HEALTH CONSULTATION

Public Health Implications from Possible Exposures to Contaminated Sites

Borough of Fair Lawn
Bergen County, New Jersey

Prepared by the New Jersey Department of Health

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Table of Contents

Statement of Issues

In 2023, the New Jersey Department of Health (NJDOH) became aware of health concerns and possible environmental exposures in the Borough of Fair Lawn, Bergen County New Jersey. To address these concerns, NJDOH representatives held two public availability sessions at the Fair Lawn Borough Hall on August 30, 2023, to meet with community members and gather more information on specific exposure concerns from contaminated sites in the area. Approximately 15 people attended the availability sessions.

Several concerns were raised by residents including possible health effects, such as cancer and birth defects, caused by environmental exposures in the community. Residents expressed concerns about potential exposures from several sites and/or contaminants in the area including:

- Fair Lawn Well Field Superfund Site (evaluated in a separate document),
- Former Topps Cleaners site (page 11),
- Former Nabisco site (page 23),
- Former Borden Coatings and Graphics site, (page 29),
- Former Sandoz Chemicals Corporation site. (page 32),
- Drinking water containing per-and polyfluoroalkyl substances (PFAS) and 1,4 dioxane in Fair Lawn and Glen Rock (page 35), and
- Indoor air contaminants at Glen Rock High School (page 41).

NJDOH representatives explained the process of evaluating potential health effects from possible environmental exposures and provided a fact sheet on this process. The first step in evaluating community exposures is to determine whether there is a current completed environmental exposure pathway (for example, residents drinking contaminated water) so actions can be taken immediately to interrupt the exposure pathway and protect public health. Health-protective recommendations are made based on the potential for environmental contamination to increase the risk of cancer or cause other adverse health effects. If a completed environmental exposure pathway is present, the public health assessment process next evaluates the potential for adverse health effects by conducting modeling/risk assessment on environmental data.

This health consultation was prepared in alignment with the approach NJDOH follows under its cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It evaluates the public health implications from exposures to the above-mentioned sites, some of which are under the oversight of the New Jersey Department of Environmental Protection (NJDEP). Addressing health implications associated with the Fair Lawn Well Field Superfund site are planned for a separate document, which will be released jointly with ATSDR.

The Fair Lawn Well Field site has been listed on the U.S. Environmental Protection Agency's (EPA) National Priorities List (NPL), or Superfund, since September 1983, and the ongoing groundwater contamination remediation is being overseen by EPA. NJDOH staff are funded by ATSDR to evaluate the potential public health implications for all NPL sites in New

Jersey as required by congressional mandate. To comply with this requirement, NJDOH has prepared several documents evaluating possible exposures to contaminants from the Fair Lawn Well Field site.

These documents were released between January 1989 and September 1996, and can be found at nj.gov/health/ceohs/environmental-occupational/hazardous-waste-sites/bergen/index.shtml#4. Since the release of these documents and prior to the availability session in the summer of 2023, NJDOH was not aware of any community concerns pertaining to this site and had not received any requests from NJDEP to evaluate data collected by them or on their behalf.

The former Topps Cleaners site, the former Borden Coatings and Graphics Site, and the former Sandoz Chemicals Corporation site are being addressed by licensed site remediation professionals (LSRPs) under NJDEP oversight. If indoor air samples are collected during investigations by LSRPs, the results are provided to residents with NJDOH's contact information to address any health concerns regarding the results. NJDOH has not been contacted by any concerned residents pertaining to these sites during the environmental investigations and prior to the August 2023 availability session.

In 2016 and 2018, NJDOH evaluated indoor air data collected at the Glen Rock High School in response to indoor air quality concerns from school staff. This evaluation was provided in letters sent to the Glen Rock Board of Education and can be found in **Appendix E** at the end of this document.

Executive Summary

Former Topps Cleaners Site

The primary concern raised by residents regarding the former Topps Cleaners site is possible indoor air impacts from contaminated groundwater vapors entering homes in the area through a process called vapor intrusion. In April 2007, at the request of NJDEP, NJDOH evaluated indoor air data collected by NJDEP for homes potentially impacted by the former Topps Cleaners site.

At the 2023 availability session, community concerns were raised about the site and NJDOH representatives learned that additional data had been collected from homes in the area by an LSRP on behalf of NJDEP since April 2007. This report summarizes NJDOH's evaluation of the public health implications from exposures to site contaminants based on these additional data.

Based on these additional data provided to NJDOH from the LSRP, four homes had elevated levels of trichloroethylene (TCE) which may have resulted in an increased risk for fetal heart impacts for pregnant women from short-term TCE exposures, and kidney effects in adults from long-term TCE exposures. One of these four homes also had an increased theoretical risk for cancer. It should be noted that this is a theoretical cancer risk and is not a prediction that

cancer will occur. The theoretical risk is used as a tool to make decisions to reduce exposures. These findings are also based on the maximum detected concentrations of TCE in these homes and represent one point in time. Therefore, these findings represent the "worst case" exposure scenario.

Three of these homes had vapor mitigation systems installed to reduce elevated TCE levels after the LSRP determined that vapor intrusion was occurring. The TCE detected in the fourth home is from background sources and not vapor intrusion. The LSRP provided information on background sources of TCE to these residents. There are no current exposure concerns for the former Topps Cleaners site.

Next Steps: The NJDEP and LSRP should continue to ensure that the vapor mitigation systems and air purifying units continue to operate properly to prevent subsurface vapors from entering impacted homes. The NJDEP and LSRP should continue to monitor the indoor air of homes located in the area of groundwater contamination where there is no active mitigation system to ensure that subsurface vapors do not impact these homes.

Former Nabisco site

The main concern regarding the former Nabisco site was the demolition of the facility and possible community exposures to asbestos. Asbestos abatement activities related to the demolition of the structures at the former Nabisco factory facility are overseen by both EPA and New Jersey Department of Labor and Workforce Development to ensure they are compliant with State and Federal regulations.

Based on information provided to NJDOH regarding past demolition and abatement activities, all asbestos samples collected along the perimeter of the former Nabisco property were below asbestos clearance criteria and were in compliance with state and federal asbestos regulations.

Next Steps: The EPA is the lead on this site with NJDEP as the state oversight. Any community concerns regarding the Nabisco asbestos abatement activities, monitoring requirements ensuring no releases, and future demolition activities should be directed to the USEPA: epa.gov/aboutepa/region-2-media-contacts.

Former Borden Coatings and Graphics and the Former Sandoz Chemicals Corp. Sites

The primary concern regarding these sites was from possible vapor intrusion impacts to homes in the area due to groundwater contamination from leaking underground storage tanks. Based on the information provided to NJDOH, vapor intrusion was not occurring. Therefore, there is no exposure concern for either of these sites.

Next Steps: Contamination at both sites is being addressed by LSRPs under NJDEP oversight and the groundwater is monitored to ensure that these sites do not pose a threat to area properties.

Glen Rock High School

In 2016, the NJDOH was asked by the Glen Rock Board of Education (BOE) to review indoor air data collected at the Glen Rock High School to address indoor air quality concerns from school staff. The data were collected by the Glen Rock BOE's environmental consultant in August and September 2016, and again in May 2018. The indoor air contaminants found in Glen Rock High School were from sources within the school and not associated with any known contaminated sites in the area. Based on NJDOH's evaluation of the indoor air data, health effects were not expected from indoor air exposures at Glen Rock High School and letters were sent (included in **Appendix E**) to the Glen Rock BOE explaining the results. There are no next steps.

Glen Rock/Ridgewood Drinking Water – 1,4 dioxane and PFAS

Residents living in Glen Rock and Ridgewood expressed concerns about potential health impacts from drinking water recently identified with emergent contaminants 1,4-dioxane and PFAS. Based on NJDOH's review of drinking water data, health effects are not expected from exposures to1,4 dioxane in Glen Rock/Ridgewood drinking water. PFAS been used for over 50 years and are in many everyday products and most people are exposed to a mixture of PFAS chemicals. Not all PFAS chemicals stay in the body for the same amount of time or have the same toxicity. The current research on health effects of PFAS exposure are summarized in the NJDOH Per- and polyfluoroalkyl substances (PFAS) fact sheet and includes a link to guidance directed to health care providers to assist in addressing concerns in communities with PFAS in their drinking water. Health effects potentially associated with PFAS exposure include increases in cholesterol levels, decreases in birth weight, lower antibody response to vaccines, kidney and testicular cancer, pregnancy-induced hypertension, preeclampsia, and changes in liver enzymes. Exposure to PFAS above health-based values does not necessarily mean one will experience health problems in the future.

Next Steps: Specific health concerns regarding PFAS exposures should be discussed with a health care provider. The Centers for Disease Control and Prevention (CDC)/ATSDR has developed information for clinicians that that can be shared with health care providers to determine the best path forward based on an individual's unique circumstances. Ridgewood Water has been in compliance with NJDEP's PFAS monitoring requirements since the NJ MCLs were adopted in 2020. The water utility is upgrading the water treatment network at all its facilities and details can be found at this link: water.ridgewoodnj.net/wp-content/uploads/2023/04/Ridgewood-NJ-Fact-Sheet_v4.pdf.

Section I – Risk Assessment Process

This section describes how NJDOH evaluated the potential public health implications from possible exposures to contaminants associated with the above listed sites. This process involved assessing potential exposure pathways (i.e. whether contaminants can get into the body), determining if contaminants exceed established standards or screening values, and evaluating the likelihood of harmful health effects from exposure to these contaminants.

Scientific Evaluation

NJDOH follows the ATSDR standard method for assessing community health risk. The scientific evaluation includes the following steps:

1. Exposure pathway evaluation
2. Screening analysis
3. Exposure Point Concentrations (EPCs) and exposure calculations
4. In-depth toxicological effects analysis – noncancer and cancer health effects

The first assessment step determines if there is a completed exposure pathway. An exposure pathway is the link between an environmental release, or source of contamination, and the point where a population might come into contact with, or be exposed to, the environmental contaminant. Exposure pathways are used to evaluate specific ways in which people were, are, or will be exposed to environmental contamination in the past, present, and future.

1. Exposure Pathway Analysis

An exposure pathway is a series of steps starting with the release of a contaminant in environmental media and ending with contact with the human body. A completed exposure pathway has the following five elements:

1. *Contaminant source*: Where did the contaminants come from?
2. *Environmental fate and transport*: How contaminants released to the environment move through and across different media, as well as how they degrade or transform in the environment.
3. *Exposure point*: The specific location(s) where people might come into contact with a contaminated medium.
4. *Exposure route*: The path by which contaminants enter the body (dermal, inhalation, ingestion).
5. *Potentially exposed population*: The people who potentially have, do, or could come in contact with environmental contaminants.

In general, ATSDR examines the exposure pathway elements and considers three exposure categories for past, present, and future site-specific situations:

- Completed exposure pathways: All five elements of a pathway are present.
- Potential exposure pathways: One (or more) element is absent, but information is insufficient to eliminate or exclude the element.
- Eliminated exposure pathways: One (or more) element is absent, and it never will be (or is extremely unlikely to be) present.

A completed exposure pathway does not necessarily mean that harmful health effects will occur. It simply indicates that all five elements are present, and that further evaluation and screening of contaminants is necessary. The likelihood of health effects depends on specific exposure conditions such as the exposure duration, contaminant toxicity and concentration, and

exposure frequency – in other words, how long the exposure occurs, how toxic the contaminants are, how much contamination is present, and how often the exposure occurs. To determine whether health effects are possible, NJDOH will further evaluate any completed exposure pathways.

2. Screening Analysis

A screening analysis involves comparing maximum concentrations of detected substances to media-specific screening levels. These screening levels help us understand what exposure levels of contaminants are safe. These screening levels can be ATSDR comparison values (CV) or other non-ATSDR values including those established by NJDEP or EPA. If concentrations meet or exceed the CV, these substances, referred to as potential contaminants of concern, are selected for further evaluation. Concentrations that meet or exceed ATSDR CVs or non-ATSDR screening levels do not mean that health effects are likely, but they do help health assessors prioritize which contaminants to evaluate further [ATSDR PHAGM 2022].

Comparison Values

Many CVs are available for screening contaminants. CVs help identify potential contaminants of concern. CVs include ATSDR environmental media evaluation guides (EMEGs) and reference media evaluation guides (RMEGs). EMEGs represent estimated contaminant concentrations below which humans exposed during a specific timeframe (acute, intermediate, or chronic) are not expected to experience harmful noncancer health effects. RMEGs are based on EPA's reference doses. RMEGs represent the concentration in water or soil at which daily human exposure is unlikely to result in harmful noncancer health effects.

If the substance is a known or a probable carcinogen and has cancer toxicity values, health assessors also consider ATSDR's cancer risk evaluation guides (CREGs) for comparison values. CREGs are estimated contaminant concentrations in soil or water that would be expected to cause no more than one excess cancer in a million (10^{-6}) people exposed during their lifetime.

For some contaminants, EPA or NJDEP's screening levels may be used when no other CVs are available. Examples of these include NJDEP's Non-Residential Indoor Air Remediation Standards (NRIARS), EPA's Maximum Contaminant Levels (MCLs) for drinking water, and DEP's soil remediation standards.

After completing a screening analysis, contaminants identified at the site are divided into two categories:

- Contaminants requiring no further analysis (below established screening levels).
- Contaminants requiring further evaluation because they meet or exceed established screening levels, have no screening levels available, or represent a contaminant of concern (e.g., a community concern).

3. Exposure Point Concentrations for Contaminants of Concern

Once the screening analysis has been completed, the exposure point concentrations (EPCs) is estimated for completed and potential exposure pathways. When assessing the public

health implications of exposure to a contaminant of concern, ATSDR recommends using the 95% upper confidence limit (UCL) of the arithmetic mean to determine the exposure point concentration (EPC) [ATSDR 2019]. The 95% UCL is considered a conservative estimate of average contaminant concentrations in an environmental medium. Using ATSDR guidance, the 95% UCL is used for contaminants with at least eight samples and for samples with at least 20% detections [ATSDR 2019]. Maximum concentrations are used as EPCs for contaminants with less than eight samples and less than 20% detections.

4. In-Depth Toxicological Analysis

Noncancer Health Effects

For health effects other than cancer, exposure doses and health guidelines are used to calculate hazard quotients (HQs). The hazard quotient is defined as the exposure dose divided by the appropriate health guideline value. When the hazard quotient exceeds 1.0 and approaches effect levels seen in toxicological literature, the potential for harmful effects increases. Noncancer health effects are not expected for hazard quotients below 1.0.

ATSDR developed health guidelines called minimal risk levels (MRLs) for contaminants that are commonly found at hazardous waste sites. An MRL is an estimate of the daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk for adverse, noncancer health effects. MRLs are developed for a route of exposure, such as swallowing or breathing, over a specified period. Exposure periods are classified as follows:

- acute (less than 14 days),
- intermediate (15 – 364 days), or
- chronic (365 days or more).

MRLs are based largely on toxicological studies in animals and on reports of human workplace exposures. MRLs are usually extrapolated doses (with safety factors applied) from effect levels reported in animal toxicological studies or occupational studies. In toxicological literature, effect levels are usually reported as follows:

- no-observed-adverse-effect level (NOAEL) and
- lowest-observed-adverse-effect level (LOAEL).

A NOAEL is the highest dose of a substance from a study that has been reported to have no harmful health effects on people or animals. A LOAEL is the lowest dose of a substance from a study that has been reported to cause harmful health effects in people or animals. Based on current ATSDR guidance, calculated exposure doses are compared to effect levels (LOAELs) when determining the potential for health effects. As the exposure dose increases beyond the MRL to the level of the LOAEL, the likelihood of adverse health effects increases. To ensure that MRLs are sufficiently protective, the extrapolated values can be several hundred times lower than the effect levels reported in experimental studies.

The next step is to evaluate and integrate exposure data (e.g., site-specific exposure conditions, doses, concentrations) and contaminant-specific health effects data from toxicologic or epidemiologic studies. The result of this in-depth toxicologic analysis is a qualitative description of whether site-specific exposures could adversely affect public health. During this part of the evaluation process, ATSDR estimates site-specific exposure doses and compares those to the MRLs. If contaminant concentrations are above MRLs, ATSDR reviews exposure variables (such as duration and frequency), the toxicology of the contaminant, and epidemiology studies to determine likelihood of possible health effects. The MRLs are developed based on data drawn from the epidemiologic and toxicological literature. Many uncertainty factors, sometimes known as safety factors, are applied to ensure that they amply protect human health.

Cancer Health Effects

NJDOH evaluates the potential for cancer health effects by assessing the excess cancer risk relating to exposure over the background cancer risk. In New Jersey, nearly 45% of women and 47% of men (approximately 46% overall), will be diagnosed with cancer in their lifetime [NJDOH 2023; New Cancer Cases in NJ 2021 NJDOH fact sheet]. This is referred to as the "background cancer risk."

The term "excess cancer risk" represents the risk on top of the background cancer risk and is referred to as the Lifetime Excess Cancer Risk, or LECR. An LECR of "one-in-a-million" (1/1,000,000 or 10^{-6} cancer risk) means that if one million people are exposed to a cancer-causing substance at a certain level for the same period of time, then one cancer above the background number of cancers may develop in those one million people over the course of their lifetime (considered to be 78 years).

To put the LECR of 10^{-6} in context of New Jersey's background cancer risk, the number of cancers expected in one million people over their lifetime is 460,000 (46%). If these one million people are all exposed to a cancer-causing substance for a specific duration, then 460,001 people may develop cancer instead of the expected 460,000 over the course of their lifetime (78 years).

NJDOH follows the ATSDR guidelines to evaluate theoretical cancer risks from environmental exposures (ATSDR 2022). When the estimated cancer risk is above one additional cancer case per 10,000 people (expressed quantitatively as $1x10^{-4}$), there is a concern for an increased cancer risk. Several factors are considered in determining whether cancer risks less than 1×10^{-4} are a health concern. Site specific factors may be considered in addition to the default factors used in the risk assessment model (which include the length of exposure, sensitive populations who may already have an elevated risk due to exposure to other carcinogens, and exposure to mutagenic carcinogens at a young age). Additionally, if the maximum concentrations were used to estimate cancer risk because of limited data, the estimated risk may not represent actual exposures.

It should be noted that the estimated cancer risks are a theoretical estimate of risk that NJDOH uses as a tool for deciding whether public health actions are needed to protect health. It

is not an actual estimate of cancer cases in a community and is not a prediction that cancer will occur.

According to the U.S. Department of Health and Human Services (DHHS), possible cancer classes of contaminants detected at a site are as follows:

1 = Known human carcinogen
2 = Reasonably anticipated to be a carcinogen
3 = Not classified

The CREGs developed for carcinogens presented earlier are based on one excess cancer case per 1,000,000 individuals exposed for a lifetime. NJDOH considers estimated cancer risks of less than or equal to one additional cancer case among one million persons exposed an unlikely increased cancer risk (expressed exponentially as 10^{-6}).

Section II – Public Health Implications from Exposures to Contaminated Sites

The following section is the scientific evaluation process as described above which was used to evaluate the potential public health implications from possible exposures to contaminants for the each of the individual sites.

Former Topps Cleaners Site

Introduction

The Topps Cleaners site is located at 22-02 Fair Lawn Avenue in Fair Lawn Borough, Bergen County, New Jersey. Several business owners conducted dry cleaning operations at this facility between 1950 and 2004 using tetrachloroethylene (also called perchloroethylene, PERC or PCE) as the cleaning solvent. The property previously contained a one-story building with a sub-basement. This building was demolished as part of remedial activities in December 2005.

Investigation of the Topps Cleaners site began in 1990, after PCE was detected in groundwater samples collected as part of remedial investigation activities for the adjacent Exxon Mobil site by NJDEP. Chlorinated solvents such as trichloroethylene (TCE) and cis 1,2-dichloroethylene (DCE), which are breakdown products of PCE, were also detected. The DEP required additional remedial investigations, however, the owner of Topps Cleaners failed to comply with NJDEP requirements.

In 1998 and 1999, remedial investigations conducted for two contaminated sites in the area partially delineated PCE contamination for areas outside of the Topps Cleaners property boundary, which led NJDEP to conclude that the Topps Cleaners property was the source of both on-site and off-site PCE contamination. The location of the former Topps Cleaners site can be found on Figure 1 in **Appendix A**.

In August 2003, remedial investigations by DEP resumed at the Topps Cleaners site which included groundwater and soil sampling to delineate the extent of chlorinated solvent contamination (primarily PCE) for on-site and off-site areas.

For off-site areas, sub-slab gas and indoor air sampling was initiated in May 2005 for 11 residences along the west side of Plaza Road to investigate if off-site PCE contamination was impacting nearby residences. Based on these results and the results of several additional rounds of indoor air sampling, PCE concentrations were found to exceed the DEP Residential Indoor Air Screening Level (RIASL) for PCE for three residences.

This prompted the installation of sub-slab depressurization systems for these three residences, which was completed by June 2006. Further groundwater delineation was extended to the east side of Plaza Road and included sub-slab gas and indoor air sampling of six residences on Plaza Road (east side), three residences on Ramapo Terrace, and one residence on Ramsey Terrace. Monitoring of all 21 residences was conducted on a quarterly basis by the NJDEP.

On- and off-site soil and groundwater contamination is being addressed with remedial oversight by the NJDEP. Based on further groundwater delineation of PCE, sub-slab gas sampling has been performed for three additional residences on Ramsey Terrace and seven residences on Townley Road as of November 2006.

Prior NJDOH Involvement

It should be noted the NJDOH previously prepared a health consultation at the request of the NJDEP, which evaluated indoor air exposures to PCE for area residents. The health consultation, which was released in April 2007, concluded that harmful health effects are not likely from exposures to PCE. TCE was not detected during this vapor intrusion investigation. In its 2007 report, NJDOH recommended that NJDEP continue monitoring impacted homes to ensure that the mitigation systems are functioning properly and that PCE levels do not exceed the DEP RIASL [NJDOH 2007].

After NJDOH released the report in April 2007, the LSRP for the former Topps Cleaners site continued sampling additional homes and communicating with residents. NJDOH has not been involved in these efforts, although the site's LSRP provided residents with their indoor air results along with NJDOH contact information. NJDOH has not been contacted by any residents. The site LSRP is communicating with residents about their indoor air results.

This health consultation evaluates additional indoor air data collected between December 2006 and March 2023 by a LSRP on behalf of NJDEP. Since November 2006, the LSRP for the former Topps Dry Cleaners site has conducted vapor intrusion investigations for 62 residential properties impacted by contamination from the site (see Figure 1 **Appendix A**).

Of the 62 residential properties, 42 have indoor air data that were included in this evaluation. Twenty-five of the 42 properties have remediation systems in place to prevent subsurface vapors from entering the homes. These remediation measures include sub-slab

depressurization systems (SSDS) or indoor air purifiers. Indoor air samples were not collected for the 20 properties in which site-related contaminants sampled in the soil gas beneath the homes were not elevated.

For indoor air exposures, ATSDR uses the measured air concentrations adjusted for the exposure frequency (i.e., worker, school, residential). A residential exposure scenario was used for this evaluation.

Completed Exposure Pathways

NJDOH evaluated the indoor air data to determine whether the detected concentrations of PCE and TCE pose a health concern. For any contaminant to be a health concern, the contaminant must be present at a high enough concentration to cause potential harm and an exposure pathway must be present.

There was a completed exposure pathway for past exposures to indoor air contaminants for some residents before remedial actions were put in place to prevent subsurface vapors from entering homes. These remedial measures included the installation of the SSDS, or the use of indoor air purifiers.

Some homes are undergoing long term monitoring to make sure vapor intrusion does not occur in these homes. Current and future exposures have been interrupted for homes where vapor intrusion was occurring. Some homes were found to have low levels of PCE and TCE after remedial measures were put in place, however these detections were attributed to background sources and not vapor intrusion.

Table 1 summarizes the contaminants of concern and the number of residential properties exceeding the applicable comparison values for contaminants related to the Topps Cleaners Site. Twenty-seven residential properties had at least one contaminant which exceeded applicable comparison values. As shown in the table, PCE, TCE, cis-1,2-DCE, and vinyl chloride exceeded their comparison values in at least one residential property and, therefore, are identified as contaminants of potential concern.

Table 1. Summary of contaminants of potential concern – Residential Properties

Contaminant	Maximum concentration (µg/m^3)	Comparison value (µg/m^3)	Does maximum exceed comparison value?	# of properties exceeding the comparison value	Contaminant of potential concern
PCE	1,060	3.8 (CREG)	Yes	14	Yes
TCE	37	0.21 (CREG)	Yes	25	Yes
DCE	77	42 (RSL)	Yes	1	Yes
Vinyl Chloride	18	0.11 (CREG)	Yes	2	Yes

Definitions: PCE = Tetrachloroethylene; TCE = Trichloroethylene; DCE = cis-1,2-Dichloroethylene; µg/m^3 = micrograms of contaminant per cubic meter of air; CREG = ATSDR cancer risk evaluation guide; RSL = EPA regional screening level

In Depth Toxicological Analysis – Evaluating the potential for health effects

EPCs were calculated for 27 residential properties where PCE, TCE, cis-1,2-DCE, and vinyl chloride exceeded comparison values. Table 2 shows the EPCs used for each contaminant of concern. Some homes had more than one exceedance for contaminants of concern; however, for simplicity, only the maximum EPCs for each contaminant of potential concern are listed in Table 2.

Table 2. Exposure Point Concentrations for contaminants of potential concern

Contaminant	Maximum EPC * ($\mu g/m^3$)	EPC type
PCE	133	95% UCL
TCE	37	Maximum
DCE	77	Maximum
Vinyl Chloride	18	Maximum

*Exposure point concentration represents the maximum concentration for properties with less than 8 samples or less than 20% detections, or the 95% upper confidence limit of the mean; PCE = Tetrachloroethylene; TCE = Trichloroethylene; DCE = cis-1,2-Dichloroethylene; $\mu g/m^3$ = micrograms of contaminant per cubic meter of air

Evaluating the Potential for Health Effects Other than Cancer

For health effects other than cancer, the calculated EPCs for all four contaminants of concern were compared to applicable health guidelines. The EPCs for PCE, TCE and vinyl chloride were compared to ATSDR's health guideline known as a Minimal Risk Level (MRL).

For contaminants without an MRL, the EPA's reference concentration (RfC) is used. An RfC is an estimate of a continuous inhalation exposure concentration to people (including sensitive subgroups) that is likely to be without risk of harmful effects during a lifetime. Since cis 1,2-DCE does not have an ATSDR MRL, the EPC for this contaminant was compared with EPA's RfC.

ATSDR's approach for evaluating inhalation exposures in a residential setting is to use the measured air concentrations (or EPCs) of the contaminant and compare it to the MRL via a ratio known as a "hazard quotient." The hazard quotient is defined as follows:

$$\textit{Hazard Quotient (HQ)} = \frac{\textit{Air Concentration (EPC)}}{\textit{ATSDR MRL or EPA RfC}}$$

Hazard quotients were calculated for all contaminants of concern in all 27 properties. As the hazard quotient increases above 1.0, the potential for harmful effects increases and further evaluation is warranted. This further evaluation includes comparing the measured air concentration to the LOAEL or NOAEL to determine the likelihood of noncancer health effects. If the hazard quotient is less than 1.0, harmful noncancer health effects are not expected. Table 3 summarizes the maximum hazard quotients for contaminants at the 27 properties.

Table 3. Hazard Quotients for contaminants of concern – Topps Cleaners Site

Contaminant	Maximum EPC * (µg/m^3)	Health Guideline (µg/m^3)	Maximum HQ **	# Properties exceeding HQ of 1	Further evaluation needed?
PCE	133	41 (MRL)	3.2	1	**Yes (HQ exceeds 1)**
TCE	37	2.1 (MRL)	18	9	**Yes (HQ exceeds 1)**
DCE	77	40 (RfC)	1.9	1	**Yes (HQ exceeds 1)**
Vinyl Chloride	18	51 (MRL)	0.35	0	No (HQ less than 1)

Definitions: PCE = tetrachloroethylene; TCE = trichloroethylene; DCE = cis-1,2-Dichloroethylene; MRL = chronic minimum risk level for PCE and TCE, intermediate minimum risk level for vinyl chloride; RfC = EPA reference concentration; µg/m^3 = micrograms of contaminant per cubic meter of air;
*Exposure point concentration representing the maximum concentration or the 95% upper confidence limit of the mean; **HQ = hazard quotient = maximum EPC/health guideline. Example HQ calculation for PCE = 133/41 = 3.2.

As shown in Table 3, PCE, TCE, and DCE exceeded the hazard quotient of 1.0 and will be evaluated further to determine the likelihood for harmful noncancer health effects.

Health Effects of PCE in Indoor Air:

As described above, the LOAEL is the lowest tested amount of a substance that has been reported to cause harmful health effects. At a LOAEL of 11,530 µg/m^3, an epidemiological study of dry cleaner workers showed a significant decrease in blue-yellow color vision compared to controls, and workers who experienced continued exposure demonstrated a further deterioration in color vision when evaluated two years after the initial measurements. The MRL of 41 µg/m^3 is derived from this study by applying some safety factors to account for human variability among other factors.

Other occupational studies showed workers exposed to PCE concentrations ranging from approximately 76,000 to 277,000 µg/m^3 performed below expectation on tasks assessing memory, motor skills (reaction times), visual and executive function deficits following low-level exposure for one year or more [Echeverria 1995]. Another human study showed mild tubular damage to the kidneys at an adjusted LOAEL of 16,280 µg/m^3. Table 4 summarizes these health effects.

Table 4. Health Effect Levels – PCE

Study	ATSDR MRL Derivation Study (human)	Other Studies (Human)	
LOAEL (µg/m^3)	11,530	16,280	76,000 -277,000
Health Effect	Decreased color vision	Mild kidney damage	Decreased neurological functions

Source: ATSDR Toxicological Profile for PCE available from: atsdr.cdc.gov/toxprofiles/tp18.pdf; µg/m^3 = micrograms of PCE per cubic meter of air; MRL = Minimal risk level; PCE = Tetrachloroethylene

PCE exceeded its comparison value in 14 homes. The maximum EPC detected in these homes was 133µg/m^3. This level is below the LOAEL of 11,530 µg/m^3. **Therefore, harmful noncancer health effects are not likely for any homes where PCE was found in the indoor air.**

Health Effects of TCE in Indoor Air:

ATSDR adopted the EPA's RfC of 2 µg/m^3 as the chronic, inhalation MRL. The RfC for TCE is based on two oral rodent studies. In these studies, where animals were exposed to TCE orally via drinking water, the most sensitive adverse effects involved the immune system and the developing fetus. The EPA used physiologically based pharmacokinetic (PBPK) modeling to convert the oral dose in animals to a human equivalent concentration (HEC) of TCE in air. Based on these studies, the effect levels for TCE exposures in air are as follows:

- Mouse Study - Immunological effects = 180 µg/m^3; and
- Rat Study – Fetal Heart effects = 20 µg/m^3.

The EPA also cites a third study conducted in 1988 by the National Toxicology Program (of lower confidence) in support of the RfC where female rats were exposed to TCE by administering the chemical in corn oil by gavage for a 104-week period. The EPA used PBPK modeling to convert the oral dose in animals to a HEC of 30 µg/m^3 TCE in air for kidney damage (See Table 5).

Table 5. Health Effect Levels - TCE

Study	**ATSDR MRL Derivation Study based on EPA RfC**		**EPA Support Study (National Toxicology Program)**
Effect Level (µg/m^3) *	20	180	30
Health Effect	Fetal Heart Effects (Rat Study)	Immune System Effects (Mouse Study)	Kidney Effects (Rat Study)

*The effect levels for these studies were derived using EPA models to derive "human equivalent concentrations (HECs);" Source: Toxicological Profile for TCE available from: atsdr.cdc.gov/ToxProfiles/tp19.pdf ; µg/m^3 = micrograms of TCE per cubic meter of air; TCE = Trichloroethylene; MRL = Minimal Risk Level

ATSDR Threshold Approach for Evaluating TCE:

TCE is unique because animal studies have shown that *short-term* exposures can increase the risk of health impacts on the developing fetus in the first trimester of pregnancy. Specifically, these animal studies show that exposure to low levels of TCE during the three-week period of heart formation in the first trimester of pregnancy could result in an increased risk of a heart defect in the unborn baby.

ATSDR considers a threshold of 6 µg/m^3 as a level of concern for fetal heart and kidney effects. Table 6 summarizes the levels of TCE which was detected above its comparison value in 25 of the 27 residential properties along with the corresponding health effect levels. The EPCs for TCE in these 25 homes ranged from 0.23 µg/m^3 to 37µg/m^3.

Table 6. Summary of TCE effect levels and TCE impacted properties

TCE indoor air concentration	Number of properties	Potential for noncancer health effects
Below 6 µg/m^3	21	No
Between 6 µg/m^3 [(a)] and 19 µg/m^3	1	**Yes**
Between 20 µg/m^3 [(b)] and 29 µg/m^3	0	**Yes**
Between 30 µg/m^3 [(c)] and 180 µg/m^3	3	**Yes**

[a] ATSDR Threshold of Concern for fetal heart and kidney effects; [b] Effect Level for fetal heart effects; [c] Effect Level for kidney effects; µg/m^3 = micrograms of TCE per cubic meter of air; TCE = Trichloroethylene

As shown in Table 6, adverse noncancer health effects from exposure to TCE are not likely for 21 of the 25 homes. TCE levels in four homes exceeded the ATSDR threshold and effect levels for fetal heart and kidney effects. Therefore, women who may have been pregnant while living in these homes may have been at an increased risk for fetal heart effects in their children from short-term exposures to TCE. There is also an increased risk for kidney effects in adults living in these homes.

It is important to note that the TCE concentrations used to draw these conclusions were the maximum levels detected and, therefore, may overestimate the risk. In addition, the TCE levels in three of the four homes have been reduced with the installation of an SSDS. TCE was detected above the NJDEP RIASL in two homes after the SSDS was installed, but these exceedances were due to background sources and not vapor intrusion from the former Topps Cleaners site according to the LSRP. Additionally, based on information provided by the LSRP, the elevated TCE levels detected in the indoor air of one of the four homes mentioned above is due to background sources and not vapor intrusion from the Topps Cleaners site.

Health Effects of DCE in Indoor Air

In the absence of a chronic ATSDR MRL, the EPA RfC for inhalation exposures was used as a health guideline value. The reference concentration for cis-1,2-DCEis based on an EPA Provisional Peer Reviewed Toxicity Value (PPRTV) [USEPA 2006]. A PPRTV is derived for use in the EPA Superfund program when a value is not available in EPA's Integrated Risk Information System.

All PPRTVs receive internal review by EPA scientists and external peer review by independent scientific experts. These values do not receive the multi-program consensus review of values as in the EPA's Integrated Risk Information System. EPA does not support use of PPRTVs for purposes other than Superfund. However, in the absence of other chronic health guideline values, this value was used to evaluate the potential for noncancer health effects from exposure to DCE in this health consultation.

One property had an elevated hazard quotient for DCE. The concentration of DCE in this home was 77 µg/m^3. The PPRTV study used to derive the RfC of 40 µg/m^3 was based on an animal study where effects on the immune system (decrease in white blood cells) were observed at 109,000 µg/m^3[EPA 2022]. The level of DCE of 77 µg/m^3 in this home is well below the level

where health effects were observed. **Therefore, harmful health effects from exposure to DCE are not likely for residents in this home.**

Evaluating the Potential for Cancer Health Effects

The following contaminants were evaluated for cancer health effects for the former Topps Cleaners site:

PCE -Studies in humans suggest that exposure to PCE might lead to a higher risk of developing bladder cancer, multiple myeloma, or non-Hodgkin's lymphoma. In animals, PCE has been shown to cause cancers of the liver, kidney, and blood system. The DHHS considers PCE to be reasonably anticipated to be a human carcinogen. The EPA considers PCE likely to be carcinogenic to humans by all routes of exposure. The International Agency for Research on Cancer (IARC) considers PCE to be a probable human carcinogen.

TCE - There is strong evidence that TCE can cause kidney cancer in people and some evidence for TCE-induced liver cancer and malignant lymphoma. Lifetime exposure to TCE resulted in increased liver cancer in mice and increased kidney cancer and testicular cancer in rats. The DHHS considers TCE to be a known human carcinogen. The IARC classified TCE as carcinogenic to humans. The EPA has characterized TCE as carcinogenic to humans by all routes of exposure.

Vinyl Chloride -The DHHS has classified vinyl chloride as a known human carcinogen. The EPA has classified vinyl chloride as a known human carcinogen by the inhalation route of exposure. It has also classified it as carcinogenic by the oral route and highly likely to be carcinogenic by the dermal route. The IARC determined that vinyl chloride is carcinogenic to humans.

Calculating Cancer Risks

The LECR is calculated for residential exposures by multiplying the measured air concentration and exposure duration by the EPA's inhalation unit risk (IUR) for cancer. The IUR is the incremental risk posed by a specific concentration unit in air (usually per one microgram per cubic meter ($\mu g/m^3$) of the pollutant in air). This LECR calculation yields the relative increase of cancer risk (above the background rate) from exposure to individual pollutants.

The LECRs for each residence were calculated using ATSDR's guidance for inhalation exposures in residential settings. Using the most conservative scenario per ATSDR's public health assessment guidance, LECRs were calculated using an exposure duration of 21 years for children and 33 years for adults over a 78-year average lifetime.

LECRs were calculated using the following formula:

LECR = C x ED/AT x IUR

Where,

LECR = Lifetime Excess Cancer Risk
C = Measured Concentration of PCE or TCE in air ($\mu g/m^3$)
ED = Exposure Duration (21 years for children; 33 years for adults)
AT = Averaging Time (Average Lifetime of 78 years)
IUR = Inhalation Unit Risk $(\mu g/m^3)^{-1}$

LECRs were calculated for 27 properties. Seventeen properties were sampled for a full "suite" of volatile organic compounds including PCE, TCE, vinyl chloride and DCE which are site related. Eight homes with elevated levels of these contaminants also had exceedances of some background contaminants including benzene, ethylbenzene, and chloroform. While these contaminants are not site related, they were included in the LECR calculations.

Table 7 provides the LECR calculation for an adult living in a home where PCE and TCE were detected in the indoor air. As shown in the table, the total LECR for adults living in this home is approximately one excess cancer case per one million similarly exposed people. NJDOH considered the factors described above in deciding whether the calculated theoretical cancer risk present a health concern. NJDOH determined that this total LECR represents no concern for an increased theoretical cancer risk.

Table 7. LECR for adults living in a home with PCE and TCE in air

Contaminant	EPC ($\mu g/m^3$)	Exposure Duration (years)	Averaging Time (years)	IUR $(\mu g/m^3)^{-1}$	LECR (Adult)
PCE	1.4	33	78	2.6×10^{-7}	1.5×10^{-7}
TCE	0.6	33	78	4.1×10^{-6}	1.0×10^{-6}
Total LECR	----------	----------	----------	----------	1.0×10^{-6}

Definitions: EPC = exposure point concentration representing 95%UCL of the mean for PCE and the maximum concentration for TCE; PCE = tetrachloroethylene; TCE = trichloroethylene; IUR = EPA inhalation unit risk; $\mu g/m^3$ = micrograms of contaminant per cubic meter of air; LECR = Lifetime excess cancer risk; Example LECR calculation for PCE = $1.4 \times 33/78 \times 2.6 \times 10^{-7} = 1.5 \times 10^{-7}$

Table 8 summarizes the ranges of LECRs for all 27 properties. Twenty-six properties had LECRs of fewer than seven excess cancer cases per 100,000 similarly exposed people. NJDOH considered the factors described above in deciding whether these calculated theoretical cancer risks present a health concern. NJDOH determined that these LECRs represents no concern for increased theoretical cancer risks for adults and children in these homes. One property had a total LECR of one excess cancer case per 10,000 similarly exposed people which represents an increased theoretical cancer risk.

As previously mentioned, this is a theoretical estimate of cancer risk that NJDOH uses as a tool for deciding whether public health actions are needed to protect health. It is not an actual estimate of cancer cases in a community and is not a prediction that cancer will occur. This

property has a sub-slab vapor mitigation system in place to prevent vapors beneath the home from impacting the indoor air.

Table 8. LECR (cancer risk) results for adults and children – Topps Cleaners Site

LECR Ranges	LECR (child)	LECR (adult)	Conclusion
Number of properties with LECRs of 9×10^{-7} or less	4	2	No concern for increased theoretical cancer risk
Number of properties with LECRs ranging from 1×10^{-6} to 7×10^{-5}	22	24	No concern for increased theoretical cancer risk
Number of properties with LECR of 1×10^{-4}	1	1	**Concern for increased theoretical cancer risk**

LECR = lifetime excess cancer risk

Conclusions

Based on the information available at the time of this evaluation, NJDOH concludes that:

1. *For health effects other than cancer, past exposures to elevated levels of TCE in the indoor air of four homes may have harmed people's health.* Women who may have been pregnant while living in these homes may have been at an increased risk for fetal heart effects in their children from *short-term* exposures to TCE. There was also an increased risk for kidney damage in adults in these four homes from *long-term* TCE exposures. Harmful health effects such as kidney damage and fetal heart effects from exposures to TCE in the indoor air of the remaining 21 homes are not likely. Three of the four homes have vapor mitigation systems to prevent contaminated groundwater vapors from entering the homes. The elevated levels of TCE in one home is due to background sources within the home and not vapor intrusion from the former Topps Cleaners site. TCE levels exceeded NJDEP's RIASL in two homes after vapor mitigation systems was installed. These elevated TCE levels are due to background sources within the homes and not vapor intrusion from the former Topps Cleaners site. The data provided by the LSRP confirms that TCE levels have been reduced after the mitigation systems were installed in the three homes. As part of the vapor intrusion investigation process NJDEP/LSRPs provide information about background sources of TCE to residents where TCE was found to be due to background sources.

2. *For health effects other than cancer, exposures to elevated levels of PCE, DCE and vinyl chloride are not likely to harm people's health.* Fourteen properties had elevated levels of PCE. Concentrations of PCE in these homes were below the levels where harmful noncancer health effects were observed in toxicological studies. Additionally, levels of DCE in one home and vinyl chloride in two homes were below levels where health effects were observed in toxicological studies.

3. *There was a concern for an increased theoretical cancer risk for one home due to elevated levels of PCE, TCE and vinyl chloride.* This home currently has a sub-slab vapor mitigation system to prevent contaminants beneath the home from impacting the indoor air. Based on indoor air data provided by the LSRP, the vapor mitigation system is

effectively reducing the levels of these contaminants in this home. There is no concern for an increased theoretical cancer risk for the remaining 26 properties.

Recommendations

The NJDOH recommends the following:

1. NJDEP and the LSRP continue to ensure that the vapor mitigations systems and air purifying units continue to operate properly to prevent subsurface vapors from entering impacted homes until it is determined that the groundwater contamination is no longer a vapor intrusion concern;

2. NJDEP and the LSRP continue to monitor the indoor air of homes where there is no active mitigation system to ensure that subsurface vapors do not impact these homes; and

3. Residents with health concerns from exposures to TCE should discuss their concerns with a physician. NJDOH can provide physician resources upon request.

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Former Mondelez International (Nabisco Brand) Bakery Site

Site Description

The former Nabisco property is located in a mixed use (residential, commercial, light industrial) area in the Borough of Fair Lawn, Bergen County and covers 39.71 acres. The site was occupied by the former Mondelez International (Nabisco Brand) Bakery, that included a large-scale bakery, offices, research and development facility and maintenance garage (see Figure 1 in **Appendix B**). The remainder of the site is covered by asphalt parking areas, concrete sidewalks, vegetation, and landscaping areas.

Below are the details on current use of the structures present on the site:

- Structure # 1: Tower. No longer in use. The production stopped in July 2021. Formerly the tower was used in manufacturing baked goods.
- Structure # 2: Bakery and Distribution Building (Plant). No longer is use. The production stopped in July 2021. Formerly the plant was used for baked goods manufacturing purposes, raw material storage, warehousing and destitution and administrative activities.
- Structure # 3: Research and Development Building. The building is currently used for raw material storage, processing, small-scale baking operations associated with product development and testing.
- Structure # 4: Vehicle Maintenance Building. The fleet building is currently used for storage. Formerly, the fleet building was used for minor vehicle maintenance and truck storage.

Nabisco shut down factory production and operations in July 2021 and demolition of the structures began in the fall of 2022, starting with asbestos remediation/abatement in the interior of the buildings, said Greek. NJDOH received calls from concerned residents regarding the demolition of the buildings, including a planned implosion of the tower structure which was scheduled for April 2023. Residents in municipalities surrounding the former Nabisco property expressed concerns about possible off-site impacts from asbestos and other contaminants to the air, soil, and water contamination as a result of the implosion. All demolition activities ceased in May 2023 due to public concerns. The latest update on the Fair Lawn Borough, date April 22, 2024, indicated that demolition at the Nabisco site was expected to resume shortly, with state approval and that a non-explosive demolition would be undertaken.

To address community concerns to on-site contaminants, NJDOH evaluated data from licensed site remediation professional's Site Investigation report (released in May 2023) which was prepared to meet NJDEP's technical requirements for site remediation and perimeter asbestos monitoring data collected from the site during abatement activities of the tower structure in early 2023 (Site Investigation report for Mondelez Global LLC 2023; Controlled Demolition Incorporated Preliminary Plan & Procedure for The Demolition of the Nabisco, 2023; Asbestos Abatement Standard Work Practices for Mondelez Bakery Not Dated; Letter to Greek Development re: Asbestos Abatement and Consulting Services at Former Nabisco Facility 2023; PCM Air Sampling Data sheets Greek Development 2023). See Table 1 and Figure 1 in **Appendix B** for sampling results and site maps.

Summary of Environmental Exposure Pathways

1) Soil contamination - ingesting contaminated soil

Between November 24, 2021, and February 2, 2022, Pennoni conducted a site investigation (SI) to determine the presence/absence of regulated compounds in the underlying soil at concentrations above the NJDEP's Ingestion Dermal Exposure Pathway (IDEP) and Migration to Ground Water (MGW) standards. The SI activities included a non-invasive Electro- Magnetic (EM)/Ground Penetrating Radar (GPR) and a soil sampling program. The SI and the Preliminary Assessment reports identified nine Areas of Concern (AOCs) that were sampled for contaminants in soil and water.

AOC1: Aboveground Storage Tanks (ASTs)
Each sample was collected from directly below each AST. No detectable target contaminants of concern were identified above the DEP standards.

AOC5: Historic Fill (HF) or Any Other Fill Material
To investigate the presence of the HF, 12 soil borings throughout the site up to 10 feet below surface grade (bsg) or the depth to native soils. Based on field screening, the presence of the HF was not identified. To determine the presence/absence of contaminants of concern, two subsurface soil samples were collected from approximately three feet bsg. No Polychlorinated Biphenyls (PCBs), pesticides, Semi Volatile Compounds (SVOCs), or volatile organic compounds (VOCs) were identified above NJDEP standards. Mercury was detected above the NJDEP's migration to groundwater standard, which is 0.10 milligrams per kilogram (mg/kg). This does not represent a completed exposure pathway as the sample was collected three feet below the surface and thus does not represent exposures via contact with surface soil.

AOC7: Rail Car/Rail Spurs
To determine presence/absence of contaminants of concern associated with the rail spurs, a total of 18 soil borings were collected at a depth of five feet bsg. Extractable Petroleum Hydrocarbons (EPH) were identified at 4,800 milligrams/kilograms (mg/kg) in the sampling. Lead (140 mg/kg) and beryllium (0.96 mg/kg) were detected above the NJDEP standards. No PCBs, Pesticides, SVOCs, VOCs or hexavalent chromium were identified above NJDEP standards. This does not represent a completed exposure pathway as the sample was collected five feet below the surface and thus does not represent exposures via contact with surface soil.

AOC8: Roof Leaders when Process Operations Vent to Roof
To determine presence/absence of COCs associated with AOC8, Pennoni advanced six borings to a maximum depth of five feet bsg in the vicinity of each roof leader located on the Vehicle Maintenance Building. No PCBs, Pesticides, EPH and VOCs were identified above the NJDEP standards. Mercury (0.8 mg/kg) and the PAH benzo(a)anthracene (1.6 mg/kg) were detected above the NJDEP standards. Benzo(a)pyrene (BaP), which is also a PAH, was detected at a concentration of 1.3 mg/kg above the NJDEP standard. This does not represent a completed exposure pathway as the sample was collected five feet below the surface and thus does not represent exposures via contact with surface soil.

AOC10: Underground Storage Tanks (USTs) and Associated Piping
Soil samples were collected along the suspected centerline at depth of the suspected tank inverts at a distance of six feet bsg. Total EPH was detected at 1,100 mg/kg. No other contaminants of concern were identified above the NJDEP standards. This does not represent a completed exposure pathway as the sample was collected six feet below the surface and thus does not represent exposures via contact with surface soil.

AOC12: Floor Drains and/or Sumps
To determine presence/absence of contaminants of concern, six subsurface soil samples were collected from the borings advanced to a depth of 10 feet bsg. No contaminants of concern were identified above the NJDEP standards.

AOC13: Documented Releases from outfalls
Sediment sampling was conducted for following documented releases:

1) A reported incident involving a suspected motor oil release in a parking lot. Per the report, the release washed into local storm grates which discharge into Henderson Brook.
2) A report incident involving the release of an unknown liquid substance that was seeping into a culvert affiliated with Henderson Brook.

Since the locations of the previous spill events could not be determined, the objective of the investigations associated with AOC13 was to collect sediment samples at the two outfalls fed by storm sewer lines that discharge into Henderson Brook. During site investigation activities, visual inspection of the Henderson Brook channel was observed to be concrete-lined with no cracking or staining identified along the channel. Furthermore, the water in the vicinity of the two outfalls was observed to be clear with no odor or sheen observed; therefore, no sampling was conducted.

AOC14: Three, 30,000-gallon #2 Heating Oil Unknown Tanks
Based on the ground penetrating radar (GPR) survey conducted at the site, the data indicated no presence of subsurface anomalies that would exhibit typical characteristics of USTs. It was determined these USTs were not present on the site.

AOC16: Electrical Transformer and Capacitor
To determine presence/absence of contaminants of concern, four subsurface soil samples were collected from the borings advanced up to five feet bsg. No PCBs or EPH were identified above NJDEP standards. The PAHs benzo(a)anthracene (3.3 mg/kg), BaP (5.1 mg/kg), benzo(b)fluoranthene (14 mg/kg) and dibenzo[a,h]anthracene (0.87 mg/kg) were detected above the NJDEP standards. This does not represent a completed exposure pathway as the sample was collected five feet below the surface and thus does not represent exposures via contact with surface soil.

Soil Sampling Conclusions

ATSDR considers the top three inches of soil to be accessible. These data were collected at depths greater than three inches and therefore do not represent exposures to contaminants in soil.

Evaluation of the report indicated that most of the soil samples were collected under the pavement or concrete and as such do not represent exposures to the public as there is no exposure to contaminated soil.

2) Drinking water exposures

The preliminary assessment report, released in May 2022, mentioned the presence and subsequent sampling of four water supply well present on site.

Water supply wells: Two of the water supply wells that were installed at the site in June 1929 and September 1941 were closed and capped prior to or during the site development. One other well was installed in February 1957 and is currently active. There are no data available for this well. The fourth well was installed on April 19, 1962; however, the well failed to yield sufficient water and was sealed in February 1996. No further investigation is recommended.

Monitoring Wells: At least three permitted monitoring wells associated with the adjacent Fair Lawn Well Field Superfund Site are currently located on the site property. The wells are used to monitor offsite impacts that have migrated onto the site. No further investigation is recommended.

Closed Wells: One groundwater monitoring well, MW-1, was installed during the closure of a 4,000-gallon leaded gasoline UST. Upon completion of the investigation, the monitoring well was subsequently sealed on June 14, 1993. No further investigation is recommended.

Drinking Water Conclusions

There are no completed exposure pathways and therefore there are no exposure to the public.

3) Asbestos Evaluation

In response to community concerns regarding demolition activities at the Nabisco site, reports were obtained from Vertex, who acted as an independent, third-party asbestos project monitor on behalf of Greek Development (the property owner) to monitor the controlled demolition work of the structure on the site. The project plan included the following:

- Continuous daily air samples during the work. Samples were analyzed using Phase Contrast Microscopy (PCM) analysis. If any air samples indicated airborne asbestos fibers above 0.01 fibers per cubic centimeter (F/cc) of air as analyzed by PCM, the sample was reanalyzed by Transmission Electron Microscopy (TEM) using NIOSH method 7402. If the NIOSH 7402 TEM analysis showed elevated concentrations, all work would cease, and the contractor methods would be altered as needed to prevent additional release.
- Perimeter Air Sampling: On workdays involving controlled demolition/waste load-out and cleanup activities, air sampling was performed by the third-party asbestos project monitor (see Figure 2 in **Appendix B**).

The data that were evaluated in response to community concerns raised at the August 2023 availability session pertain to the abatement and demolition of the tower, which occurred from January 2023 to July 2023. It should be noted that Vertex, which is an independent verification firm, had been performing asbestos air monitoring and oversight along with air clearance sampling daily since August 2022 during abatement activities. Vertex is required to adhere to all state regulations for removing asbestos and has been filing all the required and related reports.

The abatement scope of work was based on asbestos containing materials identified during inspections performed at the site by Langan Engineering & Environmental Services, Inc and Pennoni Associates, Inc. The project started with the abatement of asbestos containing materials (ACM) located in the Tower section of the building and moved into the Main Bakery Building. The timeline indicated that as of February 2023, all identified ACM had been abated from the Tower section and Main Bakery Building with passing air clearance samples analyzed via both PCM and TEM.

In March 2023, final clearance sampling occurred via PCM on the 8th Floor Tower Roof on following the outdoor abatement of approximately 120-square feet of Category I Non-Friable asbestos containing concrete roof deck seam caulk. **Final clearance sampling yielded results below 0.01 F/cc (fiber per cubic centimeter of air), the PCM clearance criteria as per State of New Jersey asbestos regulations for projects involving the abatement of less than 160 square feet/260 linear feet of asbestos containing materials.** Fiber levels ranged from <0.002 F/cc to 0.004 F/cc (see Table 1 in **Appendix B**).

In April 2023, Vertex collected samples of various suspect masonry materials (i.e., brick, mortar, concrete slab, etc.) throughout the Tower Section. Polarized Light Microscopy (PLM) Analysis yielded negative results for asbestos content.

Asbestos Sampling Conclusions

Based on the data provided to NJDOH, which included perimeter asbestos sampling, **NJDOH was able to confirm that asbestos levels were below the regulatory limits. All samples were below the PCM clearance criteria of 0.01 F/cc and, therefore, are in compliance with state and federal asbestos regulations.**

The majority of PCM indoor air sampling were <0.002 f/cc for the Nabisco Tower including various floors, the roof, and parts of the Main Building. Most of the samples are at 0.002 f/cc or below this value (see Table 1). Currently, the standard method for determining the presence of asbestos fibers in the workplace is NIOSH Method 7400, asbestos by PCM. The NIOSH 7400 method gives the limit of detection as 7 fibers/mm^2 of filter area. For a 1000 L air sample, this corresponds to a limit of detection of 0.0027 fiber/cc.

The PCM clearance criteria as per State of New Jersey asbestos regulations is set at 0.01 F/cc for projects involving the abatement of less than 160 square feet/260 linear feet of asbestos containing materials. The 0.01 F/cc of air level comes from the NJ Uniform Construction Code

at N.J.A.C. 5:23-8.21(g) that is based on the Federal criteria for asbestos abatement in schools found in 40 CFR 763.80, Subpart E.

Next steps

All community concerns about completed and ongoing demolition activities should be directed to the EPA. The EPA is the lead on this site with NJDEP as the state oversight. **Any community concerns regarding the Nabisco asbestos demolition and removal activities should be directed to the EPA: epa.gov/aboutepa/region-2-media-contacts.**

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Former Borden Coatings and Graphics Facility

Site Description

The former Borden Coatings and Graphics (Borden) site is located at 8-10 22nd Street in the Borough of Fair Lawn, Bergen County, New Jersey. The site occupies a rectangular-shaped property approximately 4.5 acres in size. New Jersey Transit railway lines and the Fair Lawn High School athletic field are located to the west of the site. Route 208 and a retail gasoline station are located to the north of the site. Residential properties are located to the east, and a light industrial facility is located to the south (see Figure 1 in **Appendix C**).

Site History

The Commercial Ink and Lacquer Company manufactured ink and lacquer products at the facility from 1946 to 1960. Borden Coatings and Graphics purchased the facility in 1960 and continued to manufacture inks and paints there until plant operations ceased and most site buildings were demolished in 2002. The facility stored various chemical products in underground storage tanks (USTs) on the property. These chemicals included acetone, ethyl alcohol, methyl ethyl ketone, isopropyl acetate, ethyl acetate, toluene, and xylene.

In 2004 and 2005, the site was redeveloped as a vehicle storage lot. During this time, the remaining office building from the former manufacturing facility was demolished. The property was re-graded, and asphalt pavement, curbing and new utilities were installed. The site is paved and currently remains a vehicle storage lot.

Remedial History

Groundwater contamination was identified in 1987 and routine sampling has been ongoing since that time. A groundwater treatment system was installed and began operating in 1992 to pump-and-treat groundwater contaminated with volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, xylenes, and naphthalene.

The primary sources of the soil and groundwater contamination were from the leaking USTs and a drum storage area on the property. Benzene was suspected to be from an offsite source since benzene was not stored on the site. Removal of the USTs and contaminated soils were performed during various remedial actions through 2002. Additional remedial investigations were conducted in the former USTs and drum storage areas of the site in 2015 and 2016 to further address any remaining contamination.

Soil and groundwater samples from the site also detected mercury, cadmium, lead, and PAHs. The cadmium, lead and PAHs were determined to be from historic fill located along the northern and western boundary of the site and not related to the site contamination. The mercury is also believed to be affiliated with the historic fill material or the active railroad corridor that runs along the western boundary of the site. Mercury was not found in groundwater.

The groundwater treatment system continued operating during the property redevelopment but was shut down and removed from the site in November 2012. The area of off-site groundwater contamination has been delineated and continues to be monitored per DEP requirements to ensure that groundwater contaminants decrease to DEP's groundwater quality standards.

Groundwater use - drinking water exposures

Shallow ground water around the site is impacted with metals including lead, arsenic, cadmium, iron and manganese, and volatile organic compounds (VOCs) including benzene, ethylbenzene, toluene, and xylenes. However, the shallow groundwater beneath the site is not used as a source of potable water. Potable water for the site and the surrounding area is supplied by the municipal water supply system.

Two residential properties located within the area of the groundwater contamination had been identified as having private potable wells according to the Fair Lawn Health Department. The environmental consultant for Borden followed up to confirm the presence of these wells and determined that there were no wells on these properties. There are no private potable wells in the area of the site.

Municipal water supply wells are located within 1,000 feet of the site. According to the October 1999 Remedial Action Selection Report and Remedial Action Workplan for the site, the extent of both shallow and deep ground water contamination has been delineated and the groundwater contamination from the site does not impact the nearby Cadmus Place municipal wellfield. Figure 2 in **Appendix C** shows the area of groundwater contamination.

In addition, all water entering the municipal water supply is treated for numerous contaminants regulated by NJDEP including VOCs and metals before reaching consumers. **Therefore, there is no completed exposure pathway and no concern for exposures to contaminated drinking water from the former Borden site.**

Vapor intrusion - indoor air exposures

Vapor intrusion is a process by which volatile chemicals in groundwater beneath a building enter indoor air through cracks and other openings in a building's foundation. These chemicals can be breathed in by building occupants. Vapor intrusion for residential and commercial buildings near the site was evaluated in 2011 and 2013.

Groundwater monitoring well data were used to indicate the need for vapor intrusion sampling. Elevated levels of VOCs in monitoring wells close to homes or businesses may indicate the need for a vapor intrusion investigation. For this site, VOC concentrations in monitoring wells located closest to residential dwellings were below the applicable NJDEP vapor intrusion screening levels. Additionally, groundwater monitoring well data identified a 4- to 10-foot thick protective "lens" of non-impacted groundwater between the VOC contamination and shallow groundwater.

Therefore, there is no completed exposure pathway for vapor intrusion from the former Borden site and breathing contaminated indoor air is not a concern. Additionally, per NJDEP requirements, groundwater conditions continue to be monitored to ensure that the concentrations of contaminants in the groundwater decrease and comply with NJDEP's groundwater quality standards.

Soil contamination - ingesting contaminated soil

Soil contamination was limited to the property itself. The site property is paved, and grass covered, preventing access to bare soil. In December 2015, three soil samples were collected from the Fair Lawn High School athletic field (Sasso Field) and analyzed for VOCs as part of soil delineation activities. Results showed no exceedances of any NJDEP soil remediation standards. **Therefore, there is no completed exposure pathway and no concern for exposures to soil contaminants on or off the former Borden site.**

Conclusion

Based on the information available to NJDOH, there is no concern for community exposures to contaminants associated with the former Borden Coatings and Graphics site.

References

Amec Foster Wheeler Environment & Infrastructure, Inc. Remedial Investigation Report Addendum. Former Borden Coatings and Graphics Inc. Fair Lawn, NJ. May 2016.

Harding Lawson Associates. Engineering and Environmental Services. Remedial Action Selection Report and Remedial Action Workplan. Borden Coatings and Graphics, Inc. Fair Lawn, NJ. October 1999.

MACTEC Engineering and Consulting Inc. Remedial Action Report. Former Borden Coatings and Graphics, Inc. Fair Lawn, NJ. December 2002.

T.M. Gates Inc. Final Phase I Remedial Investigation Report Pursuant to ACO Effective July 22, 1992. Borden, Inc. September 1994.

Former Sandoz Chemicals Corporation Site

Site Description and Remedial History

The former Sandoz Chemicals Corporation (Sandoz), also known as the Clariant Corporation, is located at 14-00 3rd Street in the Borough of Fair Lawn, Bergen County, New Jersey. The site occupies a rectangular shaped property approximately 14 acres in size. The property is bordered to the west by the Passaic River, to the east and south by residential properties, and to the north by commercial businesses (see Figure 1 in **Appendix D**).

Investigations at the site began with the initial discovery of solvent contamination in the area of the former underground storage tanks in 1989. The site subsequently became regulated under the Industrial Site Recovery Act (ISRA) the Environmental Cleanup and Responsibility Act (ECRA). The primary contaminants of concern in the groundwater at the site are dichlorobenzene (primarily ortho dichlorobenzene), other chlorobenzenes and benzene.

Groundwater extraction and treatment began in 1995. Groundwater was extracted from four extraction wells, and bioventing (a form of bioremediation) was completed via 19 air sparging wells and 32 vapor-extraction wells. The remediation well network was expanded periodically, including a major expansion in 2005. In 2005, 56 wells were installed at the site in the former underground storage tank area and in a former lime pit area.

Construction of a new groundwater extraction and treatment system was completed in May 2013. As part of the new system, the groundwater extraction, soil vapor extraction, and air sparge systems have been expanded to include 20 water extraction wells. The contaminated groundwater, which is then pumped through the on-site treatment system. Sixty-eight soil vapor extraction wells and 121 air sparging wells are used to enhance soil and groundwater contamination removal from the site. The area of groundwater contamination extends off the site property towards the Passaic River into the city of Paterson.

Groundwater sampling is conducted at the site semiannually, usually in March and September of each year. Surface water samples from the Passaic River are also collected from the site; surface water sample frequency was changed from quarterly to a semiannual frequency after March 2019, as approved by NJDEP.

Surface water samples are now collected during semiannual groundwater sampling events. Surface water samples collected from the Passaic River in 2022 for volatile organic compounds did not show any exceedances of NJDEP's Surface Water Quality Standards or ecological screening criteria.

Compliance with the terms of the soil and groundwater remedial action permits will continue to ensure that the remedial actions at the site remain protective of public health, safety, and the environment.

In April 2021, a response action outcome (RAO) was issued by the site's LSRP documenting that remediation has been completed at the site in compliance with DEP requirements. The property was sold in 2022. Future use of the site is planned for commercial and warehousing purposes.

Groundwater use - drinking water exposures

Drinking water in the area is provided by the municipal water supply. Groundwater entering the municipal water supply in Fair Lawn is treated for a wide variety of contaminants per NJDEP requirements. These contaminants include those present in groundwater from the former Sandoz site. **Therefore, there is no completed exposure pathway and no concern for exposures to contaminated drinking water from the former Sandoz facility.**

Vapor intrusion - indoor air exposures

Groundwater at the site is contaminated with VOCs, which have migrated off the property toward the Passaic River into the city of Paterson. The VOCs in groundwater may enter the indoor air of buildings through vapor intrusion These chemicals can be breathed in by building occupants.

Based on information provided to NJDOH by the environmental consultant for this site, a vapor intrusion investigation was not necessarily due to the depth of the groundwater and a layer of non-impacted groundwater between the VOC contamination and shallow ground water. In addition, the buildings on the site are vacant except for the treatment building, which is only occupied by workers trained in hazardous material safety. **Therefore, there is no completed exposure pathway for vapor intrusion from the former Sandoz site and breathing contaminated indoor air is not a concern.**

Soil Contamination – ingesting contaminated soil

Contaminants in soil on the site include dichlorobenzenes, lead, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The site is fenced, paved, and grass covered which prevents access to contaminated soil. **Therefore, there is no completed exposure pathway and no concern for exposures to contaminated soil on the site.**

Conclusion

Based on the information available to NJDOH, there is no concern for community exposures to contaminants associated with the former Sandoz Chemicals Corporation site.

References

CDM Smith Inc. Annual Remedial Progress/Monitoring Report. Clariant Corporation - Former Sandoz Chemicals Corporation Site. Fair Lawn, New Jersey. April 2023.

New Jersey Department of Environmental Protection. Groundwater Remedial Action Protectiveness/Biennial Certification Form. Clariant Corporation. Fair Lawn, New Jersey. August 2021.

Section III - General Concerns/Issues

PFAS/1,4 dioxane in Drinking Water – Glen Rock (served by Ridgewood Water)

The town of Glen Rock obtains water from the neighboring town of Ridgewood. This health consultation evaluates the public health implications of past exposure to contaminated drinking water in the Ridgewood public water system using sampling data collected by the US Environmental Protection Agency and Ridgewood Water utility. Under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), NJDOH analyzed water sampling data collected from the Ridgewood public water system between January 2013 to June 2024 to determine if exposures to site-related contaminants occurred and to evaluate the public health implications of those exposures.

Ridgewood Water is a public drinking water provider that serves approximately 61,700 customers in Bergen County, New Jersey. Ridgewood's service area spans four municipalities: the Boroughs of Glen Rock and Midland Park, the Township of Wyckoff, and the Village of Ridgewood. Ridgewood Water operates 52 municipal supply wells distributed throughout its service area and has 31 points of entry into the water system. Ridgewood Water also obtains a portion of its water via interconnections with other water utilities such as Hawthorne Water Department, Passaic Valley Water Commission, Veolia Water New Jersey Franklin Lakes, and Veolia Water New Jersey Hackensack.

In 2016, EPA issued a lifetime drinking water health advisory level of 70 parts per trillion (ppt) for PFOS and PFOA. In 2020, DEP adopted Maximum Contaminant Level (MCL) water standards for PFOA (14 ppt) and PFOS (13 ppt). Ridgewood Water commenced monitoring in 2021, which is based on a running annual average (RAA), in which the four most recent quarters of monitoring data are averaged. The RAA for PFOA, based on samples collected over the last four quarters at the exceeding treatment plants, are between 17-31 parts per trillion (ppt). The RAA for PFOS, based on samples collected over the last four quarters at the exceeding treatment plants, are between 13-17 ppt.

In May 2023, Ridgewood Water entered into an Administrative Consent Order (ACO), recognizing the need for comprehensive treatment, setting a goal to have all treatment facilities online by the end of 2026. Ridgewood Water is centralizing PFAS treatment by consolidating from 31 treatment facilities to 12 treatment facilities to provide the most efficient treatment and implementation has proceeded as follows:

- In 2019, Carr PFAS Treatment Facility went online and is currently active.
- In 2022, Twinney PFAS Treatment Facility went online and is currently active.
- In 2022, Passaic Valley Water Commission Interconnection was constructed and is active.
- In 2023, construction began at the Prospect and Ravine PFAS Treatment Facilities.
- In 2023, installation of the Raw Water Mains, to connect satellite wells to treatment facilities, also began.

- In 2024, construction began at Ames PFAS Treatment Facility.
- In 2024, West End and East Ridgewood PFAS Treatment Facility construction contracts were also awarded and will break ground this summer.
- Throughout 2024, design, permitting, and construction of the last five treatment facilities continues.

Additionally, Ridgewood Water purchases water from Veolia and Passaic Valley Water Commission for additional water supply, which is compliant with NJDEP's Per- and polyfluoroalkyl substances (PFAS) regulations.

Completed Exposure Pathways

For the past, current, and future, there is a completed exposure pathway for residents drinking water from the Ridgewood Water. A completed exposure pathway does not necessarily mean that harmful health effects will occur. It simply indicates that all five elements are present, and that further evaluation and screening of contaminants is necessary.

The likelihood of health effects depends on specific exposure conditions such as the exposure duration, contaminant toxicity and concentration, and exposure frequency. For example, how long the exposure occurs, how toxic the contaminants are, how much contamination is present, and how often the exposure occurs. To determine whether health effects are possible, NJDOH will further evaluate this completed exposure pathway.

Table 1 summarizes the detected contaminants and compares them to the lowest applicable comparison value. The data was obtained from NJDEP's Drinking Water Watch (www-dep.nj.gov/DEP_WaterWatch_public) and EPA's Unregulated Contaminant Monitoring Rule 3 (UCMR3), which was nationwide monitoring of finished water for 30 unregulated contaminants, including PFAS and 1,4- conducted from 2013-2015. As noted in Table 1, the maximum concentrations for 1,4-dioxane, perfluorobutanoic acid (PFBA), perfluorobutane sulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), and perfluorohexane sulfonic acid (PFHxS) were below applicable CVs and thus were not evaluated further. No harmful effects are likely from contaminants that do not exceed the CVs. Perfluoroheptanoic acid (PFHpA) does not a comparison value and therefore it is not possible to evaluate the potential health effects at this time.

Perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA) and perfluorononanoic acid (PFNA) exceeded CVs. These contaminants were selected for further evaluation to determine their potential for harmful health effects.

The next step in the health evaluation is to determine exposure point concentrations (EPCs) for these contaminants.

Table 1: Summary of Detected Drinking Water Contaminants (January 2013 to June 2024)

Contaminant	Number of samples	Number of detections	Minimum concentration (µg/L)	Maximum concentration (ng/L)	Comparison value (ng/L)	Exceed comparison value
SVOCs/VOCs [a]						
1,4-Dioxane	58	23	ND	210	240 (CREG) [c]	No
PFAS [b]						
Perfluorooctanesulfonic acid (PFOS)	441	354	ND	58	13 (NJ MCL) [d] 0.71 (RMEG) [e] 4 (EPA MCL) [f]	Yes
Perfluorooctanoic acid (PFOA)	441	380	ND	42	14 (NJ MCL) 0.21 (RMEG) 4 (EPA MCL)	Yes
Perfluorononanoic acid (PFNA)	483	129	ND	5.41	13 (NJ MCL) 21 (EMEG) 10 (EPA MCL)	Yes
Perfluorobutanoic acid (PFBA)	2	1	ND	5	7,100 (RMEG)	No
Perfluorobutane sulfonic acid (PFBS)	12	10	ND	8.3	2,100 (RMEG) Hazard Index of 1 (unitless) [g]	No
Perfluorohexanoic acid (PFHxA)	12	11	ND	16.3	3,500 (RMEG) Hazard Index of 1 (unitless)	No
Perfluorohexane sulfonic acid (PFHxS)	12	6	ND	4.9	140 (EMEG) 10 (EPA MCL)	No
Perfluoroheptanoic acid (PFHpA)	64	1	ND	10	Not Available	No

[a] SVOCs/VOCs = semi-volatile organic compounds/volatile organic compounds; [b] PFAS = per- and polyfluoroalkyl substances; [c] CREG = ATSDR cancer risk evaluation guide; [d] MCL = New Jersey Department of Environmental Protection's maximum contaminant level; e ATSDR's comparison value; [f] US Environmental Protection Agency's maximum contaminant level; [g] Hazard Index = The Hazard Index is a long-established approach that EPA regularly uses to understand health risk from a chemical mixture (i.e., exposure to multiple chemicals). The HI is made up of a sum of fractions. Each fraction compares the level of each PFAS measured in the water to the health-based water concentration; RMEG = ATSDR reference dose media evaluation guide; EMEG = ATSDR environmental media evaluation guide; ND = not detected; ng/L = nanograms per liter of water

Table 2 shows the EPCs used for each contaminant of concern.

Table 2. Exposure Point Concentrations for Contaminants of Concern

Contaminant	Number of samples	Number of detections	EPC (ng/L)*	EPC type
Perfluorooctanesulfonic acid (PFOS)	441	354	9.29	95% UCL† of the mean
Perfluorooctanoic acid (PFOA)	441	380	42	Maximum
Perfluorononanoic acid (PFNA)	441	129	1.34	95% UCL of the mean

* EPC=exposure point concentration; † = Upper confidence limit

In Depth Toxicological Analysis – Evaluating the potential for health effects

EPA published the final federal PFAS Rule establishing MCLs as part of the National Primary Drinking Water Regulation (NPDWR) per Safe Drinking Water Act for regulating drinking water contaminants on April 26, 2024. These levels are set using health-protective standards for the specific PFAS in drinking water, feasibility of laboratory analysis and treatment, and an analysis of the costs and benefits. Water systems must comply with monitoring and related reporting and public notification requirements. Federal EPA MCLs will require NJ drinking water systems to reduce PFOA and PFOS concentrations to even lower levels in drinking water and will address three additional PFAS not currently regulated in NJ.

Long-term exposure to PFAS is potentially harmful to health. Current peer-reviewed scientific studies have shown that exposure to certain levels of PFAS may lead to the following:

- Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women;
- Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes;
- Increased risk of some cancers, including prostate, kidney, and testicular cancers;
- Reduced ability of the body's immune system to fight infections, including reduced vaccine response;
- Interference with the body's natural hormones;
- Increased cholesterol levels and/or risk of obesity.

Water systems with PFAS exceedances over EPA's MCL's may be at increased risk adverse health impacts. Ridgewood Water has been in compliance with NJDEP's PFAS monitoring requirements since the NJ MCLs were adopted in 2020. The water utility is in the midst of upgrading the water treatment network at all its facilities. Many communities in NJ have been notified of NJMCL exceedances and NJDOH has developed a Per- and polyfluoroalkyl substances (PFAS) fact sheet as a tool to assist in addressing concerns in communities with PFAS in their drinking water supply. As the PFAS science is continuously evolving, the fact sheet is updated routinely to include new information on regulations and responses to frequently asked questions. To this end, ATSDR is working on a multi-site study to learn more about the relationship between PFAS exposure and health outcomes across seven U.S. communities exposed to PFAS-contaminated drinking water. Work is ongoing, and results are pending.

The drinking water pathways is one of many pathways a person can be exposed to PFAS. Other pathways include the following: Eating fish caught from water contaminated by PFAS, eating food packaged in material that contains PFAS, and using some consumer products such as stain resistant carpeting and water-repellent clothing. Given the ubiquitous presence of PFAS, it is difficult to draw conclusions/conduct epidemiological studies as most of the U.S. population is exposed at varying levels. Preventing exposure to PFAS is challenging due to the widespread historic and current use of PFAS, which are commonly used in consumer products throughout the world.

Recommendations:

1. Specific health concerns regarding PFAS exposures should be discussed with a health care provider. The Centers for Disease Control and Prevention(CDC)/ATSDR has developed information for clinicians that that can be shared with health care providers to determine the best path forward based on an individual's unique circumstances (atsdr.cdc.gov/pfas/hcp/clinical-overview/index.html).

2. NJDOH has developed a Per- and polyfluoroalkyl substances (PFAS) fact sheet to assist in addressing concerns in communities with PFAS in their drinking water supply (nj.gov/health/ceohs/documents/pfas_drinking%20water.pdf). As the PFAS science is continuously evolving, the fact sheet is updated routinely to include new information on regulations and responses to frequently asked questions. To this end, ATSDR is working on a multi-site study to learn more about the relationship between PFAS exposure and health outcomes across seven U.S. communities exposed to PFAS-contaminated drinking water. Work is ongoing, and results are pending (atsdr.cdc.gov/pfas/health-studies/multi-site-study.html).

3. Bottled water may be used for drinking and cooking to reduce exposure to PFAS. Bottled water sold in New Jersey is required to meet the New Jersey MCLs. Home water treatment devices are available that can reduce levels of PFAS but these are not ensured to have PFAS concentrations lower than the NJ MCLs. National Sanitation Foundation (NSF) International, an independent and accredited organization, certifies products proven effective for reducing PFOA and PFOS below 20 ppt.

4. When purchasing a filter, verify that the product is NSF/ANSI Standard 53, and check for the standard version to know at which level the filter is certified to remove total PFAS (PFOA, PFOS, PFNA, PFHxS, PFHpA). For more specific information regarding the effectiveness of home water filters for reducing PFAS, visit the NSF International website, and click on water filters.

5. Exposure can be reduced by avoiding or limiting exposure with some products, as follows:

    a. Use non-stick coated cookware according to manufacturer guidelines (not all non-stick coatings contain PFAS),
    b. Use stainless steel or cast-iron cookware in place of non-stick coated items,
    c. Avoid oil and water-resistant food packaging[1],
    d. Avoid stain resistant coatings on carpet, furniture and clothing,

[1]On January 3, 2025 the U.S. Food and Drug Administration (FDA) issued a notice in the Federal Register announcing its determination that 35 food contact notifications (FCNs) related to per- and polyfluoroalkyl substances (PFAS) are no longer effective because the manufacturers or suppliers have ceased production, supply, or use of the food contact substances. The 35 FCNs had previously authorized food contact substances used for grease-proofing coatings applied to paper and paperboard packaging to prevent leaking of oil and water.
In July 2020, manufacturers or suppliers of the food contact substances voluntarily agreed to phase-out their sales of the grease-proofing substances that contained PFAS. In February 2024, the FDA announced that all grease-proofing substances containing PFAS are no longer being sold by manufacturers for food contact use in the U.S. market.

e. Avoid water repellants on clothing, and
f. Use personal care products without “PTFE” or “Fluoro” ingredients.

References/Resources

NJDEP PFAS: General Information on PFAS available at: dep.nj.gov/pfas/ and dep.nj.gov/pfas/drinking-water/

NJDEP Site Remediation Program: Contaminants of Emerging Concern can be found at: nj.gov/dep/srp/emerging-contaminants/

NJDOH Bottled Water: New Jersey Department of Health
Internal Memorandum of Agreement ATTACHMENT B New Jersey Bottled Drinking Water Standards can be found at: nj.gov/health/ceohs/documents/phfpp/BWStandards.pdf

NSF International – More info NSF certified home water filters, visit: nsf.org/consumer-resources/waterquality/drinking-water/

CDC/ATSDR PFAS Multi-site Study: Information available at atsdr.cdc.gov/pfas/activities/studies/multi-site.html

ATSDR 2021: Detailed summaries of the toxicology and epidemiology studies on PFAS can be at: atsdr.cdc.gov/toxprofiles/tp200.pdf

ATSDR PFAS Information for Clinicians 2024 Health care provider guidance can be found at: atsdr.cdc.gov/pfas/hcp/clinical-overview/index.html

US Environmental Protection Agency – USEPA Final PFAS National Primary Drinking Regulation: epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

Glen Rock High School

In 2016, NJDOH was asked by the Glen Rock Board of Education (BOE) to review indoor air data collected at the Glen Rock High School to address indoor air quality concerns from school staff. The data were collected by the Glen Rock BOE's environmental consultant in August and September 2016, and again in May 2018. NJDOH's evaluation of these data and recommendations is detailed in NJDOH's November 2016 and August 2018 letters to the Glen Rock BOE attached in **Appendix E**.

Overall summary of NJDOH's previous review:

The results indicated that 1,2,4-trimethylbenzene exceeded EPA's reference concentration during the 2016 sampling event but was found below this reference concentration in May 2018. A reference concentration is an estimate of a continuous inhalation exposure concentration to a human population (including sensitive subgroups) that is not likely to be harmful to health during a lifetime.

Based on NJDOH's evaluation, which accounts for a school exposure scenario, harmful health effects from exposures to 1,2,4-trimethylbenzene are not expected. Glen Rock High School staff were also concerned about benzene detected in the indoor air samples collected in 2016. Benzene was found below the NJDEP's residential indoor air screening level, and levels were similar to outdoor air concentrations of benzene in Bergen County.

Formaldehyde was found above the EPA's reference concentration during the May 2018 sampling event. The NJDOH conducted an evaluation for formaldehyde using the same approach as for 1,2,4-trimethylbenzene using a school exposure scenario. Based on this evaluation, NJDOH does not expect harmful health effects from exposures to formaldehyde at the Glen Rock High School.

The indoor air contaminants found in Glen Rock High School were from sources within the school and not associated with any known contaminated sites in the area. There are many common products that contain formaldehyde and 1,2,4-trimethylbenzene. Although harmful health effects are not expected based on the results of the 2016 and 2018 sampling events, NJDOH recommended that the school do the following:

- inspect the products used in the school to identify any sources of formaldehyde and 1,2,4-trimethylbenzene,
- remove or relocate any products containing theses contaminants to custodial areas and store them in airtight containers or in a ventilated storage cabinet, and
- increase ventilation to reduce the levels of 1,2,4-trimethylbenzene and formaldehyde.

Section IV - Summary of Findings and Next Steps

1. *Former Topps Cleaners* – There are **no current exposure concerns** for the Topps Cleaners site. The NJDEP and LSRP should continue to ensure that the vapor mitigations systems and air purifying units continue to operate properly to prevent subsurface vapors from entering impacted homes. The NJDEP and LSRP should continue to monitor the indoor air of homes where there is no active mitigation system to ensure that subsurface vapors do not impact these homes.

2. *Former Nabisco* - Past and any planned future asbestos abatement activities related to the demolition of the remaining structures at the former Nabisco factory facility are overseen by both USEPA and NJ Department of Labor to ensure they are compliant with state and federal regulations. **All samples were below the PCM clearance criteria of 0.01 F/cc and, therefore, are in compliance with state and federal asbestos regulations**. The EPA is the lead on this site with NJDEP as the state oversight. Any community concerns regarding the Nabisco asbestos issues should be directed to the EPA: epa.gov/aboutepa/region-2-media-contacts

3. *Borden and Sandoz sites*: Health effects are not expected because people have not come into contact with site contaminants. There are no completed exposure pathways. Routine monitoring and remediation activities are ongoing.

4. *Glen Rock High School*: As detailed in our previously released letters to the Glen Rock BOE, health effects not expected from indoor air exposures at the high school based on NJDOH's evaluation of indoor air data.

5. *Glen Rock/Ridgewood water*: Health effects are not expected from 1,4 dioxane in drinking water. Ridgewood Water has been in compliance with NJDEP's PFAS monitoring requirements since the NJ MCLs were adopted in 2020. The water utility is in the midst of upgrading the water treatment network at all its facilities. NJDOH has developed a Per- and polyfluoroalkyl substances (PFAS) fact sheet to assist in addressing concerns in communities with PFAS in their drinking water supply (nj.gov/health/ceohs/documents/pfas_drinking%20water.pdf). Residents are encouraged to discuss any specific health concerns regarding PFAS exposures with a health care provider. CDC/ATSDR has developed information for clinicians that that can be shared with health care providers to determine the best path forward based on an individual's unique circumstances (atsdr.cdc.gov/pfas/hcp/clinical-overview/index.html).

NJDOH is available to address any health concerns from residents pertaining to exposures from any of the sites or contaminants evaluated in this report. Questions regarding the findings of this evaluation can be directed to Christa Fontecchio or Somia Aluwalia at 609-826-4984 or by email at Christa.Fontecchio@doh.nj.gov and Somia.Aluwalia@doh.nj.gov.

APPENDICES

Appendix A: Topps Cleaners

Figure 1. Area map – Topps Cleaners – Fair Lawn

Appendix B: Former Nabisco

This table presents data identified as perimeter sampling in the PCM sampling data file and correspond somewhat to the map with the sample locations. However, there are numerous entries labeled “outside” or “fence/property” for the time period up to July 6, 2023. Please note that the QA/QC indicates that a sufficient air sample volume was collected to achieve a detection limit of less than 0.01 F/cc.

Table 1: Perimeter samples for asbestos collected during abatement from January 2023-July 2023

Date	Location	Fibers/cubic centimeter (F/cc)
1/23/23	Outside - S.end - during demo of S. end of main building	<0.002[1]
1/23/23	Outside - Center-during demo of S. end	0.002
1/23/23	Outside - N.end- during demo of S. end	<0.002
1/24/23	Outside-North end by tower	<0.002
1/24/23	Outside-Center-from of building	0.002
1/24/23	Outside-South end	<0.002
1/25/23	Outside - N. end, perimeter	0.002
1/25/23	Outside, perimeter - center of property	<0.002
1/25/23	Outside, perimeter - S. end	<0.002
1/26/23	Outside, perimeter - N. end	<0.002
1/26/23	Outside, perimeter - Center	0.003
1/26/23	Outside, perimeter - S. end	0.002
1/27/23	Outside, perimeter - N. end	0.003
1/27/23	Outside, perimeter - Center	<0.002
1/27/23	Outside, perimeter - S. end	0.002
2/1/23	Outside, perimeter - N. end	<0.002
2/1/23	Outside, perimeter - Center	0.002
2/1/23	Outside, perimeter - S. end	<0.002
2/2/23	Outside, perimeter - N. end	<0.002
2/2/23	Outside, perimeter - Center	0.002
2/2/23	Outside, perimeter - S. end	0.002
2/3/23	Outside, perimeter - North end	0.002
2/3/23	Outside, perimeter - Center	<0.002
2/3/23	Outside, perimeter - South end	0.002
2/9/23	Outside- North Parking lot	0.002
2/9/23	Outside- South Entrance to Property	0.002
2/10/23	Outside- North Parking lot	<0.002
2/10/23	Outside- South Entrance to Property	0.003
2/13/23	Outside- North Parking lot	0.002
2/13/23	Outside- South Entrance to Property	<0.002
2/16/23	Outside -North Parking lot	<0.002

Date	Location	Fibers/cubic centimeter (F/cc)
2/17/23	Outside -North Parking lot	<0.002
2/21/23	Outside -North Parking lot	<0.002
2/22/23	Outside -North Parking lot	<0.002
2/23/23	Outside -North Parking lot	<0.002
2/24/23	Outside -North Parking lot	<0.002
2/27/23	Outside -North Parking lot	0.002
2/28/23	Outside -North Parking lot	0.002
3/1/23	Outside -North Parking lot	<0.002
3/2/23	Outside -North Parking lot	<0.002
3/3/23	Outside -North Parking lot	0.003
3/6/23	Outside -North Parking lot	<0.002
3/7/23	Outside -North Parking lot	0.002
3/8/23	Outside -North Parking lot	<0.002
3/9/23	Outside -North Parking lot	<0.002
3/10/23	Outside -North Parking lot	<0.002
3/13/23	Outside -North Parking lot	<0.002
3/14/23	Outside -North Parking lot	<0.002
3/15/23	Outside -North Parking lot	<0.002
3/16/23	Outside -North Parking lot	<0.002
3/20/23	Outside -North Parking lot	0.003
3/21/23	Outside -North Parking lot	<0.002
3/29/23	Outside -North Parking lot	<0.002
3/30/23	Outside -North Parking lot	<0.002
3/31/23	Outside -North Parking lot	<0.002
3/31/23	Outside -South Parking lot	<0.002
4/6/23	Outside -South Parking lot	0.002
4/7/23	Outside -North Parking lot	0.003
4/7/23	Outside -South Parking lot	<0.002
4/10/23	Outside -North Parking lot	<0.002
4/10/23	Outside -South Parking lot	<0.002
4/11/23	Outside -North Parking lot	0.002
4/11/23	Outside -South Parking lot	0.002
4/12/23	Outside -North Parking lot	0.004
4/12/23	Outside -South Parking lot	0.003
4/13/23	Outside -North Parking lot	0.004
4/13/23	Outside -South Parking lot	0.003
4/17/23	Outside -North Parking lot	0.004
4/17/23	Outside -South Parking lot	0.004
4/18/23	Outside -North Parking lot	0.004
4/18/23	Outside -South Parking lot	0.003
4/19/23	Outside -North Parking lot	0.005
4/19/23	Outside -South Parking lot	0.003
4/20/23	Outside -North Parking lot	0.002

Date	Location	Fibers/cubic centimeter (F/cc)
4/20/23	Outside -South Parking lot	0.002
4/21/23	Outside -North Parking lot	<0.002
4/21/23	Outside -South Parking lot	<0.002
4/24/23	Outside -North Parking lot	<0.002
4/24/23	Outside -South Parking lot	0.002
4/26/23	Outside -North Parking lot	<0.002
4/26/23	Outside -South Parking lot	<0.002
4/27/23	Outside -North Parking lot	<0.002
4/27/23	Outside -South Parking lot	0.002
5/1/23	Outside -North Parking lot	0.002
5/1/23	Outside -South Parking lot	0.002
5/16/23	Outside -North Parking lot	<0.002
5/16/23	Outside -South Parking lot	<0.002
5/18/23	Outside -North Parking lot	0.002
5/19/23	Outside -North Parking lot	0.003
5/22/23	Outside -North Parking lot	<0.002
5/23/23	Outside -North Parking lot	0.002
5/24/23	Outside -North Parking lot	0.004
5/25/23	Outside -North Parking lot	<0.002
5/25/23	Outside -South Parking lot	<0.002
5/30/23	Outside -North Parking lot	0.002
5/30/23	Outside -South Parking lot	0.002
5/31/23	Outside -North Parking lot	<0.002
5/31/23	Outside -South Parking lot	<0.002
6/1/23	Outside -North Parking lot	<0.002
6/1/23	Outside -South Parking lot	0.002
6/6/23	Outside -North Parking lot	0.002
6/6/23	Outside -South Parking lot	<0.002
6/7/23	Outside -North Parking lot	<0.002
6/7/23	Outside -South Parking lot	0.002
6/8/23	Outside -North Parking lot	<0.002
6/8/23	Outside -South Parking lot	<0.002
6/12/23	Outside -North Parking lot	<0.002
6/12/23	Outside -South Parking lot	<0.002
6/13/23	Outside -North Parking lot	<0.002
6/13/23	Outside -South Parking lot	0.002
6/14/23	Outside -North Parking lot	<0.002
6/15/23	Outside -North Parking lot	<0.002
6/20/23	Outside -North Parking lot	0.002
6/21/23	Outside -North Parking lot	<0.002
6/22/23	Outside -North Parking lot	<0.002
6/26/23	Outside -North Parking lot	0.002
6/27/23	Outside -North Parking lot	<0.002

Date	Location	Fibers/cubic centimeter (F/cc)
6/29/23	Outside -North Parking lot	<0.002
7/5/23	Outside -North Parking lot	0.003
7/6/23	Outside -North Parking lot	0.002

[1]The detection limit is <0.002 F/cc for this method

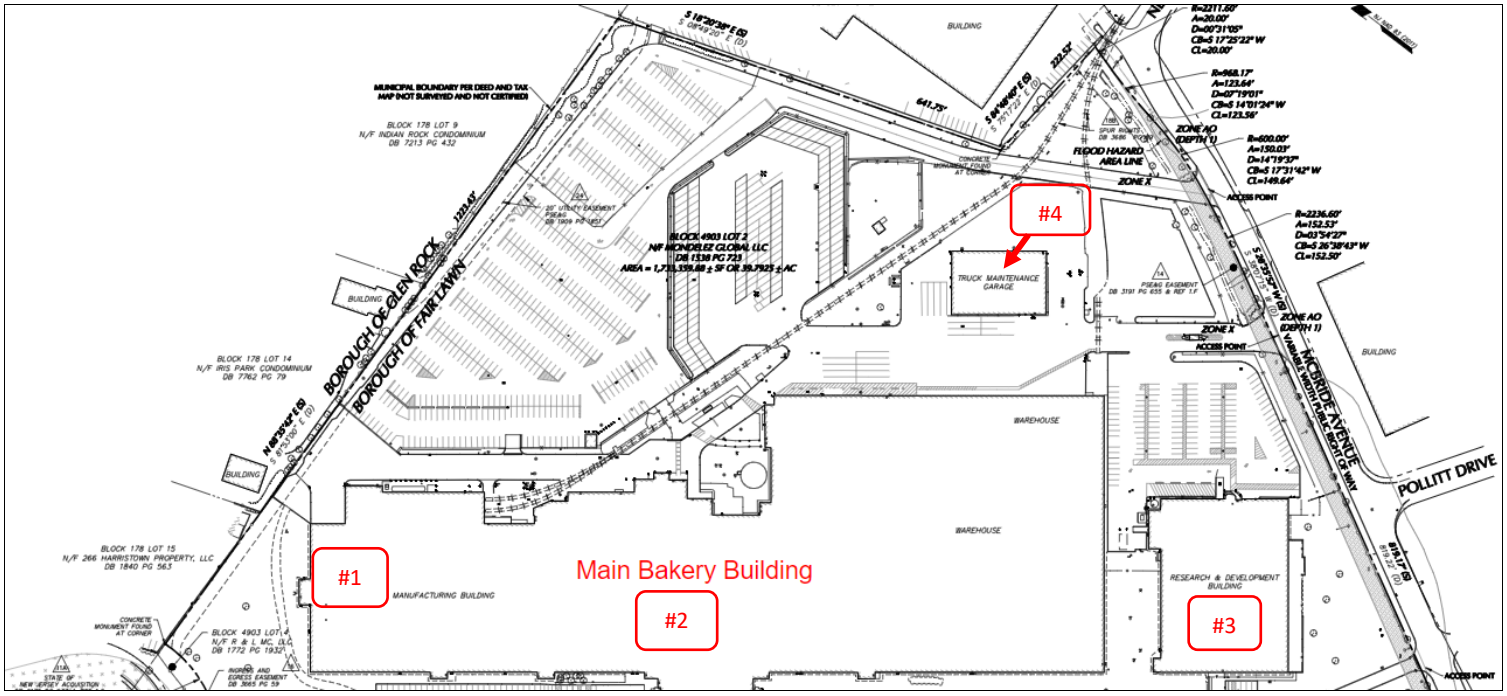

Figure 1: Site map of the Former Mondelez International (Nabisco Brand) Bakery Site

Figure 2: Asbestos perimeter sampling locations during abatement

Appendix C: Former Borden Chemicals

Figure 1 – Former Borden Site – Area Map

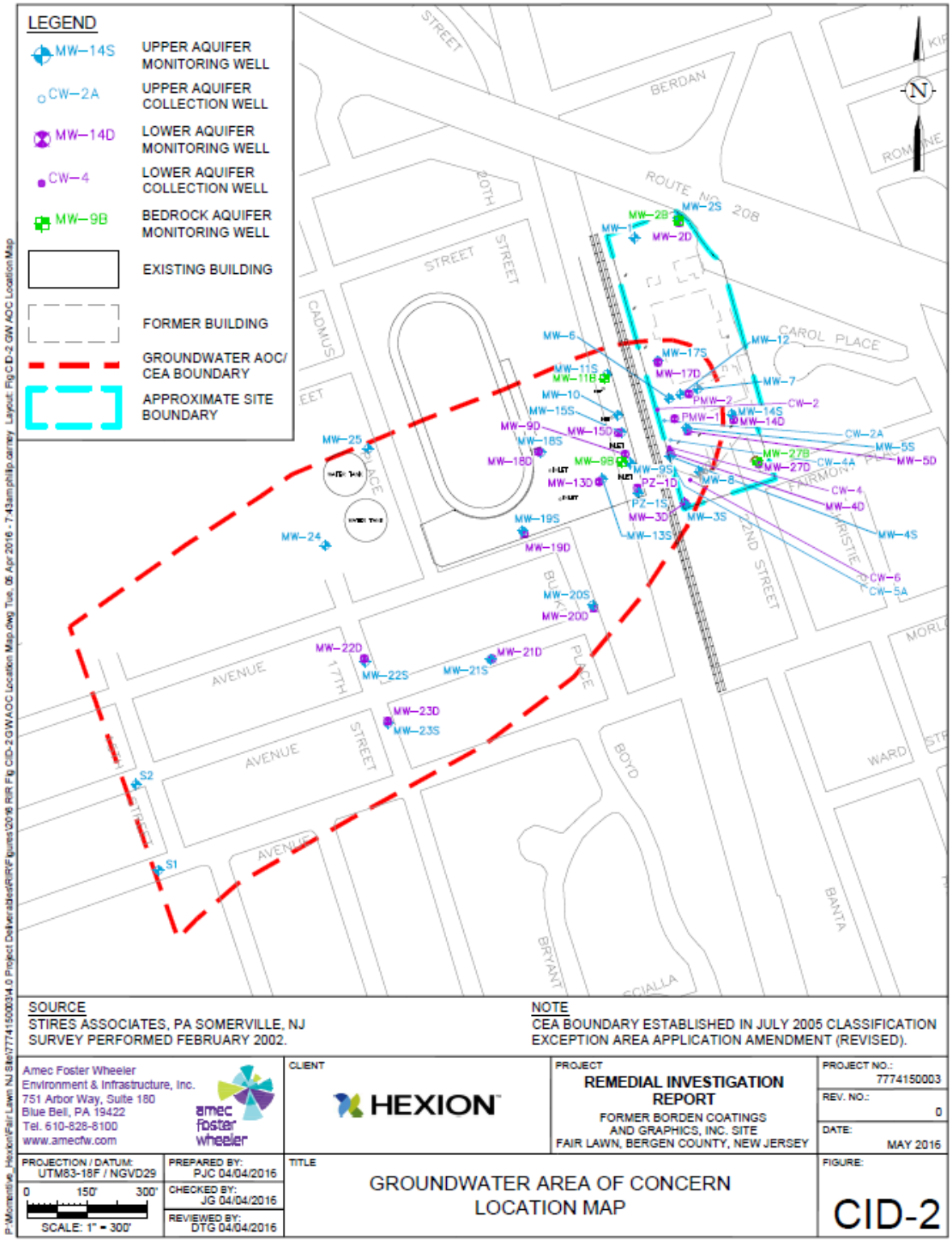

Figure 2. Former Borden Site Groundwater Plume

Appendix D - Former Sandoz Chemicals

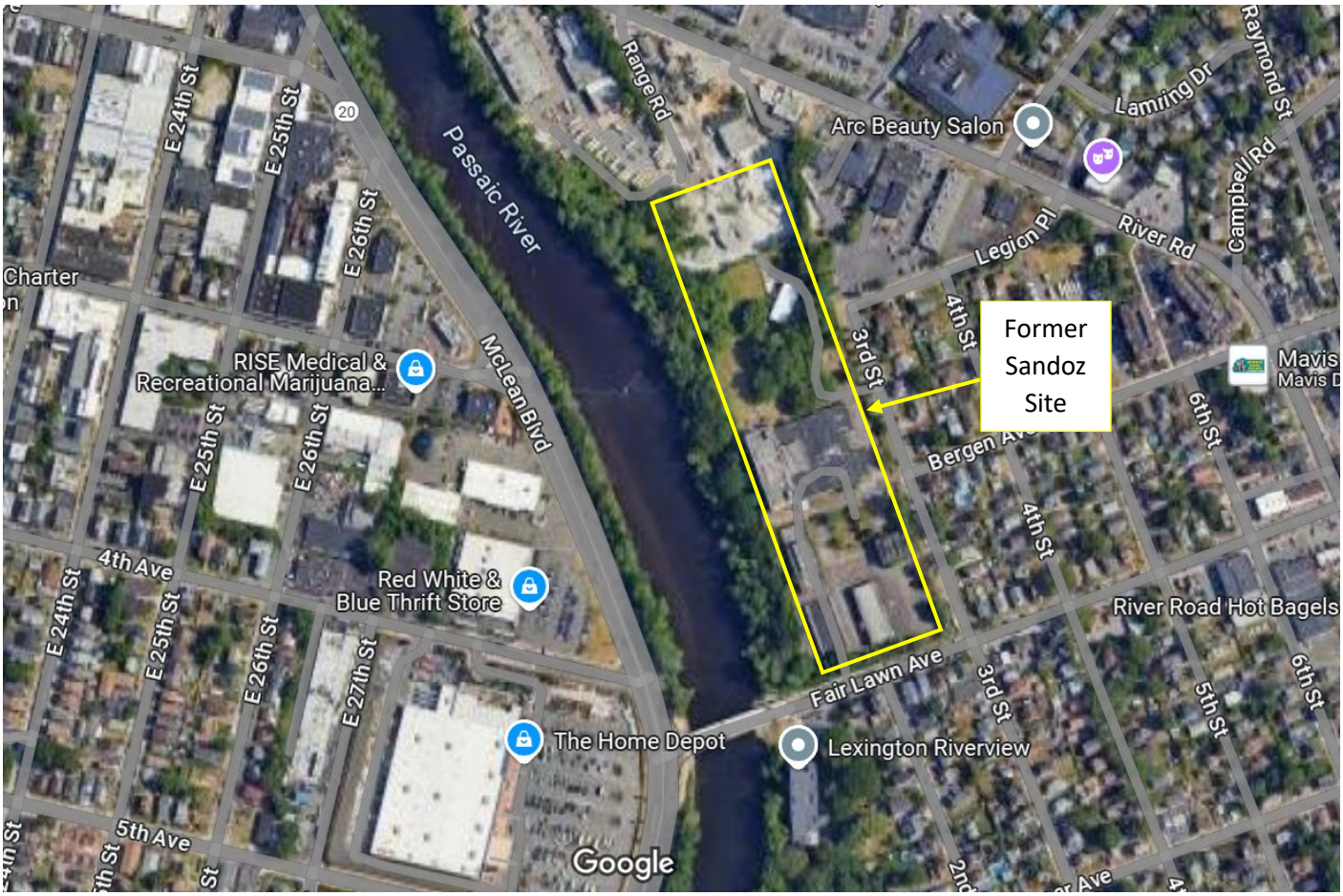

Figure 1. Former Sandoz Site Area Map

Appendix E - Glen Rock High School

State of New Jersey
DEPARTMENT OF HEALTH
CONSUMER, ENVIRONMENTAL AND OCCUPATIONAL HEALTH SERVICE
PO BOX 369
TRENTON, N.J. 08625-0369
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CATHLEEN D. BENNETT
Commissioner

November 18, 2016

Sandy Marinos
Supervisor of Facilities & Security
Glen Rock Board of Education
620 Harristown Road
Glen Rock, NJ 07452

Re: Glen Rock High School, August/September 2016 Indoor Air Investigations

Dear Ms. Marinos:

At the request of the Glen Rock Board of Education (Glen Rock BOE), the Department of Health (DOH) has reviewed indoor air quality (IAQ) investigation data conducted at the Glen Rock High School located at 400 Hamilton Avenue in Glen Rock, New Jersey. This IAQ investigation was conducted in August and September 2016 at the request of Glen Rock staff. IAQ data was provided by Glen Rock BOE's consultant, McCabe Environmental Services, LLC to the DOH via email on October 24, 2016.

Based on our review of the IAQ data, 1,2,4-Trimethylbenzene (1,2,4-TMB) exceeded the current United States Environmental Protection Agency's (EPA) reference concentration (RfC) of 60 $\mu g/m^3$ within the school's media center for both the August and September 2016 sampling events. There were no other compounds detected which exceeded EPA RfC values nor the New Jersey Department of Environmental Protection's (DEP) Residential Indoor Air Screening Levels (RIASL).

An RfC is defined by EPA as an estimate of a continuous inhalation exposure concentration to a human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Based on our exposure assessment which accounts for adjusting the exposure dose in relation to time spent within the Glen Rock High School, the DOH does not expect any adverse health effects to occur based on the observed concentrations of 1,2,4-TMB detected during the August and September 2016 sampling events.

Additionally, it has been brought to our attention that employees of the Glen Rock Public Schools District are concerned about indoor air concentrations of Benzene detected during the two IAQ investigations. Upon DOH review of the IAQ data,

Benzene was not found to exceed the DEP's RIASL. Further, the detected concentrations of Benzene are well within the mean ambient air concentration for Bergen County, New Jersey based on the EPA's National Air Toxics Assessment published in 2011 (available on our DOH website)[1].

1,2,4-TMB is used primarily as a gasoline additive and is a known by-product of combustion. Other sources for this compound include various solvents, paint thinners, cleaners, pesticides, dyes, fragrances, perfumes, degreasing agents, sterilizing agents, synthetic wood products, printing operations and inks. 1,2,4-TMB has not been classified as a carcinogen according to the World Health Organization's International Agency for Research on Cancer nor the EPA.

While the concentration of 1,2,4-TMB does not present a health concern, the following actions are recommended to be taken at the school:

1) A visual inspection of the inventory of products within the media center should be conducted to determine whether any products containing 1,2,4-TMB are present and, if present, should be considered for removal or relocation to custodial storage areas.

2) Any product containing 1,2,4-TMB that is currently in use at the school should be stored in an airtight container or in a ventilated storage cabinet.

3) An increase in air exchange rates for the media center may be considered to help reduce the level of 1,2,4-TMB.

If any new information becomes available or conditions change, the DOH will provide guidance as appropriate. If you have any additional question or concerns, please contact Mr. Keith Bobrowski or Mr. Glenn Pulliam at (609) 826-4950.

Sincerely,

Gary J. Centifonti, M.S., CIH
Acting Program Manager
Environmental and Occupational Health
Assessment Program

c: Keith Bobrowski, Consumer, Environmental and Occupational Health Service
Glenn Pulliam, Consumer, Environmental and Occupational Health Service

[1] https://www26.state.nj.us/doh-shad/indicator/complete_profile/Benzene.html

State of New Jersey
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PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHEREEF M. ELNAHAL, MD, MBA
Commissioner

August 10, 2018

Sandy Marinos
Supervisor of Facilities & Security
Glen Rock Board of Education
620 Harristown Road
Glen Rock, NJ 07452

Re: Glen Rock High School, May 31, 2018 Indoor Air Investigation

Dear Ms. Marinos:

At the request of the Glen Rock Board of Education (Glen Rock BOE), the Department of Health (DOH) has reviewed indoor air quality (IAQ) investigation data conducted at the Glen Rock High School located at 400 Hamilton Avenue in Glen Rock, New Jersey. This IAQ investigation was conducted in May 2018 at the request of Glen Rock staff. An IAQ Investigation Report dated June 20, 2018 prepared by McCabe Environmental Services, LLC (McCabe) was provided by the Glen Rock BOE to the DOH via email on June 26, 2018.

The June 2018 McCabe investigation report indicates the highest detection of 1,2,4-Trimethylbenzene (1,2,4-TMB) was 45 ug/m^3 (micrograms per cubic meter) which is below the US EPA Regional Screening Level for Trimethylbenzenes at 63 ug/m^3. The McCabe report *incorrectly* references the EPA Regional Screening Level for Trimethylbenzenes as 6.3 ug/m^3. Additionally, 1,2,4-TMB was below the current United States Environmental Protection Agency's (EPA) reference concentration (RfC) of 60 µg/m^3.

Formaldehyde was detected in 7 of the 11 indoor air samples at concentrations exceeding the US EPA's RfC of 9.8 ug/m^3. The highest concentration of Formaldehyde was detected at 16 ug/m^3. An RfC is defined by EPA as an estimate of a continuous inhalation exposure concentration to a human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. There were no other compounds detected which exceeded EPA RfC values nor the New Jersey Department of Environmental Protection's (DEP) Residential Indoor Air Screening Levels (RIASL).

The DOH conducted an exposure assessment in accordance with the US EPA's inhalation exposure assessment methodology. Based on our exposure assessment, which accounts for adjusting the exposure dose in relation to time spent within the Glen Rock High School, the adjusted Formaldehyde exposure dose falls well below the US

EPA's RfC of 9.8 ug/m^3. Therefore, the DOH does not expect any adverse health effects to occur from the observed concentrations of Formaldehyde detected during the May 2018 sampling event.

Formaldehyde is a known common indoor air contaminant that is routinely detected both in homes and in workplace areas. It is found in everyday consumer items such as cleaning products, disinfectants, cosmetics, fabrics, manufactured wood and paper products and is also a known by-product from sources of combustion. Outdoor concentrations of Formaldehyde in New Jersey measured from the period of 2001 through 2016 have typically ranged from less than 1 ug/m^3 to 11 ug/m^3 [1].

While the concentrations of Formaldehyde do not present a health concern, the following actions are recommended to be taken at the school:

1) A visual inspection of the inventory of products within the school should be conducted to determine whether any products containing Formaldehyde are present and, if present, should be considered for removal or relocation to custodial storage areas.

2) Any product containing Formaldehyde that is currently in use at the school should be stored in an airtight container or in a ventilated storage cabinet.

3) An increase in air exchange rates for the school may be considered to help reduce the level of Formaldehyde.

Additionally, the investigation by McCabe also collected samples for indoor mold and dust mite allergens which were noted to be negligible.

If any new information becomes available or conditions change, the DOH will provide guidance as appropriate. If you have any additional question or concerns, please contact Ms. Maria Carin or Mr. Glenn Pulliam at (609) 826-4950.

Sincerely,

Gary J. Centifonti, M.S., CIH
Director
Consumer Environmental and Occupational
Health Assessment Program

c: Maria Carin, Consumer, Environmental and Occupational Health Service
Glenn Pulliam, Consumer, Environmental and Occupational Health Service

[1] https://www.nj.gov/dep/airtoxics/Monitor.htm

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