FINAL REPORT

ACQUISITION OF SH-WAVE SEISMIC REFLECTION AND REFRACTION DATA IN THE AREA OF THE NORTHEASTWARD TRENDING CONTAMINANT PLUME AT THE PGDP

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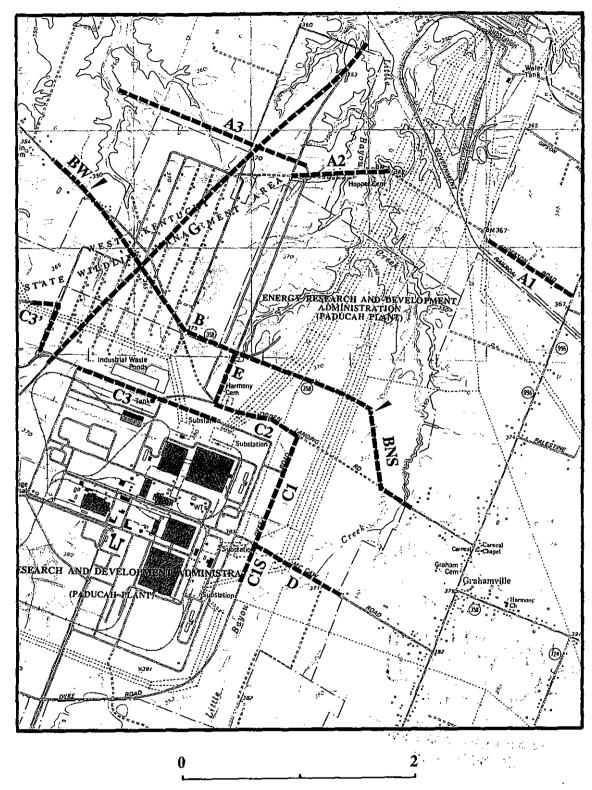
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DIVISION OF WABITE MANAGEMENT SOLID WASTE BRANCH

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The Paducah Gaseous Diffusion Plant (PGDP), a Department of Energy (DOE) facility, is located in the Jackson Purchase area of western Kentucky (Fig. 1). Constructed in 1952, the plant produces uranium enriched in the uranium isotope ²³⁵U for nuclear reactors. Procedures involved in everyday plant operations generate wastes and contaminants. Among these are TCE (tricholoroethylene) and Tc-99 (technetium-99 isotope). TCE is used at the PGDP as a cleaning agent, while Tc-99 is a byproduct of the reprocessing of nuclear power reactor tails (Clausen et al., 1992).

1.1 BACKGROUND

In 1988, TCE and Tc-99 were discovered in several private wells about 1 mile north of PGDP (Clausen et al., 1992). The source of these contaminants has been linked to the PGDP. These findings led to the initiation of numerous projects designed to characterize the site geology, hydrogeology, and groundwater flow characteristics near the PGDP. Tests showed that two contaminant plumes were emanating from within PGDP. The plumes were found to be traveling through the shallowest aquifer near the PGDP, the regional gravel aquifer (RGA), located at depths ranging from 9 to 25 m. Groundwater flow directions within the RGA are to the north, toward the Ohio River (Clausen et al., 1992). However, the plumes were found to be migrating to the northeast, suggesting that other factors may be involved in the plumes' direction of propagation. J. Drahovzal (pers.

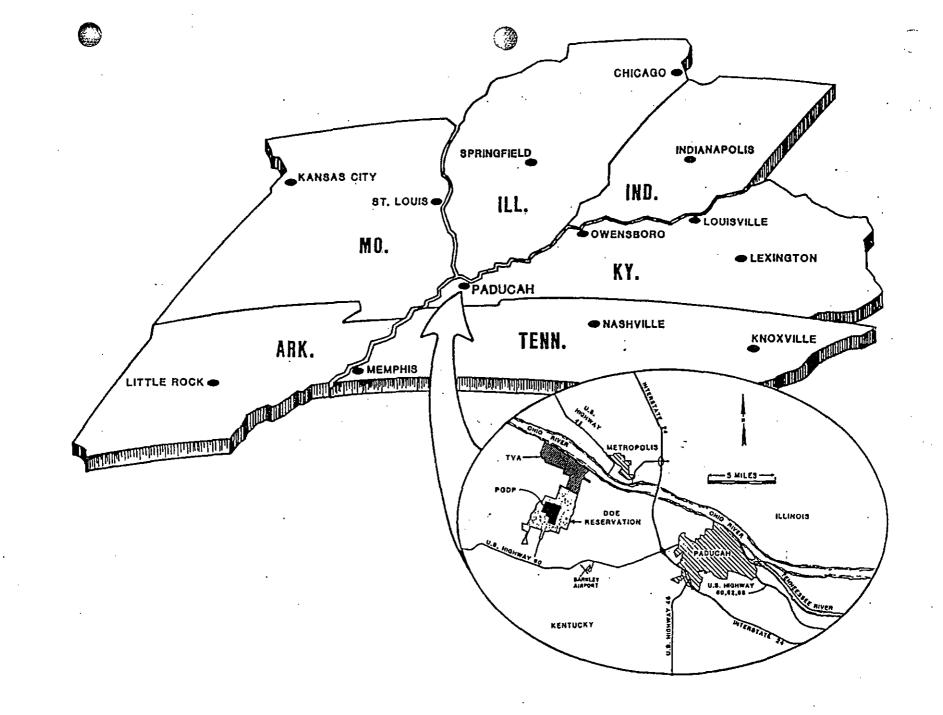


Figure 1. Regional map showing location of PGDP (from Clausen et al., 1992).

comm., 1997) proposed that the migration of the contaminant plumes might be controlled by local geologic structure. A pilot investigation was undertaken to determine data acquisition parameters to be used. Preliminary results indicated the presence of two fault zones near the northwest corner of the plant.

1.2 OBJECTIVES

There were two main objectives of the study. The first was to seismically image the RGA, the top of the Clayton and McNairy Formations, and the top of the limestone bedrock in the area of the contaminant plumes. The second objective was to find evidence of faulting or other aspects of the subsurface that could be controlling migration of the contaminant plumes. The presence of contaminants and their continuing migration indicates a strong need for specific knowledge of the shallow subsurface structure in the vicinity of the PGDP.

Based on Harris' (1992) study in the area surrounding PGDP, the need to use a nondestructive energy source in the wildlife area surrounding the PGDP, and field tests involving a weight drop for P-waves and a seismic hammer for SH-waves, it was decided that the best results could be achieved by acquiring high-resolution, SH-wave seismic CDP data using a seismic hammer. Results from the field tests were also used to determine the optimum acquisition geometry.

2.1 STRATIGRAPHY

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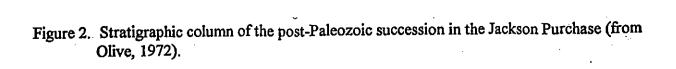
The Jackson Purchase Region of Kentucky is located in the northernmost part of the Mississippi Embayment of the Gulf Coastal Plain Province and encompasses a 2,356square-mile, eight-county area (Schwalb, 1969). The history of the embayment began in Cambrian time subsequent to the formation of the Reelfoot Rift to the south and the Rough Creek Graben to the east. Paleozoic rocks ranging from Cambrian to Mississippian in age are buried beneath Mesozoic and younger sediments, except on the eastern margin of the embayment, where Mississippian and Devonian strata crop out (Schwalb, 1969).

Cretaceous and younger rocks lie unconformably on this Paleozoic bedrock. A generalized stratigraphic column of the post-Paleozoic stratigraphy of the Jackson Purchase is shown in Figure 2. The oldest post-Paleozoic formation in the Jackson Purchase is the Upper Cretaceous Tuscaloosa Formation. A distinctive unit, this formation is composed of chert and well-rounded or broken chert gravel (Hansen, 1966). The Tuscaloosa is present over a relatively large area. In Kentucky, the formation is age-equivalent to rocks that overlie the Tuscaloosa of Alabama, indicating that the Tuscaloosa is a time-transgressive unit (Olive, 1980). This formation is very similar to another unit present locally, termed the "Little Bear Rubble". Both appear to be derived from similar material; angularity of clasts seems to be the only characteristic that can be

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sysтем	SERIES	GROUP AND FORMATION		LITH- OLOGY	THICK- NESS (feet)	CHARACTER*
QUATER- NARY	Pleil- Holocene to- And cene Pleisto- cene	Alluvium and lacustrine deposits Loess			0-185	Brown to gray silt, sand, and gravel; rarely calcareous. Thickest be- neath flood plains of Mississippi, Ohio, and Tennessee Rivers. Brown to gray silt, intermixed with minor amounts of clay and fine sand; nonstratified blanket-like deposit; locally calcareous and
<u> </u>	<u>a * v</u>		osits		0-100	fossiliferous. Thickest near Mississippi River; thins eastward,
TERTIARY(2) AND QUATERNARY	Pliocene(?) and Pleistocene					Brown to reddish-brown gravel; pebbles dominantly chert and sub- ordinately quartz; scattered lenses of clay and sand; contains fairly continuous middle member composed of sand and clay in south-central part of region. Thins northward and westward.
					400≠	Brown to gray silt and clay with thin beds and lenses of light-colored quartz sand; crossbedded in part; very sparse clay-ball sand; locally abundant carbonized plant remains; probably intergrades with Claiborne. May include beds of Oligocene age in upper 100 feet of sequence. Thickens toward axis of Mississippi embayment.
TERTIARY	Eocene				500±	Light-colored quartz sand with thin lenses of dominantly gray silt and clay; commonly crossbedded; numerous clay-ball sand beds; ear- bonized plant remains common in clay; locally contains thin lignite beds. Overlies Wilcox Formation unconformably in most of area; overlaps Wilcox in east-central part of area and ties un- conformably on Porters Creek Clay.
		Wilcox F	ormation		0-350+	Light-colored clayey quartz sand and sandy clay commonly referred to as "sawdust sand" which is characterized by white kaolinite clay grains and minute strilate rods; thin beds and lenses of clay and crossbedded sand, clay-ball sand lense; basal coarse sand com- mon. Unconformably overlies Porters Creek Clay.
	Paleocene	Midway Group	Porters Creek Clay		65- 230	Light- to dark-gray montmorillonitic clay, locally glauconitic; beds of gray to brown micaceous and generally glauconitic sand common in lower and upper parts; intersected at many places by vertical to near-vertical clastic dikes. Overlies Clayton and McNairy For- mations, conformably in most places.
sus Y	eous					Gray to brown interlensing sand and clay, characterized by thin lami- nae, blebs, and minute lenses of white, clean, very fine micaceous quartz sand; local lignite bed. Lower part dominantly light-gray to brown crossbedded quartz sand; carbonized plant remains and
CRETACEOUS AND TERTIARY	Upper Cretaceous aus Poleocene McNairy and Clayton		airy and Clayto Formations		125- 275	iron sulfide nodules common; sparse scattered lenses of chert- pebble and quartz-sand-matrix gravel in lower 50 feet. Uncon- formably overlies Tuscaloosa Formation and Paleozoic rocks.
CRETA- CR CEOUS T	<u> </u>	WCN			0-165	Pale-gray to pale-orange chert-pebble gravel in a chert-sand, silt, and clay matrix; contains irregularly spaced thin lenses of chert sand, silt, and clay. Formation occurs as scattered lenses in area bor- dering Kentucky Lake. Unconformably overlies Paleozoic lime- stone, chert, and shale.
	I	Tuscalo	osa Fm.	يسبب	1	storie, cherry and share,



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used to distinguish the two units (Clausen et al., 1992). The Tuscaloosa Formation was encountered by drillhole at only one site in the vicinity of the PGDP, near the Shawnee Steam plant (Sykora and Davis, 1993).

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The sediments of the McNairy Formation overlie the Tuscaloosa Formation. First called the McNairy Sand after its type locality, the equivalent strata in the northern Purchase area is referred to as the McNairy Formation because in this location it is principally clay (Olive, 1980). Olive (1972) observed that both formations are lithologically similar and referred to the two formations collectively as the Clayton-McNairy Formation. Sykora and Davis (1993) determined that the elastic properties of the McNairy Formation are likewise similar to those of the Tertiary Clayton Formation in the northern part of the Jackson Purchase. This report will use the nomenclature established by Olive.

The Porters Creek Clay, perhaps the most distinguishable unit in the Tertiary strata, overlies the Clayton-McNairy Formation. Its composition, that of dark-gray montmorillonitic clay that is occasionally glauconitic, is consistent throughout the embayment. Its thickness fluctuates because of erosion preceding deposition of Eocene sediments (Hansen, 1966).

Eocene sediments overlie the Paleocene Porters Creek Clay south of PGDP. Three formations of Eocene age have been identified in the Jackson Purchase: the Wilcox, Claiborne, and Jackson Formations. The sediments of these units are usually distinguished

by means of palynological data (Olive, 1980). The sediments of each unit consist of interbedded and interlensing sand, silt, and clay (Olive, 1966).

During late Tertiary to Quaternary time, a gravel unit was deposited throughout the Jackson Purchase. Common names for this unit include the Lafayette Formation, Lafavette gravel, and Mounds gravel. For the purposes of this study, the unit will be referred to as continental deposits, following the nomenclature of Olive (1980). As indicated by some of the names for this unit, it is composed chiefly of gravel, but it also contains clay lenses, sand, and silty clay (Olive, 1980). The origin and age of these deposits are still controversial; some contend that the deposits are Pleistocene in age and derived from glacial outwash, while others maintain that the gravel is Pliocene-Pleistocene in age and that only the younger gravels of the unit were influenced by glaciation (Olive, 1980). In any case, a southeastern sediment source is likely, as is evidence by a southeastern increase in the altitude of the bedrock surface beneath the deposits, a southeastern increase in the minimum size of the coarsest grains, and a southeastern increase in the size of the modal class (Olive, 1980). The base of the continental deposits is an unconformity and exhibits steps or terraces (Clausen et al., 1992). The continental deposits are overlain by Quaternary loess, lacustrine deposits, and alluvium. Loess deposits are presumably derived from alluvium deposited by glacial meltwaters in the Mississippi and Ohio River valleys (Olive, 1980). Lacustrine sediments are from an ancient lake that once occupied eastern parts of the Purchase; these deposits occur at altitudes lower than 357 feet in areas bordering the Ohio and Tennessee Rivers, as is

suggested by the presence of gravel bars at this altitude (Olive, 1980). Most of the lacustrine sediments were derived from the area surrounding the lake. Pleistocene and Holocene alluvium are derived from the Jackson Purchase Region, although the alluvium of the major rivers bordering the Purchase was likely carried from more distant sources.

2.2 DEPOSITIONAL HISTORY

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During the Cretaceous, the Purchase was an upland because of the presumed emergence of the Pascola Arch to the south. Scientists theorize that thermal events in the crust related to reactivation of the faults bounding the Reelfoot Rift contributed to this rise. Streams that flowed across the area emptied into a south-draining trunk stream (Olive, 1980). Eventually, the gradient of this stream was lowered sufficiently so that alluviation of its valley began; this alluviation is represented by the Tuscaloosa Formation (Olive, 1980).

Throughout this time, the Pascola Arch was being eroded and continued to subside. Ultimately, a sea was able to transgress into the northern part of the embayment. The transgression did not extend into the Jackson Purchase; absence of strata that are age-equivalent to those being deposited farther south during this time supports this interpretation (Stearns, 1957). This sea regressed during the Late Cretaceous. Olive (1980) noted that the sea was bordered by bays, lagoons, and saltwater marshes that mixed northward with freshwater swamps of distributaries from the northeast. Sediments

of the McNairy were deposited in this sea. McNairy sediments are thought to have come from an eastern source, as indicated by mineral assemblages (Pryor, 1960). The appearance of clay in the McNairy near PGDP, however, suggests that this area could have been located between two deltas: one to the southeast and one to the north (Olive, 1980).

The Clayton Formation of the Midway Group represents the first Tertiary deposition in the Jackson Purchase. Lithologically very similar to the McNairy Formation, the Clayton probably was deposited in much the same environment as was the McNairy. Interbedded sand and clay indicate that the marine sea, which was present to the south during deposition of the McNairy, may have influenced deposition of the Clayton Formation as well. Following deposition of the Clayton Formation, the Porters Creek Clay was laid down as the marine sea to the south transgressed to its fullest extent in the embayment (Stearns, 1957). Toward the end of the Paleocene, the sea began to regress; Porters Creek Clay continued to be deposited along the embayment axis.

During the Eocene, a sea advanced once more to occupy a large area of the embayment (Stearns, 1957). At this time, the strata of the Wilcox and possibly of the Claiborne Formations were deposited. Presumably, Eocene sediments continued to be deposited even as the sea began to regress. Evidence of this regression is shown by the presence of lignites in the Claiborne Formation (Olive, 1972). The last transgression in the embayment took place during the late Eocene; this advancement went as far north as southwestern

Tennessee (Stearns, 1957). Continued deposition of the Claiborne as well as of the Jackson Formation occurred during this time. The thickness of the combined Eocene section is substantial; some researchers theorize that this thickness is caused by structural movement that resulted in further subsidence of the embayment axis during Eocene time (Olive, 1980).

After deposition of the Jackson Formation, uplift and erosion is inferred to have occurred, based on geomorphic evidence (Clausen et al., 1992). A trunk stream existed on the margins of the Jackson Purchase, occupying roughly the same position of the present-day Tennessee, Ohio, and Mississippi Rivers (Olive, 1980). Along the eastern margin of the Purchase, the stream was confined to a valley bordered by Paleozoic rocks; farther to the west and northwest, the stream's gradient lessened as it passed over much less resistant Cretaceous and Eocene sediments. Olive (1980) theorizes that at this point the river was likely a braided or meandering stream. During the Pliocene, the trunk stream began to dump alluvium and coarser sediments (continental deposits) into the wide valley created. The load of the stream eventually increased so much that the stream could no longer transport sediments; consequently, it began to fill its course, and the alluvial fan that formed at the low-gradient portion of the stream increased in size. Eventually, the fan blanketed most of the Jackson Purchase (Olive, 1980).

In Pleistocene time, glaciation occurred. This caused many rivers throughout the Midcontinent to entrench in response to a lowering of sea level. The trunk stream and its

tributaries began to erode valleys into the alluvial fan deposits. Due to fluctuations in sea level, the streams flowing through the Jackson Purchase in turn alluviated and eroded their channels, so that the continental deposits were heavily reworked and redistributed during this period (Olive, 1980). During and between periods of glaciation, loess was deposited.

As the last stage of glaciation ended, tributaries draining from glaciated areas supplied large amounts of sediment into the ancestral Ohio and Mississippi Rivers. Streams throughout the Purchase area alluviated their valleys as the flood plains of the Ohio and Mississippi rose; however, the gradient of the ancestral Tennessee River was not great enough to keep the river from becoming blocked (Olive, 1980). Subsequently, a lake was formed that existed until the end of the Pleistocene. When it ruptured a northerly divide, the lake drained and caused the Ohio River to take on its present course (Olive, 1980). The sediments derived from this lake and from streams draining out of glaciated areas comprise latest Pleistocene and Holocene sediments.

2.3 STRUCTURAL FRAMEWORK

The main structural influence on the Jackson Purchase Region has been the ancient Reelfoot Rift-Rough Creek Graben rift structure. Despite the large amounts of knowledge gained about these two major intercontinental rift systems during the past 30 years, little is known about the role of the Jackson Purchase in relation to the rift

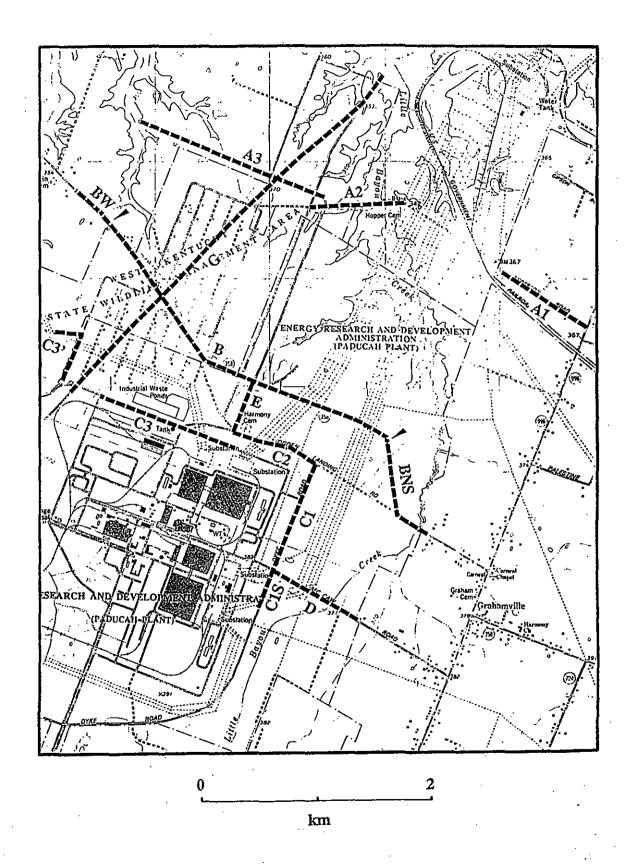
structures. It is apparent, however, that regional seismicity has affected the area in the past.

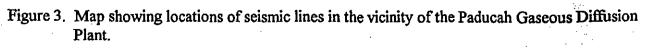
Evidence of seismic activity is found throughout the area. For example, the Porters Creek Clay is intersected by vertical to near-vertical clastic dikes in many places (Olive, 1972). Geologic mapping of the Purchase area and southern Illinois has revealed the existence of numerous faults that displace Paleozoic through Quaternary strata (Olive, 1972; Nelson et al., 1997). Other geophysical data, such as proprietary seismic reflection data and gravity and magnetic surveys, indicate that the area is structurally complex (Hildenbrand and Hendricks, 1995; Heigold and Kolata, 1993).

3.0 SEISMIC DATA ACQUISITION AND PROCESSING

Seventeen km of shallow, high-resolution SH-wave reflection and refraction data were acquired in the area of PGDP for this study. Figure 3 shows the locations of the seismic lines discussed in this report; Figures 4 through 8 illustrate the resulting seismic sections.

As previously stated, field tests using a seismic hammer to generate P-- and SH-waves, and a vacuum-assisted weight drop to generate P--waves indicated that SH--waves generated by a seismic hammer resulted in the optimum signal-to-noise ratio for imaging the bedrock and unconsolidated sediments in the study area. The energy source used for generating the SH--waves consisted of a 5.4-kg sledgehammer striking a 12-kg section of





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I-beam perpendicular to the geophone spread. The hold-down weight of the I-beam consisted of the weight of the I-beam plus the hammer swinger for a total hold-down weight of approximately 85 kg. Coupling of the energy source to the ground was enhanced by embedding the I-beam against the edge of a blacktop road whenever possible; otherwise, the edge of the I-beam was embedded in a small slit trench. The degree of coupling attained on unpaved surfaces in the PGDP area probably affected the quality of data along certain lines, as is indicated in the discussions of lines A, C3, and G.

An in-line spread of 48, 30-Hz, horizontally polarized geophones spaced at 4 m intervals was used. A zero offset was used with the energy source, and records were generally stacked six times at each shotpoint. To ensure proper identification of SH-wave arrivals, data from each side of the I-beam energy source were recorded. Based on the acquisition parameters, twelve-fold common-depth point (CDP) data were obtainable.

The seismic data used in this study were collected with a 48-channel, 24- bit, IFP Geometrics Strataview RX engineering seismograph. Data were recorded at a sampling rate of 0.5 ms. Acquisition parameters included low-cut and high-cut bandpass filters of 10 and 250 Hz, respectively, and a notch filter of 60 Hz.

Table 1 is a chronological list of the steps followed in processing data. Specific processing procedures for each line can be found in Appendix B. The seismic data were processed using the commercial software package VISTA 7.0 (Seismic Image Software,

1. Preprocessing

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a. band-pass filtering (typically 25-60 Hz)

b. AGC scaling (typically 250 ms)

c. saving .dat files in SEG-Y format

2. Configuration of field geometry into headers

- elevation static corrections (where needed)

3. Application of headers to SEG-Y files

4. Velocity Analysis

- derived stacking velocities from semblance plots

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack (6-fold)

8. Selective Post-Processing

a. AGC scaling

b. F-K filtering

c. weighted 3-trace mixing

1995). Preprocessing involved first changing the file format from dat (Geometrics file format) to SEG-Y, a standard file format. Next, a band-pass filter was applied to data in order to reduce the amount of noise encountered during field operations. AGC scaling was also applied. This preprocessing step aided in viewing of data by normalizing data within a specified time window (usually 250 ms) according to the highest wave amplitude within that window. These files were then combined for processing purposes. Geophone spacing, shotpoint spacing, and any elevation corrections were next configured and applied to the combined file. A velocity analysis was subsequently performed on the combined file. Here, a group of traces was selected and a hyperbolic curve fitted to reflections visible in the group. A normal moveout (NMO) correction was applied to correct for differences in reflection travel-times due to source-receiver distance variations. Finally, the combined file was sorted and stacked to produce a profile like those in Appendix A. After preliminary processing with 12-fold data, it was determined that lateral discontinuities and frequency distortions due to wide-angle reflections were affecting the quality of the stacked traces, subsequently, 6-fold data were used for this study. Postprocessing steps included additional AGC scaling as well as F-K filtering. This filtering procedure, like band-pass filtering, was used to remove noise. A 3-trace weighted mix was also used on many CDP sections; this procedure introduced an artificial increase in the horizontal coherence, thus making continuity of reflections more apparent (Dobrin and Savit, 1988). A glossary of geophysical terms relating to data processing procedures can be found in Appendix F. Definitions were taken from Sheriff (1973) and Sheriff and Geldart (1982).

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As stated in the introduction, the limestone bedrock, the top of the Clayton and McNairy Formations, and the RGA were to be imaged. On all sections, the bedrock was visible at about 500 ms. Imaging the top of the Clayton and McNairy Formations, however, proved to be more difficult; this is due to the negligible velocity contrast between the Clayton-McNairy and the RGA. The top of the RGA was imaged by the refraction interface at roughly 100 ms. Using the method employed by Williams et al. (1995), the traces representing the RGA refraction were stacked and then corrected for linear moveout using the velocity of the refracted wave. The interpretation of the top of the RGA and bedrock was aided by lithologic logs from previous studies in the area (Northeast Plume Preliminary Characterization Summary Report, D.O.E., 1995; Results of the Site Investigation, Phase II at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, D.O.E., 1992).

A limiting factor in the quality of some of the seismic data acquired was the degree of coupling of the energy source to the ground. Data collected in fields or along gravel or dirt roads, were, in general, of poorer quality that collected along blacktop roads. The most noticeable effect in these instances was a decrease in impulsive amplitude of the seismic reflections. An attempt was made to compensate for this by digging the flanges of the steel beam into the ground, with limited success. Along blacktop roads, one edge of the I-beam was embedded into the shoulder of the road so that it butted up next to the edge of the blacktop. This method provided better coupling of the energy source to the ground.

The nature of deposition of the RGA is a limiting element in the interpretation of the location of the RGA refractor. As discussed before, near PGDP, the continental deposits of the RGA were subject to erosion and reworking by the ancestral Tennessee River during the Pleistocene. This led to the development of an erosional surface at approximately 85 m; this surface varies, however, between 75 m and 95 m. The depositional history of the RGA undoubtedly indicates that the thickness as well as the elevations of the top and bottom of the RGA will be irregular. This variance can be seen on virtually all of the seismic sections presented in this study.

Background noise was also a factor that could affect the quality of data gathered at PGDP. This included noise associated with plant operations, power lines, and automobiles. Pre- and post-processing frequency and F-K filtering was used to remove unwanted noise from the data where possible.

4.0 RESULTS

4.1 IDENTIFICATION OF REFLECTORS

Reflections and refractions were correlated with lithologic units by comparing velocity picks from offset panels to lithologic logs of available monitoring wells at PGDP. Velocity picks were obtained in VISTA 7.0 (Seismic Image Software, 1995) by entering a set of sorted and stacked traces corresponding to a common depth point (CDP). Next, a

semblance analysis was performed and the velocities and offset times were picked from the semblance output. From these parameters, depths to various horizons could be obtained using the formula

$d = (V \times T)/2$

where d is depth (m), V is velocity (m/s), and T is time (s). These depth values for individual reflectors and refractors were then compared with data from the lithologic logs closest to the line upon which the velocity analysis was performed. Appendix C gives a complete list of the velocity picks used for each line presented in Figure 3. Lithologic data referenced in this study are included in Appendix E.

In general, the limestone bedrock reflector was the most identifiable reflector on a velocity pick. The large velocity contrast between the Mississippian limestone and the overlying sediments was likely the reason for this easily observable reflection. Harder to interpret was the refraction for the top of the RGA. Often, this refraction was masked by the direct wave. Muting the top of the CDP section often resulted in erasing the RGA refractor. Depths obtained for the RGA refraction and bedrock reflection were compared to drill hole data (Northeast Plume Preliminary Characterization Summary Report, D.O.E., 1995; Results of the Site Investigation, Phase II at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, D.O.E., 1992). Other reflectors were picked in much the same way when possible.

The top of the Clayton-McNairy was able to be determined with confidence using the above procedure only along line C2. However, the reflector corresponding to the top of the Clayton-McNairy was generally not visible. This was likely because shear-wave velocity contrasts between the Continental Deposits and the Clayton-McNairy are negligible (Sykora and Davis, 1993).

4.2 GENERAL FEATURES

Several examples of stratigraphic units that have been affected by faulting are indicated on the seismic lines in Appendix A. Fault-related and erosional features are evident on most of the lines in the study area to varying degrees. Specific features will be discussed in greater detail for specific lines in the next section.

The most significant findings of the study are that faulting is observable in areas where edges of the contaminant plumes are located and that the strike of the faults correspond to the direction of migration of the contaminant plumes. This suggests structural control on plum migration. In many instances, the faults can be traced from the limestone bedrock to the top of the RGA, thereby suggesting Quaternary activity in an area where no Quaternary faulting had previously been observed. This finding is not unexpected in light of Nelson et al.'s (1997) study just across the Ohio River in southern Illinois.

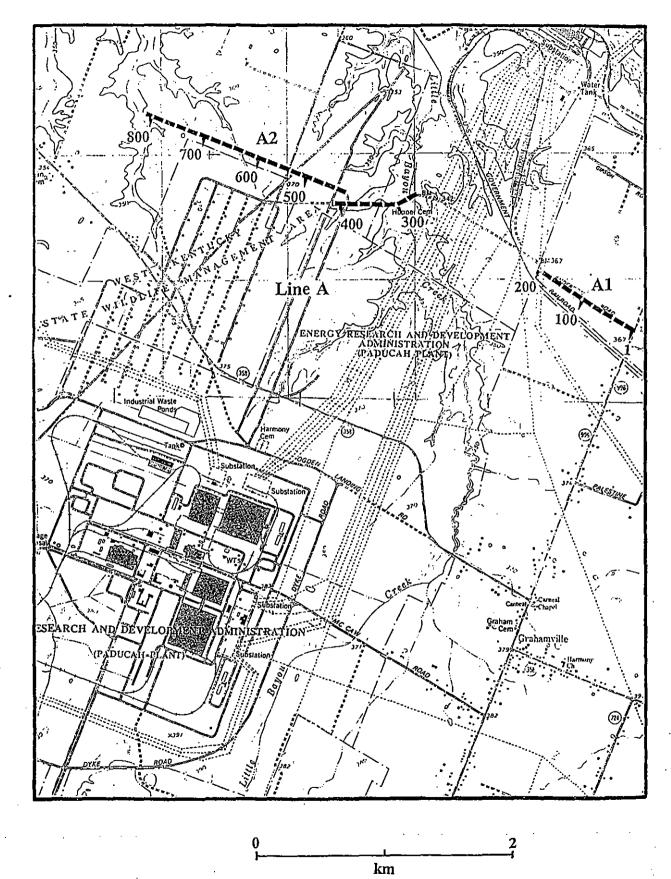
4.3 SPECIFIC FEATURES

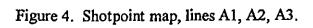
4.3.1 Line A1

Line A1 runs from the intersection of Anderson Road and Highway 996 to the U.S. government railroad lines (Fig. 4). Throughout much of the section, a prominent reflector, the limestone bedrock, is noticeable at 500 ms. A distinct break in this reflector occurs near shotpoint 36. Further breaks are seen near shotpoints 108 and 145. All of these features have been interpreted as faulting in the bedrock. The refractor imaged at roughly 100 ms is interpreted as the RGA. Here, faulting can be distinguished as well; in many cases, the faults within the RGA appear to be continuations of faults emanating from the bedrock.

The surfaces of both the RGA and the bedrock are noticeably undulatory along much of line A1, presumably because of weathering, which affected each unit subsequent to deposition. However, the depression between shotpoints 108 and 145, evident in both the bedrock and the RGA, is here interpreted as a downdropped area bounded by faulting.

Between shotpoints 1 and 36, the bedrock reflector drops to the east. The RGA refractor does not present a corresponding drop. This is thought to be primarily an erosional feature in the bedrock, or possibly basement faulting. There is no indication that these faults continue into the RGA.





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4.3.2 Line A2

Line A2 is an east-west section, located to the north of PGDP (Fig. 4). The reflector identified as the top of the bedrock is located at about 500 ms on the time section. However, in some places the bundles of energy are not as strong as in others, making interpretation difficult. The RGA refractor is present at roughly 100 ms on the section; it is noticeably undulatory. Data quality along A2 is average, likely due to differences in the degree of coupling. However, examples of faulting that are visible from the top of the bedrock through the top of the RGA are located near shotpoint 335, 350, and 370.

4.3.3 Line A3

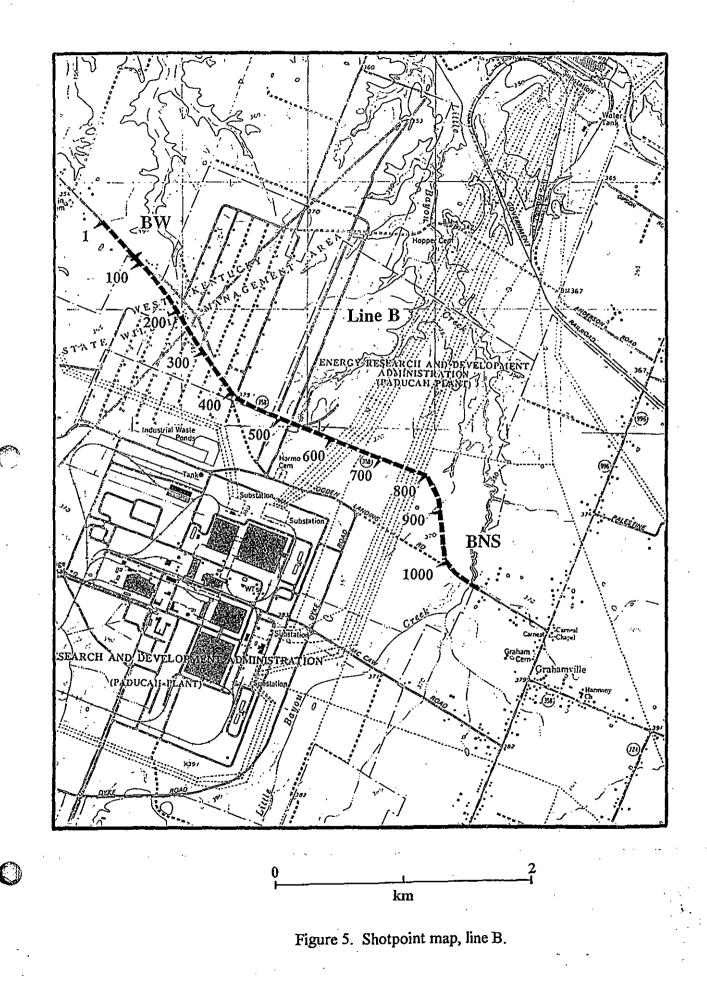
Line A3 is an east-west profile between the Ohio River and the PGDP, paralleling the northern perimeter of PGDP (Fig. 4). The bedrock reflector is present at about 500 ms at the ends of this section. However, in the middle of the section, the bedrock reflections become weaker and occur deeper in the time section. Overlying reflectors within the Clayton-McNairy as well as the refractor identified as the top of RGA also exhibit this downdrop. This feature, located between shotpoints 434 and 745, is interpreted as a graben. Within the graben, the RGA refractor exhibits some topographic relief, attributable to weathering or to tectonism associated with graben formation, or to subsequent movement along faults within or bounding the graben. In any case, the feature is significant, since it affects the RGA, and could therefore exert some control over migration of contaminants in the area. This feature is discussed in more detail in section 4.5. Faulting is evident in both the bedrock and the RGA reflectors on the bounding margins of the graben. Faults identified near shotpoints 525, 560, and 830 provide good examples of faulting that extends into the RGA refractor.

4.3.4 Line B

Line B runs east-west along Ogden Landing Road (Fig. 5). It is divided into three sections: BW, B, and BNS. Line B is key to the study, for the data gathered along this line serves as a correlator with data from other lines running parallel and perpendicular to it, thus enabling trends of features present in the subsurface to be established.

Line B begins in the western part of the study area. Here, the bedrock reflector, usually seen at 500 ms, is weak and appears to occur deeper in the time section. Near shotpoint 84, the bedrock reflector returns to 500 ms. This drop in the bedrock reflector west of shotpoint 84 is interpreted to be the eastern margin of the graben previously identified on line A3. Other reflectors and the RGA refractor above the graben tend to be disturbed in this location as well. Toward the western end of line B (indicated as BW on Fig. 4), the RGA refractor, located near 150 ms, is noticeably disturbed.

East of shotpoint 84, strong reflections from the bedrock are exhibited. The refraction from the top of the RGA is also seen clearly here at around 100 ms. Between shotpoints



97 and 265, small but distinct breaks are seen in both units, providing further examples of faulting that has penetrated the top of the RGA. Some of these faults are part of a fault zone detected in a pilot study of the PGDP area (Street, personal comm., 1997). Between shotpoints 265 and 337, another zone of faulting is interpreted to intersect the top of the RGA; this group of faults is interpreted to be part of a second zone of faulting also detected in the pilot study.

Between shotpoints 241 and 301, a large dome-like feature is present below the limestone bedrock reflector. This feature appears again farther to the east on line B and on several other lines in the study. The dome-like feature could represent parts of the bedrock that were less resistant to weathering. Correlations to this feature can be found in Hunter et al. (1984).

Past shotpoint 301 and continuing until near shotpoint 505, small breaks occur in the refractor representing the top of the RGA as well as in the bedrock reflector. Notable displacements are located near shotpoints 330 and 460. Near shotpoint 505, both reflectors drop down to the east, returning to their usual locations in the section near shotpoint 575. Just before shotpoint 553, line B intersects line E. In an attempt to correlate features across these two lines, an optimum offset technique was used in the lab with data from lines B, E, and C3. The results obtained through the use of this method will be presented in section 4.4.

Dome-like features are evident in the bedrock again between shotpoints 600 and 649, indicating that these parts of the bedrock were likely less resistant to erosion. A small down-to-the-east displacement is also present in the RGA and bedrock reflectors at this location. After shotpoint 700, the RGA refractor dips down to the east, while the bedrock reflector exhibits and opposing trend. Past this point, no other significant features are observable on line B (shotpoints 1 through 864).

4.3.5 Line BNS

Line BNS is discussed separately because it trends in a different direction than the main part of line B. Reflector and refractor locations are as noted in the earlier discussion of Line B. Line BNS begins at shotpoint 865 of line B.

The most obvious displacement occurring in both reflectors is located near shotpoint 877, where both the RGA and the bedrock reflectors are downdropped to the east. The east-bounding fault that accompanies this feature is located near shotpoint 913, indicating that this could be interpreted as a small graben. Another down-to-the-east drop in both reflectors occurs near the intersection of Line BNS with Old Ogden Landing Road. Here, near shotpoint 1000, the RGA refractor and bedrock reflector show evidence of displacement. Line BNS becomes an east-west profile as it intersects Old Ogden Landing Road near shotpoint 1022. The bedrock reflection becomes very weak at this point, and the RGA reflection becomes hard to follow with certainty: This could indicate the

presence of structure; likewise, the change in data quality might be related to other factors such as background noise. Line BNS ends at the bridge that crosses Little Bayou Creek.

4.3.6 Line C1

Line C1 runs from the intersection of Old Ogden Landing Road and Dyke Road to the intersection of Dyke Road and McCaw Road (Fig. 6). Line C1 is punctuated by at least seven monitoring wells along its length; therefore, good depth control of the RGA and the Clayton-McNairy Formation was maintained along this line.

Quality of data along Line C1 is variable. Extensive processing was necessary in order to image the top of the RGA. A solid image of the top of the limestone bedrock was likewise attained only through the use of considerable filtering. Background noise from PGDP probably affected data quality along line C1.

Examples of interpreted faulting are shown in the interpreted C1 section in Appendix A. Throughout the section, the surfaces of both the RGA and the bedrock undulate significantly; due to data quality constraints, it is not possible to say with certainty where faulting has played a role in the disruption of these units. Near shotpoint 12, the bedrock reflector bends noticeably; however, this is not seen in the top of the RGA at this location. This indicates that the downdip in the bedrock could be representative of weathering. Alternatively, faulting could occur here that simply does not penetrate the RGA. A

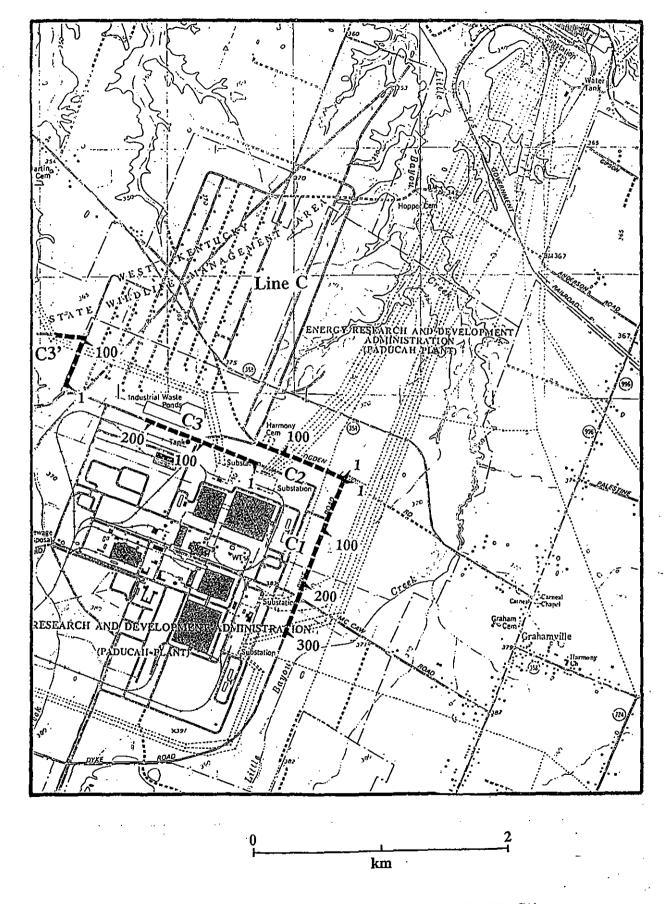


Figure 6. Shotpoint map, lines C1, C2, C3, C3'.

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distinct break occurs in an unidentified reflector below the interpreted top of the RGA just past shotpoint 36. This is accompanied by a drop in the bedrock reflector as well, indicating that this displacement is fault-related. Another break occurs in the identified top of the RGA at shotpoint 120, although this displacement is not clearly seen in the reflectors beneath. A likely candidate for faulting is located between shotpoints 136 and 144. Here, the RGA reflector is displaced, as is the somewhat weaker bedrock reflection at about 550 ms.

4.3.7 Line C1S

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Although not indicated as such on the shotpoint map, Line C1S is the section of Line C1 that runs south along Dyke Road from the intersection of Dyke Road and McCaw Road. A monitoring well at this intersection provides only approximate control on the extent of the RGA. The depth to the RGA determined from velocity picks closely correlates with the lithologic data in this area.

As is seen in both the uninterpreted and interpreted sections in Appendix A, the surfaces of the RGA and the limestone bedrock are highly variable. Between shotpoints 264 and 276, the RGA surface slopes down to the south and is broken. At this location, the top of the bedrock appears to be displaced, as do other unidentified reflectors in the 200 to 400 ms range. At shotpoint 300, both the RGA refractor and the bedrock reflector are noticeably downdropped, outlining a small graben. The other bounding fault to this

structure occurs near shotpoint 324. This feature, as well as the one between shotpoints 264 and 288, is located in the general vicinity of the lower boundary of the northeast-trending contaminant plume.

Line C1S does not cross the terrace feature present to the south of PGDP. Well data to the west and southwest of C1S show that the terrace is located to the south of the terminus of C1S.

4.3.8 Line C2

Line C2 runs from the intersection of Old Ogden Landing Road and Dyke Road west along Old Ogden Landing Road. It ends at the southern terminus of line E (Fig. 6). At its western end, C2 nears the upper boundary of the northeast- trending contaminant plume, making it potentially important for determination of fault-related control.

Line C2 is one of the few lines in the study area along which the Clayton-McNairy has been identified. Appendix C lists the velocity picks made for this line. The prominent refractor at 100 ms is identified as the top of the RGA; the somewhat fainter reflector at roughly 200 to 235 ms is distinguished as the top of the Clayton-McNairy; and the reflector at 500 ms is labeled as top of bedrock. As noted in descriptions of other sections, the surfaces of the RGA and the bedrock are undulatory and broken in many places. Specific displacements in the RGA can be seen near shotpoints 25, 30, and 55.

Accompanying breaks in the Clayton-McNairy are not as apparent; however, these displacements can be traced down into the bedrock reflector. Dome-like structures are also apparent within the bedrock along this line. A significant feature along line C2 occurs between shotpoints 145 and 150. Here, all three units are displaced in what is interpreted as a zone of faulting.

4.3.9 Line C3

Line C3 runs from a point just east of the guard gate on the northern periphery of the plant west for 812 meters. The RGA and bedrock reflectors have been identified at 120 ms and 550 ms, respectively. Only one monitoring well, P4-F08, provided control on velocity picks made during processing.

In general, the data quality of line C3 can be considered to be of lower quality. This is attributable to several factors, especially background plant noise. In general, plant noise registers at a variety of frequencies and in order to filter it out completely, desirable reflections would have to be deleted. Another factor involves the quality of coupling attained along line C3. Line C3 was shot entirely along an unpaved surface, so data quality was not as good along line C3 as along lines B or D.

Faint reflections are discernible along line C3. The RGA refractor and limestone bedrock reflector again appear at around 100 ms and 500 ms, respectively. The most noticeable

displacements within the reflector representing the top of the RGA occur near shotpoints 30 and 50. Here, the bedrock is downdropped. However, because of the weak bedrock reflector, these distinct displacements cannot be traced with certainty into the 500 ms reflector. The optimum offset method was used with data from line C3; this technique delivered clearer data than CDP data for line C3 and helped in correlating features among lines.

4.3.10 Line C3'

Line C3' runs south-to-north along a road northwest of the plant. An extension of the line runs east-to-west along a road roughly perpendicular to line C3' (Fig. 6). On this line, the top of the RGA and the limestone bedrock can be distinguished with varying degrees of certainty. The quality of data here could also be affected by plant noise, since PGDP facilities are nearby.

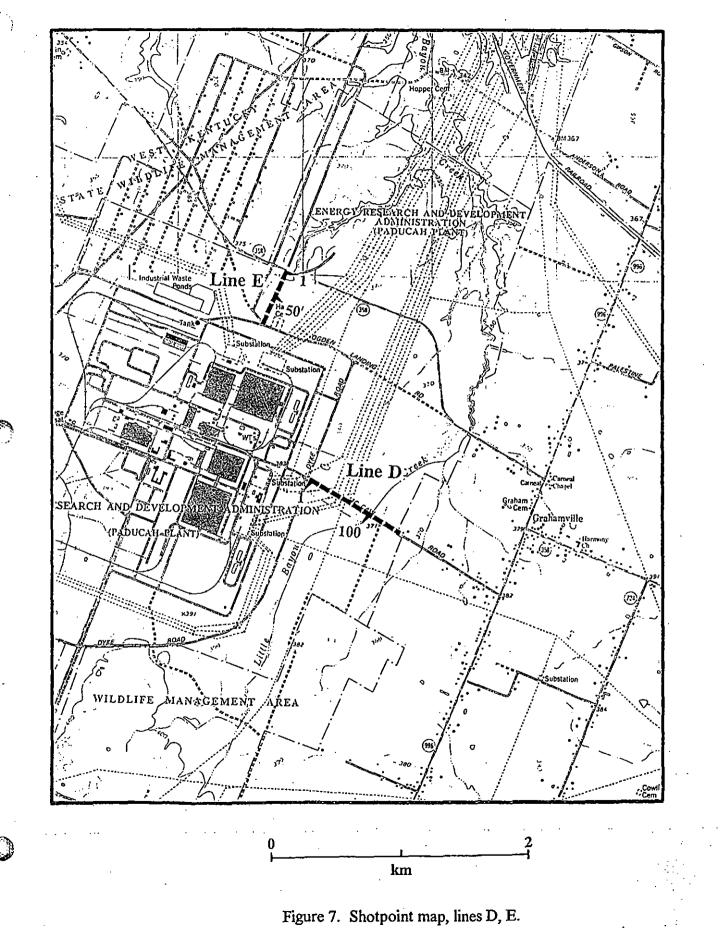
The top of the RGA and the bedrock are identified at 100 and 500 ms, respectively. Although the bedrock reflector is not as strong as it is on other lines, the quality of data obtained along line C3' is still somewhat better than that acquired along line C3. An irregular bedrock surface is apparent; breaks in the bedrock reflector and RGA refractor occur near shotpoint 100. Other parts of this section display irregularity of both surfaces; it is not possible to say with certainty that these irregularities are fault-related. Data quality for the east-west extension of line C3' is fair. The bedrock reflector is somewhat distinguishable at around 500 ms, and the top of the RGA is discernible at about 100 ms. Two distinct breaks can be observed in the RGA reflector near shotpoints 25 and 30. These displacements can tentatively be traced down into the bedrock, as indicated on the interpreted version of the extension of line C3'.

4.3.11 Line D

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Line D runs west-to-east along McCaw Road, beginning at the intersection of McCaw Road and Dyke Road and extending for a length of 480 meters (Fig. 7). The tops of the RGA and the bedrock are identified at roughly 100 and 500 ms, respectively. The top of the Clayton-McNairy cannot be detected on the line D section.

Data quality along line D is very good, with a virtually continuous refraction from the top of the RGA. Although not as well defined, the surface of the bedrock still yields sufficient information from which to make interpretations. Breaks in the RGA refractor are apparent near shotpoints 12, 36, 60, and 84. The two breaks near 12 and 60 define a downdropped area visible within the RGA as well as the bedrock, indicating that fault-related movement has occurred. This downdropped area occurs near the bottom edge of the northeast-trending contaminant plume, suggesting that this zone of displacement may also be affecting the migration of the plume.



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Line E is located along New Harmony Road, running north-to-south from the intersection of Ogden Landing Road to the intersection of New Harmony Road with Old Ogden Landing Road (Fig. 7). Along this line, the bedrock has been identified at about 500 ms. However, the top of the RGA cannot be located with certainty. The only monitoring well near line E, well P4-F08, indicates the top of the RGA is at 44 feet and the bottom is at 92 feet; the velocity pick used along line E indicated a depth of approximately 71 feet at a time of 180 ms on the time section. No other significant reflections were visible at times between 0 and 180 ms or in the interval shortly after 180 ms. This reflector may be the top of the Clayton-McNairy, and the reflector representing the top of the RGA may simply have not been visible during processing. In any case, all prominent shallow reflectors in the CDP sections in Appendix A show displacement in areas that would allow features to be correlated through the reflectors (see interpreted section, line E).

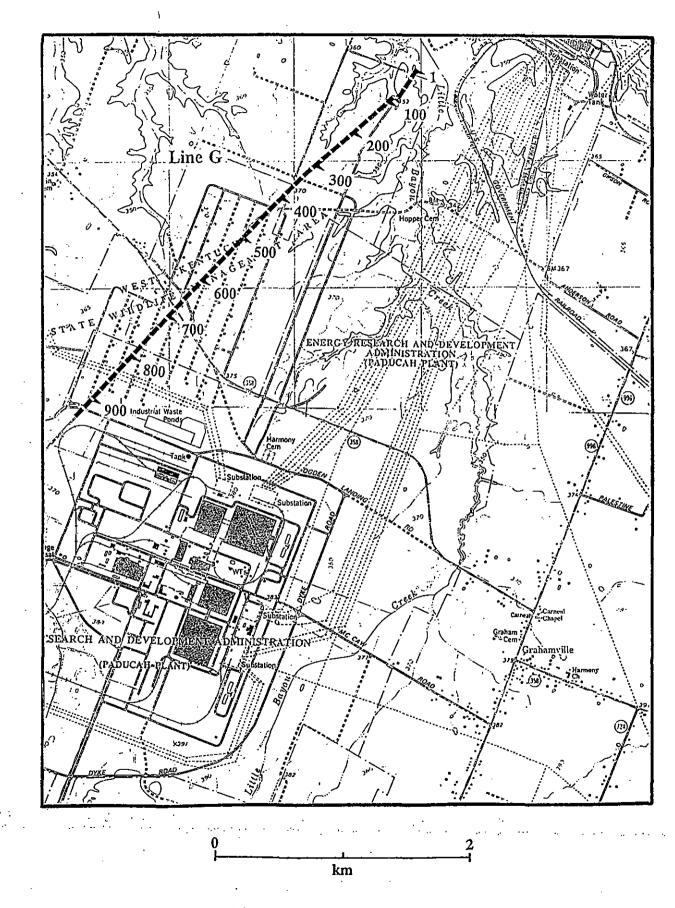
Sharp displacements are evident in the 100, 180, and 500 ms reflectors on line E. These occur near shotpoints 24, 48, 60, and 72. The break near shotpoint 60 displaces the reflectors present at 100 and 180 ms in a down-to-the-north sense, suggesting that this break represents a fault. A similar drop is present in the bedrock, although it is not as pronounced. The displacement present near shotpoint 48 is also indicative of faulting. This zone of faulting could also be important in determining whether structure present in

the subsurface has any control on contaminant migration. The optimum offset method was used on line E, with favorable results.

4.3.13 Line G

Line G is a northeast-southwest profile along an access road that begins south of the Shawnee Steam Plant (Fig. 8). It is over 3800 meters long and ends near the northwest corner of PGDP. On this line, only the refractor representing the top of the RGA and the limestone bedrock reflector can be distinguished with certainty. They occur at about 100 and 500 ms, respectively, which is typical of other lines shot for this study.

From the beginning of line G in the northeast until roughly shotpoint 250, the graben that has been identified on lines A3 and B is observable within the bedrock reflector. Near shotpoint 125, the RGA refractor begins to show obvious displacement and ultimately dips down to the north to about 200 ms on the time section. Throughout the record until shotpoint 250, the bedrock surface within the graben is uneven and discontinuous. Near shotpoint 125, the RGA refractor is clearly broken, indicating that faulting likely related to graben formation or reactivation has penetrated the RGA. Just past the intersection of lines G and B, from shotpoints 673 to 697, the bedrock surface is lower than it was before the road crossing. There are slight undulations in the RGA reflector, but no obvious indicator of faulting. This lowered reflector could simply represent a weathered part of the bedrock surface. From this point on, the bedrock reflector is significantly weaker; the



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Figure 8. Shotpoint map, line G.

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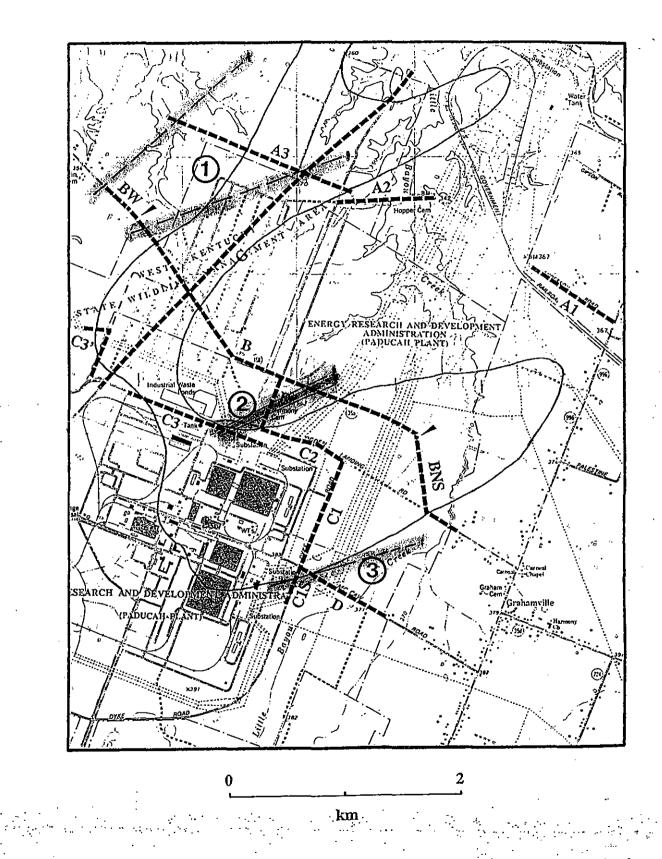
reason for this is unclear. No apparent breaks in either reflector occur until about shotpoint 877, when both reflectors drop down to the southwest.

4.4 CORRELATION OF OBSERVED FEATURES

Figure 9 is an area map of PGDP that presents the locations of the seismic profiles in the study as well as numbered faults that could be significant to the direction of contaminant plume migration. The map also shows the location of the two contaminant plumes in relation to these faults.

Based on the similarity of features from line to line, as well as the approximate locations of the two contaminant plumes, it is reasonable to conclude that the contaminant plumes are being structurally controlled to some extent. Perhaps the strongest evidence for this comes from faults observed across lines C1 and D. This fault zone is labeled '1' on both Figure 9 and on the interpreted seismic sections of both lines in Appendix A. As indicated in Figure 9, the fault zone is coincident with the lower boundary of the northeast plume and has the same strike as the edge of the plume. Additionally, the southern end of BNS could be part of this trend; however, data quality prohibits a definitive correlation of features at this point.

Other evidence for structural control of the northeast plume comes from data obtained using the optimum offset method. This technique was applied to lines C3, E, and a section



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Figure 9. Map showing locations of fault zones in relation to locations of seismic lines and contaminant plumes.

of line B (corresponding to an area between shotpoints 505 and 672). The results are shown in Appendix D. Here, continuous subsurface coverage is obtained by taking data from single but successive traces within a desired area (Burger, 1992). When data from each line is oriented according to the actual positions of each line, a northeast-trending zone of displacement is apparent; the intersection of E and B is marked by a low point in the reflector at 200 ms; line C3 also exhibits a low point in the reflector past shotpoint 52. This zone of faulting coincides with the upper boundary of the northeast-trending contaminant plume. This area is indicated in Figure 9 as zone '2'; it is also indicated on the interpreted seismic sections in Appendix A.

4.5 OTHER FEATURES

As mentioned in the discussion of lines A3, G, and B, a large graben was found in the northwest corner of the study area. The graben is illustrated in Figure 9 as fault zone '3'. The strike of the graben is roughly N50°E to N60°E, which agrees with the general strikes of faults belonging to the Fluorspar Area Fault Complex that have been recently mapped in southern Illinois by Nelson et al. (1997). Nelson et al (1997) present evidence of movement along the Lusk Creek Fault Zone, Hobbs Creek Fault Zone, and Barnes Creek Fault Zone, indicating that faults have displaced Ouaternary strata.

The existence of this graben is an indication that significant faulting and zones of faulting might also be present in the western Kentucky area, but have not been identified because

of the thick sedimentary cover of Cretaceous and younger sediments. Further work needs to be done in order to ascertain the extent of faulting of all ages in the area.

5.0 SUMMARY

Seventeen km of SH-wave seismic reflection and refraction data were collected in the vicinity of the Paducah Gaseous Diffusion Plant to test the hypothesis that faulting in Paleozoic bedrock and post-Paleozoic sediments could be controlling the migration of the contaminant plumes emanating from the PGDP facility.

Faulting in the bedrock and overlying sediments was found on all of the seismic lines shot for this study. Two major zones of faulting have been identified in the northeastern part of the DOE reservation and are coincidental with the direction of migration and edges of the northeast contaminant plume. In the northwestern quadrant of the study area, a large northeast-trending graben was imaged. The graben and faulting imaged by seismic data in this study are probably related to similar features being investigated by Nelson et al. (1997) in southernmost Illinois. The trend of the faults, and the fact that many of these faults appear to propagate from the bedrock into the RGA, strongly suggests that faulting is controlling the migration of the contaminant plumes associated with the PGDP.

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Appendix A

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UNINTERPRETED AND INTERPRETED SEISMIC SECTIONS

Appendix B

PROCESSING PROCEDURES, LINES A1-G

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files 1-120:

1. Preprocessing

-band-pass filtering (25 35 50 55)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3-trace mixing (25 50 25 weights)

files 97-240:

1. Preprocessing

-band-pass filtering (25 35 50 55)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack

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1. Preprocessing

-band-pass filtering (25 35 50 55)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers -elevation static corrections

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

8. post-stack F-K filtering

9. 250 AGC post-stack scaling

10. post-stack 3 trace mixing (25 50 25 weights)

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1. Preprocessing

-band-pass filtering (15 25 50 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers -elevation static corrections

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

Line B

BW:

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- 1. Preprocessing
 - -band-pass filtering (25 35 50 60)Hz
 - -200 AGC scaling
 - -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. post-stack F-K filtering
- 9. 250 AGC post-stack scaling
- 10. post-stack 3-trace mixing (25 50 25 weights)
- files 1-216:
- 1. Preprocessing
 - -band-pass filtering (25 35 50 60)Hz
 - -200 AGC scaling
 - -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 193–384:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz

- -200 AGC scaling
- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)



files 361–720:

- 1. Preprocessing
 - -band-pass filtering (25 35 50 60)Hz
 - -200 AGC scaling
 - -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 697-816:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. post-stack F-K filtering
- 9. 250 AGC post-stack scaling
- 10. post-stack 3 trace mixing (25 50 25 weights)

files 793-1008:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz

- -200 AGC scaling
- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. post-stack F-K filtering
- 9. 250 AGC post-stack scaling
- 10. post-stack 3 trace mixing (25 50 25 weights)

files 985-1090:

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1. Preprocessing

-band-pass filtering (25 35 50 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. post-stack F-K filtering
 9. 250 AGC post-stack scaling
- 10. post-stack 3 trace mixing (25 50 25 weights)

Line C1

1. Preprocessing

-band-pass filtering (25 35 55 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

- 4. Velocity Analysis
- 5. Normal-Moveout Correction

6. CDP Sort

- 7. CDP Stack
- 8. 500 AGC post-stack scaling
- 9. post-stack F-K filtering
- 10. post-stack 3 trace mixing (25 50 25 weights)

Line C1S

1. Preprocessing

-band-pass filtering (25 35 55 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort

7. CDP Stack

8. post-stack F-K filtering

9. 500 AGC post-stack scaling

10. post-stack 3 trace mixing (25 50 25 weights)

Line C2

1. Preprocessing

-band-pass filtering (25 35 55 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. post-stack 3 trace mix (25 50 25 weights)

Line C3

1. Preprocessing

-band-pass filtering (25 35 55 60)Hz -300 AGC scaling

- C

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

8. 250 AGC post-stack scaling

9. post-stack 3 trace mixing (25 50 25 weights)

Line C3'

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1. Preprocessing

-band-pass filtering (25 35 55 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

Line C3' extended

1. Preprocessing

-band-pass filtering (25 35 55 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

8. 250 AGC post-stack scaling

9. post-stack 3 trace mixing (25 50 25 weights)

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Line D

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1. Preprocessing

-band-pass filtering (5 10 45 50)Hz -500 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

8. post-stack F-K filtering

9. 500 AGC post-stack scaling

10. post-stack 3 trace mixing (25 50 25 weights)

<u>Line E</u>

1. Preprocessing

-band-pass filtering (15 25 50 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

3. Application of headers to SEG-Y files

4. Velocity Analysis

5. Normal-Moveout Correction

6. CDP Sort

7. CDP Stack

8. 200 AGC post-stack scaling

9. post-stack 3 trace mixing (25 50 25 weights)

Line G

files 1-216:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers -elevation static corrections
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)
- files 193-408:
- 1. Preprocessing

-band-pass filtering (25 35 50 60) Hz

-200 AGC scaling

- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling

9. post-stack 3 trace mixing (25 50 25 weights)

files 385-552:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz

-200 AGC scaling

-reformatting of data to SEG-Y format

2. Configuration of field geometry into headers

- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 529-696:

(

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz -200 AGC scaling

- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 673-768:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz -200 AGC scaling

-reformatting of data to SEG-Y format

- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 745-864:

1. Preprocessing

-band-pass filtering (25 35 50 60)

- -200 AGC scaling
- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

files 841-960:

1. Preprocessing

-band-pass filtering (25 35 50 60)Hz

-200 AGC scaling

- -reformatting of data to SEG-Y format
- 2. Configuration of field geometry into headers
- 3. Application of headers to SEG-Y files
- 4. Velocity Analysis
- 5. Normal-Moveout Correction
- 6. CDP Sort
- 7. CDP Stack
- 8. 250 AGC post-stack scaling
- 9. post-stack 3 trace mixing (25 50 25 weights)

Appendix C

VELOCITY PICKS, LINES A1-G

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1.

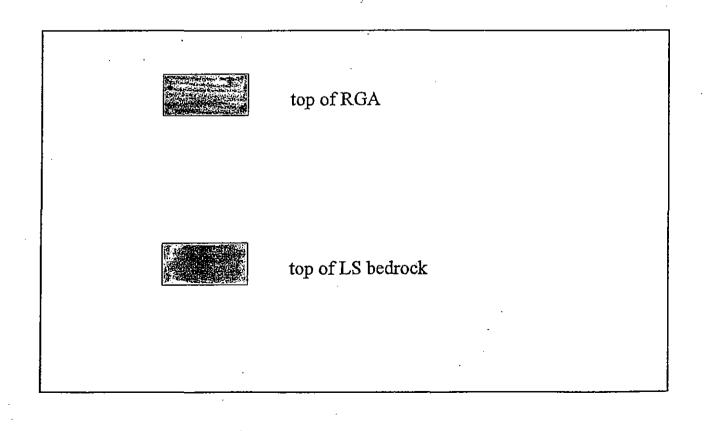
Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
175	210	18.4
325	225	36.6
555	370	102.7
675	490	165.4
820	570	233.7

Existing well data for Line A1:

<u>MW-133</u>	<u>P4-A2</u>	<u>P4-A3</u>
RGA top: 20.2 m	RGA top: 14 m	RGA top: 14 m
	TKcm top: 29.6 m	TKcm top: 31.8 m

* TKcm denotes Clayton-McNairy interval



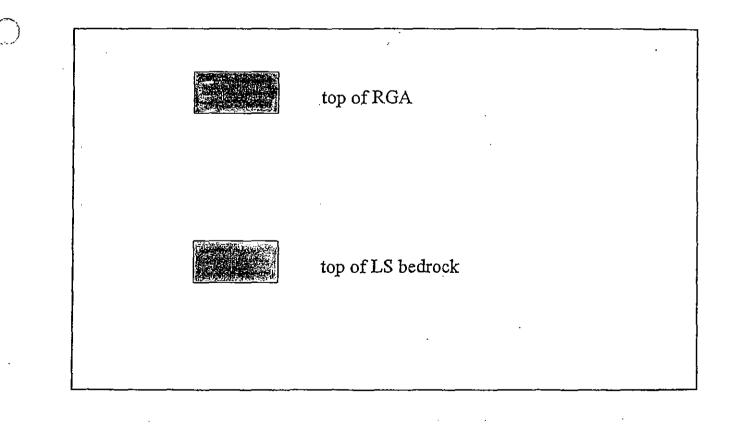
Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
145 250 500 700 800	205 245 420 500 575	14.9 30.6 105 175 230
•••		

Existing well data for Line A2:

<u>MW-133</u>

RGA top: 20.2 m (approx.)



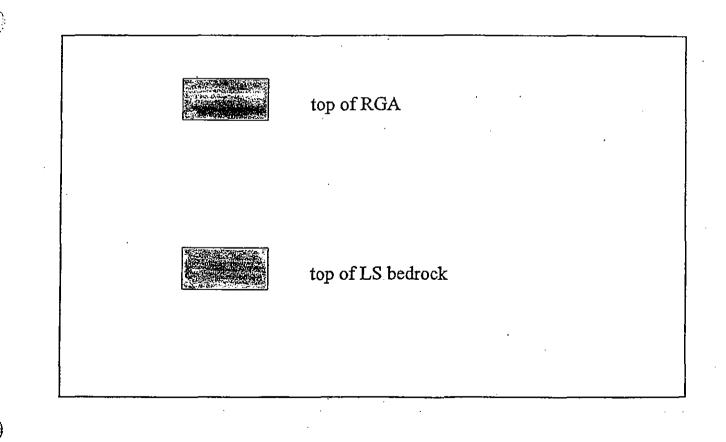
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Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
100 160 275 565 835 960	285 290 305 350 455 570	14.3 23.2 41.9 98.9 189 273.6

Existing well data for Line A3:

<u>MW-202</u> RGA top: 21.9 m (approx.)



Line B (BW, B, BNS)

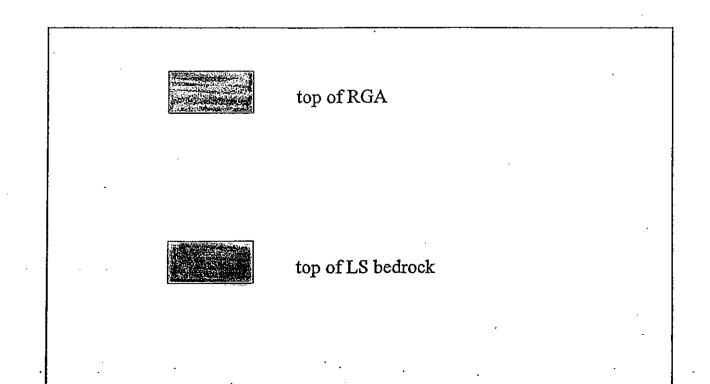
Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
80	295	11.8
230	345	39.7
380	385	73.2
505	· 440	111.1
560	460	128.8
610	490	149.4

Existing well data for line B:

<u>P4-C2</u> RGA top: 16.8 m TKcm top: 27.1 m	<u>P4-C4</u> RGA top: 17.1 m TKcm top: 30.8 m	<u>P4-C5</u> RGA top: 16.2 m TKcm top: 32.9 m	<u>P4-C7</u> RGA top: 18.3 m TKcm top: 32.6 m
<u>P4-C9</u> RGA top: 17.2 m TKcm top: 34.4 m	<u>P4-C10</u> RGA top: 18.6 m TKcm top: 36 m	<u>MW-181</u> RGA top: 17.4 m	<u>MW-193</u> RGA top: 20.7 m
<u>MW-122</u> RGA top: 18.9 m	<u>MW-140</u> RGA top: 17.7 m		

* TKcm denotes Clayton-McNairy interval



Line C1, C1S

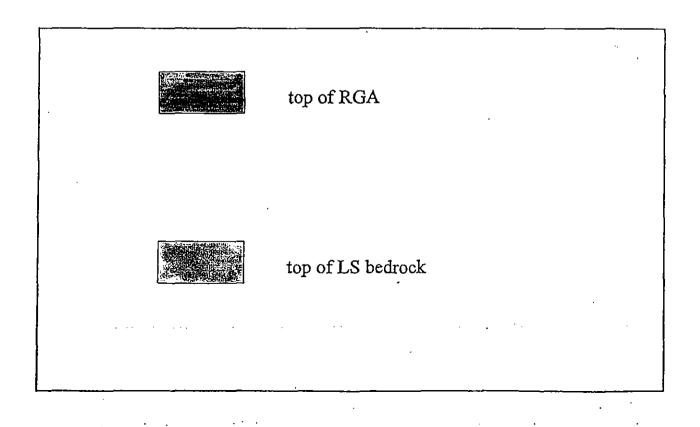
Velocity Analysis

<u>time (ms)</u>	<u>velocity (m/s)</u>	<u>depth (m)</u>
110	345	19
540	370	99.9

Existing well data for Line C1, C1S:

<u>MW-144</u> RGA top: 21.6 m	<u>P4-D6</u> RGA top: 15.9 m TKcm top: 104.6 m	<u>P4-D7</u> RGA top: 18.3 m TKcm top: 50.6 m	<u>P4-D8</u> RGA top: 17.3 m TKcm top: 31.4 m
<u>P4-D9</u> RGA top: 19.5 m TKcm top: 32 m	<u>P4-D10</u> RGA top: 18.6 m TKcm top: 32.4 m	<u>P4-D12</u> RGA top: 18.8 m TKcm top: 33.2 m	<u>P4-D12A</u> RGA top: 19.1 m TKcm top: 32.2 m
<u>P4-D11</u> RGA top: 18.3 m TKcm top: 34.3 m			

* TKcm denotes Clayton-McNairy interval



Line C2

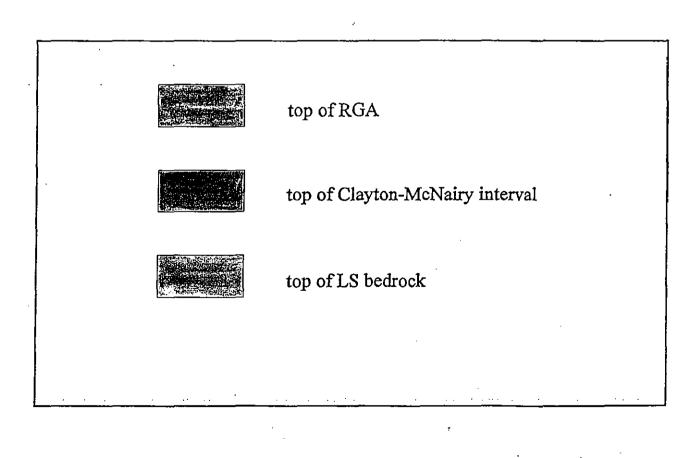
Velocity Analysis

11023512.923524028.2	<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
340 265 45.1 530 385 102	235	240	28.2
	340	265	45.1

Existing well data for Line C2:

<u>P4-D4</u>	<u>P4-D5</u>
RGA top: 16.4 m	RGA top: 16.3 m
TKcm top: 31.1 m	TKcm top: 31.2 m

* TKcm denotes Clayton-McNairy interval



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Line C3

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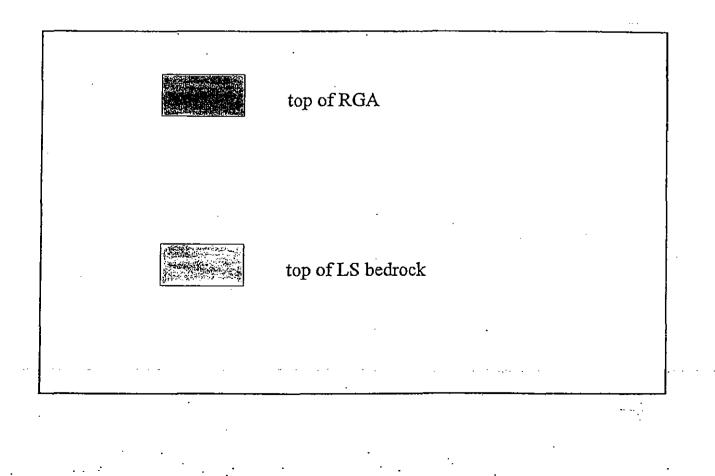
Velocity Analysis

time (ms)	velocity (m/s)	<u>depth (m)</u>
120 335 550 625 860	210 225 380 415 545	12.6 37.7 104.5 129.7 234.4
960	575	276

Existing well data for Line C3:

<u>P4-F8</u>	<u>MW-66</u>
RGA top: 13.4 m	RGA top: 17.1 m
TKcm top: 27.5 m	-
LS top: 105.2 m	

*TKcm denotes Clayton-McNairy interval LS denotes Mississippian bedrock



Line C3', C3' extended

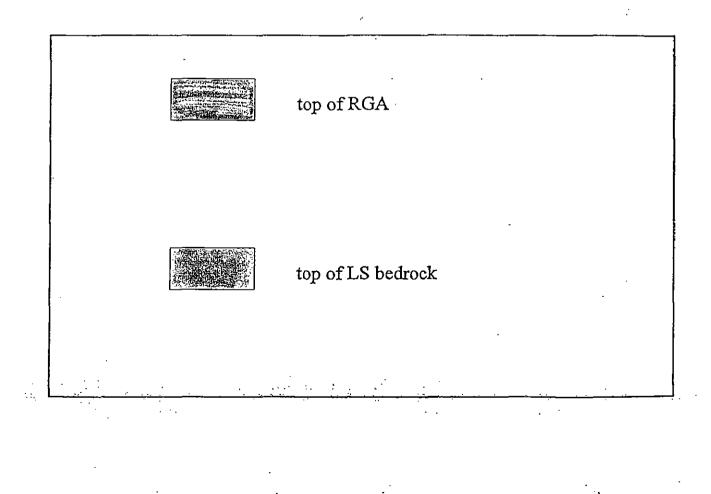
Velocity Analysis

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	<u>C3'</u>			<u>C3' extended</u>	
<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>	<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
95	270	12.8	95	240	11.4
290	280	40.6	300	250	37.5
360	285	51.3	475	445	105.7
485	435	105	580	560	162.4
515	435	112			

Existing well data for C3', C3' extended:

<u>MW-106</u>	<u>MW-194</u>
RGA top: 16.6 m	RGA top: 19.3 m

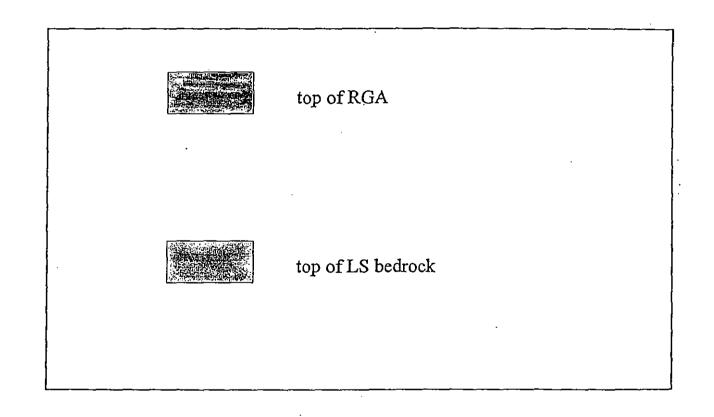


Line D

Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
110 540	345 370	18.9 99.9
Existing well data for Line D	r.	

<u>P4-D11</u>	<u>P4-D12</u>	<u>P4-D12A</u>	<u>P4-D10</u>
		RGA top: 18.6 m	RGA top: 18.8 m



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Line E

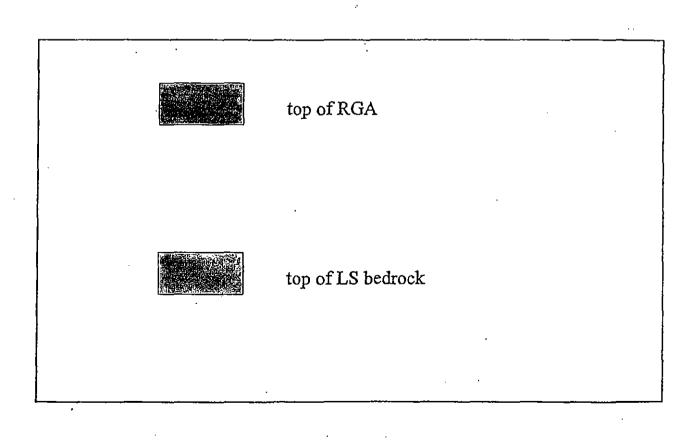
Velocity Analysis

<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
190 265	255 255	24 33.8
540	375	101.3

Existing well data for Line E:

<u>P4-F8</u>	<u>P4-D4</u>	<u>MW-181</u>
RGA top: 13.4 m	RGA top: 16.5 m	RGA top: 16.8 m
TKcm top: 27.5 m	TKcm top: 31.1 m	
LS top: 105.2 m		

* TKcm denotes Clayton-McNairy interval LS denotes Mississippian bedrock



Line G

Velocity Analysis

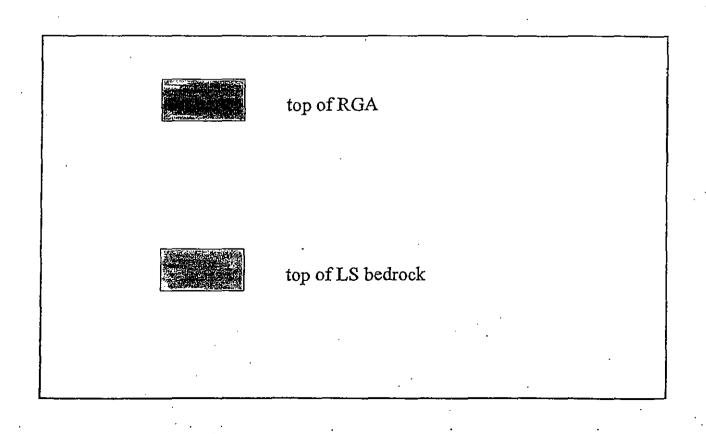
<u>time (ms)</u>	velocity (m/s)	<u>depth (m)</u>
100 250	250 290	12.5 50.8
555	370	102.7

Existing well data for Line G:

<u>MW-Z12</u> RGA top: 28.6 m TKcm top: 39.3 m LS top: 111.8 m	<u>MW-202</u> RGA top: 22 m	<u>MW-121</u> RGA top: 15.1 m TKcm top: 26.1 m	<u>MW-106</u> RGA top: 16.3 m
NBW 716			

<u>MW-Z16</u> RGA top: 18.6 m TKcm top: 30.5 m LS top: 108.4 m

* TKcm denotes Clayton-McNairy interval LS denotes Mississippian bedrock



Appendix D

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OPTIMUM OFFSET LINES

Appendix E

SOIL BORING LOGS

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	LITHOLOGY	0 GAMMA - API 100	,	10	00 N	EUTF	RON	PO	RO	SIT	Y 0		w	/L		ANALYTICAL	HYE		
	CLAY (80%) w/ Uille sül (20%) and trace pebbles, day light gray (10YR 7/1), pebbles black (10YR 2/1), soft, homogeneous									}				·					
	JiLT (90%), w/ trace clay (10%) and occasional sendy (poorly sorted, subrounded, very fine grained) brownish yellow (10YR 6/6), solt, occasional iron staining			ـا با با												-			
Upper	SILT (50%) and CLAY (50%), poorty sorted, and trace sand (subrounded to munded, very fine grained, red (2.6VR 4/8) and subangular, very fine grained, clear) light yellowish brown (10VR 6/1) w/ light gray (10VR 7/2), soft		20														HU1 & HU2		
ier Contract	CLAY (60%), silty (40%) and trace sand (as above), brownish yellow (10YR 6/8) w/ light gray (10YR 7/1), soft SAND (70%) very line to fine grained, poorly sorted,		1011232-320 30					-										UCR3	
Contractulal Disposits	subrounded to rounded, moderately centenied, some clay, very pale brown (10YR 7/4) w/ clear and red (2.5YR 4/8)		10571257)						No Recovery		Ī	
•	GRAVEL (70%) 5 to 10 mm chert, little aged (20%, very line to line grained, poorly sorted, subrounded to rounded, moderately cemented), Irace clay, reddish brown (SYR 4/4)		40	; - -					┦				42,0	13 6			ļĮ.		•
1	CLAY (60%) sendy (very fine grained, poorly sorted, subangular to angular), well cemented, abundant iron staining, reddish brown (5YR 4/4)		्रमारसम्बद्धार					2	1			·19.0	49.3		~		EH		
-	GRAVEL (80%) 3 to 10 mm, rounded to angular cheri and quartz, liltle sand, trace dark accessory minerals, yellowish red (SYR 4/8)		50 50					X								1110101-0685			
,	GRAVEL (80%) 3 to 30 mm chert and sandstone, little sand (very fine to fine grained, poorly sorted, subrounded), trace tossils, abundant iron staining, dark reddish brown (SYR 3/3)		60 60					2						60.6 ⁻		Bailed 10 ug/L TCE NA TC	ļ	RGA	
t over t	GRAVEL (80%) 30 to 40 mm chen, little sand (very fine to fine grained, poorly sorted, subtounded), abundant licen staining, dark reddish brown (SYR		10 - 20 - 1						ł				j		75,0'	1110101-0888 Pumped 1UXJ ug/L TCE 11 +/- 21 pCl/L **Tc 1110101-0687 Duplicate Pumped 1 un9 TCE			
Confinential Deposits	GRAVEL (70%) 30 to 40 mm chert w/ 3 to 20 mm while (10YR &1) quartz, some send (line grained, poorly sorted, unconsolidated, clear), dark reddish brown (5YR 3/3)															1 up/L TCE 23 +/- 19 pCUL "To 1110101-0692	- HU5		·
	SAND (80%) fine to medium grained, moderate to well sorted, subangular to subrounded, clear, little gravel, unconsolidated		10,)		H					Pumped 50.6 ug/L TCE 23.3J ug/L cia 1,2 DCI 21 t/- 19 pCJ/L Tc			
Patters Creck	CLAY micaceous (biotite) increasing to 10% by 100', dark gray, (7.5YR 4/2), soft to slightly firm, homogeneous		n <u>-angezangsag</u> t																
, ,	CLAY some sand (very fine grained, poorly sorted, subrounded to rounded quartz), abundant blottle, gray (10/R S/1) CLAY (50%) and SAND (50%) very fine grained,		100	-1															
	poorly sorted, subrounded to rounded quartz, abundant blottle, gray (107K 5/1) SAND (60%) very fine grained, moderate to poorly sorted, subrounded to occasionally rounded, clayer,		110 11				2												
•	abundant iron staining, light yellowish brown (10YR 6/4) SAND (80%) very line to fine grained, moderatoly soned, subrounded, litle clay, abundant iron										H H					- 1110101-0693 Pumped 1U ug/L TCE 26 +/-20 pCi/L "Tc			
MeNa	staining, yellow (10YR 7/6) SAND (90%) very fine grained, moderate to well sorted, submunded, trace sik and day, trace black minerals, unconsolidated, very pale brown (10YR 8/2) to clear	$\mathbb{R}^{}$	120 703-1403-663-1									!						McNai	
McNairy Fermation	SAND (70%) very fine grained, moderate to well sorted, subrounded, some silt and clay, trace black minerals, unconsolidated, white (10YR 8/2)	B	130 130					7						-		1110101-0694 Pumped		PGD McNairy Flow System	, m
	GRAVEL (60%) hard, sandy (fine to very fine grained, moderate to well sorted, unconsolidated, clear), abundant pyrite, iron staining, black (10YR 2/11, hart.		Berenter								Π					10 ug/L TCE 11 +/- 34 pCl/L "Tc		GDP Coord	levation: 37
	LAY silty, abundant pyrite and mice, dark gray 2.5Y N4/); firm, homogeneous		140	1		-	5		4	╀					l		ł	N 5705	198
	SAND vary fine to fine grained, moderate to poorly softed, subrounded, unconsofidated in part, abundant pynile w some pynile cement, grayish brown (10YR 5/2)			ļ			K							•				.0. E 3967.	Elevation: 371.98
 -	SAND (60%) very line grained, moderale to well sorted, subrounded to subangular, little slit, grayish brown (10YR 5/2)		0109121231	- - -			2								ĺ				Ū
•	155 TOTAL DEPTH					-	E									'. 		Ť₿	20

	LITHOLOGY	0		GAI	MMA - API	100		100	0 N	EUT		N P	OR	osi	TY	o ≯ WL		ANALYTIC	AL	HYDA UNIT	20	
ĥ				T		n u u		E	ĒĪ	Т				Σ	<u> </u>					1	-	
	CLAY (80%) w/ little silt (20%), yellowish brown (10YR 5/4), nonplastic, cohesive				L C	1		Ľ		_	_		F	R		_						
].	$\left + \right $	╶┼╴	+	5			┝	┼╏	┽	╉	+	┝	ĸ		-{		}				
ļ	· · · · · · · · · · · · · · · · · · ·		_		(SURA		10							t				1				
	SILT (80%), w/ little clay (20%), light gray (10YR 7/1), nonplastic, noncohestve, loess	\square		1			ą	┝	$\left \cdot \cdot \right $	-	╀		\downarrow	[-+	-						
		H	╈	-4									┢	ß	┝┼╴							
	SAND and SILT (50%), light gray (10YR 7/1), nonplastic, noncohesive	IП	Ţ		C-152%				Π					R						HU1 & HU2		
-{		\}}	╉		5		8	┝─	┼┤	+	╉	┽	┝	╟	$\left \cdot \right $	-				HS	ľ	
I	SAND (80%) very fine to medium grained, moderately sorted, subrounded to rounded quartz,			4	Bernard					1				K								
Upper	soma accessory minerals, little silt, yatowish brown (10YR 5/6)	╟┼	╉	<u>یل</u> ے ۲	р. р.			⊢	┼┦	╉	┯┝	+	┢	H	┝┼	-						
Cent	GRAVEL (60%) 6 to 18 mm chert, sandy (medium to				08-7-6 D		8	E						Ľ								
acutat	coarse grained, reddish brown (SYR 4/4)	┢┼	╇	Ş		<u></u>	Ĵ		+	╡	╉	-{-	┞	┝	=	-{		ł			Ξļ	
Upper Centricital Deposits	SAND medium grained, well sorted, well rounded quartz, very pale brown (10YR 7/4), homogeneous	H	-	Ş,	0.0000	0.00		E						<u> </u>	K‡	.						
sife		/	-	\`a	00.00	00.000								5		7		1				
	GRAVEL 6 to 25 mm chert, sendy (medium to coarse grained), reddish brown (5YR 4/4)	┢┼	-			: 1995 	9	F	H	-	╈	╋	F	F		7						
	· · · · · · · · · · · · · · · · · · ·		╪	1					Ħ	Ţ	1	1	<u> </u>			1.		1		нuз		•
	CLAY (60%) sandy (very fine to medium grained, moderately sorted, subrounded quartz w/ 15% accessory minerals), yellow brown (10YR 5/8)	┝╋	+	╀				F	\mathbf{H}		╉	╧		\mathbb{F}	╘╌┠	48.3	49.63	1		ت ا		
		仕	╈	t			8	E		1			Þ	Ł] '	ណ៍ រ				М	
		H	+	1S			0	F	┼┦		+	\downarrow	Ł			-						
	SAND (80%) fine grained, well sorted, subangular to subrounded quartz, few accessory minerals, loose,	H	-4	SA				E			K	$\overline{\mathbf{t}}$		E		j %	[
	brownish yellow (10YR 6/8)		-	С.Н 6-4					┞╌┨	-	╞	╞	<u> </u>			- 4				HU		
ļ	,		- 14	Č,			8	E				1								L1		
Î			Ę.	0	0.0.00.0	0.00.00						Д	F					1110101-0711		↑ <u> </u>		
		$\left \right $	Ť	•	0.00			⊢	┿╢	-+	┢	₽		┢	┝╌ ┍	7		Pumped SJ ug/L TCE 18,9J ug/L cis	1.2 DCI	3		
l,owej	GRAVEL (60%) 12 to 30 mm, poorly sorted, subangular to rounded chert, sandy (very fine to		J.S	÷÷;		0000	5											16 +/- 19 pC//	"Tc			
ç	coarse grained, poony sorted, subangular to subrounded), common matic minerals from 84' to		2	0.00 0.00		00,00,0	-	┝	$\left\{ \right\}$	╧┽	╉	╀	╞─	┝			ļ	1110101-0712				
	(SYR 4/6)	Ħ	2°		0.00.000	00.000					╞		ĥ			┋┙╽	i i	Pumped 3.8J ug/L TC	E	HUS		
actizeposas			5	00 • • 0		0.00.0		┝	┼╼╏		╌┼	╀		-	+	-		14 +/- 9 pCi/L	"Tc	м 		
0S4S		ιĦ	S	0.0 0.0	00000		8			-	-		Ħ					1				
	GRAVEL (60%) 12 to 30 mm, poorly sorted, subangular to rounded chart, little sand (very fine to	V-K	8.0		6.00.00 6.00			⊢	┢		╉	╋	+	<u>} </u>	\square	-						
	coarse grained, poorly sorted, subangular to subrounded), little clay, yellowish red (5YR 4/8)		हेल्		0000000	00.0.000			\square	-		+	V	-		4		1 ·				
4	,	\square	Ŧ		0.00000	ao 60 a	8	F		_	Ļ	7	1	F		┨			·	<u>+</u>	Ц	
170	,	\square	┢	╋				-	┼┤	╉	Ł	╀	┢	┢	┝┼╴	-	i i	1110101-0713 Pumped 2.9J ug/L TC				
Poters Creek City	CLAY micaceous (muscovite changing to biofite), very dark gray, (2.5Y 3/1), very firm, plasile,		_					F	\square		Ţ	Ţ		_				10 +/- 21 pCi/L	Tc.			
let.	very dark gray, (2.5Y 3/1), very firm, plasiic, homogeneous	$\left - \right $	╉	+				╞	\mathbb{H}	╉	╏	- -	╞	$\left\{ -\right\}$	┝╼┞	-{		Į			ļ	
Cicity					C.		8	E		1	1					1		İ				
		\square	+	+-					$\left \cdot \right $		+	4	┝			4					1	
î	CLAY (60%) sandy (very fine grained, well sorted,			میل				亡			_[1	L				1					ļ	
·	subangular to subrounded to rounded, clear quartz), abundant muscovite, gray (10YR 5/1)	\downarrow	1	 			10	┝	$\left \right $	+	⊀		 .			-						
	SAND (80%) very line to fine grained, well sorted, subrounded, clear quartz, linte clay, trace iron oxide,	Ħ	٧Ç		T 47.47	25/6		L	⊢		\mathbf{x}	仁		Ľ		-				l s	.	
	yellow brawn (10YR 5/6)	/∏	- į					F	ļŢ		┦	<u> </u>		F		-{			ĺ			
	CLAY (55%) sandy (very line grained, well sorted, subrounded, clear guartz w/ 10% accessory	$\left \right $						\vdash	┢		╧	1		L	-	-]				McNairy Flow System	1	
	minerals), dark yellowish brown (10YR 3/4)	Π	7				120	F	Π		1	₹			1]		İ	1	Syste	2	
 2		+		<u>11-11-1</u> 2010	<u>e a centra de la</u>			-	⊢┤	+	╉	Ł	$\left \right $	Η	+-	-				1 		
deman	SAND (95%) very fine to fine grained, rounded, clear quartz, trace muscovite, trace biolite, trace	Ц	5								╧	K		Ľ		-		[
YFon	quartz, trace muscovita, trace biolite, trace potassium feldspar, yellow brown (10YR 5/6); two lithilized stringers (132' and 135'), dark red brown (5YR 3/3) oxidizing to strong brown (7.5YR 5/8)	H	ξ_{s}^{s}				130	\vdash	\mathbb{H}	+	╇	╢		-		-						
McNatly Forntation		\L	<u></u>								1	<u>ال</u>				1					2	នទ្ធ
1	SAND (60%) very fine to line grained, well sorted, well rounded to rounded, clear quartz, silty, black (10YR 2/1), firm, homogeneous	Ħ		<u> </u>				┝	$\left \right $	+		¥	-	_		4						a lon
	(H	+	¢			140	F	H	_	+	1				1		1110101-0714			5	Elevation: 371.57 EXTIP Front: N 5697 A E 4229.2
	SILT (60%) sandy (very line to fine grained, well	\square	T	8			8	F	$ \overline{ } $		1	╞	F	F	H T	-		Pumped 5U wa/L TCE	•		14	25
	interbedded lighta, low grada cosly organica, black	\vdash	-					F				5	F	F		1		13 +/- 18 pC//L	"Te			3 2 11
	(10YR 2/1)	LΤ	2	画が				F	ĻТ	Ţ	Ţ	<u>\</u> _	<u> </u> _	F		4						ACC
	SAND (60%) fine grained, soft w/ stringers of sandstone (very fine grained, subangular, "dirty," silty, carbonaceous, calcareous cement), silty, black	╟┼	熠	戰			Ś	F	ŀ		+	Å.	E	-	╘╋	-					ľ	3
	silly, carbonaceous, calcareous cament), silly, black (10YR 2/1)	口	1	1						1	7	T	Ë	Ē		7]	1	.		Ŭ
	155 TOTAL DEPTH	7+	╉	+	┢┝╋			┝	┼┥	╉	╋	╋	┢	\vdash	┝┼	- .				l		4 A
			┢	t					П	╈	Ť	T	E	Γ		1						دن

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	LITHOLOGY	o GAMMA - API 100		WL	ANALYTICAL	
	T (60%) little clay, little sand (20%) (very fine jed, wall sorted, subrounded quartz), ysilowish m (10YR 5/8), cohestve, sand content increases w/ depth					
-	SUT (50%) and SAND (50%) very fine to fine grained, well safted, subrounded, yellawish brown (107R 5/6), conesive		8			HU1 8
- Upper Certinental Deposite	SAND (80%) very fine to fine grained, well sorted, subrounded to rounded quartz, fittle silt, light yellowish brown (10YR 6/4), slightly cohestive			•		
Initial Dra	GRAVEL 6 to 18 mm, west rounded sandslane w/ chert and quartz fragments, yellow (10YR 6/8)			•		UCRS
rhosife	SAND (80%) very fins to fine grained, well sorted, subrounded to rounded quartz, little sit, light yellowish brown (10YR 6/4), slightly cohesive			39,84		6
-	GRAVEL 6 to 25 mm, well rounded sandstone w/ chen and quartz (regments, yellow (10YR 8/8)		°	49,15		
-	SAND (70%) very fine grained, subangular, clear quartz w/ 10% secessory minerals, some s91, yellowish brown (10YR 5/8)		8			ADH CUH
Continuental Deposits	GRAVEL (60%) 6 to 25 mm, subangular to subrounded chert w/ occasional sandstone fiths, sandy (very fine to coerse grained, subangular to subrounded quartz), yellowish red (5/TR 4/6), gravel consistent size, fewer large gravels and more fine gravel and very fine grained sand			65.97 7/0	1110101-0715 Pumped 40.9 ug/L TCE 4 +/ 8 pC/L TCC 1110101-0716 (Dupikale) Pumped 80.8 ug/L TCE 2 +/ 3 pC/L *TC 1110101-0717 Bailed 183.9 ug/L TCE NA *TC	RGA HUS
· · +					1110101-0718 Bailed 1.1J ug/L TCE 27.4J ug/L ds DCE NA "Tc	
Porters Creek	CLAY common muscavite, very dark gray, (2.5Y 3/1), f/m, very plastic, cohestve, homogeneous				1110101-0719 Pumped 180,1 ug/L TCE 9 +/- 17 pCi/L *Tc 1110101-0720 (Ouplicate)	
	CLAY (60%) sandy (very fine to fine grained, well sorted, subrounded to rounded, clear quartz), common bioble, dark gray brown (10YR 5/2)				172.3 ug/ TCE 15 +/- 17 pCi/l PTc	
ة 	SAND (60%) very fine to fine grained, well sorted, subrounded to rounded, clear quartz w/ occasional sandstone likile fragments, clayey, dark gray brown (10YR 5/2)				1110101-0721 Pumped 1.1J ug/L TCE 7 +/- 43 pC/L "Tc 1110101-0722 (Ouplicate)	- McNalry Flow System
- McNany Fermation	SAND (70%) fine grained, well sorted, subangular to subrounded, clear quartz, some silt, dark gray (10YR 4/1)				Pumped 1.13 ug/L TCE 14 +/- 19 pCl/L ^M Tc	Elevation
anulion	SAND (80%) fine grained, well sorted, subangular to subrounded, clear quartz, pyritized eand at 133 and 138, fille sill, occasional coaly plant remains, dark gray (10YR 4/1)				1110101-0723 Pumped SU ug/L TCE 12 +/- 17 pC//L *Tc	Elevation: 367.37 PGDP Coord: N 3751.9, E 3008.9 tem
, , ,	LAY (90%) trace sand (very fine grained, well sonad, subangular, clear quartz), common muscovite, very dark gray (10YR 3/1)			•	1110101-0724 (Durpicate) Pumped SU ug/L TCE 11 +/- 20 pCI/L "Te	<u>9, E 3008.9</u>
	150 TOTAL DEPTH			-		P4B
<u> </u>	· · · · · ·			1	ļ	

	LITHOLOGY	κ Γ	U)	ר הואוואורי – ה			••••	~					V	٧L	ANALYTICAL	HYUN	ORO IT	•
	St. (50%) hite clay, liftle sand (20%) (very fine grained, well sorted, subangular quartz), dark gray (10/R 4/1)						╼╌┾ ╼╌┾				<u>}</u>	<mark>│</mark> │ │ │					Î	
	(to					/ 					HU1 & HU2		
	SAND (60%) very fine to medium grained, moderately sorted, subangular quartz and feldspars, clayey, yellowish brown (1DYR 5/6), cohesiva			WWW.		장											5	-
there a Contraction (11) Descentes	SAND (70%) very fine grained, subangular quartz and (elcspar, some silt, yellowish brown (10YR 5/6), slightly cohesive										弉						UCRS	
meni'il De	SAND (90%) fine to coarse grained, subangular quartz trace silt, yellowish brown (10YR 5/8)					8									. 		ł	
geruis	GRAVEL 6 to 12 mm, sandy (very line to coarse grained), yellowish brown (10YR 5/6)									R	$\overline{\mathbf{v}}$		40.6					ĺ
	SANO (70%) fine to coarse grained, subangular quanz, some sik, brown (10YR 5/3), slightly cohesive					8			-				45,8'	46,67				
ĺ	GRAVEL 3 to 12 mm, sandy, reddish yellow (7.SYR රුව)										4			47,65'				ļ
·	CLAY (60%) sandy (fine grained,-rounded to well rounded quartz), Eght yellow brown (10YR 6/4)	∏			E in the second se	8				Ð	-					CH →		
	CLAY (60%) sandy (fine grained, rounded to well rounded quartz), yellow brown (10YR 5/6)				Led .	8				₿						ļ		
Ť	SAND (60%) line grained, rounded, clear quartz, sity, yelfow brown (10YR 5/5)				0.0.0.0	•		_		K						Ŧ	_	ς. Γ
	GRAVEL (70%) 6 to 18 mm, subangular to subrounded chert w/ some quarticle, some sand (very fine to coarse grained, subangular to subrounded quartz), yellowish red (SYR 4/6), gravel up to 35 mm common from 72' to 76'					70	┝╾╀╸ ┝╾╀ ┝╴╀								1110101-0729 Pumped 240 ug/L TCE 0.7.J ug/L 1,1 DCE 4 +/- 9 pC/L "Tc 1110101-0730			
(Mart Conduc	SAND fine to medium grained, yellowish red (SYR 4/6)		<u>6</u>			:								77	Pumpad 370 ug/L TCE 3.7J ug/L 1.1 DCE 20.4J ug/L cis DCE 14 +/- 21 pCi/L =Tc		Roa	
ower Constructed Deposits	GRAVEL (70%) 6 to 36 mm, subangular to subrounded chert w/ some quartzite, occasional limestone clasts, some sand (vary fine to coarse grained, subangular to subrounded quartz), yellowish red (SYR 4/8)	H	540 13.00			8									1110101-0731 (DupBcate) Pumped 408.6 vg/L TCE 2.8.1 vg/L 1,1 DCE 27.8.1 vg/L 1,1 DCE 10 +/.21 pCi/L "Tc 1110101-0732 Pumped 301.5 vg/L TCE	HUS		
Ţ	GRAVEL (60%) some sand, fulle sill, yellowish red (5YR 4/6)					İġ	┝╌┼			K	-				2.6J trg/L 1,1 DCE 29.9J ug/L cis DCE 2.2J ug/L carbon tet 5 +/- 8 pCi/L Te	_↓↓	¥.	
Porters Cik	CLAY (90%), trace sand (very fine to fine grained, subrounded, dear quartz), abundant biotite, dark grayish brown (2,5Y 4/2), firm) }					X			-		-			
Î	CLAY (70%) some sand (very line to line grained, subrounded, clear quartz), abundant biotile, dark grayish brown (2.5Y 4/2), linm					110			+		Į							
	GRAVEL (50%) 10 to 20 mm, some sand (very fine grained, moderate to poorly sorted, subrounded, clear to light gray (10VR 7/1) quartz), little clay, brownish yellow (10VR 6/8)					120									1110101-0733 Pumped 2 ug/L TCE 0 +/- 0 pCi/L *Tc		McNah	
McNarty Forntation	SAND (70%) very fine to fine grained, poorly sorted, subrounded to subangular, clear quartz, some clay, moderate to poorly cemented, unconsolidated in part, light gray (10YR 7/1)		L L		disdisdis <u>- Maria</u> -	130											McNairy Flow System -	
aliun	SAND very fine grained, moderate to well sorted, subrounded to subangular, clear quartz, unconsolidated, white (10YR 8/2), increasing clay w/ depth				<u></u>	140					<u>北</u> 十		·		1110101-0734 Bailed 1U ug/L TCE NA "Tc			Elevallon: 368.59 PGDP Coord: N3650.7. E 3347.2
	CLAY (30%) trace sand (very fine grained, clear quartz), trace mice, gray (10YR 5/1), soft, homogeneous, increasing mice and decreasing sand w/depth					150												950.7. E 3347.2
	150 ТОТАL DEPTH					8				╺ <mark>╎</mark> ╶┤								P4B4
<u> </u>	·		-4	┸╾╢╾╢			-1-	÷	_1_	- - - -	-				J		<u>. *</u> .	

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	LITHOLOGY	0 GAMMA - API 100					
	.T (80%) little clay increasing w/ depth, occasional .onlie statining, pale yellow (2.SY 7/4) to yellow(sh brown (2.SY 6/4)		10				
	SAND (60%) very fine grained, moderate to poorly sorted, welt rounded to subrounded, clayey, occasional gravel to 3 mm, yellow (10YR 8/8) to yellow brown (10YR 5/4)		20			IJ1 & HU2 →	e e
Upper Continental Deposits	SANO (60%) medium grained, poorly sorted, moderately cemented, some clay, trace gravel (3 to 25 mm), yellow (10YR 8/8) to yellow brown (10YR 5/4)		39		υ, Ω		UCAS
,	GRAVEL (80%) 3 to 15 mm chert, little sand (medium to fine grained, poorly sorted, subrounded), trace clay, iron staining, yellowish brown (10YR 5/8) to yellow (10YR 6/8)		ð	\$	39.45'		
•	CLAY silly, fron staining, yellowish brown (10YR 5/8), firm, homogeneous					Hu	
- -	SAND line to medium grained, poorly sorted, predominantly subrounded w/ occasional subangular, silly, yellowish brown (10YR 5/8)		8	g		王 1110101-0735 1110101-0735	-
	GRAVEL 10 to 25 mm, sendy (fine grained, clear quart2), yellowish brown (10YR 5/8) to brownish yetlow (10YR 6/6) to strong brown (7.5YR 5/8)		8			Pumped 1U ug/L, TCE 0+/-0 pC/L "Tc	
Love Continental	GRAVEL 10 to 50 mm chert w/ concholdal fractures, sandy, yellowish brown (10YR 5/8) to brownlsh yellow (10YR 5/6) to strong brown (7.5YR 5/6)		10	╡ <mark>╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴</mark>	70.5	1110101-0738 Pumped 70 ug/L TCE θ +/- 25 pCl/L Tce	RGA
il Deposits	AVEL (95%) 3 to 20 mm chert, trace sand (line grained quartz), yellowish brown (10YR 5/8) to brownish yellow (10YR 8/6) to strong brown (7.5YR 5/8)	4440 27 40 10 27 40 10 27 40 2				1110101-0737 Balled	
, ,	SAND (60%) coarse grained, subrounded to angular, gravely (2 to 4 mm chent), iron staining, brownish yellow (10YR 6/5)	6.040.096.096.098.09.096.096.096.096.096.096.096.096.096.	18			70.8 Log/L TCE.	[].
Poilers Crock Clay	CLAY trace sand (quartz), occasional 2 mm gravel, very dark gray (1DYR 3/1), firm, homogeneous		. 90			110101-0738 (Ouplicate) Pumped 60.1 vg/L TCE 3 +/- 58 pCI/L "Tc	
, ,	CLAY (90%) trace gravel (2 to 4 mm, iron stained cheri), very dark gray (7.5YR N3/0) to gray (7.5YR 5/0), soft to firm						
ا ف	CLAY (50%) sandy (fine to very fine grained, poorly sorted, subangular, clear quart2), trace gravel (2 to 4 mm), gray (7.5YR 5/0), soft		6			1110101-0749	McNaty Flow System
;	GRAVEL (60%) sandy (medium to fine grained, poorly sorted, subrounded, well-cernented wi pyrite), light gray (SYR 7/1) to reddish yellow (SYR 7/8)		12		/	Bailed SU ug/L TCE NA "Tc	w System -
McNairy Forniation	SAND (90%) very fine to fine grained, moderately sorted, subrounded, trace slit, white (10YR &2)		!				
	SAND (95%) very fine to fine grained, moderately sorted, subrounded, trace gravel (3 to 10 mm, iron stained), dark yellowish brown (10YR 4/4), hard to very firm		130	8		1110101-0750	Eleval. PGDP
	SAND (60%) very fine to fine grained, moderately sorted, subrounded, clayey, light gray (10YR 6/1)		-	<u>╶</u> ┝ ┥╌┝┊╎╎┝┍ ┥		Bailed 5U ugA. TCE NA "Tc	2003 1003 1003
	AND (50%) fine to very fine grained, moderate to Stoorly sorted, subrounded and CLAY (50%), trace lights, gray (5YR 7/1)		5				Figuration: 336.29 FGDP Coort: N 3439.8. E
	CLAY (70%) some sond (line to very fine grained, moderate to poorly sorted, subrounded), trace pyrile, gray (5YR 7/1)		150				· E
1	150 TOTAL DEPTH					· · ·	
]				B5

	← →	WL.	ANALYTICAL	UNIT
CLAY (80%) little silt, occasional ilmonite staining, light gray (10YR 7/1) motiled wi brownish yellow				
(TOYN 6/6), Srm 	÷			HU1 & HU2
CLAY (90%) trace silt, occasional quartz grains, brown (7.5YR 5/6), firm, homogeneous	8			2 UCRS
CLAY (60%) silly, light brown (7.5YR 6/4)	8	æ		
CLAY (30%) little slit, yellowish red (SYR \$/6), firm, homogeneous CLAY (35%) trace sand, strong brown (7.5YR 5/6), firm, very homogeneous		5		HU3
SAND (80%) very fine grained, moderately sorted, subrounded, clear, fittle clay, yallow (10YR 7/6), soft				
SAND (90%) very fine grained, well sorted, subrounded, clear, ligtle clay, yellow (10YR 7/8), soft SAND (60%) coarse to fine grained, moderate to poorly sorted, predominantly subrounded w/ occasional subangular, gravelly (3) to 6 mm, angular chen), brownish yellow (10YR 6/5)	8			<u> *</u> * } ≩
chen), brownish yellow (10YR 6/5) GRAVEL 20 to 30 mm, rounded chert, sendy, (coarse to medium grained, moderataly sorted, subrounded w/ occasional rounded), yellowish brown (10YR 5/8)	8		1110101-0756 Pumped 2.4J ug/L TCE 13 +/- 21 pC/L "Tc	╈
GRAVEL (60%) 10 to 40 mm, rounded chert, little sand (coarse grained, poorly sorted, subrounded w/ occasional subangular, poorly cemanted), yellowish brown (10% S/8)	а з	68.3" 78.		RGA
RAVEL (60%) 2 to 10 mm, rounded chert, sandy afse grained, poorly sorted, subrounded w/ 	8	[[]	1110101-0757 Pumped 5.5 vg/L TCE 53.2J vg/L cis DCE 0.3J vg/L carbon tet	툾
GRAVEL (50%) 2 to 10 mm, munded cherl and SAND (50%) very coarse to coarse grained, moderately sorted, well rounded, unconsolidated, yellowish brown (10YR 5/8)			10 +/- 24 pCl/L "Te	
GRAVEL (70%) 2 to 10 mm, rounded chert, some sand (very coarse to coarse grained, moderately sorted, weil rounded w/ occasional subangular, quart2), unconsolidated), yellowish brown (10YR 5/8)	8			
CLAY silly, trace sand, brownish yellow (10YR 6/8), soft	╵┝ ╺┝╺╵┥╵┥ ╵┼┽┥╎╣╶┼┿╞╎╨	<u>_</u>	1110101-0758 Pumped	
SAND (80%) increasing w/ depth, very fine grained, moderate to well sorted, little clay, white(10YR 8/2)	B		2.73 ug/L TCE 16 +/- 19 pCi/L "Tc	
CLAY (60%) sandy (very line grained, clear quartz). trace mica, gray (10YR 6/1) to white (10YR 8/2), soft	18 18	ł		
CLAY (60%) little sand (very fine grained, clear quartz), gray (10YR 6/1)				McNairy F
CLAY (95%) trace sand, micaceous, dark gray (19YR 4/1), firm, homogeneous alternating w/ CLAY (60%) sandy (very fine grained, poorly sorted, subangular, clear quartz), gray (10YR 6/1), soft		· .		McNahy Flow System
CLAY (60%) sandy (very line grained, poorly sorted, subangular, clear quartz), ebundant black carbonaceous material, micaceous, gray (10YR \$/1)	15 15	•		
CLAY (80%) sandy (very fine grained, poorly sorted, subangular, clear quantz), gray (10YR 6/1), soft			-	
150 TOTAL DEPTH				

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LITHOLOGY	اڏ .			;∾	l					_ `	WL		ANALYTICAL		⊳]
SAND (60%) very line groined, subrounded, slity, brownish yellow (10VR 6/6), slightly cohesive									R	╞┤			· · · · · ·		
الله من (70%) vary fine to fine grained, subrounded, some sitt, brownish yellow (10°R 8/8)					5										
						┝╼┼╶┼╸ ┝╼┼╶┼╸ ┝─┼╍╈╸		┥╸┤ ┥╺╎╴┥ ┥╴┝	┦						
SAND (50%) very fine to fine grained, subrounded to subangular quartz and SILT (50%), brownish yallow (10YR 6/6)					22									- HU1 & HU2	
- -		_			ខ	┝┾┼	╞┼	╋┽	$\left \right $					2 UCRS	
GRAVEL (80%) to 12 mm, sandy (vary fine to coarse grained, poorly sorted, subrounded), yellow brown (10YR 5/4)											39.33 39.65				
SAND (60%) very fine to medium grained, poorly sorted, subangular to subrounded, sifty yellow brown (10YR 5/4), cohesiva					ð										
CLAY sondy (very fine grained, subongular quarb), dark yellowish brown (10YR 4/6), slightly plastlo, cohesive					8						8			H	
SAND (60%) very line grained, subangular quartz, clayey, yeBowish brown (10YR 5/6), sightly plastic, cohesive		+			8						\$9.75			Ē	
GRAVEL (50%) up to 38 mm, angular to subrounded chert, limestone and sandstone, and SAND vary fine grained subrounded quartz, reddish yellow (7.5YR 6/6)					70				K		72.16"	69,51'	1110101-0268 Pumped 5U mg/L TCE 14 +/- 24 pCi/L "Tc		
NVFL (50%) up to 36 mm, subrounded to 7. Speed chen, limestone and sandstone, and MD very fine grained subrounded quartz, (7.5YR 6/8)				0.0	li -								1110101-0287 Pumped 5U mg/L TCE 0 +/- 0 pC/L "Tc	HUS -	
GRAVEL (60%) up to 18 mm, rounded chert w/ occasional sandstone, sandy (very fine to coarse grained, subangular to subcounded quartz), reddish		- The second			8								1110101-0268 Pumped 28.2 mg/L TCE 0 +/- 0 pC/L "Tc		.
yellow (7.5YR 8/6) GRAVEL (50%) up to 18 mm, rounded chert w/ occasional sandstone and SAND (50%) very fine to coarse grained, subangular to subrounded, reddish yellow (7.5YR 8/6)		WALL BON											· · ·	 	
SUT (45%) sondy, some iron staining, micaceous, light yellowish brown (10YR 6/4) to brown (10YR 5/3), soft					1				1		-				
SiLT clayey, micaceous, trace sand (very fine grained, subrounded), very dark gray (7.5YR 3/1), soft, moderate to low plasticity					110	┝┼┿							1110101-0269		
GRAVEL (80%) 3 to 6 mm, angular to aubangular chert, littla sand (very coarse grained chert w/ some quartz), yellowish brown (10YR 5/8)					120								Pumped 7.7 ug/L TCE 0 +/- 0 pCI/L ^{III} Tc		
CLAY sily, scattered sand (very fine w occasional fine grained, subraunded), mica, very dark gray (10YR 3/1), firm, moist, high plasticity, sticky					130									McNairy Flow System -	
SANDSTONE fine grained, well sorted, subrounded, well comented w/ pyrite, common pyrite nodules, carbonaceous leminations, lignite wood fragments, some replaced w/ pyrite, dark gray (10YR 4/1)				ded er	4								· .		Elevation: 37 PGDP Coord
SIND (80%) fine grained, well sorted, subrounded increase scattard chert, occasional carse grained sand, little allt, dark gray (10YR 4/1)				2.3.3.3 97.40.44 67.40.44 67.40.44	140 1			╷╼╄ ┥╼┤╸ ┥╸┥╸ ┥					1110101-0270 Pumped 5U wa/L TCE		Elevation: 370.83 PGDP Coord, N 3074.7. W 282.5
151 TOTAL DEPTH					150						<u>,</u>	-	5U Ug/L TCE NA TC		Ď
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	LITHOLOGY SAND (60%) very line grained, subrounded, slity, trace clay, brownish yellow (10YR 6/6), slightly rohesive				. w.	ANALYTICAL	
Upper	SAND (60%) very fine to coarse grained, poorly sorted, graveliy (to 12 mm), very pale brown (10YR 7/4) SAND (50%) very fine grained, moderately sorted, subangular to subrounded quartz w/ trace feldspar, and SLIT (50%), brownish yellow (10YR 8/8)	10 20				1110-101-0240 Balled 1U ug/L, TCE NA ™Tc	
Upper Consumption Deposits	QRAVEL (60%) to 18 mm engl/ar to subangular chart w/ some sandstone, sandy (very fine to coarse grained, subangular), very pake brown (10YR 7/4) CLAY (60%) sandy (very fine greined, subrounded), yeilowish brown (10YR 5/8), cohestve, plastic	30 40			31,2		
	SAND very fine to fine grained, well sorted, subrounded to rounded quartz, brownish yellow (10YR 6/6), tots of water, loose, flowing				59.2°		 }
C Lewer Confidencial Deposits	GRAVEL (70%) 25 mm fragments of angular to subangular chert, limestone and sandstone, soma sand (fine to coarsa grained, poorty sorted, subrounded quartz), reddish yellow (7.5YR 6/6)	10 N				1110101-0241 Pumped 77.4 ug/L TCE 17 +/- 18 pC/L TC 1110101-0245 Pumped 280 ug/L TCE 1.21 ug/L 1,1 0CE	
Jopusula	Gr2AVEL (70%) up to 30 mm, fragments of engular to subangular chert, limestone and sandstone, some sand (fine to coarse grained, poorly corted, subrounded quartz), reddish yellow (7,5YR 7/8) Gr2AVEL (60%) up to 30 mm, fragments of angular to subangular chert, limestone and sandstone, some sand (line to coarse grained, poorly sorted,					18 +/- 21 pc//L =Tc 1110101-0248 (Ouplicate) Pumped 269-2 upl. TCE 1.2J upl. 1,1 DCE 0 +/- 0 pC/L *Tc	
	subrounded quartz), little clay, redidsh yellow (7.5YR 7/8) CLAY micaceous, trace mudstone lithic (ragments, trace sand (very fine grained, subrounded), black (5Y 2.5/1), very fai, plastic		╞╼╡			1110101-0247 Pumped 280 ug/L, TCE 1.2J ug/L, 1,1 DCE	
	SANDSTONE very fine grained, well sorted, subrounded w/ chert pebbles, very pale brown (10YR 8/4) to light gray (10YR 7/2)					0 +/- 13 pCI/L *Tc	
	SAND very fine grained, well sorted, subrounded to rounded quartz, some silt, brownish yellow (10YR 6/8), slightly cohesive	110		╺┼╌┞╼ ╺┠╼┞┍ ┥╴┝╸			
McNhiry Furmation	SAND (60%) very fine greined, subangular to subrounded, with Bible sandstone fragments, some pyrile, very dark gray (10YR 3/1) SAND (50%) very fine greined, subangular to subrounded quartz, and SILT, very micaceous, occasional glauconite, very dark grey (10YR 3/1), cohesive						
	SAND (70%) very fina to fine grained, moderals sorting, very finte mice, very dark gray (10YR 3/1)	140					
	NDSTONE very fine grained, well sorted, brorounded to rounded, common cubic pyrile cystals, biolite, sit, some carboneceous material, dark gray (10YR 4/1)						
	150 TOTAL DEPTH	2					

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·	LITHOLOGY			WL	ANALYTICAL	HYDRO
2						UNIT 个个
	SILT (80%), trace clay, trace gravel (1 to 2 mm, rounded to subrounded), dark yellow brown (10YR 4/4 to 4/8)					
	i (60%) clayey, some scallered gravel, increasing sand (very fine grained) w/ depih, dark yellow brown (10YR 4/4 to 4/6)				•	
	GRAVEL 1 to 4 mm w/ occasional 10 to 20 mm, angular, dark yellow brown (10YR 4/4 to 4/8)					
-	CLAY silty, yellow brown (10YR 5/4)		8-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1			
0 mini -	CLAY (60%) silly at top becoming sandy (very fine grained) w/ depth, brownish yesilow (10YR 6/6)			}		- HU1 & HU2
Depen Combinential Demosity	GRAVEL (80%) 1 to 2 mm w/ occasional 10 mm, angular limestona, cherr, and sandstone, filte silt, brownish yellow (10YR 8/8)			32.4	· .	
lenosits	SILT clayey, brownish yoliow (10YR 8/8)			38.39 [°]		
	SAND (90%) fine to coarse grained, trace sill, fight yellow brown (1DYR S/6), fining upward sequence			46,42		
,	GRAVEL (60%) 1 to 4 mm w/ occasional 10 to 30 mm, subangular, sandy, light yellow brown (10YR 5/6)				1110101-0654 Pumped 5U ug/L TCE 2 +/- 9 pC//L ^{PP} Tc	
-	SAND (60%) very fine grained, little silt, little clay, yeliow brown (10YR 5/8)					┟┷╻╽╽╶╶╴╴
Ĵ	SILT (60%) sandy (vary fine grained), pale yellow (2.5Y 8/4)					НСЗ
Lowly Contin	GRAVEL (70%) 2 to 5 mm w/ scattered 10 to 30 mm, angular, some send (very coarse grained), very pate brown (10YR 8/3)				1110101-0855 Pumped 2.3J ug/L TCE 4+/- 29 pC/L "Tc 111010-0858 Pumped 42 ug/L TCE 8+/- 31 pC/L "Tc	
Lower Continential Deposits	GRAVEL (80%) 30 to 50 mm, little sand becoming sandler w/ depth, abundant iron oxides, yellow brown (10YR 5/6)				1110101-0857	RGA HUS
•	GRAVEL dark gray brown (10YR 4/2)	0.00.00.00.00.00.00.00.00.00		g	Pumped 429 ug/L TCE	
, 🕌	GRAVEL brownish yellow (10YR 6/8)	4.40.00.00.00.00.00.00.00.00		^A	16 +/- 20 pCi/L "Tc	
Porters Greek Clay	CLAY (90%) trace silt becoming sandier w/ deplh, very dark gray (2.5YR N3/1), dense, firm, homogeneous				1110101-0858 (Duplicato) Pumped 482 ug/L TCE 14 +/- 19 pCVL 비장	
,	SAND very line grained, dark gray (2.5Y N/4)				1110101-0659	
4	SAND silly, dark gray (2.5Y N/4)				Pumped 5U ug/L TCE 19 +/- 19 pCi/L "Tc	
	SAND (90%) very fine to fine grained, becoming coarser at depth, Rhiffed at 117, trace slit, dark gray (2.5Y N/4)					McNaby
McNairy Forniation	SAND (85%) very fine grained, micaceous, dark gray (10YR 4/1)					McNaby Flow System
Mation -	CLAY sandy (very fine grained, subangular, clear to translucent quartz), micaceous dark gray (10YR 4/1), damp, stiff	↓ ┃ ┃ ┃ ┃ ┃				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	SAND medium gralned, slightly lithified w/ pyrite, dark gray (10VR 4/1), grades to sendy clay w/ depth					allon: See
16	CLAY (85%), little sand (very fine grained, subangular), dark gray (10YR 4/1)					N 2096
	SAND very fine greined, hard, abundant pyrite and pyritized sand, dark gray (10YR 4/1) w/ some light yellow brown sand throughout				1110101-0880 Pumped 1U ug/L TCE 17 +/- 20 "Tc	Evellon: 368.78 CDP Coord: N 2089.2 § 1357.8
	150 TOTAL DEPTH					. P4
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;†	CLAY silv, trace gravel (1 to 2 mm, rounded to	口		_	1	_	Ţ	L	F					4	7	7		4	ł	Ţ	1				1				Î	î	
١L	CLAY silty, trace gravel (1 to 2 mm, rounded to subrounded), organic debris, grayish brown (10YR 5/2) to brown (10YR 5/3)	Η		_	+	+	Ē	k				_			-	-		J	-	╁											ĺ
Įſ	Y (80%) little sill, brown yellow (10YR 6/6)	\square				ļ		1							-	4	+	ł		-											{
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: †		П			_	ļ	J									-+	+	-	1	+	-										
L	CLAY (85%) litile sit, yellow brown (10YR 5/4)			_										-		1	1		ſ	┢											l
	GRAVEL 1 to 3 mm, angular to subangular fimestone and sandstone, yellow brown (10YR 5/4)	П		_	4						8			{	-+	+	-	╀	≯	ł											
Ţ		Н				-4										1			Ž	7									Ē		
			\square						3,50	荒縣		_			_	_	-	ļ	1	╀	_		•						HU1 & HU2		
	SiLT (80%) little sand (very line grained), trace gravel, yellow (2.5Y 7/6 to 6/5)	Н	+	_					<u>Teri</u>	- E.	8					1		Ť	χĹ	╞									⊼ 		
		П	\square	_		4		50	2. A	8	Ĩ			_	-	+	_	-4	4	╇										1	Į
_		Н					10.01	ATA A		100					1			₿				38.33	37.35						11	UCRS	1
Ī	GRAVEL (80%) 2 to 4 mm, subangular limestone and sandstone, little silt, yellow (2.5Y 7/8 to 8/8)	Π		1	-	80		\$ 1	<u>E</u> at	s and a second					-	-	-	+	Ж	╉		ធ្ 1	L						łl-	ł	
ì	2/10 23/105/0/10, 4/10 50L, YEIOW (2.31 7/0/10 0/03)	+-					2 (723			284 72	đ				\neg			才	+	╉	-										
hiser Continental Langersty	SAND (80%) very line grained, subangular, clear quartz, little silt, yolkow (2,5Y 7/6)		Г			ş	對			1	1 [4	4	Į	Ţ	Ţ	Ţ	-	ŀ									
Į		+	⊢∤						出当			H	\vdash		_	Ⅎ	Ĵ	╈	+	+	-	ł		i							
-	SAND (75%) very fine grained, angular to subrounded, clear to milky quartz, fittle silt, trace		Ц		Ψ	98) 	<u> </u>			ja Li	8	=				4	4	╡	╉	Ŧ		ł			łł				≁		
	gravel, yellow (2.5Y 7/6)	Н	$\left \cdot \right $		H	╉	Ċ		たた	腦		┢	E		╡	ſ	Ӈ	╈	╈	┢	-			Ś				-	蓝		1
	GRAVEL (80%) 1 to 5 mm, subangular to subrounded, little slit, yelkow (10YR 7/6)	口		_	-						ŀ	F	F	\neg	1	4	₹	Ŧ	Ŧ	Ŧ			·	57,35		11101014	0637		↑	∦	
	GRAVEL (90%) 1 mm to 30 mm, angular, trace sit, yellow (10YR 7/6)	\vdash	╞┤	_			E.				8		H			1	X	╈	\pm	F	₫.]		l		Pumped 5U ug/L1	ÎCE.				l
	GRAVEL (60%) 1 to 30 mm, angular, sandy (very	\square	\square	A	000	9		353		100	ື				-	4	4	-			-		1			0 +/- Ö pC	N, "T	c			
ŀ	coarse grained), trace silt, yebow brown (10YR 6/6) SAND very fine grained, very pale brown (10YR 7/3)	\vdash		9	Ĩ	\$	ڊ ببي	مد	م. بىبىد								才										nean		1 Ž		
Ì	SAND (90%) coarse to very coarse grained, clear to translucent quartz, trace dark accessory minerals,	\square				Ţ	<u></u>	御		-	ł				+	J	+	╇	_	-	Ħ					1110101-1 Pumped 5U ug/L	ICE		Ĩ		
	silica-cemented very fine grained sand, trace silt, light yellow brown (10YR 6/4)			_	4	\leq		÷	-	-	3				Ĭ	4	士				1					0 +/- Ö pC	₩L " T	Ċ			
ţ	AND very fine grained, slity in part, light yellow ovn (10YR 6/4)	╄			\vdash	-	Ť	i.		<u>.</u>	<u>і</u> .		-			Ⅎ)	+	╉	+	4				١I				11	₽	ĺ
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	GRAVEL 5 to 30 mm, angular limestone w/ some sandstone and chert, scattered sand (coarse grained), prownish yaikw (10YR 6/8)			4	108				0020		8				+	╉	齐	4		+	┥										
		Ł		-9	202	<u>.</u>	000			30						7	1	4													
	GRAVEL 5 to 30 mm, dark brown (10YR 3/3)	┢	\vdash	Å Å			0.00					┡	┝┤	$\left \right $	-+	┥	╉	∄	╉	╉	┥			ļ					HUS		l
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	GRAVEL (90%) 5 to 30 mm, trace sand (coarse grained), brownish yellow (10YR 6/8)	F		6	B ₀		60	2 0 0		000		ŀ			-		_	+	-	÷	F										
		┢					uni Vini	ne.	-0• 		ī				1	7	1	t	+					_					Ť	Ť	
	CLAY very dark gray (2.5YR N3/1) motiled at top w/ brownish yellow (10YR 6/6), dry, firm, micaceous			-		al and and and and and and and and and and		1			ľ	\vdash			_}	4	┥	+	╀	╀	4								1		
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Hadme Crack Class	CLAY (95%) trace sill, scattered sand (very fine	╞	\mathbb{H}	┣—	\mathbb{H}	Ê		-				┝	\vdash	\mathbb{H}	4	╉	╉	╉	╀	+	┦				$\ $						
5	grained), very dark gray (2.5YR N3/1), very dry, lean	F	Ħ	Ē		#	ļ	Ţ	j		ч <u>т</u>				ţ	1	1	‡	1	1	1								1		
		-	\parallel	┣—	$\left \right $	ł	S.		<u> </u>			┝	$\left \right $		री	╉	╉	╉	+	+	-								1		
	CLAY (85%) little sand (very fine grained), very dark gray (2.5Y N3/1), micaceous		L			1						F			{	7	1	╪	1	1	1				$\ $				1		
1		\vdash	+-	┢┙	┝╌┼	+	╉	£	ΣΞ.		120	┢	H	\square	-1		╈	╉	+		┦										İ.
		F	Г	F	\square	1	ľ					\square		4	ļ	Д	1	7	Ţ	1]								1	McNalty Flow System	
Į	CLAY (75%) some sand (very fine fine grained), very dark gray (2.5Y N3/1)	+	\vdash	┢──	\vdash	+	ې د بې	Ş				\vdash	\vdash	$\left \right $	4	4	+	+	╉	+	-				$\left(\right)$					γFlow	{
M-Nairy Enmation			1_	F	۲Ţ	<u>نې</u>		\$ A	你们	6	130	-	Γ		1	<u>۲</u>	1	1							$\ $					v Syste	
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	CLAY (90%) trace send, very dark gray (2,5Y N3/1)		Γ.	Г	П	1	-				140	F			-	4	Ţ	T	1	Ţ]			• • • •		• • •					8.47 111
	.	\vdash	-	-	┝╌┝	╉	╞	E C				F	H		╡	┨		╈	1	╈	-					1110101-	0640 -				Elevation: 368.47 PGDP Coord: N 1182 D E 1731 D
	GRAVEL (90%) 1 to 20 mm, angular, trace sand (coarse grained, pyritized), very dark gray (2.5Y N3/1)	F	Ē	F	ГÌ	4	1	<u>1111</u>				F			-	4	Ţ	Ţ	T	F	B				łł	Pumped 5U ug/L 5 +/- 10 p	TCE	Te			- 1291
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	150 TOTAL DEPTH	F		[_			-	Ţ	T			\square	F	H	_	4	┦	┦	Ţ	Ŧ	-								1		R
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·	CLAY (60%) silty, trace sand (very fine grained guartz), brownish yellow (10YR 7/6), soft			┝┼┼┼	┼┼┼					Î
,			10							
Ulther	CLAY (80%) little silt, trace aand (very fine grained, well sorted clear quartz), light gray (10YR 7/2) mottled w/ ysikow (10YR 7/5)		20						 <u>-</u>	
Upper Continental Deposits	CLAY (60%) sandy (very fine grained, well sorted clear quartz), light gray (10YR 7/2) mottled w/ yellow (10YR 7/8)						27.5		HUT & HU2	UCRS -
Depends	GRAVEL 5 mm, rounded, sandy to sility matrix, yellow brown (10YR 5/8) to brown yellow (10YR 5/8)		30				327 -			
	GRAVEL (70%) 2 to 5 mm, angular chert, sandy, trace silt, multicolor				\mathbb{R}					
	GRAVEL (80%) 10 to 15 mm, angular chort w/ occasional sandstone, little sand, light gray (10YR 7/1) to yellowish red (SYR 5/8) to gray (10YR 8/2)		40	╞━╃┼┼┥		┝┼╶┾╼┿╴┤ ┥┥┥┝┍┥				.
-	CLAY (90%) trace gravel (20 mm), light gray (2.5Y 7/0), lirm, homogeneous								E.	
,	GRAVEL (90%) 10 to 15 mm, angular chart, trace sand, light gray (7.5YR N7/0)		50	″╞╾┿╾┿╸┿ ┝╾┿╾┿╸┿						$\left\ \cdot \right\ $
- Lower	GRAVEL 2 to 5 mm, subangular to subrounded, chert, light gray (7.5YR N7/D)		8					. 1110101-0751 Pumped 5U ug/L TCE 4 +/- 3 pC/L =Tc		
Continental	GRAVEL (90%) 10 mm to 20 mm, angular chert, some fractures indicating larger pieces, trace sand, light gray (7.5YR N7/0)	2000 2000 2000 2000 2000 2000 2000 200		╽╸┥╶┥╴╵	<u></u> +		8	1110101-0753	HUS	RGA
nt Deposits	GRAVEL (90%) 2 to 20 mm, angular chart, some fractures indicating larger pleces, trace sand, light gray (7.5YR N7/0)	10000000000000000000000000000000000000	70				68,72°	Pumped 5U ug/L TCE 0+/-0pCi/L "Ta		
- . <u>+</u>	GRAVEL, (60%) 2 to 20 mm, angular chert, sandy stylery fine to very coarse grained; moderately sorted, forounded, light gray (5YR 7/1)						B0,42	1110101-0752		
Porte	CLAY light oliva brown (2.57 5/4) mottled w/ light brownish gray (10YR 8/2), firm, homogeneous, Iran staining		80					Pumped SU ug/L TCE 0 +/-0 pCi/L "Tc		.
s Creek Clay	CLAY (85%) trace sand (light gray quart2), dark gray (2.5Y N4/0), firm homogeneous		D01 06							McNairy
	CLAY (90%) trace šilt, dark gray (2.5Y N4/D), Increasing softness		110							McNairy Flow System
	CLAY (70%) some silt, abundant blobie w/ some lignitic material, dark gray (2.57 N4/0), soft									{
, ₹	CLAY (60%) silly, decreasing biotile, occasional aand (quartz), dark gray (2.5Y N4/D) increasing soliness		120						ļ	
McNairy Formation	CLAY (60%) sandy (fine to very fine grained, moderalely sorted), trace bloble, trace pynte, gray (2.SY NS/D), soft						!	1110101-0754 Pumped . SU ug/L TCE 9 +/- 42 pCVL "Tc	.	
ا	CLAY (80%) little sand (fine to very fine grained, moderately sorted), trace biolite, trace pyrile, gray (2.5Y NGD), soft		130				1			PGDP Coord
, -	GRAVEL (60%) 8 to 10 mm sandstone, sandy (fine to very line greined, pyritized), grey (2.5Y NS/0), hard to very firm.		140				<u>_</u>	1110101-0755 Pumped 5U ug/L TCE 3 +/- 70 pCi/L TC -		Elevation: 357,11 PGDP Coord: N 592,8,15 2820,1
	CLAY (60%) sandy (very fine to fine grained, gray to clear), abundant mice, gray (10YR 8/1), soft									2820.1
	150 TOTAL DEPTH		8							P40
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1	LITHOLOGY	0 GAMMA - API 100	0 }		 WL	ANALYTICAL		
	SILT (75%), little clay, trace gravel (2 to 5 mm, angular), brown (10YR S/3) to dark brown (10YR 4/3), soft							
	.ILT (80%) fittle clay, trace scattered gravel (2 to 3 mm, limestone and sandstone), some kon stalning, yalkow brown (10YR 5/8)		10 19112943 19171					
	CLAY (80%), little alit, occasional sand, light olive brown (2.57 5/4) motiled yellow brown (10YR 5/8) occasionally from iron staining		A CULENCE	<mark>╞╶┼╼┵╧┾╧╎╴┤╶┝╢╷┦╞╼╓</mark> <mark>┝╼┿╴┼╶┼╌┑╼╌╴╢╴┥</mark> ╸╴				
	CLAY (80%), little slit, occasional sand, light offve brown (2.57 5/4) increased motiled yellow brown (10YR 5/6) from Iron staining		20	╔ ┥╴┥╴┥╴┥╴┥╴┥╴┥╸╎╸┥╸╎ ╔╴┨╺┲╸╅╴┨╶┥╼┅╢┥╴┱╼┥			HU1 & HU2	
	SILT clayey, little sand (very fine grained) becoming sondier (coarse grained, subangular clear quartz) w/ depth, brown yellow (10YR 6/6)		<u>1945:11111111111111111111111111111111111</u>		:		UCRS	
Upper Continental Deposits	SAND very fine to medium grained w/ scattered 1 to 3 mm pebbles, fining upward, yellow brown (10YR 5/6)		New York Control of State				RS	
al Deposits	SILT (85%) little sand (very fine to fine grained, subangular to angular, clear to milky quanz), very pale brown (10YR 7/4)				50.11 49.07 51			
	StLT (60%) Ettle sand (very fine to fine grained, subangular to angular, clear to milly querz), scattered t0 to 20 mm gravel, brown yellow (10YR 6/6)		1997) (1997) (1997) 60		58.11 51.76			· · ·
	SILT trace sand, light yellowish brown (10YR 6/4)						HU3	
	SAND very fine to occasionally coarse grained, predominantly fine grained, sity in part, subangular, clear to transfucent quartz, trace mica, scattered dark accessory minerals, increased sit at bottom, yellowish brown (10YR 5/4 to 5/8)		telestantikaseguenen 01				<>	
	GRAVEL 2 to 30 mm, engular to subangular limestone wi some sandstone and scattered quartz little sand (medium to coarse grained) scattered chert, abundant icon staining on weathered surfaces		<u>8 0 01 08 0 08</u> 08			1110101-0632 Pumped 5U upt_TCE 11 +/-25 pC/L_TC	RGA	
Covver Conlinerital Deposits			22.0.001.02.02.001.001.001.001.001.001.0			111010-0633 Pumped 40.7 ugt_TCE 21 +/- 9 pC/L **Te	HUS	
-> Creek	CLAY (90%) trace sill, very dark gray (2.5YR N3/1), slightly plastic, firm to stiff, homogeneous		110		.	1110101-0834 Pumped 60.7 ug/L. TCE		
	SAND very fine grained, very dark gray (2,5Y N/3) et top, becoming librifled at 118.5', predominanily medium grained, clear to milky quartz, pyritized, some mica, very dark gray brown (10YR 3/2), unconsolidated at 117		120 120			3J 00/L CIS DCE 18 +/- 81 pCi/L "Tc 1110101-0635 Pumped 5U 00/L TCE		
 	SAND very fine to fine grained becoming coarser w/ depth, subangular to angular, clear to milky to translucant quartz, trace silt, brown yellow (10YR 6/6)		0 0		124.1"	4 +/- БрСИL ^{те} Тс		
McNuiry Formation	SAND (90%) very fine grained, predominently clear quartz, some dark accessory minerals, silly in part (very fine layers from 131' to 133'), very dark gray (SYR 4/1 to 3/1)		130			1110101-0636 Pumped 1U ug/L_TCE_	McNairy Flow System	1
noite 1	SILT (60%) little sand (very fine grained, predominantly clear quartz), very dark gray (SYR 4/1 to 3/1)		2412792	┝┼┼┼┾╢┼╼┿┥╴╤╸		8 +/- 6 pCi/L "Tc	' System	Elevation: PGDP Co
	SILT sandy (interbedded very fina grained sand), very dark gray (SYR 4/1 to 3/1)		140		ļ			980.14 N 14
, T	CLAY silty, sandy, micaceous, very dark gray (SYR 4/1 to 3/1), firm to slightly plastic							Elevaion: 380.14 PGDP Coord: N 1413.0, W 1815.1
'	150 TOTAL DEPTH	╋╋╋╋╋╋╋╋╋╋╋╋╋╋╋╋	3		ĺ			ק
								4D
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	LITHOLOGY	K		WL ANALYTICAL	
Î	GRAVEL (75%), 3 to 5 mm. IIINe sand (very fine grained, well socted, subrounded, while (10YR 8/1)), little clay, black (10YR 2/1) and yellowish brown (10YR 5/8)				
ļ	'AY (80%) little sill, occasional sand (very fine shred, subrounded to subangular, clear), light gray , UYr 7/2) motified brownish yellow (10YR 6/8) w/ iron staining, soft				
	CLAY (80%), Etila send (very fina to fine grained, poorly sorted, subrounded, occasional subengular, multi-colored, cleer to browish yellow (10YR 6/8) to red (2.5YR 5/8) to black (2.5YR 2.5/0)), light gray (10YR 7/2)				HUI & HU2
Upper Conlinental Deposits	CLAY (60%), sandy (vary fine to fune grained, poorly sonted, subrounded, occasional subargular, multi- colored, clear to browlah yellow (10YR 6/8) to red (2.5YR 5/8) to black (2.5YR 2.5/0)), trace garavel, light gray (10YR 7/2)				UCRS
Ĩ	SAND (60%) very fine grained, subrounded to subangular, multicolor, clayey, brownish yellow (10YR 6/6), soft			47.22	
	CLAY (60%) sandy (very fine to medium grained, poorly sorted, aubangular to subrounded), silly in part, brownish yellow (10YR 6/8), soft		╡ ╡ ╡ ╡ ┥ ┥ ┥ ┥ ┥ ┥ ┥ ┥ く ┥ く ┥ く く く く	58.8° 50.05 ⁵	
	GRAVEL (60%) 5 to 10 mm chert, sandy (line grained w/ occasional medium grained, poorly sorted, subrounded to subangular), strong brown (7.5YR 5/8) to reddish yellow (7.5YR 6/5), unconsolidated				
(GRAVEL 5 to 20 mm chert, sandy (fine grained w opccasional medium grained, poorly sorted, bibrounded to subangular), strong brown (7.5YR 6) to reddish yellow (7.5YR 8/6), unconsolidated			1110101-0695 Pumped	
Lowo	GRAVEL 5 to 30 mm chert w/ sendstone, some sand, iron staining, hard, strong brown (7.5YR 5/8), (Note: water color strong brown (7.5YR 4/8))	2000 - 20		7.2 bp/L TCÉ 19 +/- 21 pC/L "Te	
Lower Continental Deposits	GRAVEL 5 to 40 mm, increased sand (line to medium grained w some coarse grained, poorly sorted, subrounded) increased iron staining, reddish yellow (7.SYR 5/6), unconsolidated				E.
	GRAVEL 5 to 50 mm, some sand (very fine to coarse grained, poorly soried, subrounded), little silt, red yellow (7.51/R 6/8)				
ļ	GRAVEL 5 to 50 mm, little sand (fine to coarse grained), little silt, red yellow (7.5YR 6/8)				
Î	SILT sandy (very fine grained, well sorted), micaceous, <1 mm taminar bedding, dark gray brown (10YR 4/2), cohesive, non-plastic, occasional zones of iron oxides, drills into chips			1110101-0698	
McNairy Formation	SAND (80%) very fine grained, subrounded, predominantly clear quartz), some dark accessory minerals, little sitz, dark gray (SYR 4/1)] Pumped 3.3J ug/L TCE 0 +/- 0 pCi/L "Tc	Eleveration: PGDP Coo
Sion	SILT (80%) little sand (vary fins grained, subrounded) dark gray (SYR 4/1), cohesive, slightly static			1110101-0699	Elevalar: 376.57 PGDP Coord: N 1551.1, W 1135.8 ow System
	150 TOTAL DEPTH			Pitmped 5U upt. TCE 26+/- 21 pCifl. "Tc	• P4D5

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LITHOLOGY	0 GAMMA - API 100		WE ANALYTIC/	
SAND (55%), vary fine to međum greined, silly, same toot hairs, yellowish brown (10YR 5/8) , Y (80%) Bille sill, trace sand, yellowish brown (10YR 5/4), slightly cohesive, damp		а а	11.02	
SILT trace clay, light yellowish brown (10YR 6/4) to very pale brown (10YR 8/3), moist to wet		8	1110301-0560 Balled 5U ug/L TCE NA "Tc	HU1 & HU2
SILT some sand (very fine grained), occessional gravel (6 to 12 mm), yefow (10YR 6/4)		8		Ţ Ì
gravel (6 to 12 mm), yellow (10YR 6/4) SILT (85%) little clay, trace sand (very fine grained), brownish yellow (10YR 6/5) CLAY silty, silt increases w/ depth, trace gravel, brownish yellow (10YR 6/6) (? Does not agree w/				
CLAY silty, silt increases w/ depth, trace gravel, brownish yellow (10YR 6/6) (? Does not agree w/ geophysica)			45.1 12.1	
SILT (65%) sandy (very fine grained, subrounded to rounded), sand increases w/ depth, brownish yellow (10VR 6/6)		8		
SAND (90%) very fine grained, trace silt, trace gravel, yellow (107R 7/6) (? Does not agree w/ geophysics)				
SAND little clay, yellow (10YR 7/6)				롲
GRAVEL (90%) 8 to 18 mm, trace sand (coarse grained), strong brown (7.5YR 5/8)			1110101-0801 Pumped 3J ug/L TCE 0+/-20 pCVL *1	
GRAVEL (90%) predominantly 3 to 6 mm w/ trace 18 to 25 mm, engular Emesione, trace send (coarse grained, clear queitz), trace clay, evidence of recommented fragments, stong brown (7.5YR 5/8)		8	78.5	
GRAVEL (85%) predominantly 3 to 6 mm w/ trace 18 to 25 mm, angular finestone, trace allit, trace asnd (coarse grained, clear quartz), stong brown (7.5YR 5/5)			88 1110101-0602 Bailed 98 ug/L TCE	ROA
GRAVEL (80%) predominantly 3 to 6 mm w/ trace 18 to 25 mm, angular timestone, trace sond (coarse grahed, clear quartz), trace clay, evidence of recemented tragments, slong brown (7.5YR 5/6) GRAVEL (80%) 3 to 6 mm, angular, ittle sond			NA "TC	
(medium to coarse grained), yellow (10YR 7/5 to 7/8)		8		
GRAVEL (95%) 6 to 18 mm, angular, trace sand (coarse grained), yelkow (10YR 7/6 to 7/8) GRAVEL predominantly 2 to 6 mm, fittle 8 to 12 mm, trace sand. (coarse grained), reddish yelkow (7.5YR	۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵. ۵			
Irace sand. (coarse grained), reddish yslkow (7,5YR 6/6 to 6/8) GRAVEL (60%) some slit, trace sand (fine grained), reddish yellow (7,5YR 6/5 to 6/8)			1110101-0606 Pumped 33 ug/L TCE 10 +/- 19 pCi/L	
CLAY trace sill, trace sand (very fine grained), micaceous, dark grayish brown (10YR 4/2), fat, very sücky				
SANDSTONE very fine grained, little silt in upper portion becoming cleaner wi depth, micaceous, gray (10YR 5/1) washiered very pale brown (10YR 7/3) and yellow (10YR 7/6) SANDSTONE very fine grained, subangular to subrounded, clear quartz, micaceous, some troft		8	1110101-0608 B Pumped SU ug/L TCE	4
slaining, gray (10YR 5/1) waathered vary pale brown (10YR 7/3) and yellow (10YR 7/6)			* 2 +/- 5 pCi/L = Tc 1110101-0909 (Duplicate) Pumped 1.5J ug/L TCE 14 +/- 64 pCi/L **	PGDP Coo ally Flow Sy
AV silty, silt increases w/ depth, dark gray brown (O'YR 4/1)			1110101-0610 Pumped 1.3J ug4, TCE	
147 TOTAL DEPTH			0 +/- 0 pC/L *T	

	LITHOLOGY	0 GAMMA - API 100		WL ANALYTICAL	HYDRO
Î	SiLT (70%), soma sand (very fine to fine grained. subrounded), dark yellow brown (10YR 4/8)				
	"ILT (70%) some send (very fine grained), light low brown (10YR 6/4), slightly cohesive, damp				
	SILT (70%) some sand (very fine grained), yellowish brown (10YR 5/8) becoming very pale brown (10YR 8/4)				
	SAND (75%) very fine to fine grained, subrounded quartz, some silt, light yellow brown (10YR 6/8)				
Unper Continental Deposits	SILT (60%) clayey, trace sand (very fine grained), yellow (10YR 7/8)				HU1 & HU2
ntiquatal (J	CLAY (90%) trace slit, yellow (10YR 7/8)		\$		
leposits	SILT (50%) and SAND very fine to medium grained, subrounded, light yellow brown (10YR 6/4)			4.63 4.63 1110101-0200 → 1 50 upL TCE NA "Te	
	GRAVEL (50%) 6 to 12 mm, and SAND, trace slit, very pale brown (10YR 8/4)				
	SAND (60%) very line to medium grained, silty, very pale brown (10YR 8/4)				
	GRAVEL (60%) 5 to 30 mm, chert, sandy (fine to coarse grained, poorly sorted), reddish yellow (7.5YR 6/6)		8	11101D1-0202 Purnped SU ug/L TCE 14 +/- 24 pCi/L "Tc	
	SAND (65%) very fine to medium graned, Oderately sorted, subrounded, siliceous, little silt 3%), very pale brown (10YR 8/4)			77.42°	HU3
-> Contin	GRAVEL (80%) 6 to 30 mm, subrounded to angular chert and weathered shale, little sand (fine to coarse grained, poorly sorted quartz w/ some feldspars), recidish yellow (7.5YR 6/6)		3		
over Continential Depopils	GRAVEL (80%) 6 to 30 mm, subrounded to angular chert and waathered shale, little sand (fine to coarse grained, poorly sorted quartz w/ some (ektspars), reddish yellow (7.5YR 7/8), Increasing oxidetion		8		HUS
ļ	CLAY some mica (muscovite), trace blue-green mudstone lithic remnants, black (SYR 5/1), very fat, plastic				
	SILT clayey, very pale brown (10YR 8/4)		8		
McNoiry Formation	SANDSTONE very line grained, well sorted, subrounded to rounded, trace mafic minerals, trace mice, some oxidation, very paic brown (10YR 8/4) to light gray (10YR 5/1)		12 12 12 12 12 12 12 12 12 12 12 12 12 1	1110101-0210 Pumped SU ug/L TCE 0 +/- 0 pC/L *Tc	PGDP Co McNairy Flow System
	dill,T sandy (Very fine grained, subrounded), micaceous, trace gisuconite, dark gray (10YR 4/1)			+1110101-0211 Pumped 5U og1. TCE 11 +/- 19 pC/L *Tc	m 722.0
	150' TOTAL DEPTH				

	LITHOLOGY			WL ANALYTICAL	HYDRO
	SILT (70%), little sand (very line to line grained, subrounded), trace clay, dark yellow brown (10YR 4/6)				
	SILT (70%) some sand (fine to very fine grained, subrounded), sand increases w/ depth, brownish yellow (10YR 6/5)		8		
-	SAND (60%) very fine grainad, subangular to subrounded, graveBy (6 to 12 mm chert, sandstone and weathored shale), very pale brown (10YR 7/4)				
na finnin	CLAY silly, trace sand (very fine grained), yellow (10YR 7/8), plastic				Ĕ
ي المسادر (الاالمالمالي) مسيحاط	SILT (50%) and SAND (50%) very fine grained, subrounded, trace clay, light yellow brown (10YR 6/4)				HU1 A HU2
nala 	SILT clayey, light ysZow brown (10YR 6/4), cohesive			ბ. ფ. ა	
	GRAVEL (30%), SAND (30%) and SILT (30%), interbedded graded sequence, light yellow brown (10YR 6/4)			165	
•	GRAVEL (50%) 6 to 30 mm chart, sandstone and shale, and SAND (45%) very fine to medium grained, moderately sorted, subrounded to subangular, trace sit, light yallow brown (10/R 6/4) SAND (60%) very fine to fine grained, moderately sorted, subangular to subrounded, sity, very pale			5 12	
,	scred, subangular to subrounded, sity, very pale brown (10YR 8/4) SAND very fine to fine grained, moderately sorted; subangular to subrounded, little sit, very pale brown				
	(10YR 8/4) SAND very fine to fine grained, moderately sorted, subangular to subrounded, little gravel, very pale				
`	brown (10YR 8/4) GRAVEL (70%) some sand (very fine grained, subrounded, light gray (10YR 6/2)			1110101-0213	
-	SAND (70%) very fina grained, subrounded, some			Pumped 5U ug/L TCE 10 +/- 25 pCi/L "Tc	₹ ↓
· 1	tAVEL (70%) 3 to 12 mm chert, Emestone, sandstone and state(?), some sand, light gray (10YR				
, I own	6/2) GRAVEL (70%) 6 to 18 mm chert, limestone, sandstone and slate(?), some sand, light gray (10YR	50.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
r Contuvental De	672) GRAVEL (70%) 12 to 25 mm chert, limestone, sandstone and slate(7), some sand, light gray (1DYR 6/2)			1110101-0226 Pumped 2J ug/L TCE	
nl:il Deposi	GRAVEL (70%) 12 to 25 mm chert, limestone, sandstone and slate(?), some sand, light yellow brown (10YR 6/4)				5
· 🖬	GRAVEL (60%) 6 to 25 mm w/ broken fragments indicating larger pleces, sendy (very fine to medium grained, well sorted), reddish yellow (7.57R 6/6)			139 ug/L TCE 139 ug/L TCE 17.7J ug/L 1,1 DCE 1J ug/L CCI, 34 +/- 21 pC/L, "Tc	
, <u>1</u>				1110101-0223 Pumped	
Porters Creek Clay	CLAY abundant mica, trace glauconitic mudstone, black (SY 2.5/1), very fat, plastic			119 ug/L TCE 6J ug/L 1,1 DCE 33 +/- 21 pC/L "Tc	
;	CLAY abundant mica, trace glauconilic mudsione, black (SY 2.5/1), very fat, plastic				
McNairy Formation	SILT (70%) some sand (very fine to fine grained, subangular), micaceous, trace glauconitic mudsione, dark gray (10YR 4/1)			1110101-0224 Pumped 5U ug/L TCE 0 +/- 0 pCi/L "Tc	Elevation: 380.12 FECEP Coord: S 604.1, W 686.1
,				1110101-0225 Pumped SU ugl. TCE 0 %- 6 pC/L "Tc	804.1.W 698.1
	150 TOTAL DEPTH				P4[
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	LITHOLOGY	GAMMA - API 100 100 NEUTRON POROSITY 0 WL	ANALYTICAL HYORO
	SILT (80%), little sand, abundant organic debris, very dark gray brown (10YR 3/2), soft, slightly damp		
	'.T clayey, scattered iron oxide stalning and ninations, yellowish brown (10YR 5/8)		
	SILY some clay, trace sand (very fine to fine grained red chen), yellowish brown (10YR 5/6)		
	SILT (85%) little sand (very fine to fine grained rod chert, increases to 30% and becomes predominantly very fine to medium grained, subangular to subrounded quartz), yellow (2.5Y 7/6) to olive yellow		
Upper	SAND (80%) vary fine to costse grained, poorty sorted, subangular quartz w/ scattered chert, gravelly (3 to 6 mm w/ some to 12 mm), trace slit, brownish yellow (10VR 6/3)		
Continental Deposits	SiLT claysy, trace send (15%) (very fine to fine grained, subangular to subrounded, percentage increases w/ depth), brownish yebow (10YR 6/6)		1110101-0611
	GRAVEL (65%) angular to subangular, some sand (fine to coarse grained, subangular), trace silt, brownish yellow (10YR 8/8)		Bailed
	SAND (50%) fine to medium grained, moderately sorted, subangular to subrounded, and SiLT, yetlowish brown (10YR 5/8)	80.77	
	CLAY silly, trace sand (very fine to fine grained, subrounded to subangular), micaceous, pale yellow (2.5Y 7/4)		
	CLAY sandy (very fine to occasionally line grained, moderately well sorted, subangular to subrounded, with trownish gray (10YR 6/2)		
	SAND fine to medium grained, moderately sorted, subangular to subrounded, clean, scattered mice, light brownish gray (10YR 6/2), grain size and mice content increase w/ depth		- HU4
<- Lower Co	GRAVEL (90%) 3 to 28 mm, angular to aubangular w/ occasional subrounded limastone, chert and sandstone, trace sand, brownish yellow (10YR 6/8)		1110101-0612 Pumped 441 ug/L TCE 10.1 ug/L 1,1 DCE 20 +/- 21 pCi/L "Tc
Continental Deposits	GRAVEL (85%) 6 to 25 mm, angular to subrounded imestone, chert and sandstone, little sand, olive yellow (2.5Y 6/6)		1110101-0613 Pumped 677 ug/L TCE
Ţ	GRAVEL (65%) 3 to 6 mm, some sand and silt, yellow brown (10YR 6/8)		15 ug/L 1,1 DCE 1.4 Jug/L 1,1,1 TCA 53 +/- 22 pC/L *Tc
Porters Greek Clay	CLAY micaceous from 110' to 116', very dark gray (2.5Y NJ/1), firm, dense, homogeneous, high plasticity, moist, very slicky		
Î	CLAY fittle sill, trace sand (very fine to fine grained), very dark gray (2.5Y N3/1)		
	CLAY silly, trace sand (very fine to fine greined quartz), micaceous, very dark gray (2.5Y N3/1), firm, slightly moist		
- McNairy Formation	SAND (65%) very fine to fine grained, subrounded, some silt, continon dark gray to black accessory minerals griving overall sail and pepper appearance, trace glauconile, very dark gray (2.5Y N3/1) to dark greenish gray (5G 4/1)		McVairy Flow System
mation -	SILT sandy, mikaceous, trace black accessory minerals, very dark gray (10YR 3/1) SAND (65%) very fine grained, fairly well sorted,		1110101-0614 0 Pumped 0 S wal TCE 0
	subangular, common black accessory minerals, race glauconile, silty, gray (5Y 5/1) to dark gray (5Y (1) SAND (60%) very fine to fine grained, moderately	Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-Ξ-	1110101-0614 Pumped 5 ug/L TCE 57 +I-22 pC/L *Tc 1110101-0615 Pumped 2 ug/L TCF 9 1110101-0615 Pumped 2 ug/L TCF
	well sorted, subangular to subrounded, abundant black accessory minarais, common glauconita, gray (SY S/1) to dark gray (SY 4/1) 150 TOTAL DEPTH	<u> </u>	1110101-0815 Pumped 2 ug/L TCE 5+/- 25 pC/L "Te
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Į	LITHOLOGY	0 GAMMA - API 100	ļ	100 NE		POROS	• ۲۲	WL	ANALYTICAL	
$\left \right $	SILY (70%), some sand, very fine grained, subrounded, yelkowish brown (10YR 5/4)									
	ILT some send (very fine grained, subengular), trace clay, occasional iron oxide staining, dark brown (10YR 4/3)		01							
	SILT some clay, trace sand (very fine to fine grained red chert), yellowish brown (10YR \$76)		10	┇ <mark>╞╼┧╶┼</mark> ┇┝╌┧╼╉╴	┼┼┽ ┽┼┼		┠╍╂╌┤			
	SAND (50%) very fine to fine grained, moderately soried, subangular quartz w/ some feldspar, sand percentage and grain size increase w/ depth, and SILT (50%), brownish yelkow (10YR 6/6)		05	┝╍┟╼╀ ┝╍┟╾┥ ┝─┼	┼┼┽					HU1 & HU2
	SAND (60%) very fine to coarse greined, pointy sorted, subangular quartz w/ some feldspar, gravelly (6 to 18 mm, angular chart and sandstone), trace sit, brownish yelkow (10YR \$76)		0	° 		┿╋				н Н
Upper Continental Deposits	SILT (60%), some sand (30%)(very fine to medium grained, moderalely sorted, subrounded), light y=20w brown (10YR 644)		40	╞┼╼╄ ╞┝┨╶┾						UCRS
Deposits	GRAVEL (50%) to 18 mm, angular to subrounded chert and sandstone, and SAND (very fine to coarse grained, subangular quartz wi some feldspar), trace sit, browniah yalow (10YR 6/6)		8	3				51.85		
	SAND (50%) very fine to fine grained, moderately soned, subangular quanz, and SILT, light yellowish brown (10YR 6/4)		8					58.16 [°]		
	SAND (50%) very line to line grained, moderately soriad, subangular quartz, and SILT, brownish yetrow (10YR 5/8)		70							HU3
4	SAND (80%) very fine grained, well sorted. ubrounded quartz w/ trace fine grained faktspar, itile sin, light gray (10YR 7/2), cohesive									HŲ
C Lower Condiniental Deposits	GRAVEL (80%) 3 to 25 mm oblong, submunded to angular chert, weathered shale and sandstone, little sand (fine to coarse grained, poorly sorted), reddish yellow (7.5YR 6/5)		5						1110101-0231 Pumped 104 ug/L TCE . 57 +/. 22 pC/L = TC 1110101-0232 Pumped 1722 ug/L TCE 29 +/. 21 pC/L **Tc 1110101-0233 Pumped 1720 ug/L TCE	RGA HUS
	GRAVEL (90%) to 25 mm, red yellow (10YR 6/6)		100						50 +/- 21 pC//L "Tc	- <u> +-</u> +
Porters Circek Clay	CLAY micaceous, trace glauconite and blue-green mudstone liths, black (SY 2.5/1), very fat, plastic		110					116.36	1110101-0236 Bailed	
	SANDSTONE very fine grained, well sorted, subrounded to rounded, moderately well cemented, yearow (10YR 8/6), drills into chips		120]	413.6 ug/L TCE NA "Tc 1110101-0237 (Ouplicate)	
	SAND (60%) very fine grained, subangular, silly, trace glauconite, dark gray (10YR 4/1), cohesive							. [[Balled 340 ug/L TCE NA ™Tc	PGOP McNainy Flow System
McNairy Formation	SANDSIONE very fine grained, well sorted, subrounded to rounded, moderalely well cemented, trace pyrite, yellow (10YR 8/6) Interbedded wi white and dark gray material		120	┇┝┽╾┤ ┥┥┥┥	<mark>┼╊╋</mark> ╋┦┨	╤┼┾╾ ┿╍┼╴				w System
alion	SAND (50%) very fine grained, well sorted, subangular, and SILT, dark gray (10YR 4/1)		_					•	1110101-0238 Pumped	erd; S 1
	GRAVEL sandy, yellow (10YR 8/6) and white, tots of water SAND (50%) very fine grained, subangular, and SILT, micaceous, trace glauconite, dark gray (10YR 4/1)		140						12 ug/L TCE 19 +/- 23 pC/L "Te 1110101-0239 Pumped	PGDP Coord: S 1655.1, W 733.4 lystem
	150 TOTAL DEPTH		150	┇┝╼┼╼┿ ┝╺┿╼┿ ┝╺┿╼┿	╋╋ ┙ ╋ ╋ ╋	╺╂╼┨╼ ╺┼╴┠╼ ╺┽╴┠╼	┝╌╎┵ ┝╴╎╼ ┝╴╎╼┥	J	50 ug/L TCE 19 */- 20 pCi/L *Te	レート スポンコー ノード
	· · · · · · · · · · · · · · · · · · ·		ļ						<u> </u>	

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	LITHOLOGY	0 GA	MMA - API 100		100 e	NE	ЛRC	N P	OROS	SITY (WL	ANALYTICAL	HYDRO
Î	SILT (80%), fittle clay, abundant organics, very dark gray brown (10YR 3/2), damp	┯┯			F	_	$\left \right $		F-				ÎÎ
					F	-		+-		\square	-		
				5	<u>E</u>			+-			1		
	SILT (85%) little clay, trace sand (very fine grained) Increasing w/ depth to 5%, yellow brown (10YR 5/4	╺┼┼┼			┝┥		╎┼	┽╴	┟╌┼╴	╉┼	ł	•	
	to 5/6) mottled occasionally dark brown				F	_		-			-		
	'			12	E	_		1			1		
		┼╌┼╴┞╕			┝╍┤		┞┼		┟╌┟╸	┽┼	4		
					F		$\left \right $	1-			-		Ŧ
	GRAVEL (60%) 1 to 10 mm, angular to subrounded, some scattered chert fragments, sity, sandy in part (very fine to very coarse grained), yellow brown			8	日			╧			1		6 HU2
filme ((10YR 5/4 to 5/6) mottled occasionally dark brown				H			+		++	-		
Upper Continental Deleasts	SILT (80%) lillle clay, trace sand (upper portion w/	╾┼╾┼╴┠╴			┢┥	_	╞╌┠╸	╉	┝┼╴	┿╀	-		
ntal De	scattered gravel), brown yellow (10YR 6/6 to 6/8)			ŧ	口			1-			1		
Instite	GRAVEL (60%) 2 to 7 mm, engular, abundant chert, sandy (fine to coarse grained), brown yellow (10YR				H		╞╌╄	+_	┟┼╸	+	- -		
	6/6)				┝┤	+	+		┝┼╴	┼╀	46.31 47.58 17.59		
				8	F		┢╌╁			\mp	1 i		
	SAND (75%) fine to medium grained, subangular to subrounded, some scattered 1 to 2 mm pebbles, some silt, brown yellow (10YR 6/6 to 6/8)				H			+-			55.42		
		┼┽┼		'	╞╼╡	╪	╞╼╞	+-	┝┼	+++-			┼╬╌║
	CLAY silly, trace sand (very fine grained) in part			8	F			1-		+			
	increasing w/ depth, plive yellow (2.5Y 6/6)	╺┽ <u>╶</u> ┼┼╴ ╷╶╢╸╎			H	\pm		+-					ΗU
		┼╂┿			┝┥		┢┼	┿╸	\vdash	++	4		
	SAND (80%) very fine to fine grained, subangular to subrounded, little sitt, scattered gravel, yellow (10YR		J	5	Ħ	+	Ħ	=					┼┵╪
Ţ	7/6)	╌┼┼┿			H			+-			<u> </u>		<u>₹</u> ,
-					Ħ		Ħ	╄	FF			1110101-0622 Pumped	<u>†</u> ↑¦
Not Co	GRAVEL (75%) 2 to 15 mm, scattered 20 to 30 mm, angular chert limastone and sandstone, some silt, dark gray brown (10YR 3/2) based on silt måtrix			8	F			1-			1-1	1.6J ug/L TCE 19 +/- 19 pCi/L "Tc	
over Continentil Derveite					口	+		1-				1110101-0623 Pumped	责
۳ ج	CLAY (60%) silty, yellow brown (18YR 5/4 to 5/6) motiled brown yellow (10YR 6/8)				E		$\left \right $	1-				1.4 J ug/L TCE 17 +/- 18 pCl/L "Tc	
			<u>)</u>	8	F				╞╌┠╴	+]		
					口	_					1 11		
					Ħ			1-]		
Porte	CLAY some six decreasingw/ depth sikihity		х. Х	ġ	┝┤	╈	╞┼	┢	┠╌┠━	┼╂			
Perters Greek Clay	CLAY some six decreasing —w/ depth, slightly micaceous, very dark gray (2.5Y N3/), homogeneous, very sticky, very plastic, damp to dry				F	_	$\left \cdot \right $	1-	\square]]]		
:k Clay	·				<u></u>	_		1-					
				19	E	_	ŀ	+-					
	CLAY silly, trace sand (fine grained, increasing w/	┼┼╄	 ∕		\vdash	+	┢╌┝	+-	╞╌┝	+]]]		McNai
	depth, very dark gray (2.5Y N3/) CLAY (75%) some silt, trace send, very dark gray						Ħ	1-					McNairy Flow System
¥	(2.5Y N3/)	╺┈┤╌┦╴╉╸ └╴╴╴╴╴╴		120	H	•		1		╞┼╸			Sysler
	SAND (60%) very fine grained, very dark gray (2.5Y	┼╌┼╌┞╴			┝┥	+	$\left \right $	╆╾			4 11		
	N3/)				F			1-		1.			
. 3	CLAY Mode shi, very dark gray (2.5Y N3/), homogeneous, plastic			ខី	H					++		Į	
Nitry		╌┼╌┼╌╴			\vdash	+	┝╌┝					1110101-0624	
McNoiry Formation	SAND (90%) very fine grained, subangular to subrounded, predominanity quartz (clear to milky), trace silt, very dark gray (2.5Y N3/)				F1	1	Ħ.	1-			↓	Pumped 1.3J ug/L TCE 9 +/- 23 pC/L **Tc	
lion –				₹.	H	+	╘	+-		╈	1		
	27. gray (2.5Y N4/)				$ \overline{ }$		$ \overline{ }$	+	+	+	-		
	SAND (85 to 95%) very fine grained, predominantly subangular w/ some subrounded, clear quartz, trace to little allt, micaceous, dark gray (2.5Y N4/)	17日 [[] [] [] [] [] [] [] [] []			口	+		1-			1	1110101-0625 Pumped 5U ug/L TCE	
	150 TOTAL DEPTH			ខ	H		E	+-		╞╋		10 +/- 18 pCVL "Tc	
		┼┼┼╴	┿╂┼┼┿╂┥		┝┥		$\left \right $			+	4		
		╪╪┼	╷╷╷┍ ╞┼┼┤		[]	-		╪			1		
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	LITHOLOGY	GAMMA - API 100		1	100 I	νeυ.	TRO	N PC		SITY	ہ ج	WL		ANALYTICAL	HYDF	20	_
	SILT (70%), some send, very fine greined, subangular, yellowish brown (10YR S/4), cohestvo		10														
	SAND (60%) very fine to medium grained, poor sorting, subrounded to angular, sand percentage increases to 80% by 30°, sily, yellow brown (10YR 5/4)		05 OZ									27,12	-		HU1 & HU2		
Upper Continen	GRAVEL (60%) up to 9 mm, sandy (30%) very fine to coarse grained, poorly sorted, subrounded, trace sill, yellow brown (10YR 5/4)											40.13				UCPS	
Continental Deposits	GRAVEL (60%) up to 12 mm, sandy (20%) very fine to coarse grained, poorly sorted, aubrounded, little silt, yellow brown (10YR 5/4)		40	\$ 		┢╹╏			╞╾┤ ┠─┤		┝╌┤ ┇┰┨			1110101-0258 Balled 1U ug/L TCE NA "Te		. 	
	SAND very fine grained, well sorted, subrounded quartz, yezow brown (10YR 5/4), very loose, non- cohesive, flows readily		2	s					╏╌┦				- 	1110101-0259 Bailed 1U ug/L TCE NA To			
	SAND (50%) very line to fine grained, moderately sorted, subengular quartz, and StLT, light yellowish brown (10YR 6/4), cohesive, moderately dense		80	- - 								85.0 ⁻			ECH H		
[;	SAND (70%) very fine to fine grained, moderately sorted, subangular quartz, little sill, trace gravel, light yellowish brown (10YR 6/4)			ļ					╏╌╏	+		-					
	SILT (70%) little clay, trace sand (very fine grained, subrounded), brownish yellow (10YR 6/8), moderately ophaive			Ĭ		· · ·				-						¥	
t ower Continential Depresats	GRAVEL (80%) 3 to 38 mm, subrounded to angular chert, weathered shale and sandatone, little sand (fine to carse grained, poorly sorted, subangular to subrounded), reddish yellow (7.5YR 6/8)			8											HUS	RGA	
C Portes Creek Clay	CLAY micaceous, trace glauconite and blue-green mudstone fiths, black (SY 2.5/1), very fat, plastic			110								119,08		1110101-0260 Baliad 50 upt_TCE			
	SAND (60%) very fine grained, subrounded, slity, micaceous, trace glauconita, occasional pyrite nodules, black (SY 2.5/1)		120 120											NA "Tc (Field GC) 1110101-0261 Bailed, Duplicate 1 ug/L TCE NA "Tc (Fixed Isb)	.	Eleval PGDP McNalry Flow System	
McNairy Formation -	SAND (80%) very fine grained, subangular, fittle silt, black (SY 2.5/1), common pyrite nodules 132' to 133', 120' to 140' is upward fining sequence								╏ ┥ ┥ ┥ ┥					1110101-0262 Pumped 1U ug/L TCE 4 +/- pCi/L "To (Fixed tab)		Elevation: 380.2 PGDP Coord: S System	
1	AND (80%) very fine grained, subangular, little silt, hicaccous, trace glauconite, trace lignite, dark gray (5YR 5/1)		10 International I									J		1110101-0263 Pumped, Duplicata 5U ug/L TCE NA Tc (Field GC) 1110101-0264 Pumped 1U ug/L TCE		Elevalian: 380.23 PGDP Coord: S 1845.6, W 683.0 lystem	
	150 TOTAL DEPTH												i	0 +/- 0 pC/L "Te (Fixed iab) 1110101-0265 Balled, Duplicate SU ug/L TCE NA "Te (Field GC)		P4D12	

LITHOLOG	Y	¢	GA	MMA - A	PI 10	0 >	100 €	NEL					° ≯	WL		CAL	HYDR UNIT	10
SILT (30%), little sand, ve sorted, subrounded, yallowis	ry fine grained, poorly h brown (10YR 5/4)												-				Î	
SRT (90%) frace sand, ve sorted, subrounded, yallawis	y fine grained, poorly h brown (10YR 5/4)					statution (staticulu) 01							- - - - -					
SAND (80%) vary fina to fini subrounded to rounded, p little silt, brownish yellow (10	contry cemented quartz,		博			20 30 30							32.9				HU1 & HU2	
SAND (80%) very fine to a sorted, subrounded to rou quartz, little slit, brownish ye	ided, poorly cemented					121112			╞╼╂ ┼╶╂		$\overline{\mathbf{A}}$	┿┤╴ ┤╌┼	- " - -					UCRS
SAND (80%) very fine to a soried, subrounded to rou quartz, little slit, brownish ye SAND (90%) trace gravel (sandstone), brownish yellow	10 to 20 mm chert and (10YR 6/8)		Here al			3 Y			· ·									.
GRAVEL (60%) 20 to subrounded, sandy (coarse medium grained, very poort rounded), strong brown (7.5)	grained w/ occasional y sorted, subrounded to	194 - Partie				09 09			┟╌┥			┥┦ ┥╴┨		49.76	1110101-0665 Pumped 5U ug/L TCE 0 +/- 14 pC/L	*T.e.		
SAND (80%) coarse grain gravel, yellow (10YR 7/8)	ed, poorly sorted, little			innenne Herefo		80 1%		+-	╞┤				55.39		U #/- IN PORC	16		
GRAVEL (50%) and SAND grained, moderately sorter yellow (10YR 7/6)	(50%) vary fina to fine d, subrounded quartz,					1341-5-60 09			┼╶┦ ┼╌╄		$\left \right\rangle$							
SAND (50%) and SILT, yello	w (2.5Y 6/8)					urusongunununun			┿╌┼ ┿╍┼ ╄╼┼								← HU3 ·	
SAND (50%) very fine subrounded quartz and SILT SI(2)	grained, well sorted, (50%), light gray (10YR	┨╼┽╸ ┝╍┼╸ ┝╶┼╴				70 1789100658765			╊╌╉ ┠╶╉ ╋╼╋		ł						HU4	 *
GRAVEL (50%) 30 to 5 mm sorted, well-cemented quart 6/5)	n chert, and SAND well z, reddish yellow (7.5YR					00 09			┼╼┿ ┼╼┿ ┼╶┼						1110101-0666 Pumped 2161.3 ug/L T 0 +/- 0 pCl/L *	CE Tc ·		
GRAVEL 40 to 20 mm, angu (7.5YR 6/6)				0000000 000000 00000000000000000000000		20000			┝╴┤			╉╶╂╸ ┨╴┨			1110101-0667 Pumped 2821.9 vg/L T		HUS	RGA -
GRAVEL 10 to 20 mm cl coarse grained, poorly s rounded, unconsolidated), d (B)	oned, subrounded to					90 00									0 +/- 14 pCi/L 1110101-0868	"Tc		
GRAVEL 20 to 40 mm, 1 strong brown (7.5YR 5/8)	ncreased iron slaining.					001- 001-	╞╼┼		╞╌┤		¥		 		2856.4 ug/L T 12 +/- 18 pCi/L	CE Te		
CLAY slightly micaceous, (7.5YR 3/2), very homogene	ưace s≆t, dark brown ous,firm					964 1100-00-00-00-00-00-00-00-00-00-00-00-00									1110101-0659 Pumped (Dupli 3100, ugA TCI 19 +/- 19 pCVA	E		
CLAY, slightly micaceous, o dark brown (7.SYR 3/2), firm	ccasional quartz grains,	┨ _{╼╋} ╸ ┝╍╋╸				<u></u>			┾╌┼ ┟╌╁ ┝╼╂				- - -			İ		
CLAY silty, sandy, trace grav	el, brown yellow		++-			120 (1333) ()	<u>⊨</u> †		[]		5			122.75 ⁻ 123 ⁻	1110101-0684 Bailed 2.1J ug/L TCE			
CLAY trace sill, micaceous,	dark brown (7.5YR 3/2)					inters (257)			1\$					^{بو} ي لـــ	15.3J UGAL CIS NA "To	1,2 DCE		Ma
SAND (80%) very line to J well sorted, subrounded, litil 4/2) with black (7.5YR N21)	ine grained, moderately e silt, dark brown (7.5YR					(<u>130</u> 130				<u>}</u> -					1110101-0670 Bailed 5U ug/L TCE NA "Tc		-	PGDP Coord: S McNairy Flow System
CLAY (70%) some sam	1 (very fine grained, wn (7.5YR 4/2)	╞┿╸											-					Eccyation: 361.4 PGDP Coord: S1651.8.W 755.1
CLAY (60%), sandy (very 1 soried), dark brown (7,5YR 4	ine grained, moderately V2)					140	H	+	╞┤	纠		┝╌┢╴			l			51.8.W
SAND (60%) fine grained, subrounded, unconsolidate (10YR 7/1)	modarately well sorted, d, trace silt, light gray					N I CONTRACTORIS			┼╌┼ ┝╼┽ ┠╺╋			┼╌ <u></u> ╡╌┤╸ ┥╴┨╺			1110101-0871 Bailed 1U ug/L TCE NA TC 1110101-0672 Pumped (from			755.1 F
SAND (98%) very line to f sorted, subrounded to micaceous, light gray (10YR	ine grained, moderately subengular, trace slit, 7/1}					150			╞╼╉ ╞╼╉ ┼╌╄ ┼╶╄						Pumped (from 4.3.) ug/L TCE 11 +/- 19 pCi/L 1110101-0873 Pumped (from - 8.8 ug/L TCE	^н тс 110')		111
V 160 TOTAL D	ЕРТН		認識	-173-278 4400-444	40.4024		H	-	┢╍┼				<u> </u>		9 +1- 34 pCi/L	*7c	<u> </u>	<u>ل</u> ل

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	LITHOLOGY	o GAMMA - API	100		WL	ANALYTICAL		
FILL FILL rour	L clay light gray (10YR 7/1) and pebblas, nded, 6 to 12 mm, iron stained, hard							
. J occa	AY (80%) little sili (20%), light gray (10YR 6/1) to owish brown (10YR 5/6), soît - alightly firm, asional iron staining							
Upper Continental Deposit	T (50%) and CLAY (50%) occasional quartz ins, yellow (10VR 7/1), increasing sit, increasing negeneous, increasing firmness, slightly wet - dry ant						UCRS	
grai	AY (60%) little silt (20%) and soundant quartz ins, brownish yeliow (10YR 6/5), soft to assionally firm, wet			┝┼┼╼┶┼┼┝┥╣┼╼ ┝┼┼╼┶┼┝╋╢┿╸				
SiL) ז הפ yell	T (60%) very homogenous, sandy (fine to very grained, moderately graded, subangular), lowish red (SYR 5/8), soft to firm							
. CL/ to sub	AY (60%) slity, reddish yellow (7.5YR 6/6) grading SAND (60%) fine grained, well graded, pangular, slity, reddish yellow (7.5YR 6/6)				њ у			
grai ang	ND (60%) fine grained w/ occasional coarse ins, well graded, subangular to occasionaßy gular, sity to claysy, trace gravel (3 mm chert), low (10YR 7/1) to clear		5655		50.5' 53.7' 52.56' 51.92'		₹ 	
(me	VAVEL (80%) 3 - 50 mm, well graded chert, sandy edium to coarse grained, clear), yellowish brown YR 5/8)					1110101-0868 Balled 1U ug/L TCE NA ^M Tc		
, che , 4/6)	IAVEL (70%) 12 - 25 mm, moderately graded eff, some sand (as above), strong brown (7.5YR					1110101-0889 Pumped		
ž so	AVEL (60%) 12 - 25 mm, poorly graded, angular, ndy (as above), brownish yellow (10YR 6/8)					2 ug/L TCE 22J ug/L ds 1,2-DCE 23 ug/L Tetra- chloroethens 1J ug/L carbon tet		
jar ≊ ang piau	WEL (70%) 12 - 37 mm, well graded, rounded to gular chert w occasional sandstone containing nt fossils, some sand (as above), dark yellowish wm (10YR 4/4)		38/11 .	┝ ╺╞╕╎╎┝┍╞╎ ┥┾┿ ┝┿┿╎┶╆┤╣┼╅	76.2' – 81.33'	0 +/- 0 pCi/L "To 1110101-0890 Pumped	RGA -	
GR.	AVEL (70%) 40 - 60 mm, increasingly well ded, rounded to engular chert w/ occasional ndsione containing plant fossils, some sand (as ave), dark yellowish brown (10YR 4/4)					65 úg/L TCE 4J ug/L 1,1 DCE 518J ug/L cis 1,2 DCE 22 ug/L carbon tet 27 +/- 20 pCi/L *Tc		
v sub	AVEL (60%) 3 - 40 mm, well graded, angular, hdy (coarse grained, submounded to occasionally pangular, dear to frosted), strong brown (7.5YR)) to yellow brown (10YR 5/8)							
(60	NO brownish yellow (10YR 6/8) grading to SAND %), sily, brownish yellow (10YR 6/8), soft					1110101-0891 Pumped 11 ug/L TCE 1J ug/L 1,1 DCE 87J ug/L 1,2 cis DCE		
sub yelli	ND (60%) very fine to fine grained, well graded, prounded to subangular, clayey, micaceous, low (10YR 7/6) to light gray (10YR 7/1)					1J ug/L carbon tet 1 +/- 2 pCVL "Tc		
SUD	NO (80%) vary fine to fine grained, well sorted, bangular, unconsolidated in part, little silt, yellow YR 7/6) to clear			╎╷┤╶╎╷┥ ┝╶┽┥┽┥╋				
	AY homogeneous, occasional quartz grains ear), very micaceous, dark gray (7.5YR 4/0), firm					1110101-0893 Bailed		
L CL/ Mc Incr 4/0)	AY (65%) some gravel (12 mm, angular), reasing slit and send w/ depth, dark gray (10YR), soft					1U ug/L TCE NA TC	, McNe	
McNairy Formation	AY (60%) sandy (some stringers), very secous, trace pyrite, very derk gray (2.5YR NS/),		in i				Eleve PGD McNelry Flow System	
SA7	ND (75%) very fine grained, subangular, consolidated in part, some sit, very micaceous, ht gray (10YR 6/1) to gray (10YR 5/1)					1110101-0894 Bailed	Elevati PGOP System	
	AY (60%) homogeneous, sitty, sandy in part, caceous, dark gray (10YR 4/1), firm to slightly firm					1U ug/L TCE NA "Tc	Coord: 177.	· .
	D TOTAL DEPTH	┝ ╶╏╺╎╶╎╴╎╶╏╺┨╸┥ ┝ ╺╎╸┪╺┝╺┝╺╿╸╿╸╿	╞	<mark>┨╶╀╼╃╼╃╍╄╍╄╼╄╼</mark> ┥ ┫ ╶┨╺╋╺╋╺╋╸╋╸╋╸╋╸╋╸		ļ	Elevration: 377,76 PGDP Coord: N 740,1. W 3280,9 stem	
		╞┿╪╪┿┿╋╧					6 082£ A	
	······································							

	LITHOLOGY	0 GAMMA - API 100		100 N			WL.		ANALYTICAL	HYDR	10
Î	SILT (90%) trace clay w/ some sand (very fine grained), dark grayish brown (10YR 3/2), hard, slightly moist						<u>-</u> -				Ē
	(75%) very homogeneous, some clay (25%), wish brown (10YR 5/8), hard, slightly molst SiLT (80%) intile clay, yallow brown (10YR 5/6), hard, slightly molst, motiled from from staining in 1 - 3 mm		10						· · · ·		
	Iaminalions SILT (50%) gravelly (40%)(1 - 3 mm, well rounded), Irace clay, yellow brown (10YR 5/6)		20								
 Ulti	SILT (80%) Little clay, scattered sand (very fine grained to fine grained), yellow brown (10YR 5/6)				┝┼╍╋	┥┥┤┤╎╎╸┥				HU1 & HU2	
Upper Continental Deprests	SAND very fine grained to fine grained, light yellow brown (10YR 6/4), fining upward sequence w/ some sill at top		30								
niaį Detros	GRAVEL (70%) 1 -3 mm, well rounded, some sit and sand, light yellow brown (10YR 6/4), basal gravel for sequence from 25 - 31 feet, dry SAND vary fine to fine grained, trace silt at top				┝┼┼	┼┼┼ ┣┼╴					UCRS
ž	becoming coarse grained at base, light yellow brown (10YR 6/4) GRAVEL (75%) 1 mm - 25 mm, angular, some sit,		1				39.26		1110101-0293		
	light yellow brown (10YR 6/4), basal gravel for sequence from 32 - 37 feet, becomes coarser w depth					╪╪┼╊╧			Beiled 5U ug/L TCE NA TC		
	CLAY (55%) sandy and sity, light yellow brown (10YR 6/4) mailled strong brown (7.5YR 5/6) from		5				23 23 23 23	49.16 }		HUS	
	SAND medium grained, well sorted, subangular to angular quartz, trace silt, fight yellow brown (10YR		the state of the s					Ì.	1110101-0294 Bailed 5U ug/L TCE		₩
ł	6/4), scattered dark accessory minerals GRAVEL (60%) 1 - 3 mm, silty, reddish yellow			╞╞╾		╏╷╴┝╶┝╶┝ ┶┿╌┝╼┿╌┝╼╅╹			22.1J ug/L cls 1,2 DCI NA "To		
	(7.5YR 6/6), color from silt GRAVEL (80%) 2 - 6 mm w/ occasional 25 - 37 mm, angular timestone w/ occasional chert, little sand					╋╍╎┄╎╴┤╺┾╼ ┽╴┼╶┼╺┿╼┽╸ ╺╋╼╋╼┦╸┦╶╎╴╸					
	(coarse grained), reddish yellow (7,5YR 4/8)			╏┝╾┼╍							
	AVEL (90%) 4 - 8 mm w/ abundant 25 - 37 mm, igular limestone and chert, little sand (very coarse	C				┿╪╋ ┿╪╋╴ ╶╴╴					
Luwer C	"grained, clear to translucent quartz), reddish yellow (7.5YR 6/6), some dark accessory minerals					┿┿╋			1110101-0295	1	RGA
Lower Continental Depusals	GRAVEL (80%) 2 - 5 mm w/ some 10 - 20 mm,		A PHILADA			┼┼╏╎╞╴	l		Pumped 29.8 vg/L TCE 54.4J vg/L cis 1,2 DCI 25 +/- 18 pCi/L "Tc	E E	·
Depusals	angular limestone and sandsiona wi scattered chert, liale sand (very coarse grained, dear to translucent quartz), dark yellowish brown (10YR 4/4)										
	· · · · · · · · · · · · · · · · · · ·			╞╼╄╾		┟┟┝┝┼					
	GRAVEL [70%] 2 - 5 mm w/ some 10 - 20 mm, angular limestone and sandstone w/ scattered chen, little sand (very coarse grained, clear to transfucen) quartz), dark yellowish brown (10YR 4/4), becoming							102,1' - 102,83' -	1110101-0296 Pumped		
	coarser with depth	6.40 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5]	53.7 vg/L TCE 60,7J vg/L cis 1,2 DCE 29 +/- 19 pCi/L "Tc		
Î	SILT (60%) sandy (very fine to fine grained, subangular to subrounded), gray brown (10YR 5/2)		110								Ĩ
	CLAY (85%) little sill, w/ scattered mica, very dark gray (57 3/1), very firm, moist, plastic										
	SAND very fine grained, micaceous, brown (10YR		120			┿┿┿┿ ┥╎╅╼┝┥			1110101-0297		
	5/3) SAND very fine grained, trace sitt, micaceous, very dark grayish brown (10YR 3/2)							 }	Pumped 5U ug/L TCE 10 +/- 39 pCi/L "Tc		1
- McNa	CLAY (65%) some sand (25%)((ine to medium grained, rounded clear to milky quartz, locally pyrilized in thin beds), trace sill (10%), very dark		130			┿┿╍┝┿┿ ╋╍╆╍┨╴┨╴┨╴					Elevation: 3 PGDP Cool
McNairy Fairmation	pyrilized in thia beds), trace sili (10%), very dark grayish brown (10YR 3/2), thin-bedded Eght reddish brown chert (SYR 6/4) throughout					┽╌╀╼╊═┧╴┼ ┅╤╍╤═┟╍╎╴┼ ┽╴┽╺┅┝═┽╴┾┱╸			1110101-0298 Pumped	ione of an	Elevation: PGDP Co
	SAND very fine grained, micaceous, trace silt and Jay in part, thin stringers of chert, glauconitic, very and grayish brown (10VR 3/2), sourn on returns		140			<u>┥</u> ┥┥╌┝╺╄┖	 	_	Pumped 5U ug/L TCE 22 +/- 18 pCl/L **Tc -		Elevation: 379.08 PGDP Coord: N 295.9. W 2327.5 low System
	CLAY (85%) little slit, trace send, micaceous, gray (10VR 5/1), plastic becoming still when worked, molat					╺ ╸╸╸ ┥┥╿╢┙╋╸					262 W 232
	150 TOTAL DEPTH		8	┢╍┼╼		┿┿┾┾┼╴			l		Р
											4E
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	LITHOLOGY	o GAN	1MA - API 100		10 €-		UTR		DROS	0 YTI →	WL	ANALYTICAL	HYD: UNIT	
	FILL clay w/ some sit, coarse grained sand, and gravel, 3 mm, brown (10/R 5/3), firm, slightly moist, sand and gravel decraase w/ depth													
	(60%) clayey, scattered sand (very fine grained 12), brown (10YR 5/3) motified light brownish - ey (10YR 6/2), firm, occasional iron staining			10										
,	SILT (60%) clayey, occasional sand (very fine to fine grained red chart, quartz) and gravel (3 mm, subrounded chart), brownish yealow (10YR 5/6), firm to very firm, slightly molst													
. i	GRAVEL (60%) 3 - 6 mm, subangular to subrounded chert, dayey, brown (10YR 5/3) SILT (60%) clayey, scattared aand (line grained,			R										
•	subrounded to subangular chert and quartz), brownish yellow (10YR 6/6), soft, molst GRAVEL (70%) 3 -12 mm, subrounded to subangular chert, some sBt and sand, brownish yellow (10YR 6/6)			30	÷								HU1 & HU2	
i I Dilio	SAND (50%) medium to coarse grained, moderately sorted, subangular to subrounded quartz w/ some chen, and SILT, reddish yellow (7.5YR 6/8)													
Continental Deposits	GRAVEL (65%) 25 mm, subangular to subrounded chert and occasional sandstone, some sand (30%)(modium to very coarse grained, subangular to subrounded quartz w/ some chert, common iron slaining), and trace sill, reddish yellow (7.5YR 6/8) to brownish yellow (10YR 6/8)			ð	3 - -			+						UCRS .
)riposils –	SAND (50%) medium to coarse grained, moderately sorted, subangular to subrounded quartz w/ some chert, and SILT, reddish yellow (7.5YR 6/8)		0.9 4.0 4.0 9 4.0 3 0.9 4.0 4.0 9 4.0 3 0.9 4.1 4.0 0.9 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0								48,8' S0.51'	· · .		Ĩ
-	GRAVEL (65%) 25 mm, subangular to subrounded chert and occasional sandstone, some sand (30%)(medium to very coarse grained, subangular to subrounded quartz w/ some chert, common iron staining), and trace silt, raddish yelkw (7.5YR 5/8) to brownish yellow (10YR 6/8)			5										
•	SILT (60%) clayer, scattered sand (fine groined quarts), yellowish brown (10YR 5/8), firm, slightly moist, moderate to high plasticity SiLT (60%) clayer, scattered sand (fine grained			50	3								H	
	quartz), yelkowish brown (10YR 5/8), occasional iron staining, lirm, slightly moist, moderate to high plasticity CLAY (60%) ality, scattered sand (line grained quartz), yelkowish brown (10YR 5/8), occasional iron							+					통	
•	staining, soft to firm, molst, moisture content increasing widepth SAND (50%) moderately sorted, medium to coarse pained, subengular to subrounded quantz wi some jert and black shale, and GRAVEL (50%) 3 - 19			0								1110101-0285 Pumped		∦
, <u> </u>	 mm, subangular to subrounded chert, quarz and carbonaceous shale w/ some iossils, yallow (2.5Y 7/5) GRAVEL (65%) 25 mm, subrounded chert and 			a	3							320 ug/L TCE 59J ug/L cls 1,2 DCE 10 +/- 22 pCI/L "Tc	₹ ↑	
Lower Costlin	occasional sandstone, some sand (35%) (medium to coarse grained, subangular to subrounded quartz), trace slR, yellow (2.5YR 7/8) GRAVEL (90%) 3 - 25 mm, fragments of larger											1110101-0286 Pumped 746 ug/L TCE 4.2J ug/L 1,1 DCE 143J ug/L cis 1,2 DCE		R
eniat Depo	picces, subangular to subrounded chert, trace sand (coarse grained) paide brown (1078 803), (ew fines between 91 and 93°, increase in sand from 93 to 95°. SAND (60%) medium to coarse grained, moderately		00000000000000000000000000000000000000	90	3⊢	┿┿ ╋╋				┠╍┤┷ ┝─┼╍ ┟──┼┰		13 +/- 21 pCi/L "To	HC:	
"	sorted, subangular to subrounded quartz and cheri, gravely (13 mm chert), strong brown (7,5YR 5/8)		200 2 3 2 2 0 2 2 2 2 2 2 2 2 2 2 2 2 2	UUI	3	╋╼╊╸ ╋╼┠╸ ╉						1110101-0287 Pumped	<u> </u>	¥
Porters Creek Clay	CLAY, scattered mice and very fine grained quartz sand, very dark gray (5Y 3/1), very fam, molsi, very plastic, sticky, hole extremely tight											772 ug/L TCE 7.2J ug/L 1.1 DCE 151J ug/L cla 1.2 DCE 1J ug/L carbon tet 11 +/- 22 pC/L =Tc		
" 	SILT (60%) some sand (fine grained w/ some coarse			ULL DEL								1110101-0292 Pumped (Duplicale) 612 ug/L TCE 7J ug/L 1,1 DCE		
	quartz, chert, some black shale), and gravel (3 - 8 mm, subangular chert), olive gray (SY 4/2), vary soft GRAVEL (60%) 3 - 6 mm, subangular chert, silty, olive gray (SY 4/2)			071					-			159J ug/L cis 1,2 DCE 1.1J ug/L carbon let 25 +/- 22 pCi/L "To		
÷	117 TOTAL DEPTH													McNairy F
McNa)				130		┥┥								McNairy Flow System
McNairy Formation						╋				╊╴╄╼ ┠╴╋╼ ┞╴┠╼				Elevation: 3 PGDP Coord
				Ē								· ·		Elevation: 381.08 2GDP Coord; \$ 782.4. W 1979.6
i	· · ·			Ē								· .		1979.6
														P4E
L	l			J	ł	ļ ŀ	١ا		L		L	<u>. </u>	<u> </u>	<u>ALF</u>

LITHOLOGY	GAMMA - API 100		WL	ANALYTICAL	HYDRO UNIT
No sample, bit plugged FILL gravel, angular limestone, subrounded chert, clay matrix, brownlah yellow (10YR 6/8) CLAY (60%) silty, scattered sand (very fine to fine grained quentz w/ some chert), yellowish brown (10YR 5/8), soft, moist SILT (60%) w/ fittle clay, common sand (very fine to fine grained, subrounded to subangular), yellowish brown (10YR 5/8), soft					
SAND (50%) very fine to fine grained, subangular quatz w some chert, SILT and CLAY (50%), yellowish brown (10YR 5/8) GRAVEL (75%) 6 - 25 mm w/ larger broken fragments, subrounded to subangular, some sand (very fine to coarse grained quartz), trace allt, yellow brown (10YR 5/8) GRAVEL (65%) 3 -12 mm, angular to subrounded chert, some sand (very fine to medium grained, subrounded to subangular quartz and some chert), trace sill, storog brown (7.5/R 5/8) SAND (50%) very fine to fine grained, moderately sorted quartz w/ some chert, and SILT, strong brown (7.5/R 5/6) GRAVEL (85%) 3 - 6 mm w/ some up to 18 mm, angular to subangular chert, some sand (30%), and trace sill, yellow brown (10YR 5/8) NO SAMPLE appears to be very fine grained sand/sill mit			50.13 50.13 47.51"	1110101-0271 Bailed	UCRS HU1A HU2
SILT (65%) some sand (30%)(very fine to fine grained quart2), and trace gravel, 3 mm, yellow (2.5Y 7/6) SAND (60%) very fine to fine grained, moderate to well sorted, subrounded quartz w/ some chert and black shale, some gravel (3 mm, angular to subangular lossiliferous shale and some chert), trace sill, brown yellow (10YR 6/8) GRAVEL (60%) 3 - 12 mm w/ some larger (ragmenis, well graded, subrounded shale,chert and occasional sandshone, andy (vary fine to coarse grained, subangular to subrounded quartz), very pale brown (10YR 7/4) SAND (60%) very fine to fine grained, well sorted, subrounded to rounded quartz w/ scattered black Deassory minerals, chert and bioble, fittle sill, very				SU uga TCE NA TE	
GRAVEL (85%) 6 - 12 mm, subrounded chert w/ some black shale, little sand and sit, very pele brown (10YR 7/4) SAND (60%) very fine to fine grained, well sorted, subrounded to rounded quartz w/ scattered black accassory minerals, chert and blotte, little sit, very pele brown (10YR 7/4)				1110101-0272 Bailod 5U ug/L TCE NA TC	₩ HLA
GRAVEL (63%) 3 mm - 38 mm w/ fragments of targer gravels, angutar to subrounded chert and sandstone, Bills and (very fine is coarse grained quarts and cherd, trace int, brownish yellow (10/R 8/8) GRAVEL (60%) 3 mm - 25 mm w/ fragments of larger gravets, subanguiter to subrounded chert, sandy (very fine to coarse grained, sub-ounded chert, sandy (very fine to coarse grained, sub-ounded quarts; and chert), brownish yellow (10/R 8/8) SAND (60%) (fine to very coarse grained, well graded, subanguiter to subrounded gravely (2 - 25 mm, fragments of larger pieces, subanguiar to subrounded chert), brownish yellow (10/R 8/8) GRAVEL (70%) 13 mm, subanguiar to subrounded chert		3 	69,55	1110101-0273 Pumped 4.1J ug/L TCE 34 +/- 20 pCi/L "Tc	
SAND (60%) fine la very coarse grained, well graded, subangular to subcounded, gravelly (3 - 25 mm, fragments d' larger pieces, subangular lo subtrounded cherd, normish yellow (107R 96) GRAVEL (70%) 13 mm, subangular to subtrounded cherd, some sand (medium to very coarse grained, subtrounded to rounded quarts and chert, some black acc minerais), yellowish brown (107R 82)				1110101-0274 Balled 100 ug/L TCE 19 ug/L 1,1 DCE 34.8J ug/L cis 1,2 DCE	+S2
CLAY, scattered mica and very fine grained quartz sand, very dark gray (SY 3/1), firm, moist, very plastic				1110101-0275 Pumped 519 ug/L TCE 22.9 ug/L 1,1 DCE 115.4 ug/L cls 1,2 DCE 115.4 ug/L cls 1,2 DCE 1.21 ug/L 1,1 TCA 2.8J ug/L carbon le1 19 +/- 24 pCVL **Tc-	
CLAY, sity, scattered mice and very fine grained quartz sand, very dark gray (SY 3/1), soft, molat, plastic					Mc
SILT (50%) and SAND (50%) fine grained, well sorted, subrounded to rounded, mica, black accessory minerals and occasional glauconite, very dark gray (5Y 3/1), sand content increasing w/ depth				1110101-0284 . Bailed	PGDP Coor McNairy Flow System
SAND (80%) fine grained, well sorted, subangular to subtroinded quartz, black accessory minerals and (coasional glauconite and mica, fittle silt, dark gray (SY 4/1) SAND fine grained, well sorted, subrounded quartz, black accessory minerals, occasional glauconite and				Bailed 5U ug/L TCE NA "Tc	PGDP Coord: <u>\$ 1894 S. W 1608 B</u> ow System
mica, some semi-consolidated layers, brownish yaBow (10YR 6/3), tran staining		\$			

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	LITHOLOGY	0 GAMMA - APJ 10		WL ANALYTICAL	
Î	در المعرفة المعرفة (20%). reddish yellow (7.5YR		┪╠┯┯┯┯┿		
,	7/5), firm, Iron staining				
	CLAY (80%) little silt (20%), occasional sand grains artz and chan), reddish yellow (7.5YR 7/6), d w/ gray (10YR 6/1), firm to soft		╗┝ ╶╎╎╎╎┝╕╶╣╷╷ ╸ ╕┍┶┶┶┼╾┼╾┼╸╋╺┨╸	•	
,	CLAY (70%) some alit, homogeneous, brownish yellow (10YR 6/8), soft, damp				
	CLAY (80%) w/ little silt, traca biotita, pebbles, brownish yallow (10YR 8/6) mottled w/ light gray (10YR 7/1), soft, damp				
,	CLAY (60%) silty, occasional sand grains (chert), light gray (10YR 7/1), firm, occasional iron staining				
	GRAVEL (50%) 3 - 6 mm, chert, sandy (40%)(medium to coarse grained, poorly sorted,				
1	(40%)(medium lo coarse grained, poorly sorted, clear to brownish yellow (10YR 8(8)), trace sill, yellowish brown (10YR 5(8) to brown (7,5YR 5(8) GRAVEL (40%) 3 - 6 mm, chert, some sand (medium				HU1 & HU2
Lipper Conduc-	Is coarse grained, poorly sorted, clear to brownish yellow (10YR 6/8), trace sill, yellowish brown (10YR 5/5) to brown (7.5YR 5/8), decrease in sand and sill				
et di la constante la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di la constante di	CLAY (40%) some sand (30%)(very fine to fine grained), and gravel (30%)(18 - 25 mm, chert), ystow (2.5YR 7/6)			1110101-0759	UCRS .
ž.	GRAVEL (65%) very rounded chert w/ some quartz, some sand (35%), white (2.5Y 8/2)			Bailed 0.13 ugA. TCE 183 ugA. cis 1,2 OCE NA "To	
• 1	CLAY (90%) trace silt, light gray (2.5Y N7/), firm, homogeneous			5 52.51'	
-	CLAY (70%) some sand (30%)(fine grained, moderately well sorted, subrounded, clear quart2), light gray (10YR 7/1), soft, some motived iron			ຍ ຍີ່ 	
,	staining CLAY (60%) sondy (fine grained, moderately well sorted, subrounded, clear quartz), while (10YR 6/2),				
	CLAY (90%) trace sand (line prained, moderately				
,	well sorred, subrounded, clear quartz), white (19YR 8/2), homogeneous			68.43	<u>↓</u>
	CLAY (60%) sandy (fine grained, moderately sorted, subrounded, multicolor quartz and chert), white (10YR 8/2), soft, molst				HU3 .
, <u>↓</u>	-AVEL (90%) 2 to 25 mm w/ some larger agments, rounded to angular chert, trace sand and			1110101-0760	
, invest	silt while (10YR 8/2) to brownish vallow (10YR 6/8)			Pumped 1331 ug/L TCE NA "Tc	
Lower Conditionated Depus	GRAVEL (80%) 2 to 25 mm w/ some larger fragments, rounded to angular chern, little sand (coarse to very coarse grained, poorty soried, subrounded to rounded quartz), yellow (10YR 7/8)	60000000000000000000000000000000000000			
tal Depo	GRAVEL (85%) 2 to 50 mm w/ some larger			1110101-0781 Pumped 2385 ug/L TCE 12 +/- 23 pC/L **Tc	
, ,	fragments, rounded to angular chert, little sand (very coarse grained, poorly sorted, subrounded to rounded quartz), yellow (10YR 7/8)			12 +/- 23 pCi/L **Tc	
			·····	1110101-0762 Pumped 2284 ug/L TCE	
Porter	CLAY kitle silt, scattered very fine grained quartz sand, very dark gray (2,5Y 3/1), soft to firm			3 +/- 32 pCI/L "Te	-
Parters Creek Clay				106.43"	
, сізу ,	CLAY (95%) trace slit, very dark gray (2.5Y N/3), firm to very firm, very homogeneous				
* <u> </u>				118.45	
, Î	CLAY (95%) trace slit, trace gravel (5 mm), vary dark gray (2.5Y N/3), firm, very homogeneous			بن ا	
. i				1110101-0763	
	SAND (60%) very fine to fine grained, moderately well sorted, subrounded to subangular, abundant biolite, trace pyrite, clayey, gray (2.5Y NSJ) to dark			8alled 1.5J vg/L TCE 28J vg/L cis 1,2 DCE NA *Tc	McNalry
	gray				Elect
- - Met	SAND (50%) quartz, and CLAY (50%), trace biotito, dark gray (2.5Y N4/), soft				stem –
MeNaily Pom			δ	1110101-0764	Elevation: 390.42 PCOP Coard: \$ 1914.8, W 931.3
- noilion	ANO (70%) fine to very fine grained, well sorted, subrounded, moderately comanted quartz, mica, some clay, light gray (2.5Y N8/ to 10YR 6/1)			Pumped 0.3J ug/L TCE 10 +/- 8 pC/L "Tc	1914.8.1
	ວບກະວັບລາງ, ຄຽກເ ຽາສາງ (2, ວາ, Nb/ to 10YR 6/1)				V 931,3
	150 TOTAL DEPTH		┥ [┙] ┟┼┼┼┾┿┿┿┿╵		P4.
	· · · ·		╶┦╎ <mark>╌╊╍╊╍┦╴╀╶╿╶╄╌╀╌┼</mark> ╴ ╶┦╵┠ ╍╊╍┫╾┨╸╎╵╎╵╎╵┝╵┝╵╵		
<u>_</u> .	L		╧┛╶ <mark>┞╓╂╼╂╼╊╼╢┑╄╼╂┯╂╍┨╧╊╼╊</mark> ╼ ╵		L¥J N

· -]	LITHOLOGY	0 GAMMA - AP	YI 100		o WL	ANALYTICAL	
	(60%) sendy (40%)(very fine grained, ingular quertz), yelowish brown (10YR 5/4), very cohestve, moderately dense						
	GRAVEL (50%) 3 - 6 mm, some sand (30%)(very fine to coarse grained), little silt (20%), vellowish brown (10YR 5/4) SILT (60%) sandy (40%)(very fine grained, subangular quartz), vellowish brown (10YR 5/4), very conselve, moderately dense			8			
- Unter	GRAVEL (50%) 3 - 5 mm, some sand (30%)(very fine to coarse grained), little sit (20%), brownish			8			HU1 & HU2
Unter Continental Deposits	yellow (10YR 8/8) SILT (60%) sandy (40%)(very fine grained, subangular quartz), brownish yellow (10YR 8/6), very cohesive, moderately dense						UCRS
Inposits	SAND (60%) very line to coarse grained, angular to subangular, silty (40%), yellow (10YR 7/8)						
	GRAVEL (60%) 3 - 6 mm, some sand (30%)(very line to coarse grained), little silt (10%), brownish yellow (10YR 6/6)				T ·	No Recovery	
· - -	SAND (70%) very fine to medium greined, subangular quartz, some silt (30%), yellow (10YR 7/8)			8	54.12" 54.7" 54.7" 54.7"		
	SAND (55%) very fine to fine grained, subangular quartz, clayey, yellow brown (10YR 6/4), cohestve, slightly dense			8			
.΀	SSCRAVEL (70%) 3 - 12 mm chert with some quartz of sandstone, some sand (very fine to coarse ained quartz), pale brown (10YR 7/4)						1Ť ŤI
- Lower	SAND very fine to coarse grained, subangular to angular quartz, pale brown (10YR 7/4)					1110101-0838 Pumped	
	GRAVEL (70%) 3 - 12 mm chert with some quartz and sandstone, some sand (very fine to coarse grained quartz), pale brown (10YR 7/4)			8			
Continuential Oxpers	SAND very fine to coarse grained, subangular to angular quartz, pale brown (10YR 7/4)]		
prosits	GRAVEL (70%) 3 - 12 mm chart with some quartz and sandstone, some sand (very fine to coarse grained quartz), pale brown (10YR 7/4) GRAVEL (85%), 25 - 36 mm w/ some targer tragments, rounded to engular, chert, litte sand,			g		11101D1-0837 Pumped 229 ug/L TCE 19 +/- 23 pCi/L "Tc	
> Pontois Creuk Clay	Ströng brown (7,5YR 7/8) CLAY, micaceous, trace blue-green mudstone liths, Irace glauconite, black (5YR 5/1), very (at, very dense					1110101-0838 Pumped 1480 ug/L TCE 7 +/- 19 pCi/L **Te	
÷	SAND (50%) very fine grained, subrounded, micaceous, some silt and clay, black (5YR 5/1), sand content increases w/ depth		į				Elevation: 360.97 PGOP Coord: S 2228.2, W 1531,8 McNairy Flow System
Inmalion	SAND, vary line grained, subrounded to rounded quartz, very dark gray (SY 4/1), loose, flowing CLAY, very dark gray (SY 4/1), plastic, dense						28.2. W 1521
	SAND, very fine grained, subrounded to rounded quartz, consolidated w/ iron oxide laminae, white			ġ		1110101-0839	
.	(10YR 8/2), moderately dense 155 TOTAL DEPTH				≖ −	Pumped 3J ug/L TCE 17 +/- 18 pCl/L Tc)4E{

	1	becoming silty clay to clayey silt to approx 3, decrease in gravel, occasional sand	┼╾┾╾╉ <u>╘</u> ┟╧╧════┫╴┠┼┼┼┼┽┑┤┼┼┤╢┼┼╴╽	
_	. [
١,	.	CLAY (80%) little silt (20%), scattered sand (fine	╞┼╼┝┥┥	
		grained chert and quartz) and gravel (3 mm chart), yellow brown (10YR 5/8) to light gray (10YR 5/1), soft		
		şon	┼┼┼╱╦╦╦╦╦╦╡╵┝╌┾┾┾┝┼┝┼┼╣╾┝┼╶┤	
				별
		GRAVEL (55%) 3 - 12 mm, subangular to		
	ء	subrounded chert, some silt and clay (35%), trace sand (fine (quartz)to very coarse (chert) grained,		
	Upper C	poorly sorted, subrounded to rounded), brown yallow (10YR 6/6)		
	Conthenial	SAND (60%) fina to medium grained, moderately well sorted, subangular to subrounded quartz w/		
		occasional chert and black accessory minerals, sity (40%), yellow brown (10YR 5/8), abundant iron		
	Deposits	stalning on quartz grains		
	17 1	GRAVEL (65%) 3 - 12 mm, subangular to subrounded chert, some sand and slit, yellow brown (10YR 5/6)	-	
		SILT (60%) sandy (fine to medium grained,		<u> </u>
		moderately well sorted, subrounded to round quartz w some chart), and scattered gravel (3 - 6 mm		H
		chart), brown yellow (10YR 6/5), send content increases w/ depth		
		SAND (65%) medium to coarse grained, moderalely	8 	
		sorted, subrounded to rounded quartz w abundant chart, grain size increases w/ depth, some sit,		
		common gravel (3 - 6 mm chart), gravel increases w/ depth, yellow brown (10 YR 5/4)		Ę
		SAND (30%) medium to coarse grained, subrounded	8	
		to rounded quartz w/ chart moking up coarse grained fraction, gravally (up to 18 mm, subangular to subrounded chart), yellow brown (10 YR 5/4)		
	Ť	GRAVEL (60%) to 38 mm, w/ occasional fragments		1110101-0871
		of larger cobbles, sandy (medium to very coatso grained, poorly sorted, subangular to rounded w/ occasional well rounded quartz and chert), trace sit.		2-2J ug/L TCE 0.8J ug/L 1,1 DCE
		yelowish brown (10YR S/8)		141J ug/L cis 1,2 DCE 19 +/- 16 pCi/L "To
-		SAND (60%) medium to very coarse grained, poorly sorted, subangular to rounded w/ occasional well		1110101-0872
(×,	rounded quartz and chert, gravely (to 36 mm, w/ occasional fragments of larger cobbles), trace sit, /		Pumped 2553 ug/L TCE 442J ug/L cis 1,2 DCE
Ψ,		yellowish brown (10YR 5/8)		25 +/- 18 pCi/L Tc
	Ninen.	GRAVEL (60%) to 25 mm, w/ occasional fragments of larger cobbles, sandy (medium to very coarsa grained, poorly sorted, subangular to rounded w/		1110101-0873 <u>T</u> Pumped <u>S</u>
	egotinenial Deposits	occessional well rounded quartz and chert), sand Increases w/ depth, irace silt, yellowish brown (10YR		Pumped 5 268 up/L TCE 2J up/L 1,1 DCE 1
	, Š	5/8) SAND (60%) medium to vary coante grained, poorly		70J Ug/L da 1,2 DCE 46 +/- 19 pC/L Tc
	1	sorted, subangutar to well rounded quartz and chart, gravely (to 18 mm, subangular to subrounded		1110101-0874
		chert), yellow brown (10YR 5/8) GRAVEL (60%) to 25 mm, subangular to subrounded		Pumped 421 ug/L TCE 2.3J ug/L 1,1 DCE
1		chert, some sand (increasing medium grained), trace allt (increasing rapidly w/ depth), yellow brown (10YR 5/6)		134J ug/L cis 1,2 DCE
	Ť	SAND (70%) medium grained quartz w/ abundant very coarse grained chert, well sorted, subangular to		40 +/- 19 pCi/L "Tc ↓ ↓
		rounded, some six, trace iron oxide grains, scattered / iron oxide staining on quartz, yellow brown (10YR /		
		SILT (60%) sandy (line grained quartz, chert and		
		some impnite), micaceous, yellow brown (10YR 5/8) to gray (10YR 6/1) w/ depth		
		SILT (75%) little sand (very fine to fine grained, moderately sorted, subangular to subrounded), micaceous, scattered carbonaceous debris and		
		fragments (<1 mm), occasional very fine grained glauconite, dark gray (SY 4/1), very soupy		
		CLAY selv, micaceous, very carbonaceous, common pyrite zones and small grains, silt increases w/		
		depth, carbonaceous material decreases w/ depth, black (2.5Y 2/0), firm to moderately stiff, moderate plasticity		
	ł	Prospecty		
	<u>Š</u>	SILT sandy (fina grained w/ occasional medium grained, well sorted, subangular to subrounded).		
	Jaily F	sand content Increases rapidly w/ depth, common carbonaceous debris, micaceous, dark gray (SY 4/1)		Y Flow
	McNairy Formation			1110101-0875 1c. Balled a
-	ĝ		┟╾┼╍┶╌┼╌┼╌┨╔╝╣┇ <mark>┝╼╼╌╎╆╌┥╼┥┥┥┥</mark> ┦╿╌╌╌╾┛	Balled 3 1.6J ug/L TCE 1
		SAND (00%) fine grained, well sorted, subangular to subrounded, trace site, micaceous, abundance		
		carbonaceous debris, gray (5Y 5/1)	┟╾┟╾┽╌┽╶┼╼╢┋┊╣╴┝╼╋╾┼╶┽╶┽╌┿╼┿╼┯┯╌┥	
				Epender: 33447, W 34224
9	[]	SAND (90%) fine grained, well sortad, subangular to	┟┾┼┼┼┾┼═╠╬╣╹╟┼┽┼╤┾┽╧┿┼╼┾╼┤	
		subrounded, trace six, micaceous, sbundanct carbonaceous wood fragments, occasional nodules of pyrilized sand, gray (5Y 5/1)		
ļ			┝╀┼╌┠╼╄╼┾╌╠╔╝╣╻┣╉═┞╌┨┼╌╄╼╄╼╂╌┠╌┠┥	K M
		SAND very fine to medium grained, well sorted, subrounded to rounded, clean, abundani		
		carbonaceous wood fragmants, gray brown (10YR 5/2)	┝╉┲┦┨┲┼┉╩╩╝┝╋┲┼╂╋╄┾┼┧	קו
		165 TOTAL DEPTH		
	1			ા કે પીર્ડ

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11	brawn (10YR 5/6), cohesive, sand content increases w/depih		
	SAND (55%) very fine grained, subrounded quartz sity, pale brown (10YR 8/4)	B	
। ।	GRAVEL (60%) 3 - 6 mm, sandy (very fine grained), brownish yellow (10YR 6/6)		HU1 & HU2
Upper Continental Deposits	SAND (50%) very line grained quariz, and SILT(50%), brownish yellow (10YR 6/8)		
Deposils	GRAVEL (60%) 3 - 6 mm, engular chert, sendy, urace silt, brownish yellow (10YR 6/6), send content increases wi depth		No Recovery
	SANO (85%) very line grained quartz, gravelly (3 - 6 mm, angular chert), browniah yallow (10 YR 6/6)		
	SANO (60%) very fine to fine grained, subangular to subrounded quanz, dayey, pale brown (10YR 8/4) to brownish yellow (10 YR 8/6), cohestva	8	
	SAND (65%) very line to fine grained, subangular quartz, some silt, yelkov (10YR 7/8)		
	SAND (65%) very fine grained quartz, gravelly (3 - 6 mm, angular chert), brownish yellow (10 YR 8/6)		No Recovery
Î	GRAVEL (70%) 3 - 6 mm chert and sandslone, some sand (fine to coarse grained, subangular quartz), yellowish red (SYR 5/8)		1110101-0831 Pumped
 	GRAVEL (60%) 12 - 15 mm will fresh frectures		13 ug/L TCE 32 +/- 20 pC/L *Tc
Lower Contine	Indicating Targor motorial, sendy (vory coarse grained), strong brown (7.5YR 5/8)		Pumped 148 ug/L TCE
intal Deposits	GRAVEL (70%) 4 - 30 mm, some sand (very coarse		421 001. 051 12 DCE 65 +/- 21 pC/L **Tc
5	grained). strong brown (7.5YR 5X8)		Pumped 560 ug/L TCE 2J ug/L 1,1 DCE 156J ug/L cis 1,2 DCE
	GRAVEL (60%) 4 - 30 mm w/ fresh fractures indicating larger material, some sand (very coarse grained). Increase in iron oxide, strong brown (7.5YR 7/8)		1J up/L carbon tet 190 +/- 23 pCi/L [®] Tc
Î	SAND (70%) fine to medium grained quartz, some silt, strong brown (7,5YR 7/8), slightly cohesive		*
	SAND (60%) fine to medium grained quartz, silty and clayey, strong brown (7.5YR 7/8), slightly cohesive		1110101-0834 Pumped 656 ug/L TCE 2J ug/L 1,1 DCE
	SILT (60%) and clay, sandy (very line grained, subangular quartz), yellowich brown (10YR 5/6)		1683 wg/L cit.12 DCE 69 +/- 21 pC/L "To
	SiLT (50%) and clay, sandy (very fine grained, subangular quartz), yellowish brown (10YR 5/6)		
- McNalry Formation	SILT and CLAY (75%), some sand (very fine grained quartz), trace black accessory minerals, dark gray (7.5YR 4/1), cohesive		111D101-0835 Pumped 19 ugL TCE
nation	SILT and CLAY (80%) sandy (very fine grained quartz), trace black accessory minerals, dark gray (7.5YR 4/1), cohestve		1110101-0835 Pumped 19 ug/L TCE 13 +/- 18, pCi/L **Tc
	SAND (75%) very fine grained, silty, common accessory minerals, occasional glauconite, dark gray (7.5YR 4/1)		
	SILT (60%) clayer, common dark accessory minaraia, abundani mica, trace sand (very fine to fine grained, subargular to subrounded, class quanz), dark gray (10YR 4/1), moderately cohesive		
	CLAY (60%) silly, common blotite, some muscovite, dark gray (10YR 4/1), very cohesive, more dense than previous unit		· ·

,	LITHOLOGY	0 GAMMA - API · 100	100 NEUTRON POROSITY	WL.		
	FiLL predominantly sitty clay w/ abundant organic debra to approximately 1.5', greding to sitty clay at approximately 3' SILT (60%) clayey, yellow brown (10YR 5/4) motified light gray (10YR 6/1io 5/1), firm, sightly motist moderate to low plasticity SILT (60%) clayey, scattered fine pebble chart gravets and from oxide nodules, yellow brown (10YR 5/4) motified light gray (10YR 6/1 to 5/1), firm, sightly motist, moderate to low plasticity		<i>a</i>			
Upper Continental Deposas	 SILT (60%) clayer, scattarid sand (line grained, subrounded quartz), brown yellow (10YR 6/8) and gray (10YR 5/1), firm, silghtly molat, majority of yellow bown color from line on code stalking SAND (65%) medium to very coarse grained, moderately dotted, abbangular to subrounded quartz wf some site, brown yellow (10YR 6/8). SAND (65%) medium to very coarse grained, moderately dotted, subbangular to subrounded quartz wf some site, brown yellow (10YR 6/8). SILT (60%) clayer, scottared sand (very fine to fine pebble chen), yellow brown (10YR 5/6), firm to soft, moderate plasbeity. GRAVEL (40%) to 12 mm, subangular to subrounded, light yellow brown (10YR 6/4) to yellow brown (10YR 5/4). SAND (50%) fine to medium grained, moderately habingular to subrounded. Ight yellow brown (10YR 6/4) to yellow brown (10YR 5/4). SAND (50%) fine to medium grained, moderately babangular very coarse grained, bubangular very coarse grained uno axide nodules, and SILT, gray (10YR 5/1) and yellow brown (10YR 5/8). SILT (65%) clayer, scassonal cher grained, subrounded to subangular chert, wery coarse grained, subangular chert, and yellow brown (10YR 5/8). SILT (65%) clayer, trace sand, yellow brown (10YR 5/8) and gray (10YR 6/1), firm to soft, common inon oxide staining. GRAVEL (80%) 12 mm, subangular chert and occasional sand stand (medium to coarse grained duatz w/ some chert), yellow brown (10YR 5/8) and gray (10YR 6/1). SILT (60%) fitte sand (very fine grained chert wf some grained duatz w/ some chert), selow brown (10YR 5/8) and gray (10YR 6/1). 			59,1°		
Lower Continental Deposits	Sould quark, ligh gray (10YR 7/2) to light brown gray (10YR 6/2) SAND fins grained wi scattered medium grained (predominately medium grained by 707), well sorted, subrounded to rounded quark, scattered mice and black scessory micrafis, light gray (10YR 7/2) GRAVEL (80%) to 12 mm, subrounded chert and carbonaceous shale, sandy (very coarse grained chert and black shale), light gray (10YR 7/2) ORAVEL (80%) to 13 mm wi scattered 12 mm, angular to subrounded chert, little sand (coarse grained chert and black shale), light gray (10YR 7/2) ORAVEL (80%) up to 33 mm wi fragments of larger material, subrounded to subrounded chert, little sand (20%) (medium to very coarse grained, poorly sorted, subrounded to subrounded chert, some sand (medium to very coarse grained, poorly sorted, subrounded to subrounded chert, some and (medium to very coarse grained, poorly sorted, subrounded to rounded quark, clear), some sand (medium to very coarse grained, poorly sorted, subrounded to rounded quark, clear), some sand (medium to very coarse grained, poorly sorted, subrounded to rounded quark, clear), yellow brown (10YR 5/8)				1110101-0391 Balled 9.4J ug/L TCE 4BJ ug/L cls 1,2 OCE NA TC 1110101-0392 Pumped 0.3J ug/L TCE 96J ug/L CE 1,2 DCE 65 +/- 22 pC/L TC	
- Meva	SiLT (50%) clayey, abundani timonite lenses, usually massive, sandy in part-micaceous, gray (10YRS/1) w/ abundant yellow brown (10YR 5/8) staining SiLT (60%) sandy (very fins to fine grained, moderately sorted, subangular clear quartz w/ some chert, occasional medium grained, subrounded), common mica and scattered limonite-cemented sand, scattered massive pyrile, dark gray brown (10YR 4/2) soft, soupy CLAY (60%) 1 mm laminations, silly, micaceous, trace sand (very fine grained quartz), becoming carbonaceous, very dark gray (10YR 3/1), soft, moderate to high plasticity LIGNITE soft -firm, earthy to subways texture, platy, appears to be wood fragments, abundant pyrils (massive w/ some pieces showing isomatic structure), sit content horsaves at 20, black				0,12J ug/L carbon let 73 +/- 20 pC/L **Tc 1110101-0399 Pumped 22 ug/L TCE 2 +/- 6 pC/L **Tc	
McNaty Formation	SILT clayer, scattered sand (very line grained), micaceous, dark gray (2.5Y N4(0), soft SAND (60%) very fine grained to occasional fine grained, well sorted, subanguiar quartz wi scattered dark accessory minerals, sity, abundant mice, trace glauconite and carbonaceous debris, dark gray (7.5YR N4(0) SAND (60%) very fine grained to occasional fine grained, well sorted, subangular quartz wi scattered dark accessory minerals, sity, abundant mice, trace glauconite with increase in carbonaceous material, dark gray (7.5YR N4(0) 150 TOTAL DEPTH				1110101-0400 Bailed 0.2J ug/L TCE NA "Te	McNairy Flow System

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(SILT (60%) clayey, trace send (very fine greined,	Ħ		.	L Z	01	Ŀ						\$								
		subrounded to rounded quartz w/ scattered fine grained chan), yellowish brown (10YR 5/6), soft to firm, moderate to low plasticity	Ħ	╞	ŀ	<u></u>		F					+	∦	Ħ							
					Ē		1991 20 20	E			-		-	Å								
	ł	CLAY (60%), sity, trace sand (very fine to fine grained, subangular to subrounded), light yelknw	╞					F		+				ł								
		бложп (2.5Y 6/4), vary soupy	甘		1	2		╞		-	+			ł							HU1 & HU2	
		SILT (60%) clayey, scattered send (fine grained, subrounded chert and quartz), brown yellow (10YR 6/8), soft to firm	H			Ş		F		-	+			$\left\{ \right\}$							Ĩ	
			H				ULLEUR OF	E						2								
	Upper	SUI (60%) clayey, scaltered sand (fine grained, subrounded cheft and guart2) and gravel (6 - 12 mm, subangular lo subrounded cheft), brown yejiow (10YR 6/8), soft to firm	Ħ	-				È		-	╞		4	4								
	er Continental	SILT (60%) clayey, scattered sand (fine grained,	Ħ					F			╞			4								
	ental Depos	subrounded cheft and quartz), brown yellow (10YR 8/8), soft to firm			1-			Ë	Ħ	-	╡		┦	+		53.64						
		SiLT (60%) clayey, occasional iron oxide grains, becoming sandy w/ depth (fine grained, subangular						E					ł									
		lo subrounded quartz), brown yezow (10YR 8/6)	Ħ	+	┢		2	ľ	┢╍╏	+	╞		र्द			61.94° –						
		SILT (60%) clayey, scattered sand (fine grained chert, quartz and carbonaceous shale), micaceous,	Ħ		╞			F	$\left \right $	-	T		₹								┈┤╨╌ │ _┯	•
		light yellow brown (10YR 8/4) SILT (60%) sandy (fine grained, very well sorted, subrounded to rounded quarts w/ occasional black	E					E					4								Ę	
		accessory minerals), light yellow brown (10YR 6/4), Interbedded wi dayey silts, yellow brown (10YR 5/8) SAND (70%) fine grained, very well sorted,		-	1			F		╡		Ş	-	+				Bai 28	0101-0 led vg/L 7 "Tc			
(See		subrounded to rounded, some sik, occasional black accessory minerals, light yellow brown (2.5Y 6/4), grain size increases w/ depth	Ħ	5			31 <u>12</u> 115 00	╞	┼╌┦	-		ţ		+	Π		63.65	111 Pur	0101-0 nped		۱ ۲	
<u> </u>		SAND (80%) medium to coarse grained, moderately to poorly sorted, subrounded to rounded quart wi common chert and occasional black accessory minerals, little sill, scattered gravel (to 6 mm, chert).	Ħ	بر بير بير	- - 			F		+	Ļ	Ĵ		-	T		ي ت	2J 34	υα/L 1	TCE .1.1 TCA .1 DCE cls 1.2 DC		
F	¥ Tome	some iron stelning, light yellow brown (2.5Y 6/4)	F	}. 	8.01		i i i i i i i i i i i i i i i i i i i	Ē				K	1		Ī			24 -	•/- 20 p 0101-0	CirL Te	╁	•
		GRAVEL (60%) to 18mm, angular to subrounded chert, sandy (medium to coarse grained, subangular	H	665 1				╘	┢	+		┟╸╽	ļ	╈			96.5	383 2J 31	եց/Լ Սց/Լ1 Սց/Լ1	TCE 11TCA 1DCE cla 1,2 DC		
	Continental Deposits	lo wéll rounded quartz and chert), common iron staining, brown yellow (10YR 6/6 to 6/8)	The second	00			182452	F			+		Д	+-			<u>,</u>	11	ug/Ľc	arbon let Ci/L Tc	L H	
	esiite 1			6.00	0000		100						Ц				-					
	ğ				È		1111111	E										Ball 220	ua/L	TCE		
	Porters Creek Clay	CLAY trace send (very fine to fine grained quartz), micaceous, very dark gray (SY 3/1), firm, very			R	5. 	110	È	╞╴┤		≵		\downarrow					105	JUDL	1,1 TCA 1 DCE cis 1,2 DC abon tel	E	
	k Clay			-				E							 			NA	Te	abon tel		
-	1	CLAY trace sand (very line to line grained quartz),	₽				120		-		1											
	╟	micaccous, very dark gray (5Y 3/1), firm, very plastic, slight increase in sit CLAY (604) Ritle sit (20%), trace sand (very fine to fine grained quark), micaccous, very dark gray (5Y	╞┼╴	╞					H		₹_		+		E							
	∦	3/1), firm, very plastic SILT (60%) sandy (fine grained, subangular quartz)		-	Ħ		130			+	\$		+	-	H							
		micaceous, scallered carbonaceous debris and glauconile, dark gray (5Y 4/1), so/1			F		212131212	Η		+	ł		+	-	F							
	McNalry	SAND (60%) vary fine to fine grained, moderately sorted, subangular to subrounded quartz w/ some		S.	総議		140	Е		╉	<	Ž		-	▤			Baile 1J L 32J	ug/L T(ug/L c	88 CE 4a 1,2 DCE		
	McNalry Formation	cheri, Iron atalned, silty, micaceous, occasional carbonaceous debris, yellow brown (107R 5/8)	Þ	I.			0	H		+		Ź	+	╞	Ħ			NA	"Tc	_		
		SAND predominately fine grained w/ some medium grained, moderately sorted, subrounded to rounded quartz, common mica, Iron stained, yellow brown	Ħ.				1	Ħ	H	╪	F	}	-	1	Ħ		-					
\cup		(101X 528)	H				150			-		<u>}</u>			E	•					}	
		SAND predominately fine grained w/ some medium grained, moderately sorted, subnounded to rounded quart, common mice, iron stained, some sity clay interbeds, yellow brown (10YR 5/8)				4 3 4 2 4 3 4 7 4 6 4 5 4 5 4 5 4 5 4 5		H				4	+		Н							
	╟	SILT CLAYEY, MICELEONIA VEROW DOWN (10)YR 5/81					ŝ	╞┤		+		+	+	+						•		
		soft, moderate plasticity 165 TOTAL DEPTH	\vdash					H		╞		╈	╪	+	H							
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	LITHOLOGY	0 GAMMA - API 100		100 NE	UTR	ON PC	ROS	TY ₀ >	WL	ANALYTICAL	
	SILT (70%) some sand (very line grained, rubanguiar), yellow brown (10YR 5/4), firm, 		05								
	SAND (50%) very line grained, subangular quartz and CLAY (50%), yalkowish brown (10YR 5/8), firm, cohesive		20 30						24.27		HU1 & HU2
Upper Car	GRAVEL (60%) 3 - 9 mm chart, slity, yallowish brawn (10VR 5/8)		40				{			•	
Continental Deposits	CLAY (80%) little sand (vary fine grained, subangular quartz), yellowish brown (10YR 5/6)										
JSIG	CLAY (60%) sandy (very fine grained, subangular quartz), yelikwish brown (10YR 5/8)						R		55 ×		
	SAND (80%) very fine to fine grained quartz w/ occasional chert fragments, silty, yellowish brown (10YR 5/5)								67. N		
	SAND (80%) fine to coarse grained quartz w/ occasional chert fragments, little sift, yeBowish brown (10YR 5/8)		70				\$		70.5'	1110101-0828 Pumped 1400 ug/L TCE 25J ug/L dis 1,2 DCE	
	CAVEL (60%) up to 18 mm, sandy, yellow (10YR (8) (Does not agree with wireline logs)				-	-	\geq			27 +/- 23 pCi/L **Te	5
ļ	SAND (90%) very fine grained, subangular quartz, some (eldspar, trace silt, very pale brown (10YR 8/4), very losse flowing sand		80			XX	,	Ī		1110101-0627 Bailed 560 ug/L TCE	<u>₹</u>
Lower Co	GRAVEL (60%) 3 - 12 mm w/ fragments of larger pleces, chert, sandy, very pale brown (10YR 6/4) GRAVEL (80%) 25 mm w/ fragments of larger						\geq			1 Jug/L 1,1 DCE 19 Jug/L cis 1,2 DCE NA *Tc	
Continental D	pleces, cher, litile sand, very pale brown (10YR 8/4) GRAVEL (60%) 25 mm w/ fragments of larger pieces, chert, sandy, dark brown (10YR 3/3)		4				ł			1110101-0628 Pumped 37 ug/L TCE 23 ug/L 1,1,1 TCA	RGA HU5 -
Dujinsits	SILT (60%) clayey, trace very fine grained sand, yellowish brown (10YR 5/6)					£	-			35 ug/L 1,1 DCA 210 ug/L 1,1 DCE 382 +/- 35 pC/L "Tc	
C Porters Creek Clay	CLAY micaceous, very dark gray (SY 3/1), dense, very firm, very plastic		100 110								
			120	┝╍┼╌┼							McNairy Flow System
McNah	SILT (60%) sandy (Very fine grained quartz), abundani black accessory minerals, very dark gray (5Y 3/1), less dense than Porters Creek, firm		130 140						129.S'	1110101-0828 Bailed IV ug/L TCE 83J ug/L cls 1,2 DCE 11 +/- 18 pCI/L **Tc	
nation	SAND vary fine to fine grained, moderately sorted, subrounded to rounded quartz, brownish yellow (10YR 6/8), loose, flowing		150							1110101-0830 Bailed 15 ug/L TCE 17 +/- 18 pC/L TTC	Elevation: 381.88 PGDP Coord: \$ 2666.5.W 2095.9
	150 TOTAL DEPTH										

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	LITHOLOGY	0 GAMMA - API 100	•		
וו	FilL silty clay w/ abundant coarse grained sand, brown (10YR 5/3)		1303h 113		\uparrow
	CLAY (80%) little allt (20%), scattered sand (very to fine grained), abundant iron oxide nodules (lo m) at 6' to 10', yellow brown (10YR 5/4)		10 10		
	CLAY (55%) süly, trace gravel (3 – 6 mm, subtounded to angular chert, yellow brown (10YR 5/4)		20 20		
r 7	GRAVEL (40%) 3 - 12 mm, subrounded to subangular chart, some sand (30%)(very fine to coarse grained), some sit, brownish yellow (10YR 6/8)				UCRS
Upper Comfinental Deposits	SAND (60%) very fine grained, well rounded, silly (40%), yellow brown (10YR 5/6)				
al Deposits	CLAY (60%) some silt, little sand (vary fine grained w/ trace coarse grained chert), abundant iron oxide nodules, brownish yellow (10YR 6/8)		40		-
	SILTSTONE semi-consolidated, well indurated in part, scattered mica, brownish yellow (10YR 6/8)				
,	SAND (65%) very fina to medium grained, well sorted, well rounded, some silt, scattered black accessory minerals, brownish yellow (10 YR 6/8)			1110101-0355 Bailed 5U ug/L TCE	
,	SAND (80%) medium to coarse grained, angular to subrounded, little gravel (up to 25 mm, increasing in size and roundness w/ depth), yellowish brown (10 YR 5/6)		60		
Lower Continental Deposits	GRAVEL (60%) 3 - 50 mm, well graded, subrounded to angular, sandy (medium to coarse grained, subrounded to angular), yallowish brown (1DYR S/B)		2010/01/2020/2010/01/2010/2010/2020/202	30 1/2 UPL cs 1	RQA
	SAND (75%) medium to coarse grained, subrounded to angular, little gravel (12 25 mm, subrounded to angular), yeliowish brown (10YR 5/8)		100 100	380 ug/L TCE 1 8 27/ ug/L 110CE 1 1 1 <td></td>	
	SAND (60%) line to medium gralned, silty, yellow (10YR 8/8)		110		Ĩ
]	SAND (80%) very fine to fine grained, well sorted, well rounded, clear, little sill, gravel (common at 120, 3 - 6 mm chert), white (2.57 8/2)		121 121	1110101-0369 Balled 0.2J ug/L TCE	
3	CLAY w/ trace silt, pyrite-cemented sand (st 1247, black (10YR 2/1), fst, plastic		HIRAL I		
McNalry Formation	CLAY (65%) some silt, very carbonaceous, scattered mica, occasional pyrite-cemented sand and massive pyrite, black (10YR 2/1)		130 130		Me
nation	SAND (60%) fine to medium grained, well rounded, sily, abundant massive pyrile, very dark gray (10YR 3/1)		0		Elevation: 375.97 PGDP Coord: <u>S 21</u> McNalry Flow System
	CLAY (60%) silly, occesional sand (very fine grained, well rounded), gray (10YR 5/1)		140 150 150		: 375.97 xxrd: <u>S 207,8, W 4394,8</u> .tem
	150 TOTAL DEPTH				P4F6

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<u> </u>		LITHOLOGY	0 GAMMA - API 100		JTRON	WL,	ANALYTICAL	HYDRO
		FILL silly clay w abundant iron oxide nodules, light yellowish brown (10YR 6/4) CLAY (60%) silly, increased iron oxide nodules (to 3 mm), light yellowish brown (10YR 6/4) CLAY (60%) Rite sill, decreased iron oxide nodules,		10				
	Upper Continental Deposita	GRAVEL (40%) 3 - 6 mm, singular chart, some sand (30%)(vary fine to coarse grained), some salt, brownish yellow (10YR 8/6)		20				HU1 & HU2
	tal Deposita	SAND (60%) fine to coarse grained, little gravel (20%)(6 mm, angular chert), little sitt (20%), brownish yellow (10YR 8/8) SILT (60%) sandy (medium to coarse grained),		30 40				
		yelowish brown (10YR 5/6) SAND (50%) and GRAVEL (50%) well graded, trace		50		45.38 45.38 45.6 45.6	1110101-0382 Pumped	E CDH
	×	elit, yežiowich brown (10YR 5/8) GRAVEL (75%) little sand (25%) yežiowish brown (10YR 5/8)		. 80		66,38	2.2) up1. TCE 24.8 up1. 1.1 DCE 49 +/- 19 pC/L. TE 1110101-0383 Pumped	<u>₹</u>
C	Lower Continental Deposits	GRAVEL (75%) size increased to 25 mm, little sand (25%) yellowish brown (10YR 5/8)					28.8 upt. TCE 19.8 upt. 11 DCE 124.1 upt. et 1,2 DCE 48 +/- 19 pC/L *Tc 1110101-0384 Pumped 86.8 upt. TCE 1.8 upt. 1,1 DCE 358.1 upt. et 1,2 DCE 358.1 upt. et 1,2 DCE 43 +/- 20 pC/L *Tc	2 A
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	GRAVEL (75%) 3 - 50 mm, well graded, angular to well rounded chert and quartzite, little sand (fine to coarse grained, poorly sorted, rounded to subangular), yellowish brown (10YR 5/8)					1110101-0385 Pumped 2764 ugl. TCE 10.5 ugl. 1.1 DCE 662J ugl. cis 1,2 DCE 32 +/- 21 pC/J. TC	
		SAND (60%) medium to coarse grained, subrounded to angular, Fitle gravel (30%)(6 mm chert), trace silt, occasional mice, yaBow brown (10YR 5/8) SILT (60%) sandy (medium to coarse grained,				103	· ·	
		subrounded, clean), accessional mica, light brownish gray (10YR 8/2) SAND fins to medium grained, well sorted, subrounded to subangular, yolikw (10YR 8/6)		- T10			1110101-0388 Balled 7.8 vg/L TCE 14 vg/L 1,1 DCE	
	McNairy Formation	CLAY ally, occasional very miceceous w massive pynic, vary dark gray (10YR 3/1)		120			15.4 upt Ces 1.2 DCE 12.4 upt. Irans 1.2 DCE NA TE	McNahy Flo
C		CLAY (85%) some silt, trace send (line to medium grained, clear), very dark gray (10YR 3/1) 150 TOTAL DEPTH		18			1110101-0387 Bailad 5.5 ug/L TCE 9.7J ug/L 1,1 DCE 9.8J ug/L trans 1,2 DCE	PGDP Coord: N 1007. W 4612.3 w System
							NA "To	

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•	LITHOLOGY	o K			SAN	1MA - API 100		100	NE	UT	RON	1 PC	DRO	SIT	Y ¢		WL.		ANALYTICAL	HYO UNI		
.5				ديمت	ŕ					Т	T			Ľ	2	1—				↑	Ŷ	
	FILL clayey sill w/ common interbedded sand and occasional limestone roadbase, brown (10YR \$/3),					2					-		ļ		$\square$							ĺ
<b>'</b> :	soft, slightly moist			-	눦	<u>Terrera</u>		Н	┿			$\vdash$	A	┥	+							
	(40%) some clay(30%), some sand (30%)(very to fine grained, subangular, red chert),						10				$\pm$			7	-							
•.	_asional black minerals, light yellowish brown (10YR 6/4)			-	⊢						┺			4					•			
·	SILT (60%) sandy (fine to medium grained,	-						H			╞	$\vdash$	_	╉						H		
	moderately sorted, subangular to subsounded quartz and chert), occasional sand (coarse grained,				5			Н	+	+-	╈		-	┓						2		
1	subangular chert), scattered gravel (6 mm angular to subangular chert), light yellowish brown (10YR 6/4)			Ę.			8			1				יך	<u> </u>					LE HUZ		
	GRAVEL (65%) 3 - 12 mm, angular to subrounded	-	H	ş,	80					+	╀	$\vdash$	_	- (	+						!	
	chert, little sand (20%)(fine to medium grained w/ common coarse grained, moderately sorted, subangular to rounded quartz w/ some chert), trace			8							+	Н		╢							UCRS	ŀ
-	sill, yellow brown (10YR 5/8), abundant iron oxide staining on quartz		$\Box$	ŝ	<u>ار</u>									4							5	
Parase Comparison of Streamster,							8	Н	-	╋	┿		-	¥								
•,	SAND (60%) fine to medium grained w/ scattered very coarse grained, moderately weil sorted,	-						H	╉	╉	╈	Н		Ħ	+	1					Į	l
7	subrounded to rounded quartz and chert, silty, brownish yellow (10YR 6/8), common fron adde										-			Π						Ť		ĺ
	staining		┝	-	╞┤			┡		╇	╌┼╌	$\vdash$		$\frac{1}{1}$								
1	CLAY (60%) some silt, trace sand (very fine to medium grained, occasional coarse grained chert).						5	H		╈	╈		H	1	-	42.62				нuз		.
	yellow brown (10YR 5/8), moderate plasticity									_				Ş						Ì	1	
		—		_	Ŀ			┝	-	_	+			4						<u> </u>	¥	ļ
, <u> </u>			5	87- -	÷		<b>.</b>	Ė	_		+		Ž	≻						Ē	Ĩ	
Ĵ.	SAND (60%) medium to very coarse grained,	E		4	950 950		8	Г		1	Ť		2Ī	Ţ		]				Î		
-	subangular to subrounded w/ scattered well rounded ouartz and chert, gravelly (40%) (to 25 mm, subangular to subrounded chert), brown yellow	H	È	÷	÷.		<b>.</b>	$\vdash$	+	+	╋	$\mathbb{H}$		+					1110101-0797 Pumped			1
	Subangular to subrounded chert), brown yellow (10YR 6/8)		k.		-			F			╈	H	H	ţ	_†-				14 ug/L TCE 83J ug/L cts 1,2 DCE			
1		_	ļ.	•	•••	op	8	$\square$			F			X	П	μι		•	1113 +/- 56 pcl/L *Tc			
.]	SAND (55%) medium to very coarse grained,	H	20		•	9		┝	+	+			+	-	+		65.1°	64.21" AT A	1110101-0798 Pumped			
Ę	subangular to subrounded w/ scattered well rounded quartz and chert, gravely (45%) (to 25 mm	Ľ	<b>6</b>			0.0000		E		1					)	1	- -		43 ug/L TCE 0.3J ug/L 1,1,1 TCA			
Lowy Configuration Deputits	Increasing w/ depth, subangular to subrounded chart), brown yellow (10YR 6/8)	_	66		0		11				-			_	$\Gamma$	]	2		3J ug/L 1,1 DCE 138J ug/L cls 1,2 DCE		ł	
pullin.	GRAVEL (90%) to 37 mm w/ fragments of larger material, subangular to subrounded chert, trace	Þ		0	0	2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.	12	⊢	$\vdash$	+	┿		┝╾┼	┥	$\frac{1}{1}$	┢┛	71.56		2681 +/- 84 pci/L "Tc 1110101-0799	1	RGA	
mail	sand (10%) (medium to coarse grained), yallow (10%) (medium to coarse grained), yallow	D	<u>ę</u> ,	20	- 2	<u> 856 8</u>		┝──			+			1	1	1		ļļ	Pumped 37 ug/L TCE	ŝ	Í	ł
• 10	WEL (70%) to 25 mm, subrounded to	H	Ď	°,	Ŋ,	2.00.000										]			2.1 Jug/L 1.1.1 TCA 11 ug/L 1.1 DCA			
	grained quartz and chert, some sand (medium to coarse grained quartz and chert, respectively), yatiow brown (10YR 5/8) to dark ye/low brown (10YR 4/6)	⊢	<u>کم</u>	2	<u>, (</u>	0700200		┝╌	-	╉		┞	$\vdash$	-	-∦-	$\mathbf{I}$			25 Ug/L 1,1 DCE 40J Ug/L cis 1,2 DCE			
1	GRAVEL (60%) 18 to 25 mm, subrounded chert		ŝ		Ç,	2.000.00	비	L		Ť	ŀ	Ĺ		ł	Ť	<u>}</u>	-		880 +/- 50 pci/L "Tc			
,	some sand, trace silt, yellow brown (10YR 5/6) SAND (50%) fine to coarse grained, predominately	Ľ	Ê,	00	80 80	9.0030 9.0000 9.0		$\vdash$		╇	+-	L	-	_	)	-			1110101-0800 Bailed			İ.
	medium grained, subangular to subrounded will scattered well rounded quartz and chert, guertz iron		Į.	2	77	0		$\vdash$		╈	-				$\mathcal{H}$		7		11 ug/L TCE 0.8J ug/L 1,1,1 TCA 5 ug/L 1,1 DCA			
•	oxide stained, some gravel, trace silt, occesional limonite (medium to coarse grained), yellow brown			ó-		40 6540	8								5				7 ug/L 1,1 DCE 21J ug/L cls 1,2 DCE		ł	
<u>۲</u>	(10YR 5/6)	-	P	Ŀ.				╞━		┿	┿	-	-	<u>_</u>					<u>NA "Tc</u>	<u> </u>		
'	SANO (60%) fine to medium grained, moderately sorted, subrounded to rounded quartz, sity, common			×	<u> </u>			-	+	┿	┿	-	+	7							*	
	chert and limonite (coarse to vary coarse grained), yeflow brown (10YR 5/8)			4						_				Д								
		F			Ħ		8	H		+	+		_	H	+	ł		ī				1
	SILT (60%) sandy (very fine to fine grained,			. 1	Ś				ŀ		1-		-1	51		1		33	1			
	moderately to well sorted, subengular to subrounded) micaceous, yellow brown (10YR 5/8 to light yellow brown (10YR 6/4)			-				$\square$		-		П		Ţ		]	- [1	1				ļ
		-			Į,			$\vdash$	╉	╋		$\square$	ᡧ	┥		ł					11	1
				Ē	<u>a</u>		61	口		1	$\Box$			t								
				-				$\left  - \right $	4	┥		$\left  - \right $	-	$\prod$	_	}						
ŇĊ	SAND (80%) very fine to fine groined, well sorted,	$\vdash$		-	5	Antreaded		⊢∤	╉	╉	+	$\vdash$		╟	┥				1			
iniry	subangular to subrounded w/ scattered well for an angle and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the set and the se				ini article article		1			T				Ϋ́					1110101-0815 Balled			
Forms	minerals, mice and medium grained chert, very pale brown (10YR 7/4)		$\downarrow$	_	-		20	Цļ	Ļ	$\downarrow$	Ц		-	١Ţ			_		SU Ug/L TCE NA *Tc			
io			+	-	$\dashv$		'	$\vdash$	╪	╋	╈	$\square$	╋	H	+-						11	
McNairy Formation - Upper Member					3				$\pm$				7	1	1-							
er Mo	SAND (60%) very fine to fine grained, well sorted,		$\rightarrow$	-			13		+	╇	+	-		₩.	<b>_</b>						Ш	
mbor	subangular to subrounded w/ scattered well rounded, silly, scattered black accessory minerals, very dark gray (5Y 3/1)	+	+	┥				$\left  \right $	+	+	╀┦	-+	┥	ᠿ	+							
1				二			ľ				$\square$		1	Ť								
	CLAY silty, trace sand (very line to fine grained, subrounded), micaceous, occasional carbonaceous debris, very dark gray (SY 3/1), soft to firm	4	_	Ĩ	Ţ		-	$\downarrow$	_	ſ	ļД		7	T					· · ·			
		$\dashv$	-+	+	+		ā	+	+	╋	┼╍╂	+	ł	╞	+							
	AY sity, very micaceous, common thin joations very fine grained sand, occasional stive ovide to 18 ms) was shown or construct			_	1		t			$\perp$	t	╈	Ť		╓							
11		1	Ţ	4	_		F	_[		F	ГĪ	_	A	Ţ	Ē				1110101-0816		11	
	SANDSTONE very line to fine grained, moderate to well sorted, subangular, very well comented w/	+	╡	4	<u>s</u>		<u>_</u> ł	+	╋	+	┢╸		4	+	田		_]		Pumped 5U ug/L TCE			
	pyrite, silty, scattered black accessory minerals, some massive pyrite, light gray (5Y ?/?)			-fe			8	1		T	Ħ			Ľ	Ħ				18 +/- 18 pCI/L "To			
	SAND (75%) yery fine to fine employed with some	$\downarrow$	4	-	ŧ		ł	-+		+	$\left  - \right $			{ <u> </u> _	$\left  \right $			111	}			
J	dark accessory minerale scattered entraneous	+	+	┦	2		ŀ	╉		┢	┝┥	╉	┢	ᢔ᠆	+1							
Ť	George and mica, dark gray (SY 4/1)				Ē		ž i				$\Box$		+	t	Ħ				· [			
11	CLAY micaceous, silty, common laminations very			- I			•		1	1	1 1			1				411	· .		11	

	SANDSTONE very fine to fine grained, moderate to well sorted, subangular, very well cemented w/ pyrite, sity, scattered black accessory minerals,	8		SU ug/L TCE 18 +/- 16 pCi/L "Tc
	some massive pyrite, light gray (SY ?/?) SAND (75%) very fine to fine grained, well sorted, subrounded to rounded quartz, some sitt, occasional dark accessory minerals, scattered carbonaceous debds and mica, dark gray (SY 4/1)			
Î	Y micaceous, sity, common laminations very grained sand, scattered carbonaceous debris, (x gray (SY 4/1)	<b>i</b>		
Monhie Fran	SILT (80%) illue sand (20%)(vary fine to fina grained, well sorted, subangular to subrounded), micaceous, common carbonaceous debris, scattered black accessory minerals, dark gray (SY 4/1), sand increases w/ depth	B B B B B B B B B B B B B B B B B B B		
AnNning Committeen - Environe, Monthere	SAND (70%) vory fine to fine grained, well sorted, subangular to subrounded, occasional well rounded, some slit, micacoous, trace black accessory minerals, scattered carbonaceous debrie, dark gray (5Y 4/1)			
Mondure	SAND (85%) very fine to fine grained, well sorted, subangular to subrounded, trace silt, micaceous, scattered carbonaceous debris, occasional black accessory minerale, gray (SY S/1) to dark gray (SY 4/1)			1110101-0817 Bailed 5U ug/L TCE NA TC
	SAND (70%) fine grained, well sorted, subrounded to rounded, little slit, micaccous, common carbonaceous debris, dark gray (5Y 4/1)			
Ì	SAND (85%) fine grained, well sorted, subrounded to rounded, trace silt, micaceous, common carbonaceous debris, dark gray (5Y 4/1)			
f	SILT (60%) sandy (40%) (fine grained w/ occasional medium grained, well sorted, aubangular to well rounded), micaceous, abundant wood fragments up (10,12 mm, gray brown (2,5YR 5/2)			
	SILT (60%) sandy (40%) (fine grained w/ occasional medium grained, well sorted, subangular to well rounded), micacous, decreasing wood (ragments becoming absent by 235°, gray brown (2.5YR 5/2)			McNairy Flow System
	SiLT (60%) clayey (30%), slightly micaceous, common sand (very fine-to fine-grained), common carbonaceous debris, scattered situane (slightly sandy, micaceous, occasional carbonaceous debris, light brown), silistone decreasing by 245', dark gray (5Y 4/1)			
	SILT (75%) some sand (25%) (very fine- lo fine- grained w/ occasional medium-grained, subangular to wzB-rounded, moderately sorted), micaceous, scattered silistone iragments, dark gray (SY 4/1)			
MaNairy Fernation - Lover	CLAY (60%) sity (40%), common*thin laminations <1 mm sand (very fine grained quartz, slightly micaccous), scattered carbonascous debris, dark gray (SY 4/1), firm to slightly stiff, moderate to high plasticity	200		1110101-0816 Bailed 5U ug/L TCE 17J ug/L cls 1,2 DCE
allan - Lewe	SILT clayey, micaceous, scattered carbonaceous debris, increasing sand (very fine grained, subrounded), occasional (regments pyrite-cemented sandstone, very dark gray (SY 3/1)			NA "Te
Member -	SILT (70%) some tand (30%), micaceous, common carbonaceous debris, occasional silistane gravel (12 mm, carbonaceous, alightly micaceous, tan), dark gray (SY 4/1)	6	┝ <del>╶┦╄╍╞╸╠╡╌╎╎┥┥</del> ┝ <del>╺╹┍┍┍╹</del> ┝ <del>╺╹┍┍╹</del>	
	SAND (70%) very fine to fine-grained (predominant) w/ some medium-grained, well sorted, subrounded to rounded, some silt (30%), scattered carbonacous debris, common siltschore (ragments (very sandy, carbonaceous, tan) olive gray (5Y 5/2)			
	SAND (85%) very fine to fine-grained, well sorted, subrounded to rounded, micaceous, common carbonaceous debris, scattered alistone gravels (very sandy, lan), occasional pyrite-comented sandstone nodules, gray (5Y 5/1)			
E	SAND (90%) very fine to fine-grained, well sorted, 'rounded to rounded, iitile allt (10%), scattered les sandstone (fine grained, pyrite cemant, very Jonaceous, occasional pyritized wood Tragments), gray (SY 5/1)			
	SAND (90%) fine to medium-grained, moderately, well sorted, subrounded to rounded, abundant prito-comented sand nodules (3 - 25 mm), common carbonaceous wood fragmants (occasionally pritized), slightly micaceous, dark gray (6Y 411)			
	SAND (90%) fine to medium-grained, moderately well sonted, subfounded to rounded, decreasing pyrite-			

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• •	scattered siltstone fragments, dark gray (SY 4/1)										ľ				D					-	1 ·				
•:	CLAY (60%) silty (40%), common thin laminations <1 mm sand (very fine grained quartz, slightly	F	$\square$		1						}			-	X		╞		1	┞	4				
-	micaceous), scattered carbonaceous debris, dark	┢	++	+	╋		3			1	ŀ	+	┢	+-	5	⊢	╞	+	+-	łτ	ł		1110101-0818 Bailed		`
11	gray (5Y 4/1), firm to slightly stiff, moderate to high plasticity	┢	++	+	+	┼╌	1 2	2		3	3	+	+		K		1	-	┢	Ľ		1	5U ug/L TCE 17J ug/L cis 1,2 DCE	i	
ł	clayey, micaceous, scattered carbonaceous	┢	╞╋	+	ᠯ				tu.		Ī		1	-	٢s		t		t		1		NA To		
-	s, increasing sand (very fine grained, rounded), occasional fragments pyrite-cemented		$\square$	T	,	<b>لیج</b> اح				1	[				$\Box$						]				
	sandstone, very dark gray (5Y 3/1)	L		$\bot$	2						ł							_	-		1				
`:	SILT (70%) some sand (30%), micaceous, common	┝	$\square$	불	2		-74		42		3		+	┢		-	┝	-			-				
- 1	carbonaceous debris, occasional aitistone gravel (12 mm, carbonaceous, slightly micaceous, tan), dark	┝	┢╼┼╸	5	5		555	- 11	à ra	ж,	╞	-+-	+	┟╌	+	-	┢	+-		-	ł				
•	gray (5Y 4/1)		╉┼	彊		ца П		÷.		ŝ	ŀ	-		-		Į-	-	┢╼		┢	-				
	SAND (70%) very fine to fine-grained (predominant) w/ some medium-grained, well sorted, subrounded		TK		7	ų d				3	Ī					٢				1					
	to rounded, some silt (30%), scattered carbonaceous debris, common silisione fragments		Ľš						3		š	_				Σ		Γ			]				
	(very sandy, carbonaceous, Ian) olive gray (5Y 5/2)	┢	<u>   </u> \$	-11-13 	7		÷		拉	<u>ظًا</u>	•	-		┢		Ų									
	SAND (85%) vary line to fine-grained, well sorted, subrounded to rounded, miceceous, common	┝	╞						<b>漢</b>	ŝ	ŀ	_	-	┢		K		┢─	-	┢╸					
ا ۲	carbonaceous debris, scottered silistone gravels (very sandy, lan), occasional pyrile-cemented	H	E.		1	f F		<u></u>	1	2	ŀ		+			17	┢─	┢	<u> </u>		-		1		
	sandstone nodules, gray (SY 5/1)	F	Į٤	N.	÷.,	L (		ιų,	巅	<u>.</u>	, İ				-	١٢		┢	$\mathbf{T}$	┢					
-		Г		ž		1	1		3	園で	š					$\square$					]			- 1	1
Ì	SAND (90%) very fine to fine-grained, well sorted, subrounded to rounded, little sitt (10%), scallared	Ŀ		-	фэ	i a		*	*	÷				L		Ц			L	L_	ľ				
,	nodules sandstone (fine grained, pyrite cement, very carbonaceous, occasional pyritized wood	-	É	2	εŻ.		ŧŤ		2	ŝ	┢		+	-	_	Ķ	-	┢	┢		-				
1	fragments), gray (SY 5/1)		癥	Ŧ				Ŧ		Ξ.				<u> </u> -	-	R	-	┢	-		ł				
٠į		┢	匮	÷			÷.		-	園	ŝ		•	17		IJ			F	-	1				
1	SAND (90%) fine to medium-grained, moderately well sorted, subnounded to rounded, abundant pyrite-camented sand nodules (3 - 25 nm), common carbonaceous wood fragments (occasionelly	L	See	-	10.0	101	-	10	3	5						Ś					]		ļ		l
1	carbonaccous wood fragments (occasionally pyritectus wood fragments (occasionally pyritectus), alighty micecaous, dark gray (5Y 4/1)	H		÷.				10	游	8	ŀ	_	┢	Ļ		Ļ	ļ	_	╞		Į			- {	1
; ]	printed, angling meteorola, daix ging (all with	╞		*	24	-		÷,	-	ð.	٦ł	+	1.	$\vdash$		В		┢╌	⊢	$\vdash$	{	1	' /	- 1	1
			Č.,		124	<u></u>		Pi a			5					Ľ			_		ļ				
,	SAND (90%) line to modium-grained, moderately well sorted, subrounded to rounded, decreasing pyrite-	Ľ	<u>.</u>	<u>.</u>	1	2.1	1	1	<u>.</u>	8						Σ						ļ		ļ	ſ
	cemented sand nodules (3 - 25 mm, gone by 315), common carbonaceous wood fragments	┢	極	李		74	拉		ų,	4	ŀ	+	+			K		_					· j		}
-	(occasionally pyribized), slightly micaceous, dark gray (5Y 4/1)	-	R	8	\$Z	2-5	いた	1	35	鬻.	. H		1	-	_	K		┢	┢	H					1
			R.	57				4.72 			3 -					λ	1				1				
1		L					-		1							E			Ľ		1		l	l	l
.[	SAND (85%) fine-grained, well sorted, clean, subangular to subrounded, occasional	$\vdash$	極	2			Ŵ	漆	4.2	ž	ŀ	_ _		╞		<b>\</b> -	-	┞	┞		4				].
	carbonaceous debris and mica, abundant pyntized sand nodules at 330°, light gray (5Y 7/1)	⊢	惨	*		1	-	Ť			ŀ	+	┿	┼╌	$\vdash$	R		╀	┞		4				
Ť	NO medium to coarse-grained, moderately	h	爅		d 			~	4	ž,	3	+	+	-	-	5		F	┢		1			Í	1
	sorted, clean, well rounded, abundant pyrilized sand nodules, common black carbonaceous wood		L¢	叢	÷.,	÷,		義		÷	ł		t	t		5		E			]				
Ľ,	fragments, trace alliceous limestone gravels (3 mm).	L	際	ŝ,	-	4	4	3	8.	瀫	- [					ς					]				នួរ
BILLINE	dark gray (SY 4/1) GRAVEL 12 mm, clean, slikified limestone,	┡		in. Eri		(14) (16)			14	<u>z</u>	ŀ	+	┢	╞	╘	٤	⊢	╂	╂	$\vdash$	4				Elevation: 371.85 PGDP Coont: N 690
2000	occasional sand (coarse grained, decreases w/	┝╸	┢	圈			聞	2	8		ŝŀ	+	+	+			⊢	$\vdash$	┢	$\vdash$	4				37
	depth), trace pyrilized sand, gray (5Y 6/1) to very dark gray (5Y 3/1)	F		80) 80)			躨	嘗	影	Ϋ́,	ł	+	╞╴	$\mathbf{T}$	2	╞	-	ŀ	<u> </u>		1			·	N 65
	LIMESTONE, weathered, clay, limestone fragments, dark grayish brown	ſ		巖				*			E		T			2			Ĺ	•	1				30. W
Mi	LIMESTONE very fine crystalline, hard, no visible	Ħ		Ť					Ϋ́,	Ë,	ŀ	-						╞	╞	T			1110101-0819	¥	4
Series I	porosity, fight to medium gray 350 TOTAL DEPTH	╘		푸	Ť	辞	符	주	守	격ᢠ	ŝ		+	┼╌				┝		<u> </u>		- 1	SU ug/L TCE		Γ
Mississippium Linxestone	350 TOTAL DEPTH	F	╞╌┠╸	+	╀	$\square$	$\vdash$	+	┽	+	┢	+	+	┢		ŀ		$\vdash$	╞		1		20 +/- 20 pci/L Tc		<u> </u>
ŝ		L	Ħ						$\uparrow$	-1	F	+	$\uparrow$			1		1	1		1				ЦЦ
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	LITHOLOGY	0 GAMMA - API 100		WL	ANALYTICAL HYDRO
Î	Fill predominately silty clay w/ abundant interbedded sand and gravel				
	CLAY (60%) silty, abundani iron oxide nodules from 9 to 11' (3 mm), scattered send (very fine grained quartz and chert), yellow brown (10YR 5/4), soft		5 		
- -	SiLT (70%) some clay, increasing aand (line to medium grained, subrounded quartz and chert), scattered gravel (3mm, chert), yellow brown (10YR 5/4)		8		HU 1 & HU2
Upper Continental Deposits	GRAVEL (60%) 3 - 25 mm, angular to subrounded chert, sendy (coarse to very coarse grained chert), brownish yellow (10/R 6/S) alternating with SAND (70%) medium grained, moderately sorted quartz w/ some chert, some silt, brownish yellow (10/R 6/S)		8		
osits 	GRAVEL (70%) 12 mm, angular to subrounded chert, some slit, increasing, w/ depth, little sand (madium to course grained, sublanguiar to subrounded chert and quartz, brownish yellow (10YR 6/5)				
	SAND (65%) fine to medium grained, moderately sorted, subangular to subrounded quartz, some iron statiling, silty, yallow brown (10 YR 5/6)			48,25 48,16 46,27	
	SANDSICNE fine to medium grained, subrounded quartz w/ occasional chart, well cemented w/ limonite, vary dark red brown (SVR 3/2) SAND (70%) very fine to predominantly fine grained, moderately well storted, subangular to		8		
	graunac, moderatery weil sonac, subanguar to occasionally subrounded quart; some sit, scallored dark accessory minerals, brownish yellow (10 YR 6/8) SAND (80%) medium to coarse grained, moderately				
	well softed, subargular to subtounded quartz w/ some chert, filte sit, scattered very coarse sand to very fine public gravel chert, brownish yellow (10 YR 6/8)		8	61.3 ⁻	
Lowe	GRAVEL (85%) to 25 mm w/ fresh fractures indicating larger material, angular to subrounded chert, tille sand (medium to very coarse grained, modarate to well-sorted, subangular to rounded quarta), yellowish brown (10YR 5/8)		8		1110101-0334 Pumped 3900 ug/L TCE 32.8 ug/L 1,1 DCE 9.5 ug/L 1,1 TCA 4.8 ug/L cr/s 1,2 DCE 9.5 ug/L 1,1 TCA 4.8 ug/L cr/s 1,2 DCE 133 +/- 102 pC/L TC
Anental Deposits			8		t110101-0335 풍   Pumped
posíts	GRAVEL (60%) 18 mm, subrounded to munded cheft, some sand (medium to very coarse grained, moderate to poorly sorted, subrounded to rounded quartz), little silt, yellowish brown (10YR 5/8)				13000 ug/L TCE 142.1 ug/L 1,1 DCE 419,9J ug/L cis 1,2 DCE 15.9 ug/L 1,1,1 TCA 11.1 ug/L carbon tet 3728 +/- 67 pC/L "To
$\uparrow$	SAND (80%) fine w some medium grained, subangular to subrounded quartz, silly, trace carbonaceous shale, micaceous, olive (57 5/3)		8		1110101-0336 Pumped
	SILT (60%) clayey, scattered and (medium grained, subrounded to rounded quentz and chen) micaceous, gray (10YR 6/1) motiled wi yellow brown (10YR 5/8), soft, modernic plasticity SLI (60%) clayey, abundant mica, scattered aand /			99,91 -	44661.5 ug/L, TCE 379.5 ug/L, 1,1 DCE 935.4J ug/L cis 1,2 DCE 20 ug/L carbon tet 43922 +/- 325 pC/L "Tc
	(fine to medium grained quart2), dark gray (10YR 4/1) SAND (65%) medium grained w/ occasional coarse grains, well sorted, subrounded to rounded quartz, occasional black accessory minerals and chert, trace glauconite, some fron etaining, fittle silt and clay, yellowish brown (10YR 5/8)				1110101-0337 Pumped 15 ug/L TCE 17 +/- 23 pCi/L "To
McNa	SAND (80%) fine to medium grained w/ occasional coarse grains, moderately sorted, subangutar to subrounded quartz, occasional sandstone fregments, some iron oxide coment, increasing sill, yellowish brown (10YR 5/8) SILT (60%) sandy (very fine to fine grained, moderate to well sorted, subrounded quartz wi occasional very fine grained glauconite), micaceous, abundant carbonaceous majerial, occasional lighte				1110101-0338 Pumped 18 ug/L TCE 28 +/ 25 pc/L "Tc T
McNalry Formation	SAND (80%) very fine to fine grained, moderately well sorted, subangular to subrounded, silly, decreasing mica and carbonaceous material, occasional glauconite, massive pyrite, sandstone w/ pyrite cement, very dark gray (SY 3/1)		₩ ₩		28 +/- 25 pC//L *Tc Kc
	SILT (60%) clayey, scattered sand (fine grained quartz), micaceous, dark gray (SY 4/1), soft, kow plasticity SAND (85%) fine to medium grained, moderately				PGOP Ca
ł	occasional black accassory minerals and mice fakes, gray (SY 5/1)		ž		1110101-0339
	ina to ina grained, subangular quartz), scattered mica, silt increasing below 145', dark gray (5Y 4/1), soft, moderale plasticity				1110101-0339
	SILT (60%) clayey, vory carbonaceous, abundant coaly residue on water returns at surface, common sand (line to madium grained, subrounded quartz), black (7.5YR 2/0), soft, sticky 155 TOTAL DEPTH				1U up/L TCE 0+/- 13 pCi/L *Tc
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LITHOLOGY	o GAMMA - API	100 NEUTRON POROSITY	WL	ANALYTICAL	
FiLL predominately ality clay w/ interbedded sand (very coarse grained) and gravel (3 cm cher), some iron staining, dry to 3, brown yellow (10YR 6/6), soft to firm					
CLAY (50%) stilly, common sand (very line to fine grained, aubanguisr to subrounded chert wil some quartz), brown yellow (10YR &6), soupy					
SiLT (50%) Rite and (line grained, subrounded quartz and chert), occasional gravel (3 mm), yallow brown (10VR 5/1)					HU1 & HU2
GRAVEL (60%) 8 mm, angular to subrounded chen, sandy (fine to coarse grained, poorly softed, subangular to subrounded quark we some chent), scattered iron axide staining, yellow brown (1078 5/1)		▓▌┢┿┼┼┼╼┝╍┼┼┡┿╍╢			
Characterize praimed, poorly sorted, aubangular to subrounded quarts we some characterize aubangular to staining, yellow brown (10/R 5/11), seals and is staining, yellow brown (10/R 5/11), seals and is subrounded quarts we some characterize aubangular to subrounded quarts we some characterize aubangular to moderate to high plasticity, molet GRAVEL (70%) 6 to 12 mm, angular to sublangular cherd wi extensional limetione some site and shard from to year			34,05		
GRAVEL (70%) 6 to 12 mm, angular to autongular chert w cocasional innatone, some sit and and (fine to very coarse grained, autounded quarts and chan, gravel atea and sand contant increasing w/ depth, yellowish brown (107R 56)				1110101-0319 Balled 2.5J ug/L TCE 5.BJ ug/L 1,1 DCE 75J ug/L cis 1,2 DCE NA "Tc	
SILT (60%) sandy (fine grained w/ scattored coarse grains, aubangular quarta) yellow brown (10 YR 5/8), firm, slightly moist		▓▋┝┽┼┼┅┾┽┥┾╢┽╡	46,887 50,3 49.2*		E
SILT and CLAY (80%) little send (fine to medium grained, angular to subarguisr quark will some check and scalared dark scassory minerals), browniah yellow (10YR 8/5), extremely source SILT (40%) space (fine in medium staland source)		8	\$8.37   - 70	1110101-0320	
SILT (60%) sandy (fice to medium grained, angular to subangular quark we some chart and seataned dark accessory minersis), brownish yallow (107R 608) SAND (95%) medium grained, well sorted, clean, subrounded, occasional cause grained, subangular chert				Pumped 1800 ug/L TCE 269.1 ug/L 1,1 DCE 1592J ug/L cis 1,2 DCE 402.5 ug/L carbon let	₹
turboviceo, occasional coarse graineo, subsinguar cher, trace siti trace darki secessary minerala, common kon ordea staining, browniah yelow (10 YR 6/8)				155 +/- 27 pCi/L Tc 1110101-0321	
GRAVEL (65%) 12 to 25 mm w/ (noments of targer picces, angular to subnounded chart, title sand (modium to very coarse grainde, subangular to subnunded quartz w/ some chart), sight yellow brown (10 YR 6/4)				Pumped, Duplicate 1800 ug/L TCE 215.8 ug/L 1,1 DCE 3097J ug/L cl 1,2 DCE 335.1 ug/L carbon tet 139 +/- 26 pCi/L Tc	RGA
C C C C C C C C C C C C C C			79.3'	1110101-0322 Pumped 2300 vg/L TCE 382.1 vg/L 1,1 DCE	HUS
<ul> <li>SAND (75%) fine to coarse grained, poorly anted,</li> </ul>			] s	1738J ug/L cls 1,2 DCf 186 +/- 27 pC/L TC 1110101-0323 Pumped, Duplicate 2200 ug/L TCE 322.5 ug/L 1,1 DCE 2387J ug/L cls 1,2 DCf	
submunded is autoangular, some gravel (6 to 12 mm, angutar to subrounded chan), trace sit, strong brown (7.57K 5/6) Sit7 and SAND very line to fine will some medium grained.		500 S		163 +/- 27 pCl/L "Tc	
motionally sands around any has an are we write insolution gradients, motionally sands around and going selection (1017) 841 and gray (1017) 31) SAND (70%) vary fine to fine wi some motium grained, motionally sortict, subbounded, some all, scattered to				1110101-0324 Pumped 1700 ug/L TCE 51.4 ug/L 1,1 DCE 1092J ug/L cis 1,2 DCE	
common gravet (3 mm chert), light yellowiah brown (10YR 6/4) and grav (10YR S/1) SILT (60%) sandy (very fine to fine grained, moderate to well softed, wiblaquiar quartz well scattered to common				139 ug/L carbon tet 78 */- 22 pCl/L "To 1110101-0325	
median drainadegiala (donta de activitation de unitation and mice, pale brown (107R 63) GRAVEL (50%) 3 to 6 mm, angular to subangular chert, study (very fun to predominanty fine grained, moderalely				Pumped, Duplicate 1700 ug/L TCE 34.3 ug/L 1,1 DCE 1182J ug/L cls 1,2 DCE 79.9 ug/L carbon let	
no wear somed, subsequiar to subcounded quartz, collided medium to coarse grained, subangular chart), scattered black accessory minarats, trace sitt, yeBowish brown (10VR 5/5)				64 +/- 21 pCV_ "Tc	
SILT (60%) sandy (very line to fine grained, subangular, scalitered coarse prained, subangular cher), micateous, vary dark pray (2-5Y 37), koit, bow plasticaly SANO (60%) very line to fine grained, subangular, scattered					
course grained, subangular chart, silly, micaceous, very		8			McNairy Flow System
Cart gray (r.s. un) SANDSTONE fine grained, moderale to well sorted, subrounded to subangular, very well comented w/ pyrile, scatbered carbonace/us material, occasional wood fragments, medium gray (SY 201) SAND (95%) fine grained, well conted, subangular to subrounced guart, occasional black accession minurals and coars grained chi, trace sit, gingh gray (SY 71)					W System
SAND (50%) fine to medium grained, moderately sorted, subangular to subrounded quartz, and SILT, micaceous, very dark gray (SY 3/1), firm				}	
SiLT (70%) some sand (very fine to fine grained wi occasional medium grains, subangular to subrounded quarts), micsaeous, occasional glaucanite, vury dark gray (SY Jri), firm to soft, silt and sand occur as alternating layers (5 mm and 1 - 8 mm, neapectively) PyGIEF massion				1110101-0326 Balled 10 ug/L TCE	PGDP Coord: \$ 1009.8 W 3913.2
PYRITE massive, common carbonaceous Laminations, reasonal sand lamination (very fine grained), occasional tod (agenera), coaly readius an waiter returns to a utyrace SILT (80%) Brid sand (very fine to fine grained we occasional medium grates, subanguist to subrowned (5%) 201 acume, occasional glouconile, very dark gray			ł	NA "To	1009.8.19
<ul> <li>prancy, micesoni, grand, butangiasy in subcomped quarty, micesoni, occasional glauconie, vany dark gray (SY 17), soopy</li> <li>PYRTE massie, some cubic structures, common carbonaceous bminations, occasional sand ismination (Vary Ina grained), occasional spinite wood fragmenta, coshy resistive an valar returns to surface</li> </ul>				1110101-0327 Balled 1U ug/L TCE NA "Tc	V 3913.2
SILT (50%) sendy (very time prained, aubangular quartz), occasional glauconito, scattered lignitic wood (ragmenta, very dark gray (5Y 3/s)					
160 TOTAL DEPTH				<u> </u>	

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LITHOLOGY	0 GAMMA - API 1	)0 >	11 4		RON P	OROS	۰ ۲۲۱ ~~~	WL	ANALYTICAL			
FILL predominately clayey silt w/ interbedded sand (fine to medium grained) and gravel (3 mm chert), brown (10YR 5/3) w/ dark gray (10YR 4/1 molile), firm, slightly molst												
SILT (60%) clayey, scattered sand (vary fine to fine grained, subangular chert w/ some quartz), sand content increases below 16', thin gravel (3 mm, chan) at 15', micaceous, dark brown (10YR 4/3)		10 10	\$-									
SAND (85%) medium grained, well sorted, subangular to subrounded quartz w/ some chert grading to coarse grained, moderataly socied, common gravel (3 mm to occasional 12 mm), trace siti, tight yellow brown (10YR 8/4)		10 10 10	4	╺ <mark>┥</mark> ╺┥╶┤ ╵┥╶╎╼┑ ╶┝╼┼╾╎								
SiLT (60%) sandy (medium grained, well sorted, subangular to subrounded quarz w/ some chert), light yellow brown (10YR 6/4)												
GRAVEL (70%) 3 to 12 mm, angular to subangular chert w/ occasional quartz, some sand, brown yellow (10YR 5/8)		8	3							HU1 & HU2		
SILT (50%) and CLAY (45%), common sand (very fine to fine grained quartz w/ some chert), coasionat mics, light yellowish brown (10YR 6/4), aoît											UCRS 1	
SILT (50%) and CLAY (45%), common sand (very fine to fine grained quartz w/ some cher), coccasional mica, light yellowish brown (10YR 6/4), soft GRAVEL (70%) 6 to 12 mm, subangular to subrounded chert w/ occasional imeatone, some sand (medium to very coarse grained, moderately sonted, subrounded to rounded quartz and cher), light yellowish brown (10YR 6/4)								***				•
SILT (80%) clayey, traca tend (fine to medium grained, subangular to subrounded quartz w/ some chert), sand content increases w/ depth, yellow brown (10YR 5/8) w/ light-gray molite (10YR 7/1), firm, moderate plesticity			8-					49.32				
SiLT and CLAY (85%) little sand (line grained quartz), occasional iron oxide nodules, light gray (10YR 6/1) with yallowish brown (10YR 5/3) staining SAND (75%) fine to predominantly medium grained, moderaiely sorted, subrounded quartz w/ occasional chart, some sith, scattered gravel (3 mm chert),		8	8									•
brownish yellow (10YR 6/6) CLAY (60%) silly, occasional sand (fine grained) and mica, brownish yellow (10YR 6/8), soft, very plastic SAND (95%) medium grained, wall sorted, clean,										Hu Hu		
subrounded to rounded, quartz, trace chart, trace site, trace dark accessory minerals, light yellowish torwn (2.5Y 6/4) SAND (90%) medium grained, well sorted, clean, subrounded to rounded quartz, trace gravel (8 mm), trace site, trace dark accessory minerals, light		20							1110101-0329 Pumped 138.8 ug/L TCE 17.8 ug/L 1,1 DCE 268.1J ug/L cis1,2 DC	H 문 H		•
yellowish brown (2.5Y 6/4) GRAVEL (70%) 6 to 30 mm w/ fragmants of larger piccas, angular to subrounded chort, little sand (medium to coarse grained, subrounded quatz w/ some chert), light yellow brown (2.5Y 6/4)		560 (Rugelson) 08							289 +/- 31 pCi/L "To			
G piecas, angular to subrounded chert, little sand (medium to coarse grained, subrounded quatz w/ some chert), light yellow brown (2.5Y 6/4) G GRAVEL (95%) 6 to 30 mm w/ fresh fractures indicating larger material, angular to subrounded chert w/ occasional sandsione, trace sand (medium to very coarse grained, poorly sorted, subangular to subrounded quarz), brown yellow (7.5YR 5/8)		Tesh Navis Carile De	90					88.6	1110101-0330 Pumped 243.3 ug/L TCE 33.5 ug/L 1,1 DCE 463.8J ug/L cis1.2 DC 712 +/- 45 pC/L "Tc	- HU5	RGA	
SAND (80%) line grained, well sorted, subangular to subrounded quanz w/ occasional chert, fittle silt, common gravel (6 mm chert), very pale brown (10YR 7/4)		100						98,45				
SILT (60%) sandy (fine grained, weil sorted, subangular to subrounded quartz w/ occasional chart), iron oxide staining, yeirowish brown (10YR 5/8) SAND (60%) fine grained, weil sorted, subangular to									1110101-0331 Pumped 0.3J ug/L TCE 0 +/- 13 pCi/L TCE			
subrounded quartz wi scattered cheft, sitzy, abundant reddish brown sandstone fragments (fine grained, well sorted, subangular to subrounded quartz wi scattared chert) with iron oxide cement, very pate brown (10YR 7/4)		STRANDING STRAND									$\left  \right $	
SAND (80%) vary fine to line grained, moderate to well sorted, angular to subangular, sitly increasing w/ g depth, abundant black lightle wood fragments, some w/ subwaxy texture, dark gray (SY 4/1), coaly		120 123	130									
<ul> <li>Weis sorted, angular to subangular, silly increasing w/ depth, abundant black light(wood fragments, some w/ subway texture, dark gray (SY 4/1), coaly SILT (60%) sandy (very fine to fine grained, modarate to weil sorted, angular to subangular), scattered arkonaccous material, occasional wood // agments, dark gray (SY 4/1)         </li> </ul>		3. IEU IU IU IU IU IU IU IU IU IU IU IU IU IU							1110101-0332 Pumped 1U ug/L TCE		- McNality F	
SILT clayey, abundant mica, scattered sand (fine grained), very dark gray (SY 3/1) SILT (S0%) and SAND very fine grained, well sorted,		130							0 +/- 0 pCi/L "Te		PG0P McNairy Flow System	Elavat
common carbonaceous debris, dark gray (SY 4/1), sand content increasing w/ depth SILT clayey, abundant mica, scattered sand (fine		140									Coord: Sa	jon: 379.20
stand and carbonaceous laminations, very dark gray (SY 3/1) SAND (90%) very fine grained, well sorted.							· 				PG0P Coord: S 7097.0, W 3871.0 System	-
aubangular to subrounded, abundani mice, common carbonaceous debits, trace alt, gray (SY 5/1) 150 TOTAL DEPTH		5							1110101-0333 Bailed 1U UgAL TCE NA *Tc	.	10 T	0
								·····				200

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	LITHOLOGY	0 	GAMMA - API	100		100 N	eutr	ON PO	ROSITY	( 0 ->	WL			HYDR	0
	FILL angular gravel roadbase SILT clayey, trace sand (very fine to fine grained quartz), brown (10YR 4/3), soft, low plasticity														
	11 cloyey, trace sand (very fine grained, moderale to well sorted, subangular quartz), occasional gravel (3 mm, chari), light yallow brown (10YR 6/4)	┠╌┝╸ ┝╌┝╸			5			╺┼╴╎ ╺-┼╸╎ ╺─┼╴┤							
	GRAVEL (60%) 3 to 6 mm, angular to subrounded chert, sandy (very fine to coarse grained, subrounded to rounded quartz w/ some chert), silly, light yellow brown (10YR 6/4)				8										
	GRAVEL (75%) 3 to 12 mm, subangular to subrounded chart, some sand (medium to coarse grained, poorly sorted, subangular to rounded quartz w/ some chert), brown yallow (10YR 6/8)						╺╺╂╶╎ ┝╼╂╼╴ ┝──┠──	┝╌╊╼╂ ┝╌╂╼╉	R	)   					
Upper Contine	CLAY sity, scattered sand (very fine grained), scattered gravel (3 mm chert), light gray (10YR 6/1) to fight yellow brown (10YR 6/4), soft, moderate plasticity SiLT clayey, trace sand (very fine to fine grained				8									HU1 & HU2 -	
Upper Continential Deposits	quarzi, occasional gravel (3 mm), light yellowish brown (10YR 8/4) to brown yellow (10YR 8/8) GRAVEL (70%) 6 to 12 mm, subangular to subrounded chert w occasional limesione, some sand (medium grained, subangular quarz and her subrown (medium grained, subangular quarz and				\$					┿╌┨ ┿╌┨ ┿╼┨					
	chert), some silt, yellowish brown (10YR 5/8) SiLT clayey, common sand (very fine to fine grained querz w/ some chert), occasional ilmonite nodules, common to abundant fron axide stalining, light yellow brown (10YR 6/4) to gray (10YR 6/4)								X						
	SiLT clayey, scattered sand (very fine to fine grained quartz w/ some chart), abundani iron code staining, yellow brown (10 YR 5/8), firm, low plasticity SAND (60%) fine to medium grained, moderately sorted, subangular to subrounded quartz w/				8					┾┥	52.15 ·				
,   -	occasional chert, sitty, scattered graval (6 io 12 mm, subanguiar chart) at 60°, yellowish brown (10YR 5/8) SiLT clayey, occasional sand (fine grained) and mica, light yellow brown (10YR 6/4), soft				8									HUI	
,	SAND (95%) medium grained w/ some fine grains, well sorted, clean, subangular to rounded, trace sill, trace dark accessory minerals, carbonaceous material and iron oxide nodules (coarse grain), light offve gray (SY 6/2)							╞╼╄╼┨ ┝╴┠╼┧		╶╂╼┩ ╺┿╼┦ ╺╋╼┦	88.57 			HQA	¥-         .
	 ັງ				2								1110101-0342 Pumped 420.2 ug/L TCE		
Lower Conlinen	"GRAVEL (60%) 6 to 30 mm w/ fragments of larger pieces, angular to subrounded chert, title sand (medium to very coarse greined, moderately sorted, subangular to rounded quartz w/ some chert), yellow brown (10YR 5/8) to dark yellow brown (10YR 4/6)				8						\$		98.7.1 ug/L cts 1.2 DCI 56 +/- 20 pC/L Tc 1110101-0347 Pumped		Real
Conlinental Deposits					8			┝╌╎╼┥ ┥╌┦╼┥		┿┥ ╈┙			353.8 ug/L TCE 89.9 J ug/L cia 1,2 DCi 5.5 ug/L carbon lat 61 +/- 20 pCi/L "Tc	= ₩ 	
,	GRAVEL (60%) 6 to 16 mm angular to subrounded chert, sandy (medium to very coarse grained, moderately sorted, subangular to rounded quarty some chert), yellow brown (10YR 5/6) to dark yellow brown (10YR 4/6)				•			┥╶╀╾╿ ┥╴┼╍┥ ┥┲┫═┙					1110101-0348 Pumped 485.8 ug/L TCE 60 +/- 20 pC/L =Tc		
-	SAND (75%) medium to coarse grained, moderate to well sortad, subangular to subrounded quartz w occasional chert, some gravel (6 mm chart), yellowish brown (10YR 5/8) SAND (75%) fine grained, well sorted, subrounded to				8					╤┧┵╂ ╺┽╶┦ ╺┼╌┦	J		1110101-0351 Pumped, Duplicate 500 ug/L TCE 74.3J ug/L ds 1,2 DCE		*  
-     -    - - 1  -	rounded quartz w/ occasional cheit and black accassory minerals, some sill, micaceous, red (2.5YR 5/8) CLAY silly, trace sand (vary fine grained quartz ), micaceous, occasional iron oxide staining, brown (10YR 4/3), and gray (10YR 5/1), soft, modarate to				110							Ħ	51 +/- 20 pC//L *Tc	ł	
	high plasticity CLAY slity, very dark gray (2.5YR 3/0), micaceous, sticky, very plastic PYRITE massive, very carbonaceous, pyritized				: 				<u>}</u>			115.42 [*]	1110101-0352 Bailed		
	wood fragments, common black lignite, common sand (line grained), scattered gravel (3 to 8 mm chert) SiLT sandy (very fine to fine grained, subrounded), abundant mice, scattered carbonaceous debris, very dark gray (57 3/1)				128							-	11.8 ug/L TCE 23J ug/L cbs 1,2 DCE NA TC		McNairy Flow System
McNahy Formation	SAND (60%) very fine w/ some fine grained, moderate to weg sorted, subangular to subrounded				130										1
,    ,	duartz, utte sti, micaceous, scattered carbonaceous debris, occasional glauconite, gray (5Y 5/1)				140					H					Elevation: 381.96 PGDP Coord: \$ 2678.3. W 3440.1
	subangular to subrounded, abundant mica, (salonal ion oxide nodules, some sit, dark gray (4/1) SAND (60%) very fine grained, well sorted, subangular to subrounded, common carbonacous								╺╁╶┼╸			 			98 S 2679.3. W 34
·	məterfəl, dark gray (SY 4/1) 150 TOTAL DEPTH	┲			150						-				
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	LITHOLOGY	o GAMMA - API 100		WL	ANALYTICAL	
	FILL gravel limestons CLAY (70%) some slit, trace black accessory verals, brownish yellow (10YR 7/8), soft					
	CLAY (60%) little sitt, sbundent black minerals, yallowish brown (107R 5/6) mottled w/ gray (107R 6/1), firm		5 		•	
5	SAND (60%) medium to coarse grained, poonly sorted, subrounded to rounded, silty, trace gravel, very pale brown (10YR 7/4)					
Upper Continental Deposits	GRAVEL (75%) 3 to 6 mm, subangular to subrounded chert, some sand (medium to coarsa grained, poorty sorted, subangular), very pale brown (10YR 7/4)			-	No Recovery	HU1 & HU2
III Deposits	CLAY (80%) little sill and sand, strong brown (7.5YR 4/5) mottled w/ gray 7.5YR 6/0)				No Recovery	
	CLAY (70%), some silt, trace cand, abundant iron staining, strong brown (7.57R 4/8) motiled w/ gray (7.57R 8/0), gray increasing					
	CLAY (75%) some silt, abundant iron staining, brownish yallow (10YR 6/8) mottled w/ gray (10YR 8/1), firm			52.41"		
	CLAY (80%) Rite sand (quartz), brownish yellow (10YR 8/6)		8			
4	SAND (40%) medium to coarse grained, poorly sorted, subangular, slity, yatlow (10YR 7/8)					H I
Lower Continental Dependent	GRAVEL 3 to 38 mm, subangular chert, silly, trace sand (coarse grained quartz), white (10YR 8/2) to Seveniah yellow (10YR 6/8)			78,48° ~	1110101-0770 Bailed 1.3J ug/L TCE 5.5J ug/L 1,1 DCE 163J ug/L cis 1,2 DCE 2.SJ ug/L carbon tel NA ^M Tc	AGA HUS
C Porters Creek Clay	CLAY Very homogeneous, slightly rulcaceous, very dark gray (7.5YR N 3), firm to very firm				1110101-0771 Pumped 72 ugl. TCE 50.1 ugl. T.1 DCE 998J ugl. cathon let 18 +/- 17 pCVL "Tc	4 McNaity Flow system
	CLAY Unce sill, trace gravel (12 mm chert), very dark gray (10YR N 3/), film to medium film					ow system
¥.	CLAY very homogeneous, slightly micaceous, very , dark gray (10YR N 30), ໂທກ to very ໂທກ					
	CLAY very homogeneous, increasing mica, vary dark gray (10YR N 3/), fam				- -	
McNairy Fo	CLAY sity, abundant black accessory minerals, occasional quartz, very dark gray (10YR N3), medium from			137.48 ¹	1110101-0772 Balled 5U ug/L TCE NA *Tc	PGDP Coond: \$ 3070.6. W 2277.0
omation -	ND fine grained, well sorted, subangular to continounded, silty, yellow (2.5Y 7/8) to office yellow (2.5Y 8/83) SAND fine orgined, well seered subangular to		┝┽┝┽┼╄┿┼┾┿		1110101-0773	70.9.WZ
	SAND fine grained, well sorted, subangular to subrounded, silly, browniah yallow (10YR 6/8) 150 TOTAL DEPTH	┝ <mark>┼╶╎╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴╴</mark>			Pumped SU ug/L TCE 11 +/- 18 pCi/L *Tc	

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UNDERT L-1 Train, mutator deal, tandy, yalawah       Image: Construction of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o	Upper Contin									
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Image: Second and and young register of second and young and grad (10718 50)         Status will be and young and grad (10718 50)         Status will be and young and grad (10718 50)         Status will be and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young and young a	11	GRAVEL 6 - 12 mm, angular chert, sandy, yollowish brown (10YR 5/8)	╄╋		er de de la companya de la companya de la companya de la companya de la companya de la companya de la companya	┠╂╂╂╊╂╊				
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SAND cases paired wild docklow by control to the soft and participation by control (10 YE 60)       Image: Soft and participation by control (10 YE 60)         GOADEL (50%) 12 - 24 mm, angular clust and control to the soft and participation been (10 YE 60)       Image: Soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and the soft and th	•	SILT sandy (very fine grained) content increasing wi			5	8		λς 		
GRAVEL (60%) 12 - 24 mm, angular chart and swell (cores ba)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core said)       Core and a submach server (core		grains, well sorted, rounded quartz w/ some chert,		<u> Esconomia</u>		8		1 1		₹ Î
SAND (75%) some gravel (oredoninanity chert w some quarts; yellowish brown (10% 5(9) GRAVEL (50%) 12 - 24 mm, engular chert and SAND fine to very costse grated, subconded, predominanity gravel from BY to BS, yellowish toom (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (75%) some gravel (predominanity chert w Some quarts; yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9) SAND (ref yellowish brown (10% 5(9)		SAND find to very coarse grained, subrounded, gravel content increasing with depth, yallowish				70			Pumped 0.8J ug/L TCE 88J ug/L cis 1,2 DCE 18 +/- 18 pCi/L *Tc 1110101-0372	
GRAVEL (50%) 12 - 24 mm, angular cheft and SAND fine to very costse grained, subrounded, precominantly gravel from 80° to 95°, yellowish brown (10VR 59) 58 T sandy, grav (10VR 5/1) SAND (75%) some gravel (gradominantly cheft will some guarda, yellowish brown (10VR 56) SAND chery, some gravel (gradominantly cheft will some guarda, yellowish brown (10VR 56) SILT sandy, gray (10VR 5/1) CLAY silly, dark gray to black (5Y 3/1), lakity plastic and fat CLAY silly, carbonateous parting throughout, peaks SAND tery fine to fine grained, well sorted, counded, some entry fine to fine grained, well sorted, counded, provide gravel (Grann, black, more rate) SILT sandy, gray (10VR 5/1) CLAY silly, carbonateous parting throughout, peaks SAND tery fine to fine grained, well sorted, counded, software, costsoland sillow well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, counded, provide software well sorted, co	wor Continental Deposits	SAND (75%) some gravel (predominantly chert wi soma quartz), yellowish brown (10YR 5/8)				8			3035 ug/L TCE 87.6 ug/L 1,1 DCE 591J ug/L cis 1,2 DCE 148 ug/L carbon tel	
SAND (75%) some gravel (predominantly chert w/ some quartz), yellowish brown (10YR 5/8)       Itil0101-0374         SAND charty, some gravel (6 mm), yellowish brown (10YR 5/8)       Itil0101-0374         SAND charty, some gravel (6 mm), yellowish brown (10YR 5/8)       Itil0101-0374         SAND (SAND (5) 5 to 12 mm, and SAND coarse grained, gray (10YR 5/1)       Itil0101-0375         CLAY silly, dark gray (5Y 3/1), plastic and fait       Itil0101-0375         CLAY silly, carbonaceous parting throughout, occasional plant fragments, black, moderately       Itil0101-0375         SAND very fine to fine grained, very fine to fine grained, well sorted, rounded, carbonaceous parting, black, moderately       Itil0101-0375         SAND very fine to fine grained, well sorted, rounded, carbonaceous parting, black for y coal       Itil0101-0375		SAND fine to very coatse grained, subrounded, predominantly gravel from 90' to 95', vellowish							Bailed 6826 ug/L TCE 189.8 ug/L 1,1 DCE 453J ug/L c/s 1,2 DCE 10.3 ug/L carbon tet	
SAND charty, some gravel (8 mm), yellowish brown (10VR 5/8) SAND charty, some gravel (8 mm), yellowish brown (10VR 5/8) GRAVEL (50%) B to 12 mm, and SAND coarse grained, gray (10VR 5/1) CLAY silly, dark gray (5Y 3/1), plastic in part CLAY silly, dark gray (5Y 3/1), plastic in part CLAY silly, carbonaceous parting throughout, occasional plant fragments, black, moderately plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional sillstore w coal CHAY silly, carbonaceous partings, occasional sillstore w coal CHAY silly, carbonaceous partings, occasional sillstore w coal CHAY silly, the fine grained, well sorted, founded, carbonaceous partings, occasional sillstore w coal CHAY silly, the fine grained, well sorted, founded, carbonaceous partings, occasional sillstore w coal CHAY silly, dark gray (by the to fine grained, well sorted, founded, carbonaceous partings, for sorted for the grained for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sorted for the first sor	ÌŤ	SILT sandy, gray (10YR S/1)	Ħ				Ħ			
South 2 listly, South grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), yound grave (o ham), youn		SAND (75%) some graval (predominantly chert w/ some quartz), yellowish brown (10YR 5/8)	Ħ	F.						
GRAVEL (50%) 6 to 12 mm, and SAND coarse grained, gray (10YR 5/1) CLAY silly, dark gray (5Y 3/1), plastic in part CLAY very dark gray to black (5Y 3/1), fairly plastic and fat CLAY very dark gray to black (5Y 3/1), fairly plastic and fat CLAY silly, carbonaceous parling throughout, occasional plant fragments, black, moderately plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional sillstone wi coal CLAY the fine grained, well sorted, rounded, carbonaceous partings, forcestinal fast for moment		SAND charty, some gravel (6 mm), yellowish brown (10YR 5/8)	扞			┋ <mark>┝╌┨╼┤╼╎╼╎╼┝╸</mark> ┝	<b>₹</b>		Pumped	
CLAY sily, dark gray (5Y 3/1), plastic in pan CLAY sily, dark gray to black (5Y 3/1), plastic in pan CLAY sily, carbonaceous parling throughout, occasional plant inagments, black, moderately plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous parlings, forcesional silistone wi coal CLAY sily, carbonaceous parling throughout, occasional plant inagments, black, moderately plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous parlings, forcesional silistone wi coal CLAY through the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted for the sorted	·]   [		仕						4777 vg/L TCE 131.6 vg/L 1,1 DCE 161J vg/L cis 1.2 DCE	
CLAY sity, dark gray (5Y 3/1), plastic in part CLAY very dark gray to black (5Y 3/1), fairly plastic and fat CLAY sity, carbonaceous parting throughout, occasional plant fragments, black, moderately plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional sitistone wi coai SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional fable from the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted of the sorted		GRAVEL (50%) B to 12 mm, and SAND coarse grained, gray (10YR 5/1)							3.4J ug/L carbon lat	
plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional silicione wit coal Coarbinaceous partings, occasional silicione wit coal Coarbinaceous partings, occasional silicione wit coal SA uget, TCE SA uget, TCE		CLAY silly, dark gray (5Y 3/1), plastic in part					┥┽┤			
plastic SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional silicione wit coal Coarbinaceous partings, occasional silicione wit coal Coarbinaceous partings, occasional silicione wit coal SA uget, TCE SA uget, TCE	AcNahy For	CLAY very dark gray to black (5Y 3/1), fairly plastic and fat								
SAND very fine to fine grained, well sorted, rounded, carbonaceous partings, occasional iflustone wi coal yrilized and carbonaceous worm tubes and plant regments, gray (10YR 5/1) CLAY sity, carbonaceous partings, very dark gray, plastic	mation	occasional plant fragments, black, moderately								Elevation PGDP C
CLAY sity. carbonaceous partings, very dark gray.	C	consectors partings, occasional silistone w/ coai sarings, micaceous, occasional fossili fragments, yrilized and carbonaceous worm tubes and plant ragments, gray (10YR 5/1)			ž	ă X			Pumped 5.4 ug/L TCE	1: 375.33 <u>cont: S 628.8, W</u> ly Flow System
		CLAY sity, carbonaceous partings, very dark gray, plastic	F			╡	╉╍┧╼┨			4859.7
		150 TOTAL DEPTH	1-1-	┽┥╫╎┼		⁸	$\mp$			
				<del>┍╺╻╻╸╹</del>						ĂI I
	J.			┿╋╴╏┝╋┥┾		┝┥╎┿╎╢┿┥				

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	LITHOLOGY	o GAMMA - API 100	0 2		WL,	ANALYTICAL	HYDRO
	FiLL silly, sandy clays w/ abundant wood /ragments, very pale brown (10YR 7/4)						
  ( 	SILT sandy (very fine grained), iron oxide cement, very pale brown (10YR 7/4)		<u>IEREORIUEROENU</u> or	5			
	SILT sandy (very fine grained), iron oxide cament, occasional charl fragments at 20°, very pale brown (10YR 7/4)			8			- HU1 & HU2
Upper C	GRAVEL up to 6 mm, angular chert, silly, little sand (coarse grained), yellowish brown (10YR 5/8)						
Upper Continental Deposits	GRAVEL up to 6 mm, angular chert, sandy (coarse grained, angular, clasr), yellow brown (10YR 5/6)			8	-		
Depos	GRAVEL up to 8 mm, angular chert, silty, fron oxide coment, very pale brown (10YR 7/4)						<b> </b> ₩
l(s	SILT sandy, yeliow (10YR 7/8)			5 	46.61°		
	SAND very fine to medium grained w/ occasional very coarse grains, rounded, silly, trace gravel (12 mm) at 607, yellow (10YR 7/8)				62		HU4
	SAND fine to medium grained, well sorted, well rounded, silly, browniah yallow (10 YR 8/8)		There		65.72		
Lower OfficeEntal De	GRAVEL (60%) 12 - 24 mm, angular to subrounded chert and quartize, sandy (fine to very coarse grained, angular to subrounded, clear to red), trace sill, yetowish brown (10YR 5/8)		22223241414210-11213246 21			1110101-0377 Bailed 2.3J ug/L TCE NA TE 1110101-0378 Pumped 58.4 ug/L TCE	RGA HUS
Deposils	SAND (75%) line to very coarse grained, some gravel (to 12 mm, angular to subrounded), trace silt, yeSowish brown (10VR 5/8)		記念での対	8		4.1 Jug/L 1.1 DCE 24.8 Jug/L ds 1.2 DCE 36 +/- 19 pC/L Tc	
	GRAVEL (50%) and SAND medium to coarse grained, subangular, siky, yellowish brown (10YR 5/8)			8		1110101-0379 Pumped 5U ug/L TCE	
	SANO medium to coarse grained, angular, silty, yellow (2.5Y 7/6)					10 +/- 19 pCi/L, **Tc	
	SAND very fine to coarse grained, angular to subrounded, silty, abundant mica, brownish yellow (10YR 5/6)						┼─┼┤
	SILT (80%) little sand (medium to coarse grained, angular), pale brown (10YR 8/3)				l Í		
	SANDSTONE fine to coarse-grained, angular, well cemented, dark graylah brown (10YR 4/2)						
	SILT sandy (line to medium grained, angular to subrounded, clear) occasional mica, dark gray (10YR 4/1)			╡┼╌╴╴╞╌╴╴╴╴╴		1110101-0390 Pumped 5U ug/L TCE 10 +/- 29 pCVL "Tc	
McNaley Formation	SiLT sandy (line to medium grained, angular to subrounded, clear) increasing mice, gray (10YR 5/1)		÷ .				Mc
	Sill sandy (ine to merition project any in-			18 16			PGDP Coord: S 973.8. W S206.1 McNalry FLw System
	SiLT sandy (fine to medium grained, angular to subrounded, clear), micaceous, occasional pyrita, gray (10YR 5/1)		<u> </u>	38	·	1110101-0378 Bailed 5U ug/L. TCE	73.8. W 5308.1
	150 TOTAL DEPTH	┝┿┿┿	1	┝╍╫╶╃╍╫╴╫╼╋╼╋╼╄╼╫╌╢ ┟╌╋╍╫╶┼╍╋╍┨╼		5U ug/L TCE NA "To	<u> </u>
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LITHOLOGY	0 GAMMA - API 100	100 NEUTRON POROSITY	WL	ANALYTICAL	HYDRO UNIT
CLAY silly, trace sand (rounded, chert and quartz), yellow brown (10YR 5/6) mottled w/ gray (10YR 6/1), soft					
CLAY slib, trace sand (rounded, chert and quartz), iron stalalog, yellow brown (10YR 5/B) motified wf gray (10YR 6/1), increasing firmness		ä		•	
SAND (50%) medium to cearse grained, poorly sorted, subangular, occasionally well cemented, silly, trace gravel (6 to 25 mm, chert), yatiow brown (10YR 5/6) to brownish yellow (10YR 6/6)					HU1 & HU2
GRAVEL (40%) 6 to 25 mm, chert, some sand (medium to coarse grained, poorly sorted, subangular, occasionally well comented), some sill yellow brown (10YR 5/6) to brownish yellow (10YR 6/8)		8			
(medium to coarse grained, poorly sorted, subangular, occasionally well comented), some sill, yellow brown (10YR 5/6) to brownish yellow (10YR 8/6) CLAY (80%) fille sand, iron staining, yellow brown (10YR 5/6) mollied w/ gray (10YR 6/1), firm		8			UCRS -
CLAY some silt, trace sand, occasional black accessory minerals, brownish yellow (10YR 6/6), firm to very firm		\$	43.72 43.47 42.72	<u></u> .	*          ·
CLAY sandy, iron staining, brownish yellow (10YR 8/6), firm		g			HCS
GRAVEL 3 to 25 mm chert, sandy (medium to coarse grained, poorly sorted, subrounded to rounded quartz), brownish yellow (10YR 8/8)		8		1110101-0774 Pumped 3.2.J ug/L, TCE 6.8.J ug/L 1,1 DCE 63.9.J ug/L ds 1,2 DCE	
GRAVEL (95%) 6 to 20 mm, angular chert, trace sand, strong brown (7.5YR 5/8) to reddish yellow (7.5YR 6/6)			68,72 .	1 +/- 6 pC/L "Tc 1110101-0775 Pumped 3.8J ug/L TCE 7.9J ug/L 1,1 DCE	
GRAVEL (80%) 6 to 30 mm, angular, chert w/ iron inclusions, fittle sand (medium to coarse grained, subrounded to rounded), strong brown (7.5YR 5/5) to reddish yellow (7.5YR 6/8)				87.8J ug/L c/s 1,2 DCE 0 +/- 0 pCi/L =Tc 1110101-0777 Pumped 10443 ug/L TCE	RGA HUS
SAND (70%) coarse to vary coarse grained, subrounded to rounded, clear to frosted, some gravel (to 30 mm), brownish yallow (10YR 6/8)		8		180 upd. 1,1 DCE 542 upd. 6s 1,2 DCE 48 upd. carbon lat 1850 +/ 68 pC/L. Tc 1110101-0778 Pumped 9717 upd. TCE 204 upd. 1,1 OCE 3143 upd. carbon lat 12 upd. carbon lat 12 upd. carbon lat	
CLAY little sand, Iron statining, yellowish brown (10YR 5/8) motiled w/ gray (10YR 5/1) nodules, firm CLAY micaceous, very dark gray (10YR 3/1), very		8			
furm, fat SAND (60%) vary fine to fine grained, subangular to subrounded, elliy, ebundant mice, yellow (10YR 7/8) SAND clayey grading to sandy clay, light yellowish brown (2-5Y 6/4), soft				1110101-0779 Pumped 3060 ug/L TCE 34.8 ug/L 1,1 DCE 168J ug/L cis 1,2 DCE 22 ug/L cis 1,2 DCE 22 ug/L cis 1,2 DCE 307 */- 32 pCl/L "To	
CLAY w/ very fine grained sendy inclusions, very micaceous, dark gray (10YR 4/1), firm to very firm		ġ			
CLAY silly, trace sand (very fine grained quartz), very micaceous, dark gray (10YR 4/1), firm to moderately firm					Egen PGI McNairy Flow System
CLAY silly, trace sand (very fine grained quartz), wery mecaceus, very dark gray (7.5YR 3/0), firm to moderately firm		₿ 			Elevation: 3 PGDP Coord System
SILT (70%) little sand, trace clay, very micaceous, occasional black minerais, light gray (10YR 8/1), wet, soft CLAY little sand, very micaceous, light gray (10YR		8		1110101-0780 Belled 25 ug/L TCE NA Ta	REDP Cond. S 2017, W S389,2 Item
6/1) to gray (10YR 5/1) 150 YOTAL DEPTH		ğ		· ·	
					<u>4G1</u> ∫

[	LITHOLOGY	o GAMMÀ - API	100	10	00 NEU		WL	ANALYTICAL	HYDRO UNIT	]
	SILT some sand (vary fine grained, angular), lillio day, yallow brawn (10YR S/4), soft									
	SLT sonch (very fine grained, angular), trece clay, yellow brown (10YR 5/4), soft								HU1 & HU2	
Upper Conunentar Deposito	GRAVEL up to 12 mm and SAND very line to coarse grained, poorly sorted, subrounded quartz, iron oxide staining, yellow brown (10YR 5/8)		100	28					HU2 UCRS	
Deposito	CLAY (80%) little sand (very fine to fine grained, subrounded), yellow brown (10YR 5/6), firm, very cohesive			30 40			42.03"			
	SAND (70%) very fine to fine grained, moderately sorted, subrounded to rounded, light gray SAND (80%) very fine to fine grained, subangular to			8			49,62	1110101-0820 Balled 9.2 ug/L TCE	· · · ·	
	SAND (dus) very me to me graned, subarguar to subrounded quartz w occasional chert and pyrite, little silt, yallow brown (10YR 5/4), locas, flowing				╶ <del>╎</del> ┊╿╼ <del>╺┥╺┥╺</del>	┝╌╄╼╄╼╀╌╊╲╟═┦┰		31J ug/L cis 1.2 DCE 1J ug/L carbon let NA Tc		
	GRAVEL (60%) sendy SAND (80%) very fine to coarse grained, subengular to subrounded quartz, little gravel, yellow brown (10YR 5/4)			8-				1110101-0821 Pumped 2028 ug/L TCE		
	GRAVEL (60%) sandy	B						54 ug/L 1,1 DCE 541J ug/L cis 1,2 DCE 40 ug/L carbon tet 518 +/- 42 pCi/L **Tc		l
é	SAND (80%) very fine to coarse grained, subangular to subrounded quartz, little gravel, yellow brown (10VR 5/4)									
elicodari evicuito	GRAVEL 9 to 12 mm chert, sandy (fine to coarse grained), yellow brown (10YR 5/4), low water production rate			80		┝╼╬╌╏╴╄╶╄╼╬╬╧ ┝╶╅╌╉╼┿╼┝╏╋┹		1110101-0822 Pumped 8418 ug/L TCE 170 ug/L 1,1 DCE 942J ug/L cis 1,2 DCE	HUS -	
	GRAVEL 3 to 12 mm chert, little sand, yellow brown (10YR 5/4)			2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				133 ug/L carbon tel 1419 +/- 61 pC/L Tc 1110101-0823 Pumped 27188 ug/L TCE 120 ug/L 1,1 DCE 1007J ug/L cis 1,2 DCI 46 ug/L carbon tel		
	· · · · · · · · · · · · · · · · · · ·						្រ រ	4490 */- 105 pC/L "To 1110101-0824		ļ
	SAND (80%) very fine to fine grained, subangular to subrounded quertz, fittle silt, sbundant mica, occasional gravel (chert), yellow brown (10YR 5/4)			100				Pumped 23494 ug/L TCE 388 ug/L 1,1 DCE 1044J ug/L cis 1,2 DCE 28 ug/L carbon tet 2154 +/- 74 pC/L =Tc		
	CLAY sandy (very fine to fine grained, subrounded quartz), yellow (10YR 7/8), conesive, slightly plastic			110						
Mercelly Community	CLAY micaceous, very dark gray (10YR 3/1) firm, fat			120				1110101-0825		
	CLAY sandy greding to pyritized sandsione rubble with abundant mafe minerals, lots of water			3			I	Pumped 2J ug/L TCE 20 +/- 18 pCi/L "Tc	McNalry Flow System	- FGU
	CLAY sity, very miceceous, very dark gray (7.5YR 3/0)			140					System	PG0P Coord: N 434,4, W 5975,5
				-	╈╋	┝┼╣╌┼┼┼┼				14 M 2
	SAND very fine grained, subrounded, clayey, very micaceous, occasional pyrite, very dark gray (SY 3/1)					┝╌╎╱╾╀╌╄╼┾ ┝╾┥╱╴╴╴╴╴ ┝╴┥╶┥╴╴╴				975.5
	150 TOTAL DEPTH	┝┼ <del>╋┥╞╋╠╏</del> ╬		ŀ	┼┼┙	┝┾╀╶┼╌╄╼╄╼╄╴				ł
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Elevation: 370,14 PGDP Coord: N 434. P4G1;

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	Sill any financial will come chart light any				E										
,	FILL gravel limestone w/ some cherl, light gray (10YR 7/2)				┢	┥┥┥			╞┼	+					
	CLAY (75%) some silt, trace black accessory rats, iron staining, yellowish brown (10YR 5/4) ed w/ gray (10YR 7/1), firm, medium plasilcity	Ц-						<u> </u>	$\square$	퓌					
	- A ₂ , <u></u>	廿-			햐							•			
•	CLAY (70%) some still, trace black accessory minerals, iron staining, yeltowish brown (10YR 5/4) less motiled w/ gray (10YR 7/1), firm, medium plasticity	$\square$			┢									· .	
	plasticity				ļ				$\square$	$\square$					
ومسادة ومحطرات		Ħ			8				Ħ	丨	23.ť		$\uparrow$		
1	GRAVEL (50%) 3 to 18 mm chert, some silt, some sand (medium to coarse grained, subrounded to rounded), brownish yellow (10YR 6/6)				ł										
					8			┝┼╌	┝┼		ង	1110101-0765			
i	GRAVEL (50%) 3 to 18 rum chert, some silt, some sand (medium to coarse grained, subrounded to rounded), yellow (10YR 7/8)	]-}-			ĥ	+	├-├	$\left  \right $	H	+	32.61' -	Balied 217.3 ug/L TCE NA "Tc	Тепзоз		
;	GRAVEL (75%) 3 to 18 mm quartz and chart, some sand. (subangular to subrounded), brownish yellow	$\square$			F	$\square$							a Gravels		
;	(10YR 6/6)				å					∄		1110101-0766 Pumped 143.4 ug/L TCE 19 +/- 18 pCl/L "Tc	- C		
•	GRAVEL (50%) 3 to 18 mm quartz and chert, and SAND (subangular to subrounded), brownish yelkow (10YR 6/6)		B		-					+		19 +/- 18 pCl/L. "Tc			
	GRAVEL (75%) 3 to 18 mm quartz and chart, some sand (subangular to aubrounded), brownish yallow	┝┼╴			ł	╶┼┼┦		┢╌┟╴	┝╌┠						
, ,	(10YR 6/8)	F			8			<b></b>					ļĮ	-	
-	CLAY (75%) some silt, pale yellow (2.5Y 8/3) occasionally mottled w/ yellow (2.5Y 8/8), firm				. [					$\pm 1$					
,	occasionally moltied w/ yellow (2.5Y 8/8), firm				ł				$\square$	+					
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	Clay homospherus me chart public yest durk	H	Z.		Ī	-1-1		$\square$	$\square$						
'	CLAY homogeneous, rare chert peoble, very dark gray (2.5Y N/3), high plasticity, very firm														
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Porters Cirek Ciny	A state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the								ŀ	+			Porters Creek Clay		
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	LITHOLOGY	o GAMMA - API	100	į	100 €		WL	ANALYTICAL	HYDRO UNIT	
	SILT (70%) some clay, occasional sand (very line grained), dark yellow brown (10YR 4/4), low plasticity			10						
	CLAY (60%) silly, trace quartz and black accessory minerais, light yellowish brown (2.5Y 6/2) motited w/ dark brown (107R 3/3) CLAY (50%) some gravel (up to 10 mm, while quartz and dark red chen) itillo sit, trace send (very line to fine grained), light yellowish brown (2.5Y 6/2) motited w/ dark brown (107R 3/3) GRAVEL up to 10 mm, white quartz and dark red			28						
Upper Continental	chen, some sand (very fine to fine grained), some sit increasing w/ depth, yellow (2.5Y 7/6) SAND (70%) fine to coarse grained, occasionally very coarse, moderately sorted, subengular to well rounded quartz w/ occasional chent, some all, trace gravel (5 mm chent), becomes finer w/ depth, yellow (2.5Y 7/8)		22	38					UCRS	
tal Deposits	SIU (60%) sendy (very fine to very coarse grained, poorly sorted, angular to rounded quartz), very pele brown (10YR 7/4)			40			51,43			.
	GRAVEL (50%) 2 to 20 mm quartz and chart, and SILT, common sand (very fine to coarse grained, angular to subrounded), very pale brown (10YR 7/4)			- - -		┿┿╌┦╴┦ ╵┥╾┥╼┝ ┥┥┥┥┥┝	33.6° 56.27 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1110101-0791 Bailed		
	SILT little sand (fina grained), light yellow brown (10YR 6/4) GRAVEL (50%) up to 25 mm chart, and SiLT, trace			8				1.6J ug/L TCE 20J ug/L ds 1,2 DCE NA "TC		
	sand (very line grained), light gray (2.5Y 7/2) SAND (65%) fine to medium grained, subangular to subrounded, little gravel (25mm chart), light gray (10YR 7/2)			2					토	
Deposits	GRAVEL (70%) up to 25 mm chert w/ some quartz, fittle sitt, little sand (very fine grained), very pale brown (10YR 7/4)			80				1110101-0792 Pumped 2J ug/L TCE 84J ug/L tCE 17 */-23 pC/L *TC 1110101-0793 Pumped 1J ug/L TCE 8 */-19 pC/L *TC	- RGA	
	GRAVEL 5 mm, quart2, chert, heavity stained w/ limonite, common sand (very fine to very coarse grained)			8				1110101-0794		
	SILT (70%) some sand (very fine grained), light brownish gray (10YR 6/2) motiled w/ brownish yelkow (10YR 6/8) SILT (70%) some sand (very fine to fine grained, subangular to subrounded, clear quartz), occasional			F				Pumped 3J ug/L TCE 10 +/- 6 pC/L "TC		
- Parter Creak ?	red and black accessory minarals, light yellowish brown (10YR 6/4) SAND (70%) fine to medium grained, moderate to well sorted, subangular to subrounded, scattered coarse grained, subangular chert, some sitt, common (rico axide stating, brownish yellow (10YR			8						
	6/8) SILT (70%) some sand (fine to medium grained, moderate to well sorted, subargular to subrounded), light brownish gray (1074 6/2), solt SAND (70%) fine to medium grained, moderate to well sorted, subargular to subrounded, scattered coarse grained, subargular to through content, some sit, common iron oxide staining, brownish yellow (10YR 6/6)		- ES	110 120				1110101-0795 Pumped 0.2J ug/L TCE 20+/-19 pC/L *TC	McNairy Flow System	
	SILT clayey, common carbonaceous debris, micaceous, scattered sand laminations (very fine grained), very dark gray (7.5YR 4/1) SILTSTONE clayey, abundant carbonaceous debris, trace sand (fine grained), trace mice, fight gray CIAY stilly very microcous scattered, and			130						
MeNaity Formation	CLAY silly, very micaceous, scattered send laminations (very fine grained quart2), occasional massive pyrite, very dark gray (SY 3/1), firm, moist LAY silly, scattared pyrite, occasional wood fragments becoming very carbonaceous by 145,			140						Elevation: 380.06 PGDP Coord: S 3260.0, W 4064.3,
	decrasse from 145 to 148 then Increase, black (7.5YR N2/0), firm to slightly slift			150				1110101-0796 Balled 0.51 ug/L TCE 1701 ug/L dis 1,2 DCE NA "TC		14984.3 P <u>4</u> F
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	LITHOLOGY	0 - GAMMA - API 100		10 (	WL	ANALYTICAL	HYDRO UNIT	
	CLAY (80%) linte silt, some iron staining, brownish yezow (10YR 6/6) mottled w/ gray (10YR 6/1), soft to slightly firm							-
	CLAY (70%) some silt, some iron staining, brownish yellow (10YR 6/8) motiled w/gray (10YR 6/1), soft to slightly firm, increased moleture		२००१ तम् अस्ति विद्यालय स्त			•		
Upper Con	SAND (60%) medium to fine grained, moderately sorted, subrounded, clear quartz, some clay, trace gravel (3 to 25 mm chert), yelowish brown (10YR Si9) to yellow (10YR 7/8) SAND (60%) fine to coorse grained, moderately sorted, subrounded, clear quartz, some slit, trace gravel (3 to 25 mm chert), yellowish brown (10YR Si8) to yetrow (10YR 7/8)		20 20					
Upper Continental Deposits	Given (1 or 25 mm Chen, youtware bown (1 or 1 548) to yearow (10 YR 7/5) GRAVEL 5 to 25 mm chert and quart, some sand (fine to coarse grained, moderately sorted, subrounded, clear quartz), pinkta white (7.5YR 8/2) to brown (7.5YR 4/8) to occasional yellowith red (5YR 5/8)		an an an an an an an an an an an an an a	30			- HU1 & HU2	
	SAND fine to very fine grained, moderately sorted, clayey, occasional gravel (6 mm), yelkow (10YR 7/6)		40 40					•
	SLT soncy (line to very fine grained, moderately sorted), occasional gravel, yellow (10YR 7/8) to yellowish brown (10YR 5/8), soft, wet SAND (60%) fine to very fine grained, well sorted, subrounded, moderate to well cemanted, some silt (35%), trace gravel (3 to 8 mm chart), yellow (10YR			8 -		1110101-0767 Bailed 2J ug/L TCE 35.4J ug/L cts 1,2 DCE		
	7/6)		<u>asureeususansa na na na na na na na na na na na na na</u>	8	_	NA TC 1110101-0768 Balled 2.2.Jug/L TCE 27.7Jug/L cle 1,2 DC6		
-> Lower Capit	GRAVEL (75%) 10 to 30 mm, angular chart, some sand (medium to coarse grained, pootly sorted, subrounded to occasionally rounded), yallow (10/78 7/8) GRAVEL (70%) 10 to 30 mm, angular chart, trace sand (medium to coarse grained, poorly sorted, subrounded to accasionally rounded), yallow (10/78 7/6)		aditatication nj			NA TC	→ ← → RGA	
te te te te te te te te te te te te te t	FIAME (70%) up to 40 mm, singular chert, trace isand (medium to coarse grained, poorly sorted, subrounded to occasionety rounded), yellow (1078 7/8) CLAY sity, occasional iron staining, yellow (2.5Y)		معتقمكالللة			Bailed 1J ug/L TCE NA [#] Tc		
Portora (	7/8) w/ gray inclusions (2.5Y NS/), soft CLAY traca silly, very dark gray (7.5YR N3/), homogeneous, firm						McNalty Flow	
Creek Clay	SAND very fine to fine grained, moderate to well sorted, clear quartz, little silt, occasional gravel (5 mm, strong brown (7.5YR \$78)), yellow (10YR 778) to very pale brown (10YR 874)		T NSFERSESSES				System	
	100 TOTAL DEPTH							
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	LITHOLOGY	0 GAMMA - API 10		100 NE	UTRON POROSITY	o. →	wL	ANALYTICAL	
	FILL predominately claysy sill v/ abundant interbedded sand (line grained w/ occasional coarse grained), scaltered carbonaceous debris, dark gray (7.5YR N4/0) to gray (7.5YR N5/0), solt		<u>मुम्ल हिंसी छिल्ल</u>						
	SLI Coyey, scattered sand (line grained chert and quartz), common fron stabiling, Sight yellow brown (10YR 5/4) to yellowish brown (10YR 5/8) at 15' w/ gray (10YR 6/1) motiling		10 10						
	GRAVEL (60%) 12 rum, angular to subrounded chert, some sand (medium to very coarse grained, poorly sorted, subangular to rounded quartz w/ some chert), trace silt, brownish yellow brown (10YR 6/8)		20 20						
Upper	SILT sandy (predominantly fine grained w/ occessional medium grained, subangular quartz), common iron sialning, occasional carbonaceous debris, yellow brown (10YR \$/6), soft								HU1 & HU2
per Continental	SAND medium to coarse grained, poorly sorted, subrounded to rounded quartz, sitty yellow brown (10YR 5/8)		8						
remai Deposita	SILT (60%) sandy (fine to coarse grained, poorly sorted, subargular to rounded quartz w/ some chert), occasional iron staining, scattered gravel (6mm, angular chert), brown yellow (10YR 6/8), soupy		-10 						
	SILT clayey, trace sand (fine grained, subangular to subrounded quartz), yellow brown (10YR 5/8) w/ occasional laminae of gray (10YR 6/1)		section building and the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of the section of	┝╴┼╼┼ ┝╴┽╺┽╴ ┝╶┽╶┽╸ ┝╶┼╼┽		47.55	<b>4</b> 9		
	SILT (60%) sandy (line to medium grained, well sorted, subrounded to rounded quartz w/ some chert), sand content increases wid deph, sight iron stahling, occasional black accessory minerale, yeliow (2.5Y 7/8)								
	GRAVEL (75%) 10 to 25 mm, angular to subrounded chert, some sand (fine to very coarse grained, poorly sorted, subrounded to angular quartz wir rare chart), occasional iron siteling, brown yeallow (10YR 408)						8 <u>.</u>	1110101-0785 Pumped 12000 ug/L TCE	<u>†</u> ∏
	GRAVEL (80%) to 30 mm, angular to subrounded chert, little sand (line to very coarse grained, poorly sorted, subrounded to angular quartz w/ rare chert), occasional iron staining, brown yellow (10/K 878)	40200000000000000000000000000000000000	100000					18 ug/L 1,1 DCE 282J ug/L cls 1,2 DCE 2.1J ug/L 1,1,1 TCA 7.3 ug/L carbon tet NA "Tc	
nünental	GRAVEL (80%) to 30 mm, angular to subrounded chert, little sand (very fine to very coarse grained, and a state state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of		<u>(1)</u>				78.15	1110101-0785 Pumped 99 up/L TCE 92 up/L 1,1 DCE	1 1 1 1 1
al Deposits	sorted, well rounded to subangular quartz and chert, gravely (20 mm) trace slit, brown yellow (10YR 6/8)			┝╀╉	╊┼┽╄ <u></u> ╋┿ ┽┼┼┽╋┿╸	┡╌┨ ┝╌┨		7 ug/L 1,1,1 TCA 64 +/- 22 pCl/L "Tc	<del>E</del> G <b>R</b> Ø <u> </u>       .
	solid (b) yery line to very coarse grained, poorly solid (angular to well rounded quart (70%) and chert (30%), some gravel (30 mm red chert), little sift, yellowish brown (10YR \$78)		8					1110101-0787 Pumped 36 ug/L TCE 15 ug/L 1,1 DCE 1.8J ug/L 1,1 TCA	
	SAND (60%) very fine to very coarse grained, pooly softed, angular to well rounded quarts (70%) and chet (30%), some gravel (30 mm red chert), trace silt, yellowish brown (10YR S/6)	B						76 +/- 22 pCVL "Tc	
	SAND (60%) very fine to very coarse grained, poorly sorted, angular to we'l rounded quartz (90%) and chert (10%), some grovel (30 mm red chert), titte silt, yellowish brown (10YR 5/6)		100					1110101-0788	¥
	SILT (80%) Illuis sand (very fine grained, well sorted, subangular to subrounded clear quartz), dark gray (10YR 4/1)			╞┾┽	┿ <u>╋</u> ┾┥┿┶ ┽╉┾┥┽┶			Pumped 46 ug/L TCE 34 ug/L 1,1 DCE 5 ug/L cis 1,2 DCE	
	SILT (60%) sandy (fine grained w/ scattered medium grained, moderate to well sorted, subangular to subrounded), iron ouide stainfor, occasional black accessory minerals, yellow(sh brown (10YR 5/6)		110					5 ug/L 1,1,1 TCA 27 +/- 21 pC/L "Tc	
	SAND (60%) fine to medium groined, moderately sorted, subangular to subrounded, silly (gray (10YR 5/1).occasional ince, yellowish brown (10YR 5/8) SAND (50%) fine to medium grained, moderately			╞╌┾╌ ┝╼┽╌┾╌	┼╆╣┽┼┾┝╸				
McNa	yellowish brown (10YR 5/8), and SILT gray (10YR 5/1)		120 120			<u></u>	چ چ	1110101-0789 Pumped 0.9Jug/LTCE 1+/-8pC/L"Tc	
McNalry Foramtion	SILT clayey, micaceous, trace sand, occasional dark accessory minerals, very dark gray (7.5YR 3/0) SANO very fine to fine grained, subrounded to	$\mathbb{B}$		┝ <del>╶╽╸╽╺</del>			124.7		
ğ	rounded quartz, micaceous, abijobioted to minerals, very dark gray (7.5YR 3/0), bijn pyrilized layer at 130 w/ lignite gravel (8 mm)		130						May
	CLAY silly, abundant mica, organic, very dark gray (2.5Y N3/), Ngh plasticity, fat							1110101-0790	Elevation: 373.81 PGDP Coord: S.2 McNairy Flow System
	<b>^</b> )		140	┝╍┠╾╉╼╴		 	]	Pumped 4 vg/L TCE 10 +/- 20 pC/L "Te	373.81 205 205
	SAND silty, micaceous, pyrilized, dark gray (7.5YR		-		┍╶┲╺╏╾┾╴┠╼┽╶╛ ┥╼┥╴┠╼╅╴┠╼┽╴┤				.81 S.2051.8.W 5030.8
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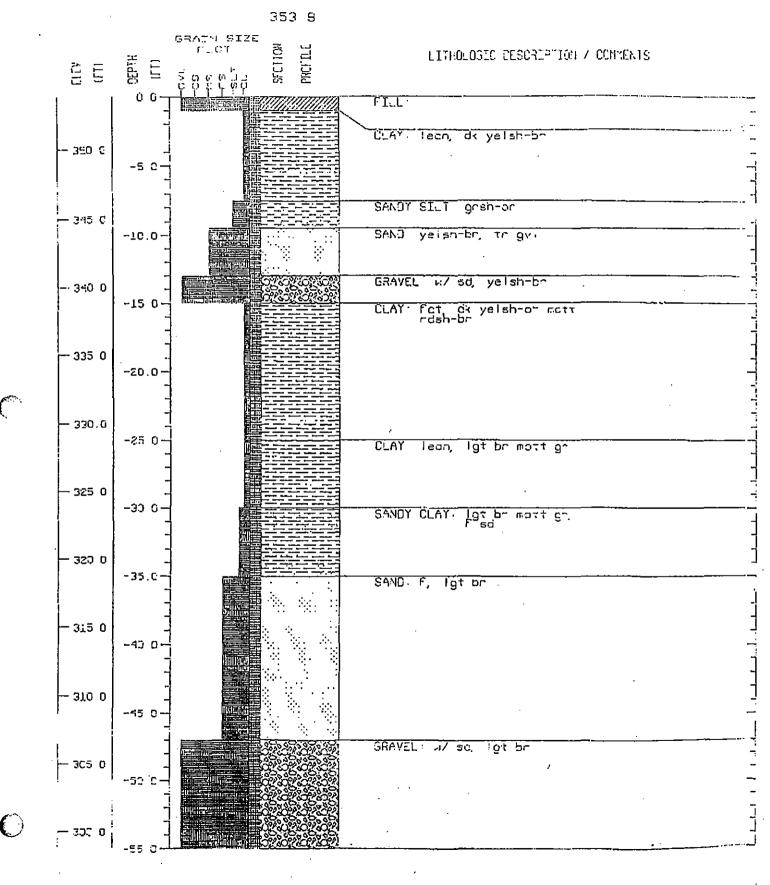
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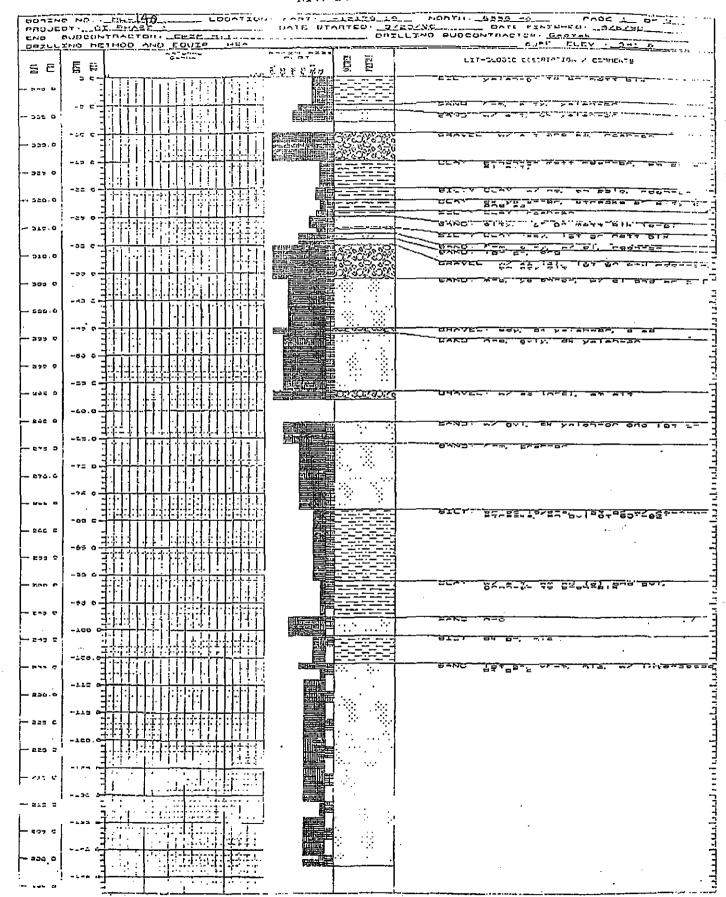
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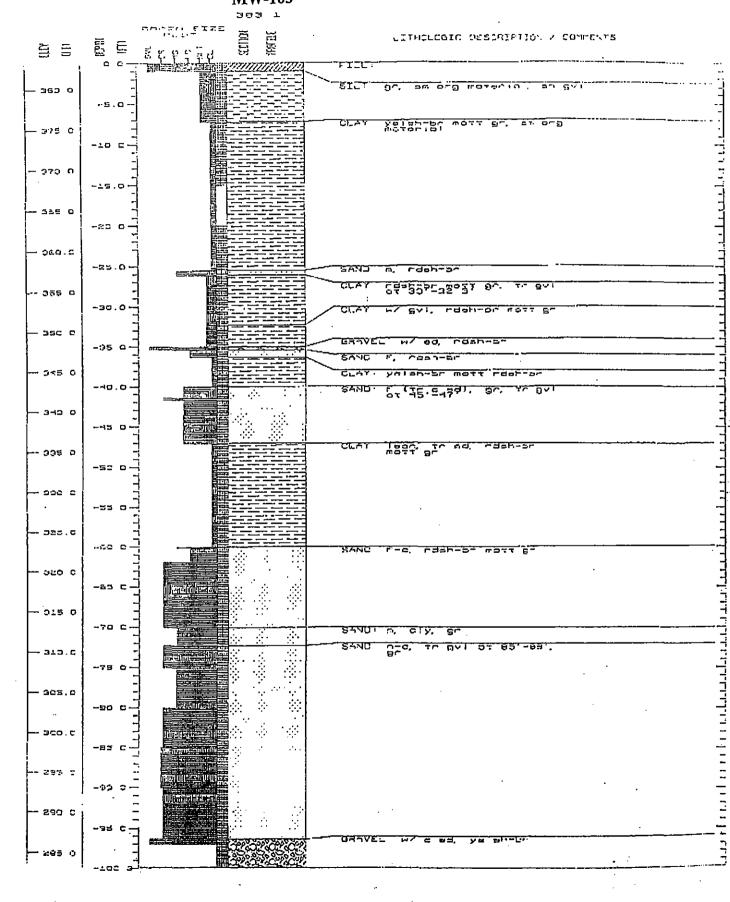
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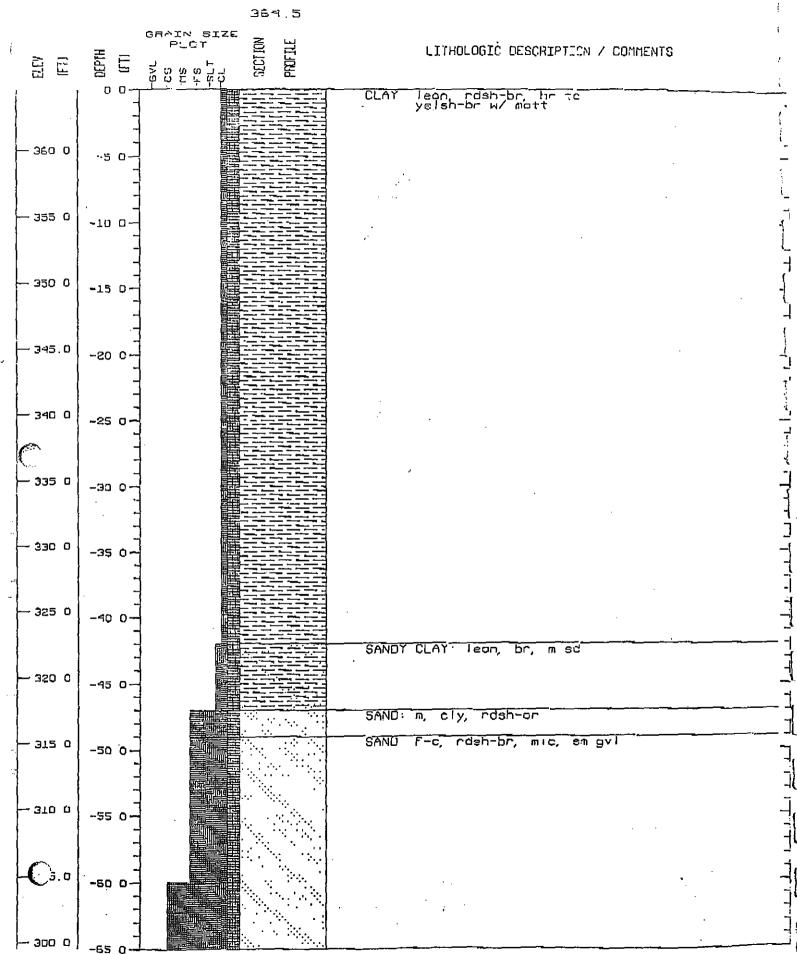
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## PGDP Boring <u>P4-F08</u> Land Surface = 371.95' AMSL

P4-F08

		<u>P4-F08</u>	
DEPTH (FEET)	GRAPHIC LOG	LITHOLOGY DESCRIPTION	GAMMA LOG
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_ 50  		<u>L. Cont. Dep.</u> 49-90'	
_ 100 		<u>McNairv Fm.</u> 90-337' <u>Sand</u> : 90-98' <u>Silt</u> : 98-112' <u>Sand &amp; Silt</u> : 112-134'	
_ 150		<u>Clav</u> : 134-148', slty <u>Sand: 148-159'</u> <u>Silt</u> : 159-185', cly	
		<u>Silt</u> : 185-215', sdy	
 250		<u>Clav &amp; Sand</u> : 215-263', interbd	
- 300 T		<u>Silt</u> : 263-269' <u>Sand</u> : 269-337'	
_ _ 		Dubble 7 and 337 347	
		<u>Rubble Zone</u> : 337-347' <u>Mississippian</u> : 347'-TD TD = 350'	

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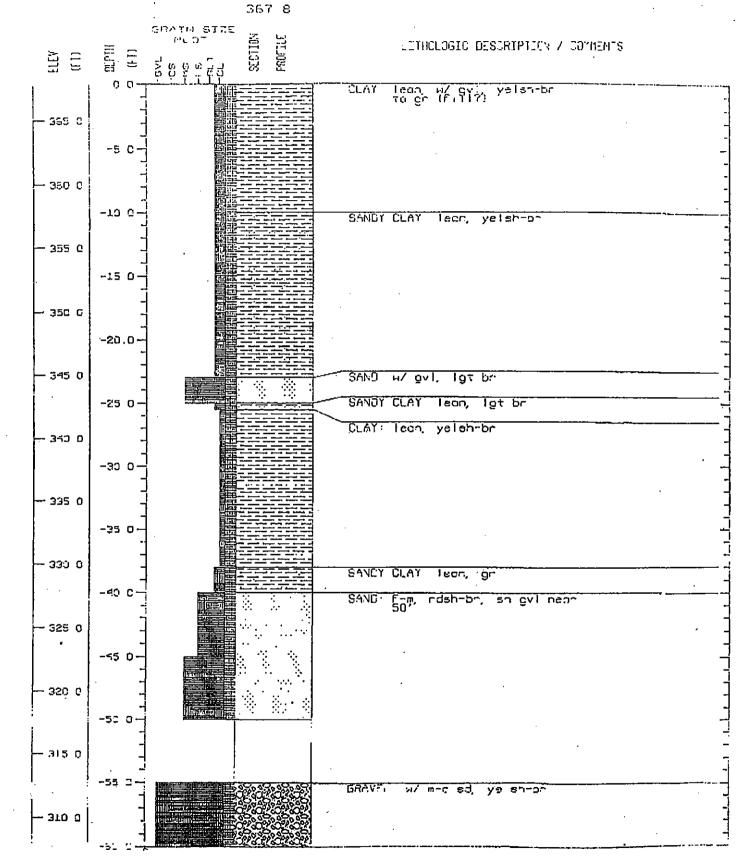
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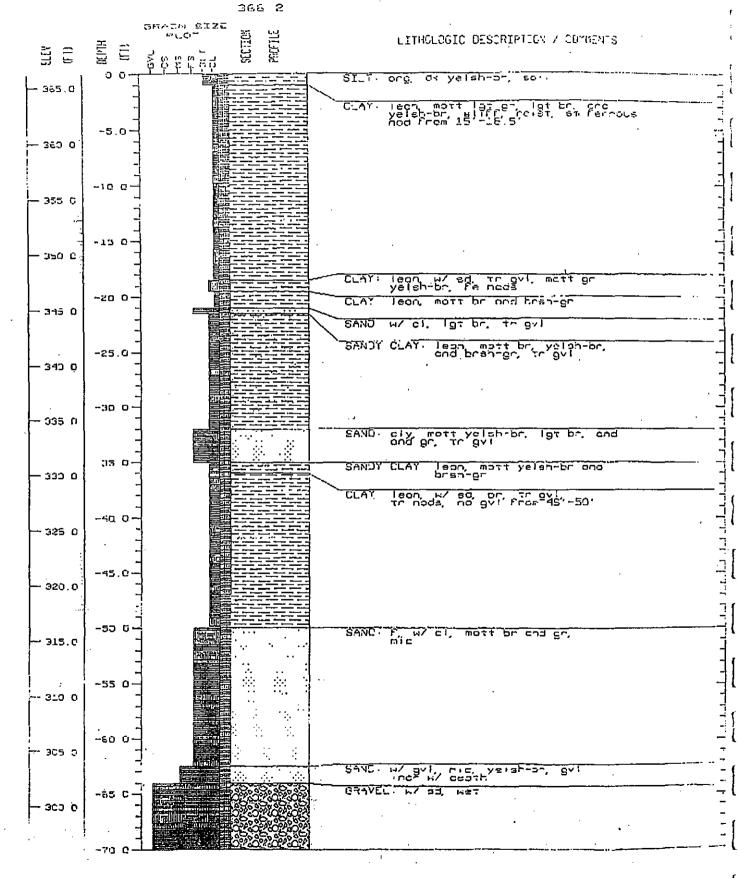
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PGDP Boring Z16 Land Surface = 370.9' AMSL

<u>Z16</u>							
DEPTH (FEET)	GRAPHIC LOG	LITHOLOGY DESCRIPTION	GAMMA LOG				
_ 0 		Loess & U. Cont. Dep. 0-62'	ANNA ANA ANA				
_ 50 - - - _ 100	-	<u>L. Cont. Dep.</u> 62-101'	restricted best for the				
		<u>McNairy Fm.</u> 101-322' <u>Sand</u> : 101-122' <u>Silt</u> : 122-129' <u>Sand</u> : 129-131', gvly <u>Silt. Sand. &amp; Clay</u> : 131-162' gvly	HANNAN HANNAN				
		<u>Silt, Sand, &amp; Clay</u> : 162-186' <u>Clav &amp; Silt</u> : 186-207' <u>Sand</u> : 207-211' <u>Silt &amp; Clay</u> : 211-224'	A white of the of the of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the stand of the st				
- - 250 - 1014 Namo - Namo		<u>Sand</u> : 224-248' <u>Clay</u> : 248-272'	MAN MANNA ANAMAN				
300		<u>Sand</u> : 272-322'	WYTHM				

<u>Mississippian</u> : 322'-TD TD = 356.5'

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PGDP Boring Z12 Land Surface = 351.1' AMSL

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DEPTH (FEET)	GRAPHIC LOG	LITHOLOGY DESCRIPTION	GAMMA LOG
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- 50 		<u>L. Cont. Dep.</u> 75-110'	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		<u>McNairv Fm.</u> 110-333' <u>Sand</u> : 110-129' Silt: 129-140'	M.M.
_ 150  source source source source  		<u>Clay</u> : 140-168' <u>Sand</u> : 168-175', gvly <u>Silt</u> : 175-229'	WHWWW WWW WWWWWW
- 250 - 250 - 300 - 300 -		<u>Sand &amp; Silt</u> : 229-283' <u>Sand</u> : 283-333'	Monther why Mr. 1. 1-1-1-1-1
 350 		<u>Rubble Zone</u> : 333-348' <u>Mississippian</u> : 348'-TD TD = 369'	MAN ANA ANA

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## PGDP Well MW121 Land Surface = 372.43 ' AMSL Drilled by Geotek Engineering in 1989-1990

DEPTH (FEET)	GRAPHIC LOG	LITHOLOGY DESCRIPTION
0 		Loess & U. Cont. Dep. 0-52'
_ 50 _ _ _		<u>L. Cont. Dep.</u> 52-88'
- 100 		McNairy Fm. 88'-TD Clay: 88-95.5' grysh-pink, Intrbd w/ sd. 95.5-110' slty, mic, yellsh-brn Sand: 110-115' cly, yllsh-brn 115-130' well sort, w/slt, yellsh-brn-gry. 130-135' intrbd w/cl Silt: 135-165' olv blk, w/thin sd lens 165-170' intrbd w/f sd. wht
		170-200.5' olv blk w/thin sd lens Sand: 200.5'-TD vf, well sort, slty, lt gry TD = 211.5'

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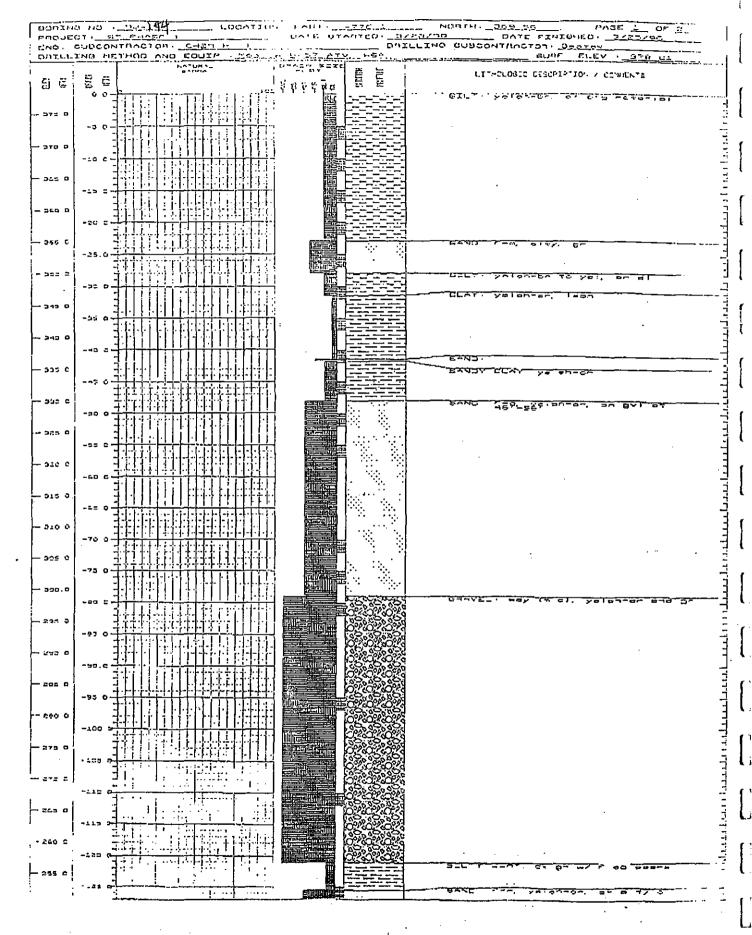
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# Appendix F

### **GLOSSARY OF GEOPHYSICAL TERMS**

(from Sheriff, 1973; Sheriff and Geldart, 1982)

<u>common-depth-point (CDP)</u>: having the same midpoint between source and detector. Also called common-midpoint or common-reflection-point.

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<u>common-depth-point stack</u>: a sum of the traces corresponding to the same midpoint. The traces from different profiles having different offset distances are gathered together, corrected for statics and normal moveout, and then summed (or stacked). The objective is to attenuate random effects and events whose dependence on offset is different from that of primary reflections.

- filter: A part of a system that discriminates against some of the information entering it. Band pass filters are often specified by listing their low-cut and high-cut component filters. Filter characteristics are often specified by the frequencies at which the amplitude is down by 3 dB (70 percent or half power) and by the slope of the cutoff.
- <u>f-k plot</u>: A frequency-wavenumber plot, which displays how data sort into distinguishable sets in the frequency-wavenumber domain. The energy density within a given time interval is usually contoured. Used to examine the direction and apparent velocity of seismic waves.

<u>normal moveout</u>: Differences in the arrival time of reflections because of the distance between source and receiver.

- velocity analysis: Calculation of stacking or NMO velocity from measurements of normal moveout. In current usage, generally involves common-midpoint data but includes also  $T-\Delta T$  analysis and  $X^2-T^2$  analysis. Most analysis schemes assume a normal moveout, measure the coherency at that normal moveout, and then vary the normal moveout in order to maximize the coherency. The stacking velocity value depends somewhat on the amount of data included in the analysis, that is, on the range of offsets and locations analyzed. Where all reflectors are horizontal and where velocity varies only with depth, the stacking velocity is approximately the rms velocity.
- stack: A composite record made by combining traces from different records. Stacking involves filtering because of timing errors or waveshape differences among the elements being stacked.
- stacking velocity: Velocity calculated from normal-moveout measurements and a constant-velocity model. Used to maximize events in common-midpoint stacking. Sometimes erroneously called "rms velocity". Usually calculated for the best-fit hyperbola to gather data, the value thus depending somewhat on the range of offsets involved. Fitting an NMO equation to CDP data is equivalent to assuming and ellipsoidal wavefront, yielding the stacking velocity of the horizontal component.

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