"Federal Funding Opportunities for Early-Stage Water Companies: NIH"

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Please follow link to topics of interest:

National Institute of Environemental Health Sciences Website

Current SBIR/STTR Grantees

NIEHS Superfund Research Program Mission

Apply Fundamental Knowledge

NIH Research Mission

…to Understand Health Outcomes

oxicology, epidemiology, genetics, -omics…

NIEHS Research Mission

…related to environmental exposures

SRP Funded in 1986 under Superfund Amendments Reauthorization Act (SARA)

…including health, risk assessment, remediation and detection

SRP Research Mission

…with relevance to Superfund (EPA and ATSDR)

NIEHS SRP Hazardous Substances Detection and Remediation SBIR/STTR Grant Program
(R41, R42, R43, R44)

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

SBIR/STTR Topic Development

- Internal input:
  - Program mandates
  - Mission and priorities of the Institute
- External input:
  - EPA colleagues
    - Office of Superfund Remediation and Technology Innovation (OSRTI)
    - Office of Research and Development (ORD) Regional Superfund Technology Liaisons
- NIH is not a customer
  - Topics are fairly general…
  - Applicants must seek out best opportunities under our mission areas, find best market opportunities.

- SRP 2010 Strategic Plan: http://www.niehs.nih.gov/research/supported/assets/docs/r_s/srp_about_2010_plan.pdf

Superfund and Technology Liaisons

National Institute of Environmental Health Sciences
Superfund Research Program

NIEHS SRP SBIR/STTR Purpose
To foster commercialization of novel strategies to detect and remediate hazardous substances at contaminated sites.

Topics of Interest:

Topics to be updated mid-May, 2015

- Media: soil, surface water, groundwater, subsurface, sediments, drinking water, well water, etc.
- Real-time, rapid detection technologies. Nanotechnology-based sensors and probes, biosensors, self-contained miniaturized toxicity-screening kits and miniaturized analytical probes and data analysis tools
- Non-targeted or multi-analyte field sampling tools or kits; assays or devices to determine the extent to which a contaminant is bioavailable
- Products that allow for rapid sample clean-up/preparation for analysis of environmental samples
- Devices to detect and measure vapor intrusion or to detect non-aqueous phase liquids (NAPLs) and dense non-aqueous phase liquids (DNAPLs) in the subsurface; devices to detect contaminants in geological subsurface

Updated examples provided on SRP Webpage in May 2015:

SRP WEB Page

National Institute of Environmental Health Sciences
Superfund Research Program

NIEHS SBIR/STTR Topics
Complete List – NIEHS SBIR/STTR Topics

Topics of Interest (continued):

- Novel technologies for *in situ* remediation of contaminated sediments, soils, and groundwater.
- Cost-effective devices to detect or remediate chemical mixtures in environmental media.
- Computational, geographical information system-based, or modeling products for predicting fate and transport of contaminants, rates of remediation, or for identifying contamination sources.
- Nano-enabled structures, electrochemical methods, photocatalytic processes, thermal treatments, or filtration-based methods of remediation.
- Bioremediation and phytoremediation technologies
- High throughput assays or toxicity screening products for use in ecological risk assessments.

Updated examples provided on SRP Webpage in May 2015: SRP Webpage

NIH National Institute of Environmental Health Sciences
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Superfund Relevance

- Clearly state connection to Superfund
  - Readily adaptable for Superfund site monitoring or mitigation
  - Hazardous Substances: Priority List of contaminants found on Superfund Sites: Hazardous Substances Priority List Link
  - Value added over current Superfund Site Remedies: see Superfund Remedy Report: Superfund Site Remedy Report Link
- Consistent with EPA/ATSDR Policies and Priorities:
  - High Priority issues: High Priority Issues at Contaminate Site Clean Up Information
  - Green & sustainable – improve energy efficiency and reduce waste generation.

Outside Scope NIEHS SBIR/STTR:

- ✗ Pathogens in the environment
- ✗ Agricultural pollutants (N, P, etc).
- ✗ Petroleum (or hydrofracturing) remediation or detection technologies (per SARA, this is not a "hazardous substance")

Superfund Site Work is not a requirement

National Institute of Environmental Health Sciences
Superfund Research Program

Application Due Dates:
- **Jan 5, 2016**
- **Apr 5, 2016**
- **Sep 5, 2016**

NIH Solicitations

- Health and Human Services (HHS "Omnibus" Program Announcements): used by **National Institutes of Health (NIH)**, Centers for Disease Control and Prevention (CDC), Food and Drug Administration (FDA).
  - SBIR Omnibus - SBIR Omnibus Link
  - STTR Omnibus - STTR Omnibus Link
  - Occasionally Other Requests for Application are released = Topic-specific.
- Full list of topics for all Institutes is provided in Program Announcement**
- Required Registrations (takes 6-8 weeks)
  - DUNS Number (Company)
  - System for Award Management (SAM)
  - Grants.gov (Company)
  - eRA Commons (Company and all PD/PIs)
  - SBA Company Registry at SBIR.gov

****Other NIEHS SBIR/STTR Topics:**
- Exposure assessment tools
- Bio-monitoring technologies
- Toxicity screening
- Educational materials for Environmental Health
- Advanced Training Tech for Emergency Responders

electronic Researh Administration (eRA) Link

NIEHS Total SBIR/STTR budget
SBIR ~12.5M STTR ~2.0M

NIEHS SRP Budget & Awards

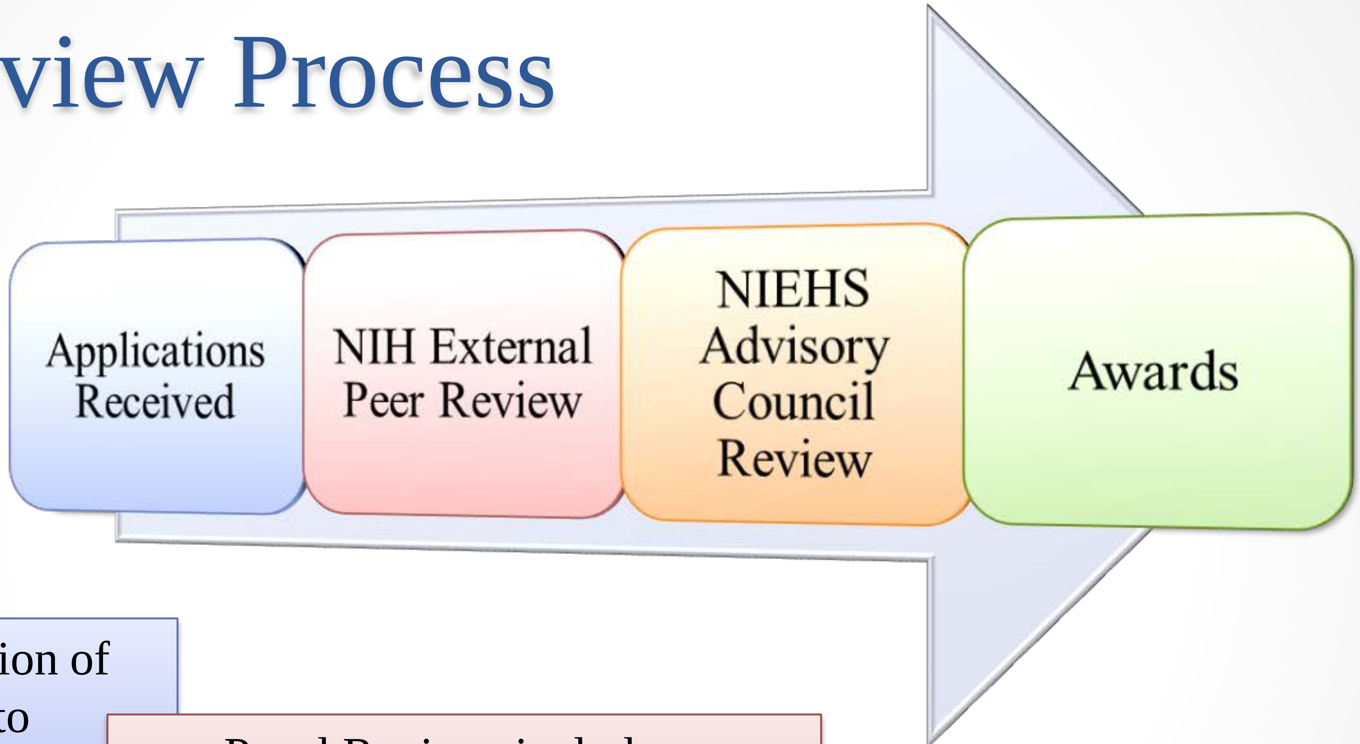
- Award Budget ~ $1.8M (SRP SBIR/STTR)
- Awards **grants**
  - Phase I**:** Feasibility Study
    - $150,000 direct costs
    - 6 months (SBIR), 1 year (STTR)
  - Phase II**:** Full Research/R&D
    - $1M direct costs
    - 2 years
  - Fast Track – Phase I and Phase II application combined
    - Time and award amounts are same as Ph I and Ph II, but consecutive
  - Phase IIB: NIEHS SRP does not participate
  - Phase III: Not funded through NIH SBIR/STTR

SBIR Technical Assistance Programs

- **BIO Innovation Zone**
  - NIH and NSF area at BIO with individual kiosks for each SBC
  - 4 ES Phase II grantees were selected and accepted
- **CAP**
  - Commercialization Assistance Program with 3 tracks
  - 2 ES Phase II grantees active in the Commercialization Training Track
- **Niche Assessment**
  - Commercialization and market data from a third party vendor
  - 12 ES Phase I grantees (136 total slots)
- **I-Corps**
  - For Phase I grantees, designed to aide development of a robust business and customer model
  - Pioneered at NSF; piloted by NCI, NHLBI, NINDS, NCATS
  - Now recruiting more institutes – NIEHS may participate

NIH National Institute of Environmental Health Sciences
Superfund Research Program

NIH Review Process



Determination of Relevance to Program Announcement

Panel Review: includes
ion, remediation, biomedical
es, biomedical
engineering applications.

NAEH Council Review: Conference of Peer Review

om
time of submission

National Institute of
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External Peer Review – Scoring

Scored Criteria:

- **Significance**
  (Real Problem/
  Commercial Potential)
- **Investigators**
  (PI and team)
- **Innovation**
  (New or Improved?)
- **Approach**
  (Research Design, Feasible)
- **Environment**
  (Facilities/Resources)

Also see "Additional Criteria" – i.e. plan for Biohazards (chemical safety)

Impact	Score	Descriptor	Strengths/Weaknesses
High Impact	1	Exceptional	
	2	Outstanding	
	3	Excellent	
Moderate Impact	4	Very Good	
	5	Good	
	6	Satisfactory	
Low Impact	7	Fair	
	8	Marginal	
	9	Poor	

- Initial Scoring 1-9, Final Score 10-90
- Scores typically released within 3-4 days of review. Summary Statement posted within 2-3 weeks of review.

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External Peer Review – Points to Know

Study Sections

- 3 reviewers per application
- Wide scope expertise - majority are not environmental technologists

Expectations

- Preliminary data
- Fundamental science, novelty, innovation
- Convince reviewers the market exists (hint of commercialization capability, even for Phase I)

Review Study Section: http://public.csr.nih.gov/StudySections/IntegratedReviewGroups/IMSTIRG/IMST12-13/Pages/default.aspx

National Institute of
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Superfund Research Program

NIH Application to Award Timeline

Submission Dates* Phase I & Phase II	National Technical Merit Review	Advisory Council/ Board Review	Estimated Award Date
September 5	October/November	January/February	March
January 5	February/March	May/June	July
April 5	June/July	August	September or December

TOP 10 Keys to Success

1. Contact the Program Official before applying
2. Begin the registration process 6 -8 weeks in advance
3. Submit your application 3-5 days before the due date
4. Read the solicitation/funding announcement carefully
5. Need an effective team (technical and business expertise)
6. Demonstrate real market interest and need for proposed innovation
7. Anticipate questions and doubts about the proposal
8. If resubmitting, address all previous review comments
9. Use the cover letter to direct your application to the correct review group
10. Remember NIEHS SRP is an “investor” not a “customer”

Work We Fund

- Drinking Water Treatment
- Drinking Water Monitoring
- Wastewater Treatment
- Wastewater Monitoring
- Water Remediation
- Water Quality Monitoring
- Oceans and Human Health
- Sediment Remediation and Detection Technologies

Water Monitoring (Top 3)
- Arsenic
- PAHs
- Mercury

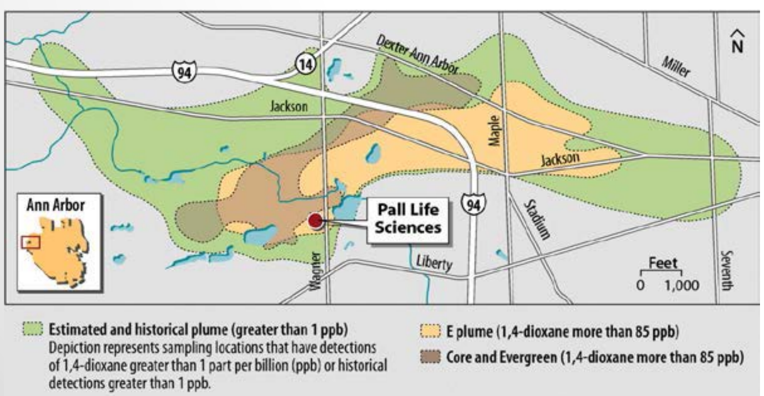
Water Remediation (Top 5)
- TCE
- Arsenic
- Mercury
- PAHs
- PCBs

Includes Current SBIR/STTR Grantees and Non:
[SBIR/STTR Grantees Link]

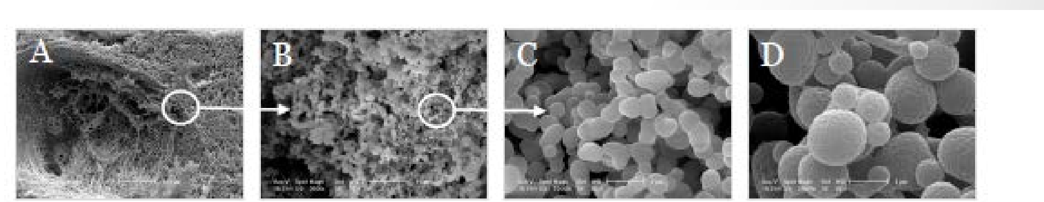
Bioremediation of 1,4-dioxane

Microvi Biotechnologies, Joseph Salanitro, Fatemah Shirazi (R43/R44 ES022123)

- Remediation of **1,4-dioxane** from water resources via a biological treatment pathway
- Engineered bioreactor called the MB-DX bioreactor; High density of Rhodococcus sp. N21 fully integrated within the bioreactor material matrix
- Results to-date: degradation of 1,4-dioxane to very low levels; TCE has no detrimental effect on performance



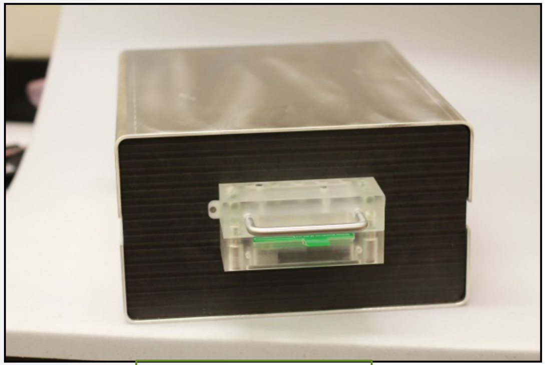
Map of the PLS Site and dioxane plume – proposed test location.



Scanning Electron Micrographs shows cross section of one biocomposite matrix (A), microbial integration throughout the pores and cavities of the material (B), and a high cell density contained within the matrices (B-D)

Detection Technologies to Improve Remediation of Perchlorate in Food and Water Supplies

Advanced Microlabs, Philippe Dekleva (R44ES017200)



The Chip

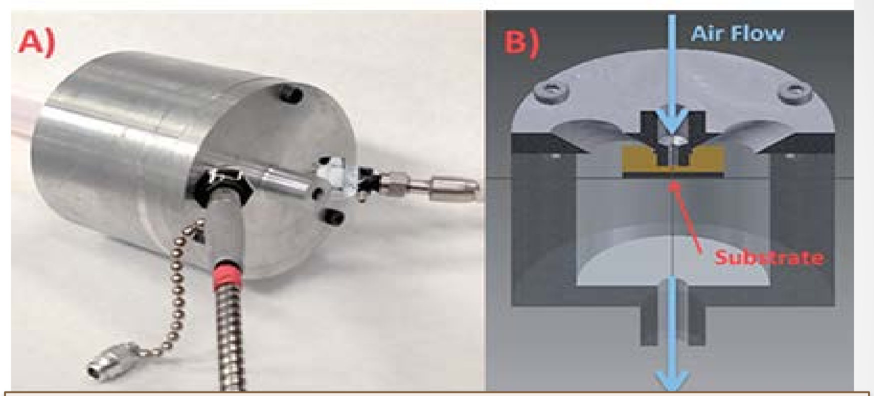
Main Box – Benchtop Instrument

- New prototype instrument for measuring online perchlorate analysis in the field, allowing ion-exchange resin bed reactors to operate more cost effectively and with greater public safety
- It can also measure heavy metals via Anodic Stripping Voltammetry (ASV)
- Developed for the Army. Main box is 11.5" wide x 7" high by 13.75" deep. Battery powered.
- Head (clear plastic) - user inserts the microchip, closes it, and the inserts it onto the front face to to run analysis.
- Benchtop instrument (lab use) runs whatever chemistry needs to be developed. It is a manually loaded instrument.
- Holds small sample bottles and reagents to perform multiple runs if needed. Lab-tested, soon to be released.

Mercury Detection Device – Gold Nanotechnology

Picoyune, Jay James, (R43ES023729)

- Research at UC Berkeley SRP used gold to adsorb mercury as part of a detection devices.
- Later, Jay James, Ph.D., won SBIR grant under the small business, Picoyune, with a patented technology to detect mercury contamination in the environment.
- Inexpensive, simple, and highly sensitive gold nanoparticle-based sensor to measure mercury in air or water.
- Adapting the technology from air to soil and sediment detection.



The air enters the chamber and mercury readily adsorbs onto gold surfaces, creating a change in the nanoparticle film that is optically detectable by spectrometry.

NIH National Institute of Environmental Health Sciences
Your Environment. Your Health.

Thank You!

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Free Webinar Archive: "US Small Business Funding Opportunities (SBIR/STTR) for Environmental Technologies at **NIEHS SRP, EPA**, and NSF" Webinar April 2, 2015: Free Webinar Archive Link

Featured Heather Henry (NIEHS), April Richards (EPA), and Prakash Balan (NSF)

Extra Slides about SBIR

Upcoming Events

- **April 2, 2015,** “US Small Business Funding Opportunities (SBIR/STTR) for Environmental Technologies at NIEHS SRP, EPA, and NSF” Webinar
  - **Archive available on www.Clu-in.org**
  - **Featured Heather Henry (NIEHS), April Richards (EPA), and Prakash Balan (NSF)**
- **Wed, May 6, 2015, Concord, New Hampshire**
  - NIEHS Grantee Roundtable panel on private well outreach and education
  - **NH Department of Environmental Services**
    Drinking Water Source Protection Conference
  - Event Informatioin Link

NHDES

United States Environmental Protection Agency

Contaminants Studied in Recently Funded Water Treatment Projects (FY 2011-2014)

Introduction

Phase I
Establish Technical merit, feasibility, & commercial potential

Phase II
Continue R&D efforts initiated in Phase I

Phase III
Pursue commercialization objectives resulting from Phase I & II

- SBIR – **S**mall **B**usiness **I**nnovation **R**esearch
  - For profit
  - <500 employees
  - US owned and operated

Required Allocations

FY	SBIR	STTR
2015	2.90%	0.40%
2016	3.00%	0.45%
2017	3.20%	0.45%

- STTR – **S**mall Business **T**echnology **T**ransfe**r**
  - Small business (for profit) + Research Institution (nonprofit)

[Small Business Innovation Research Website Link]

SBIR Program – a brief history

- In 1976
  - ✓ Roland Tibbetts initiated an NSF program to support small businesses
  - ✓ Provided early-stage financial support for high-risk technologies with commercial potential
- In 1982
  - ✓ Congress passed Small Business Innovation Development Act
- Today
  - ✓ 11 Federal agencies support SBIR
  - ✓ 5 Federal agencies support STTR
  - ✓ Over $2.5 billion awarded to small businesses in FY2011
  - ✓ Produces an average of 7 patents/day

Other SBIR/STTR Agencies and Institutes that Fund Environmental Technologies

AGENCIES

- Department of Defense (DoD) - Tracy Frost administrator.dodsbir@osd.mil
- Department of Energy (DoE) - Manny Oliver manny.oliver@science.doe.gov
- United States Department of Agriculture (USDA) - Charles F. Cleland ccleland@nifa.usda.gov
- National Oceanic and Atmospheric Administration (NOAA) - Joan Clarkson joan.e.clarkston@noaa.gov

NIH INSTITUTES

- National Institute of General Medical Sciences (NIGMS) - Scott Somers somerss@nigms.nih.gov
- National Center for Advancing Translational Sciences (NCATS) - Lili M. Portilla Portilll@mail.nih.gov
- National Heart, Lung, and Blood Institute (NHLBI) - Jennifer Shieh jennifer.shieh@nih.gov
- National Institute of Biomedical Imaging and Bioengineering (NIBIB) - Todd Merchak merchakt@mail.nih.gov
- *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) - Louis A. Quatrano Email: Quatranol@mail.nih.gov

Summary

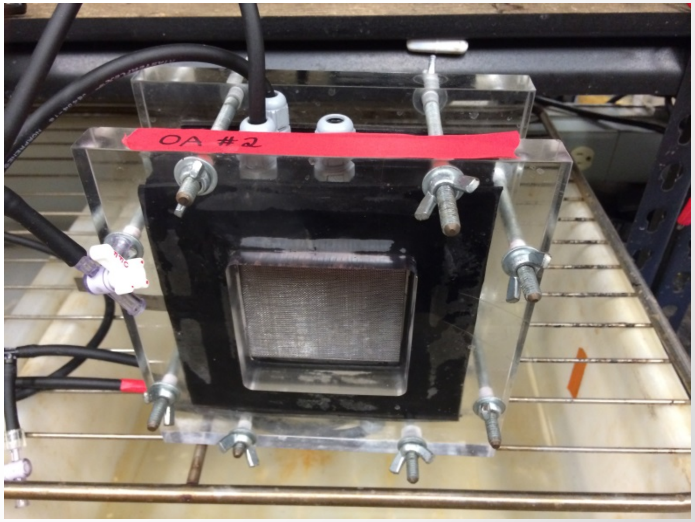
- NIH SBIR/STTR Contact for Water:
  - Contact info Heather Henry, 959-541-5330
- Water topics:
  - Priorities driven by EPA input, needs and new policies/clean-up levels.
  - Relevant to Superfund
  - Suggested Topics of Interest
- Application Due Dates: Jan 5, Apr 5, Sep 5
  - SBIR Omnibus
  - STTR Omnibus
- Budget:
  - Phase I: $150,000 total costs for up to 6 months (SBIR) or 1 year (STTR)
  - Phase II: $1M total costs for up to 2 years
- Current SBIR/ STTR Grantees

In Situ Chemical Oxidation with Persulfate/Iron for 1,4 Dioxane and PFOA

David L Sedlak, Fiona M. Doyle, UC Berkeley (P42ES004705)

- Testing new approaches for oxidizing solvents and difficult-to-treat contaminants in AFFF (e.g., PFOA, PFOS).
- Evaluating the mechanism and efficiency of through which oxidants such as persulfate and hydrogen peroxide are activated by aquifer solids during ISCO.
- Developing inexpensive and robust electrochemical techniques for ex situ oxidation of contaminants.
- Anticipated outcome: Models that will facilitate better predictions of contaminant oxidation rates during remediation.

Perfluorooctonic acid
PFOA



Direct-Push Oxidant Candles with Pneumatic Circulators

Mark Christenson and Steve Comfort, Airlift Environmental
(R41ES022530)

- To remove chlorinate solvents and petroleum products from contaminated aquifers – potential use for 1,4 Dioxane

On a simple burner, purple permanganate granules are mixed with paraffin to create candles

Direct-push candles w/aerators

Mark Christenson shows how paraffin-based permanganate candles are prepped for lowering down a borehole at Cozad landfill.

(Photos by Steve Comfort)

University of Nebraska Lincoln AirLift Environmental, LLC