



# 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.

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.

### 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

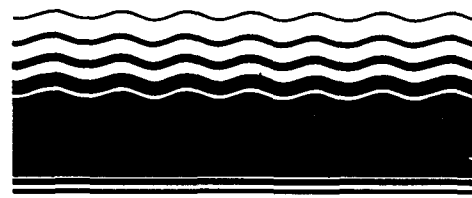
### TECHNOLOGY DESCRIPTION

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



77 West Jackson Street, 12th Floor  
Chicago, IL 60604-3690

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

P.O. Box 98922  
1200 N. Street  
Lincoln, NE 68509-8922  
(402) 471-2186  
FAX: (402) 471-2909

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

Richard Schlenker  
Nebraska Department of Environmental Quality

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

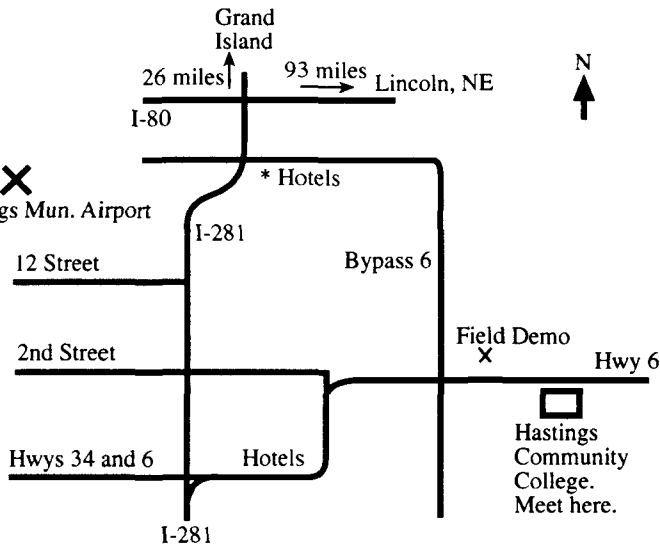
Time: 9:30 a.m.

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-100)  
77 West Jackson Boulevard, 11th Floor  
Chicago, IL 60604-8000

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

Official Business  
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EPA/540/F-96/503

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