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COMBINED ENVIRONMENTAL EXPOSURE REPORT

for

FORT MCCLELLAN ALABAMA

Prepared by

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The following report provides a per chemical exposure-event summary of Fort McClellan, Alabama covering the past 50 years; and some cases, much longer. Chisholm Chisholm & Kilpatrick utilized reliable sources of research to assemble this report. The combined research is attached on an accompanying CD-ROM. The reference citations in this report correspond to the page numbers in the combined research document on the disc.

MONSANTO POLYCHLORINATED BIPHENYLS (“PCBs”) IN ANNISTON, ALABAMA

Fort McClellan, located in Calhoun County, Alabama, served as an active duty Army installation from 1917 to 1998. The base is comprised of two installations, Main Post, which is located to the north-west of the city of Anniston, and Pelham Range, which is located six miles away, on the east side of Anniston.

The city of Anniston is listed on the Environmental Protection Agency “National Priorities List” due to polychlorinated biphenyl (“PCBs”) contamination. EPA website. <http://www.epa.gov/region4/superfund/sites/npl/alabama/anpcbstal.html>. PCBs are considered a probable carcinogen and have been found to cause skin-irritation, liver damage, neurobehavioral and immunological changes and other health problems. R-1787-88. When PCBs are released into the environment, they can be transferred long distances in the air, dissolve in water, and disperse downstream. PCBs remain in the environment for long periods of time, especially in soil and sediment, and can be transferred to humans by consuming water and food, such as fish, animal and dairy products. Production of PCBs was made illegal in the United States in 1977. R-1787.

According to the EPA, the vast majority of PCBs in the Anniston area were released from the operation of the former Monsanto Company’s Anniston PCB manufacturing plant. The Monsanto Company, which later spun off into Solutia Inc. (collectively “Monsanto”), manufactured organic chemicals for use in herbicides and

other products. R-1877. Manufacturing operations began at the Monsanto plant in 1917. R-1800. The company began producing PCBs in 1929, and continued to do so until 1971. R-1877-78. The company disposed of hazardous and non-hazardous waste in two landfills located on the plant property. R-1801. According to the EPA, “there was a potential for hazardous substances, including PCBs, to be released from the landfills via soils and sediments being transported in surface water leaving the property.” *Id.* Furthermore, tests of a drainage ditch leading from the facility to a local stream revealed various levels of PCBs. *Id.* According to the EPA, the primary exposure areas include the Monsanto plant and adjacent residential and commercial properties, as well the downstream waterways and floodplains of Snow Creek and Choccolocco Creek. R-1800.

According to the EPA, in their *Final Pathways Analysis Report* from December 2009, the primary means by which humans could be exposed to PCBs from the Monsanto plant are:

- Direct contact with contaminated media (soil, sediment, and surface water).
- Consumption of agricultural products (*e.g.*, vegetables, beef) from the floodplain.
- Consumption of fish.

R-1808-09. (*Final Pathways Analysis Report*).

According to the EPA, there are a number of recreational areas along the Choccolocco Creek and “forested areas provide attractive habitat for various

recreational activities including hiking, fishing, canoeing, wading, etc.” R-1804. The report also indicated that the flood plain was a common area for hunting. *Id.* It also acknowledged that “[s]ediment and surface water exposure may occur along the riverbank or in shallow areas of the Creek during recreational activities such as fishing, canoeing, swimming or wading.” R-1808. Also, “[a]nglers, farmers, and hunters and their family’s may be exposed to Site contaminants from consumption of fish caught in the Creek, crops and other agricultural products raised in the floodplain.” *Id.*

However, the spread of PCBs was not merely contained in the flood plain area of the Choccolocca Creek. In fact, PCBs were detected throughout the city of Anniston. In 1991, the EPA collected soil samples at over 400 properties in the city of Anniston, of which 99 percent tested positive for PCBs. R-2267. A map indicating the locations of the positive samples indicated that two positive samples were collected on the south-eastern perimeter of Fort McClellan’s Pelham Range. *See* R-2286; *see also* R-1697 (Fort McClellan Map). It is possible that if tests had also been conducted on Fort McClellan property, PCBs may have been discovered at that time.

Although the EPA has not identified airborne transport of PCBs as a continued threat of exposure, a September 2011, *Interim Record of Decision* from the EPA indicated that airborne PCBs were detected in varying concentrations downwind from the Monsanto Plant. R-1917, (1861-2022). Furthermore, a February 1998 study suggested a high likelihood of airborne dispersion of PCBs had occurred historically. R-2324-37. According to the study, the air in west Anniston was highly contaminated

compared to other cities. R-2268; 2324-37. The examiner also “tested local tree bark and found further evidence of ongoing atmospheric releases of PCB.” *Id.* According to the examiner, analysis of the tree bark suggested airborne distribution of PCBs had been occurring for a number of years. R-2326. The examiner opined that the source of the airborne PCBs were the “off-gasses” produced by the landfills at the Monsanto plant. *Id.*

Certainly, many soldiers stationed at Fort McClellan lived off post in the City of Anniston. In fact, according to a January 2000 Army Community Relations Plan, “Fort McClellan historically contributed significantly to the population of Anniston and surrounding areas.” R-2406. Even soldiers that lived on post likely frequented the city as part of normal recreational activities, such as shopping, dining and entertainment. As the plan acknowledged, “[i]t is general knowledge that Fort McClellan has been a significant factor in the economic viability of the city of Anniston and Calhoun County and the influx of military service people and their families have helped define the community.” R-2413. Furthermore, many soldiers may have been directly exposed to PCBs while using Choccolocco Creek for recreation activities, which as swimming, boating, fishing and hunting.

In 2003, the Monsanto Company agreed to a \$700 million settlement in two lawsuits filed by about 21,000 Anniston residents. R-2481 (Plaintiff’s Attorney’s Press Release); *see* R-2483-2498 (Global Settlement Agreement). \$600 million of the settlement was set aside to reimburse the Anniston residents for personal damages. *Id.*

Monsanto also agreed to conduct court supervised remediation of the PCB-contaminated areas, and establish medical clinics to provide low-income residents with health screenings and drug prescription benefits. R-2481.

FORT MCCLELLAN BASE CHEMICALS

Additionally, dangerous chemicals were located, used, and occasionally spilled on Fort McClellan, especially since it was home to the U.S. Army Chemical School from 1951 until 1999, with a brief period in the 1980s when it was relocated to Aberdeen, Maryland. R-1087-88.

Fort McClellan Chemicals Generally:

Throughout the 1980s and 90s, the Alabama Department of Environmental Management repeatedly cited Fort McClellan for violations regarding hazardous chemicals. R-1099-1107. Specifically, the base was cited for improperly labeled drums, leaking drums, personnel lacking training, lacking warning signs, lacking inspection logs, deficiencies in Installation Spill Contingency Plan, no waste analysis plan, 50 drums of PCP stored onsite for more than two years, hazardous waste stored for over 90 days, open waste containers, failure to assess hazards to human health or environment after chemical fire or Dusbun release in a vehicle wash area, and failure to perform required inspections. *Id.*

Sec. 3.307 Chemicals on Fort McClellan:

For VA compensation purposes, regulations at 38 C.F.R. § 3.307 establishes presumptive service connection for diseases associated with exposure to 2,4-D; 2,4,5-T and its contaminant TCDD (Agent Orange); cacodylic acid, and picloram. *See* 38 U.S.C. § 1116.

In 1974, the base used 8,000 gallons of Silvex – which is 2,4,5-T based – 18,480 gallons in 1975, and 41,460 gallons in 1976. R-289. Also, it used 7,200 gallons of 2,4-D in 1974, 6,000 in 1975, and 4,800 in 1976. *Id.* The base also used 1,800 gallons of 2,4,5-T in 1974 and 10,000 gallons in 1976. *Id.* Further, the base used 4,000 gallons of picloram in 1975, in addition to 20,300 gallons of Tordon 101, which is picloram and 2,4,-D-based, also known as Agent White. Agent White is also contaminated with hexachlorobenzene and nitrosamines, both known carcinogens. Hexachlorobenzene was banned in the U.S. in 1966 and has been banned globally by the Stockholm Convention on Persistent Organic Pollutants.

Later, a 1980 list of pesticides used or being stored for future disposal at Fort McClellan indicates that the Fort had 2,005 pounds of Tordon 10k pellets and 300 gallons of Tordon 101 mixture. R-890. The base also had 145 gallons of the 2,4,5-T-based Silvex LV. *Id.*

A Fort McClellan forester from 1960-87 noted that Tordon pesticides were sprayed and dispersed all over the base. R-165. He specifically remembered that over 1,000 pounds of Tordon were buried in a landfill after the EPA banned them. *Id.*

According to the 1998 *Environmental Baseline Survey* conducted for the Department of Defense as part of the Base Realignment and Closure (BRAC), in March 1989 a building storing pesticides and herbicides was consumed by fire. R-1103, 1232. Specifically, the fire consumed, *inter alia*, 120 gallons of 2,4-D and 70 gallons of Tordon 101. *Id.* The Fire Department permitted the fire to consume the chemicals. R-1166. Soon after the fire had extinguished, trees nearby died. *Id.* As late as 1990, 2,4-D was found in the ground where the storage building once stood. R-1104. As indicated above, the base did not perform an inspection of the area after the fire. R-1103.

Additionally, in 1998, soil samples from various locations around the base contained traces of 2,4,5-T; 2,4,5-TP; 2,4-D; 2,4-DP, and TCDD. R-60-63. (TCDD or “2,3,7,8-TCDD” is the contaminant in 2,4,5-T (Agent Orange)). *See* 38 C.F.R. § 3.307. Similarly, 2,3,7,8-TCDD was found in a soil sample near the Chemical Waste Storage Area. R-2253.

Other Harmful Materials:

Chemical Warfare Agents

In addition to chemicals that presumptively warrant service connection, the base contained and used residues of numerous other harmful chemicals, many of which are currently banned due to their toxicities.

As previously mentioned, Fort McClellan was home to the U.S. Army Chemical School. R-1087-88. Training and exercises for chemical warfare commenced on the

base in 1951. R-1087. Although the 1998 *Environmental Baseline Survey* noted it is unclear what quantity of chemical warfare materials were stored and used there, mustard gas and nerve agent were the two most used. R-1169. Additionally, sarin (“GB”) and VX nerve agents, caustic, bleach, DS2 HTH, silver fluoride, silver nitrate, and buffer solutions were stored there. R-1170. Nerve agents, mustard and BZ – an incapacitating agent, *inter alia*, were also authorized for reaction exercises. R-913 (listing the chemicals used for various lessons). For at least one lesson, they were used on live rabbits and a pigeon. *Id.* GB tests were also performed on goats. R-1176.

Fort McClellan was where the controversial Operation Top Hat occurred. R-1249. The exercise, in part, consisted of mustard (“HD”) being dispersed and personnel flying via helicopter to decontaminate it. R-1249. This Operation also involved nerve agents and biological warfare agents.¹ The operation was not protocol approved by the Department of Defense.²

An area known as Area T-5 was used from 1961 to 1973 for mustard, GB, and VX. R-1178. Area T-6 had training exercises using mustard, lewisite (“L”) – a vesicant, and GB. R-1179. Similarly, mustard, GB, cyogen chloride (“CK”) – a blood toxin, phosgene oxine (“CX”) – a skin irritant, and phosgene (“CG”) – a chemical gas used in WWI, may have been used from the 1950s to 1972 at the Detection and

¹ VETERANS AT RISK: THE HEALTH EFFECTS OF MUSTARD GAS AND LEWISITE 379-80 (Constance M. Pachura & David P. Rall eds., Nat’l Academy of Sciences 1993), *available at* http://www.nap.edu/catalog.php?record_id=2058 (“[Operation Top Hat] involved use of Chemical Corps personnel in test of decontamination methods for biological warfare agents, sulfur mustard, and nerve gases. These personnel were not informed and were not volunteers.”) (providing a summary of a Department of Defense report on “the use and treatment of human volunteers in chemical agent research”).

² *Id.* at 380.

Identification area. R-1176. The base used an area known as T-24A until 1973 for chemical exercises, which included disposal of munitions filled with CG, BZ (an incapacitating agent), GB, and mustard. R-1180. At this area, there were two burning pits in which chemical warfare agent would be sprayed into a fire in an attempt to destroy the agents. *Id.* According to a participant, GB – the nerve agent – was used for these exercises. *Id.*

In 1973 the pits were sealed with soil, and subsequent soil tests that year appeared negative for the chemicals used; however, metals, volatile organic compounds (“VOCs”), semivolatile organic compounds (“SVOCs”), and possibly explosives were found in these soil samples. R-1180-81. The 1998 *Environmental Baseline Survey* questioned whether these soil samples were from the correct location and depths. *Id.* Testing in 1993, however, did not return positive for residuals of these chemicals. *Id.* Conversely, in 1973, another area – Range T-38 – did return positives for VX, GB, and mustard contamination. R-901.

In several other areas there were mustard burn pits, some of which were used as early as the 1950s, but all of which closed by 1973. R-914 (noting range 24 Alpha, T-6, and Detection and Identification Area had such burn pits).

The *Survey* also noted that Area T-5 is where a large, 110-gallon mustard spill may have occurred. R-1177, 1181. Further, in 1961 there was another mustard spill where leaky containers were transported through the base, dripping mustard on the vehicle and the pavement. R-1185. A non-commissioned officer, through a lay

statement, recalled a 55-gallon drum of mustard being buried in the Toxic Agent Yard. R-161.

A lay statement from someone who worked at a dog kennel on base, noted that a dog died of “mysterious causes” in 1988. R-159. The interviewee thought the death was related to the kennel’s proximity to areas T-5, -6, and the Decontamination and Inspection Area. *Id.* The dog trainers subsequently submitted a “Request for Environmental Survey.” *Id.* Another interviewee recalled that a dog had burned paws. R-160. Eventually – as a member of the base’s environmental office stated – the kennel was moved because “dogs were burned by mustard which had previously been buried at that location.” R-169.

Also regarding burial, someone involved with the Chemical School operations noted that for decontamination exercises, cans of mustard would be opened, mixed with decontaminate, and then buried in the soil without sealing. R-175-76. According to this interviewee, these practices also occurred with other chemicals in other base locations. R-176.

Banned and Other Harmful Pesticides

In addition to the herbicides for which Sec. 3.307 grants presumptive service connection status, Fort McClellan used and spilled other dangerous pesticides and herbicides. In 1989, a Dursban spill occurred at a vehicle wash area. R-1162. This insecticide is moderately toxic, has been linked to possible brain damage in children,

causes immunological changes, and is banned by the EPA for home use.³ Soil samples of the former Waste Chemical Storage Area had traces of the following pesticides all of which are now banned or being phased out: 4,4'-DDT⁴, 4,4'-DDD⁵; 4,4'-DDE⁶; endosulfan II⁷, and endrin ketone.⁸ R-2252. DDE was also found in one of the landfills. R-1151.

In 1985, soil samples contained the following pesticides: chlordane metabolites,⁹ methoxychlor¹⁰; hexachlorobenzene¹¹ (HCB), p,p'-DDT, and dieldrin.¹² R-1210. Although the Baseline Survey found that the chemicals were not at levels

³ Brett Isreal, *Common Insecticide May Harm Boys' Brains More than Girls'*, SCI. AM. (Aug. 21, 2012), <http://www.scientificamerican.com/article.cfm?id=common-insecticide-may-harm-boys-brains-more-than-girls>; JD Thrasher et al., *Immunological Abnormalities in Humans Chronically Exposed to Chlorpyrifos*, ARCH ENVIRON HEALTH, May-June 2002, at 181, available at <http://www.ncbi.nlm.nih.gov/pubmed/12507170> (noting immunological link).

⁴ DDT (GENERAL FACT SHEET), NAT'L PESTICIDE INFORMATION CENTER, available at <http://npic.orst.edu/factsheets/ddtgen.pdf> (noting DDT is banned for use in the United States and is a carcinogen).

⁵ p,p'-Dichlorodiphenyl dichloroethane, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/iris/subst/0347.htm> (indicating that DDD is a breakdown product of DDT, and is also a carcinogen).

⁶ DDE (1,1-DICHLORO-2,2-BIS(p-CHLOROPHENYL)ETHYLEN), ENVTL. PROTECTION AGENCY, <http://www.epa.gov/ttnatw01/hlthef/dde.html> (noting DDE is a breakdown product of DDT, and is also a carcinogen).

⁷ Endosulfan Phase-out, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/oppsrrd1/reregistration/endosulfan/endosulfan-agreement.html> (stating the compound is in the process of phasing out because of its health risks to farmworkers and wildlife); .

⁸ Endrin/Endrin Aldehyde, AGENCY FOR TOXIC SUBSTANCE & DISEASE REGISTRY, <http://www.atsdr.cdc.gov/phs/phs.asp?id=615&tid=114> (noting the compound banned in 1986, and can cause severe neurological damage).

⁹ Pesticides and Breast Cancer Risk: Chlordane, PROGRAM ON BREAST CANCER AND ENVTL RISK FACTORS, <http://envirocancer.cornell.edu/factsheet/Pesticide/fs11.chlordane.cfm> (noting that chlordane has been banned in the United States since 1988, and that it is a carcinogen).

¹⁰ Methoxychlor Reregistration Eligibility Decision (RED), ENVTL. PROTECTION AGENCY http://www.epa.gov/oppsrrd1/REDS/methoxychlor_red.htm (noting that methoxychlor is highly toxic and has been banned).

¹¹ Hexachlorobenzene, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/ttnatw01/hlthef/hexa-ben.html> (noting that HBC has been banned and causes liver disease with associated skin lesions).

¹² <http://www.epa.gov/pbt/pubs/aldrin.htm> (noting that dieldrin has been banned, and that it decreases the effectiveness of the immune system, reduces reproductive success, may cause cancer, may cause birth defects, and damages kidneys); AG Kanthasamy, *Dieldrin-induced neurotoxicity: relevance to Parkinson's disease pathogenesis*, NEUROTOXICITY, Aug. 2005, at 701, available at <http://www.ncbi.nlm.nih.gov/pubmed/16112328> (noting that dieldrin may cause Parkinson's disease).

dangerous to humans, all of these chemical compounds are banned for pesticides use.

Id.

At one point, one pound of Diaznon was buried in a base landfill. R-1163. Diaznon is now banned in the United States because of its toxicity.¹³ Also found in groundwater near landfill were endosulfans I and II,¹⁴ alpha/delta-BHC,¹⁵ heptachlor,¹⁶ isodrin,¹⁷ 4,4'-DDE, 4,4'-DDT, and pentachlorophenol¹⁸ ("PCP"). Similarly, groundwater samples in Area T-24A contained benzene, phenol, and PCP. R-1181.

Dioxins

In 1998, Twenty-five dioxins were found in soil samples at the Former Waste Chemical Storage Area.¹⁹ R-2252. Further, at least one dioxin, octachlorodibenzo-p-dioxin, was found in four groundwater samples on this site. R-2256. Among those contaminants found was 2,3,7,8-TCDD, the hazardous contaminant in Agent Orange. R-2253.

¹³ *Diazinon: Phase Out of all Residential Uses of the Insecticide*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/pesticides/factsheets/chemicals/diazinon-factsheet.htm> (noting phase out starting in 2004); *Diazinon*, AGENCY FOR TOXIC SUBSTANCE & DISEASE REGISTRY, <http://www.atsdr.cdc.gov/phs/phs.asp?id=511&tid=90> (indicating that the substance can affect the nervous system).

¹⁴ See note 6, *supra*.

¹⁵ See note 5, *supra*.

¹⁶ <http://www.epa.gov/ttnatw01/hlthef/heptachl.html> (noting heptachlor has been banned in the United States).

¹⁷ See note 10, *supra*. Isodrin is an isomer of aldrin.

¹⁸ <http://www.epa.gov/ttnatw01/hlthef/pentachl.html> (noting is had been banned in the United States because it is very toxic to humans).

¹⁹ See *Dioxins and Their Effects on Human Health*, WORLD HEALTH ORG., <http://www.who.int/mediacentre/factsheets/fs225/en/> (indicating that dioxins can cause, lesions, affect the liver, impairment of the immune system, developing nervous system, endocrine system, reproductive functions, and with some types, cause cancer).

Benzenes

AS late as 1991, elevated benzene levels were found in groundwater near several underground storage tanks. R-1144. Benzenes were also in the groundwater at Area T-24A. R-1181. Benzenes are known carcinogens,²⁰ and were also found in the water at Camp Lejeune.²¹

Lead

Lead was found in several areas of the based. Lead was located near underground tanks, in landfills, and in groundwater near landfills. R-1139-40 (indicating lead near tanks), 1151 (indicating lead in landfills and nearby groundwater), 1153 (indicating lead in groundwater near landfills).

Polychlorinated biphenyls (“PCBs”)

Polychlorinated biphenyls (“PCBs”) were in transformers on base. R-972. There were several spills and leaks, but all were deemed to be below reporting requirements. R-1164 (listing spills), 1269 (noting that there were spills that did not require reporting). PCBs are known to cause cancer, and negative effects on, *inter alia*, the immune system, reproductive system, nervous system, and endocrine system.²²

²⁰ IARC *Monographs on the Evaluation of Carcinogenic Risks to Humans Overall Evaluations of Carcinogenicity*, WORLD HEALTH ORGANIZATION INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, <http://monographs.iarc.fr/ENG/Monographs/suppl7/suppl7.pdf> (noting that benzenes are carcinogens).

²¹ *Marine Corps Busted Over Benzene Contamination at Lejeune*, SALEM-NEWS (Feb. 17, 2010) http://salem-news.com/articles/february172010/marines_victory_tk.php (noting that Camp Lejeune was contaminated with benzenes).

²² *Health Effects of PCBs*, ENVIRONMENTAL PROTECTION AGENCY, <http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/effects.htm> (stating negative health effects of PCBs, including causing cancer, affecting immune system, reproductive effects, and neurological effects).

Arsenic

Arsenic – whose poisonousness to humans is well-known – was detected in the groundwater at Parcel 517. R-1761. Arsenic was also found in the ground near a landfill. R-1151.

Trichloroethene (“TCE”)

TCE was found in groundwater near one of the base’s landfills. R-1153. Drinking water contaminated with TCE can result in birth defects, Hodgkins disease, non-Hodgkins lymphoma, and many cancers.²³ This is one of the highly toxic compounds found in Camp Lejeune groundwater.²⁴

Explosive Compounds

Explosive compounds were also located in the groundwater near some of the base’s landfills. R-1153. These included: 1,3,5-trinitrobenzene, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, and chrysene. The explosive compound 1,2-dinitrobenzene was also found in a downstream, surface water sample. R-1151.

Chlorinated Compounds

Also in the groundwater near a landfill, several chlorinated compounds in low concentrations were detected. R-1153. Among these, was tetrachloroethene, which is

²³Reported health effects linked with trichloroethylene (TCE), tetrachloroethylene (PCE), benzene, and vinyl chloride (VC) exposure, AGENCY FOR TOXIC SUBSTANCE & DISEASE REGISTRY, http://www.atsdr.cdc.gov/sites/lejeune/tce_pce.html (listing all the negative health effects TCE may cause, including various cancers, leukemia, neurological effects, and reproductive effects).

²⁴ *Id.*

a carcinogen.²⁵ Chronic exposure can cause neurological and other internal organ effects. *Id.*

Radiological Materials:

The base used radiological materials, and several areas have the potential for radiological contamination. R-113-135 (noting that Areas 10A, 10B, 24A, 24C and 9D all have the potential for radiological contamination); *see also* R-154 (enumerating the thirty-five radioactive isotopes used in radiological training at Fort McClellan). The base used the radioactive isotopes Cobalt and Cesium in large quantities. R-135. Many radioactive isotopes may have been buried in Pelham Range. *Id.* For one unfenced area where there may be buried Cobalt, the Army Corps of Engineers suggested that a fence be erected with signage indicating possible contamination. R-139-39. Also, one isolated incident of underground ionized radiation contamination occurred in 1984. R-138.

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²⁵ *Tetrachloroethylene (Perchloroethylene)*, ENVTL. PROTECTION AGENCY, <http://www.epa.gov/ttnatw01/hlthef/tet-ethy.html> (explaining the negative health effects of tetrachloroethene, including cancer, reproductive effects liver damage irritation of the upper respiratory tract and eyes, kidney dysfunction, and at lower concentrations, neurological effects, such as reversible mood and behavioral changes, impairment of coordination, dizziness, headache, sleepiness, and unconsciousness).