SITE HAZARD ASSESSMENT
RECOMMENDATION FOR NO FURTHER ACTION
February 5, 2014

SITE INFORMATION:

Lynnwood Dodge Inc
20612 Hwy 99
Lynnwood, WA 98036
Snohomish County

Tax Parcel Number:	00564100000802
Section/Township/Range:	20/27/4E
Latitude:	47.81185
Longitude:	-122.32395
Facility Site ID:	38761451
Cleanup Site ID:	6008

Site assessed for the February 2014 Hazardous Sites List Publication by Mike Young, Snohomish Health District

SITE DESCRIPTION:

This 3.2 acre site has been an Auto Sales and Service business since 1964. The property is fully developed with structures built in 1964, 1993 and 1999. The property is in the city limits of Lynnwood and is serviced by the storm water collection system. The area around the site is largely commercial with some residential apartments.

- The properties north of the site are residences and apartments called Heather Ridge and another car lot. This is the closest family residences to the site, which is about 300 feet north of the site.

- South of this site are other businesses, is a Hyundai dealership car lot and Stadium Flowers. It was also noted that a dry cleaning business is located 770 feet southeast of the site at 6810 208th St SW # B, Lynnwood, WA.

- West of this site, is a county district court house and post office. Edmonds Community College is about 700 feet northwest of the site.

- East of the site are several businesses that include a Walgreens drugstore, motel, and a mexican restaurant (Taqueria).

Figure 1, Map from Google Earth below (The aerial photo was taken on July 5, 2012):

BACKGROUND:

In 1988, a 300 gallon steel underground storage tank was identified on the property by an environmental consultant. In addition it was noted that the floor drain of the shop was draining to the storm water system. Cleanup work started April 20th, 1990 after replacing the leaking waste oil storage tank, hydraulic hoist in old garage, storm drains and removing contaminated soil. [2] At the time of tank removal 1,1,1 Trichloroethane (1,1,1 TCE) was encountered in the soils. A total of 48 cubic yards of contaminated soil was removed by 1991. Problems persisted as the site was further evaluated and groundwater monitoring wells were installed in 1994. Halogenated organics and petroleum were found in the groundwater wells.[4]

In 1995 an additional 400 tons of contaminated soil was removed from inside and outside of the buildings, as well as 165 feet of storm water drain line. The storm water catch basin that the shop floor drained into was 6 feet deep and had an open basin. Two of the monitoring wells were used for chemical oxidation injection wells to treat the groundwater in 1996. Additional exploration was performed in 1999 with six soil borings up to 30 feet deep; two of the borings were converted to additional monitoring wells. The groundwater monitoring wells were monitored quarterly until 2000. The groundwater data shows contamination moved east with the groundwater under the office building toward Highway 99 to the east, See figure 1.[5]

It appears that the treatment worked for the petroleum, because no concentrations of diesel or oil range petroleum were detected in the five wells by 1998. It was reported that "TPH concentrations in monitoring wells MW-2 and MW-3 appear to have responded to hydrogen

peroxide treatments in 1995 and 1996 and remain undetected or at residual levels below cleanup standards. Solvent concentrations did not demonstrate a definitive response to hydrogen peroxide treatment, but have decreased since the source of contamination was removed."[7]

In June of 2000, Earth Tech reported that the groundwater sample collected from monitoring well MW-4 had concentrations of 1,1-dichloroethene (1,1-DCE) and tetrachloroethene (PCE) above the action levels. Although it was noted that 1,1-DCE was at similar levels recorded since 1995, "The concentrations of PCE in MW-4 (9 micrograms per liter (ug/L)) exceeded the method A action level (5 ug/L) for the first time since being detected in February 1998." [8]

In 2003, Michael Barman of Chrysler submitted an independent remedial action application pursuing a voluntary cleanup review and requesting an NFA given minor MTCA exceedances. The 2005, consultant Richard Buzinski submitted a summary of all reports concerning the site. However, the reports did not include any new data, which ends with the sampling from April 2000. Thus, the property is still on the Washington State Departments of Ecology's Confirmed and Suspected Contaminated Sites List.

FINAL SITE MONITORING

In May of 2013, while preparing a SHA for this property, we contacted the property owner and asked if there was any more recent work done on this property. The last sample data we found on file was from 2000 and now 13 years old. The owner hired AMCOM of Seattle to re-sample all the wells at the site, which they reported in 1/27/2014.

Table 1 shows compounds of concern at this site include metals (barium and chromium), TPH hydrocarbons, BTEX and Halogenated Organics. This table shows the maximum result of any chemical compound (ug/L) found in any of the seven monitoring wells between 1994 and 2013. The table also shows the most recent test result at the same well where the maximum result was recorded. The table includes compounds that were detected in the groundwater, but were below the MTCA standard (rows not shaded). The yellow shaded rows are contaminants that were found above a MTCA standard. Green shading shows that more data has reduced concern of this compound. This reduced concern could be from more recent lower sample results, a change in the MTCA standards, or both. Note there were several cleanup MTCA standard changes since this site was listed. For example, 1,1-Dichloroethene levels are no longer above the cleanup standard.

Several organic chemical compounds (shown as bold in table 1) were reviewed in more detail as part of this assessment. A brief description of the chemical compound and discussion of degradation products of some of these organic chemicals follow table 1. A review of trend analysis graphs is also included for several organic chemicals. Figure 2, 3 and 4 below shows plots of the historic results, most starting in 1994. This was done to search for potential problems that may not be apparent in just reviewing the maximum and latest test results.

Table 1 **Componds of Concern groundwater ug/L**	**Max Result**	**Well**	**date**	**Latest Result**	**Well**	**Date**	**Old MTCA Standard**	**New MTCA Standard**	**Method**
Acetone	62	4	8/16/1995	ND	4	12/24/13	320	7200	B
Barium	**770**	2	8/31/1994	30	2	2/15/96	**200**	3200	B
benzene	3.4	2	2/16/1995	ND	2	12/24/13	5	5	A
Chlorobenzene	3.2	2	8/31/1994	ND	2	12/24/13	160	160	B
Chloroform	4.5	2	8/31/1994	ND	2	12/24/13	7.17	80	B
Chromium	**180**	2	8/31/1994	ND	2	2/15/96	**50**	50	A
1,2-Dichlorobenzene **(1,2-DCB)**	10.8	2	8/22/1996	ND	2	12/24/13	720	720	B
1,4-Dichlorobenzene **(1,4, DCB)**	**10.7**	3	7/20/1999	ND	3	12/24/13	**1.82**	Researched-No Data	B
1,1-Dichloroethane **(1,1-DCA)**	13	4	2/17/1995	0.94	4	12/24/13	800	1600	B
1,1-Dichloroethene **(1,1-DCE)***	**4**	4	8/16/1995	0.56	4	12/24/13	**0.0729**	400	B
dichloroethylene;1,2-,cis **(cis-1,2-DCE)**	**46**	2	8/31/1994	ND	2	12/24/13	**8**	16	B
ethylbenzene	4.6	2	2/16/1995	ND	2	12/24/13	30	700	A
Tetrachloroethene **(PCE)**	**9**	4	4/14/2000	4.7	4	12/24/13	**5**	**5**	A
1,1,1 Trichloroethane **(1,1,1 TCE)**	15	4	5/16/1995	1.1	4	12/24/13	200	200	B
toluene	2.7	2	2/16/1995	ND	2	12/24/13	40	1000	A
tph: Diesel range organics	**1300**	2	8/31/1994	0.27	2	4/14/00	**1000**	500	A
Heavy Oil	890	2	8/31/1994	ND	2	4/14/00	1000	500	A
tph: gasoline range organics, benzene present*	**1600**	2	2/16/1995	ND	2	4/14/00	**1000**	800	A
Trichloroethene **(TCE)***	3	4	4/14/2000	4.2	4	12/24/13	5	5	A
Vinyl Chloride* **(VC)**	**2.3**	3	8/31/1994	ND	3	12/24/13	**0.5**	0.2	A
Xylenes	**47**	2	2/16/1995	ND	2	12/24/13	**20**	1000	A

1,1-DCA (1,1-Dichloroethane) is used as a solvent for plastics and oils. It is also used in certain fire extinguishers.[13] Although the levels of this chemical have been dropping in MW-2 (See Figure 2), it was still detected in 2000 and 2013. The concentration of 1,1-DCA in MW-4 was 4 ug/L in 2000 and 0.94 ug/L in 2013. This concentration is far below the new Method A action level (1600 ug/L).

1,2-DCB (1,2-Dichlorobenzene) is used in softening and removing carbon-based contamination on metal surfaces.[13] This chemical has been found consistently (See Figure 2), with a recent hit in 1999, where it was found in MW-3 at 4.62 ug/L. However, this chemical was not above the MTCA Method B (carcinogen) CLARK method B cleanup level of 720 ug/L and found non-detect in 2013.

1,4, DCB (1,4-Dichlorobenzene) is used to control moths and mold, it also finds use as a disinfectant in waste containers and restrooms and is the characteristic smell associated with urinal cakes.[13] Overall the 1,4, DCB trend has been downward (See Figure 2), but has had a recent upward trend and spike in 1999 of 10.7 ug/L (See Figure 4). However, the last 3 sample test result in show a lower level to non-detect. Note that the MTCA standard was removed since 2000, where the cleanup standard was 1.82 ug/L. Now the CLARK web site reports 1,4 Dichlorobenzene as "Researched-No Data" for Method B, Carcinogen.[16]

cis-1,2-DCE (dichloroethylene;1,2-,cis) is used as a solvent for waxes and resins.[13] This chemical was found at 46 ug/L in 1994, with a MTCA Method B level of 8 ug/L. Cis-1,2-DCE levels found has trend downward (See Figure 2) and the MTCA cleanup level has gone up, with (non-carcinogen) CLARK value of 16 ug/L. Levels have dropped in 13 subsequent tests and are well below the MTCA standard.

1,1-DCE (1,1-Dichloroethene, also called 1,1-dichloroethylene) is an organochloride with the molecular formula $C_2H_2Cl_2$. "During the 1990's research suggested that, in common with many chlorinated carbon compounds, Saran posed a possible danger to health by leaching, especially on exposure to food in microwave ovens. Since 2004, therefore cling wrap's formulation has changed to a form of polyethylene."[13] "Further biodegradation products of DCE isomers include vinyl chloride…"[6] It was noted that the concentration of the 1,1-DCE in 2000 was similar to previous sampling events conducted since August 1995 (See Figure 3). Earth Tech reported 1,1-Dichloroethene had an MTCA method B cleanup standard of 0.0729 ug/L. However, CLARK now reports 1,1-dichloroethylene to have a MTCA method B cleanup level of 400 ug/L with "Researched-No Data" for Method B, Carcinogen. The 2013 result was 0.56 ug/L about 1000 times lower than the current cleanup standard.

PCE (AKA: Tetrachloroethylene, Tetrachloroethene, perchloroethene, perchloroethylene or "PERC") is a chlorocarbon with the formula $Cl_2C=CCl_2$. It is a colorless liquid widely used for dry cleaning of fabrics, hence it is sometimes called "dry-cleaning fluid." [13] In 2000 the concentration of PCE in MW-4 (9 micrograms per liter (ug/L)) exceeded the Method A action level (5 ug/L) for the first time since being detected in February 1998."[8] Test results, between 1998 and 2000, showed that the chemical compound had an upward trend.

However, the last round of samples was significantly less than the 2000 result which may suggest the levels peaked and are moving downward. Only one of the 18 results taken were above MTCA.

1,1,1 TCE (AKA: TCA, 1,1,1 Trichloroethane, Methyl Chloroform, chloroethene, Solvent 111, Genklene, R-140a) has shown a downward trend historically in MW-4 as shown in figure 3 from levels that were 12 and 14 ug/L. The downward trend continues as seen in figure 4. The MTCA cleanup level was 200 ug/L.

TCE (AKA: Trichloroethylene, Trichloroethene, 1,1,2-Trichloroethene, 1,1-Dichloro-2-Chloroethylene, 1-Chloro-2,2-Dichloroethylene, Acetylene Trichloride, Trethylene, Triclene, Tri, Trimar, Trilene, HCC-1120) By 1956 the use of TCE as a general anesthetic was greatly diminished. TCE was also an effective solvent for a variety of organic materials. In 2005 the Environmental Protection Agency completed its Final Health Assessment and TCE is listed as a known carcinogen [13] TCE is an environmental byproduct of weather PCE, see figure 5. There were only 4 detected results of TCE at this site in groundwater, starting in 1998. These results appear to be in an upward trend in MW-4 as shown in Figure 4. However, the MTCA cleanup level of 5 ug/L has not been exceeded, because the last result was 4.2 ug/L. Since the levels of PCE have dropped, and the TCE is likely coming from the PCE, we do not anticipate TCE to increase significantly.

VC (Vinyl chloride) VC is a gas with a sweet odor. It is highly toxic, flammable, and carcinogenic. Smaller amounts of VC are used in furniture and automobile upholstery, wall coverings, housewares, and automotive parts.[13] VC was found in well MW-3 with a decreasing trend and not detected in MW-4, vinyl chloride was only tested a few time in MW-5 where it was not detected. In 2000 and 2013 vinyl chloride was not detected in any of the wells. Figures 5 and 6 may explain why this was not seen VC in MW-4, VC is an environmental byproduct of weather TCE and it appears it would be the first organic to drop out in biodegradation according to this model.[32]

Figure 2

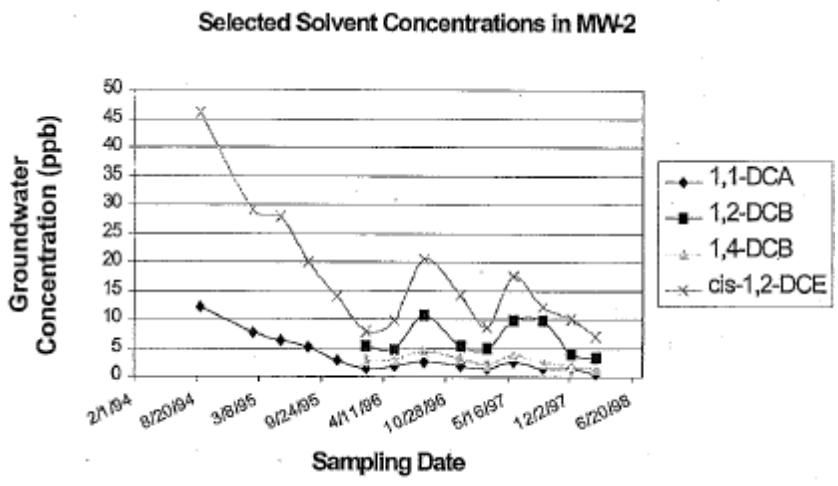


Figure 3

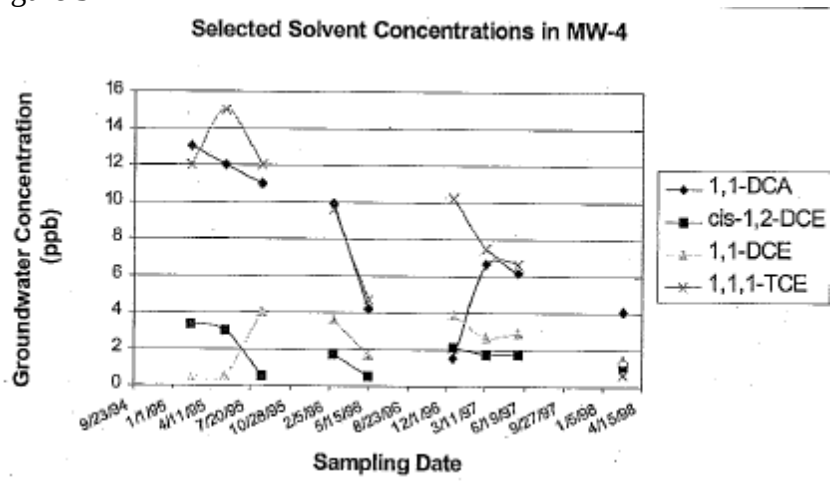


Figure 4

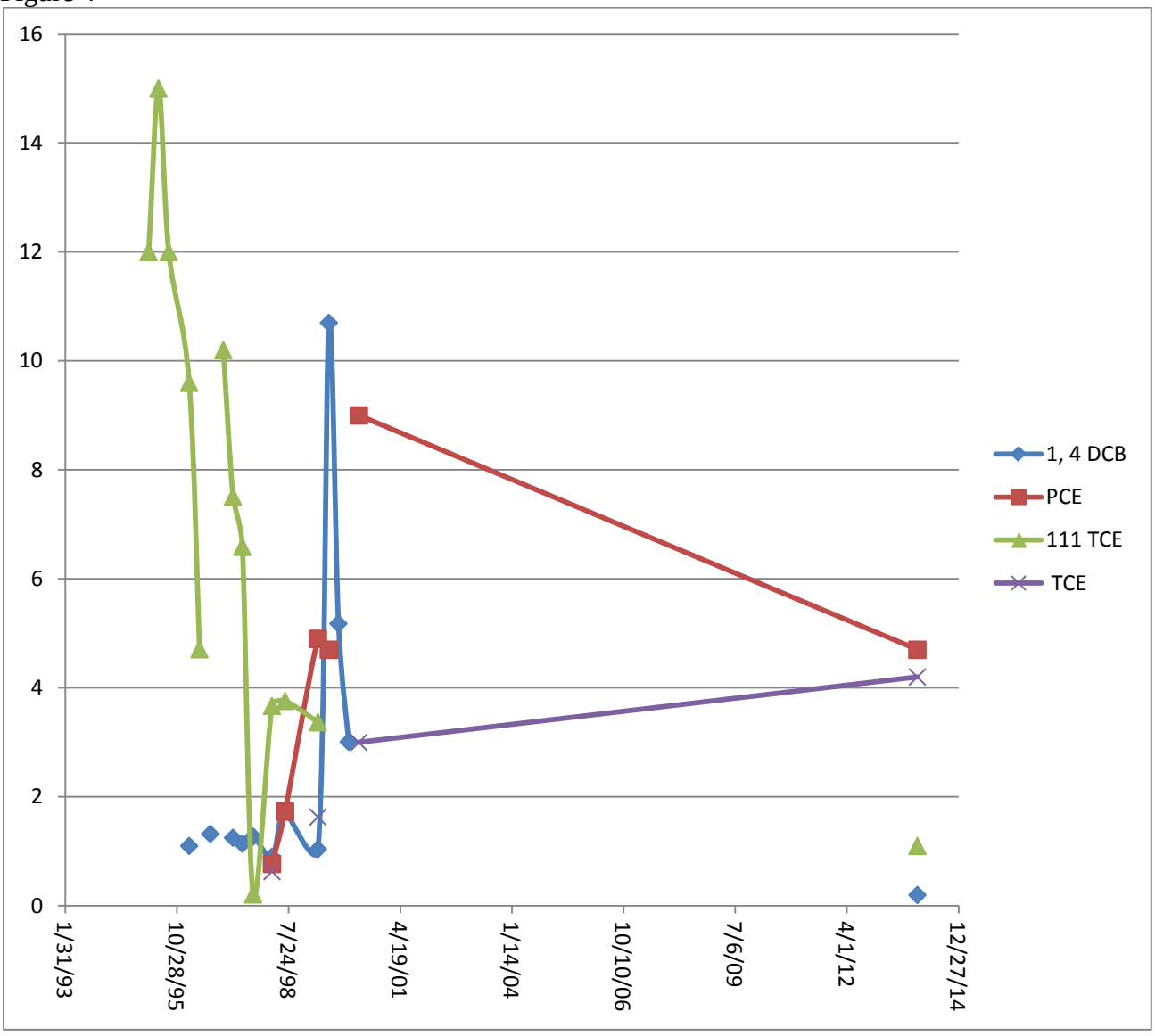
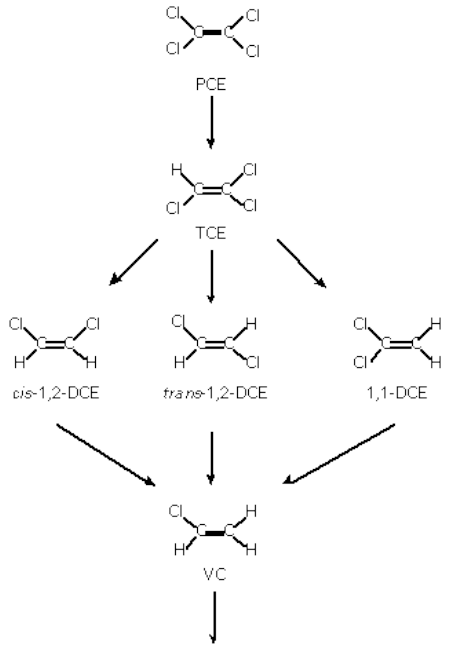
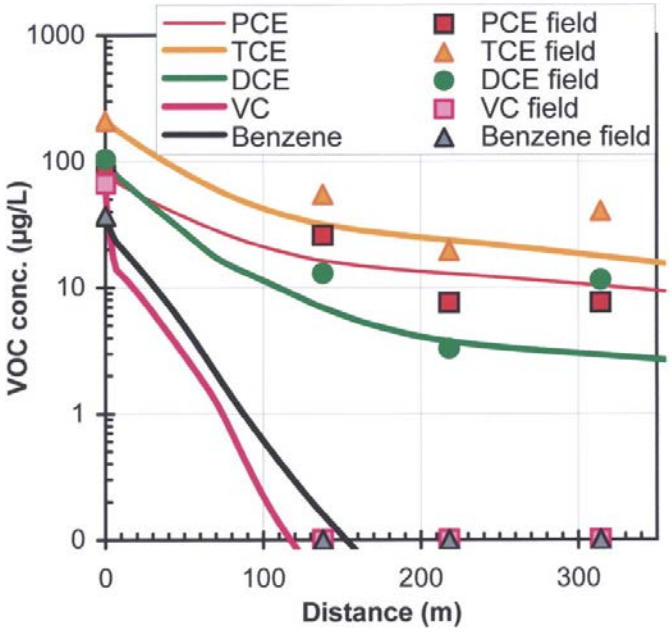


Figure 5. Microbial degradation of chlorinated ethenes to form vinyl chloride.[15]



*PEC is degraded by "…reductive dechlorination with anaerobic conditions present, with the degradation products like trichloroethene, dichloroethene, vinyl chloride, ethene, and ethane."[31] We have considered that there is some potential that VC will be detected if monitoring were to continue in the future, because VC is a daughter product of TCE. However, the graph in Figure 6 was made from a study that shows the fate of VC over distance. It appears VC is short lived compared to TCE and PCE and would likely dissipate quickly.[32]

Figure 6,



CONCLUSIONS

Considering the persistent nature of chlorinated hydrocarbons we are not surprised to find the small amount of remnant contamination left after 24 years. There has been a large effort made to remove and/or treat the gross contamination starting in 1990. There appears to be no exposure pathways that the residual contamination could present a risk. It would appear that the residual plume is below pavement and utilities such as sewer lines and surface water collection systems. There are no basements in the immediate area of the plume. The offsite topography slopes to the east, where Hall Creek (1200 feet from the site) flows south into Lake Ballinger.[30]

This community is serviced by the Lynnwood Wastewater Treatment Plant (WWTP) that is located along the shore of Browns Bay on the Puget Sound. Drinking water in this area is serviced by the City of Lynnwood, who purchases the water from the Alderwood Water District. There are few wells in the area. 71 well logs were downloaded from Washington State Department of Ecology well log site in the 2 mile radius. All of the well logs were tagged as "Water Wells" under Well Type. However, after review of the well logs only a few wells appears to be actual irrigation water production wells at the golf course, which is believed to be upgradient from this site.

In 2000 Earth Tech reported no chemical parameters were detected above MTCA action levels in groundwater samples from monitoring wells MW-1, MW-2, MW-3, MW-5, MW-6, and MW-7. Data in 2000 and 2013 show MW-4 had several hits of organic compounds. In 2000 the downward trend was not obvious for some chemical compounds such as PCE and TCE. However, with the addition 2013 data, PCE is much lower and below MTCA cleanup standard. Considering TCE is a daughter product of PCE and PCE is trending downward, we don't anticipate TCE to increase significantly. At this time all compounds of concern are under the MTCA cleanup standards and significant levels are not anticipated in the future.

RECOMMENDATIONS

Snohomish Heath District concludes that this site poses no significant threat to human health and the environment. We recommended that it receives no further action (NFA) at this time, under MTCA [WAC 173-340-310(5)(d)(ii)] because the evidence available concerning the release that occurred, in our judgment, does not pose a threat to human health or the environment.

REFERENCES

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3. Letter about soil treatment Applied Geotechnology Inc. 10/23/1990
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30. Water Quality Improvement Project Ballinger Lake Area: Total Phosphorus http://www.ecy.wa.gov/programs/wq/tmdl/BallingerLKTMDL.html
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33. Vinyl Chloride: Still a Cause for Concern Environmental Health Perspectives v.108, n.7, Jul00 Janet Kielhorn,1 Christine Melber,1 Ulrich Wahnschaffe,1 Antero Aitio,2 and Inge Mangelsdorf, Fraunhofer Institute for Toxicology and Aerosol Research with Drug Research and Clinical Inhalation, Hanover, Germany; 2 International Program on Chemical Safety, World Health Organization, Geneva, Switzerland. http://www.mindfully.org/Plastic/Vinyl-ChlorideJul00.htm

Note:

May 15, 2009: “Jack Carroll sold his Lynnwood Dodge franchise to Town & Country Chrysler Jeep of North Seattle…”
http://seattletimes.com/html/businesstechnology/2009222252_chrysler15.html

Jack Carroll's Skagit Hyundai
1313 Goldenrod Road, Burlington, WA 98233
Service: (360) 707-4714
Sales: (360) 707-4769
http://www.skagithyundai.net/ContactUsForm?siteMapItemName=4721001254253860473