

Association of State and Territorial

**ASTSWMO**

Solid Waste Management Officials

# Report of State Action Levels

Prepared by:  
**CERCLA**  
Training and Technology Transfer (T3)  
Focus Group

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## **Acknowledgements**

It is our intent that the information provided in this report will act as a resource for States and trust Territories in the further development of standards, regulations, and guidelines designed to support and enhance cleanup activities at our nation's contaminated sites. ASTSWMO wishes to thank all of the States who responded to this effort. Without their cooperation, this report would not be possible.

ASTSWMO especially recognizes the following State members of the CERCLA Training and Technology Transfer (T3) Focus Group, who conducted this research and compiled the results in this report:

George Klein, NJ (Chair)  
Paul Locke, MA  
James Carroll, MD  
Bheem Kothur, FL  
Heidi Sorin, OH  
Catherine Sharp, OK  
Robert Stout, MO  
Catherine LeCours, MT  
Michael Sorensen, CA

## **Opportunity for Comments, Questions, and Further Input**

Although the information contained in this report was provided by staff from the 34 individual States that responded to this effort, the Focus Group takes full responsibility for the information contained herein. Questions or corrections regarding the information contained in this report, or additions to it, should be directed to:

Jennifer M. Patterson  
CERCLA Staff Associate  
ASTSWMO  
444 North Capitol Street, NW, Suite 315  
Washington, DC 20001  
Phone: 202/624-5828  
Fax: 202/624-7875  
Email: [swmjenn@sso.org](mailto:swmjenn@sso.org)

Note: If a State or Territory did not previously provide information and is interested in doing so, ASTSWMO is still accepting responses. The Focus Group will incorporate all additional information received, as well as any necessary corrections, and provide an update to this report on or about January 2007. The Excel workbook used to collect the information and instructions for completing it are both accessible via the ASTSWMO website. (Please see links to ["Action Levels Project.xls"](#) and ["Action Levels Instructions.doc"](#).)

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444 North Capitol Street, NW, Suite 315  
Washington, DC 20001  
tel: (202) 624-5828 fax: (202) 624-7875  
www.astswmo.org

## **CERCLA TRAINING AND TECHNOLOGY TRANSFER FOCUS GROUP REPORT OF STATE SCREENING AND ACTION LEVELS**

### **Executive Summary**

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) is a non-profit trade organization supporting the environmental agencies of the States and trust Territories. ASTSWMO's mission is, "To enhance and promote effective State and Territorial waste management programs, and affect national waste management policies." The organization is structured to accomplish this two-part mission through both member committees and Association staff efforts.

In August 2004, the ASTSWMO CERCLA Research Center Subcommittee requested that its Training and Technology Transfer (T3) Focus Group compile and present a comprehensive list of State/Territorial screening and action levels, in order to assist States and Territories in developing their own standards, regulations, and guidelines. This report summarizes the results of a two-year research project conducted by the CERCLA T3 Focus Group.

### **Goal**

The principal goal of this research is to provide a resource that summarizes existing State/Territorial standards and guidelines, in order for this information to be readily used by States and Territories in developing or modifying cleanup criteria.

### **Methodology**

Members of the T3 Focus Group developed a customized Excel workbook titled, "[Action Levels Project](#)", which consisted of seven sheets or "tabs" to organize the information gathered. Five of the tabs allowed for respondents to input their State's/Territory's information by exposure medium (see Figures 1 and 2); one tab was used to input the respondent's full contact information, and one tab was provided as an example of the information requested. For each exposure medium (i.e., soil, groundwater, surface water, vapor intrusion, and sediment) the State/Territory was asked to provide information on a range of exposure pathways (e.g., dermal contact, ingestion, ecological). Where a State/Territory has published standards or guidelines that address an exposure, the respondent was asked to:

- Provide a reference for the information, e.g., a regulatory citation and/or a web address;
- Indicate the target cancer and non-cancer risk levels, and describe the basis for establishing the criteria; and
- Provide contact information (i.e., name and telephone number and/or email address) for further inquiry.

A drop-down list of common responses was compiled and provided to facilitate completion and to standardize responses to the extent possible. For example, when requesting information from States/Territories regarding the “basis” for the criteria cited, a drop-down list of cancer risk levels was provided (e.g., 1E-07, 1E-06, 1E-05, 1E-04, 1E-03). In each case, space was provided to allow for clarification and unique responses by a State/Territory.

## ASTSWMO T3 Focus Group Query of State Standards and Guidelines

**Goals of Query:** The goal of this research is to assist States in development or modification of cleanup criteria. The final product of this research will be distributed by ASTSWMO to each State/Territorial Waste Program.

**Instructions:** Please see attached instructions in MS Word and the example form in this spreadsheet. Then begin by filling in the respondent information below. This information will be automatically copied to each of the other tabs.

**Return via e-mail to:** Jennifer M. Patterson  
ASTSWMO CERCLA Research Center  
[swmienn@sso.org](mailto:swmienn@sso.org)  
(202) 624-5423

**Respondent Information**

State: \_\_\_\_\_

Program: \_\_\_\_\_

Name of Responder: \_\_\_\_\_

Title: \_\_\_\_\_

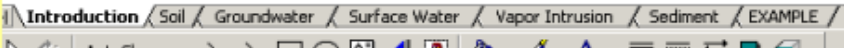
Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Date: \_\_\_\_\_

**To Begin:** The query is organized by exposure media provided so that you can see the type of standards requested. Also, many cells have drop-down lists that presume the answers provided are current as of this date. You can also directly type your answers. The workbook, accessible by clicking on the tabs at the bottom of your screen. The tabs look like this:




You can also click on these links to bring you directly to any sheet:

- [I. Soil Standards](#)
- [II. Groundwater Standards](#)
- [III. Surface Water Standards](#)
- [IV. Vapor Intrusion Standards](#)
- [V. Sediment Standards](#)
- [Example](#)

*Note: A tooltip box is present over the 'Date' field with the text: 'Please enter the date the form was completed. The T3 Focus Group presumes the answers provided are current as of this date.'*

Figure 1: Instructions Tab



Return to  
Intro  
Page

State: \_\_\_\_\_  
 Program: \_\_\_\_\_  
 Name & Email: \_\_\_\_\_  
 Date: \_\_\_\_\_

**I. Soil**

	Risk Basis	r Risk Basis	Regulations	Risk Basis	r Risk Basis	Guidelines
Inhalation	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		<div style="border: 1px solid black; padding: 5px; font-size: 8px;"> <b>Contact</b>            Provide a contact            name, email            and/or telephone            number         </div>
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Direct Contact (Dermal)	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Ingestion	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Impact to Groundwater	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Impact to Surface Water	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Ecological Risk	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		
Other*	1. <i>Citation/Location:</i>		1. <i>Citation/Location:</i>	1. <i>Citation/Location:</i>		
	2. <i>Basis:</i>		2. <i>Basis:</i>	2. <i>Basis:</i>		
	3. <i>Contact:</i>		3. <i>Contact:</i>	3. <i>Contact:</i>		

**REGULATION & GUIDELINES**

1. Citation or location of information  
i.e. N.J.A.S. 12:34.5, www.

2. Select basis for values:  
i.e. 10-6 Cancer Risk and derivation info

3. Availability of information  
- Contact Person

**OTHER PROGRAMS**

Please indicate Y or N whether other Programs in your State use the same or similar standards.

<input type="checkbox"/> RCRA Corrective Action <input type="checkbox"/> Solid Waste Landfill <input type="checkbox"/> Underground Storage Tank <input type="checkbox"/> Brownfields <input type="checkbox"/> Voluntary Cleanup Program <input type="checkbox"/> Air Quality Program (Clean Air Act)	<input type="checkbox"/> Drinking Water Program (Safe Drinking Water Act) <input type="checkbox"/> Wetlands Protection Program <input type="checkbox"/> Surface Water Protection Program <input type="checkbox"/> Other(s): _____ _____ _____
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**^ COMMENTS / MORE DETAILED EXPLANATION**

Introduction \ **Soil** / Groundwater / Surface Water / Vapor Intrusion / Sediment / EXAMPLE /

**Figure 2: Example Tab**

The Focus Group also asked respondents to indicate for each exposure medium, whether other regulatory programs within their State/Territory use the same criteria, e.g., RCRA Corrective Action, Solid Waste Landfill, Underground Storage Tank, Brownfields, Voluntary Cleanup Program, Air Quality Program (Clean Air Act), Drinking Water Program (Safe Drinking Water Act), Wetlands Protection Program, and/or Surface Water Protection Program. Finally, space was included to allow respondents to provide any additional information they felt would improve understanding of the development and use of the criteria cited.

A copy of the “Action Levels Project” (Excel workbook) may be downloaded at: <http://www.astswmo.org>. (Note link is under CERCLA publications.)

The sections of the Query are described below:

1. **Introduction:** Respondent information was entered once on the Introduction tab and then replicated automatically throughout the workbook. Brief instructions for completing the workbook were also provided.
2. **Example:** An example of the information requested was provided for soil, to help respondents gauge the appropriate level of detail sought by the Focus Group.
3. **Soil:** The exposure pathways of concern that were listed for soil included inhalation, direct contact (i.e., dermal), ingestion, impact to groundwater (i.e., leaching), impact to surface water, and ecological risk.
4. **Groundwater:** The exposure pathways of concern that were listed for groundwater included discharge to surface water, drinking (i.e., ingestion), and direct contact.
5. **Surface Water:** The exposure pathways of concern that were listed for surface water included direct contact, ecological risk, drinking (i.e., ingestion), and fish consumption.
6. **Vapor Intrusion:** Inhalation was the only exposure pathway of concern listed for vapor intrusion.
7. **Sediment:** The exposure pathways of concern that were listed for contaminated sediment included human health risk and ecological risk.

Regulators may find the wide range of approaches identified by the States cited in this report to be useful as they establish new standards or revise existing regulations, policies, or guidelines. The detailed description provided by each respondent provides clarity, and the references and contacts the States have identified are provided to facilitate contact with staff for additional information or further clarification of that State's response. A brief overview of the results has been developed by the Focus Group, in hopes of providing a broader context by which to evaluate each individual State's approach (see below).

### Overview of Findings

[Attachment A](#) organizes the responses by State. [Attachment B](#) organizes the responses by environmental media, to allow easy review of the various approaches adopted by States to address a particular exposure of concern (e.g., vapor intrusion).

As of June 23, 2006, thirty-four (34) of fifty (50) States had responded to the query. This is a 68 percent response rate. The States which responded are listed in Table 1 below. Note there were no Territories that responded.

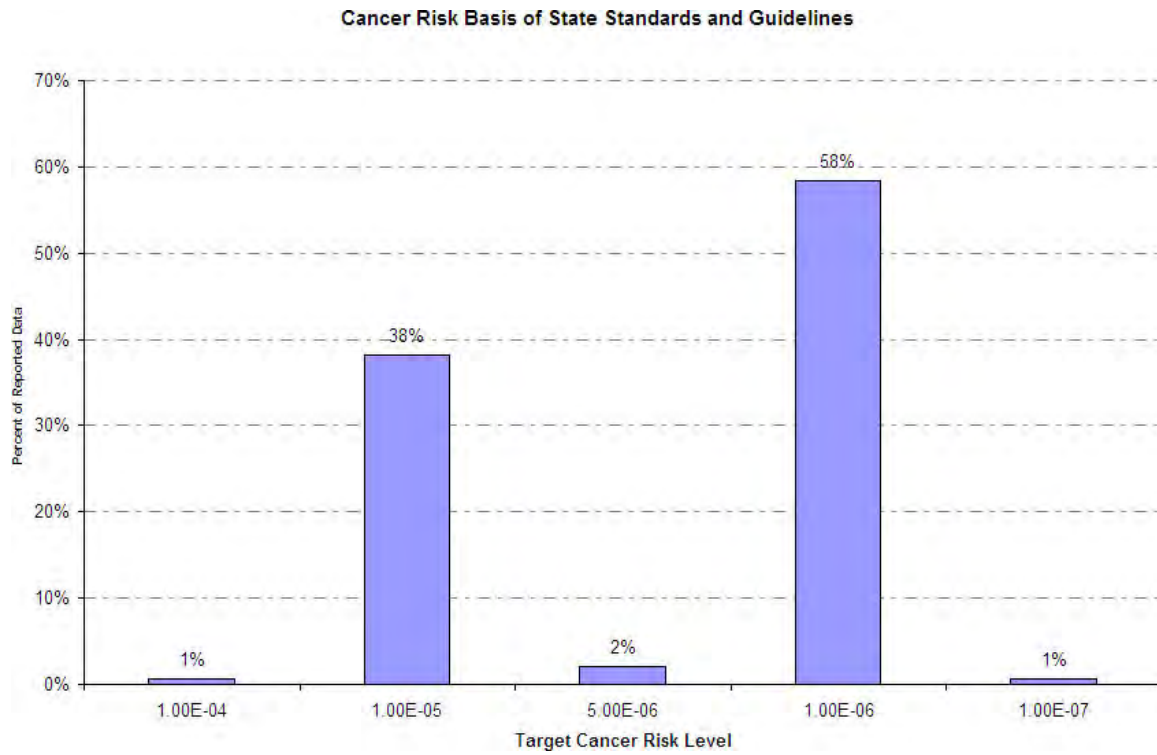
**Table 1: States Responding**

State Name		
ALASKA	ARIZONA	ARKANSAS
CALIFORNIA	COLORADO	CONNECTICUT
DELAWARE	FLORIDA	GEORGIA
ILLINOIS	INDIANA	IOWA
KENTUCKY	LOUISIANA	MARYLAND
MASSACHUSETTS	MICHIGAN	MINNESOTA
MISSISSIPPI	MISSOURI	MONTANA
NEBRASKA	NEW HAMPSHIRE	NEW JERSEY
NORTH DAKOTA	OHIO	OKLAHOMA
OREGON	RHODE ISLAND	SOUTH DAKOTA
TEXAS	UTAH	VIRGINIA
WISCONSIN		

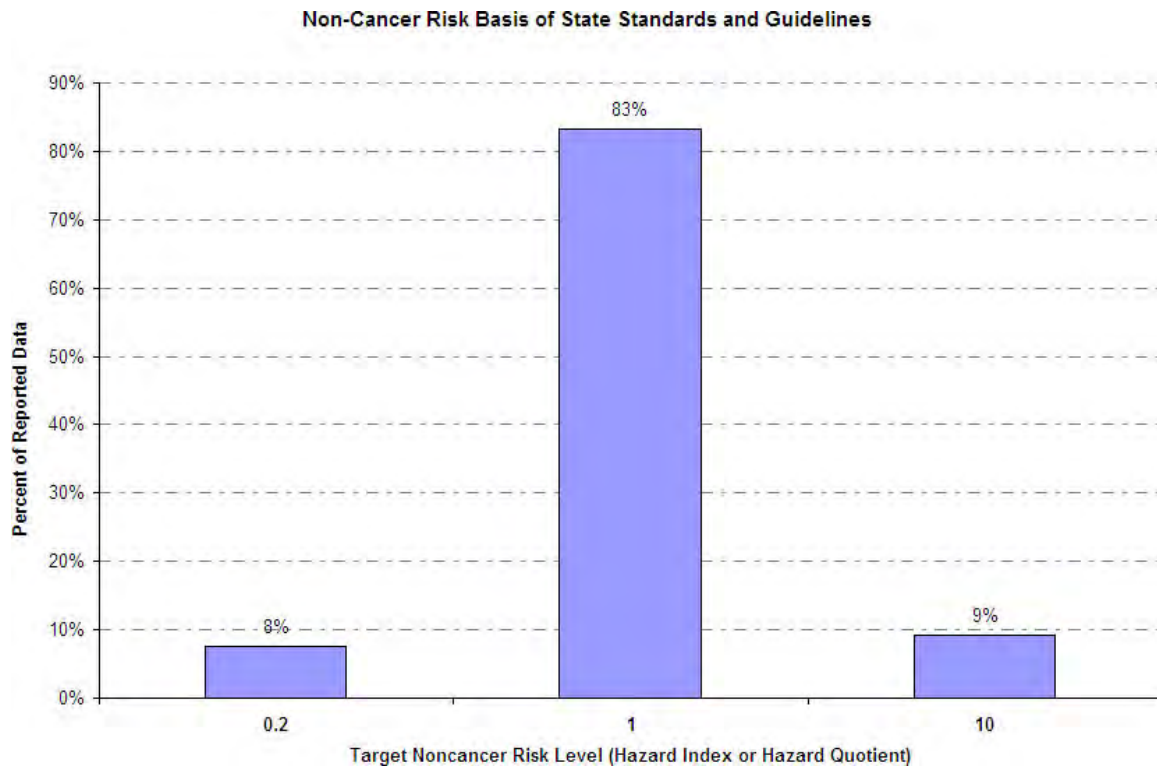
***Risk Basis for the Criteria***

**Cancer Risk:** The cancer risk basis of the standards and guidelines reported by States ranged from a stringent one-in-ten million (1E-07) to one-in-ten thousand (1E-04). The majority of standards utilize the more typical one-in-one million (1E-06) risk level criteria. Figure 3 depicts the distribution of cancer risk target levels reported.

**Non-Cancer Risk:** The non-cancer risk basis of the standards and guidelines reported by States ranged from a Hazard Index of 0.2 to a Hazard Index equal to 10. The majority of States reporting use a standard designed to achieve a non-cancer risk level equal to a Hazard Index of one (1). Figure 4 depicts the range of non-cancer risk target levels reported.



**Figure 3: Cancer Risk Basis of State Standards and Guidelines**



**Figure 4: Non-Cancer Risk Basis of State Standards and Guidelines**

## ***Exposure Pathways of Concern***

The Focus Group specifically solicited information concerning 19 exposure pathways associated with five exposure media. Soil and groundwater criteria were the most frequently reported, with the five most common exposures of concern listed in order below:

1. Inhalation of contaminants from soil;
2. Ingestion of contaminants in groundwater;
3. Leaching of contaminants from soil;
4. Ingestion of contaminated soil; and
5. Discharge of contaminated groundwater to surface water.

The results indicate that the most common standard (i.e., regulation rather than guidance) reported was for ingestion of groundwater as drinking water. The results also indicate that States are more likely to publish soil criteria in the form of guidance rather than promulgate soil standards in regulations.

Depicted in Table 2 and the bar chart below (see Figure 5) are the number of responses received from States which indicate they have standards established in regulations or guidelines for each of the exposure pathways of concern specified in the report. Overall the responding States do not show a clear preference for regulation or guidance in setting cleanup goals. While there is a slight variation by exposure medium, as noted above for soil criteria, the number of regulations established by the responding States is approximately the same as the number of guidelines published by the responding States. For instance, 20 responses by States indicate they have established regulations addressing dermal contact with soil. This is approximately equal to the number of guidelines developed by the States (21) to address the same exposure pathway.

States reported Guidelines and Regulations separately and these responses were counted separately in each category. It should also be noted that the number of total responses reported in each category below does not include instances where States failed to specify whether the standards cited were established in regulations or guidelines. See [Attachment B](#) for detailed information received from States, presented by exposure medium.

**Table 2: Frequency of  
Regulations/Guidelines Developed by States  
for the Referenced Exposures of Concern**

<b>Medium</b>	<b>Exposure Medium</b>	<b>Total # of Responses</b>	<b>Guidelines</b>	<b>Regulatory</b>
<b>Groundwater</b>	Direct Contact (Dermal)	30	13	17
	Discharge to Surface Water	44	17	24
	Drinking (Ingestion)	50	19	31
	Other	16	8	8
<b>Sediment</b>	Ecological Risk	35	22	10
	Human Health Risk	28	14	9
	Other	5	2	1
<b>Soil</b>	Direct Contact (Dermal)	42	21	20
	Ecological Risk	36	17	12
	Impact to Groundwater	48	25	21
	Impact to Surface Water	33	11	14
	Ingestion	45	22	21
	Inhalation	51	26	23
	Other	11	6	5
<b>Surface Water</b>	Direct Contact (Dermal)	32	12	19
	Drinking (Ingestion)	35	12	23
	Ecological Risk	39	16	21
	Fish Consumption	37	13	22
	Human Health Risk	1	1	
	Ingestion	2	1	1
	Other	12	5	6
<b>Vapor Intrusion</b>	Human Health Risk	6	4	1
	Inhalation	33	19	12
	Other	5	3	1

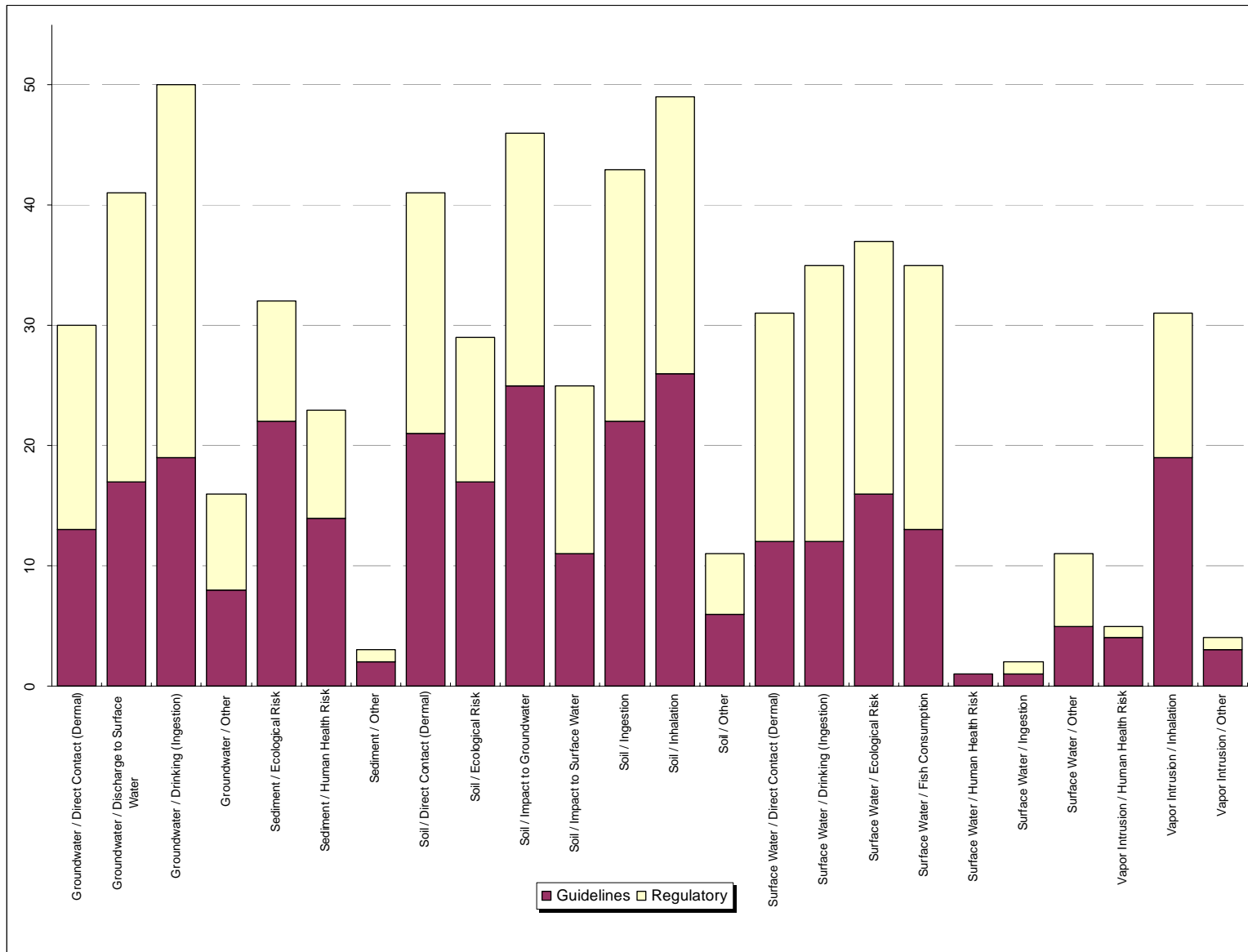
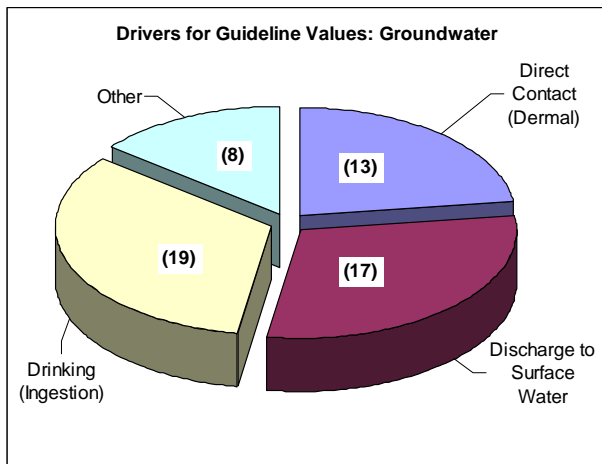
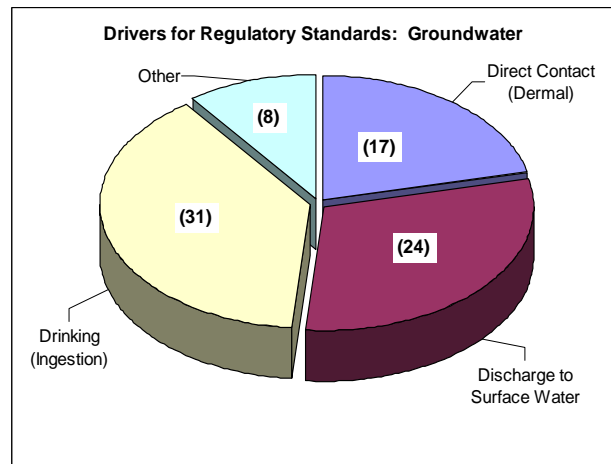


Figure 5: Frequency of Regulations/Guidelines Developed by States for the Referenced Exposures of Concern

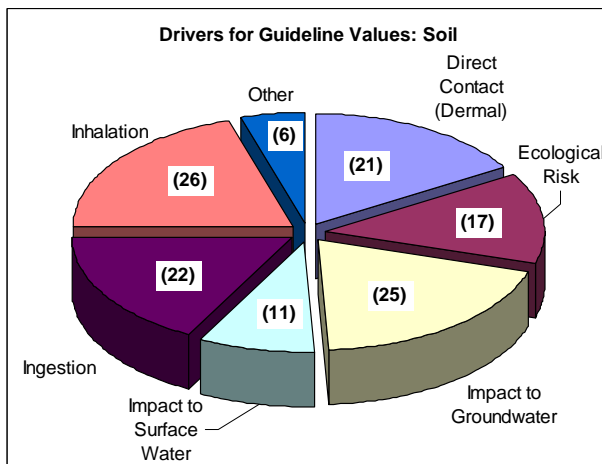
The pie charts shown below in Figures 6-10 provide the distribution of guidelines (or regulations) for each exposure pathway of interest for each environmental medium. The numbers shown in each piece of the pie represent the number of responses received. For example, Figure 6a shows there were 19 references by States to groundwater guidelines where the basis cited for establishment of the criteria was “drinking/ingestion” of groundwater. Seventeen responses cited “discharge of groundwater to surface water”; 13 indicated the guidelines are based upon “direct contact (dermal)”, and 8 indicated an “other” basis for the groundwater guidelines. Again, the number of total responses indicated in each category below does not include instances where States failed to specify whether the standards cited were established in regulations or guidelines. The basis with the highest number of responses, in each case, is interpreted by the Focus Group as what States consider to be the primary “driver” in developing guidelines or regulations for the specific media.



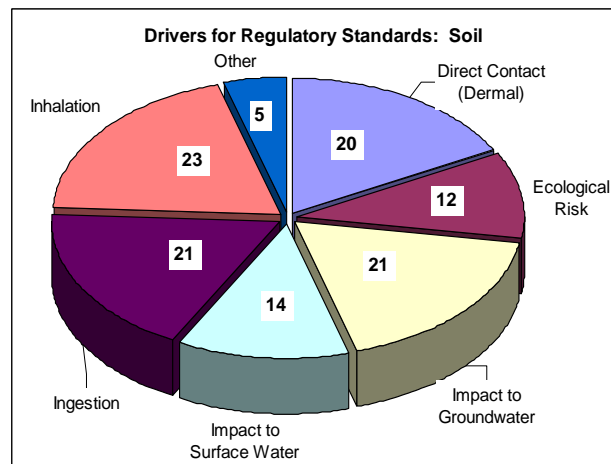
**Figure 6a: Frequency of Basis Cited for Establishment of Groundwater Guidelines**



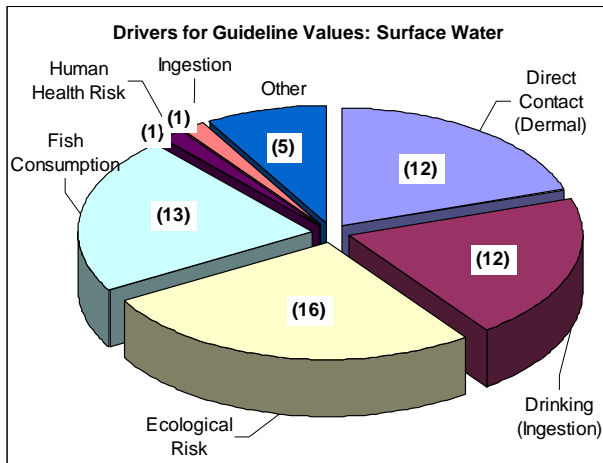
**Figure 6b: Frequency of Basis Cited for Establishment of Groundwater Regulations**



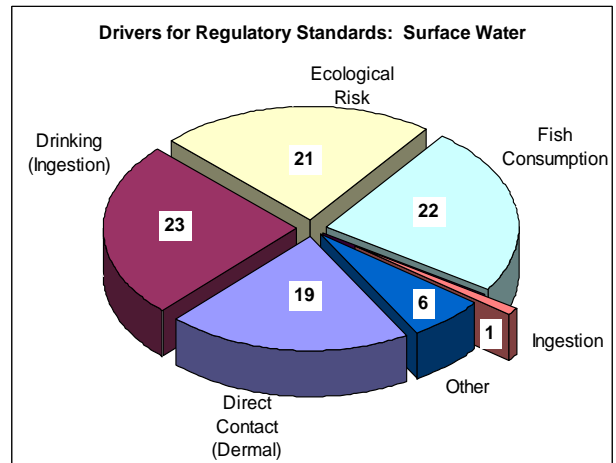
**Figure 7a: Frequency of Basis Cited for Establishment of Soil Guidelines**



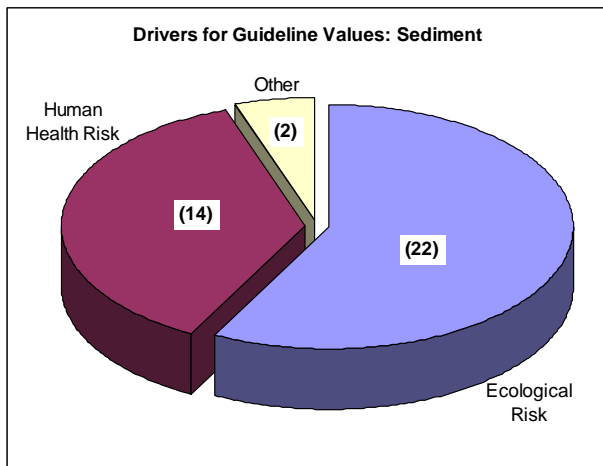
**Figure 7b: Frequency of Basis Cited for Establishment of Soil Regulations**



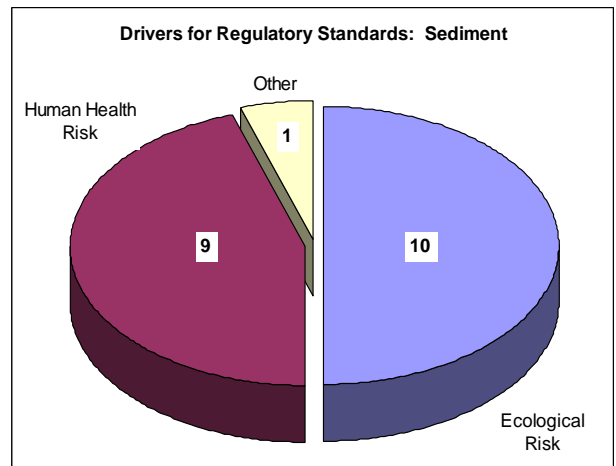
**Figure 8a: Frequency of Basis Cited for Establishment of Surface Water Guidelines**



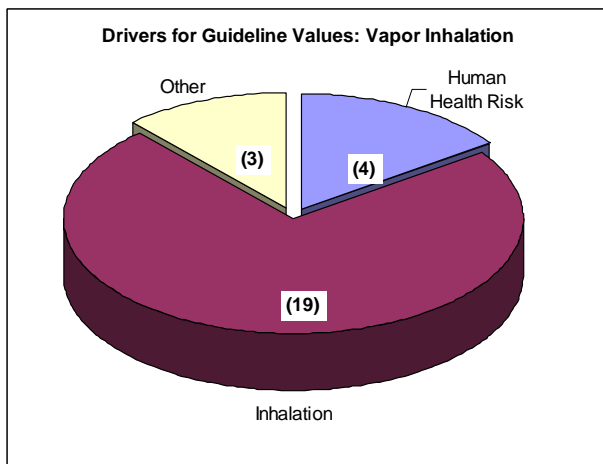
**Figure 8b: Frequency of Basis Cited for Establishment of Surface Water Regulations**



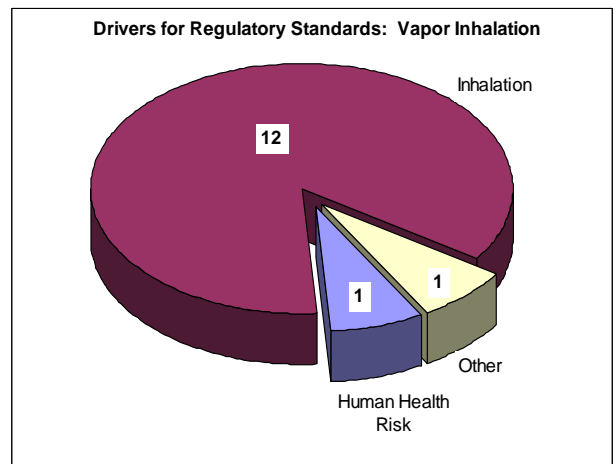
**Figure 9a: Frequency of Basis Cited for Establishment of Sediment Guidelines**



**Figure 9b: Frequency of Basis Cited for Establishment of Sediment Regulations**



**Figure 10a: Frequency of Basis Cited for Establishment of Vapor Inhalation Guidelines**



**Figure 10b: Frequency of Basis Cited for Establishment of Vapor Inhalation Regs.**

## **Conclusions and Next Steps**

The T3 Focus Group completed this research under the direction of the ASTSWMO CERCLA Research Center. 34 States submitted information for this report. This compilation of State action levels is designed to assist States and Territories in developing or modifying their own cleanup standards, guidelines, and regulations, by enabling those States and Territories to review what others have already developed to address the same media or exposure route, and by providing contacts and references for more detailed information.

The Focus Group plans to update this report on or about January 2007. Should a State or Territory identify the need for corrections or updates to the information they have submitted, or wish to provide new information for this report, the Focus Group will consider all additional information received by December 31, 2006. Please contact Jennifer Patterson at ASTSWMO for more information regarding the report update: [swmjenn@sso.org](mailto:swmjenn@sso.org).