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Comments: Packet #16: McKenzie 2017, Currie et al., 2017, Haley et al, 2016, and Epstein, A., 2017

The following (and attached) research studies on human health, including childhood cancers, and the risks from residential proximity to fracking, must be fully assessed if fracking is to be considered as an activity of the Wayne in the new Plan.

1. McKenzie LM, Allshouse WB, Byers TE, Bedrick EJ, Serdar B, Adgate JL (2017) Childhood hematologic cancer and residential proximity to oil and gas development. PLoS ONE 12(2): e0170423.
doi:10.1371/journal.pone.0170423

"...In this registry based case control study, we found that children aged 5-24 years diagnosed with ALL were 3-4 times as likely to live in areas with active oil and gas wells as were children diagnosed with nonhematologic cancers, and the association between ALL and residential density of oil and gas wells increased monotonically from the lowest to highest IDW well count categories after

adjusting for age, race, gender, socioeconomic status, and elevation. Further adjustment for year of cancer diagnosis resulted in a slightly larger association in children aged 5-24 years....

"One possible environmental risk factor for childhood ALL that is associated with oil and gas development is exposure to benzene and other petroleum hydrocarbons. Ambient air benzene levels in Colorado areas with active oil and gas development ranged from 0.03-22 parts per billion by volume (ppbv). Median benzene concentrations ranged from 0.212-0.757 ppbv which are greater than the Environmental Protection Agency's (EPA) risk based screening level (RBSL) of 0.102 ppbv for benzene in residential air [18, 20, 47-50]. Benzene concentrations in groundwater samples collected at oil and gas development sites in northeastern Colorado associated with surface spills range from less than 1-12,000 parts per billion (ppb), with a median of 1.5 ppb [16], which is greater than EPA's RBSL of 0.45 ppb for benzene in tap water [50]. It is important to note that EPA's RBSLs for benzene are based on cancer concerns.

"Benzene is a well established cause of acute myeloid leukemia in adults [51]. Studies of benzene exposures and acute leukemias in children are limited and less conclusive. An ecological study in Texas reported that census tracts with the highest benzene levels (1.6 ppbv) had elevated rates of childhood ALL [11]. A case-control study in France reported that children aged 0-14 years living in

a home adjoining to a gas station or repair garage were at increased odds of ALL [10]. Another case-control study in California reported elevated odds of ALL in children aged 0-5 years exposed to ambient levels of benzene and xylenes in the their third trimester of pregnancy [8]. ..."

Given that Ohio does not regulate off-gassing and venting from oil&gas and frackwaste facilities, these results suggest ominous consequences from Wayne's decision to frack. Given the cumulative air pollution exposures in SE Ohio and the complex mixtures to which the population is already exposed, these grave impacts must be fully assessed before the Wayne considers further enabling fracking, per NEPA, which has NOT been followed to date in Wayne's minimal evaluations of fracking impacts. Shame on Mr. Scardina and company for authorizing the poisoning of our children and our communities' health.

2. Also attached, Janet Currie, Michael Greenstone, Katherine Meckel,

Hydraulic fracturing and infant health: New evidence from Pennsylvania, Science Advances 13 Dec 2017: Vol. 3, no. 12, e1603021, DOI: 10.1126/sciadv.1603021

"...To evaluate the potential health impacts of fracking, we analyzed records of more than 1.1 million births in Pennsylvania from 2004 to 2013, comparing infants born to living at different distances from active fracking sites and those born both before and after fracking was initiated at each site. We adjusted for fixed maternal determinants of infant health by comparing siblings who were and were not exposed to fracking sites in utero. We found evidence for negative health effects of in utero exposure to fracking sites within 3 km of a mother's residence, with the largest health impacts seen for in utero exposure within 1 km of fracking sites. Negative health impacts include a greater incidence of low-birth weight babies as well as significant declines in average birth weight and in several other measures of infant health. There is little evidence for health effects at distances beyond 3 km, suggesting that health impacts of fracking are highly local. Informal

estimates suggest that about 29,000 of the nearly 4 million annual U.S. births occur within 1 km of an active fracking site and that these births therefore may be at higher risk of poor birth outcomes.

3. And from <https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.1510547>:

M. Haley et al., Adequacy of Current State Setbacks for Directional High-Volume Hydraulic Fracturing in the Marcellus, Barnett, and Niobrara Shale Plays

Environmental Health Perspectives * volume 124 | number 9 | Sept 2016, a review of some of the threats to communities that must be assessed by the Wayne planning team.

4. Also see

Advances in Chemical Pollution, Environmental Management and Protection

Volume 1, 2017, Pages 113-145

<<https://www.sciencedirect.com/science/journal/24689289/1/supp/C>>

Chapter Five - The Human Health Implications of Oil and Natural Gas Development, Anne C. Epstein:
<https://www.sciencedirect.com/science/article/pii/S2468928917300023?via%3Dihub#!>

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Abstract: Shale energy extraction activities in residential areas have the potential to adversely affect human health. The oil and gas sector is the largest industrial source of volatile organic compounds, which are dangerous because they include hazardous air pollutants, such as the carcinogen benzene; and because they are precursors to ozone, which is also hazardous to health. Leaks from a small number of high-emitting sources account for a large percentage of these emissions. Furthermore, recent studies from several shale basins suggest that benzene emissions from oil and natural gas activities are significantly greater than accounted for in state inventories. Benzene may reach dangerous levels within legal residential distances in very close proximity to individual facilities, and sometimes at the regional level as well. Recent studies of ozone indicate that oil and natural gas activities are responsible for a significant percentage of regional ozone levels in densely drilled shale basins, with potential health impacts on millions of people. A study of well blowouts revealed that the average evacuation radius due to a major blowout is 0.8 miles and displaces 49 families. Additionally, six epidemiologic public health studies demonstrated that people who live in close proximity to multiple oil and gas wells in densely developed shale basins have experienced an increased incidence of childhood leukemia, asthma attacks, congenital heart defects, low birth weight, and preterm birth compared to people who live with no production

wells nearby. Collectively, these data indicate that dense shale development, as currently practiced, may pose a risk to human health.

Sincerely,

Heather Cantino, Steering Committee Chair,

Athens County Fracking Action Network, acfanohio@gmail.com

on behalf of

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Buckeye Environmental Network (formerly Buckeye Forest Council), Roxanne Groff, board chair

Jean Andrews, Documentary Video Producer, "A Forest Returns: The Success Story of Ohio's Only National Forest as Told by Ora Anderson"

Concerned Citizens of New Concord Muskingum County, OH 43762

Meghan Wynne, Organizer