Caribbean Petroleum Explosion and Fire Response

Bayamon, Puerto Rico

Presented by

Federal On-Scene Coordinator:

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- *Disclaimer* : This is not a comprehensive list of response actions undertaken by EPA and/or federal, commonwealth, or local partners.

Incident

- October 23, 2009 at 0023 hours
- Unknown cause for explosion and fire
- 2.9 earthquake caused by explosion
- Unknown amount of petroleum product released, burning
- Massive smoke plume over residential communities
- Shattered windows and damage to businesses and residents
- Closure of Highway 22
- No deaths

Facility Overhead

Facility Background

- Located in Bayamon, PR
- Former refinery
- Used for fuel storage including gasoline, jet fuel, bunker
- Facility had a total oil storage capacity of 90 Million gallons and over 60 Million gallons of material stored at the time of the explosion. Later calculations showed there was approximately 30 million gallons of product in effected tanks
- Distributed to fueling stations, offices, power generation facilities, Airports, and other intra-island facilities
- Privately owned and operated

Causes of the Explosion

- The Chemical Safety Board investigated many different scenarios that could have caused the explosion.
- CSBs conclusion was that the cause of the spill was an overfill of tank 409, during a barge transfer.
- The overfill produced a large vapor cloud that traveled west across the facility and found an ignition source, near the wastewater treatment plant control area, and then flashed across the facility. The resulting fire then engulfed the entire north tank farm and the majority of the central tank farm.

Incident's effect on surrounding Community

- Damage to residential properties

- Evacuation of neighborhoods and nearby facilities including Ft. Buchanan, and Federal Prison

Resources and Assets

- U.S. EPA
- FBI
- CSB
- FEMA
- USCG
- ATF
- DOI
- SBA
- Commonwealth agencies
- Local groups

- Length of involvement and cost differed by agency
  - 150 firefighters, 30 fire trucks for 2.5 days
  - FBI agents for 7 days
  - Min of 1 SBA person, 29 hrs/wk for 6 weeks
  - 225 PR National Guard members for 2.5 days

Initial Command Structure

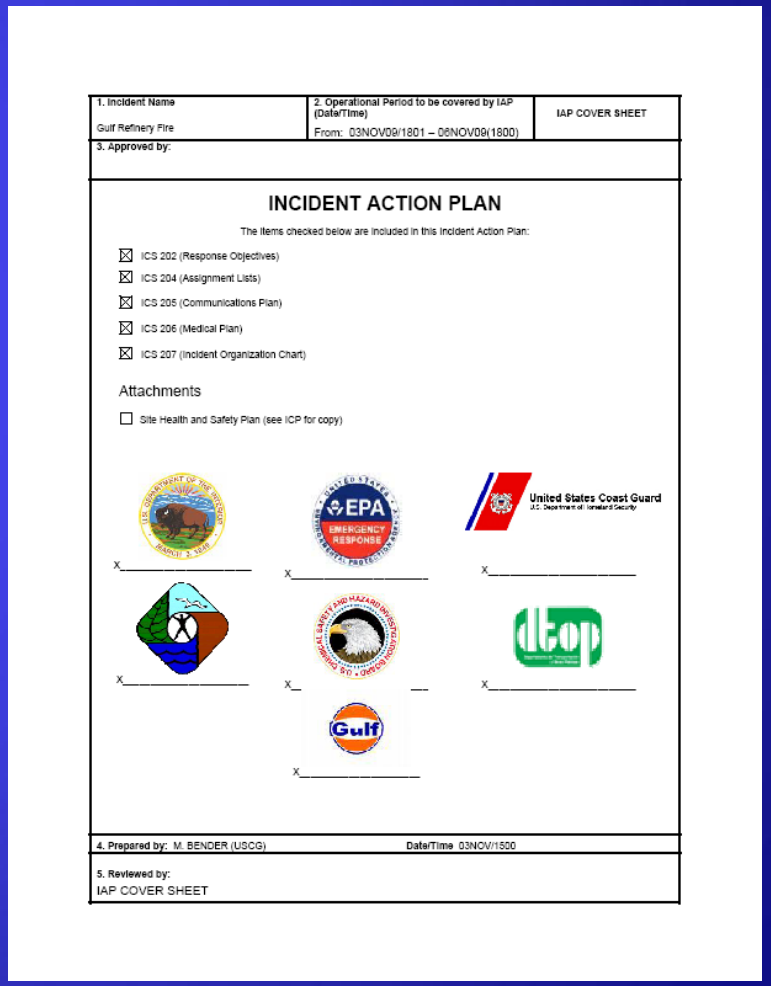
- Fire Department and Local Agencies
- Transitioned into Unified Command
- Puerto Rico National Guard declared as IC
  - All others became assisting agencies

Transfer of Command

- Stafford Act declaration on October 24, 2009
  - No Mission Assignment Issued
  - FEMA was primarily providing public assistance
  - EPA coordinated activities with FEMA
- EPA responded Using it own authorities under the NCP 300.322. Initial action funded by OSLTF
- Transition to Unified Command with:
  - EPA, DOI, DNRA, Facility Representatives, CSB, Fire, USCG, FBI, ATF, EQB, DOT
- Incident Command Post was established on the facility

ICS Implementation

- Incident Action Plans
  - Signed by members of the UC
  - Done based on Operational Period
- Meeting Schedules
- Pollution Reports
- ICS-209 (Incident Status Summary)



1. Incident Name Gulf Refinery Fire	2. Operational Period to be covered by IAP (Date/Time) From: 03NOV09/1801 – 06NOV09(1800)	IAP COVER SHEET

3. Approved by:

INCIDENT ACTION PLAN

The items checked below are included in this Incident Action Plan:

- ☒ ICS 202 (Response Objectives)
- ☒ ICS 204 (Assignment Lists)
- ☒ ICS 205 (Communications Plan)
- ☒ ICS 206 (Medical Plan)
- ☒ ICS 207 (Incident Organization Chart)

Attachments

- ☐ Site Health and Safety Plan (see ICP for copy)

x_____ x_____ x_____

x_____ x_____ x_____

x_____

4. Prepared by: M. BENDER (USCG)	Date/Time 03NOV/1500

5. Reviewed by:
IAP COVER SHEET

Environmental Damages

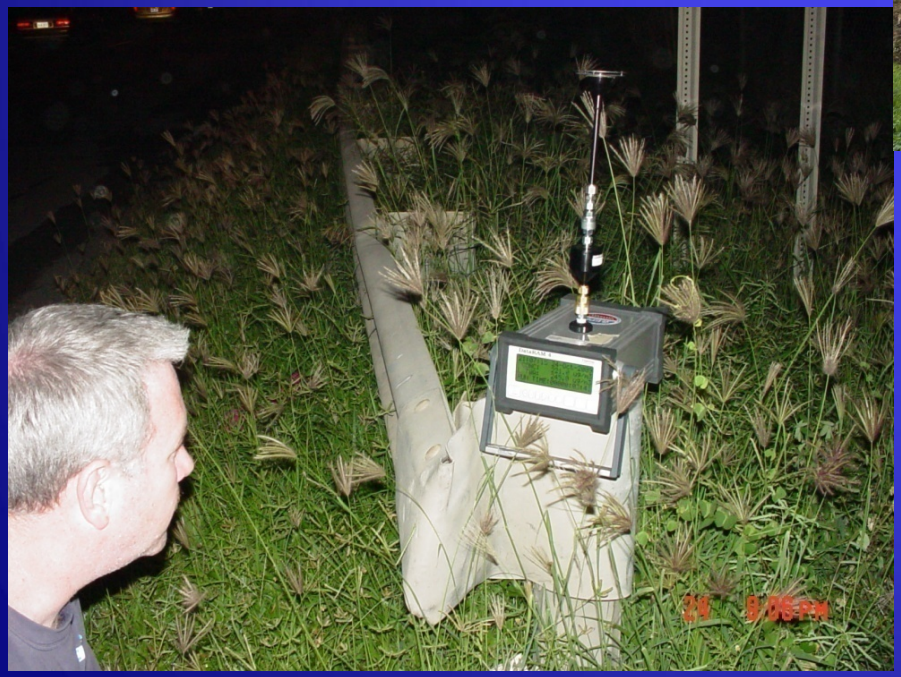
- Majority of spilled oil contained within the facility
- Oiled birds and dead reptiles found in the area
- Product found in storm water channels, on site streams and creek, neighboring wetlands, and offsite waters

Operations

- Assessment and Investigation of crime scene
- Containment and collection of material
- Air monitoring – Fixed and mobile
- Sampling activities – surface water, sediment, product, discharge parameters
- Facility infrastructure rehabilitation
- Road construction, access, and security
- Removing source material
- Removal of threatened and spent animals
- Protection from secondary hazards for health and safety – electrical, mechanical, fire, explosion, hazardous waste storage areas, aquatic environments, asbestos, weather, security, respiratory, insects,

Operations

Plume / Air monitoring



Operations *(continued)*

Fire Suppression

Operations *(continued)*

Underflow Dams

Operations *(continued)*

Tank Integrity

Secondary Containment

Removal of Free Oil

Drum Stabilization Emergency Response

Drum Stabilization Emergency Response

Addressing Unified Command Objectives

- Initially UC objectives were accomplished using RP Resources. Supplemented by EPA, EPA Contractor resources, as well as resources from other agencies that were part of Unified Command.
- As response action progressed the RP was having difficulty providing resources to address issues at the Site. Mainly due to monetary concerns. This issue necessitated EPA to increase the amount of contractor resources on-site.
- Due to issues related to CAPECO willingness and ability to commit resources for the CWA and CERCLA removal actions, EPA began the process of negotiating an Administrative Order on Consent AOC.

Initiation of Order Process

- EPA began process of negotiating an AOC with CAPECO
- After a long period of negotiation CAPECO informed EPA that they would not agree to the terms of the AOC.
- EPA R2 Office Regional Council issued CAPECO a Unilateral Order for both OPA and CERCLA actions that needed to be conducted at the Site.
- CAPECO responded that they could not comply with the terms of the Order.

Initiation of Order Process

- After CAPECO informed EPA that they could not comply with the terms of the Unilateral Order, EPA made the decision to conduct both the OPA and CERCLA actions as fund lead Removal Actions.
- During the Fund Lead Actions conducted by EPA, CAPECO remained on-site to maintain the facility's infrastructure, and to facilitate transfers of material off-site and within the facility.
- In August of 2010 CAPECO filed for Chapter 11 Bankruptcy.

EPA Fund Lead Actions

- EPA issued a Notice of Federal Assumption of Response Activity to CAPECO on March 25, 2010.
- OPA clean-up activities included: Removal of free oil, excavation of oil contaminated soils, demolition of heavily damaged storage tanks. And underlying contaminated soils, and draining of in-plant oil pipelines. Throughout the span of this action EPA spent approximately 10.5 M
- Concurrently EPA prepared an Action Memorandum to complete the CERCLA action at the Site which included a drum/cylinder removal, removal of F and K waste sludge from the facility WWTP and addressing ACM issues in the decommissioned refinery and other parts of the facility. Throughout the span of the CERCLA Action EPA spent approximately 2.5M

Tank Demolition

- View of test cuts in tank used to collect samples and determine level of sludge and oil remaining in tank bottom

Tank Demolition

- View of cutting operations with shears

Tank Demolition

- View of torch cutting operations

Tank Demolition

- View of panel lay down

Tank Demolition

- View of tank interior

Tank 502 May 2010

Tank 502 July 2010

Avenue D after soil/line removal. Tank 503 lid in background

Wetland Assessment/Damage

CERCLA Clean-up Activities

- Hazardous Waste Drum storage area clean-up
- Cylinder Removal
- Removal of F and K waste sludge from facility API separator
- Removal of Hazardous waste from Refinery
- Removal of ACM
- Conducting of ACM survey in the Refinery to quantify the amount of ACM. It is estimated that there approximately 50,000 linear feet of ACM in the refinery

Waste and Product Disposition

- Partial list of waste and product transferred off-site as of May 2011
- 70 yards of contaminated debris
- 17,917 tons of contaminated soil
- 1,000,000 gallons of contact water treated off-site at by PRASA
- 22,890,000 gallons of contact water treated on-site through WWTP
- 30,511,399 gallons of product transported to PREPA
- 449,022 gallons of collected oil transferred off-site

Certain Reported Costs

- Identified costs associated with the explosion and fire
  - $6.4 million spent on day 1 of the emergency response effort, all agencies included
  - $10.5 million spent for EPA portion of the OPA environmental cleanup
  - $2.5 million spent for EPA portion of the CERCLA clean-up
  - Costs do not include costs incurred by CAPECO portion of the clean-up

Challenges

- Responsible Parties inability to finance emergency response and removal efforts
- Oil Funding – competition between other national priorities (BP, Embridge)
- Communications – radios, Internet, language barrier
- Weather
- Integrity of remaining tanks
- Recovery of material from wetlands
- Identifying source material – piping, storm water channels, secondary containment, process sewers
- Obtaining resources and specialized equipment in a timely manner
- Negotiating AOC with original RP
- Negotiation of 4 orders simultaneously with purchaser
- Public Information
  - Press conferences, visits to neighborhoods, interaction with community leaders and interest groups

Successes

- Establishment of Unified Command and integration with multiple agencies, including law enforcement
- NPFC located on-site for funding issues
- Teamwork with all players
- Cooperation within Unified Command (local, federal, and Responsible Party) in operational decision making and addressing safety concerns
- Quick mobilization of personnel
- Timely distribution of documents by UC
- Establishment of physical Command Post with communication capabilities

Sale of the Facility

- CAPECO Filed for Chapter 11 Bankruptcy.
- CAPECO engaged in a jointly administered purchaser agreement with Puma Energy Caribe and the United States Bankruptcy Court.
- EPA participated in these negotiations with DOJ and the Bankruptcy Court.
- EPA accepted Puma Energy as a viable purchaser.
- As part of the purchase agreement Puma negotiated 4 AOCs with EPA for the clean-up of the Site and other purchased assets.
- The 4 agreements covered OPA, CERCLA, RCRA and UST, contingent on purchase of the property. CAPECO previously had a RCRA Corrective Action Order with EPA, this order was amended and renegotiated with Puma.
- Sale was finalized with Puma on May 11, 2011, for $82,000,000. Proceeds of purchase were used to pay creditors, the governments response costs as well as a fine.

Bayamon Terminal

Storage Capacity:

- 17 Tanks + 59 LPG Bullets + 1 Sphere
- Overall Capacity 2.03Mbbls
- Main Products:
  - ULSD, LSD, HSD
  - Jet Fuel
  - LPG – C3 propane and C4 Butane

Aerial photo of CAPECO after the explosion in October 2009

Two months after Puma acquisition in July 2011

October 2011

February 2012

September 2012

Photo Log Manifold Area: December 26, 2012

Photo Log Manifold Area: January 8, 2013

September 2013

September 2014

January 2015

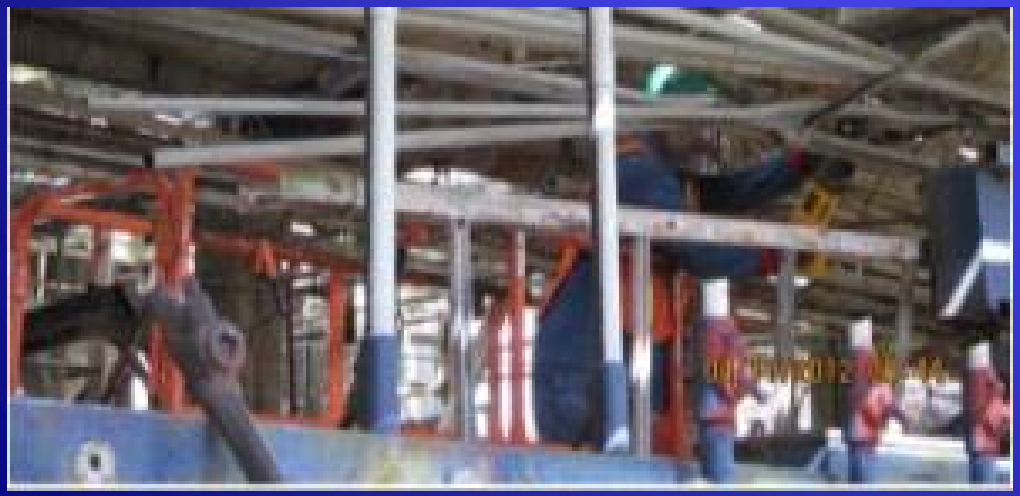
January 2015

January 2015

Asbestos Containing Material

Encapsulated Material

Refinery Demolition



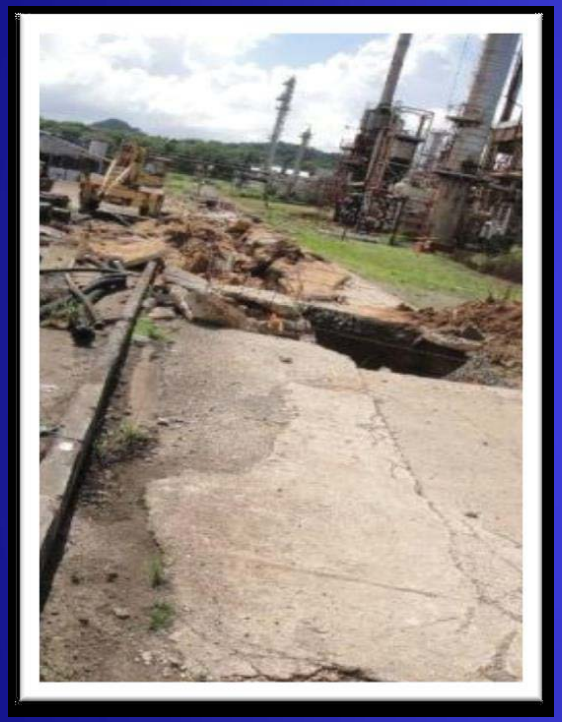
Refinery Demolition

Loading oil contaminated soil

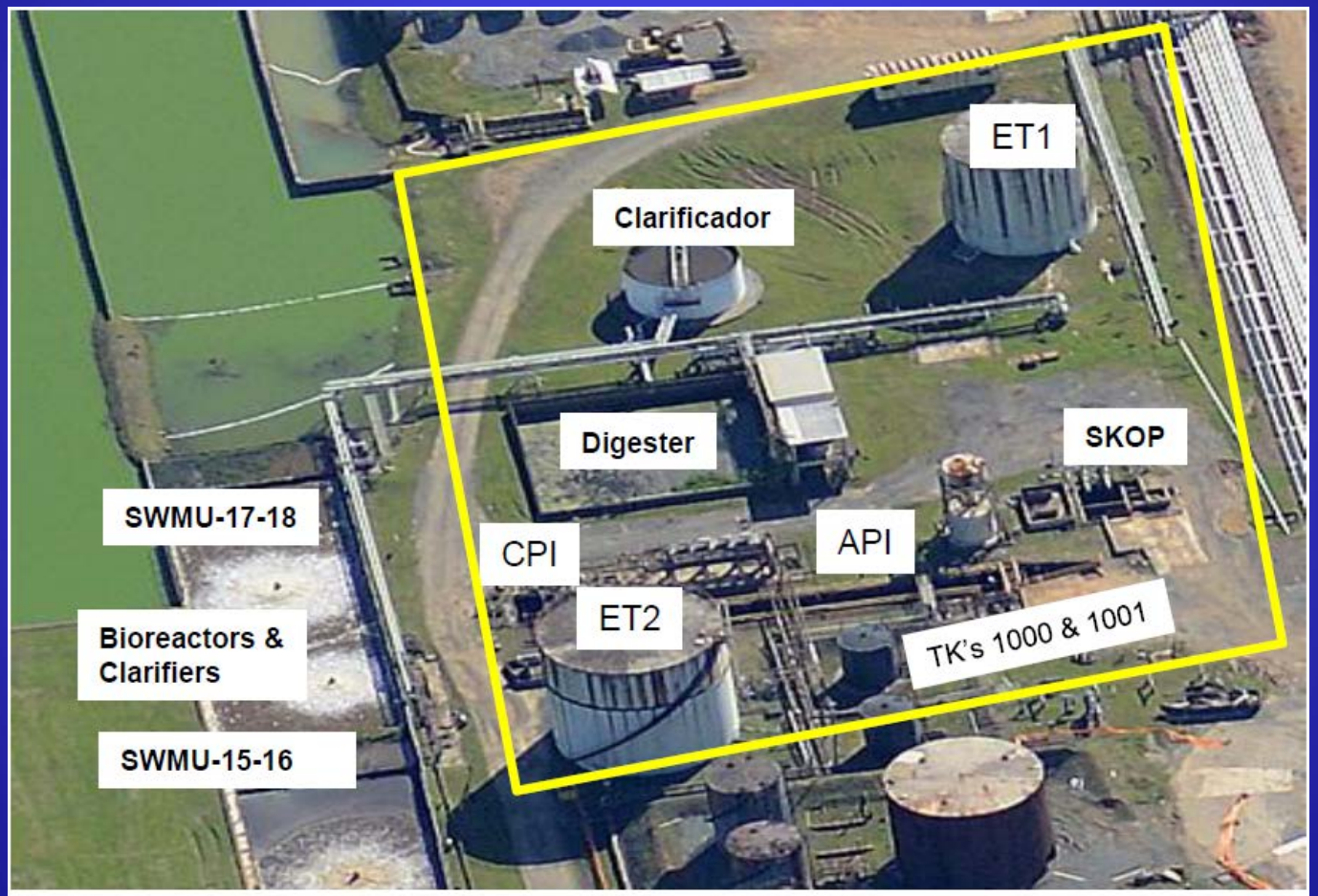
South-West Storm Channel

Waste Water Pipeline Replacement & Storm Water Channel Baffles

Exploded Storm Sewer along 4th Street



Waste Water Treatment Plan – Bayamon Terminal 2014-15 Phase 1 Decommissioning and Demolition



Before demolition

Waste Water Treatment Plan – Bayamon Terminal 2014 Phase 1 Decommissioning and Demolition

Current Aerial picture September 2014

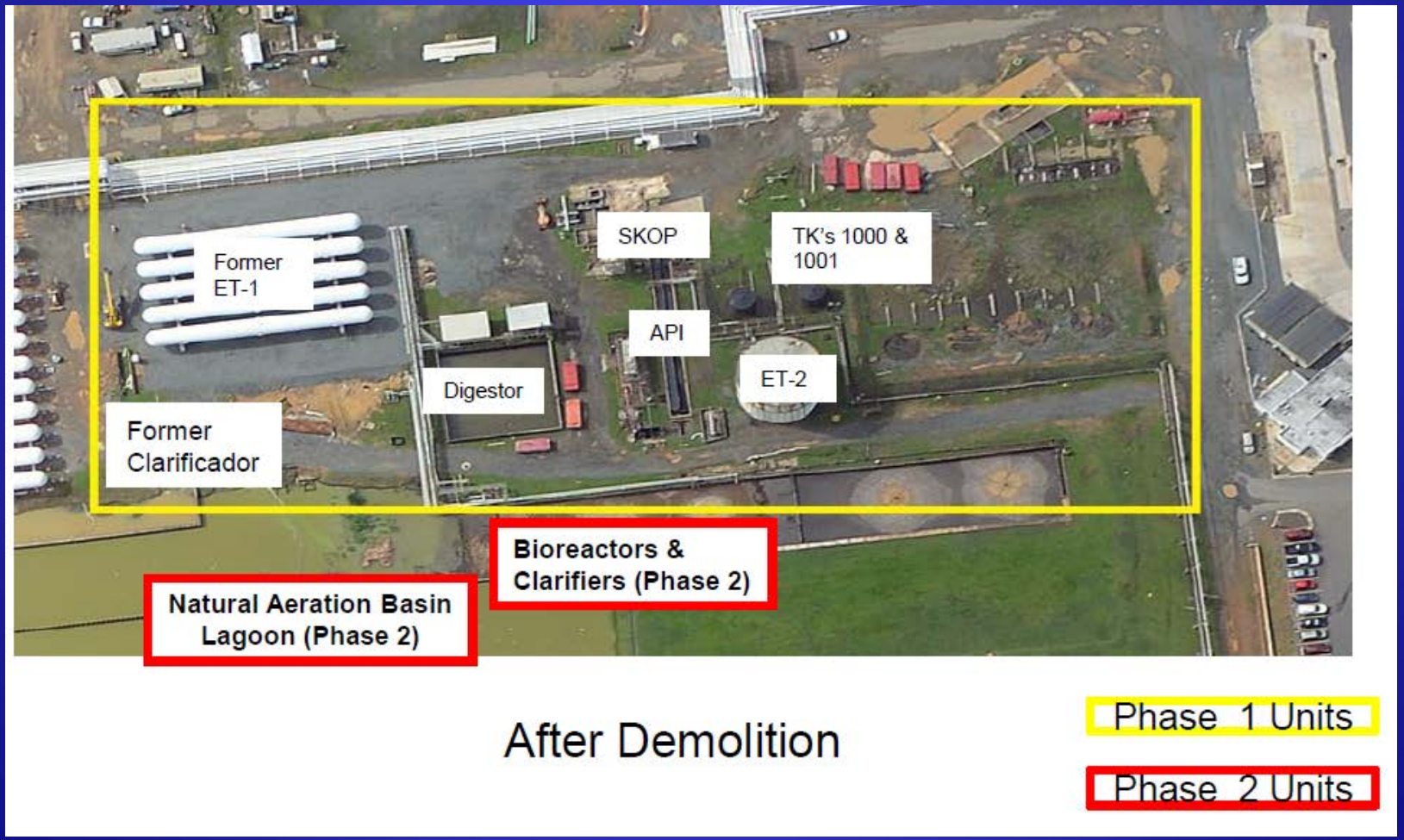


Photo Log Cleanup & Demo: ET-1

Photo Log Cleanup & Demo: Circular Clarifier and Digestor

Photo Log Cleanup & Demo: API

Photo log ET-2 Demolition in progress

Area of the former Phase 1 WWTP Units Backfilled

WWTP- Bayamon Terminal Decommissioning and Demolition

Phase 1 Units Project – Completed 2014 -15

- Total cost expenditure for the Phase1: $3,224,843
- Phase 1 WWTP Works included the activities for sampling soil for re-use, process system clean up and capping, Order implementation cost and reports, units waste removal, waste disposal (Hazardous & Non-Hazardous) which represent 83% of total cost ($2.7 M), unit clean, steel structure demolition and backfill of the units including site restoration.

Natural Aeration Basin Lagoon (Phase 2)

Bioreactors & Clarifiers (Phase 2)

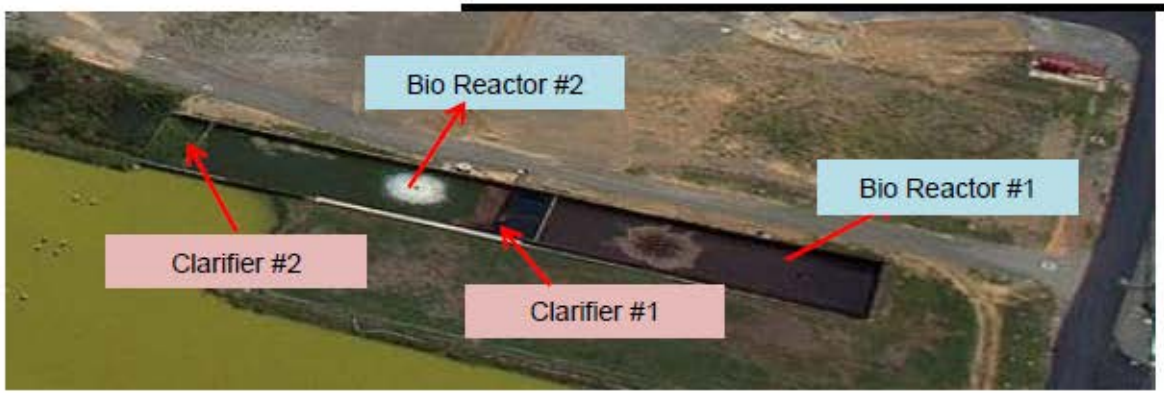
ET-3 & filters (Phase 2)

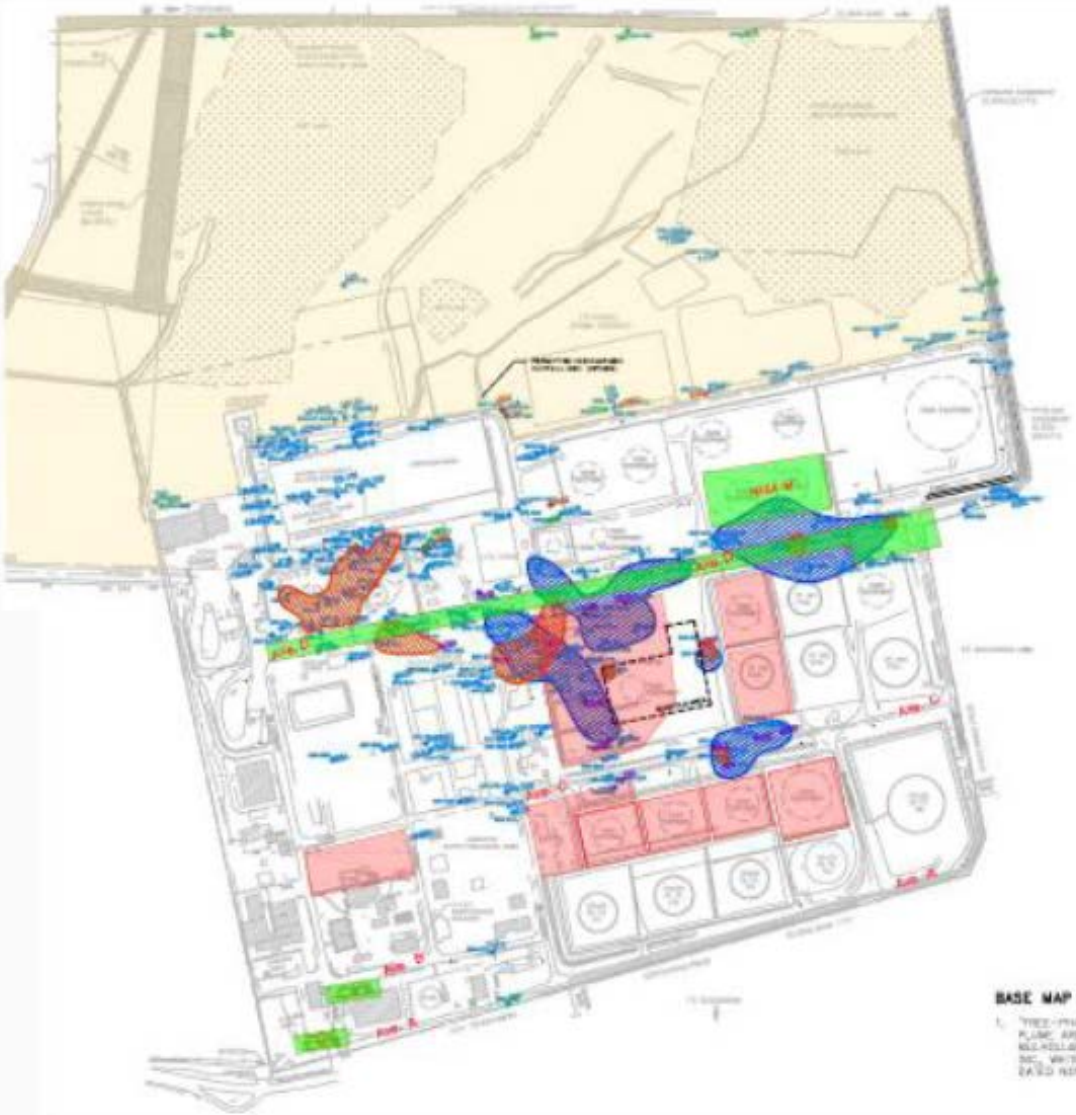
General SOW to be presented to the EPA as part of the Order requirements:

- **Dewatering, Sludge removal and unit clean up for**: Bio Reactors #1 & #2, Clarifiers #1 & #2, Sand Filters and Equalization Tank (ET-3)
- **Disposal** - Haz and Non-Haz according to waste classification.
- **Backfill** - of the units re-using the soil storage in the north section of the Terminal
- Expected to be completed by EOY 2017

Waste Water Treatment Plan – Bayamon Terminal Phase 2 Decommissioning and Demolition

Unit	Dimensions	Capacity	Comments
Bio-Reactor #1	150' long, 50' wide; 9.5' deep at inlet, 10' deep at outlet	65,625cf (490,909 gal)	Underflow into first clarifier
Clarifier #1	20' long, 50' wide; 10' deep	9,000cf (67,324 gal)	Overflow into Bio-reactor No. 2
Bio-Reactor #2	150' long, 50' wide; 10' deep	60,000cf (448,831gal)	Underflow into 2nd clarifier
Clarifier #2	20' long, 50' wide; 10' deep	9,000cf (67,324 gal)	Overflow into Natural Aeration Basin





LEGEND:

- MONITORING WELL
- MONITORING WELL (SAMPLED SEMIANNUALLY)
- MONITORING WELL (SAMPLED ANNUALLY)
- RECOVERY WELL
- HYDROCARBON PLUME – ZONE A
- HYDROCARBON PLUME – ZONE B
- SOIL REMOVED DURING CONSTRUCTION PHASES
- UNDEVELOPED WETLAND
- OTHER AREAS OF INVESTIGATION

NOTES:

1. EXTENT OF FREE-PHASE HYDROCARBON BASED ON SEPTEMBER 2008 DATA.

0m 100m 200m

GRAPHIC SCALE: 1:4000

BASE MAP REFERENCE:

1. "FREE-PHASE HYDROCARBON PLUME AREA" BY ANDERSON-NELSON & ASSOCIATES, INC., WHITE PLAINS, NEW YORK, DATED NOVEMBER 2005.

NOT TO SCALE

ARCADIS

CERCLA Order
(Comprehensive Environmental Response, Compensation, and Liability Act

Demo Activities & Material 2012	Quanity
Total recycle scrap metal prepared in metric tons	15,755 Mton
Total of pipeline flushed & cleaned	19,062 LFt

ACM Abatement Description	Quanity
Transite	55,969 sq ft
Vinyl Tiles	13,187 sq ft
Stucco	1,970 sq ft
Pipeline ACM Removal	48,946 LFt
Soil with ACM	16,340 ton

EPA Notice of Compensation was Issued to PUMA for CERCLA action on September 9, 2014.

Waste Removal

Phase I Waste Water Treatment Plant Totals	
Media	**Number**
Hazardous	1,784,438 pounds
	67,201 gallons of water
Non-Hazardous	2,650 gallons
	361 cubic yards

Phase II Waste Water Treatment Plant Totals	
Media	**Number**
Non-Hazardous High Oil Content	1,708 cubic yards
Oil contaminated contact water	927,000 gallons of water

Non-Hazardous: Contaminated Soil, Sorbents, Catalyst, Tank Sludge	
Media	**Number**
Bulk waste soil tank sludge	50,633 tons
Soil, and fire-fighting foam	507 drums
Bulk soil and tank sludge	80,662 cubic yards

Hazardous Waste	
Media	**Number**
lab packs, solvents, flammable liquids, PCBs	598 drums
Benzene, xylene, toluene, solid waste	3,178,798 pounds
Liquid waste from WWTP	67,201 gallons