



State of Vermont
Department of Environmental Conservation
Waste Management & Prevention Division
1 National Life Drive – Davis 1
Montpelier, VT 05620-3704

AGENCY OF NATURAL RESOURCES

Responsiveness Summary: An Evaluation of PAHs, Arsenic, and Lead Background Soil Concentrations in Vermont Draft

Public Comment Period December 19, 2016-January 18, 2017

Study Purpose and Notes:

“Before computing the decision statistics we need to address the project objectives.”

“A defensible background data set represents a ‘single’ population, possibly without any outliers.” ProUCL Document

Commenter #1: (Don Maynard)

1. The document is light on the methods used to determine BTVs. Could you please answer the following questions? How many outliers were removed from the 130 samples, and what were their values?

Response: 5 for arsenic, 6 for lead (1 urban and 5 non-urban), and 17 for PAH TEQ (9 urban and 8 non-urban).

Arsenic: 31 ppm, 25 ppm, 22 ppm, 22 ppm, 21 ppm.

Lead Urban: 140 ppm.

Lead Non-Urban: 260 ppm, 74 ppm, 55ppm, 54 ppm, 52 ppm.

TEQ PAH Urban: 4759 ppb, 3847 ppb, 1364 ppb, 1173 ppb, 1150 ppb, 748 ppb, 568 ppb, 557 ppb, and 545 ppb.

TEQ PAH Non-Urban: 309 ppb, 137 ppb, 95 ppb, 62 ppb, 60 ppb, 55 ppb, 53.3 ppb, 44 ppb

2. Were the outliers removed prior to separation into rural and urban data sets, and if so, how many outliers were in each set, how many samples were left in each set, and what were the outlier values?

Response: No, outliers were removed after the determination was made that two distinct sets existed. In the case of arsenic, as one dataset, the outliers were removed from the whole dataset.

3. How were duplicate samples treated?

Response: If and only if duplicate samples passed the Relative Percent Difference (RPD) calculation then they were treated as one sample by taking the arithmetic mean. Only one sample/duplicate sample for one analyte failed, and it was removed from further analysis. The sample that was removed was grid location F1 in Charlotte for arsenic (sample location for arsenic was 7.1 mg/kg, duplicate was 19.5 mg/kg).

4. The report says that the “rural” dataset will be “residential” and the “urban” dataset as “commercial/industrial”; does this mean people living in residential neighborhoods within the “urban” areas of the state will be required to clean up the soil in their yards to “rural” standards?

Response: This is correct, as is the current protocol for active sites. Using the “urban” and “rural” distinctions had several drawbacks and it was determined that all sites, regardless of the contaminant present, should be cleaned up the same way based on use (residential or commercial/industrial).





5. My major objection is the apparent application of rural soils background data to urban residential areas. It is clear that there are many residential areas within the visual GIS “urban” zones. Forcing clean-up of soil to levels not attainable due to recontamination by airborne pollutants is arbitrary and unreasonable.

IF the decision to use rural clean-up levels for urban areas is promulgated, if any resident tests the soils in their lawn, they will have to either 1) expend thousands of dollars in remedial efforts in an attempt to reach an unattainable goal, to get soil that will then be recontaminated by airborne sources or 2) implement institutional controls to prevent residential use of existing households, thereby adversely affecting property values and reducing available housing.

Response: We understand your concerns. We have decided that trying to use the GIS layers for “urban” and “rural” had more negatives if implemented. The largest being that if soils within and “urban” area were found to contain PAHs that were “clean” for an “urban” area, they would still be “dirty” in a “rural” area. As soon as these soils were transported outside of the GIS layer – these soils needed to be treated as contaminated and disposed of properly. The only option to not have to dispose of soils would be to find another location within one of the GIS “urban” layers. Our feeling was that there were not a lot of locations within the “urban” areas that had the capacity to accept this soil and in the end, it didn’t solve the issue. We also felt that making a determination based on the GIS layer and trying to regulate transportation and disposal of soil based on a GIS layer was not going to be something that would be easily regulated. For these reasons, we chose to continue with the current process that has been used and have two sets of standards based on use of a property; residential and commercial/industrial.

Commenter #2: (Curt Carter)

6. When DEC first discussed how to perform the testing and the collection of soil samples to determine background concentrations of PAH’s, arsenic and lead, it became immediately apparent that it would probably be impossible to have private property owners volunteer full permission to have the soils on their property tested for contaminants, naturally occurring or not. Needing to proceed with the sampling, DEC’s was able to identify state and municipally owned sites for sampling locations. Sampling sites were appropriately identified as “urban” or “rural”.

In order to determine background concentrations, the data set of the “urban” sample was subsequently classified as “commercial/industrial” and “rural” was classified as “residential”. The problem however is that soil samples now included in the “commercial/industrial” data set did not actually include any samples taken on commercial or industrial lands. The “urban”, (now “commercial/Industrial”) samples were taken in urban parks and cemeteries. No samples were actually taken on commercial sites or on industrial sites. How then can a background standard be now accurately established for “commercial/industrial” based upon these samples?

Response: Background conditions are those where there is little likelihood that onsite activities have altered unused conditions. Active industrial and commercial lands were excluded because we were attempting to locate “background” soils, as we were focusing on background due to atmospheric deposition. Industrial or commercial properties would not yield a true background atmospheric deposition sample, as it could not be ruled out that a release did or did not occur. As per the approved QAPP:

“The following is a proposed sub-group of desired sample location types:

- 1. Municipal Park/Green*
- 2. School Yard Grassed Area*
- 3. Grassed Area around Building*
- 4. Forested Land (Town Forest)*

The sample locations should not possess the following:

- Not a current or former industrial property, confirmed via review of Sanborn Maps (if available),*
- Not a listed site (i.e., hazardous waste site, RCRA, Spill),*
- No obvious signs of soil staining, stressed vegetation, odors, etc.,*
- No obvious signs of petroleum storage (past or present),*
- No obvious signs of fires or nearby combustion sources,*
- If fill material is encountered during sampling, it should be noted and no debris/asphalt/foreign material, etc. should be included in sample.”*



7. One might assume that a true background standard for “commercial/industrial” would actually be somewhat higher than that indicated by DEC as based upon their analysis of the samples. The indicated DEC standard appears to be artificially lowered further by DEC’s elimination of outliers.

Response: Outliers were identified by standard statistical procedures as described below. Outliers are data that potentially do not belong to the study dataset. These were further evaluated to see whether they met the study criteria above. The DEC disagrees that the removal of statistical outliers would “artificially” lower the standards herein. As per the ProUCL User Guide: “A few elevated statistical outliers present in a background data set may actually represent potentially contaminated locations belonging to impacted site areas and/or possibly from other polluted site(s); those elevated outliers may not be coming from the main dominant background population under evaluation.” (ProUCL Version 5.1 Technical Guide, US EPA, 2015.) The outliers that were removed were statistically outside the dataset and therefore appeared to be representative of something other than “background” conditions.

8. While the study provides much useful information on PAH’s, lead and arsenic statewide and is helpful in determining a “residential” background standard, it appears that the information gathered in the study may not be able to accurately indicate a valid “commercial/industrial” standard.

Response: See response to comment 7.

Commenter #3: (VEC Independent Study)

9. Review and comment on independent study funded by VEC and provided to VTDEC.

Response: The VT DEC appreciates this thorough effort and response. We acknowledge that there are many methods to conduct statistical analyses. Both the method chosen by ESS and VT DEC are valid and acceptable. To conduct the original “potential outlier” analysis we invoked the approach of Wisconsin (July 2013; RR-940) and ITRC training, which were consistent with the methodology presented in ProUCL manuals. This involved applying the Rosner’s test prior to transforming the data set. Evaluation of the data trend prior to identification of outliers is to presume that the outliers belong to the data set. As the ProUCL manual states, inclusion of outliers will artificially distort the statistical analysis. VT DEC then conducted a historical land use survey of the TEQ PAH outliers and this effort confirmed that the outliers were taken from sample locations with plausible releases.

Commenter #4: (Dan Albrecht)

10. Thank you for the opportunity to comment on the recently released report, “An Evaluation of PAHs, Arsenic, and Lead Background Soil Concentrations in Vermont.” I have the following questions: What is the significance of the report’s apparent assignment of rural or “non-urban” background levels to residential land uses? Does this mean, as discussed on page 6 of the report, that regulatory thresholds for existing residential properties or proposed residential developments located in urban areas are going to be evaluated using the rural or “non-urban” background levels rather than the “urban” background levels that actually exist in those area?

Response: Yes.

We looked at a layer called density of habitable buildings as a visual support tool to evaluate if a pattern emerged. We never had access to any data that defined rural versus urban.

11. Were soil samples from commercial and industrial properties not suspected to be the source of a release also included in the “urban” dataset or was that dataset just comprised of samples from residential, public and/or open land?

Response: No; we chose properties that would be representative of background due to atmospheric deposition. Refer to QAPP and what were defined as “acceptable” properties.

12. What is the relationship of the lead background level determined in the report and the DEC’s process for determining applicable remediation thresholds to the VT Dept of Health’s separate risk-based evaluation of lead levels in blood based on potential exposure to lead in soils?



Response: This study was for the purposes of determining background concentrations of arsenic, lead, and TEQ PAHs in surface soils. The current policy the VTDEC has used to determine what value to use (background vs calculated risk based concentration is to use the higher of the two values. Currently the EPA calculated risk based value is higher than the background value, therefore the EPA value will be included in the new Rule as the lead standard in soil.

Commenter #4: (Kathy Beyer)

13. Setting a PAH residential standard that is *significantly* lower than the background sample results from the Urban Sample Locations will result in the same “donut hole” clean-up efforts that exists currently, where a multi-family housing property will be remediated to 26 ppb, while surrounded by parcels that have PAH levels closer to your urban sample results. I would ask the Division to consider how to incorporate the Table I Urban Sample results in the assessment of establishing the Residential TEQ PAH background threshold values.

Response: The purpose of this study was to establish background concentrations of arsenic, lead, and TEQ PAHs that would act as a default soil screening value. However, any listed site may choose to conduct a site-specific background study. Also, please refer to response for comment 5.

Commenter #5: (City of Burlington)

14. The Report makes no mention of a recreational soil standard. Will VTDEC be considering the generation of such a standard? Consideration should be made to the reduced duration of exposure when comparing recreation and residential use.

Response: Determination of a recreational standard was not required by the statute nor was it part of the proposed sampling plan that was approved. At a future date the VTDEC may include a cleanup value for recreational uses but we did not do that in the current Rule. However, conducting a site-specific background study site specific risk analysis is an option.

15. Please confirm that it is VTDEC’s intention to use the current EPA Regional Screening Level (RSL) for lead (400 mg/kg for residential and 800 mg/kg for industrial) as the future standard and not the calculated background threshold values (BTVs) provided for lead in the Report. Is VTDEC aware of an EPA initiative to revise the RSLs for lead? Is the Vermont Department of Health (VDH) considering the development of a VDH specific soil screening value (SSV) for lead? If so, would the proposed VDH SSV for lead be less than the calculated residential and industrial BTVs in the Report? If the VDH value was to be less than the BTV, would VTDEC elect to use a VDH standard that is lower than the BTV, thus forcing clean-up to a level below background in an urban setting?

Response: Current policy utilizes the EPA RSLs for lead. DEC is aware of EPA’s impending revision on the lead RSLs. It is expected that this new value will be less than the current values of 400ppm and 800pm. When the EPA value is updated, VTDEC will review the new value and the background value to determine which value is adopted.

16. Specifically, how will VTDEC utilize the urban, non-urban BTVs? Will they replace the residential and industrial RSLs for properties based on future reuse?

Response: That is correct.

17. The basis for sample location selection criteria in ‘urban’ areas is flawed, because it omits locations that could be considered representative of background in non-residential settings. More specifically, by not including data from current or former industrial/commercial properties, the resulting background values are more representative of residential land in urban areas and do not represent sites that have been and will continue to be used for non-residential purposes. By using ‘non-urban’ data to generate a residential threshold, housing projects in urban settings will be forced to clean up to a standard that does not directly correlate with residential properties in urban settings. This will result in remediation being required for residential projects, when they are surrounded by existing parcels with background levels that exceed the standard.

Response: Please see response to comment #6 and comment #18.

18. Upon review of supporting information regarding the use of the Rosner Outlier Test, it was determined that data should not be excluded from analysis solely on the basis of the results of this or any other statistical test. If any values are flagged as possible outliers, further investigation is recommended to determine whether there is a plausible explanation that justifies removing or



replacing them. The Report states: “Historical property uses were researched via available Sanborn maps researched and local institutional knowledge”. Would VTDEC please provide supporting historical information (i.e. known release, fire, or contaminant source area, etc.) for the properties where data points were omitted that would justify exclusion?

1. *Response: The land use narratives for TEQ PAHs are as follows. The sample location (K2; 4759.35 ppb) was taken from a municipal park location, that contained a former historic gasoline fueling station, shown on Sanborn Fire Insurance map.*
2. *The sample location (K2b; 3846.6 units) was in the floodplain, about 600 feet downgradient from a former Manufactured Gas Plant, in Rutland.*
3. *The sample location (J2; 1363.62 ppb) was taken at the small Brandon green. May 9, 1919 saw a Town Fire. Brandon is a source for Kaolin, Iron ore, and in the past manufactured iron*
4. *The sample location (A1; 1172.95 ppb) was taken at the Swanton Park, downtown. Swanton saw a large catastrophic fire across the street in 1970. See LS51508.jpg at Landscape Change Program website. Sanborn Fire Insurance maps show the land always as a Park*
5. *The sample location (F4; 1149.6 ppb) was taken at the Montpelier State House lawn. Montpelier state house. Close (280 Ft) to National Life Coal fired heating plant building. Records suggest a massive downtown fire in the immediate area in 1874. Also, in 1857 fire destroyed the State House. See UVM Landscape Change program photo: LS11201*
6. *The sample location (G2; 748.07 ppb) was collected at the Bristol town green. Bristol 1872 and 1898 fires destroyed entire adjacent downtown blocks. See LS03217.jpg*
7. *Sample location (K1; 567.6 ppb) was taken from the town green in Fair Haven. The Safford distillery, west of the common, burned down in 1824 (A History of the Town of Fair Haven, Vermont: in Three Parts).*
8. *Sample location (H4; 557 ppb) was taken from Brookfield Floating Bridge. First constructed in 1820, the bridge is now on its eighth iteration. Most recently the bridge was reconstructed in 2014-2015, and soil disturbance occurred in the location where the sample was taken.*
9. *Sample location (B2; 544.9 ppb) was taken from Taylor Park in Saint Albans. Saint Albans saw a catastrophic multi-block fire across from the park in 1895.*

Commenter #6: (VHB)

19. The VT DEC draft report adopts “industrial/commercial” and “residential” background threshold values (“BTVs”) based on data collected from “urban” and “rural” areas, respectively. VHB believes that this assumption is not appropriate as urban vs. rural designations relate to density (or sparseness) of development, while industrial/commercial vs. residential designations are related to the use of the land (rather than density). More simply put, “residential” sites can be located in “urban” areas, and industrial/commercial” sites can be located in “rural” areas. Therefore, it is not a valid assumption to equate these two different classification mechanisms (density and land use) regardless of statistical correlation, because correlation does not necessarily mean causation. Additionally, all properties located in urban areas have the potential for elevated background levels regardless of whether they have “industrial/commercial” or “residential” uses. VHB understands that the VT DEC may have tailored the nomenclature to remain consistent with the EPA Soil Screening Value (“SSV”) nomenclature, but the SSVs are based on health risk assessments, whereas BTVs are background values for a given region and should therefore be determined based on the data from that region. VHB suggests two alternative revisions to the VT DEC analysis regarding the division of the data set into different categories: one based on density (urban vs. rural), and one based on land use (industrial/commercial vs. residential). VHB recommends that the preferred method to analyze the background data should be consistent with the categories that will be regulated under the forthcoming rule as outlined under H.269.
 - a. Density Analysis (Urban vs. Rural) – If the VT DEC wishes to divide sampling locations based on “urban” (dense) and “rural” (sparse) designations, then those spatial limits (urban vs. rural) should be based on regulated districts where those background values would apply in the future. In the statutory definition from H.269 of those areas where the BTV may apply:

“designated downtown development district, growth center, neighborhood developments area, TIF district, or village centers.”

However, we note that H.269 only requires management of development soils within these specific areas until the Agency adopts its forthcoming rule, at which time the Agency may regulate development soils in additional areas at its discretion. To more adequately define urban vs. rural sites, it may be more appropriate to use Federal Aid Urban Areas which can be found in the August 24, 2011 Federal Register (76 FR 53030). These Federally classified “urban” areas are based on Federal census data, and are defined as densely developed territory, encompassing residential, commercial, and other nonresidential urban land uses. VHB believes this definition of “urban” is more suitable than the assumptions of the draft report’s analysis, as there are many different land uses within “urban” areas. Under this method, sampling locations



within the defined “urban” center would be segregated into the “urban” dataset, and the resulting “urban BTV” would be applied to the areas located within that “urban” boundary, regardless of land use. A “rural BTV” could be calculated based on points which fall outside the “urban” areas, and should be applied to those sites that fall outside of the “urban” areas.

- b. Land Use Analysis (Industrial/Commercial vs. Residential) – Alternatively, if the VT DEC wishes to divide sampling locations based on “industrial/commercial” and “residential” land use designations, then those spatial limits should be, at a minimum, better defined by using the full E911 database, rather than just habitable buildings, as was done in the VT DEC analysis. Using only habitable buildings does not adequately characterize all forms of land use, and should not be equated to represent “urban” or “industrial/commercial” areas. The E911 database would need to be sorted into “industrial/commercial” vs. “residential” defined uses and separate spatial/statistical analyses should be completed on those separate datasets to define areas of specific land use. A more thorough analysis would include historic land use datasets to analyze the impacts of atmospheric deposition over time, and would include road and railroad datasets which are not represented on the E911 database but would be considered “industrial/commercial” uses.

Under this method, sampling locations within the defined “industrial/commercial” area should be segregated into the “industrial/commercial” dataset, and the resulting “industrial/commercial BTV” would be applied to the areas with “industrial/commercial” land uses, regardless of density. A “residential BTV” can be calculated based on points which fall inside the “residential” kernel analysis layer, and should be applied only to residential areas. It should be noted that under this analysis, it is likely that some of the data may not be located within the “industrial/commercial” or “residential” layers and therefore, should not be included in either BTV calculation.

Response: VT DEC did not have access to data that defined rural and urban areas for Vermont, and as such we used the GIS layer “Density of Habitable Buildings.” The use of land use density is a recognized way of differentiating urban and rural land uses. The E911 layer does not have SIC code information, thus it cannot be sorted by industrial/commercial and residential. Industrial and commercial lands were excluded because we were attempting to locate “background” soils, as we were focusing on background due to atmospheric deposition. Industrial or commercial properties would not yield a true background atmospheric deposition sample, as it could not be ruled out that a release did or did not occur. As per the approved QAPP:

“The following is a proposed sub-group of desired sample location types:

- 1. Municipal Park/Green*
- 2. School Yard Grassed Area*
- 3. Grassed Area around Building*
- 4. Forested Land (Town Forest)*

The sample locations should not possess the following:

- Not a current or former industrial property, confirmed via review of Sanborn Maps (if available),*
- Not a listed site (i.e., hazardous waste site, RCRA, Spill),*
- No obvious signs of soil staining, stressed vegetation, odors, etc.,*
- No obvious signs of petroleum storage (past or present),*
- No obvious signs of fires or nearby combustion sources,*
- If fill material is encountered during sampling, it should be noted and no debris/asphalt/foreign material, etc. should be included in sample.”*

VHB would like to acknowledge that by completing these proposed revisions, the datasets may no longer contain enough sampling points to remain statistically significant. If that is the case, VHB would recommend supplementing the existing dataset with additional samples, so that the analysis would remain statistically significant.

Response: The VT DEC acknowledges that additional data will further the work already conducted, but at this point in time will not be collected any additional data.

20. Did the VT DEC account for roadway or railroad corridors in their spatial analysis in classifying a sample as “rural” or “urban”? As these types of facilities contribute to atmospheric deposition of contaminants including PAHs and lead, it seems appropriate to expand the spatial analysis to consider these datasets.



Response: Yes, the protocol described in the approved QAPP outlines the excluded property types. Report states: “Properties excluded from consideration as a background location may have had one of the following attributes: Current or former industrial use; A state identified hazardous waste site with a surficial soil issue; Current or former petroleum storage; Recent property fire; Visual or olfactory evidence of contamination upon site visit or sample collection; Fill material containing anthropogenic debris discovered upon sample collection.” Industrial or commercial properties would not yield a true background atmospheric deposition sample, as it could not be ruled out that a release did or did not occur.

21. The sampling locations were divided into urban and rural categories based on land use data current as of 2015. However, one main source of lead in soil is from atmospheric deposition associated with leaded gasoline emissions which started in the 1920s. A phase out of leaded gasoline started in the mid-1970s and leaded gasoline was fully banned in 1996. As present land use may not be representative of historic land use, would it be appropriate to assess the lead sampling points in light of historic land use when leaded gasoline was used?

Response: The objective of the study was to choose and sample “background” locations not suspected “release” sites. The locations in the “urban” dataset would be the locations where historic vehicular transit would have occurred and deposited lead in the soil through deposition. VTDEC evaluated the land use history of outlier locations. Through this process known former gas station locations were excluded.

22. The sampling method described by the VT DEC (see page 2 of the VT DEC draft report) eliminates the potential for contaminated sites or contaminated fill (that could bias the data high) to be included in the sample set; however, have the sampling locations been evaluated for recent redevelopment, and for the potential presence of fill sourced from off-site areas? VHB would like to acknowledge the possibility that, for example, some sampling locations in the dataset could have been recently redeveloped with fill sourced from ‘clean’ areas that could bias the data low (such as those in reconstructed floodplains, parks, recreational fields, etc.). VHB requests that the VT DEC draft report on whether the dataset is affected by this potential bias.

Response: We acknowledge that fill from unknown sources could potentially bias the data set. There is no consistent way to establish all of the uses of imported clean soils as fill in the Vermont. We do not have regulation that tracks the movement of clean fill, or a definition of clean soils. Consequently, Vermont researched the reasonably available information on past land use. As stated in the report: “Historical property uses were researched via available Sanborn Maps and local institutional knowledge; however, a Phase I Environmental Site Assessment was not conducted on any of the sampled property locations.” Also, interviews were conducted prior to obtaining site access in order to evaluate the potential presence of fill on the proposed site. As per the report: “Properties excluded from consideration as a background location may have had one of the following attributes:

- Current or former industrial use;*
- A state identified hazardous waste site with a surficial soil issue;*
- Current or former petroleum storage;*
- Recent property fire;*
- Visual or olfactory evidence of contamination upon site visit or sample collection;*
- Fill material containing anthropogenic debris discovered upon sample collection.”*

23. In the VT DEC draft report, 27 sampling locations classified as “urban” under the VT DEC analysis are located outside of the density of habitable buildings layer. However, based on the analysis provided by the VT DEC in the draft report, only sites located within the habitable buildings layer should be considered “urban.” Therefore, these sampling locations should be re-classified as “rural” according to the VT DEC’s analysis (see page 8 of the VT DEC draft report).

Response: The sampling locations in the near vicinity , on the fringes, or located within the layer of the Density of Habitable Buildings layer, were included in the “urban” data set. The sampling locations were evaluated on the VTDEC GIS “ANR Atlas.” Each location was inspected for proximity to the “density of habitable buildings” atlas layer. Sampling locations “inside” the



“density of habitable buildings” layer or sampling locations within a buffer of approximately 500 feet were considered Urban. Sample locations that were “engulfed” in the “density of habitable buildings” layer were also considered Urban. Other sample locations (not engulfed or within 500 feet of the density layer) were considered Non-Urban. A column was introduced to the spreadsheet denoting the Urban/Non-urban status for each sampling location. The report has been updated to include this protocol.

Outliers are not identified on the commercial/industrial and residential tables (pages 13-14 of the VT DEC draft report). Can the VT DEC please identify which sample results were considered to be outliers in the analysis?

Response: Please see response to comment 1.

24. The VT DEC draft report states that outliers were removed by “Rosner’s Outlier Test and visual inspection of the histogram and box and whisker plots.” Can the VT DEC please explain methods for ‘visual inspection’ further?

Response: The visual inspection of the histogram and box plots included observing the distribution of data and graphically assessing the bulk of the data in comparison to the extreme values. For instance, in plotting the data in a box plot, the graphical spread of the data becomes apparent, with the box representing the interquartile range, and the whiskers depicting 1.5xIQR; beyond the whiskers the isolated points are considered extreme, and potential outliers. There is no standard protocol for visual evaluation, statistical subjective evaluation is part of the decision process to identify “potential” outliers. Upon identification of these potential outliers VT DEC undertook a land use evaluation to determine if the data in question met the criteria of the study. Those data that did not meet the study criteria were subsequently excluded.

25. The VT DEC draft report states that outliers were removed by “consideration of ancillary geographical information.” Can the VT DEC please explain “consideration of ancillary geographical information” further? Can the VT DEC also please provide justification for each outlier removed based on this method?

Response: Please refer to historical research on outliers included in response to comment #17.

26. The Introduction section states “surface soil samples were collected spatially throughout Vermont to determine background concentrations of polycyclic aromatic hydrocarbons (PAHs), arsenic, and lead from locations presumed to not have *anthropogenic sources* of these compounds. For the purposes of this study, background is defined as the concentration of PAHs, arsenic, or lead attributed to atmospheric deposition or naturally occurring mineralogy.” The use of the term “*anthropogenic sources*” is confusing as VHB interprets atmospheric deposition may originate from anthropogenic sources (i.e. exhaust or combustion byproducts). Therefore, VHB suggests that “anthropogenic sources of these compounds” be revised to “identifiable, site-specific sources of the PAHs, arsenic, or lead contamination on the property” or similar, which is language consistent with H.269.

Response: The report has been updated to read: “Surface soil samples were collected spatially throughout Vermont to determine background concentrations of polycyclic aromatic hydrocarbons (PAHs), arsenic, and lead from locations presumed to not have had a known release or land use that would have been a source of these contaminants.”

27. As the data are presented in the VT DEC draft report, it appears that some samples reportedly collected from grid cell K6 were actually collected from grid cell K5. VHB suggests labeling the data points within the maps, for clarity.

Response: As stated in the Deviations from QAPP: “Some municipalities offered sampling locations. These locations were not identified by the sampling team, and may not have reflected the original selection criteria.” We acknowledge that in the sampling protocol several K5 sample locations are located in grid K6. These locations were incorporated at the behest of the municipality subsequent to the establishment of the protocol. For clarification, readers are directed to the sample location Maps beginning on page 17.

28. As the data are presented in the VT DEC draft report, sample point N2 appears to be collected from grid cell M2. If so, should this sample be labeled M2a? Were any samples collected from Manchester, Vermont in Grid cell N2?

Response: Similar to response to comment #33, we acknowledge the mislabeling of N2. The sample labeled N2 was taken from Emerald Lake State Park which falls into both grid cells M2 and N2. As per the Deviations from QAPP, no samples were taken in the actual grid cell N2.



29. The VT DEC draft report states that samples were not collected from grid cells A4 (Richford), C2 (Fairfax), D2 (Essex Junction) or H6 (Vershire); however, on the Surficial Soil Sample Locations map (page 16 of the VT DEC draft report) there are sampling locations mapped in these cells. Are these proposed sampling locations?

Response: Map referenced in this comment presents proposed sampling locations; not all locations were sampled as we were not granted property access. Individual maps directly following the statewide map, beginning on page 17 represent the actual sample locations.

30. The BTVs for lead reported by the VT DEC were determined to be lower than both the residential SSV and industrial SSV. Is VHB correct in understanding that soils with lead concentrations below the SSVs will continue to not be regulated as a waste?

Response: Please see response to comment #14.

31. PAH thresholds in this background study are reported as toxicity equivalency quotient (“TEQ”) values, only. However, it may be possible to be below the BTV for TEQ, but to exceed the SSV for an individual PAH compound. How will individual PAH compound exceedances, including those PAH compounds which are included and excluded in the TEQ calculation, be regulated under the forthcoming rule?

Response: The current policy in the IROCP and what is proposed in the Rule is to conduct a TEQ for PAHs. Individual compounds that are not included in a TEQ will be included as separate compounds.

32. The background study incorporated results from “rural” areas and “urban” areas; however, pursuant to H.269 only soils sourced from development districts generally located in “urban” areas are subject to the development soils management practices, until the Agency adopts rules for the management of development soils. Would the forthcoming rule apply statewide, or would the BTVs only be applied to properties located within “urban” areas?

Response: The Statute states: “(1) include statewide or regional background concentration levels for PAHs, arsenic, and lead that are representative of typical soil concentrations and found throughout existing development areas” The VTDEC calculated statewide BTV (background threshold value) concentrations. The use of these values will not be restricted to development districts.

33. VT DEC proposes to adopt a single statewide arsenic BTV. If the forthcoming rule includes provisions for the management of development soils in only “urban” areas, then VHB recommends that an alternate rule or provision should be implemented to adopt the statewide arsenic BTV that can be applied to the entire State, regardless of density or land use.

Response: The study which the VT DEC conducted indicated that there was no statistically significant difference between the “urban” and “rural” arsenic data sets; therefore the arsenic value will be used for all property uses.

34. VHB respectfully suggests that the forthcoming rule include a provision that at a minimum, soils sourced from sites located within Federal Aid Urban Areas (August 24, 2011 Federal Register (76 FR 53030)) be eligible to have those soils managed as development soils. VHB suggests this change, because actual urban, industrial, and commercial properties extend beyond the boundaries of the designated downtown development districts, growth centers, neighborhood developments areas, TIF districts, and village centers that H.269 specifies for the interim period until the Agency adopts rules for the management of development soils.

Response: Please see response to question 32.

35. How will site-specific maximum development soil concentration levels for PAHs, lead, and arsenic be determined in accordance with H.269 (d)(4)?

Response: Per the rule, an SPLP analyses will be required.

36. Given the number of questions and comments VHB has compiled, we respectfully request a public meeting be held to hear responses from the VT DEC regarding these comments, and comments from other members of the public.

Response: We will post these comments publicly for all to review. If there is a need for a public meeting, based on public request, the VTDEC will be happy to hold a public meeting.