

Letter Health Consultation

OLD FORT FINISHING SITE

OLD FORT, NORTH CAROLINA

**Prepared by the
North Carolina Department of Health**

FEBRUARY 16, 2010

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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LETTER HEALTH CONSULTATION

To: Sue Neurath, ATSDR Petition Coordinator
From: Jesse McDaniel, CIH, CSP, NC HACE
Subject: Old Fort Finishing Site/Old Fort Elementary School
Date: February 16, 2010

In response to a citizen petition, the Agency for Toxic Substances and Disease Registry (ATSDR) requested that the NC Health Assessment, Consultation, and Education Program (HACE) evaluate hazardous waste exposures at the Old Fort Finishing site. The petitioner's initial concern was the potential exposure of staff and students at the nearby Old Fort Elementary School to chemicals from the Old Fort Finishing site. The specific concern was the possible relationship between the chemicals and cancer cases among former school staff. The petitioner subsequently raised additional questions with school, public health, and environmental agencies about potential asbestos and radon exposures.

United Merchants and Manufacturing Company operated the Old Fort Finishing (textile manufacturing) site from 1947 to 1984. In 1987, United Merchants and Manufacturing collected groundwater samples as part of the close-out protocol for the site's wastewater treatment plant. Volatile organic compounds were detected in one of the monitoring wells. A phase II environmental assessment that was performed in 1988 detected coal waste and buried drums. In 1989, a phase III environmental investigation detected a total of 108 buried drums in 2 locations on the site. The drums, sludge, and associated soils were removed as a part of the remediation process.

Groundwater flow at the site is generally east-southeast toward the Catawba River. In 1988, NC DENR sampled private wells near the site and detected trichloroethylene (TCE), tetrachloroethylene (PCE) and dichloroethylene (DCE). As a result, the residences on well water were connected to the municipal water system. Groundwater remediation was begun at the site in 1989. United Merchants and Manufacturing Company performed quarterly groundwater monitoring at 9 monitoring wells from 1989 through 1996. Old Fort Industrial Park LLC acquired the property and has performed annual ground water monitoring since 1999. NC DENR currently requires annual groundwater monitoring at 4 of the existing monitoring wells and the process well¹. The building is divided into flexible warehouse space and is currently leased to different entities including a machine works, freight line, and furniture manufacturer.

Discussion

The petitioner's concerns can be broken into 3 compartments: asbestos, radon and chemical exposures. The asbestos and radon concerns are associated directly with the school and not with the Old Fort Finishing site.

Asbestos

EPA requires schools to inspect buildings for asbestos containing materials (ACM) and develop management plans for any ACM that is identified. Old Fort Elementary School was inspected for and found to contain both friable and non-friable asbestos in 1990. Documentation indicates that the friable asbestos was removed in 1991 as part of the demolition of the High School Building. The exception is the boiler insulation. The basement boiler room was not demolished but the area is inaccessible (kept locked). The boiler insulation was listed as in good condition in the 2004 and 2007 re-inspections². Non-friable asbestos-containing floor tiles are present in the school and were also listed as in good condition in the re-inspection reports. No evidence of exposure to airborne asbestos was found.

The hazard associated with asbestos is the inhalation of asbestos fibers. The primary health effects are lung cancer and mesothelioma (cancer of the lining of the chest and abdominal cavities). The friable ACM was removed and/or secured in 1991.

Radon

Radon is a naturally occurring radioactive gas that is present in soil, rock, and water. The western and mountain counties of North Carolina have the highest potential radon levels. EPA maps describe McDowell County as a Level II Zone with predicted radon levels of 2 to 4 pico-Curies per liter (pCi/L). Specific levels can vary depending on soil and building characteristics.

The adverse health effect associated with radon exposure is lung cancer. The specific concerns raised by the petitioner (brain, bone and breast cancer) are not consistent with radon exposure models. The petitioner also raised a concern about a lung cancer case of a past school employee. There is not enough information to reach specific conclusions regarding the lung cancer reported by the petitioner.

Radon levels were measured at Old Fort Elementary school in December 1989. EPA recommends an action level of 4 pCi/L for radon in schools and homes. Radon levels exceeded 4 pCi/L at 13 locations in the initial tests. The highest level measured in the initial series of tests was 12.9 pCi/L. Retesting was performed in April 1990 and the average radon level exceeded the action level at 10 locations. No information is available from the school system on specific mitigation actions, if any, that were taken at Old Fort Elementary. The school maintenance director stated that the HVAC system was replaced in the school in the early 1990s. However, no sampling was performed to determine if radon levels were reduced as a result of changes to the ventilation system.

Sampling was performed at Old Fort Elementary in September 2009 to determine current radon levels (see Appendix B). Results were above 4 pCi/L action level for 17 of the 27 sample locations. The highest value was 13.4 pCi/L and the average value was 6.0 pCi/L. The EPA created a radon decision matrix for schools which includes mitigation strategies if levels exceed 4 pCi/L³. The action level is based on the ability of current technologies to reduce radon levels below 4 pCi/L rather than a cancer risk scenario.

The school has begun implementation of the EPA recommendations. Specific actions that are being taken by the school to reduce radon exposures are increasing the amount of outside air introduced into the HVAC system, cleaning of the HVAC system coils, and the sealing of cracks between the concrete slab and the baseboard. Retesting is planned after the actions are complete. The school held a public meeting to discuss the radon results and mitigation actions that are underway.

Chemical Exposures

Three specific areas of concern were expressed by the petitioner regarding exposure to chemicals from Old Fort Finishing site. The areas of concern are transport of chemicals by groundwater, through the sewer system and by air movement from vehicle traffic along the adjacent I-40 interstate highway.

Old Fort Elementary School is located less than 1000 ft from the Old Fort Finishing site. No ambient air monitoring data is available at Old Fort Finishing Site from the NC Division of Air Quality. Nor has air monitoring been performed for volatile organic chemicals in the school. The school is connected to the municipal water and sewer system. Therefore, ingestion or exposure to volatilized contaminants from the drinking water is not an issue

Groundwater remediation was accomplished by pumping the process well at the Old Fort Finishing site to control the migration of the contaminant plume. Monitoring well data indicated a decrease in tetrachloroethylene (PCE) and trichloroethylene (TCE) during the groundwater remediation process. An increase in contaminant values was observed at one of the on-site monitoring wells after pumping of the plant process well was discontinued in 2000. The increase was attributed to resumption of the natural groundwater flow pattern towards the Catawba River. Groundwater samples collected at the Old Fort Finishing site in 2006 exceeded the NC groundwater standard for PCE, TCE, and vinyl chloride at several on-site monitoring wells. However, the overall contaminant levels were at historic lows for most of the monitoring wells⁴. TCE and PCE plume maps are included in Appendix C.

Old Fort School is located southwest of the Old Fort Finishing site. The groundwater flow is to the east southeast towards the Catawba River. Therefore, the general direction of groundwater flow is away from the school. In addition, the presence of Mills Creek between the school and Old Fort Finishing creates a barrier that will intercept any contaminated groundwater¹. A groundwater contour map is included in Appendix C. NC DENR analysis of the groundwater monitoring data did not indicate migration of the contamination towards the school. Therefore, vapor intrusion at the school is not a viable contaminant pathway.

The petitioner also raised the issue of transport of contaminant vapors through or along the sewer system. The municipal waste system is a positive pressure (pumped) system. The direction of flow in the sewer line is from the school to the Old Fort Finishing Site. Therefore, leakage of low level contaminants against the pressure gradient into the

system and subsequent transportation and release into the school is unlikely. Transport of contaminants through the sewer line does not appear to be a valid pathway.

The sewer line runs from the school along Crawford Street underneath the ball field to the south side of Old Fort Finishing site (see attached site maps). The sewer line crosses Mill Creek above ground. A contaminant transport mechanism below ground along the exterior of the sewer line does not exist.

Although no air monitoring data is available, transport of any TCE/PCE vapors by air entrainment from westbound I-40 traffic is unlikely because of the distance from the highway, prevailing wind direction (from north-northwest) and average wind speed (6 to 10 mph)⁵. Any indoor air contaminants that may be present are much more likely to be associated with the school buildings/activities than outside sources or groundwater contaminants.

The NC Central Cancer Registry identified the types of cancers reported in Old Fort community from 1995 to 2007. The Cancer Registry did not detect a higher occurrence of cancers typically associated with environmental factors. The cancer rates for McDowell County were consistent with overall cancer rates for the state. It is not possible to focus the study on a small population such as school employees and maintain statistical validity. The analysis of the NC Central Cancer Registry is included in Appendix D.

Conclusions/Recommendations:

NC HACE concludes that there are no exposures to asbestos, TCE, and PCE at the Old Fort Elementary School. Because there are no exposures to asbestos, TCE, and PCE, the contaminants will not harm people's health. Therefore, air sampling for these substances is not warranted in Old Fort Elementary School.

NC HACE concludes that inhalation of radon for a prolonged period of time at Old Fort Elementary School could harm people's health. Prolonged exposure to elevated radon levels increases the risk of lung cancer and poses a public health hazard. Short term samples documented radon levels exceeded the action level (4 pCi/L) at some locations in the school. However, it should be noted that 3 weeks of sampling data is not necessarily representative of actual exposures over the past 20 years.

Old Fort Elementary School has initiated efforts to reduce radon levels and has committed to re-evaluating exposure levels to determine the effectiveness of mitigation actions. It is recommended that McDowell County School System continue these efforts at Old Fort Elementary School and follow a similar approach at other county schools if radon levels exceeding 4 pCi/L are documented. NC HACE will follow-up with McDowell County School System to determine if actions taken are effective in reducing radon exposures.

References

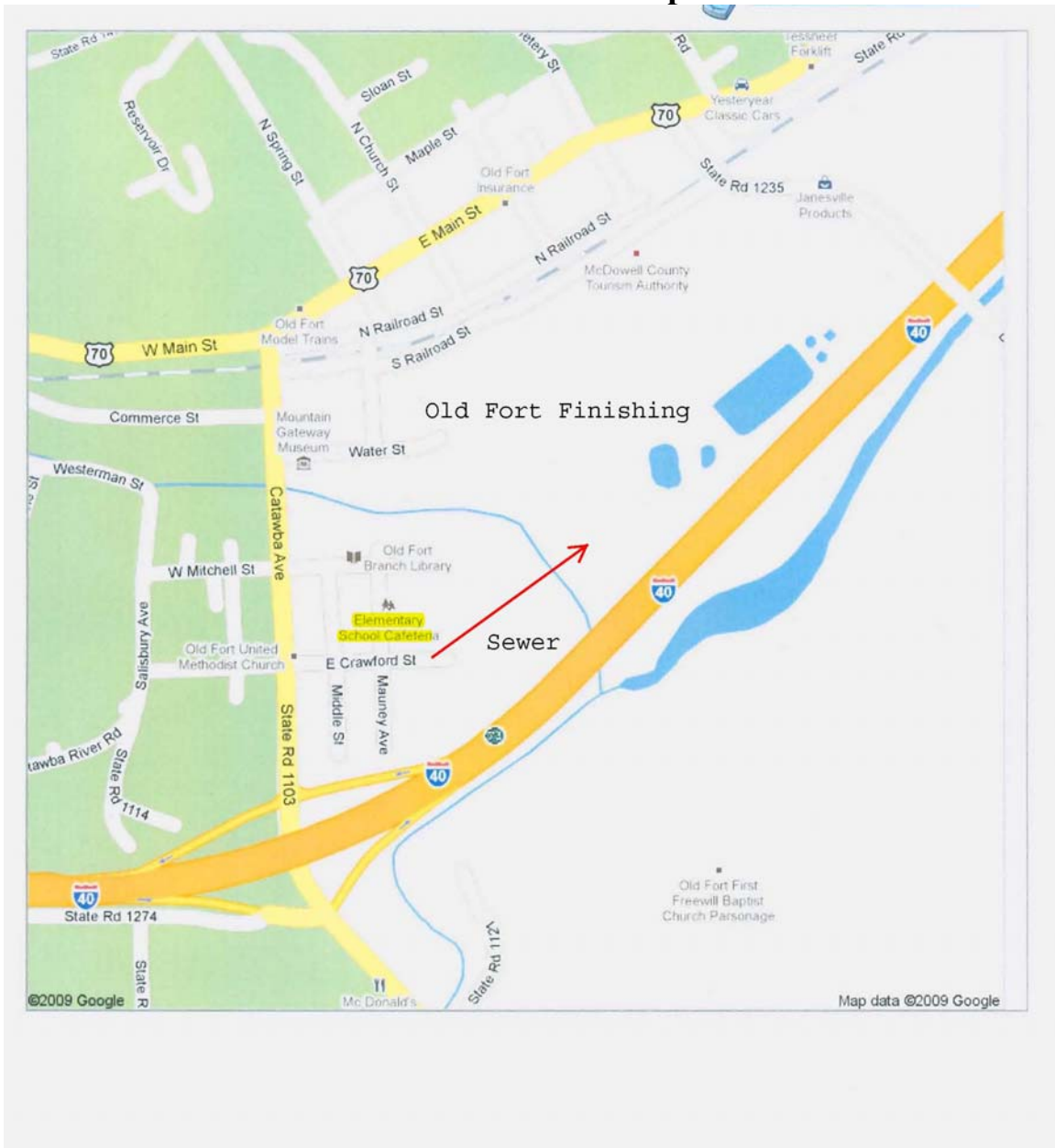
- ¹ Parker, Stuart, Hydro-geologist, NC Superfund Section. Preliminary Assessment Report, Old Fort Finishing, June 18, 2008.
- ² Lipton, David, Industrial Hygiene Consultant, NC Public Health Division. Letter to Private Citizen August 10, 2009
- ³ Environmental Protection Agency, Radon Measurement in Schools Revised Edition, July 1993
- ⁴ TEC Environmental, PC:2006 Annual Groundwater Monitoring Report, Old Fort Industrial Park, One Water Street, Old Fort, North Carolina. Groundwater Incident Number 3575, January 16, 2007
- ⁵ NOAA National Climatic Data Center, Climatic Wind Data for the United States

Appendix A: Satellite and Street Map

Satellite Photo of Site



Old Fort Street Map

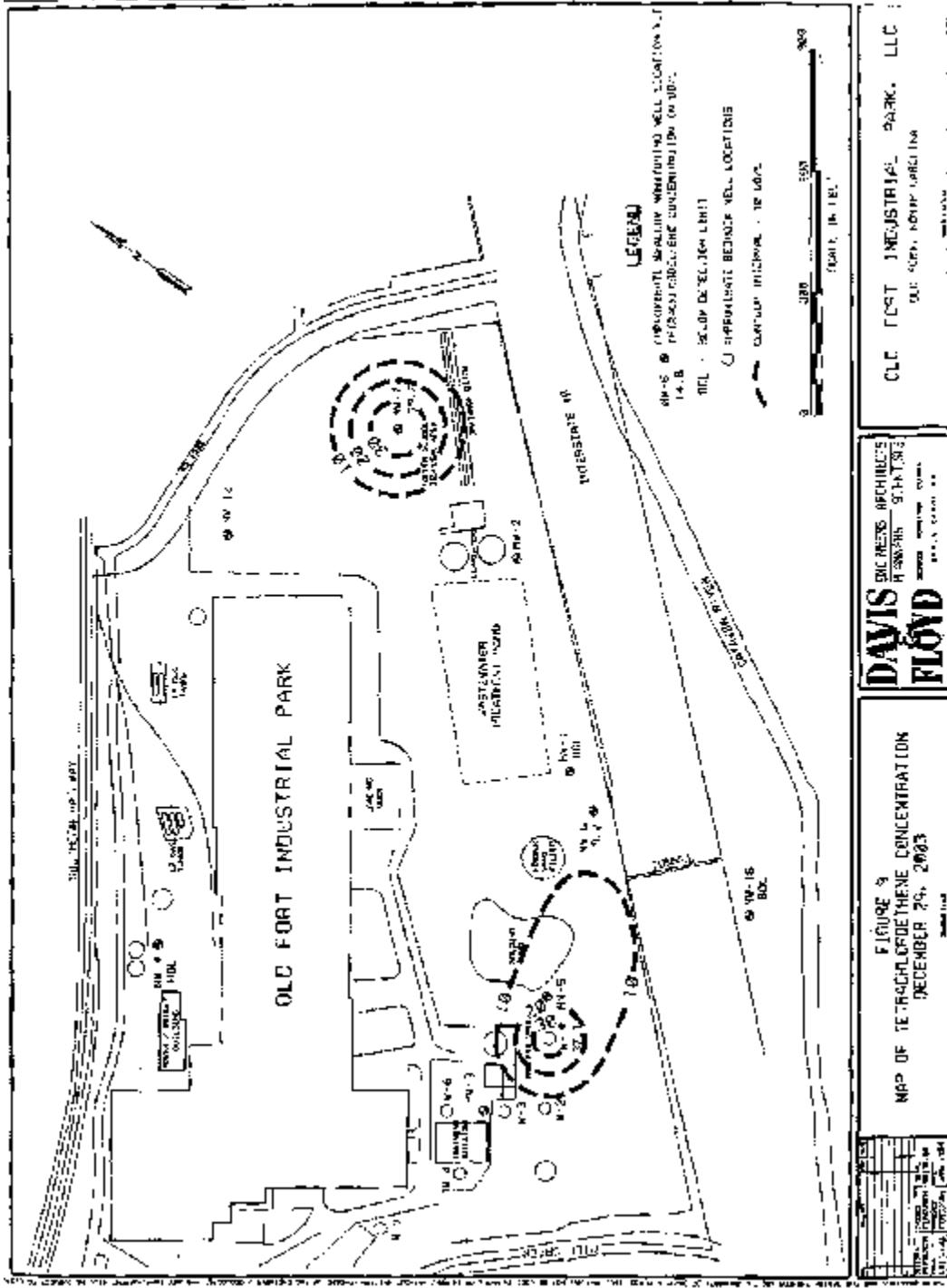


**Appendix B: Radon Analytical Results Old Fort Elementary School
September 14-21, 2009**

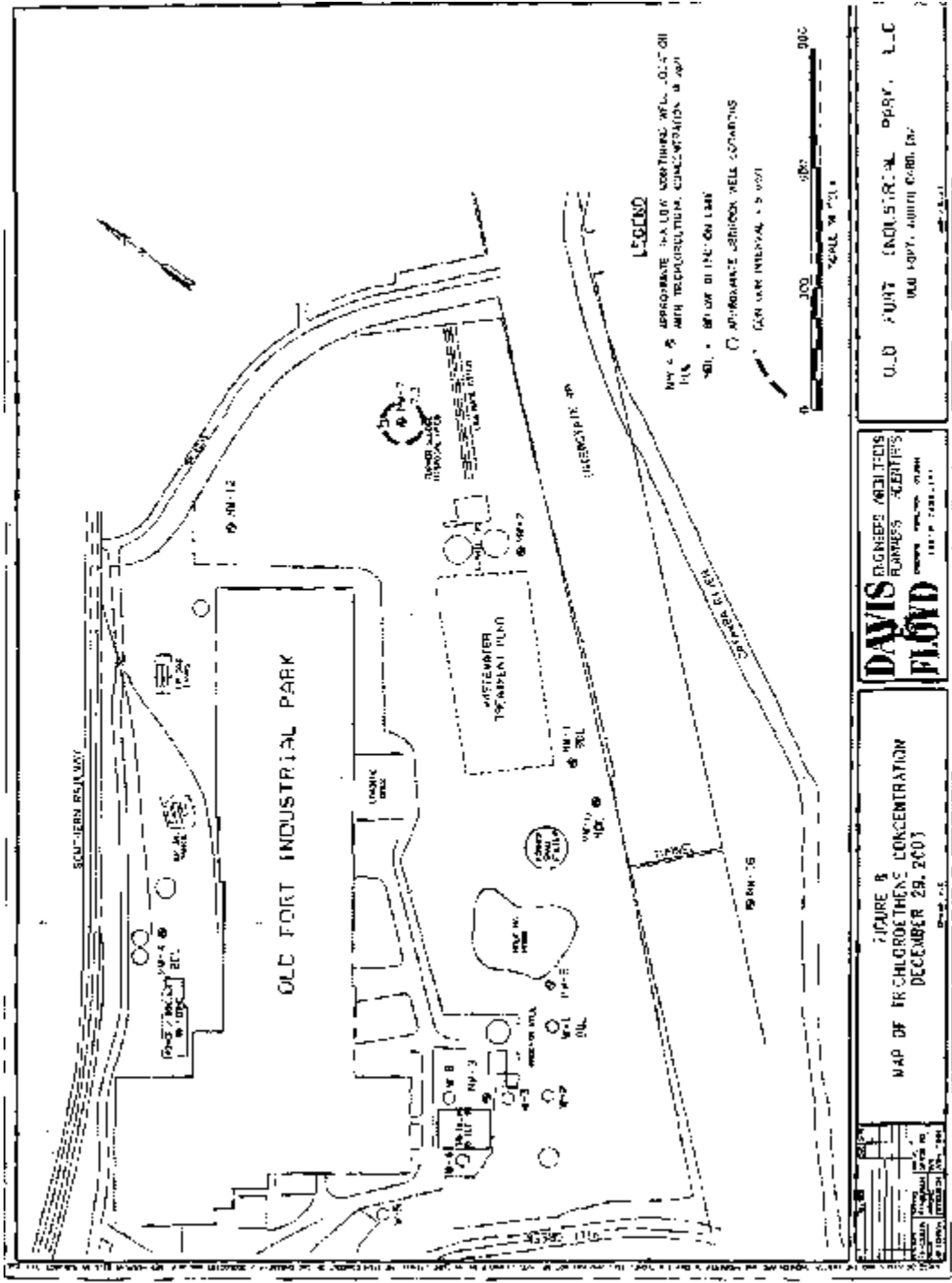
Location	Results pCi/L
Rm #603	13.4
Rm #504	13.2
Rm #610	12.9
Rm #511	12.1
Rm #602	11.7
Rm #513	11.3
Rm #501	7.6
Rm #411 Music Room	7.1
Rm #522	5.6
Rm #139 New Building	5.5
Rm #153 New Building	4.7
Rm #152 New Building	4.4
Main Office	4.3
Rm Not Listed	4.2
Rm #126 New Building	4.2
Rm #602	4.1
Rm #143 New Building	4.1
Rm #129 New Building	3.9
Rm #112	3.7
Rm #206 Computer	3.5
Rm #227 Special Services	3.3
Rm #150 New Building	3.2
Rm #226 Special Services	2.8
Rm #223 Special Services	2.8
Rm #168 Media Center	2.7
Rm #606	2.6
Rm #605 Pre-K	2.4
Rm #301 Gym	n/a

Appendix C: Contaminant and Groundwater Contour Maps

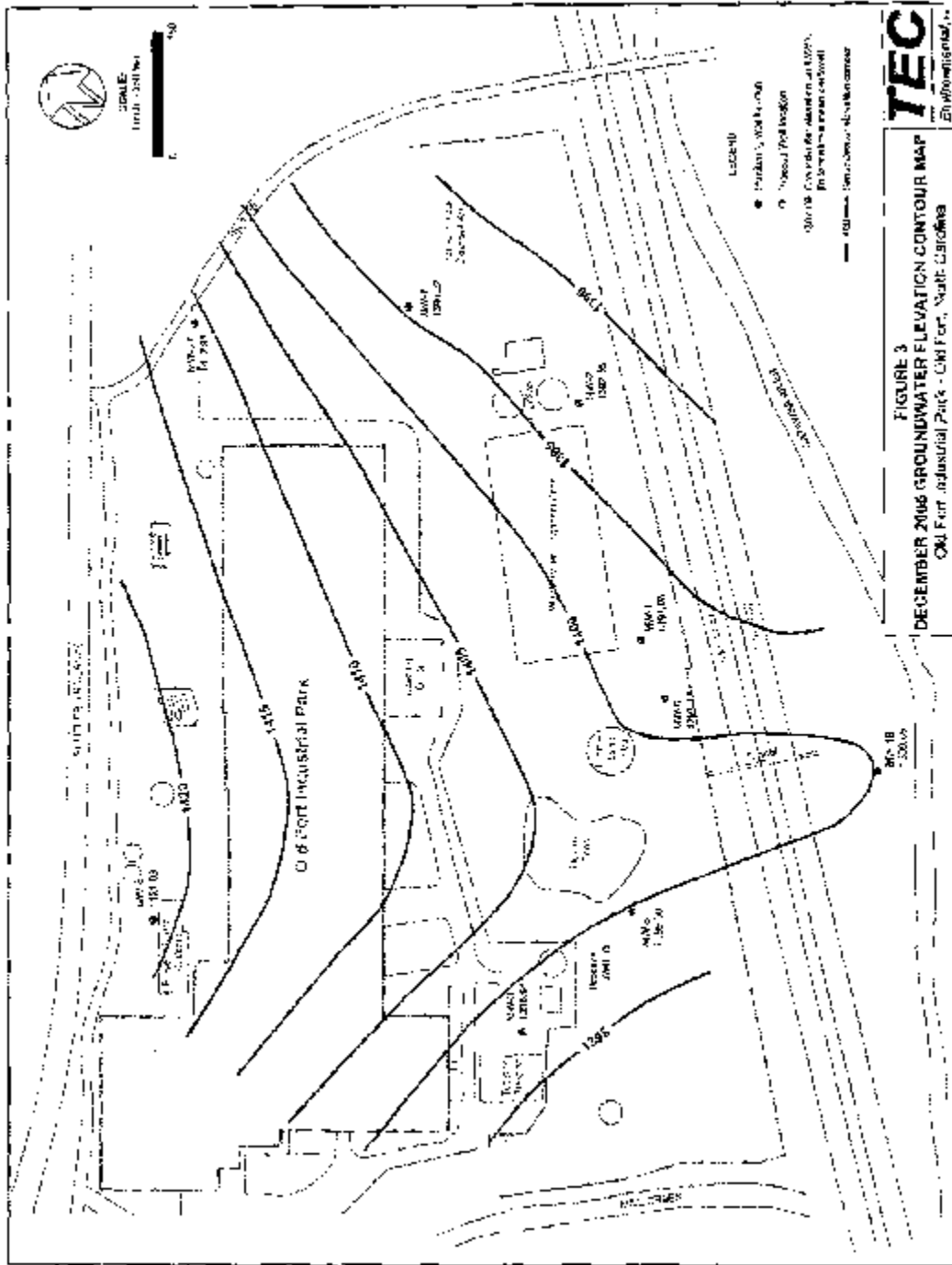
Map of PCE Concentration



Map of TCE Concentration



Groundwater Contour Map



Appendix D: NC Central Cancer Registry

**North Carolina Department of Health and Human Services
Division of Public Health**

1908 Mail Service Center, Raleigh, North Carolina 27699-1908

Michael F Easley, Governor

Dempsey Benton, Secretary

July 31, 2008

Dear

Thank you for your concern regarding cancer cases in your neighborhood. We receive many requests such as yours for information about cancers in local areas throughout the state. The Central Cancer Registry compiles information on cancers across North Carolina and we monitor cancer rates for many types of cancer for each county annually to see if there appear to be areas of the state that need special attention.

Although much has been learned about cancer over the past couple of decades, there is still much that is not known about the causes of cancer. \What we do know is that cancer is not one disease, but a group of diseases that behave similarly. We know that different types of cancers are caused by different things. For example, cigarette smoking has been implicated in causing lung cancer, some chemical exposures are associated with leukemia, and prolonged exposure to sunlight causes some types of skin cancer. Genetic research has shown that defects in certain genes result in a much higher likelihood that a person will get cancer. What is not known is how genetic factors and exposures to cancer causing agents interact.

Many people do not realize how common cancers are. It is estimated that out of every men and one out of every three women will develop a cancer of some type during his or her lifetime. As a result, it is common to find what appear to be cancer cases clustering in neighborhoods over a period of years. This will occur in any neighborhood. As people age, their chance of getting cancer increases, and so as we look at a community, it is common to see increasing numbers of cancer cases as the people in the community age.

Cancers are diseases that develop over many years. As a result, it is difficult to know when any specific cancer began to develop, and consequently, what the specific factor was which caused the cancer. Because people in our society move several times during their lives, the evaluation of clusters of cancer cases is quite challenging. One can never be certain that a specific cancer was caused by something in the community in which the person currently resides. When we investigate clusters of cancer cases, we look for several things that are clues to likely associations with exposures in the community. These are:

1. Groups of cases of all the same type of cancer (such as brain cancer or leukemia). Because different types of cancer are caused by different things, cases of many different types of cancer do not constitute a cluster of cases.

2. Groups of cases among children, or ones with an unusual age distribution.
3. Cases diagnosed during a relatively short time interval. Cases diagnosed over a span of years do not constitute a cluster of cases unless there is consistency in the type of cancer.
4. Clusters of rare cancers. Because lung, breast, colon, and prostate cancers are so common, it is very difficult to find any association between them and exposures in a community.

In order to evaluate the cancer risk in your area, all of the cases of cancer in our database diagnosed from 1995 to 2007 were identified. We focused on Old Fort, NC to see if an unusually large number of cancer cases were concentrated in that area. During this 13-year period, 433 cancer cases were reported for residents of Old Fort. Of these 433 cases, 53.35 % of the cases were breast, lung, colon and prostate cancers. 85.68% of the cancer cases were in people age 50 or older, in which cancer diagnoses are quite common, whereas only less than 2% of the cases were in young people under the age of 20. There were nine brain cancer cases were reported over the last 13 years period and not concentrated in anyone year.

Also, all of the previously mentioned cases were spread out over the 13 years, not concentrated in a short time period. Lastly, the rates for cancer incidence in McDowell County (472.5 %) were comparable with North Carolina's rates (475.9 %) for 2001 to 2005. Overall, we did not observe any excess of cancers beyond what we usually see in the state.

It is possible that there is an environmental risk for cancer in the area; however, we do not see a higher occurrence of cancers usually associated with environmental factors at this time.

At the request of the NC Senate and House of Representatives, copies of neighborhood cancer evaluations are also sent to those who represent the area of the state being evaluated.

If you have questions regarding any of this information, please do not hesitate to contact me at (919) 715-8036.

Sincerely yours,

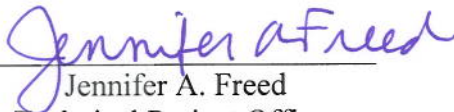
Sohrab Ali, MPH, MIS
Statistician
NC Central Cancer Registry
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(919) 715-8036
Sohrab.Ali@ncmail.net

CC: Rep. Mitch Gillespie

Sen. Joe S. Queen

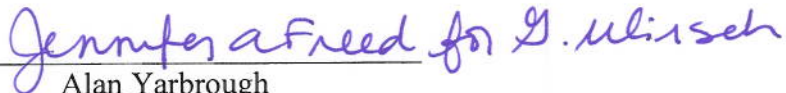
CERTIFICATION

This Letter Health Consultation for Old Fort Finishing was prepared by the North Carolina Division of Public Health (N.C. DHHS) under a cooperative agreement with the Federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consult and update was initiated. Editorial review was completed by the cooperative agreement partner.



Jennifer A. Freed
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.



Alan Yarbrough
Team Leader,
CAT, CAPEB, DHAC, ATSDR