

SOLUTIONS TO A STINKY PROBLEM: CONGRESSIONAL LEGISLATION TO PROMOTE THE USE OF CLOTH DIAPERS

I. INTRODUCTION

They are everywhere, society uses them daily, and they are essential to the efficient operation of any civilized community; landfills are critical to the world.¹ Each and every citizen contributes to a landfill in their community, which makes landfill contribution a part of every individual's life, regardless of where they live.² Approximately 4.62 pounds of municipal solid waste is thrown away per person every day.³ Therefore, our society also has the responsibility of maintaining every landfill to ensure that citizens are not harmed by combustible methane levels and underground water contamination that can be caused by landfill waste.⁴

While one would expect that only solid waste materials are collected in a designated municipal solid waste landfill, other waste materials, such as human fecal matter frequently end up in landfills.⁵ This is due, in large part, to tons⁶ of disposable diapers entering the landfill system daily.⁷ Landfills create methane gas,⁸ a toxic and combustible gas that not only pollutes the surrounding soil but also contaminates the under-

¹ See generally FORBES MCDUGALL ET AL., INTEGRATED SOLID WASTE MANAGEMENT: A LIFE CYCLE INVENTORY 2ND EDITION 297 (Blackwell Science 2001) (1994).

² See generally *id.*

³ UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, MUNICIPAL SOLID WASTE IN THE UNITED STATES 2007 FACTS AND FIGURES 1 (2008), available at <http://www.epa.gov/waste/nonhaz/municipal/pubs/msw07-rpt.pdf>.

⁴ See MCDUGALL ET AL., *supra* note 1, at 301.

⁵ Carl Lehrburger, *The Disposable Diaper Myth: Out of Sight, Out of Mind*, *WHOLE EARTH REV.*, Fall 1988, at 61.

⁶ *Id.* at 62.

⁷ See *id.* at 61.

⁸ See Jim O'Donnell, *Recycling Super Guide, How to Recycle: Everything You Ever Wanted to Know, Learn about Landfills and Methane Gas*, <http://www.recyclingsuperguide.com/learn-about-landfills-and-methane-gas-2> (last visited Dec. 27, 2009).

ground water that is used for drinking and irrigating the food we eat.⁹ This explosive methane is created by a lack of oxygen in the various layers of the landfill.¹⁰ As a result of the methane, nearby agricultural land, underground water systems, and residences are destroyed.¹¹

This Comment explores landfills as one of the world's largest generators of methane gas.¹² Situations at various landfill sites will be used to illustrate the damage methane can do to underground water and surrounding agricultural land.¹³ Specifically, the serious environmental, health, and safety risks caused by disposable diapers will be examined.¹⁴ Further, this Comment will explore the current remedial measures taken by those who manage landfills.¹⁵ Next, this Comment will explore proposed legislation by various states intended to curb the use of disposable diapers.¹⁶ Finally, this Comment will discuss the benefit of legislating disposable diapers in an effort to reduce the environmental, health, and safety issues associated with their use.¹⁷

II. PROBLEMS CAUSED BY LANDFILLS

Landfills cause a variety of environmental, agricultural, and social problems.¹⁸ Landfills create methane which is considered to be a greenhouse gas that consequently results in climate change.¹⁹ Methane leaks into the soil and causes the land to be useless because nothing can be produced from soil that is contaminated with methane.²⁰ Landfills also contaminate underground water making it non potable so it cannot be used for irrigating farmland or for human consumption.²¹ This contami-

⁹ U.S. ENVIRONMENTAL PROTECTION AGENCY, RECORD OF DECISION: FRESNO SANITARY LANDFILL 3-5 (1996).

¹⁰ See O'Donnell, *supra* note 8.

¹¹ See U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3.

¹² O'Donnell, *supra* note 8.

¹³ See *infra* pp. 6-10.

¹⁴ See *infra* pp. 16-24.

¹⁵ See *infra* pp. 5.

¹⁶ See *infra* pp. 24-27.

¹⁷ See *infra* pp. 28-32.

¹⁸ See generally O'Donnell, *supra* note 8.

¹⁹ Gavin Schmidt, *Methane: A Scientific Journey from Obscurity to Climate Super-Stardom*, GODDARD INSTITUTE FOR SPACE STUDIES (Sept. 2004) available at <http://www.giss.nasa.gov/research/features/methane/>.

²⁰ See DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *Envirostor: Fresno Sanitary Landfill* (2007) available at http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=10490097 (last visited July 22, 2009).

²¹ See *id.*

nation occurs when rainwater and liquids from the landfill percolate through the landfill and into the underground water.²²

A. Landfills are one of the Largest Sources of Methane Gas Worldwide

Methane is a molecule that is created when bacteria “feed[s] on organic material.”²³ This colorless and odorless gas “is lighter than air” and can be created in areas where there is oxygen as well as in areas where there is no oxygen.²⁴ When there is oxygen surrounding the bacteria that feed on organic material, aerobic bacteria²⁵ produces carbon dioxide which dissipates into the atmosphere.²⁶ This causes little to no harm because only a minimal amount methane is created.²⁷ However, complications occur when there is no oxygen.²⁸ This forces complex hydrocarbons to break down into methane.²⁹ When there is no oxygen, significant amounts of methane are produced,³⁰ which is then released up into the atmosphere and down into the soil.³¹ Thereafter, the methane that is produced undergoes a series of chemical reactions and ends up as carbon dioxide and water.³² While the end products of carbon dioxide and water do not seem to be harmful at the outset, the chemical process that methane molecules undergo can take in excess of eight years to complete.³³ This means that a single methane molecule can continue to trap heat and exist in the atmosphere for over eight years before it oxidizes.³⁴ A single methane molecule is also larger than a single carbon dioxide molecule which allows it to trap more heat—resulting in greater climate change.³⁵ Methane is also twenty-one times more harmful than carbon dioxide.³⁶

²² MCDUGALL ET AL., *supra* note 1, at 301.

²³ Schmidt, *supra* note 19.

²⁴ City of Burnaby, *Methane Gas*, http://www.city.burnaby.bc.ca/cityhall/departments/departments_building/bldng_artcls/bldng_artcls_mthngs.html (last visited Jan. 4, 2010).

²⁵ Schmidt, *supra* note 19.

²⁶ *Id.*

²⁷ *Id.* (using the word “preferred”).

²⁸ *Id.*

²⁹ *Id.*

³⁰ *See id.*

³¹ *See* U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3-5 (using collection systems is evidence of this statement).

³² Schmidt, *supra* note 19.

³³ *Id.*

³⁴ *Id.*

³⁵ Carbonally, *Super Challenge: Boast About Compost*, (2008), <http://www.carbonally.com/challenges/19-compost>.

³⁶ Methane can trap twenty one more times as much frequencies of infrared radiation as carbon dioxide and lead to global warming. This is because a methane molecule is larger

Methane in landfills is a cause for concern because methane can ignite when it reaches a specific concentration.³⁷ Methane is combustible when there is a minimum of five percent concentration of methane to oxygen.³⁸ The five percent minimum is also referred to as a “lower explosive limit.”³⁹ There is also a maximum concentration of methane that can ignite, which is referred to as an “upper explosive limit.”⁴⁰ Methane has an upper explosive limit of fifteen percent, which means that any concentration up to fifteen percent can ignite, while any concentration over fifteen percent cannot ignite because its concentration is too high compared to the oxygen in the air.⁴¹ As a result of methane levels reaching the point of combustibility, those responsible for managing landfills must take expensive preventative measures to ensure the safety of the surrounding communities because fires can easily be started.⁴²

Currently, landfills such as the Newland Park Landfill in Salisbury, Maryland continue to struggle with vast quantities of methane gas being released into the atmosphere.⁴³ In August 2008, wells in the Newland Park Landfill were tested for methane.⁴⁴ The wells were found to exceed the lower explosive limit, and operators of the landfill had to install a methane gas generator as a safety precaution.⁴⁵ Similarly, the Altamont Landfill in Livermore, California which covers 2,170 acres and takes in 7,000 tons of waste per day,⁴⁶ is currently flaring off⁴⁷ most of its meth-

in size than a carbon dioxide molecule. But for methane, this infrared radiation would otherwise escape into space. *See id.*; Schmidt, *supra* note 19.

³⁷ City of Burnaby, *supra* note 24.

³⁸ KELE, TECHNICAL REFERENCE: HAZARDOUS ATMOSPHERES I (2009), available at <http://www.preconusa.com/Techpapers/hazardousatmos.pdf>.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² See Greg Latshaw, *Landfill methane gas on agenda*, DAILY TIMES, July 7, 2009, available at <http://www.delmarvanow.com/article/20090707/NEWS01/907070324/-1/news%20front2/Landfill-methane-gas-on-agenda>.

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ Although no express mention of a gas generator is in the article, the landfill managers need to update an existing system. *See generally id.*

⁴⁶ Sophia Kazmi, *World's largest plant to convert garbage gas to fuel to open soon in Altamont Pass*, MERCURY NEWS, July 5, 2009, available at http://www.mercury-news.com/breakingnews/ci_12753930?nclink_check=1 <http://historicfresno.org/nrhp/landfill.htm>.

⁴⁷ See Lisa Huynh, *GMUG: “Flaring” methane gas from coal mine not feasible*, MONTROSE DAILY TIMES, Mar. 8, 2008, available at <http://www.montrosepress.com/articles/2008/03/09/news/doc47d35460b4ce5761198483.txt> (flaring methane means to burn it, rather than allowing it to flow into the atmosphere).

ane emissions each day.⁴⁸ This landfill, like the Newland Park Landfill, is also installing a methane generator in an attempt to reduce emissions.⁴⁹ Unfortunately, landfill generators are very costly⁵⁰ and they do not catch all of the methane emissions produced.⁵¹ This is due in large part to uncontrolled conditions at the landfill site which have been found to result in a significant amount of the methane gas escaping into the atmosphere.⁵² These corrective measures are very costly and do not collect all of the methane emissions that are emitted. Because it is the city's obligation to provide funding for costly remedial investigations and methane generators, taxpayers are actually the original source for funding.⁵³ This is unfortunate as the taxpayer's money is unnecessarily spent because there are other ways of reducing methane gas.

Landfills are one of the largest producers of methane gas worldwide⁵⁴ because harmful methane is produced in areas where there is little to no oxygen.⁵⁵ Landfills have little to no oxygen because trash is brought to the landfill by the truckload, removed of recyclables, compacted, and then "juiced"⁵⁶ to remove liquids.⁵⁷ The compacted trash is then put into trenches and topped with dirt at the end of each day.⁵⁸ While the layers of dirt work to neutralize odors of rotting trash and work to prevent various animals from foraging, they also remove oxygen from the rotting trash.⁵⁹ This process produces large quantities of methane.⁶⁰ The Environmental Protection Agency ("EPA") has estimated that approximately 91-123 pounds of methane are produced per ton of trash buried per day.⁶¹

⁴⁸ Kazmi, *supra* note 46.

⁴⁹ *Id.*

⁵⁰ This methane generator cost 15.5 million dollars. *See id.*

⁵¹ MCDUGALL ET AL., *supra* note 1, at 298.

⁵² *Uncontrolled conditions* means uncontrolled weather in general. *See id.*

⁵³ "Superfund hazardous substance cleanup" refers to governmental control and authority over hazardous landfills. *See generally* David Wallechinsky, *Where Does Your Tax Money Go?*, PARADE, Apr. 10, 2005, available at http://www.parade.com/articles/editions/2005/edition_04-10-2005/featured_0.

⁵⁴ O'Donnell, *supra* note 8.

⁵⁵ *See generally* Brendan I. Koerner, *The Other Greenhouse Gases: Is methane really worse for the environment than carbon dioxide?*, (Nov. 27, 2007), <http://www.slate.com/id/2178595/>; *see* Schmidt, *supra* note 19.

⁵⁶ O'Donnell, *supra* note 8 (compacting to remove the liquids from within).

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.* (mentioning disposable diapers). *See generally* Schmidt, *supra* note 19 (layering removes oxygen, thus creating methane).

⁶⁰ *See* Carbonally, *supra* note 35.

⁶¹ *Id.*

B. Landfills Contaminate Underground Water

Not only are landfills the largest producer of methane in the United States,⁶² they also contaminate underground water aquifers used for irrigation of crops and private wells for personal use.⁶³ Underground water can become contaminated two ways: (1) by the original liquids derived from the garbage and (2) from rainwater that percolates and collects contaminants as it leaks downward through the layers of the landfill into underground aquifer layers.⁶⁴

In *Connecticut Resources Recovery Authority v. Refuse Gardens Inc.*, 642 A.2d 762, (1993), the landfill in question was under scrutiny for contamination of ground water.⁶⁵ Connecticut Resources Recovery Authority (plaintiff) brought the suit in an attempt to recover expenses in the amount of \$1,009,286.38 for the study and implementation of remedial measures.⁶⁶ The study revealed that groundwater contamination and landfill gas migrated beyond the boundary of the landfill.⁶⁷ In response to the required investigation by the Commissioner,⁶⁸ as well as the results that the tests found, the plaintiff had to spend approximately \$877,963.18 on a landfill gas recovery system as well as approximately \$133,661.19 to study the groundwater and surface water contamination.⁶⁹ The judgment was in favor of the defendant because of the plaintiff's ownership in the land, not because the defendants were negligent in maintaining and operating the landfill site when they previously owned it.⁷⁰

Connecticut Resources Recovery Authority illustrates just how costly it is to identify and remedy the contamination that landfills frequently cause.⁷¹ Moreover, this case was the beginning of several government regulations that were to be imposed on existing and future landfills.⁷² In

⁶² O'Donnell, *supra* note 8.

⁶³ The wells are for both personal use as well as irrigation, based on 1982 control of leachate. See generally Bruce Edward Walker, *Discarding False Notions: The Facts About Solid Waste Disposal in Michigan*, (Jan. 31, 2007), <http://www.mackinac.org/article.aspx?ID=8186>.

⁶⁴ MCDUGALL ET AL., *supra* note 1, at 301. See generally O'Donnell, *supra* note 8 ("juicing" the original liquids).

⁶⁵ *Connecticut Resources Recovery Authority v. Refuse Gardens, Inc.*, 642 A.2d 762, 762 (Conn. Super. Ct. 1993).

⁶⁶ *Id.*

⁶⁷ *Id.* at 763.

⁶⁸ The Ellington Planning and Zoning Commission. *Id.*

⁶⁹ *Id.* at 764.

⁷⁰ *Id.*

⁷¹ *Id.* at 762.

⁷² The regulations in the case occurred in 1987. See *id.* at 763, the city was liable because EPA's investigation determined that the landfill was leaking significant

1992, the EPA required that all municipal solid waste landfills install composite liners.⁷³ This membrane lines the bottom and sides of the landfill to protect groundwater and soil from leachate releases.⁷⁴ While this liner protects the soil and underground water, there are several landfills, such as the Fresno Sanitary Landfill, that were built unlined, and remain unlined.⁷⁵ Even in lined landfills, these liners will eventually deteriorate, causing the landfills to leak.⁷⁶ Costly remedial measures such as those used in *Connecticut Resources Recovery Authority* could easily be avoided by alternative waste management practices such as recycling, and composting. Reducing one of the largest contributors to landfill waste is also a practical method of preventing remedial investigations and installing methane generators. Additionally, the \$1,009,286.38 that the plaintiff sought could have been used to promote those alternative waste management practices. Unfortunately, even a million dollar remedial measure cannot completely fix the migration of methane and leachate⁷⁷ releases, because even those landfills that are in compliance with the EPA's 1992 waste management standards leak methane and contaminate the groundwater.⁷⁸

amounts of toxic chemical wastes and metallic sludge. *See also* City of Albion v. Guaranty National Insurance Company, 73 F.Supp.2d 846 (W.D. Mich. 1999).

⁷³ *See* UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, LANDFILLS (2009), available at <http://www.epa.gov/waste/nonhaz/municipal/landfill.htm>; *see* UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, LDR RULES AND REGULATIONS 1992 (2009), available at <http://www.epa.gov/osw/hazard/tsd/ldr/rules92.htm>.

⁷⁴ UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *supra* note 73.

⁷⁵ Unlined landfills are extremely difficult and expensive to line after being in use for a long period of time. *See* U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3.

⁷⁶ Because landfill liners and plastic pipes will eventually breakdown, become brittle, and swell; plastic is not indestructible. Lynn Landes, *Landfills: Hazardous to the Environment*, <http://www.zerowasteamerica.org/Landfills.htm> (last visited Feb. 17, 2010).

⁷⁷

Leachate is created by rain water and surface water entering buried refuse in a landfill from the top and seeping through the sides and bottom of the landfill. The process of rain water and surface water passing through the landfill creates a contaminant. This contaminant, in the form of water, comes out the sides and bottom of the landfill polluting the groundwater in the area. Methane gas is created from the household solid waste material delivered to the landfill that decomposes. Methane gas is highly flammable. Landfill leachate and landfill gas are commonly associated with municipal solid waste landfills. *Connecticut Resources Recovery Authority*, 642 A.2d. at 763.

⁷⁸ MCDUGALL ET AL., *supra* note 1, at 301.

C. Landfills Create a Variety of Problems

In *LeBlanc v. City of Lafayette*, 558 So.2d 259 (La. Ct. App 1990), the property owners surrounding the City of Lafayette Municipal Landfill, filed suit against the City of Lafayette for property damages arising out of the existence of the landfill.⁷⁹ According to the plaintiffs, the landfill caused: nauseating odors; an abundance of flies; loose trash scattered around the landfill; interference with natural water drainage; a constant noise of machinery; as well as the overall, unsightly appearance of visible garbage.⁸⁰ Additionally, the plaintiffs claimed that there was an abundance of rats in the area, potholes in the street, and that the water had a poor taste and smell as a result of the existence and continual operation of the landfill.⁸¹

According to the testimony of the Assistant Administrator from the Department of Environmental Quality,⁸² there had been numerous complaints since 1983, but the first violation and penalty was not issued until January of 1988.⁸³ The plaintiffs collectively were awarded \$34,000 in general damages.⁸⁴ *LeBlanc* demonstrates that landfills actually are a legal nuisance and pose many health and safety hazards to the surrounding public.⁸⁵ This case also exemplifies that actions are brought and damages are awarded in court based on the threats that landfills pose to neighbors and citizens of the community.⁸⁶

As the largest producer of methane gas worldwide, landfills cause a variety of problems.⁸⁷ The methane created by landfills is dangerous because it contributes to climate change.⁸⁸ The methane also leaks into the atmosphere, soil, and underground water.⁸⁹ Additionally, landfills pose a public nuisance to surrounding residences, and threaten nearby farmland.⁹⁰ These problems have occurred in and around various land-

⁷⁹ *LeBlanc v. City of Lafayette*, 558 So.2d 259, 260 (La. Ct. App 1990).

⁸⁰ *Id.*

⁸¹ *Id.* at 261.

⁸² A department in Louisiana that strives to manage all environmental concerns. *Id.* See Louisiana Department of Environmental Quality. *History of the Department* (2009), available at <http://www.deq.louisiana.gov/portal/tabid/2241/Default.aspx>.

⁸³ *LeBlanc*, 558 So.2d at 261.

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.* at 260. General damages awarded and diminished property value. See *Acadian Heritage Realty, Inc. v. City of Lafayette*, 434 So.2d 182 (La. Ct. App. 1983).

⁸⁷ See O'Donnell, *supra* note 8.

⁸⁸ Schmidt, *supra* note 19.

⁸⁹ MCDUGALL ET AL., *supra* note 1, at 299.

⁹⁰ DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *supra* note 20; See Scorecard: The Pollution Information Site. *Superfund Site Report: Fresno Municipal Sanitary Landfill*

fills nationwide, and have led to numerous lawsuits regarding contamination of water, nuisance, and preservation of agricultural land.⁹¹

III. LANDFILLS ARE A CONTINUOUS THREAT TO AGRICULTURE

As a result of underground water contamination and the vast amounts of methane being produced by landfills, landfills across the nation have one of two options: shut down or comply with federal regulations.⁹² In 1935, the Fresno Sanitary Landfill in Fresno, California, became the nation's first modern landfill,⁹³ but because it was unlined, it closed to collection in 1987.⁹⁴ This landfill is 145 acres⁹⁵ and the area surrounding the landfill at the time of its opening consisted of agricultural land and residential homes.⁹⁶ Currently, the landfill still exists, but is closed to collection because it pollutes the underground water.⁹⁷ The total waste quantity of compacted trash in the landfill to date is between 4.7 and 8 million cubic yards.⁹⁸ The groundwater beneath the landfill is part of a sole-source aquifer used for drinking and irrigation water for the residents of Fresno.⁹⁹

In 1983, the California Department of Health Services revealed that methane at the Fresno Sanitary Landfill was migrating.¹⁰⁰ A year later, nearby residents filed complaints against the city alleging that waste oils and solvents had been disposed of in the landfill.¹⁰¹ After testing of the

(2005) available at https://www.scorecard.org/env-releases/land/site.tcl?epa_id=CAD980636914.

⁹¹ See *infra* pp. 10-16.

⁹² The only other option is to shut down. See generally Walker, *supra* note 63.

⁹³ The Fresno Sanitary Landfill is considered to be "modern" because garbage in the 19th century was sent to incinerators, to barges floating on the sea, or used to fill in wetlands. See *id.*

⁹⁴ See generally U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3.

⁹⁵ *Id.*

⁹⁶ Scorecard: The Pollution Information Site, *supra* note 90.

⁹⁷ U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3.

⁹⁸ Martin V. Melosi, *A Guide to Historic Architecture in Fresno, California: Fresno Sanitary Landfill* (2006) available at <http://historicfresno.org/nrhp/landfill.htm>.

⁹⁹ Groundwater exists underneath the landfill site. See U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 3. "Water that's beneath the earth's surface between the soil and deep layers of rock. This water supplies springs and wells, and may be used to supply drinking water." See Larimer County, *The Garbage Glossary*, (2009), <http://www.larimer.org/SolidWaste/kidspages/glossary.htm>.

¹⁰⁰ Scorecard: The Pollution Information Site, *supra* note 90.

¹⁰¹ The EPA Hazard Ranking System ranks sites on a 100 percent scale. *Id.* Figures assess the type and magnitude of potential exposure to contaminants that are present and/or migrating from the site, this assessment is part of the Comprehensive Environmental Response Compensations and Liability Act of 1980 "CERCLA" which authorizes

landfill conducted, it was determined that the overall hazardousness of the landfill was in the thirty percent range, which put it below the national average of the fifty percent range.¹⁰² However, the underground migration of the methane was in the seventy percent range, placing it above the national average of fifty percent.¹⁰³ This migration affected surrounding vineyards which were to the east and west of the landfill.¹⁰⁴ Methane barriers¹⁰⁵ were installed on the north and south to protect the surrounding residences.¹⁰⁶

Testing of the Fresno Sanitary Landfill site showed that high levels of vinyl chloride¹⁰⁷ were present in soil that was located 700 feet away from the landfill.¹⁰⁸ Polluted water was used to irrigate the surrounding agricultural land which induced downward gradients of contaminants.¹⁰⁹ This became extremely problematic because the downward gradient induction of contaminants can draw the contaminants into deeper aquifer layers and make the threat caused by the landfill site far worse by polluting fresh water.¹¹⁰ The immediate presence of methane and vinyl chloride, as well as other contaminants in the groundwater, caused the city to begin testing the site's groundwater from domestic wells, methane monitoring wells, and agricultural irrigation wells.¹¹¹ In 2004, as a result of the negligence of the City of Fresno and landfill site planners, the City had to reimburse Souza Farms for three new agricultural wells and re-

the Federal Government to respond to releases or threatened releases of hazardous substances. See U.S. ENVIRONMENTAL PROTECTION AGENCY, SUPERFUND EXPOSURE ASSESSMENT MANUAL 1-2 (1988), available at <http://www.hanford.gov/dqo/project/level5/sfndxass.pdf>.

¹⁰² Scorecard: The Pollution Information Site, *supra* note 90.

¹⁰³ *Id.* The hazard ranking system uses numerical values to determine the initial risk based on the conditions at the site. See UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, INTRODUCTION TO THE HAZARD RANKING SYSTEM (HRS), (2009), available at http://www.epa.gov/superfund/programs/npl_hrs/hrsint.htm.

¹⁰⁴ DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *supra* note 20.

¹⁰⁵ Methane barriers consist of vacuum and gas extraction systems that are installed in the ground. U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 5.

¹⁰⁶ Scorecard: The Pollution Information Site, *supra* note 90; DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *supra* note 20.

¹⁰⁷ Vinyl chloride is a chemical used in various materials including the manufacturing of building, construction, automotive parts, piping and is heavily relied on in the plastic industry. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, CONSUMER FACTSHEET ON VINYL CHLORIDE, (2009), available at http://www.epa.gov/OGWDW/contaminants/dw_contamfs/vinylchl.html.

¹⁰⁸ U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 5.

¹⁰⁹ Vertical gradients occur because groundwater flows downstream. *Id.* at 7; *see generally* Landes, *supra* note 76.

¹¹⁰ U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 16-17.

¹¹¹ *Id.* at 7.

place three existing agricultural wells on their property, to stop the potential migration of contaminated groundwater.¹¹² The purchase of the wells was in the form of a settlement agreement involving Souza Farms and the City of Fresno.¹¹³ In addition to underground water contamination, there currently continues to be high concentrations of methane, vinyl chloride, and lower concentrations of volatile organic compounds (“VOCs”).¹¹⁴

The Fresno Sanitary Landfill is another example of costly remedial measures which had to be implemented in an attempt to halt the migration of methane and contamination of underground water. Unfortunately, the measures that were taken did not amend the harm that was already done to the nearby vineyards and water wells.¹¹⁵ The Fresno Sanitary Landfill is an important example of how damaging landfills can be to the surrounding neighbors and agricultural land.

Fresno is not the only place where methane destroyed nearby agricultural land.¹¹⁶ In *Town of Centerville v. Department of Natural Resources*, 417 N.W.2d 901 (1987), a concerned group of citizens wanted a judicial review of an environmental impact statement because there was a concern that the landfill in question would destroy agricultural land.¹¹⁷ The Circuit Court held that the Wisconsin Department of Natural Resources did not have a sufficient record to allow for deference in not issuing an environmental impact statement.¹¹⁸ The citizens were concerned that after landfill closure, unlimited agricultural use of the land would no longer be feasible.¹¹⁹ This concern regarding the agricultural use of the land was because the landfill site would have erosion problems when the land was tilled.¹²⁰ As a result of the adjacent wetlands and the concern over the potential uselessness of the agricultural land upon closure of the landfill, the appellate court upheld the judgment of the Circuit Court

¹¹² CITY OF FRESNO: REPORT TO THE CITY COUNCIL 2 (2007), available at <http://www.fresno.gov/CouncilDocs/agenda9.25.2007/1n.pdf>.

¹¹³ *Id.*

¹¹⁴ DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *supra* note 20.

¹¹⁵ *See generally id.*

¹¹⁶ *See* *Town of Centerville v. Department of Natural Resources*, 417 N.W.2d 901, 903 (Wis. Ct. App. 1987).

¹¹⁷ *Id.* at 903.

¹¹⁸ The issue that was of most concern by the group of citizens (plaintiffs) was the wetlands that were adjacent to the landfill site. *Id.* at 905.

¹¹⁹ *Id.* at 907.

¹²⁰ The land was useless after it was used as a landfill. *Id.* *See also* *McFarlin v. City of Murfreesboro*, No: 01-A-019206CH00215, 1992 WL 319460, at *1 (Tenn. Ct. App. Nov. 6, 1992).

which compelled the department to issue the environmental impact statement.¹²¹

The landfill system that continues to be used is alarming because it is inevitable that landfills will leak. This means that landfills will require some type of corrective solution once they commence collection. Although the EPA has enacted rules and regulations for collecting municipal solid waste, these rules and regulations do not eliminate all the public health and safety hazards, as well as the environmental hazards associated with landfill systems. An effective way to reduce the environment, health, and safety hazards would be to reduce the amount of waste that enters landfills, especially one of the largest contributors to the municipal solid waste--disposable diapers.

A. Landfills Consume Agricultural Land

While the Fresno Sanitary Landfill settlement illustrates how landfills threaten agricultural land in terms of groundwater contamination,¹²² landfills can also threaten agriculture by consuming otherwise fertile agricultural land for waste management purposes.¹²³ This causes land which could have been used for various agricultural purposes, to instead be used for storing municipal solid waste.¹²⁴

Cases involving landfills and agricultural land are far from new to the courtroom.¹²⁵ In *Shea Homes Limited Partnership v. County of Alameda*, 2 Cal.Rptr.3d 739 (2003), the appellants challenged a county measure titled, "Measure D, Citizens for Open Space Initiative Plan to Protect Agriculture and Open Space."¹²⁶ Shea Homes Limited Partnership ("Shea Homes"), was the plaintiff and owned approximately 2,700 acres of undeveloped property in the area.¹²⁷ Shea Homes filed suit seeking to set aside Measure D as invalid, alleging that it violated various statutes governing housing requirements for a general development plan.¹²⁸

¹²¹ *Town of Centerville*, 417 N.W.2d at 908.

¹²² Melosi, *supra* note 98.

¹²³ MCDUGALL ET AL., *supra* note 1, at 299.

¹²⁴ *Id.*

¹²⁵ See generally *Shea Homes Ltd. Partnership v. County of Alameda*, 2 Cal.Rptr.3d 739 (2003).

¹²⁶ Measure D relocates the urban growth boundary to coincide with the existing city urban growth boundaries and converts the outside land to 20-acre enhanced agricultural parcels upon demonstration of available water. *Id.* at 743-744.

¹²⁷ *Id.* at 744.

¹²⁸ *Id.* at 745.

The Court defined the Measure's overarching purpose as, "to preserve and enhance agriculture and agricultural lands, and to protect the natural qualities, the wildlife habitats, the watersheds and the beautiful open spaces of Alameda County from excessive, badly located and harmful development."¹²⁹ The Court decided that a limitation on the development of landfills conformed to the purpose of Measure D because fewer landfills allowed for more agricultural space.¹³⁰ The Court held that landfills are environmentally harmful uses of land and even though landfills have their own regulations, the public has the ability to make those regulations stricter.¹³¹

The Court in *Shea Homes Limited Partnership* was correct in finding for the respondents because landfills are incompatible with the purpose of Measure D, which was specifically enacted to preserve agricultural land.¹³² The measure was necessary to help protect agricultural land from landfills because landfills: are a major contributor of methane gas; cause underground water contamination; ruin soil for agricultural use; cause noxious odors; and cause insects and animals to forage.¹³³ Had the outcome of the case been different, the proposed landfill would have consumed land that should be used for agricultural purposes.¹³⁴ This is critical because if the intake of municipal solid waste is significantly reduced, then more agricultural land would be preserved since there would be less dependence on landfill collection. The most effective way to bring about a reduction in landfill waste would be for the Federal Government to either tax disposable diapers or incentivize cloth diapers.

Landfills are hazardous to agriculture because they create methane, which causes many problems, they damage ground water, soil, and they are a nuisance.¹³⁵ Landfills also consume potential agricultural land because once a landfill is actualized, methane will be created and under-

¹²⁹ *Id.* at 747. The plaintiff challenged a zoning ordinance in order to build a landfill. The Appellate Court found in favor of the plaintiff based on the defendant's lack of evidence establishing that landfills are a health and/or safety risk, or interfered with existing agricultural land, and based on the fact that the plaintiff established that the proposed site was geologically suitable for a landfill. *See also* *Ottawa County Farms, Inc. v. Township of Polkton*, 345 N.W.2d 672, 675 (Mich. Ct. App. 1983).

¹³⁰ *Shea Homes*, 2 Cal.Rptr.3d at 748.

¹³¹ The passing of the act by the public restricts what is considered appropriate use of the land. *Id.* at 749.

¹³² *Id.*

¹³³ *McDOUGALL ET AL.*, *supra* note 1, at 299.

¹³⁴ *Shea Homes*, 2 Cal.Rptr.3d at 749.

¹³⁵ *See generally* *McDOUGALL ET AL.*, *supra* note 1, at 299.

ground water may become contaminated, which results in useless land.¹³⁶ While it is important to understand the consequences of landfills, it is equally important to be conscious of what landfills are composed of in order to better solve the landfill crisis.¹³⁷

IV. DISPOSABLE DIAPERS WORSEN THE LANDFILL CRISIS

Many people are unaware of what exactly is in the local landfill, and may not know that the third largest contributor to landfill waste is disposable diapers.¹³⁸ While there has not been a conclusive study on the amount of methane that a single diaper generates,¹³⁹ reducing the amount of disposable diapers in a landfill will have many positive impacts for the health and safety of the nearby community as well as a positive impact on surrounding agriculture.¹⁴⁰ The most significant benefit of reducing the number of disposable diapers would be the resulting reduction in methane because a reduction in waste would result in a reduction of methane.¹⁴¹ This reduction of methane would benefit surrounding agricultural land by decreasing the likelihood of combustion, as well as less contamination of underground water, which is commonly used for irrigation.¹⁴² A reduction in disposable diapers will also result in a reduction in the cost associated with their disposal.¹⁴³ Another benefit is less fecal matter in landfills.¹⁴⁴ This is important because fecal matter poses many health risks to employees that are frequently handling the trash at the landfill.¹⁴⁵

¹³⁶ See generally DEPARTMENT OF TOXIC SUBSTANCES CONTROL, *supra* note 20; *Town of Centerville*, 417 N.W.2d at 907.

¹³⁷ Newspapers, food and beverage containers, and disposable diapers are the three largest contributors to municipal solid waste. See generally Anna Jo Bratton, *Padding the Bottom Line*, FRESNO BEE, Apr. 26, 2009, at B3.

¹³⁸ *Id.*

¹³⁹ There is no mention of the amount of methane a single diaper generates. See generally CARL LEHRBURGER, *DIAPERS IN THE WASTE STREAM: A REVIEW OF WASTE MANAGEMENT AND PUBLIC POLICY ISSUES* (1989); see generally Lehrburger, *supra* note 5, at 60.

¹⁴⁰ There is no conclusive study as to the amount of methane a diaper produces, but soil will be better preserved with less fecal matter in it. See Lehrburger, *supra* note 5, at 61.

¹⁴¹ See LEHRBURGER, *supra* note 139, at 34 (composting diapers are a feasible alternative because there is more oxygen present than in the landfill, therefore if there is fewer diapers, less methane will be produced).

¹⁴² U.S. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 9, at 7.

¹⁴³ Lehrburger, *supra* note 5, at 61.

¹⁴⁴ See *id.*

¹⁴⁵ See *id.*

Not only are disposable diapers a contributory cause of methane gas in the landfill system,¹⁴⁶ but they are also the source of municipal solid waste complications nationwide.¹⁴⁷ The only two sources of municipal solid waste that are greater than disposable diapers are newspapers and food and beverage containers.¹⁴⁸ Americans also use approximately eighteen billion diapers every year.¹⁴⁹ Even more alarming is the estimation that disposable diapers take approximately 500 years to decompose.¹⁵⁰ Conversely, newsprint only takes two to four weeks to decompose;¹⁵¹ therefore, disposable diapers will remain on earth at least 6,000 times longer than the largest contributor of municipal solid waste.¹⁵² In 1978, three landfills were randomly sampled in Oregon.¹⁵³ Of the three landfills sampled, disposable diapers accounted for sixteen percent, twenty-six percent, and thirty-two percent of the total waste in the landfill.¹⁵⁴ In addition to the landfill issues, disposable diapers are continually found in places where they are not supposed to be, including on the roadside, along rivers, and in septic systems.¹⁵⁵

In addition to the hazard that disposable diapers create upon being discarded, they consume vast quantities of resources to produce.¹⁵⁶ At first glance, the fluffy, absorbent filling inside a disposable diaper looks like cotton, but it is actually wood pulp.¹⁵⁷ The wood pulp that is required to make diapers each year equals 1.3 million tons, or approximately 250,000 trees.¹⁵⁸ The wood pulp makes up approximately 800 million pounds of paper that, once discarded, can never be recycled.¹⁵⁹ Dispos-

¹⁴⁶ Contributory because they are the third largest contributor to municipal solid waste. See Bratton, *supra* note 137, at B3.

¹⁴⁷ National Ass'n of Diaper Services, *Why Use Cloth?* (2005), <http://www.diapernet.org/whycloth.htm>.

¹⁴⁸ Newspapers are the number one contributor to municipal solid waste. Bratton, *supra* note 137, at B3.

¹⁴⁹ National Ass'n of Diaper Services, *supra* note 147.

¹⁵⁰ *Id.*

¹⁵¹ See Brie Cadman, *In a landfill, how long does trash really last?*, (2009), <http://climate.weather.com/articles/dclandfill2009.html?page=7>.

¹⁵² Newsprint decomposes this quickly in wet conditions only, 500 years multiplied by 12 sets of 4 weeks in a year, equals 6,000 times longer. *Id.*

¹⁵³ The Mothering Staff, *The Politics of Diapers*, MOTHERING, Jan. 2003, available at <http://www.mothering.com/green-living/politics-diapers>.

¹⁵⁴ *Id.*

¹⁵⁵ See *id.*; Doris Smith, *People leave appalling mess behind along river*, FRESNO BEE, July 18, 2009, at B4.

¹⁵⁶ National Ass'n of Diaper Services, *supra* note 147.

¹⁵⁷ Huggies, *Environmental FAQs* (2009), <http://www.huggieshappybaby.com/products/index.aspx?uri=efaq/index.aspx> (last visited Jan. 5, 2010).

¹⁵⁸ The Mothering Staff, *supra* note 153.

¹⁵⁹ *Id.*

able diapers also require 3.5 billion gallons of oil and 82,000 tons of plastic each year to produce.¹⁶⁰ However, if cloth diapers were promoted and used in place of disposable diapers, there would be a positive indirect effect on the cotton industry because there would be an increased demand for cotton.

The average American may believe that once the disposable diaper has left their home and is en route to the landfill, it is gone forever.¹⁶¹ However, there are hidden costs associated with the collection and disposal of the diaper.¹⁶² For example, tipping fees¹⁶³ are fees that landfills and waste transfer stations charge to dump waste at their facility.¹⁶⁴ The average tipping fee in the United States is currently \$33.70 per ton,¹⁶⁵ and transportation costs are in excess of \$48 per ton.¹⁶⁶ Therefore, the average cost to dispose of diapers is approximately \$81.70 per ton or approximately \$350 million annually.¹⁶⁷ Additionally, for every consumer dollar spent on disposable diapers, about ten cents goes to disposing of the diaper after it is used.¹⁶⁸

A. Public Health Risks Associated with Disposable Diapers

Disposable diapers have significant impacts on the nation's municipal landfill system,¹⁶⁹ on the nation's resources and budget,¹⁷⁰ and pose serious public health and safety risks once they commence the degradation cycle.¹⁷¹ This health and safety hazard is a result of the presence of fecal matter in landfills.¹⁷² Although many cities have defined what hazardous

¹⁶⁰ *Id.*

¹⁶¹ See Lehrburger, *supra* note 5, at 60.

¹⁶² *Id.* at 61.

¹⁶³ Customers are charged tipping fees for disposing of waste at the landfill sites. The amount of the fee is based on the amount of tons deposited at the landfill and are used to pay for bonds or operation costs. Craig Freudenrich, *How Landfills Work*, (2009), <http://science.howstuffworks.com/landfill8.htm> (last visited Jan. 4, 2010).

¹⁶⁴ Larimer County, *supra* note 99.

¹⁶⁵ Based on figures from 2002. Ed Repa, *Tipping through Time*, WASTE AGE, Nov. 1, 2002, http://wasteage.com/mag/waste_tipping_time/ (last visited Jan. 4, 2010).

¹⁶⁶ LEHRBURGER, *supra* note 139, at 32.

¹⁶⁷ 18 billion disposable diapers purchased each year, approximately 90 percent end up in landfills. If each solid diaper weighs about one half a pound, there are approximately 4.3 million tons of disposable diapers end up in a landfill each year. See Lehrburger, *supra* note 5, at 62.

¹⁶⁸ *Id.* at 62.

¹⁶⁹ LEHRBURGER, *supra* note 139, at 6-7.

¹⁷⁰ If state officials should be notified about a problem, then EPA should take notice. See generally *id.* at 7.

¹⁷¹ The Mothering Staff, *supra* note 153.

¹⁷² LEHRBURGER, *supra* note 139, at 43.

waste matter and solid waste matter is, few cities specifically mention that human excrement is not to enter the municipal solid waste system.¹⁷³ An example of a municipality that has addressed this issue is Seattle, Washington which set forth explicit guidelines for the disposal of excrement in disposable diapers: “The following shall not be deposited or discarded into any commercial or residential garbage can, container or receptacle: . . . sewage; . . . human or animal excrement (including excrement from disposable diapers). . . .”¹⁷⁴

Most importantly, municipal solid waste facilities are not equipped to dispose of raw fecal matter.¹⁷⁵ This is evidenced by publications of the World Health Organization and the American Public Health Association.¹⁷⁶ In 1975, the World Health Organization called for an end to the inclusion of urine and fecal matter dumped in municipal solid waste facilities.¹⁷⁷ In 1989, the American Public Health Association issued a policy statement regarding the safety hazards of disposable diapers.¹⁷⁸ In its definition of solid waste the EPA has clearly banned, “solid or dissolved materials in domestic sewage.”¹⁷⁹ Interestingly, the EPA has also set forth guidelines for identifying various characteristics of hazardous waste, at Code of Federal Regulations Title 40 §261.10, which states:

A solid waste that exhibits the characteristic may: Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed¹⁸⁰

Raw fecal matter contained in discarded disposable diapers is within the scope of the EPA standards for hazardous waste because human fecal matter can contain more than 100 viruses.¹⁸¹ Of the diapers that enter the

¹⁷³ Does not mention that human excrement should not enter the municipal landfill waste system. *Compare* ANN ARBOR, MICH., CODE § 26.2.1 (1986), BERKELEY, CAL., CODE § 12.32.010 (1996), and BOULDER, COLO., CODE § 1.2.1 (1981), with SEATTLE, WASH., CODE § 21.36.025 (1989) (stating that human excrement is not to enter the municipal landfill waste system).

¹⁷⁴ SEATTLE, WASH., CODE § 21.36.025 (1989).

¹⁷⁵ See generally Lehrburger, *supra* note 5, at 61.

¹⁷⁶ See The Mothering Staff, *supra* note 153; AMERICAN PUBLIC HEALTH ASS'N, POLICY STATEMENT DATABASE, (2009), available at <http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1189>.

¹⁷⁷ The Mothering Staff, *supra* note 153.

¹⁷⁸ AMERICAN PUBLIC HEALTH ASS'N, *supra* note 176.

¹⁷⁹ 40 C.F.R. § 258.2(3) (2008).

¹⁸⁰ 40 C.F.R. § 261.10(a)(1) (2009); see LEHRBURGER, *supra* note 139, at 7.

¹⁸¹ AMERICAN PUBLIC HEALTH ASS'N, *supra* note 176.

solid waste system, almost all of the diapers contain urine and feces.¹⁸² The list of viruses found in used diapers includes, but is not limited to, Hepatitis A,¹⁸³ Norwalk,¹⁸⁴ and the Rota Virus.¹⁸⁵ It is important to note that these viruses can live in the excrement for several months, which increases the chance of leaching into groundwater.¹⁸⁶ These fecal contaminants can affect both agricultural irrigation and drinking water and are important because law suits have been filed as a result of people being harmed from these contaminants.¹⁸⁷

In, *In re Shigellosis Litigation*, 647 N.W.2d 1, (Minn. Ct. App. 2002), more than 200 people became ill after eating bacteria-contaminated parsley at the defendant restaurant.¹⁸⁸ After several complaints were filed, the Minnesota Department of Health investigated the restaurant and concluded that the parsley was contaminated with shigella bacteria.¹⁸⁹ The parsley was traced back to the grower who used untreated water to rinse and ice the parsley.¹⁹⁰ The court found the grower, the purchaser, the seller and distributor, and the restaurant liable for \$1,000,000 in dam-

¹⁸² While thirty three percent of disposable diapers contained fecal matter in a particular study, Lehrburger also claims "that few, if any" parents rinse out disposable diapers. See generally LEHRBURGER, *supra* note 139, at 22.

¹⁸³ A liver disease lasting from a few weeks to a couple months, caused by ingestion of fecal matter even if in microscopic amounts. DIVISION OF VIRAL HEPATITIS AND NATIONAL CTR. FOR HIV/AIDS, VIRAL HEPATITIS, STD, AND TB PREVENTION, CTRS. FOR DISEASE CONTROL AND PREVENTION, HEPATITIS A INFORMATION FOR THE PUBLIC (2009), available at <http://www.cdc.gov/hepatitis/A/index.htm>.

¹⁸⁴ An intestinal virus that occurs in outbreaks, caused by ingestion of fecal matter. DIRECTORS OF HEALTH PROMOTION AND EDUC., NORWALK VIRUS INFECTION (2009), available at <http://www.dhpe.org/infect/Norwalk.html>.

¹⁸⁵ Kills 600,000 children annually, worldwide, and is caused by ingestion of fecal matter. CTRS. FOR DISEASE CONTROL AND PREVENTION, ABOUT ROTAVIRUS (2009), available at http://www.cdc.gov/rotavirus/about_rotavirus.htm.

¹⁸⁶ See AMERICAN PUBLIC HEALTH ASS'N, *supra* note 176; Lehrburger, *supra* note 5, at 61.

¹⁸⁷ See generally LEHRBURGER, *supra* note 139, at 43; see *infra* notes 188-191 and accompanying text.

¹⁸⁸ *In re Shigellosis Litigation*, 647 N.W.2d 1, 3 (Minn. Ct. App. 2002), Plaintiff infected with e coli after eating defendant's salad. See also *Cohron v. Wendy's International, Inc.*, No. 1:06-CV-146 TS, 2008 WL 2149386, at *2 (D. Utah May 20, 2008); E coli is transmitted orally from ingesting food containing fecal matter. See also NAT'L CTR. FOR ZOONOTIC, VECTOR-BORNE, AND ENTERIC DISEASES (ZVED), CTRS. FOR DISEASE CONTROL AND PREVENTION, DIVISION OF FOODBORNE, BACTERIAL AND MYCOTIC DISEASES (DFBMD): ESCHERICHIA COLI (2009), available at http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html; see also KidsHealth, *What is E. Coli?*, (2009), http://kidshealth.org/kid/stay_healthy/food/ecoli.html (last visited Jan. 5, 2010).

¹⁸⁹ *In re Shigellosis Litigation*, 647 N.W.2d at 3

¹⁹⁰ *Id.* at 4.

ages.¹⁹¹ Shigella bacteria is found in feces and is transmitted orally.¹⁹² Vegetables can become contaminated with shigella if they are harvested from a field containing fecal matter, are irrigated with water containing fecal matter, or as *In re Shigellosis Litigation* exemplifies, rinsed and iced in water containing fecal matter.¹⁹³

The employees that handle the raw fecal matter in the course of disposing of the soiled diapers are at an increased risk for illness because they are frequently exposed to contaminants.¹⁹⁴ Another way that illness can be spread from disposable diapers to humans is through flies and insects.¹⁹⁵ Flies and other air-borne insects can come into contact with the human fecal matter and transmit the viruses to humans or to other animals.¹⁹⁶

B. Disposable Diapers: The Health and Safety Risks for Children

In addition to the public health and safety risks associated with disposable diapers in landfills, children who use these diapers are also subject to health risks.¹⁹⁷ Dioxin, for example, is a by-product of the bleaching process that paper and wood pulp undergo in the production of disposable diapers.¹⁹⁸ This harmful by-product has been linked to cancer, liver disease, and skin diseases.¹⁹⁹ Dioxin, however, is not the only chemical released from disposable diapers, toluene,²⁰⁰ xylene,²⁰¹ ethylbenzene,²⁰²

¹⁹¹ See *id.* at 3, 12-13 (all parties having to answer to some liability).

¹⁹² NAT'L CTR. FOR ZOONOTIC, VECTOR-BORNE, AND ENTERIC DISEASES (ZVED), CTRS. FOR DISEASE CONTROL AND PREVENTION, DIVISION OF FOODBORNE, BACTERIAL AND MYCOTIC DISEASES (DFBMD): SHIGELLOSIS (2009), available at http://www.cdc.gov/nczved/dfbmd/disease_listing/shigellosis_gi.html#2.

¹⁹³ *Id.*; *In re Shigellosis Litigation*, 647 N.W.2d 1, at 4.

¹⁹⁴ LEHRBURGER, *supra* note 139, at 5.

¹⁹⁵ Lehrburger, *supra* note 5, at 61.

¹⁹⁶ Based on transmission from the flies and insects. See generally *id.*

¹⁹⁷ See generally *The Mothering Staff*, *supra* note 153.

¹⁹⁸ *Id.*

¹⁹⁹ Jane McConnell, *The Joy of Cloth Diapers*, MOTHERING, May 1998, available at <http://www.mothering.com/green-living/joy-of-cloth-diapers>.

²⁰⁰ Used in making paints, paint thinners, fingernail polish, lacquers, and may be used in the leather tanning process. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, TOLUENE 1 (2009) available at <http://www.atsdr.cdc.gov/tfacts56.pdf>.

²⁰¹ Used as a solvent in the printing, leather, and rubber industries. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, XYLENE 1 (2009) available at <http://www.atsdr.cdc.gov/tfacts71.pdf>.

²⁰² Found in gasoline and paints. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, ETHYLBENZENE 1 (2009) available at <http://www.atsdr.cdc.gov/tfacts110.pdf>.

styrene,²⁰³ and isopropylbenzene²⁰⁴ are also found to be present.²⁰⁵ Prolonged exposure to these chemicals can cause irritation of the eyes, nose, throat, and bronchoconstriction.²⁰⁶

The superabsorbent chemical that turns the urine into a gel-like matter is also concerning.²⁰⁷ Sodium polyacrylate is among one of the various chemicals used in disposable diapers.²⁰⁸ Sodium polyacrylate is a highly absorbent fiber which gels liquids, such as body fluids, upon contact.²⁰⁹ This chemical was removed from tampons in 1985, due to its association with Toxic Shock Syndrome.²¹⁰ When sodium polyacrylate is used in disposable diapers, the chemical can come in contact with the skin and become visible on the surface of the skin.²¹¹ There is also a concern that this chemical can be absorbed into the body through open abrasions such as those caused by diaper rash.²¹²

While disposable diapers have caused illnesses originating from the chemical components of the diaper, there are also health risks associated with the plastic lining of the diaper.²¹³ A study involving disposable diapers was conducted in 2000, the purpose of which was to investigate the increase in male infertility and decrease in quality of sperm.²¹⁴ This study concluded that the mean scrotal temperature is substantially higher in male children that wear plastic lined, disposable diapers than those

²⁰³ Usually a synthetic chemical, used for rubber, automobile parts, and food containers. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, STYRENE (2009) available at <http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=74>.

²⁰⁴ Isopropylbenzene is used as a thinner for paints, lacquers, and enamels. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, HEALTH CONSULTATION: CROWN INDUSTRIES SITE 6 (2009) available at <http://www.atsdr.cdc.gov/HAC/pha/CrownIndustriesSite/CrownIndustriesHC061207.pdf>.

²⁰⁵ The Mothering Staff, *supra* note 153.

²⁰⁶ *Id.*; Airways become constricted, which makes breathing more difficult and causes inflammation, coughing and/or wheezing. See KidsHealth, *Bronchoconstriction*, (2009), http://kidshealth.org/parent/asthma_basics/dictionary/bronchoconstriction.html (last visited Jan. 5, 2010).

²⁰⁷ C Heal & C Cooper, *Other Implications of Disposable Nappies*, 85 ARCHIVES OF DISEASE IN CHILDHOOD 268, 269 (2001).

²⁰⁸ *Id.*

²⁰⁹ See *Picketts v. International Playtex, Inc.*, 215 Conn. 490, 494-495 (Conn. 1990).

²¹⁰ Toxic Shock Syndrome is associated with the use of tampons and occurs as a complication of skin abscesses. *Playtex, Inc. v. Columbia Casualty*, No: CIV A. 88C-MR-233, 1993 WL 390469, at *3 (Del. Super. Ct. Sept. 20, 1993).

²¹¹ Huggies, FAQs, (2009), <http://www.huggieshappybaby.com/products/index.aspx?faqs>.

²¹² C Heal & C Cooper, *supra* note 207, at 269.

²¹³ The Mothering Staff, *supra* note 153.

²¹⁴ C-J Partsch et. al., *Scrotal Temperature is Increased in Disposable Plastic Lined Nappies*, 83 ARCHIVES OF DISEASE IN CHILDHOOD, 364, 364 (2000).

who wear cloth diapers,²¹⁵ because the insulation properties in the disposable diapers significantly interfered with the body's physiological cooling system.²¹⁶ While temporary heating of the scrotum in young children during the day may not have significant negative impacts, prolonged periods of scrotal warmth may cause poor testicular maturation, interfere with spermatogenesis, and may result in testicular cancer.²¹⁷

Although the above conditions are unique to male children, diaper dermatitis, also known as diaper rash, affects both male and female children.²¹⁸ Studies have shown that infants who use disposable diapers are changed less frequently and as a result diaper rash is more prevalent with the use of disposable diapers.²¹⁹ Children who wear disposable diapers are more likely to continue to wear a soiled diaper because the sodium polyacrylate immediately changes the liquid into a gel.²²⁰ This solid gel is held in the center of the diaper and makes it harder for the caretaker to determine whether or not the diaper is soiled, thus increasing the length of time the diaper is worn.²²¹ Children who wear cloth diapers, however, are less susceptible to diaper rash, because the materials that form the cloth diaper are usually breathable fabrics such as cotton or wool,²²² and there is less time for the skin to be exposed to the urine because cloth diapers are changed more frequently.²²³

V. PREVIOUSLY PROPOSED LEGISLATION REGARDING DISPOSABLE DIAPERS

Environmental hazards occur when disposable diapers are produced, when they enter the landfill system, and there are health risks associated with the prolonged use of disposable diapers.²²⁴ The safety, environmental, and health hazards that disposable diapers pose for the children who wear them as well as the public that disposes of them, would prompt

²¹⁵ *Id.* at 366.

²¹⁶ *Id.* at 367.

²¹⁷ *Id.*

²¹⁸ Diaper rash is commonly associated with the skin's prolonged exposure to urine. When a child urinates in a disposable diaper, the urine breaks down into ammonia and can cause serious skin irritation especially when the urine is held closely to the skin. C Heal & C Cooper, *supra* note 207, at 269.

²¹⁹ *Id.*

²²⁰ *See generally id.*

²²¹ *See generally id.*

²²² Rachel Snyder, *Natural Fiber Diaper Covers*, *WHOLE EARTH REV.* 64, 64 (1988).

²²³ There is no gel that conceals the liquids. National Ass'n of Diaper Services, *supra* note 147; *see also* McConnell, *supra* note 199.

²²⁴ It is more easily determined that a child has soiled his/her diaper. *See* National Ass'n of Diaper Services, *supra* note 147.

a person to ask, "Why has there not been legislation to reduce the use of disposable diapers due to their harmful effects?" There has been proposed legislation for the banning, taxing, and requirement of warning labels regarding the environmental effects of disposable diapers.²²⁵ However, for various reasons proposed legislation has never been made into law.²²⁶

Only one state has successfully passed a law regarding the reduction of disposable diapers.²²⁷ Nebraska is the only state that required disposable diapers to be made of six percent corn starch because it was believed that disposables made of corn starch were more degradable.²²⁸ Unfortunately, diapers made of corn starch which were advertised as "degradable," were far from being efficiently degradable, and were eventually presumed to be non-degradable because the decomposition process was so slow.²²⁹ In 1992, prior to the enactment of the law, they were removed from the market by the Federal Trade Commission.²³⁰

In addition to Nebraska's concern for environmental protection, Nebraska's law makers were also motivated by the possibility that legislation requiring the use of corn starch in that state would subsequently result in an increase in the demand for corn within the state.²³¹ One reason why legislation promoting "degradable" diapers was never enacted was because the public and many legislators thought that degradation actually occurred in landfills.²³² This assumption is erroneous because degradation does not occur in landfills since there is very little oxygen.²³³ Another reason is that legislators, as well as farmers, had misplaced desires to increase demand for a local agricultural commodity.²³⁴ Both legislators and farmers believed that increased demand for "degradable" diapers would drive up the price of corn starch, but after research was completed, it was found that products made of corn starch and polyethylene were not readily degradable.²³⁵

²²⁵ Patricia Cox Crews, et al., *A Summary of Environmental Legislation Targeting Disposable Diapers and Review of Related Literature*, 2 J. OF ENVIRONMENTAL POLYMER DEGRADATION 39, 45 (1994).

²²⁶ *Id.* at 45-46.

²²⁷ *Id.*

²²⁸ *Id.*

²²⁹ *Id.*

²³⁰ *Id.*

²³¹ *Id.* at 40.

²³² *Id.* at 45.

²³³ *See generally id.* at 42.

²³⁴ *Id.* at 39.

²³⁵ *Id.* at 46.

Despite Nebraska's inability to enact legislation to promote degradable diapers, their desires to increase demand for an agricultural commodity may not have been so misplaced. One indirect benefit to legislating disposable diapers or incentivizing cloth diapers would be that the demand for cotton would increase.²³⁶ The benefits of legislating disposable diapers or an incentive towards using cloth diapers will be two-fold: (1) landfill sites will have less disposable diapers which will preserve the soil and underground water quality; and (2) cotton farmers will have a new market of buyers to sell their cotton to.²³⁷

Although the passing of Nebraska's law fell short of enactment, twenty-five other states made attempts to pass legislation proposing to ban, tax, and/or reduce the use of disposable diapers.²³⁸ Oregon attempted to ban disposable diapers in 1979 and again in 1987, in order to "prevent the disposal of untreated sewage in an environmentally hazardous manner."²³⁹ While an outright ban of disposable diapers is a noble attempt to eliminate all harmful effects associated with them, this is too stringent a law to be imposed on a modern society that is dependent on the convenience of disposable diapers. Washington also proposed a bill that required a comprehensive waste stream analysis of the state, which particularly gave priority to solid waste that, "present[ed] a high potential of harm to human health," and specifically included disposable diapers in the analysis.²⁴⁰ The Washington proposal is a novel attempt at recognizing and informing the public that disposable diapers are in the waste stream and are a potential hazard to human health. This proposal only recognizes that disposable diapers are in the landfills; the bill does not require any action to be taken to cease or reduce their use. Both the Oregon and Washington proposals did not pass because they were also considered to be premature reactions to media statements.²⁴¹

From 1990 to 1992, several states proposed legislation to ban disposable diapers in their state.²⁴² However, an outright ban is too ambitious a

²³⁶ See generally Electronic letter from Casey Creamer, Vice President, Cal. Cotton Ginners and Growers Ass'n(s) (June 24, 2009) (on file with author).

²³⁷ See generally *id.*

²³⁸ Crews, *supra* note 225, at 45.

²³⁹ Lehrburger cited house bill 3315 that was introduced in 1987 and house bill 2838 that was introduced in 1979. LEHRBURGER, *supra* note 139, at 41.

²⁴⁰ Lehrburger cited house bill 1684 that was introduced in 1988. *Id.*

²⁴¹ See Crews, *supra* note 225, at 45 (Concluding that this legislation regarded a concern of dwindling landfill space and the media displayed improperly discarded diapers along the highways, beaches, and riverbanks).

²⁴² Ark., Ariz., Cal., Fla., Haw., Mass., Neb., N.Y., Ohio., Or., Pa., S.C., S.D., Tenn., Va., and Wis. This is possibly a result of the Earth Day 1992, Arthur D. Little's research, and Carl Lehrburger's research. See *id.*

law to impose on people that are dependent on the modern conveniences of the disposable diaper. Another attempt to reduce the use of disposable diapers included proposed legislation which mandated environmental warning labels on the packaging.²⁴³ However, people may not read the label or people may feel that using the disposable diaper is worth the risk, so this would not be an effective way to reduce the amount of diapers used.

While the outright ban of disposable diapers is one way to reduce their use, nine states have proposed legislation in favor of additional taxes for disposable diapers.²⁴⁴ Imposing additional taxes on disposable diapers is an ideal method of reducing the use of disposable diapers because individuals that rely on disposable diapers can still use them and additional revenue will be made.²⁴⁵ Individuals may also be less inclined to purchase disposable diapers in an attempt to avoid the additional tax, thus reducing the amount of disposable diapers that enter landfills.²⁴⁶ The additional revenue that comes from the tax can be spent on programs informing the public of the environmental, health, and safety hazards associated with disposable diapers.

VI. BENEFITS OF LEGISLATING DISPOSABLE DIAPERS

Legislation that deemphasizes the use of disposable diapers will have many environmental and social benefits.²⁴⁷ Although previous proposed legislation has never been enacted, there still should be national economic policies and subsidies which incentivize the use of cloth diapers and which work toward reducing the amount of solid waste that enters the landfills each year.²⁴⁸ A complete ban on disposable diapers is an impractical solution, but a tax on disposable diapers could be a feasible

²⁴³ *Id.*

²⁴⁴ Such as Cal., Colo., Ill., Iowa., Ky., N.H., N.J., Or., and S.D. *Id.*

²⁴⁵ See generally The Huffington Post, *Save Gas, Save Money*, (2008), http://www.huffingtonpost.com/2008/06/24/save-gas-save-money-66-wa_n_108824.html (listing ways to save money on gas and alternative methods of travel); ABC News, *Gas Prices Continue To Rise*, (2007), <http://abcnews.go.com/GMA/video/playerIndex?id=3852639> (stating how the rise in gas prices effects American families and how Americans will be scaling back).

²⁴⁶ Disposable diapers are a relatively essential commodity, therefore a considerable tax will be needed to be implemented in order to be effective. Additionally, consumers will be significantly burdened by an imposed tax and alternative diapering practices may be sought. See generally CLEM TISDELL & KEITH HARTLEY, MICROECONOMIC POLICY: A NEW PERSPECTIVE 119 (Edward Elgar Publishing Ltd. 2008) (2008).

²⁴⁷ See LEHRBURGER, *supra* note 139, at 6-7.

²⁴⁸ See *Id.* at 6.

alternative.²⁴⁹ A tax on disposable diapers could decrease the amount of disposable diapers in landfills while raising revenue to promote alternative diapering practices such as cloth diapers. A tax on disposable diapers would be the most effective method of decreasing the use of disposable diapers because it is simple and immediate.

The government uses tax incentives often to encourage individuals to engage in a certain behavior. For example, Internal Revenue Code §25D provides a tax credit for individuals with energy efficient property.²⁵⁰ A tax credit such as this incentivizes energy efficient changes that property owners make to their property. Another example of a tax credit would be Internal Revenue Code §36(c)(1).²⁵¹ Section 36(c)(1), incentivizes first time homebuyers through a tax credit and encourages individuals to purchase a home,²⁵² which is beneficial to the economy. This same logic can be applied to cloth diapers and can be in the form of a federally-funded program that distributes, and promotes the use of, cloth diapers. The incentive that is offered to individuals could be low-cost or no-cost cloth diapers and information on how to properly use cloth diapers. The government can also promote the use of cloth diapers by providing information on how the use of cloth diapers benefits the environment, public safety, and the children who wear/use them.

Diaper services²⁵³ can also be promoted by the government to reduce the amount of disposable diapers in landfills. Consumers of diaper services can easily be given a tax credit by the Federal Government which would promote, advertise, and inform the public about diaper services. For many individuals, diaper services are not an option because they are not available in rural or small town communities or they are unable to afford it.²⁵⁴ However, if the Federal Government offers a tax credit for the cost or a portion of the cost of the diaper service, individuals would be able to afford it. This would not only increase the amount of individuals who would potentially use this service as an alternative to using disposable diapers, but would also incentivize other individuals to offer this service as a business in areas where it may be unavailable. Another

²⁴⁹ *Id.*

²⁵⁰ I.R.C. § 25D (West 2009).

²⁵¹ I.R.C. § 36(c)(1) (West 2009).

²⁵² *Id.*

²⁵³ Diaper services are professional businesses that rent cloth diapers for families to use and, on a weekly basis, pick up the soiled diapers and replace with clean diapers. When the soiled diapers are picked up, the diaper service professionally launders them and prepares them for delivery the following week. See National Ass'n of Diaper Services, *How Does it Work?*, (2005), <http://www.diapernet.org/howdoesitwork.htm>.

²⁵⁴ See Lehrburger, *supra* note 5, at 64.

method of decreasing the use of disposable diapers could be in the form of warning labels, which warn consumers of the possible health risks and public safety hazards associated with their use. But as previously discussed, consumers may be less likely to respond to a warning label than they would an imposed tax or a marketing campaign aimed at alternative diapering practices.²⁵⁵

Increasing the use of cloth diapers will reduce the amount of landfill waste that is collected daily because fewer people will be using and discarding disposable diapers.²⁵⁶ There will be less methane produced because there will be fewer disposable diapers in municipal solid waste landfills.²⁵⁷ Legislation that promotes the use of cloth diapers means that there will be less human fecal matter contaminating the underground water used for drinking and agricultural purposes,²⁵⁸ this is because more fecal matter will properly enter the sewage system rather than ending up in municipal solid waste systems.²⁵⁹ If there is less fecal matter in the landfill system, the quality of the soil will also be preserved.²⁶⁰

Legislation will also benefit agricultural production because, if the third largest contributor to landfills is reduced, less land will be used for landfill purposes.²⁶¹ As a result of fewer disposable diapers in landfills, agricultural land will be preserved.²⁶² Such legislation would decrease household waste by approximately 8,000 to 10,000 diapers per child.²⁶³ Fewer non-renewable resources will be destroyed to produce disposable diapers because demand will decrease; these resources include trees, plastic, and chemicals.²⁶⁴ There will be less demand for disposable diapers as more people choose to use cloth diapers or a diaper service, and thus fewer natural resources will be demolished.²⁶⁵

²⁵⁵ Packaging has a label which recommends that the fecal matter be dumped out of the discarded diaper before disposal. Few, if any parents, follow the recommended instructions. *See id.* at 61.

²⁵⁶ LEHRBURGER, *supra* note 139, at 37.

²⁵⁷ *See id.* at 29.

²⁵⁸ *See generally id.*

²⁵⁹ *Id.* at 15.

²⁶⁰ *See id.* at 22.

²⁶¹ Beneficial because twenty four percent to thirty one percent of sewage sludge is used in agricultural fertilizers. If more fecal matter is processed in the sewage system, more fertilizer will be produced. *Id.* at 36.

²⁶² *See generally* MCDUGALL ET AL., *supra* note 1, at 299.

²⁶³ This figure is the total amount of diapers until potty trained. Lehrburger, *supra* note 5 at 61.

²⁶⁴ *See generally* LEHRBURGER, *supra* note 139, at 46.

²⁶⁵ *See generally id.*

Public and personal health and safety will also benefit greatly as a result of the reduction in the amount of disposable diapers used.²⁶⁶ The public will benefit from cleaner water and safer work conditions for those people that work at landfills.²⁶⁷ Children will benefit individually because disposable diapers are linked to harmful chemicals, testicular cancer, and severe diaper rash.²⁶⁸

In addition to the reduced municipal solid waste in our landfills, less carbon emissions, and a healthier public, consumers of disposable diapers will also see the money that would have been used on disposal costs better spent.²⁶⁹ Instead of allocating approximately ten cents per dollar spent on landfill disposal costs, the consumer will see that money spent on advertising or promoting new legislation through marketing schemes.²⁷⁰ This marketing will entice parents of young children to switch to alternative diapering practices.

VII. CONCLUSION

No civilized society can exist without landfills.²⁷¹ While the waste created by newspapers and food and beverage containers can be remedied by recycling efforts, reducing disposable diapers also can make a significant impact to reduce landfill waste, on the quality of the landfill site, and the quality of the groundwater the public depends on.²⁷² This can be achieved by changing the way society diapers children.²⁷³ Disposable diapers cause complications for society from the time they are manufactured to the moment they enter the landfill and further complications while they degrade.²⁷⁴ One way that these complications can be remedied with is through enactment of legislation that reduces the amount of disposable diapers in the landfills which will remedy the negative environmental and social impacts they cause. The most effective

²⁶⁶ *Id.* at 5.

²⁶⁷ *Id.* at 22, 29.

²⁶⁸ The Mothering Staff, *supra* note 153.

²⁶⁹ The point of manufacture would be the most effective reduction of solid waste. LEHRBURGER, *supra* note 139, at 46.

²⁷⁰ Lehrburger, *supra* note 5 at 61.

²⁷¹ See generally MCDUGALL ET AL., *supra* note 1, at 297.

²⁷² See generally LEHRBURGER, *supra* note 139, at 4.

²⁷³ See generally *id.*

²⁷⁴ Based on the lack of oxygen under the surface of the landfill. See generally *id.* at 29.

way to achieve this goal would be to impose a tax on disposable diapers. Hopefully, this Comment prompts such discussions and promotes the possible legislating of disposable diapers to incentivize the public not to use them.

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