

# Proposal of Management Policies for Contaminated Sites - Case Study: Santa Elena Lot in Cartagena, Colombia

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IPWE 2018 - Cartagena de Indias, Colombia, 4-7 December 2018

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# Introduction

Located in South-east end of the City - “Ternera” towards Turbaco



# Introduction (cont'd)

## Background History

- Plot acquired by the FNA in 1969
- Initially 44 Ha plot dedicated to Cotton Crop and Pesticide/Fertilizer Experimentation
- 1987 the FNA was liquidating and foreclosing their assets
- Banco de Colombia received the Land as Payment-In-Kind for its financial obligations
- Banco de Colombia was changing ownership (Eventually becoming Bancolombia)
- 1993 Bank sells the land to Corvivienda
- Project “Ciudadela 2000” begins construction
- 1994-1995 Interred pesticides found . Construction halted (main contaminants Methyl Parathion and Toxaphene)



# Introduction (cont'd)

## Background History

- 1998 Large Characterization exercise (Three zones: North, South and Interment)
- 1999 1 Ha Confinement built
  - South end developed (Housing; School; Baseball field)
  - North end returned to Bank (Responsible for Confinement)
- Early 2000's flooding events in the city - great need for housing land
- 2005 "Colombiaton" project - Bank participated donating the northern plot
- 2005 during construction of "Colombiaton" some contaminated soil found. Construction Halted
- 2006 Min. Env. promulgates stern resolutions forcing the Bank to commit to remedial actions at the site (PRG as remediation endpoint)

# Aerial view “Colombiaton” project around Sept 2005

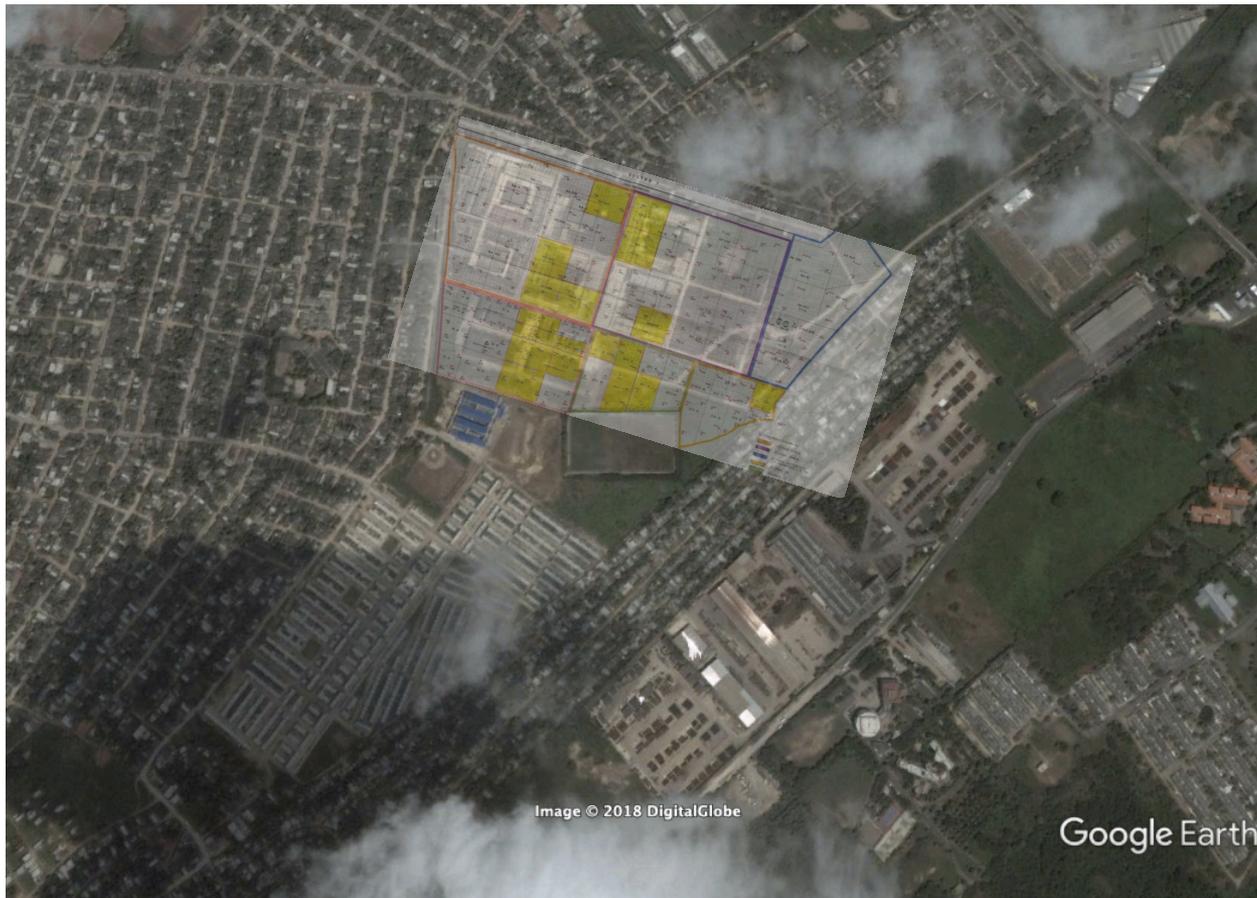


image taken from Google Earth Pro - Historic Records - Recovered Dec 2018

# Introduction (cont'd)

## Background History

- 2009 High detail site characterization, quantification and delineation
- RBCA Concentrations Determined

### Concentrations found at site

Substance	Concentration (mg/kg)			
	Min	Max	SSL*	SCCS***
4,4'-DDT	ND	13.1	1.7	13
4,4'-DDD	1.5	5	2	18
Heptachlor Epoxy	ND	0.35	0.053	0.48
Gamma BHC (Lindane)	0.017	2.4	0.52	4
Toxaphene	0.49	1200 (900)**	0.44	3.9
Methyl Parathion	180**	4300**	15	130

\* USEPA Soil Screening Levels

\*\* Concentrations found inside the confinement

\*\*\* RBCA – Specific Calculated Concentrations (remediation goals)

Source: The authors

# Introduction (cont'd)

## Background History

- 2013 Beginning of Remediation Procedures; First Stage (ISCO)
- 2015 Second Stage (Biological Reduction/dechlorination)
- Removal efficiencies up 99%
  - Most places concentrations below RBCA - SCCs
  - Some below SSL's
  - Few still slightly above SCC's

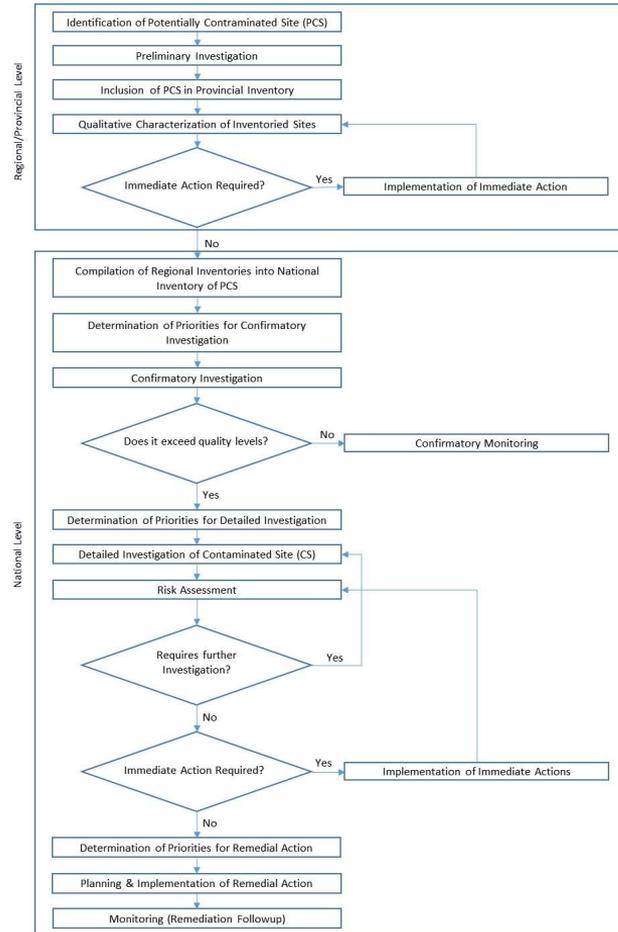
Remedial actions have stopped due to disagreement between ANLA and Bank regarding remediation endpoints (Lack of regulation); Judicial Sentence exonerating the Bank of any environmental wrongdoing

# Management Issues

- Min. Env. (now under ANLA control) imposed the obligation of Remediation
  - Lack of specific regulatory framework
  - General, broader regulations called
  - No knowledge of proper procedure (Agencies)
  - Difficult Social Issues in the surrounding communities
  - Most Administrative actions use Hazardous Wastes Regulation
- Implementation of “Superfund” approach (CERCLA)
  - Phase I & Phase II Environmental Site Assessments (ASTM E1527 and ASTM E1903)
  - Risk Based Corrective Action (RBCA - ASTM E2081)
  - BDAT - Treatability Studies
  - On site monitoring (still active)

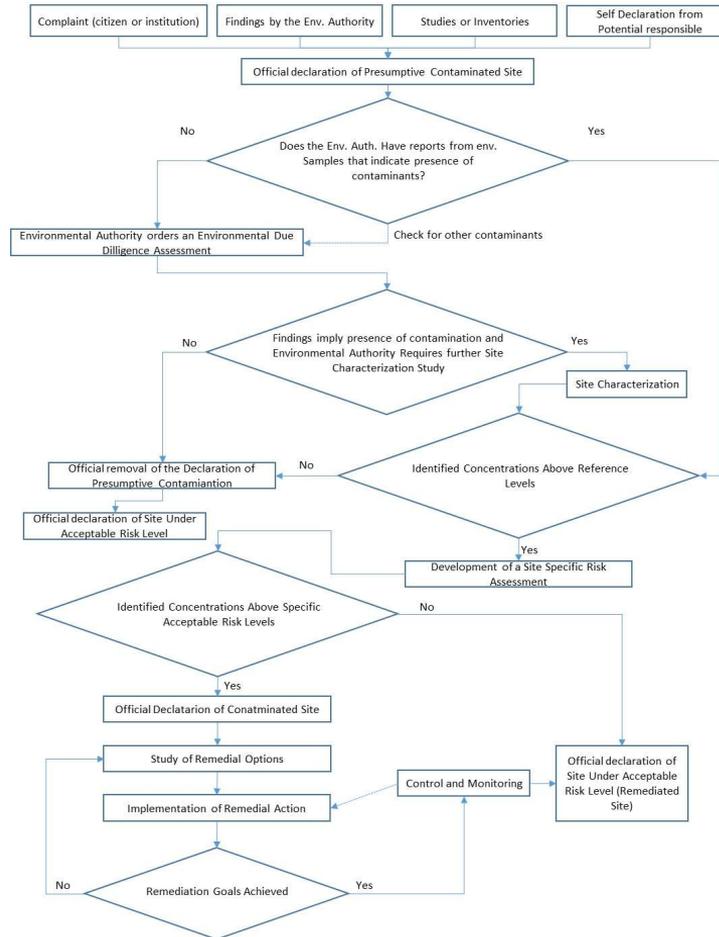
# PROSICO Program for the Environmental Management of Contaminated Sites

2006 Secretariat of  
Environment and  
Sustainable Development  
of the Nation (República  
Argentina)



- 2006 Creation of Latin American Network for the Prevention and Management of Polluted Sites (ReLASC by its acronym in Spanish), made by an agreement of the governments of Colombia, Argentina, Brazil, Mexico, Peru, Chile, Ecuador and Uruguay and other organizations of public and private nature

# Proposed Management Sequence Flow Chart



# Conclusions

- Tendency to use Haz. Waste Regulation in lieu of Contaminated Site Specific regulation (even in countries which it was already there!)
- ReLASC based in USEPA/CERCLA procedures
- Need of Background concentrations and development of Screening Levels
- Step by step, site specific approach rather than a generic approach

# THANK YOU VERY MUCH

## QUESTIONS?



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