

BOS 100®

REMEDATION PRODUCTS INC.

Primary Use

In Situ Chlorinated Solvent
Remediation

Treatment Mechanism

Trap & Treat® - Activated
Carbon Adsorption + Chemical
Reduction via Impregnated
Reactive Iron

Delivery Methods

RPI-Approved Direct Push
or Packer Injection. Direct
Application via Soil Mixing
or Trenching



BOS 100® Product Description

BOS 100® is a Trap & Treat® in situ remediation technology specifically designed to degrade chlorinated solvents. It is a unique material manufactured from high grade virgin carbons (intended for use in food or drinking water applications). The food grade carbon is impregnated with metallic iron formed under reducing conditions at a temperature of roughly 850 degrees C. At this temperature, as the metallic iron is formed it partially dissolves into the carbon forming a new and unique material with properties of both the carbon and iron but with capabilities exceeding ZVI in terms of rates of destruction and the range of halogenated compounds it can degrade. As manufactured, the product contains roughly 6.5% (wt) metallic iron. Reaction end products include dissolved iron, chloride, and a series of unregulated gases such as ethylene and methane. The product is insensitive to groundwater geochemistry (e.g. pH, oxidation-reduction potential).

BOS 100® Product Applications

The product is typically mixed with water to create a slurry that can be applied using a variety of techniques including: Direct push injection, soil mixing techniques, and trenching. It is commonly employed in plume wide treatment including treatment of source, mid, and downgradient plume regions. Plume area treatment is normally accomplished using slurry injection across the impacted thickness at a number of points located using a triangular grid pattern. Effective barriers can be constructed by injection using a tight point grid layout or through trenching or soil mixing. The product has been successfully used to treat excavation residuals by spraying slurry into the pit with subsequent mixing into the shallow soils of the excavation floor. Specialized injection techniques have been developed to address a variety of lithologic settings. BOS 100® has been successfully applied on hundreds of sites in North America and Europe since 2004 including dry cleaners, industrial, DOE, and DOD. Case studies describing the use of BOS 100® can be found on RPI's website at www.trapandtreat.com.

RPI Group

RPI Group is comprised of Remediation Products, Inc. (RPI) and a group of select remediation contractors that employ a three-pronged approach to ensure success: High density soil and groundwater sampling to support detailed conceptual site model development, expert design, and proven installation techniques to ensure distribution of the BOS 100® in the targeted intervals. The RPI Quality Assurance Laboratory located in Golden, CO provides cradle to grave analytical support throughout the project at no charge to the client. AST Environmental (AST) acts as RPI's Distributor & Training Affiliate for the installation contractors. A list of the contractors can be found at RPI's website..

CAT 100

REMEDIATION PRODUCTS INC.

Primary Use

Soils and groundwater highly impacted with halogenated compounds and complex mixes of recalcitrant contaminants typically addressed through combined remedies.

Treatment Mechanism

Catalytic degradation of a broad spectrum of halogenated and recalcitrant organic compounds through surface reactions on a conductive platform fed with a continuous source of electrons.

Delivery Methods

RPI-Approved Direct Push or Packer Injection. Direct Application via Soil Mixing or Trenching



CAT 100 Product Description

CAT 100 is a fusion of RPI's BOS 100® and biotechnology to produce a technology capable of achieving results beyond the capabilities of either one alone. Electron transfer, the heart of all contaminant degradation processes, is promoted as the contaminant binds to the metal creating an electrical connection extending throughout the carbon. An electron pump created by slow degradation of complex carbohydrates and peptides feeds electrons to the conductor which shuttles them to the site of depletion. In this process the metallic iron facilitates catalytic degradation of the contaminant without significant depletion of the iron. This overall cycle enables degradation of far more contaminant mass than would be estimated by simple iron demand.

CAT 100 Product Applications

The product is typically mixed with water to create a slurry that can be applied using a variety of techniques including: Direct push injection, soil mixing techniques, and trenching. It is commonly employed in plume wide treatment including treatment of source, mid, and downgradient plume regions. Plume area treatment is normally accomplished using slurry injection across the impacted thickness at a number of points located using a triangular grid pattern. Effective barriers can be constructed by injection using a tight point grid layout or through trenching or soil-mixing. Specialized injection techniques have been developed to address a variety of lithologic settings. CAT 100 was quietly introduced to last year and has now been used at multiple sites in the USA and Europe. These sites were impacted by NAPL and principal contaminants include carbon tetrachloride and associated daughters, TCE, PCE, and a complex spectrum of halogenated and non-halogenated compounds.

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BOS 200®

REMEDIATION PRODUCTS INC.

Primary Use

In Situ Petroleum
Hydrocarbon Remediation

Treatment Mechanism

Trap & Treat® - Complete
System Supporting Biological
Degradation of Petroleum
Hydrocarbons

Delivery Methods

RPI-Approved Direct Push or
Packer Injection. Direct
Application via Soil Mixing or
Trenching



BOS 200® Product Description

BOS 200® is a Trap & Treat® in situ remediation technology specifically designed to degrade petroleum hydrocarbons, related solvents, and oils. BOS 200® is a complete system effecting accelerated biodegradation of various organic compounds on an activated carbon platform that includes micro and macro nutrients, time release terminal electron acceptors, and a blend of facultative organisms designed to flourish within the aerobic to anaerobic conditions present in the pore structure of the carbon. It has been demonstrated to be effective with LNAPL, fuel oxygenates, alcohols, glycols, and cyclic ethers. No toxic byproducts such as sulfide are produced. The product is insensitive to groundwater geochemistry and is effective under aerobic and anaerobic conditions and over a broad range of pH. High salinity and TDS of 30,000 ppm are also not detrimental to performance.

BOS 200® Product Applications

The product is typically mixed with water to create a slurry that can be applied using a variety of techniques including: Direct push injection, soil mixing techniques, and trenching. It is commonly employed in plume wide treatment including treatment of LNAPL source, mid, and downgradient plume regions. Plume area treatment is normally accomplished using slurry injection across the impacted thickness at a number of points located using a triangular grid pattern. Effective barriers can be constructed by injection using a tight point grid layout or through trenching or soil mixing. The product is also routinely used to treat excavation residuals by spraying slurry into the pit with subsequent mixing into the shallow soils of the excavation floor. Specialized injection techniques have been developed to address a variety of lithologic settings, including bedrock. BOS 200® has been successfully applied on hundreds of sites in North America and Europe since 2002 including convenience stores, bulk terminals, pipelines, natural gas wellhead and compressor station sites, industrial, DOE, and DOD. Case studies can be found on RPI's website at www.trapandtreat.com.

RPI Group

RPI Group is comprised of Remediation Products, Inc. (RPI) and a group of select remediation contractors that employ a three-pronged approach to ensure success: High density soil and groundwater sampling to support detailed conceptual site model development, expert design, and proven installation techniques to ensure distribution of the BOS 200® in the targeted intervals. The RPI Quality Assurance Laboratory located in Golden, CO provides cradle to grave analytical support throughout the project at no charge to the client. AST Environmental (AST) acts as RPI's Distributor & Training Affiliate for the installation contractors. A list of the contractors can be found at www.trapandtreat.com.

BOS 200+[®]

REMEDIATION PRODUCTS INC.

Primary Use

In Situ Petroleum
Hydrocarbon Remediation

Treatment Mechanism

Trap & Treat[®] - Complete
System Supporting Biological
Degradation of Petroleum
Hydrocarbons

Delivery Methods

RPI-Approved Direct Push or
Packer Injection. Direct
Application via Soil Mixing or
Trenching



BOS 200+[®] Product Description

BOS 200+ is a patented Trap and Treat[®] in situ technology that expands the capabilities of the time-tested, field-proven BOS 200[®] treatment for petroleum hydrocarbons (PHCs). To trap contaminants, BOS 200+ utilizes the highest quality, agglomerated, virgin activated carbon. The activated carbon adsorbs hydrophobic contaminants like PHCs lowering aqueous phase contaminant concentrations immediately. To treat contaminants, BOS 200+ uses an expanded proprietary consortium of microbes and enhancements, including complex carbohydrates, amino acids, nutrients, and time-release terminal electron acceptors (TEAs). Before emplacement, the activated carbon base is pre-conditioned with the microbes and nutrients to initiate the formation of biological growth. Thus, BOS 200+ builds a rich, abundant assembly of hydrocarbon-degrading microorganisms that is robust and persistent even in the presence of LNAPL. The technology supports vigorous biodegradation of lube oils, crude oil, fuel oxygenates, alcohols, glycols, cyclic ethers, and similar contaminants. It is largely insensitive to groundwater geochemistry and performs in aerobic and anaerobic environments.

BOS 200+[®] Product Applications

BOS 200+ technology treats LNAPL source areas, mid-plume, and downgradient low-concentration areas, thereby protecting property boundaries and sensitive receptors. It may be installed by high-energy direct push technology (DPT) injection, soil mixing, trenching, or spraying into excavations. These proven techniques have been used in the field for over two decades. Specialized injection techniques are available through the RPI Group companies to address a variety of lithologic settings, including fractured bedrock, bedrock, and caliche. BOS 200+ has been successfully applied in the United States, Canada, Europe, and elsewhere around the globe. Case studies can be found on RPI's website at www.remediationproducts.com.

RPI Group

RPI Group is comprised of Remediation Products, Inc. (RPI) and associated remediation contractors that employ a three-pronged approach to ensure success:

- High-density soil and groundwater sampling to support the development of an accurate conceptual site model.
- Expert design based on collaborative review.
- Proven installation techniques to ensure optimal distribution of the BOS 200+ in the targeted subsurface.

The RPI Project Support Laboratory, located in Golden, CO, provides analytical support throughout the project at no charge to the client.

AST Environmental, Inc. (AST) is RPI's Distributor & Training Affiliate for all RPI Group installation contractors.