

# Groundwater, Surface Water & Sediment Assessments for World Bank & Equator Principles & International Financing

Richard Bost, P.E., P.G.(1); Don Whitley, P.G.(2); Lori Magyar (2)

(I2M Associates and Auradon Consulting, a Texas & National HUB, Houston, Texas, USA)



## INTRODUCTION:

Globalization and rapid economic expansion, despite the world recession, continues to stimulate redevelopment of older cities, industrial areas, and port facilities. In many cases, those involved could benefit from the reviews completed by US EPA and World Bank of the limitations, lessons learned, and opportunities associated with addressing recent US offshore oil spills and industrial releases into marine environments. Experiences and methods used in US can be applied to meet the hydrologic and sediment site characterization and risk assessment guidelines embodied in World Bank and Equator Principle protocols. Two case studies are presented to illustrate the processes and best practices. The importance of thorough site characterizations and appropriate receptor identification for remedial risk assessments is demonstrated in the cases studies.

## BACKGROUND

The authors were retained either to help assess and remediate international industrial sites or alternatively to serve as third party reviewers to verify compliance with the applicable protocols and regulatory guidance. The objective of our paper is to discuss what some refer to as "international standards" that are typically based on EPA Brownfield guidance, World Bank standards, or Equator Principle protocols. An overview and summary of the best practice for characterizing the ground water sediment surface water interactions are given based on two previous projects.

## RECENT GUIDANCE

General EHS Guidelines: Environmental Contaminated Land are similar to U.S. EPA Superfund Guidance and Developed to Support Redevelopment "Brownfield" Projects; International Finance Funding Protocols Require:

- Basic ESA and Due Diligence following ASTM or similar standards
- **Reporting of and Addressing Existing Contamination**
- Risk Screening, and if required
- Interim Remediation
- Detailed Risk Assessment
- Selection of Remediation and Mitigation Goals
- Selection of Conceptual Approach
- Detailed Review of Remedial Technologies
- Selection and Implementation of Preferred Remediation Technologies and Plan

## APPROACH

The World Bank Group Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with:

- general and industry-specific examples of Good International Industry Practice (GIIP).
- specified performance levels and measures that are normally acceptable to the World Bank Group, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology.

They are used by the World Bank, IFC and MIGA. Following the 2012 update of IFC's Policy and Performance Standards on Environmental and Social Sustainability, the World Bank Group updated their EHS Guidelines and are adding new Guidelines ..... for example, the Offshore Deep Water Petroleum Industry and Contaminated Land Guidance .

The evolution of international guidance is summarized with a focus on recent updates, relevant to coastal sediments. Oil & gas terminals and refineries can impact shoreline and wetland sediments and underlying ground water as shown for a Bahamas & Columbian terminal and refinery. International guidance requires a thorough investigation of historical impacts on ground water, coastal sediments and bay surface water quality and the ecological end points for evaluating the impacts. These two case studies illustrate the steps involved, the type of field data gathered and the limitations of some historical practices, the benefits of current technologies, and the importance of adequate sediment water interface interactions, including the scientific principles of the advanced site investigation technologies applied,

Remediation is implemented in context of World Bank or Equator Principles, including:

1. Review and Categorization
2. Completion of Environmental and Social Assessment
3. Identifying Environmental & Social Standards
4. Developing and Implementing Environmental/Social Management System and Action Plan
5. Stakeholder Engagement
6. Grievance Mechanism
7. Independent Review & Audits
8. Covenants & Potential Loss of Funding
9. Independent Monitoring and Reporting
10. Reporting / Transparency

## REDEVELOPMENT OF BAHAMAS REFINERY AS A TERMINAL



### Financed via Equator Principles Financial Institution Financing

The Equator Principles Association (EPA) published a new document: 'Equator Principles Implementation Note'

The document, written by EPA Financial Institutions, contains selected information and examples to support the understanding of the requirements in, and implementation of, the Equator Principles.

The document comprises a series of modules supporting the implementation of the requirements contained in the Equator Principles on scope, climate change (Principle 2 and Annex A of the Equator Principles) and reporting (Principle 5, 10 and Annex B of the Equator Principles),

The document includes provisions for reporting and addressing existing contamination.

## EP RISK ASSESSMENT GUIDANCE

**Equator Principles (EP)** represent a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in project lending.

Are intended to provide a minimum standard for due diligence to support responsible risk decision-making and bank loan management. Currently 87 Equator Principles Financial Institutions (EPFIs) in 36 countries have officially adopted the EP, covering over 70% of international Project Finance debt in emerging markets.

EPFIs have committed to implementing the EP.



### .Cartagena Columbia Refinery Upgrade & Expansion

- ❖ Applied US EPA Region 3 Criteria. Risk Reduction required, based on RBCA Approach.
- ❖ ASTM E1739-95(2002) Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites and the ASTM E2081-00(2004)E1 Standard Guide for Risk-Based Corrective Action (at chemical release sites).
- ❖ Identified risk reduction measures, including:
  - ❖ 1) Soil & NAPL Removal, 2) Developing a GW, SW, Marine Sediment monitoring plan, and 3) Institutional controls (land-use restrictions).

## Summary

- International World Bank and IFC guidance now require thorough site characterization, sediment impact assessments, and US-style risk assessments that address direct and indirect exposure pathways from releases of potentially hazardous substances.
- EPA risk-based cleanup standards are now utilized to define remediation goals
- Risk assessments, remedial evaluations and development of alternative cleanup goals follow US EPA guidance.
- Opportunities exist for US environmental contractors to assist with international practices.

