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***Remediation Best Practices in  
Light of EPA / World Bank /  
Equator Principles: Findings from  
U.S. Experience and International  
“Brownfield” Sites***

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# Principles and Protocols of the World Bank, IFC, and Equator Principles EFIs



Over Past Decade Internationally Funded Projects  
Have Encountered Existing Contamination and Has  
Led to Issuance of EHS Guidance for Contaminated Land  
Aka the “International Brownfield Guidance”

- Addresses Contamination of *All Environmental Media*
- Focus on Social Impact and Redevelopment Projects, ala “Brownfields”

# Environmental, Health, and Safety (EHS) Guidelines GENERAL EHS GUIDELINES: ENVIRONMENTAL CONTAMINATED LAND



Similar to U.S. EPA Superfund Guidance and Developed to Support Redevelopment “Brownfield” Projects; International 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

# Remediation is Implemented in Context of World Bank Group 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
- 8. Covenants
- 9. Independent Monitoring and Reporting
- 10. Reporting / Transparency

# World Bank Group EHS Guidelines



- ▶ 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 .

# New Clarity in Equator Principles



- ▶ The Equator Principles Association published a new document: 'Equator Principles Implementation Note' with external stakeholders and other interested parties.
- ▶ The document, written by EPFIs, 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.

# 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 in their internal environmental and social policies, procedures and standards for financing projects.
- ▶ Encountering Existing Contamination in Several Projects led to momentum to develop a standard guidance for “Brownfield Situations.”

# World Bank Group & IFC Commitment to Operate By Example including IFC Office Brownfields



- ▶ IFC's Footprint Commitment
- ▶ IFC strives to reduce the environmental impact of day-to-day activities while working to benefit communities wherever IFC has offices.
- ▶ Wide-ranging program of corporate initiatives, includes:
  - ❑ Maintaining carbon neutrality,
  - ❑ Reducing our global electricity use, and
  - ❑ Reducing waste, paper, and water use.
  - ❑ Supporting green procurement, alternatives to business travel and efficient commuting practices.
  - ❑ Community outreach and volunteering.
- ▶ This work is lead by a dedicated Program that is governed by a cross-cutting senior-level committee, and supported by a network of 185 Footprint Champions who support IFC's Footprint Commitment within our global offices.

# New Leadership of Equator Principle Association



- ▶ *Standard Bank* has been appointed the new chair of the Equator Principles Association for 2015/16, making it the first African Bank to be elected to this position.
- ▶ The appointment, which took effect on the 1 June 2015, comes at a critical juncture in the integration of environmental and social considerations within business as a component of responsible investing.
- ▶ *Standard Bank's* Executive & Head of Environmental and Social Advisory within Investment Banking, Mr. Nigel Beck, chairs the EP Association.
- ▶ Mr. Beck is leading the Association in implementing changes and addressing a need for uniform consistency and understanding of the Equator Principles, including use of U.S., European & WHO standards.

# EHS Guidelines and Equator Principles are Integrated in Funding Process



- The Equator Principles apply to four financial products:
  - ❑ Project Finance Advisory Services,
  - ❑ Project Finance,
  - ❑ Project-Related Corporate Loans, and
  - ❑ Bridge Loans.
- The loan or “investment” agreement provides Equator Principles Financial Institutions (EPFIs) with the formal opportunity to require the client to address environmental and social issues throughout the Project Cycle, especially following Financial Close and subsequent disbursements or line drawdowns.
- An important strength of the Equator Principles is the incorporation of covenants linked to compliance as outlined in Principle 8. with all relevant host country environmental and social laws, regulations and permits & international standards in all material respects.

# Remediation Plan Compliance Required by Loan Documents



- ▶ The client will provide a covenant in the financial documentation to:
  - ❑ **a)** comply with the Environmental and Social Management Plan and Equator Principles Action Plan (including Remediation Plan where applicable) during the construction and operation of the Project in all material respects; and
  - ❑ **b)** provide periodic reports in an agreed format with EPFIs (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff AND independent third party experts, that:
    - **i)** document compliance with the Environmental and Social Management Plan and Equator Principles Action Plan (including Remediation Plan where applicable), and
    - **ii)** provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
  - ❑ **c)** decommission the facilities, where applicable and appropriate, in accordance with an agreed Decommissioning Plan.

# Loan Agreement Terms



**Covenants** – the promises made by the Borrower to undertake certain actions (positive covenant) or to refrain from taking certain actions (negative covenant). Compliance with environmental and social laws and regulations, and the Project’s Environmental and Social Management Plan and Equator Principles Action Plan (where applicable), is a key covenant of loan agreements related to a Project. Reporting requirements should also be included as a covenant. Material non compliances with the covenants will normally constitute an Event of Default under the loan agreement.

**Event of Default** - an event that entitles the Lenders to cancel a commitment, declare all amounts owed by the Borrower to become immediately due and payable, and/or enforce security. For Projects with complex environmental or social issues, the Lenders and Borrower include specific environmental or social Events of Default covenants that may, for instance, refer to specific remedy periods.

# Environmental / Social Representations



Environmental and social clauses included in loan agreements depend on the nature of the site:

## REPRESENTATIONS AND WARRANTIES

- ▶ There is no Environmental or Social Claim outstanding, pending or likely to occur in respect of, or in connection with the Project, which Environmental or Social Claim has or is reasonably likely to have a Material Adverse Effect on the Project.
- ▶ The Project has at all times complied and currently complies with, and will continue, during all phases of construction and operation, to comply with all applicable Environmental and Social Requirements, and has obtained and complies with all necessary Environmental and Social Permits and conditions therein.

[According to Principle 7, an Independent Review is required for all Category A, and most Category B Project Finance loans and, for Project-Related Corporate Loans with potential high-risk impacts including adverse impacts on indigenous peoples, Critical Habitat impacts, significant cultural heritage impacts and large-scale resettlements.]

- ▶ The Borrower has produced all relevant reports and information on Environmental and Social Matters to the Lenders.
- ▶ The Borrower has appointed an Independent Environmental and Social Consultant, who will provide to the Lenders relevant monitoring reports satisfactory to the Agent on the implementation of the Environmental and Social Management Plan and Equator Principles Action Plan, including where appropriate the Remediation Plan

# Conditions for Fund Disbursement



- ▶ A certified copy of an Environmental and Social Impact Assessment, including where applicable a Contaminated Land report;
- ▶ A report from the Independent Environmental and Social Consultant evaluating and confirming implementation of the Environmental and Social Management Plan for the corresponding phase of the Project which complies with all Environmental and Social Requirements, and all arrangements necessary for such timely implementation of next steps have been made;
- ▶ An Equator Principles Action Plan responding to or addressing arrangements and recommendations of the Project's or Lenders' consultants necessary to achieve compliance with Environmental and Social Requirements;
- ▶ Required reports of the Technical Consultant, the Independent Environmental and Social Consultant, the Insurance Consultant, and where required, Remediation Consultants have been received, and recommendations implemented to achieve compliance with all Environmental and Social Requirements;
- ▶ A reliance certificate from the Technical Consultant, Independent Environmental and Social Consultant and Insurance Consultant entitling the Agent and the Lenders to rely on the reports and plans prepared by these consultants; and
- ▶ Lenders' Independent Consultant Review of The Environmental and Social Impact Assessment, Environmental and Social Management System, Stakeholder Engagement process documentation, Environmental and Social Management Plan and Equator Principles Action Plan.

# Checks & Balances to Facilitate Principles



- ▶ When the Environmental and Social Impact Assessment does not meet international standards, as identified in the IFC Performance Standards, it should be supplemented to meet international standards,
- ▶ Rights of Inspection of Facility, Books, Records,
- ▶ Delivery of appointment letters, agreed scope of work, in relation to the Technical Consultant, the Independent Environmental and Social Consultant and the Insurance Consultant,
- ▶ The Borrower and Lenders have agreed on the form and substance of the Terms of Reference for the Independent Monitoring Consultant,
- ▶ The Independent “Absence of Threat” Monitoring Consultant has commenced its work,
- ▶ The Borrower has certified that there is no reason for revocation of permit and no environmental or social risks or events have occurred that would result in a Potential Threat,
- ▶ In Event of Default, Funding only resumes if and when:
  - a) Confirmation that Borrower is in material compliance with all applicable Covenants,
  - b) The applicable representations and warranties are true and correct,
  - c) Financial advisors have structured the due diligence with Conditions for Duty of Care, and
  - d) Revisions include all covenants required by the Equator Principles.

# Public Reporting & Transparency



- ▶ A summary of the Environmental and Social Impact Assessment and Operational Information is accessible and available online,
- ▶ Public Reporting by the Borrower for Most Projects, including:
  - a) Land Contamination with significant impacts, and projects that emits over 100,000 tonnes of CO<sub>2</sub> equivalent and exceeds other emission standards annually,
  - b) The Borrower shall publicly report HAPs and GHG Emissions during the operational phase on an annual basis with quantification of the Green House Gas emissions.
- ▶ Monitoring and Reporting of Data and Risk Assessment Findings will be conducted by the Borrower in accordance with internationally recognized methodologies and good industry practice.
- ▶ Similar requirements for water discharges.

# Alternative Risk-Based Cleanup Levels



- ▶ When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.
- ▶ If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment.
- ▶ This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.
- ▶ This is based on actual opportunity for exposure and whether exposure pathway is or may become complete.
- ▶ Very similar to Texas Risk Reduction Program (TRRP) and various state Risk-Based Cleanup Assessment (RBCA) programs.
- ▶ Allows Establishment of Management Areas Similar to Texas Program.

# Risk Assessment Process is Used to Guide and Select Remediation Required



- ▶ When any the defined risk factors are present (in spite of limited data) under current or foreseeable future conditions, the following steps should be followed (as described in the remaining parts of this section):
- ▶ 1) Risk screening; 2) Interim risk management; 3) Detailed quantitative risk assessment; and 4) Permanent risk reduction measures.

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## 1) **Risk Screening** is the “problem formulation” and entails the following steps:

- ❖ Identification of the location of suspected highest level of contamination through a combination of visual and historical operational information;
- ❖ Sampling and testing of the contaminated media (soils or water) according to established technical methods applicable to suspected type of contaminant;
- ❖ Evaluation of the results with environmental standards, including international standards;
- ❖ Verification of the potential human and/or ecological receptors and exposure;
- ❖ The outcome of risk-screening may reveal that there is no risk to human health or the environment.

# Immediate Action Required When Imminent Threat



**2) Interim Risk Management** Interim risk management actions should be implemented at any phase of the project life cycle if the presence of land contamination poses an “imminent hazard”, i.e., representing an immediate risk to human health and the environment if contamination were allowed to persist unremediated, even a short period of time.

Examples of situations considered to involve imminent hazards include, but are not restricted to:

- ❖ Presence of an explosive atmosphere caused by contaminated land,
- ❖ Accessible and excessive contamination for which short-term exposure and potency of contaminants could result in acute toxicity, irreversible long-term effects, sensitization, or accumulation of persistent biocumulative and toxic substances,
- ❖ Concentrations of pollutants at concentrations above the Risk Based Concentrations (RBCs) or drinking-water standards in potable water at the point of production, and
- ❖ Appropriate risk reduction should be implemented as soon as practicable to remove the condition posing the imminent hazard.

# Detailed Risk Assessment Similar to those for U.S. Superfund Sites



An assessment of contaminant risks needs to be considered in the context of current and future land use, and development scenarios (e.g., residential, commercial, industrial, and urban parkland or wilderness use).

**3. A detailed quantitative risk assessment** builds on risk screening (problem formulation). It involves first, a detailed site investigation to identify the scope of contamination. Site investigation programs should apply quality assurance/quality control (QA/QC) measures to ensure that data quality is adequate for the intended data use (e.g., method detection limits are below levels of concern). The site investigation in turn should be used to develop a conceptual site model of how and where contaminants exist, how they are transported, and where routes of exposure occur to organisms and humans. The risk factors and conceptual site model provide a framework for assessing contaminant risks.

- ❖ Human or ecological risk assessments facilitate risk management decisions at contaminated sites. Specific risk assessment objectives include:
  - a) Identifying relevant human and ecological receptors (e.g., children, adults, fish, wildlife),
  - b) Determining if contaminants are present at levels that pose potential human health and/or ecological concerns (e.g., levels above applicable regulatory criteria based on health or environmental risk considerations), and
  - c) Determining how human or ecological receptors are exposed to the contaminants (e.g., ingestions of soil, dermal contact, inhalation of dust)
- ❖ Examples include processes defined by the American Society of Testing and Materials (ASTM) Phase II ESA Process; the British Columbia Ministry of Environment Canada (BC MOE) [http://www.env.gov.bc.ca/epd/epdpa/contam\\_sites/guidance](http://www.env.gov.bc.ca/epd/epdpa/contam_sites/guidance) ); and the Massachusetts Department of Environment <http://www.mass.gov/dep/clean>

# When Remediation Required, Selection Follows a Streamlined U.S. Approach



- ❖ If risk reduction is required, then determine where, and in what conceptual manner, risk reduction measures should be implemented,
- ❖ An example of a simplified quantitative risk assessment method is the 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).
- ❖ Identifying the preferred technologies (including engineering controls) needed to implement the conceptual risk reduction measures consist of: 1) Developing a monitoring plan to ascertain whether risk reduction measures are effective, and 2) Considering the need and appropriateness for institutional controls (e.g. deed restriction, land-use restrictions) as part of a comprehensive approach.

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**4. Permanent Risk Reduction Measures:** The risk factors and conceptual site model within the contaminant risk approach described also provide a basis to manage and mitigate environmental contaminant health risks. The underlying principle is to reduce, eliminate, or control any or all of the three risk factors. A short list of examples of risk mitigation strategies is provided below, although actual strategies should be developed based on site specific conditions, and the practicality of prevailing factors and site constraints. Regardless of the management options selected, the action plan should include, whenever possible, contaminant source reduction (i.e., net improvement of the site) as part of the overall strategy towards managing health risks at contaminated sites, as this alone provides for improved environmental quality.

# Remediation and Mitigation Options



- ▶ The selected approach should take into consideration the technical and financial feasibility (e.g. operability of a selected technology given the local availability of technical expertise and equipment and its associated costs). Example risk mitigation strategies for contaminant source and exposure concentrations would include:
  - ▶ **Soil, Sediment, and Sludge:**
    - ❖ In situ biological treatment (aerobic or anaerobic)
    - ❖ In situ physical/chemical treatment (e.g., soil vapor extraction with off-gas treatment, chemical oxidation)
    - ❖ In situ thermal treatment (e.g., steam injection, phase heating)
    - ❖ Ex situ biological treatment (e.g., excavation and composting)
    - ❖ Ex situ physical/chemical treatment (e.g., excavation and stabilization)
    - ❖ Ex situ thermal treatment (e.g., excavation and thermal desorption or incineration)
    - ❖ Containment (e.g. landfill)
    - ❖ Natural attenuation
    - ❖ Other treatment processes

# Remediation and Mitigation Options (Cont'd.)



- ▶ The selected approach should take into consideration the technical and financial feasibility (e.g. operability of a selected technology given the local availability of technical expertise and equipment and its associated costs). Example risk mitigation strategies for contaminant source and exposure concentrations include:
  - ▶ **Groundwater, Surface Water, and Leachate:**
    - ❖ In situ biological treatment (aerobic and/or aerobic)
    - ❖ In situ physical/chemical treatment (e.g., air sparging, zero-valent iron permeable reactive barrier)
    - ❖ Ex situ biological, physical, and or chemical treatment (i.e., groundwater extraction and treatment)
    - ❖ Containment (e.g., slurry-wall or sheet-pile barrier)
    - ❖ Natural Attenuation
  - ▶ **Other Treatment Processes:**
    - ❖ Soil Vapor Intrusion:
      - a) Soil vapor extraction to reduce VOC contaminant source in soil /sediments
      - b) Installation of a sub-slab depressurization system to prevent migration of soil vapor into the building
      - c) Creating a positive pressure condition in buildings.

# Remediation and Mitigation Options (Cont'd.)



- ❖ Installation (during building construction) of an impermeable barrier below the building and/or an alternative flow pathway for soil vapor beneath building foundations (e.g., porous media and ventilation to shunt vapors away from building)

## ▶ **Example of Risk Mitigation Strategies for Receptors Include:**

- ❖ Limiting or preventing access to contaminant by receptors (actions targeted at the receptor may include signage with instructions, fencing, or site security)
- ❖ Imposing health advisory or prohibiting certain practices leading to exposure such as fishing, crab trapping, shellfish collection
- ❖ Educating receptors (people) to modify behavior in order to reduce exposure (e.g., improved work practices, and use of protective clothing and equipment)

## ▶ **Example of Risk Mitigation Strategies for Exposure Pathways Include:**

- ❖ Providing an alternative water supply to replace, for example, a contaminated groundwater supply, e.g., bottled water, new water well, new pipeline from other wells,
- ❖ Capping contaminated soil with at least 1 meter of clean soil to prevent human contact, as well as to prevent plant-root or small-mammal penetration into contaminated soils/sediments,
- ❖ Paving over contaminated soil as an interim measure to negate the pathway of direct contact or dust generation and inhalation •
- ❖ Using an interception trench and pump, and treat technologies to prevent contaminated groundwater from discharging into fish streams

# IFC Adopted U.S. EPA Region 3 as Example of Risk-Based Standards



- ▶ These may include the USEPA Region 3 Risk-Based Concentrations (RBCs).  
<http://www.epa.gov/reg3hwmd/risk/human/index.htm> .
- ▶ These RBCs are considered acceptable for specific land use and contaminant exposure scenarios as they have been developed by governments using risk assessment techniques for use as general targets in the site remediation.
- ▶ Separate PRGs have been developed or adopted for soil, sediment or groundwater, and often a distinction is made between land uses (as noted earlier) because of the need for more stringent guidelines for residential and agricultural versus commercial/industrial land use.
- ▶ The RBC Tables contains Reference Doses (RfDs) and Cancer Slope Factors (CSFs) for about 400 chemicals. These toxicity factors have been combined with “standard” exposure scenarios to calculate RBCs-chemical concentrations corresponding to fixed levels of risk (i.e., a Hazard Quotient (HQ) of 1, or lifetime cancer risk of 1E-6, whichever occurs at a lower concentration) in water, air, fish tissue, and soil for individual chemical substances.
- ▶ The primary use of RBCs is for chemical screening during baseline risk assessment (see EPA Regional Guidance EPA/903/R-93-001, “Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening”).
- ▶ Additional useful soil quality guidelines can also be obtained from [Lijzen et al. 2001](#).

# Case Study: Cartagena Refinery Redevelopment



# Case Study: Cartagena Refinery Redevelopment



- ▶ Risk Study identified soil and land contamination as posing a low risk and prioritized funding for sensitive habitat protection and waste water treatment facilities and operations
- ▶ Engineered controls and containment of contaminated land provided best cost benefit option while meeting Equator Principals and EHS Guidelines of protection environment
- ▶ Study of River and Bay Quality was expanded to include Groundwater Contaminant parameters
- ▶ Affected Area Management Area was established that created protocols for activities that could potentially encounter or disturb affected soils and provide pathways for migration to ground water.
- ▶ More costly options of removal, treatment and/or reuse were not justified.
- ▶ Investigations were integrated into construction activities and ongoing operation and maintenance activities to meet EHS standard.

# Case Study: Cartagena Refinery Reports Required



- ▶ Certification of whether in relation to the Project there are any: i. past or existing adverse risks or impacts relating to [Environmental or Social Matters] that have not been addressed by one or more [Corrective Action Plans], or ii. known or threatened [Environmental or Social Impact]
- ▶ Study of River and Bay Quality, that did not include all relevant monitoring parameters
- ▶ Study of Soil and Groundwater
- ▶ Modeling of Impact on Surface Water
- ▶ Air emission inventory, Monitoring of air quality, and Modelling of air quality
- ▶ Engagement and Transparency with Stake Holders with Local Social Impact Plan, including upgrade of education, training, hiring, and upgraded public housing.
- ▶ Mitigation and Remediation Plans
- ▶ Waste Water Treatment Plan
- ▶ Detailed design and cost estimation of upgrades required to protect surface water, soil, groundwater, and air quality

# Case Study: Bahamas Former Refinery & Terminal



# Case Study: Bahamas Former Refinery & Terminal



- ▶ Certification of whether in relation to the Project there are any: i. past or existing adverse risks or impacts relating to [Environmental or Social Matters] that have not been addressed by one or more [Corrective Action Plans], or ii. known or threatened [Environmental or Social Impact]
- ▶ Study of Bay, Reefs, and Sensitive Habitat Quality and Monitoring
- ▶ Study of Water Quality, Soil, Underlying Sediments, Groundwater, LNAPL plume,
- ▶ Modeling of Potential Spills and Effectiveness of Alternative Response Measures
- ▶ Enhanced Spill Prevention and Response Program, with staged equipment and dispersants
- ▶ Monitoring and Modelling of air quality
- ▶ Engagement and Transparency with Stake Holders, Involvement of Universities and NGOs, with Local social impact plan including upgrade of education, training, hiring, and upgraded public housing.
- ▶ Mitigation and Remediation Plans, including LNAPL Recovery and Ruse Program
- ▶ Waste Water Treatment Plan
- ▶ Detailed design and cost estimation of upgrades required to protect surface water, soil, <sup>31</sup> underlying sediments, groundwater, and air quality.

# Case Study: Bahamas Former Refinery & Terminal



## **Brownfield Project with a Remediation Plan that entailed:**

- ▶ Source Control and Corrective Action Management Area,
- ▶ Effectiveness and Threat Monitoring Program with Quarterly and Annual Reporting,
- ▶ Public Reporting and Transparency with University involvement,
- ▶ Integration of Investigation and Mitigation Measures into Demolition decommission plans and facility O&M plans, including personal safety and air monitoring during construction activities with potential reuse of affected soils in asphalt,
- ▶ Establishments of Alternative Cleanup Levels for Soils based on Texas distilled water leaching tests,
- ▶ Alternative groundwater protection standards based on assimilative capacity of ground water and receiving streams,
- ▶ Detailed design and cost estimation of upgrades required to protect surface water, soil, ground water, and air quality, and
- ▶ Third Party Monitoring and Certification.

# Case Study: Recommendations for Investments in Mexico Oil and Gas and Energy Projects



- ▶ **A Mexico Version of Similar Environmental Sustainability and Social Standards Equivalent to International Standards:**
  - ❖ Flexible and based on Best of US, Equator Principals and European Standards and ISO protocols
  - ❖ Involvement of Country's Centers of Learning and Excellence to help define:
  - ❖ Requirements for Environmental SUSTAINABILITY and Social Impact Assessment
  - ❖ Due Diligence Environmental Site Assessments
  - ❖ Risk-Based Cleanup
  - ❖ An Action Plan and Third Party Verification as part of funding requirements
  - ❖ Funding based on Compliance with Plans
  - ❖ Stakeholder Engagement with Public Reporting and Transparency
  - ❖ A Bar of Performance Exceeding the Rest of the World

# Conclusions



- ▶ World Bank Group EHS Guidelines and Equator Principles are having a tremendous uncovered impact on improving environmental and social conditions in our World and advancing goal of cleaning up contamination.
- ▶ We can help by Facilitating Our Success Stories.
- ▶ Checks and Balances in System and Focus on Sustainability and Continuous Improvement and Monitoring have upgraded the integrity of developments and funding processes.
- ▶ NGOs also play a role in ensuring integrity to processes.
- ▶ Due Diligence, Risk-Based Remediation, and Climate Change are fully integrated into the process.
- ▶ Great Opportunities exist for those who choose a mission of contributing to cleaning up and preserving our natural resources for future generations while providing greater opportunities for Today's World.
- ▶ Challenges to Our Values: Reducing Availability of Capital and Ceding Funding to Chinese and Russian Oligarchs.

# Climate Change Footnote



- ▶ Public Reporting by the Borrower for a Project that emits over 100,000 tonnes of CO<sub>2</sub> equivalent annually:
  - a) The Borrower shall publicly report Conventional HAPs and Greenhouse Gas Equivalent Emissions during the operational phase on an annual basis, and
  - b) Quantification of the Green House Gas emissions will be conducted by the Borrower in accordance with internationally recognized methodologies and good industry practice.

## Questions and Answers

- ▶ Thank you for this opportunity to share my perspectives with you.

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President and Chief Engineer

