APPENDIX H

SUPPORTING INFORMATION RELATED TO URS' COST ESTIMATE FOR THE GAVIN LANDFILL LATERAL EXPANSION OPTION

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Background Information

As part of the landfill siting study for the AEP Gavin Plant, URS was directed to design a conceptual expansion of the existing Gavin Landfill that would provide approximately 52 million cubic yards of disposal capacity. At the kickoff meeting on June 19, 2009, URS presented options that expanded the existing facility horizontally over a portion of the Stingy Fly Ash Reservoir and Turkey Run Site, but also expanded the facility vertically. At the meeting, AEP directed URS to revise the footprint to stay out of the Turkey Run property and further expand the facility horizontally over the Stingy Run Fly Ash Reservoir as needed to provide the required disposal capacity, without significantly increasing the peak elevation of the facility.

Following the meeting, the conceptual design for the expansion site was revised and presented to AEP for approval. The next step in the study was to provide a cost estimate for each viable site in the study, which included the expansion and three 'green' sites within a 5-mile radius of the Gavin Plant.

Stingy Run Fly Ash Reservoir

The Stingy Run Fly Ash Reservoir is located directly northwest of the existing Gavin Landfill. The existing landfill footprint extends to the emergency overflow of the Stingy Run Fly Ash Reservoir, but does not extend over any portion of the reservoir that contains ash material.

The reservoir covers a total of approximately 270 acres. Approximately 115 acres of the pond has been covered with excess soil/rock material that was excavated and blasted during the construction of the Gavin Landfill. Based on conversations with Doug Workman of AEP, this existing soil layer is an average of 8 feet thick. The remaining 155-acre area of the pond is wet.

Historical USGS mapping indicates that the likely depth of existing ash in the reservoir is approximately 50-100 feet, with the deepest portion of the reservoir located directly adjacent to the center of the Stingy Dam at the eastern edge of the reservoir.

Landfill Construction over the Reservoir

Typical expansions above fly ash ponds cover the entirety of the pond. The perimeter embankments of the fly ash pond provide a buttress against potential global instabilities.
Engineering controls are provided to allow the release of pore pressure as the underlying ash consolidates. This is often achieved by installing a wick drain system below the proposed landfill that allows pore water to be collected and discharged from the pond as the landfill is developed. In addition, the landfill must be designed to allow for the expected settlement of the fly ash material in the pond.

The proposed Gavin Expansion is different than a typical landfill construction over a fly ash pond in that the landfill is only proposed over a portion of the reservoir (approximately 90 acres of the 270 acre reservoir). Because the landfill is not proposed over the entire footprint of the reservoir, along the northern edge of the proposed landfill there is no buttress to prevent global instabilities.

Therefore, in addition to the pore water pressure and settlement concerns of a typical landfill construction above a pond, <u>it is URS' opinion that additional engineering controls will be</u>

required to improve the strength of the ash below the proposed expansion, to verify that the ash material provides enough strength to resist potential global instabilities.

One potential option would be to construct a splitter dike along the perimeter of the proposed landfill to divide the landfill footprint from the remainder of the reservoir. This would likely involve the excavation of existing ash material and the construction of an earthen berm. However, due to the required length of the splitter dike (approximately 3,000 feet) and the depth of the reservoir, it was determined that this solution would not be financially feasible without modifying the expansion footprint significantly.

Another potential option for the construction of the landfill over the fly ash pond would be to design a phased construction approach to allow the weight of the landfilled ash material to consolidate the sluiced ash in the Reservoir. This approach would include a wick drain system below the landfill liner to release pore pressure as the landfill is developed. Instrumentation would be required to verify that the ash material in the pond was adequately consolidated at each stage of landfill development. However, the feasibility of this construction method, and the ability of this method to meet OEPA geotechnical design requirements is not clear without further geotechnical investigation and analysis.

Therefore, in order to provide a conservative estimate of the costs associated with constructing the Gavin Landfill Expansion above the Stingy Run Fly Ash Reservoir, it was determined that a wick drain system and soil preloading program would be required to consolidate and improve the existing ash material prior to construction of the Gavin Landfill Expansion. This approach has been accepted by OEPA in the past and is a less risky approach because it allows for the stabilization of ash in the Reservoir to be confirmed *prior to* construction and operation of the landfill.

The expansion footprint proposes to place over 200 feet of ash above the pond. URS determined that the preloading program would only need to place enough pressure on the ash material to consolidate and strengthen the ash to an acceptable level. However, without a detailed stability analysis and subsurface information about the condition and depth of the existing ash in the Stingy Run Fly Ash Reservoir, the loading condition required to adequately strengthen the ash material is unknown.

Preloading Costs

It was decided that for the purpose of estimating the cost of the preloading program, an assumed average of 100 feet of material would be placed above the 90-acre fly ash reservoir area in order to preload and strengthen the ash material in the reservoir. For the Gavin Expansion the required material for preloading is then:

100 feet x 90 acres = 14,500,000 cubic yards of material

It was assumed that during construction of the landfill expansion, approximately 3.8 million yards of excavation is required to remove highwalls in the landfill footprint. Therefore, the additional fill required to preload the pond was:

14,500,000cy -3,800,000cy = 10,700,000 cubic yards of additional ash pond fill.

The cost of the additional pond fill material was estimated at $6.50/cy, assuming a typical cost for borrow soil of $5.00/cy and approximately $1.50/cy for the placement of the preloading material. Therefore, the total cost for preloading the pond was:

$6.50/cy x 10,700,000 cy = **$69,550,000**

Wick Drain System Installation Costs

The cost for the wick drains was based on an assumed wick drain spacing of every 15 feet. On an average acre this amounts to approximately 200 wick drains/acre. Wick drains were assumed to be placed an average of 75 feet deep based on the assumed average depth of the reservoir. A unit price for installation was assumed to be $0.15/lf. Therefore:

200 wick drains/acre x 75-foot average length * $0.15/lf = $2,250/acre

A 1-foot stone drainage layer was assumed to be constructed at the base of the landfill to allow for the release of pore water pressure from the wick drains. At an average cost of $25/cy, the cost for the stone drainage layer is:

$25/cy x 1,600 cy/acre = $40,000/acre

Based on previous experience installing wick drains, it was assumed that pre-drilled borings would be required in order to install the wick drains through the 8-foot existing soil layer on the reservoir. Pre-drilling costs were assumed to be approximately $20/lf. Therefore:

$20/lf * 200 wick drains/acre * 8 ft length = $32,000/acre

Therefore, the total wick drain system installation cost was approximately $75,000/acre

For the Gavin Landfill Expansion, the total cost of installing the wick drain system over the 90 acre Stingy Run Fly Ash Reservoir area was then:

90 acres x $75,000/acre = **$6,750,000**

APPENDIX I

GENERAL DESCRIPTION OF RECOMMENDED GEOTECHNICAL EVALUATION FOR THE GAVIN LANDFILL LATERAL EXPANSION OPTION

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In order to develop an optimal plan for strengthening and improvement of the ponded fly ash to accept the loads of the new landfill, additional geotechnical investigation and evaluations will be required. Conceptually, URS envisions the program of investigations and evaluations would include the following:

- *Drilling and Sampling:* Geotechnical sampling of the fly ash materials within the fly ash pond would be required. This would likely include a program of both conventional drilling and sampling (auger or mud rotary drilling techniques in conjunction with Standard Penetration Testing (SPT)) and a complementary program of cone penetration testing (CPT). The program would include sufficient borings/CPT to adequately characterize the consistency and characteristics of the ponded ash both spatially and with depth. Although the number, location, and depth of borings are to be determined, URS estimates that borings would be spaced at roughly 400 to 500 ft on-center across the portion of the landfill footprint that is to be constructed over the reservoir as well as within a zone beyond the footprint that may be influenced by the landfill surcharge. CPT holes would be implemented at roughly twice this frequency, to better characterize spatial variations within the ponded fly ash. Use of in-situ test methods, such as vane shear testing may also be considered.

  URS anticipates that certain areas of the pond to be investigated may present challenging access conditions for drilling equipment (i.e., due to poor subgrade conditions, reservoir water depth, etc). Improvement of the reservoir surface (by constructing temporary stone roads or placing crane mats, for example) and/or use of a barge-mounted rig may be necessary for these areas.

- *Laboratory Testing:* In URS's experience, undisturbed sampling of sluiced fly ash using Shelby Tubes is generally not successful. Therefore, laboratory strength and compressibility testing of fly ash would likely be performed on reconstituted samples of fly ash, prepared at the moisture content and consistency of the materials existing in the pond. These parameters would be established by performing moisture content and index tests on disturbed samples of fly ash collected during the drilling operations. Bulk samples of dry ash from the plant, as well as a knowledge of the sluicing operation would also be needed to make decisions on how to prepare the reconstituted samples.

  The laboratory testing program would need to characterize both the drained and undrained shear strength as well as the compressibility characteristics of the ponded fly ash. URS envisions that the testing program would include triaxial testing (both unconsolidated-undrained tests and consolidated-undrained tests with pore pressure measurements), one-dimensional consolidation testing, direct shear testing, and permeability testing.

As mentioned above, this testing would be performed on reconstituted samples of fly ash, prepared to mimic the in-situ conditions that exist in the reservoir. Based on URS's past experience, if the ash has very high in-situ moisture content, preparation of reconstituted samples and testing in conventional triaxial cells and oedometers may prove challenging. In such cases, pilot testing, as described below, could be used to complement the lab data.

- *Geotechnical Analysis:* The data obtained from the field and laboratory testing will be used to perform geotechnical analysis to support the design of the improvement. Ultimately, the landfill design will need to satisfy OEPA requirements for stability analyses and the guidance given in the OEPA Geotechnical Resource Group (GeoRG) Manual "Geotechnical and Stability Analyses for Ohio Waste Containment Facilities". The plan for improvement of the fly ash must address these requirements, and thus pertinent analyses recommended in the GeoRG Manual will need to be performed during the design process for the improvement program. Geotechnical analyses are envisioned to include deep seated stability analyses of the facility during and after construction, settlement analyses, and analyses of liquefaction under seismic loads. These analyses, in conjunction with the OEPA requirements, would be used to gauge the effectiveness of different improvement schemes, and to select the extent and configuration of the improvements. The specific scope and analytical tools for implementation of these analyses would be established upon review of the field and laboratory data.
- *Pilot Testing:* The project may benefit from larger scale pilot testing. This testing may include, for example, construction of a temporary test embankment within the pond, and monitoring of the response of the fly ash to the surcharge of this embankment. Monitoring and instrumentation may include settlement plates to measure the amount and rate of settlement under the embankment and vibrating wire piezometers to measure changes in porewater pressure due to the embankment load. The need for pilot testing will be evaluated based on the results of the sampling, laboratory testing, and geotechnical analyses.

Phase I Cultural Resources Management Survey for the Approximately 121 ha (300 ac) New Landfill Project at the Gavin Plant in Cheshire Township, Gallia County, Ohio

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i. Abstract

In August of 2010, Weller & Associates, Inc. conducted a Phase I Cultural Resources Management Survey for the approximately 121 ha (300 ac) New Landfill Project at the Gavin Plant in Cheshire Township, Gallia County, Ohio. This document was revised in 2013 to reflect minor boundary revisions that pertain to previously disturbed land. The lead federal agency that is involved in this project is the U.S. Army Corps of Engineers, Huntington. A cultural resources management (CRM) survey was conducted pursuant to Section 106 of the National Historic Preservation Act to identify any sites or properties relative to this undertaking and to evaluate them for the National Register of Historic Places (NRHP). The work involved a literature review, background documentation, field investigations, and a final report. The fieldwork involved subsurface testing and visual inspection as much of the surveyed locations were either steeply sloped or severely disturbed. These investigations identified two archaeological sites, 33GA351 and 33GA352.

The project area is located in northeastern part of Gallia County and west of the community of Cheshire. It includes two separate locations that are both situated in upland environments. The terrain is rugged and consists of narrow ridge tops with entrenched stream valleys. This is an area that is drained by Kyger Creek and its tributaries. The project area, positioned in the uplands, is generally located to the south of SR 554 and west of SR 7. It is an area that has been the subject of previous coal and mineral mining during the middle part of the twentieth century. More recent activity has involved abutting land use by AEP and its facilities including an existing landfill and associated energy producing constructions. The conditions within the project area largely include deciduous secondary growth dating to the prior mining. There are highwalls throughout the area that account for much of the side slopes. Above-ground electric lines traverse the area as well as access road constructions and a defunct conveyor system corridor.

The literature review identified one previously recorded archaeological site (33GA253) within the project area and one immediately adjacent the project area (33GA259). These were identified during cultural resource management investigations for borrow areas (Reichwein 1993) and electric line corridors (Pape et al. 1992). Neither of these sites was determined to be significant and they are indicative of an historic period scatter and isolated prehistoric find. There are scattered sites recorded in the surrounding terrain.

These investigations involved subsurface testing and visual inspection as much of the project area is steeply sloped or severely disturbed. These investigations identified two previously unrecorded prehistoric sites; 33GA351 and 33GA352. These sites are not considered to be eligible for the National Register of Historic Places (NRHP) as they do not meet the minimum criteria. The undertaking will not involve any buildings that are older than 50 years. A finding of no historic properties affected as outlined by 36 CFR § 800.4 and 36 CFR § 800.5 is considered appropriate. No further work is deemed necessary for this project.

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Introduction

In June of 2010, the American Electric Power (AEP) contracted Weller & Associates, Inc. (Weller) to conduct Phase I Cultural Resources Management Survey for the approximately 121 ha (300 ac) New Landfill Project at the Gavin Plant in Cheshire Township, Gallia County, Ohio (Figures 1 and 2). The lead federal agency that is involved in this project is the U.S. Army Corps of Engineers, Huntington, regarding wetland permitting. This report summarizes the results of the fieldwork and literature review. The report format and design is similar to that established in *Archaeology Guidelines* (Ohio Historic Preservation Office [OHPO] 1994).

The project area includes two locations that are both situated in a rugged, upland setting. The terrain is diverse with occasionally abrupt topography that is consistent with the former mining activities. There are aboveground electric line corridors that bisect the landfill site as well as a former conveyor belt corridor. Mining activity from the middle of the twentieth century is evident along most of the side slopes. Various access easements cross through the area. Immature stands of deciduous and occasionally conifer forests account for the canopy and conditions experienced in the area. The fieldwork was limited to the few locations where the terrain was not steeply sloped or severely disturbed. There are no buildings or structures within the project area.

Chad Porter conducted the literature review in March of 2010. On May 1, 2013 AEP had Weller review some boundary revisions that included disturbed areas; these were included in this document. Ryan Weller served as the Principal Investigator. The field crew included Brett Carmichael, Chad Porter, Ryan Weller, and Justin Zink. The report preparation was by Ryan, with Chad completing the figures.

Environmental Setting

Climate

Gallia County, like all of Ohio, has a continental climate, with hot and humid summers and cold winters. The prevailing wind is from the south. The total annual precipitation for the county is 41 inches most of which (55 percent) falls as rain between April and September [United States Department of Agriculture, Soil Conservation Service (USDA, SCS) 1997].

Physiography, Relief, and Drainage

Gallia County is located in the unglaciated Allegheny Plateau Region. The county is contained within the Marietta Plateau of this region (Brockman 1998). Some aspects of the central part of the county have been affected by pre-glacial stream deposition associated with the Teays River system and, more specifically the pre-glacial Marietta River. The terrain and topography in the eastern part of the county is rugged and hillier with steeply sided upland landforms. The soils in this area are primarily formed from decomposing and weathering underlying bedrock as the parent material. The relief within the project area and its surroundings involves narrow upland ridge tops, entrenched stream valleys, and steep side slopes.

The northeastern part of the county is drained by Kyger Creek, Little Kyger Creek, or Campaign Creek. The project areas are drained by the unnamed tributaries of Kyger Creek, Stingy Run, and Turkey Run (USDA, SCS 1997). The latter two are tributaries of the creek.

Geology

The project area is in eastern part of Gallia County. The underlying bedrock in the county is affiliated with the Pennsylvanian System (Brockman 1998; USDA, SCS 1997). The Monongahela formation is present in the eastern part of the county.

Soils

The soils that are affiliated with the project areas are within the Gilpin-Upshur-Steinsburg Association. These are soils that are affiliated with rugged upland environments and entrenched stream valleys (USDA, SCS 1997). There are 10 specific soil series types within the project area (Table 1); however, some of these are duplicate types that merely have different slope percentages.

Table 1. Soils in the Project.

Soil Symbol	Soil Name	% Slope	Location
GwE	Guernsey-Gilpin silt loam	'Steep'	Side slopes
PnD, PnF	Pinegrove sandy loam	8-25, 25-70	Mining spoil
UgC2, UgD2	Upshur-Gilpin silt loam	8-15, 15-25	Eroded ridge tops and slopes
Bhd, BhF	Bethesda channery clay loam	8-25, 40-70	Sloped terrain/ mining
Or	Orrville silt loam	---	Upland valley floodplains
PgB	Pinegrove sandy loam	1-8	Mining spoil
WeB	Wellston silt loam	1-6	Ridge tops

Generally, the soils that are present and dominate in the project areas are poorly suited to occupation (Figure 3). This is because they are either steeply sloped or formed from mineral mining activity. There is one deposit of Wellston silt loam, which appears to be the best suited for the identification of cultural land use/occupation. There are few locations within this project area that have suitable slope percentages to be testable (i.e., <15 percent).

Flora

There is or at least was great floral diversity in Ohio. This diversity is relative to the soils and the terrain that generally includes the till plain, lake plain, terminal glacial margins, and unglaciated plateau (Forsyth 1970). Three major glacial advances, including the Kansan, Illinoisan, and Wisconsinan, have affected the landscape of Ohio. The effects of the Wisconsin glaciation are most pronounced and have affected more than half of the state (Pavey et al. 1999).

The least diverse part of Ohio extends in a belt from the northeast below the lake-affected areas through most of western Ohio (Gordon 1966). These areas are part of the late Wisconsin ground moraine and lateral end moraines. It is positioned between the

lake plains region and the terminal glacial moraines. This area included broad forested areas of beech maple forests interspersed with mixed oak forests in elevated terrain or where relief is greater (Forsyth 1970; Gordon 1966). Prairie environments such as those in Wyandot and Marion County areas would contain islands of forests, but were mostly expansive open terrain dominated by grasses.

The northwestern Ohio terrain is nearly flat because of ancient glacial lakes and glaciation, which affected the flora. However, the vegetation was more diverse than the till plain to the south and east because of the variety of factors that contributed to its terrain. Forests within the Black Swamp were generally comprised of elm/ash stands; however, dissected areas along drainages and drier, elevated areas from beach deposits would contain mixed forests of oak and hickory (Gordon 1966, 1969). There was little upland floral diversity in the lake plains (Black Swamp region) except for the occasional patches of oak and hickory. Floral variety was most evident in narrow sleeves along larger stream valleys where there is relief.

The most biological diversity in Ohio is contained within the Allegheny Plateau, which encompasses the southeastern two-thirds of the state (Sheaffer and Rose 1998). Because this area is higher and has drier conditions, it is dominated by mixed oak forests. Some locations within the central part of this area contain beech and mixed mesophytic forests. There are large patches of oak and sugar maple forests to the south of the terminal moraine from Richland to Mahoning County (Gordon 1966).

Southwestern Ohio from about Cincinnati to Bellefontaine east to the Scioto River historically contained a very diverse floral landscape. This is an area where moraines from three glacial episodes are prevalent (Pavey et al. 1999). Forests in this area include elm-ash swamp, beech, oak-sugar maple, mixed mesophytic, prairie grasslands, mixed oak, and bottomland hardwoods (Core 1966; Gordon 1966, 1969). These forest types are intermingled with prairies being limited to the northern limits of this area mostly in Clark and Madison Counties.

Generally, beech forests are the most common variety through Ohio and could be found in all regions. Oak and hickory forests dominated the southeastern Ohio terrain and were found with patchy frequency across most of northern Ohio. Areas that were formerly open prairies and grasslands are in glacial areas, but are still patchy. These are in the west central part of the state. Oak and sugar maple forests occur predominantly along the glacial terminal moraine. Elm-ash swamp forests are prevalent in glaciated areas including the northern and western parts of Ohio (Gordon 1966; Pavey et al. 1999).

The project area, in eastern Gallia County, is generally within what is considered to be mixed oak and sugar maple-oak forestation (Gordon 1966).

Fauna

The upland forest zone offered a diversity of mammals to the prehistoric diet. This food source consisted of white-tailed deer, black bear, Eastern cottontail rabbit, opossum, a variety of squirrels, as well as other less economically important mammals. Several avian species were a part of the upland prehistoric diet as well (i.e. wild turkey,

quail, ruffed grouse, passenger pigeon, etc.). The lowland zone offered significant species as well. Raccoon, beaver, and muskrat were a few of the mammals, while wood duck and wild goose were the economically important birds. Fishes and shellfish were also an integral part of the prehistoric diet. Ohio muskellunge, yellow perch, white crappie, long nose gar, channel catfish, pike, and sturgeon were several of the fish, whereas, the Ohio naiad mollusc, butterfly's shell, long solid, common bullhead, knob rockshell, and cod shell were the major varieties of shellfish. Reptiles and amphibians, such as several varieties of snakes, frogs, and turtles, were also part of the prehistoric diet (Trautman 1981; Lafferty 1979; Mahr 1949).

Cultural Setting

The first inhabitants of Ohio were probably unable to enter this land until the ice sheets of the Wisconsin glacier melted around 14,000 B.C. Paleoindian sites are considered rare due to the age of the sites and the effects of land altering activities such as erosion. Such sites were mostly used temporarily and thus lack the accumulation of human occupational deposits that would have been created by frequent visitation. Paleoindian artifact assemblages are characteristic of transient hunter-gatherer foraging activity and subsistence patterns. In Ohio, major Paleoindian sites have been documented along large river systems and near flint outcrops in the Unglaciated Plateau (Cunningham 1973). Otherwise, Paleoindian sites in the glaciated portions of Ohio are encountered infrequently and are usually represented by isolated finds or open air scatters.

The Paleoindian period is characterized by tool kits and gear utilized in hunting Late Pleistocene megafauna and other herding animals including but not limited to short-faced bear, barren ground caribou, flat-headed peccary, bison, mastodon, giant beaver (Bamforth 1988; Brose 1994; McDonald 1994). Groups have been depicted as being mobile and nomadic (Tankersley 1989); artifacts include projectile points, multi-purpose unifacial tools, burins, gravers, and spokeshaves (Tankersley 1994). The most diagnostic artifacts associated with this period are fluted points that exhibit a groove or channel positioned at the base to facilitate hafting. The projectiles dating from the late Paleoindian period generally lack this trait; however, the lance form of the blade is retained and is often distinctive from the following Early Archaic period (Justice 1987).

The Archaic period has been broken down into three sub-categories, including the Early, Middle, and Late Archaic. During the Early Archaic period (ca. 10,000-8000 B.P.), the environment was becoming increasingly arid as indicated by the canopy (Shane 1987). This period of dryness allowed for the exploitation of areas that were previously inaccessible or undesirable. The Early Archaic period does not diverge greatly from the Paleoindian regarding the type of settlement. Societies still appear to be largely mobile with reliance on herding animals (Fitting 1963). For these reasons, Early Archaic artifacts can be encountered in nearly all settings throughout Ohio. Tool diversity increased at this time including hafted knives that are often re-sharpened by the process of beveling the utilized blade edge and intense basal grinding (Justice 1987). There is a basic transition from lance-shaped points to those with blades that are triangular. Notching becomes a common hafting trait. Another characteristic trait occurring almost exclusively in the Early and Middle Archaic periods is basal bifurcation and large blade serrations. Tool forms begin to vary more and may be a reflection of differential resource

exploitation. Finished tools from this period can include bifacial knives, points, drills/perforators, utilized flakes, and scrapers.

The Middle Archaic period (8000-6000 B.P.) is poorly known or understood in archaeological contexts within Ohio. Some (e.g., Justice 1987) regard small bifurcate points as being indicative of this period. Ground stone artifacts become more prevalent at this time. Other hafted bifaces exhibit large side notches with squared bases, but this same trait can extend back to the Paleoindian period. The climate at this time is much like that of the modern era. Middle Archaic period subsistence tended to be associated with small patch foraging that involved a consistent need for mobility with a shift towards stream valleys (Stafford 1994). Sites encountered from this time period throughout most of Ohio tend to be lithic scatters or isolated finds. The initial appearance of regional traits may be apparent at this time.

The Late Archaic period in Ohio (ca 6000-3000 B.P.) diverges from the previous periods in many ways. Preferred locations within a regional setting appear to have been repeatedly occupied. The more intensive and repeated occupations often resulted in the creation of greater social and material culture complexity. The environment at this time is warmer and drier. Most elevated landforms in northeastern Ohio have yielded Archaic artifacts (Prufer and Long 1986: 7), and the same can be stated for the remainder of Ohio.

Various artifacts are diagnostic of the Late Archaic period. Often, burial goods provide evidence that there was some long-distance movement of materials, while lithic materials used in utilitarian assemblages are often from a local chert outcrop. There is increased variation in projectile point styles that may reflect regionalism. Slate was often used in the production of ornamental artifacts. Ground and polished stone artifacts reached a high level of development. This is evident in such artifacts as grooved axes, celts, bannerstones, and other slate artifacts.

It is during the Terminal Archaic period (ca 3500-2500 B.P.) that extensive and deep burials are encountered. Cultural regionalism within Ohio is evident in the presence of Crab Orchard (southwest), Glacial Kame (northern), and Meadowood (central to Northeastern). Along the Ohio River, intensive occupations have been placed within the Riverton phase. Pottery makes its first appearance during the Terminal Late Archaic.

The Early Woodland period (ca 3000-2100 B.P.) in Ohio is often associated with the Adena culture and the early mound builders (Dragoo 1976). Early and comparably simple geometric earthworks first appear with mounds more spread across the landscape. Pottery at this time is thick and tempered with grit, grog, or limestone; however, it becomes noticeably thinner towards the end of the period. There is increased emphasis on gathered plant resources, including maygrass, chenopodium, sunflower, and squash. Habitation sites have been documented that include structural evidence. Houses that were constructed during this period were circular, having a diameter of up to 18.3 m (Webb and Baby 1963) and often with paired posts (Cramer 1989). Artifacts dating from this period include leaf-shaped blades with parallel to lobate hafting elements, drilled slate pieces, ground stone, thick pottery, and increased use of copper. Early Woodland artifacts can be recovered from every region of Ohio.

The Middle Woodland period (ca 2200-1600 B.P.) is often considered to be equivalent with the Hopewell culture. The largest earthworks in Ohio date from this period. There is dramatic increase in the appearance of exotic materials that appear most often in association with earthworks and burials. Artifacts representative of this period include thinner, grit-tempered pottery, dart-sized projectile points (Lowe Flared, Steuben, Snyders, and Chesser) [Justice 1987], exotic materials (mica, obsidian, and marine shell, etc.). The points are often thin, bifacially beveled, and have flat cross sections. There seems to have been a marked increase in the population as well as increased levels of social organization. Middle Woodland sites seem to reflect a seasonal exploitation of the environment. There is a notable increase in the amount of Eastern Agricultural Complex plant cultigens, including chenopodium, knotweed, sumpweed, and little barley. This seasonal exploitation may have followed a scheduled resource extraction year in which the populations moved camp several times per year, stopping at known resource extraction loci. Middle Woodland land use appears to center on the regions surrounding earthworks (Dancey 1992; Pacheco 1996); however, there is evidence of repeated occupation away from earthworks (Weller 2005a). Household structures at this time vary with many of them being squares with rounded corners (Weller 2005a). Exotic goods are often attributed to funerary activities associated with mounds and earthworks. Utilitarian items are more frequently encountered outside of funerary/ritual contexts. The artifact most diagnostic of this period is the bladelet, a prismatic and thin razor-like tool, and bladelet cores. Middle Woodland remains are more commonly recovered from central Ohio south and lacking from most areas in the northern and southeastern part of the state.

The Late Woodland period (ca A.D. 400-900) is distinct from the previous period in several ways. There appears to be a population increase and a more noticeable aggregation of groups into formative villages. The villages are often positioned along large streams, on terraces, and were likely seasonally occupied (Cowan 1987). This increased sedentism was due in part to a greater reliance on horticultural garden plots, much more so than in the preceding Middle Woodland period. The early Late Woodland groups were growing a wide variety of crop plants that are collectively referred to as the Eastern Agricultural Complex. These crops included maygrass, sunflower, and domesticated forms of goosefoot and sumpweed. This starch and protein diet was supplemented with wild plants and animals. Circa A.D. 800 to 1000, populations adopted maize agriculture, and around this same time, shell-tempered ceramics appear. Other technological innovations and changes during this period included the bow and arrow and changes in ceramic vessel forms.

The Late Prehistoric period (ca A.D. 1000-1550) is distinctive from former periods. The Cole complex (ca A.D. 1000-1300) has been identified in central and south central Ohio. Sites that have been used to define the Cole complex include the W.S. Cole (33DL11), Ufferman (33DL12), and Decco (33DL28) sites along the Olentangy; the Zencor Village site, located along the Scioto River in southern Franklin County; and the Voss Mound site (33FR52), located along the Big Darby Creek in southwestern Franklin County. It has been suggested that this cultural manifestation developed out of the local Middle Woodland cultures and may have lasted to be contemporaneous with the Late Prehistoric period (Barkes 1982; Baby and Potter 1965; Potter 1966). Cole is a poorly defined cultural complex as its attributes are a piecemeal collection gathered from various sites. Some have suggested that it may be associated with the Fort Ancient period (Pratt

and Bush 1981). Artifacts recovered from sites considered as Cole include plain and cordmarked pottery, triangular points, Raccoon Notched points, chipped slate discs, rectangular gorgets, and chipped stone celts. The vessels often have a globular form with highly variable attributes and rim treatment. There have been few structures encountered from this period, but those that have are typically rounded or circular (Pratt and Bush 1981; Weller 2005b).

Monongahela phase sites date to the Late Prehistoric to Contact period in eastern Ohio. Monongahela sites are typically located on high bottomlands near major streams, on saddles between hills, and on hilltops, sometimes a considerable distance from water sources. Most of these sites possessed an oval palisade, which surrounded circular house patterns. Burials of adults are usually flexed and burial goods are typically ornamental. A large variety of stone and bone tools are found associated with Monongahela sites. Monongahela pottery typically is plain or cordmarked with a rounded base and a gradually in-sloping shoulder area. Few Euro-American trade items have been found at Monongahela sites (Drooker 1997).

Protohistoric to Settlement

By the mid-1600s, French explorers traveled through the Ohio country as trappers, traders, and missionaries. They kept journals about their encounters and details of their travels. These journals are often the only resource historians have regarding the early occupants of seventeenth century Ohio. The earliest village encountered by the explorers in 1652 was a Tionontati village located along the banks of Lake Erie and the Maumee River. Around 1670, it is known that three Shawnee villages were located along the confluence of the Ohio River and. the Little Miami River. Because of the Iroquois Wars, which continued from 1641-1701, explorers did not spend much time in the Ohio region, and little else is known about the natives of Ohio during the 1600s. Although the Native American tribes of Ohio may have been affected by the outcome of the Iroquois Wars, no battles occurred in Ohio (Tanner 1987).

French explorers traveled extensively through the Ohio region from 1720-1761. During these expeditions, the locations of many Native American villages were documented. In 1751, a Delaware village known as Maguck existed near present-day Chillicothe. In 1758, a Shawnee town known as 'Lower Shawnee 2' existed at the same location. The French also documented the locations of trading posts and forts, which were typically established along the banks of Lake Erie or the Ohio River (Tanner 1987).

While the French were establishing a claim to the Ohio country, many Native Americans were also entering new claims to the region. The Shawnee were being forced out of Pennsylvania because of English settlement along the eastern coast. The Shawnee created a new headquarters at Shawnee Town, which was located at the mouth of the Scioto River. This headquarters served as a way to pull together many of the tribes which had been dispersed because of the Iroquois Wars (Tanner 1987).

Warfare was bound to break out as the British also began to stake claims in the Ohio region by the mid-1700s. The French and Indian War (1754-1760) affected many Ohio Native Americans; however, no battles were recorded in Ohio (Tanner 1987).

Although the French and Indian War ended in 1760, the Native Americans continued to fight against the British explorers. In 1764, Colonel Henry Bouquet led a British troop from Fort Pitt, Pennsylvania to near Zanesville, Ohio.

In 1763, the Seven Years' War fought between France and Britain, also known as the French and Indian War ended with The Treaty of Paris. In this Peace of Paris, the French ceded their claims in the entire Ohio region to the British. When the American Revolution ended with the Second Treaty of Paris in 1783, the Americans gained the entire Ohio region from the British; however, they designated Ohio as Indian Territory. Native Americans were not to move south of the Ohio River but Americans were encouraged to head west into the newly acquired land to occupy and govern it (Tanner 1987).

By 1783, Native Americans had established fairly distinct boundaries throughout Ohio. The Shawnee tribes generally occupied southwest Ohio, while the Delaware tribes stayed in the eastern half of the state. Wyandot tribes were located in north-central Ohio, and Ottawa tribes were restricted to northeast Ohio. There was also a small band of Mingo tribes in eastern Ohio along the Ohio River, and there was a band of Mississauga tribes in northeastern Ohio along Lake Erie. The Shawnee people had several villages within Ross County along the Scioto River (Tanner 1987). Although warfare between tribes continued, it was not as intense as it had been in previous years. Conflicts were contained because boundaries and provisions had been created by earlier treaties.

In 1795, the Treaty of Greenville was signed as a result of the American forces defeat of the Native American forces at the Battle of Fallen Timbers. This allocated the northern portion of Ohio to the Native Americans, while the southern portion was opened for Euro-American settlement. Although most of the battles which led up to this treaty did not occur in Ohio, the outcome resulted in dramatic fluctuations in the Ohio region. The Greenville Treaty line was established, confining all Ohio Native Americans to northern Ohio, west of the Tuscarawas River (Tanner 1987).

Ohio Native Americans were again involved with the Americans and the British in the War of 1812. Unlike the previous wars, many battles were fought in the Ohio country during the War of 1812. By 1815, peace treaties began to be established between the Americans, British, and Native Americans. The Native Americans lost more and more of their territory in Ohio. By 1830, the Shawnee, Ottawa, Wyandot, and Seneca were the only tribes remaining in Ohio. These tribes were contained on reservations in northwest Ohio. By the middle 1800s, the last of the Ohio Native Americans signed treaties and were removed from the Ohio region.

Gallia County History

The new state legislature organized and created Gallia County in the spring of 1803. The new county was taken from a portion of land that had been under the territorial organization of Washington County. It was while under this initial government that the first whites came to modern Gallia County to begin settlement and thereby control of the wilderness of the Northwest Territory. Marietta had been settled as the first city there in 1788. In that same year, congressman William Duer and some fellow land

speculators created the Scioto Company, a subsidiary of the Ohio Company in some way. They hatched a plan by which they would send Joel Barlow to Europe in hopes of enticing new immigrants to come and occupy the virgin wilderness, which, of course, they billed as cleared, settled, and cosmopolitan in the face of the frontier (Appalachian Ohio 2007; Griffith 1874; Howe 1888; Ohio Historical Society 2005).

Paris was a goldmine. In the face of impending civil unrest, many French bought the lie, and bought the land. Sadly, as it was such a goldmine, the land agents there in France, upon receiving all that gold, absconded to England once the ships had sailed in January of 1790 and the French land patents were never finalized. The troubles had just begun for the French refugees who were to inhabit the new settlement along the Ohio River. Once they arrived in 1791, the true nature of the settlement was apparent. A village compound had been finished in October 1790. It consisted of four blockhouses and 96 rude log cabins. Nearly 500 French were the intended occupants of this land on the edge of hostile Indian territory. To add to the troubles, most of the French were courtiers and artisans, not the trappers and frontiersmen of which one generally thinks within the Northwest Territory. Many moved back to the east coast where things were considerably more civilized. For those who stayed, this was the beginning of the town Gallipolis; named for them, literally, "The city of the French" (Appalachian Ohio 2007; Griffith 1874; Howe 1888; Ohio Historical Society 2005).

In 1849, the legislature created another county, Vinton, and in doing so, Gallia donated a portion of its northern border. By that time, the county had transitioned from its French roots with an influx of Welsh settlers. Today, the county is very rural there are no cities or towns within Gallia. Though only a village, Gallipolis is the largest municipality and county seat. There are only five other villages there: Vinton, Cheshire, Centerville, Rio Grande, and Crown City (Appalachian Ohio 2007; Ohio Historical Society 2005).

The history of the County has been very quiet as there has been little growth in building, business, education, transportation, and few significant events. However, the county is not completely void of progress and there are excellent examples to be found there of each category. American Electric Power does a large business in the county. Bob Evans Farms has become a nationally known business. Rio Grande University is a quality institution of higher education. US 35 passes through the heart of the county. Morgan's Raiders visited the county during the Civil War, and tragedy visited in 1967 when the Silver Bridge collapsed (Appalachian Ohio 2007; Ohio Historical Society 2005).

Cheshire Township History

Gallia County's commissioners took part of Kyger Township and created Cheshire Township on March 3, 1811 (Hardesty 1976; Little-Creech 2003). However, settlement began while the township's land was under the jurisdiction of the Ohio Territory in the days of the Northwest Ordinance before Ohio's statehood. Abram Darst is the first recorded settler having come in the year 1794 (Hardesty 1976). A settlement grew up around his purchase near the present location of Cheshire and before the year was out Darst was joined by Paul Darst, Adam Rousch, and Edward McMullen. A

certain Mr. Slaughter and Francis Norwood taught the township's first school early on, but a proper school building was not constructed until 1835. David Tate built the first sawmill and Asa Bradburry, W. S. Jenkins, and Isaac Patridge built a gristmill in 1850. L. C. Guthrie built another one at Cheshire the same year. Churches were an important early element too, and the Free-Will Baptists formed in 1805 while the Methodists built the first church structure in 1820. The middle to the end 19th Century was the high tide for Cheshire Township. The town built an academy building in 1860, which functioned in many facets over the years (Hardesty 1976).

C. L. Guthrie laid out the village of Cheshire in 1837 and the plat was filed in 1841. Business in Cheshire was good in the later 1800s, but lost relevance to the larger markets and eventually was decimated by the Great Depression. Agriculture has always been an important facet of Cheshire Township's economy. The Ohio River and the river shipping business helped the little community through the 1930s and 40s. With the arrival of the Kyger Creek Power Plant, the town was incorporated in 1953. American Electic Power bought out the entire town in 2002 and the plant is certainly the most important element of the township today. The only other remaining community in Cheshire Township is Kyger, which Asa Bradbury laid out in 1842. Carlton was a coal town that disappeared with the mine's coal. In the 1880s, however, the town was an integral and proud portion of the township (Little-Creech 2003).

Research Design

The purpose of a Phase I survey is to locate and identify cultural resources that will be affected by the planned water treatment plant facility. This includes archaeological deposits as well as architectural properties that are older than 50 years. The plans for this project have not been completed, so the location of any future buildings has yet to be determined. Once these resources are identified and sampled, they are evaluated for their eligibility or potential eligibility to the National Register of Historic Places (NRHP). These investigations are directed to answer or address the following questions:

1) Did the literature review reveal anything that suggests the project had been previously surveyed and what is the relationship of previously recorded properties to the project?
2) Are cultural resources likely to be encountered in the project?
3) Will the planned undertaking affect any archaeological or architectural properties?
4) Will any NRHP eligible sites or properties be affected by the undertaking?

Archaeological Field Methods

The survey conducted within the project area used three methods of sampling and testing to identify and evaluate cultural resources. These included shovel test unit excavation, shovel probe excavation, and visual inspection.

Shovel test unit excavation. Shovel test units were placed at 15-m intervals. Shovel test units measure 50 cm on a side and are excavated to 5 cm below the topsoil/subsoil interface. Individual shovel test units were documented regarding their depth, content and color (Munsell). Wherever sites are encountered, Munsell color readings are taken per shovel test unit. All of the undisturbed soil matrices from shovel test units are screened using 0.6 cm hardware mesh. When sites are encountered, additional shovel test units will be excavated at 7.5 m intervals extending on grid and in the four cardinal directions from the positive locations.

Shovel probe excavation. Shovel probes were excavated during these investigations to document the extent of the disturbance generally associated with previous mining disturbance. These probes were excavated similarly to shovel test units. They had the same dimensions of 50 cm on a side, but were not screened. They were excavated at 15-m intervals and to a depth of 15-20 cm or deep enough to establish lack of soil integrity.

Visual inspection. Locations where cultural resources were not expected, such as disturbed/sloped areas, and wet locations were walked over and visually inspected. This method was used to verify the absence or likelihood of any cultural resources being located in these areas. In addition, this method was also utilized to document the general terrain and the surrounding area.

The application of the resulting field survey methods was documented in field notes, field maps, and permit maps.

Prehistoric Artifact Analysis

An artifact inventory was accomplished upon completion of the fieldwork. This involved identifying the functional attributes of individual artifacts, as well as the artifact cluster(s) or site assemblage collectively. The prehistoric artifact types and material were identified during the inventory process. The lithic artifact categories are modeled after Flenniken and Garrison (1975) and include the following:

Primary Thinning Flakes. This flake type represents a transitional mode of chert reduction. The intent of this reduction activity is to reduce a core to a crude biface. Flakes have a steep platform angle (i.e., >65°) and lack cortex. However, occasional small remnants of cortex are prevalent at this point, especially on the striking platform.

Secondary Thinning Flakes. These flake types represent a reduction mode that is a direct result of the previous reduction activities (i.e., primary thinning). Soft, antler billet percussion and pressure flaking are used for this mode of reduction. At this point, the chert artifact being reduced or thinned is a biface rather than a core. The striking platform for this flake

type is commonly represented by the edge of the biface. The platform angle is typically acute but can range from 30° to 65°. Previously removed flake scars are common on the dorsal side.

Identification of the material type of individual artifacts is based on several attributes, including color, inclusions, and luster. Several resources were used to aid in the inventory of the material types, including Converse (1994), DeRegnaucourt and Georgiady (1998), and Stout and Schoenlaub (1945).

Curation

A letter regarding the disposition of the cultural materials identified and collected during survey for this project was sent to the landowners. A return letter outlining the disposition of these materials had not been received at the time of this report. Notes and maps affiliated with this project will be maintained at Weller & Associates, Inc. files.

Literature Review

The literature review study area is defined as a 2.0 km (1.24 mile) radius from the project. In conducting the literature review, the following resources were consulted at OHPO, at the Columbus Metropolitan Library, at the State Library of Ohio, and from various online resources:

1) *An Archaeological Atlas of Ohio* (Mills 1914);
2) OHPO United States Geological Survey (USGS) 7.5' series topographic maps;
3) Ohio Archaeological Inventory (OAI) files;
4) Ohio Historic Inventory (OHI) files;
5) National Register of Historic Places (NRHP) files;
6) OHPO consensus Determinations of Eligibility (DOE) files;
7) OHPO CRM/contract archaeology files; and
8) Gallia County atlases, histories, historic USGS 15'series topographic map(s), and current USGS 7.5' series topographic map(s).

A review of *An Archaeological Atlas of Ohio* (Mills 1914) was conducted. There were no resources indicated within or adjacent to the project.

The OHPO topographic maps and online mapping service indicated that there is one previously recorded archaeological site located within the project area, 33GA253 (isolated flake; Appendix A) and one site that is immediately adjacent to it (33GA259; historic period trash and debris). There is one site located in each of the two areas surveyed. There are 10 other previously recorded sites in the study radius (Table 2).

Table 2. Previously recorded archaeological sites in the study radius.			
Site #	Quadrangle	Cultural affiliation	Temporal affiliation
GA0003	Cheshire (W. Va.)	Prehistoric (Rockshelter)	Unknown Prehistoric
GA0342		Prehistoric	Type unknown
GA0259	Addison	Historic	historic
GA0269	Addison	Prehistoric	Late Woodland
GA0249	Addison	Prehistoric	Unknown Prehistoric
GA0250	Cheshire (W. Va.)	Prehistoric and Historic	Late Archaic/Historic
GA0251	Addison	Historic	Unknown historic
GA0253	Addison	Prehistoric	Unknown Prehistoric
GA0022	Cheshire (W. Va.)	Prehistoric	Unknown Prehistoric
GA0018	Cheshire (W. Va.)	Prehistoric	Unknown Prehistoric
GA0019	Cheshire (W. Va.)	Prehistoric	Unknown Prehistoric
GA0020	Cheshire (W. Va.)	Prehistoric and Historic	Unknown Archaic/historic

*adapted from the OHPO online service

The OHI files were reviewed for the project in order to see if any previously recorded OHIs were located in the project or in the study area (Table 3). Site GAL0054603 at 1872 Turkey Run Road is positioned immediately southwest of the proposed landfill expansion. It includes the residence and a barn, but is not regarded as being significant. The remaining OHI resources are not near or within the project area; they are mostly located in the communities of Kyger and Cheshire.

Table 3. OHI's filed that are within the study radius.									
OHI #	Present Name	Other Name	Address	Place name	Arch. Style	Historic Use	Other use	Activity	Date
GAL0 00720 3		Mauck Farm	Gravel Hill Rd	Cheshire (Township of)	Italianate	Single Dwelling		Original Construction	1855
GAL0 00730 3		Boice Farm	Jessie Creek Rd	Cheshire (Township of)	Gothic Revival	Single Dwelling	Barn	Original Construction	1855
GAL0 00740 3	Farmhouse		Jessie Creek Rd	Cheshire (Township of)	Italianate	Single Dwelling		Original Construction	1875
GAL0 00760 3	Poplar Ridge Freewill Baptist		Poplar Church Rd	Cheshire (Township of)	High Victorian Gothic	Church/Religious Structure		Original Construction	1892
GAL0 00780 3	Farmhouse		SR 554	Cheshire (Township of)	Gothic Revival	Single Dwelling		Original Construction	1865
GAL0 00790 3		J Thomas Farm	Storys Rd	Cheshire (Township of)	Greek Revival	Single Dwelling		Original Construction	1855
GAL0 00800 3	Farmhouse		Van Zant Rd	Cheshire (Township of)	Italianate	Single Dwelling	Barn	Original Construction	1870
GAL0 00940 3	House		Cemetery Rd	Kyger	Vernacular	Single Dwelling		Original Construction	1865
GAL0 00950 3	Kyger Schoolhouse		Cemetery Rd	Kyger	Vernacular	School		Original Construction	1900

GAL0 00960 3	Old House		SR 554	Kyger	Vernacular	Single Dwelling		Original Construction	1845
GAL0 00970 3	House		SR 554	Kyger	Queen Anne			Original Construction	1885
GAL0 00980 3	Bungalow		SR 554	Kyger	Craftsman/Arts and Crafts	Single Dwelling		Original Construction	1920
GAL0 00990 3	Store		SR 554	Kyger	Vernacular	COMMERCI AL		Original Construction	1875
GAL0 01000 3	Kyger Methodist Church		SR 554	Kyger	High Victorian Gothic			Original Construction	1884
GAL0 01010 3	House		SR 554	Kyger	Vernacular			Original Construction	1860
GAL0 05420 3		Peter Swisher House	1555 Gravel Hill Rd	Cheshire (Township of)	Vernacular	Single Dwelling		Original Construction	1820
GAL0 05430 3	Roush Cemetery		SR 554	Cheshire (Township of)		Cemetery		Original Construction	1820
GAL0 05440 3	Marvin Thomas House		1816 SR 554	Cheshire (Township of)	Vernacular	Single Dwelling		Original Construction	1880
GAL0 05450 3	1st Kyger Freewill Baptist		Stingy Run Rd	Cheshire (Township of)	Gothic Revival	Church/Religi ous Structure		Original Construction	1880
GAL0 05460 3	House		1872 Turkey Run Rd	Cheshire (Township of)	Vernacular	Single Dwelling	Barn	Original Construction	1875
GAL0 05490 3	Gravel Hill Cemetery		Turkey Run Rd & Gravel Hill Rd	Cheshire (Township of)		Cemetery		Original Construction	1847
GAL0 05500 3	McCarty Cemetery		Turkey Run Rd	Cheshire (Township of)		Cemetery			
GAL0 06690 3	Rife Cemetery	Rife Cemetery	Approx 1,300 ft N/NE of TR 1089	Cheshire (Township of)		FUNERARY	Cemete ry		1826 - 1920
GAL0 06700 3	J Swisher Farm	J Swisher Farm	SR 554 NE of Rife Cemetery	Cheshire (Township of)	No academic style - Vernacular	RESIDENTIA L/DOMESTIC	Single Dwellin g	Original/Most significant construct	ca. 1870 s
GAL0 06710 3	A Rife Farm	A Rife Farm	SR 554 W of Oxyer Rd	Cheshire (Township of)	No academic style - Vernacular	RESIDENTIA L/DOMESTIC	Single Dwellin g		ca. 1870 s

*adapted from the OHPO online service

A review of the NRHP files and determinations of eligibility (DOE) files indicates that there is one site in the study area. This was identified during the Gavin 138 KV Project survey (Pape et al. 1992) and is 33GA250; a prehistoric and historic period component associated with the Peter Swisher Farmstead. There are no other such resources identified in the study radius. Site 33GA250 is not adjacent to or within the current project area.

A review of the CRM reports and professional surveys file indicated that there have been numerous surveys conducted in the study radius and two that incorporate the project area (Pecora et al. 2002a and 2002b; Murphy 1991 and1996; Reichwein 1993; Pape et al. 1992; Wright 1988; Bush and Cantelas 1986; Dewert 1978; Addington 1976).

The Pape et al. 1992 survey was conducted for electric line corridors that traverse the current project area. They identified site 33GA259 during their survey that is within the project area. A letter report was filed for three small soil borrow areas that impinge upon the eastern part of the Poplar Ridge Road area (Reichwein 1993). This identified a historic period trash and foundation debris site that had been destroyed, 33GA253. This site is immediately east of the project area.

The USGS *1908 Point Pleasant, Ohio-West Virginia 15 Minute Series (Topographic)* map was reviewed (Figure 4). There are several residences located in the Poplar Ridge Road area and one located in the landfill expansion area according to the 15 minute resource. The USGS *1960 (PR PR1989) Addington, Ohio-W. VA 7.5 Minute Series (Topographic)* indicates a single residence in the Poplar Ridge Road area and none in the landfill expansion area (Figure 2). The late nineteenth century atlas was consulted to identify landowners, but this resource does not depict any residential locations (Griffith 1874). The landowners for the landfill expansion area include: David Swisher, Newel King, Peter Knopp, J. & W. Roush, S. Boice, L. Butcher, and Peter Swisher. The landowners for the Poplar Ridge Road area include W. Shoemaker, Jacob Halfhill, H. H. Smith, P. Thomas, and G. A. Fife.

Evaluation of Research Questions 1 and 2

Based on the results of the literature review, the first two research questions can be addressed.

1) Did the literature review reveal anything that suggests the project had been previously surveyed and what is the relationship of previously recorded properties to the project?
2) Are cultural resources likely to be identified in the project?

The literature review indicated that there were two previously recorded sites within the project area that are associated with surveys for borrow areas and an electric line corridor. A review of the atlases and older topographic maps indicate several residences within the area; however, these are mostly positioned where mining activity is prevalent.

Fieldwork Results

The field investigations for this project were conducted in early August of 2010. The weather conditions at the time of these investigations were typical of summers in counties that border the Ohio River. It was hot and humid. The field crew was relieved from some of the heat as the tested locations were shaded in the woods. The fieldwork involved subsurface testing and surface/visual inspection. Much of the project areas were found to be severely disturbed or steeply sloped. Testing was limited to locations that

were outside of these situations. This involved limited landforms and situations in both of the planned landfill areas. These investigations identified two archaeological sites, 33GA351 and 352.

The vast majority of the two areas that were part of these investigations were ill-suited for testing. This refers to situations that are either steeply sloped (>15 percent) or severely disturbed. Steep terrain and disturbances associated with previous mining activity were encountered in each area. Grading and corridor construction activities have severely altered aspects of the areas as well. These situations were observed, but are additionally apparent on topographic maps and aerial images from the 1950s (Figure 5). Figure 2 depicts surface mining activity along the side slopes that dates from both before and after 1989. The following describes the survey methods, conditions, and findings for each location.

Landfill Expansion Area (Figures 2, 6-19)

Locations that would involve archaeological investigation in this area were determined by review of several sources including: topographic maps, atlases, the literature review, aerials, and the soil survey. The soil survey information was probably the most useful as it delineated many locations that were very steeply sloped, which precluded investigation (Figure 3). Much of the terrain had been altered by mining activity, which was evident on the 7.5 minute topographic map (Figures 2 and 6); however, the soils survey further defined the extent of this activity as it relates to the Pinegrove series soils. Pinegrove soils are very sandy and are essentially a byproduct of mining activity. The terrain is dominated by previous mining and other disturbances.

There are merging above-ground electric line corridors in the project area. These corridors have been deforested and are severely eroded (Figure 5). Additionally, these were the subject of Pape et al. 1992 survey (Figure 2). The current investigations recognized these previously surveyed locations and they were typically avoided. The site that was recorded by this previous CRM survey, 33GA253, was not relocated. It is an isolated prehistoric period artifact.

There were previous constructions in the area that are now defunct or abandoned/dismantled. A conveyor corridor extended throughout this area and along the electric line corridor that was previously surveyed. A concrete drainage way still exists in this area and the terrain has been modified to make it suitable for the conveyor system. Access drives cut throughout the area and have altered the terrain as they take advantage of the flattest landforms. The conveyor system had been dismantled prior to these investigations.

The sides of the ridges in this area are steep. Their steepness is relative to either mining activity or naturally occurring. In fact, the soils survey lists one of the soils simply as "steep" rather than list its slope percentage. The location of the mining activity utilized this steepness to access exposures of the resource readily. It was apparent that during the mining activity of the middle twentieth century that the ridge tops were deforested or these ridges were formerly fields that were left fallow after the mining. In either case, visual inspection and archaeological investigations noted the absence of old

growth trees and very shallow to nearly absent topsoil. The forestation was no older than 60 years. A review of the aerial maps from 1951 (Figure 5) indicate that many of the currently forested ridge tops were once open and presumed farmland.

The soils that were investigated in this area include the Upshur-Gilpin Complex (UgC2, eroded) and Wellston silt loam (WeB). The testing identified shallow and eroded soils throughout the testable aspects of this area. The soils were very dry, had many roots, and hard. There were 99 shovel test units and 47 shovel probes excavated in this area (Figure 19).

The survey of this area did not include any buildings or structures as none are contained within the project area. There are buildings and residences positioned along Turkey Run Road that are adjacent to the surveyed area (Figures 28-41). These were photographed as they are included in what is considered to be the area of potential effect (APE). Most of these residences are modern (i.e., less than 50 years old).

Poplar Ridge Road Area (Figures 2, 20-27)

This is an irregularly-shaped area that is bisected by Poplar Ridge Road (Figures 2 and 20). This road and the terrain in general, slope to the north and towards Kyger Creek. An entrenched unnamed tributary of this drainage, which dominates the setting, drains the area. This area is somewhat shaped like a bowl with an outlet to the north due to the naturally entrenched drainage as well as previous mining activity. Mining is prevalent along the side slopes and dates from pre- and post-1960 activity. This activity created highwalls with exposed bedrock and severely altered most of the landscape around it. The forestation in the area is not mature, but is about 50-60 years or younger; it dates from the mining period. Many locations were inaccessible due to the ruggedness of the terrain. These locations were addressed via visual inspection, photographs, and inspection of soil survey maps/aerials (Figures 3 and 5).

Visual inspection was necessary in the majority of this area. Attention was given to any locations where a residence was indicated on topographic maps. There were two residences indicated in the central part of this area and on either side of Poplar Ridge Road. The area on the east side was inaccessible due to excessively steep and broken terrain associated with mining. This residence is depicted in the same location as the mining and is expected to have been destroyed by this activity. The residential location on the east side of the road is contained in steep slope and mining spoil. There were no intact locations identified via inspection and any remnants of this former house are absent.

Based on the disturbance, visual inspection, and steepness of the terrain, there were few locations that were physically testable. Subsurface testing was limited to the eastern part of this area. This is a ridge top situation and associated toe ridges that extend north and/or west of an abandoned road. The soils in this area (UgC2, Upshur-Gilpin Complex) have thin topsoil due to erosion and timbering. The shovel testing typically identified topsoil that ranged from 12-17 cm thick. Intact locations identified brown topsoil (10YR 5/3) with reddish brown (5YR 4/4) subsoil (i.e., Bt1). Despite locating intact topsoil at the tested locations, it was clear that the area had been logged in the past

as evidenced by the younger trees, occasional dozer piles, and irregularity of the terrain. Areas abutting the road were frequently found to be severely disturbed from being cleared or graded by bulldozing. There were 17 shovel test units and 54 shovel probes excavated in this area and there were no cultural resources identified.

The fieldwork conducted during these investigations identified two archaeological sites, 33GA351 and 352. These are both isolated finds and were not located during subsurface testing, but in disturbed situations.

Site Descriptions

33GA351

This site is an isolated prehistoric artifact that was identified during surface inspection (Figure 6). The artifact was identified on the exposed surface of the root ball of a fallen tree. The site is located on a narrow ridge top. Intensified inspection of other surrounding and similar soils, as well as shovel test units, failed to identify any other artifacts. This site is drained by an unnamed tributary of Kyger Creek. By definition, the size of this site is 1 sq m.

The artifact is a secondary thinning flake of Upper Mercer chert. This is functionally indicative of bifacial reduction stage of lithic processing. This artifact is not regarded as being temporally diagnostic.

This site was evaluated for its eligibility for the NRHP. This site lacks integrity (Little et al. 2000:39-43; U.S. Department of the Interior, National Park Service [USDI, NPS] 1997:44-45) and the ability to yield further and important information regarding prehistory. The site has a functionally limited artifact assemblage and lacks temporally diagnostic materials. This site is not considered to be eligible for inclusion into the NRHP, and further work at this site is not deemed necessary.

33GA352

This site is an isolated prehistoric artifact that was identified during surface inspection (Figure 6). The artifact was identified on the exposed surface of a bulldozer pile that is located on the top of a ridge. Intensified inspection of other surrounding and similar disturbed soils, as well as shovel probing, failed to identify any other artifacts. This site is drained by an unnamed tributary of Kyger Creek. By definition, the size of this site is 1 sq m.

The artifact is a primary thinning flake of Upper Mercer chert. This is functionally indicative of core reduction/medial stage of lithic processing. This artifact is not regarded as being temporally diagnostic.

This site was evaluated for its eligibility for the NRHP. This site lacks integrity (Little et al. 2000:39-43; U.S. Department of the Interior, National Park Service [USDI, NPS] 1997:44-45) and the ability to yield further and important information regarding prehistory. The site has a functionally limited artifact assemblage and lacks temporally

diagnostic materials. This site is not considered to be eligible for inclusion into the NRHP, and further work at this site is not deemed necessary.

Evaluation of Research Questions 3 and 4

3) Will the planned undertaking affect any archaeological or architectural properties?
4) Will any NRHP eligible sites or properties be affected by the undertaking?

The development will directly impact archaeological deposits. The cultural resources identified within the project (33GA351 and 352) are not, in the opinion of the Principal Investigator, eligible for the NRHP. Inspection and determination of the APE suggests that no historic properties will be affected by the planned undertaking.

APE Definition and NRHP Determination

The APE is a term that must be applied on an individual project basis. The nature of the project or undertaking is considered in determining the APE. This may include areas that are off the property or outside of the actual project's boundaries to account for possible visual impacts. When construction is limited to underground activity, the APE may be contained within the footprint of the project. The APE includes the footprint of the project and an area surrounding it that was determined in the field and based on the planned constructions. The APE addresses both architecture and archaeology.

The project plans are to utilize each of the areas for landfill purposes. AEP currently owns both locations and the areas that surround them. There are many ancillary constructions and activities associated with the Gavin Plant at Kyger throughout this area. For example, there are conveyor corridors extending through much of the area as well as electric lines and their towers. The plants are visible and dominate fixtures in this setting including cooling towers and stacks. There exists a landfill at this location and the plans are to expand onto this area. These plans conform to the larger aspect of the areas that were investigated by this survey.

The smaller area (i.e., Poplar Ridge Road area) is located in an upland setting and is slightly more removed from the plant activities and constructions. However, this area has been substantially altered by mining activity and is mostly in steep slope. It is bisected by Poplar Ridge Road and there are no buildings present within it. The surrounding area is consistent with that of the project area; rugged steep slopes and mined locations. The ridge tops are wooded with deciduous, tall trees. A review of the residences in this area identified many that are either modern and/or in very poor condition.

Other factors that were considered were effects to the surrounding area by things such as noise, increased traffic, smell, and dust. The noise, dust, and smell aspects are moot as these are either limited to the APE or not a factor. The material does not have an aberrant smell, the dust is limited and controlled, and the noise of the activity is consistent with construction machinery—just like what exists in the surrounding area.

The traffic aspect is not a factor as it will be primarily limited to the APE and possibly State Route 554.

The APE that was determined for this project considered the surroundings, terrain, and conditions. Residences in this area are mostly modern or from the twentieth century. Many of these are house trailers or double-wide types. The resources identified within the APE for this project area are not considered to be significant.

Recommendations

In August of 2010, Weller & Associates, Inc. conducted Phase I Cultural Resources Management Survey for the approximately 121 ha (300 ac) New Landfill Project at the Gavin Plant in Cheshire Township, Gallia County, Ohio. The archaeological field investigations identified terrain that has been either severely disturbed from mining activity or steeply sloped. These situations precluded testing in these areas. Testing was directed at locations/situations that were amiably sloped and not altered. The field investigations resulted in the identification of two previously unrecorded archaeological sites, 33GA351 and 33GA352.

The project plans involve the expansion of existing landfill activities. The surrounding terrain is rugged. There are no buildings located in the project areas and those identified in the abutting terrain are mostly modern. There are few residences/buildings located in what was considered as the APE that are older than 50 years and only a couple that might be older than 1900. The planned expansion is not considered to affect any historic properties.

In May of 2013, the boundary of the planned expansion was slightly revised. Communication with AEP, field reconnaissance, and inspection of aerial images verified the disturbed conditions of these added areas. There were no cultural materials identified within these areas.

The two archaeological sites that were identified during these investigations (33GA351 and 352) are isolated prehistoric finds. Additionally, they were identified in disturbed conditions. These sites are not considered to be significant. Inspection of the surrounding setting regarded as the APE did not identify any architectural resources that would be regarded as significant. The sites identified during these investigations do not possess the qualities and aspects of integrity and significance that are necessary to meet the minimum requirements to be considered eligible for the National Register of Historic Places (33 CFR 60.4). These sites are not historic properties as defined by 36 CFR 800.16(l). The proposed undertaking will not affect any historic properties, no further work is recommended.

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