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POPs/Dioxin Pollution Assessment and Remediation in Vietnam

Environmental Remediation of Dioxin Contamination at Danang Airport Using IPTD®

WORKSHOP, DECEMBER 2 - 3, 2013



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AGENDA

- History of US-Vietnam Collaboration on Remediation
- Site Description and Project Objectives
- Design
- Progress to Date
- Schedule (2014 and beyond)
- Questions



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History of US – Vietnam Collaboration



US-VIETNAM COLLABORATION ON REMEDIATION

2008

- USAID began working with the Office of the National Steering Committee 33

2009

- USAID and Office 33 sign a Memorandum of Understanding establishing the framework for the Danang Airport Remediation Project
- USAID begins preparing an Environmental Assessment (EA) to assess the extent of dioxin contamination and approaches to remediate Danang Airport

2010

- USAID completes the EA, recommends thermal desorption as most effective available and scientifically proven technology
- USAID and MND sign a Memorandum of Intent for implementation of the Danang Airport Remediation Project



US-VIETNAM COLLABORATION ON REMEDIATION

2011

- The Prime Minister of Vietnam and MND approve plans for the Danang Airport Remediation Project
- MND clears unexploded ordnance from the site and submits Environmental Impact Assessment (EIA) on the technology selection and project plan to the Vietnamese Ministry of Natural Resources and Environment (MONRE) for review

2012

- MONRE approved the EIA in May 2012
- USAID and MND launch the Project on August 9, 2012



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Site Description and Project Objectives



REMEDIATION ACTIVITIES AND SCHEDULE

Project Areas

- Phase I
 - Storage Area
 - MLA
 - PISA
 - South Ends of Drainage Ditch and Eastern Wetland
- Phase II
 - Sen Lake
 - North Ends of Drainage Ditch and Eastern Wetland
 - Area Between Drainage Ditch & Eastern Wetland





PROJECT OBJECTIVES DURING IMPLEMENTATION

- Dioxin cleanup:
 - All dioxin contamination above cleanup levels will be excavated
 - All dioxin contamination will be remediated to below cleanup levels
 - Perform confirmation sampling to verify cleanup objectives are met
- Prevent off-site migration of contamination
- Protection of health
 - Safety of residents, nearby communities, and airport workers is a top priority
 - Protect health and safety of workers



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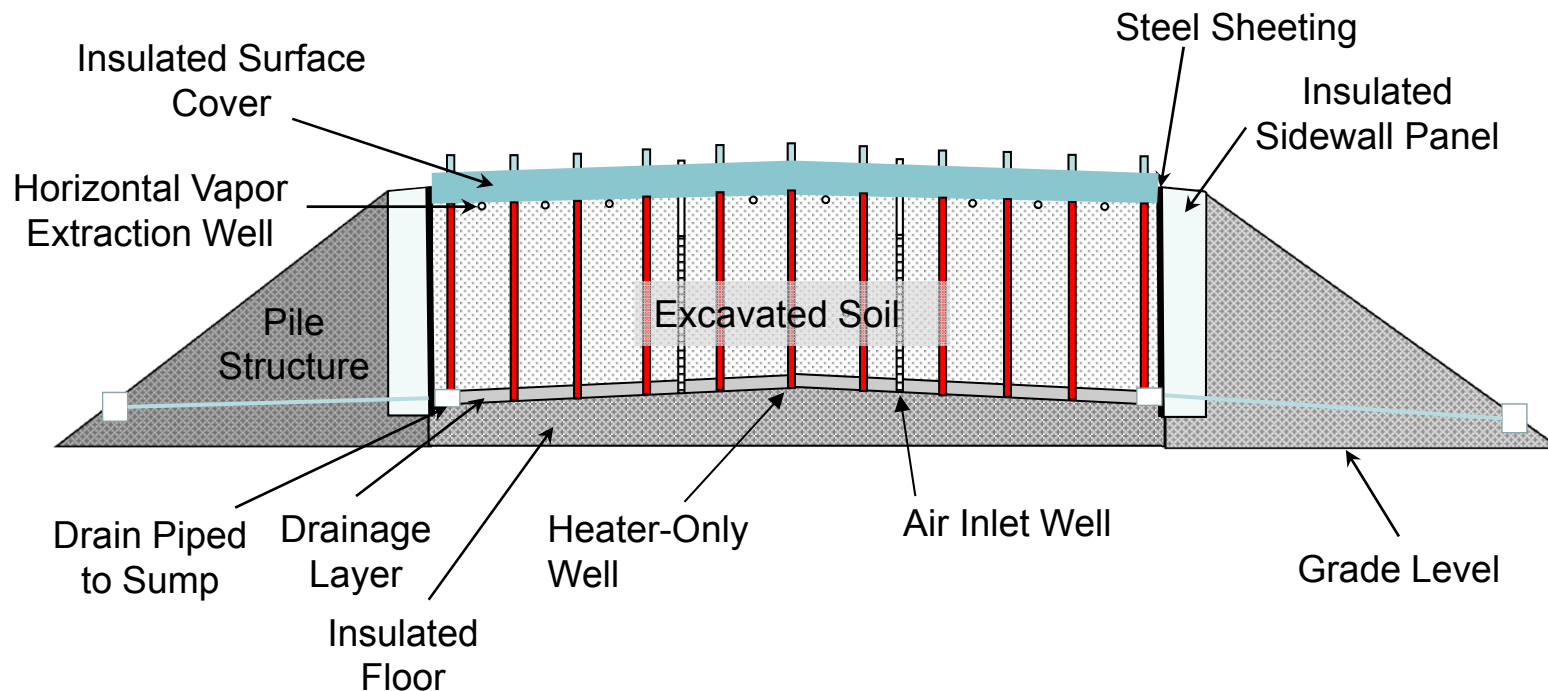
DESIGN



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SKETCH OF IPTD[®] PROCESS

IPTD[®] is ISTD performed in a fully contained and insulated structure



U.S. Patents 6,881,009; 7,004,678; and 7,534,926; U.S. and international patents pending.



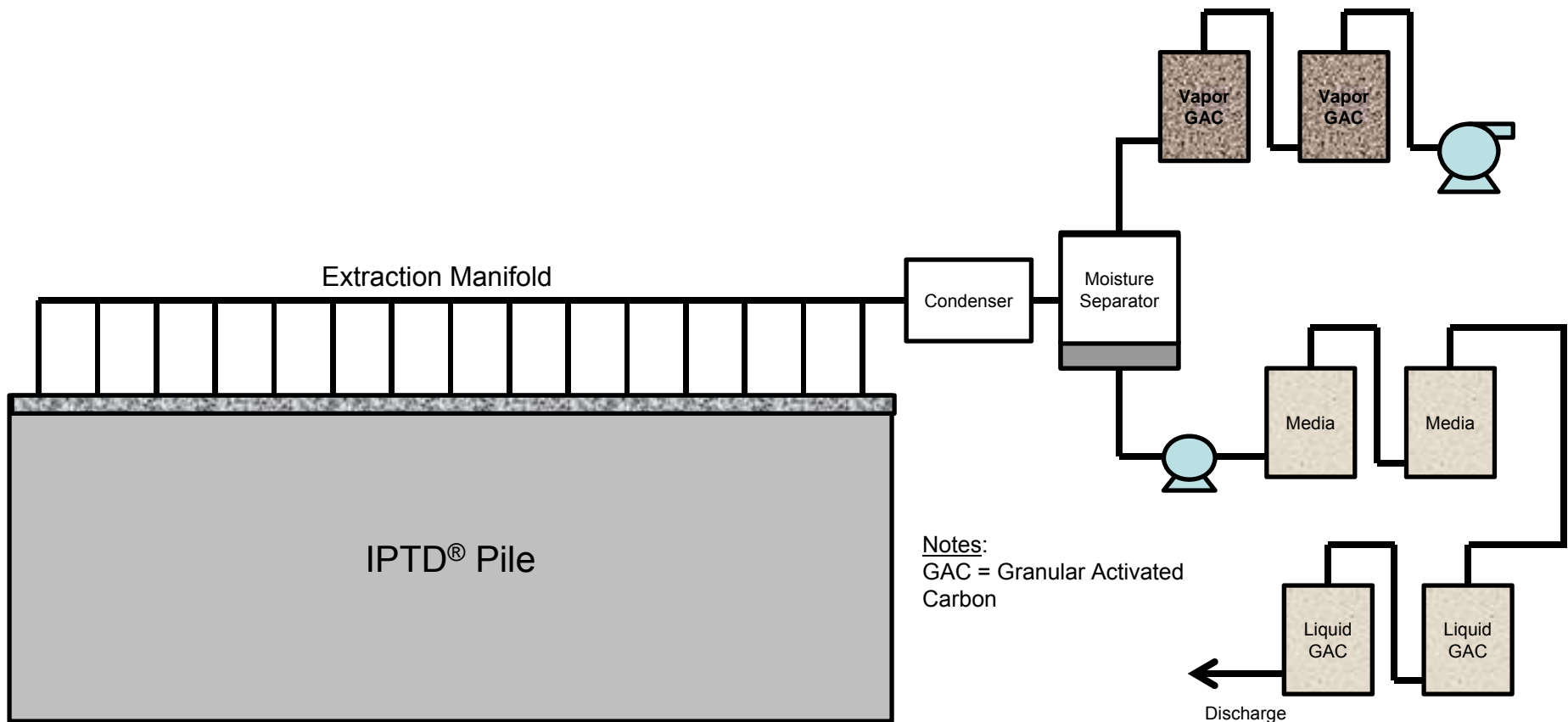
IPTD[®] PILE FEATURES

- Bottom insulation system
- Perimeter support structure (pre-cast concrete blocks)
- Contaminated soil/sediment placed per specifications
- Bottom and top of pile are crowned to promote drainage and water runoff





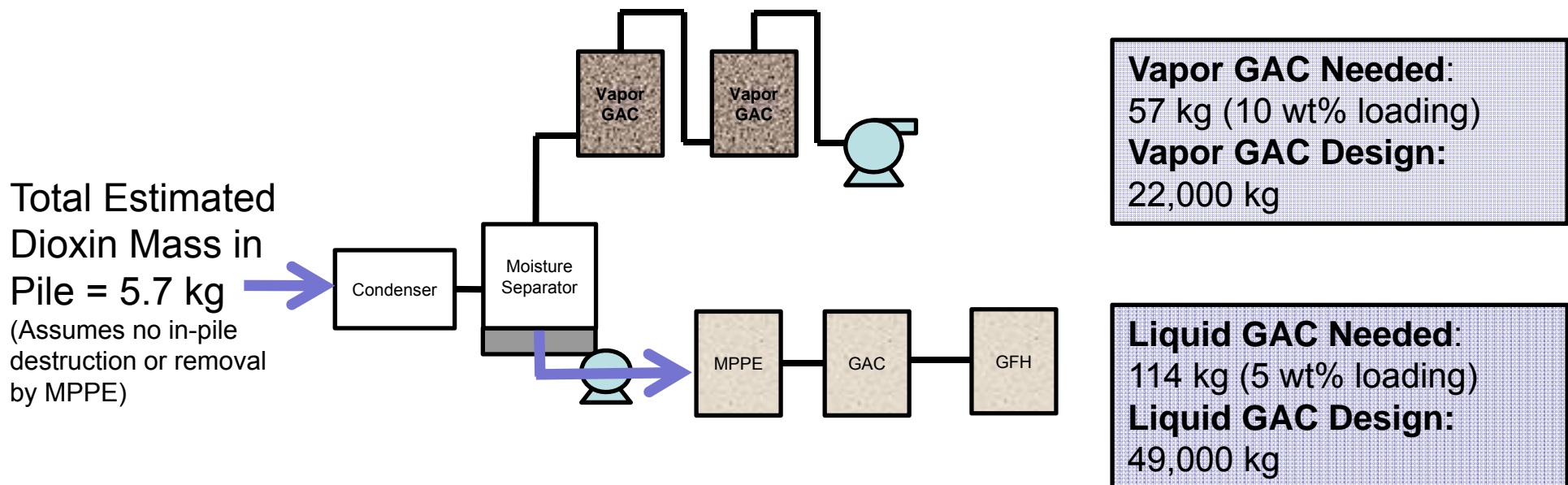
SIMPLIFIED PROCESS FLOW DIAGRAM (PFD)





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DIOXIN TREATMENT CAPACITY – ADSORPTION ON GRANULAR ACTIVATED CARBON (GAC)

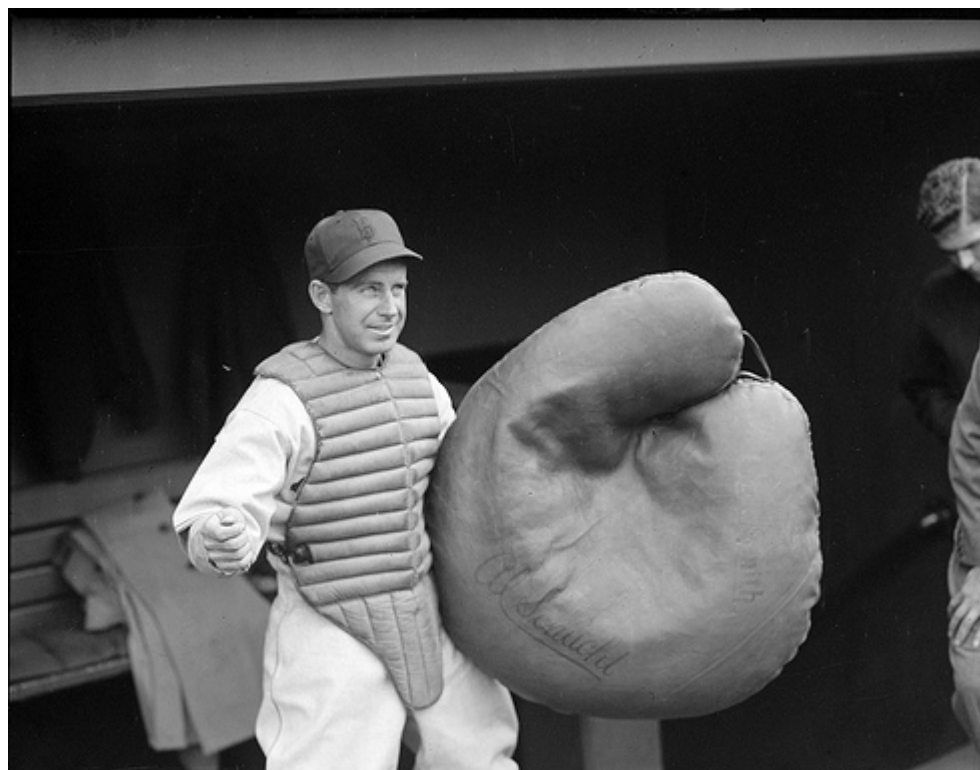


Relative to the estimated mass of dioxin in the Phase 1 pile, we have about 400 times more GAC loading capacity than needed, worst-case. Mass of dioxin in Phase 2 is much smaller.



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WE HAVE A BIG CATCHER'S MITT!





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IPTD[®] EMISSIONS CONTROLS & MONITORING



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IPTD[®] DESIGN FEATURES ENSURE AGAINST UNCONTROLLED EMISSIONS

- IPTD[®] is performed inside a fully-enclosed pile structure
- Surface cover will be sealed to the well penetrations and sidewalls
- The piping and treatment equipment are tightly interconnected, including expansion joints to accommodate thermal expansion



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IPTD[®] OPERATIONS ENSURE AGAINST UNCONTROLLED EMISSIONS

- Operational data will be monitored continually
 - 448 temperature monitoring points (all depths, throughout the pile)
 - 8 pressure monitoring points within the heated soil (beneath the extraction plenum)



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PERFORMANCE MONITORING: REAL-TIME ON-SITE SCREENING

- PID and/or FID for real time total VOC air monitoring
- Drager tubes for Phenol, Cresol & HCl in air
- DustTrak for Dust emissions
- Water test kits for pH, COD, Phenol, 2,4-D/2,4,5-T



PERFORMANCE MONITORING: OFF-SITE LABORATORY

- Vapor emissions will be sampled and analyzed at an off-site laboratory for dioxins
- Liquid discharge will be sampled and analyzed at off-site laboratories
 - Dioxin
 - Arsenic
 - Oil & Grease

ACCOMPLISHMENTS SINCE PROJECT LAUNCH

- Project Launching Ceremony (August 9, 2012)
- Land Handover by MND (September 27, 2012)
- IPTD structure full (September 2013)
- IPTD treatment system being installed





Constructing IPTD Structure's Wall





IPTD Structure Under Construction





Interior of IPTD Structure





IPTD Structure Being Filled with Contaminated Soil/Sediments





Filling and Compacting





Top of IPTD Structure Showing Wall System





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Approx. 45,000 m³ of soil/sediment and 1250 heaters in place





Sub-Station Constructed by MND





Confirmatory Sampling





Future Plan (2014 and beyond)



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REMEDIATION SCHEDULE - 2014

- Phase 1 remediation
- Phase 2 excavations and dewatering likely
- Sample remediated soil/sediment to confirm remediation effectiveness
- Remove Phase 1 remediated soil from structure
- Capacity building

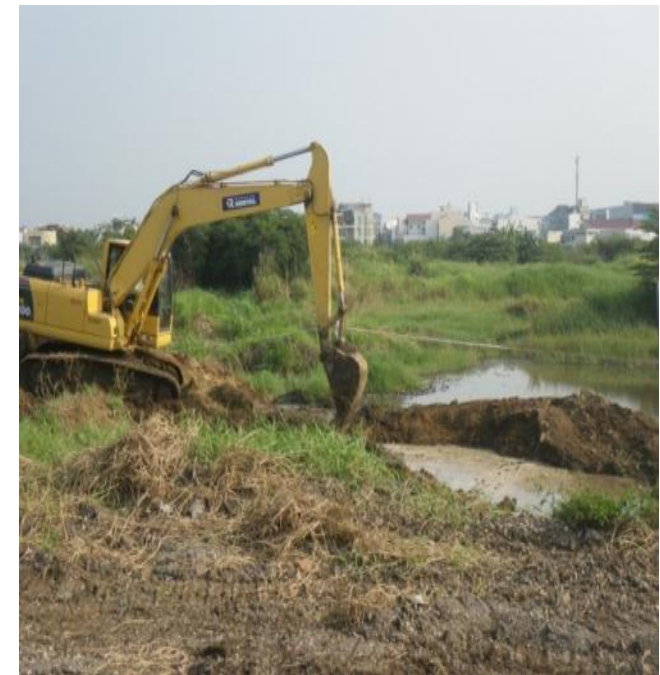




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REMEDIATION SCHEDULE - 2015

- Continue Phase 2 excavation and dewatering
- Re-fill IPTD structure
- Re-install remediation system
- Capacity Building





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REMEDIATION SCHEDULE - 2016

- Phase 2 remediation
- Sample remediated soil/sediment to confirm remediation effectiveness
- Remove Phase 2 remediated soil from structure
- Capacity Building
- Site restoration





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QUESTIONS