DEMONSTRATION OF AN EXPLORATION TECHNIQUE INTEGRATING EARTHSAT'S LANDSAT LINEAMENTS, SOIL GAS ANOMALIES, & FRACTURE INTENSIFICATION DOMAINS FOR THE DETERMINATION OF SUBSURFACE STRUCTURE IN THE BASS ISLAND TREND, NEW YORK STATE

FINAL REPORT

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NOTICE

ABSTRACT

Detailed soil gas data and structure data were collected in order to demonstrate that by integrating these data with Landsat lineaments, the existence, locations, and trends of thrusts of the Bass Island Trend and cross-strike discontinuities (CSDs) can be determined. Previously, these trends were only poorly defined by widely-spaced well data. Well log data were used to construct structure contour maps on the top of the Tichenor Limestone ("Tully"), Onondaga, B-Salt, and "Packer Shell" units. These maps, plus an isopach map of the B-Salt, defined the general trends of the Bass Island thrust front and CSDs. The maps also revealed hints that other structures exist in the area. Soil gas anomalies confirmed all four CSDs that were hypothesized on the basis of well logs. Detailed outcrop structural data were consistent with the location of a CSD defined by soil gas analyses. Additionally, structural analyses suggested that zones of N-striking faults transect the region. These data confirm and refine the location of very equivocal N-striking faults based on sparse well log data. The Packer Shell structure contour map indicates that these faults extend from the surface to at least the Packer Shell. These faults probably mark reactivated faults in the Precambrian basement.

The structure contour maps and B-Salt isopach map show indications of additional thrust faults behind the thrust front, based on anomalously high elevations of the various units, and an anomalously thick salt section. Several of the anomalous wells can be aligned along NE-striking Landsat lineaments. One of the possible thrust ramps is confirmed by a wide NE-striking FID that is coincident with a topographic lineament. Deformed sedimentary layering that strikes northeast also occurs along strike. It is thus probable that several thrust ramps exist behind the thrust front, and that they can be recognized by integrating structure, lineaments, and well log analyses.

KEY WORDS

Bass Island Trend, New York State, soil gas analyses, fractures, Appalachian Basin structure

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SUMMARY

The importance of structural control on oil and gas reservoir quality, and in some cases, on even the presence of a play, is well known. However, delineation of detailed structure by conventional techniques, based on well logs and high resolution seismic data, is often prohibitively expensive, especially 3-D seismic or reconnaissance high resolution seismic. A primary objective of the research was to demonstrate the validity of a rapid, relatively inexpensive method of determining target areas for more expensive technologies, such as seismic profiling or exploratory drilling. This approach integrates Landsat lineaments, fractures mapped at the surface, and soil gas anomalies in order to identify the surface manifestations of deep structures. The research plan was to first test the integrated approach in areas where sufficient well log data indicated the presence of faults, and then apply the integrated technique, combined with sparse well log data, to identify additional deep structures.

The specific area of study was the Bass Island Trend, a prolific oil and gas fracture play along Alleghanian thrusts in western New York State. Subsurface structures of interest included thrusts and tear faults, or cross-strike discontinuities (CSDs), that offset the trend of the thrusts. Tear faults can provide seals between segments of the thrusts, and thus play an important role in determining the extent of along-strike play and the extent of potential communication among wells on the thrusts.

The result of the study showed that an integration of lineaments, surface structure and soil gas is an extremely effective method for recognizing subsurface structure and mapping the patterns of these subsurface structures. The method is essentially a "poor-person's 3-D seismic", especially if combined with a confirmation seismic line.

Soil gas analyses indicate where open fracture systems occur, even in areas of thick surficial deposits. Thus, soil gas and surface fracture studies together are a powerful tool to groundtruth the lineaments. The orientation and extent of the groundtruthed lineaments yields a map view of the subsurface structures that are indicated by seismic data and well logs, and by the surface fractures, and soil gas anomalies. This integrated approach confirmed the location of thrusts and CSDs previously known or suspected from well logs. The approach also provided a strong indication for additional thrusts "behind" (southeast of) the thrust front of the Bass Island Trend, where widely-spaced well log data had previously prevented the recognition of thrusts and their trends. The integrated approach also suggested that the NW-striking CSDs can be a series of

closely-spaced parallel faults. A series of N-striking faults were also discovered, one of which may have influenced the development of a tear fault.

OBJECTIVES OF THE RESEARCH PROJECT

The primary objective of the research was to demonstrate the validity and efficacy of advanced methodologies for detection of known and suspected structures in a fracture play in New York State, the Bass Island Trend (BIT). The BIT has been the most important regional play in western New York in the past 20 years. A second objective was to better define cross-strike discontinuities (CSDs) across which thrusts of the BIT are offset. Tear faults can provide seals between segments of the thrusts, and thus play an important role in determining extent of along-strike play and the extent of potential communication among wells on the thrusts. In the process of realizing these objectives, the research project delineated a more complex picture of the faults in the region than previously understood. The objectives included:

1. The use of Landsat lineaments identified by Earthsat (1997) as an aid for determining the location of controlling structures in a portion of the BIT. The validity of the lineaments as a predictor of deep structures was to be tested by well log analyses, and, where available, seismic reflection profiles.

2. Advanced structural characterizations of fractures observed in outcrops as an aid for delineation of deep structural trends. The structural characterizations were to be compared to the lineaments, soil gas anomalies, and to deep structure as inferred from well logs and by available seismic reflection profiles.

3. Demonstration of surface soil gas anomaly technology for delineation of open fractures, even in regions of glacial cover. Such recognition will test whether soil gas anomalies can be used to aid in identifying fracture systems important in the target area of the BIT.

4. Integration of the methodologies with well log control to define new structures in the region and to refine the location of the known structures.

BACKGROUND/APPROACH

The importance of structural control on oil and gas reservoir quality, and in some cases, on even the presence of a play, is well known. However, delineation of detailed structure by conventional techniques, based on well logs and high resolution seismic data, is often prohibitively expensive. Similarly, high resolution seismic can be prohibitively expensive as a reconnaissance tool. An approach for delineating deep structure with much less expensive techniques has been developed, based on work over the past 15 years. This integrated approach has shown that deep structure in New York State has a surface expression that can be recognized by lineament and fracture analyses combined with soil gas surveys (e.g., Jacobi and Fountain, 1996, 2002; Fountain and Jacobi, 2000). Thus, characterization of the surface manifestations of deep-structures by lineaments, fractures, and soil gas anomalies can provide a rapid, relatively inexpensive method for determining the precise coordinates for the application of more expensive technologies, such as seismic profiling or exploratory drilling.

This study included both a proof-of-concept stage, wherein the new methodologies were tested along a portion of the BIT, where the deep structure was fairly well understood from existing well logs, and an application stage wherein the new methodologies were used to identify, or refine, structures that may prove to be new potential exploration targets. In the proof-of-concept stage, the orientation, location and extent of subsurface structures deduced from lineament analysis, surface fracture analysis and soil gas surveys were tested against structure deduced from existing well log data.

This demonstration project location was in Dayton and Persia townships, Cattaraugus County, southwestern New York State (Figure l). The demonstration project was accomplished by a partnership that included Quest Energy, Stuart Loewenstein, President; Professors Jacobi and Fountain of the University at Buffalo Rock Fracture Group; and two UB graduate students, Andrew Baudo and Travis Nelson. Stuart Loewenstein made the stratigraphic picks on the well logs; he contoured the various stratigraphic horizons and isopach maps using the program Geographix. He and Jacobi modified the salt isopach map with hand contouring in areas where the Geographix contouring program did not appear to precisely honor the posted data, and Jacobi interpreted the maps for this report. Dr. Fountain was in charge of the soil gas task; he and his graduate student, Travis Nelson, collected and analyzed the soil gas data. Dr. Jacobi was in charge of the structure task; he and his graduate student, Andrew Baudo, collected and analyzed the structure data. Dr. Fountain wrote the section on soil gas results contained within this Final Report; the remainder of the Final Report was written by Dr. Jacobi.

BASIS FOR PRESENT STUDY: ALLEGANY COUNTY NYSERDA-FUNDED PROJECT

The rationale for the technical approach hinges primarily on the work Jacobi and Fountain performed in Allegany County for NYSERDA (Jacobi and Fountain, 1996). They established that deep structures in the Appalachian Basin of western NYS have surface expressions that can be manifested by:

1. fracture intensification domains (FIDs);
2. lineaments observed on air photos, topographic maps, Landsat and SLAR images; and, in some cases,
3. soil gas anomalies.

These deep structures include both Alleghanian fault systems, such as thrusts in Allegany County that are similar to the Bass Island Trend, and Precambrian basement reactivated fault systems, like the Clarendon-Linden Fault System and cross-strike discontinuities (CSDs). FlDs are narrow, linear zones characterized by relatively closely-spaced fractures that define the trend of the FID. These fractures commonly are also the master fractures, even though in regions outside the FID this fracture set may characteristically abut other fracture sets. In many of the FIDs, fractures of sets other than the master set are reduced in number, compared to regions outside the FID. Fractal and geostatistical analyses of fractures within and outside of the FIDs show that FIDs have different fractal and geostatistical characteristics compared to fractures outside the FIDs (Jacobi et al., 2001). FIDs generally coincide with faults both at the surface (faults observed in outcrop or inferred from stratigraphic offset between outcrops) and in the subsurface (faults observed on seismic reflection profiles or inferred between wells).

Jacobi and Fountain (1996) found that in Allegany County the remotely-sensed lineaments correlate spatially with FIDs. Thus, in regions where well and seismic control are relatively sparse, these tools can be integrated into the exploration package to better define where further, more conventional exploration techniques should be concentrated. Furthermore, in areas where some structure is known, these structures can be extended along the strike of the trends defined by these lineaments. Thus, the extension of known structures, or the recognition of new structure, can significantly improve the oil and gas potential for New York State.

That fault zones can be pathways for accelerated fluid flow has been understood for quite some time (see Fountain et al., 2001, for a review). Previous studies of gas accumulations in soil, conducted for hydrocarbon exploration, have documented that faults can serve as conduits for gas migration (Jones and Drozd, 1983; Duddridge et al., 1991). Natural gas bearing units are common in the Appalachian Basin, including Allegany County (Jenden et al., 1993). The UB Rock Fracture Group demonstrated that natural gas seeps along FIDs in Allegany County can be detected from high resolution soil gas surveys (e.g., Jacobi and Fountain, 1996; Fountain and Jacobi, 2000). These surveys sample and analyze the *in situ* soil gases on a 10m or less spacing. High ethane concentrations indicate open FIDs, usually with significant vertical extent. Thus, soil gas surveys promote identification and tracing of faults even where the faults are hidden by unconsolidated sediment (Fountain and Jacobi, 2000). Thus, it appears possible to determine which lineaments are associated with faults that are hydraulically conductive on the basis of outcrops and soil gas anomalies.

PREVIOUSLY KNOWN STRUCTURE IN THE STUDY AREA

Although the general trend and character of the Alleghanian northwest-directed thrusts involved in the Bass Island Trend was known previously (Figures 1, 2.; e.g., van Tyne et al., 1980; Beinkatner, 1983), significant data gaps that potentially hid important plays existed prior to our research. In the area of interest, preliminary well log analyses by Quest demonstrated the existence of two NE-striking thrust faults of the BIT (labeled Thl and Th2 in Figure 2). These faults were recognized on the basis of repeated stratigraphic sections in well logs (e.g., the Onondaga, Figure 3), as well as anomalously high elevations of the Onondaga. Wells on both structures have been good producers. One northwest-striking CSD was also known from tight well log control (labeled CSD 2 in Figure 2). However, neither the northeastern nor the southwestern extent of the thrusts (Thl and Th2) was known. The proposed existence and location of CSD 1 (Figure 2) was based on essentially two wells that had different posted elevations of the Onondaga (Figure 2). The proposed existence and location of CSD 3 (Figure 2) was based on:

1. regional well log data that suggested that a CSD must exist in the general area where a major dislocation in the BIT occurs between the segment south of Cattaraugus Creek and a known segment to the northeast, and
2. NW-striking topographic lineaments that guided the actual placement of the proposed CSD 3 trend.

The existence of several lineaments in the research area that were identified by Earthsat (1997) in Landsat data suggested that additional structures may exist, but for the proof-of-concept stage, only the two thrusts and CSD 1 were available as known structures at the beginning of this project.

For the application research stage (Stage II), all techniques were integrated to test their applicability and to better delineate structures in the research area. Soil gas anomalies and detailed well log analyses confirmed the existence and location of CSD 1. A lack of outcrop prevented structural confirmation of the trend. The CSD 3 was confirmed by soil gas analyses, surface structural analyses, and topographic lineaments. Two additional CSDs were recognized on the basis of Landsat lineaments, topographic lineaments, and well log analyses. In addition, N-striking faults were identified initially in surface structure data (Jacobi and Baudo, 1999). These N-striking trends are broadly coincident with Landsat lineaments and well log analyses. Additional NE-striking thrusts were also indicated at the surface by Earthsat's (1997) Landsat lineaments, topographic lineaments and surface structure.

METHODOLOGIES OF PRESENT STUDY

Well Log Analyses

Well log analyses of over 250 wells in the research area allowed a much more detailed view of the structure in the research area. Picks were made on the tops of the Tichenor Limestone (sometimes mistakenly referred to as the Tully in this region), Onondaga, B-Salt, and "Packer Shell" (Reynales/Irondequoit) and on the base of the B-Salt. Quest energy "machine-contoured" (by Geographix) maps that display the structure contours of the Tichenor Limestone ("Tully"), Onondaga, B-Salt and the Packer Shell. A salt isopach map was also constructed.

Soil Gas Survey

Background. Soil gas analysis has been used for over 40 years as a tool for the location of natural gas reservoirs (Jones and Drozd, 1983). Originally the technique was developed on the assumption that anomalously high gas concentrations would be found in the soil gas above gas reservoirs, and this approach is still used with success. However, results of soil gas studies by Jones and Drozd (1983) and Richers et al. (1986) established that the largest anomalies were not centered over reservoirs but were associated with faults. In these studies, the spacing of the samples was large (typically several km between samples) and only major faults were reported. Thus, it could not be established if there was a one to one correlation between faults and soil gas anomalies.

A much smaller sample spacing than has been used in previous studies is required to correlate anomalies to specific faults or fractures. Since a smaller spacing requires more samples, sampling must be rapid and relatively inexpensive, which in turn requires sampling from shallow depths. However, interpretation of hydrocarbon anomalies from shallow samples is complicated by the fact that methane is produced both from decay of organic matter (biogenic methane) and from the thermogenic processes that form petroleum. An indication of the source of the gas is provided by the ratio of ethane to methane in the sample. Biogenic gas is nearly pure methane (Whiticar et al., 1986), whereas the ratio of methane to heavier hydrocarbons varies with maturity in thermogenic gas (Tissot and Welte, 1984). The ratio of ethane to methane thus can be used to distinguish thermogenic methane from biogenic methane. In southwestern New York, the near-surface units are predominately Devonian shales and sandstones with ethane/methane ratios between 0.05 and 0.20 (Jenden et al., 1993). Interpretation of the gas as thermogenic gas was confirmed with isotopic analyses for selected samples.

Soil Gas Survey Design. Soil gas surveys were conducted along a north-south profile, following existing seismic lines. Traverses were conducted along the edge of roads. Samples were collected at a distance of 3 to 10 meters from the road, depending on road construction, to avoid the roadbed fill material.

Samples were obtained by driving a stainless steel probe to a depth of 60 cm using a hand-held sledge hammer. Twenty cubic centimeters of air, slightly more than one probe-volume, was withdrawn from the probe and discarded with an air-tight syringe to purge atmospheric air from the probe. An additional 60 cc of air was then withdrawn with the syringe and injected directly into a gas chromatograph (GC) equipped with a flame ionization detector for analysis (a Century OVA 128 GC). Gas entered the probe through an array of holes approximately 5 cm above the tip; the holes were covered by a loose sliding collar that minimized plugging during insertion (Figure 2).

Samples were collected at 10 m intervals. This distance is somewhat arbitrary; however, the results of over 10,000 analyses established that most anomalies are more than l0 m wide, confirming that a 10 m spacing will detect most anomalies.

Linear response of the gas chromatograph was determined by analysis of standard gasses at the start of each day, after four hours of analyses, and at the end of each day. Samples were analyzed in duplicate every l0 samples.

All samples with 10 ppm or greater total organic vapor content were returned to the laboratory for analysis on a laboratory gas chromatograph to determine ethane/methane ratios. The GC was calibrated daily for response and elution times using standard gas mixtures.

Fountain and assistants collected 3,073 soil gas samples from 24 different traverse sections with a length that totaled 86,460 feet (16.375 miles, 26.36 km). They collected an additional 119 samples in box patterns and another 300 sites were resampled. The box patterns account for an additional 1,070 feet (326 m) of traverse.

Structure Analyses

Jacobi and Baudo used two different methods to collect structural data. During the first field season, Baudo, Jacobi and assistants collected structural data along a continuous scanline in the South Branch of Cattaraugus Creek. They collected nine attributes of every fracture that crossed the scanline, including:

1. Distance along the scanline where the fracture intersects
2. Strike and dip of the fracture
3. Exposed length of the fracture
4. Exposed height of the fracture
5. Abutting relationships (with other fractures)
6. Top and basal abutting relationships (primarily abutting some sedimentary unit)
7. Character of fracture trace (e.g., straight, curvy)
8. Decorations on the fracture face
9. Offset along the fracture

Jacobi and Baudo used the orientation, character and abutting relationships to sort out the different fracture sets. After separating the fracture sets, they calculated the fracture frequency for each set from the fracture intercepts on the scanline. As most fractures are very steeply dipping (80^{o}+), modified rose diagrams can be used to portray the results. In these rose diagrams, fracture frequency is displayed in the top half of the diagram. Generally, three orders of magnitude are shown on the diagram as successively larger concentric circles, with the inner circle representing 0.1 fractures/m, the middle ring representing 1.0 fracture/m, and the outer ring representing 10 fractures/m. Thus, long petals indicate a relatively high number of fractures, as did the traditional rose diagrams. The advantage of this modified diagram is that it does not promulgate a potential sampling bias where a scanline is parallel to a fracture set. In the traditional rose diagram, the raw number of fractures would be underrepresented for the set that paralleled the scanline. The lower half of the rose diagram is used to indicate other features of the fracture sets, commonly either abutting relationships, or length (which is a proxy for abutting relationships). The longest petals in the lower half indicate the master set; the next longest petals indicate the set that abuts the master set, but that is itself master to another fracture set, which is portrayed by even shorter petals.

The scanline location was selected so that it crossed the expected location of the CSD, and crossed N-striking faults in outcrop. Jacobi and Baudo also collected fault data on thrusts and high angle faults that outcrop in the South Branch. The second field season, Baudo continued the scanline, and Jacobi and Baudo also used an abbreviated method to collect structure data at discrete sites. At these sites, Jacobi and Baudo identified the fracture sets in the outcrop, and measured the spacing among a minimum of three fractures for each systematic fracture set. They also collected abutting and length/height information. These data were also portrayed on the same modified rose diagrams. Baudo and Jacobi (1999, 2000) performed geostatistical studies on the fracture sets for which they has sufficient data.

RESULTS

PROOF-OF-CONCEPT STAGE

For the proof-of-concept stage, two thrusts and the one CSD 1 were utilized as known structures from well log analyses. However, because the dip of thrusts between the Onondaga and the surface is unknown, correlating specific NE-striking structural features at depth with surface features (soil gas anomalies, lineaments, and surface structure) is slightly equivocal. The researchers therefore concentrated on the NW-treading CSD 2, since it was believed to have a high dip. Unfortunately, no outcrops occur along the trend of the CSD as originally proposed based on preliminary well log analysis of the Onondagas (Figure 2). Similarly, no Earthsat (1997) Landsat lineament occurs along the original location of the CSD. Also, no soil gas anomalies were discovered along the original trace. However, one NW-trending soil gas anomaly was defined close to the original CSD trace. This soil gas anomaly was based on single clusters of soil gas anomalies on Peck Road and Rt. 62 near Dayton (Figures 4, 5). It is important to note that no other ethane spikes were observed on the > 2 km traverse along US Rt. 62 that crossed the proposed approximate trace of the CSD. Similarly, only one cluster was observed on the > 1 km traverse that crosses the CSD trace farther northwest (Figures 4, 5). The NW-striking CSD defined by these two clusters of soil gas anomalies is consistent with a NW-striking CSD that is offset about 0.7 km southwest of the CSD inferred from the Onondaga elevations on well logs (Figures 4, 5). This offset could imply a shallow-dipping CSD between the Onondaga and the ground surface, if the CSD is correctly located at the Onondaga level, and if the soil gas anomalies indicate the locus of fracturing associated with the CSD at the surface. The Onondaga elevation is about -600 ft (-183 m) in this area, and ground surface elevations are on the order of 1325 ft (404 m above sea level). The vertical distance between the Onondaga and the soil gas anomalies at the surface is thus about 600 m. The CSD therefore could be interpreted to have a shallow dip of about 1 to 1 (45^o) to the northeast. Such a dip could be consistent with a ramp geometry for the CSD between the Onondaga and the surface. However, several considerations suggest that this explanation is not the most probable alternative:

1. The fractures associated with the CSDs at the surface elsewhere in the region (see discussion below) have consistently high dips (80^o+) at the surface, and the high cliffs in the gorge at Zoar Valley allow complete observation of these dips for more than 400 ft (122 m) height. Thus, it seems improbable that the CSD could have a consistently low dip on the order of 45^o.
2. Data from very closely spaced proprietary well logs elsewhere along the BIT show that the spacing of minor CSDs can be very close, on the order of the offset observed here.
3. Surface structure in the area, especially in Zoar Valley, shows that several discrete narrow zones of fracturing (FIDs) can be relatively closely-spaced, forming a wider zone on the order of 1 km.

The offset could be a result of discrete horizontal jumps in a single FID along prominent bedding surfaces. However, another explanation is that the CSD is actually a zone of discrete, narrow FIDs, as evidenced both in structure outcrop to the east in Zoar Valley and in proprietary well log data. Thus, the location of the major subsurface fractures offsetting the Onondaga, as inferred from Onondaga tops, may not be the same discrete FID that is leaking gas at the surface. However, both of these CSDs may comprise a wider CSD zone. A second explanation is that the CSD location inferred for the Onondaga is not precisely located; rather, the relatively widely--spaced well logs allow multiple interpretations as to the exact location.

The surface traces of the thrusts Thl and Th2 (Figure 2) that were mapped in the Onondaga pass through a region of no outcrop; rather, thick glacial deposits cover the area. No soil gas anomalies were observed where traverses crossed the surface trace of Thl and Th2 in either the Dayton area (CSD 2) or the South Dayton area (CSD 1). Soil gas anomalies were also rarely observed along NE-striking faults in Allegany County (Fountain and Jacobi, 1998). However, two Earthsat (1997) Landsat lineaments correspond in a general way to Thl and Th2 (Figure 2). Both lineaments are displaced to the southeast of the thrust trace by less than 0.6 km (0.4 mi.). This offset could be a function of:

1. back-thrusts, i.e., southeast-directed thrusts that extend upsection from the Onondaga in order to accommodate the displacement above the Onondaga; or
2. the "vagaries" of map registration and the generalities of Landsat data and its interpretation by Earthsat (1997).

Nevertheless, it is noteworthy that Earthsat (1997) data included two lineaments exactly parallel to the thrusts and offset < 0.6 km from the trace inferred from the Onondaga. The lineaments extend farther southwest across CSD 1 without a break, and terminate to the northeast before reaching a major CSD. Thus it would appear that these NE-striking CSDs can be used as a general indicator of structure, but perhaps not as a precise predictor of the structure location.

APPLICATION OF INTEGRATED TECHNIQUES STAGE: I) DETAILED DISCUSSION OF RESULTS OF EACH METHODOLOGY

Results of Well Log Analyses

Isopach Map of the B-Salt Interval (Figure 6). Isopach maps do not depend on the elevation of the well; thus, isopach maps are "insulated" from the serious problem of poorly surveyed well elevations. The high resolution means that relatively small changes in thickness are considered a true indication of conditions in the subsurface, and are not considered "within the probable error" of the system. The isopach map of the B-Salt should reveal important elements in the Alleghanian thrust and tear faults, since the thrusts sole out on the salt (e.g., Beinkafner, 1983). Although the relatively widely-spaced well logs introduce ambiguities into the interpretation of the well log data, several important themes are evident.

The most dominant features of the isopach map are the cross-trends superimposed on the generally NE-trending 0-line and associated contours. The NW-striking salt ridge (feature SI-1) is located along CSD 1, and is paired with a NW-striking zone of anomalously thin salt ("valley", feature SI-2). The spacing and location of the wells is such that other trends could be contoured for the salt ridge. For example, in the southern part, the ridge is contoured as a continuous feature that separated the salt minima at wells #21777 and #20924. However, because there is no well directly between the salt minima wells, the two salt minima could be connected as a generally NE-trending low, approximately parallel to the BIT structures. This contouring would interrupt the NW-striking salt ridge, and could imply that in this area the anomalously thick salt (e.g. 90 ft) is actually associated with an unrecognized, NE-trending thrust. However, this northeast trend is rejected as a general case for SI-1 on the basis of well pairs in two areas that demonstrate that at least there, a northeast trending salt ridge is not likely. In the northwestern part of SI-1, the salt thickness minimum at well #18939 is directly southwest from a salt thickness maximum on SI-1 (well #18627). Similarly, in the southern part of SI-1, salt thickness maxima on SI-1 (wells #21193 and #21773) are directly southwest oftwo wells with salt thickness minima. The coincidence between an Earthsat (1997) lineament and SI-2 supports the NW trend of SI-2. If this pair of NW-striking salt ridge and valley is correct, then southwest-directed ramping probably did occur in the vicinity of the CSD 1, and that this ramping included salt flowage. Such a ramp along a transfer is similar to that proposed by Kowalik and Gold (1976) as a way to explain how basement faults could influence the location of CSDs in the higher section, including salt.

The north strike of CSD feature SI-3 is defined by seven relatively widely-spaced wells, so the trend is certainly not definitive. However, N-striking Landsat lineaments from Earthsat's (1997) coincide with SI-3. This north trend is not a usual trend for tear faults. Because the trend is coincident with N-striking lineaments that extend from Lake Ontario region, this CSD was probably controlled by faults in the Precambrian basement. The N-strike of the tear fault/CSD poses a dilemma. Although it could be argued that the N-striking tear fault indicates that large-scale slip in this region was generally N-directed, the adjacent tear faults trend northwest. Thus, in order to satisfy the space problem, non-rigid-body translation along the thrust surface would need to be invoked in order to explain northwest transport at the southwest end of the thrust segment and northward transport at the northeast end. Because the Onondaga stratigraphic offset is on the order of 100-200 ft, the actual transport on any one of the thrust ramps is actually quite small. On the thrust segment between CSD 1 and SI-3, strike-parallel extension of ~ 1.5% along the thrust front could account for the needed rotation. Such an extension is common for fracture development m thrust terranes, including the Appalachian basin of NYS (Zhao and Jacobi, 1997). Thus, because each thrust ramp has a relatively small displacement, the N-striking CSD is possible.

If the north strike of SI-3 CSD is confirmed with well log/seismic data, then there are at least two explanations for the N-striking CSD. One is that the faults in the Precambrian basement were reactivated during the Alleghanian, and controlled the strike and location of the CSD, as in the model proposed by Kowalik and Gold (1976). A second model is that the north strike is a function of the depositional extent of the Silurian salt. That is, the faults in the Precambrian were reactivated during the time of the salt deposition. The faults thus controlled (or modified) the outline of the Silurian salt basin. At SI-3, the north strike, with salt thickening to the west, would suggest that the active fault raised a fault block on the east (down-on-the-west sense of motion) during salt deposition. The resulting 0-line then controlled the extent of the Alleghanian thrust riding on the salt.

Feature SI-4 has a N- to NNW-striking trend, similar to SI-3, but the trend is poorly controlled. Feature SI-4 is on strike with SI-3 and is offset, but parallel to Landsat lineaments that are about 1 to 1.5 km to the east. Feature SI-4A trends northwest and separates a salt ridge (SI-11) from a thin salt area to the west. The dual trends of SI-4 and 4A illustrate the problems with a lack of close spacing of well data in a complicated structural region; either or both features are possible. Feature SI-5 is extremely poorly defined by well logs, but is consistent with surface structural data, and is coincident with a Landsat lineament. This lineament is one of a series of lineaments that extends from the north. Jacobi and Baudo (1999) used the surface data and lineament extent to propose that a Precambrian, multiply reactivated fault zone extends through the region here, and is indicated at the surface by N-striking faults and CSDs.

At the south end of SI-5, a thickened salt section in well #16412 is adjacent to a thinned salt section in well #11066. This juxtaposition could be a result of the N-trending SI-5, or could indicate an unrecognized thrust in the region of well #16412. Significantly, a long NE-striking Landsat lineament passes within ~ 0.2 km of the well. N-striking SI-6 is approximately on-strike with SI-5. Features SI-7 and 8 mark NW-striking gradients with a salt ridge between the gradients. CSDs may occur along each gradient.

Northeast and east-trending salt ridges are assumed to indicate the position of thrust ramps, based on the models of Beinkafner (1983), as well as on well log inspections that demonstrate salt thickening by repeated section in the salt. Thus, salt ridges SI-9 and 10 may indicate the presence of previously unsuspected thrust ramps. The east-west trend of salt ridge SI-11 may be an artifact of the well spacing, but in any case, the salt thickness maxima indicate possible thrust faults in this area. Single-point maxima in salt thickness can indicate problems in data reduction. However, after checking the data, the remaining single point maxima could also indicate either a NE-striking thrust or, NW-striking salt ridges and CSDs. Single points that may indicate thrusts are #17050 and #18090. It is significant that #17080 is located on a NE-trending Landsat lineament that is also a prominent topographic lineament. A prominent NE-striking CSD also crops out along this lineament. Well #14513 also suggests that a thrust may ramp in the vicinity of this well.

Structure Contour Map of the Packer Shell (Figure 7). In order to determine which structures identified in the salt isopach map may be related to deeper structures, a structure contour map was constructed on the top of the Packer Shell (the Silurian Irondequoit and Renayles formations). This map was machine contoured by Geographix. The paucity of data does not allow definitive identification of structures; rather the data reveal suggestions of the possible structure below the Silurian salt. Nevertheless, these data do strongly indicate that the Packer Shell is not merely disposed in a gently, uniformly-dipping surface. Rather, the Packer Shell surface shows jogs, or discontinuities. Some of these discontinuities align with both the NW-striking and N-striking CSDs. This coincidence between the Packer Shell discontinuities and the CSDs in the overlying units supports our suggestion that the location of many of the CSDs were controlled by structure below the salt layer. Because single well anomalies may be a function of poor elevation control on the well, this report will concentrate on features that are defined by several wells. The fault trends on Figure 7 are generally fairly short because a lack of well data precludes knowledge concerning possible extensions of the faults. The discontinuities in the Packer Shell could be either monoclines (as contoured) or faults. The narrow CSDs at the salt and Onondaga, and surface horizons, and the close correspondence among the discontinuities in the Packer Shell with those in the overlying units suggests that most of these discontinuities are faults. It seems improbable that a gentle warp would localize coincident deformation in all the overlying horizons, but the well spacing will generally allow some ambiguity on this question.

Feature PS-1 trends northwest and is coincident with CSD1. The northern and southern parts of the proposed fault are each controlled by three wells. Feature PS-2 trends northwest and is defined in the northwest by eight wells. The general strike of the Packer Shell is well defined by three wells on the northeast side of the structure (wells #17220, #17180, and #18773). The Packer Shell is about 25 ft. lower on the other side of the proposed structure, if the Packer Shell has similar strikes on both sides of the structure (compare elevations in wells #18001 and #18628 to those on the northeast side). The proposed structure cannot strike north, since one of the anomalously low elevations is directly south of one of the high elevations (well #18628 and #17220, respectively). The location of this fault is approximately coincident with the salt thickness "valley" (SI-2), and is approximately on-strike with Landsat lineaments.

Feature PS-4 also trends northwest and is coincident with CSD 1. This fault is defined by five wells in the south and three wells in the north. The general strike of the Packer Shell in the region on either side of PS-4 is assumed to be northeast, as calculated from the three wells southwest of PS-4 (#17220, #17180, and #18773), and the five wells to the northeast near PS-6 and 7. If this assumption is valid, then PS-4 has about 20 to 30 ft offset, down-to-the-southwest. Although an argument could be made for NE-striking faults to accommodate the anomalously low elevations at the southern end of the fault, an anomalously low elevation in well #18773 is directly southwest of well #17179 with a high elevation. At the north end of PS-4 the locations of three wells with the same elevation (#17931, #18653 and #18662) suggest that at least two faults may be present, if the strike of the Packer Shell is generally northeast.

Feature PS-5 is poorly defined, but does align with a Landsat lineament. The trend of feature PS-6 is primarily controlled by a single low elevation, as well as the same elevation observed in two wells that are on a NNW-SSE bearing from each other. The implied strike from these wells is anomalous. Both PS-6 and-7 are in an area where surface structure indicates an important zone of N-striking FIDs. Additionally, a N-striking Landsat lineament is coincident with PS-6 and another is approximately on strike with PS-7. The anomalous strike inferred from the two wells could also indicate that a monocline exists along this trend, rather than a fault. Feature PS-8 trends north and is defined by six wells. Although NW-striking Landsat lineaments occur in the area, the pattern of wells strongly suggests a N-trending feature. This feature is aligned with anomalous trends in the salt isopach map.

Features PS-9 and 10 are not well controlled, and in fact, could be explained by either NW- or NE-trending structures. That PS-9 is coincident with proposed CSD #4, and controlled by 4 widely-spaced wells, suggests that the fault does exist.

Structure Contour Map of the Top of the B-Salt (Figure 8). This map was machine contoured by Geographix. Features evident in the B-Salt isopach map are generally less evident in this map. However, a few CSDs and thrust-related trends are indicated by the data.

Feature ST-1 is defined only by two wells; thus two trends are possible: a NE-striking, southeast-facing fault that is parallel to CSD 1, or a NE-striking structural ridge that could indicate a previously unrecognized thrust. The well with the low elevation also had a minimal amount of salt (see Figure 6). Thus, salt withdrawal from this region is a possible causal mechanism for the anomalously low elevation of the B-Salt top here. Feature ST-2 is a larger feature that is defined by five wells in the southeast and three wells in the northwest. Although the feature is drawn as a fault, four wells on the southwest side of ST-2 (# 17220, #17180, #18774, and #17637) suggest an E-W strike. If this strike is correct, then ST 2 may indicate the axis of a fold that warps the salt top. Such a warp is possible in the mobile salt layers. Two interpretations are possible for the northwestern end of ST-2. One is that ST-2 extends through the zone of thrusts (as portrayed). The second alternative is that the low at well #18763 is actually an extension of the possible NE-trending ST-3, which is related to the thrusting.

Features ST-3 and 3A trend NE along the BIT. The machine contours, which legitimately honor the posted data, do not indicate these trends. However, it is apparent that the Top-of-the-B-Salt highs at wells #18193 and #16927 are exactly on the BIT thrust Th2. Such a high would be expected at the site of thrust ramps up from the salt. Similarly, the neighboring lows of the

Top-of-the-B-Salt at wells #18654 and #18540 are in the region between the two thrusts of the BIT. This low would also be expected from salt withdrawal related to the salt ridge at the thrust ramps. Using this model of a structural low between the thrusts, ST-3 may extend southwest between the thrusts to at least well # 18605. In this model, the low at well #18763 could be related to the proposed low between the thrusts. It is not possible with this data set to differentiate between the CSD and/or thrust origins for this low.

Feature ST-4 is defined by essentially two wells, but the elevations are consistent with the salt isopach map, so these elevations are probably correct. The low occurs where the B-Salt thickness is 0 (Figure 6). The high at well #13364 could be related to a NE-trending, previously unrecognized thrust, or to a N-striking fault, as portrayed in Figure 8. A NW-trending fault parallel to the CSD is deemed unlikely because the high at well #13364 is directly southeast of the low. A N-striking fault is consistent with the N-striking FIDs found on strike to the north. Feature ST-4A is poorly defined and has several possible trends, including one (NNW-striking) that is coincident with a very long Landsat lineament. Feature ST-5 is based on five wells, but the pattern of wells allows several different interpretations. The preferred interpretation is that the wells with highs indicate a NE-striking thrust. This interpretation is consistent with:

1. a NE-striking Landsat lineament which is less than 0.2 km south of the proposed structural high,
2. NE-striking topographic lineaments in the same area,
3. a poorly-defined salt ridge to the south, and
4. structural data that indicate NE-striking FIDs, including faults, on strike in the South Branch of Zoar Valley.

Other interpretations are possible, as shown on Figure 8, but are not thought to be probable.

Feature ST-6 and 6A show the range of alternative trends for a feature defined by two wells. The center trend is parallel to a long Landsat lineament. Feature ST-7A and 7B are also alternative trends for a low defined by 4 wells. Trend ST-7B is approximately north-south, coincident with a Landsat lineament. North-striking FIDs and faults are observed in the general area.

Feature ST-8 is defined by two wells and may trend either northwest or northeast. The northwest trend option is about 0.5 km southwest of a similarly oriented Landsat lineament. Feature ST-9 is better defined by four wells. Although the machine contours impart a northwest strike to these anomalous elevations, the highs trend approximately northeast. If the northeast trend is correct, then a thrust may exist along the highs. Salt withdrawal for the salt ridge associated with the thrust then caused the associated lows. This northeast trend is nearly coincident with a NE-trending Landsat lineament.

Features ST-10, 11 and 12 are defined by only a few wells. As an illustration of the poor control, ST-12 is offered as an alternative trend to ST-10 and 11. ST-11 is essentially coincident with CSD 4 and SI-8 (Figure 6). The northwest trends are therefore judged more probable.

Structure Contour Map of the Top of the Onondaga Formation (Figure 9). The Onondaga Formation structure contour map shows many of the same features observed in the B-Salt and Tichenor Limestone ("Tully") structure contour maps. These commonalties indicate that the structures extend from the B-Salt to at least the Tichenor Limestone ("Tully"), and surface lineaments and structural data suggest that effects of these structures extend up through the entire section above the Tichenor Limestone ("Tully").

Feature ON-0 is based on two wells, and is the southeastward continuation of CSD 1. A similar feature is observed in the Tichenor Limestone ("Tully"). Feature ON- 1 is based on three wells. The proposed NE-striking structural high may indicate a thrust ramp at this locality. The northwest-striking Feature ON-2 is defined by four wells. This feature is coincident with Landsat and topographic lineaments, and is on strike with the linear zone of thin salt (SI-2 in Figure 6). The feature, with the same sense of offset, is also observed in the overlying Tichenor Limestone ("Tully") and underlying B-Salt top. It would appear that ON2 marks a CSD that is through going from B-Salt to the Tichenor Limestone ("Tully"). The Packer Shell also shows the same sense of offset, so either the fault extends through all the units studied, or the elevations of the wells are consistently incorrect.

The location of Feature ON-3 is based on wells #176637 and #18778. Both wells display the same elevation of the Onondaga, with a resulting northwest strike of the Onondaga top. As this strike is orthogonal to the regional strike, either a fold or a fault lies between these wells. Additional CSDs may be located farther southwest (e.g., Feature ON-3A). The positions of these CSDs are more consistent with the location of the CSD as determined by soil gas analyses (as discussed in the Proof-of-Concept section).

The structural low at well #18223 is directly southeast of the structural high associated with a thrust ramp of the BIT at well #17982. Thus, the thrust ramp at the structural high (well #17982) appears to strike directly into the structural low. The Tichenor Limestone ("Tully") displays the same pattern. Possible explanations include:

1. the thrust ramp changes dip between the two wells,
2. the thrust ramp bends to the northwest of well #18223,
3. a small CSD (tear fault) separates the two wells, or
4. the strike of the thrust ramp is actually east-northeast here.

Because two wells directly to the northeast have the same Onondaga elevations, the strike in this area is NE. It is therefore improbable that the thrust ramp strike in general is east-northeast. Possibilities 2 and 3 are variations on the same theme, that the thrust ramp is offset, and either is allowable with the present data set. Feature ON 4 is drawn offset by a small CSD, but a fault trace bending around well #18223 is also possible. The structural high along Feature ON 4A suggest that the CSD 2 should be relocated to the southwest, since well #17931 has essentially the same Onondaga elevation as the adjacent well to the northeast. To the southwest, the elevation along ON-4A decreases significantly where a NW-striking Landsat lineament and the northwest zone of salt thinning occur. This CSD is on strike with ON-2.

Feature ON-5 is based on six wells, and is coincident with a Landsat lineament. The northwest trend suggests that it is a CSD. Wells #17815 and #18445 establish a notheast strike immediately southwest of the proposed CSD. On strike, but across the proposed CSD, the Onondaga is 50 ft higher in well #13364. Feature ON 6 is defined by three wells. The NE-striking structural high is nearly coincident with a Landsat and topographic lineament. To the northeast, structural data suggest an on-strike NE-striking fault. The Tichenor Limestone ("Tully") exhibits a similar feature.

Features ON-7, 7A, and 8 are all poorly defined. NW- and N-striking features are both possible, and both may cross the area. Structure in South Branch shows that both N-striking faults and NW-striking FIDs are present, and soil gas confirms a NW-striking CSD.

The NE-striking Feature ON-9 is based on nine widely-spaced wells. Although other trends are possible, the Landsat lineament ~ l km to the north suggests that a thrust in this area is a possibility. Anomalous elevations of the Onondaga in the region of ON-10 suggest that a CSD is present, as well as possible N-striking features. However, the exact trends and locations are not possible to determine from this data set.

<u>**Structure Contour Map of the Top of the Tichenor Limestone ("Tully") (Figure 10).**</u> The accepted tradition concerning the Alleghanian thrusts and other faults in the Appalachian Plateau was that they ramped up from the salt layer, but the strain was distributed throughout the shales overlying the Onondaga Formation (e.g., Fakundiny et al., 1978) because there was little evidence

for faulting in units above the Onondaga Formation. However, recent structural field work and well analyses have suggested that Alleghanian (and perhaps late Acadian) faulting can be found throughout the stratigraphic section in NYS, including the sandstones and shales of the Upper Devonian Catskill Delta (e.g., Evans, 1994; Jacobi and Fountain, 1996;). Consistent with this more recent view is the structure map on the top of the Tichenor Limestone ("Tully"). Although the data are sparse, the data do indicate that the surface of the Tichenor Limestone ("Tully") is not planar. Rather, the top of the Tichenor Limestone ("Tully") is disposed in warps and probable faults.

Feature T-1 is defined by six wells, and its trend is most likely N-S. Feature T-1 is parallel to a Landsat lineament about 0.5 km to the east. Feature T-1 is coincident with N-striking features in the salt isopach and the Top of the B-Salt structure contour map (Figures 6, 8). The Tichenor Limestone ("Tully") structure contour map offers little assistance for locating CSD 1. For example, in the northwestern part, no wells control the location of CSD 1. In the central part, wells on the southwest side (#18254 and #18939) have Tichenor Limestone ("Tully") elevations that are essentially on regional strike with the well on the northeast side (#18627). This lack of significant offset can be explained by two different alternatives:

1. The thrusts and accompanying tear faults do not extend much above the Onondaga, and little affect the Tichenor Limestone ("Tully").
2. In a simple case of a single decollement (thrust "flat") in the salt, and a thrust ramp up from the decollement, variances in elevation across a tear fault will only be significant in the region where the ramping thrust and associated hammer-head fold are displaced across a tear fault. Little stratigraphic offset should be observed behind the ramping thrust where only thrust "flats" are located.

Because Tichenor Limestone ("Tully") elevations do indicate that thrusts and other faults do extend up to the Tichenor Limestone ("Tully") (see discussion below), it is probable that the nominal offset displayed by the three wells indicates that no thrusts occur in the area of these three wells.

Feature T-2 is defined by only two wells, but could be interpreted to be aligned with CSD 1. The offset displayed here would indicate a thrust ramp in the area. Such a possibility is supported by NE-trending Landsat lineaments, topographic lineaments and surface FIDs that trend NE along strike to the northeast. Feature T-3 is poorly defined by three wells. The structural high may trend northeast, indicating a thrust ramp; CSDs are a less likely alternative. The NW-striking CSD, Feature T-4, is defined by 5 wells. This trend is coincident with a Landsat lineament and is on-strike with topographic lineaments to the southeast. That stratigraphic offset is observed in this region supports the contention that a NE-striking thrust is located in this area.

Feature T-5 is aligned with CSD 2 and is based on 7 wells. There is little doubt that the Tichenor Limestone ("Tully"), like the units below it (B-Salt top, Onondaga) is displaced across the CSD. The question is whether the displacement is a fold (warp) or an actual fault. Sufficient data are not available to differentiate, but the three wells (#17220, #17180, and #18773) indicate that the regional NE-strike of the Tichenor Limestone ("Tully") extends quite close to the CSD. The two wells (#17637 and #18770) that are close to the CSD can be contoured as indicating a sharp fold along the CSD (as portrayed in Figure 10). However, if the CSD is actually several narrow FIDs, each with offset, then it could be that the CSD is a series of parallel faults that are merely contoured as a fold because of a lack of tight well spacing. Seismic would answer this question. Feature T-5 may extend farther southeast between wells #21841 and #21202. Compared to the Tichenor Limestone ("Tully") elevation and strike between #21131 and #21202, the Tichenor Limestone ("Tully") is structurally high at #21841. This high is consistent with the offset across CSD 2 to the northwest. The offset also may indicate a thrust ramp in the region. Such a thrust ramp is supported by a NE-striking Landsat lineament that passes through the well that has the high Tichenor Limestone ("Tully"). Northeast-striking topographic lineaments and structural data to the northeast support the thrust ramp suggestion.

Feature T-6 is associated with the ramping thrusts of the BIT. The structural high at wells #17982 and #16929 are consistent with a NE-trending thrust ramp. The structural low at well #18223 is directly on-strike (to the southwest) with the structural high at well #17982. Possible explanations include:

1. the thrust ramp changes dip between the two wells,
2. the thrust ramp bends to the northwest between the two wells,
3. a small CSD (tear fault) separates the two wells, or
4. the strike of the thrust ramp is actually ENE here, essentially parallel to the line between the two wells with structural highs (#17982 and #16929). In that case, the thrust ramp would pass north of the well with the low elevation.

The structural low northwest of Feature T-6 (wells #17931 and #18615) indicates that essentially no stratigraphic offset across the CSD as originally proposed. Either the CSD is located slightly to the southwest, or there are no fault ramps in the Tichenor Limestone ("Tully") in this area. Because well #19273 does display anomalously high Tichenor Limestone ("Tully"), the latter alternative is not correct. In the proof-of-concept section of this report, soil gas anomalies are used to suggest that the CSD was actually located about 0.7 km farther southwest. This distance would allow both the wells with lows to be northeast of the CSD. That the structural high indicated by well #19273 is directly on strike with the structural low indicated by the two wells is the same situation as observed for Feature T-6. The same possible alternative explanations apply to this area. However, the two wells defining the structural low suggest that the strike is about northeast. If that is the case, then the most probable explanation is that a small CSD displaces the thrust ramps between the well with the structural high and the well with the structural low.

Feature T-7 is defined by three wells and could indicate a structural high trending NE. The high could be extended to the east-northeast to well #16425. Northwest-trending structures are also possible. In either case, however, a NE-striking thrust ramp is suggested by the data. Feature T-7A is defined by two wells, and could indicate either a NW-striking CSD or a northeast-striking thrust ramp. Feature T-8 is also poorly defined, and like T-7A, is consistent with either a thrust ramp or a series of small tear faults. Because a NE-striking T-8 (as drawn on Figure 10) is nearly coincident with a Landsat lineament, the thrust ramp alternative is judged more probable. The ramp hypothesis is also consistent with topographic lineaments and with structural data onstrike to the northeast.

Insufficient data do not allow discrimination among the various possible trends indicated by the data in the area of features T-9, T-9A, and T-9B. Feature T-9 is coincident with a Landsat lineament, which might indicate that a CSDis located along this trend; however, other explanations are possible. A small thrust could account for the high at well #17615, although B-Salt is not anomalously thick there. Features T-10 and lOA are alternative interpretations that both honor the data. Feature T-10 trends northwest and parallels CSD 3. Structural data are consistent with a CSD passing through the South Branch in this general area. Feature T lOA trends north, and is also consistent with structural data. It may be that both trends occur in the area, since both trends are found in the structural data.

The structural high at well #18077 may indicate a northeast-striking thrust ramp (Feature T-11). This trend is coincident with a Landsat lineament and structural anomalies in the B-Salt top (ST-9, Figure 6). The possible N-trending Feature T-l lA is defined by four wells.

Features T-12, 12A and 12B are based on a single well, #12461. Both NW-striking CSD and NE-striking thrust ramps are possible. Another alternative is that the well is incorrectly surveyed, because it is difficult to understand why an anomalously thick salt section (Figure 6) leads to a structural low.

Structure Results

Fractures are displayed in modified rose diagrams on Figure 11. Overall, five fracture sets form local FIDs in the study area:

1. NW
2. NE
3. ENE
4. E-W
5. N-S

Faults also outcrop in the area of Figure 11, and are shown in map view in Figure 12. These faults are found in FIDs and confirm the supposition that FIDs mark locations of faulting. The NW-striking systematic fracture set (cross-strike fracture set of Engelder and Geiser, 1980) is generally the master set across western NYS. The set has been previously proposed to have developed as a regional response to a far-field stress related to Alleghanian collisional tectonics (e.g., Engelder and Geiser, 1980; Zhao and Jacobi, 1997). Although the NW-striking fractures are typically thought to be regularly spaced, Jacobi and Fountain (1996) identified NW-striking FIDs. Jacobi and Fountain (1996) and Jacobi (2002) suggested that these FIDs indicate the location of NW-striking CSDs.

Northeast-striking systematic fractures (strike-parallel fractures of Engelder and Geiser, 1980) also comprise a regional systematic set. Typically, these fractures abut the NW-striking set, and are therefore thought to be younger than the NW-striking set (e.g., Engelder and Geiser, 1980). Origins proposed for these fractures include fracture development during uplift and denudation when "inherited stress" was released (e.g., Engelder, 1985). However, Jacobi and Fountain (1996) found that NE fractures can occur in FIDs that predate the NW-striking set, i.e., the NE-striking fractures are master to NW-striking fractures in the FID. These FIDs appear to mark NE-striking faults in other areas where sufficient data exist (e.g., Jacobi, 2002).

North-striking systematic and non-systematic fractures are relatively uncommon in western NYS, and went unremarked until Jacobi and Fountain (1996) showed that N-striking FIDs in Allegany County marked N-striking faults of the Clarendon-Linden Fault System. Approximately E-striking fractures and FIDs are also relatively uncommon. The source of E-striking FIDs is poorly understood. However, to the east in the Finger Lakes region, the FIDs appear to mark faults that are related to rift faults developed during Iapetan opening. These faults were reactivated during later loading events and orogenies when they partly controlled the shape of the northern termination of the Appalachian Basin in NYS (Jacobi, 2002). Other E-striking FIDs occur only in proximity to N-striking FIDs. In Allegany County Jacobi and Fountain (1996) were able to trace NW-striking FlDs into these E-striking FlDs through the use of topographic lineaments. Apparently, these NW-striking FIDs have a "curving orthogonal" abutting relationship with the Clarendon-Linden Fault System (CLF). Such an abutting relationship suggests that the CLF was "open" at the time of the development of the NW-striking FIDs.

Fracture Rose Diagrams, Northern Section. Figure llB. In Figure l1B, NW-striking FID NW-1 is characterized by NW-striking master fractures that are unusually closely-spaced. For example, the fracture frequency of NW-striking fractures at sites MB 55-1 and MB 59 is as high as 10 fractures/meter. Inspection of Figure 11 demonstrates that this frequency is an order of magnitude higher than the norm for the NW-striking fracture set. Other NW-striking FIDs on Figure 11B (NW2 and NW-3) also exhibit relatively high fracture frequency for NW-striking fractures.

Northeast-striking FIDs are also evident in Figure 11B. The widest FIDs occur near the junction of South Branch with the main Cattaraugus Creek (FIDs NE-2, ENE/NE-3 and NE-4). Narrower and distinctly fewer NE-striking FIDs outcrop northwest of FID NE 2 (FIDs NE-0, NE-1 and NE-1A). Most of these FIDs have a NE-striking fracture frequency of 1/m, but NE-0 and NE-4 both exhibit areas where fractures approach 10/m (sites MB 56 and MB 63).

Four N-striking FIDs can been recognized in Figure 11B. The widest zone of N-striking FIDs is NS-2, where N-striking fractures are the master set, even to NW-striking fractures. However, it appears that where NS-2 intersects the NW-striking zone of FIDs, NW-1, the N-striking fractures generally abut the NW-striking master fractures (for example, compare site MB 41 to MB-44-1). The N-striking FID NS-2 also exhibits a relatively high fracture frequency of 1/m. In areas outside the N-striking FIDs, the fracture frequency approaches 0/m.

Five E-striking FIDs outcrop in Figure 11B. Each zone of E-striking fractures is narrow, constrained to 1 or 2 outcrops. In only two of the FIDs are the E-striking fractures the master set (EW-4 and EW-5). The other FIDs are defined only by the higher frequency of E-striking fractures. Note that outside the E-striking FIDs, the fracture frequency is essentially 0/m, like the N-striking fractures.

Fracture Rose Diagrams, Central Section, Figure llC. Three primary trends of FIDs occur in Figure 11C; NW, NE, and NS. Only three minor E-striking FIDs outcrop in the area. Compared to the area in Figure l1B, this area is devoid of prominent E-striking FIDs.

The N-striking FIDs in Figure 11C include one prominent zone (NS-3, a southward continuation from Figure 11B), and a narrow FID, NS-4. FID NS-3 exhibits master N-striking fractures with a relatively high frequency of generally 1/m. Near exposed N-striking faults, the fracture frequency increases to as high as 10+/m. In this zone, both the fractures and exposed faults have a curving-parallel abutting relationship with one through-going NW-striking fracture. To the southeast this fracture becomes a NW-trending FID.

Northwest-striking fractures in this area control the erosion along long stretches of the South Branch. In the gorge walls, the fractures extend from the base of the canyon walls to the top, well over 400 ft. Most of the NW-striking fractures consist of either single fractures or narrow FIDs. The fracture frequency is generally on the order of l/m in these FIDs, but locally, the frequency increases to 10/m (e.g., NW 6). However, most of these FIDs do not display the high frequency common in NW-1. FID NW-5 is the master to NS-3, as discussed above.

Northeast-striking FIDs are defined in the area of Figure 11C on the basis of high frequency and/or master fractures. The NE-striking fractures in the few NE-striking FIDs in the northern part of the area (NE-5, NE-6) are generally not the masters, and average about 1 fracture/m. In contrast, FID NE-8 displays both NE-striking master fractures and a higher fracture frequency of 10/m (e.g. site SB 85a).

Fracture Rose Diagrams, Southern Section, Figure 11D. The most well developed FID trends in Figure 11D strike NW, NE, and NS, and of these, the most prominent trends are NS and NW-striking FIDs. Compared to the area in Figure 11C, NE-striking FIDs are less well developed in this area. Only two minor E-striking FIDs crop out in the area.

All the N-striking FIDs in Figure 11D can be included in a zone of N-striking FIDs that are a probable continuation of FID NS-4. In this area, the N-striking FIDs includes N-striking fractures that are master even to NW-striking fractures (e.g. site SB 98). The fracture frequency is commonly greater than 1/m and approaches 10/m in some localities. Interestingly, N-striking faults are found along much of NS-4 (see following section), supporting the contention that fracture frequency and faults are related.

As in the areas of Figures 11B and C, NW-striking fractures in this area control the erosion along long stretches of the South Branch. Most of the NW-striking fractures consist of either single fractures or narrow FIDs, except for a possible wider zone in the south (NW-10). The fracture frequency varies from ~ 1/m to as many as 10/m, but the norm is on the order of 1/m or less.

NE-striking FIDs are defined in the area of Figure l1C on the basis of high frequency and master fractures. Most of the NE-striking zones in this area display master fractures. For example, NE-9A and 10 have NE-striking fractures that are master to N-striking fractures, NE-10 has NE-striking fractures that intersect NW-striking fractures (neither the NE nor the NW-striking set shows an abutting relationship to the other). However, in several other localities the NW-striking sets are master to the NE-striking fractures.

Faults (Location Map, Figure 12). Faults observed in the region of Figure 12 strike primarily north and northeast. Generally, no evidence exists for faulting along the NW-striking FIDs. The N-striking faults in FID NS-3 (Figures 11C, 12, 13, 14) are particularly instructive. The faults occur where N-striking fracture frequencies increase by an order of magnitude near the faults (Figure 13). The trend of the N-striking faults appears to be displaced by the NW-striking fracture, but N-striking fractures associated with the faults have a curving-parallel abutting relationship with the NW-striking fracture. Thus, if the N-striking fractures were contemporaneous with the NS fault development, then the abutting relationship of the N-striking fractures indicates that the NW-striking fracture predates development of the N-striking fault. However, if the N-striking fractures postdate development of the fault, then the N-striking fault could be used as evidence that the NW-fracture experienced dextral strike-slip fault motion before the N-striking fractures developed. However, no decoration is observed on the NW-striking fracture surface that would support fault motion. Furthermore, the fracture ends at the gorge wall. Therefore, it is probable that the N-striking faults developed after the NW-striking fracture was generated.

The meanders of South Branch continually cross and recross N-striking FID NS-4. On most of these crossings, Jacobi and Baudo (1999) found N-striking faulted folds. These features could be described as asymmetric pop-ups with thrusts and fault-bend folds. However, the unaffected units on either side of the faults show small amounts of stratigraphic offset. The faults also do not fit the explanation that pop-ups in valleys are an unweighting phenomenon resulting from erosion and denudation (e.g., Fakundiny et al., 1978). These faults trend north into the walls of the meandering canyon that commonly trend northwest or northeast.

NE-striking faults were also observed (Figure 15) that are similar in form to the N-striking faults. The faults are asymmetric "pop-ups" that have been breached by thrusts. Like the N-striking faults, small amounts of stratigraphic offset are observed across the features. In the thrust/fault bend fold shown in Figure 15, duplexing and backthrusts are common in the limbs.

Soil Gas Results

Fountain and Nelson conducted soil gas analyses along the traverses shown in Figures 4 and 5 (see Appendices for data). The Dayton area (CSD 2) was previously discussed in the Proof-of-Concept section. In the South Dayton area, Fountain and Nelson found only three clusters of ethane-charged methane soil gas anomalies. All three sites are aligned in a northwest-trend that is parallel to CSD 1. The lineament defined by the soil gas anomalies is displaced about 0.3 km southwest of the proposed location of the CSD. Because the location of CSD 1 is defined by widely-spaced wells, the offset between the CSD and the soil gas lineament is insignificant.

In the Gowanda-South Branch region (CSD 3), Fountain and Nelson discovered five ethane-charged methane soil gas anomalies that align in a NW trend over 2 km long. This lineament constructed through all 5 soil gas anomalies is essentially parallel to CSD 3 and to NW-striking FIDs in the area. Particularly defining were the soil gas anomalies at the southeastem end of the lineament on Marek Road. There, Fountain and Nelson found a soil gas spike on both legs of the Marek Road where it makes a right-angle bend. A line passing through these two spikes predicts the other spikes that they found, and is parallel to CSD 3.

In the CSD 4 area, Fountain and Nelson ran two short traverses that cross four soil gas anomalies. Together, these anomalies define a broad, NW-striking zone that in the Cattaraugus Creek area is coincident with the CSD proposed from well log analyses.

APPLICATION OF INTEGRATED TECHNIQUES STAGE: 2) INTEGRATION AND DISCUSSION

The utility of detailed soil gas analyses has been demonstrated in order to define the location of suspected structures. In this case, four CSDs were proposed, based on fairly widely-spaced well log data. In each case, Fountain and Nelson found soil gas anomalies that confirmed the trend and trace of the CSD. For CSD 1 and CSD 2, the soil gas data show that the CSD at the ground surface is slightly displaced with respect to the best estimate locations of the CSDs based on widely spaced Onondaga well data. The advantage of the soil gas technique was demonstrated at CSD 1, where the lack of outcrops prevented the structure group (Jacobi and Baudo) to confirm the location and trend of CSD 1. Similarly, no outcrops existed at Dayton along the proposed trace of CSD 2.

For CSD 3, the soil gas data demonstrated that the trend may be slightly different from the originally proposed CSD trend, but the soil gas anomalies did predict the general trend and location of a CSD. Detailed structural analyses in the Gowanda South Branch region (CSD 3) also confirmed both the trend and location of the CSD. The southwestern boundary of the NW-striking zone of FIDs (NW-1 on Figure 11B) is exactly coincident with the line passing though the soil gas anomalies. Thus, the structural analyses confirmed that the soil gas trend was correct, and that the location and trend of the originally-proposed CSD should be slightly modified. That the zone of NW-striking FIDs is wider than any of the clusters of soil gas spikes suggests that the soil gas surveys can point to which part of an FID is most conductive.

In the detailed well log analyses, the exact location and trend of CSD 4 was very poorly defined (and indeed, even the existence of a CSD was questionable). However, the limited survey across proposed CSD 4 confirmed that a CSD probably does exist in that area, but that the trend may be different from that originally proposed. The result is that, to the southeast, the CSD may be displaced farther to the northeast than originally proposed. In the detailed well log analyses section it was suggested that if a NW-striking CSD does exist, then to the southeast, the CSD might actually be displaced to the northeast. Thus, soil gas analyses and detailed well log analyses both converge on the same conclusion—that a CSD exists, but has a different trend and location than originally proposed.

The structure data did not just confirm the trend and location of CSD 3. Rather, the structure data also pointed to other probable, but previously unsuspected, fault trends, such as the N-striking faults along South Branch ("Eastern NS-Zone"), and to the west at the big horseshoe in Cattaraugus Creek ("Western NS-Zone"). These trends were also hinted at in the well log data, but the sparsity of wells with available logs made the recognition of faults equivocal. Possible N-striking structures were observed in the B-Salt isopach map (SI-3, SI-3A, SI-4, SI-5 and SI-6). These possible structures were centered on the South Branch ("Eastern NS-Zone", SI-5 and SI-6) and to the west, south of the big horseshoe in Cattaraugus Creek ("Western NS-Zone", SI-3, SI-3A, SI-4). Similarly poorly defined N-striking structures occur in the B-Salt structure contour map: ST-4 and ST-4A for the Western NS-Zone and ST-7B for the Eastern NS-Zone. The Onondaga structure contour map showed an equivocal N-striking structure for the Eastern NS-Zone (ON-7). The Tichenor Limestone ("Tully") structure contour map also displayed N-striking structures in the Eastern NS Zone (T-10A) and the Western NS-Zone (T-9A and T-9B). However, all of these Nstriking features in the Tichenor Limestone ("Tully") could be explained by NW-striking structures. Finally, the Packer Shell displayed N-striking features in the Western NS-Zone (PS-6 and PS-7), as well as farther south in the Eastern NS-Zone (PS-8). Like the other structure contour maps, NW-striking features could also fit the data, except for PS-8. Thus, in general, although there are hints of north-south structure in the structure contour maps and isopach map, the data are not tight enough to unequivocally state that N-S structure exists in these areas. However, the detailed structure along the Main Branch of Cattaraugus Creek and the South Branch confirmed that such structures do exist, and refined the locations of the NS structures. That the Packer Shell shows some possible N-striking trends, and that Landsat lineaments trend north from here along magnetic lineaments, suggest that the N-striking faults reflect reactivated deep faults in the Precambrian basement (Jacobi, 2002).

The BIT has been drawn with two ramping thrusts between CSD 1 and CSD 3. However, a lack of tightly spaced well and seismic data has precluded determining the location of these two thrusts between CSD 3 and CSD 4. The NE-striking FIDs can help define the probable locations of the thrusts. On Figure 11B, the NE-striking FIDs are strongly developed in the region of the South Branch confluence with the main Branch of Cattaraugus Creek (NE-2, NE-3, NE-4). Northwest of NE-2, the NE-striking FIDs are much rarer and narrower. Therefore, it is possible that the ramping thrusts of the BIT pass through this area, and that the ramps may not be restricted to only two thrusts. (Note that to the north, more detailed well log and seismic information shows that at least three thrusts exist.) The proposed location of the thrust front is about on strike with the thrusts to the northeast.

Additional anomalous elevations are sited on all the structure contour maps (above the B-Salt) southeast of the thrust front and the possible thrusts discussed above. These anomalous elevations suggest that additional thrust ramps may exist. For example, the Tichenor Limestone ("Tully") structure contour map displays four NE-striking trends that may indicate ramping thrusts: T-3, T-7, T-8, and T-11. In the Onondaga structure contour map, NE-striking feature ON-9 corresponds to T-11, ON-6 to T-8, and ON-1 to T-3. Similarly, on the B-Salt top structure contour map, ST-9 corresponds to ON-9 and T11, and ST 5 corresponds to ON-6 and T-8. However, as drawn on the B-Salt structure contour map, either trend is permissible with the existing data. Because these trends are essentially coincident with Landsat lineaments and topographic lineaments, the trends probably do indicate ramping thrusts. Structural data strongly confirms that ST-5/ON-6/T-8 is a ramping thrust. A well-developed NE-striking FID east of the Landsat lineament is coincident with ST5/ON-6/T-8. This FID is offset to the south across a probable NW-striking CSD that is prominent in topographic lineaments. Further, on South Branch, a NE-striking zone of folded, highly dipping and disrupted bedding is located about 1 km north of the NE-striking FID and exactly on-strike with the NE-striking Landsat lineament.

A second zone of ramping thrusts may exist between the ramps discussed above and the thrust front. The structural data (Figure 11C and D) showed several NE-striking FIDs and faults. If these

NE-striking FIDs do indicate NE-striking thrusts, then the Tichenor Limestone ("Tully") highs at and near well 11066 might be a result of a thrust ramp in this area. Such a thrust might extend southwest to well 17615. However, the lack of well data make this suggestion, based on structure data alone, equivocal.

CONCLUSIONS

This report demonstrates that by integrating soil gas surveys, structural data, and Landsat lineaments, the existence, location, and trend of thrusts and CSDs can be determined that were only poorly defined previously by widely-spaced well data. Soil gas anomalies confirmed all four CSDs that were hypothesized on the basis of well logs. Detailed outcrop structural data was consistent with the location of a CSD defined by soil gas analyses. Additionally, structural analyses suggested that zones of N-striking faults transect the region. These data confirm and refine the location of very equivocal faults based on sparse well log data. The Packer Shell structure contour map suggests that these faults extend from the surface to at least the Packer Shell. These proposed faults may mark reactivated faults in the Precambrian basement.

Detailed analyses of the structure contour maps and B-Salt isopach map showed indications of additional thrust faults behind the thrust front. These faults were hypothesized on the basis of anomalously high elevations of the various units, and an anomalously thick salt section. Several of the anomalous wells can be aligned along NE-striking Landsat lineaments. One of the possible thrust ramps is confirmed by a wide NE-striking FID that is coincident with a topographic lineament. Deformed sedimentary layering that strikes NE also occurs along strike. It is thus probable that several thrust ramps exist behind the thrust front, and that they can be recognized by integrating structure, lineaments, and well log analyses.

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FIGURE CAPTIONS

FIGURE 1. General Location Map of Study Area.

FIGURE 2. Onondaga Structure Contour Map and Faults as Surmised Before the Study. The Bass Island Trend faults trend northeast, the cross-strike discontinuities (CSDs) strike northwest.

FIGURE 3. Example of a Repeated Section in a Well Log (Well # 18614). In this well log, a thrust fault of the Bass Island Trend repeats the indicated part of the Onondaga Formation. Note that at the base of the repeated section, at about 2225 ft, the caliper log indicates a widened hole (cave-ins), and the density and porosity logs indicate a narrow zone of higher porosity and lower density. These three logs suggest that at about 2225 ft the hole intersects a thrust fault that repeated the Onondaga.

FIGURE 4. General Map Displaying Soil Gas Traverses. For location of map, see Figure 1. The yellow-green CSDs (labeled "possible" in the legend) are the proposed trace of the CSDs based on the pre-study Onondaga structure contour map (Figure 2).

FIGURE 5A. Enlargement of the South Dayton Area. CSD 1 is located in this region. For location, see Figure 4.

FIGURE 5B. Enlargement of Figure 5A. Individual soil gas determinations are displayed along the traverse. Legend as in Figure 5A.

FIGURE 5C. Enlargement of the Dayton Area. CSD 2 is located in this region. For location, see Figure 4.

FIGURE 5D. Enlargement of Figure 5B. Individual soil gas determinations are displayed along the traverse. Legend as in Figure 5A.

FIGURE 5E Enlargement of the Gowanda Area. CSD 3 is located in the are. For location, see Figure 4.

FIGURE 5F. Enlargement of Figure 5E. Individual soil gas determinations are displayed along the traverse. Legend as in Figure 5A.

FIGURE 5G Enlargement of the Collins Center Area. CSD 4 is located in the area. For location, see Figure 4.

FIGURE 5H. Enlargement of Figure 5G. Individual soil gas determinations are displayed along the traverse. Legend as in Figure 5A.

FIGURE 6. Salina "B" Salt Isopach Map. Annotated lines (e.g., SI 2) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 6. Salina "B" Salt Isopach Map Annotated lines (e.g., S12) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 7. Packer Shell Structure Contour Map. Annotated lines (e.g., PS 2) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 8. Top of the Salina "B" Salt Structure Contour Map. Annotated lines (e.g., ST 2) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 9. Top of the Onondaga Structure Contour Map. Annotated lines (e.g., ON 2) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 10. Top of the Tichenor Limestone ("Tully") Structure Contour Map. Annotated lines (e.g., T 2) indicate features discussed in text. Gold straight lines indicate Landsat lineaments interpreted by Earthsat (1997). For location of map, see Figure 1.

FIGURE 11A. Modified Rose Diagrams for Fractures. The top half of the modified rose diagram displays the fracture frequency for each fracture set, and the lower half of the diagram shows the abutting relationships of the fracture sets. South Branch of Cattaraugus Creek is the major north-flowing streams, and Cattaraugus Creek (Main Branch) is the major west-flowing stream. For location of map, see Figure 1. From Baudo and Jacobi (1999, 2000)

FIGURE 11B. Modified Rose Diagrams for Fractures and FIDs (Northern Section). This map shows the modified rose diagrams for the northern part of Figure 11A, and also shows the trends of fracture intensification domains (FIDs). Red=NW-striking FID, green=NE-striking FID, blue=N-striking FID, and yellow=E to ENE-striking FID.

FIGURE 11C. Modified Rose Diagrams for Fractures and FIDs (Central Section). These maps shows the modified rose diagrams for the central part of Figure 11A, and also show the trends of fracture intensification domains (FIDs). Red=NW-striking FID, green=NE-striking FID, blue=N-striking FID, and yellow=E to ENE-striking FID.

FIGURE 11D. Modified Rose Diagrams for Fractures and FIDs (Southern Section). These maps show the modified rose diagrams for the southern part of Figure 11A, and also show the trends of fracture intensification domains (FIDs). Red=NW-striking FID, green=NE-striking FID, blue=N-striking FID, and yellow=E to ENE-striking FID.

FIGURE 12. Fault Distribution Map along South Branch of Cattaraugus Creek.

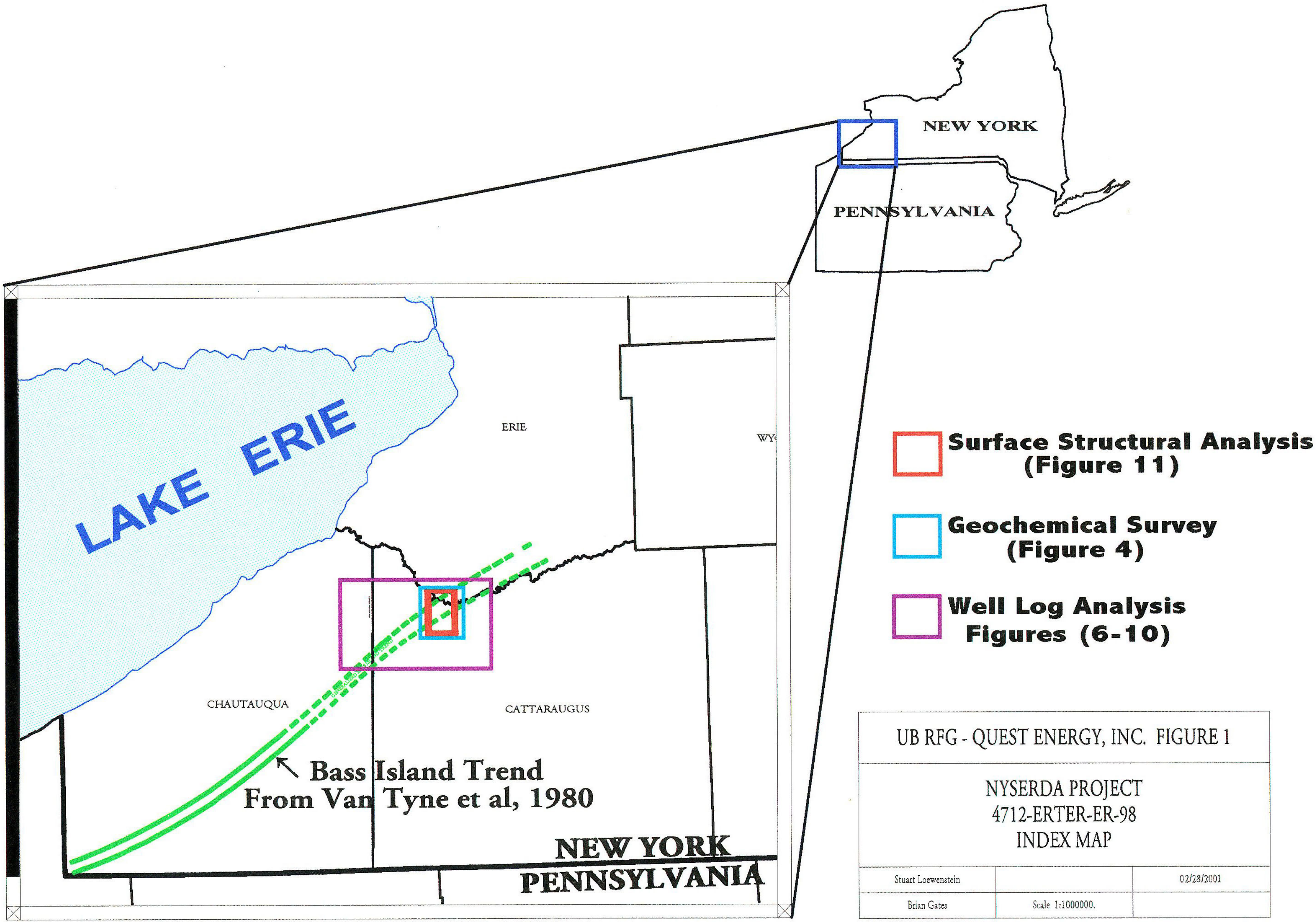
FIGURE 13. N-striking Faults in South Branch of Cattaraugus Creek. Map shows location of scanlines (red lines) and fractures measured along the scanlines. Modified rose diagrams portray the fracture orientation on the upper half and the relative length of fractures oriented in the direction of the petal in the lower half. Longest fractures are the master fractures. Note that the N-striking fractures of the FID have a curving-parallel (abutting) relationship with the NW-striking master fracture, indicating that the FID postdates the NW-striking Alleghanian fracture. From Jacobi and Baudo (1999). For location, see Figure 12.

FIGURE 14A. The North Fault in Figure 13. View is to the north. Note dipping units on the left in a horse caught up between the exposed fault (at long arrow in center of the photograph) and an assumed fault to the west. The units to the right of the fault are flat lying. Short arrow points to a 15 cm ruler. The white bars were added to the photograph to aid in distinguishing the dips.

FIGURE 14B. Hydrocarbon Seep Along the North Fault. View is to the north. Hydrocarbon seep is marked by the red-orange stained rock left of the vertical fault. Scale is a 1 5-cm rule that is horizontal.

FIGURE 14C. South Fault in Figure 13. View is to the north. To the left (west) of the fault, note the high dips of units at the arrows along the water edge. The units are flat lying east of the fault. Scanline tape for seale.

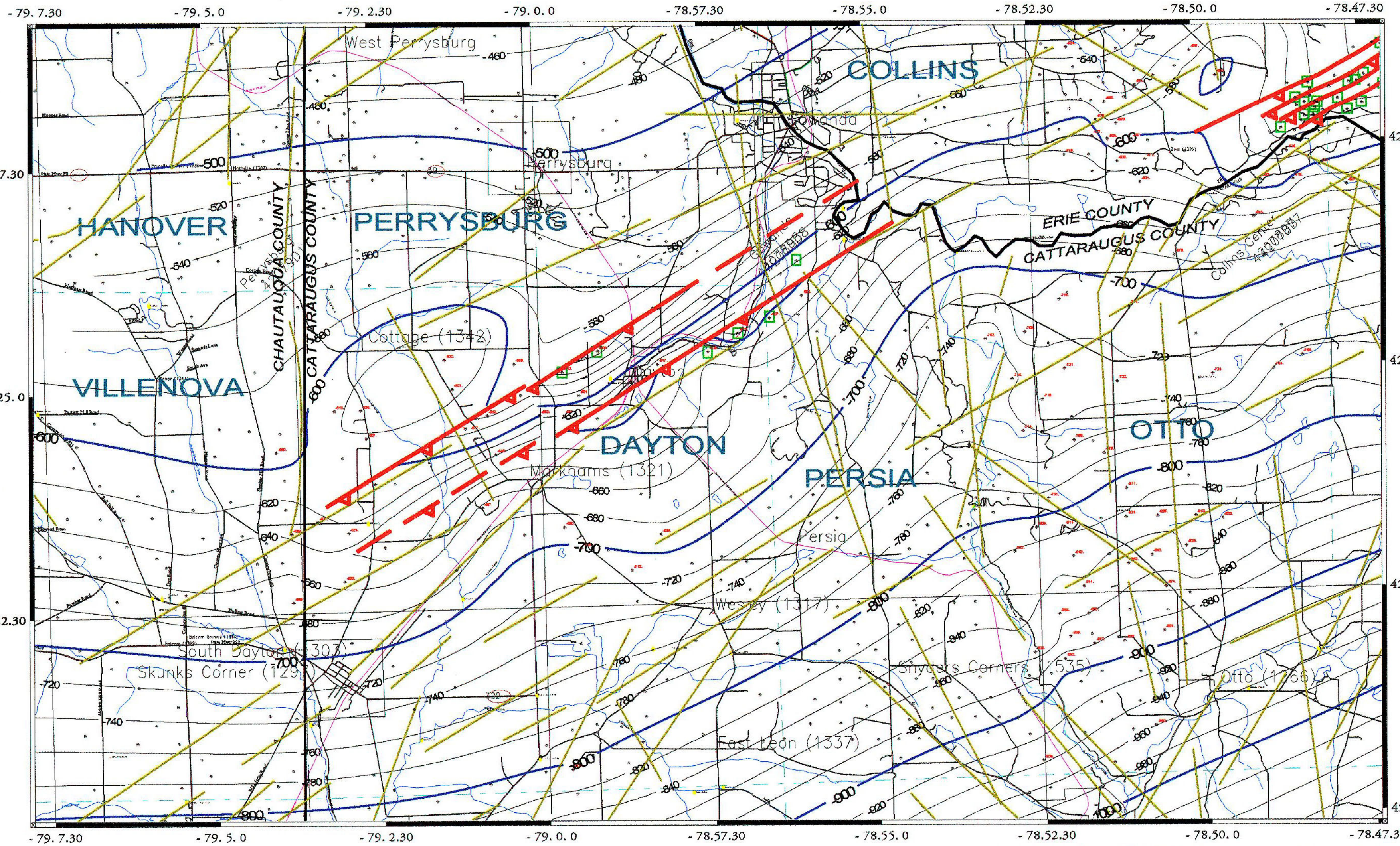
FIGURE 15. NE-striking thrusts and fold along South Branch of Cattaraugus Creek. Horizontal 48" ruler for scale in lower part of picture. Arrows point to intra-fold limb thrusts. View to the southwest. (From Jacobi and Baudo, 1999).



UB RFG - QUEST ENERGY, INC. FIGURE 1

NYSERDA PROJECT
4712-ERTER-ER-98
INDEX MAP

Stuart Loewenstein		02/28/2001
Brian Gates	Scale 1:1000000.	

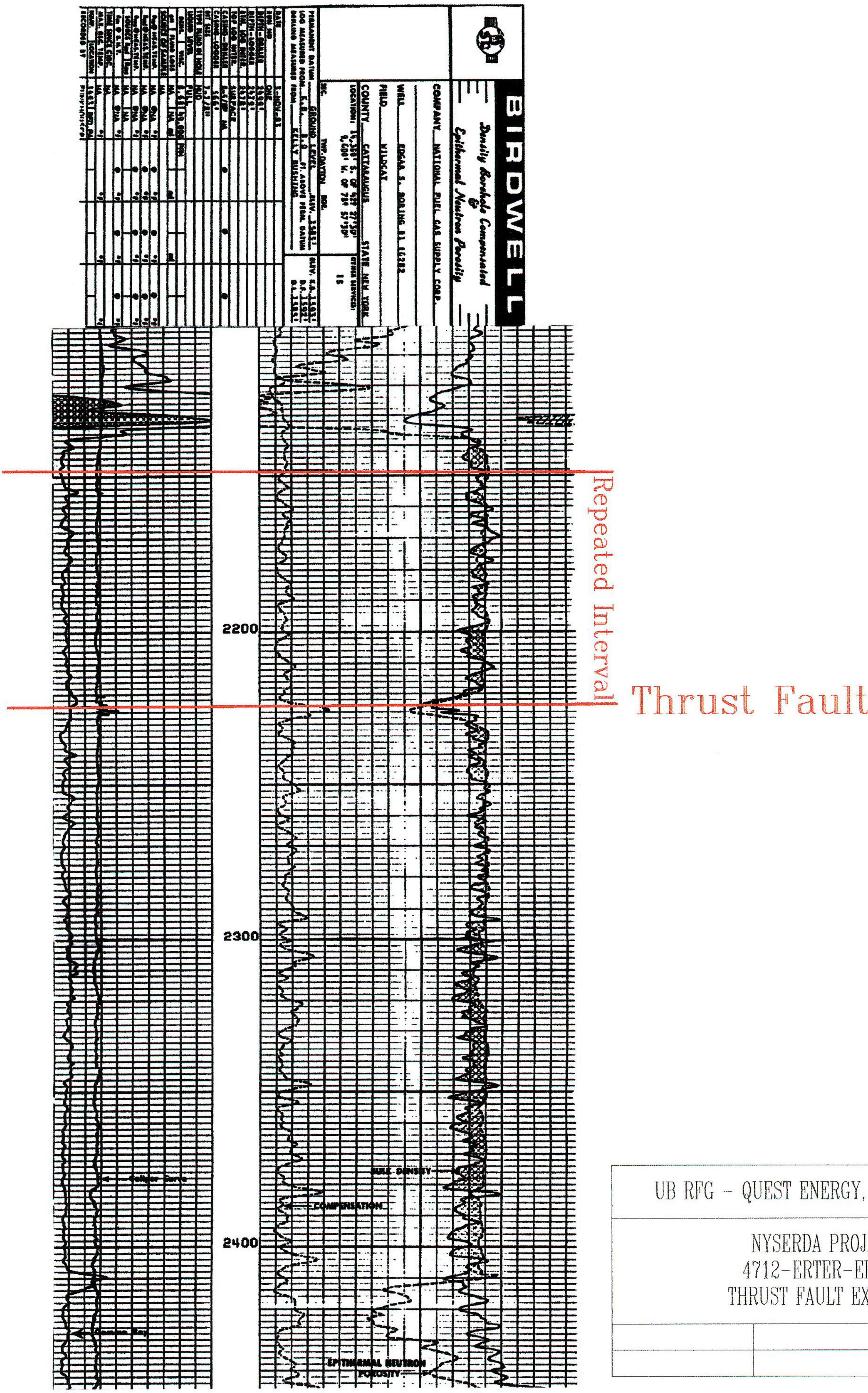


Scale 1:125000.

2000. 0. 2000. 4000. 6000. 8000. 10000. feet

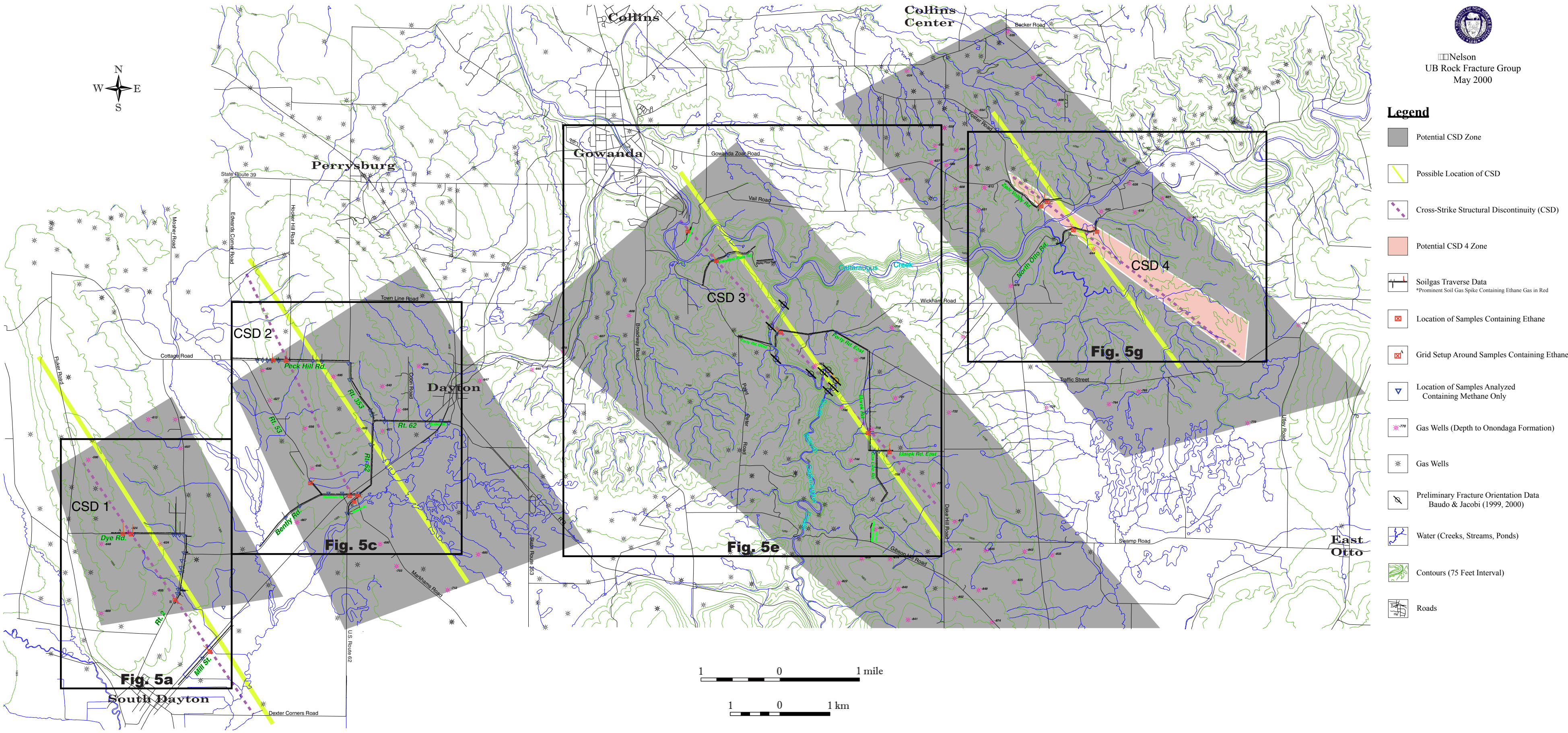
1. 0. 1. 2. 3. 4. 5. miles

UB RFG - QUEST ENERGY, INC. FIGURE 2		
NYSERDA PROJECT 4712-ERTER-ER-98 Onondaga Structure Contour (Pre Study)		
Stuart Loewenstein	drjonold.gpf	02/28/2001
Brian Gates	Scale 1:125000.	CI=25'



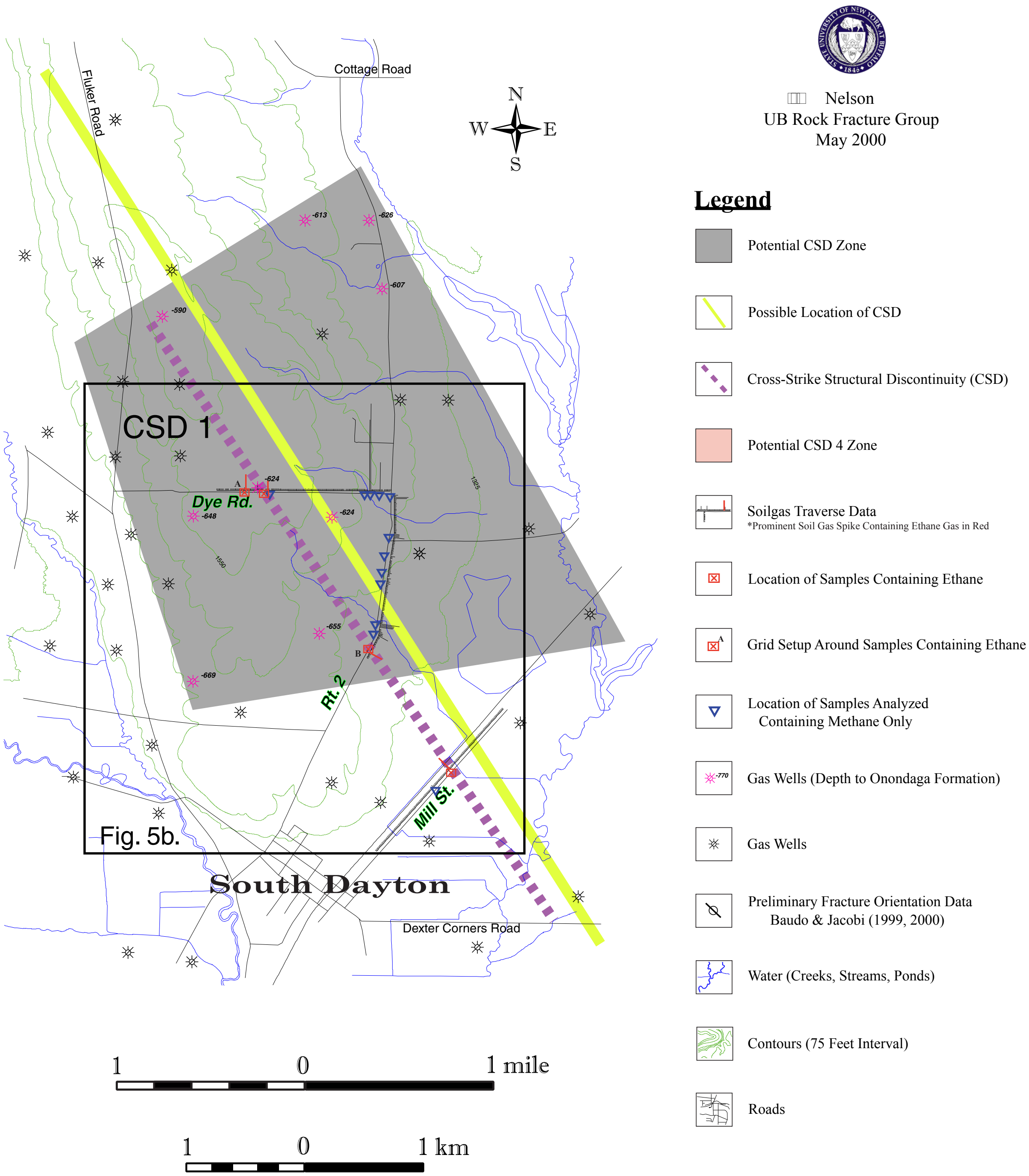
UB RFG - QUEST ENERGY, INC. FIGURE 3

NYSERDA PROJECT
4712-ERTER-ER-98
THRUST FAULT EXAMPLE



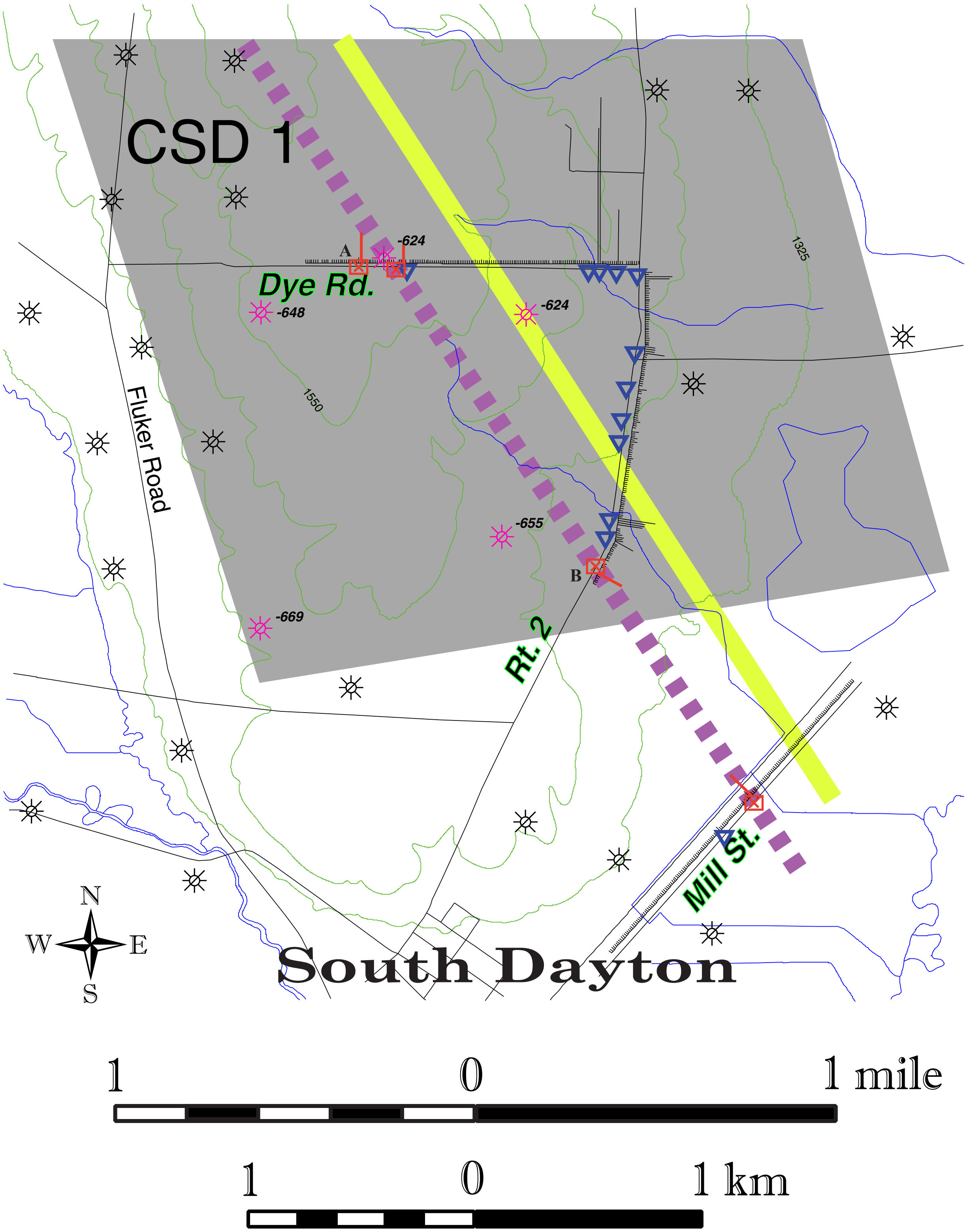
Nelson
UB Rock Fracture Group
May 2000
Legend
Potential CSD Zone
Possible Location of CSD
Cross-Strike Structural Discontinuity (CSD)
Potential CSD 4 Zone
Soilgas Traverse Data
Location of Samples Containing Ethane
Grid Setup Around Samples Containing Ethane
Location of Samples Analyzed Containing Methane Only
Gas Wells (Depth to Onondaga Formation)
Gas Wells
Preliminary Fracture Orientation Data Baudo & Jacobi (1999, 2000)
Water (Creeks, Streams, Ponds)
Contours (75 Feet Interval)
Roads
N
W
E
S
Collins
Collins Center
Gowanda
Perrysburg
Dayton
South Dayton
East Otto
CSD 1
CSD 2
CSD 3
CSD 4
Fig. 5a
Fig. 5c
Fig. 5e
Fig. 5g
Dye Rd.
Peck Hill Rd.
Rt. 353
Rt. 62
Rt. 53
Bently Rd.
Mill St.
Rt. 2
Cattaraugus Creek
North Otto Rd.
State Route 39
Cottage Road
Town Line Road
Gowanda Zoar Road
Vail Road
Wickham Road
Becker Road
Traffic Street
Swamp Road
Dexter Corners Road
Markhams Road
U.S. Route 62
State Route 353
Broadway Road
Dake Hill Road
1 0 1 mile
1 0 1 km

Figure 4.



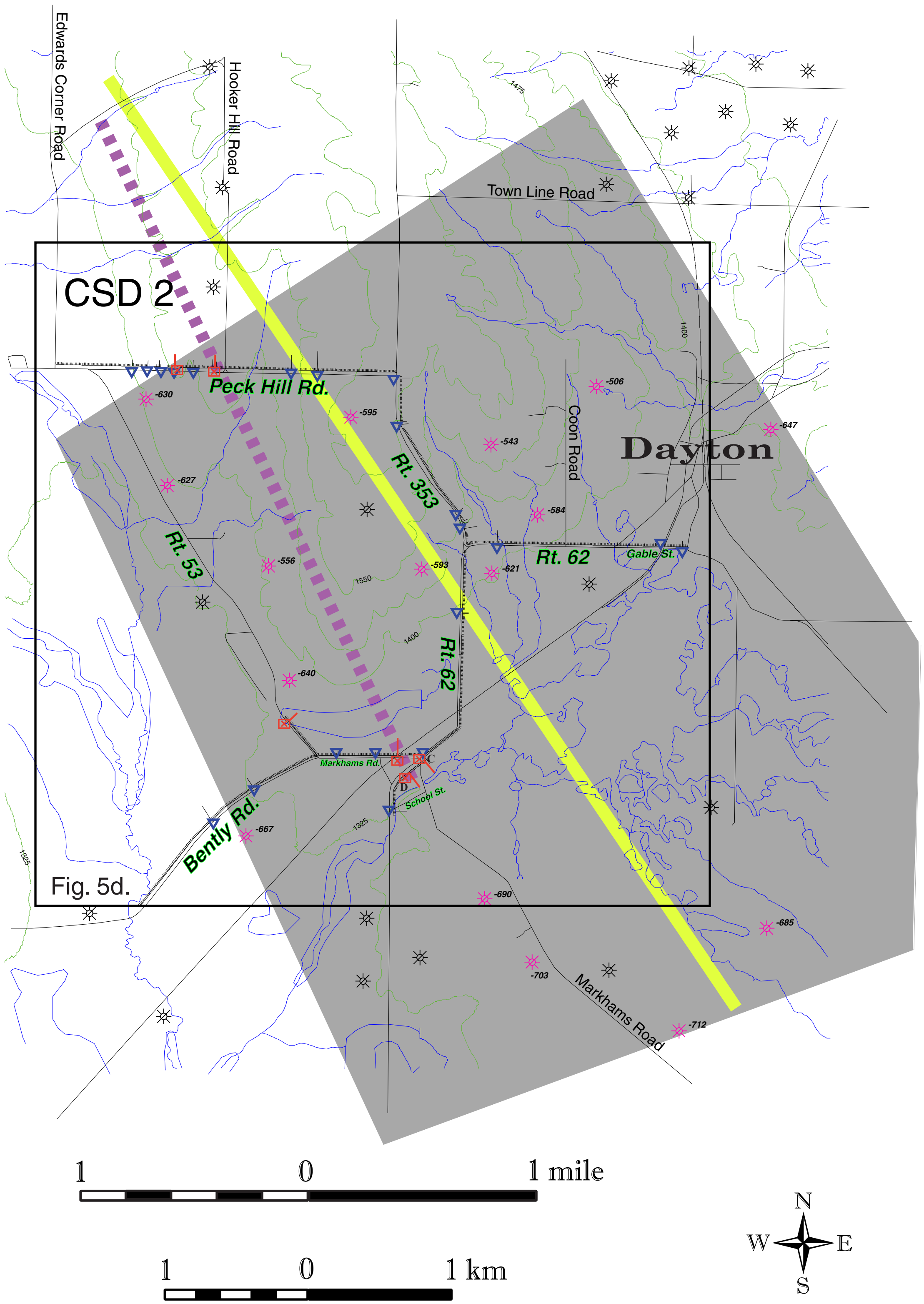
Nelson
UB Rock Fracture Group
May 2000
N
W
E
S
Cottage Road
Fluker Road
CSD 1
Dye Rd.
Rt. 2
Mill St.
Fig. 5b.
South Dayton
Dexter Corners Road
-613
-626
-607
-590
-624
-648
-624
-655
-669
1 0 1 mile
1 0 1 km
Legend
Potential CSD Zone
Possible Location of CSD
Cross-Strike Structural Discontinuity (CSD)
Potential CSD 4 Zone
Soilgas Traverse Data
*Prominent Soil Gas Spike Containing Ethane Gas in Red
Location of Samples Containing Ethane
Grid Setup Around Samples Containing Ethane
Location of Samples Analyzed Containing Methane Only
Gas Wells (Depth to Onondaga Formation)
Gas Wells
Preliminary Fracture Orientation Data Baudo & Jacobi (1999, 2000)
Water (Creeks, Streams, Ponds)
Contours (75 Feet Interval)
Roads

Figure 5a.



CSD 1
A
-624
Dye Rd.
-648
-624
1550
1325
Fluker Road
-655
B
-669
Rt. 2
Mill St.
N
W
E
S
South Dayton
1
0
1 mile
1
0
1 km

Figure 5b.



Edwards Corner Road
Hooker Hill Road
Town Line Road
CSD 2
Peck Hill Rd.
Rt. 353
Coon Road
Dayton
Rt. 53
Rt. 62
Gable St.
Markhams Rd.
School St.
Bently Rd.
Fig. 5d.
Markhams Road
-630
-595
-543
-506
-647
-627
-584
-556
-593
-621
-640
-667
-690
-685
-703
-712
1475
1400
1550
1325
C
D
1 0 1 mile
1 0 1 km
N
W
E
S

Figure 5c.

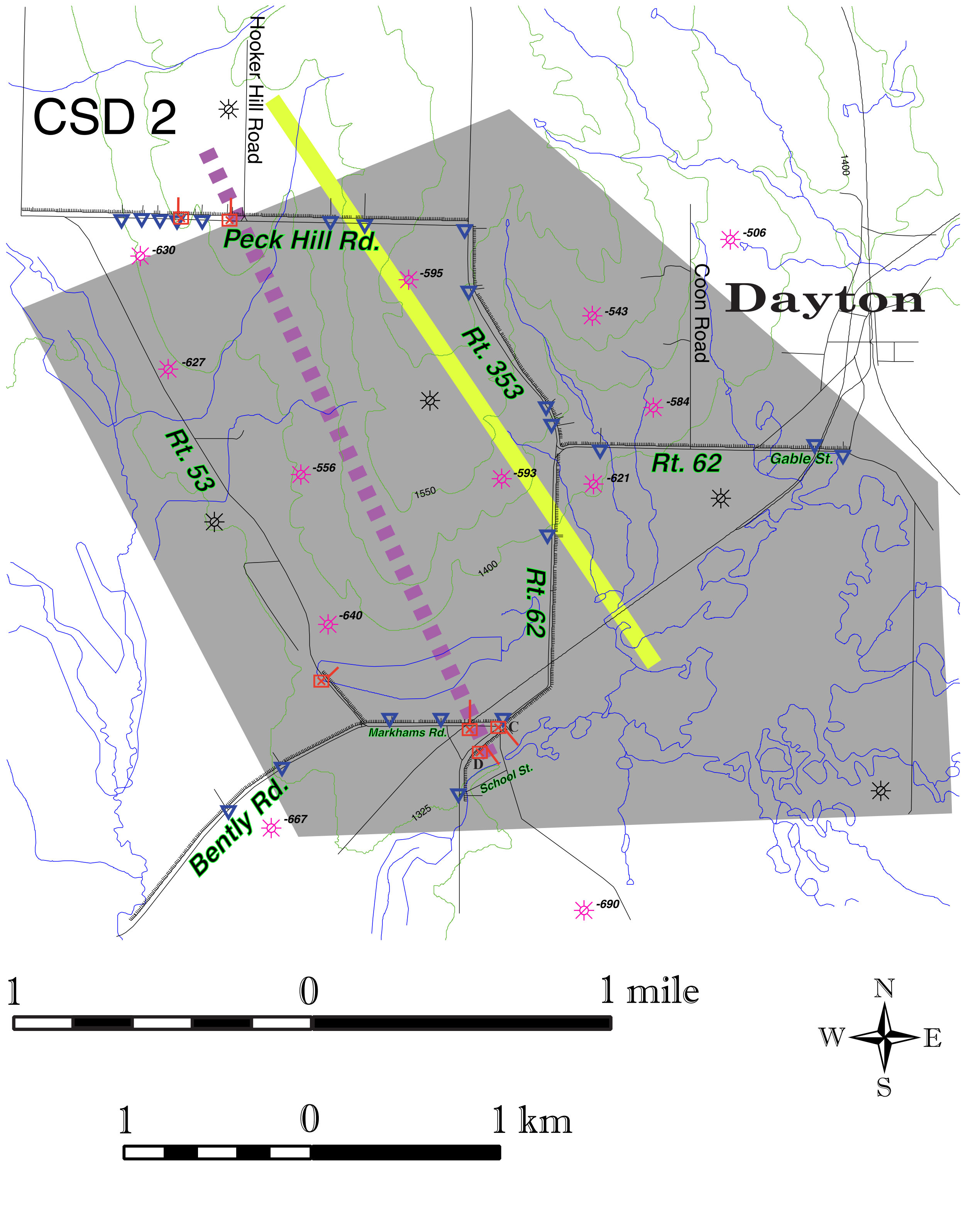

CSD 2
Hooker Hill Road
Peck Hill Rd.
Rt. 353
Rt. 53
Rt. 62
Rt. 62
Coon Road
Dayton
Gable St.
Markhams Rd.
School St.
Bently Rd.
-630
-595
-543
-506
-627
-584
-556
-593
-621
-640
-667
-690
1400
1550
1400
1325
C
D
1 0 1 mile
1 0 1 km
N
W
E
S

Figure 5d.

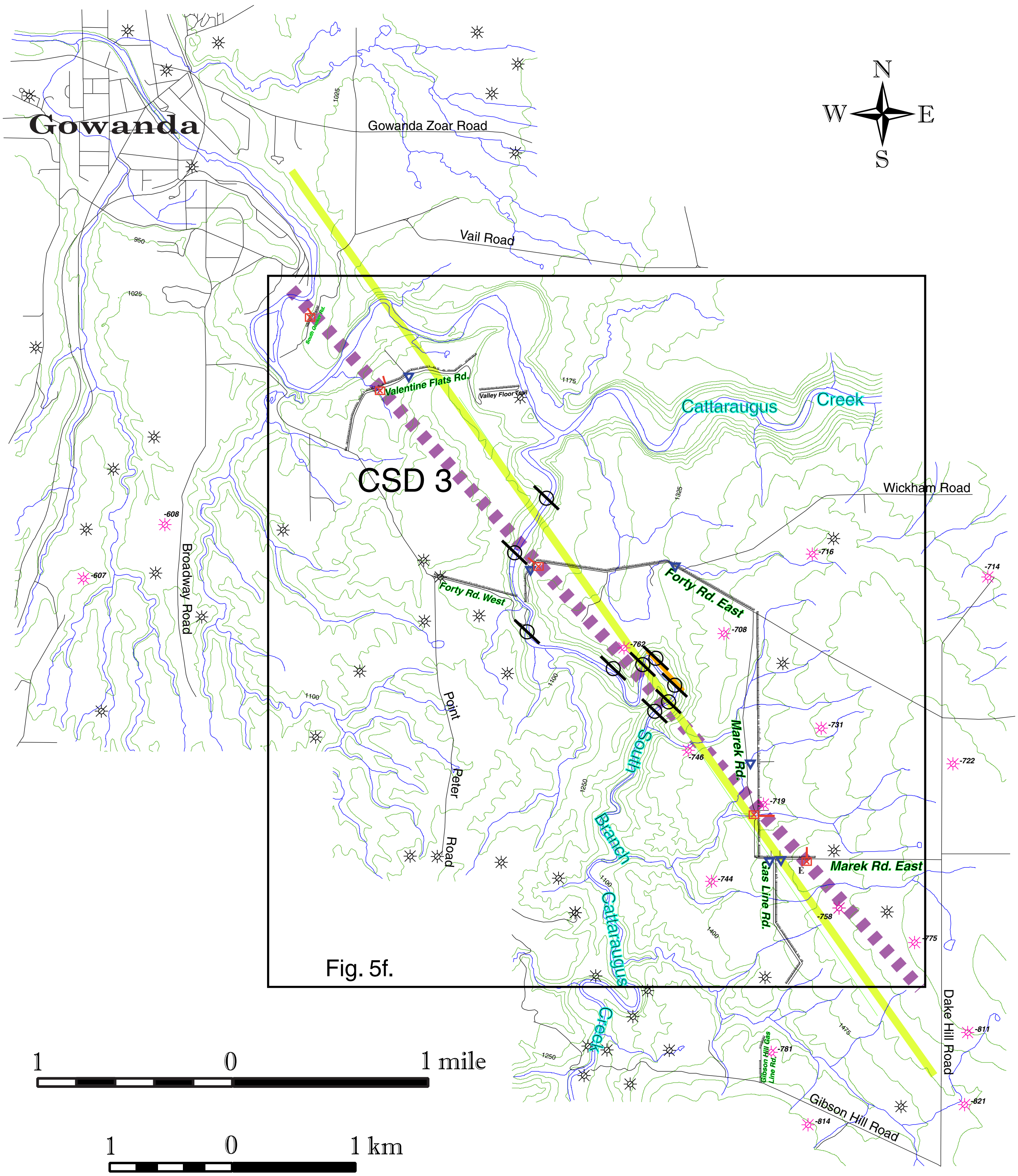
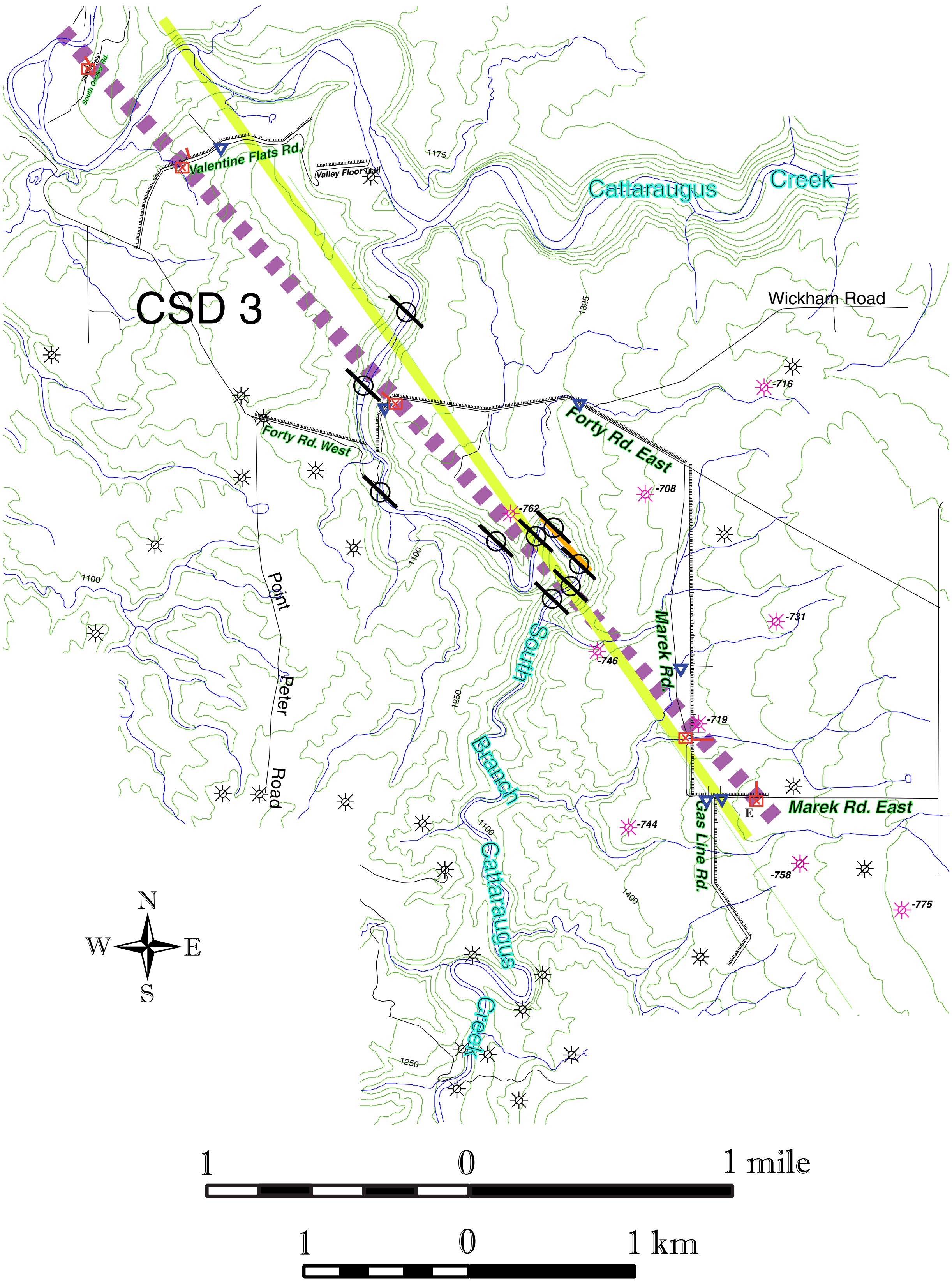

Gowanda
Gowanda Zoar Road
Vail Road
N
W
E
S
CSD 3
Valentine Flats Rd.
Valley Floor Trail
Cattaraugus
Creek
Wickham Road
Forty Rd. East
Forty Rd. West
Broadway Road
Point
Peter
Road
Marek Rd.
Marek Rd. East
Gas Line Rd.
South
Branch
Cattaraugus
Creek
Dake Hill Road
Gibson Hill Road
Fig. 5f.
-608
-607
-716
-714
-708
-762
-731
-722
-746
-719
-744
-758
-775
-781
-811
-821
-814
1 0 1 mile
1 0 1 km

Figure 5e.



South Otto Rd
Valentine Flats Rd.
Valley Floor Trail
1175
Cattaraugus
Creek
CSD 3
1325
Wickham Road
-716
Forty Rd. West
Forty Rd. East
-708
-762
1100
Point
Peter
Road
South
Branch
Cattaraugus
Creek
Marek Rd.
-731
-746
1250
-719
E
Marek Rd. East
Gas Line Rd.
-744
-758
1400
-775
N
W
E
S
1
0
1 mile
1
0
1 km

Figure 5f.

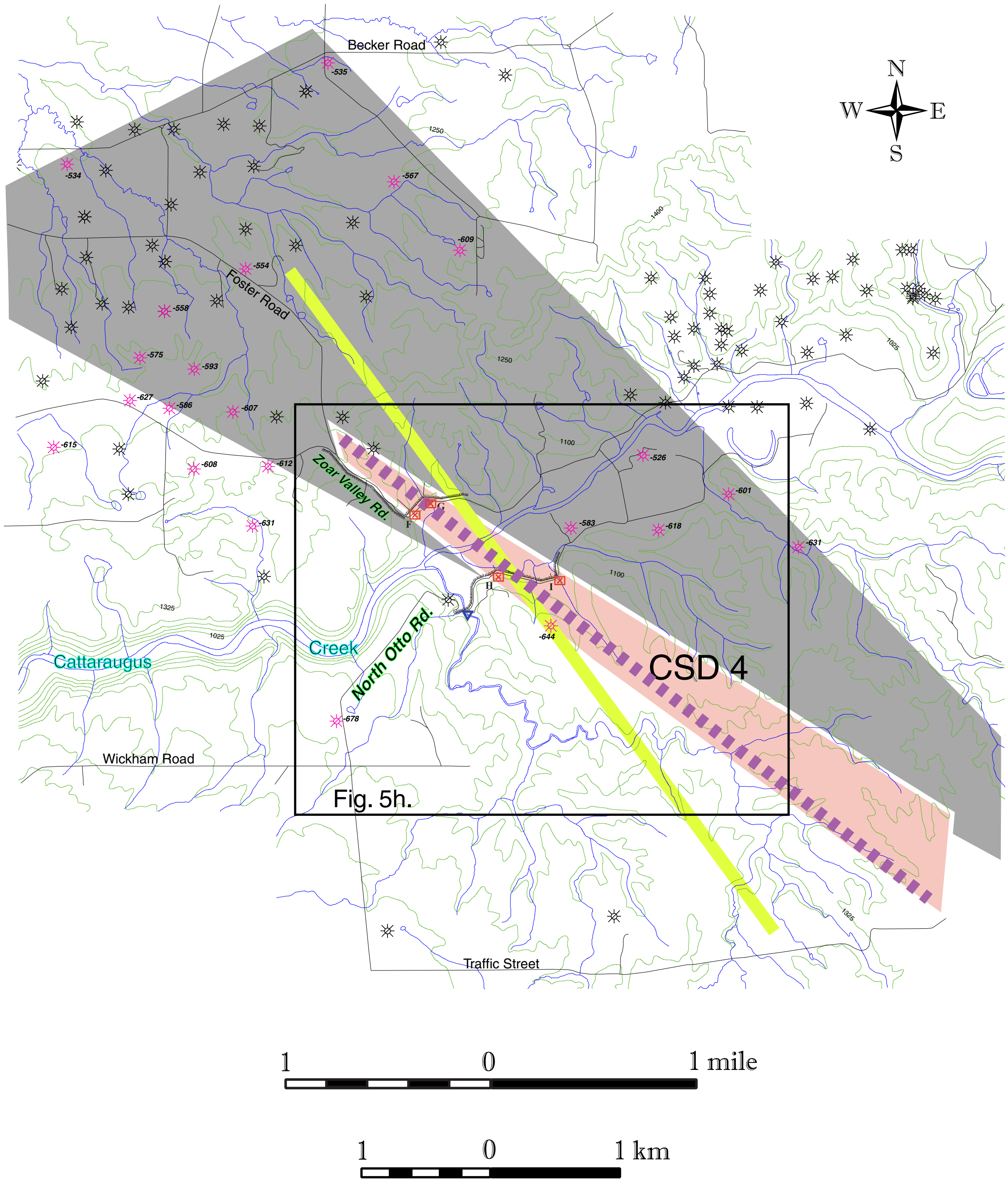
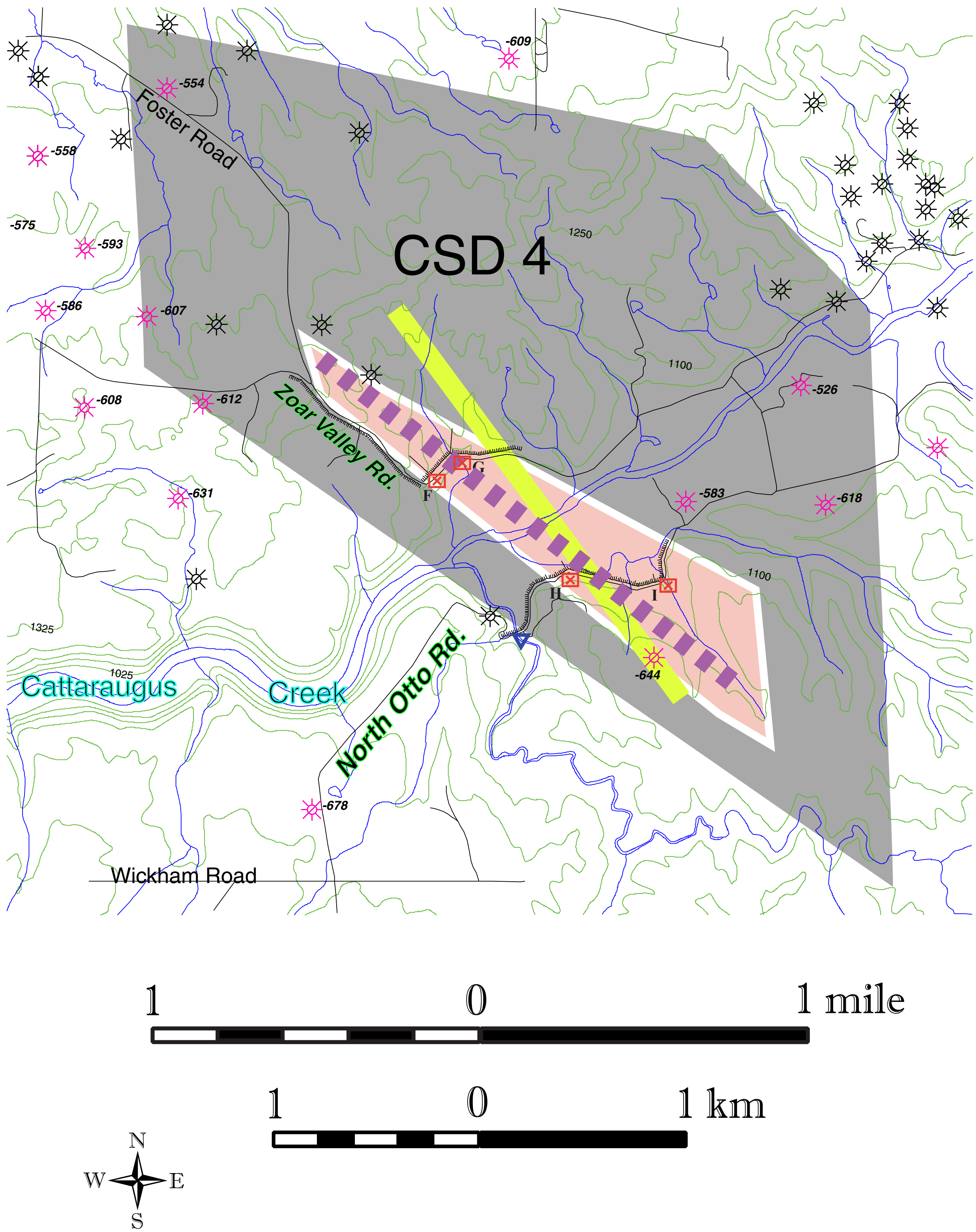
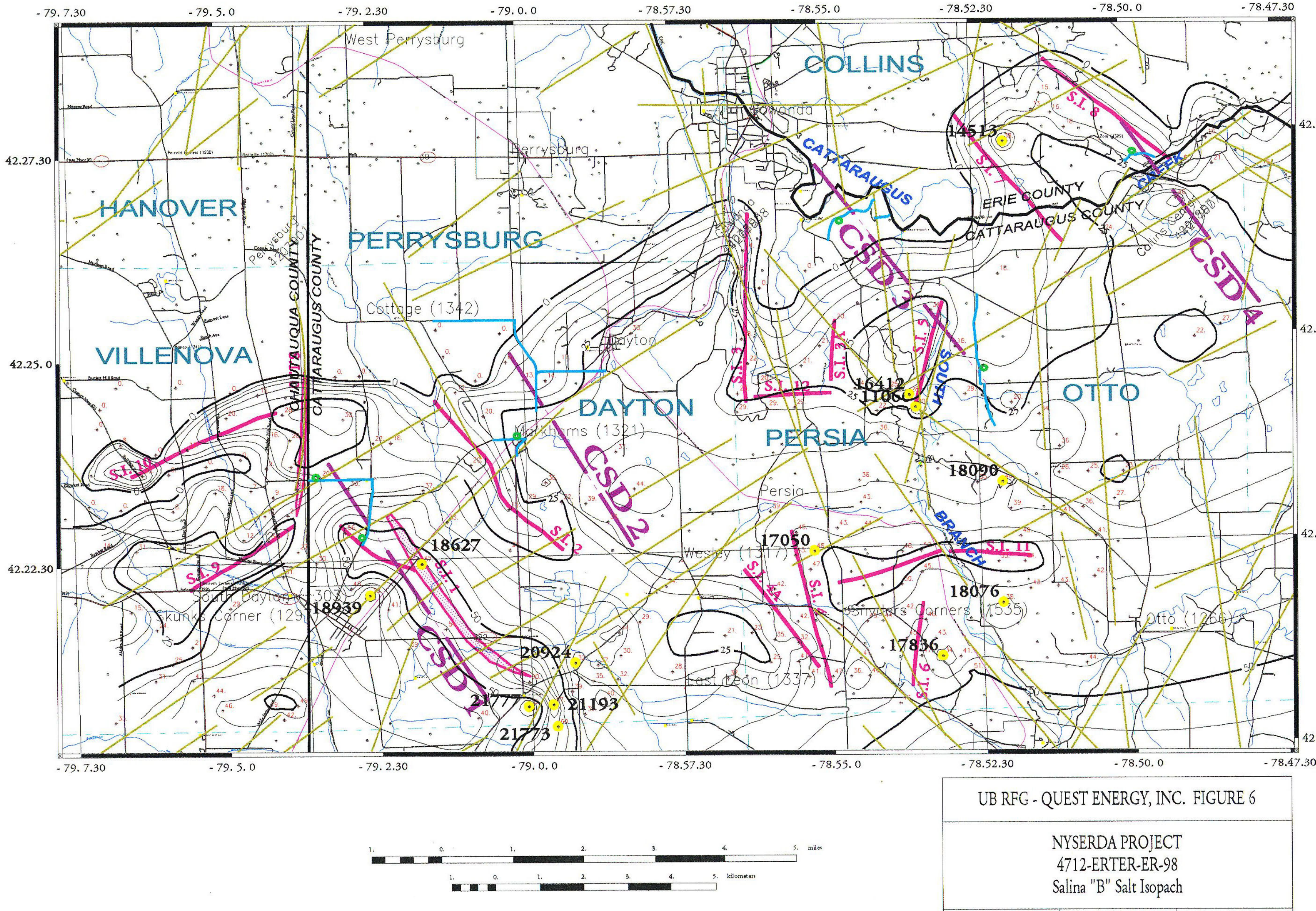

Becker Road
N
W
E
S
Foster Road
Zoar Valley Rd.
North Otto Rd.
Cattaraugus
Creek
Wickham Road
Traffic Street
CSD 4
Fig. 5h.
-535
-534
-567
-609
-554
-558
-575
-593
-627
-586
-607
-615
-608
-612
-631
-526
-601
-583
-618
-631
-644
-678
F
G
H
I
1250
1100
1325
1025
1400
1 0 1 mile
1 0 1 km

Figure 5g.



CSD 4
Foster Road
Zoar Valley Rd.
North Otto Rd.
Cattaraugus
Creek
Wickham Road
-609
-554
-558
-575
-593
-586
-607
-608
-612
-631
-526
-583
-618
-644
-678
1250
1100
1100
1325
1025
F
G
H
I
1 0 1 mile
1 0 1 km
N
W
E
S

Figure 5h.



UB RFG - QUEST ENERGY, INC. FIGURE 6		
NYSERDA PROJECT 4712-ERTER-ER-98 Salina "B" Salt Isopach		
drjbsalt.gpf		CI=5'

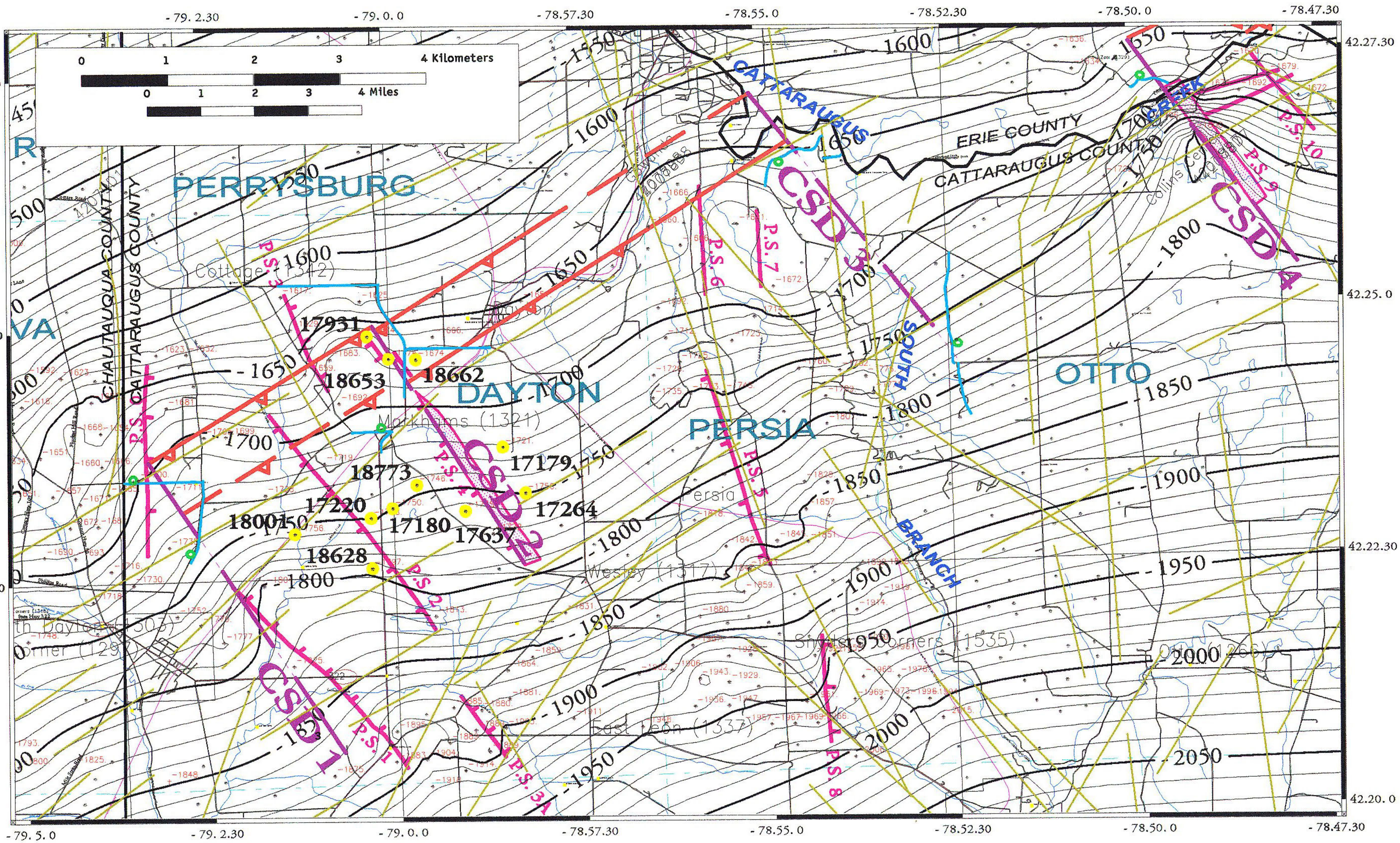
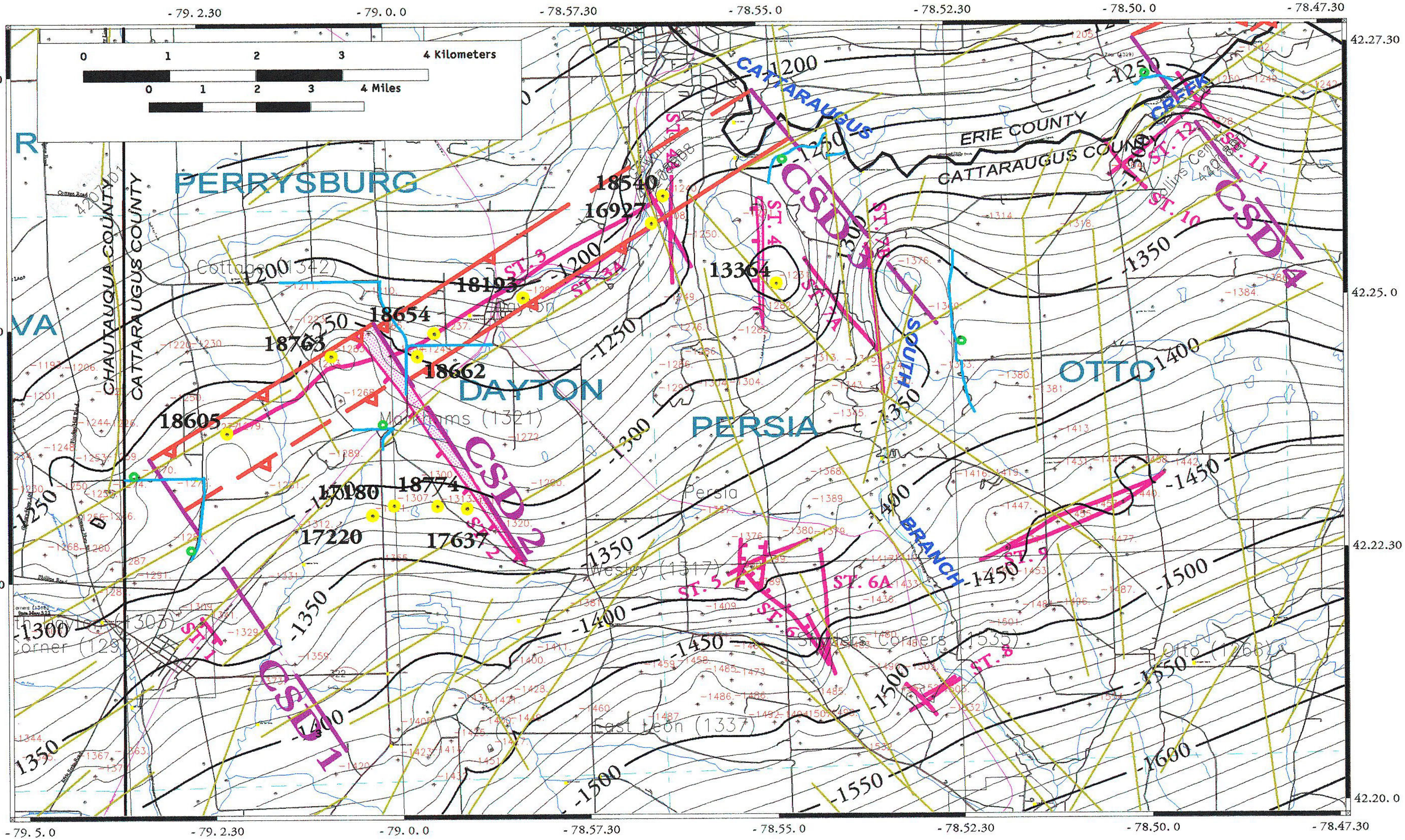
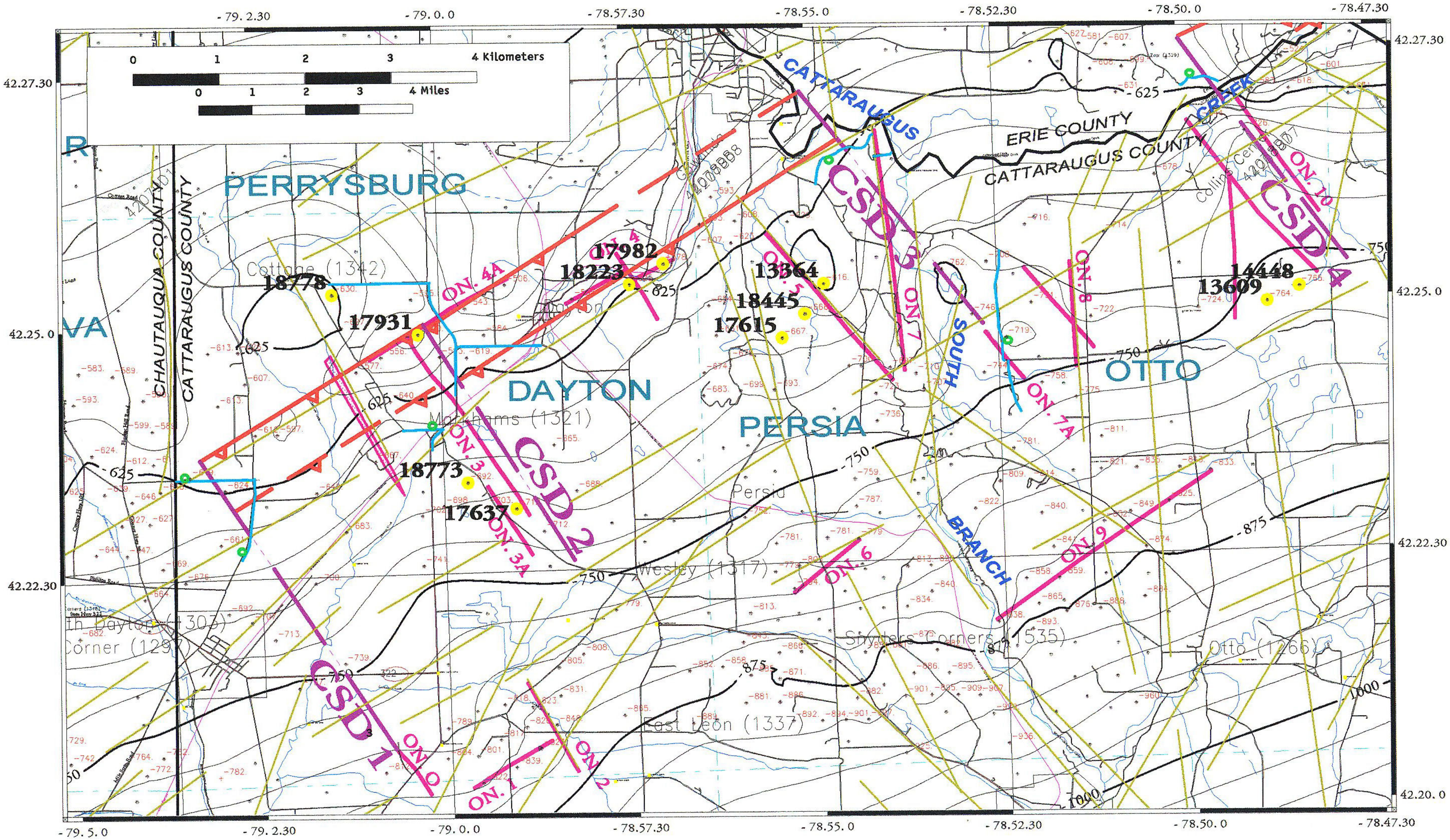

PERRYSBURG
DAYTON
PERSIA
OTTO
CATTARAUGUS
CREEK
SOUTH
BRANCH
ERIE COUNTY
CATTARAUGUS COUNTY
CHAUTAUQUA COUNTY
CSD 1
CSD 2
CSD 3
CSD 4
17931
18653
18662
18773
17179
17264
17220
17180
17637
18001
18628
4 Kilometers
4 Miles

FIGURE 7



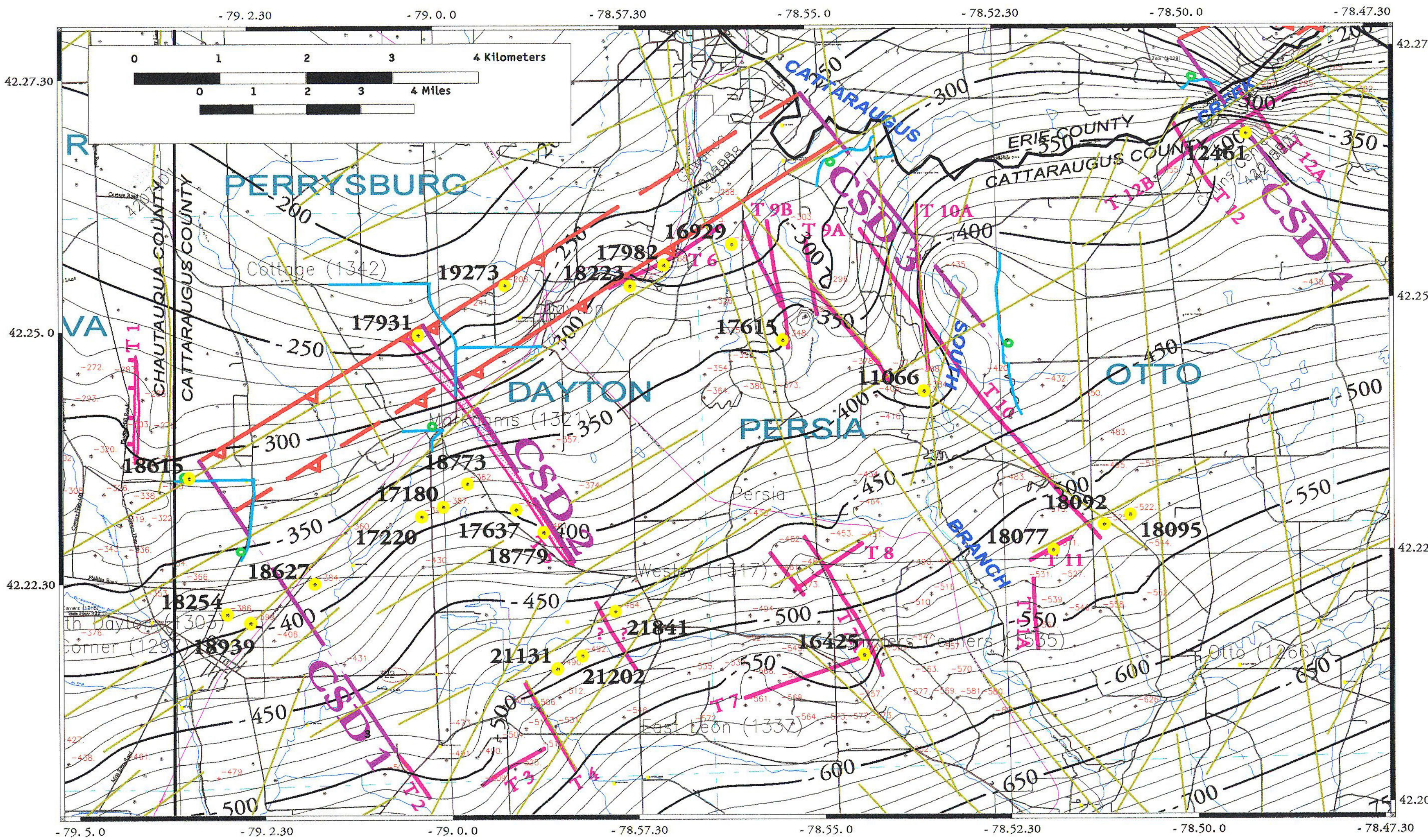
0 1 2 3 4 Kilometers
0 1 2 3 4 Miles
PERRYSBURG
DAYTON
PERSIA
OTTO
CHAUTAUQUA COUNTY
CATTARAUGUS COUNTY
ERIE COUNTY
CATTARAUGUS CREEK
SOUTH BRANCH
CSD 1
CSD 2
CSD 3
CSD 4
18540
16927
18193
18654
18763
18662
18605
13364
17180
18774
17220
17637
ST. 3
ST. 3A
ST. 5
ST. 6A
ST. 8
ST. 9
ST. 10
ST. 11
ST. 12
- 79. 2.30
- 79. 0. 0
- 78.57.30
- 78.55. 0
- 78.52.30
- 78.50. 0
- 78.47.30
- 79. 5. 0
42.27.30
42.25. 0
42.22.30
42.20. 0

FIGURE 8



4 Kilometers
4 Miles
PERRYSBURG
DAYTON
PERSIA
OTTO
CHAUTAUQUA COUNTY
CATTARAUGUS COUNTY
ERIE COUNTY
CATTARAUGUS CREEK
SOUTH BRANCH
CSD 1
CSD 2
CSD 3
CSD 4
18778
17931
17982
18223
13364
18445
17615
14448
13609
18773
17637

FIGURE 9



0 1 2 3 4 Kilometers
0 1 2 3 4 Miles
PERRYSBURG
DAYTON
PERSIA
OTTO
CHAUTAUQUA COUNTY
CATTARAUGUS COUNTY
ERIE COUNTY
CATTARAUGUS COUNTY
CATTARAUGUS
SOUTH BRANCH
CSD 1
CSD 2
CSD 3
CSD 4
T 1
T 2
T 3
T 4
T 6
T 7
T 8
T 9A
T 9B
T 10
T 10A
T 11
T 11A
T 12
T 12A
T 12B
18615
18254
18939
18627
17220
17180
18773
17637
18779
17931
19273
18223
17982
16929
17615
11066
21131
21202
21841
16425
18077
18092
18095
12461
-79. 5. 0
-79. 2.30
-79. 0. 0
-78.57.30
-78.55. 0
-78.52.30
-78.50. 0
-78.47.30
42.27.30
42.25. 0
42.22.30
42.20. 0

FIGURE 10

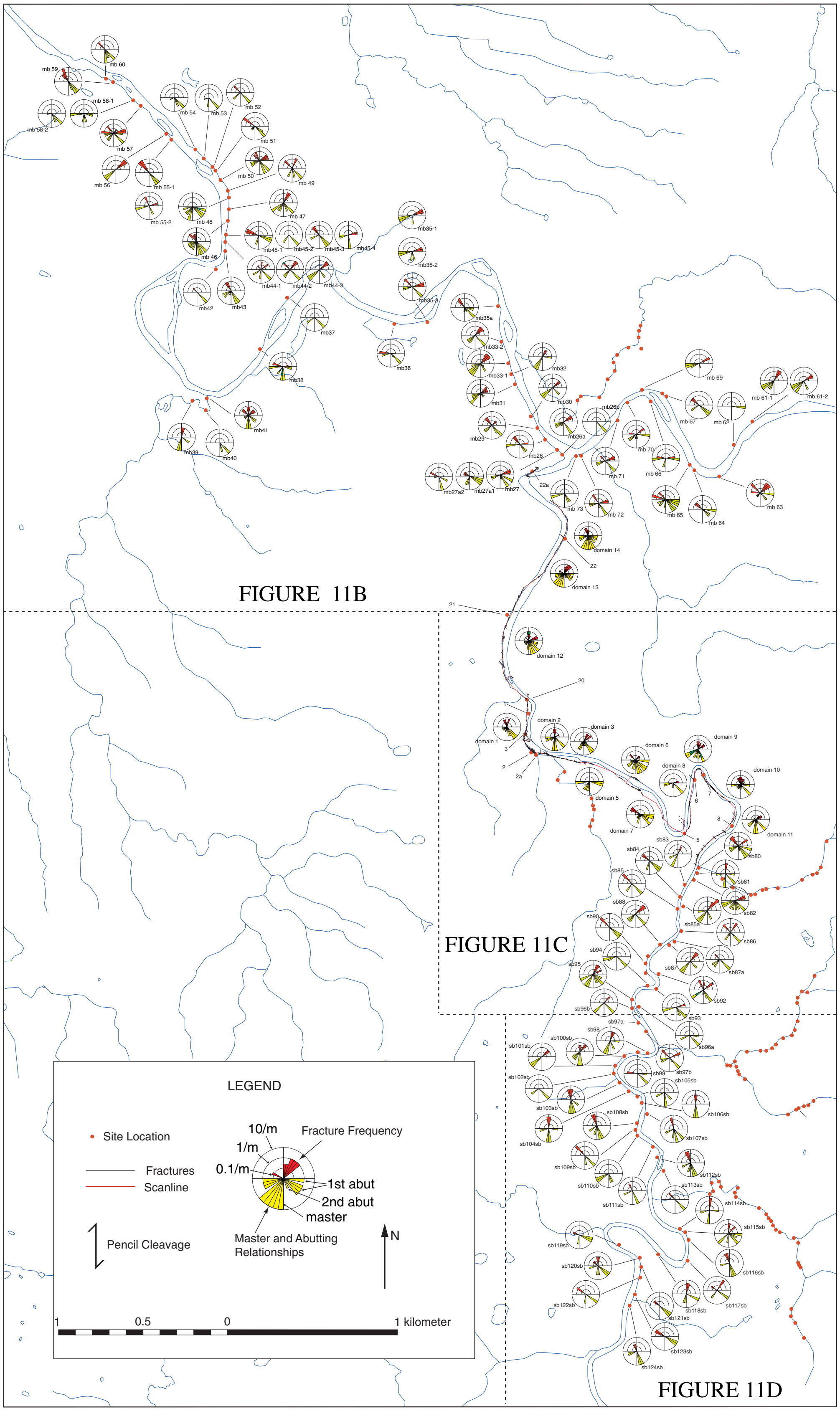
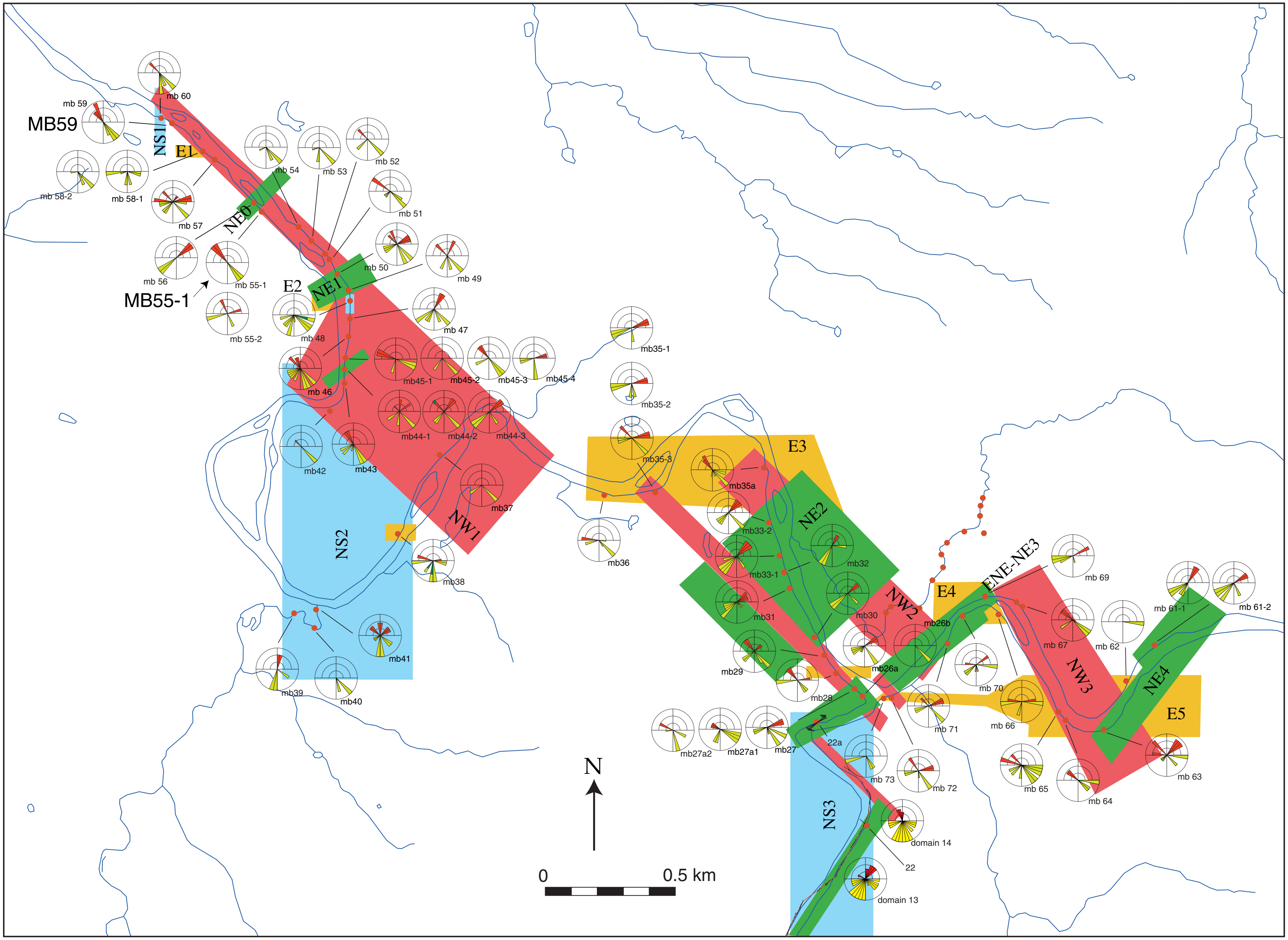


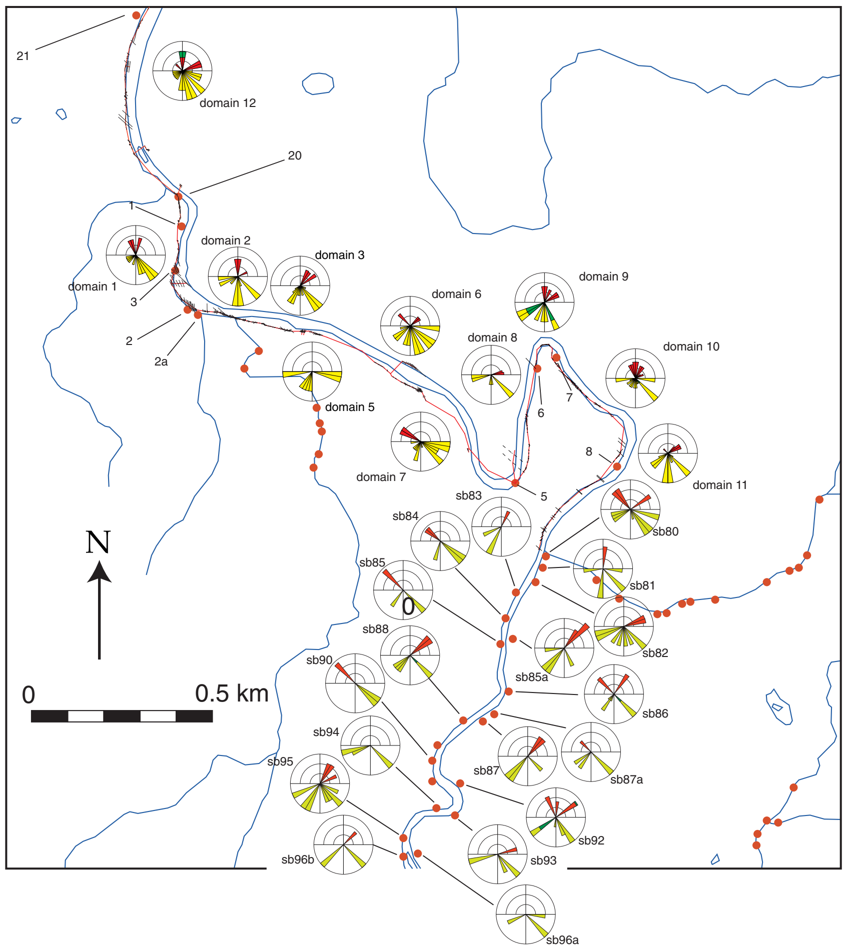
FIGURE 11B
FIGURE 11C
FIGURE 11D
LEGEND
Site Location
Fractures
Scanline
Pencil Cleavage
10/m
1/m
0.1/m
Fracture Frequency
1st abut
2nd abut
master
Master and Abutting Relationships
N
1
0.5
0
1 kilometer

FIGURE 11A



MB59
MB55-1
NS1
E1
NE0
E2
NE1
NW1
NS2
E3
NE2
NW2
E4
ENE-NE3
NW3
NE4
E5
NS3
mb 60
mb 59
mb 58-2
mb 58-1
mb 57
mb 56
mb 55-1
mb 55-2
mb 54
mb 53
mb 52
mb 51
mb 50
mb 49
mb 48
mb 47
mb 46
mb45-1
mb45-2
mb45-3
mb45-4
mb44-1
mb44-2
mb44-3
mb42
mb43
mb37
mb38
mb41
mb39
mb40
mb35-1
mb35-2
mb35-3
mb35a
mb36
mb33-2
mb33-1
mb32
mb31
mb30
mb29
mb28
mb26a
mb26b
mb27a2
mb27a1
mb27
22a
mb 73
mb 72
mb 71
mb 70
mb 69
mb 67
mb 66
mb 65
mb 64
mb 63
mb 62
mb 61-1
mb 61-2
domain 14
22
domain 13
N
0
0.5 km

FIGURE 11B


21
domain 12
20
1
domain 1
domain 2
domain 3
3
2
2a
domain 5
domain 6
domain 8
domain 9
domain 10
domain 7
domain 11
6
7
8
5
N
0
0.5 km
sb83
sb84
sb80
sb85
sb81
0
sb82
sb88
sb85a
sb90
sb86
sb94
sb87
sb87a
sb95
sb92
sb96b
sb93
sb96a

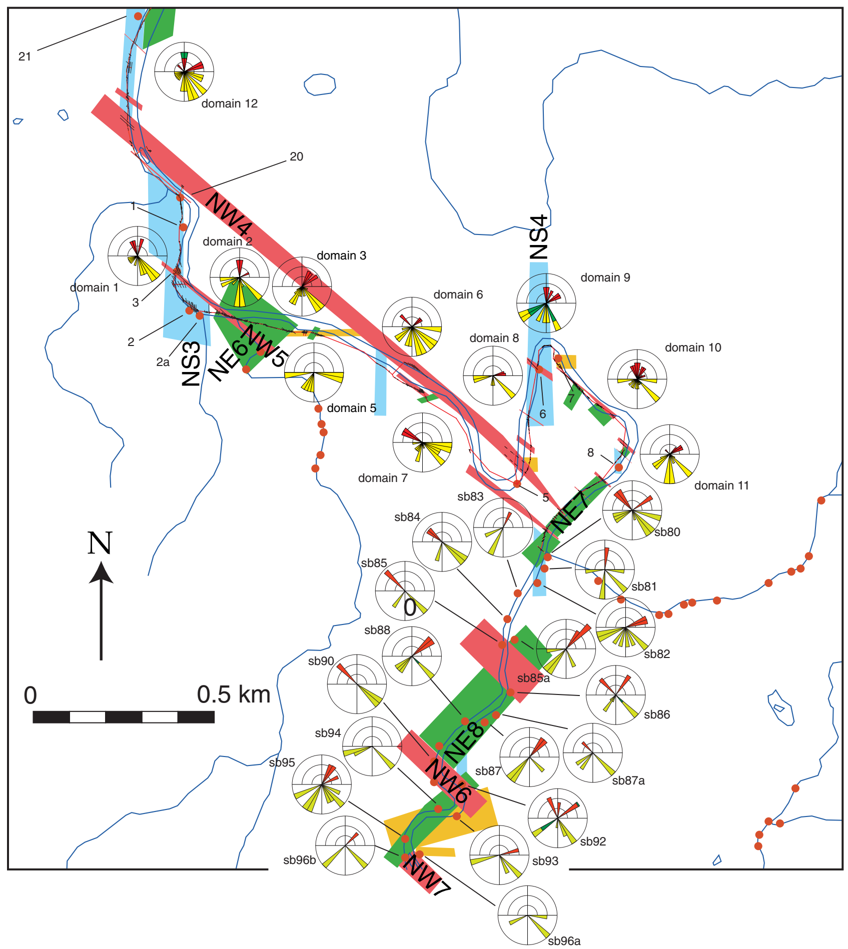
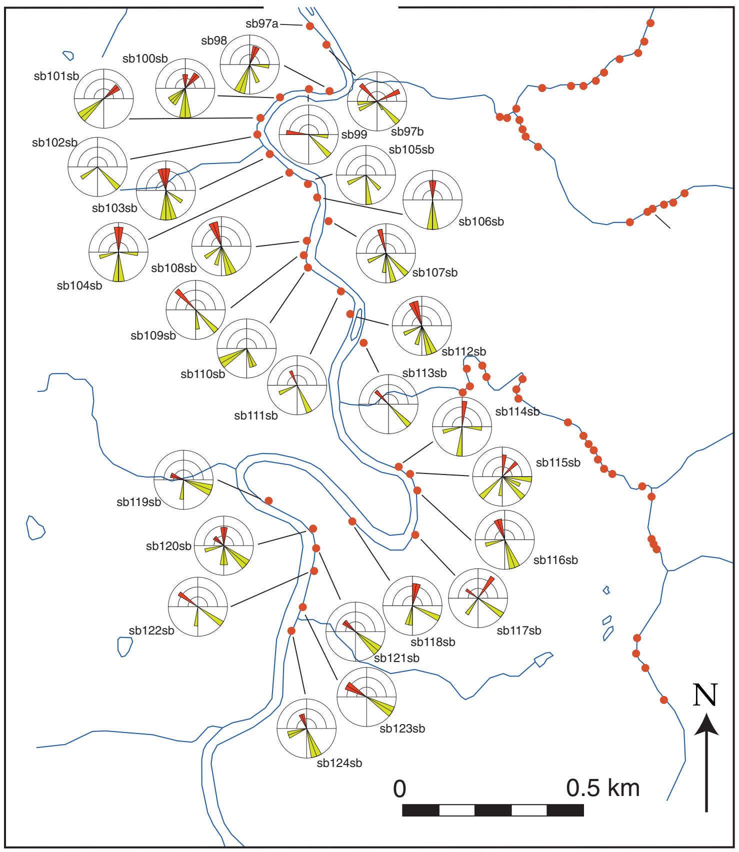

21
domain 12
20
NW4
1
domain 1
domain 2
domain 3
NS4
3
2
2a
NS3
NE6
NW5
domain 5
domain 6
domain 8
domain 9
domain 10
domain 7
domain 11
6
7
8
5
NE7
N
0
0.5 km
sb83
sb84
sb80
sb85
sb81
0
sb82
sb88
sb85a
sb90
sb86
NE8
sb94
sb87
sb87a
NW6
sb95
sb92
sb96b
sb93
NW7
sb96a

FIGURE 11C


sb97a
sb98
sb100sb
sb101sb
sb97b
sb99
sb105sb
sb102sb
sb103sb
sb106sb
sb104sb
sb108sb
sb107sb
sb109sb
sb110sb
sb112sb
sb111sb
sb113sb
sb114sb
sb115sb
sb119sb
sb120sb
sb116sb
sb117sb
sb122sb
sb118sb
sb121sb
sb123sb
sb124sb
0
0.5 km
N

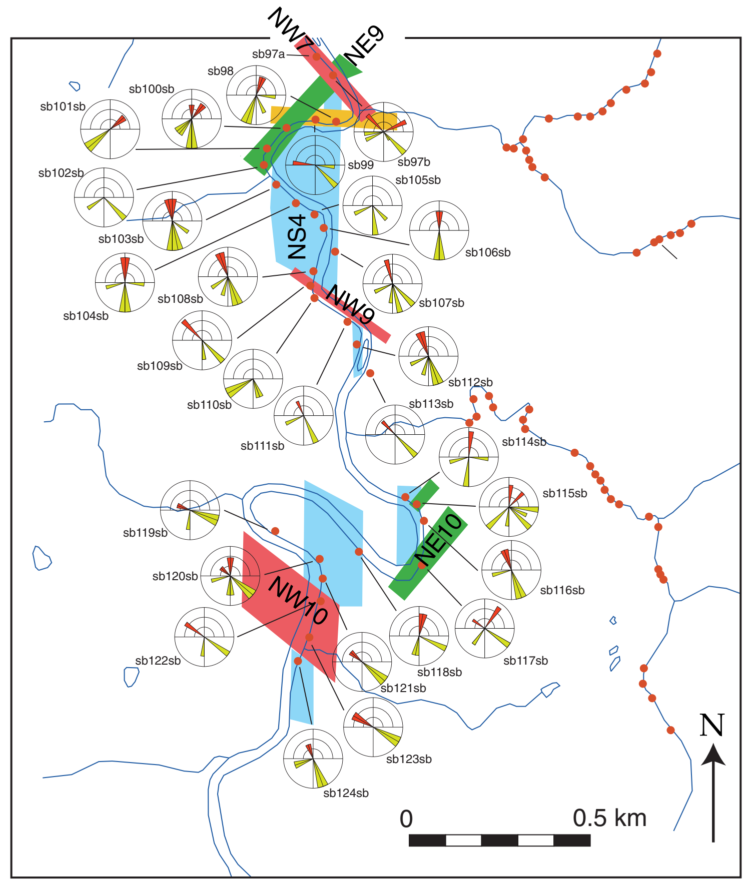

NW7
NE9
sb97a
sb98
sb100sb
sb101sb
sb97b
sb99
sb105sb
sb102sb
sb103sb
NS4
sb106sb
sb104sb
sb108sb
sb107sb
NW9
sb109sb
sb110sb
sb112sb
sb111sb
sb113sb
sb114sb
sb115sb
sb119sb
NE10
sb120sb
NW10
sb116sb
sb117sb
sb122sb
sb118sb
sb121sb
sb123sb
sb124sb
0
0.5 km
N

FIGURE 11D

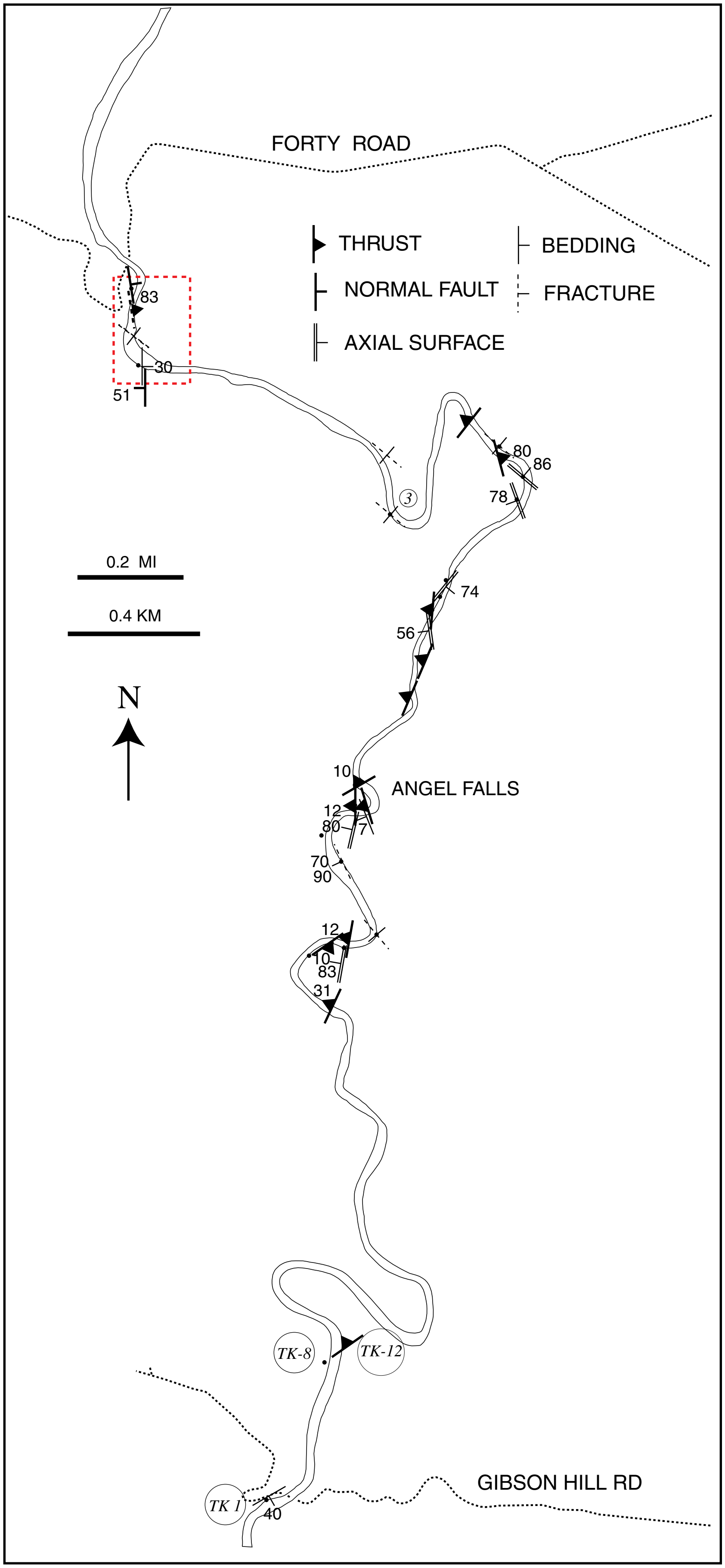
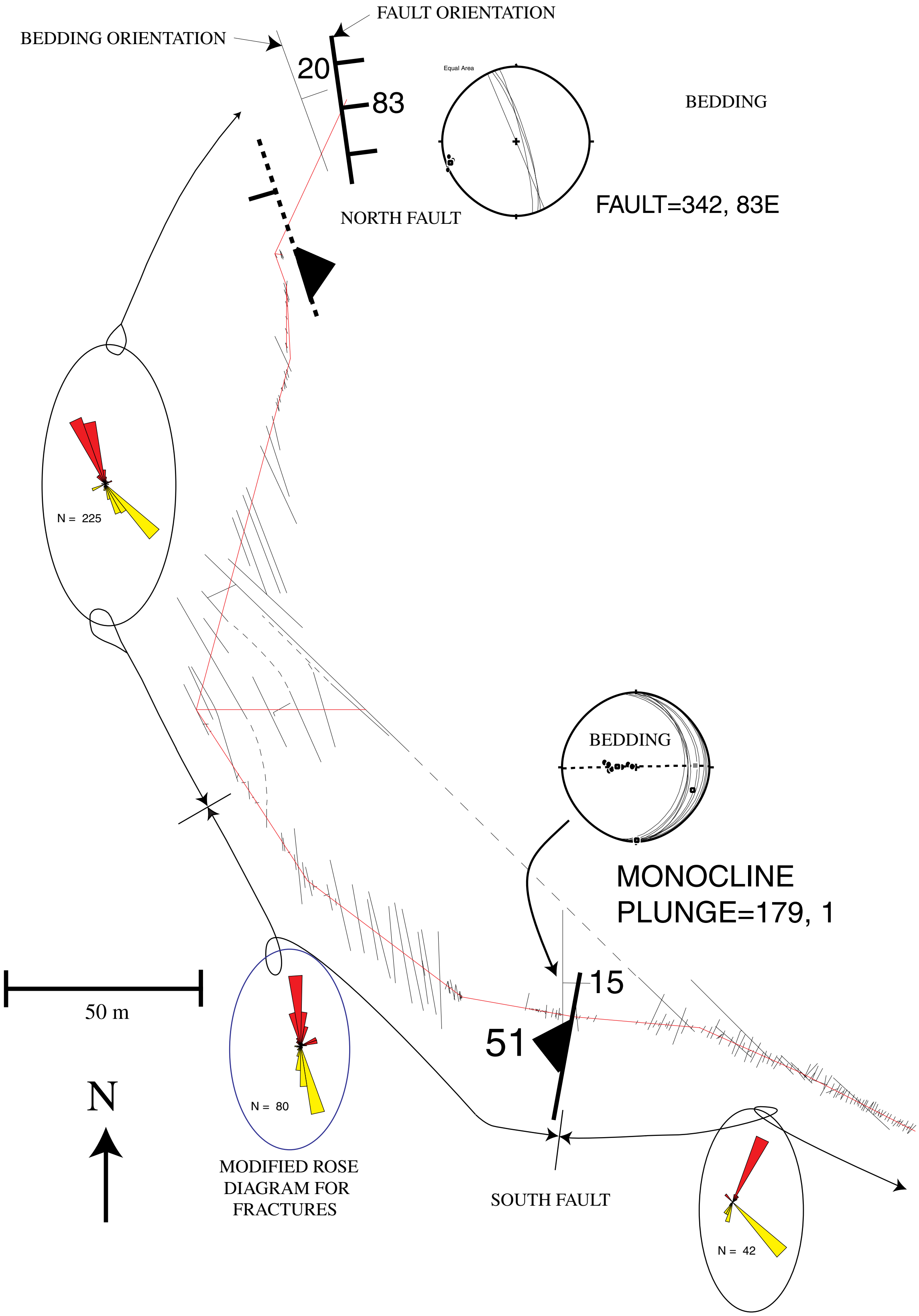

FORTY ROAD
THRUST
BEDDING
NORMAL FAULT
FRACTURE
AXIAL SURFACE
83
30
51
80
86
78
3
0.2 MI
0.4 KM
74
56
N
10
ANGEL FALLS
12
80
7
70
90
12
10
83
31
TK-8
TK-12
GIBSON HILL RD
TK 1
40

FIGURE 12



FAULT ORIENTATION
BEDDING ORIENTATION
20
83
Equal Area
BEDDING
FAULT=342, 83E
NORTH FAULT
N = 225
BEDDING
MONOCLINE
PLUNGE=179, 1
15
51
50 m
N = 80
N
MODIFIED ROSE
DIAGRAM FOR
FRACTURES
SOUTH FAULT
N = 42

FIGURE 13

FIGURE 14A

FIGURE 14B

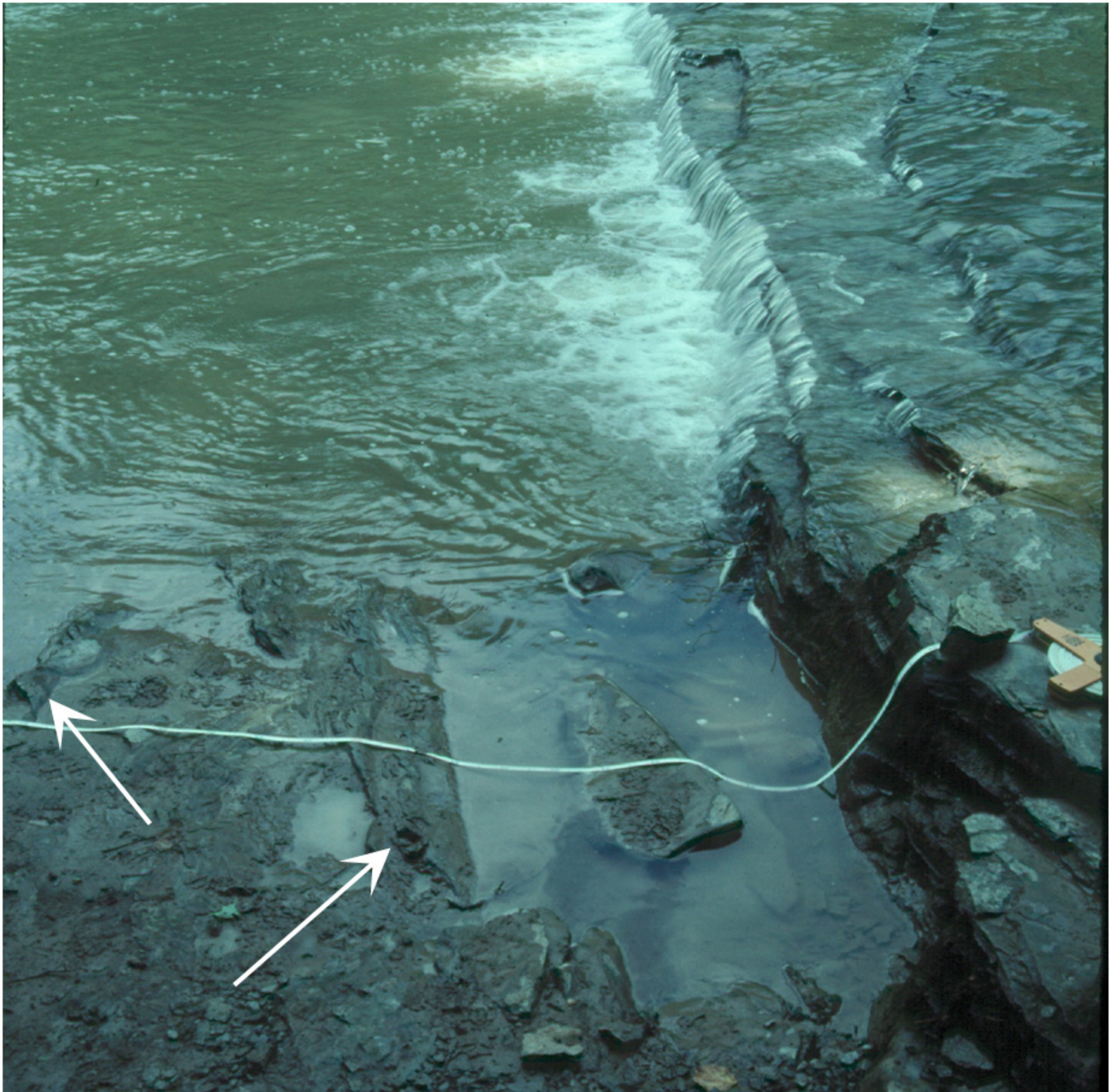


FIGURE 14C

FIGURE 15

APPENDIX A

Soil Gas Data Along Traverses

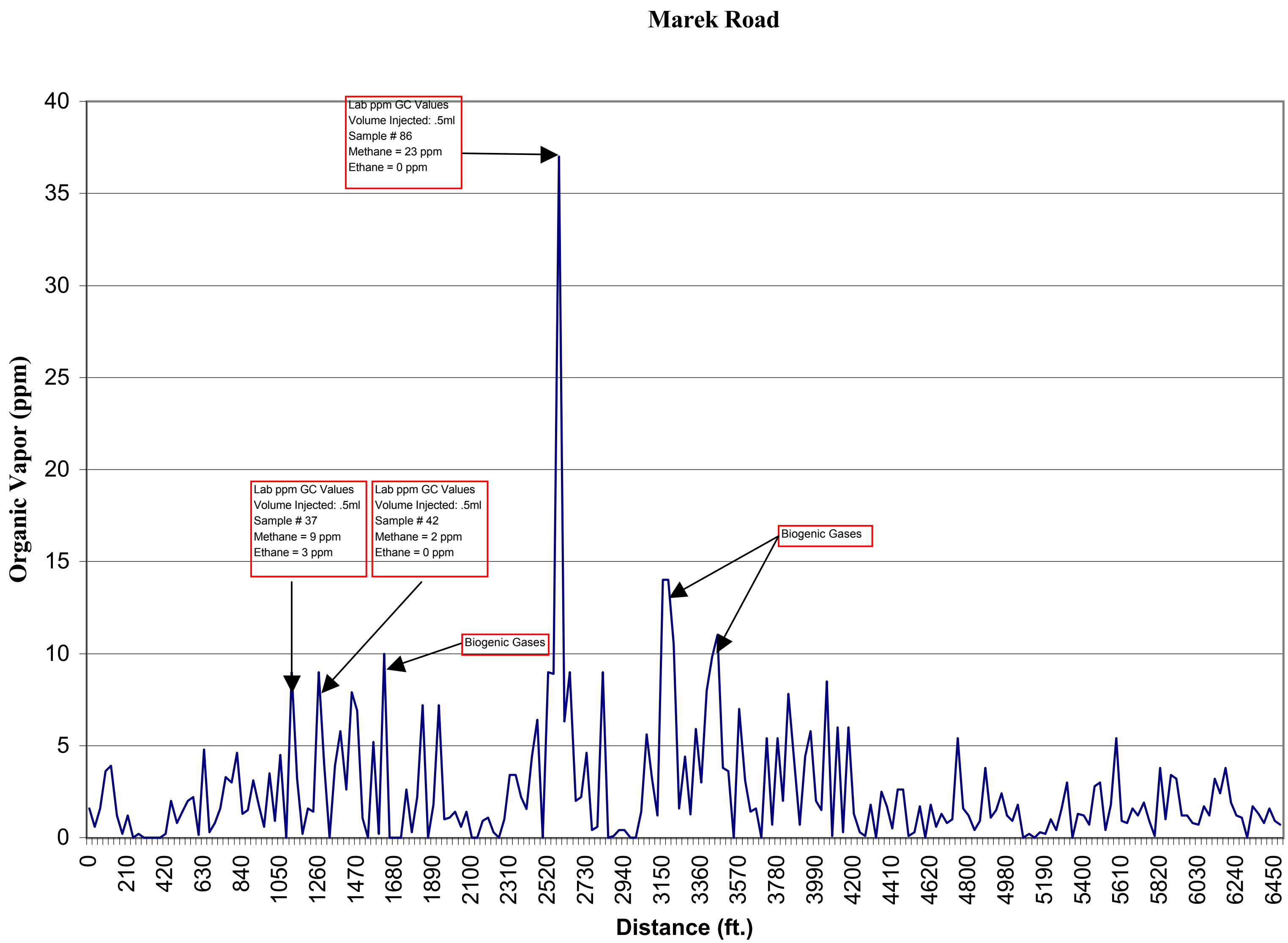
Traverse 98-1	Marek Road, traverse heading north.					5/21/98-5/27/98		
Fountain, Nelson, Jennings								
H2=1850, 10	Batt.=8.0	Leak Test=OK		Flow=Good				
Cool & Clear								
Sample #0 is 10ft. East of underground electrical box.								
Traverse begins at south end of Marek rd. where it turns east, Probe spacing 30ft.								
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	2.6	1.6	5/21/1998	Cal. Gas	
1	9.144	30	1	1.6	0.6	Dry Loam Soil		
2	18.288	60	1	2.6	1.6	1x		
3	27.432	90	1	4.6	3.6			
4	36.576	120	1	4.9	3.9			
5	45.72	150	1	2.2	1.2			
6	54.864	180	1	1.2	0.2			
7	64.008	210	1	2.2	1.2			
8	73.152	240	1	1	0			
9	82.296	270	1	1.2	0.2			
10	91.44	300	1	1	0			
11	100.584	330	1	1	0	*ran diluted sample, No Peak		
12	109.728	360	1	0	0	flame out, No Peak		
13	118.872	390	1	0	0	flame out, No Peak		
14	128.016	420	1	1.2	0.2			
15	137.16	450	1	3	2			
16	146.304	480	1	1.8	0.8			
17	155.448	510	1	2.4	1.4			
18	164.592	540	1	3	2			
19	173.736	570	1	3.2	2.2			
20	182.88	600	1	1.15	0.15			
21	192.024	630	1	5.8	4.8			
22	201.168	660	1	1.3	0.3			
23	210.312	690	1	1.8	0.8			
24	219.456	720	1	2.6	1.6			
25	228.6	750	1	4.3	3.3			
26	237.744	780	1	4	3			
27	246.888	810	1	5.6	4.6			
28	256.032	840	1	2.3	1.3			
29	265.176	870	1	2.5	1.5			
30	274.32	900	1	4.1	3.1			
31	283.464	930	1	2.8	1.8			
32	292.608	960	1	1.6	0.6			
33	301.752	990	1	4.5	3.5			
34	310.896	1020	1	1.9	0.9			
35	320.04	1050	1	5.5	4.5			
36	329.184	1080	1	1	0			
37	338.328	1110	1	10	9	*Dup=2.0, 4.0		
38	347.472	1140	1	4.2	3.2			
39	356.616	1170	1	1.2	0.2			
40	365.76	1200	1	2.6	1.6			
41	374.904	1230	1	2.4	1.4			
42	384.048	1260	1	10+	9			
43	393.192	1290	1	5	4			

44	402.336	1320	1	0	0	flame out, No Peak		
45	411.48	1350	1	4.9	3.9			
46	420.624	1380	1	6.8	5.8			
47	429.768	1410	1	3.6	2.6			
48	438.912	1440	1	8.9	7.9			
49	448.056	1470	1	7.9	6.9			
50	457.2	1500	1	2.05	1.05			
51	466.344	1530	1	1	0	Wet Soil, moved probe depth to 12in.		
52	475.488	1560	1	6.2	5.2		"	
53	484.632	1590	1	1.2	0.2		"	
54	493.776	1620	1	11	10	*Dup=12,10	"	
55	502.92	1650	1	1	0		"	
56	512.064	1680	1	1	0		"	
57	521.208	1710	1	1	0		"	
58	530.352	1740	1	3.6	2.6		"	
59	539.496	1770	1	1.3	0.3	Cal. Gas	"	
60	548.64	1800	1	3.2	2.2		"	
61	557.784	1830	1	8.2	7.2			
62	566.928	1860	1	0	0	flame out, No Peak		
63	576.072	1890	1	2.8	1.8			
64	585.216	1920	1	8.2	7.2			
65	594.36	1950	1	2	1			
66	603.504	1980	1	2.1	1.1			
67	612.648	2010	1	2.4	1.4			
68	621.792	2040	1	1.6	0.6			
69	630.936	2070	1	2.4	1.4			
70	640.08	2100	1	1	0			
71	649.224	2130	1	1	0			
72	658.368	2160	1	1.9	0.9			
73	667.512	2190	1	2.1	1.1			
74	676.656	2220	1	1.3	0.3			
75	685.8	2250	1	1	0			
76	694.944	2280	1	2	1			
77	704.088	2310	1	4.4	3.4			
78	713.232	2340	1	4.4	3.4			
79	722.376	2370	1	3.2	2.2			
80	731.52	2400	1	2.55	1.55			
81	740.664	2430	1	5.4	4.4			
82	749.808	2460	1	7.4	6.4			
83	758.952	2490	1	1	0			
84	768.096	2520	1	10	9			
85	777.24	2550	1	9.9	8.9			

86	786.384	2580	1	38	37	Sample 86	GC Injection	
87	795.528	2610	1	7.3	6.3	Bkgd.	Peak min/sec.	Scale
88	804.672	2640	1	10+	9	1	5.2 (1:27)	10x
89	813.816	2670	1	3	2	1.1	1.6 (1:50)	1x
90	822.96	2700	1	3.2	2.2			
91	832.104	2730	1	5.6	4.6			
92	841.248	2760	1	1.4	0.4			
93	850.392	2790	1	1.6	0.6			
94	859.536	2820	1	10+	9			
95	868.68	2850	1	0	0	flame out, No Peak		
96	877.824	2880	1	1.1	0.1			
97	886.968	2910	1	1.4	0.4			
98	896.112	2940	1	1.4	0.4			
99	905.256	2970	1	0	0	flame out, No Peak		Cal. Gas
Traverse 98-1	Marek Road	5/26/1998						
Nelson, Jennings								
H2=2000, 11.5	Batt.=8.0	Leak Test= OK		Flow=Good				
Warm, Clear								
Started at middle of Marek rd., 100ft. North of electric pole 180, east side of rd., probe spacing 30ft.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
100	914.4	3000	1	1	0	5/26/1998	Cal. Gas	flame out
101	923.544	3030	1	2.4	1.4	1x	Water in ditch	
102	932.688	3060	1	6.6	5.6	Sandy loam soil, 40% wet		
103	941.832	3090	1	4.2	3.2			
104	950.976	3120	1	2.2	1.2			
105	960.12	3150	1	15	14	*Dup=16,15		
106	969.264	3180	1	15	14	*Dup=22,8		
107	978.408	3210	1	11.5	10.5	*Dup=10,13		
108	987.552	3240	1	2.6	1.6			
109	996.696	3270	1	5.4	4.4			
110	1005.84	3300	1	2.25	1.25			
111	1014.984	3330	1	6.9	5.9			
112	1024.128	3360	1	4	3			
113	1033.272	3390	1	9	8			
114	1042.416	3420	1	10.8	9.8	*Dup=10,11.6		
115	1051.56	3450	1	12	11			
116	1060.704	3480	1	4.8	3.8			
117	1069.848	3510	1	4.6	3.6			
118	1078.992	3540	1	1	0	flame out, No Peak		
119	1088.136	3570	1	8	7			
120	1097.28	3600	1	4.1	3.1			
121	1106.424	3630	1	2.4	1.4			
122	1115.568	3660	1	2.6	1.6			
123	1124.712	3690	1	1	0	flame out, No Peak		
124	1133.856	3720	1	6.4	5.4			
125	1143	3750	1	1.7	0.7			
126	1152.144	3780	1	6.4	5.4			
127	1161.288	3810	1	3	2			
128	1170.432	3840	1	8.8	7.8			
129	1179.576	3870	1	5.4	4.4			

130	1188.72	3900	1	1.7	0.7			
131	1197.864	3930	1	5.4	4.4			
132	1207.008	3960	1	6.8	5.8			
133	1216.152	3990	1	3	2			
134	1225.296	4020	1	2.5	1.5			
135	1234.44	4050	1	9.5	8.5			
136	1243.584	4080	1	1.1	0.1			
137	1252.728	4110	1	7	6			
138	1261.872	4140	1	1.3	0.3			
139	1271.016	4170	1	7	6			
140	1280.16	4200	1	2.3	1.3			
141	1289.304	4230	1	1.3	0.3	Cal. Gas		
142	1298.448	4260	1	1.1	0.1			
143	1307.592	4290	1	2.8	1.8			
144	1316.736	4320	1	1	0			
145	1325.88	4350	1	3.5	2.5			
146	1335.024	4380	1	2.7	1.7			
147	1344.168	4410	1	1.5	0.5			
148	1353.312	4440	1	3.6	2.6			
149	1362.456	4470	1	3.6	2.6			
150	1371.6	4500	1	1.1	0.1			
151	1380.744	4530	1	1.3	0.3			
152	1389.888	4560	1	2.7	1.7			
153	1399.032	4590	1	1	0			
154	1408.176	4620	1	2.8	1.8			
155	1417.32	4650	1	1.6	0.6			
156	1426.464	4680	1	2.3	1.3			
157	1435.608	4710	1	1.8	0.8			
158	1444.752	4740	1	2	1			
159	1453.896	4770	1	6.4	5.4			
160	1463.04	4800	1	2.6	1.6	Cal. Gas		
Traverse 98-1	Marek Road	5/27/1998						
Nelson, Jennings								
H2=2000,12	Batt.=8.1	Leak Test=OK		Flow=Good				
Warm & Sunny								
Started at electric pole 3, north on Marek rd., east side of road, probe spacing 30ft.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
161	1472.184	4830	1	2.2	1.2	5/27/1998	Cal. Gas	
162	1481.328	4860	1	1.4	0.4	1x		
163	1490.472	4890	1	1.9	0.9			
164	1499.616	4920	1	4.8	3.8			
165	1508.76	4950	1	2.1	1.1			
166	1517.904	4980	1	2.5	1.5			
167	1527.048	5010	1	3.4	2.4			
168	1536.192	5040	1	2.2	1.2			
169	1545.336	5070	1	1.9	0.9			
170	1554.48	5100	1	2.8	1.8			
171	1563.624	5130	1	1	0			
172	1572.768	5160	1	1.2	0.2			
173	1581.912	5190	1	1	0			

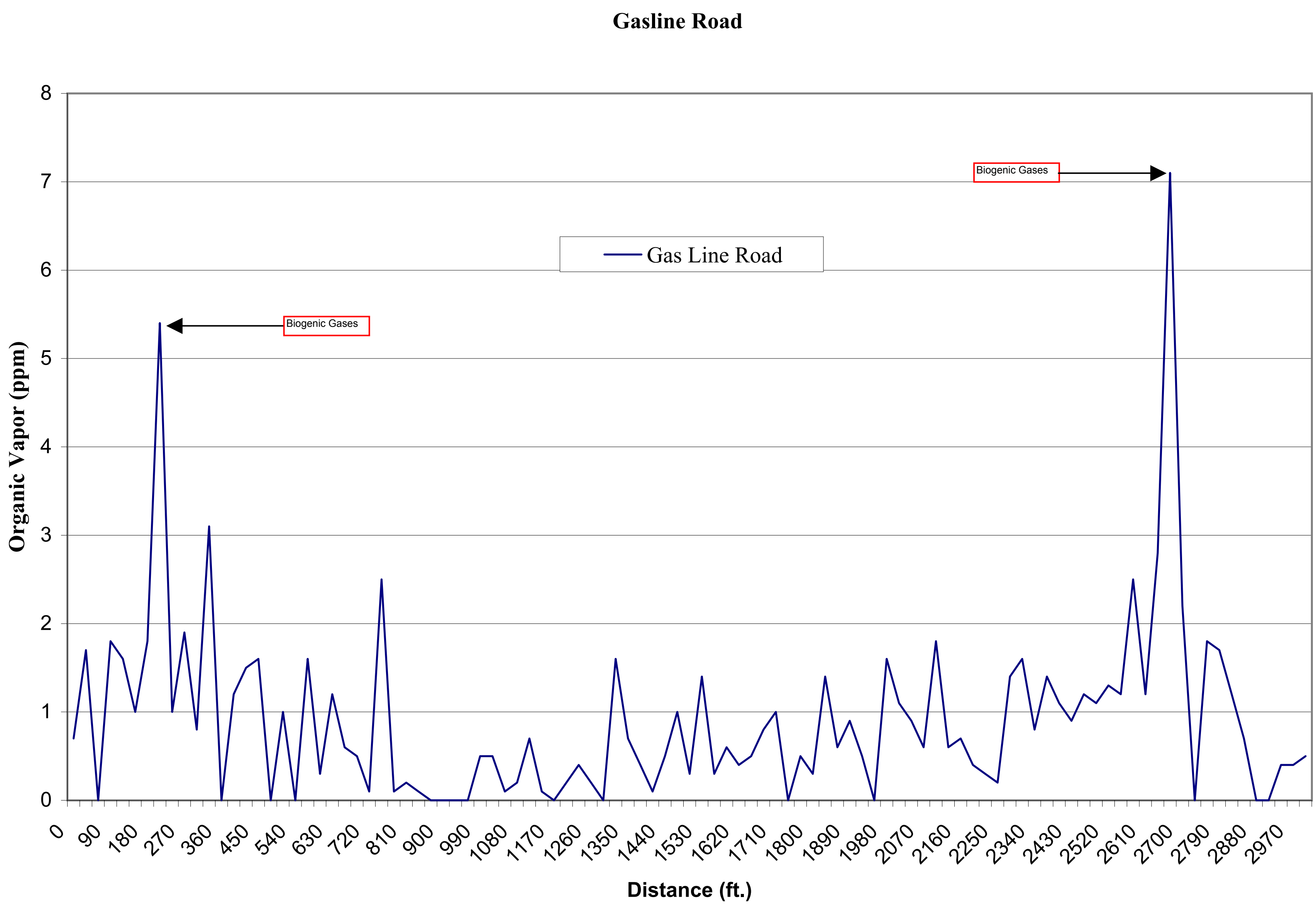
174	1591.056	5220	1	1.3	0.3			
175	1600.2	5250	1	1.2	0.2			
176	1609.344	5280	1	2	1			
177	1618.488	5310	1	1.4	0.4			
178	1627.632	5340	1	2.6	1.6			
179	1636.776	5370	1	4	3			
180	1645.92	5400	1	1	0			
181	1655.064	5430	1	2.3	1.3			
182	1664.208	5460	1	2.2	1.2			
183	1673.352	5490	1	1.7	0.7			
184	1682.496	5520	1	3.8	2.8			
185	1691.64	5550	1	4	3			
186	1700.784	5580	1	1.4	0.4			
187	1709.928	5610	1	2.8	1.8			
188	1719.072	5640	1	6.4	5.4			
189	1728.216	5670	1	1.9	0.9			
190	1737.36	5700	1	1.8	0.8			
191	1746.504	5730	1	2.6	1.6			
192	1755.648	5760	1	2.2	1.2			
193	1764.792	5790	1	2.9	1.9			
194	1773.936	5820	1	1.9	0.9			
195	1783.08	5850	1	1.1	0.1			
196	1792.224	5880	1	4.8	3.8			
197	1801.368	5910	1	2	1			
198	1810.512	5940	1	4.4	3.4			
199	1819.656	5970	1	4.2	3.2			
200	1828.8	6000	1	2.2	1.2			
201	1837.944	6030	1	2.2	1.2			
202	1847.088	6060	1	1.8	0.8			
203	1856.232	6090	1	1.7	0.7			
204	1865.376	6120	1	2.7	1.7			
205	1874.52	6150	1	2.2	1.2	Cal. Gas		
206	1883.664	6180	1	4.2	3.2			
207	1892.808	6210	1	3.4	2.4			
208	1901.952	6240	1	4.8	3.8			
209	1911.096	6270	1	2.9	1.9			
210	1920.24	6300	1	2.2	1.2			
211	1929.384	6330	1	2.1	1.1			
212	1938.528	6360	1	1	0			
213	1947.672	6390	1	2.7	1.7			
214	1956.816	6420	1	2.3	1.3			
215	1965.96	6450	1	1.8	0.8			
216	1975.104	6480	1	2.6	1.6			
217	1984.248	6510	1	1.9	0.9	*Sample #218 is 16.5ft. North of		
218	1993.392	6540	1	1.7	0.7	electric box #39,		
						on east side of Marek rd. at "T" of		
						Marek rd. and Forty rd.		


Marek Road
Organic Vapor (ppm)
Distance (ft.)
40
35
30
25
20
15
10
5
0
0
210
420
630
840
1050
1260
1470
1680
1890
2100
2310
2520
2730
2940
3150
3360
3570
3780
3990
4200
4410
4620
4800
4980
5190
5400
5610
5820
6030
6240
6450
Lab ppm GC Values
Volume Injected: .5ml
Sample # 86
Methane = 23 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 37
Methane = 9 ppm
Ethane = 3 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 42
Methane = 2 ppm
Ethane = 0 ppm
Biogenic Gases
Biogenic Gases

Traverse 98-2	Gas Line Road off Marek Rd., heading south						5/27/98-5/28/98	
Nelson, Jennings								
Sample #0 is at electric pole 167, on Gas Line rd., off south end of Marek rd., probe spacing 30ft.								
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.7	0.7	Cal. Gas		5/27/1998
1	9.144	30	1	2.7	1.7	1x		
2	18.288	60	1	1	0	flame out, No Peak		
3	27.432	90	1	2.8	1.8			
4	36.576	120	1	2.6	1.6	Hard soil, moved probe		
5	45.72	150	1	2	1	depth to 14in.		
6	54.864	180	1	2.8	1.8			
7	64.008	210	1	6.4	5.4			
8	73.152	240	1	2	1			
9	82.296	270	1	2.9	1.9			
10	91.44	300	1	1.8	0.8			
11	100.584	330	1	4.1	3.1			
12	109.728	360	1	1	0	flame out, No Peak		*Dup=0,0
13	118.872	390	1	2.2	1.2			
14	128.016	420	1	2.5	1.5			
15	137.16	450	1	2.6	1.6			
16	146.304	480	1	1	0	flame out, No Peak		*Dup=10,0,0
17	155.448	510	1	2	1			
18	164.592	540	1	1	0	flame out, No Peak		
19	173.736	570	1	2.6	1.6			
20	182.88	600	1	1.3	0.3	Cal. Gas	Sample #20 is 88ft.	
							South of electric pole	
Traverse 98-2	Gas Line rd., off Marek rd.		5/28/1998				#165	
Fountain, Nelson, Jennings								
H2=2000, 12	Batt.=8.0	Leak Test=C	Flow=Good					
Hot & Sunny								
Sample #21 is 118ft. South of electric pole 165 on east side of Gas Line Road								
*Traverse will follow electric lines								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
21	192.024	630	1	2.2	1.2	5/28/1998	Cal. Gas	
22	201.168	660	1	1.6	0.6	1x		
23	210.312	690	1	1.5	0.5			
24	219.456	720	1	1.1	0.1			
25	228.6	750	1	3.5	2.5			
26	237.744	780	1	1.1	0.1			
27	246.888	810	1	1.2	0.2			
28	256.032	840	1	1.1	0.1			
29	265.176	870	1	1	0	*		
30	274.32	900	1	1	0	*		
31	283.464	930	1	1	0	*	Sample #32 is on north	
32	292.608	960	1	1	0	*	bank of creek bed	
33	301.752	990	1	1.5	0.5	*Bed Rx exposed in creek		
34	310.896	1020	1	1.5	0.5			
35	320.04	1050	1	1.1	0.1			
36	329.184	1080	1	1.2	0.2			
37	338.328	1110	1	1.7	0.7			
38	347.472	1140	1	1.1	0.1			

39	356.616	1170	1	1	0			
40	365.76	1200	1	1.2	0.2			
41	374.904	1230	1	1.4	0.4			
42	384.048	1260	1	1.2	0.2			
43	393.192	1290	1	1	0			
44	402.336	1320	1	2.6	1.6			
45	411.48	1350	1	1.7	0.7			
46	420.624	1380	1	1.4	0.4			
47	429.768	1410	1	1.1	0.1			
48	438.912	1440	1	1.5	0.5			
49	448.056	1470	1	2	1			
50	457.2	1500	1	1.3	0.3			
51	466.344	1530	1	2.4	1.4			
52	475.488	1560	1	1.3	0.3			
53	484.632	1590	1	1.6	0.6			
54	493.776	1620	1	1.4	0.4			
55	502.92	1650	1	1.5	0.5			
56	512.064	1680	1	1.8	0.8			
57	521.208	1710	1	2	1			
58	530.352	1740	1	1	0	flame out, No Peak		
59	539.496	1770	1	1.5	0.5			
60	548.64	1800	1	1.3	0.3	Cal. Gas		
61	557.784	1830	1	2.4	1.4			
62	566.928	1860	1	1.6	0.6			
63	576.072	1890	1	1.9	0.9			
64	585.216	1920	1	1.5	0.5			
65	594.36	1950	0	0	0	*under water		
66	603.504	1980	1	2.6	1.6			
67	612.648	2010	1	2.1	1.1			
68	621.792	2040	1	1.9	0.9			
69	630.936	2070	1	1.6	0.6			
70	640.08	2100	1	2.8	1.8			
71	649.224	2130	1	1.6	0.6			
72	658.368	2160	1	1.7	0.7			
73	667.512	2190	1	1.4	0.4			
74	676.656	2220	1	1.3	0.3	Sample #74 is 10ft.		
75	685.8	2250	1	1.2	0.2	North of electric pole #158		
76	694.944	2280	1	2.4	1.4			
77	704.088	2310	1	2.6	1.6			
78	713.232	2340	1	1.8	0.8			
79	722.376	2370	1	2.4	1.4			
80	731.52	2400	1	2.1	1.1			
81	740.664	2430	1	1.9	0.9			
82	749.808	2460	1	2.2	1.2			
83	758.952	2490	1	2.1	1.1			
84	768.096	2520	1	2.3	1.3			
85	777.24	2550	1	2.2	1.2			
86	786.384	2580	1	3.5	2.5			
87	795.528	2610	1	2.2	1.2			
88	804.672	2640	1	3.8	2.8			
89	813.816	2670	1	8.1	7.1			

90	822.96	2700	1	3.2	2.2			
91	832.104	2730	0	0	0	*under water		
92	841.248	2760	1	2.8	1.8			
93	850.392	2790	1	2.7	1.7			
94	859.536	2820	1	2.2	1.2			
95	868.68	2850	1	1.7	0.7			
96	877.824	2880	1	1	0	flame out, No Peak		
97	886.968	2910	1	1	0	flame out, No Peak		
98	896.112	2940	1	1.4	0.4			
99	905.256	2970	1	1.4	0.4			
100	914.4	3000	1	1.5	0.5	Cal. Gas	Sample #100 is 60ft.	
							North of electric pole	
							#156	


Gasline Road
Organic Vapor (ppm)
Distance (ft.)
Gas Line Road
Biogenic Gases
Biogenic Gases
0
1
2
3
4
5
6
7
8
0
90
180
270
360
450
540
630
720
810
900
990
1080
1170
1260
1350
1440
1530
1620
1710
1800
1890
1980
2070
2160
2250
2340
2430
2520
2610
2700
2790
2880
2970

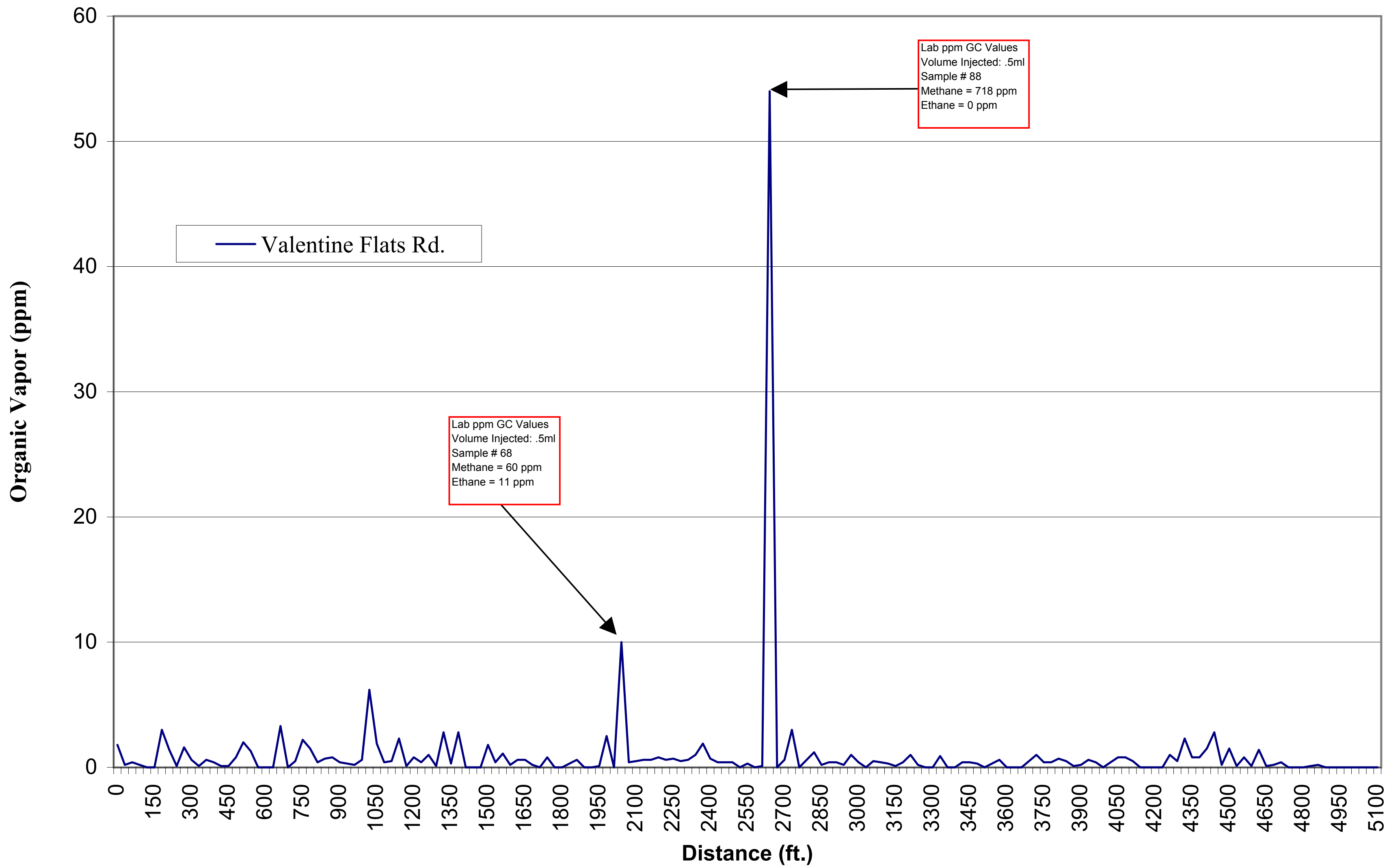
Traverse 98-3	Valentine Flats Rd.		6/4/98-6/10/98				
Nelson, Jennings							
H2=2000,11	Batt.=7.9	Leak Test=OK	Flow=Good				
Cool & Sunny							
Sample #0 is 36ft. East, 29ft. North from electric pole #32 on Point Peter Rd.-west side of Val. Flats Rd.							
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	2.8	1.8	6/4/1998	Cal. Gas
1	9.144	30	1	1.2	0.2	1x	
2	18.288	60	1	1.4	0.4	Sandy Soil	
3	27.432	90	1	1.2	0.2		
4	36.576	120	1	1	0	flame out, No Peak	
5	45.72	150	1	1	0	flame out, No Peak	
6	54.864	180	1	4	3		
7	64.008	210	1	2.4	1.4		
8	73.152	240	1	1.1	0.1		
9	82.296	270	1	2.6	1.6		
10	91.44	300	1	1.6	0.6		
11	100.584	330	1	1.1	0.1		
12	109.728	360	1	1.6	0.6		
13	118.872	390	1	1.4	0.4		
14	128.016	420	1	1.1	0.1		
15	137.16	450	1	1.1	0.1		
16	146.304	480	1	1.8	0.8		
17	155.448	510	1	3	2		
18	164.592	540	1	2.3	1.3		
19	173.736	570	1	1	0		
20	182.88	600	1	1	0		
21	192.024	630	1	1	0		
22	201.168	660	1	4.3	3.3		
23	210.312	690	1	1	0		
24	219.456	720	1	1.5	0.5		
25	228.6	750	1	3.2	2.2		
26	237.744	780	1	2.5	1.5		
27	246.888	810	1	1.4	0.4		
28	256.032	840	1	1.7	0.7		
29	265.176	870	1	1.8	0.8		
30	274.32	900	1	1.4	0.4		
31	283.464	930	1	1.3	0.3		
32	292.608	960	1	1.2	0.2		
33	301.752	990	1	1.6	0.6		
34	310.896	1020	1	7.2	6.2		
35	320.04	1050	1	2.9	1.9		
36	329.184	1080	1	1.4	0.4		
37	338.328	1110	1	1.5	0.5		
38	347.472	1140	1	3.3	2.3		
39	356.616	1170	1	1.1	0.1		
40	365.76	1200	1	1.8	0.8		
41	374.904	1230	1	1.4	0.4		
42	384.048	1260	1	2	1		
43	393.192	1290	1	1.1	0.1		
44	402.336	1320	1	3.8	2.8		

45	411.48	1350	1	1.3	0.3	Cal. Gas	
46	420.624	1380	1	3.8	2.8		
47	429.768	1410	1	1	0		
48	438.912	1440	1	1	0	flame out, No Peak	
49	448.056	1470	1	1	0	flame out, No Peak	
50	457.2	1500	1	2.8	1.8		
51	466.344	1530	1	1.4	0.4		
52	475.488	1560	1	2.1	1.1		
53	484.632	1590	1	1.2	0.2		
54	493.776	1620	1	1.6	0.6		
55	502.92	1650	1	1.6	0.6		
56	512.064	1680	1	1.2	0.2		
57	521.208	1710	1	1	0	flame out, No Peak	
58	530.352	1740	1	1.8	0.8		
59	539.496	1770	1	1	0	flame out, No Peak	
60	548.64	1800	1	1	0	flame out, No Peak	
61	557.784	1830	1	1.3	0.3		
62	566.928	1860	1	1.6	0.6		
63	576.072	1890	1	1	0	flame out, No Peak	
64	585.216	1920	1	1	0	flame out, No Peak	
65	594.36	1950	1	1.1	0.1		
66	603.504	1980	1	3.5	2.5		
67	612.648	2010	1	1	0		
68	621.792	2040	1	11	10		
69	630.936	2070	1	1.4	0.4		
70	640.08	2100	1	1.5	0.5		
71	649.224	2130	1	1.6	0.6		
72	658.368	2160	1	1.6	0.6		
73	667.512	2190	1	1.8	0.8	Cal. Gas	
						Sample #73 is 193	
						ft. east of enviro. con.	
Traverse 98-3	Valentine Flats Road		6/9/1998			sign, north side of	
Nelson, Jennings						Valentine Flats Rd.	
H2=2000, 11	Batt.=7.9	Leak Test=OK	Flow=Good				
Sample # 74 is 223ft. East of environmental Conserv. Sign							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
74	676.656	2220	1	1.6	0.6	6/9/1998	Cal. Gas
75	685.8	2250	1	1.7	0.7	1x	
76	694.944	2280	1	1.5	0.5	Dry clay soil	
77	704.088	2310	1	1.6	0.6		
78	713.232	2340	1	2	1		
79	722.376	2370	1	2.9	1.9		
80	731.52	2400	1	1.7	0.7		
81	740.664	2430	1	1.4	0.4		
82	749.808	2460	1	1.4	0.4	*Sample #88	Scale 10x
83	758.952	2490	1	1.4	0.4	Methane(ppm)/	Ethane
84	768.096	2520	1	1	0	55.0 (1:30)	No Peak
85	777.24	2550	1	1.3	0.3	34.0 (1:30)	No Peak
86	786.384	2580	1	1	0		
87	795.528	2610	1	1.1	0.1		
88	804.672	2640	1	55	54	*Off scale, flame out	

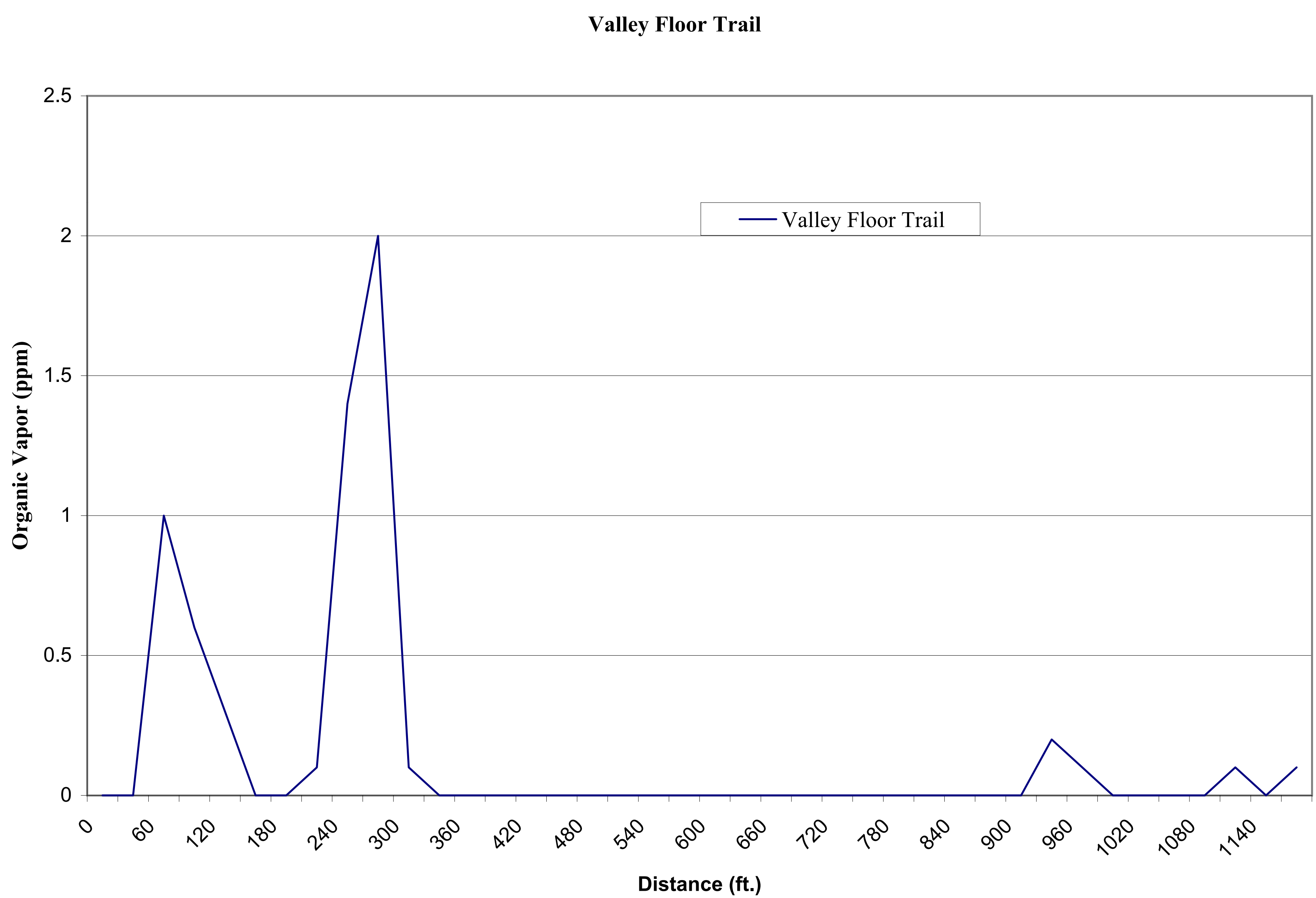
89	813.816	2670	1	1	0		
90	822.96	2700	1	1.6	0.6		
91	832.104	2730	1	4	3		
92	841.248	2760	1	1	0		
93	850.392	2790	1	1.6	0.6		
94	859.536	2820	1	2.2	1.2		
95	868.68	2850	1	1.2	0.2		
96	877.824	2880	1	1.4	0.4		
97	886.968	2910	1	1.4	0.4		
98	896.112	2940	1	1.2	0.2		
99	905.256	2970	1	2	1		
100	914.4	3000	1	1.4	0.4		
101	923.544	3030	1	1	0	flame out, No Peak	
102	932.688	3060	1	1.5	0.5		
103	941.832	3090	1	1.4	0.4		
104	950.976	3120	1	1.3	0.3		
105	960.12	3150	1	1.1	0.1		
106	969.264	3180	1	1.4	0.4		
107	978.408	3210	1	2	1		
108	987.552	3240	1	1.2	0.2		
109	996.696	3270	1	1	0		
110	1005.84	3300	1	1	0	flame out, No Peak	
111	1014.984	3330	1	1.9	0.9		
112	1024.128	3360	1	1	0	flame out, No Peak	
113	1033.272	3390	1	1	0	flame out, No Peak	
114	1042.416	3420	1	1.4	0.4		
115	1051.56	3450	1	1.4	0.4		
116	1060.704	3480	1	1.3	0.3		
117	1069.848	3510	1	1	0	flame out, No Peak	
118	1078.992	3540	1	1.3	0.3	Cal. Gas	
119	1088.136	3570	1	1.6	0.6		
120	1097.28	3600	1	1	0	flame out, No Peak	
121	1106.424	3630	1	1	0	flame out, No Peak	
122	1115.568	3660	1	1	0	flame out, No Peak	
123	1124.712	3690	1	1.5	0.5		
124	1133.856	3720	1	2	1		
125	1143	3750	1	1.4	0.4		
126	1152.144	3780	1	1.4	0.4		
127	1161.288	3810	1	1.7	0.7		
128	1170.432	3840	1	1.5	0.5		
129	1179.576	3870	1	1.1	0.1		
130	1188.72	3900	1	1.2	0.2		
131	1197.864	3930	1	1.6	0.6		
132	1207.008	3960	1	1.4	0.4		
133	1216.152	3990	1	1	0		
134	1225.296	4020	1	1.4	0.4		
135	1234.44	4050	1	1.8	0.8		
136	1243.584	4080	1	1.8	0.8		
137	1252.728	4110	1	1.5	0.5	Next to corn field	
138	1261.872	4140	1	1	0	flame out, No Peak	
139	1271.016	4170	1	1	0	flame out, No Peak	

140	1280.16	4200	1	1	0	flame out, No Peak	
141	1289.304	4230	1	1	0	flame out, No Peak	
142	1298.448	4260	1	2	1	*Entrance to trail	
143	1307.592	4290	1	1.5	0.5		
144	1316.736	4320	1	3.3	2.3		
145	1325.88	4350	1	1.8	0.8		
146	1335.024	4380	1	1.8	0.8		
147	1344.168	4410	1	2.5	1.5		
148	1353.312	4440	1	3.8	2.8		
149	1362.456	4470	1	1.2	0.2		
150	1371.6	4500	1	2.5	1.5	Cal. Gas	
						*Sample 150 is 3ft. East of	
Traverse 98-3	Valentine Flats Road		6/10/1998			creek on trail	
Nelson, Jennings							
H2=1700, 11	Batt.=8.1	Leak Test=OK	Flow=Good				
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
151	1380.744	4530	1	1.1	0.1	6/10/1998	
152	1389.888	4560	1	1.8	0.8	1x	
153	1399.032	4590	1	1.1	0.1	*Trail splits at sample #153.	
154	1408.176	4620	1	2.4	1.4	Sample #154	
155	1417.32	4650	1	1.1	0.1	and beyond are on north trail	
156	1426.464	4680	1	1.2	0.2		
157	1435.608	4710	1	1.4	0.4		
158	1444.752	4740	1	1	0		
159	1453.896	4770	1	1	0		
160	1463.04	4800	1	1	0		
161	1472.184	4830	1	1.1	0.1		
162	1481.328	4860	1	1.2	0.2		
163	1490.472	4890	1	1	0		
164	1499.616	4920	1	1	0		
165	1508.76	4950	1	1	0		
166	1517.904	4980	1	1	0		
167	1527.048	5010	1	1	0		
168	1536.192	5040	1	1	0		
169	1545.336	5070	1	1	0		
170	1554.48	5100	1	1	0	Cal. Gas	
*Note: Well beyond sample #170, off trail contained-G.C. Graph Area							
	Methane = 23,932						
	Ethane = 7,736						
	Propane = 463						
	Butane = 1,274						

Valentine Flats Road



Traverse 98-4	Valley Floor Trail end of Valentine Flats Rd., Zoar Valley					6/10/1998	
Nelson, Jennings							
Traverse starts 20ft. South of last apple tree on valley floor, heading east towards creek							
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	1	0	6/10/1998	Cal. Gas
1	9.144	30	1	1	0	1x	
2	18.288	60	1	2	1	High organics soil, black	
3	27.432	90	1	1.6	0.6	Good Flow	
4	36.576	120	1	1.3	0.3		
5	45.72	150	1	1	0		
6	54.864	180	1	1	0		
7	64.008	210	1	1.1	0.1		
8	73.152	240	1	2.4	1.4		
9	82.296	270	1	3	2		
10	91.44	300	1	1.1	0.1		
11	100.584	330	1	1	0		
12	109.728	360	1	1	0		
13	118.872	390	1	1	0		
14	128.016	420	1	1	0		
15	137.16	450	1	1	0		
16	146.304	480	1	1	0		
17	155.448	510	1	1	0		
18	164.592	540	1	1	0		
19	173.736	570	1	1	0		
20	182.88	600	1	1	0		
21	192.024	630	1	1	0		
22	201.168	660	1	1	0		
23	210.312	690	1	1	0		
24	219.456	720	1	1	0		
25	228.6	750	1	1	0		
26	237.744	780	1	1	0		
27	246.888	810	1	1	0		
28	256.032	840	1	1	0		
29	265.176	870	1	1	0		
30	274.32	900	1	1	0		
31	283.464	930	1	1.2	0.2		
32	292.608	960	1	1.1	0.1		
33	301.752	990	1	1	0		
34	310.896	1020	1	1	0		
35	320.04	1050	1	1	0		
36	329.184	1080	1	1	0		
37	338.328	1110	1	1.1	0.1		
38	347.472	1140	1	1	0		
39	356.616	1170	1	1.1	0.1	Cal. Gas	
						*Sample #39 is on bank of	
						creek, 14ft. From bed Rx	


Valley Floor Trail
Valley Floor Trail
Organic Vapor (ppm)
2.5
2
1.5
1
0.5
0
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
Distance (ft.)

Traverse 98-5		Peck Hill Road and T Junction Hooker Hill Road, Rt. 353, Rt. 62					
Nelson, Jennings						6/11,17,18,24/98 & 7/14/98	
H2=2000,12		Batt.=8.0	Leak Test=OK		Flow=Good		
Overcast, warm							
Traverse starts at "T" junction of Hooker Hill rd. and Peck Hill rd.- 6.5ft. North of arrow sign/Dayton township							
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	1.2	0.2	Cal. Gas	6/11/1998
1	9.144	30	1	3.4	2.4	1x	
2	18.288	60	1	1.2	0.2	Sandy soil	
3	27.432	90	1	1.1	0.1		
4	36.576	120	1	1.1	0.1		
5	45.72	150	1	1.1	0.1		
6	54.864	180	1	1.3	0.3		
7	64.008	210	1	1.7	0.7		
8	73.152	240	1	1.6	0.6		
9	82.296	270	1	1	0	Flame out/No Peak	
10	91.44	300	1	2.3	1.3		
11	100.584	330	1	2.2	1.2		
12	109.728	360	1	1.2	0.2		
13	118.872	390	1	1	0		
14	128.016	420	1	1.3	0.3		
15	137.16	450	1	1	0		
16	146.304	480	1	2.5	1.5		
17	155.448	510	1	1.4	0.4		
18	164.592	540	1	1.9	0.9		
19	173.736	570	1	1	0		
20	182.88	600	1	1.2	0.2		
21	192.024	630	1	2.3	1.3		
22	201.168	660	1	5.4	4.4		
23	210.312	690	1	6.5	5.5		
24	219.456	720	1	2.5	1.5		
25	228.6	750	1	4.2	3.2		
26	237.744	780	1	5.5	4.5		
27	246.888	810	1	3	2		
28	256.032	840	1	4.1	3.1		
29	265.176	870	1	7.3	6.3		
30	274.32	900	1	3.5	2.5		
31	283.464	930	1	4	3		
32	292.608	960	1	2.6	1.6		
33	301.752	990	1	1.7	0.7		
34	310.896	1020	1	2.2	1.2		
35	320.04	1050	1	1.3	0.3		
36	329.184	1080	1	1.4	0.4		
37	338.328	1110	1	1.2	0.2		
38	347.472	1140	1	7.2	6.2		
39	356.616	1170	1	2.1	1.1		
40	365.76	1200	1	1.9	0.9	Cal. Gas	
41	374.904	1230	1	1.9	0.9		
42	384.048	1260	1	1.5	0.5		
43	393.192	1290	1	1.2	0.2		
44	402.336	1320	1	3	2		

45	411.48	1350	1	2.1	1.1		
46	420.624	1380	1	2.6	1.6		
47	429.768	1410	1	1.6	0.6		
48	438.912	1440	1	2	1	*Methane Spike (sample 51)	
49	448.056	1470	1	1.7	0.7	Peak (Methane)	Methane
50	457.2	1500	1	2.2	1.2	10(	1.8(1:30)
51	466.344	1530	1	62	61	140	1.7(1:30)
52	475.488	1560	1	1.5	0.5	Ethane	Scale
53	484.632	1590	1	1.6	0.6	No Peak	1x
54	493.776	1620	1	3.8	2.8	No Peak	1x
55	502.92	1650	1	1	0	Flame out/No Peak	
56	512.064	1680	1	1	0	Flame out/No Peak	
57	521.208	1710	1	1	0	Flame out/No Peak	
58	530.352	1740	1	1.4	0.4		
59	539.496	1770	1	1.7	0.7		
60	548.64	1800	1	1.6	0.6		
61	557.784	1830	1	1.9	0.9		
62	566.928	1860	1	2.9	1.9		
63	576.072	1890	1	2.2	1.2		
64	585.216	1920	1	1	0	Flame out/No Peak	
65	594.36	1950	1	1	0	Flame out/No Peak	
66	603.504	1980	1	1.9	0.9		
67	612.648	2010	1	1.1	0.1		
68	621.792	2040	1	1.4	0.4		
69	630.936	2070	1	3.3	2.3		
70	640.08	2100	1	3.9	2.9	Cal. Gas	
Traverse 98-5		Peck Hill Rd.	6/17/1998				
Nelson, Jennings							
H2=2000,12		Batt.=7.9	Leak Test=OK		Flow=OK		
Sunny & warm							
Sample #71 is 158ft. East of gas pipeline stake, south side of rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Comments		
71	649.224	2130	1	42	41	6/17/1998	
72	658.368	2160	1	2.2	1.2	Cal. Gas	
73	667.512	2190	1	1.4	0.4	1x	
74	676.656	2220	1	1.4	0.4	Very wet conditions/Just rained	
75	685.8	2250	1	1	0	*Methane Spike	Sample 71
76	694.944	2280	1	1.2	0.2	Methane	Ethane
77	704.088	2310	1	1.1	0.1	3.8(1:25)	2.4(1:53)
78	713.232	2340	1	1.1	0.1	2.7(1:23)	No Peak
79	722.376	2370	1	1	0	*Also a 1000+ Pea	Scale 1x
80	731.52	2400	1	3	2		
81	740.664	2430	1	1	0		
82	749.808	2460	1	2.7	1.7		
83	758.952	2490	1	3.5	2.5		
84	768.096	2520	1	3.2	2.2		
85	777.24	2550	1	3.2	2.2		
86	786.384	2580	1	1.4	0.4		
87	795.528	2610	1	1.1	0.1		
88	804.672	2640	1	1.2	0.2		

89	813.816	2670	1	1.2	0.2		
90	822.96	2700	1	1.9	0.9		
91	832.104	2730	1	3.9	2.9		
92	841.248	2760	1	3.2	2.2		
93	850.392	2790	1	4.5	3.5		
94	859.536	2820	1	2.5	1.5		
95	868.68	2850	1	2	1		
96	877.824	2880	1	2.1	1.1		
97	886.968	2910	1	1.6	0.6		
98	896.112	2940	1	2.6	1.6		
99	905.256	2970	1	2.8	1.8		
100	914.4	3000	1	2.4	1.4		
101	923.544	3030	1	1.1	0.1		
102	932.688	3060	1	2	1		
103	941.832	3090	1	1.7	0.7		
104	950.976	3120	1	2	1		
105	960.12	3150	1	2.4	1.4		
106	969.264	3180	1	1.1	0.1		
107	978.408	3210	1	1.2	0.2		
108	987.552	3240	1	1	0		
109	996.696	3270	1	1.6	0.6		
110	1005.84	3300	1	1	0		
111	1014.984	3330	1	4.2	3.2		
112	1024.128	3360	1	2.9	1.9		
113	1033.272	3390	1	2.3	1.3		
114	1042.416	3420	1	1.2	0.2	Cal. Gas	
115	1051.56	3450	1	1.8	0.8		
116	1060.704	3480	1	2.4	1.4		
117	1069.848	3510	1	3.6	2.6		
118	1078.992	3540	1	4	3		
119	1088.136	3570	1	3.4	2.4		
120	1097.28	3600	1	3.2	2.2		
121	1106.424	3630	1	1	0		
122	1115.568	3660	1	1.9	0.9		
123	1124.712	3690	1	2.7	1.7		
124	1133.856	3720	1	2	1		
125	1143	3750	1	2.2	1.2		
126	1152.144	3780	1	1.3	0.3		
127	1161.288	3810	1	1	0		
128	1170.432	3840	1	1.2	0.2		
129	1179.576	3870	1	1.9	0.9		
130	1188.72	3900	1	1.8	0.8	Flame out	
131	1197.864	3930	1	1.1	0.1		
132	1207.008	3960	1	2.8	1.8	*South on Rt. 353	
133	1216.152	3990	1	3.2	2.2		
134	1225.296	4020	1	10	9	Off Scale	
135	1234.44	4050	1	4	3		
136	1243.584	4080	1	5.8	4.8		
137	1252.728	4110	1	3.6	2.6		
138	1261.872	4140	1	4.6	3.6		
139	1271.016	4170	1	4.5	3.5		

140	1280.16	4200	1	3	2		
141	1289.304	4230	1	3	2		
142	1298.448	4260	1	2.4	1.4		
143	1307.592	4290	1	1.2	0.2		
144	1316.736	4320	1	1.2	0.2		
145	1325.88	4350	1	1.4	0.4		
146	1335.024	4380	1	1.6	0.6		
147	1344.168	4410	1	3.3	2.3		
148	1353.312	4440	1	1.9	0.9		
149	1362.456	4470	1	1.7	0.7		
150	1371.6	4500	1	2.7	1.7		
151	1380.744	4530	1	3.8	2.8		
152	1389.888	4560	1	6.2	5.2		
153	1399.032	4590	1	3	2		
154	1408.176	4620	1	1.6	0.6		
155	1417.32	4650	1	1.1	0.1		
156	1426.464	4680	1	1	0		
157	1435.608	4710	1	1.5	0.5		
158	1444.752	4740	1	1.9	0.9		
159	1453.896	4770	1	1.8	0.8		
160	1463.04	4800	1	1.4	0.4		
161	1472.184	4830	1	1.9	0.9		
162	1481.328	4860	1	1.3	0.3		
163	1490.472	4890	1	1.3	0.3		
164	1499.616	4920	1	1	0		
165	1508.76	4950	1	1.1	0.1	Cal. Gas	
Traverse 98-5		Rt. 353	6/18/1998				
Fountain, Nelson, Jennings							
H2=2000, 12		Batt.=8.0	Leak Test=OK		Flow=Great		
Sunny & Warm							
Sample #166 is 41ft. South of curve sign on west side of Rt. 353							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
166	1517.904	4980	1	8	7	Cal. Gas	6/18/1998
167	1527.048	5010	1	1.1	0.1	1x	
168	1536.192	5040	1	9.5	8.5	Sandy Loam	
169	1545.336	5070	1	4	3	*Sample #170 is 10ft. North to	
170	1554.48	5100	1	9.2	8.2	actual location due to stream	
171	1563.624	5130	1	1	0	Flame out/No Peak	
172	1572.768	5160	1	1	0	Flame out/No Peak	
173	1581.912	5190	1	1	0	Flame out/No Peak	
174	1591.056	5220	1	1.2	0.2		
175	1600.2	5250	1	1.2	0.2		
176	1609.344	5280	1	3.8	2.8		
177	1618.488	5310	1	2.8	1.8		
178	1627.632	5340	1	3	2		
179	1636.776	5370	1	2.4	1.4		
180	1645.92	5400	1	1.4	0.4		
181	1655.064	5430	1	1.2	0.2		
182	1664.208	5460	1	1.4	0.4		
183	1673.352	5490	1	3	2		

184	1682.496	5520	1	3.4	2.4		
185	1691.64	5550	1	5.4	4.4		
186	1700.784	5580	1	1.2	0.2		
187	1709.928	5610	1	2.8	1.8		
188	1719.072	5640	1	2.1	1.1		
189	1728.216	5670	1	1.4	0.4		
190	1737.36	5700	1	2.4	1.4		
191	1746.504	5730	1	3.4	2.4		
192	1755.648	5760	1	2.2	1.2		
193	1764.792	5790	1	3.6	2.6		
194	1773.936	5820	1	5.4	4.4		
195	1783.08	5850	1	4	3		
196	1792.224	5880	1	3.5	2.5		
197	1801.368	5910	1	1.1	0.1		
198	1810.512	5940	1	4.4	3.4		
199	1819.656	5970	1	2	1		
200	1828.8	6000	1	1	0	Flame out/No Peak	
201	1837.944	6030	1	3	2		
202	1847.088	6060	1	5.5	4.5		
203	1856.232	6090	1	4	3		
204	1865.376	6120	1	1.3	0.3		
205	1874.52	6150	1	1.8	0.8		
206	1883.664	6180	1	3.5	2.5		
207	1892.808	6210	1	7.7	6.7		
208	1901.952	6240	1	2.6	1.6		
209	1911.096	6270	1	5	4		
210	1920.24	6300	1	3.2	2.2		
211	1929.384	6330	1	2.3	1.3		
212	1938.528	6360	1	2.4	1.4		
213	1947.672	6390	1	5.8	4.8		
214	1956.816	6420	1	1.5	0.5		
215	1965.96	6450	1	4.5	3.5		
216	1975.104	6480	1	1	0	Flame out/No Peak	
217	1984.248	6510	1	5	4		
218	1993.392	6540	1	2.6	1.6		
219	2002.536	6570	1	5.4	4.4		
220	2011.68	6600	1	1.9	0.9		
221	2020.824	6630	1	6.5	5.5		
222	2029.968	6660	1	4.3	3.3		
223	2039.112	6690	1	5	4		
224	2048.256	6720	1	5.8	4.8		
225	2057.4	6750	1	4.8	3.8		
226	2066.544	6780	1	2.4	1.4		
227	2075.688	6810	1	1.2	0.2		
228	2084.832	6840	1	2.2	1.2		
229	2093.976	6870	1	6.8	5.8	Cal. Gas	
230	2103.12	6900	1	2.7	1.7		
231	2112.264	6930	1	1.6	0.6		
232	2121.408	6960	1	1.6	0.6		
233	2130.552	6990	1	1.5	0.5		
234	2139.696	7020	1	1.4	0.4		

235	2148.84	7050	1	1.1	0.1		
236	2157.984	7080	1	1.6	0.6		
237	2167.128	7110	1	1.4	0.4		
238	2176.272	7140	1	1.1	0.1		
239	2185.416	7170	1	1.9	0.9		
240	2194.56	7200	1	2.4	1.4		
241	2203.704	7230	1	1.8	0.8		
242	2212.848	7260	1	2.8	1.8		
243	2221.992	7290	1	1.2	0.2		
244	2231.136	7320	1	1.5	0.5		
245	2240.28	7350	1	1.8	0.8		
246	2249.424	7380	1	3.7	2.7		
247	2258.568	7410	1	1.4	0.4		
248	2267.712	7440	1	1.9	0.9		
249	2276.856	7470	1	5	4		
250	2286	7500	1	2.5	1.5	Cal. Gas	
Traverse 98-5		Rt. 353/Rt. 62		6/24/1998			
Nelson, Jennings, Bieber							
H2=2000, 12		Batt.=7.8	Leak Test=OK		Flow=good		
Humid & warm							
Sample #251 is at stop sign on Rt. 353, east side of rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
251	2295.144	7530	1	7.4	6.4	Cal. Gas	6/24/1998
252	2304.288	7560	1	6.2	5.2	1x	
253	2313.432	7590	1	5	4		
254	2322.576	7620	1	1.8	0.8		
255	2331.72	7650	1	1	0	Rt. 62	
256	2340.864	7680	1	10	9	Off Scale	
257	2350.008	7710	1	1.7	0.7		
258	2359.152	7740	1	3.1	2.1		
259	2368.296	7770	1	1.8	0.8		
260	2377.44	7800	1	1	0	Flame out/No Peak	
261	2386.584	7830	1	2.1	1.1		
262	2395.728	7860	1	1.6	0.6		
263	2404.872	7890	1	2.2	1.2		
264	2414.016	7920	1	8.8	7.8		
265	2423.16	7950	1	4.8	3.8		
266	2432.304	7980	1	10	9		
267	2441.448	8010	1	8	7		
268	2450.592	8040	1	4	3		
269	2459.736	8070	1	8.8	7.8		
270	2468.88	8100	1	100	99	*Methane Spike Sample #270	
271	2478.024	8130	1	1	0	Peak	Methane
272	2487.168	8160	1	5.6	4.6	90(10x)	2.4(1:28)
273	2496.312	8190	1	5.5	4.5	28(10x)	1.4(1:30)
274	2505.456	8220	1	8.5	7.5	Ethane	Scale
275	2514.6	8250	1	4.6	3.6	No Peak	1x
276	2523.744	8280	1	4	3	No Peak	1x
277	2532.888	8310	1	2	1		
278	2542.032	8340	1	5.2	4.2		

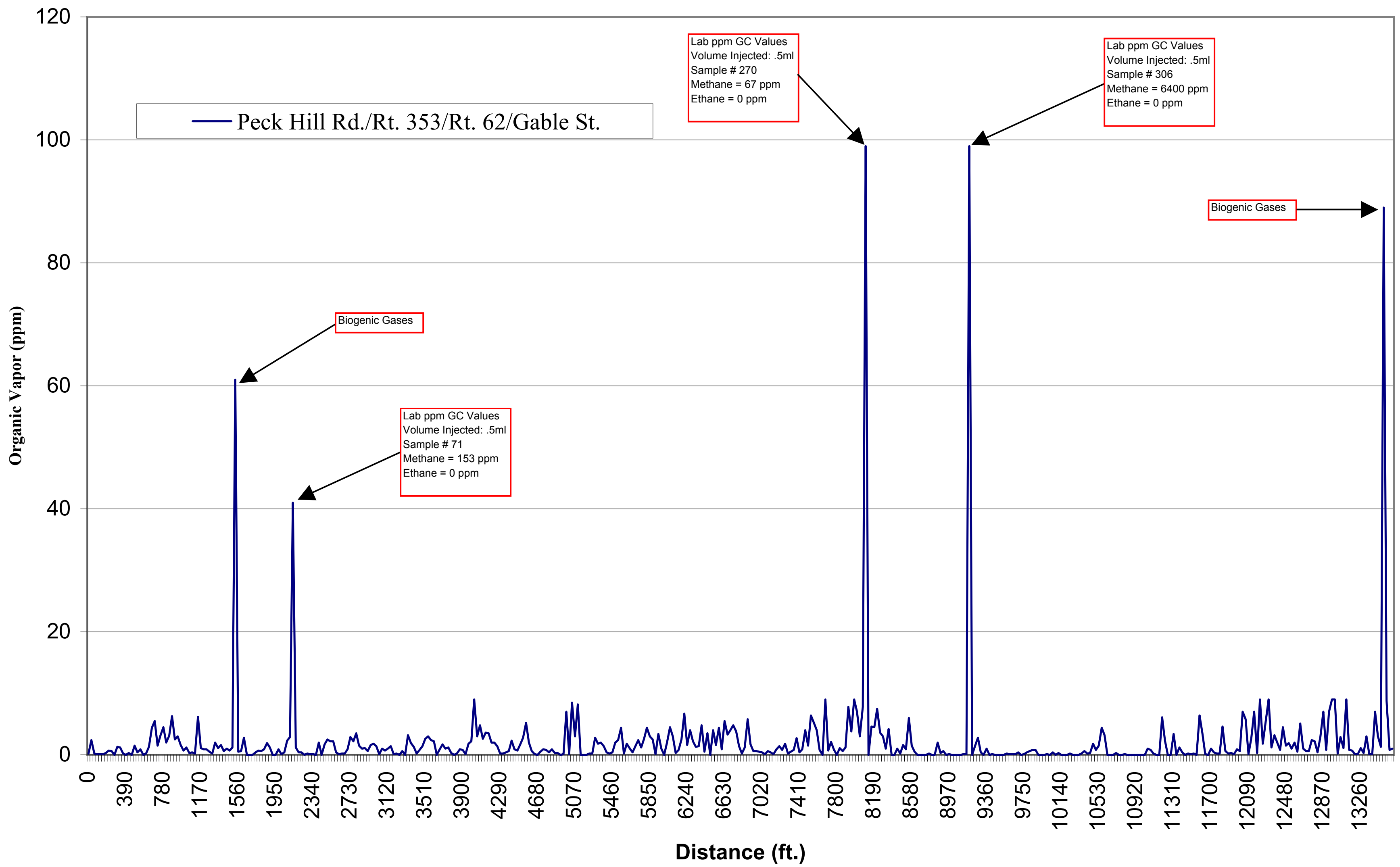
279	2551.176	8370	1	1	0	Flame out/No Peak	
280	2560.32	8400	1	1	0	Flame out/No Peak	
281	2569.464	8430	1	2	1		
282	2578.608	8460	1	1.2	0.2		
283	2587.752	8490	1	2.6	1.6		
284	2596.896	8520	1	1.9	0.9		
285	2606.04	8550	1	7	6		
286	2615.184	8580	1	2.5	1.5		
287	2624.328	8610	1	1.5	0.5		
288	2633.472	8640	1	1	0		
289	2642.616	8670	1	1	0		
290	2651.76	8700	1	1	0		
291	2660.904	8730	1	1	0		
292	2670.048	8760	1	1.2	0.2		
293	2679.192	8790	1	1	0	Flame out/No Peak	
294	2688.336	8820	1	1	0	Flame out/No Peak	
295	2697.48	8850	1	3	2		
296	2706.624	8880	1	1.3	0.3	Cal. Gas	
297	2715.768	8910	1	1.6	0.6		
298	2724.912	8940	1	1	0		
299	2734.056	8970	1	1.1	0.1		
300	2743.2	9000	1	1	0		
301	2752.344	9030	1	1	0		
302	2761.488	9060	1	1	0		
303	2770.632	9090	1	1	0		
304	2779.776	9120	1	1.1	0.1		
305	2788.92	9150	1	1.1	0.1		
306	2798.064	9180	1	100	99		
307	2807.208	9210	1	1	0		
308	2816.352	9240	1	2.4	1.4		
309	2825.496	9270	1	3.8	2.8		
310	2834.64	9300	1	1.4	0.4		
311	2843.784	9330	1	1	0	Flame out/No Peak	
312	2852.928	9360	1	2	1		
313	2862.072	9390	1	1	0		
314	2871.216	9420	1	1.1	0.1		
315	2880.36	9450	1	1	0	Flame out/No Peak	
316	2889.504	9480	1	1	0		
317	2898.648	9510	1	1	0		
318	2907.792	9540	1	1	0		
319	2916.936	9570	1	1.2	0.2		
320	2926.08	9600	1	1.1	0.1		
321	2935.224	9630	1	1.1	0.1		
322	2944.368	9660	1	1.1	0.1		
323	2953.512	9690	1	1.4	0.4	30% wet soil, sandy	
324	2962.656	9720	1	1	0		
325	2971.8	9750	1	1.1	0.1		
326	2980.944	9780	1	1.4	0.4		
327	2990.088	9810	1	1.6	0.6		
328	2999.232	9840	1	1.8	0.8		
329	3008.376	9870	1	1.8	0.8		

330	3017.52	9900	1	1	0		
331	3026.664	9930	1	1	0		
332	3035.808	9960	1	1	0		
333	3044.952	9990	1	1.1	0.1		
334	3054.096	10020	1	1	0		
335	3063.24	10050	1	1.4	0.4		
336	3072.384	10080	1	1	0		
337	3081.528	10110	1	1.3	0.3		
338	3090.672	10140	1	1	0	Flame out/No Peak	
339	3099.816	10170	1	1	0		
340	3108.96	10200	1	1	0		
341	3118.104	10230	1	1.2	0.2		
342	3127.248	10260	1	1	0		
343	3136.392	10290	1	1	0		
344	3145.536	10320	1	1	0		
345	3154.68	10350	1	1.2	0.2		
346	3163.824	10380	1	1.6	0.6		
347	3172.968	10410	1	1.2	0.2		
348	3182.112	10440	1	1.3	0.3		
349	3191.256	10470	1	2.8	1.8		
350	3200.4	10500	1	1.8	0.8	Cal. Gas	
Treverse 98-5		Rt. 62	7/14/1998				
Nelson, Jennings, Bieber							
H2=2000,12		Batt.=7.6	Leak Test=OK		Flow=Good		
Sunny & Hot							
Sample # 351 is 56ft. From electrical pole #75, north side of rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
351	3209.544	10530	1	2.5	1.5	Cal. Gas	7/14/1998
352	3218.688	10560	1	5.4	4.4	1x	
353	3227.832	10590	1	4.2	3.2	Sandy Soil	
354	3236.976	10620	1	1	0		
355	3246.12	10650	1	1	0		
356	3255.264	10680	1	1	0		
357	3264.408	10710	1	1.3	0.3		
358	3273.552	10740	1	1	0		
359	3282.696	10770	1	1	0		
360	3291.84	10800	1	1.1	0.1		
361	3300.984	10830	1	1	0		
362	3310.128	10860	1	1	0		
363	3319.272	10890	1	1	0		
364	3328.416	10920	1	1	0		
365	3337.56	10950	1	1	0	Flame out/No Peak	
366	3346.704	10980	1	1	0		
367	3355.848	11010	1	1	0	Flame out/No Peak	
368	3364.992	11040	1	2	1		
369	3374.136	11070	1	1.8	0.8		
370	3383.28	11100	1	1.2	0.2		
371	3392.424	11130	1	1	0	Flame out/No Peak	
372	3401.568	11160	1	1	0		
373	3410.712	11190	1	7.1	6.1		

374	3419.856	11220	1	3.3	2.3		
375	3429	11250	1	1	0		
376	3438.144	11280	1	1	0	Flame out/No Peak	
377	3447.288	11310	1	4.4	3.4	Flame out/No Peak	
378	3456.432	11340	1	1	0		
379	3465.576	11370	1	2.2	1.2		
380	3474.72	11400	1	1.4	0.4		
381	3483.864	11430	1	1	0		
382	3493.008	11460	1	1.2	0.2		
383	3502.152	11490	1	1.1	0.1		
384	3511.296	11520	1	1.2	0.2		
385	3520.44	11550	1	1	0		
386	3529.584	11580	1	7.4	6.4		
387	3538.728	11610	1	4.5	3.5		
388	3547.872	11640	1	1.1	0.1		
389	3557.016	11670	1	1	0		
390	3566.16	11700	1	2	1		
391	3575.304	11730	1	1.4	0.4		
392	3584.448	11760	1	1.2	0.2		
393	3593.592	11790	1	1.2	0.2		
394	3602.736	11820	1	5.6	4.6		
395	3611.88	11850	1	1.6	0.6		
396	3621.024	11880	1	1.2	0.2		
397	3630.168	11910	1	1.3	0.3		
398	3639.312	11940	1	1.1	0.1		
399	3648.456	11970	1	1.9	0.9		
400	3657.6	12000	1	1.6	0.6		
401	3666.744	12030	1	8	7		
402	3675.888	12060	1	6.8	5.8		
403	3685.032	12090	1	1.1	0.1		
404	3694.176	12120	1	3.7	2.7		
405	3703.32	12150	1	8	7		
406	3712.464	12180	1	1.3	0.3		
407	3721.608	12210	1	10	9		
408	3730.752	12240	1	2.8	1.8	*Between Two Creeks	
409	3739.896	12270	1	6.5	5.5	Cal. Gas	
410	3749.04	12300	1	10	9		
411	3758.184	12330	1	2.2	1.2		
412	3767.328	12360	1	4.2	3.2		
413	3776.472	12390	1	3	2		
414	3785.616	12420	1	1.8	0.8		
415	3794.76	12450	1	5.5	4.5		
416	3803.904	12480	1	2.5	1.5		
417	3813.048	12510	1	2.9	1.9		
418	3822.192	12540	1	2	1		
419	3831.336	12570	1	3	2		
420	3840.48	12600	1	1.5	0.5		
421	3849.624	12630	1	6.1	5.1		
422	3858.768	12660	1	2	1		
423	3867.912	12690	1	1.6	0.6		
424	3877.056	12720	1	1.6	0.6		

425	3886.2	12750	1	3.4	2.4		
426	3895.344	12780	1	3.2	2.2		
427	3904.488	12810	1	1.4	0.4		
428	3913.632	12840	1	3.9	2.9		
429	3922.776	12870	1	8	7		
430	3931.92	12900	1	1.8	0.8		
431	3941.064	12930	1	8	7		
432	3950.208	12960	1	10	9	*Next to swamp	
433	3959.352	12990	1	10	9	"	
434	3968.496	13020	1	1.2	0.2	"	
435	3977.64	13050	1	3.9	2.9	"	
436	3986.784	13080	1	2.1	1.1	"	
437	3995.928	13110	1	10	9	"	
438	4005.072	13140	1	1.8	0.8		
439	4014.216	13170	1	1.7	0.7		
440	4023.36	13200	1	1.1	0.1	Good Flow	
441	4032.504	13230	1	1.1	0.1		
442	4041.648	13260	1	2.1	1.1		
443	4050.792	13290	1	1.3	0.3		
444	4059.936	13320	1	4	3		
445	4069.08	13350	1	1.1	0.1		
446	4078.224	13380	1	1.1	0.1		
447	4087.368	13410	1	8	7		
448	4096.512	13440	1	4	3		
449	4105.656	13470	1	2.3	1.3		
450	4114.8	13500	1	90	89	*Methane Spike	Scale 1x
451	4123.944	13530	1	9.8	8.8	Methane	Ethane
452	4133.088	13560	1	1.8	0.8	1.2(1:25)	No Peak
453	4142.232	13590	1	2	1	Cal. Gas	
					*Sample #453 is 15ft. From electric		
					pole#14a on Rt. 353, South side		
					of rd.		

Peck Hill Rd. / Rt. 353 / Rt. 62 / Gable St.



Traverse 98-6		Dye Road			6/23/98,6/25/98		
Nelson, Jennings							
H2=2000, 12		Batt.=7.8	Leak Test=OK		Flow=Slow		
Misty, Rain, Cool							
Point #0 is located next to Electrical pole #2-2-19-8-14, south side of Dye Rd., Heading east							
Sample #	Distance (m)	Distance (ft)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	1.4	0.4	Cal. Gas	6/23/1998
1	9.144	30	1	1	0	1x	
2	18.288	60	1	1	0	Wet Clay Soil	
3	27.432	90	1	1.4	0.4	poor flow	
4	36.576	120	1	1.3	0.3		
5	45.72	150	1	1.1	0.1		
6	54.864	180	1	1.1	0.1		
7	64.008	210	1	1	0	Flame out/No Peak	
8	73.152	240	1	1	0		
9	82.296	270	1	1	0		
10	91.44	300	1	1	0		
11	100.584	330	1	1	0		
12	109.728	360	1	1	0	Flame out/No Peak	
13	118.872	390	1	1.2	0.2		
14	128.016	420	1	1	0		
15	137.16	450	1	1	0		
16	146.304	480	1	1	0		
17	155.448	510	1	1.2	0.2		
18	164.592	540	1	1.1	0.1	*at pole #2-2-19-9-15	
19	173.736	570	1	1.2	0.2		
20	182.88	600	1	1	0	Cal. Gas	
Traverse 98-6		Dye Rd.	6/25/1998				
Nelson, Jennings, Bieber							
H2=2000, 12		Batt.=7.9	Leak Test=OK		Flow=Good		
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
21	192.024	630	1	1	0	Cal. Gas 6/25/1998	
22	201.168	660	1	1.2	0.2	1x	
23	210.312	690	1	1	0		
24	219.456	720	1	1.3	0.3		
25	228.6	750	1	1.1	0.1		
26	237.744	780	1	5	4		
27	246.888	810	1	10	9	Redo 3 samples	Box A
28	256.032	840	1	1.3	0.3		
29	265.176	870	1	2.5	1.5		
30	274.32	900	1	1.2	0.2		
31	283.464	930	1	1.1	0.1		
32	292.608	960	1	1	0		
33	301.752	990	1	1	0		
34	310.896	1020	1	1.1	0.1		
35	320.04	1050	1	1.1	0.1		
36	329.184	1080	1	1.2	0.2		
37	338.328	1110	1	1.6	0.6		
38	347.472	1140	1	1.4	0.4		
39	356.616	1170	1	1	0		

40	365.76	1200	1	1.1	0.1		
41	374.904	1230	1	1.1	0.1		
42	384.048	1260	1	1.2	0.2		
43	393.192	1290	1	1	0		
44	402.336	1320	1	1	0	Flame out/No Peak	
45	411.48	1350	1	1	0	Flame out/No Peak	
46	420.624	1380	1	2.6	1.6		
47	429.768	1410	1	1.2	0.2		
48	438.912	1440	1	7	6	*Dup=3.5, 2.0	
49	448.056	1470	1	1.1	0.1		
50	457.2	1500	1	1	0	Flame out/No Peak	
51	466.344	1530	1	1.2	0.2		
52	475.488	1560	1	1.6	0.6		
53	484.632	1590	1	1.5	0.5		
54	493.776	1620	1	1.2	0.2	Cal. Gas	
55	502.92	1650	1	1.1	0.1		
56	512.064	1680	1	1.8	0.8		
57	521.208	1710	1	2.8	1.8		
58	530.352	1740	1	1.8	0.8		
59	539.496	1770	1	1.3	0.3		
60	548.64	1800	1	1.4	0.4		
61	557.784	1830	1	1.2	0.2		
62	566.928	1860	1	1.4	0.4		
63	576.072	1890	1	1.3	0.3		
64	585.216	1920	1	1.4	0.4		
65	594.36	1950	1	1.8	0.8		
66	603.504	1980	1	1.1	0.1		
67	612.648	2010	1	2	1		
68	621.792	2040	1	1.2	0.2		
69	630.936	2070	1	1.1	0.1		
70	640.08	2100	1	1.3	0.3		
71	649.224	2130	1	1.4	0.4		
72	658.368	2160	1	2	1		
73	667.512	2190	1	2.7	1.7		
74	676.656	2220	1	2.1	1.1		
75	685.8	2250	1	2.4	1.4		
76	694.944	2280	1	1.3	0.3		
77	704.088	2310	1	1.6	0.6		
78	713.232	2340	1	2.3	1.3		
79	722.376	2370	1	3	2		
80	731.52	2400	1	1.7	0.7		
81	740.664	2430	1	1.4	0.4		
82	749.808	2460	1	1.8	0.8		
83	758.952	2490	1	5	4		
84	768.096	2520	1	1.6	0.6		
85	777.24	2550	1	1.7	0.7		
86	786.384	2580	1	5.2	4.2		
87	795.528	2610	1	2	1		
88	804.672	2640	1	3.6	2.6		
89	813.816	2670	1	4.2	3.2		
90	822.96	2700	1	3	2		

91	832.104	2730	1	1.7	0.7		
92	841.248	2760	1	4	3		
93	850.392	2790	1	5.7	4.7		
94	859.536	2820	1	3.6	2.6		
95	868.68	2850	1	1.2	0.2		
96	877.824	2880	1	1.1	0.1		
97	886.968	2910	1	1.2	0.2		
98	896.112	2940	1	1.3	0.3		
99	905.256	2970	1	1.6	0.6		
100	914.4	3000	1	1.8	0.8	Cal. Gas	
Traverse 98-6		Dye Rd.	7/15/1998				
Nelson, Jennings, Bieber							
H2=2000, 12		Batt.=7.9	Leak Test=OK		Flow=Good		
Sample #101 is 3ft. 6in. From west side of drain pipe, half-way down Dye hill rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
101	923.544	3030	1	1.5	0.5	Cal. Gas	7/15/1998
102	932.688	3060	1	2.5	1.5	1x	
103	941.832	3090	1	1.5	0.5	Dry soil	
104	950.976	3120	1	1.2	0.2		
105	960.12	3150	1	1.8	0.8		
106	969.264	3180	1	1.2	0.2		
107	978.408	3210	1	1	0		
108	987.552	3240	1	1.6	0.6		
109	996.696	3270	1	1	0		
110	1005.84	3300	1	1.3	0.3		
111	1014.984	3330	1	3	2		
112	1024.128	3360	1	1	0		
113	1033.272	3390	1	1.1	0.1		
114	1042.416	3420	1	1	0		
115	1051.56	3450	1	1	0		
116	1060.704	3480	1	1	0		
117	1069.848	3510	1	1.5	0.5		
118	1078.992	3540	1	1.1	0.1		
119	1088.136	3570	1	1	0		
120	1097.28	3600	1	1	0	Flame out/No Peak	
121	1106.424	3630	1	1.2	0.2		
122	1115.568	3660	1	1.1	0.1		
123	1124.712	3690	1	1	0		
124	1133.856	3720	1	1.1	0.1		
125	1143	3750	1	1	0		
126	1152.144	3780	1	1	0		
127	1161.288	3810	1	1	0	Cal. Gas	
128	1170.432	3840	1	1.1	0.1		
129	1179.576	3870	1	1.2	0.2		
130	1188.72	3900	1	1.5	0.5		
131	1197.864	3930	1	1	0		
132	1207.008	3960	1	1	0		
133	1216.152	3990	1	1.2	0.2		
134	1225.296	4020	1	1	0		
135	1234.44	4050	1	1.5	0.5		

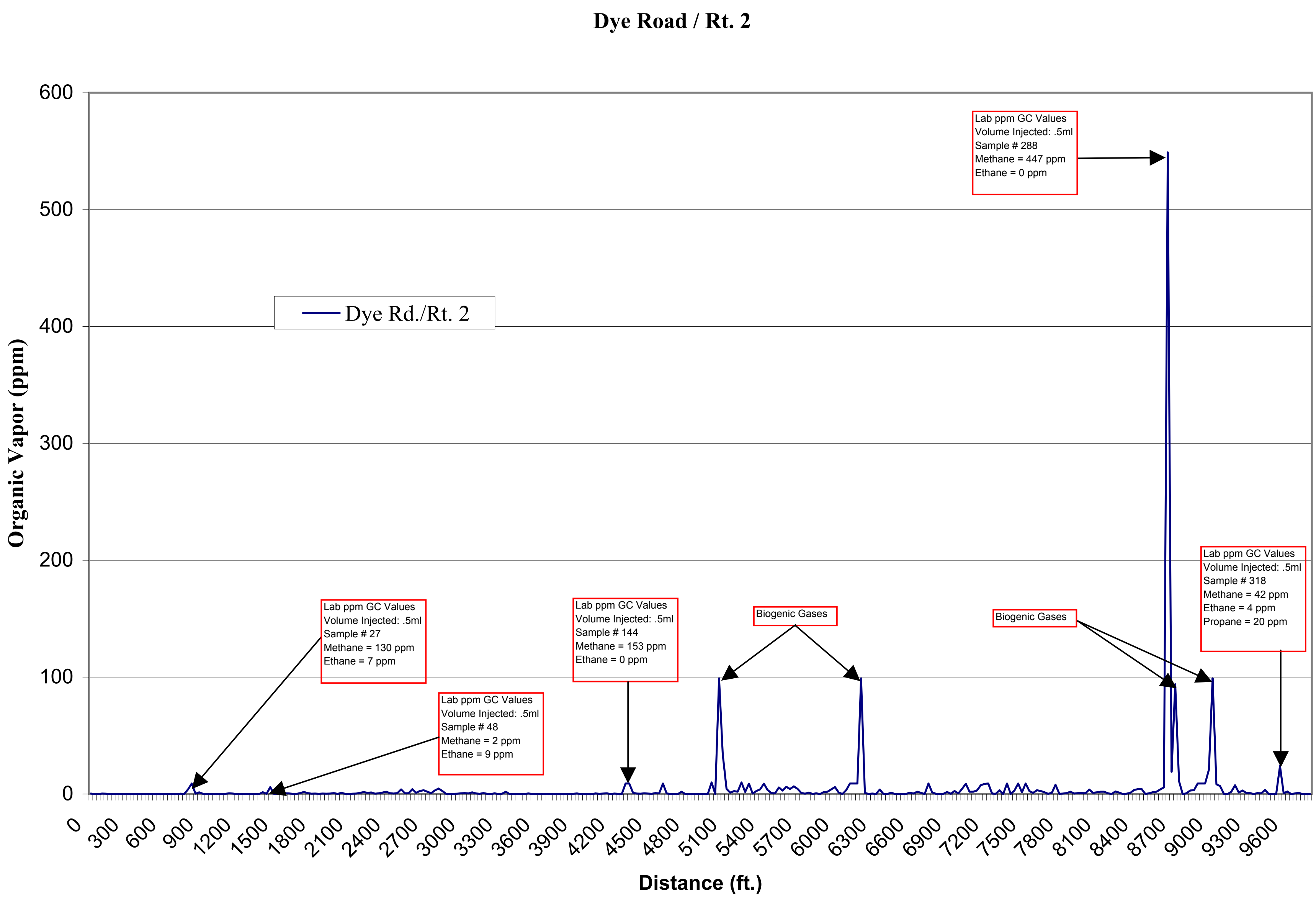
136	1243.584	4080	1	1.2	0.2		
137	1252.728	4110	1	1.4	0.4		
138	1261.872	4140	1	1.6	0.6		
139	1271.016	4170	1	1	0		
140	1280.16	4200	1	1.4	0.4		
141	1289.304	4230	1	1.2	0.2		
142	1298.448	4260	1	1	0	Flame out/No Peak	
143	1307.592	4290	1	10	9	*Next to Swamp	
144	1316.736	4320	1	10	9	*Next to Swamp	
145	1325.88	4350	1	2.1	1.1		
146	1335.024	4380	1	1.4	0.4		
147	1344.168	4410	1	1.3	0.3		
148	1353.312	4440	1	1.6	0.6		
149	1362.456	4470	1	1.4	0.4		
150	1371.6	4500	1	1.2	0.2		
151	1380.744	4530	1	1.8	0.8		
152	1389.888	4560	1	1.5	0.5		
153	1399.032	4590	1	10	9		
154	1408.176	4620	1	1.5	0.5		
155	1417.32	4650	1	1.1	0.1		
156	1426.464	4680	1	1	0	Flame out/No Peak	
157	1435.608	4710	1	1	0		
158	1444.752	4740	1	3	2		
159	1453.896	4770	1	1	0		
160	1463.04	4800	1	1	0		
161	1472.184	4830	1	1	0		
162	1481.328	4860	1	1.1	0.1		
163	1490.472	4890	1	1	0	Flame out/No Peak	
164	1499.616	4920	1	1.1	0.1		
165	1508.76	4950	1	1	0	Flame out/No Peak	Cal. Gas
Traverse 98-6		Dye Rd./Rt. 2	7/26/1998				
Nelson, Bieber							
H2=2000, 12		Batt.=8.0	Leak Test=OK		Flow=Fair		
Sunny, Warm							
Traverse starts at "T" of Dye road and Rt. 2 Heading south on Rt. 2, Samples taken on west side of Rt. 2							
Sample #166 is 30ft. From stop sign.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
166	1517.904	4980	1	11	10	Cal. Gas *Dup=11,8,6	7/26/1998
167	1527.048	5010	1	1	0	1x, Probe depth to 14in.	
168	1536.192	5040	1	100	99	Silty, Sandy soil	
*G.C. Injection, Sample #168							
Methane	Ethane	Scale	Peak				
2.1(1:28)	No Peak	1x	100+				
169	1545.336	5070	1	35	34		
*G.C. Injection, Sample #169							
Methane	Ethane	Scale	Peak				
3.3(1:30)	No Peak	1x	100+				
170	1554.48	5100	1	5.4	4.4		
171	1563.624	5130	1	2.2	1.2		
172	1572.768	5160	1	3.5	2.5		

173	1581.912	5190	1	3	2		
174	1591.056	5220	1	11	10	30/30 Mix of sample #174	
175	1600.2	5250	1	2.8	1.8		
176	1609.344	5280	1	9.9	8.9		
177	1618.488	5310	1	1.4	0.4		
178	1627.632	5340	1	3.6	2.6		
179	1636.776	5370	1	5	4		
180	1645.92	5400	1	9.9	8.9		
181	1655.064	5430	1	4.5	3.5		
182	1664.208	5460	1	1.8	0.8		
183	1673.352	5490	1	1.6	0.6		
184	1682.496	5520	1	6.7	5.7		
185	1691.64	5550	1	3.9	2.9		
186	1700.784	5580	1	7.2	6.2		
187	1709.928	5610	1	5.3	4.3	Cal. Gas	
188	1719.072	5640	1	7.6	6.6		
189	1728.216	5670	1	5.4	4.4		
190	1737.36	5700	1	1.9	0.9	*West side of road	
191	1746.504	5730	1	1.3	0.3	"	
192	1755.648	5760	1	2.3	1.3	"	
193	1764.792	5790	1	1.1	0.1	"	
194	1773.936	5820	1	1.6	0.6	"	
195	1783.08	5850	1	1	0	"	
196	1792.224	5880	1	2.7	1.7		
197	1801.368	5910	1	3	2		
198	1810.512	5940	1	5	4		
199	1819.656	5970	1	7	6		
200	1828.8	6000	1	2.4	1.4		
201	1837.944	6030	1	1	0		
202	1847.088	6060	1	4.2	3.2		
203	1856.232	6090	1	10	9	Flame out/No Peak	
204	1865.376	6120	1	10	9	*Dup=6	
205	1874.52	6150	1	10	9	Flame out/No Peak	
206	1883.664	6180	1	100	99	*Dup=100+	
207	1892.808	6210	1	1.9	0.9		
208	1901.952	6240	1	1.1	0.1		
209	1911.096	6270	1	1.4	0.4		
210	1920.24	6300	1	1.1	0.1	*West side of road	
211	1929.384	6330	1	4.9	3.9		
212	1938.528	6360	1	1	0		
213	1947.672	6390	1	1	0	*West side of road	
214	1956.816	6420	1	2.2	1.2		
215	1965.96	6450	1	1.1	0.1		
216	1975.104	6480	1	1	0		
217	1984.248	6510	1	1.1	0.1		
218	1993.392	6540	1	1.1	0.1		
219	2002.536	6570	1	2.2	1.2		
220	2011.68	6600	1	1.4	0.4		
221	2020.824	6630	1	3	2		
222	2029.968	6660	1	2	1		
223	2039.112	6690	1	1	0	Flame out/No Peak	

224	2048.256	6720	1	10	9	Change Batt.=8.1	
225	2057.4	6750	1	2.5	1.5		
226	2066.544	6780	1	1.2	0.2		
227	2075.688	6810	1	1	0	Flame out/No Peak	
228	2084.832	6840	1	1.2	0.2		
229	2093.976	6870	1	2.8	1.8		
230	2103.12	6900	1	1.2	0.2		
231	2112.264	6930	1	3.6	2.6	Cal. Gas	
Traverse 98-6		Rt. 2	7/27/1998				
Nelson, Bieber							
H2=2000,12		Batt.=8.1	Leak Test=OK		Flow=Good		
Sunny, Hot							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
232	2121.408	6960	1	1.5	0.5	Cal. Gas	7/27/1998
233	2130.552	6990	1	5.4	4.4	1x	
234	2139.696	7020	1	9.8	8.8	Sandy soil	
235	2148.84	7050	1	3	2	Probe depth 12-14in.	
236	2157.984	7080	1	3	2		
237	2167.128	7110	1	4	3		
238	2176.272	7140	1	8.5	7.5		
239	2185.416	7170	1	9.7	8.7		
240	2194.56	7200	1	10	9		
241	2203.704	7230	1	1.4	0.4		
242	2212.848	7260	1	1.2	0.2		
243	2221.992	7290	1	4.2	3.2		
244	2231.136	7320	1	1	0	Flame out/No Peak	
245	2240.28	7350	1	10	9	*Dup=0	
246	2249.424	7380	1	1.1	0.1		
247	2258.568	7410	1	4	3		
248	2267.712	7440	1	10	9	*Dup=5	
249	2276.856	7470	1	2.5	1.5		
250	2286	7500	1	10	9	*Dup=10+,8	
251	2295.144	7530	1	3.5	2.5		
252	2304.288	7560	1	1.9	0.9		
253	2313.432	7590	1	4.2	3.2		
254	2322.576	7620	1	3.6	2.6		
255	2331.72	7650	1	2.6	1.6		
256	2340.864	7680	1	1.2	0.2		
257	2350.008	7710	1	2	1		
258	2359.152	7740	1	9	8		
259	2368.296	7770	1	1.2	0.2		
260	2377.44	7800	1	1.4	0.4		
261	2386.584	7830	1	1.8	0.8		
262	2395.728	7860	1	3	2		
263	2404.872	7890	1	1.4	0.4		
264	2414.016	7920	1	1.8	0.8		
265	2423.16	7950	1	1.8	0.8		
266	2432.304	7980	1	1.7	0.7		
267	2441.448	8010	1	4.9	3.9		
268	2450.592	8040	1	2	1		

269	2459.736	8070	1	2.5	1.5		
270	2468.88	8100	1	3	2		
271	2478.024	8130	1	3	2		
272	2487.168	8160	1	1.6	0.6		
273	2496.312	8190	1	1.1	0.1		
274	2505.456	8220	1	3.2	2.2		
275	2514.6	8250	1	2.3	1.3	Cal. Gas	
276	2523.744	8280	1	1	0	Flame out/No Peak	
277	2532.888	8310	1	1.3	0.3		
278	2542.032	8340	1	2	1		
279	2551.176	8370	1	4.5	3.5		
280	2560.32	8400	1	5.2	4.2		
281	2569.464	8430	1	5.4	4.4		
282	2578.608	8460	1	1.1	0.1		
283	2587.752	8490	1	1.6	0.6		
284	2596.896	8520	1	2.6	1.6	Cal. Gas	
Traverse 98-6		Rt. 2	7/28/1998				
Nelson							
H2=2000,12		Batt.=8	Leak Test=OK		Flow=Great		
Sunny, Hot							
Rt. 2 next to rod & gun club. Sample #285 is 104ft. South of pole #445, west side of road.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
285	2606.04	8550	1	3	2	Cal. Gas	7/28/1998
286	2615.184	8580	1	5	4	Very dry silty soil	
287	2624.328	8610	1	6.7	5.7		
288	2633.472	8640	1	550	549		
*G.C injection Sample #288							
*20/60 mix=20.6							
	Methane	Ethane	Scale	Peak			
	2.0(1:25)	No Peak	1x	110			
	2.2(1:25)	No Peak	1x	400			
				550			
289	2642.616	8670	1	20	19		
290	2651.76	8700	1	95	94		
291	2660.904	8730	1	12	11	*Red slime on water	
292	2670.048	8760	1	1	0	Flame out/No Peak	
293	2679.192	8790	1	1.6	0.6		
294	2688.336	8820	1	4	3		
295	2697.48	8850	1	4.2	3.2		
296	2706.624	8880	1	10	9		
297	2715.768	8910	1	10	9	*Broken Probe	
298	2724.912	8940	1	10	9		
299	2734.056	8970	1	22	21	*Dup=8	
300	2743.2	9000	1	100	99	*Dup=10+,24,100+	
*G.C. Injection, Sample 300							
	Methane	Ethane	Scale	Peak			
	8.0(1:22)	No Peak	1x	1000+			
301	2752.344	9030	1	9.4	8.4		
302	2761.488	9060	1	7.8	6.8	Cal. Gas	

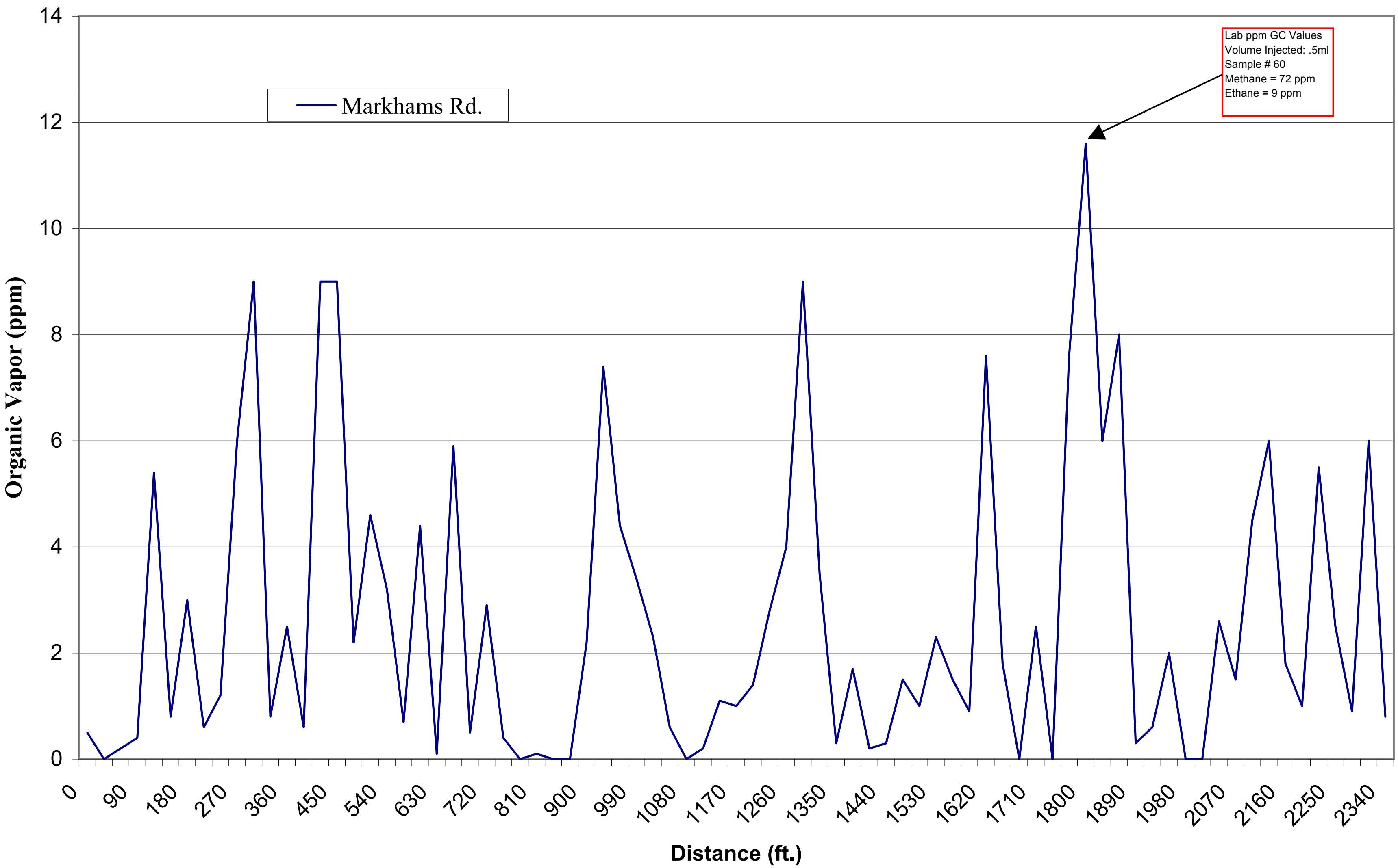
Traverse 98-6		Rt. 2	7/30/1998				
Nelson, Bieber							
H2=2000,12		Batt.=8.1	Leak Test=OK		Flow=OK		
Overcast, Warm							
Sample #303 is next to electrical pole SP6, west side of Rt. 2.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
303	2770.632	9090	1	1.2	0.2	Cal. Gas	7/30/1998
304	2779.776	9120	1	1	0	1x	
305	2788.92	9150	1	3	2	Dry sandy soil	
306	2798.064	9180	1	8.5	7.5		
307	2807.208	9210	1	2.3	1.3		
308	2816.352	9240	1	4	3		
309	2825.496	9270	1	1.9	0.9		
310	2834.64	9300	1	1.8	0.8		
311	2843.784	9330	1	1	0	Flame out/No Peak	
312	2852.928	9360	1	1.8	0.8		
313	2862.072	9390	1	1.6	0.6		
314	2871.216	9420	1	4.6	3.6		
315	2880.36	9450	1	1	0	Flame out/No Peak	
316	2889.504	9480	1	1	0	Flame out/No Peak	
317	2898.648	9510	1	1	0		Box B
318	2907.792	9540	1	25	24	*Dup=10+,17,12,25	Redo 4
319	2916.936	9570	1	1.6	0.6	*across from pond	samples
320	2926.08	9600	1	3.2	2.2		
321	2935.224	9630	1	1	0		
322	2944.368	9660	1	1.5	0.5		
323	2953.512	9690	1	2	1		
324	2962.656	9720	1	1	0	Flame out/No Peak	
325	2971.8	9750	1	1	0	Flame out/No Peak	
326	2980.944	9780	1	1	0	Flame out/No Peak	
						Sample #326 is 13ft. North of	
						electrical pole #39	


Dye Road / Rt. 2
Organic Vapor (ppm)
Distance (ft.)
Dye Rd./Rt. 2
0
100
200
300
400
500
600
0
300
600
900
1200
1500
1800
2100
2400
2700
3000
3300
3600
3900
4200
4500
4800
5100
5400
5700
6000
6300
6600
6900
7200
7500
7800
8100
8400
8700
9000
9300
9600
Lab ppm GC Values
Volume Injected: .5ml
Sample # 288
Methane = 447 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 27
Methane = 130 ppm
Ethane = 7 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 144
Methane = 153 ppm
Ethane = 0 ppm
Biogenic Gases
Biogenic Gases
Lab ppm GC Values
Volume Injected: .5ml
Sample # 318
Methane = 42 ppm
Ethane = 4 ppm
Propane = 20 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 48
Methane = 2 ppm
Ethane = 9 ppm

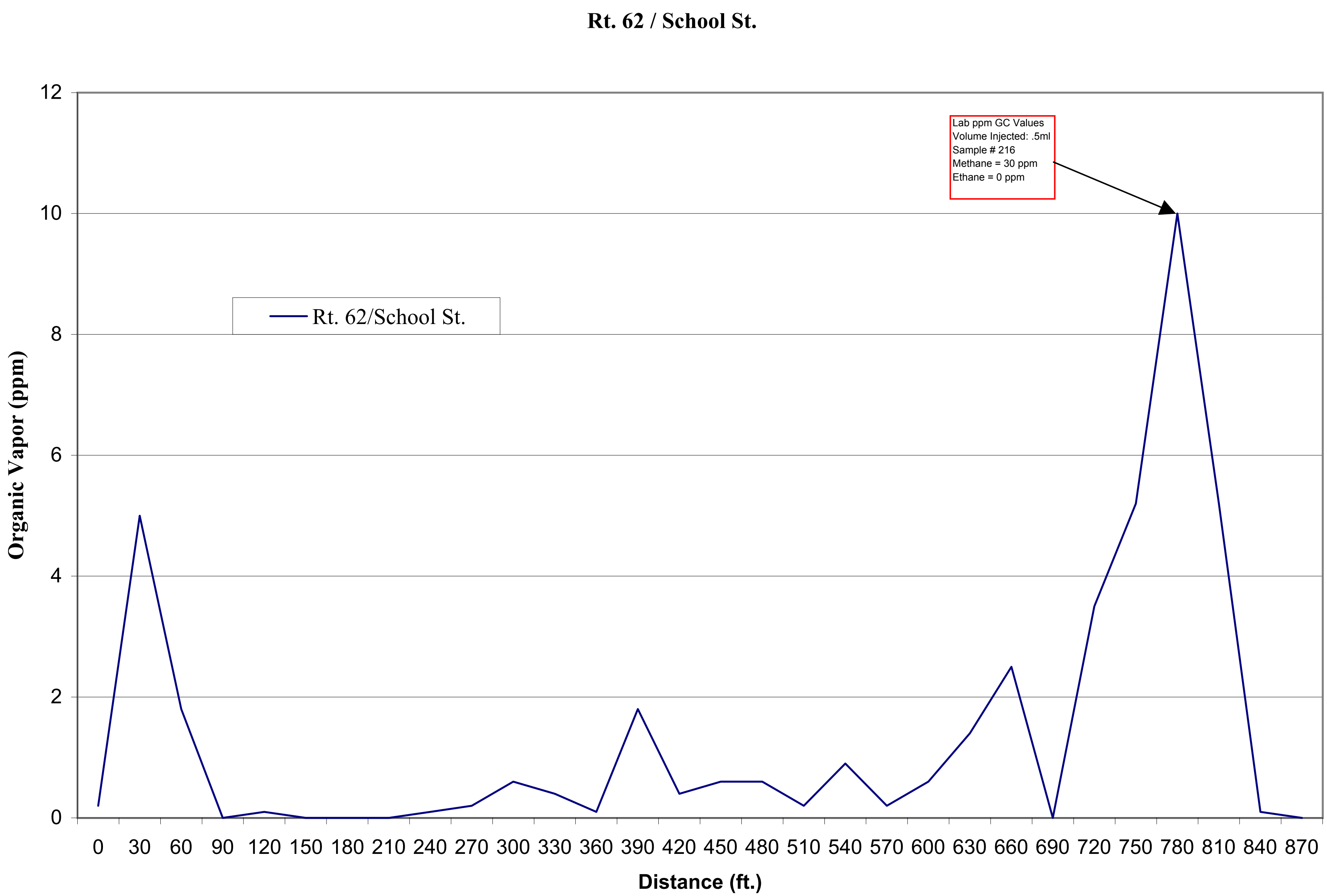
Traverse 98-7		Markhams rd.		7/29/1998			
Nelson, Bieber							
H2=2000, 12		Batt.=8.1	Leak Test=OK		Flow=Great		
Warm, Sunny							
Point #0 is next to stop sign on south side of Markhams rd. and Bentley rd., heading east							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	1.5	0.5	Cal. Gas	7/29/1998
1	9.144	30	1	1	0	1x	
2	18.288	60	1	1.2	0.2	Sandy Soil	
3	27.432	90	1	1.4	0.4		
4	36.576	120	1	6.4	5.4		
5	45.72	150	1	1.8	0.8		
6	54.864	180	1	4	3		
7	64.008	210	1	1.6	0.6		
8	73.152	240	1	2.2	1.2		
9	82.296	270	1	7	6		
10	91.44	300	1	10	9		
11	100.584	330	1	1.8	0.8		
12	109.728	360	1	3.5	2.5		
13	118.872	390	1	1.6	0.6		
14	128.016	420	1	10	9		
15	137.16	450	1	10	9		
16	146.304	480	1	3.2	2.2		
17	155.448	510	1	5.6	4.6		
18	164.592	540	1	4.2	3.2		
19	173.736	570	1	1.7	0.7		
20	182.88	600	1	5.4	4.4		
21	192.024	630	1	1.1	0.1		
22	201.168	660	1	6.9	5.9		
23	210.312	690	1	1.5	0.5		
24	219.456	720	1	3.9	2.9		
25	228.6	750	1	1.4	0.4		
26	237.744	780	1	1	0	Flame out/No Peak	
27	246.888	810	1	1.1	0.1		
28	256.032	840	1	1	0		
29	265.176	870	1	1	0		
30	274.32	900	1	3.2	2.2		
31	283.464	930	1	8.4	7.4		
32	292.608	960	1	5.4	4.4		
33	301.752	990	1	4.4	3.4		
34	310.896	1020	1	3.3	2.3		
35	320.04	1050	1	1.6	0.6		
36	329.184	1080	1	1	0		
37	338.328	1110	1	1.2	0.2		
38	347.472	1140	1	2.1	1.1		
39	356.616	1170	1	2	1		
40	365.76	1200	1	2.4	1.4		
41	374.904	1230	1	3.8	2.8		
42	384.048	1260	1	5	4		
43	393.192	1290	1	10	9		
44	402.336	1320	1	4.5	3.5		

45	411.48	1350	1	1.3	0.3		
46	420.624	1380	1	2.7	1.7		
47	429.768	1410	1	1.2	0.2		
48	438.912	1440	1	1.3	0.3		
49	448.056	1470	1	2.5	1.5	*north side of road	
50	457.2	1500	1	2	1		
51	466.344	1530	1	3.3	2.3		
52	475.488	1560	1	2.5	1.5		
53	484.632	1590	1	1.9	0.9		
54	493.776	1620	1	8.6	7.6		
55	502.92	1650	1	2.8	1.8		
56	512.064	1680	1	1	0	Flame out/No Peak	
57	521.208	1710	1	3.5	2.5		
58	530.352	1740	1	1	0	Flame out/No Peak	
59	539.496	1770	1	8.6	7.6	Cal. Gas	
60	548.64	1800	1	12.6	11.6	*next to RxR Redo 4 samples	
61	557.784	1830	1	7	6		
62	566.928	1860	1	9	8		
63	576.072	1890	1	1.3	0.3		
64	585.216	1920	1	1.6	0.6		
65	594.36	1950	1	3	2		
66	603.504	1980	1	1	0		
67	612.648	2010	1	1	0	Flame out/No Peak	
68	621.792	2040	1	3.6	2.6		
69	630.936	2070	1	2.5	1.5		
70	640.08	2100	1	5.5	4.5		
71	649.224	2130	1	7	6		
72	658.368	2160	1	2.8	1.8		
73	667.512	2190	1	2	1		
74	676.656	2220	1	6.5	5.5		
75	685.8	2250	1	3.5	2.5		
76	694.944	2280	1	1.9	0.9		
77	704.088	2310	1	7	6		
78	713.232	2340	1	1.8	0.8	Cal. Gas	
						Traverse ends at the intersection	
						of Rt. 62 and Markhams Rd.	

Markhams Road



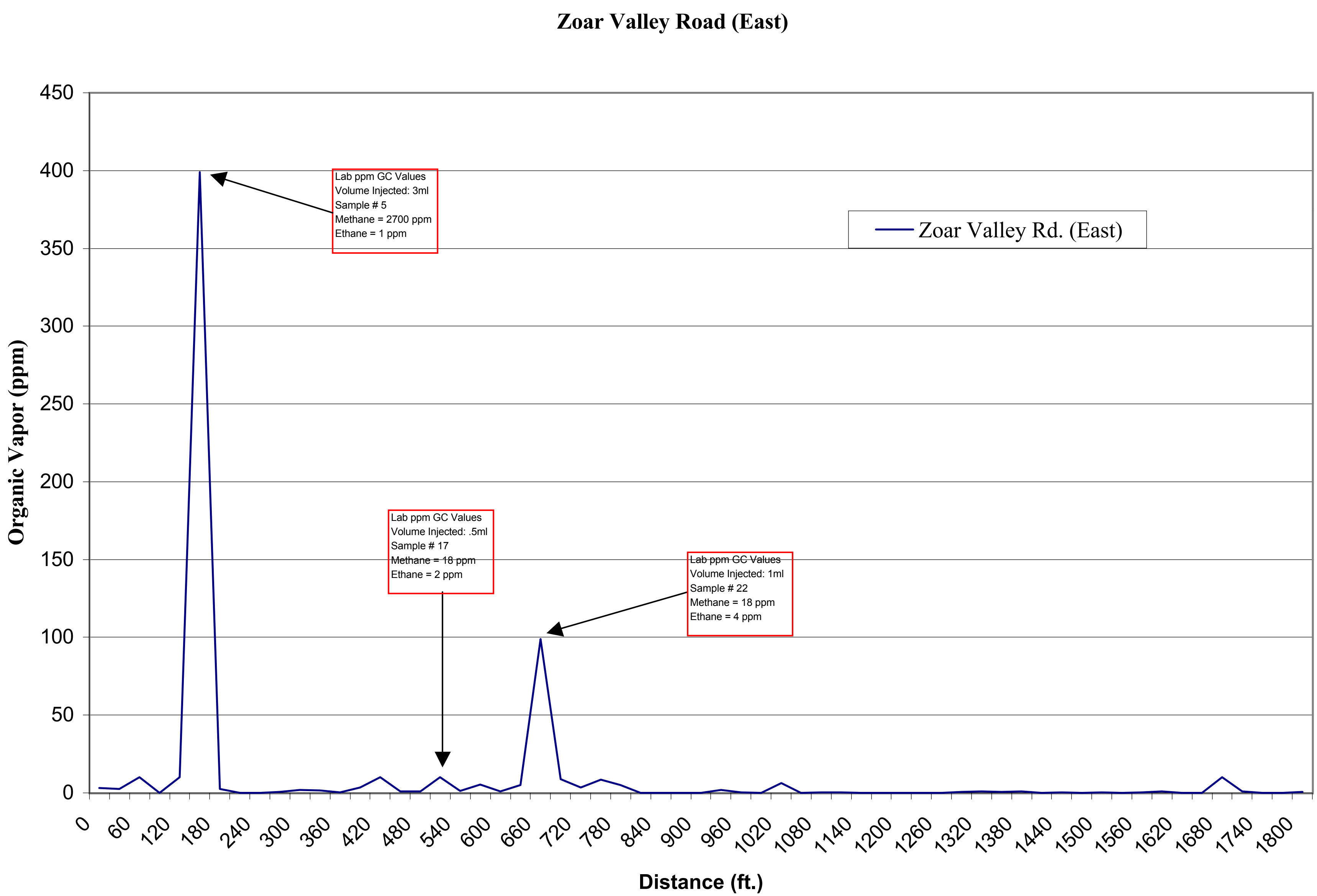
Traverse 98-8		Rt. 62 to School St., in the town of Markhams					7/30/1998	
Nelson, Bieber								
H2=2000, 12		Batt.=8.0	Leak Test=OK		Flow=Good			
Overcast, Warm								
Point #190 is next to electrical pole #114 on south side of Rt. 62 in the town of Markhams								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
190	0	0	1	1.2	0.2	Cal. Gas	7/30/1998	
191	9.144	30	1	6	5	1x		
192	18.288	60	1	2.8	1.8			
193	27.432	90	1	1	0			
194	36.576	120	1	1.1	0.1			
195	45.72	150	1	1	0			
196	54.864	180	1	1	0			
197	64.008	210	1	1	0			
198	73.152	240	1	1.1	0.1			
199	82.296	270	1	1.2	0.2			
200	91.44	300	1	1.6	0.6			
201	100.584	330	1	1.4	0.4			
202	109.728	360	1	1.1	0.1			
203	118.872	390	1	2.8	1.8			
204	128.016	420	1	1.4	0.4			
205	137.16	450	1	1.6	0.6			
206	146.304	480	1	1.6	0.6			
207	155.448	510	1	1.2	0.2			
208	164.592	540	1	1.9	0.9			
209	173.736	570	1	1.2	0.2			
210	182.88	600	1	1.6	0.6			
211	192.024	630	1	2.4	1.4			
212	201.168	660	1	3.5	2.5			
213	210.312	690	1	1	0	Flame out/No Peak		
214	219.456	720	1	4.5	3.5			
215	228.6	750	1	6.2	5.2			
216	237.744	780	1	11	10	Redo 3 samples		
217	246.888	810	1	6.2	5.2			
218	256.032	840	1	1.1	0.1			
219	265.176	870	1	1	0	Cal. Gas		
						Sample #219 is 158ft. South of		
						electrical pole #117		



Rt. 62 / School St.
Organic Vapor (ppm)
0
2
4
6
8
10
12
Distance (ft.)
0 30 60 90 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660 690 720 750 780 810 840 870
Rt. 62/School St.
Lab ppm GC Values
Volume Injected: .5ml
Sample # 216
Methane = 30 ppm
Ethane = 0 ppm

Traverse 98-9		Zoar Valley Rd. (East)			8/4/1998		
Nelson, Jennings							
H2=2000, 12		Batt.=7.9	Leak Test=OK		Flow=Poor		
Sunny, Hot							
Traverse starting pt. Is approx. 1/2 mile from Foster Rd. heading east on Zoar Valley Rd.							
Pt. #0 is 29ft. 4in. From house driveway, south side of rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	4	3	Cal. Gas	8/4/1998
1	9.144	30	1	3.4	2.4	1x	
2	18.288	60	1	11	10	Clay, silt soil	
3	27.432	90	1	1	0		
4	36.576	120	1	11	10		
5	45.72	150	1	400	399	Box F	
6	54.864	180	1	3.6	2.6		
7	64.008	210	1	1.1	0.1		
8	73.152	240	1	1	0		
9	82.296	270	1	1.5	0.5		
10	91.44	300	1	2.9	1.9		
11	100.584	330	1	2.6	1.6		
12	109.728	360	1	1.4	0.4		
13	118.872	390	1	4.4	3.4		
14	128.016	420	1	11	10		
15	137.16	450	1	1.8	0.8		
16	146.304	480	1	2	1		
17	155.448	510	1	11	10	*Creek	
18	164.592	540	1	2.4	1.4		
19	173.736	570	1	6.4	5.4		
20	182.88	600	1	2	1		
21	192.024	630	1	5.9	4.9		
22	201.168	660	1	100	99	Box G	
23	210.312	690	1	9.7	8.7		
24	219.456	720	1	4.5	3.5	Cal. Gas	
25	228.6	750	1	9.4	8.4		
26	237.744	780	1	6.1	5.1		
27	246.888	810	1	1	0		
28	256.032	840	1	1.1	0.1	*1ft. West of pole #106	
29	265.176	870	1	1.1	0.1		
30	274.32	900	1	1.1	0.1		
31	283.464	930	1	2.8	1.8		
32	292.608	960	1	1.4	0.4		
33	301.752	990	1	1	0		
34	310.896	1020	1	7.2	6.2		
35	320.04	1050	1	1	0		
36	329.184	1080	1	1.4	0.4		
37	338.328	1110	1	1.2	0.2		
38	347.472	1140	1	1.1	0.1		
39	356.616	1170	1	1	0		
40	365.76	1200	1	1.1	0.1		
41	374.904	1230	1	1	0		
42	384.048	1260	1	1	0		
43	393.192	1290	1	1.5	0.5		

44	402.336	1320	1	1.8	0.8			
45	411.48	1350	1	1.6	0.6			
46	420.624	1380	1	1.8	0.8			
47	429.768	1410	1	1.1	0.1			
48	438.912	1440	1	1.4	0.4			
49	448.056	1470	1	1	0			
50	457.2	1500	1	1.2	0.2			
51	466.344	1530	1	1	0			
52	475.488	1560	1	1.3	0.3			
53	484.632	1590	1	1.8	0.8			
54	493.776	1620	1	1	0			
55	502.92	1650	1	1	0			
56	512.064	1680	1	11	10	Flame out/No Peak, second		
57	521.208	1710	1	2.1	1.1	sample		
58	530.352	1740	1	1	0			
59	539.496	1770	1	1	0	*7ft. East of pole #113		
60	548.64	1800	1	1.5	0.5	Cal. Gas		

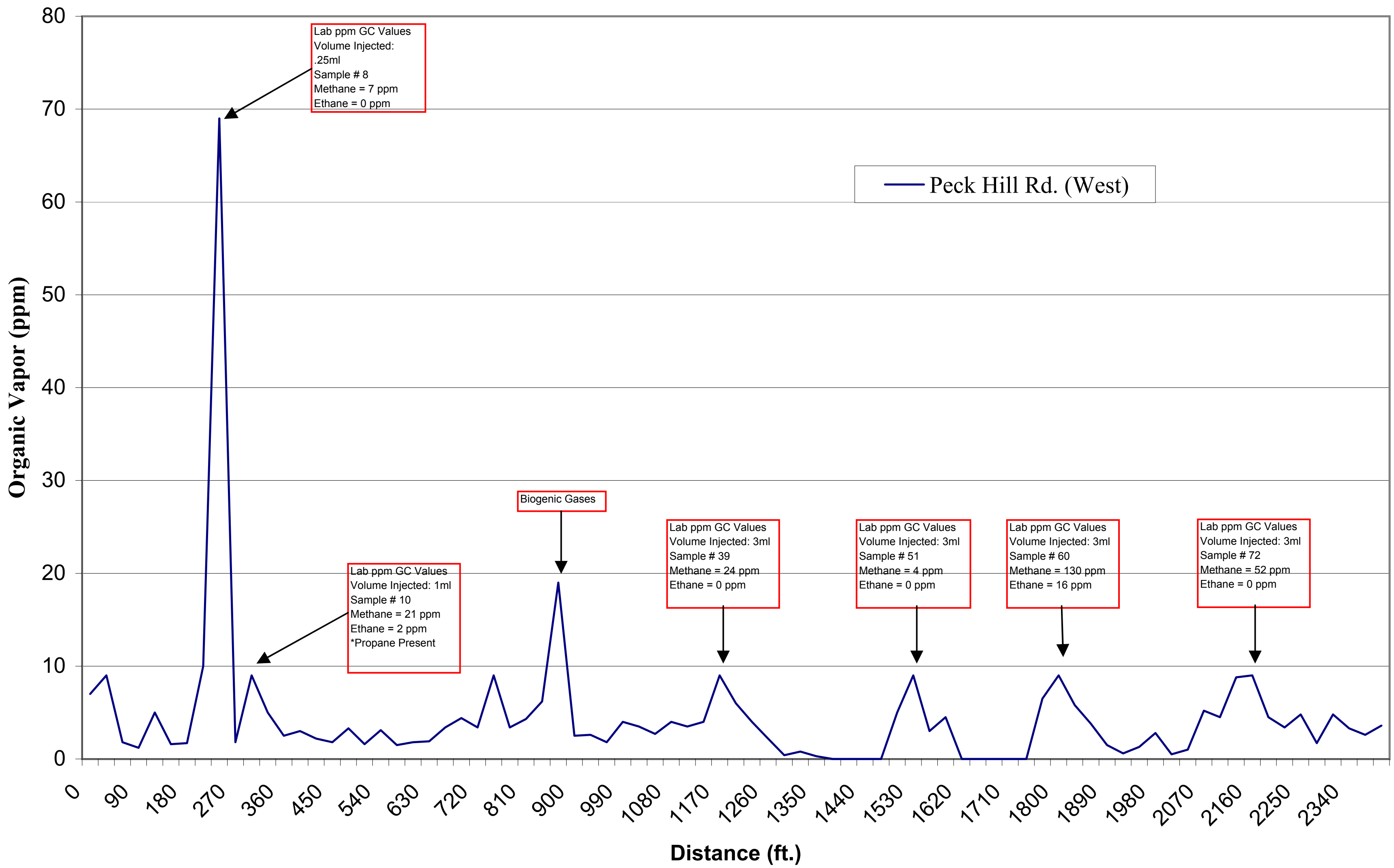


Zoar Valley Road (East)
Organic Vapor (ppm)
450
400
350
300
250
200
150
100
50
0
Distance (ft.)
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
1260
1320
1380
1440
1500
1560
1620
1680
1740
1800
Zoar Valley Rd. (East)
Lab ppm GC Values
Volume Injected: 3ml
Sample # 5
Methane = 2700 ppm
Ethane = 1 ppm
Lab ppm GC Values
Volume Injected: .5ml
Sample # 17
Methane = 18 ppm
Ethane = 2 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 22
Methane = 18 ppm
Ethane = 4 ppm

Traverse 98-10		Peck Hill Rd. West			8/12/1998		
Nelson							
H2=2000, 12		Batt.= 8.0		Leak test = OK		Flow = Fair	
Overcast							
Traverse starting point is at the T - junction of Peck Hill Rd. and Hooker Hill Rd.							
Pt. 0 is north 6.5 feet from arrow sign on south side of Peck Hill Rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	8	7	Cal. Gas	8/12/1998
1	9.144	30	1	10	9	1x	
2	18.288	60	1	2.8	1.8	Sandy soil, a bit wet	
3	27.432	90	1	2.2	1.2	Probe depth to 12"	
4	36.576	120	1	6	5	Samples taken on North side of	
5	45.72	150	1	2.6	1.6	Peck Hill Rd.	
6	54.864	180	1	2.7	1.7		
7	64.008	210	1	11	10		
8	73.152	240	1	70	69		
9	82.296	270	1	2.8	1.8		
10	91.44	300	1	10	9	Then flame out	
11	100.584	330	1	6	5		
12	109.728	360	1	3.5	2.5		
13	118.872	390	1	4	3		
14	128.016	420	1	3.2	2.2		
15	137.16	450	1	2.8	1.8		
16	146.304	480	1	4.3	3.3		
17	155.448	510	1	2.6	1.6		
18	164.592	540	1	4.1	3.1		
19	173.736	570	1	2.5	1.5		
20	182.88	600	1	2.8	1.8		
21	192.024	630	1	2.9	1.9		
22	201.168	660	1	4.4	3.4		
23	210.312	690	1	5.4	4.4		
24	219.456	720	1	4.4	3.4		
25	228.6	750	1	10	9	Cal. Gas	
26	237.744	780	1	4.4	3.4		
27	246.888	810	1	5.3	4.3	*Next to Creek	
28	256.032	840	1	7.2	6.2		
29	265.176	870	1	20	19	Then flame out	
30	274.32	900	1	3.5	2.5		
31	283.464	930	1	3.6	2.6		
32	292.608	960	1	2.8	1.8		
33	301.752	990	1	5	4		
34	310.896	1020	1	4.5	3.5		
35	320.04	1050	1	3.7	2.7		
36	329.184	1080	1	5	4		
37	338.328	1110	1	4.5	3.5		
38	347.472	1140	1	5	4		
39	356.616	1170	1	10	9		
40	365.76	1200	1	7	6	Cal. Gas	
Traverse 98-10		Peck Hill Rd. West			8/14/1998		
Nelson							
H2=1700, 12		Batt.= 8.0		Leak test = OK		Flow = Good	

Sunny, Warm							
Sample #41 is 15' South and 92' West of Electric Pole #P74-86 North side of Peck Hill Rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
41	374.904	1230	1	5	4	Cal. Gas	8/14/1998
42	384.048	1260	1	3.2	2.2	1x	
43	393.192	1290	1	1.4	0.4		
44	402.336	1320	1	1.8	0.8		
45	411.48	1350	1	1.3	0.3		
46	420.624	1380	1	1	0	Flame out/ No Peak	
47	429.768	1410	1	1	0	Flame out/ No Peak	
48	438.912	1440	1	1	0	Flame out/ No Peak	
49	448.056	1470	1	1	0	Flame out/ No Peak	
50	457.2	1500	1	6	5	Then flame out	
51	466.344	1530	1	10	9		
52	475.488	1560	1	4	3	Then flame out	
53	484.632	1590	1	5.5	4.5		
54	493.776	1620	1	1	0	Flame out/ No Peak	
55	502.92	1650	1	1	0	*2' West of Electric Pole #88	
56	512.064	1680	1	1	0		
57	521.208	1710	1	1	0		
58	530.352	1740	1	1	0		
59	539.496	1770	1	7.5	6.5		
60	548.64	1800	1	10	9		
61	557.784	1830	1	6.8	5.8	Cal. Gas	
Traverse 98-10		Peck Hill Rd. West			8/21/1998		
Nelson							
H2=2000, 12		Batt.= 8.1		Leak test = OK		Flow = Good	
Overcast, humid							
Sample #80 is 15' South of Electric Pole #P69-91 North side of Peck Hill Rd.							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
62	566.928	1860	1	4.8	3.8	Cal. Gas	8/21/1998
63	576.072	1890	1	2.5	1.5	1x	Then Flame out
64	585.216	1920	1	1.6	0.6	Then flame out	
65	594.36	1950	1	2.3	1.3	Then flame out	
66	603.504	1980	1	3.8	2.8		
67	612.648	2010	1	1.5	0.5	Then flame out	
68	621.792	2040	1	2	1	Then flame out	
69	630.936	2070	1	6.2	5.2		
70	640.08	2100	1	5.5	4.5		
71	649.224	2130	1	9.8	8.8		
72	658.368	2160	1	10	9		
73	667.512	2190	1	5.5	4.5		
74	676.656	2220	1	4.4	3.4		
75	685.8	2250	1	5.8	4.8		
76	694.944	2280	1	2.7	1.7		
77	704.088	2310	1	5.8	4.8		
78	713.232	2340	1	4.3	3.3		
79	722.376	2370	1	3.6	2.6		
80	731.52	2400	1	4.6	3.6	Cal. Gas	

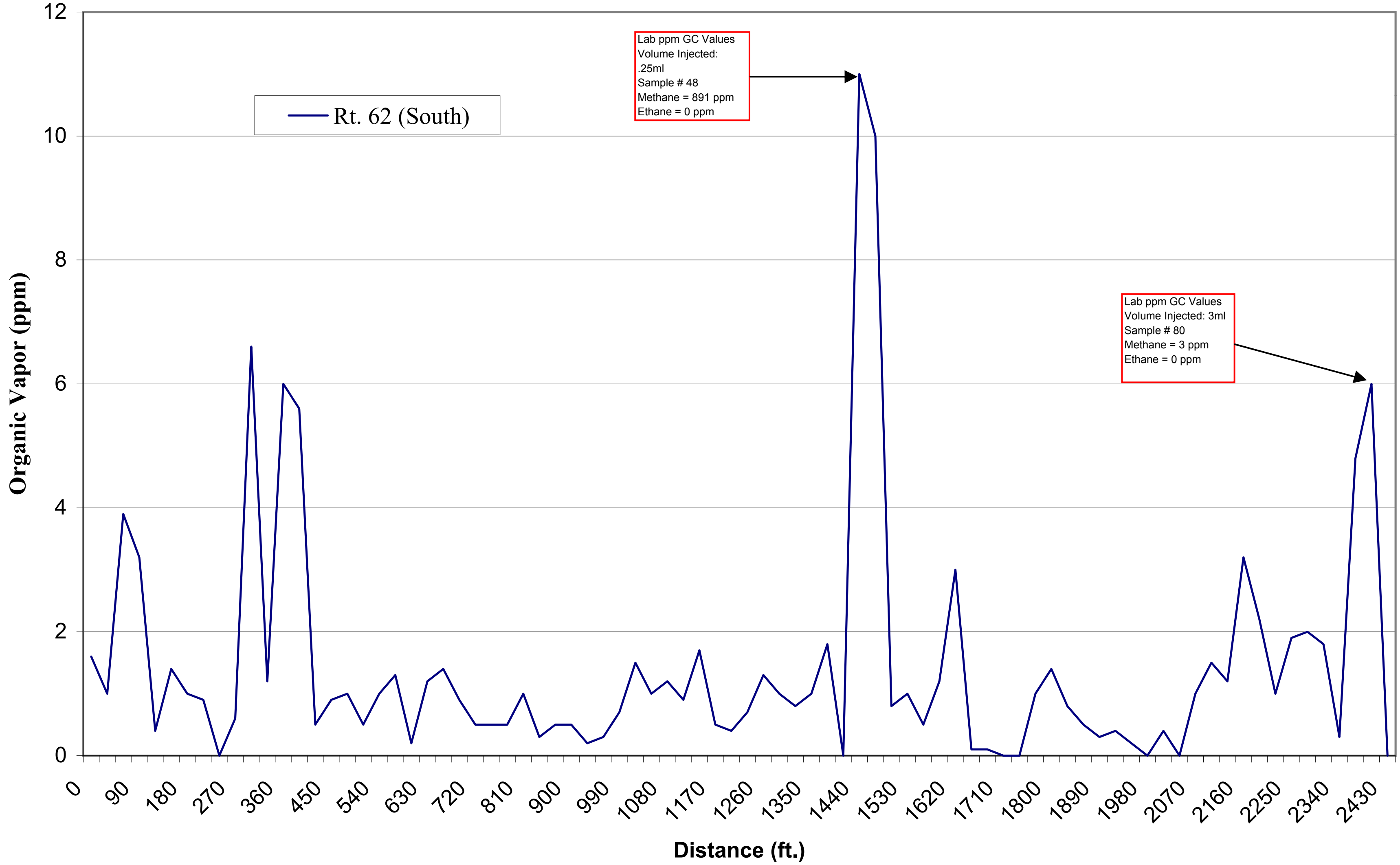
Peck Hill Road (West)



Traverse 98-10		Rt. 62 South, Heading South to Markhams				8/21/1998		
Nelson								
H2=2000, 12		Batt.=7.9	Leak test=O.K.		Flow=Good			
Sunny								
Traverse starting point is at the Triangle junction of Rt. 353 and Rt. 62.								
Sample #0 was taken 6' East of "Do Not Enter" sign on west side of Rt. 62.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	2.6	1.6	Cal. Gas	8/21/1998	
1	9.144	30	1	2	1	1x	Taken on East side	
2	18.288	60	1	4.9	3.9	Sandy soil	of Rt. 62	
3	27.432	90	1	4.2	3.2			
4	36.576	120	1	1.4	0.4			
5	45.72	150	1	2.4	1.4			
6	54.864	180	1	2	1			
7	64.008	210	1	1.9	0.9			
8	73.152	240	1	1	0	Flame out/ No Peak		
9	82.296	270	1	1.6	0.6			
10	91.44	300	1	7.6	6.6			
11	100.584	330	1	2.2	1.2			
12	109.728	360	1	7	6	Sample taken on East side of Rt. 62		
13	118.872	390	1	6.6	5.6	Sample taken on East side of Rt. 62		
14	128.016	420	1	1.5	0.5	Cal. Gas		
15	137.16	450	1	1.9	0.9			
16	146.304	480	1	2	1			
17	155.448	510	1	1.5	0.5			
18	164.592	540	1	2	1			
19	173.736	570	1	2.3	1.3			
20	182.88	600	1	1.2	0.2			
21	192.024	630	1	2.2	1.2			
22	201.168	660	1	2.4	1.4			
23	210.312	690	1	1.9	0.9			
24	219.456	720	1	1.5	0.5			
25	228.6	750	1	1.5	0.5			
26	237.744	780	1	1.5	0.5			
27	246.888	810	1	2	1			
28	256.032	840	1	1.3	0.3			
29	265.176	870	1	1.5	0.5			
30	274.32	900	1	1.5	0.5			
31	283.464	930	1	1.2	0.2			
32	292.608	960	1	1.3	0.3			
33	301.752	990	1	1.7	0.7			
34	310.896	1020	1	2.5	1.5	Cal. Gas		
Traverse 98-10		Rt. 62 South		8/21/1998				
Nelson								
H2=2000, 12		Batt.=8.1	Leak test=O.K.		Flow=Good			
Sunny, Warm								
Sample #35 is 23' South of Electric Pole #98, on East side of Rt. 62								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
35	320.04	1050	1	2	1	Cal. Gas	8/27/1998	
36	329.184	1080	1	2.2	1.2	1x		
37	338.328	1110	1	1.9	0.9	Sandy Soil		

38	347.472	1140	1	2.7	1.7			
39	356.616	1170	1	1.5	0.5			
40	365.76	1200	1	1.4	0.4	Clay Soil		
41	374.904	1230	1	1.7	0.7	Clay Soil		
42	384.048	1260	1	2.3	1.3	Clay Soil		
43	393.192	1290	1	2	1	Clay Soil		
44	402.336	1320	1	1.8	0.8	Clay Soil		
45	411.48	1350	1	2	1	Clay Soil		
46	420.624	1380	1	2.8	1.8	Clay Soil		
47	429.768	1410	1	1	0	Flame out/ No Peak		
48	438.912	1440	1	12	11	Off Scale	*Next to wood pile	
49	448.056	1470	1	11	10	Off Scale	Broke Probe	
50	457.2	1500	1	1.8	0.8	Cal. Gas		
51	466.344	1530	1	2	1			
52	475.488	1560	1	1.5	0.5	Clay Soil		
53	484.632	1590	1	2.2	1.2	Clay Soil		
54	493.776	1620	1	4	3	Clay Soil		
55	502.92	1650	1	1.1	0.1	Clay Soil		
56	512.064	1680	1	1.1	0.1	Clay Soil		
57	521.208	1710	1	1	0			
58	530.352	1740	1	1	0	Flame out/ No Peak		
59	539.496	1770	1	2	1			
60	548.64	1800	1	2.4	1.4	Cal. Gas		
Traverse 98-10		Rt. 62 South		8/28/1998				
Nelson								
H2=2000, 12		Batt.=7.8	Leak test=O.K.		Flow=Good			
Sunny, Hot								
Sample #61 is 62' South of Electric Pole #10, on East side of Rt. 62								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
61	557.784	1830	1	1.8	0.8	Cal. Gas	8/28/1998	
62	566.928	1860	1	1.5	0.5	1x		
63	576.072	1890	1	1.3	0.3			
64	585.216	1920	1	1.4	0.4			
65	594.36	1950	1	1.2	0.2			
66	603.504	1980	1	1	0	Flame out/ No Peak		
67	612.648	2010	1	1.4	0.4			
68	621.792	2040	1	1	0	Flame out/ No Peak		
69	630.936	2070	1	2	1	Put Flame out		
70	640.08	2100	1	2.5	1.5			
71	649.224	2130	1	2.2	1.2			
72	658.368	2160	1	4.2	3.2			
73	667.512	2190	1	3.2	2.2			
74	676.656	2220	1	2	1			
75	685.8	2250	1	2.9	1.9			
76	694.944	2280	1	3	2			
77	704.088	2310	1	2.8	1.8			
78	713.232	2340	1	1.3	0.3	Sample #81 is 9 ft.		
79	722.376	2370	1	5.8	4.8	north of electrical pole #96		
80	731.52	2400	1	7	6	Put Flame out		
81	740.664	2430	1	1	0	Flame out/ No Peak		Cal. Gas

Rt. 62 (South)



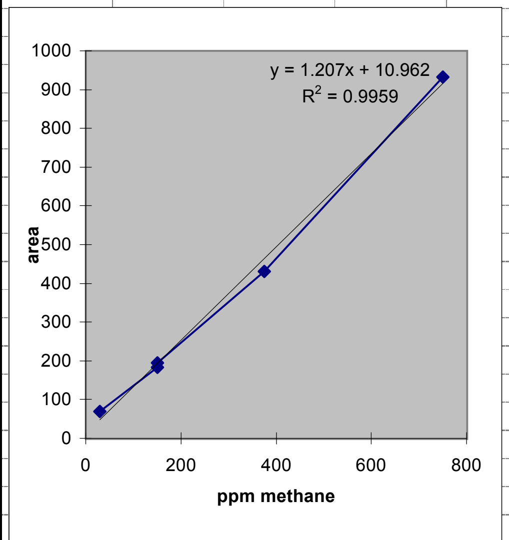
Rt. 62 (South)
Lab ppm GC Values
Volume Injected:
.25ml
Sample # 48
Methane = 891 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 3ml
Sample # 80
Methane = 3 ppm
Ethane = 0 ppm
Organic Vapor (ppm)
Distance (ft.)
0
2
4
6
8
10
12
0
90
180
270
360
450
540
630
720
810
900
990
1080
1170
1260
1350
1440
1530
1620
1710
1800
1890
1980
2070
2160
2250
2340
2430

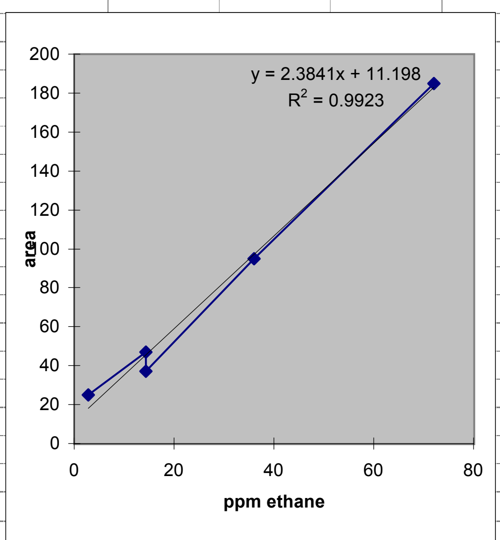
Methane

ppm	area	cts/ppm	vol
750	933	1.244	500
375	431	1.149333333	250
150	194	1.293333333	100
150	183	1.22	100
30	70	2.333333333	20

Ethane

ppm	area	cts/ppm	vol
72	185	2.569444444	500
36	95	2.638888889	250
14.4	37	2.569444444	100
14.4	47	3.263888889	100
2.88	25	8.680555556	20





methane

ppm	area
0	10.962
3	14.583
6	18.204
9	21.825
12	25.446
15	29.067
18	32.688
21	36.309
24	39.93
27	43.551

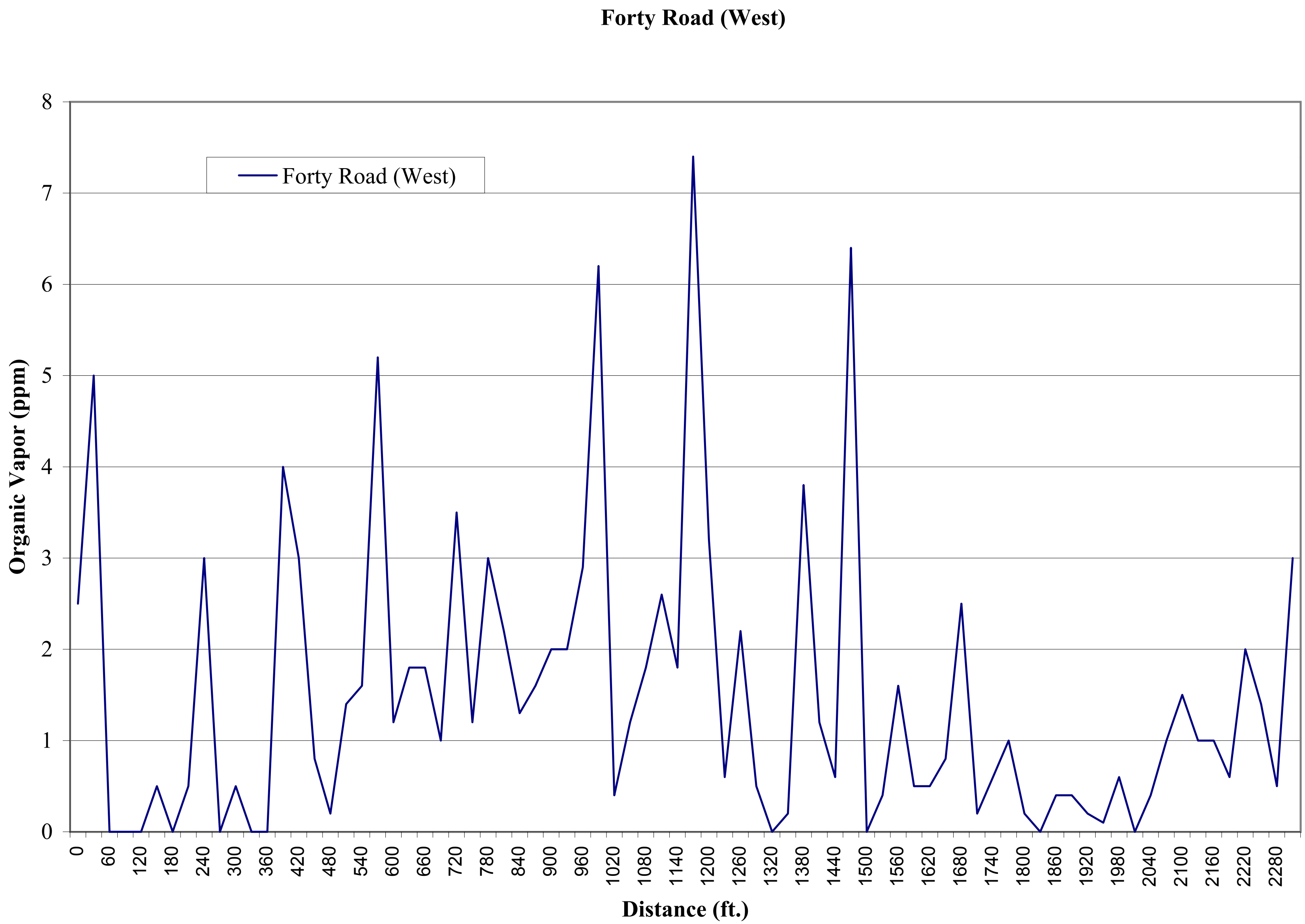
ppm	area	if meth= 10% eth	ethane area	experimental GC values	Sites
637.1483016	780	63.71483016	163.10	135	Calibration Gas - Methane/Ethane
67.14001657	92	6.714001657	27.20	26	Dye Road, Sample # 27
40.62800331	60	4.062800331	20.88	16	Dye Road, Sample # 318
19.08699254	34	1.908699254	15.75	11	Zoar Valley Road, Sample # 17
9.144987572	22	0.914498757	13.38	13	Zoar Valley Road, Sample # 22
28.2004971	45	2.82004971	17.92	14	Valentine Flats Road, Sample # 68
7.487986744	20	0.748798674	12.98	10	Marek Road, Sample # 37
71.28251864	97	7.128251864	28.19	29	Markhams Road, Sample # 60
32.34299917	50	3.234299917	18.91	18	Markhams Road, Sample # 60

ethane

ppm	area
0	11.198
2	15.9662
4	20.7344
6	25.5026
8	30.2708
10	35.039
12	39.8072
14	44.5754
16	49.3436
18	54.1118

Traverse 99-12		Forty Road West, Heading East towards the South branch of Cattaraugus Creek						
Nelson, Bieber								5/31/1999
H2=2000, 12		Batt.=8.2	Leak test=O.K.		Flow=Great			
Sunny, Very Hot 90								
Traverse starting point is at the Triangle junction of Point Peter Rd. Forty Rd..								
Sample #0 was taken 6' south of the Forty Rd. sign on north side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	3.5	2.5	Cal. Gas	5/31/1999	
1	9.144	30	1	6	5	1x	Taken on North side	
2	18.288	60	1	1	0	Sandy soil	of Forty Rd.	
3	27.432	90	1	1	0			
4	36.576	120	1	1	0			
5	45.72	150	1	1.5	0.5			
6	54.864	180	1	1	0			
7	64.008	210	1	1.5	0.5			
8	73.152	240	1	4	3			
9	82.296	270	1	1	0			
10	91.44	300	1	1.5	0.5			
11	100.584	330	1	1	0			
12	109.728	360	1	1	0			
13	118.872	390	1	5	4			
14	128.016	420	1	4	3			
15	137.16	450	1	1.8	0.8			
16	146.304	480	1	1.2	0.2			
17	155.448	510	1	2.4	1.4			
18	164.592	540	1	2.6	1.6			
19	173.736	570	1	6.2	5.2			
20	182.88	600	1	2.2	1.2			
21	192.024	630	1	2.8	1.8			
22	201.168	660	1	2.8	1.8			
23	210.312	690	1	2	1			
24	219.456	720	1	4.5	3.5			
25	228.6	750	1	2.2	1.2			
26	237.744	780	1	4	3			
27	246.888	810	1	3.2	2.2			
28	256.032	840	1	2.3	1.3			
29	265.176	870	1	2.6	1.6			
30	274.32	900	1	3	2	Cal. Gas		
31	283.464	930	1	3	2			
32	292.608	960	1	3.9	2.9			
33	301.752	990	1	7.2	6.2			
34	310.896	1020	1	1.4	0.4			
35	320.04	1050	1	2.2	1.2			
36	329.184	1080	1	2.8	1.8			
37	338.328	1110	1	3.6	2.6			
38	347.472	1140	1	2.8	1.8			
39	356.616	1170	1	8.4	7.4			
40	365.76	1200	1	4.2	3.2			
41	374.904	1230	1	1.6	0.6			
42	384.048	1260	1	3.2	2.2			
43	393.192	1290	1	1.5	0.5			

44	402.336	1320	1	1	0			
45	411.48	1350	1	1.2	0.2			
46	420.624	1380	1	4.8	3.8			
47	429.768	1410	1	2.2	1.2			
48	438.912	1440	1	1.6	0.6			
49	448.056	1470	1	7.4	6.4			
50	457.2	1500	1	1	0			
51	466.344	1530	1	1.4	0.4			
52	475.488	1560	1	2.6	1.6			
53	484.632	1590	1	1.5	0.5			
54	493.776	1620	1	1.5	0.5			
55	502.92	1650	1	1.8	0.8			
56	512.064	1680	1	3.5	2.5			
57	521.208	1710	1	1.2	0.2			
58	530.352	1740	1	1.6	0.6			
59	539.496	1770	1	2	1			
60	548.64	1800	1	1.2	0.2	Cal. Gas		
Traverse 99-12		Forty Road West, Heading East towards the South branch of Cattaraugus Creek						
Nelson, Bieber								7/7/1999
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 80								
Sample #61 was taken 10' east and 30' north of "not a turn around" sign on north side of road.								
61	557.784	1830	1	1	0	Cal. Gas	7/7/1999	
62	566.928	1860	1	1.4	0.4			
63	576.072	1890	1	1.4	0.4			
64	585.216	1920	1	1.2	0.2			
65	594.36	1950	1	1.1	0.1			
66	603.504	1980	1	1.6	0.6			
67	612.648	2010	1	1	0			
68	621.792	2040	1	1.4	0.4			
69	630.936	2070	1	2	1			
70	640.08	2100	1	2.5	1.5			
71	649.224	2130	1	2	1			
72	658.368	2160	1	2	1			
73	667.512	2190	1	1.6	0.6			
74	676.656	2220	1	3	2			
75	685.8	2250	1	2.4	1.4			
76	694.944	2280	1	1.5	0.5			
77	704.088	2310	1	4	3	Cal. Gas		
						Sample #77 is 27ft. South		
						of environmental sign		



Forty Road (West)
Forty Road (West)
Organic Vapor (ppm)
0
1
2
3
4
5
6
7
8
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
1260
1320
1380
1440
1500
1560
1620
1680
1740
1800
1860
1920
1980
2040
2100
2160
2220
2280
Distance (ft.)

Traverse 99-13		Forty Road East, Heading West towards the South branch of Cattaraugus Creek						
Nelson, Bieber								6/8/1999
H2=1700, 12		Batt.=8.1	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Traverse starting point is at the "T" junction of Marek Rd. and Forty Rd..								
Sample #0 was taken 10 ft. south of the Forty Rd. sign on north side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.4	0.4	Cal. Gas	6/8/1999	
1	9.144	30	1	2	1	1x	Taken on North side	
2	18.288	60	1	2	1	Sandy soil	of Forty Rd.	
3	27.432	90	1	2.2	1.2			
4	36.576	120	1	1.5	0.5			
5	45.72	150	1	1.5	0.5			
6	54.864	180	1	2.4	1.4			
7	64.008	210	1	1.4	0.4			
8	73.152	240	1	3	2			
9	82.296	270	1	1.4	0.4			
10	91.44	300	1	1.5	0.5			
11	100.584	330	1	1.2	0.2			
12	109.728	360	1	1.4	0.4			
13	118.872	390	1	1.6	0.6			
14	128.016	420	1	1.2	0.2			
15	137.16	450	1	1.8	0.8			
16	146.304	480	1	1.4	0.4			
17	155.448	510	1	1.4	0.4			
18	164.592	540	1	1.6	0.6			
19	173.736	570	1	2	1			
20	182.88	600	1	1.8	0.8			
21	192.024	630	1	1.3	0.3			
22	201.168	660	1	1.2	0.2			
23	210.312	690	1	1.2	0.2			
24	219.456	720	1	2.4	1.4			
25	228.6	750	1	1.2	0.2			
26	237.744	780	1	1.4	0.4			
27	246.888	810	1	2.8	1.8			
28	256.032	840	1	1.4	0.4			
29	265.176	870	1	1.2	0.2			
30	274.32	900	1	1.6	0.6			
31	283.464	930	1	3	2	Cal. Gas		
32	292.608	960	1	2.2	1.2			
33	301.752	990	1	3.5	2.5			
34	310.896	1020	1	1.6	0.6			
35	320.04	1050	1	3.2	2.2			
36	329.184	1080	1	1.8	0.8			
37	338.328	1110	1	2	1			
38	347.472	1140	1	1.8	0.8			
39	356.616	1170	1	2	1			
40	365.76	1200	1	1.4	0.4			
41	374.904	1230	1	3	2			
42	384.048	1260	1	1.8	0.8			
43	393.192	1290	1	3	2			

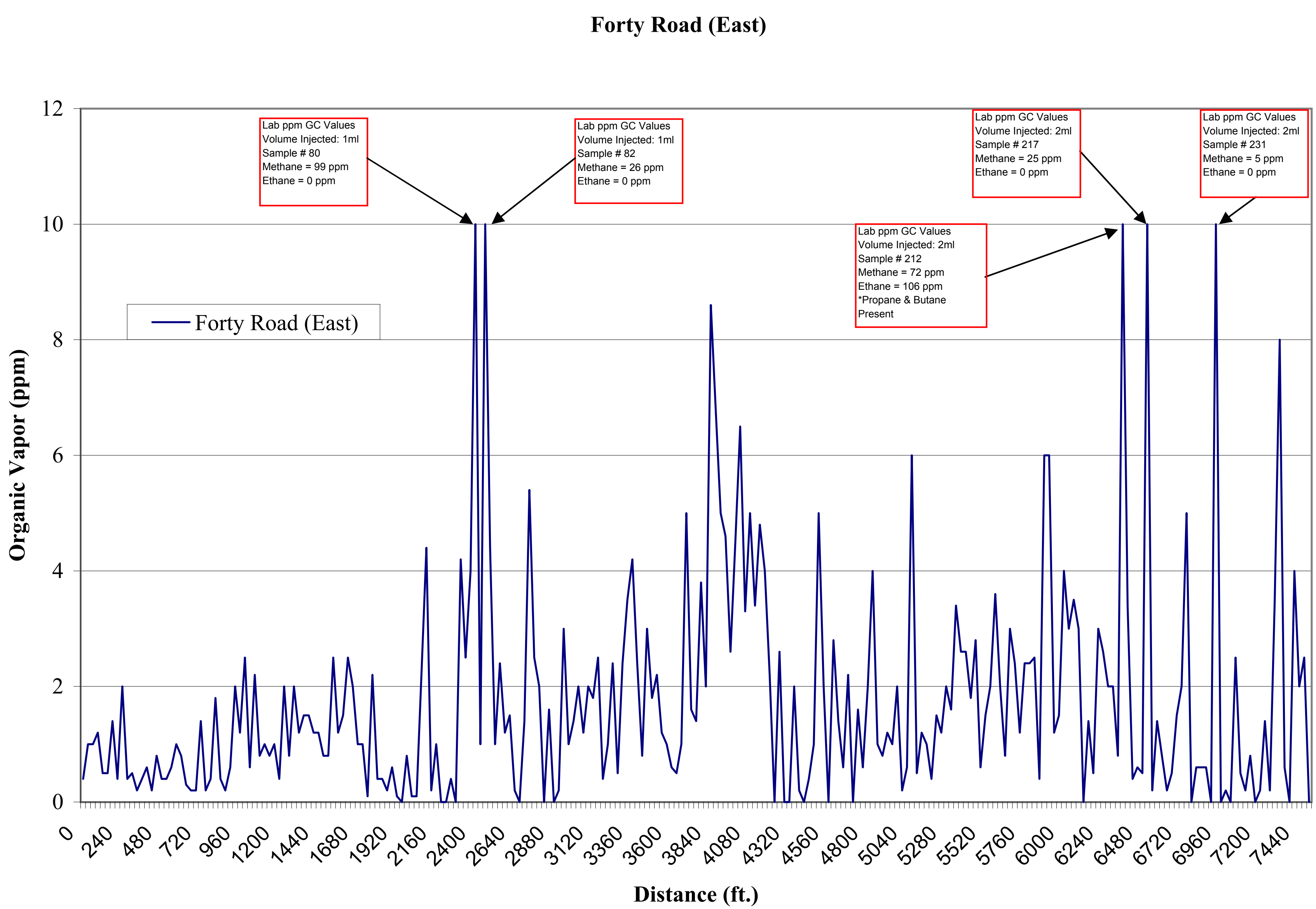
44	402.336	1320	1	2.2	1.2			
45	411.48	1350	1	2.5	1.5			
46	420.624	1380	1	2.5	1.5			
47	429.768	1410	1	2.2	1.2			
48	438.912	1440	1	2.2	1.2			
49	448.056	1470	1	1.8	0.8			
50	457.2	1500	1	1.8	0.8			
51	466.344	1530	1	3.5	2.5			
52	475.488	1560	1	2.2	1.2			
53	484.632	1590	1	2.5	1.5			
54	493.776	1620	1	3.5	2.5			
55	502.92	1650	1	3	2			
56	512.064	1680	1	2	1			
57	521.208	1710	1	2	1			
58	530.352	1740	1	1.1	0.1			
59	539.496	1770	1	3.2	2.2			
60	548.64	1800	1	1.4	0.4			
61	557.784	1830	1	1.4	0.4			
62	566.928	1860	1	1.2	0.2			
63	576.072	1890	1	1.6	0.6			
64	585.216	1920	1	1.1	0.1			
65	594.36	1950	1	1	0			
66	603.504	1980	1	1.8	0.8			
67	612.648	2010	1	1.1	0.1			
68	621.792	2040	1	1.1	0.1			
69	630.936	2070	1	3.2	2.2			
70	640.08	2100	1	5.4	4.4	Cal. Gas		
Traverse 99-13		Forty Road East, Heading West towards the South branch of Cattaraugus Creek						
Nelson, Bieber								6/9/1999
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Sample #71 was taken 90 ft. east of no parking sign on south side of road.								
71	649.224	2130	1	1.2	0.2	1x, Cal. Gas	6/9/1999	
72	658.368	2160	1	2	1			
73	667.512	2190	1	1	0			
74	676.656	2220	1	1	0			
75	685.8	2250	1	1.4	0.4			
76	694.944	2280	1	1	0			
77	704.088	2310	1	5.2	4.2			
78	713.232	2340	1	3.5	2.5			
79	722.376	2370	1	5	4			
80	731.52	2400	1	11	10	Redo 3 samples		
81	740.664	2430	1	2	1			
82	749.808	2460	1	11	10	Redo 3 samples		
83	758.952	2490	1	5.4	4.4			
84	768.096	2520	1	2	1			
85	777.24	2550	1	3.4	2.4			
86	786.384	2580	1	2.2	1.2			
87	795.528	2610	1	2.5	1.5			
88	804.672	2640	1	1.2	0.2			
89	813.816	2670	1	1	0			

90	822.96	2700	1	2.4	1.4			
91	832.104	2730	1	6.4	5.4			
92	841.248	2760	1	3.5	2.5			
93	850.392	2790	1	3	2			
94	859.536	2820	1	1	0			
95	868.68	2850	1	2.6	1.6			
96	877.824	2880	1	1	0	Cal. Gas		
97	886.968	2910	1	1.2	0.2			
98	896.112	2940	1	4	3			
99	905.256	2970	1	2	1			
100	914.4	3000	1	2.4	1.4			
101	923.544	3030	1	3	2			
102	932.688	3060	1	2.2	1.2			
103	941.832	3090	1	3	2			
104	950.976	3120	1	2.8	1.8			
105	960.12	3150	1	3.5	2.5			
106	969.264	3180	1	1.4	0.4			
107	978.408	3210	1	2	1			
108	987.552	3240	1	3.4	2.4			
109	996.696	3270	1	1.5	0.5			
110	1005.84	3300	1	3.4	2.4			
111	1014.984	3330	1	4.5	3.5			
112	1024.128	3360	1	5.2	4.2			
113	1033.272	3390	1	3.4	2.4			
114	1042.416	3420	1	1.8	0.8			
115	1051.56	3450	1	4	3			
116	1060.704	3480	1	2.8	1.8			
117	1069.848	3510	1	3.2	2.2			
118	1078.992	3540	1	2.2	1.2			
119	1088.136	3570	1	2	1			
120	1097.28	3600	1	1.6	0.6			
121	1106.424	3630	1	1.5	0.5			
122	1115.568	3660	1	2	1			
123	1124.712	3690	1	6	5			
124	1133.856	3720	1	2.6	1.6			
125	1143	3750	1	2.4	1.4			
126	1152.144	3780	1	4.8	3.8			
127	1161.288	3810	1	3	2			
128	1170.432	3840	1	9.6	8.6			
129	1179.576	3870	1	7.8	6.8			
130	1188.72	3900	1	6	5			
131	1197.864	3930	1	5.6	4.6			
132	1207.008	3960	1	3.6	2.6			
133	1216.152	3990	1	5.5	4.5			
134	1225.296	4020	1	7.5	6.5			
135	1234.44	4050	1	4.3	3.3			
136	1243.584	4080	1	6	5			
137	1252.728	4110	1	4.4	3.4			
138	1261.872	4140	1	5.8	4.8			
139	1271.016	4170	1	5	4			
140	1280.16	4200	1	3.2	2.2			

141	1289.304	4230	1	1	0			
142	1298.448	4260	1	3.6	2.6	Cal. Gas		
Traverse 99-13		Forty Road East, Heading West towards the South branch of Cattaraugus Creek						
Nelson, Bieber								6/10/1999
H2=1700, 12		Batt.=8.1	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Sample #143 was taken 28 ft. south and 36 ft. west of dead end sign on south side of road.								
143	1307.592	4290	1	1	0	1x, Cal. Gas	6/10/1999	
144	1316.736	4320	1	1	0			
145	1325.88	4350	1	3	2			
146	1335.024	4380	1	1.2	0.2			
147	1344.168	4410	1	1	0			
148	1353.312	4440	1	1.4	0.4			
149	1362.456	4470	1	2	1			
150	1371.6	4500	1	6	5			
151	1380.744	4530	1	3	2			
152	1389.888	4560	1	1	0			
153	1399.032	4590	1	3.8	2.8			
154	1408.176	4620	1	2.4	1.4			
155	1417.32	4650	1	1.6	0.6			
156	1426.464	4680	1	3.2	2.2			
157	1435.608	4710	1	1	0			
158	1444.752	4740	1	2.6	1.6			
159	1453.896	4770	1	1.6	0.6			
160	1463.04	4800	1	3	2			
161	1472.184	4830	1	5	4			
162	1481.328	4860	1	2	1			
163	1490.472	4890	1	1.8	0.8			
164	1499.616	4920	1	2.2	1.2			
165	1508.76	4950	1	2	1			
166	1517.904	4980	1	3	2			
167	1527.048	5010	1	1.2	0.2			
168	1536.192	5040	1	1.6	0.6			
169	1545.336	5070	1	7	6			
170	1554.48	5100	1	1.5	0.5	Cal. Gas		
171	1563.624	5130	1	2.2	1.2			
172	1572.768	5160	1	2	1			
173	1581.912	5190	1	1.4	0.4			
174	1591.056	5220	1	2.5	1.5			
175	1600.2	5250	1	2.2	1.2			
176	1609.344	5280	1	3	2			
177	1618.488	5310	1	2.6	1.6			
178	1627.632	5340	1	4.4	3.4			
179	1636.776	5370	1	3.6	2.6			
180	1645.92	5400	1	3.6	2.6			
181	1655.064	5430	1	2.8	1.8			
182	1664.208	5460	1	3.8	2.8			
183	1673.352	5490	1	1.6	0.6			
184	1682.496	5520	1	2.5	1.5			
185	1691.64	5550	1	3	2			
186	1700.784	5580	1	4.6	3.6			

187	1709.928	5610	1	3	2			
188	1719.072	5640	1	1.8	0.8			
189	1728.216	5670	1	4	3			
190	1737.36	5700	1	3.4	2.4			
191	1746.504	5730	1	2.2	1.2			
192	1755.648	5760	1	3.4	2.4			
193	1764.792	5790	1	3.4	2.4			
194	1773.936	5820	1	3.5	2.5			
195	1783.08	5850	1	1.4	0.4			
196	1792.224	5880	1	7	6			
197	1801.368	5910	1	7	6			
198	1810.512	5940	1	2.2	1.2			
199	1819.656	5970	1	2.5	1.5			
200	1828.8	6000	1	5	4			
201	1837.944	6030	1	4	3			
202	1847.088	6060	1	4.5	3.5	Sample #202 is 20 ft. East of Road		
203	1856.232	6090	1	4	3	Closed Rail		
204	1865.376	6120	1	1	0			
205	1874.52	6150	1	2.4	1.4			
206	1883.664	6180	1	1.5	0.5			
207	1892.808	6210	1	4	3			
208	1901.952	6240	1	3.6	2.6			
209	1911.096	6270	1	3	2			
210	1920.24	6300	1	3	2			
211	1929.384	6330	1	1.8	0.8			
212	1938.528	6360	1	11	10	Redo 3 samples		
213	1947.672	6390	1	4.4	3.4			
214	1956.816	6420	1	1.4	0.4			
215	1965.96	6450	1	1.6	0.6			
216	1975.104	6480	1	1.5	0.5			
217	1984.248	6510	1	11	10	Redo 3 samples		
218	1993.392	6540	1	1.2	0.2			
219	2002.536	6570	1	2.4	1.4			
220	2011.68	6600	1	1.8	0.8			
221	2020.824	6630	1	1.2	0.2			
222	2029.968	6660	1	1.5	0.5			
223	2039.112	6690	1	2.5	1.5			
224	2048.256	6720	1	3	2	Cal. Gas		
Traverse 99-13		Forty Road East, Heading West towards the South branch of Cattaraugus Creek						
Nelson, Bieber								6/16/1999
H2=2000, 12		Batt.=8.1	Leak test=O.K.		Flow=Good			
Sunny, Cool 70								
Sample #225 was taken 23 ft. south and 10 ft. east of drain pipe on east side of road.								
225	2057.4	6750	1	6	5	1x, Cal. Gas	6/16/1999	
226	2066.544	6780	1	1	0			
227	2075.688	6810	1	1.6	0.6			
228	2084.832	6840	1	1.6	0.6			
229	2093.976	6870	1	1.6	0.6			
230	2103.12	6900	1	1	0			
231	2112.264	6930	1	11	10	Redo 3 samples		
232	2121.408	6960	1	1	0			

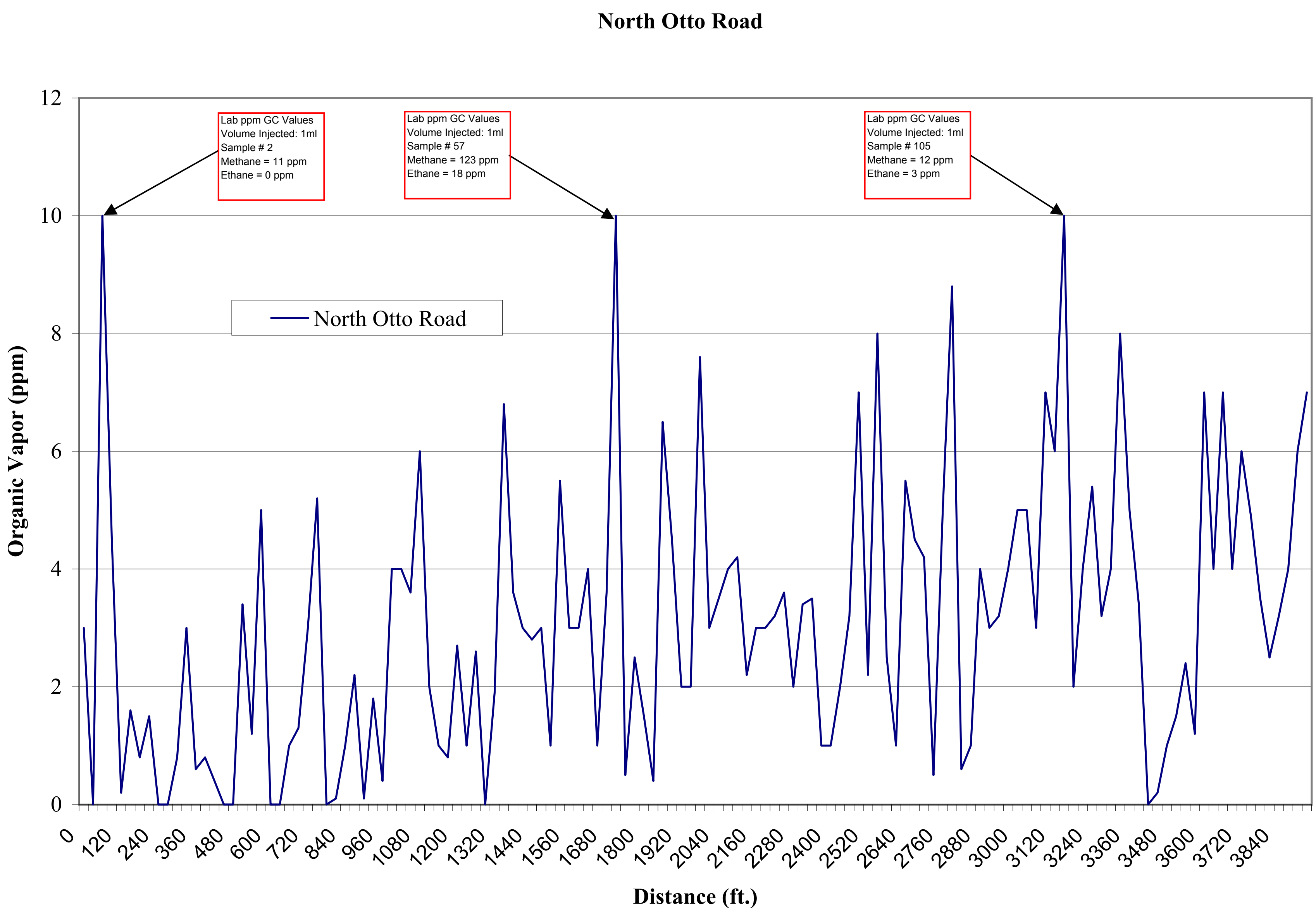
233	2130.552	6990	1	1.2	0.2			
234	2139.696	7020	1	1	0			
235	2148.84	7050	1	3.5	2.5			
236	2157.984	7080	1	1.5	0.5			
237	2167.128	7110	1	1.2	0.2			
238	2176.272	7140	1	1.8	0.8			
239	2185.416	7170	1	1	0			
240	2194.56	7200	1	1.2	0.2			
241	2203.704	7230	1	2.4	1.4			
242	2212.848	7260	1	1.2	0.2			
243	2221.992	7290	1	4.5	3.5			
244	2231.136	7320	1	9	8	Redo 3 samples		
245	2240.28	7350	1	1.6	0.6			
246	2249.424	7380	1	1	0			
247	2258.568	7410	1	5	4			
248	2267.712	7440	1	3	2			
249	2276.856	7470	1	3.5	2.5			
250	2286	7500	1	1	0	Cal. Gas		
						Sample #250 is 8ft. South		
						of rock pile		


Forty Road (East)
Organic Vapor (ppm)
Distance (ft.)
Forty Road (East)
Lab ppm GC Values
Volume Injected: 1ml
Sample # 80
Methane = 99 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 82
Methane = 26 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 2ml
Sample # 217
Methane = 25 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 2ml
Sample # 231
Methane = 5 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 2ml
Sample # 212
Methane = 72 ppm
Ethane = 106 ppm
*Propane & Butane
Present
0
2
4
6
8
10
12
0
240
480
720
960
1200
1440
1680
1920
2160
2400
2640
2880
3120
3360
3600
3840
4080
4320
4560
4800
5040
5280
5520
5760
6000
6240
6480
6720
6960
7200
7440

Traverse 99-14		North Otto Road, Heading East.					6/16/1999	
Nelson, Bieber								
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Cool 70								
Traverse starting point is approx. 500 ft. West of Girl Scout Camp at 90 degree bend in North Otto Rd.								
Sample #0 was taken 57 ft. West of the Narrow Bridge Sign on South side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	4	3	Cal. Gas	6/16/1999	
1	9.144	30	1	1	0	1x	Taken on South side	
2	18.288	60	1	11	10	Redo 3 samples	of North Otto Rd.	
3	27.432	90	1	5.5	4.5	Gravel		
4	36.576	120	1	1.2	0.2	Road Bed		
5	45.72	150	1	2.6	1.6			
6	54.864	180	1	1.8	0.8			
7	64.008	210	1	2.5	1.5			
8	73.152	240	1	1	0			
9	82.296	270	1	1	0	Sample #9 on bridge, Moved down		
10	91.44	300	1	1.8	0.8	below Oily stain on water		
11	100.584	330	1	4	3			
12	109.728	360	1	1.6	0.6			
13	118.872	390	1	1.8	0.8			
14	128.016	420	1	1.4	0.4			
15	137.16	450	1	1	0			
16	146.304	480	1	1	0			
17	155.448	510	1	4.4	3.4			
18	164.592	540	1	2.2	1.2			
19	173.736	570	1	6	5			
20	182.88	600	1	1	0			
21	192.024	630	1	1	0			
22	201.168	660	1	2	1			
23	210.312	690	1	2.3	1.3			
24	219.456	720	1	4	3			
25	228.6	750	1	6.2	5.2			
26	237.744	780	1	1	0			
27	246.888	810	1	1.1	0.1			
28	256.032	840	1	2	1			
29	265.176	870	1	3.2	2.2			
30	274.32	900	1	1.1	0.1			
31	283.464	930	1	2.8	1.8			
32	292.608	960	1	1.4	0.4			
33	301.752	990	1	5	4			
34	310.896	1020	1	5	4			
35	320.04	1050	1	4.6	3.6			
36	329.184	1080	1	7	6			
37	338.328	1110	1	3	2			
38	347.472	1140	1	2	1			
39	356.616	1170	1	1.8	0.8			
40	365.76	1200	1	3.7	2.7			
41	374.904	1230	1	2	1			
42	384.048	1260	1	3.6	2.6			
43	393.192	1290	1	1	0			

44	402.336	1320	1	2.9	1.9				
45	411.48	1350	1	7.8	6.8				
46	420.624	1380	1	4.6	3.6				
47	429.768	1410	1	4	3				
48	438.912	1440	1	3.8	2.8				
49	448.056	1470	1	4	3				
50	457.2	1500	1	2	1	Cal. Gas			
Traverse 99-14		North Otto Road, Heading East.						6/21/1999	
Nelson, Bieber									
H2=2000, 12		Batt.=8.1	Leak test=O.K.		Flow=Good				
Sunny, Hot 80									
Sample #51 is 1530 ft. from start of traverse.									
51	466.344	1530	1	6.5	5.5	Cal. Gas		6/21/1999	
52	475.488	1560	1	4	3				
53	484.632	1590	1	4	3				
54	493.776	1620	1	5	4				
55	502.92	1650	1	2	1				
56	512.064	1680	1	4.6	3.6				
57	521.208	1710	1	11	10	Box H			
58	530.352	1740	1	1.5	0.5				
59	539.496	1770	1	3.5	2.5				
60	548.64	1800	1	2.5	1.5				
61	557.784	1830	1	1.4	0.4				
62	566.928	1860	1	7.5	6.5				
63	576.072	1890	1	5.5	4.5				
64	585.216	1920	1	3	2				
65	594.36	1950	1	3	2				
66	603.504	1980	1	8.6	7.6				
67	612.648	2010	1	4	3				
68	621.792	2040	1	4.5	3.5				
69	630.936	2070	1	5	4				
70	640.08	2100	1	5.2	4.2				
71	649.224	2130	1	3.2	2.2				
72	658.368	2160	1	4	3				
73	667.512	2190	1	4	3				
74	676.656	2220	1	4.2	3.2				
75	685.8	2250	1	4.6	3.6				
76	694.944	2280	1	3	2				
77	704.088	2310	1	4.4	3.4	Cal. Gas			
78	713.232	2340	1	4.5	3.5				
79	722.376	2370	1	2	1				
80	731.52	2400	1	2	1				
81	740.664	2430	1	3	2				
82	749.808	2460	1	4.2	3.2				
83	758.952	2490	1	8	7				
84	768.096	2520	1	3.2	2.2				
85	777.24	2550	1	9	8				
86	786.384	2580	1	3.5	2.5				
87	795.528	2610	1	2	1				
88	804.672	2640	1	6.5	5.5				
89	813.816	2670	1	5.5	4.5				

90	822.96	2700	1	5.2	4.2			
91	832.104	2730	1	1.5	0.5			
92	841.248	2760	1	6	5			
93	850.392	2790	1	9.8	8.8			
94	859.536	2820	1	1.6	0.6			
95	868.68	2850	1	2	1			
96	877.824	2880	1	5	4			
97	886.968	2910	1	4	3			
98	896.112	2940	1	4.2	3.2			
99	905.256	2970	1	5	4			
100	914.4	3000	1	6	5			
101	923.544	3030	1	6	5			
102	932.688	3060	1	4	3			
103	941.832	3090	1	8	7			
104	950.976	3120	1	7	6			
105	960.12	3150	1	11	10	Box I		
106	969.264	3180	1	3	2			
107	978.408	3210	1	5	4			
108	987.552	3240	1	6.4	5.4	Cal. Gas		
Traverse 99-14		North Otto Road, Heading East.					6/22/1999	
Nelson, Bieber								
H2=1900, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Sample #109 is 55 ft. from arrow sign.								
109	996.696	3270	1	4.2	3.2	Cal. Gas	6/22/1999	
110	1005.84	3300	1	5	4			
111	1014.984	3330	1	9	8			
112	1024.128	3360	1	6	5			
113	1033.272	3390	1	4.4	3.4			
114	1042.416	3420	1	1	0			
115	1051.56	3450	1	1.2	0.2			
116	1060.704	3480	1	2	1			
117	1069.848	3510	1	2.5	1.5			
118	1078.992	3540	1	3.4	2.4			
119	1088.136	3570	1	2.2	1.2			
120	1097.28	3600	1	8	7			
121	1106.424	3630	1	5	4			
122	1115.568	3660	1	8	7			
123	1124.712	3690	1	5	4			
124	1133.856	3720	1	7	6			
125	1143	3750	1	5.9	4.9			
126	1152.144	3780	1	4.5	3.5			
127	1161.288	3810	1	3.5	2.5			
128	1170.432	3840	1	4.2	3.2			
129	1179.576	3870	1	5	4			
130	1188.72	3900	1	7	6			
131	1197.864	3930	1	8	7	Cal. Gas	Sample #131 is at	
							electrical pole #138	


North Otto Road
Lab ppm GC Values
Volume Injected: 1ml
Sample # 2
Methane = 11 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 57
Methane = 123 ppm
Ethane = 18 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 105
Methane = 12 ppm
Ethane = 3 ppm
North Otto Road
Organic Vapor (ppm)
0
2
4
6
8
10
12
0
120
240
360
480
600
720
840
960
1080
1200
1320
1440
1560
1680
1800
1920
2040
2160
2280
2400
2520
2640
2760
2880
3000
3120
3240
3360
3480
3600
3720
3840
Distance (ft.)

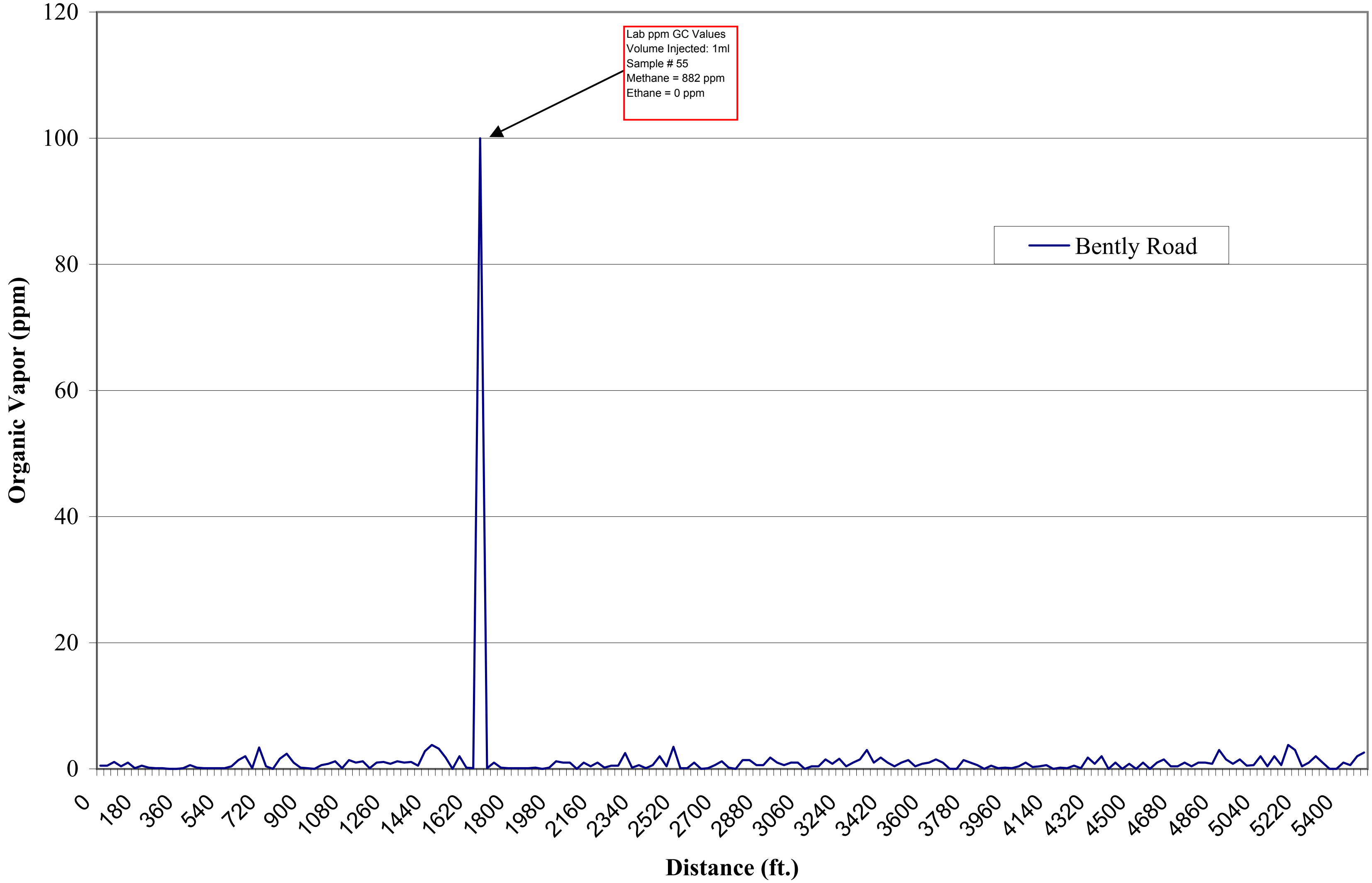
Traverse 99-15		Bently Road, Heading West.					7/6/1999	
Nelson, Bieber								
H2=2100, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 90								
Traverse starting point is where Markham Rd. and Bently Rd. meet, heading West. In the town of Markhams								
Sample #0 was taken 30 ft. West of Stop Sign on South side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.5	0.5	Cal. Gas	7/6/1999	
1	9.144	30	1	1.5	0.5	1x	Taken on South side	
2	18.288	60	1	2.1	1.1	Gravel	of Bently Rd.	
3	27.432	90	1	1.4	0.4	Road Bed		
4	36.576	120	1	2	1			
5	45.72	150	1	1.1	0.1			
6	54.864	180	1	1.5	0.5			
7	64.008	210	1	1.2	0.2			
8	73.152	240	1	1.1	0.1			
9	82.296	270	1	1.1	0.1			
10	91.44	300	1	1	0			
11	100.584	330	1	1	0			
12	109.728	360	1	1.1	0.1			
13	118.872	390	1	1.6	0.6			
14	128.016	420	1	1.2	0.2			
15	137.16	450	1	1.1	0.1			
16	146.304	480	1	1.1	0.1			
17	155.448	510	1	1.1	0.1			
18	164.592	540	1	1.1	0.1			
19	173.736	570	1	1.4	0.4			
20	182.88	600	1	2.4	1.4			
21	192.024	630	1	3	2			
22	201.168	660	1	1.1	0.1			
23	210.312	690	1	4.4	3.4			
24	219.456	720	1	1.4	0.4			
25	228.6	750	1	1	0			
26	237.744	780	1	2.6	1.6			
27	246.888	810	1	3.4	2.4			
28	256.032	840	1	2	1			
29	265.176	870	1	1.2	0.2			
30	274.32	900	1	1.1	0.1			
31	283.464	930	1	1	0			
32	292.608	960	1	1.6	0.6			
33	301.752	990	1	1.8	0.8			
34	310.896	1020	1	2.2	1.2			
35	320.04	1050	1	1.1	0.1			
36	329.184	1080	1	2.4	1.4			
37	338.328	1110	1	2	1			
38	347.472	1140	1	2.2	1.2			
39	356.616	1170	1	1.1	0.1			
40	365.76	1200	1	2	1			
41	374.904	1230	1	2.1	1.1			
42	384.048	1260	1	1.8	0.8			
43	393.192	1290	1	2.2	1.2			

44	402.336	1320	1	2	1			
45	411.48	1350	1	2.1	1.1			
46	420.624	1380	1	1.5	0.5			
47	429.768	1410	1	3.8	2.8			
48	438.912	1440	1	4.8	3.8			
49	448.056	1470	1	4.2	3.2			
50	457.2	1500	1	2.8	1.8			
51	466.344	1530	1	1	0			
52	475.488	1560	1	3	2			
53	484.632	1590	1	1.2	0.2	Cal. Gas		
54	493.776	1620	1	1.1	0.1			
55	502.92	1650	1	101	100	Redo 3 samples		
56	512.064	1680	1	1.1	0.1			
57	521.208	1710	1	2	1			
58	530.352	1740	1	1.2	0.2			
59	539.496	1770	1	1.1	0.1			
60	548.64	1800	1	1.1	0.1			
61	557.784	1830	1	1.1	0.1			
62	566.928	1860	1	1.1	0.1			
63	576.072	1890	1	1.2	0.2			
64	585.216	1920	1	1	0			
65	594.36	1950	1	1.2	0.2			
66	603.504	1980	1	2.2	1.2			
67	612.648	2010	1	2	1			
68	621.792	2040	1	2	1			
69	630.936	2070	1	1	0			
70	640.08	2100	1	2	1			
71	649.224	2130	1	1.4	0.4			
72	658.368	2160	1	2	1			
73	667.512	2190	1	1.2	0.2			
74	676.656	2220	1	1.5	0.5			
75	685.8	2250	1	1.5	0.5			
76	694.944	2280	1	3.5	2.5			
77	704.088	2310	1	1.2	0.2			
78	713.232	2340	1	1.6	0.6			
79	722.376	2370	1	1.1	0.1			
80	731.52	2400	1	1.6	0.6			
81	740.664	2430	1	3	2			
82	749.808	2460	1	1.4	0.4			
83	758.952	2490	1	4.5	3.5			
84	768.096	2520	1	1.1	0.1			
85	777.24	2550	1	1.1	0.1			
86	786.384	2580	1	2	1			
87	795.528	2610	1	1	0			
88	804.672	2640	1	1.1	0.1			
89	813.816	2670	1	1.6	0.6			
90	822.96	2700	1	2.2	1.2			
91	832.104	2730	1	1.2	0.2			
92	841.248	2760	1	1	0			
93	850.392	2790	1	2.4	1.4			
94	859.536	2820	1	2.4	1.4			

95	868.68	2850	1	1.6	0.6			
96	877.824	2880	1	1.6	0.6			
97	886.968	2910	1	2.8	1.8			
98	896.112	2940	1	2	1			
99	905.256	2970	1	1.6	0.6			
100	914.4	3000	1	2	1	Cal. Gas		
Traverse 99-15		Bently Road, Heading West.					7/7/1999	
Nelson, Bieber								
H2=1900, 12		Batt.=7.9	Leak test=O.K.		Flow=Good			
Sunny, Hot 90								
Sample #100 was taken 11 ft. west and 64 ft. south of electrical pole #1286A on South side of road.								
101	923.544	3030	1	2	1	Cal. Gas	7/7/1999	
102	932.688	3060	1	1	0			
103	941.832	3090	1	1.4	0.4			
104	950.976	3120	1	1.4	0.4			
105	960.12	3150	1	2.5	1.5			
106	969.264	3180	1	1.8	0.8			
107	978.408	3210	1	2.6	1.6			
108	987.552	3240	1	1.4	0.4			
109	996.696	3270	1	2	1			
110	1005.84	3300	1	2.5	1.5			
111	1014.984	3330	1	4	3			
112	1024.128	3360	1	2	1			
113	1033.272	3390	1	2.8	1.8			
114	1042.416	3420	1	2	1			
115	1051.56	3450	1	1.4	0.4			
116	1060.704	3480	1	2	1			
117	1069.848	3510	1	2.4	1.4			
118	1078.992	3540	1	1.4	0.4			
119	1088.136	3570	1	1.8	0.8			
120	1097.28	3600	1	2	1			
121	1106.424	3630	1	2.5	1.5			
122	1115.568	3660	1	2	1			
123	1124.712	3690	1	1	0			
124	1133.856	3720	1	1	0			
125	1143	3750	1	2.4	1.4			
126	1152.144	3780	1	2	1			
127	1161.288	3810	1	1.6	0.6			
128	1170.432	3840	1	1	0			
129	1179.576	3870	1	1.5	0.5			
130	1188.72	3900	1	1.1	0.1			
131	1197.864	3930	1	1.2	0.2			
132	1207.008	3960	1	1.1	0.1			
133	1216.152	3990	1	1.4	0.4			
134	1225.296	4020	1	2	1	Cal. Gas		
135	1234.44	4050	1	1.3	0.3			
136	1243.584	4080	1	1.4	0.4			
137	1252.728	4110	1	1.6	0.6			
138	1261.872	4140	1	1	0			
139	1271.016	4170	1	1.2	0.2			
140	1280.16	4200	1	1.1	0.1			

141	1289.304	4230	1	1.5	0.5			
142	1298.448	4260	1	1.1	0.1			
143	1307.592	4290	1	2.8	1.8			
144	1316.736	4320	1	1.8	0.8			
145	1325.88	4350	1	3	2			
146	1335.024	4380	1	1	0			
147	1344.168	4410	1	2	1			
148	1353.312	4440	1	1	0			
149	1362.456	4470	1	1.8	0.8			
150	1371.6	4500	1	1	0			
151	1380.744	4530	1	2	1			
152	1389.888	4560	1	1	0			
153	1399.032	4590	1	2	1			
154	1408.176	4620	1	2.5	1.5			
155	1417.32	4650	1	1.4	0.4			
156	1426.464	4680	1	1.4	0.4			
157	1435.608	4710	1	2	1			
158	1444.752	4740	1	1.4	0.4			
159	1453.896	4770	1	2	1			
160	1463.04	4800	1	2	1			
161	1472.184	4830	1	1.8	0.8			
162	1481.328	4860	1	4	3			
163	1490.472	4890	1	2.5	1.5			
164	1499.616	4920	1	1.8	0.8			
165	1508.76	4950	1	2.5	1.5			
166	1517.904	4980	1	1.5	0.5			
167	1527.048	5010	1	1.6	0.6			
168	1536.192	5040	1	3	2			
169	1545.336	5070	1	1.4	0.4			
170	1554.48	5100	1	3	2			
171	1563.624	5130	1	1.6	0.6			
172	1572.768	5160	1	4.8	3.8			
173	1581.912	5190	1	4	3			
174	1591.056	5220	1	1.4	0.4			
175	1600.2	5250	1	2	1			
176	1609.344	5280	1	3	2			
177	1618.488	5310	1	2	1			
178	1627.632	5340	1	1	0			
179	1636.776	5370	1	1	0			
180	1645.92	5400	1	2	1			
181	1655.064	5430	1	1.6	0.6			
182	1664.208	5460	1	3	2			
183	1673.352	5490	1	3.6	2.6	Cal. Gas	Sample #183 is 90 ft.	
							from bridge.	

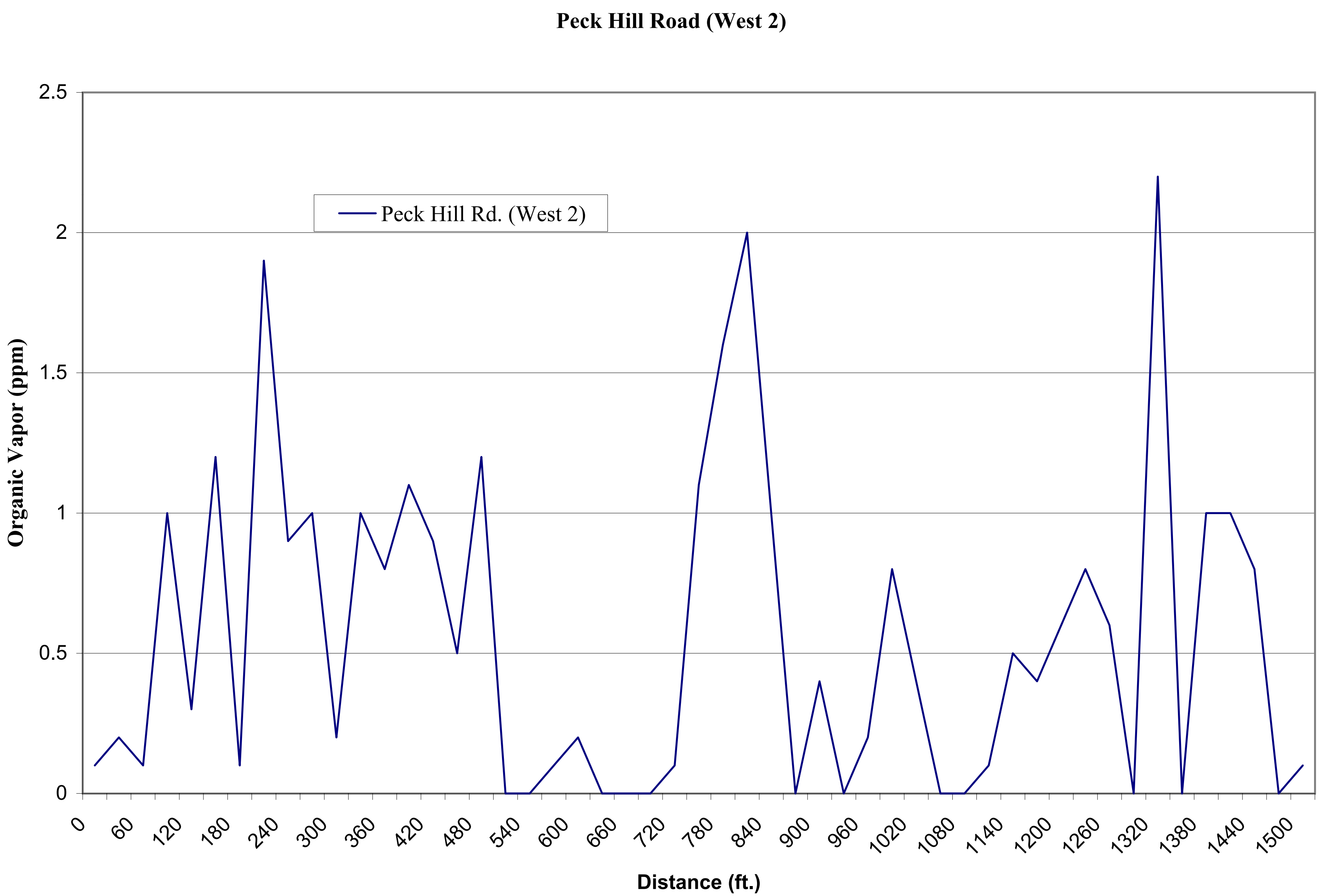
Bently Road



Organic Vapor (ppm)
120
100
80
60
40
20
0
Lab ppm GC Values
Volume Injected: 1ml
Sample # 55
Methane = 882 ppm
Ethane = 0 ppm
Bently Road
0
180
360
540
720
900
1080
1260
1440
1620
1800
1980
2160
2340
2520
2700
2880
3060
3240
3420
3600
3780
3960
4140
4320
4500
4680
4860
5040
5220
5400
Distance (ft.)

Traverse 99-16		Peck Hill Road, Heading West.(2)					7/8/1999	
Nelson, Bieber								
H2=1700, 12		Batt.=7.9	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Traverse starting point is at electrical pole #P69 on Peck Hill Rd., heading West. In the town of Cottage.								
Sample #81 was taken 6 ft. South of electrical pole #P69 on North side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
81	0	0	1	1.1	0.1	Cal. Gas	7/8/1999	
82	9.144	30	1	1.2	0.2	1x	Taken on North side	
83	18.288	60	1	1.1	0.1	Sandy Soil	of Peck Hill Rd.	
84	27.432	90	1	2	1			
85	36.576	120	1	1.3	0.3			
86	45.72	150	1	2.2	1.2			
87	54.864	180	1	1.1	0.1			
88	64.008	210	1	2.9	1.9			
89	73.152	240	1	1.9	0.9			
90	82.296	270	1	2	1			
91	91.44	300	1	1.2	0.2			
92	100.584	330	1	2	1			
93	109.728	360	1	1.8	0.8			
94	118.872	390	1	2.1	1.1			
95	128.016	420	1	1.9	0.9			
96	137.16	450	1	1.5	0.5			
97	146.304	480	1	2.2	1.2			
98	155.448	510	1	1	0			
99	164.592	540	1	1	0			
100	173.736	570	1	1.1	0.1			
101	182.88	600	1	1.2	0.2			
102	192.024	630	1	1	0			
103	201.168	660	1	1	0			
104	210.312	690	1	1	0			
105	219.456	720	1	1.1	0.1			
106	228.6	750	1	2.1	1.1			
107	237.744	780	1	2.6	1.6			
108	246.888	810	1	3	2			
109	256.032	840	1	2	1			
110	265.176	870	1	1	0			
111	274.32	900	1	1.4	0.4			
112	283.464	930	1	1	0			
113	292.608	960	1	1.2	0.2			
114	301.752	990	1	1.8	0.8			
115	310.896	1020	1	1.4	0.4			
116	320.04	1050	1	1	0			
117	329.184	1080	1	1	0			
118	338.328	1110	1	1.1	0.1			
119	347.472	1140	1	1.5	0.5			
120	356.616	1170	1	1.4	0.4			
121	365.76	1200	1	1.6	0.6			
122	374.904	1230	1	1.8	0.8			
123	384.048	1260	1	1.6	0.6			
124	393.192	1290	1	1	0			

125	402.336	1320	1	3.2	2.2			
126	411.48	1350	1	1	0			
127	420.624	1380	1	2	1			
128	429.768	1410	1	2	1			
129	438.912	1440	1	1.8	0.8			
130	448.056	1470	1	1	0			
131	457.2	1500	1	1.1	0.1	Cal. Gas		
						Sample #131 is 28 ft. north and		
						46 ft. east of arrow sign next to		
						Edwards Corners rd.		

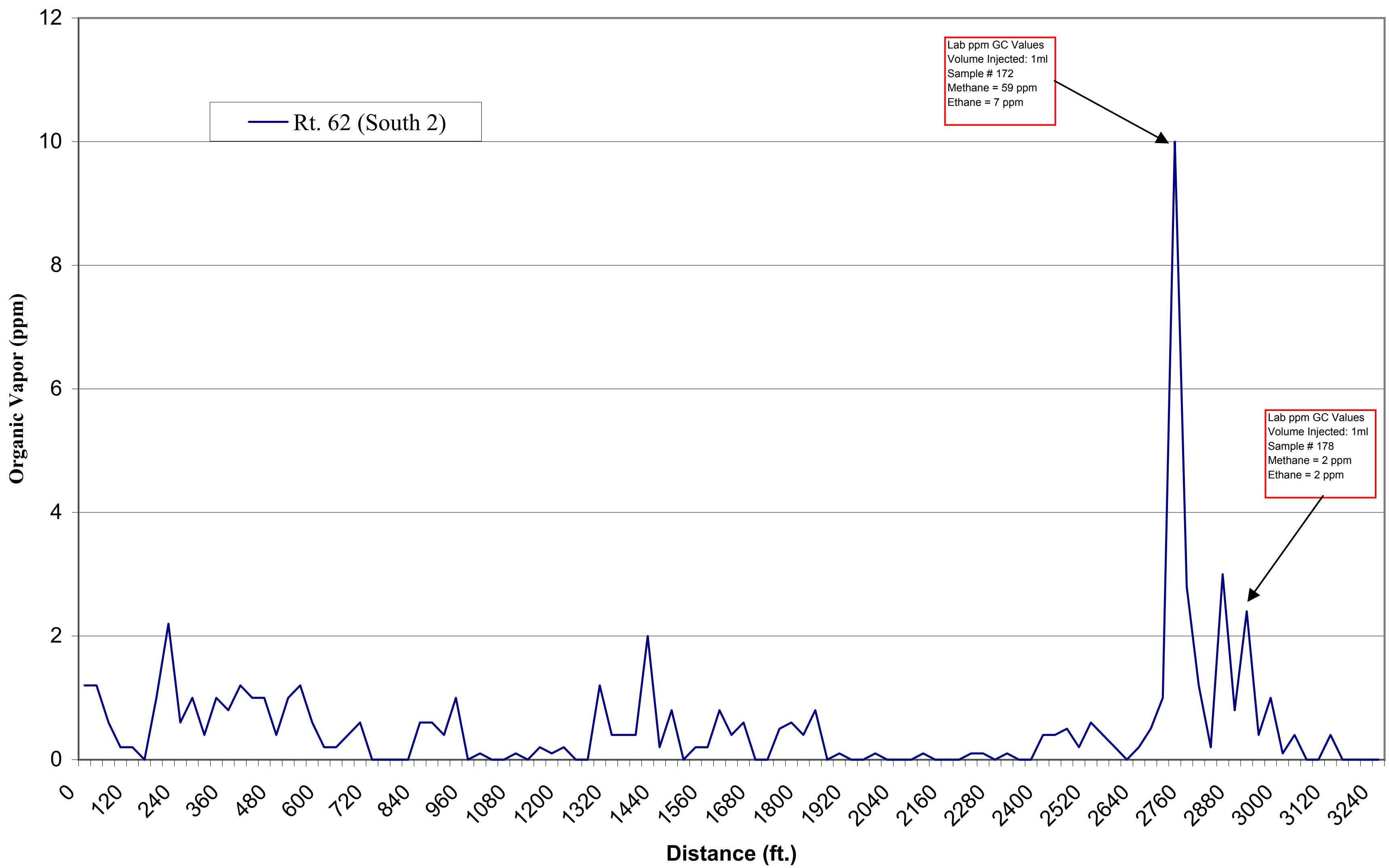

Peck Hill Road (West 2)
Peck Hill Rd. (West 2)
Organic Vapor (ppm)
Distance (ft.)
0
0.5
1
1.5
2
2.5
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
1260
1320
1380
1440
1500

Traverse 99-17		Rt. 62, Heading South.(2)					7/8/1999	
Nelson, Bieber								
H2=1800, 12		Batt.=7.9	Leak test=O.K.		Flow=Good			
Sunny, Hot 85								
Traverse starting point is at electrical pole #96-1 on Rt. 62, heading South. In the town of Markhams.								
Sample #81 was taken 51 ft. West of electrical pole #96-1 on East side of road.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
81	0	0	1	2.2	1.2	Cal. Gas	7/8/1999	
82	9.144	30	1	2.2	1.2	1x	Taken on East side	
83	18.288	60	1	1.6	0.6	Sandy Soil	of Rt. 62.	
84	27.432	90	1	1.2	0.2			
85	36.576	120	1	1.2	0.2			
86	45.72	150	1	1	0			
87	54.864	180	1	2	1			
88	64.008	210	1	3.2	2.2			
89	73.152	240	1	1.6	0.6			
90	82.296	270	1	2	1			
91	91.44	300	1	1.4	0.4			
92	100.584	330	1	2	1			
93	109.728	360	1	1.8	0.8			
94	118.872	390	1	2.2	1.2			
95	128.016	420	1	2	1			
96	137.16	450	1	2	1			
97	146.304	480	1	1.4	0.4			
98	155.448	510	1	2	1			
99	164.592	540	1	2.2	1.2			
100	173.736	570	1	1.6	0.6			
101	182.88	600	1	1.2	0.2			
102	192.024	630	1	1.2	0.2			
103	201.168	660	1	1.4	0.4			
104	210.312	690	1	1.6	0.6			
105	219.456	720	1	1	0			
106	228.6	750	1	1	0			
107	237.744	780	1	1	0			
108	246.888	810	1	1	0			
109	256.032	840	1	1.6	0.6			
110	265.176	870	1	1.6	0.6			
111	274.32	900	1	1.4	0.4			
112	283.464	930	1	2	1			
113	292.608	960	1	1	0			
114	301.752	990	1	1.1	0.1			
115	310.896	1020	1	1	0			
116	320.04	1050	1	1	0			
117	329.184	1080	1	1.1	0.1			
118	338.328	1110	1	1	0			
119	347.472	1140	1	1.2	0.2			
120	356.616	1170	1	1.1	0.1			
121	365.76	1200	1	1.2	0.2			
122	374.904	1230	1	1	0			
123	384.048	1260	1	1	0			
124	393.192	1290	1	2.2	1.2			

125	402.336	1320	1	1.4	0.4			
126	411.48	1350	1	1.4	0.4			
127	420.624	1380	1	1.4	0.4			
128	429.768	1410	1	3	2			
129	438.912	1440	1	1.2	0.2			
130	448.056	1470	1	1.8	0.8			
131	457.2	1500	1	1	0			
132	466.344	1530	1	1.2	0.2			
133	475.488	1560	1	1.2	0.2			
134	484.632	1590	1	1.8	0.8			
135	493.776	1620	1	1.4	0.4			
136	502.92	1650	1	1.6	0.6			
137	512.064	1680	1	1	0			
138	521.208	1710	1	1	0			
139	530.352	1740	1	1.5	0.5			
140	539.496	1770	1	1.6	0.6			
141	548.64	1800	1	1.4	0.4			
142	557.784	1830	1	1.8	0.8			
143	566.928	1860	1	1	0			
144	576.072	1890	1	1.1	0.1			
145	585.216	1920	1	1	0			
146	594.36	1950	1	1	0			
147	603.504	1980	1	1.1	0.1			
148	612.648	2010	1	1	0			
149	621.792	2040	1	1	0			
150	630.936	2070	1	1	0	Cal. Gas		
151	640.08	2100	1	1.1	0.1			
152	649.224	2130	1	1	0			
153	658.368	2160	1	1	0			
154	667.512	2190	1	1	0			
155	676.656	2220	1	1.1	0.1			
156	685.8	2250	1	1.1	0.1			
157	694.944	2280	1	1	0			
158	704.088	2310	1	1.1	0.1			
159	713.232	2340	1	1	0			
160	722.376	2370	1	1	0			
161	731.52	2400	1	1.4	0.4			
162	740.664	2430	1	1.4	0.4			
163	749.808	2460	1	1.5	0.5			
164	758.952	2490	1	1.2	0.2			
165	768.096	2520	1	1.6	0.6			
166	777.24	2550	1	1.4	0.4			
167	786.384	2580	1	1.2	0.2			
168	795.528	2610	1	1	0			
169	804.672	2640	1	1.2	0.2			
170	813.816	2670	1	1.5	0.5			
171	822.96	2700	1	2	1	Box C		
172	832.104	2730	1	11	10	Redo 4 samples		
173	841.248	2760	1	3.8	2.8	Sample #172 is 9ft. West of road		
174	850.392	2790	1	2.2	1.2	sign at the intersection of Rt. 62		
175	859.536	2820	1	1.2	0.2	and Markhams Rd.		

176	868.68	2850	1	4	3			
177	877.824	2880	1	1.8	0.8			
178	886.968	2910	1	3.4	2.4	Box D		
179	896.112	2940	1	1.4	0.4			
180	905.256	2970	1	2	1			
181	914.4	3000	1	1.1	0.1			
182	923.544	3030	1	1.4	0.4			
183	932.688	3060	1	1	0			
184	941.832	3090	1	1	0			
185	950.976	3120	1	1.4	0.4			
186	960.12	3150	1	1	0			
187	969.264	3180	1	1	0			
188	978.408	3210	1	1	0			
189	987.552	3240	1	1	0	Cal. Gas	Sample #189 is 23ft.	
							east of electrical pole	
							#114	

Rt. 62 (South 2)



Rt. 62 (South 2)
Lab ppm GC Values
Volume Injected: 1ml
Sample # 172
Methane = 59 ppm
Ethane = 7 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 178
Methane = 2 ppm
Ethane = 2 ppm
Organic Vapor (ppm)
0
2
4
6
8
10
12
Distance (ft.)
0
120
240
360
480
600
720
840
960
1080
1200
1320
1440
1560
1680
1800
1920
2040
2160
2280
2400
2520
2640
2760
2880
3000
3120
3240

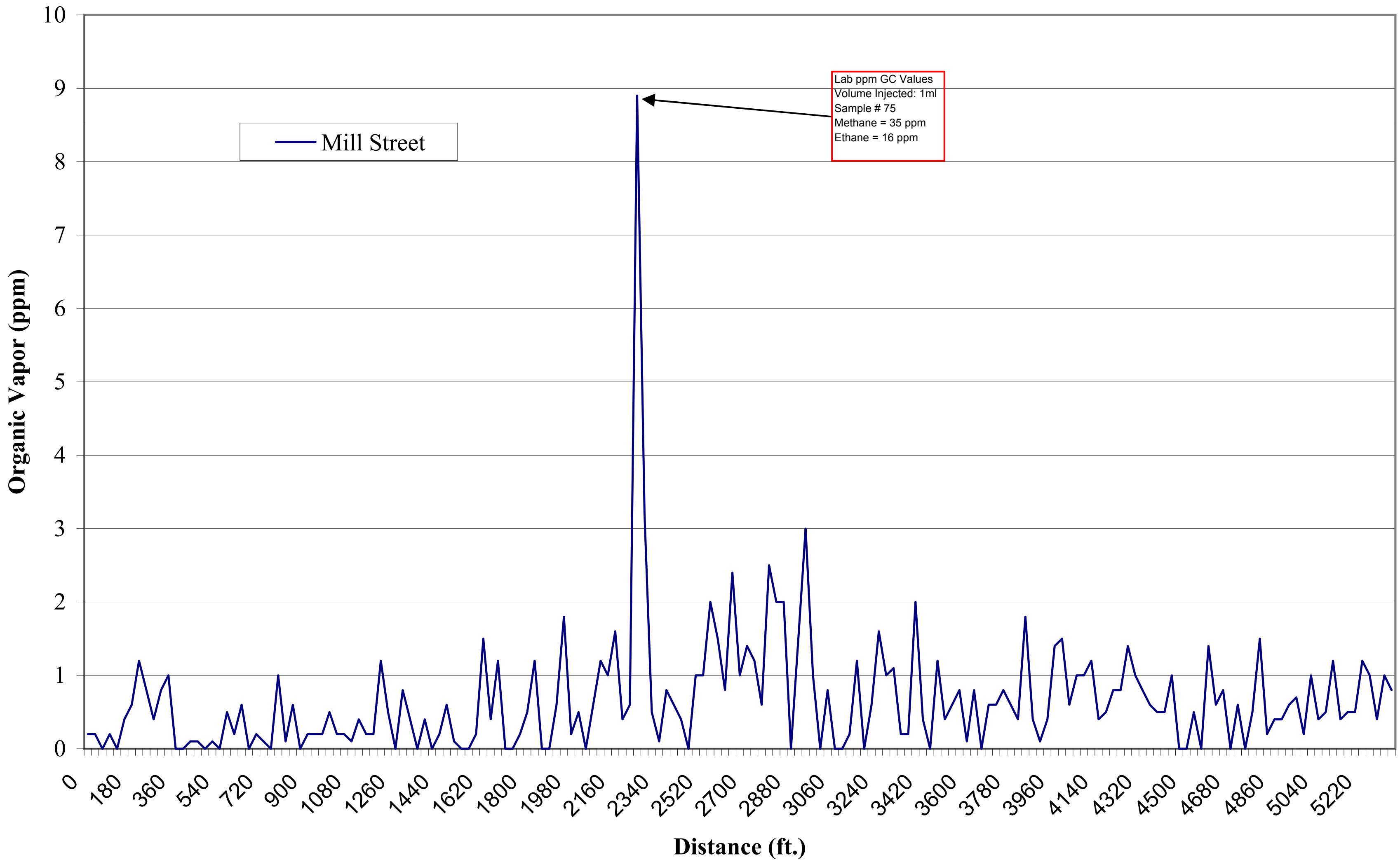
Traverse 99-18		Mill St., Heading South towards the town of South Dayton					(RXR)	7/12/1999
Nelson								
H2=1800, 12		Batt.=7.9	Leak test=O.K.		Flow=fair			
Sunny, Hot 80								
Sample #0 was taken 8ft. East of electric pole 1293, 1-3 at the North end of Mill St. in South Dayton township								
Traverse is heading South on Mill St. with samples taken on West side of Rd.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.2	0.2	Cal. Gas	7/12/1999	
1	9.144	30	1	1.2	0.2	1x	Taken on West side	
2	18.288	60	1	1	0	Gravel	of Mill St.	
3	27.432	90	1	1.2	0.2	(Road Bed)		
4	36.576	120	1	1	0			
5	45.72	150	1	1.4	0.4			
6	54.864	180	1	1.6	0.6			
7	64.008	210	1	2.2	1.2			
8	73.152	240	1	1.8	0.8			
9	82.296	270	1	1.4	0.4			
10	91.44	300	1	1.8	0.8			
11	100.584	330	1	2	1			
12	109.728	360	1	1	0			
13	118.872	390	1	1	0			
14	128.016	420	1	1.1	0.1			
15	137.16	450	1	1.1	0.1			
16	146.304	480	1	1	0			
17	155.448	510	1	1.1	0.1			
18	164.592	540	1	1	0			
19	173.736	570	1	1.5	0.5			
20	182.88	600	1	1.2	0.2			
21	192.024	630	1	1.6	0.6			
22	201.168	660	1	1	0			
23	210.312	690	1	1.2	0.2			
24	219.456	720	1	1.1	0.1			
25	228.6	750	1	1	0			
26	237.744	780	1	2	1			
27	246.888	810	1	1.1	0.1			
28	256.032	840	1	1.6	0.6			
29	265.176	870	1	1	0			
30	274.32	900	1	1.2	0.2			
31	283.464	930	1	1.2	0.2			
32	292.608	960	1	1.2	0.2			
33	301.752	990	1	1.5	0.5			
34	310.896	1020	1	1.2	0.2			
35	320.04	1050	1	1.2	0.2			
36	329.184	1080	1	1.1	0.1			
37	338.328	1110	1	1.4	0.4			
38	347.472	1140	1	1.2	0.2	Sample #38 is at electrical pole #2		
39	356.616	1170	1	1.2	0.2			
40	365.76	1200	1	2.2	1.2			
41	374.904	1230	1	1.5	0.5			
42	384.048	1260	1	1	0			
43	393.192	1290	1	1.8	0.8			

44	402.336	1320	1	1.4	0.4			
45	411.48	1350	1	1	0			
46	420.624	1380	1	1.4	0.4			
47	429.768	1410	1	1	0			
48	438.912	1440	1	1.2	0.2			
49	448.056	1470	1	1.6	0.6			
50	457.2	1500	1	1.1	0.1	Cal. Gas		
Traverse 99-18		Mill St., Heading South towards the town of South Dayton					(RXR)	7/23/1999
Nelson								
H2=2300, 12		Batt.=7.9	Leak test=O.K.		Flow=Good			
Sunny, Hot 80								
Sample #51 was taken 112ft. South of dirt rd. on Mill st.								
51	466.344	1530	1	1	0	1x Cal.Gas	7/23/1999	
52	475.488	1560	1	1	0			
53	484.632	1590	1	1.2	0.2			
54	493.776	1620	1	2.5	1.5			
55	502.92	1650	1	1.4	0.4			
56	512.064	1680	1	2.2	1.2			
57	521.208	1710	1	1	0			
58	530.352	1740	1	1	0			
59	539.496	1770	1	1.2	0.2			
60	548.64	1800	1	1.5	0.5			
61	557.784	1830	1	2.2	1.2			
62	566.928	1860	1	1	0			
63	576.072	1890	1	1	0			
64	585.216	1920	1	1.6	0.6			
65	594.36	1950	1	2.8	1.8			
66	603.504	1980	1	1.2	0.2			
67	612.648	2010	1	1.5	0.5			
68	621.792	2040	1	1	0			
69	630.936	2070	1	1.6	0.6			
70	640.08	2100	1	2.2	1.2			
71	649.224	2130	1	2	1			
72	658.368	2160	1	2.6	1.6			
73	667.512	2190	1	1.4	0.4			
74	676.656	2220	1	1.6	0.6			
75	685.8	2250	1	9.9	8.9	Redo 3 samples		
76	694.944	2280	1	4.2	3.2	Sample #75 is 164ft. South of		
77	704.088	2310	1	1.5	0.5	electrical pole #4		
78	713.232	2340	1	1.1	0.1			
79	722.376	2370	1	1.8	0.8			
80	731.52	2400	1	1.6	0.6			
81	740.664	2430	1	1.4	0.4			
82	749.808	2460	1	1	0			
83	758.952	2490	1	2	1			
84	768.096	2520	1	2	1			
85	777.24	2550	1	3	2			
86	786.384	2580	1	2.5	1.5			
87	795.528	2610	1	1.8	0.8			
88	804.672	2640	1	3.4	2.4			
89	813.816	2670	1	2	1			

90	822.96	2700	1	2.4	1.4			
91	832.104	2730	1	2.2	1.2			
92	841.248	2760	1	1.6	0.6			
93	850.392	2790	1	3.5	2.5			
94	859.536	2820	1	3	2			
95	868.68	2850	1	3	2			
96	877.824	2880	1	1	0			
97	886.968	2910	1	2.5	1.5			
98	896.112	2940	1	4	3			
99	905.256	2970	1	2	1	Sample #99 is 12ft. North of		
100	914.4	3000	1	1	0	electrical pole #293		
101	923.544	3030	1	1.8	0.8			
102	932.688	3060	1	1	0			
103	941.832	3090	1	1	0			
104	950.976	3120	1	1.2	0.2			
105	960.12	3150	1	2.2	1.2			
106	969.264	3180	1	1	0			
107	978.408	3210	1	1.6	0.6			
108	987.552	3240	1	2.6	1.6			
109	996.696	3270	1	2	1			
110	1005.84	3300	1	2.1	1.1			
111	1014.984	3330	1	1.2	0.2			
112	1024.128	3360	1	1.2	0.2			
113	1033.272	3390	1	3	2			
114	1042.416	3420	1	1.4	0.4			
115	1051.56	3450	1	1	0			
116	1060.704	3480	1	2.2	1.2			
117	1069.848	3510	1	1.4	0.4			
118	1078.992	3540	1	1.6	0.6			
119	1088.136	3570	1	1.8	0.8			
120	1097.28	3600	1	1.1	0.1			
121	1106.424	3630	1	1.8	0.8			
122	1115.568	3660	1	1	0	Sample #122 is 14ft. North of		
123	1124.712	3690	1	1.6	0.6	electrical pole #8		
124	1133.856	3720	1	1.6	0.6			
125	1143	3750	1	1.8	0.8			
126	1152.144	3780	1	1.6	0.6			
127	1161.288	3810	1	1.4	0.4			
128	1170.432	3840	1	2.8	1.8			
129	1179.576	3870	1	1.4	0.4			
130	1188.72	3900	1	1.1	0.1			
131	1197.864	3930	1	1.4	0.4			
132	1207.008	3960	1	2.4	1.4			
133	1216.152	3990	1	2.5	1.5			
134	1225.296	4020	1	1.6	0.6			
135	1234.44	4050	1	2	1			
136	1243.584	4080	1	2	1			
137	1252.728	4110	1	2.2	1.2			
138	1261.872	4140	1	1.4	0.4			
139	1271.016	4170	1	1.5	0.5			
140	1280.16	4200	1	1.8	0.8			

141	1289.304	4230	1	1.8	0.8			
142	1298.448	4260	1	2.4	1.4			
143	1307.592	4290	1	2	1			
144	1316.736	4320	1	1.8	0.8			
145	1325.88	4350	1	1.6	0.6			
146	1335.024	4380	1	1.5	0.5			
147	1344.168	4410	1	1.5	0.5			
148	1353.312	4440	1	2	1			
149	1362.456	4470	1	1	0			
150	1371.6	4500	1	1	0			
151	1380.744	4530	1	1.5	0.5			
152	1389.888	4560	1	1	0			
153	1399.032	4590	1	2.4	1.4			
154	1408.176	4620	1	1.6	0.6			
155	1417.32	4650	1	1.8	0.8			
156	1426.464	4680	1	1	0			
157	1435.608	4710	1	1.6	0.6			
158	1444.752	4740	1	1	0			
159	1453.896	4770	1	1.5	0.5			
160	1463.04	4800	1	2.5	1.5	Sample #162 is 46 ft. North of electric		
161	1472.184	4830	1	1.2	0.2	pole #14, West side of road		
162	1481.328	4860	1	1.4	0.4	Cal. Gas		
Traverse 99-18		Mill St., Heading South towards the town of South Dayton					(RXR)	9/3/1999
Nelson								
H2=2000, 12		Batt.=7.9	Leak test=O.K.		Flow=OK			
Sunny, Hot 85								
Sample #163 is 16 ft. north of electrical pole #14 on west side of Mill St.								
163	1490.472	4890	1	1.4	0.4	9/3/1999		
164	1499.616	4920	1	1.6	0.6	1x Cal. Gas		
165	1508.76	4950	1	1.7	0.7			
166	1517.904	4980	1	1.2	0.2			
167	1527.048	5010	1	2	1			
168	1536.192	5040	1	1.4	0.4			
169	1545.336	5070	1	1.5	0.5			
170	1554.48	5100	1	2.2	1.2			
171	1563.624	5130	1	1.4	0.4			
172	1572.768	5160	1	1.5	0.5			
173	1581.912	5190	1	1.5	0.5			
174	1591.056	5220	1	2.2	1.2			
175	1600.2	5250	1	2	1			
176	1609.344	5280	1	1.4	0.4			
177	1618.488	5310	1	2	1	Cal. Gas		
178	1627.632	5340	1	1.8	0.8	Sample #178 is 3 ft. North of Village sign.		

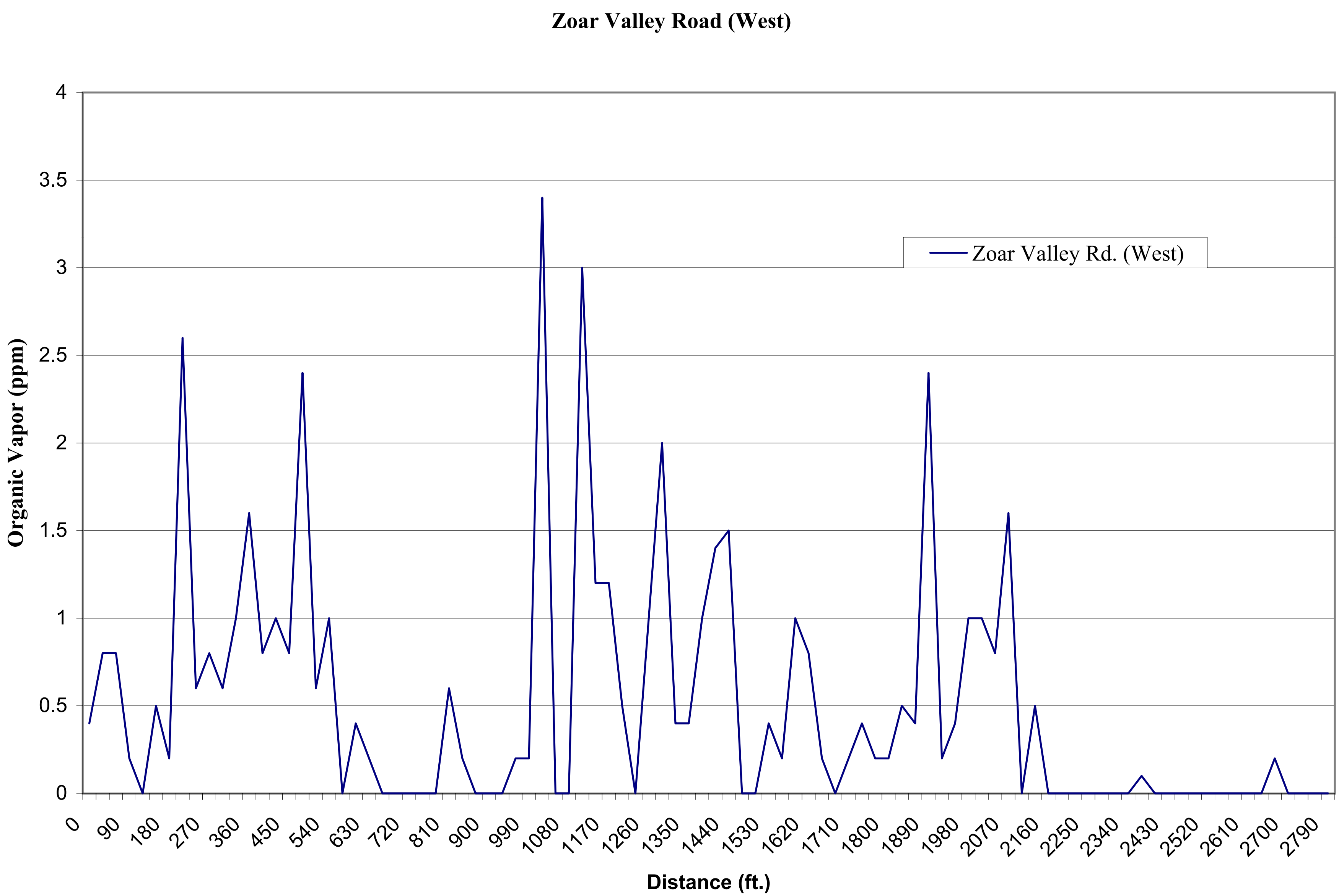
Mill Street



Mill Street
Organic Vapor (ppm)
Distance (ft.)
0
1
2
3
4
5
6
7
8
9
10
0
180
360
540
720
900
1080
1260
1440
1620
1800
1980
2160
2340
2520
2700
2880
3060
3240
3420
3600
3780
3960
4140
4320
4500
4680
4860
5040
5220
Lab ppm GC Values
Volume Injected: 1ml
Sample # 75
Methane = 35 ppm
Ethane = 16 ppm

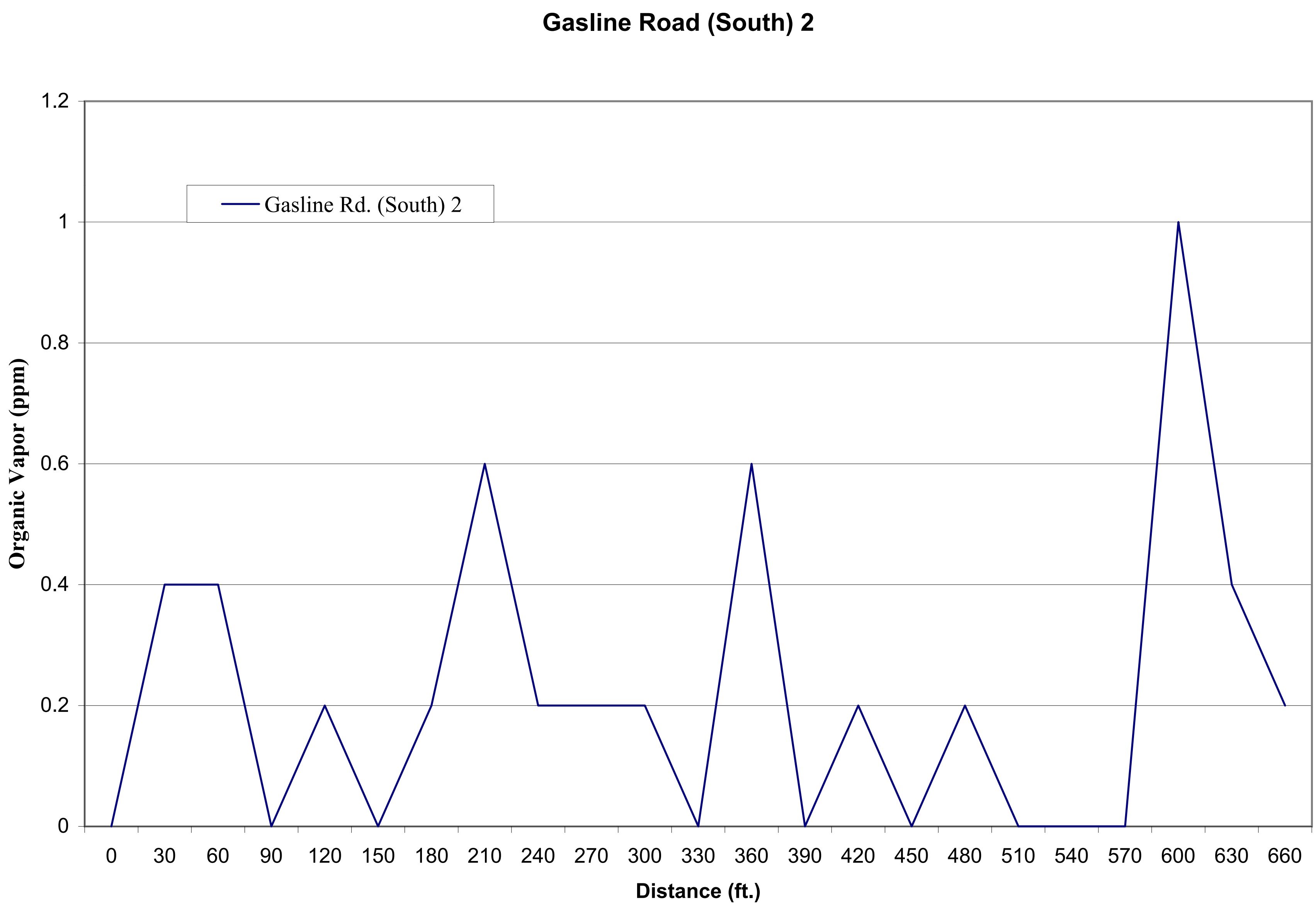
Traverse 99-19		Gowanda-Zoar Rd., Heading West towards Foster Rd., Gowanda township.						
Nelson, Bieber							7/15/1999	
H2=1700, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 88								
Sample #0 was taken 30 ft. West of house driveway at sharp bend in road. Gowanda township.								
Traverse is heading West on Gowanda-Zoar Rd. with samples taken on South side of Rd.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.4	0.4	Cal. Gas	7/15/1999	
1	9.144	30	1	1.8	0.8	1x	Taken on South side	
2	18.288	60	1	1.8	0.8	Gravel	of Gowanda-Zoar Rd.	
3	27.432	90	1	1.2	0.2	(Road Bed)		
4	36.576	120	1	1	0			
5	45.72	150	1	1.5	0.5			
6	54.864	180	1	1.2	0.2			
7	64.008	210	1	3.6	2.6			
8	73.152	240	1	1.6	0.6			
9	82.296	270	1	1.8	0.8			
10	91.44	300	1	1.6	0.6			
11	100.584	330	1	2	1			
12	109.728	360	1	2.6	1.6			
13	118.872	390	1	1.8	0.8			
14	128.016	420	1	2	1			
15	137.16	450	1	1.8	0.8			
16	146.304	480	1	3.4	2.4			
17	155.448	510	1	1.6	0.6			
18	164.592	540	1	2	1			
19	173.736	570	1	1	0			
20	182.88	600	1	1.4	0.4			
21	192.024	630	1	1.2	0.2			
22	201.168	660	1	1	0			
23	210.312	690	1	1	0	wet area		
24	219.456	720	1	1	0	wet area		
25	228.6	750	1	1	0	wet area		
26	237.744	780	1	1	0	wet area		
27	246.888	810	1	1.6	0.6			
28	256.032	840	1	1.2	0.2			
29	265.176	870	1	1	0			
30	274.32	900	1	1	0			
31	283.464	930	1	1	0			
32	292.608	960	1	1.2	0.2			
33	301.752	990	1	1.2	0.2			
34	310.896	1020	1	4.4	3.4			
35	320.04	1050	1	1	0			
36	329.184	1080	1	1	0			
37	338.328	1110	1	4	3			
38	347.472	1140	1	2.2	1.2			
39	356.616	1170	1	2.2	1.2			
40	365.76	1200	1	1.5	0.5			
41	374.904	1230	1	1	0			
42	384.048	1260	1	2	1			
43	393.192	1290	1	3	2			
44	402.336	1320	1	1.4	0.4			
45	411.48	1350	1	1.4	0.4			
46	420.624	1380	1	2	1			

47	429.768	1410	1	2.4	1.4			
48	438.912	1440	1	2.5	1.5			
49	448.056	1470	1	1	0			
50	457.2	1500	1	1	0			
51	466.344	1530	1	1.4	0.4			
52	475.488	1560	1	1.2	0.2			
53	484.632	1590	1	2	1			
54	493.776	1620	1	1.8	0.8			
55	502.92	1650	1	1.2	0.2			
56	512.064	1680	1	1	0	Cal. Gas		
57	521.208	1710	1	1.2	0.2			
58	530.352	1740	1	1.4	0.4			
59	539.496	1770	1	1.2	0.2			
60	548.64	1800	1	1.2	0.2			
61	557.784	1830	1	1.5	0.5			
62	566.928	1860	1	1.4	0.4			
63	576.072	1890	1	3.4	2.4			
64	585.216	1920	1	1.2	0.2			
65	594.36	1950	1	1.4	0.4			
66	603.504	1980	1	2	1			
67	612.648	2010	1	2	1			
68	621.792	2040	1	1.8	0.8			
69	630.936	2070	1	2.6	1.6			
70	640.08	2100	1	1	0	went down to 0.8		
71	649.224	2130	1	1.5	0.5	"	Possibly CO2	
72	658.368	2160	1	1	0	"	"	
73	667.512	2190	1	1	0	"	"	
74	676.656	2220	1	1	0	"	"	
75	685.8	2250	1	1	0	"	"	
76	694.944	2280	1	1	0	"	"	
77	704.088	2310	1	1	0	"	"	
78	713.232	2340	1	1	0	"	"	
79	722.376	2370	1	1.1	0.1	"	"	
80	731.52	2400	1	1	0	"	"	
81	740.664	2430	1	1	0	"	"	
82	749.808	2460	1	1	0	"	"	
83	758.952	2490	1	1	0	"	"	
84	768.096	2520	1	1	0	"	"	
85	777.24	2550	1	1	0	"	"	
86	786.384	2580	1	1	0			
87	795.528	2610	1	1	0			
88	804.672	2640	1	1	0			
89	813.816	2670	1	1.2	0.2			
90	822.96	2700	1	1	0			
91	832.104	2730	1	1	0			
92	841.248	2760	1	1	0			
93	850.392	2790	1	1	0	Cal. Gas	Sample #93 is 15ft. West of	
							stop sign, south side of zoar	
							rd. at the junction of zoar rd.	
							and foster rd.	



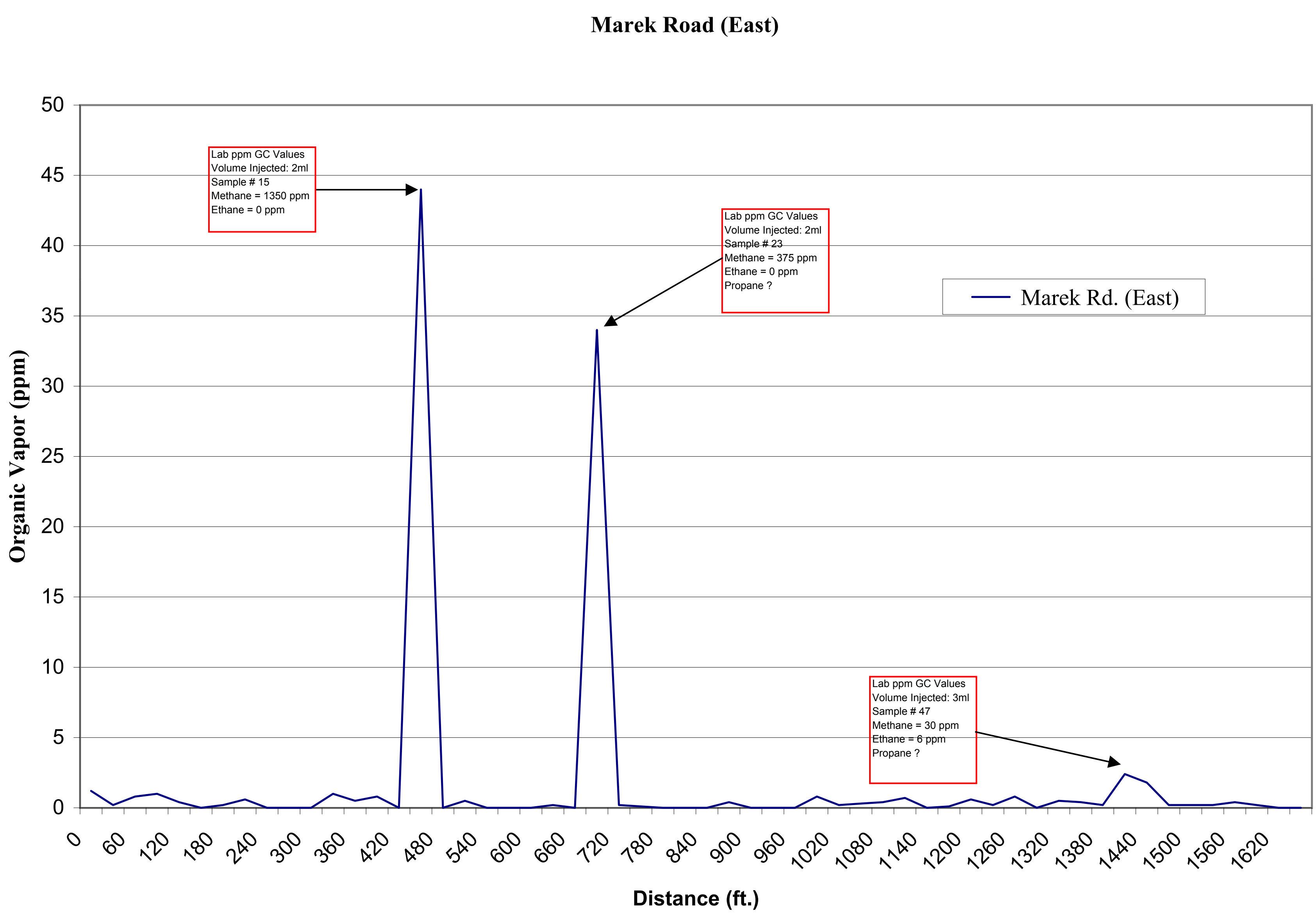
Zoar Valley Road (West)
Zoar Valley Rd. (West)
Organic Vapor (ppm)
0
0.5
1
1.5
2
2.5
3
3.5
4
Distance (ft.)
0
90
180
270
360
450
540
630
720
810
900
990
1080
1170
1260
1350
1440
1530
1620
1710
1800
1890
1980
2070
2160
2250
2340
2430
2520
2610
2700
2790

Traverse 99-20		Gas-line Rd., Heading South towards Gibson Hill Rd., Otto township.						7/22/1999
Nelson, Bieber								
H2=2300, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, Hot 88								
Sample #101 was taken 30 ft. North of electric pole #156.								
Traverse is heading South which follows power lines.								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
101	0	0	1	1	0	Cal. Gas	7/22/1999	
102	9.144	30	1	1.4	0.4	1x		
103	18.288	60	1	1.4	0.4	little wet		
104	27.432	90	1	1	0			
105	36.576	120	1	1.2	0.2			
106	45.72	150	1	1	0			
107	54.864	180	1	1.2	0.2			
108	64.008	210	1	1.6	0.6			
109	73.152	240	1	1.2	0.2			
110	82.296	270	1	1.2	0.2			
111	91.44	300	1	1.2	0.2			
112	100.584	330	1	1	0			
113	109.728	360	1	1.6	0.6			
114	118.872	390	1	1	0			
115	128.016	420	1	1.2	0.2			
116	137.16	450	1	1	0			
117	146.304	480	1	1.2	0.2			
118	155.448	510	1	1	0			
119	164.592	540	1	1	0			
120	173.736	570	1	1	0			
121	182.88	600	1	2	1			
122	192.024	630	1	1.4	0.4			
123	201.168	660	1	1.2	0.2	Cal. Gas		
						*Traverse ends in the woods above		
						the gorge		


Gasline Road (South) 2
Gasline Rd. (South) 2
Organic Vapor (ppm)
0
0.2
0.4
0.6
0.8
1
1.2
0 30 60 90 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660
Distance (ft.)

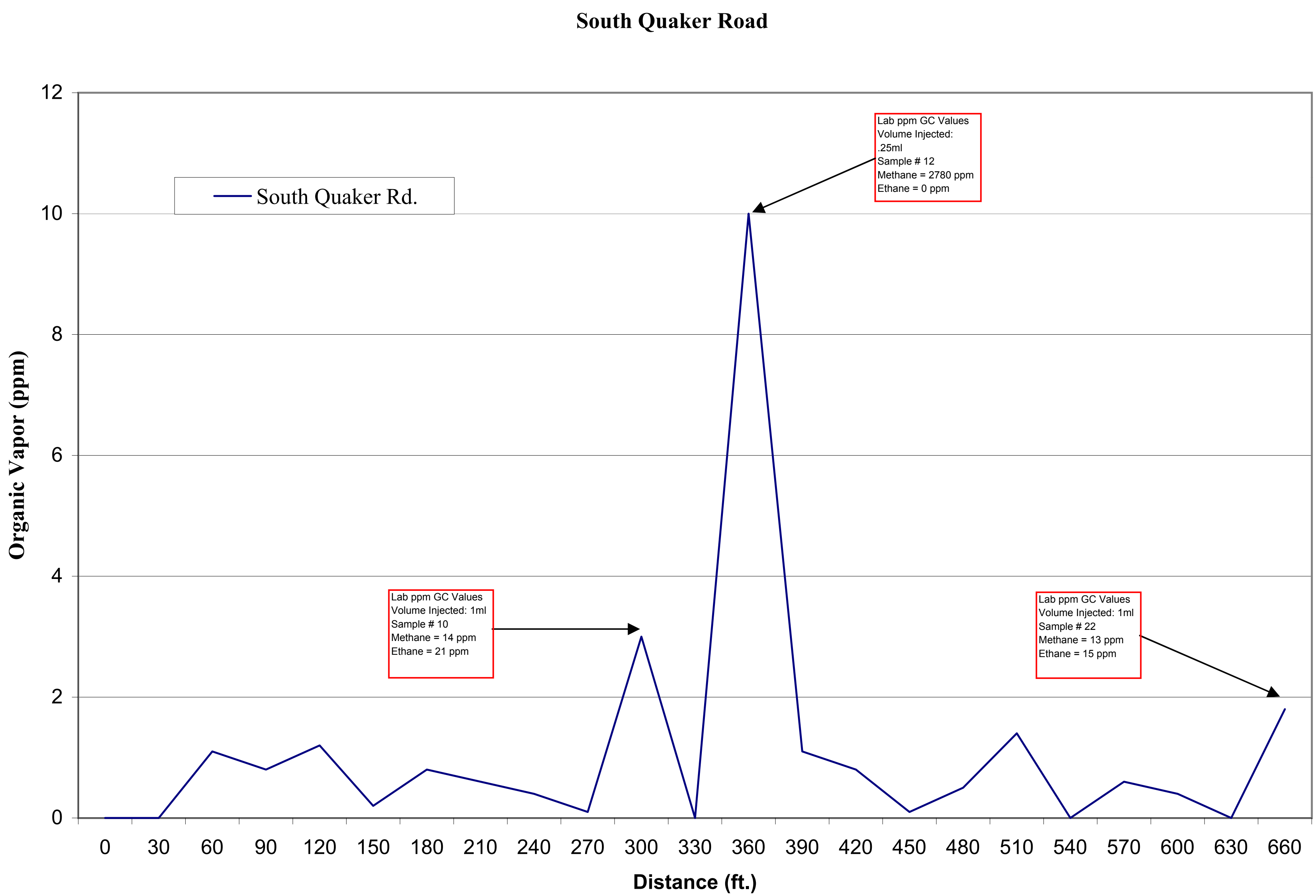
Traverse 99-21		Marek Rd.East, Heading East towards Drake Hill Rd., Otto township.						10/13/1999
Nelson								
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, windy 70								
Sample #0 was taken next to arrow sign at 90 curve on Marek Rd..								
Traverse is heading East, samples taken on North side of Rd..								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	2.2	1.2	Cal. Gas	10/13/1999	
1	9.144	30	1	1.2	0.2	1x		
2	18.288	60	1	1.8	0.8			
3	27.432	90	1	2	1			
4	36.576	120	1	1.4	0.4			
5	45.72	150	1	1	0			
6	54.864	180	1	1.2	0.2			
7	64.008	210	1	1.6	0.6			
8	73.152	240	1	1	0			
9	82.296	270	1	1	0			
10	91.44	300	1	1	0			
11	100.584	330	1	2	1			
12	109.728	360	1	1.5	0.5			
13	118.872	390	1	1.8	0.8			
14	128.016	420	1	1	0			
15	137.16	450	1	45	44	Redo 3 samples		
16	146.304	480	1	1	0			
17	155.448	510	1	1.5	0.5			
18	164.592	540	1	1	0			
19	173.736	570	1	1	0			
20	182.88	600	1	1	0			
21	192.024	630	1	1.2	0.2			
22	201.168	660	1	1	0			
23	210.312	690	1	35	34	Redo 3 samples		
24	219.456	720	1	1.2	0.2	Box		
25	228.6	750	1	1.1	0.1			
26	237.744	780	1	1	0			
27	246.888	810	1	1	0			
28	256.032	840	1	1	0			
29	265.176	870	1	1.4	0.4			
30	274.32	900	1	1	0			
31	283.464	930	1	1	0			
32	292.608	960	1	1	0			
33	301.752	990	1	1.8	0.8			
34	310.896	1020	1	1.2	0.2			
35	320.04	1050	1	1.3	0.3			
36	329.184	1080	1	1.4	0.4			
37	338.328	1110	1	1.7	0.7			
38	347.472	1140	1	1	0			
39	356.616	1170	1	1.1	0.1			
40	365.76	1200	1	1.6	0.6			
41	374.904	1230	1	1.2	0.2	Cal. Gas		
Traverse 99-21		Marek Rd.East, Heading East towards Drake Hill Rd., Otto township.						10/16/1999
Nelson								

H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, warm 70								
Sample #42 is 11ft. South and 18ft. East of electrical pole #12, north side of rd.								
42	384.048	1260	1	1.8	0.8	10/16/1999		
43	393.192	1290	1	1	0	Cal. Gas		
44	402.336	1320	1	1.5	0.5	1x		
45	411.48	1350	1	1.4	0.4	little wet		
46	420.624	1380	1	1.2	0.2			
47	429.768	1410	1	3.4	2.4	Redo 5 samples		
48	438.912	1440	1	2.8	1.8	Box E		
49	448.056	1470	1	1.2	0.2			
50	457.2	1500	1	1.2	0.2			
51	466.344	1530	1	1.2	0.2			
52	475.488	1560	1	1.4	0.4			
53	484.632	1590	1	1.2	0.2			
54	493.776	1620	1	1	0			
55	502.92	1650	1	1	0	Cal. Gas		
						Sample #55 is 112ft. East of		
						electrical pole #11		

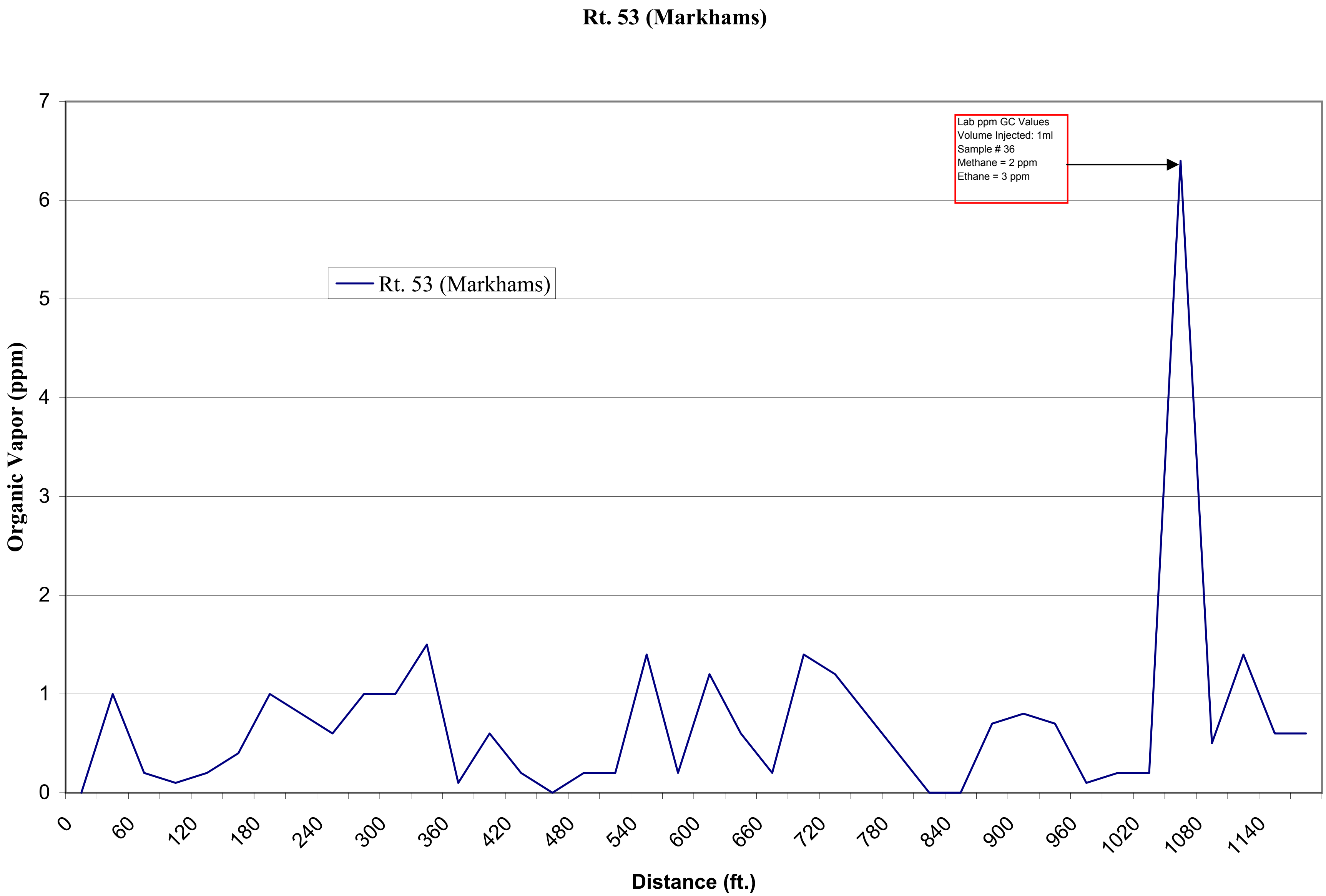


Marek Road (East)
Organic Vapor (ppm)
50
45
40
35
30
25
20
15
10
5
0
Lab ppm GC Values
Volume Injected: 2ml
Sample # 15
Methane = 1350 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 2ml
Sample # 23
Methane = 375 ppm
Ethane = 0 ppm
Propane ?
Marek Rd. (East)
Lab ppm GC Values
Volume Injected: 3ml
Sample # 47
Methane = 30 ppm
Ethane = 6 ppm
Propane ?
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
1260
1320
1380
1440
1500
1560
1620
Distance (ft.)

Traverse 99-22		South Quaker Rd., Heading North (dead end, dirt road ext.), Gowanda township.					
Nelson							9/2/1999
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=Good		
Hot, 85							
Sample #0 is before the house taken across from maple tree with posted sign on it.							
Traverse is heading North, samples taken on East side of Rd..							
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments	
0	0	0	1	1	0	Cal. Gas	9/2/1999
1	9.144	30	1	1	0	1x	
2	18.288	60	1	2.1	1.1	Redo 3 samples	
3	27.432	90	1	1.8	0.8		
4	36.576	120	1	2.2	1.2		
5	45.72	150	1	1.2	0.2		
6	54.864	180	1	1.8	0.8		
7	64.008	210	1	1.6	0.6		
8	73.152	240	1	1.4	0.4		
9	82.296	270	1	1.1	0.1		
10	91.44	300	1	4	3	Redo 3 samples	
11	100.584	330	1	1	0		
12	109.728	360	1	11	10		
13	118.872	390	1	2.1	1.1		
14	128.016	420	1	1.8	0.8		
15	137.16	450	1	1.1	0.1		
16	146.304	480	1	1.5	0.5		
17	155.448	510	1	2.4	1.4		
18	164.592	540	1	1	0		
19	173.736	570	1	1.6	0.6		
20	182.88	600	1	1.4	0.4		
21	192.024	630	1	1	0		
22	201.168	660	1	2.8	1.8	Cal. Gas	Redo 3 samples
						Sample #22 is 4 ft. South of	
						electrical pole #15, East side.	

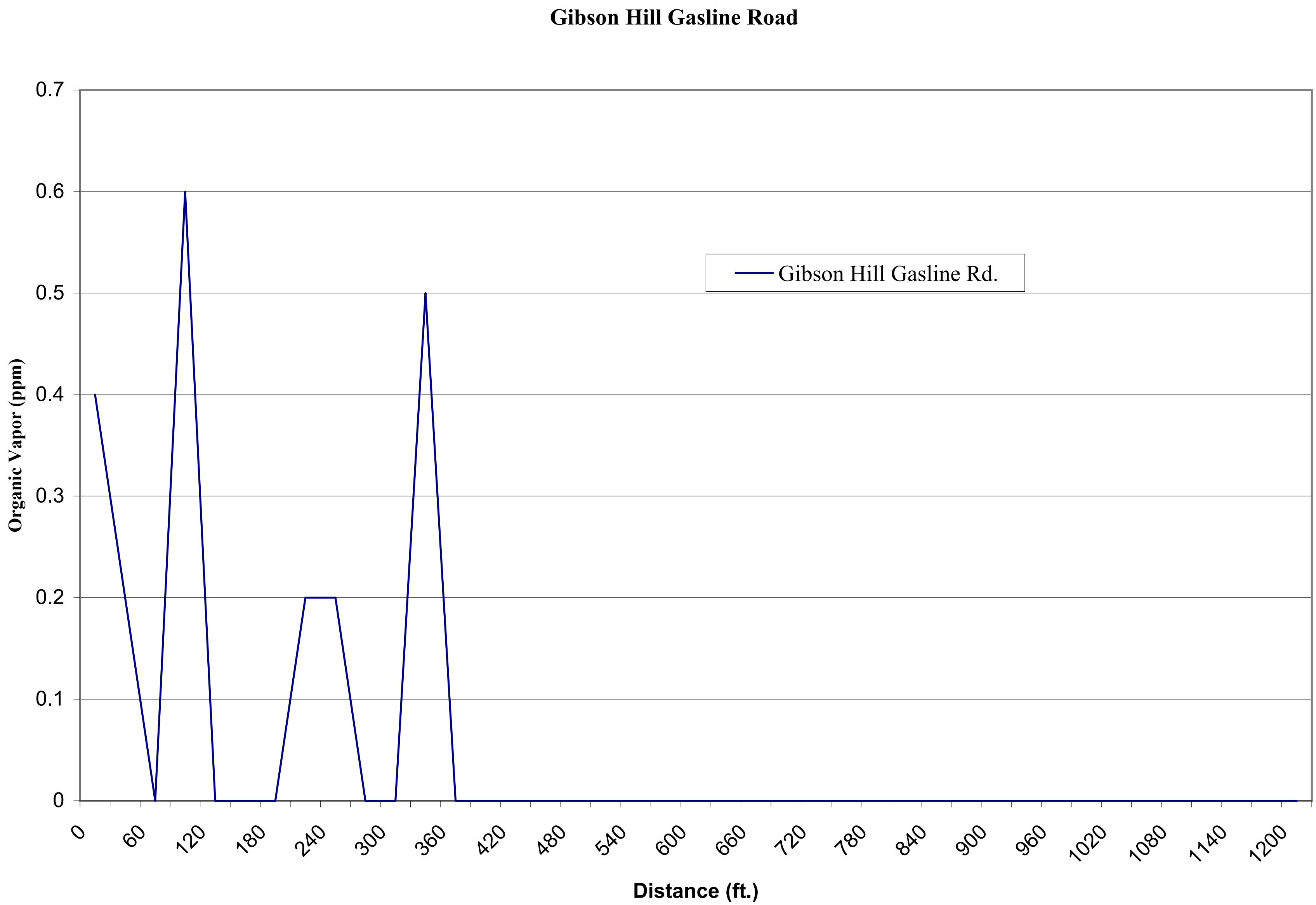

South Quaker Road
South Quaker Rd.
Organic Vapor (ppm)
Distance (ft.)
0
2
4
6
8
10
12
0
30
60
90
120
150
180
210
240
270
300
330
360
390
420
450
480
510
540
570
600
630
660
Lab ppm GC Values
Volume Injected:
.25ml
Sample # 12
Methane = 2780 ppm
Ethane = 0 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 10
Methane = 14 ppm
Ethane = 21 ppm
Lab ppm GC Values
Volume Injected: 1ml
Sample # 22
Methane = 13 ppm
Ethane = 15 ppm

Traverse 99-23		Rt. 53 in Markhams, Heading North, Dayton township.						8/12/1999
Nelson, Bieber								
H2=1700, 12		Batt.=8.0	Leak test=O.K.		Flow=Good			
Sunny, hot, 80								
Sample #1 (No Zero) is at electrical pole #383/101.								
Traverse is heading North, samples taken on East side of Rd..								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
1	0	0	1	1	0	Cal. Gas	8/12/1999	
2	9.144	30	1	2	1	1x		
3	18.288	60	1	1.2	0.2			
4	27.432	90	1	1.1	0.1			
5	36.576	120	1	1.2	0.2			
6	45.72	150	1	1.4	0.4			
7	54.864	180	1	2	1			
8	64.008	210	1	1.8	0.8			
9	73.152	240	1	1.6	0.6			
10	82.296	270	1	2	1			
11	91.44	300	1	2	1			
12	100.584	330	1	2.5	1.5			
13	109.728	360	1	1.1	0.1			
14	118.872	390	1	1.6	0.6			
15	128.016	420	1	1.2	0.2			
16	137.16	450	1	1	0			
17	146.304	480	1	1.2	0.2			
18	155.448	510	1	1.2	0.2			
19	164.592	540	1	2.4	1.4			
20	173.736	570	1	1.2	0.2			
21	182.88	600	1	2.2	1.2			
22	192.024	630	1	1.6	0.6			
23	201.168	660	1	1.2	0.2			
24	210.312	690	1	2.4	1.4			
25	219.456	720	1	2.2	1.2			
26	228.6	750	1	1.8	0.8			
Traverse 99-23		Rt. 53 in Markhams, Heading North, Dayton township.					9/2/1999	
Nelson								
H2=2000, 12		Batt.=8.0	Leak test=O.K.		Flow=OK			
Sunny, hot 85								
Sample #27 is 23ft. North of curve sign.								
Traverse is heading North, samples taken on East side of Rd..								
27	237.744	780	1	1.4	0.4	Cal. Gas	9/2/1999	
28	246.888	810	1	1	0	1x		
29	256.032	840	1	1	0			
30	265.176	870	1	1.7	0.7			
31	274.32	900	1	1.8	0.8			
32	283.464	930	1	1.7	0.7			
33	292.608	960	1	1.1	0.1			
34	301.752	990	1	1.2	0.2			
35	310.896	1020	1	1.2	0.2			
36	320.04	1050	1	7.4	6.4	Redo 3 samples		
37	329.184	1080	1	1.5	0.5	Sample #36 is 3 ft. North		
38	338.328	1110	1	2.4	1.4	of cow sign.		
39	347.472	1140	1	1.6	0.6			
40	356.616	1170	1	1.6	0.6	Cal. Gas		
						Sample #40 is 9ft. North of		
						electrical pole #10A		



Rt. 53 (Markhams)
Lab ppm GC Values
Volume Injected: 1ml
Sample # 36
Methane = 2 ppm
Ethane = 3 ppm
Rt. 53 (Markhams)
Organic Vapor (ppm)
Distance (ft.)
0
1
2
3
4
5
6
7
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140

Traverse 99-24		Gibson Hill Road Gasline, Heading North, Otto township.						10/29/1999
Nelson								
H2=1600, 12		Batt.=8.0	Leak test=O.K.		Flow=Bad			
Sunny, 68								
Sample #0 is 39 ft. South of electrical pole #22, at the entrance to the gas well.								
Traverse is heading North, samples taken on East side of Rd..								
Sample #	Distance (m)	Distance (ft.)	Bkgd.	Peak	Net.	Comments		
0	0	0	1	1.4	0.4	Cal. Gas	10/29/1999	
1	9.144	30	1	1.2	0.2	1x		
2	18.288	60	1	1	0			
3	27.432	90	1	1.6	0.6			
4	36.576	120	1	1	0			
5	45.72	150	1	1	0			
6	54.864	180	1	1	0			
7	64.008	210	1	1.2	0.2			
8	73.152	240	1	1.2	0.2			
9	82.296	270	1	1	0			
10	91.44	300	1	1	0			
11	100.584	330	1	1.5	0.5			
12	109.728	360	1	1	0			
13	118.872	390	1	1	0			
14	128.016	420	1	1	0			
15	137.16	450	1	1	0			
16	146.304	480	1	1	0			
17	155.448	510	1	1	0			
18	164.592	540	1	1	0			
19	173.736	570	1	1	0			
20	182.88	600	1	1	0			
21	192.024	630	1	1	0	To Wet	No samples	
22	201.168	660	1	1	0	"	No samples	
23	210.312	690	1	1	0	"	No samples	
24	219.456	720	1	1	0	"	No samples	
25	228.6	750	1	1	0	"	No samples	
26	237.744	780	1	1	0	"	No samples	
27	246.888	810	1	1	0	"	No samples	
28	256.032	840	1	1	0	"	No samples	
29	265.176	870	1	1	0	"	No samples	
30	274.32	900	1	1	0	"	No samples	
31	283.464	930	1	1	0			
32	292.608	960	1	1	0			
33	301.752	990	1	1	0			
34	310.896	1020	1	1	0			
35	320.04	1050	1	1	0			
36	329.184	1080	1	1	0			
37	338.328	1110	1	1	0			
38	347.472	1140	1	1	0			
39	356.616	1170	1	1	0			
40	365.76	1200	1	1	0	Cal. Gas		



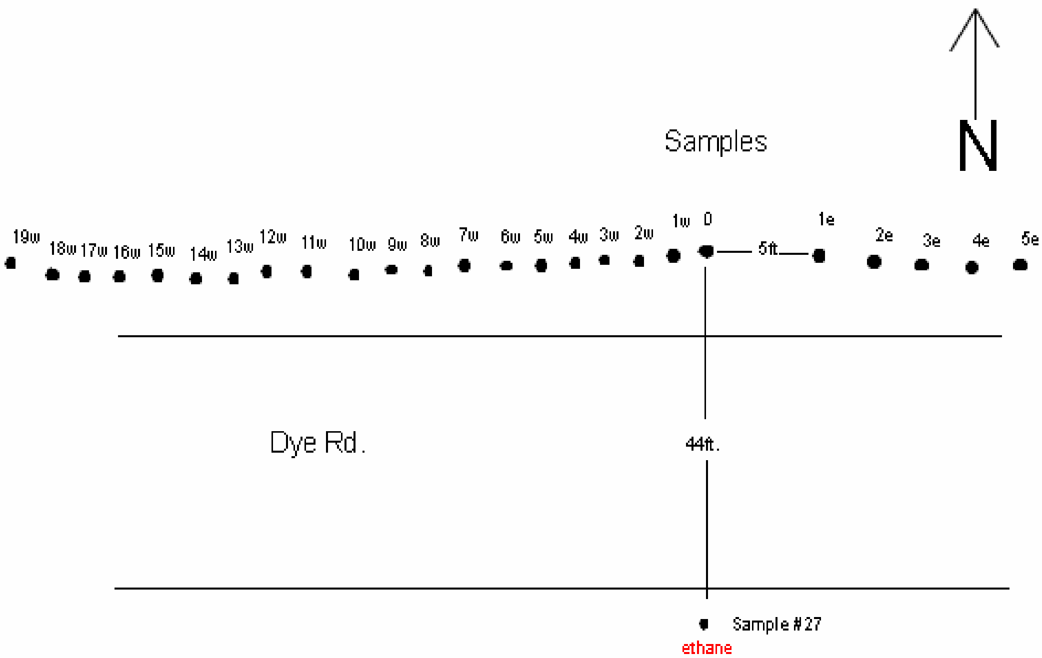
Gibson Hill Gasline Road
Gibson Hill Gasline Rd.
Organic Vapor (ppm)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
60
120
180
240
300
360
420
480
540
600
660
720
780
840
900
960
1020
1080
1140
1200
Distance (ft.)

APPENDIX B

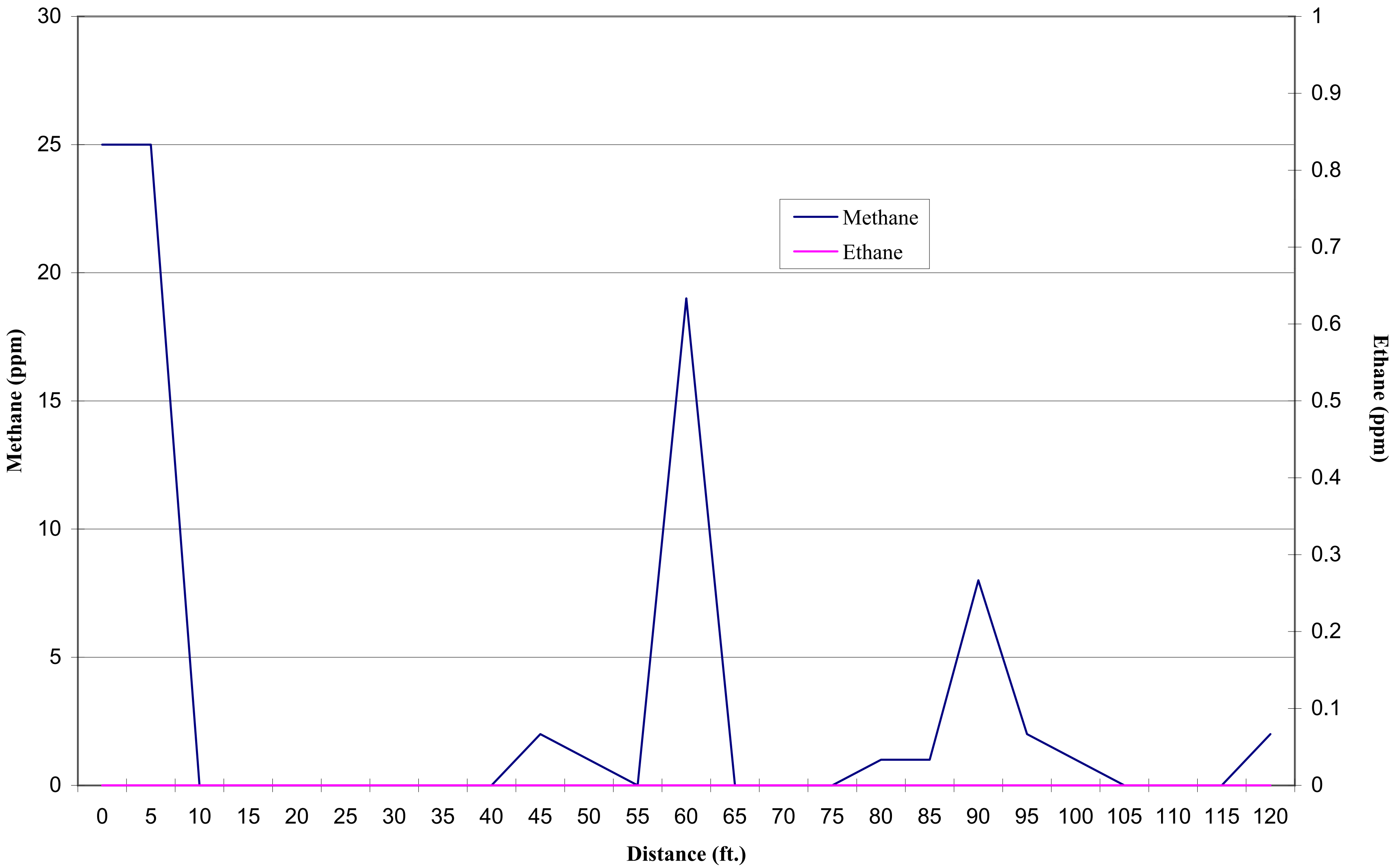
Soil Gas Data in Survey Boxes

Dye Road Box (A) Data Sample # 27							7/20/1999
Samples analyzed in the lab							
Column: Hayesep D		Mesh: 6/1/8, 80/100					
at: 110c (temp.)		Carrier gas: 400		CHP: 2			
H2: 20 psi.	Air: 25 psi.						
Injection: 1000 microliters							
		Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm
5e	0	0.81	40	25	0	0	0
4e	5	0.86	40	25	0	0	0
3e	10	0.83	4	0	0	0	0
2e	15	0.83	4	0	0	0	0
1e	20	0	0	0	0	0	0
o	25	0.83	4	0	0	0	0
1w	30	0.83	4	0	0	0	0
2w	35	0.83	4	0	0	0	0
3w	40	0.85	5	0	0	0	0
4w	45	0.85	13	2	0	0	0
5w	50	0.83	9	1	0	0	0
6w	55	0	0	0	0	0	0
7w	60	0.85	32	19	0	0	0
8w	65	0.83	5	0	0	0	0
9w	70	0.9	5	0	0	0	0
10w	75	0	0	0	0	0	0
11w	80	0.83	9	1	0	0	0
12w	85	0.85	9	1	0	0	0
13w	90	0.85	19	8	0	0	0
14w	95	0.85	12	2	0	0	0
15w	100	0.86	7	1	0	0	0
16w	105	0.86	4	0	0	0	0
17w	110	0	0	0	0	0	0
18w	115	0.93	4	0	0	0	0
19w	120	0.85	11	2	0	0	0

Dye Rd. Box (A) Figure - Sample #27

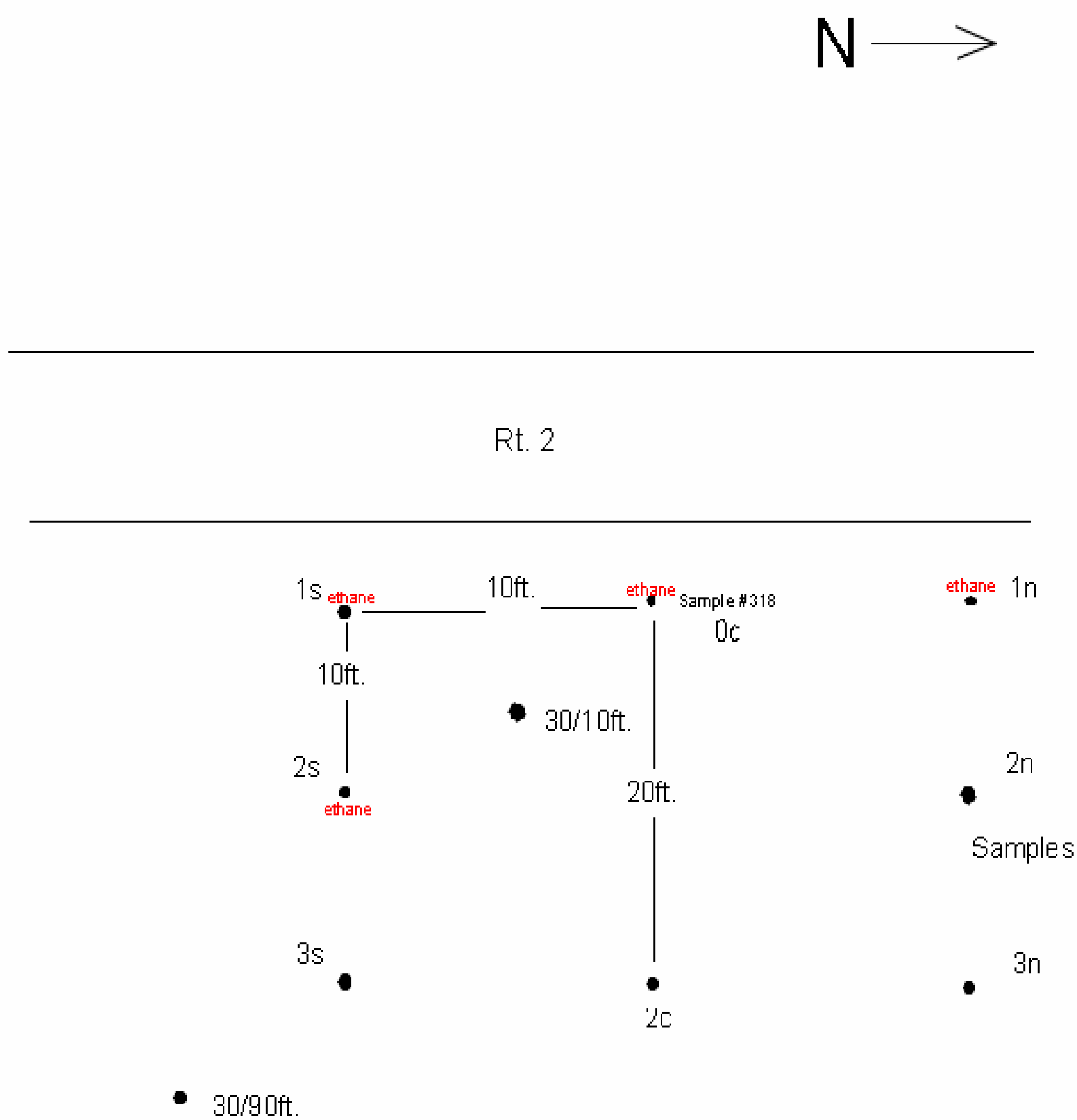


Dye Rd. Sample #27 Box A Graph

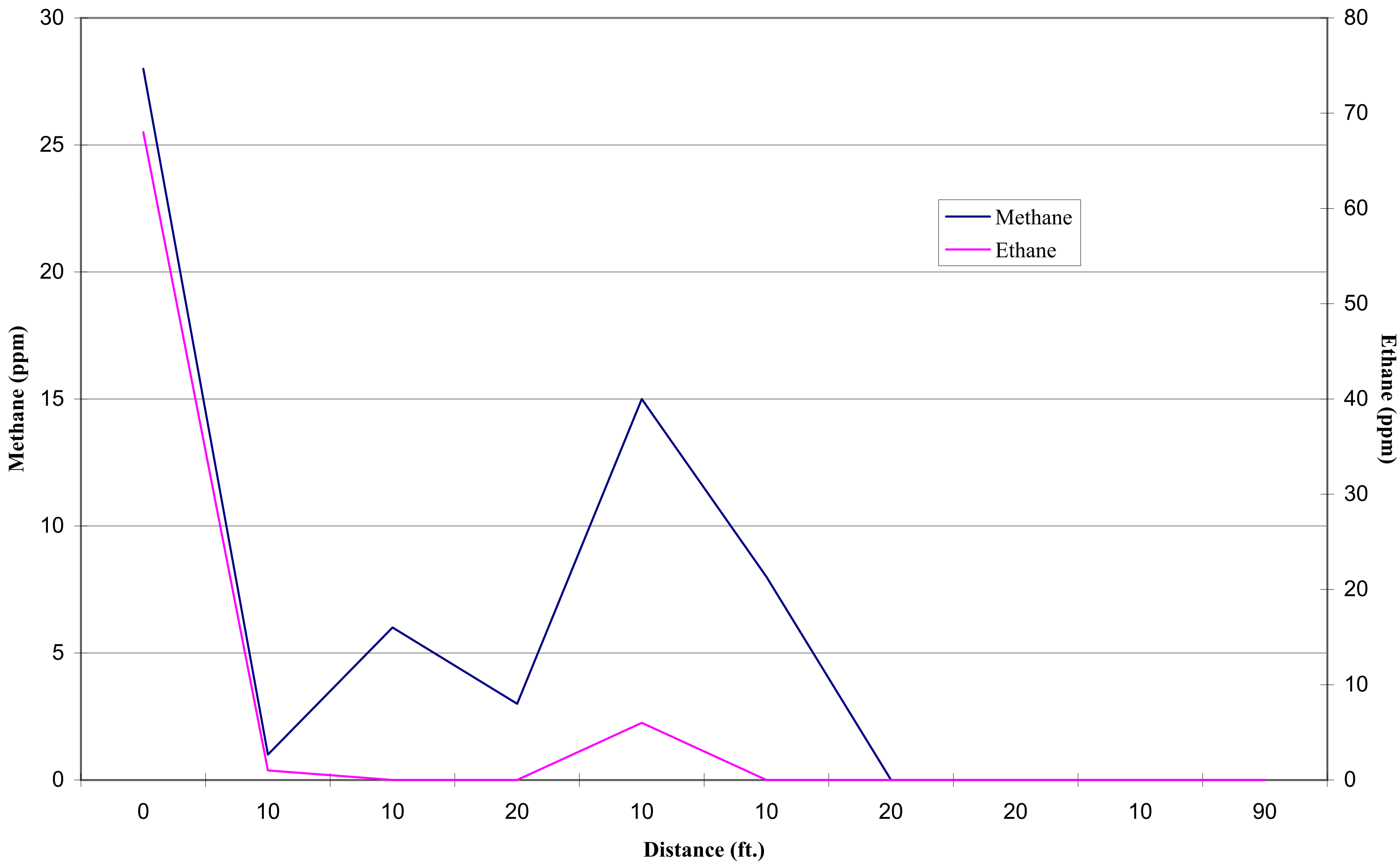


Rt. 2 Box (B) Data Sample # 318						9/3/1999	
Samples analyzed in the lab							
Column: Hayesep D		Mesh: 6/1/8, 80/100					
at: 110c (temp.)		Carrier gas: 400		CHP: 2			
H2: 20 psi.	Air: 25 psi.						
Injection: 1000 microliters							
		Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm
0c	0	0.75	45	28	0.967	174	68
1s	10	1.11	9	1	1.63	10	1
2s	10	0.833	18	6	1.05	4	0
3s	20	0.867	14	3	0	0	0
1n	10	0.8	29	15	1.15	24	6
2n	10	0.8	20	8	0	0	0
3n	20	0	0	0	0	0	0
2c	20	0	0	0	0	0	0
30/10ft	10	0	0	0	0	0	0
30/90ft.	90	0	0	0	0	0	0

Rt. 2 Box (B) Figure - Sample #318

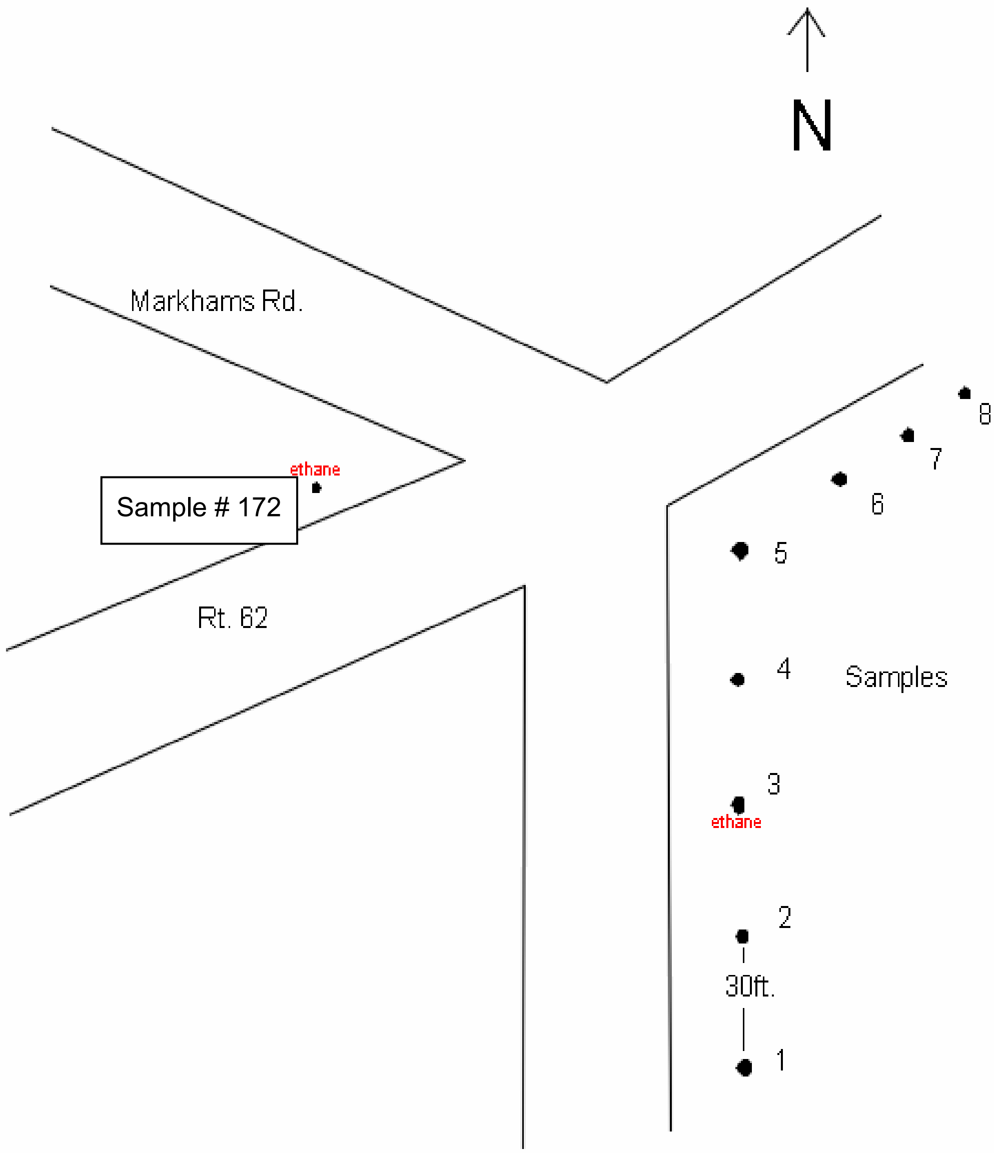


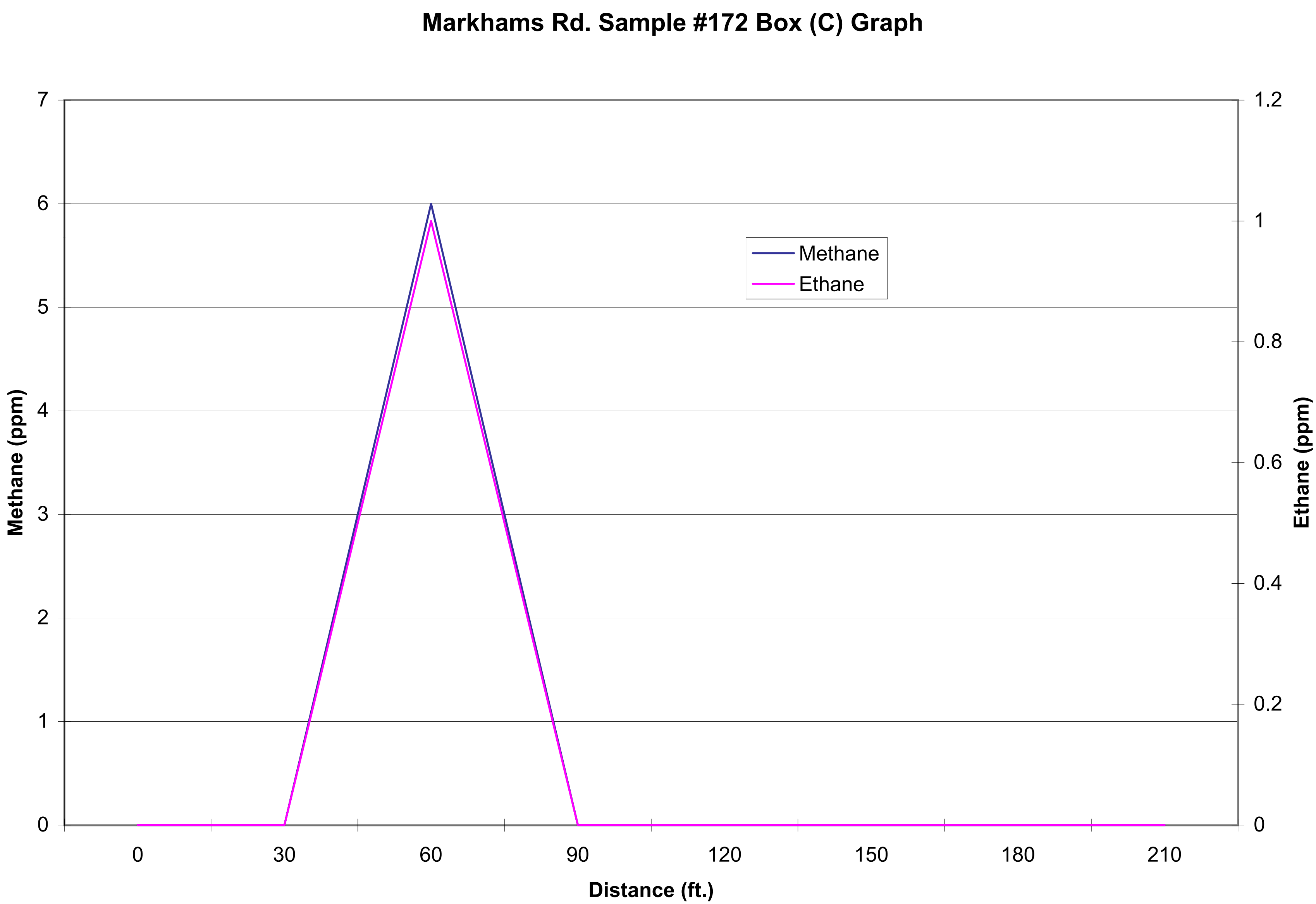
Rt. 2 Sample #318 Box (B) Graph



Markhams Rd. Box (C) Data Sample # 172						8/12/1999		
Samples analyzed in the lab								
Column: Hayesep D		Mesh: 6/1/8, 80/100						
at: 110c (temp.)		Carrier gas: 400		CHP: 2				
H2: 20 psi.	Air: 25 psi.							
Injection: 1000 microliters								
		Methane			Ethane			
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm	
1	0	0	1.2	0	0	0	0	Field
2	30	0	2	0	0	0	0	Field
3	60	0.88	18	6	1.1	4	1	Lab
4	90	0	2.1	0	0	0	0	Field
5	120	0	2	0	0	0	0	Field
6	150	0	1.4	0	0	0	0	Field
7	180	0	2	0	0	0	0	Field
8	210	0	1.4	0	0	0	0	Field

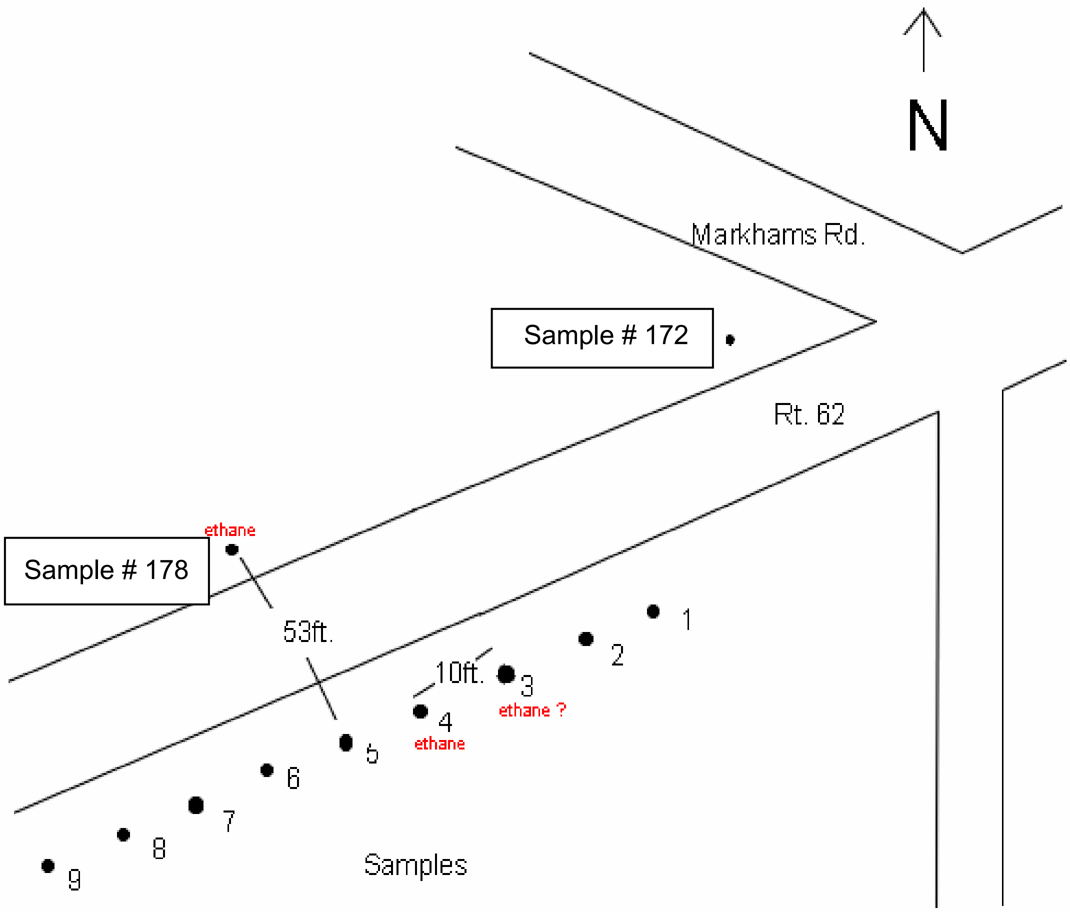
Markhams Rd. Box (C) Figure - Sample #172

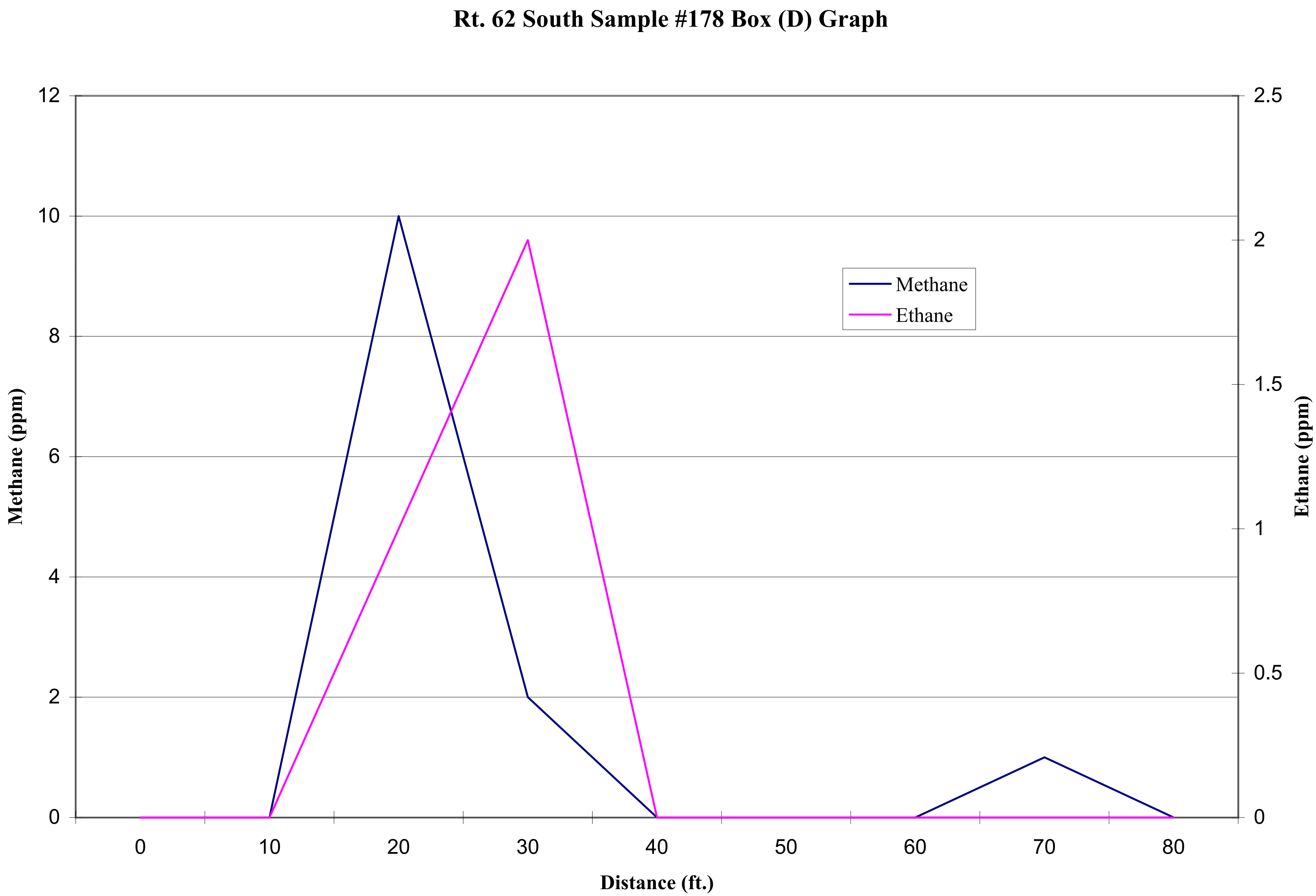



Markhams Rd. Sample #172 Box (C) Graph
Methane (ppm)
Ethane (ppm)
Distance (ft.)
Methane
Ethane
0
1
2
3
4
5
6
7
0
0.2
0.4
0.6
0.8
1
1.2
0
30
60
90
120
150
180
210

Rt. 62 South Box (D) in Markhams Data Sample # 178							11/12/1999	
Samples analyzed in the lab								
Column: Hayesep D		Mesh: 6/1/8, 80/100						
at: 110c (temp.)		Carrier gas: 400		CHP: 2				
H2: 20 psi.	Air: 25 psi.							
Injection: 1000 microliters								
			Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area		ppm
1	0	0	0	0	0	0		0
2	10	0.75	4	0	0	0		0
3	20	0.76	22	10	1.3	0	?	1
4	30	0.8	12	2	1.26	2		2
5	40	0.75	2	0	0	0		0
6	50	0	0	0	0	0		0
7	60	0	0	0	0	0		0
8	70	0.75	6	1	0	0		0
9	80	0	0	0	0	0		0

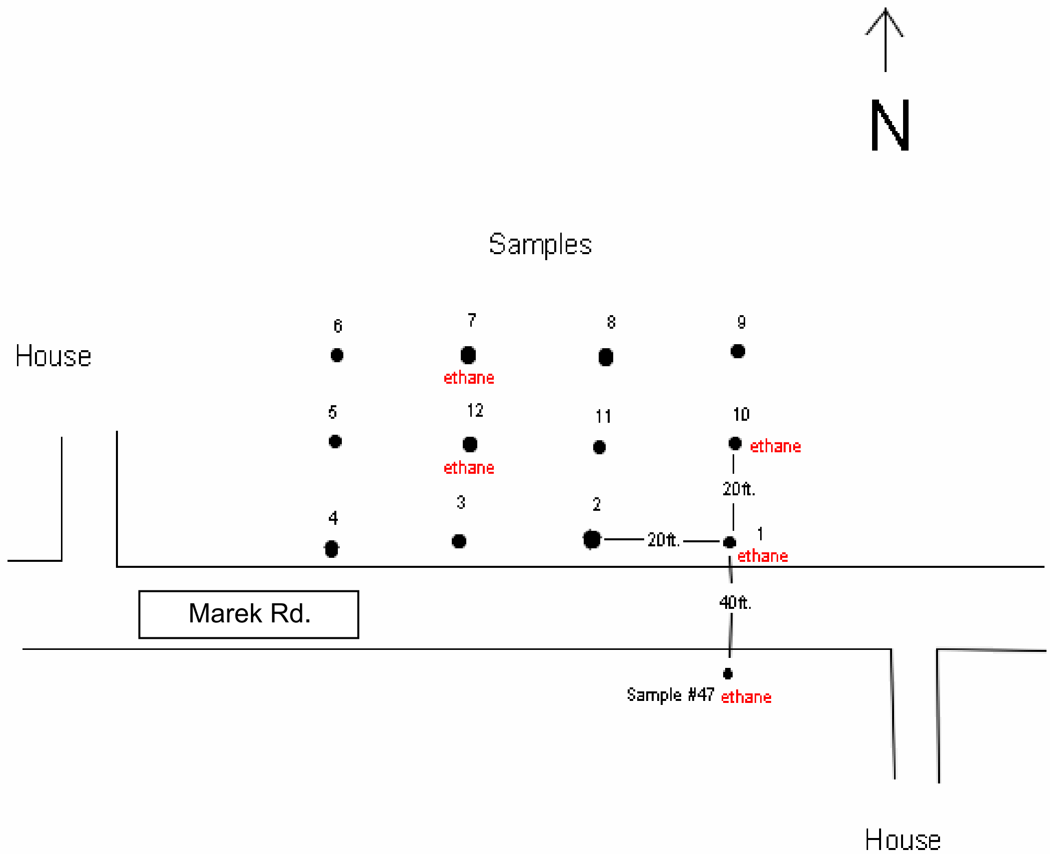
Rt. 62 Box (D) Figure - Sample #178

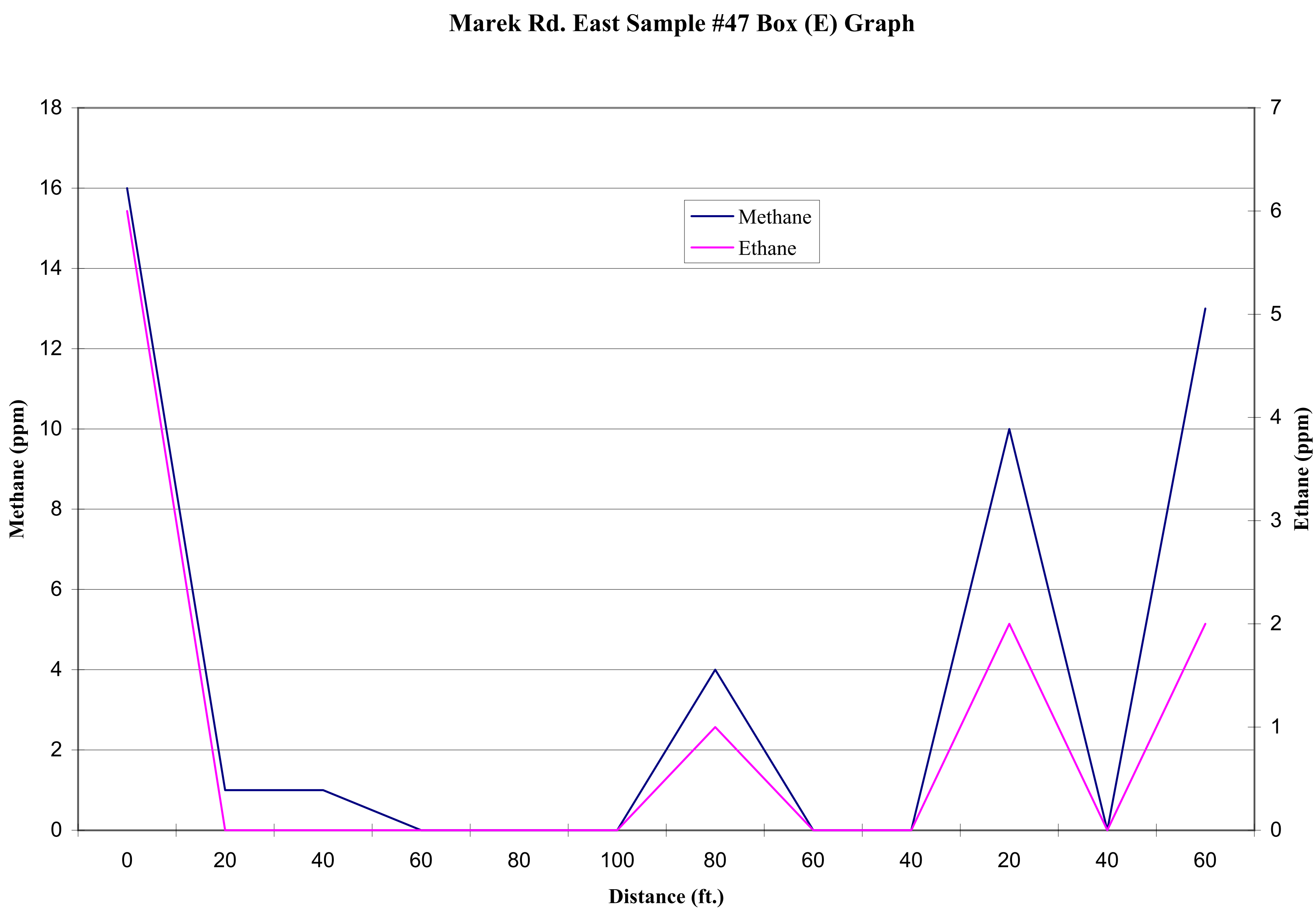



Rt. 62 South Sample #178 Box (D) Graph
12
10
8
6
4
2
0
2.5
2
1.5
1
0.5
0
Methane (ppm)
Ethane (ppm)
Methane
Ethane
0
10
20
30
40
50
60
70
80
Distance (ft.)

Marek Rd. East Box (E) Data Sample # 47							10/29/1999
Samples analyzed in the lab							
Column: Hayesep D		Mesh: 6/1/8, 80/100					
at: 110c (temp.)		Carrier gas: 400		CHP: 2			
H2: 20 psi.	Air: 25 psi.						
Injection: 1000 microliters							
		Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm
1	0	0.733	30	16	1.03	25	6
2	20	0.78	8	1	0	0	0
3	40	0.75	2	1	0	0	0
4	60	0	0	0	0	0	0
5	80	0	0	0	0	0	0
6	100	0	0	0	0	0	0
7	80	0.75	14	4	1.2	4	1
8	60	0	0	0	0	0	0
9	40	0	0	0	0	0	0
10	20	0.75	22	10	1.15	10	2
11	40	0	0	0	0	0	0
12	60	0.7	26	13	1.11	11	2

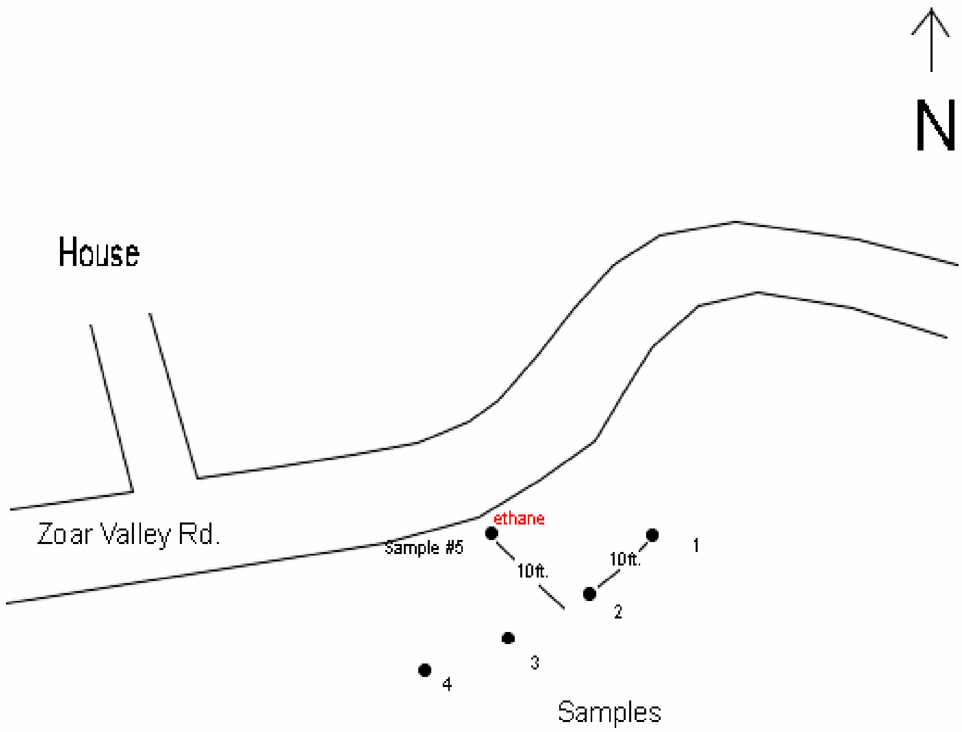
Marek Rd. Box (E) Figure - Sample #47




Marek Rd. East Sample #47 Box (E) Graph
Methane
Ethane
Methane (ppm)
Ethane (ppm)
Distance (ft.)
0
20
40
60
80
100
80
60
40
20
40
60
0
2
4
6
8
10
12
14
16
18
0
1
2
3
4
5
6
7

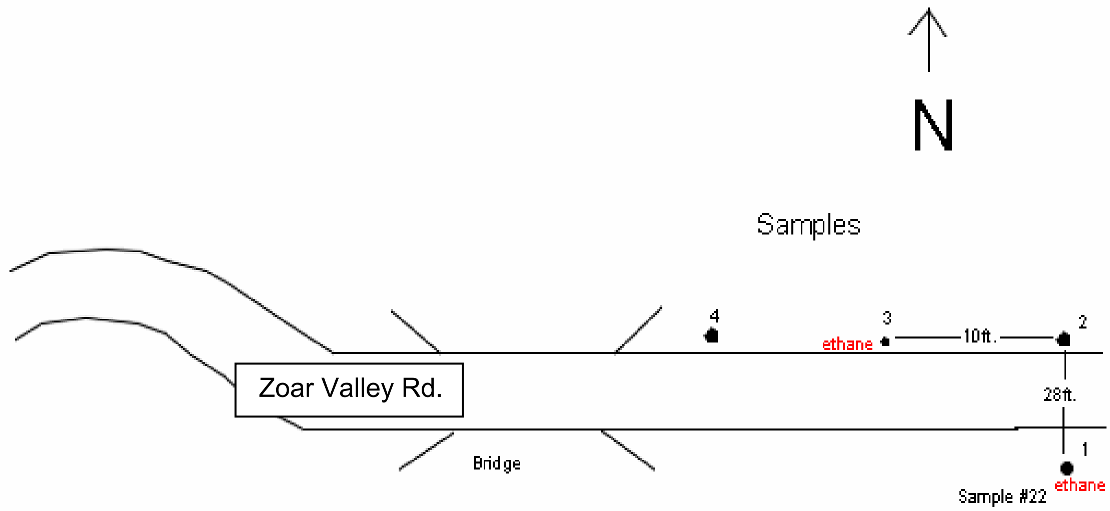
Zoar Valley Rd. West Box (F) Data Sample # 5					9/7/1999
Samples analyzed in the lab					
Column: Hayesep D		Mesh: 6/1/8, 80/100			
at: 110c (temp.)		Carrier gas: 400		CHP: 2	
H2: 20 psi.	Air: 25 psi.				
Injection: 1000 microliters					
		Methane		Ethane	
Sample #	Distance (ft.)	Time (min.)	Area (ppm)	Time (min.)	Area (ppm)
1	0	0	0	0	0
2	10	0	0	0	0
3	20	0	0	0	0
4	30	0	0	0	0

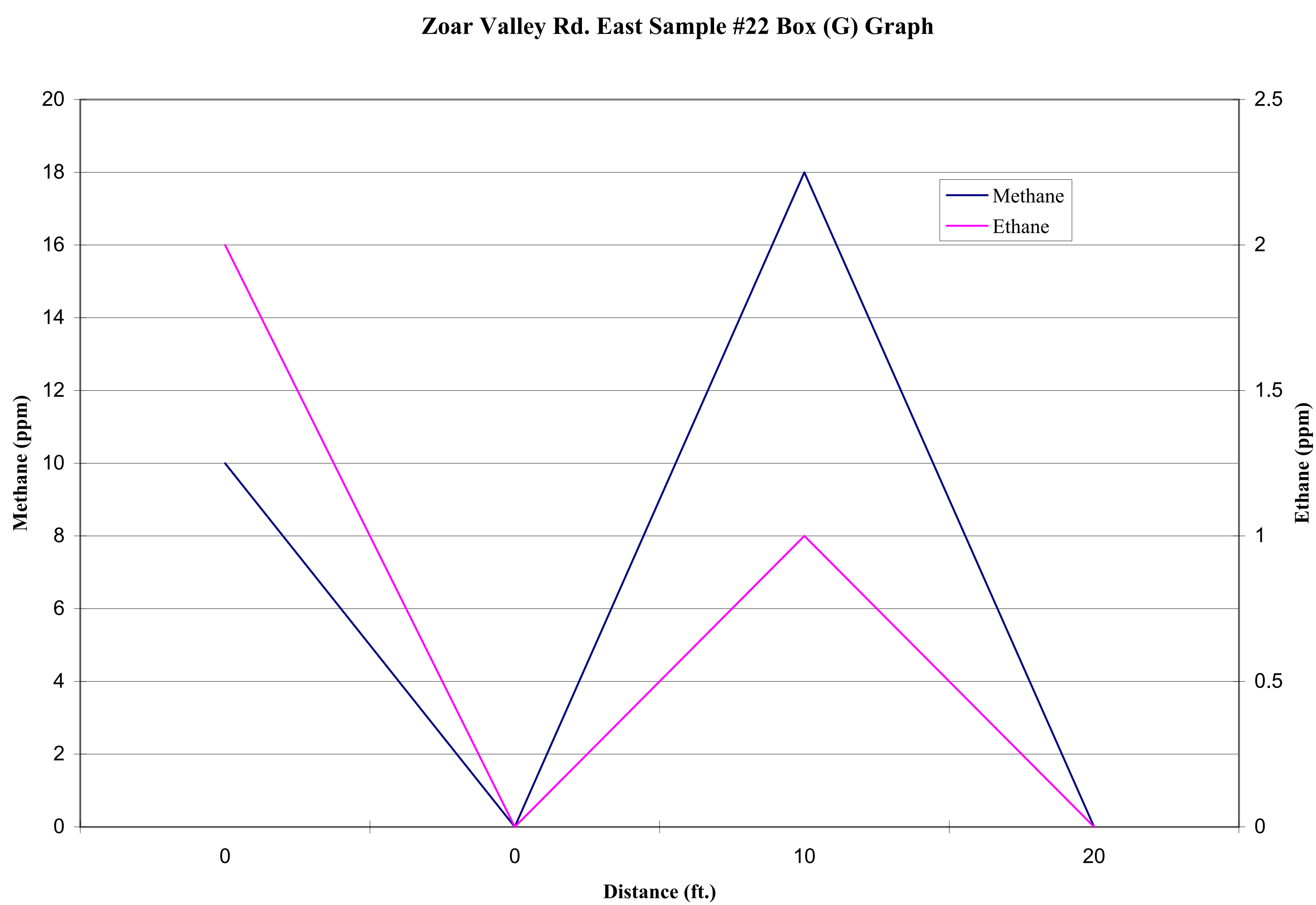
Zoar Valley Rd. West Box (F) Figure - Sample #5



Zoar Valley Rd. East Box (G) Data Sample # 22								10/23/1998
Samples analyzed in the lab								
Column: Hayesep D		Mesh: 6/1/8, 80/100						
at: 110c (temp.)		Carrier gas: 400		CHP: 2				
H2: 20 psi.	Air: 25 psi.							
Injection: 500 microliters								
		Methane			Ethane			
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm	
1	0	0.633	22	10	0.967	13	2	Southside of ro
2	0	0	0	0	0	0	0	Northside of ro
3	10	0.65	31	18	1.1	6	1	Northside of ro
4	20	0	0	0	0	0	0	Northside of ro

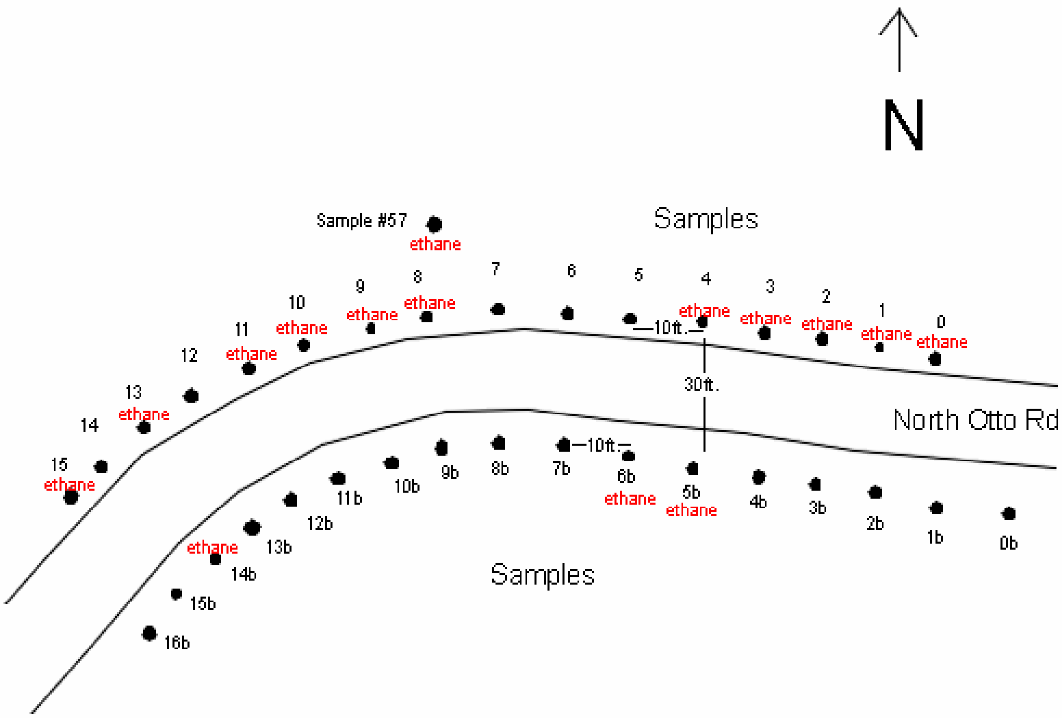
Zoar Valley Rd. East Box (G) Figure - Sample #22

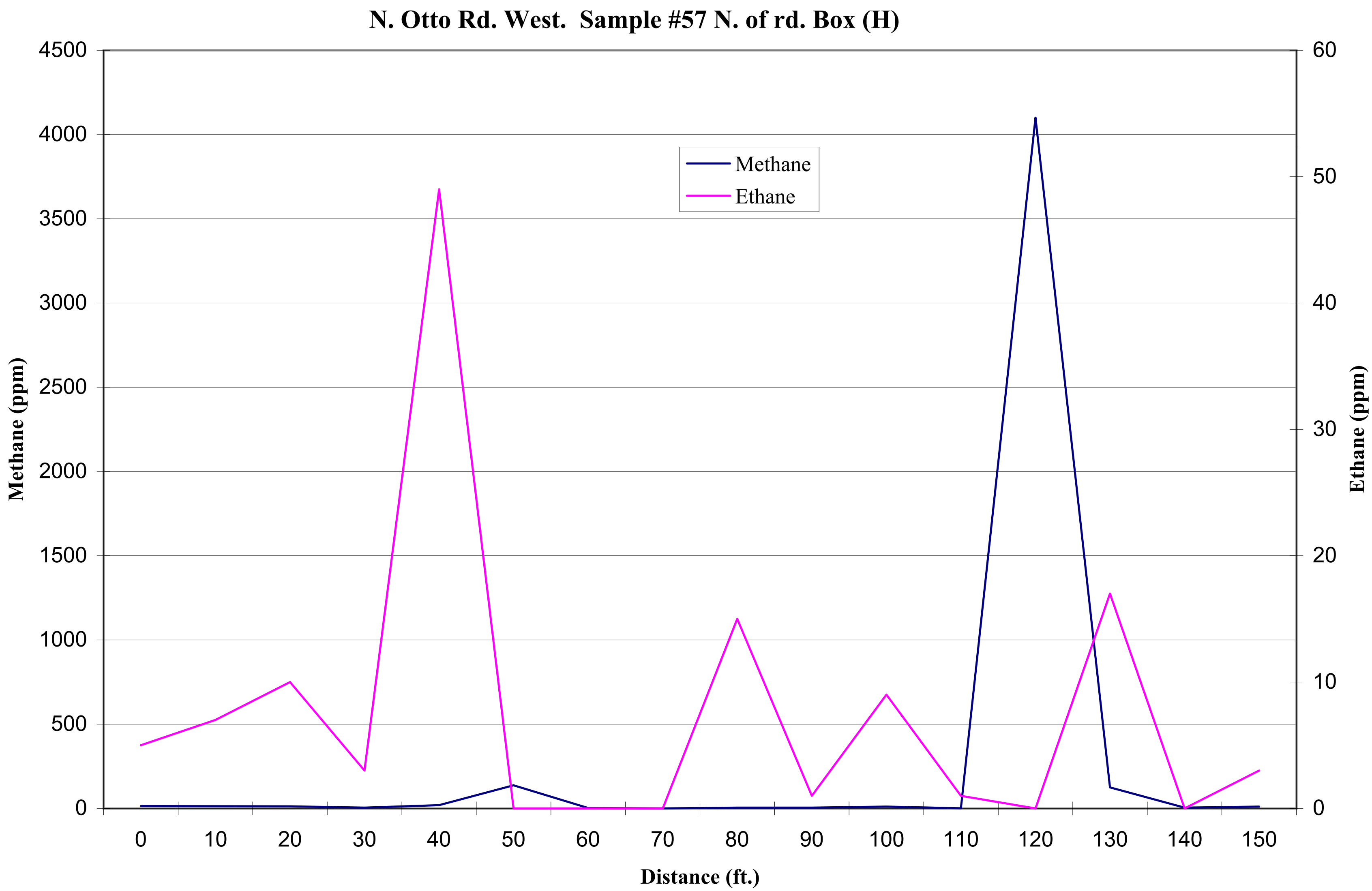



Zoar Valley Rd. East Sample #22 Box (G) Graph
Methane (ppm)
Ethane (ppm)
Distance (ft.)
Methane
Ethane
20
18
16
14
12
10
8
6
4
2
0
2.5
2
1.5
1
0.5
0
0
0
10
20

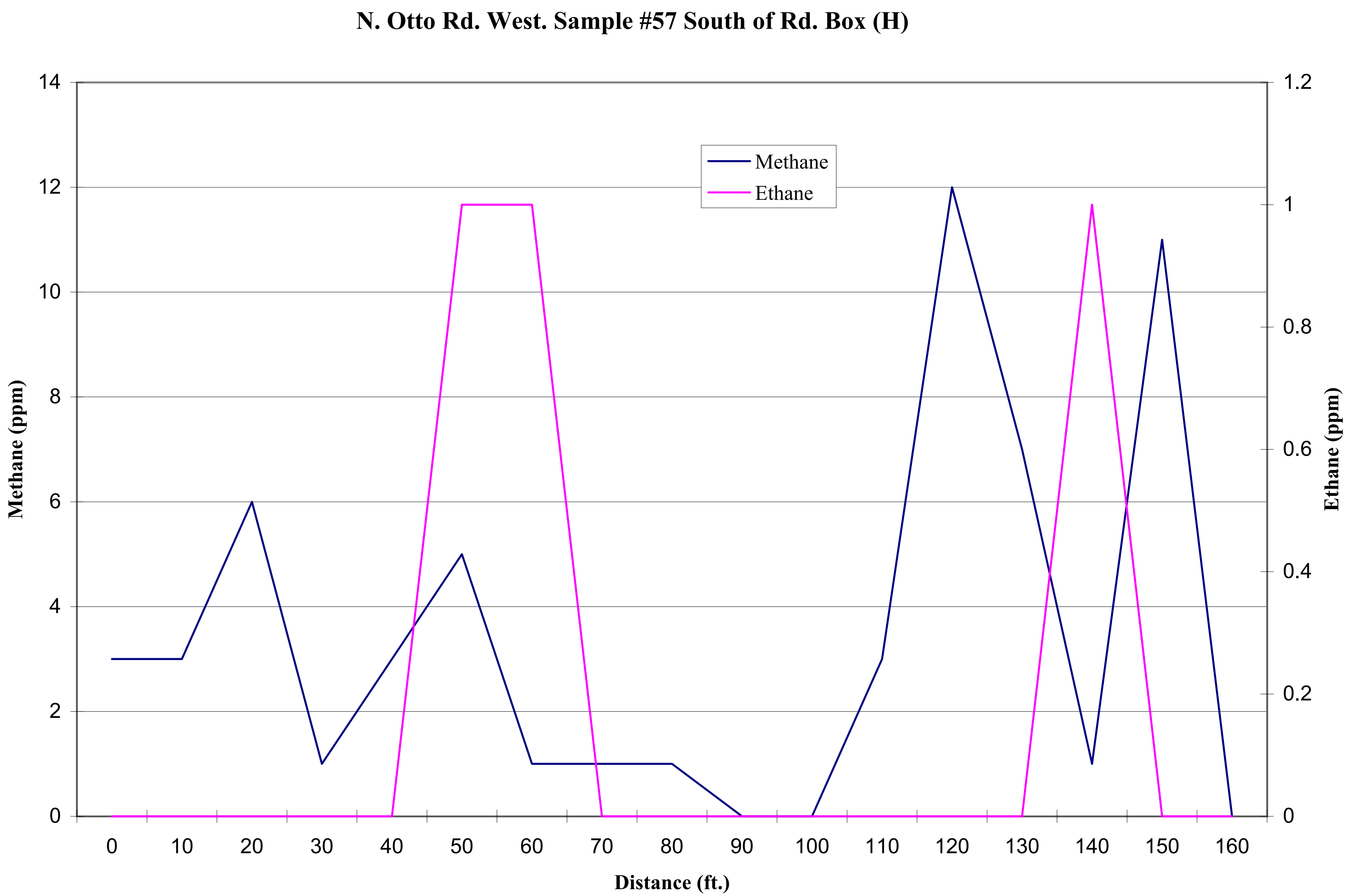
North Otto Rd. West Box (H) Data Sample # 57							7/21/1999
Samples analyzed in the lab							
Column: Hayesep D		Mesh: 6/1/8, 80/100					
at: 110c (temp.)		Carrier gas: 400		CHP: 2			
H2: 20 psi.	Air: 25 psi.						
Injection: 1000 microliters							
Northside of road							
		Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm
0	0	0.85	27	14	1.21	22	5
1	10	0.83	25	13	1.18	28	7
2	20	0.83	24	12	1.2	35	10
3	30	0.96	16	5	1.43	16	3
4	40	0.78	33	19	1.15	127	49
5	50	0.8	176	137	0	0	0
6	60	0.85	13	2	0	0	0
7	70	0.85	5	0	0	0	0
8	80	0.78	17	5	1.13	45	15
9	90	0.8	16	5	1.13	12	1
10	100	0.81	21	11	1.15	31	9
11	110	0.8	7	1	1.3	11	1
12	120	0.75	4871	4100	0	0	0
13	130	0.78	160	125	1.167	53	17
14	140	0.81	17	5	0	0	0
15	150	0.81	21	11	1.15	18	3
Southside of road							
0b	0	0.81	14	3	0	0	0
1b	10	0.81	15	3	0	0	0
2b	20	0.8	18	6	0	0	0
3b	30	0.83	12	1	0	0	0
4b	40	0.81	14	3	0	0	0
5b	50	0.83	16	5	1.26	10	1
6b	60	0.81	12	1	1.18	3	1
7b	70	0.85	7	1	0	0	0
8b	80	0.83	8	1	0	0	0
9b	90	0	0	0	0	0	0
10b	100	0	0	0	0	0	0
11b	110	0.833	15	3	0	0	0
12b	120	0.8	25	12	0	0	0
13b	130	0.83	19	7	0	0	0
14b	140	0.93	10	1	1.35	4	1
15b	150	0.83	24	11	0	0	0
16b	160	0.96	5	0	0	0	0

North Otto Rd. West Box (H) Figure - Sample #57



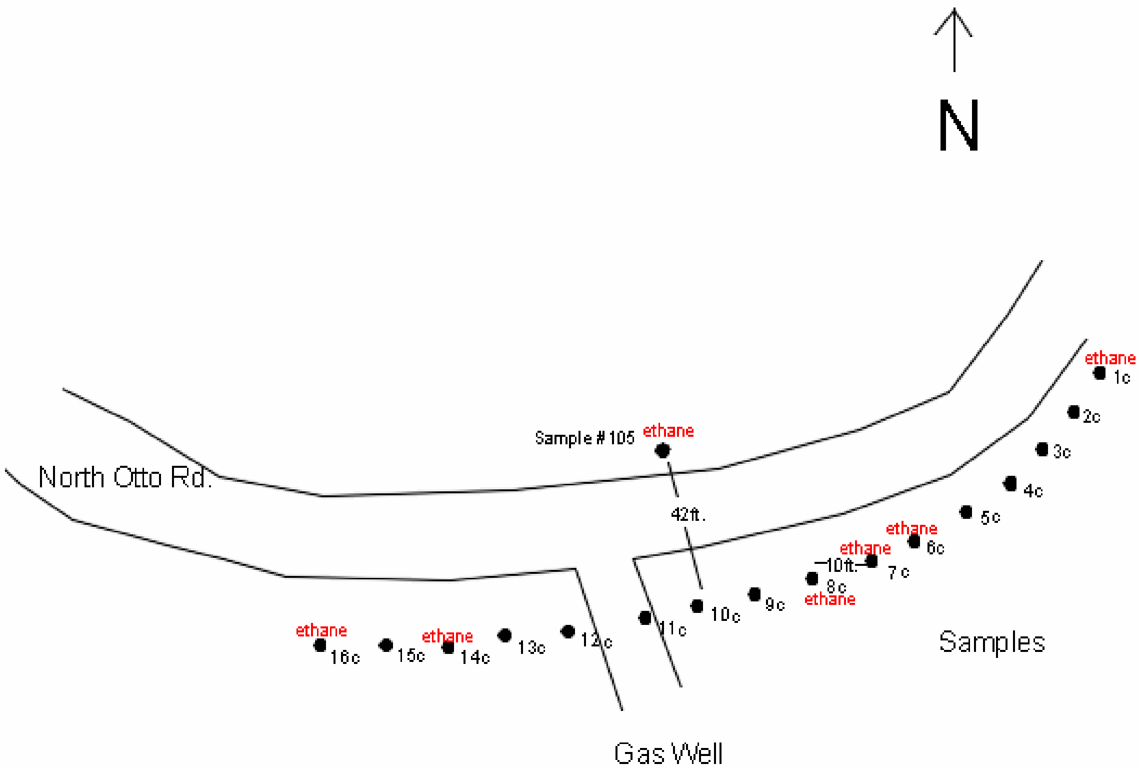


N. Otto Rd. West. Sample #57 N. of rd. Box (H)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Methane (ppm)
60
50
40
30
20
10
0
Ethane (ppm)
Methane
Ethane
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Distance (ft.)


N. Otto Rd. West. Sample #57 South of Rd. Box (H)
Methane
Ethane
Methane (ppm)
Ethane (ppm)
Distance (ft.)
0
2
4
6
8
10
12
14
0
0.2
0.4
0.6
0.8
1
1.2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160

North Otto Rd. East Box (I) Data Sample # 105							7/26/1999
Samples analyzed in the lab							
Column: Hayesep D		Mesh: 6/1/8, 80/100					
at: 110c (temp.)		Carrier gas: 400		CHP: 2			
H2: 20 psi.	Air: 25 psi.						
Injection: 1000 microliters							
Southside of road							
		Methane			Ethane		
Sample #	Distance (ft.)	Time (min.)	Area	ppm	Time (min.)	Area	ppm
1c	0	0.8	15	4	1.13	17	3
2c	10	0	0	0	0	0	0
3c	20	0	0	0	0	0	0
4c	30	0.85	10	1	0	0	0
5c	40	0.81	11	1	0	0	0
6c	50	0.8	25	12	1.1	14	2
7c	60	0.78	17	5	1.11	12	1
8c	70	0.81	14	4	1.2	10	1
9c	80	0.88	4	0	0	0	0
10c	90	0.81	27	14	0	0	0
11c	100	0.85	8	1	0	0	0
12c	110	0	0	0	0	0	0
13c	120	0.81	12	2	0	0	0
14c	130	0.81	15	4	1.15	22	5
15c	140	0.83	11	1	0	0	0
16c	150	0	0	0	1.4	6	1

North Otto Rd. East Box (I) Figure - Sample #105



North Otto Rd. East. Sample #105 Box (I) Graph