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The Pueblo Viejo Mine: A Transition from Successful Brownfield Remediation (Dominican Republic)

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Butte, MT. 4 May 2011

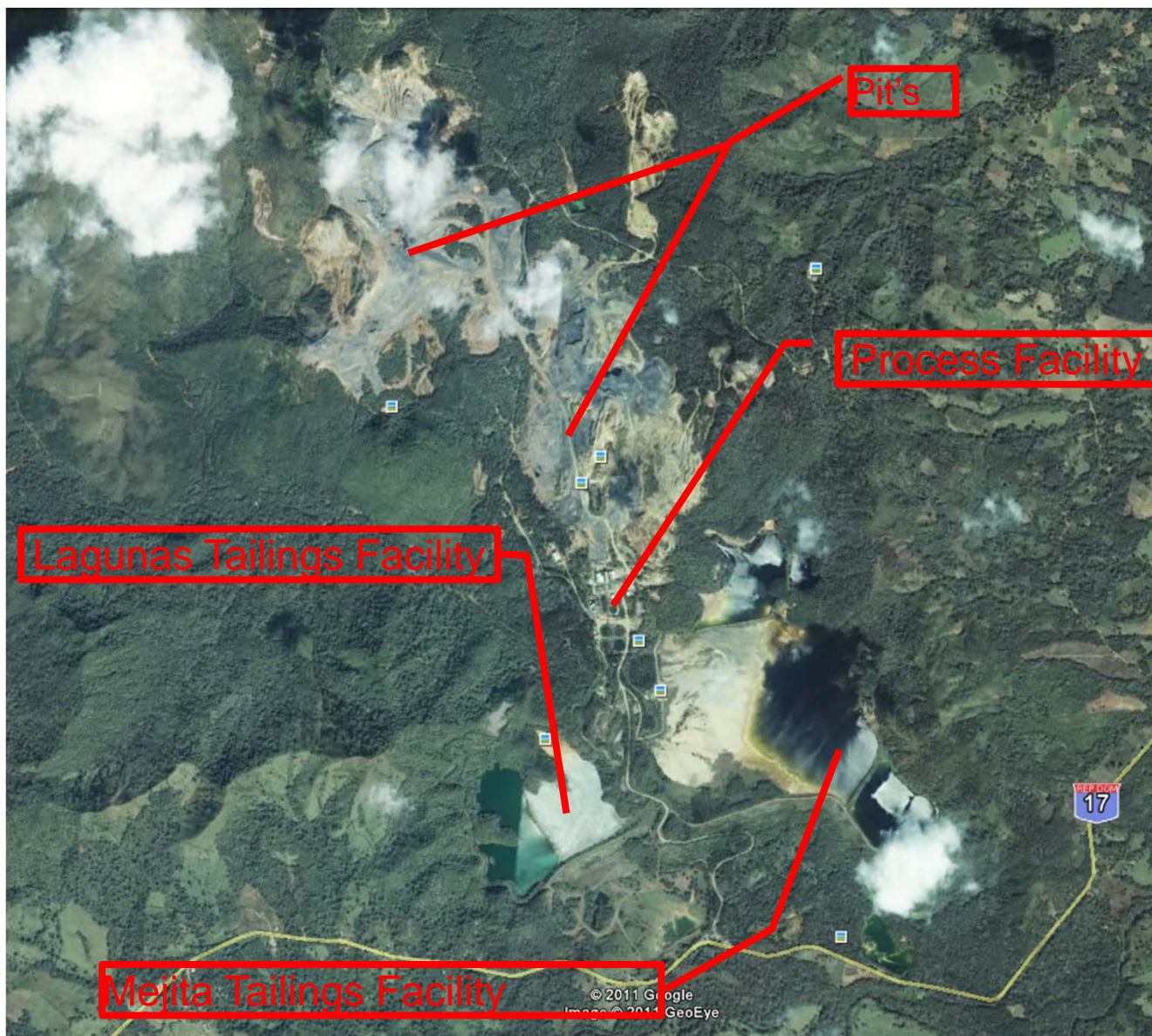
Barrick in the world



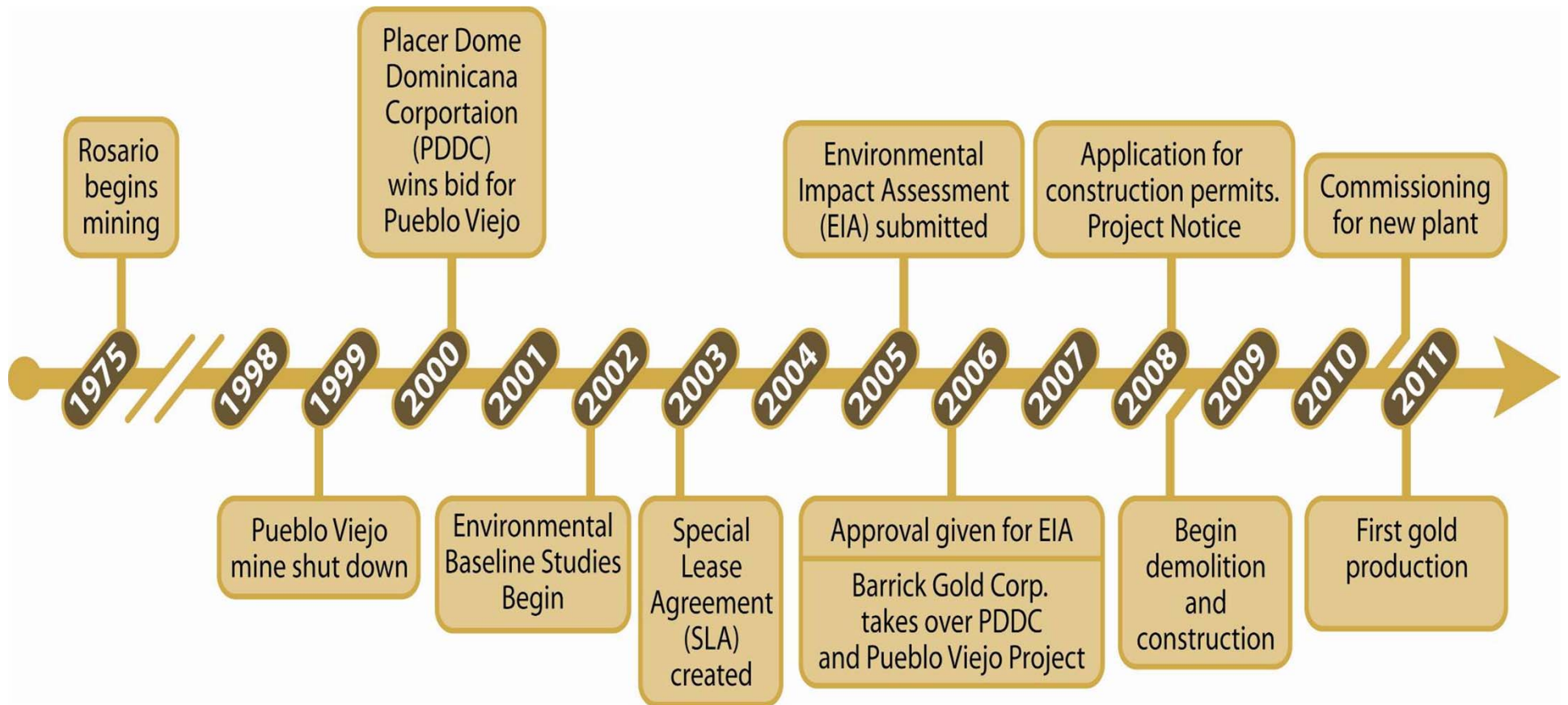
Location-Dominican Republic



Pueblo Viejo Mine (Historical Footprint)



Pueblo Viejo-Historical Timeline



Pueblo Viejo Mine Site Overview 2007



Pueblo Viejo-Plant Site



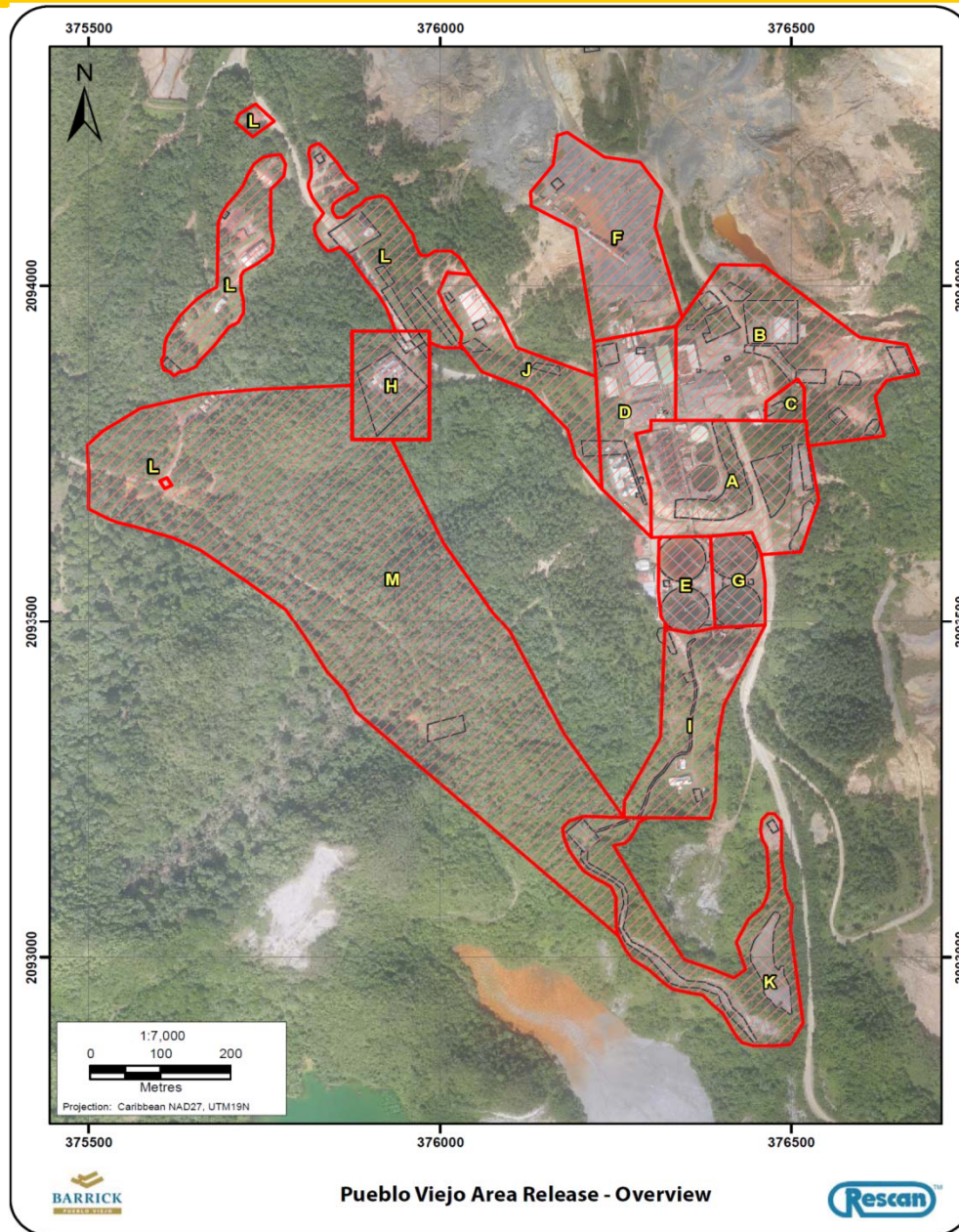
**Primary
Target
Area**

14/11/20

Government Area



Areas Released



F-ACO-PRE-001

Area Release and Tracking Form



Proyecto Pueblo Viejo Project



Area Release Form – Area A

Date	October 7, 2006
Location	Quadrant 1 including the area extending from Q1 to the eastern perimeter of the plant site area and extending to include 50% of Quadrant 2. See attached figure.

Buildings					
Abatement Complete	<input checked="" type="checkbox"/>	Demolition Complete	<input checked="" type="checkbox"/>	Materials Removed	<input checked="" type="checkbox"/>
Considerations and Comments					

Foundations and Subsurface Infrastructure					
Abatement Complete	<input checked="" type="checkbox"/>	Demolition Complete	<input checked="" type="checkbox"/>	Sumps and Pipes Exposed	<input checked="" type="checkbox"/>
Considerations and Comments					

Excavations			
Abatement Complete	<input checked="" type="checkbox"/>	Materials Removed	<input checked="" type="checkbox"/>
Considerations and Comments			

Special Considerations
A complete list of all materials removed from this area and all abatement activities will be published in a future report. <i>PLS-CONTACT HOLTON BURNS IN THE EVENT OF FIELD QUESTIONS. Foundations on South Side of Area 9 to be taken out later.</i>

Abatement Confirmation	
QA/QC Representative <input checked="" type="checkbox"/> <i>[Signature]</i> Name: <i>Pierre Pelletier</i>	Date: <i>10 07 2006</i> mm - dd - yyyy

Release Signatures	
Floor Construction Manager <input checked="" type="checkbox"/> <i>[Signature]</i> Name: <i>FOR JACK ON 10/07/06</i>	Date: <i>5-10-2006</i>
PVDC Environmental Manager <input checked="" type="checkbox"/> <i>[Signature]</i> Name: <i>HOLTON L. BURNS</i>	Date: <i>10 07 2006</i> mm / dd / yyyy
PVDC Construction Manager <input checked="" type="checkbox"/> <i>[Signature]</i> Name: <i>J. Burns</i>	Date: <i>10 7 06</i> mm - dd / yyyy

Received by Document Control	Date / Fecha:	Signature / Firma:
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Phase-1 Permitting

- Permitted by the Secretaria (now Ministry) of Environment and Natural Resources (MIMARENA)
- 20 - compliance aspects outlined in Environmental Permit #0699-08
- Permanent MIMARENA presence on-site (living in separate camp)
- Regular visits by national MIMARENA Compliance & Enforcement Officers (HAZWOPER Trained by PVDC)
- 80/20 (Barrick/State Cost Sharing)
- 100% Environmental Liability to State for recovered wastes (Plant Site Footprint Waste Phase-1)
- JV funds ongoing remediation (historical tailings and waste dumps) around mining concession-non plant site areas

Permitted Budget-Phase 1



Mobilization/Demobilization	\$234,000
Construction (Waste Storage Pads, Hazardous Materials Transfer Station)	\$3,380,711
Containers (Shipping Containers)	\$436,290
Excavation, backfill, transportation & decontamination	\$2,742,100
Personal Protective Equipment	\$145,590
Quality Control (Delineation, characterization, manifest, inventory)	\$4,410,068
Sub Total	\$11,348,759
IPC Services (calculated as 12% of direct cost)	\$1,361,851
Contingency (25% of direct cost + indirect cost)	\$3,177,652
Total	\$15,888,262

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Phase 1 Project Organization



PVDC Construction Support



Local
Technicians and
Engineers

Local Foreman
and
Operators

Milestones

- Program commenced in **May, 2008** after 16 regulator planning sessions with Ministries of Industry - Commerce and Environment (defining liability and hazardous substances)
- 125 Dominican nationals were tested for 29-CFR1910.120 (HAZWOPER) and 80 were selected to form the core of the abatement program workforce
 - 5 courses held in spanish language
 - 1 course in english language
 - Locals had no prior industrial or mining experience
- These nationals were allocated: 13 to QAQC (Rescan) and 67 to physical remediation (Hazco)
- First surface and sub-surface area released to the EPCM contractor in **October 7, 2008** with the majority of the activities completed by **December, 2008**
- Soil bioremediation and hazardous waste re-packaging was initiated in **January, 2009**
- All wastes packaged for international shipment (IMDG sandards) by **October, 2009**
- All soil remediated by **December, 2009**

Challenges



- No site schematics for buried services
- Buried energized electrical lines
- Constant construction schedule pressure
- Developing inventory, tracking and information management systems (concurrent to field works)
- Coordination of hazmat removal and unplanned environmental surprises resulting from demolition activities (Mercury)
- Nascent technical, analytical and remediation skills/facilities on island (lack of TSDF's)
- Regulatory support and buy in to scope of remedial plan and project timeline (Act as Agent for State) as real time issues emerge

Surprise - Surprise

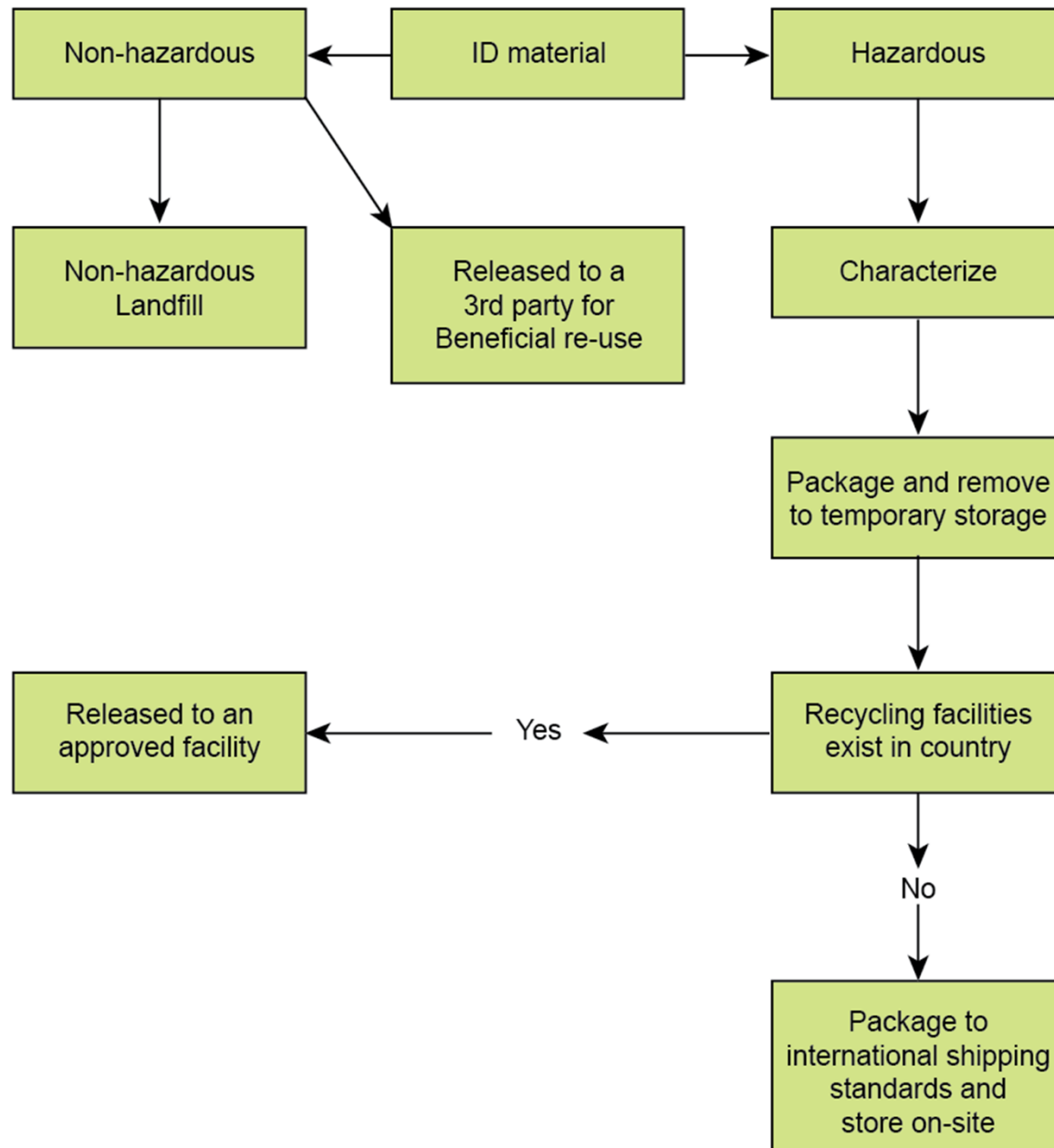


- Free mercury in old refinery footprint (post structural abatement and demolition of elevated structures)
- Additional tailings spills discovered outside of scope
- Hydrocarbon migration 800m down gradient from old power plant into several plumes
- Additional remediation management pads (laydown and waste manipulation) required due to increased volumes
- Hydrocarbon soils kept emerging beyond initial scope and continued to emerge after release to EPCM-Civil contractors

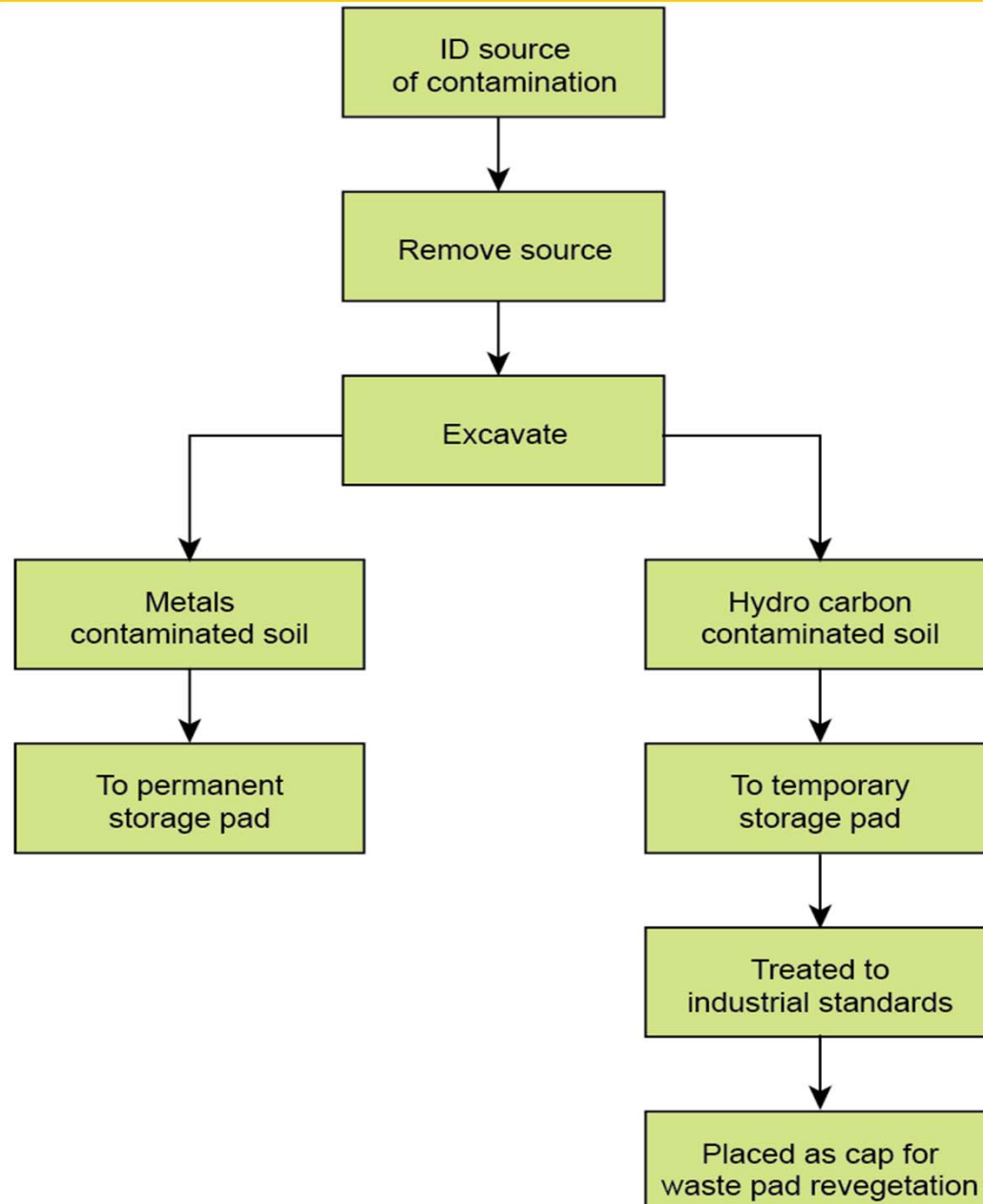
Plan vs. Actual Results

Description	Estimated Volume (m³)	Actual Volume (m³)	% Above Estimate
Metal contaminated soils and slurry/sediments	58,000	78,200	35%
Petroleum hydrocarbon contaminated soils	12,000	57,500	479%
Asbestos containing materials (ACMs)	1,250	750	-40%
Polychlorinated biphenyls (PCBs), various types	46	85	84%
Mercury waste, various types	4	4.2	5%
Miscellaneous hazardous waste	310	541	75%
Bulk materials (process steel, process piping etc.)	16,000	25,000	56
Total	87,610	162,080	85%

Bulk Material Handling Matrix



Soils Handling Matrix



On-Site Lab Capability

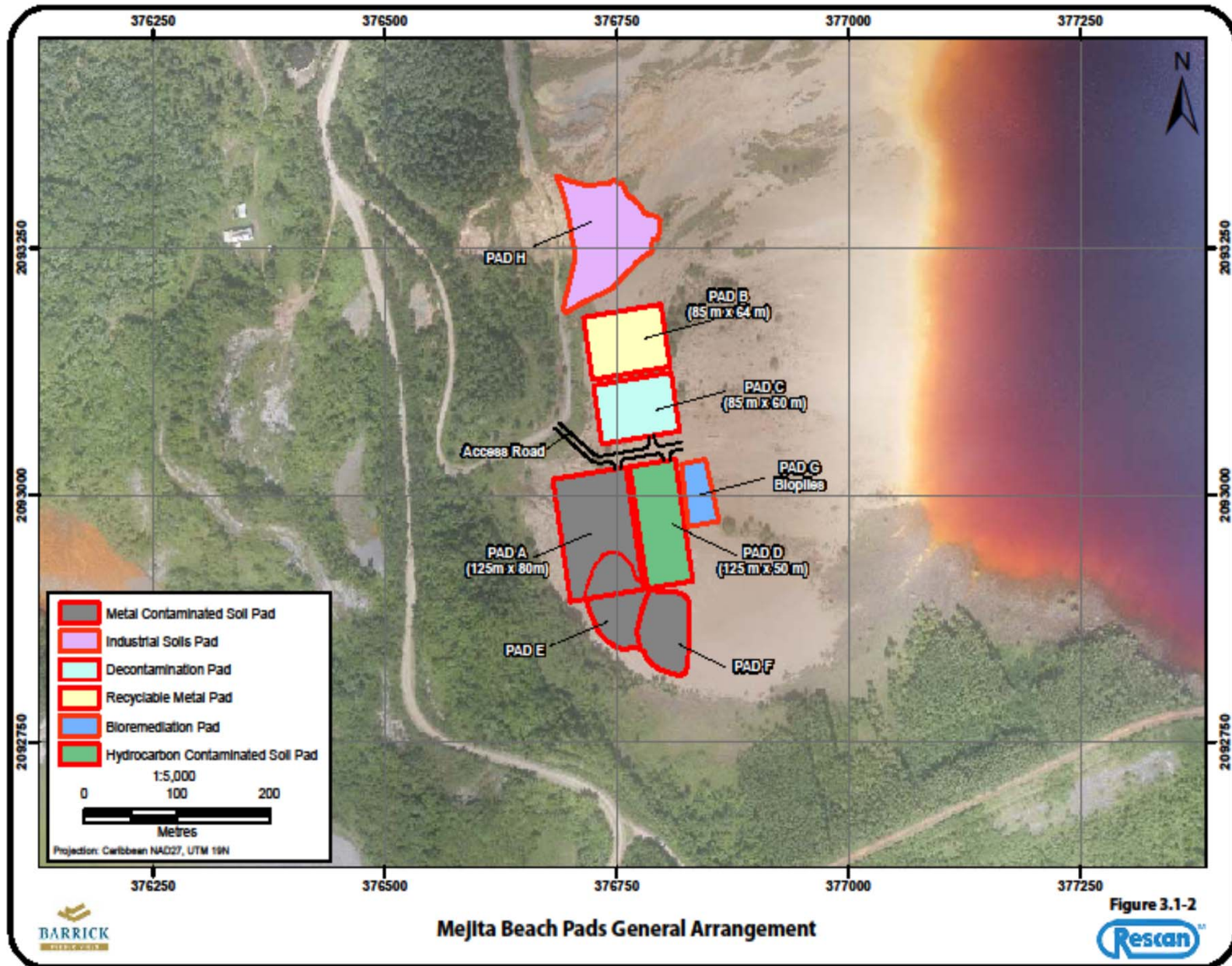


- **X-50 Portable x-ray fluorescence (XRF)** analyzer for determining metals in soils
- **PetroFlag** for hydrocarbons in soils
- **RKI Eagle** portable gas monitor for volatile petroleum hydrocarbons (lower explosive limit)
- **RemediAid** Analyzer for petroleum hydrocarbons in soils (BTEX, PAH, diesel fuel, leaded and unleaded gasoline, weathered gasoline, lubricating oil)
- **Chlor-N-Soil** field test kit for PCBs in soils
- **Dexsil L2000** Analyzer for PCBs and chloride in oil
- **EM Quant Test Strips** for metals and cyanide in soils

Lab Sampling (#'s by media)

- Air (257)
 - Onsite 28%
 - Offsite 72%
- Liquid (901)
 - Onsite 36%
 - Offsite 64%
- Solids/Soils (10,928)
 - Onsite 74%
 - Offsite 26%

Mejita Tailings Beach



Typical Abatement Actions



Refinery Footprint (HG)



HG (Refinery Footprint)



HG Landfill



De-contaminating Building Debris



Release to 3rd Parties (7,000t Scrap)



Hazardous Wastes Classification



Transformer Sampling-Classification



Acid and Base Neutralization



Metals Contaminated Soils



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Asbestos Containing Materials



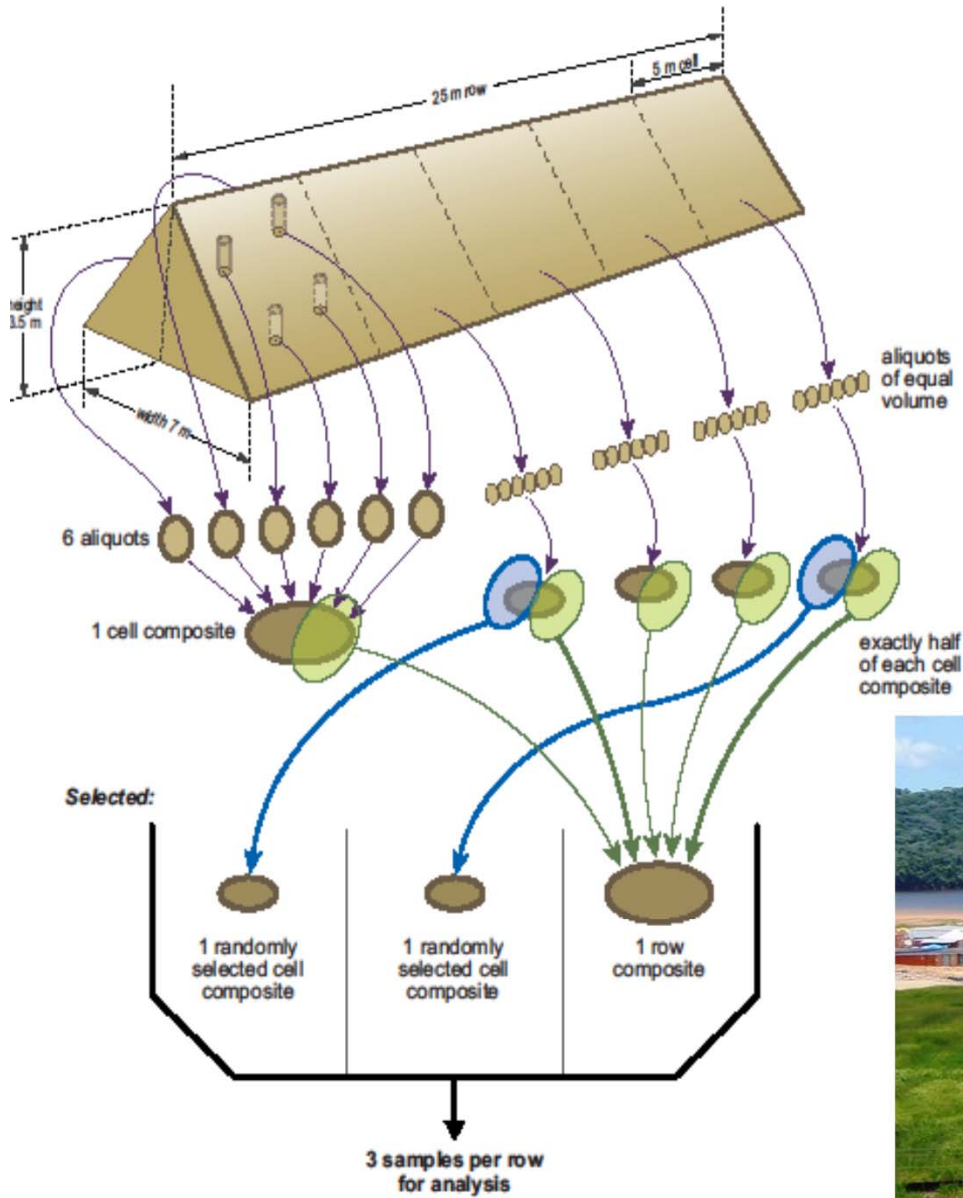
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Hydrocarbon Contaminated Soil



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Bio-pile Treatment Scheme (Hydrocarbons)





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Every Person Home Safe Every Day!