



**KEY ENVIRONMENTAL AND PUBLIC HEALTH ISSUES  
ASSOCIATED WITH THE PURCHASE OF THE  
PARKER-HANNIFIN PROPERTY BY THE CITY OF BERA**

Presented by  
Kentucky Environmental Foundation  
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**SUMMARY AND RECOMMENDATION**

There appear to be significant environmental and therefore potential major public health issues associated with the purchase of the Parker-Hannifin property (hereafter known as “the property”) by the City of Berea.

The property is located at 103 Lewis Avenue, Berea, Ky. The City of Berea (hereafter known as “the City”) has provided \$5,000 in earnest money as evidence of their intent to purchase the property.

The Kentucky Environmental Foundation (KEF) has reviewed many documents regarding the environmental condition of the property and consequentially the potential public health impacts associated with the purchase and use of the property by the City. It is assumed all the documents in the possession of the City have been provided to KEF as of the date of this report.

KEF has acquired the services of two Environmental Health Science Department faculty from Eastern Kentucky University, Dr. Gary Brown and Dr. Carolyn Harvey, to review and provide observations and opinions on the environmental state of the property and the acceptability or unacceptability of the public or private use of the property, as is, by the City based on the documents provided KEF. A brief overview of the qualifications of these experts appears at the end of this paper and both have agreed to speak to the issues identified with the appropriate representatives of the City.

Having reviewed the documents, KEF and the two experts strongly advise against the purchase of the property by the City and propose the alternative of having the property declared a Brownfield by the United States Environmental Protection Agency (EPA). As defined Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” (<http://epa.gov/brownfields/>)

The EPA Brownfields program can provide grants that support revitalization efforts by funding environmental assessment and cleanup of qualified sites. This report is not intended to determine whether or not the Parker-Hannifin property qualifies, but rather to propose pursuing this option as a win-win for the City and its' citizens regarding the future use of the property.

*Instead of focusing on indemnification, KEF proposes that the City should be focused on prevention of exposure to harmful chemicals to their employees and their citizenry.*

## **FACTS OF CONCERN**

Following are the objectives and key findings in the various documents on the Parker-Hannifin property and buildings, in the chronological order. In all sections, emphasis added.

**1. SECOR, 28 October 2004: Phase II Subsurface Investigation [SECOR Project 46OT.43027.00.001].** This study was undertaken at the direction of and paid for by Parker-Hannifin.

Objective: To determine if shallow soil and groundwater was impacted by the use of chlorinated degreasing solvents and hydraulic fluids.

Primary findings:

- Monitoring Wells (stated to exist by Parker-Hannifin) *could not be located.*
- Of the 16 soil samples taken, 14 *were above the clean-up standard* for Total Petroleum Hydrocarbons (TPH) for Diesel contamination (DRO)
- Trichloroethene (aka: Trichloroethylene or TCE) (CAS#: 79-01-6) *levels exceeded residential and industrial Preliminary Remediation Goals (PRG) at two of the sample locations.* In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is “reasonably anticipated to be a human carcinogen.” The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is “probably carcinogenic to humans.” (U.S. Department of Health and Human Services <<http://www.atsdr.cdc.gov/tfacts19.html>>).

TCE exposure can occur from breathing and/or drinking water contaminated with it. Impacts are determined by dose, and include: headaches, lung irritation, dizziness, poor coordination, difficulty concentrating, impaired heart function, unconsciousness, nerve, kidney, and liver damage, impaired immune system function, and impaired fetal development in pregnant women, and death.

- Cis-1, 2 dichloromethane was also detected but at levels below residential and industrial PRG. According to DHHS, “breathing high levels of 1,2-dichloroethene can make you feel nauseous, drowsy, and tired; breathing very high levels can kill you.” <<http://www.atsdr.cdc.gov/tfacts87.html#bookmark05>>

The 2004 SECOR study concluded, “Based upon the analytical results the site appears to have been impacted with TCE in the area of SB-4 and soils impacted with heavy end petroleum hydrocarbons, *TPH DRO, are present throughout the main portion of the facility in the areas investigated.*

**2. SECOR: 22 March 2006. Additional Investigation from 2004 report.** This was also undertaken at the direction of and paid for by Parker-Hannifin.

Objective: Provide additional subsurface investigation and to evaluate potential vapor intrusion into the building.

Primary Findings:

- Volatile Organic Compounds (VOC's) detected above the laboratory-reporting limit in two soil locations.
- Isopropylbenzene (CAS # 98-82-8 0) was detected at one soil location. Inhalation can cause ataxia (gross lack of coordination of muscle movements), cough, dizziness, drowsiness, headache, sore throat and unconsciousness. "Do NOT let this chemical enter the environment (extra personal protection: A/P2 filter respirator for organic vapor and harmful dust)." <[http://training.itcilo.it/actrav\\_cdrom2/en/osh/ic/988280.htm](http://training.itcilo.it/actrav_cdrom2/en/osh/ic/988280.htm)>
- Volatile Organic Compounds (VOC's) detected in every spill gas air sample. Volatile organic compounds (VOC's) are emitted as gases from certain solids or liquids. VOC's include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOC's are consistently higher indoors (up to ten times higher) than outdoors. < <http://www.epa.gov/iaq/voc.html>>
- Air level of TCE was detected above EPA target concentration of 220 micrograms per cubic meter. TCE was detected in three borings at concentrations of 380 micrograms per cubic meter, 910 micrograms per cubic meter and 5300 micrograms per cubic meter.
- The average TCE concentration in the air was 746 mg/m<sup>3</sup>- well above EPA's residential target concentration of 220 mg/m<sup>3</sup> and above the industrial target concentration as well.

The 2006 SECOR report **concluded** that in spite of the findings noted above, "The risks associated with subsurface soil gas vapors were determined to be within the acceptable range defined by US EPA."

**3. SHIELD Environmental Associates, Inc., 29 November 2006: File Review and Indoor Air Sampling Results.** Undertaken at the direction of and paid for by Parker-Hannifin at the request of Mr. Michael Moores.

Objective: Perform a Phase I Environmental Site Assessment and indoor air quality sampling on behalf of an individual interested in purchasing the property (Mr. Michael Moores). Note that SHEILD did not perform a full Phase I Environmental Site Assessment, but "instead conducted a file review of the appropriate regulatory agencies": Kentucky Division of Waste Management, Kentucky Division of Water and the Kentucky Underground Storage Tank Branch.

Primary Findings:

- SHIELD could not find any evidence to document that a 1979 Agreed Order with the State had been satisfied. The Agreed Order contained six (6) points, including the removal of all underground storage tanks, while leaving 2 buried 10,000 gallon tanks; and a commitment to permanently eliminate all discharges to the streams of the Commonwealth. Parker-Seal was subsequently issued an oil/water separator to assist in remedial efforts, but no further

- documentation was discovered. Therefore there is no evidence to show compliance with the Agreed Order. No documentation regarding the removal of any of the tanks including a 150-gallon waste oil storage tank. No written records except for the closure of the tanks in 1993 were found.
- SHIELD concluded Mr. Moore should add liability protection (indemnification) for all past and future issues related to the Agreed Order; the known oil spill (1983) previous underground storage tank system operations and previous waste oil tank system issues.
- Air samples inside the building found three chemicals above EPA Ambient Air Preliminary Remediation Goals (PRG's): Carbon Tetrachloride; Benzene and Trichloroethene (TCE)
  - Carbon Tetrachloride was detected at 5X PRG
  - Benzene was detected at 10 X PRG
  - Trichloroethene (TCE) at 100 X PRG
  - Benzene was found throughout the building, as was TCE.
- SHIELD concluded, all three of these chemicals “are considered known carcinogens.” Furthermore, “Exceeding PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate” Additionally, “The presence of these three carcinogens in the air of the facility would warrant further investigation to determine how risks to the public can be eliminated.”

#### **4. THIRD ROCK Consultants: 21 May 2008: Environmental Condition Evaluation.**

Undertaken at the direction of and paid for by the City of Berea.

Objective: Evaluate environmental condition of the property in light of the City's interest in purchasing the property.

##### Primary Findings:

##### Hydraulic Oil Tanks

- 1983 Oil leak in hydraulic oil tanks – but no records of quantity of oil recovered.
- Soil treatment for hydraulic oil releases noted, but, “...no statistical difference in the oil contamination was measured compared to the initial level. It can be anticipated that *significant contamination is still present* in the form of heavy oil contamination of the soil.”
- Hydraulic oil was present beneath the floor of the plant in areas outside the soil treatment area.
- No documentation found to confirm the removal of the underground tank on the south side of the building.

##### Underground Storage Tanks

- One of three tanks on the property was removed in 1990 (documented). Clean closure documented for this gas tank.
- Two remaining tanks removed in 1991 (documented) Testing shows soil contaminated by fuel oil. This is *not in compliance* with Kentucky Waste Management Regulations.

##### Indoor Air Sampling:

- All three contaminants (Carbon Tetrachloride; Benzene and Trichloroethene (TCE)) found in SHEILD report were found to be **above** Region 9 EPA screening levels. *In the case of TCE, concentrations were “significantly” above screening levels.*

- Concentrations of Carbon Tetrachloride; Benzene and Trichloroethene (TCE) measured in the indoor air in the building are “*significantly higher than the Kentucky standards for an industrial setting*. It is anticipated that an *indoor air level for a recreational use would be more stringent than that for an industrial setting*.”

#### Soil Gas Assessment:

Risk associated with soil gas is regulated by Kentucky to be 1 case per million persons affected by specific chemicals (i.e. TCE). The Parker-Seal Plant showed 3.9 per million for industrial use and 6.5 per million for residential use! The report reads, “Based on this result, *remedial measures should be taken prior to any future use of the building*.”

#### Other Potential Issues:

- Possible contamination of soil and water from cooling system on the NE corner.
- Possible presence of PCB’s from electrical transformers. PCBs have been demonstrated to cause cancer, as well as a variety of other adverse health effects on the immune system, reproductive system, nervous system, and endocrine system.  
<<http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/about.htm>>
- Process Residues from pits and sumps should be evaluated.
- Surface depressions suggest burial of unknown substances on the property
- Possible contamination by lead, arsenic and chromium from “carbon black”.
- Property groundwater needs to be evaluated

Third Rock concluded:

“...the proposed ***redevelopment of this property for recreational use is not recommended*** unless further assessment of the site is conducted to determine if the VOC concentrations in the indoor air are persistent and can be mitigated. It is recommended that the City of Berea and the property owner consider the Voluntary Remediation Program (VERP) (Kentucky’s version of Brownfields) to allow regulatory agency oversight. [T]he VERP was created allowing interested parties to initiate cleanups on a property they wish to purchase and redevelop.”

Third Rock went on to conclude that they *do not recommend that the City of Berea take possession of this property* without full indemnification for all known and unknown environmental liabilities in perpetuity. ***There may be additional environmental conditions that have not been identified and could represent significant future liabilities*** and loss of use of the property.”

**5. ENSR Corporation: November 2008 :Data Analysis and Summary Report Parker Hannifin Corporation Berea, Kentucky.** Undertaken at the direction of and paid for by Parker-Hannifin.<sup>1</sup>

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<sup>1</sup> KEF notes that this report is actually a risk assessment rather than a data-gathering document. For those not familiar with the vagaries of risk assessments, consider that as the first administrator of U.S. Environmental Protection Agency, William Ruckelshaus, said in 1984: “We should remember that risk assessment data can be like the captured spy: If you torture it long enough, it will tell you anything you want to know.” Risk assessments are often used merely to argue that a certain amount of harm is justifiable, not to learn how much harm is avoidable.

Objective: To identify site related chemicals that are present in the site media and evaluate potential human health risk at the site.

Primary Findings:

- ENSR did one soil gas sample, four soil samples and one ambient air sample at the site. As will be pointed out in the Observations and Conclusions segment of this section of this paper, the sampling methods and selectivity of sampling locations raise questions about the reliability of the data collected.
- ENSR found metals in two of the four soil samples; VOC's in two of the four samples; polycyclic aromatic hydrocarbons (PAH's) in two of the four samples; and, PCB's in one sample. ALL samples were taken at a depth of .5 feet (6 inches)!<sup>2</sup>
- ENSR's soil samples identified 21 chemicals of concern in their soil samples, including, but not limited to: Arsenic; Benzo(a)pyrene; Acetone; Cadmium; Chromium; Lead; and, Mercury. (Table 2-4)
- ENSR's soil gas samples identified 33 chemicals of concern in the soil gas samples, including, but not limited to: Chloroform; Trichlorofluoromethane; Trichloroethene; Benzene; 4-Ethyltolune; and, Vinyl Chloride. (Table 2-3)
- ENSR's air samples identified three primary chemicals of concern in their air samples: Chloroform; Trichlorofluoromethane; and, Trichloroethene.<sup>3</sup>

ENSR concludes, "...there is no potential for unacceptable human health risks at the Site due to vapor intrusion of Chloroform, Trichlorofluoromethane; Trichloroethene. As a result, no further action is necessary."

KEF observes the following regarding the ENSR report/risk assessment:

- 1) The entire risk assessment done by ENSR is based on future on-site workers and assumes the individual being measured for risk weighs 70 kg (154 lbs); breathes 24 m<sup>3</sup> of air per eight-hour day, and is engaged in normal activity. In contrast, the facility is being considered for use by students possibly weighing less and breathing 35-50 m<sup>3</sup> of air per eight-hour day. Or, worse yet, young athletes, weighing less still and breathing up to 72 m<sup>3</sup> of air per eight hour day. (Addressed in the AECOM report below).
- 2) Furthermore, ENSR's own language in section 6.4 states, "[T]he risks are conditional estimates based on a considerable number of professional and subjective assumptions about the exposure and toxicity. The uncertainty of the numerical result is large." (page 6-3)
- 3) ENSR notes, "The building was ventilated twice through the week prior to sampling point installation and sample collection." No other report indicates intentional ventilation prior to sampling.

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<sup>2</sup> As a comparison, SECOR all samples were taken at minimum depths of 0-2 feet and 2-4 feet. In some cases additional samples were taken at 4-6 feet and 6-8 feet. Concentrations of chemical of concern varied at different depths. For example all TCE concentrations that failed the residential and industrial acceptable standards were found at 6-8 feet at certain locations during the SECOR investigation.

<sup>3</sup> Interestingly enough, ENRS did not identify Carbon Tetrachloride or Benzene as chemical of concern, although both SECOR and SHIELDS found both at concentrations multiple times above the Preliminary Remediation Goals levels.

- 4) ENSR conducted fewer samples than the SECOR and SHEILDS reports. Additionally, ENSR DID NOT hit the “hot spots” identified in the previous reports.
- 5) ENSR pulled 7 indoor samples whereas previous investigations pulled at least 12.
- 6) ENSR did not take soil samples where oil was spilled earlier and was noted to have not been completely remediated.
- 7) There is no consideration given to the synergistic (combined) effects of the multiple chemicals of concern identified on the property and in the facility.

KEF concludes, therefore, that ENSR’s risk assessment, *paid for by Parker Hannifin*, is fraught with flaws; inappropriately focused; suspiciously narrow and should not be relied on by the City’s in their decision making process regarding the potential purchase of the property.

**6. AECOM Environment: 10 November 2008: Recreational Use Evaluation, Parker Hannifin.** Undertaken at the direction of and paid for by Parker-Hannifin.

Objective: This memo is written in support of the ENR report. To evaluate site-related chemicals identified in the ENSR report.....and evaluate potential human health risks considering potential future recreational use of the site.

Primary Findings:

- Ambient conditions did not influence the soil gas results and were not discussed.
- For analytes lacking applicable screening levels, OSHA permissible exposure limits (PEL's) were used as surrogate screening levels in the soil gas Chemical of Concern selection process.
- Cumulative indoor air risks for both cancer and non-cancer, for adults and children, are below the EPA “acceptable level” target of 1 per million
- Cumulative soil risks for both cancer and non-cancer for both adults and children are above the 1 per million target levels being 3 per million for adults and 8 per million for children.
- Because the higher cancer/non-cancer rates are attributed to arsenic in the soil not associated with plant operations AECOM states it is not “a significant concern”.

KEF observes the following regarding these findings:

- 1) All observations noted regarding the ENSR report, with the exception of observation # 1 (i.e. “The uncertainty of the numerical result is large.”), apply to the AECOM report.
- 2) OSHA permissible exposure limits should NOT be used as surrogate screening levels as these are targeted at industrial sites and assume adult risks.
- 3) Cancer and non-cancer rates for indoor air and soil DO NOT consider exposures to individuals from other sources to which exposures from this property could increase risk. In other words, the risks do not acknowledge the total exposures (background levels) of the chemicals of concern already carried by individuals who would be exposed to similar chemicals at this site.

KEF notes that the mere fact that the cancer rate for children has been identified as eight times what is deemed “acceptable” by the US EPA, regardless of the cause, should be enough to have the City reject purchase of this property.

## CONCLUSIONS

There can be no argument that over the years, the property under consideration for purchase has been environmentally impacted by previous industrial operations taking place there. This is not an indictment of the company who occupied the property, or of the workers that operated the facility. The plant operated since the 1950’s when the environmental and public health impacts of such activities were much less understood. However, the City should not use a 1950’s mentality when it comes to protecting its citizens.

Inconsistencies abound between the findings of the reports. In some cases, certain chemicals were found to be significantly above screening levels, while in others they were not identified at all. For example, tentatively identified compounds<sup>4</sup> (TIC’s), were not considered in any of the reports reviewed. Since the studies only looked for targeted compounds (re: analytes), it is very likely that additional chemicals of concern are present on the property that have not yet been identified.

Samples in the most recent report (ENSR and relied on in AECOM) were taken at locations other than those identified in earlier reports where contamination was found. These more recent reports, based on this approach (avoiding “hot spots”) were understandably more positive of the proposed use of the property than were the earlier reports.

Interestingly, earlier reports, even those paid for by Parker Hannifin, were noticeably more cautious in recommending purchasing of the property than were the more recent reports, written after the City showed more interest in making the purchase.

Risk assessments are always suspect, particularly those done by or paid for by individuals or entities that have a vested interest in the outcome.

The City would be wise to consider carefully the recommendation made by the only review done by an entity hired by the City, arguably the contractor most attuned to the best interests of its client. Specifically, Third Rock recommended that, “...*remedial measures should be taken prior to ANY future use of the building.*”

There is an increase in corporations trying to “unload” contaminated properties as environmental regulations tighten and a greater understanding the impacts of certain chemicals alone or in combination have on humans and the ecology. Indemnification by purchasers, regardless of how

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<sup>4</sup> TICs or Tentatively Identified Compounds are those that can be detected by an analytical method but concentration cannot be confirmed without additional analytical testing. For instance, a gas chromatograph/mass spectrometer instrument can be calibrated to identify and quantify the concentrations of a number of target compounds. However, additional compound spectra may be detected for which instrument was not calibrated. Their identity can often be confirmed with a search of the spectral library of compounds to find a match.

[http://www.caslab.com/Tentatively\\_Identified\\_Compounds\\_TICs\\_Meaning/](http://www.caslab.com/Tentatively_Identified_Compounds_TICs_Meaning/)

concisely written is no guarantee that the purchaser will not be responsible for at least a portion of any liability. Even if, ultimately not held responsible, a significant amount of time and money can be consumed defending against such claims.

In cases where there are inconsistencies in research or sampling data, and where the cause-and-effect relationships between contamination and illness are not, or could not be proven, governments should be acting in a manner of precaution. In this case, there exists too much evidence of potential harm and too much uncertainty that such harm will not occur if the property is not cleaned up. Remediation is clearly the right thing to do to protect the environment and health of the people who live in close proximity to the facility, and certainly when considering any future use of the property by anyone, especially children.

KEF recommends that the City should begin investigating the specifics necessary to have the property remediated as a Brownfield, and we pledge our assistance as much as possible to ensure that this property be cleaned up to a level that is safe for residents and businesses as soon as possible.

*Instead of focusing on indemnification, KEF recommends that the City of Berea should be focused on prevention of exposure to harmful chemicals to their employees and their citizenry.*

## PROFESSIONAL REVIEWERS

1. Dr. Gary Brown, CIH  
PhD: Public Health, Occupational Safety & Health, and University of Alabama at Birmingham, 2001  
MS: Environmental and Occupational Health, Hunter College, New York, 1992  
BA: Environmental Science, State University of New York, Buffalo, 1990  
Certified Industrial Hygienist CIH
  
2. Dr. Carolyn Harvey, CHMM, CIH:  
PhD: Occupational Health and Safety, University of Texas School of Public Health, 1994  
MS: University of Houston-Clear Lake, 1979  
BS: East Tennessee State University, 1967  
American Board of Industrial Hygiene  
Certified Industrial Hygienist, Certificate Number 8991 CIH  
Academy of Hazardous Materials Managers  
Certified Masters Level #0816 CHMM  
National Registry of Environmental Professionals  
Registered Environmental Professional #5533 REP

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## ABBREVIATIONS

CAS	Chemical Abstracts Service (numerical identifiers for chemical elements, compounds, polymers, biological sequences, mixtures and alloys)
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
DHHS	Department of Health and Human Services
DRO	Diesel Range Organics (contamination)
EPA	Environmental Protection Agency
IARC	International Agency for Research on Cancer
KEF	Kentucky Environmental Foundation
kg	kilograms
m <sup>3</sup>	cubic meter
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PAH's	Polycyclic Aromatic Hydrocarbons
PCB's	Polychlorinated biphenyls
PEL's	Permissible Exposure Limits
PRG	Preliminary Remediation Goals
TCE	Trichloroethylene (also Trichloroethene)
TICs	Tentatively Identified Compounds
TPH	Total Petroleum Hydrocarbons
VERP	Voluntary Remediation Program (Kentucky's version of Brownfields)
VOC's	Volatile Organic Compounds