United States Environmental Protection Agency

Office of Research and Development Cincinnati, OH 45268

EPA/540/F-96/503
May 1996

EPA **Fact Sheet**

Demonstration of VOC Treatment and Disposal Via Spray Irrigation Hastings, Nebraska

PURPOSE OF THIS FACT SHEET:

- To describe EPA's SITE Program demonstration of VOC Treatment and Disposal Via Spray Irrigation.
- To announce the EPA Visitor's Day scheduled for July 15, 1996 in Hastings, Nebraska.

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) will perform a technology demonstration at a contaminated ground water site in Hastings, Nebraska. The demonstration is part of the EPA's Superfund Innovative Technology Evaluation (SITE) Program. The SITE Program, created in 1986, evaluates new and promising treatment technologies for addressing hazardous waste site contamination.

The technology is a Center Pivot Spray Irrigation system which was developed by University of Nebraska-Lincoln researchers. The irrigation system is equipped with off-the-shelf fog producing impact pads for improved efficiency. The demonstration will evaluate the ability of this technology to remove (strip) volatile organic compounds (VOCs) from contaminated groundwater. The effluent contaminant levels will be evaluated against cleanup criteria set by the EPA Region 7.

As part of the Western Governor's Association initiative for innovative technologies, several state environmental agencies, representatives from the Navy Facilities Engineering Centers, U.S. Army Corps of Engineers, and other stakeholders reviewed the demonstration plan. The purpose is to use this demonstration to identify appropriate applications of the spray irrigation alternative for states and federal facilities.

TECHNOLOGY DESCRIPTION

The arm of a sprinkler irrigation system can be short or long, depending on the availability of water and land. Sprinkler irrigation systems are widely used throughout the country and the world for crop production because of the capability to irrigate sandy areas and hilly terrains. These systems are self propelled, highly mechanized, and efficient. Sprinkler irrigation systems apply water uniformly, reduce leaching, and have low labor and operating requirements. They do not require land leveling and start-up costs are low.

The heart of the sprinkler irrigation system is the nozzle. By placing nozzles at relatively close intervals along an elevated pipeline, field water application is

SITE
SUPERFUND INNOVATIVE TECHNOLOGY EVALUATION

essentially uniform. The amount of sprayed water is controlled by the speed with which the "pivot" or "linear" travels across the field.

When irrigation water is applied using the sprinkler method, the water is distributed over the irrigated area by a spray. The nozzles are configured to have a small opening from which a stream of water is emitted. The high velocity stream strikes an impact pad and forms a thin film of water. The film breaks up into small droplets as it leaves the pad. The droplet size depends on the pressure and the impact pad design.

SITE DESCRIPTION AND HISTORY

A SITE Demonstration using a center pivot irrigation system will be performed at the North Landfill Subsite in Hastings, Nebraska. The 20-ha (50-acre) site is a furrow-irrigated corn field underlain by commingled plumes of contaminated groundwater, located on the eastern edge of Hastings, Nebraska. The ground water is 36.5 m (120 feet) below the land surface and contains trace levels of the solvents 1,1,2-trichloroethylene (TCE), 1,1,1-trichloroethane (TCA) and the fungicides carbon tetrachloride (CT) and ethylene dibromide (EDB). Also present are traces of solvent and fungicide degradates such as 1,1-DCE, trans 1,2-dichloroethylene and chloroform. A grain elevator up gradient is the source of the fungicides while the solvents are allegedly from an abandoned landfill and industrial sites located southwest of the elevator.

TECHNOLOGY DEMONSTRATION

The primary goal of the SITE Demonstration is to determine the efficiency of sprinkler irrigation as a method for remediating VOC-contaminated ground water to levels below the maximum contaminant levels (MCLs). The results of previous tests indicate removal rates of EDB, TCE, TCA, and CT that exceeded 95% in most cases. In some instances the removal rate approached 100%. Monitoring of system parameters will also be performed to characterize the operation of the system.

Samples will be sent to the EPA Office of Research and Development laboratory in Cincinnati, Ohio. The EPA will analyze the liquid samples for the volatile compounds of interest. All data will be collected using strict quality assurance and quality control (QA/QC) procedures. These data will be used to determine whether the sprinkler irrigation system has met the cleanup objectives specified by the EPA Region 7.

Operational information such as treatment rates, temperatures, and pressures will be collected during the course of treatment. An economic evaluation of the technology will also be performed based on available information.

TECHNOLOGY TRANSFER

The final products of the SITE Demonstration will be a Technology Bulletin and an Innovative Technology Evaluation Report. A videotape of the demonstration may also be produced.

A summary of the comments, questions, and suggestions offered by state and federal reviewers will be included in the final report.

As part of the technology transfer effort and in conjunction with on-going community activities, the EPA is sponsoring a Visitor's Day on July 16, 1996, in Hastings, Nebraska.

If you would like to attend, please complete the attached registration form and mail or FAX it to:

Vicente Gallardo
U.S. EPA
26 West Martin L. King Drive
Cincinnati. Ohio 45268
(513) 569-7176
FAX: (513) 569-7620
email: gallardo.vincente@epamail.epa.gov

Questions regarding the center pivot spray irrigation system should be directed to:

Roy Spalding
University of Nebraska-Lincoln
Water Center/Environmental Programs
103 Natural Resources Hall
P.O. Box 830844
Lincoln, Nebraska 68583-0844
(402) 472-7558
FAX: (402) 472-9599

Questions concerning the SITE Demonstration should be directed to:

Teri Richardson
EPA SITE Project Manager
U.S. EPA
National Risk Management Research Laboratory
26 West Martin Luther King Drive
Cincinnati, Ohio 45268
(513) 569-7949 Fax: (513)569-7105

REGISTRATION FORM

Name _____ Phone # _____

Organization _____ FAX _____

Address _____

_____

_____ Attendees _____

To register ***by phone*** (IA, KS, MO, NE residents only) call 1-800-223-0425. The registration form may also be FAXed to Vincente Gallardo at (513)569-7620.

PLEASE REGISTER BY JUNE 15, 1996

Questions concerning the EPA Region 7 cleanup at the Hastings site should be directed to:

Diane Easley
SUPRIANE
U.S. EPA Region 7
726 Minnesota Avenue
Kansas City, Kansas 66101
(913) 551-7797
Toll Free (IA, KS, MO, NE)
1-800-223-0425
FAX: (913) 551-7063

Questions concerning the state and federal facilities participation should be directed to:

Richard Schlenker
Nebraska Department of Environmental Quality
P.O. Box 98922
1200 N. Street
Lincoln, NE 68509-8922
(402) 471-2186
FAX: (402) 471-2909

The University of Nebraska-Lincoln and the U.S. EPA would like to express appreciation to Morrison Enterprises for installing the sprinkler irrigation system and operating it during previous tests and this Demonstration.

Additionally, we would like to thank the farmers, Davie Utecht and Kenneth Craig for permitting access to the site and apologize for any inconvenience.

Demonstration of Spray Irrigation as a* VOC *Treatment and Disposal Method
Hastings, Nebraska

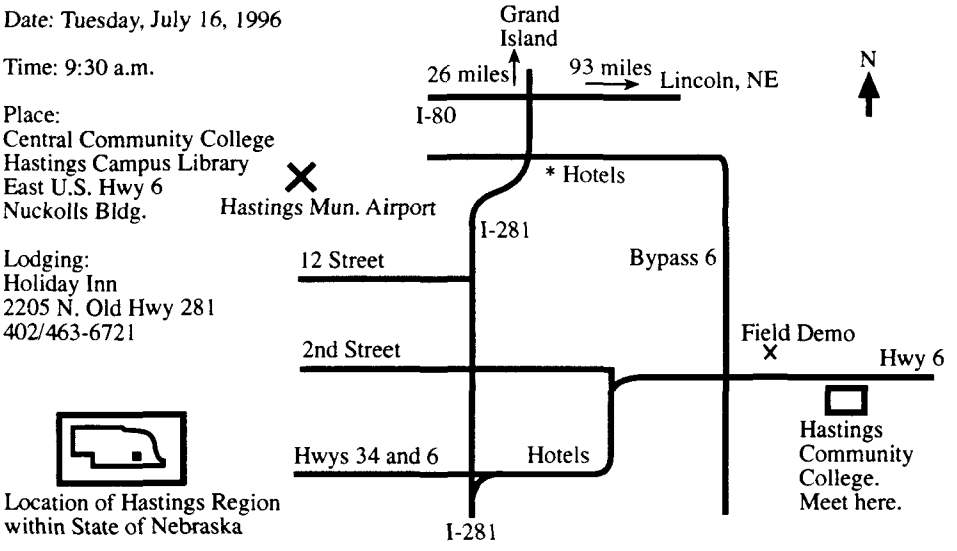
Visitor's Day Information

Date: Tuesday, July 16, 1996

Time: 9:30 a.m.

Place:
Central Community College
Hastings Campus Library
East U.S. Hwy 6
Nuckolls Bldg.

Lodging:
Holiday Inn
2205 N. Old Hwy 281
402/463-6721



Location of Hastings Region within State of Nebraska

U.S. Environmental Protection Agency
Region 5, Library (PL-12J)
77 West Jackson Boulevard, 12th Floor
Chicago, IL 60604-3590

United States
Environmental Protection Agency
National Risk Management
Research Laboratory, G-72
Cincinnati, OH 45268

Official Business
Penalty for Private Use
$300

EPA/540/F-96/503

BULK RATE
POSTAGE & FEES PAID
EPA
PERMIT No. G-35