



**Stockholm Convention on Persistent Organic Pollutants**

**Regional Training Workshop on New POPs and  
the Process of Reviewing and Updating NIPs**

**CONTAMINATED SITES WITH POPs IN SÃO PAULO  
STATE**

**Eng. Alfredo Rocca**  
**Gerente da Divisão de Resíduos Sólidos e Áreas Contaminadas**

**Sao Paulo, Brazil, May 2010**



**SECRETARIA DO  
MEIO AMBIENTE**



# SÃO PAULO STATE IN BRAZILIAN CONTEXT



- 248.809 KM<sup>2</sup>

- 645 MUNICIPALITIES

- MORE THAN 40 MILHION OF INHABITANTS

- MORE THAN 30 % OF BRAZILIAN PIB

- PROMINENT IN INDUSTRY, AGRICULTURE, CATTLE RAISING AND SERVICES

- MORE THAN 210.000 INDUSTRIES



SECRETARIA DO  
MEIO AMBIENTE



# **CONTAMINATED SITES**

**SITE WITH SOIL OR GROUNDWATER  
CONTAMINATION**

**CAUSED BY CHEMICALS / WASTES DEPOSITION  
OR INFILTRATION**

**PLANNED OR ACCIDENTALLY**



SECRETARIA DO  
MEIO AMBIENTE



# **CONTAMINATED SITES MANAGEMENT AT CETESB**

**CETESB HAVE BEEN MANAGING CONTAMINATED SITES IN SÃO PAULO STATE SINCE 1980, WHEN IT HAVE BEEN DISCOVERED 6 RHODIA CONTAMINATED SITES WITH CHLORINATED SOLVENTS, INCLUDING HEXACHLOROBENZENE, IN BAIXADA SANTISTA**



SECRETARIA DO  
MEIO AMBIENTE



# CONTAMINATED SITES MANAGEMENT AT CETESB

**CETESB ACTS IN TWO LINES;**

- **PREVENTIVE AND**
- **CORRECTIVE**



SECRETARIA DO  
MEIO AMBIENTE



# **BASIC TOOLS FOR CONTAMINATED SITES PREVENTION AND CONTROL**

- **LEGISLATION;**
- **POLLUTION PREVENTION AND WASTE MINIMIZATION INCENTIVES;**
- **LICENCING, CONDITIONING AND FISCALIZATION OF POLLUTION SOURCES;**
- **ESTABLISHMENT OF SOIL AND GROUNDWATER GUIDED VALUES;**
- **ESTABLISHMENT OF MANAGEMENT PROCEDURES FOR ALL STAKEHOLDERS;**
- **TECHNICAL MANUAL FOR ALL STEPS OF CONTAMINATED SITE MANAGEMENT.**



SECRETARIA DO  
MEIO AMBIENTE



# FEDERAL LEGISLATION

- **Art 225 of Constitution - encumber public power and collectivity to preserve environment ecologically balanced for future generations;**
- **Art 170 of Constitution - establish the social function of property and the environmental protection need;**
- **Federal Law 9.605/98 -environmental pollution and public health damage is considered a crime;**
- **Federal Law 6.938/81 - establish the National Environmental Protection Policy and the principle of the polluter payer;**
- **CONAMA Resolution 273/00 - establish the necessity of gas stations environmental licensing and site rehabilitation;**
- **CONAMA Resolution 420/09 - establish soil and groundwater guided values and contaminated sites management procedures.**



SECRETARIA DO  
MEIO AMBIENTE



# SÃO PAULO STATE LEGISLATION

- **State Constitution** - encumber public power, private companies and collectivity to keep and improve environmental quality, preventing degradation, avoiding negative impacts and keeping environment ecologically balanced for future generations;
- **State Law n° 997/76**, establish environmental protection and control system in São Paulo State;
- **Law 13577/09** - establish soil and groundwater guided values and guidelines for contaminated sites management in São Paulo State and create a financial fund to support investigation assessment and rehabilitation of contaminated sites.



SECRETARIA DO  
MEIO AMBIENTE





# CONTAMINATED SITES FRAMEWORK IN SÃO PAULO STATE

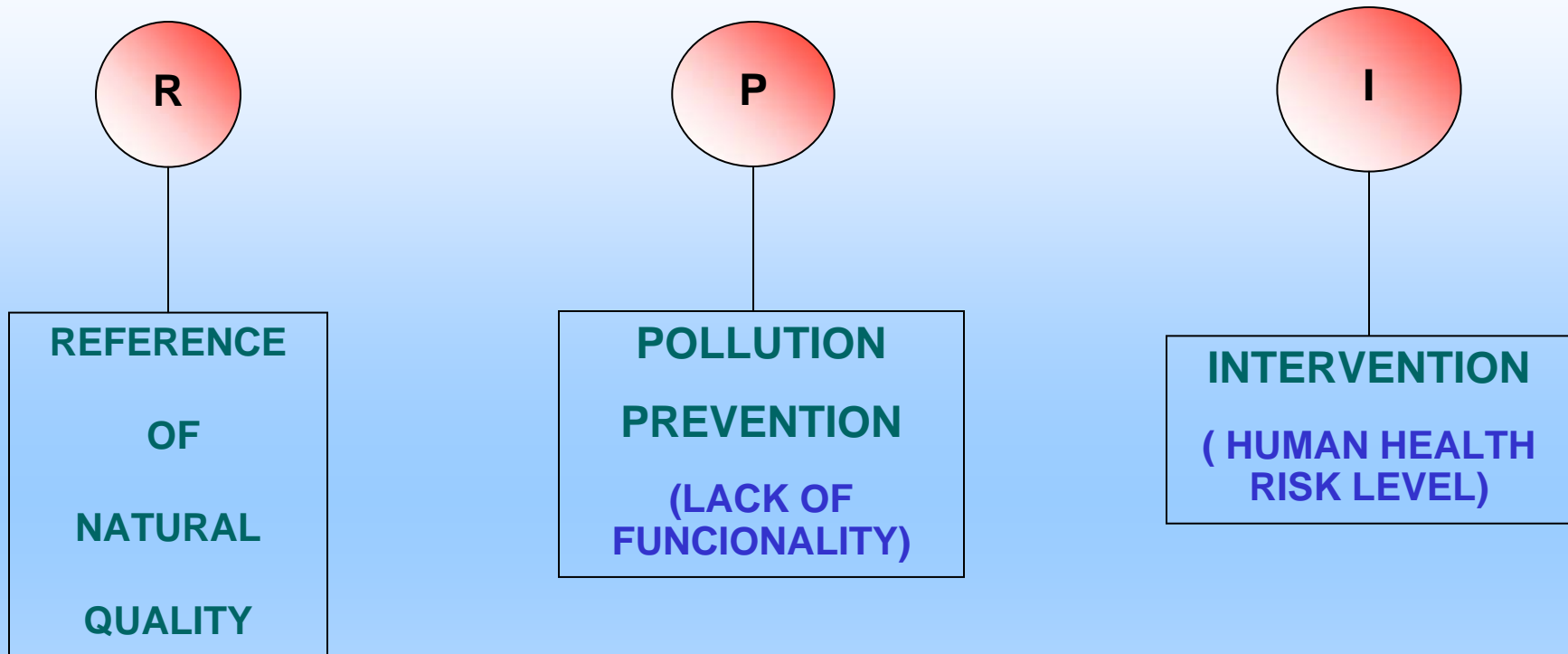
- SOIL AND GROUNDWATER ORIENTATION VALUES;
- MANAGEMENT PROCEDURES;
- TECHNICAL MANUAL;
- OFICIAL CADASTER AND REGISTRY;



SECRETARIA DO  
MEIO AMBIENTE



# SOIL AND GROUNDWATER GUIDED VALUES



“Relatório de Estabelecimento de Valores Orientadores para Solos e Águas Subterrâneas no Estado de São Paulo” (CETESB, 2005)

[www.cetesb.sp.gov.br](http://www.cetesb.sp.gov.br)



SECRETARIA DO  
MEIO AMBIENTE

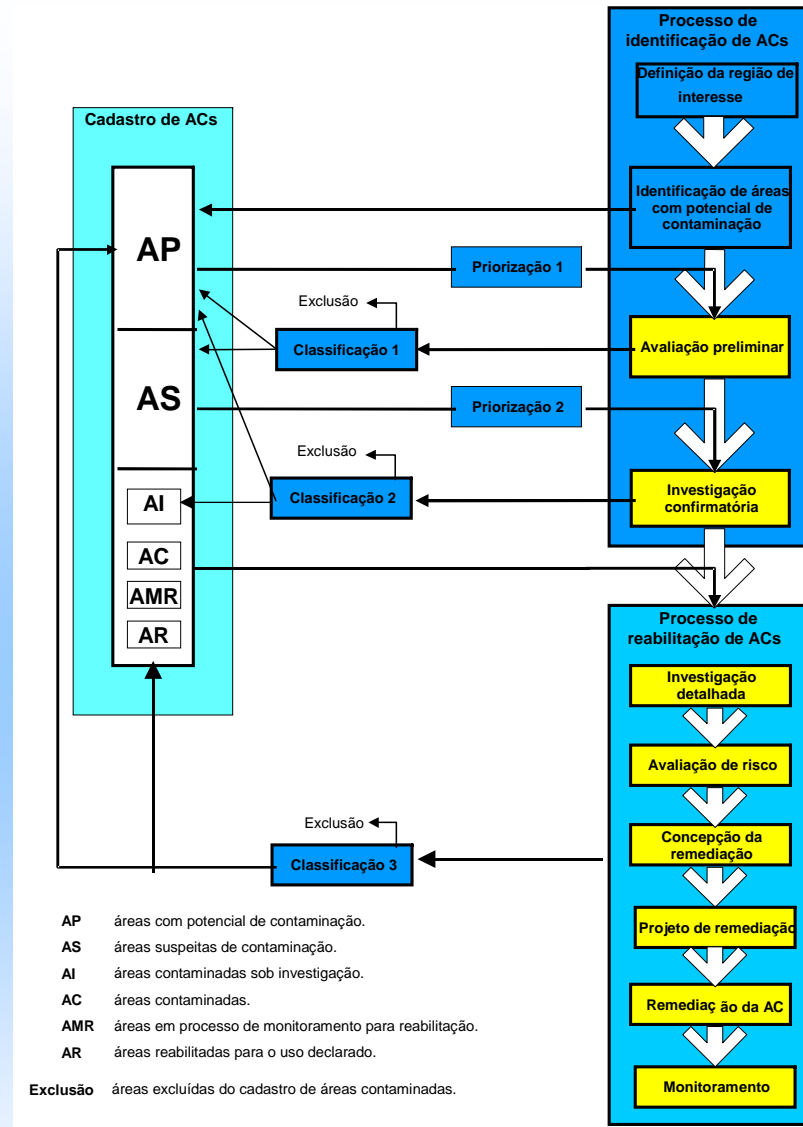


# CONTAMINATED SITES MANAGEMENT AND PROCEDURES IN SÃO PAULO STATE

•“Manual de Gerenciamento de Áreas Contaminadas” (CETESB, 2001);

•“Procedimentos Para o Gerenciamento de Áreas Contaminadas no Estado de São Paulo” (CETESB, 2007).

[www.cetesb.sp.gov.br](http://www.cetesb.sp.gov.br)



SECRETARIA DO  
MEIO AMBIENTE



# CONTAMINATED SITES IN SÃO PAULO STATE

- MORE THAN 2900 CONTAMINATED SITES IDENTIFIED;
- ABOUT 1.000 UNDER INVESTIGATION;
- ABOUT 1.000 WITH INTERVENTION PROPOSED OR UNDER DEVELOPMENT;
- ABOUT 1000 REHABILITATED FOR THE USE DECLARED BY THE LEGAL RESPONSIBLE PART.

“Relação de Áreas Contaminadas” no Estado de São Paulo” (CETESB, NOVEMBRO de 2009)

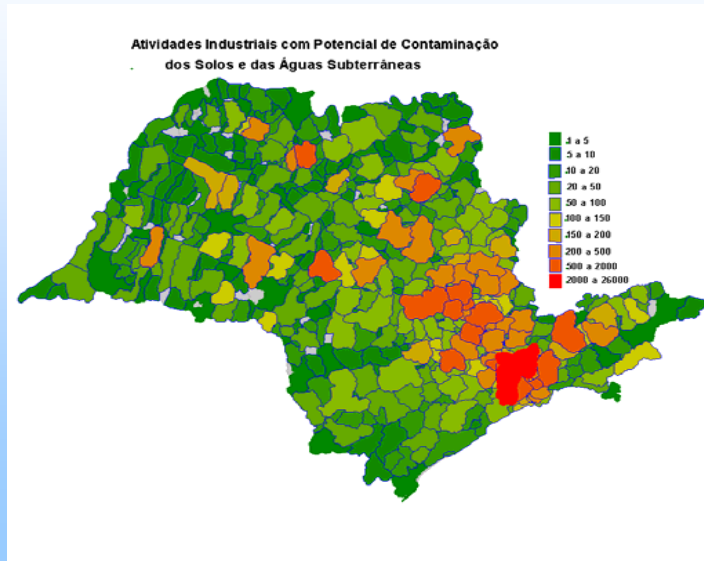
[www.cetesb.sp.gov.br](http://www.cetesb.sp.gov.br)



SECRETARIA DO  
MEIO AMBIENTE

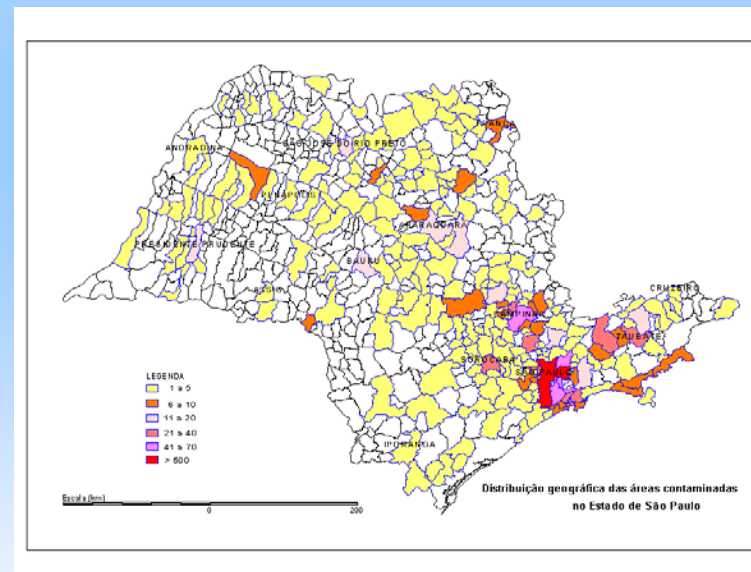


# CONTAMINATED SITES IN SÃO PAULO STATE



LOCATION OF ACTIVITIES WITH POTENTIAL FOR SOIL AND GROUNDWATER CONTAMINATION

LOCATION OF CONTAMINATED SITES IDENTIFIED



SECRETARIA DO  
MEIO AMBIENTE



# CONTAMINATED SITES WITH FIRST POPS IN SÃO PAULO STATE (38 IDENTIFIED UP TO NOW)

CONTAMINANTE	NÚMERO DE ÁREAS	CONCENTRAÇÃO NO SOLO (MG/KG)	VALOR DE INTERVENÇÃO SOLO(MG/KG)	CONCENTRAÇÃO NA ÁGUA SUBTERRÂNEA (uG/l)	VALOR DE INTERVENÇÃO AGUA(uG/l)
<i>aldrin</i>	5	1,7 a 43	0,003 a 0,03	0,3 a 27	0,03
<i>endrin</i>	2	0,4 a 60	0,4 a 2,5	0,4 a 2,5	0,6
<i>dieldrin</i>	4	1,2 a 400	0,2 a 1,3	0,1 a 9,5	0,03
<i>toxafeno</i>	1	100	1,6	-	-
<i>hexaclorobenzeno</i>	12	3,4 a 2150	0,005 a 1	2,3 a 5,3	1
<i>PCB</i>	17	0,1 a 27	0,01 a 0,12	0,3 a 1,8	3,5
<i>DDT</i>	1	-	0,55 a 5	0,3	2
<i>dioxinas e furanos</i>	1	13 a 25 ng/kg	4 a 16 ng/kg	-	-

FASE DO GERENCIAMENTO	NÚMERO DE ÁREAS
<i>INVESTIGAÇÃO DETALHADA E AVALIAÇÃO DE RISCO</i>	16
<i>REMEDIAÇÃO</i>	21
<i>REABILITADA</i>	1

TECNOLOGIA DE REMEDIAÇÃO	NÚMERO DE ÁREAS
<i>REMOÇÃO E REDISPOSIÇÃO DE SOLOS</i>	19
<i>BARREIRA FÍSICA</i>	6
<i>BOMBEAMENTO E TRATAMENTO DE ÁGUAS SUBTERRÂNEAS</i>	9



SECRETARIA DO  
MEIO AMBIENTE



# **CONTAMINATED SITES MANAGEMENT IN SÃO PAULO STATE**

## **TENDENCES AND NECESSITIES**

- **INTEGRATED APPROACH WITH FEDERAL AND MUNICIPAL LEVELS;**
- **DEVELOPMENT AND QUALIFICATION OF CONSULTANCY AND REMEDIATION COMPANIES;**
- **FINANCIAL FUND.**



SECRETARIA DO  
MEIO AMBIENTE



# CONTAMINATED SITES WITH NEW POPS IN SÃO PAULO STATE

- **NEW POPS** (CHLORDECONE, HEXABROMOBIPHENYL, HEXABROMODIPHENYL ETHER AND HEPTABROMODIPHENYL ETHER, ALPHA HEXACHLOROCYCLOHEXANE, BETA HEXACHLOROCYCLOHEXANE, LINDANE, PENTACHLOROBENZENE (PECB), PERFLUOROOCCTANE SULFONIC ACID (PFOS), ITS SALTS AND PERFLUOROOCCTANE SULFONYL FLUORIDE (PFOS-F), TETRABROMODIPHENYL ETHER AND PENTABROMODIPHENYL ETHER).
- **WE NEED TO IDENTIFY, AT CETESB CADASTER OF CONTAMINATED SITES, THOSE CONTAMINATED WITH THE NEW POPS;**
- **THAN VERIFY THE CURRENT STAGE OF MANAGEMENT AND REHABILITATION;**
- **IT DOES NOT LOOK LIKE WE HAVE IDENTIFIED MANY AREAS CONTAMINATED WITH NEW POPS IN SÃO PAULO STATE**



SECRETARIA DO  
MEIO AMBIENTE





**CETESB**  
**ENVIRONMENTAL AGENCY OF SAO PAULO STATE**

**TKANK YOU !**  
**GRACIAS!**  
**OBRIGADA!**

**Eng. Alfredo Rocca**  
**Gerente da Divisão de Resíduos Sólidos e Áreas Contaminadas**

Sao Paulo - BRAZIL

[www.cetesb.sp.gov.br](http://www.cetesb.sp.gov.br) Tel.+ 5511.3133.3564



SECRETARIA DO  
MEIO AMBIENTE

