

## Background Document Maryland Square PCE Site

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### Introduction

This background paper provides a summary of the discovery and subsequent investigation of a release of perchloroethylene (PCE, also called tetrachloroethylene or tetrachloroethene). The PCE was released to the environment by a former dry cleaners (Al Phillips the Cleaners) in the former Maryland Square Shopping Center at 3661 S. Maryland Parkway. This site is located just north of the intersection of S. Maryland Parkway and Twain Avenue in Las Vegas, Nevada.

PCE is a solvent/degreaser commonly used by dry cleaners to clean clothes. Some other consumer products also contain PCE and other chlorinated chemicals.

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### Discovery of the Release and the Subsequent Investigation

In Nevada, investigations of contaminant releases are performed by professional consultants certified as Environmental Managers by the Nevada Division of Environmental Protection (NDEP). The consultants are hired by the party responsible for the release. NDEP is the state regulatory agency that oversees and directs the investigation and cleanup of such releases. The parties responsible for the contamination perform and pay for the characterization and cleanup of contaminated soil and groundwater.

The PCE discharge at the site of the former dry cleaner was first reported on November 29, 2000 via NDEP's spill reporting hotline. The historical release was discovered during a routine environmental site assessment performed as part of a property transaction. NDEP received the initial environmental report on July 21, 2001. After reviewing the report, NDEP determined that more investigation was required to evaluate whether the PCE had migrated off site.

The dry cleaner operated at the Maryland Square site from 1969 through 2000; however, the exact date of the release is not known. Data collected during the early stages of the investigation indicated that the PCE discharged by the dry cleaner leached into the soil and subsequently migrated into the shallow groundwater under the site of the former dry cleaner. Follow-on investigations showed that the PCE contamination had migrated off site, forming what is called a "plume" in the groundwater. NDEP required the responsible party to install additional monitoring wells to define the extent of the PCE plume.

Determining the shape and size of a contaminant plume in groundwater requires a methodical step-by-step process installing a series of borings and monitoring wells. Samples of groundwater collected from the wells are analyzed to determine if the contaminant is present at that well location. This process is followed by the installation of additional wells in the direction of groundwater flow, until the extent of the plume is defined. The history of wells is shown at: [http://ndep.nv.gov/pce/doc/maryland\\_square\\_well\\_monitoring\\_history3.jpg](http://ndep.nv.gov/pce/doc/maryland_square_well_monitoring_history3.jpg)

Wells, installed in 2002, 2003 and 2004, failed to find the eastern boundary of the plume; more wells were needed. In **March, 2005**, five new monitoring wells were installed in the Paradise Palms neighborhood, and results were provided in a **July 2005** report. This 2005 report presented the first data showing that the PCE plume had migrated more than 2,000 feet east of the source area and extended beneath the residential neighborhood east of Boulevard Mall (See report at: <http://www.ndep.nv.gov/pce/record/2005-07-11-a.pdf>).

In **April 2006**, two more wells were installed farther to the east on Seneca Lane near Spencer Street and at Ottawa Circle. The information collected in 2006 indicated that the Maryland Square PCE plume was atypically long compared with other PCE sites the Las Vegas Valley and extended at least several thousand feet from the source area. In **September 2006**, responsibility for the case was transferred from NDEP's Las Vegas office to NDEP's headquarters in Carson City so greater staff resources could be devoted to the case.

Additional monitoring wells were installed in 2007 through 2013. Recently installed wells delineate the PCE plume to the east of Eastern Avenue, about 6,000 feet east of the source area at the former dry cleaners.

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## **NDEP Requires Preparation of a Soil Vapor Sampling Plan and New Corrective Action Plans for Cleanup of Soil and Groundwater**

Following an **October 2006** meeting with representatives for the potentially responsible party, the NDEP sent a letter requiring the former dry cleaners to (1) conduct soil vapor sampling in the neighborhood to the east of Boulevard Mall, (2) prepare a detailed investigation and plan for removal of the contaminated soil at the dry cleaner site, (3) perform additional characterization of the groundwater contamination, and (4) prepare a corrective action plan (CAP) for remediating groundwater.

Sampling for the soil gas study was conducted in **March 2007**, with a total of 32 soil gas samples collected from 16 locations. NDEP evaluated the results using the Johnson-Ettinger model, as provided by the U.S. Environmental Protection Agency (EPA), to assess the potential for vapor intrusion into homes. Although the model output indicated that there was no immediate health threat to residents, it also predicted that concentrations of PCE in the indoor air of these homes could exceed the EPA's health-protective level for long-term (30 years or more) exposure.

Based on the soil gas data, groundwater data, and the results of modeling, NDEP began planning a campaign of residential notification and indoor air sampling in the Paradise Palms neighborhood. In a June 19, 2007 letter, NDEP notified the former dry cleaner and other potentially responsible parties of (1) NDEP's intent to move forward with investigation and mitigation, expending state funds as necessary to protect human health, and (2) NDEP's intent to seek reimbursement of all costs from DCI (parent company of the former dry cleaner) and other potentially responsible parties.

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## **NDEP Prepares for Public Outreach Campaign**

Beginning in late April, and extending through **August 2007**, the NDEP conducted the following:

- NDEP staff were briefed for conducting the public outreach effort
- The entire administrative record for the Maryland Square PCE Site was digitized
- NDEP staff prepared a new PCE website, which included webpages containing the digitized administrative record for the Maryland Square PCE Site
- NDEP staff prepared letters, informational literature and briefing documents for elected officials, other agencies and residents
- The NDEP set up a temporary, dedicated resident call-in line to answer resident's questions

- Another temporary phone line was set up for residents to make appointments with the NDEP's door-to-door team, in preparation for indoor air sampling
- The NDEP sent a letter to the potentially responsible parties requiring additional site assessment work and corrective action.
- NDEP managers and staff briefed representatives from the Clark County School District, along with the County Commissioner and other political representatives.

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## Meetings with Residents and Sampling of Indoor Air

On **August 27, 2007**, the NDEP mailed notification letters and information packets to approximately 150 residents and property owners, the website and phone lines went live, and a press release was issued.

In **September and October of 2007**, NDEP staff met with residents at their homes for personal meetings to answer questions, provide information, and obtain permission to sample the indoor air at the residence.

Following general EPA guidelines, NDEP contractors collected samples of indoor air from homes with permission of the residents through October. On **November 28, 2007**, the NDEP sent sample results to each resident whose home was sampled during September and October, 2007. In **December, 2007**, NDEP representatives met with all interested homeowners to discuss their sample results and answer their questions.

In **February 2008**, the NDEP sent out additional notification letters to residents to (1) offer indoor air sampling to residents who did not respond to the initial offer and (2) to offer indoor air sampling to additional homes north of the original notification area to define the northern boundary of the plume.

Indoor air was sampled again in the spring of 2012, and a sampling campaign is planned for February-March, 2014.

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## Cleanup of Groundwater and Source Area Soil

On **May 4, 2009**, following a year of negotiations between NDEP and the property owner, the Nevada Office of Attorney General Filed a Complaint in U.S. District Court, District of Nevada, against all potentially responsible parties for the Maryland Square PCE Site. The NDEP complaint is available at: [http://www.ndep.nv.gov/pce/record/2009\\_05\\_04\\_marylandsquare\\_ndep\\_complaint.pdf](http://www.ndep.nv.gov/pce/record/2009_05_04_marylandsquare_ndep_complaint.pdf). This complaint requested injunctive relief (cleanup of contaminated soil and groundwater) and cost recovery for state funds expended on indoor air sampling, home mitigation, and other work.

Throughout 2009 and 2010, Quarterly Groundwater Monitoring Reports were prepared and submitted to NDEP as scheduled (see: [http://ndep.nv.gov/pce/maryland\\_reports.htm](http://ndep.nv.gov/pce/maryland_reports.htm)), but little progress was made on the cleanup. On **December 27, 2010**, Judge Jones, U.S. District Court, signed the "*Permanent Injunction Governing the Clean Up of Hazardous Substances at and Emanating from Maryland Square Shopping Center.*" The NDEP is overseeing the work being performed under this injunction, including reviewing all work plans and reports. See: [http://ndep.nv.gov/pce/record/2010\\_12\\_27\\_permanent\\_injunction.pdf](http://ndep.nv.gov/pce/record/2010_12_27_permanent_injunction.pdf)

Since the **December 27, 2010 Permanent Injunction** was issued, the following work has been accomplished:

- Work plans for cleanup of soil, groundwater and indoor air were submitted for NDEP review, comment and concurrence.
- The cleanup plan for source area soil was approved and excavation began in September 2011.
- Cleanup of source area soil was completed by late October 2011 and involved the excavation and offsite disposal of PCE-contaminated soils, followed by in situ chemical oxidation (ISCO) treatment of soil and groundwater at the bottom of the open pit prior to filling the excavation with clean soil
- In September 2011, NDEP concurred with the *Corrective Action Plan (CAP) for Groundwater*. The CAP established cleanup objectives and described laboratory and field tests to be conducted to better characterize the site where the remedy will be installed/performed.
- The plume was documented to extend east of Eastern Avenue; well MW-38 contained 5.7 ppb PCE.
- The *Corrective Action Report for Soil* describing the cleanup was submitted to NDEP on May 16, 2012.
- Additional drilling and site characterization were performed in 2013, and the results documented in the *Corrective Action Report for Groundwater*, which was submitted to NDEP in August, 2013.
- Bids for cleanup of groundwater were submitted in late 2013; the selection process is on-going

Excavation of source area soil - September, 2011



Application of oxidant on floor of excavation.



## Cleanup of Groundwater: What are the Challenges?

Not all technologies are appropriate for all sites, due to geochemical, hydrological, geological and engineering issues. In the Las Vegas Valley, cleanup of PCE-contaminated groundwater is technically difficult due to the types of geologic deposits and the geochemistry of the shallow groundwater. In addition to the goal of cleaning up the groundwater, the remedy must be selected and designed to avoid spreading the plume into areas that are currently unaffected. Some form of hydraulic containment could possibly be employed to prevent further migration of the PCE mass underneath the residential neighborhood.

Additional testing is required to determine which technologies are most likely to be effective in cleaning up the groundwater. Typically, this testing involves conducting both “bench-scale” and “field-scale” pilot tests. The *Corrective Action Plan for Groundwater* specifies the types of testing and the types of data collected for this evaluation. For details, see: [http://ndep.nv.gov/pce/record/2011\\_06\\_14\\_groundwater\\_cap.pdf](http://ndep.nv.gov/pce/record/2011_06_14_groundwater_cap.pdf)

Data from the laboratory and field tests will be evaluated, and a preferred remedial technology will be proposed. NDEP will prepare a “Proposed Plan” summarizing the remedy and requesting public input. All comments and responses on the Proposed Plan will be compiled and provided as an appendix to the Record of Decision (ROD). The ROD is the document that describes the remedy selected to clean up the Site.

After a groundwater treatment system is put in place, groundwater will continue to be monitored on a regular basis. Currently, wells are monitored and sampled quarterly to annually, depending on the well. Based on the type of remedy selected and implemented, the frequency of monitoring and sampling may be adjusted to provide adequate data for managing the site.

Pilot testing and characterization of the treatment area, along with additional drilling and delineation of the contaminated groundwater was performed in 2013. The Corrective Action Report for Groundwater (August 12, 2013) documented results from the pilot testing and additional vertical delineation.

At present (January, 2014), the schedule for cleanup of groundwater has been delayed. As a result of these delays, the series of cleanup documents and decisions will also have extended dates. The schedule presented at the October 26, 2011 Community Meeting (see [http://ndep.nv.gov/pce/doc/community\\_meeting\\_posters.pdf](http://ndep.nv.gov/pce/doc/community_meeting_posters.pdf)) listed a Final Corrective Action Report due in the Fall, 2012, and a Proposed Plan listed for public review in the first quarter of 2013.

The Corrective Action Report was submitted to the NDEP in August, 2013; however, a preferred remedy has not yet been selected, and the Proposed Plan has not yet been prepared and released for public comment. The NDEP currently anticipates that the Proposed Plan will be released in late 2014. To follow progress on the cleanup of groundwater, see the Administrative Record at: <http://ndep.nv.gov/pce/foia.htm>

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## **The Administrative Record and Other Resources**

The NDEP continues to review and post all documents submitted by the responsible party. All documents and correspondence are available in the Administrative Record, on-line at: <http://ndep.nv.gov/pce/foia.htm> Hard-copy reports and other documents are housed in the files at NDEP’s headquarters in Carson City. The NDEP’s Maryland Square and PCE websites also provide links to additional information and other resources

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