal land ownership code;

29-32 = State land ownership code; and

33-52 = Null (binary zeros) field, if present.

If a given overlay has not been digitized, the codes for that overlay will all be zero. To be sure that a regular grid of cells (forming a UTM rectangle) covers the entire base map quadrangle, a "buffer zone" of cells with all zero attributes has been included in the binary CTG data file.

Binary CTG Map Header

The CTG map header associated with a binary CTG data file is stored in a physically separate sequential file. The header consists of six 32-byte logical records. For the first four records, each 32-byte binary record is equivalent to an 80-character CTG map header card image; each integer in a 5-digit character field is stored in a 2-byte binary integer field, and each integer in a 10-digit character field is stored in a 4-byte binary integer field. The fifth card image header record (with text data) is represented as the fifth and sixth 32-byte binary records with EBCDIC coded characters (the last 16 characters of the card image record are always blank).

Listing of CTG Map Header Data

COMPOSITE THEME GRID CHARACTER DATA OUTPUT:

C T G B T A RUN: JUNE 3, 1982 TIME 19:23:06

GRID CELL MAP HEADER INFORMATION:

TITLE: LAWRENCE, MO KS 1:250,000 QUAD LU PB CN HU FO SO

FILE CREATION DATE: 81084 TIME 0: 0

MAP TYPE: 77 PROJECTION: 1 SCALE 1: 7874016 MAP DATE: 1973

NUMBERS OF FILE ELEMENTS:

CATEGORIES	CELLS	ROWS	COLUMNS	ZONE NUMBER	WEST & NORTH EASTING	EDGES: NORTHING
6	485368	575	884	15	236900	4321100

DUPLICATE POINT TOLERANCE = 0 CELL SIZE IN METERS = 200

MIN COL = 1 MIN ROW = 1 MAX COL = 884 MAX ROW = 575

CONTROL POINT INFORMATION:

	LONGITUDE	LATITUDE	COL	ROW
SOUTH WEST	960000	380000	-1	557
NORTH WEST	960000	390000	17	2
NORTH EAST	940000	390000	883	21
SOUTH EAST	940000	380000	877	576

CHARACTERISTICS OF THE CHARACTER CTG FILE:

THE FILE CONTAINS ONLY GRID CELL (AND NO HEADER) RECORDS.

THE FILE CONSISTS OF 80 CHARACTER RECORDS, ONE GRID CELL PER RECORD.

UTM ZONE, EASTING, AND NORTHING VALUES ARE PART OF EACH CTG DATA RECORD AS THE FIRST THREE INTEGERS, RIGHT JUSTIFIED IN BYTES 1-3, 4-11, AND 12-19.

BYTES 21 80 OF EACH RECORD CONTAIN THE USGS 10 DIGIT INTEGER CODES, RIGHT JUSTIFIED WITHIN 10 BYTE FIELDS, FROM THE FOLLOWING OVERLAYS, IN ORDER:

LAND USE/LAND COVER, POLITICAL UNIT, HYDROLOGIC UNIT, CENSUS SUBDIVISION/TRACT, FEDERAL LAND OWNERSHIP, AND STATE LAND OWNERSHIP.

ONLY RECORDS WITH AT LEAST ONE NON ZERO ATTRIBUTE ARE PART OF THE FILE.
(A VARIABLE NUMBER OF RECORDS EXIST FOR A GIVEN ROW OR COLUMN.)

Sample "Standard" Character-Formatted CTG Data file (without header)

15	240200	4321000	21	0	0	0	0	0
15	240400	4321000	21	0	0	0	0	0
15	240600	4321000	21	0	0	0	0	0
15	240800	4321000	21	0	0	0	0	0
15	241000	4321000	21	0	0	0	0	0
15	241200	4321000	21	0	0	0	0	0
15	240200	4320800	21	201971	0270102	0	2099	2099
15	240400	4320800	21	20197	10270102	0	2099	2099
15	240600	4320800	21	20197	10270102	0	0	2099
15	240800	4320800	21	20197	10270102	0	0	2099
15	241000	4320800	21	20197	10270102	0	0	2099
15	241200	4320800	21	20197	10270102	0	0	2099
15	241400	4320800	21	20197	10270102	0	0	2099
15	241600	4320800	21	0	0	0	0	2099
15	241800	4320800	21	0	0	0	0	2099
15	242000	4320800	21	0	0	0	0	2099
15	242200	4320800	21	0	0	0	0	0
15	242400	4320800	31	0	0	0	0	0
15	242600	4320800	31	0	0	0	0	0
15	242800	4320800	31	0	0	0	0	0
15	243000	4320800	31	0	0	0	0	0
15	243200	4320800	31	0	0	0	0	0
15	1243400	4320800	31	0	0	0	0	0
15	243600	4320800	31	0	0	0	0	0
15	243800	4320800	31	0	0	0	0	0
15	244000	4320800	31	0	0	0	0	0

15	244200	4320800	31	0	0	0	0	0
15	244400	4320800	31	0	0	0	0	0
15	244600	4320800	31	0	0	0	0	0
15	244800	4320800	31	0	0	0	0	0
15	245000	4320800	31	0	0	0	0	0
15	245200	4320800	31	0	0	0	0	0
15	245400	4320800	31	0	0	0	0	0
15	245600	4320800	31	0	0	0	0	0
15	245800	4320800	31	0	0	0	0	0
15	246000	4320800	31	0	0	0	0	0
15	246200	4320800	31	0	0	0	0	0
15	246400	4320800	31	0	0	0	0	0
15	246600	4320800	21	0	0	0	0	0
15	246800	4320800	21	0	0	0	0	0
15	247000	4320800	21	0	0	0	0	0
15	247200	4320800	21	0	0	0	0	0
15	247400	4320800	21	0	0	0	0	0
15	247600	4320800	21	0	0	0	0	0
15	247800	4320800	21	0	0	0	0	0
15	248000	4320800	21	0	0	0	0	0
15	248200	4320800	21	0	0	0	0	0
15	240200	4320600	21	20197	10270102	20197025	2099	2099
15	240400	4320600	21	20197	10270102	20197025	2099	2099
15	240600	4320600	21	20197	10270102	20197025	2099	2099
15	240800	4320600	21	20197	10270102	20197025	2099	2099
15	241000	4320600	21	20197	10270102	20197025	2099	2099

[etc]

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