



## A Profile in Using Green Remediation Strategies

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**BP Site**  
Paulsboro, NJ

**NJ Voluntary Cleanup**

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**Cleanup Objectives:** Remove petroleum products and chlorinated compounds from soil and groundwater.

**Green Remediation Strategy:** Use solar energy resources to partially power remediation systems, while making productive use of adjacent land unsuitable for the area's anticipated redevelopment. Implementation of the strategy has involved:

- Installing a 275 kW solar field encompassing 5,880 ground-mounted photovoltaic (PV) panels collectively connecting to the site's internal electricity grid
- Siting the solar field on a third-party owned, closed/covered gypsum landfill area that could not otherwise be used for industrial/commercial purposes
- Using solar field-supplied electricity to operate (1) a groundwater pump and treat (P&T) system with 8 recovery wells extracting 225 gallons per minute; (2) air and ozone sparge systems with associated soil vapor extraction (SVE), and (3) light non-aqueous phase (LNAPL) recovery systems employing dual-phase extraction and product skimming; groundwater is transferred into a biologically activated carbon treatment system, soil vapors are routed to thermal oxidizer and carbon treatment systems, and recovered LNAPL is transferred to temporary holding tanks

**Results:**

- Producing approximately 200,000 kWh of electricity each year from a renewable energy source, which meets 5-10% of the remediation systems' annual electricity demand
- Generated a total of 1,879,000 kWh of electricity during the first 10 years of PV system operation, effectively increasing capacity of the electricity grid by an equivalent amount
- Avoiding carbon dioxide (CO<sub>2</sub>) emission of more than 300,000 pounds per year, resulting in a total CO<sub>2</sub> avoidance exceeding 3 million pounds over 10 years
- Avoiding more than 800 pounds of sulfur dioxide (SO<sub>2</sub>) and 500 pounds of nitrogen dioxide (NO<sub>2</sub>) emissions per year, resulting in a 10-year total avoidance of NO<sub>2</sub> exceeding 5,900 pounds and SO<sub>2</sub> exceeding 8,500 pounds
- Gaining long-term productive use of the offsite landfill area as onsite remediation continues

**Property End Use:** Deep water port on the Delaware River

**Point of Contact:** [Sasa Jazic](#), BP



**PV Arrays:** Each PV array was installed on concrete footers designed to accommodate the landfill cover system's operation and maintenance requirements.



**Ozone Sparge System Installation:** In 2011, an ozone sparge system was installed to accelerate removal of contaminant vapors from groundwater in two contaminant source areas.



**Solar Field in Former Infrastructure:** Integrated cleanup and reuse planning allowed installation of the solar field without disruption to tank and building demolition or to operation of large-scale groundwater P&T and SVE systems.



**Current Infrastructure Port:** All planned remediation systems began operating by the end of 2012. The deep-water port is anticipated to begin accepting ships in 2015.

**Update: August 2014**

**BP Site/Paulsboro**

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United States Environmental Protection Agency  
Office of Solid Waste and Emergency Response (5203P)

For more information:  
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