NEVADA ENVIRONMENTAL RESPONSE TRUST

LE PETOMANE XXVII, INC., NOT INDIVIDUALLY BUT SOLELY AS ENVIRONMENTAL RESPONSE TRUST TRUSTEE

4Q 2018 STAKEHOLDER CONFERENCE CALL

NOVEMBER 7, 2018

STATE OF THE TRUST – 4Q 2018

- Remedial Investigation on schedule
  - Phase 3 RI within OU-2 has been completed
  - Phase 3 RI within OU-3 largely complete
  - Downgradient Phase 2 groundwater work plan under preparation
- Feasibility Study on schedule
  - 6 treatability / pilot studies currently underway
- AP-5 Pond closure activities largely complete (reporting underway)
- Drafting of OU-1/OU-2 Remedial Investigation Report underway
- YTD 2018 costs and investment income thus far as projected
- Continued progress on NERT Third Amendment
- Advancing dialogue on AMPAC matter

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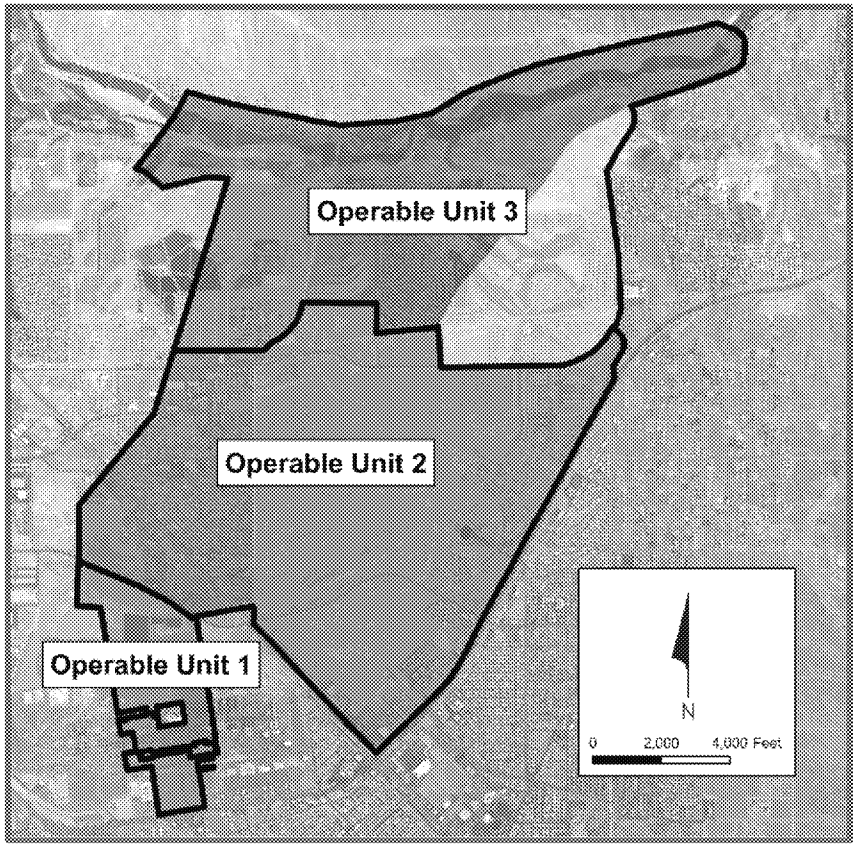
NERT REMEDIAL STRATEGY

- OU strategy implemented in 2017 to expedite remedy implementation
- RAOs established for each OU
  - OU 1: Site Source Control and Containment
  - OU 2: Mid-Plume Containment and Mass Removal
  - OU 3: Mitigate Discharge to Las Vegas Wash



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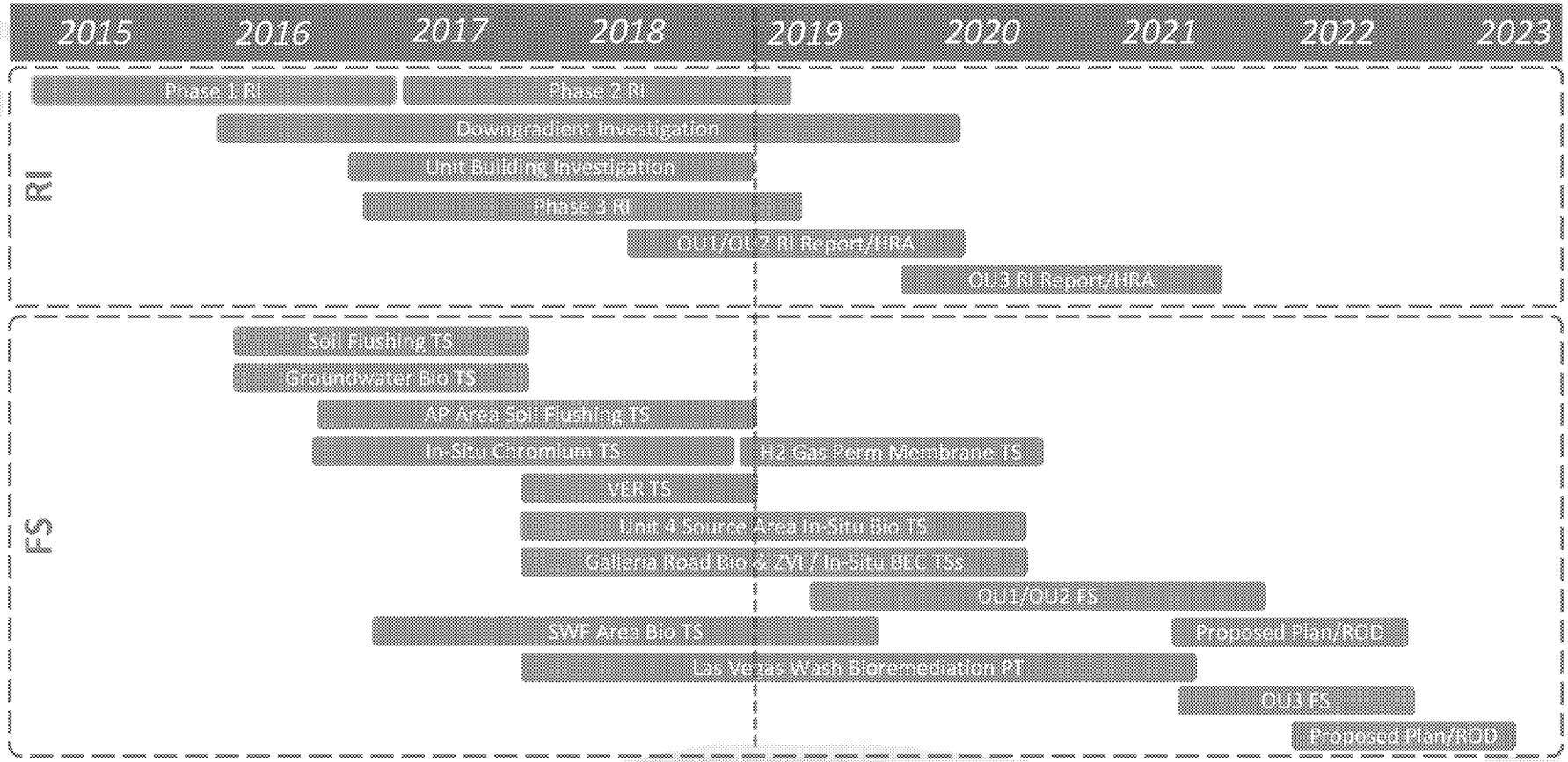
REMEDIAL PROGRAM UPDATE



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REMEDIAL PROGRAM UPDATE: OU-1/OU-2

4Q 2018 STAKEHOLDER CONFERENCE CALL

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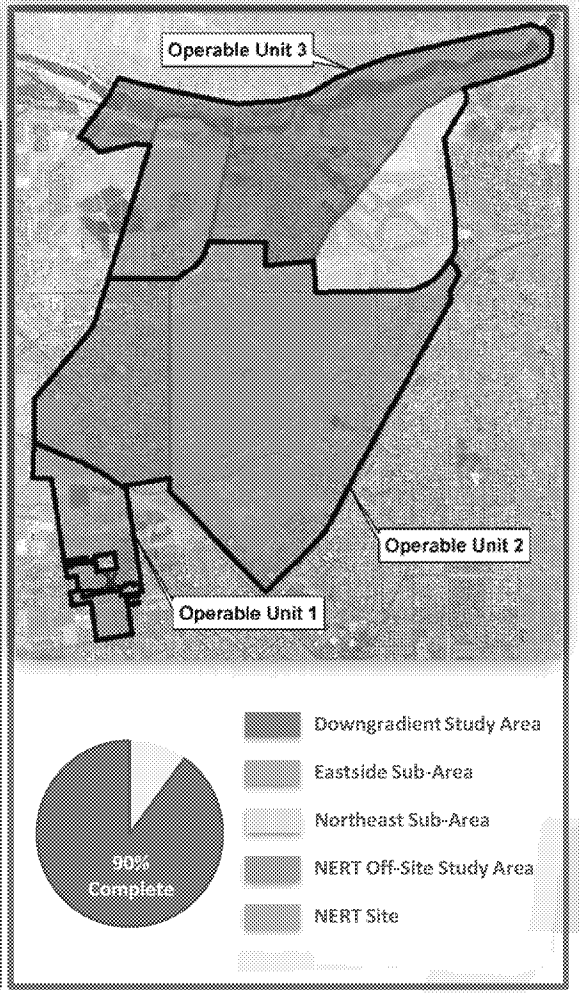
REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: UNIT 4 & 5 BUILDINGS INVESTIGATION

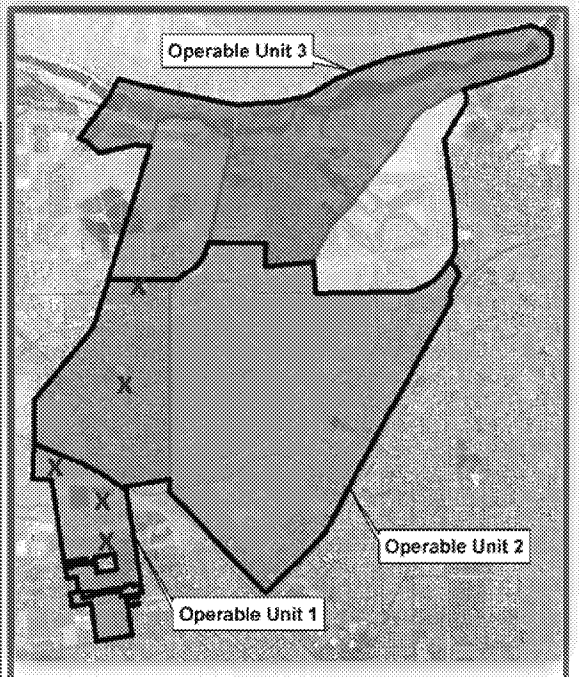
- Field work complete
  - 21 permanent wells
  - 330 groundwater samples
  - 77 soil borings
  - 1,527 soil samples
- Data evaluation and report preparation underway
- Report will be submitted as part of the OU-1 / OU-2 RI Report (March 2019)

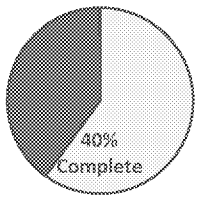


REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: PHASE 2 RI MODIFICATIONS

- Modification #11 : OU-1/OU-2 Soil Gas Investigation beginning in November 2018
- Modification #12 : Parcel E site characterization activities underway
- Modification #13: North Property Boundary Soil Boring/Wells underway
- Additional Work Plans:
  - Barrier Wall Geophysical Integrity Evaluation underway
  - AWF Capture Evaluation / UMCf Matrix Diffusion Evaluation underway



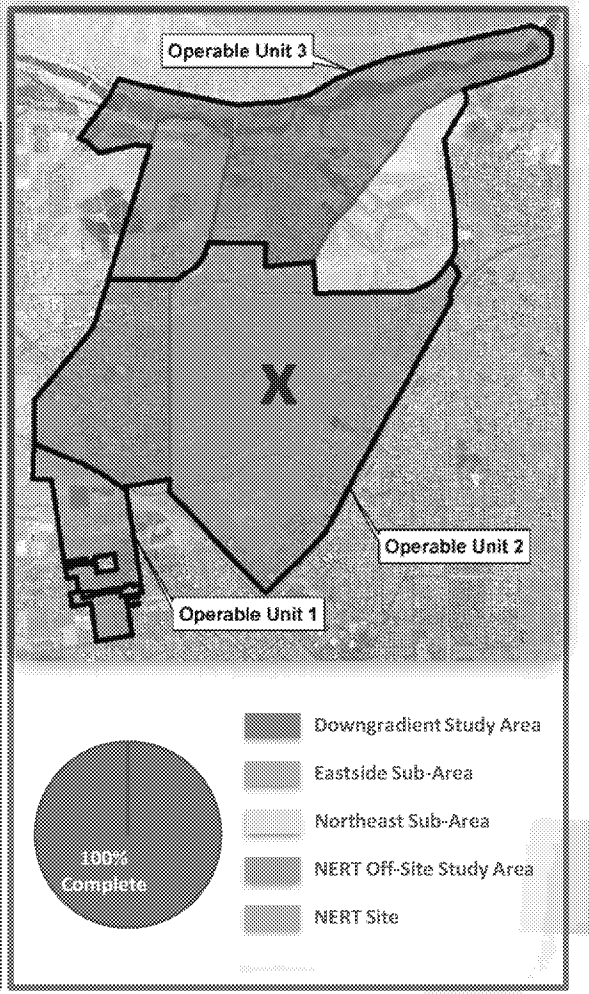


Downgradient Study Area
Eastside Sub-Area
Northeast Sub-Area
NERT Off-Site Study Area
NERT Site

REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: PHASE 3 RI

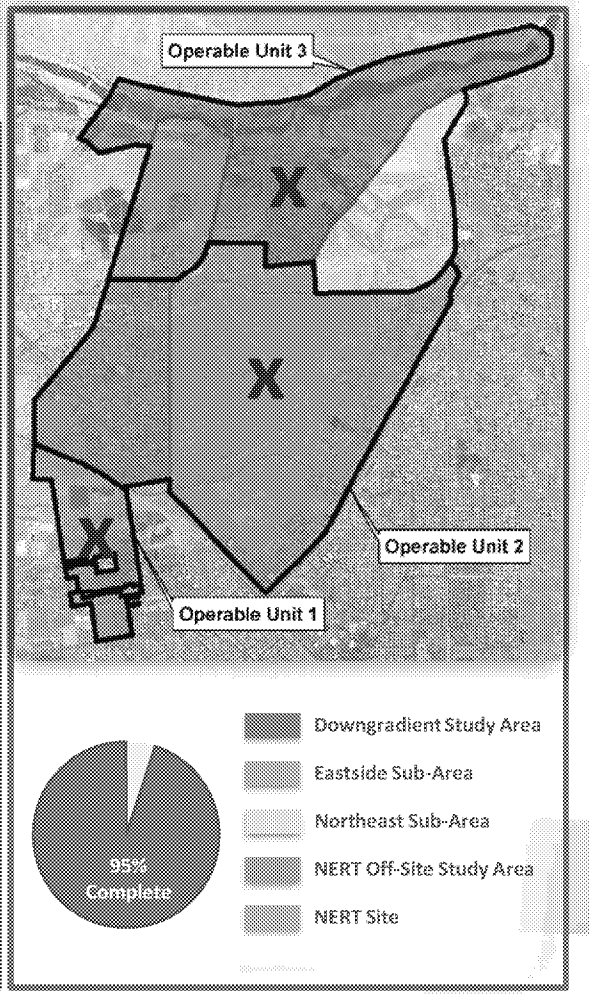
- Drilling and Soil Sampling - Complete
  - 27 monitoring wells
  - 18 soil borings
  - 57 transect borings
  - 580 soil samples
  - 186 physical test samples
- Well Development, Sampling, and Hydraulic Testing - Complete
  - 27 new monitoring wells developed and sampled
  - 113 existing wells sampled
  - 30 wells slug tested



REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: PHASE 3 RI MODIFICATIONS

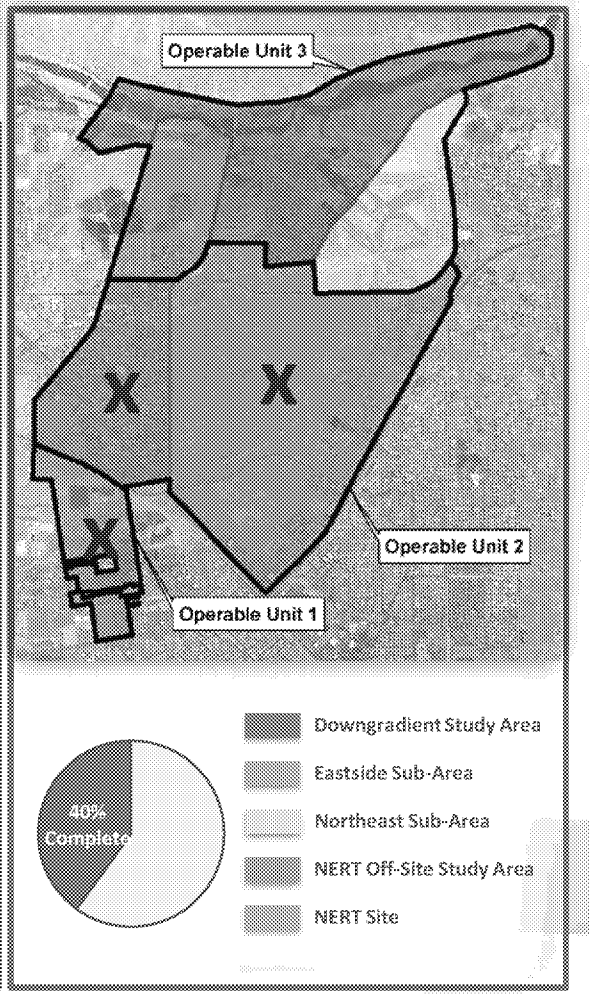
- Modification #3: Nuclear Magnetic Resonance (NMR) logging of historical and RI wells largely complete



REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: RI REPORT

- Preparation of RI Report in progress
  - Data evaluation underway
  - Geologic cross section development underway
  - Initial draft sections of RI Report (Introduction, Site History, Regulatory Actions and Site Investigations, Physical and Environmental Setting, Conceptual Site Model, and Risk Assessment Summary)
- Stakeholder Roundtable scheduled for December 13, 2018
- OU-1/OU-2 RI Report to be submitted in March 2019



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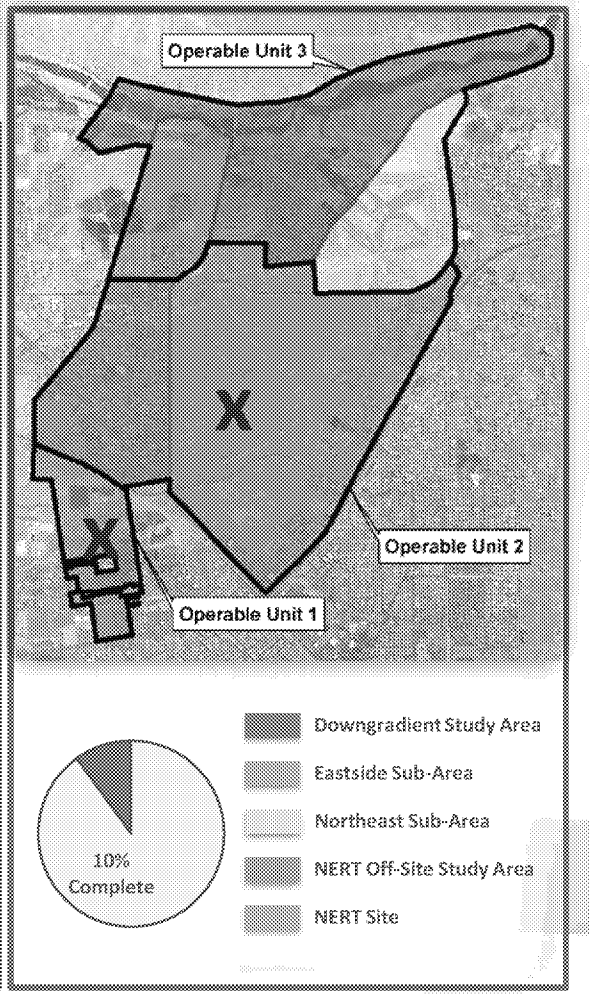
REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: RISK ASSESSMENTS

- OU-1 Soil COPC / Decision Unit Report approved in December 2017
- Revised OU-2 Screening-Level Ecological Risk Assessment Work Plan approved on October 30, 2018
- OU-1 / OU-2 Soil Gas / Groundwater Baseline Health Risk Assessment Work Plan under revision; work plan to be submitted in January 2019
- OU-1 Soil Baseline Health Risk Assessment underway; report to be submitted in 1Q 2019
- OU-1 / OU-2 Human Health and Ecological Risk Assessment reports to be submitted in 3Q 2019



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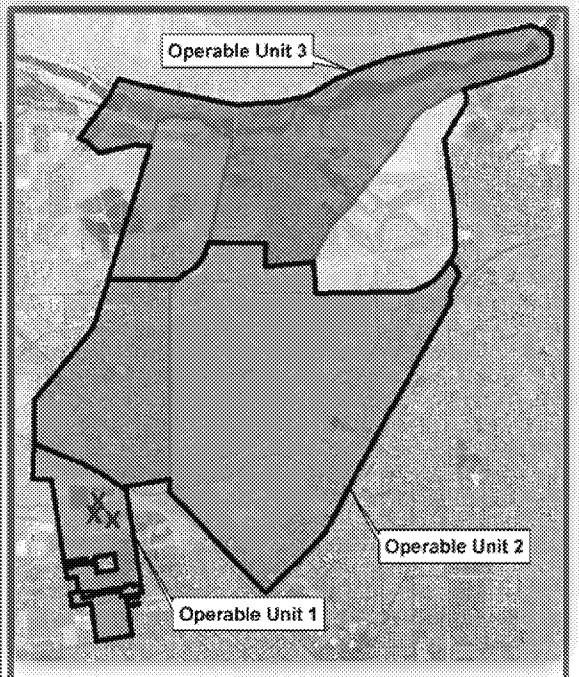
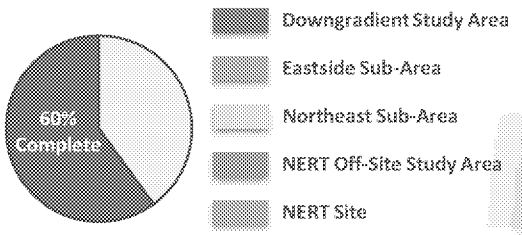
REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: FEASIBILITY STUDY

- In-Situ Chromium Treatability Study
  - Report approved in August 2018
  - Report addendum preparation underway
- Vacuum Enhanced Recovery Treatability Study
  - Report approved in September 2018
  - Post-test groundwater sampling completed
- AP Area Soil Flushing Treatability Study
  - Report submitted in July 2018
  - Revised report under preparation for submittal in December 2018

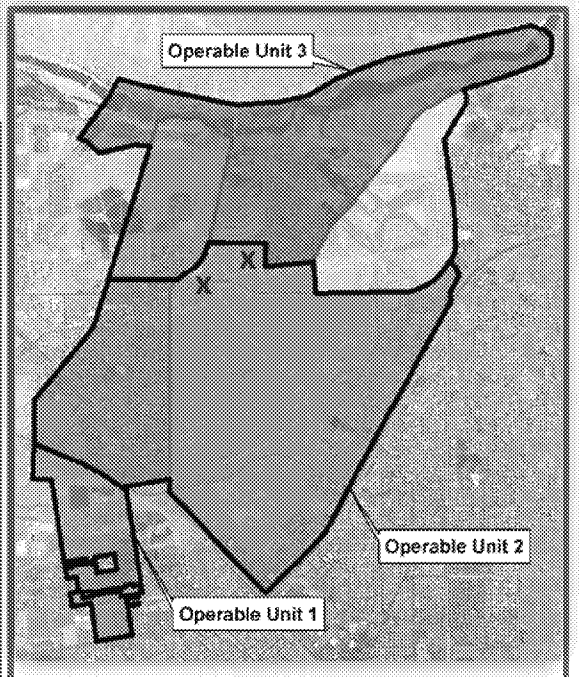


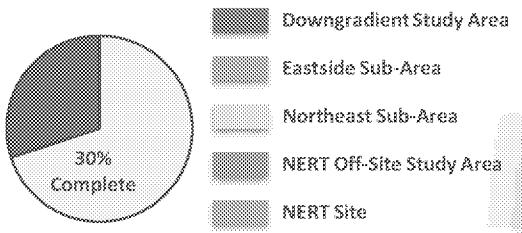


REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: FEASIBILITY STUDY

- Galleria Road Bioremediation Treatability Study
  - Phase 1 field activities completed
  - Stakeholder Roundtable to be held in 1Q 2019
  - Work Plan Addendum (incl. third-party cost review) to be submitted in 1Q 2019
  - Final Report to be submitted in 2Q 2020
- Galleria Road ZVI Treatability Study
  - Phase 1 field activities completed
  - Stakeholder Roundtable to be scheduled 1Q 2019
  - Work Plan Addendum (incl. third-party cost review) to be submitted in 1Q 2019
  - Report to be submitted in 2Q 2020





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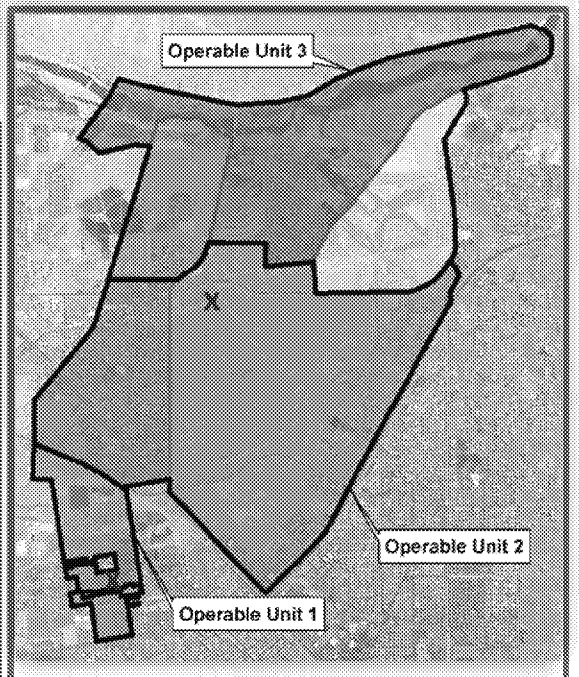
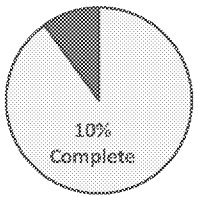
REMEDIAL PROGRAM UPDATES

OU-1 / OU-2: FEASIBILITY STUDY

- Unit 4 In-Situ Source Area Treatability Study
  - Site characterization activities ongoing
  - Stakeholder Roundtable to be scheduled 1Q 2019
  - Work Plan Addendum (incl. third-party cost review) to be submitted in 2Q 2019
  - Report to be submitted in 4Q 2020
- In-Situ Bioelectrochemical Laboratory-Scale Treatability Study
  - Work Plan approved in May 2018
  - Laboratory testing underway
- OU-1/OU-2 Feasibility Study to be submitted in 1Q 2021





Downgradient Study Area
Eastside Sub-Area
Northeast Sub-Area
NERT Off-Site Study Area
NERT Site

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REMEDIAL PROGRAM UPDATE: OU-3

4Q 2018 STAKEHOLDER CONFERENCE CALL

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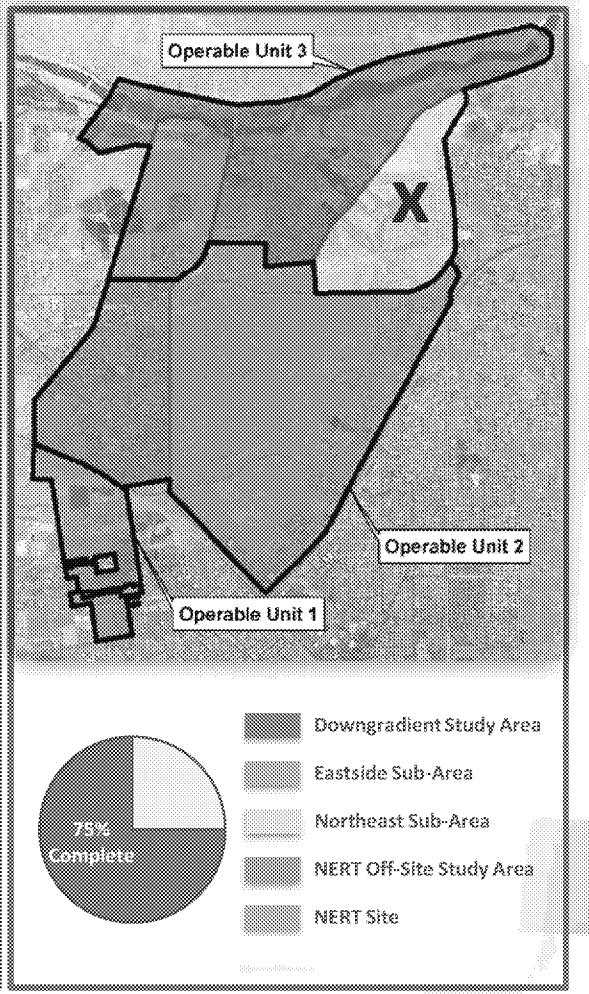
REMEDIAL PROGRAM UPDATES

OU-3: PHASE 3 RI

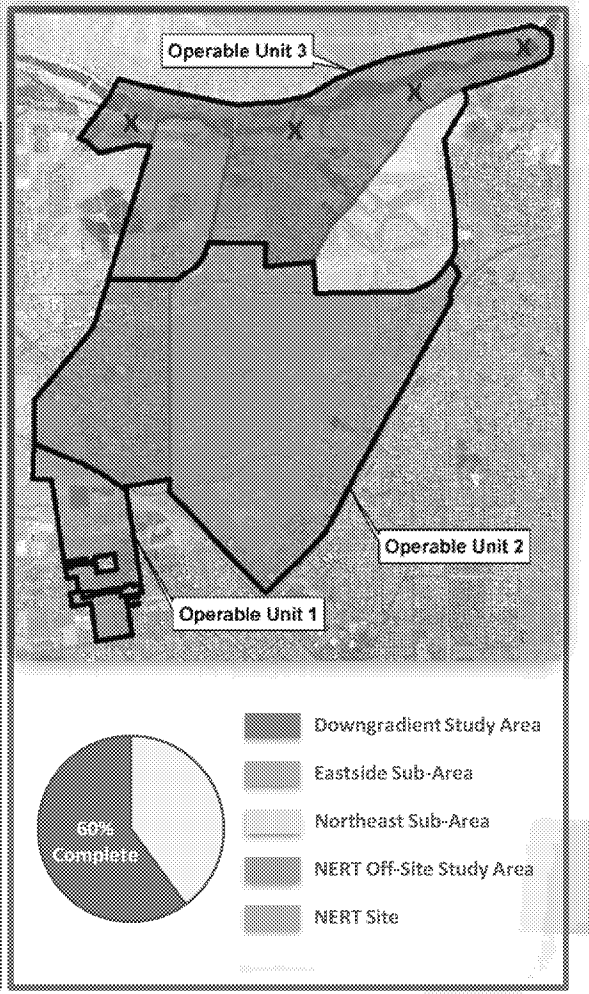
- Drilling and Soil Sampling Completed To Date:
  - 11 monitoring wells
  - 7 transect borings
  - 105 soil samples and 66 physical test samples
- Well Development, Sampling, and Hydraulic Testing Completed To Date:
  - 11 new monitoring wells developed / sampled
  - 30 existing wells sampled
  - 11 wells slug tested
- Final round of groundwater sampling in November 2018
- Well sampling and hydraulic testing largely complete



REMEDIAL PROGRAM UPDATES

OU-3: DOWNGRADIENT INVESTIGATION

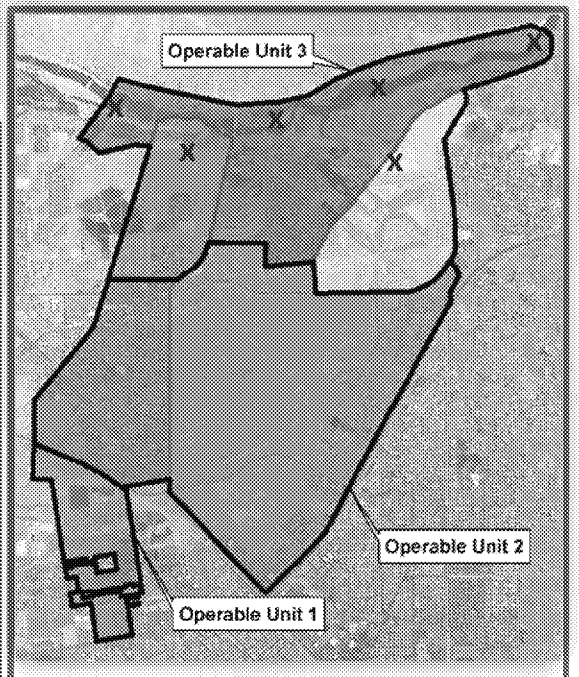
- Thermal Infrared Investigation and Distributed Temperature Survey completed
- Surface Water Sampling completed
- Phase 1 Groundwater Investigation completed
- Phase 1 Groundwater Tech Memo under preparation
- Surface Water Investigation Tech Memo under preparation
- Phase 2 Groundwater Investigation anticipated to begin 1Q 2019

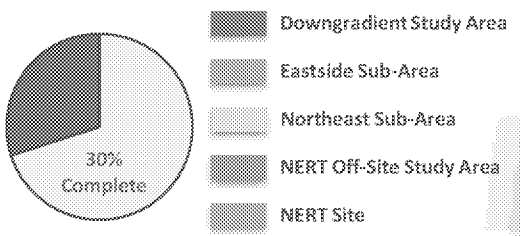


REMEDIAL PROGRAM UPDATES

OU-3: PHASE 2 RI MODIFICATIONS

- Modifications # 3, 10, & 14 : Surface water sampling program ongoing
- Forthcoming Modifications
  - Groundwater well installation in paleochannel just north of Tuscany Village community
  - Additional deep soil borings planned within NERT Off-site RI Study Area to complement Downgradient Investigation





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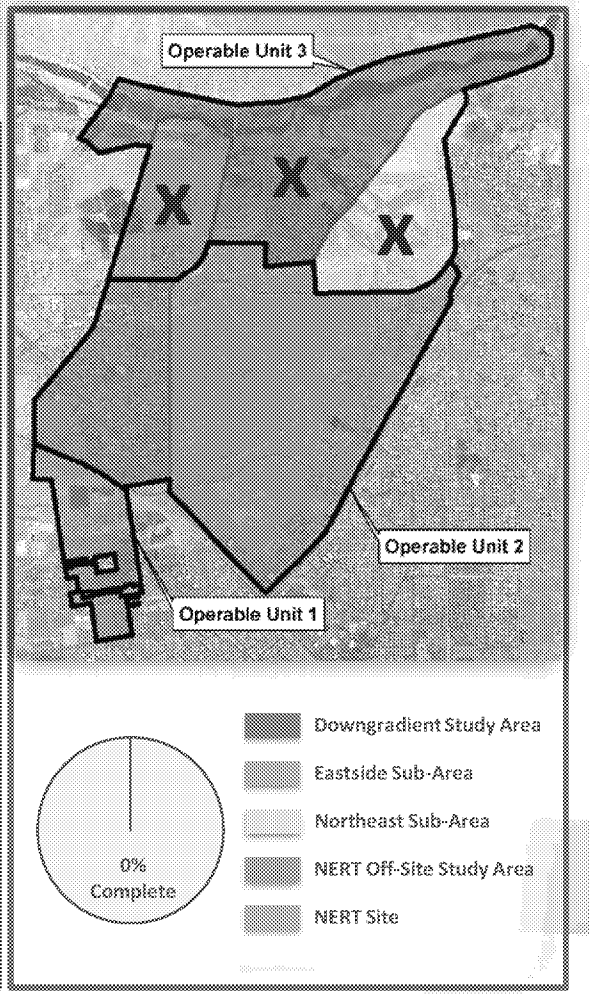
REMEDIAL PROGRAM UPDATES

OU-3: RI REPORT

- Report preparation activities expected to begin in 2019
- Stakeholder Roundtable to be scheduled in 1Q 2020
- OU-3 RI Report to be submitted in 2Q 2020



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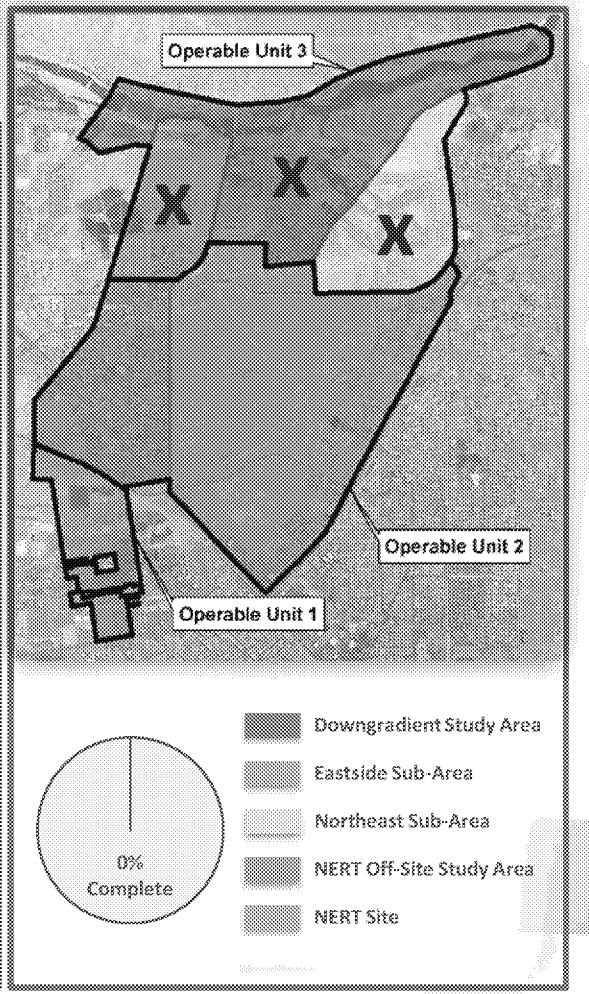
REMEDIAL PROGRAM UPDATES

OU-3: RISK ASSESSMENTS

- OU-3 Baseline Ecological Risk Assessment Work Plan submitted in October 2018
- OU-3 Baseline Health Risk Assessment Work Plan to be submitted in 2Q 2019
- OU-3 Baseline Ecological and Health Risk Assessment reports to be submitted in 4Q 2020



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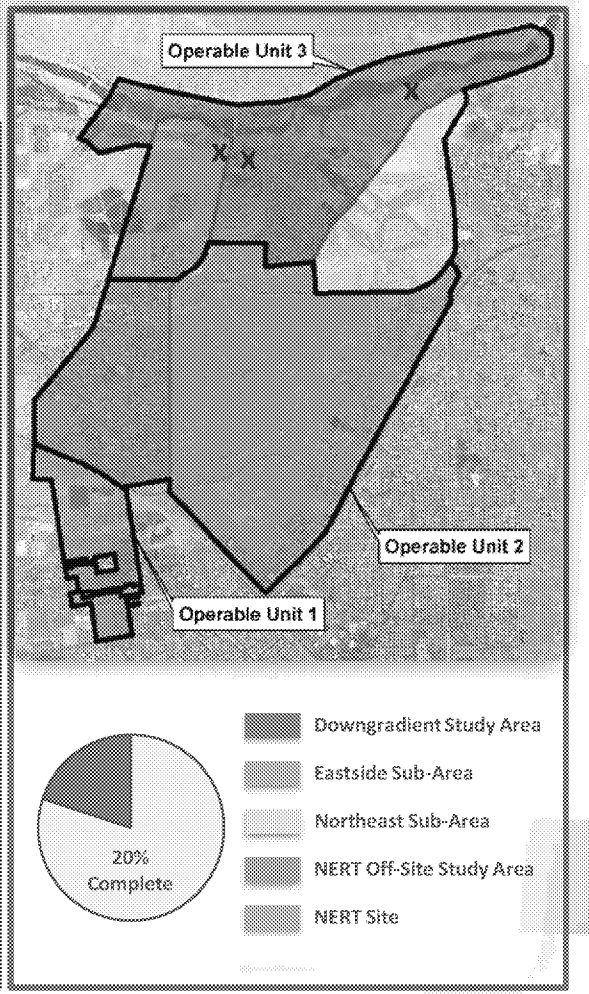
REMEDIAL PROGRAM UPDATES

OU-3: FEASIBILITY STUDY

- Seep Area Bioremediation Treatability Study
  - Third injection completed, monitoring underway
  - Report to be submitted in 1Q 2019
- Las Vegas Wash Pilot Study
  - Transect 1A field activities complete (COH property)
  - Transect 1B activities ongoing (CC property)
  - Stakeholder Roundtable to be scheduled 1Q 2019
  - Work Plan Addendum (incl. third-party cost review) to be submitted in 1Q 2019
  - Report to be submitted in 2Q 2021
- Feasibility Study to be submitted in 4Q 2021



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OTHER PROJECTS

4Q 2018 STAKEHOLDER CONFERENCE CALL

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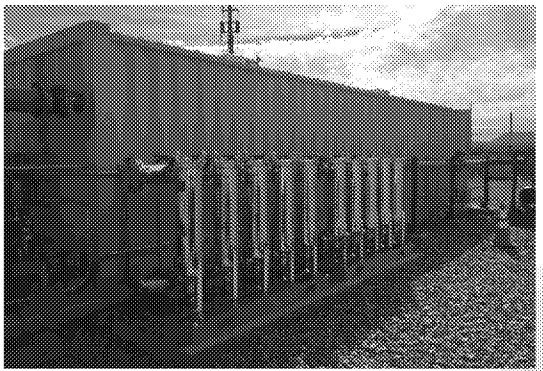
OTHER PROJECTS

GWETS

GWETS COMPONENT	STATUS	COMMENTS
Extraction Wells	Condition Normal	Average total extraction rate at ~1,270 gpm
Lift Stations / Pipelines	Condition Normal	Increased pigging implemented; coagulant change underway
GW-11 : Volume	35MG ~19 days available	Desired available volume > 17 days; Long-term plan to decommission
Chromium Treatment Plant	Condition Normal	Accepting ~70 gpm from IWF and AP Area Extraction Wells
Biological Treatment Plant	Condition Normal	Processing AP-5 material at ~7 gpm
Ion Exchange Treatment Plant	Condition Normal	Accepting ~180 gpm of 740 gpm generated from SWF



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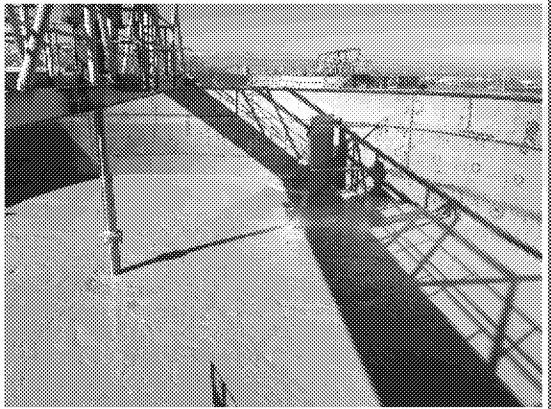
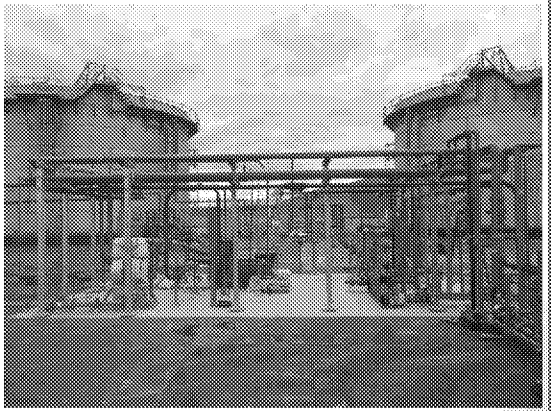
OTHER PROJECTS

AP-5

- ~1,720,500 gallons of AP wash water has been decanted and ~2,444,000 gallons have been treated by the FBRs
- Approximately 537,000 lbs of perchlorate destroyed
- In-pond solids removal activities completed July 19, 2018; Approximately 3.5M gallons of slurry transferred (containing ~ 1.4M lbs of perchlorate)
- Liner system (primary liner, secondary liner, filter fabric, drainage material, and leak detection pipe) and berm have all been removed
- Pond area has been graded in accordance with NDEP-approved closure plan
- Administrative closure in progress





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OTHER PROJECTS

AP-5

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OTHER PROJECTS

AP-5

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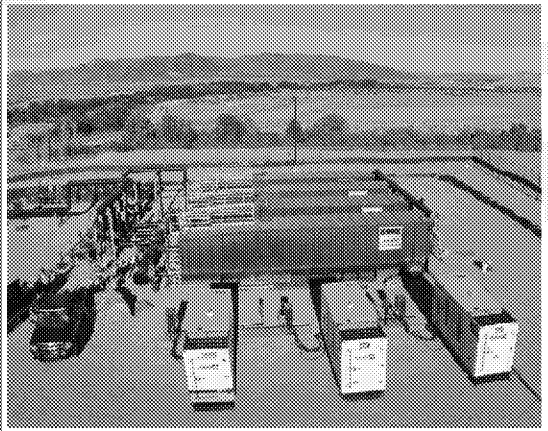
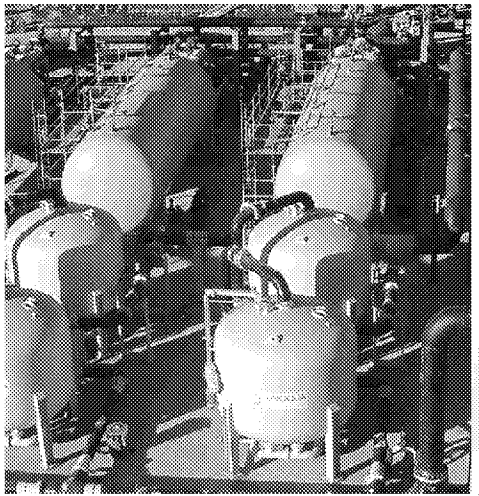
OTHER PROJECTS

SNWA WEIR DEWATERING TREATMENT

- Historic Lateral Weir
  - Dewatering was terminated by SNWA on June 4, 2018
- Sunrise Mountain Weir
  - Dewatering was terminated by SNWA on August 14, 2018
- 6,010 lbs of perchlorate removed from the environment





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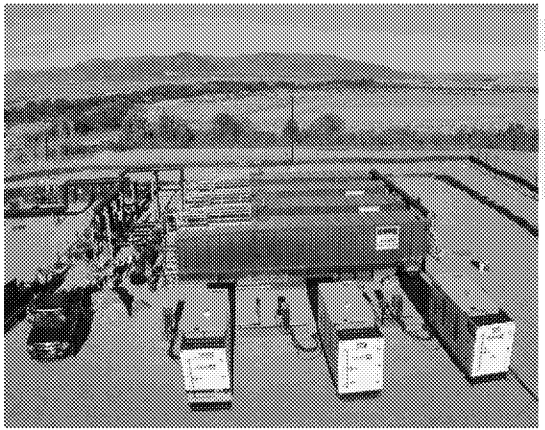
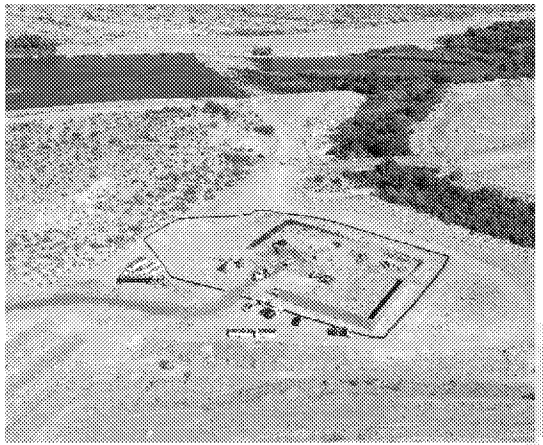
OTHER PROJECTS

SNWA WEIR DEWATERING TREATMENT

- Demolition
  - Logistical Solutions implementing HLPS demolition
    - All tanks demobilized
    - All above ground structures and conveyance pipelines removed
    - Relocated all equipment intended for reuse to NERT Site
    - Relocated aggregate within secondary containment for reuse at NERT Site
  - Schmueser and Ingram to be awarded SMPS and CWTP demolition





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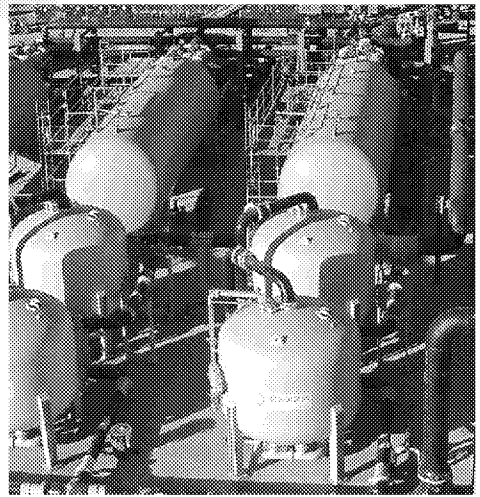
OTHER PROJECTS

SNWA WEIR DEWATERING TREATMENT

- Disposition
  - NERT to retain
    - 3 Composite Samplers
    - 10 Flow / Level Transmitters
    - 15 Valves
    - 10 Pumps
    - Site Lighting
    - Lab Equipment
  - Rental equipment return to supplier
    - Generators / Storage Tanks



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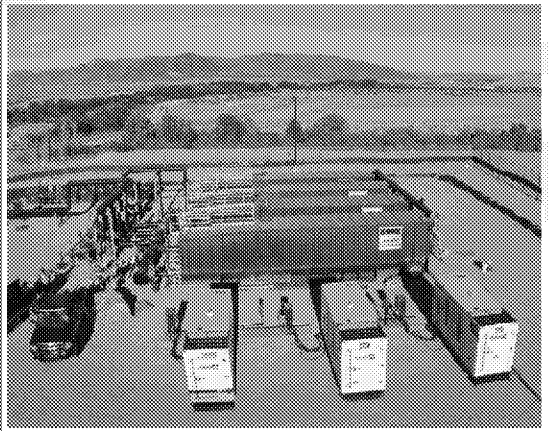
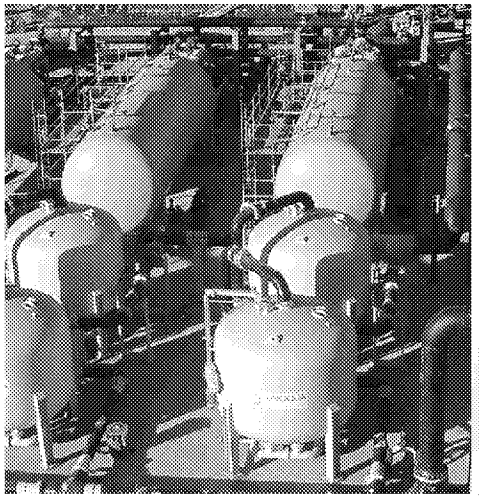
OTHER PROJECTS

SNWA WEIR DEWATERING TREATMENT

- Disposition (continue)
  - Non-Retained Elements of HLPS and Pipeline
    - Recycled or Disposed
- Restoration
  - Bureau of Reclamation approved Restoration Work Plan on October 5, 2018
  - Major components
    - Removal of all components (above and underground)
    - Grading
    - Revegetation





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UPCOMING DELIVERABLES AND TECHNICAL ROUNDTABLES

4Q 2018 STAKEHOLDER CONFERENCE CALL

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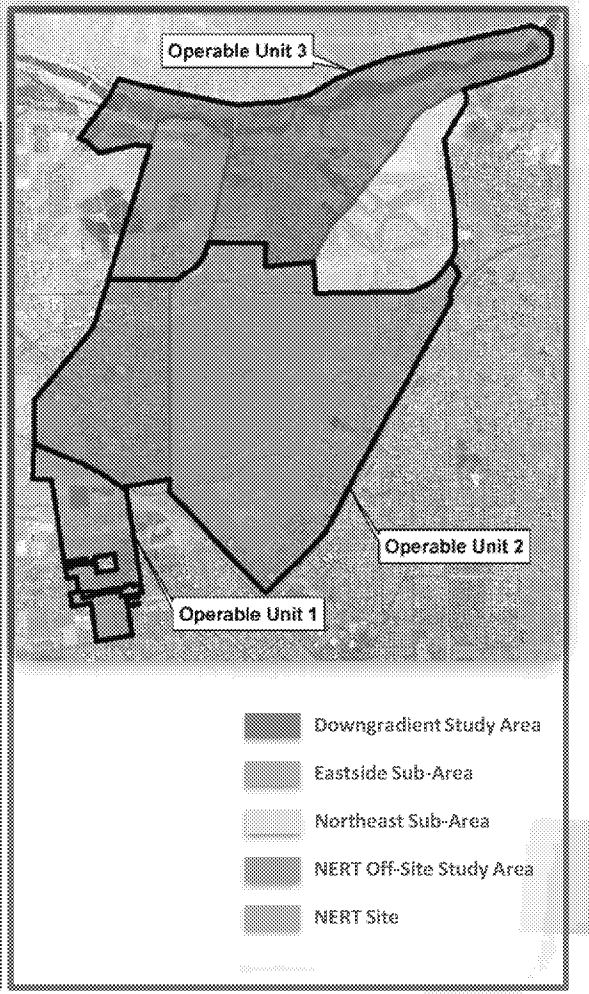
DELIVERABLES AND TECHNICAL ROUNDTABLES

UPCOMING 4Q 2018 DELIVERABLES

- Annual Remedial Performance Report (November 2018)
- Hydrogen-Based Gas Permeable Membrane Technology Pilot Study Work Plan (December 2018)
- Revised AP Area Down and Up Flushing Treatability Study Results Report (December 2018)



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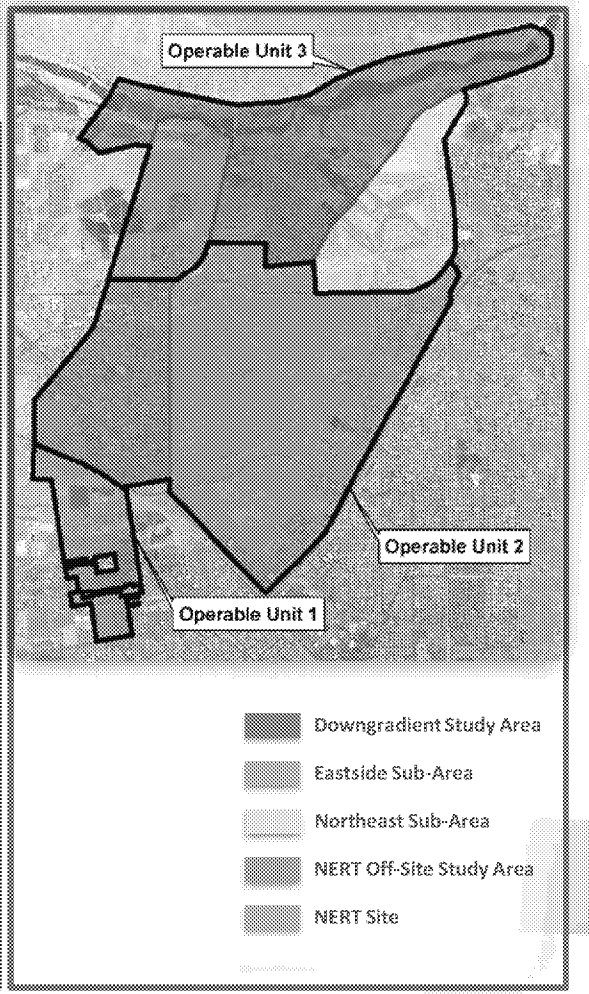
DELIVERABLES AND TECHNICAL ROUNDTABLES

TECHNICAL ROUNDTABLES

- 4Q 2018
  - OU-1 / OU-2 RI Findings and Remedial Strategy
- 1Q 2019
  - Las Vegas Wash Pilot Study Work Plan Addendum
  - Unit 4 Source Area In-Situ Bioremediation Treatability Study Work Plan Addendum
  - Galleria Road Bioremediation Treatability Study Work Plan Addendum
  - Galleria Road ZVI Treatability Study Work Plan Addendum



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NEVADA ENVIRONMENTAL RESPONSE TRUST

LE PETOMANE XXVII, INC., NOT INDIVIDUALLY BUT SOLELY AS ENVIRONMENTAL RESPONSE TRUST TRUSTEE

STAKEHOLDER Q&A

4Q 2018 STAKEHOLDER CONFERENCE CALL

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FINANCIAL UPDATES

4Q 2018 STAKEHOLDER CONFERENCE CALL

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KEY FINANCIAL PERFORMANCE DATA

Total Equity Holdings* : $328,284,223

Realized Gains/(Losses)

2018	$ 5,117,179
*Since Inception**	$ 4,174,921

Unrealized Gains/(Losses)

As of 9/30/18	$ 90,246,848

Dividend Income

2018	$ 5,664,793
*Since Inception**	$ 15,824,075

Total Fixed Income Holdings* : $ 782,433,000

Interest Income

2018	$ 11,379,473
*Since Inception**	$ 34,163,540

Investment Fees (2018) :

U.S. Bank Custodial	$ 71,276
U.S. Bank Investment	$ 460,115
ACG	$ 120,000
	$ 651,391

NET INVESTMENT INCOME :
(excl. unrealized gains)

2018	$ 21,510,054
2017	$ 19,010,659
*Since Inception**	$ 52,113,507

** As of 9/30/18*

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ENVIRONMENTAL BUDGET TRACKING

Task Grouping	Budget	Spend*	%
F : GENERAL SITE OPERATIONS	1,589,615	473,400	29.8%
G : LEASEHOLD / OFF-SITE OPERATIONS	335,000	135,400	40.4%
H : GROUNDWATER MONITORING PROGRAM	2,426,942	1,448,600	59.7%
I : GWETS OPERATIONS & MAINTENANCE (ENVIROGEN)	11,647,300	3,571,100	30.7%
J : GWETS COMPLIANCE AND REPORTING	1,255,500	419,300	33.4%
K : GWETS PROJECTS AND TRUST SUPPORT	15,215,950	7,741,800	50.9%
L : REMEDIAL INVESTIGATION PLANNING / STRATEGY	23,419,270	10,162,800	43.4%
M : REMEDIAL INVESTIGATION / FEASIBILITY STUDY	54,307,850	13,636,600	25.1%
N : DOWNGRADIENT STUDY AREA IMPLEMENTATION	1,280,800	1,122,100	87.6%
O : TRUST ENVIRONMENTAL SERVICES	1,512,600	1,126,600	74.5%
P : LEGAL ENVIRONMENTAL SERVICES	410,000	183,400	44.7%
Q : AGENCY OVERSIGHT	770,000	410,000	53.2%
S : FINANCIAL INSTITUTION FEES (ENVIRONMENTAL FUNDS)	739,500	502,800	68.0%
Total Estimated Q1-Q3 Environmental Spend	**114,910,327**	**40,933,900**	**35.6%**

** As of 9/30/18*

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CLOSING REMARKS

4Q 2018 STAKEHOLDER CONFERENCE CALL

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NEVADA ENVIRONMENTAL RESPONSE TRUST

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HYDROGEN PERMEABLE MEMBRANE PILOT STUDY

4Q 2018 STAKEHOLDER CONFERENCE CALL

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HYDROGEN PERMEABLE MEMBRANE PILOT

Project History

- Hydrogen Gas Permeable Membrane technology (APT Water) was initially evaluated in 2016 but not pursued because prior demonstration projects focused on lower flow rates and lower perchlorate concentrations.
- APT presented additional data and NERT conducted further evaluations and concluded that APT's technology could be a cost-effective alternative to FBR technology or a remedial co-technology as part of NERTs final remedy.
- APT will provide engineering, start-up, operational, and data management support during the pilot program at no cost, a savings to the Trust of approximately $150,000.
  - The Trust will provide funding for APT equipment upgrades to the Pilot Test Unit.

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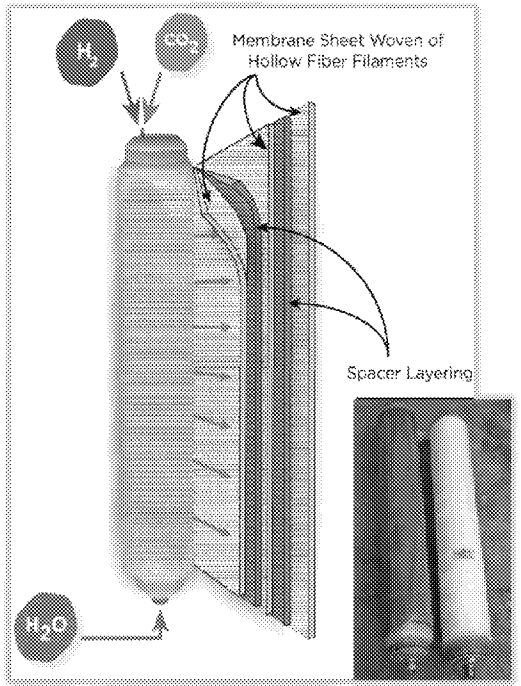
HYDROGEN PERMEABLE MEMBRANE PILOT

Technology Overview

- The Hydrogen-based Gas Permeable Membrane technology is a biological treatment system developed by APT Water.
- In the APT system, bacteria grows on sheets of woven hollow fibers.
- Several membrane sheets of hollow fibers are spiral wound around a water feed tube with a water channel spacer between the sheets.
- Pressurized H_2 (the electron donor) is fed through the hollow fibers and diffuses through the membrane.
- Water passes through the sheets, contacts biofilm, and biodegradation occurs.



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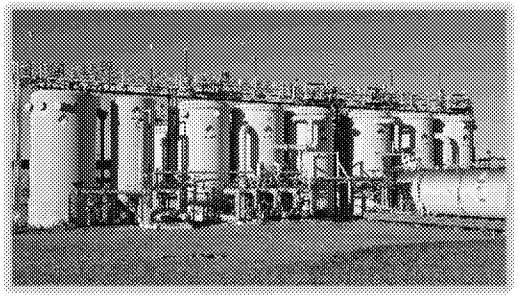
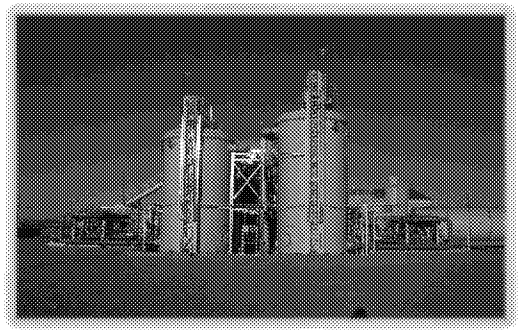
HYDROGEN PERMEABLE MEMBRANE PILOT

Advantages Over Fluidized Bed Reactor Technology

- Lower electron donor cost for direct hydrogen addition
  - In the FBRs, ethanol is converted to hydrogen - hydrogen is the actual electron donor.
  - In the APT system, hydrogen is used in lieu of ethanol.
- Reduced waste
  - APT operational data has demonstrated less biological solids are generated compared to FBRs.
- Control Stability
  - No carbon donor to add or residual carbon donor to remove.
  - Hydrogen supply automated to respond immediately to biomass demand.





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HYDROGEN PERMEABLE MEMBRANE PILOT

Potential Advantages to NERT

- The prime objective of the study is to develop preliminary cost data to compare APT and FBR technologies.
- APT operational data appear to indicate that APT System operating cost could be much lower than the FBR operating cost.
- Lower donor cost for direct hydrogen addition.
  - Hydrogen generated by electrolysis is cheaper than the cost of a carbon (ethanol) donor on an equivalent demand basis.
- Greener technology
  - Reduced excess biological solids results in reduced waste handling, transportation and disposal costs.
  - Reduced chemical usage and transportation (i.e. no ethanol shipments).

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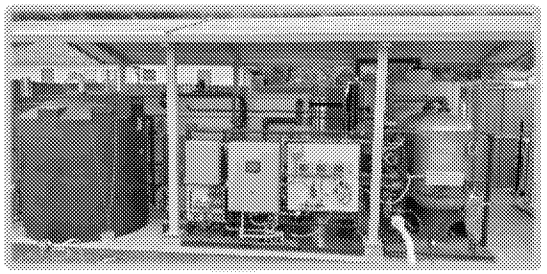
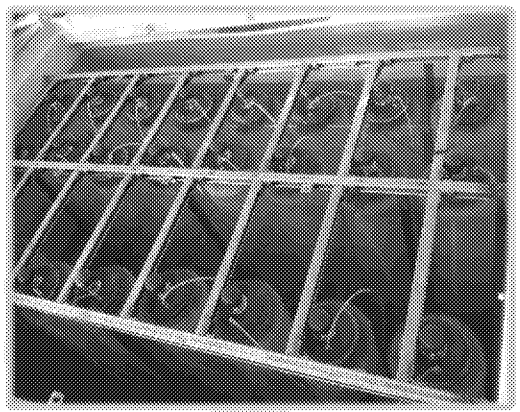
HYDROGEN PERMEABLE MEMBRANE PILOT

Existing APT Facilities

- Certified for Drinking Water in California
  - 130 gpm commercial unit in Rialto, CA for nitrate treatment; operating more than 1 year.
  - 150 gpm commercial unit began operation in 3Q 2018 in La Crescenta, CA for nitrate treatment.
- 11 Pilot Plant projects:
  - 3 gpm water containing 14 ppm perchlorate reduced to less than 4 ppb.
  - 14 gpm water contaminated with nitrate and perchlorate; perchlorate was reduced to less than 10 ppb.





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HYDROGEN PERMEABLE MEMBRANE PILOT

Pilot Study Objectives

- Demonstrate the ability of the technology to treat various influent concentrations of perchlorate to less than 18 ppb, the current GWETS perchlorate discharge limit.
- Demonstrate that hexavalent chromium can be effectively reduced to trivalent chromium, and subsequently removed from the water.
- Demonstrate stable and automated treatment system operation and performance.
- Determine and demonstrate the scalability of the system.
- Demonstrate onsite H_2 generation is cost-effective.
- Develop site-specific operating cost estimates to compare to FBR technology.
- If successful, develop key design and operating information for sizing and developing full-scale treatment system for use in alternative evaluation in the FS.

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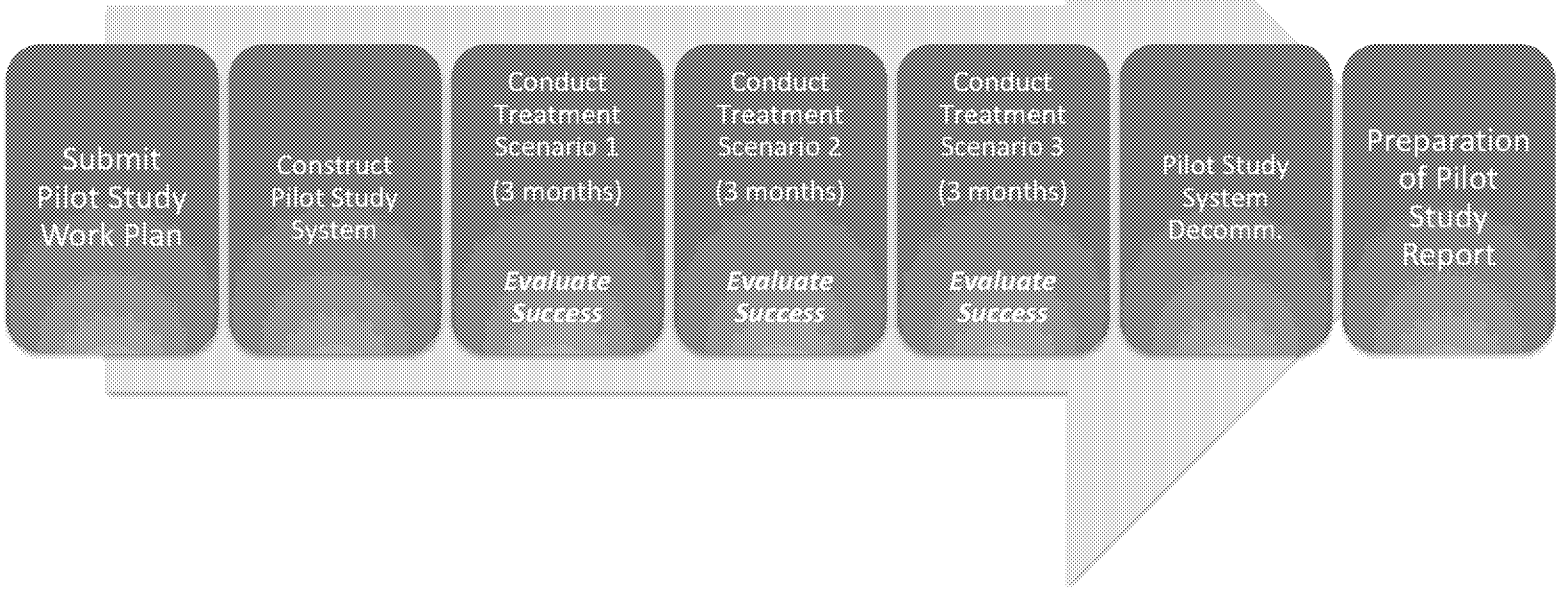
HYDROGEN PERMEABLE MEMBRANE PILOT

Pilot Study Strategy



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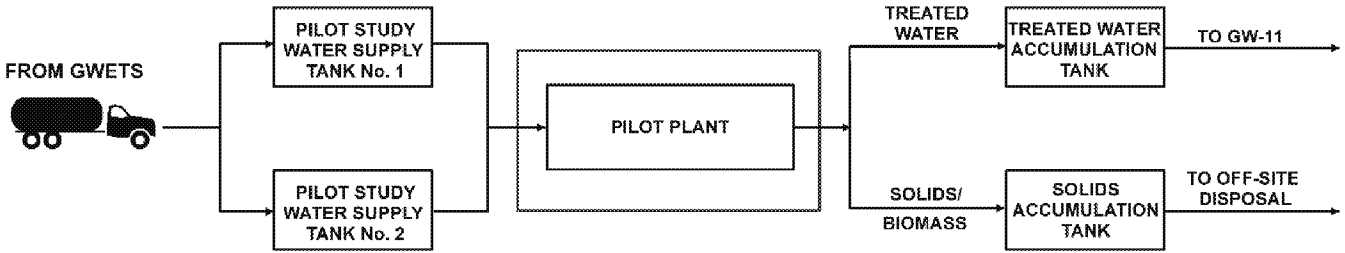
HYDROGEN PERMEABLE MEMBRANE PILOT

Treatment System Conceptual Design



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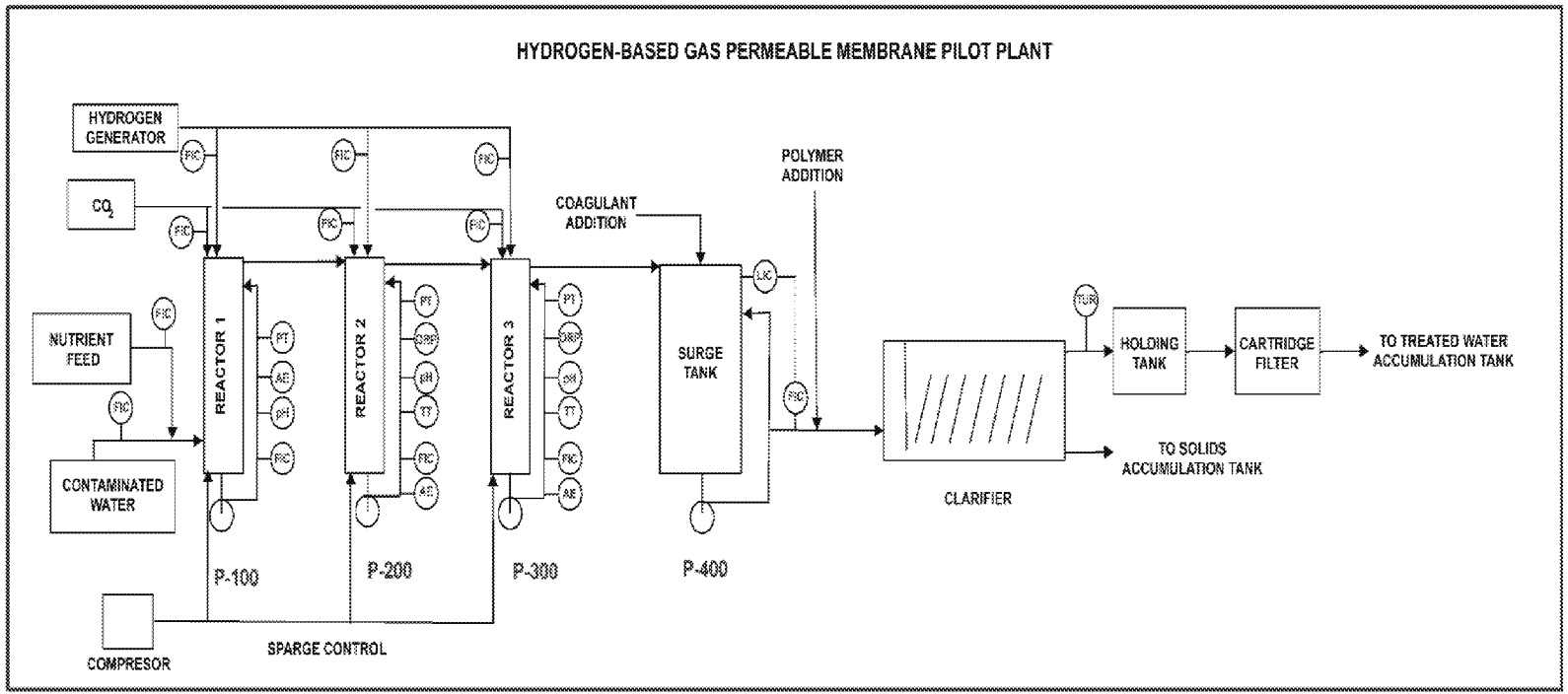
HYDROGEN PERMEABLE MEMBRANE PILOT

Treatment System Conceptual Design



HYDROGEN PERMEABLE MEMBRANE PILOT

Pilot Study Scenarios

To obtain data representative to all contemplated influent sources the following scenarios were developed:

- No. 1 – Existing FBR groundwater influent
  - Water fed to FBRs from SWF, AWF, and IWF
  - Obtain test water from EQ Tanks
- No. 2 – Blend of AWF and IWF water after chromium removal
  - Obtain AWF water from Lift Station 3 sump
  - Obtain IWF water from GWTP effluent pump
- No. 3 – Scenario #2 without chromium removal
  - Obtain IWF water from feed water storage tank at GWTP – prior to chromium treatment

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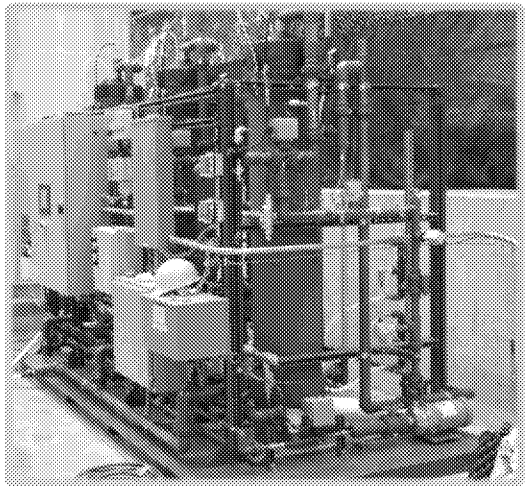
HYDROGEN PERMEABLE MEMBRANE PILOT

Treatment System Details

- An existing APT pilot unit will be modified for use in the pilot test.
- Existing unit consists primarily of three reactor modules containing the hollow-fiber membranes and associated pumps and controls.
- Modifications will include:
  - A small hydrogen generator.
  - A chemical feed system and clarifier to separate excess biological solids from treated water.
  - A filtration system for residual solids removal.
  - An air supply system for sparging.
  - Sample ports at various locations.



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HYDROGEN PERMEABLE MEMBRANE PILOT

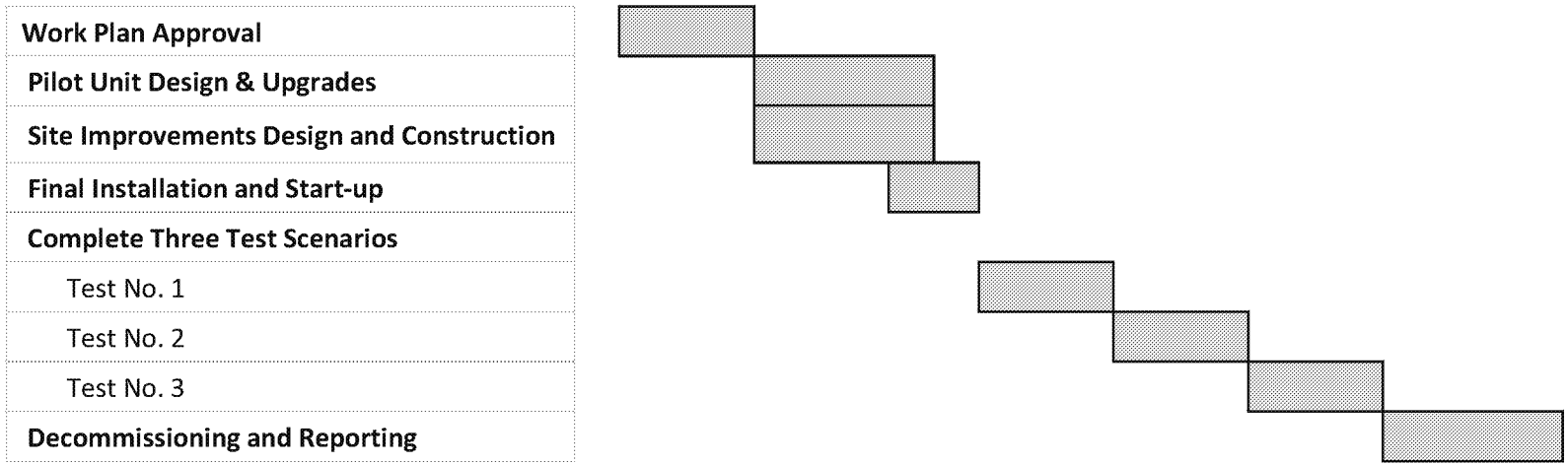
Cost Considerations

Hydrogen-based Gas Permeable Membrane Pilot Study	
Scope Item	*Conceptual Cost*
Work Plan	$60,000
Design - Pilot Unit Upgrades and Site Improvements	$225,000
Implement - Pilot Unit Upgrades and Site Improvements	$640,000
Final Installation and Start-up	$50,000
Operations - Three Test Scenarios ($225,000 each)	$675,000
Decommissioning	$100,000
Reporting	$150,000
TOTAL	$1.9M

HYDROGEN PERMEABLE MEMBRANE PILOT

Pilot Study Schedule

	Q4 2018			Q1 2019			Q2 2019			Q3 2019			Q4 2019			Q1 2020			Q2 2020			Q3 2020		
Hydrogen-based Gas Permeable Membrane Pilot Study	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**



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