



# RISK ASSESSMENT IN ITALY

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# WHO IS SYNDIAL

In the ENI Group, Syndial S.p.A. (Former EniChem S.p.A.) has mainly the mission of managing environmental activities necessary to restore and re-develop industrial sites.



**More than  
50 sites**

**LEGEND:**

-  ex ANIC/EniChem
-  ex Montedison
-  ex SIR-Rumianca
-  ex LiquiChimica
-  ex SINGEA
-  ex Ambiente
-  ex Agricoltura

# Syndial sites of national interest (SIN)



# ITALIAN LEGISLATION (1999)

At the end of 1999 was published in Italy the first remediation law (DM 471/99) with these characteristics:

- a tabular approach to fix the same clean up target levels in all the regions
- **risk analysis performed only when the target level cannot be reached even with the best available technology (residual application of RA)**

# JRC, European Commission study (2007)

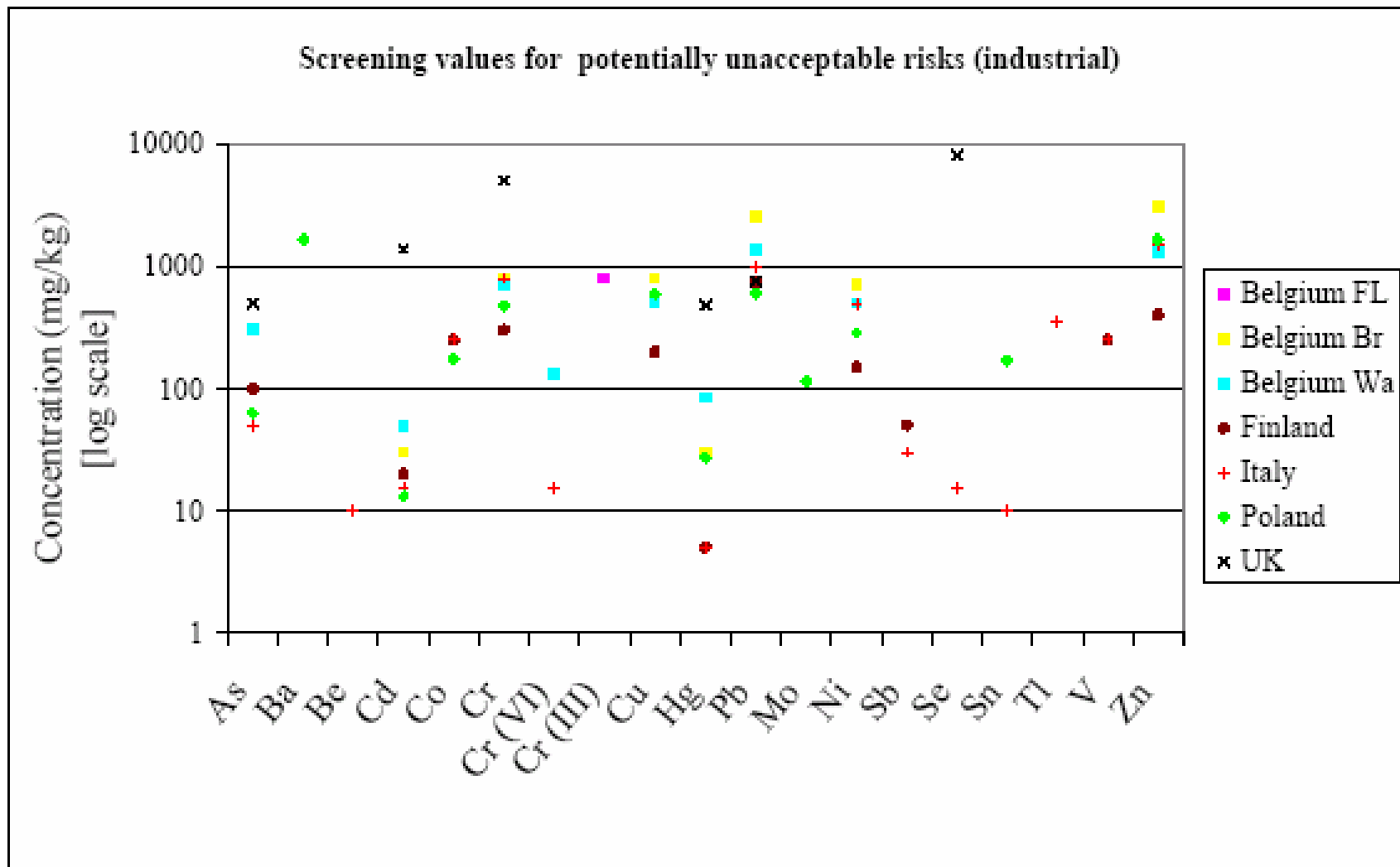


Figure 4.7. Screening values for potentially unacceptable risk (industrial soil-use) for the metals and metalloids.

# JRC, European Commission study (2007)

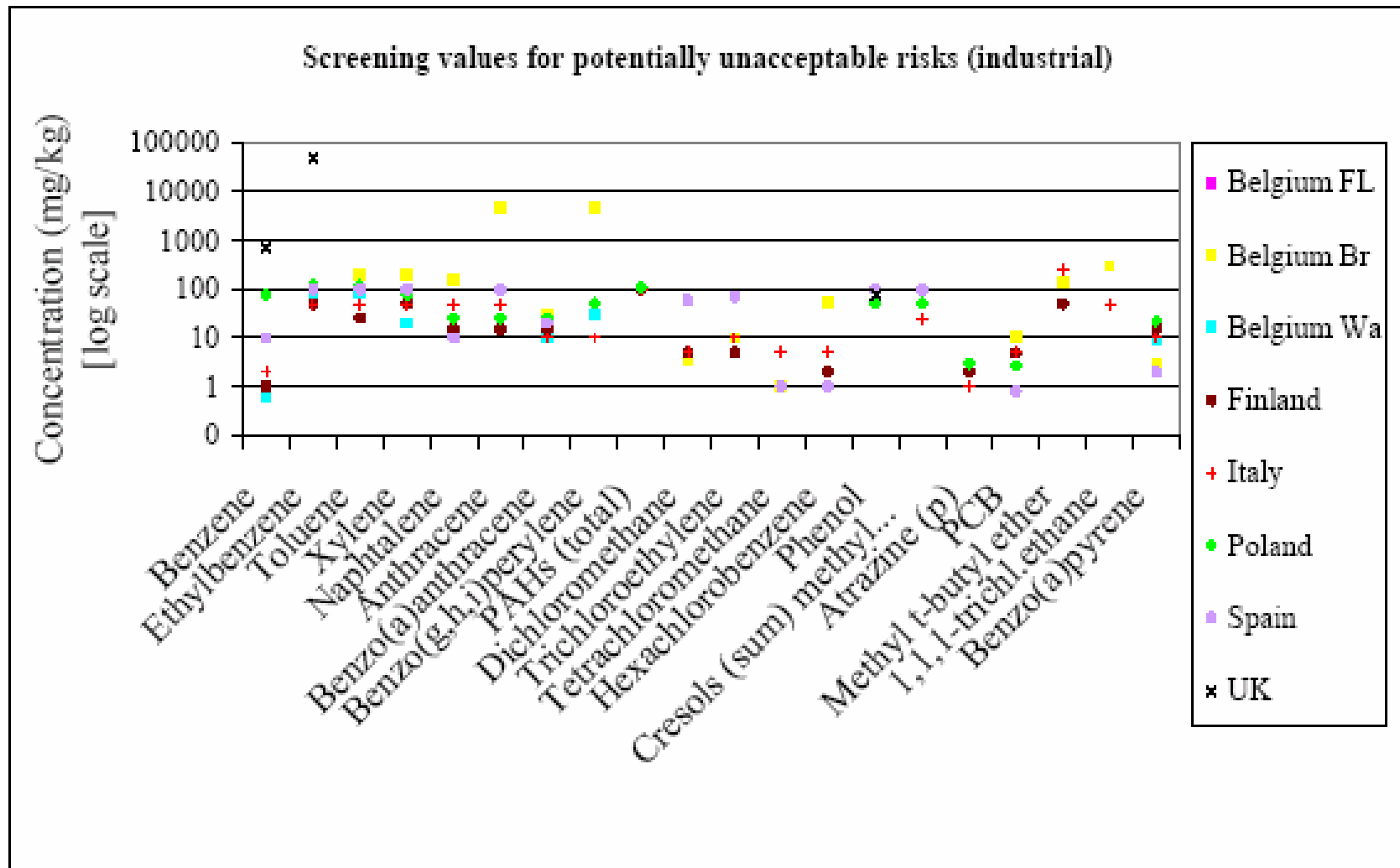
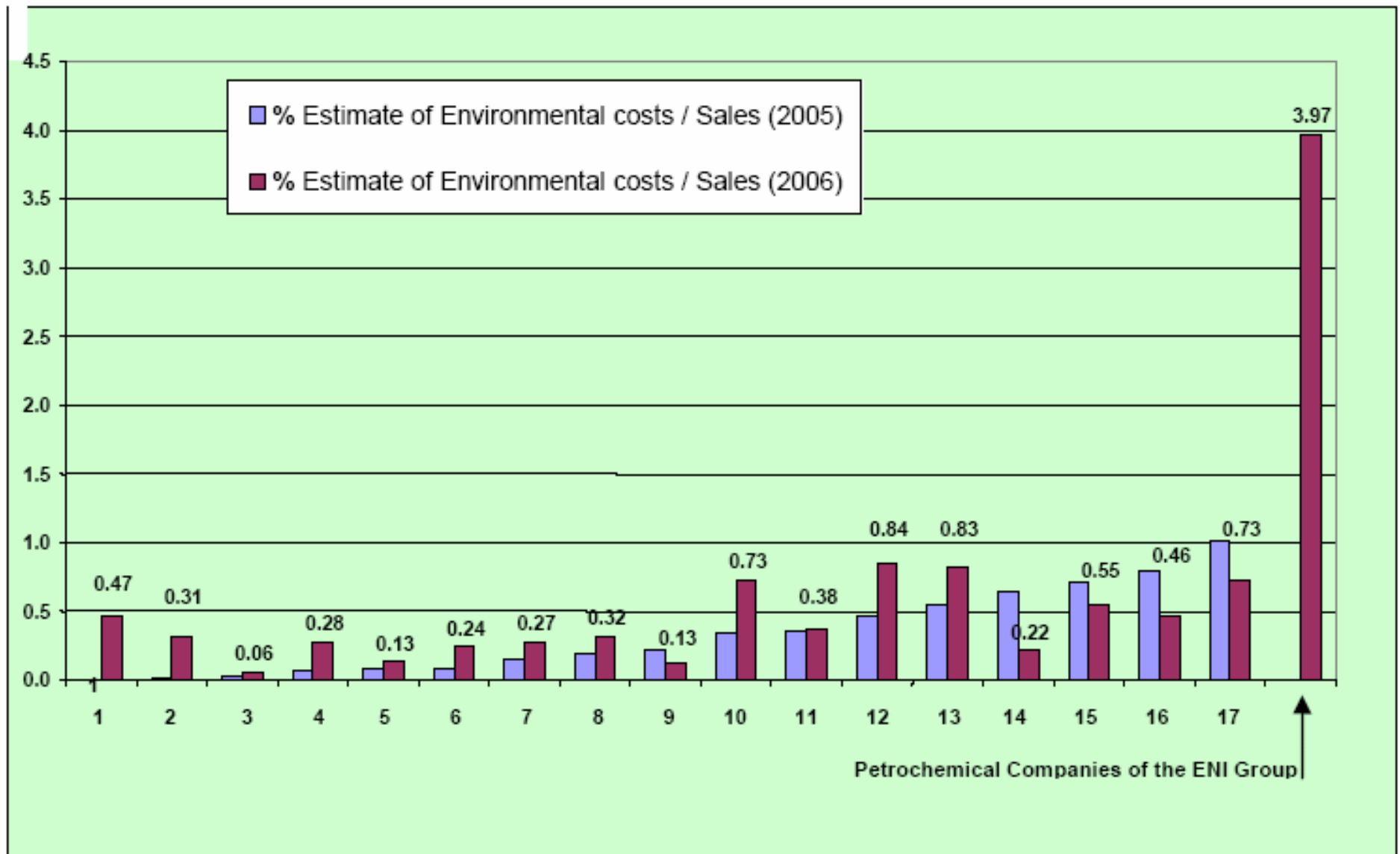
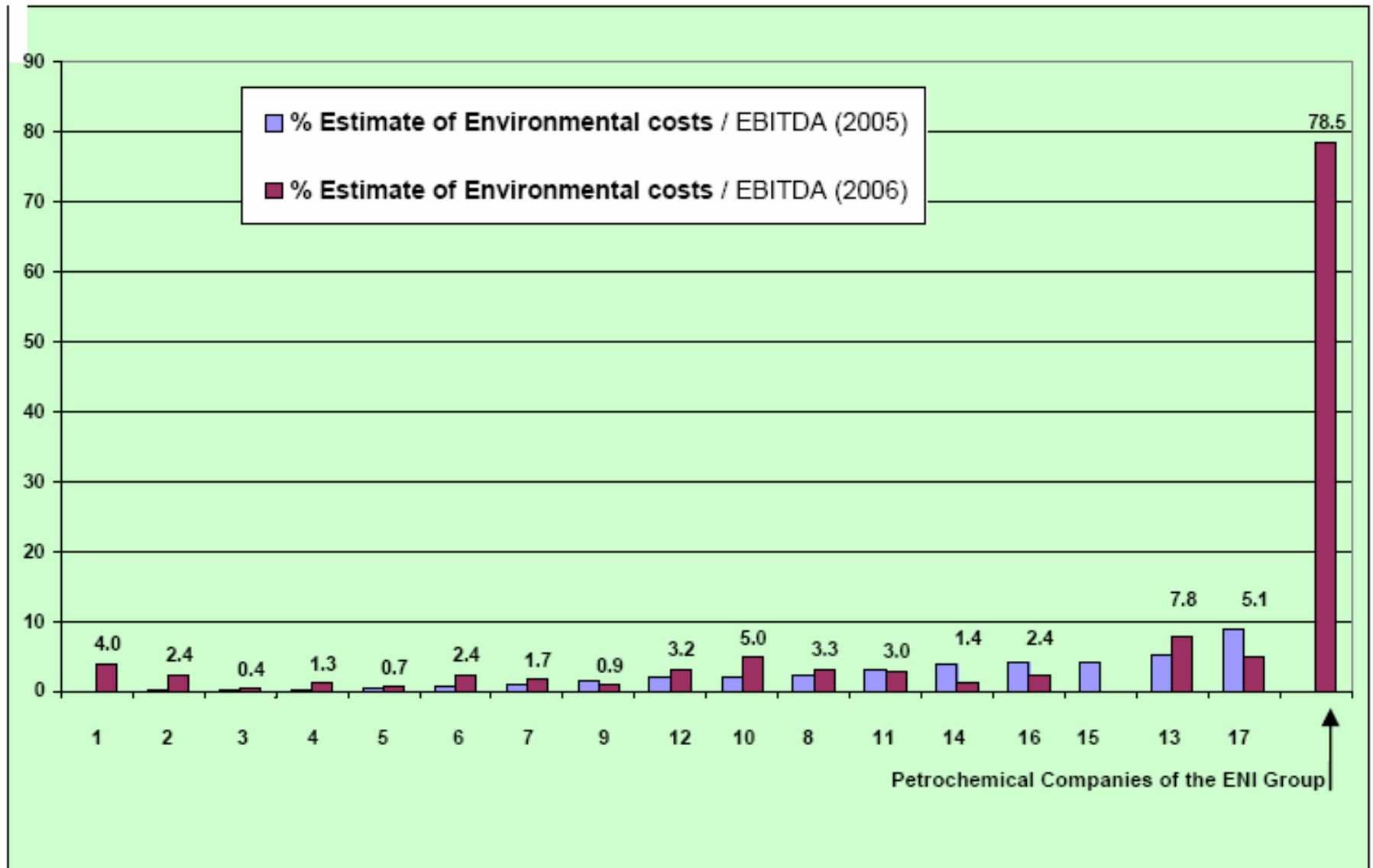


Figure 4.8. Screening values for potentially unacceptable risk (industrial soil-use) for the most relevant organic contaminants.

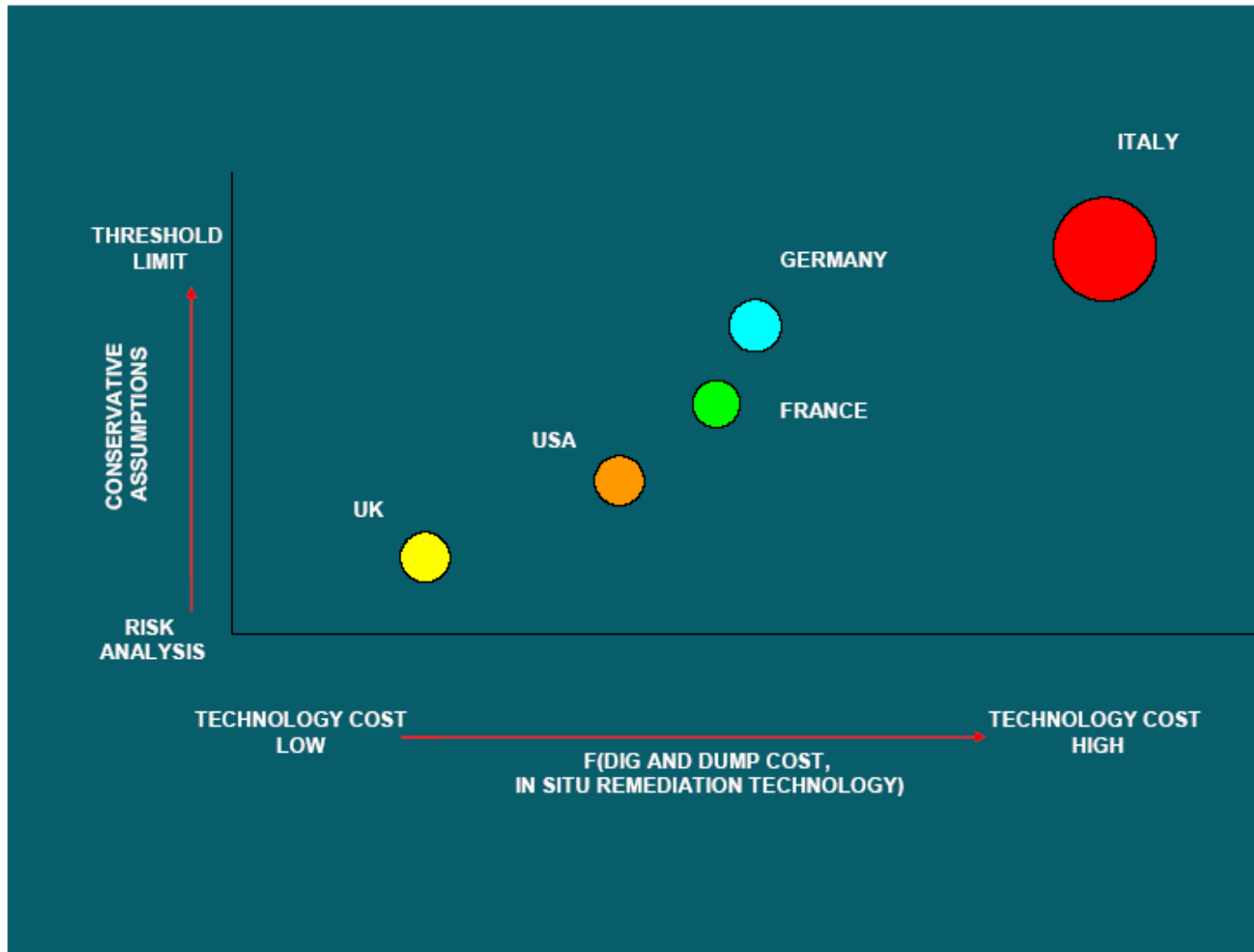
# THE CONSEQUENCES



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# REMEDIATION POSITIONING



# ITALIAN LEGISLATION (2006)

The new environmental legislation issued in 2006 (Legislative Decree n.152/06) has introduced risk analysis to define the remediation target levels (called CSR in Italy), but the law has still problems for its application

# Prescriptions received to the Risk Analysis (July, 2008)

	<u><i>Our proposal (2007)</i></u>	<u><i>P.A. prescriptions (2008)</i></u>
<b>Migration pathways</b>	Vapour inhalation not applied to dioxin and furans	Vapour inhalation (indoor and outdoor) must be applied also to dioxin and furans
<b>Porosity</b>  <b>Fraction of organic carbon</b>	Used standard USCS for sands  95% LCL from all site specific data (0,48%) as required by (APAT, june 2006)	Must be used more conservative standard values defined by APAT per terreni a granulometria sabbiosa Must be used the most conservative value found in the site
<b>water table level</b>	Average (5 m da p.c.)	The most conservative depending on prevalent pathway
<b>Hydraulic parameters</b>	Used standard USCS for sands	Must be used more conservative standard values defined by APAT for sandy soil

## Prescriptions received to the Risk Analysis (July, 2008)

	<u><i>Our proposal (2007)</i></u>	<u><i>P.A. prescriptions (2008)</i></u>
<b>Mixing zone thickness</b>	Site specific	Calculated by APAT guidelines
<b>Volatilization of Hg</b>	Site specific	Data base with standard values
<b>Ripartition coefficient (Koc) for DDx</b>	Site-specific	Data base with standard values
<b>Frequency of exposure for external area</b>	Site specific data (1 our/week)	6 our/week
<b><u>CSR</u></b>	When the value is < CSC (screening level), we fixed CSR = CSC	Not accepted

COPCs	CSR (mg/kg) Suolo Superficiale 2007	CSR (mg/kg) Suolo Superficiale 2008 SCENARIO 1	CSR (mg/kg) Suolo Superficiale 2008 SCENARIO 2	CSR (mg/kg) Suolo Profondo 2007	CSR (mg/kg) Suolo Profondo 2008 SCENARIO 1	CSR (mg/kg) Suolo Profondo 2008 SCENARIO 2
Aromatici Leggeri	250*	250*	250*	250*	250*	250*
Alifatici Pesanti	750*	750*	750*	750*	750*	750*
Acenaftilene	189#	110#	110#	-	-	-
Fenantrene	109#	63#	63#	-	-	-
Pirene	50*	50*	50*	-	-	-
Benzo(a)Antracene	16#	16	16	16#	16	16
Benzo(b)Fluorantene	10*	10*	10*	-	-	-
Indenopirene	5*	5*	5*	5*	5*	5*
Crisene	50*	50*	50*	-	-	-
DDD	89	276	68	432#	4114#	252#
DDE	63	7	48	2573#	29#	1501#
DDT	80	31	61	316#	47#	184#
TCDD	0,0122	0,0325	0,0325	0,8347	0,4380	0,438
Mercurio	160	7	146	11066	38	10580
Antimonio	472676	>10 <sup>6</sup>	>10 <sup>6</sup>	388002	268983	268983
Arsenico	13933	63407	63407	25076	23974	23974
Piombo	10816	105223	105223	214160	380859	380859
Rame	>10 <sup>6</sup>	>106	>10 <sup>6</sup>	>10 <sup>6</sup>	>106	>10 <sup>6</sup>
Cadmio	53027	217209	217209	89369	82360	82360
Zinco	>10 <sup>6</sup>	>106	>10 <sup>6</sup>	-	-	-
alfa-BHC	0,4	0,3	0,32	-	-	-
beta-BHC	2#	1#	1#	-	-	-
gamma-BHC	3,9	3,0	2,97	-	-	-
Benzene	2*	2*	2*	-	-	-
Esaclorobenzene	5*	5*	5*	5*	5*	5*
Diclobenzene (1,4)	10*	10*	10*	-	-	-
Diclobenzene (1,2)	50	79	79	-	-	-
Tetraclobenzene 1,2,4,5	25*	25*	25*	-	-	-
Triclorobenzene 1,2,4	60	105	105	-	-	-
PCB	5*	5*	5*	6	3,8	3,8
Dieldrin	1,4	1,1	1,1	-	-	-

# SYNDIAL LAST REAL CASE

Target level	Contaminated soil	Notes
Screening values	>1.000.000 (mc)	2000: R.A. not applied (tabular approach)
Risk Based Value (European approach)	350.000 (mc)	2003: first site-specific R.A. without APAT guidelines (not available)
Risk Based – first evaluation	573.000 (mc)	2005: R.A. performed with the first APAT guidelines
Risk Based – second evaluation	813.000 (mc)	2008: R.A. performed with the new APAT Guidelines with the addition of two main “site-specific prescriptions” - Site specific Kd for Hg not accepted - Site specific Koc for DDX not accepted

Mercury and DDx are the contaminants of concern

# CONCLUSIONS

- Our experience demonstrates that in Italy the Risk Analysis has not been **practically** applied
- Italian Guidelines (APAT 2005 and 2008) are very conservative, also for site-specific calculations
- In January 2008, an update of the remediation law establishes that for groundwater the target levels at the boundary of the site must be equal to the screening values (even if the sites are near the sea!)
- There are no differences in site remediation approach between old and new contamination