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Region 2

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Response Action Contract

FINAL
REMEDIAL INVESTIGATION REPORT
FOR OPERABLE UNIT 2 (OU-2)
FACILITY SOILS AND BUILDINGS
FOR
CORNELL-DUBILIER ELECTRONICS
SUPERFUND SITE
SOUTH PLAINFIELD
MIDDLESEX COUNTY, NEW JERSEY

DECEMBER 2002
VOLUME I OF II

Contract No: 68-W-98-214

FOSTER WHEELER
FOSTER WHEELER ENVIRONMENTAL CORPORATION

EPA WORK ASSIGNMENT NUMBER: 018-RICO-02GZ
EPA CONTRACT NUMBER: 68-W-98-214
FOSTER WHEELER ENVIRONMENTAL CORPORATION
RAC II PROGRAM

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VOLUME I OF II

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DECEMBER 2002

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CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
REMEDIAL INVESTIGATION REPORT
FOR OPERABLE UNIT 2 (OU-2)
FACILITY SOILS AND BUILDINGS

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300015

EXECUTIVE SUMMARY

This Remedial Investigation Report is for Operable Unit 2 (OU-2), Facility Soils and Buildings, of the Cornell-Dubilier Electronics Superfund site (the site), located in Middlesex County, New Jersey. This report has been prepared by Foster Wheeler Environmental Corporation in response to Work Assignment 018-RICO-02GZ, issued under United States Environmental Protection Agency (EPA) RAC II Contract Number 68-W-98-214. This report presents the activities and findings of the Remedial Investigation (RI) performed in regard to the facility soils and buildings. The RI was performed to define the nature and extent of the contamination in the facility soils (shallow and subsurface) and buildings (and associated drainage systems). This was accomplished by: defining the boundaries of the dump/fill area; locating and delineating other potential source areas; investigating the potential for building contamination; determining local geologic conditions; characterizing site contaminants; and assessing the risks to human and ecological receptors.

Site Description

The Cornell-Dubilier Electronics site consists of the Hamilton Industrial Park, contaminated portions of the Bound Brook adjacent to and downstream of the industrial park, and contaminated residential, municipal, and commercial properties in the vicinity of the former Cornell-Dubilier Electronics Corporation, Inc. (Cornell-Dubilier Electronics) facility. The former Cornell-Dubilier Electronics facility, also known as the Hamilton Industrial Park, is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey, and consists of approximately 26 acres, containing numerous subdivided buildings that are used by several commercial and industrial operations.

Cornell-Dubilier Electronics operated at what is now the Hamilton Industrial Park from 1936 to 1962, manufacturing electronic components including capacitors. Polychlorinated biphenyls (PCBs) and chlorinated organic degreasing solvents were used in the manufacturing process, and it has been alleged that during Cornell-Dubilier Electronics' period of operation, the company disposed of PCB-contaminated materials and other hazardous substances at the facility. A former employee has claimed that the rear of the property was saturated with transformer oils and that capacitors were also buried behind the facility during the same time period.

The developed portion of the facility (i.e., the northwestern area) comprises approximately 45 percent of the land area, and contains buildings, a system of catch basins to channel stormwater flow, and paved roadways. Several of the catch basins drain into outfalls along Bound Brook. The other 55 percent of the property is predominately vegetated (i.e., undeveloped). The central part of the undeveloped portion is primarily an open field, with some wooded areas to the northeast and south, and a deteriorated, partially paved area in the middle. The northeast and southeast boundaries consist primarily of wetland areas associated with Bound Brook, which flows from the eastern corner across the northeastern border of the undeveloped portion of the facility.

Nature and Extent of Contamination

During the RI, a total of 208 samples were collected: 96 shallow soil samples; 59 subsurface soil samples; 32 building floor dust samples; 10 perched water samples; 5 drainage system sediment samples; and 6 drainage system standing water samples. Analyses included: TCL organics; TAL

metals and cyanide; PCB congeners; dioxins and furans; total organic carbon; and grain size. Screening criteria, including Applicable or Relevant and Appropriate Requirements (ARARs) and "to be considered" (TBC) guidance values based on both human health and ecological effects, were used to assist in the interpretation of the nature and extent of contamination. When there was more than one criterion for a specific constituent, the most conservative (i.e, the lowest) was utilized for the comparison evaluation. Clean-up goals for OU-2 will be determined during the Feasibility Study.

PCBs: PCBs are the most prevalent contaminants found on the property, and are likely a direct result of former activities. Almost all of the collected samples (92 percent) indicated the presence of PCB compounds. Dust samples collected from the facility buildings contained Aroclor-1254, and the more elevated PCB concentrations (i.e., greater than 500 mg/kg) were present in Building Nos. 1, 1B, 5, and 6.

Four individual Aroclor constituents (-1242, -1248, -1254, and -1260) and Total PCBs exceeded screening criteria in the soils, by factors up to approximately 265,000. The highest levels of these compounds occurred in the central undeveloped portion of the facility where test pit excavations unearthed capacitors that appeared corroded and/or partially burned. In addition, shallow soils in parts of the southern developed, northeastern undeveloped and floodplain undeveloped portions of the property contained elevated concentrations greater than 10,000 times screening criteria (0.371 mg/kg). Although PCBs typically exhibit limited mobility in soils, elevated concentrations (i.e., up to 600 times the subsurface screening criteria of 0.49 mg/kg) were noted in the deeper overburden soils. The enhanced downward migration of PCBs is likely due to co-solvent effects by the presence of volatile organic compounds (VOCs), especially chlorinated solvents.

PCBs were also detected in the perched water encountered in the overburden soil and weathered bedrock at elevated concentrations (up to 7,400 ug/L). PCB compounds were detected at exceedance concentrations in all sediment (maximum concentration of 210 mg/kg) and standing water (maximum concentration of 13.7 ug/L) samples. The elevated levels of PCBs are likely due to deposition (historical and/or present) of contaminated soil particles into the drainage system during storm events.

Dioxins and Furans: Although analyzed in only a few shallow soil samples, dioxins and furans were detected during the OU-2 RI soils investigation (i.e., 2,3,7,8-TCDD was detected at concentrations exceeding screening criteria (3.15 pg/g) in locations SS03 and MW09 by factors of 3.2 and 18, respectively).

VOCs: Elevated levels of VOCs, especially trichloroethene (TCE), were detected in the soils, perched water, and drainage system water samples. The more elevated concentrations in the soils (i.e., up to 47,000 ug/kg TCE) and perched water (i.e., up to 15,000 ug/L TCE) were present in the southern developed and central undeveloped portions of the property. The presence of TCE and its dechlorination products may enhance dissolution and migration of PCBs and less soluble organic compounds by co-solvency.

SVOCs: The OU-2 RI investigation revealed elevated concentrations of semi-volatile organic compounds (SVOCs) in certain distinct locations around the property (e.g., in the vicinity of the historic fuel tank area, within test pits with debris, and from an area with semi-dried tar).

Pesticides: Individual pesticides were present at relatively high concentrations in the soils (i.e., up to 12,500 times their respective screening criteria values).

Metals: Metals were detected in soil throughout the facility property at concentrations which exceed their respective screening criteria.

NAPL: Significant accumulation of non-aqueous phase liquid (NAPL) was not noted during the OU-2 RI investigation. The PCB concentrations detected in the subsurface soils, and the PCB and TCE concentrations in the perched water indicate the potential for NAPL. In addition, staining, odors, sheens and an "oily water seep" were observed during the field investigation. Specifically, the eastern and western parts of the central undeveloped portion and southwestern part of the southern developed portion of the facility may contain NAPL.

Fate and Transport

The migration of contaminants to underlying soils and groundwater by the percolation of rainwater through contaminated soils and the former dump/fill area is a major environmental fate and transport mechanism for the facility. The OU-2 RI data indicated that the subsurface soils and perched water are heavily contaminated. Co-solvent effects exerted by the more mobile VOCs (primarily TCE and 1,2-dichloroethene) has likely enhanced migration of the less mobile organic constituents (e.g., PCBs).

Airborne entrainment of contaminated soil particulates has been a significant environmental transport mechanism, which has resulted in site-related contaminants (primarily PCBs) spreading to facility building interiors and to properties in the vicinity of the former facility. Currently, sufficient surface cover (i.e., pavement) and vegetation exist on the property to reduce the potential for airborne dust. The present vegetative cover on the undeveloped property areas also inhibits the emission of volatile compounds from soils and perched water.

Prior to the implementation of a site stabilization order in 1997, contaminants migrated by vehicle traffic via disturbance of surficial soil particulates to which constituents were adsorbed. Paving of the facility roadways in 1997 has significantly reduced this transport mechanism.

Generation of dust is expected as a result of the degradation of the building concrete slabs/floors. Contaminants potentially present in the surficial layer of the building floors would become incorporated in the resulting dust generated within the facility buildings. Migration of this contaminated dust outside of the buildings by operations and/or employees at the industrial park may be occurring.

Transitory ponding of stormwater occurs at several locations, and contaminants may be migrating from the ponded water to adjacent soils. Migration of contaminants may also be occurring during heavy rainfall events, by the dissolution of contaminants into surface runoff and by entrainment of

soil particulates to which constituents are adsorbed. Storm water is diverted to a man-made surface water drainage ditch or to several other natural ditches, or through numerous catch basins into the storm sewer system. The storm water ultimately discharges to an unnamed tributary of Bound Brook or to Bound Brook directly.

Human Health Risk Assessment

The Baseline Human Health Risk Assessment (BHHRA) indicates that the contamination on the property poses a potential risk to the public health. The BHHRA addressed seven populations: current trespassers; future trespassers; current indoor site workers; current outdoor site workers; future indoor site workers; future outdoor site workers; and future construction workers.

The noncancer hazards for all populations exceeded the EPA benchmark of 1.0. The maximum noncancer hazard of 3,800 was indicated for future construction workers working in the eastern portion of the site. The chemical of potential concern (COPC) responsible for generating the elevated noncancer hazard indices was Aroclor-1254. The target organ systems or effects were the eyes and immune deficiency.

The EPA benchmark for cancer risks (1.0E-04) was exceeded for all populations except the current indoor worker population. The total cancer risk values ranged up to 2.9E-02 (i.e., 3 in 100 additional cancers), and the majority of these risks were attributable to Total PCBs. PCBs are probable human carcinogens based on suggestive human evidence and adequate animal evidence.

Lead was assessed separately in the BHHRA due to a lack of a conventional toxicity factor. The mean lead concentration for each applicable data set was compared to the average industrial lead cleanup value of 1,250 mg/kg. The mean lead concentrations in the surface soil in the western portion of the property (11,000 mg/kg) and indoor dust (5,248 mg/kg) exceeded the screening level.

In situ soil gas concentrations of TCE ranged up to 14,000 ug/L in Area A (SG039, located southwest of Building No. 12) and up to 2,200 ug/L in Area B (SG082, located near the southwestern corner of the former truck driving school fence). The maximum soil gas concentration in Area A was collected from a "hot spot" area, and the remainder of the soil gas data from Area A (i.e., not including this "hot spot" area) was lower in concentration (i.e., average of approximately 4 ug/L TCE). Modeled risk calculation results from soil data indicate the volatiles (mainly TCE) present in Area B soil pose a greater potential vapor inhalation risk (1.0E-03) than the volatiles present in Area A soil (4.7E-06). The indoor air risk calculations are based on modeling of soil concentrations to indoor air, not on modeling of soil gas concentrations to indoor air. The maximum TCE concentrations were 250 ug/kg in All Soils, Area A and 47,000 ug/kg in All Soils, Area B.

Ecological Risk Assessment

The Ecological Risk Assessment (ERA) considered facility surface soils as the primary media of concern. The undeveloped portion of the property was deemed as supporting a diverse assemblage of wildlife and as representing significant habitat for ecological receptors. No significant habitat for ecological receptors was noted in the developed portion of the facility.

Evaluation of the ecological conceptual site model and pathways analysis revealed that exposure of ecological receptors to contaminants via contact with surface soils was incomplete in the developed portion of the property. The developed portion of the property was deemed more significant in the human health evaluation than in the ecological risk assessment.

Sixty-three contaminants exceeded at least one of the ecological benchmarks for the direct contact pathway considering microbial, soil invertebrate, and terrestrial plant endpoints. Results of the screening level food chain evaluation revealed sufficient ecological risks to proceed to a refined exposure assessment. The refined exposure assessment revealed that ecological receptors associated with the undeveloped areas of the property may be at excess risk from site-related contaminants. The highest risks were associated with DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dioxin-like PCB congeners.

Conclusions

The data collected during the OU-2 RI were adequate: to characterize the nature and extent of the contamination in the facility soils (shallow and subsurface) and buildings (and associated drainage systems); and to assess risks to human health and ecological receptors. The risks present at the former Cornell-Dubilier Electronics facility warrant remedial action, and the OU-2 RI data are adequate to proceed with the Feasibility Study to evaluate remedial alternatives.

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1.0 INTRODUCTION

This Remedial Investigation Report is for Operable Unit 2 (OU-2), Facility Soils and Buildings, of the Cornell-Dubilier Electronics Superfund site (the site), located in Middlesex County, New Jersey, and has been prepared by Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) in response to Work Assignment 018-RICO-02GZ (EPA, 1999c), issued under United States Environmental Protection Agency (EPA) RAC II Contract Number 68-W-98-214. This report presents the activities and findings of the Remedial Investigation (RI) performed in regard to the facility soils and buildings. This Remedial Investigation Report was prepared pursuant to the EPA-approved Final Work Plan (Foster Wheeler Environmental, 2000a), Final Field Sampling Plan (Foster Wheeler Environmental, 2000b), Final Quality Assurance Project Plan (Foster Wheeler Environmental, 2000c), and current EPA guidance.

The RI was separated into three operable units: residential, commercial, and municipal properties in the vicinity of the former Cornell-Dubilier Electronics facility (OU-1), the facility soils and buildings (OU-2), and the groundwater and Bound Brook Corridor (OU-3). This report addresses the facility soils and buildings. The results of the residential, commercial, and municipal properties investigation have been addressed in the OU-1 Remedial Investigation Report, dated August 2001. The results of the groundwater and Bound Brook Corridor investigations (OU-3) will be addressed in a separate report after additional site activities are performed. The RI was divided to focus on individual elements of the site and to expedite the RI process.

1.1 Purpose of Report

This Remedial Investigation Report for OU-2 presents and evaluates the results of the field investigation task performed to characterize the facility soils and buildings portion of the site. The work performed included:

- Review of previous investigations and existing information;
- Performance of a field investigation to determine impacts to the facility soils and buildings resulting from activities at the facility;
- Characterization of the nature and extent of contamination for the soils/buildings;
- Characterization of the fate and migration of contaminants present in the facility soils and in/around the facility buildings, and a determination of the potential impacts to off-site locations;
- Determination of the current and potential future human health and ecological risks from the soil and building contamination; and
- Development of the technical database needed for the completion of the Feasibility Study (FS).

The results of the RI will be used to determine areas which require consideration in the FS. The OU-2 FS will utilize the OU-2 RI results to evaluate remedial alternatives to eliminate, reduce, or control unacceptable risks to human health and the environment.

1.2 Site Background

1.2.1 Site Location

The Cornell-Dubilier Electronics site consists of the Hamilton Industrial Park, contaminated portions of the Bound Brook adjacent to and downstream of the industrial park, and contaminated residential, municipal, and commercial properties in the vicinity of the former Cornell-Dubilier Electronics Corporation, Inc. (Cornell-Dubilier Electronics) facility. The former Cornell-Dubilier Electronics facility, also known as the Hamilton Industrial Park, is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey (Latitude 40°34'35.0", Longitude 74°24'51.0"), and consists of approximately 26 acres, containing numerous subdivided buildings that are used by several commercial and industrial operations (Figures 1-1 and 1-2). The former Cornell-Dubilier Electronics facility portion of the site is bordered on the northeast by Bound Brook and the former Lehigh Valley Railroad, Perth Amboy Branch (presently Conrail); to the southeast by the South Plainfield Department of Public Works property, which includes an unnamed tributary to Bound Brook; to the southwest, across Spicer Avenue, by single-family residential properties; and to the northwest, across Hamilton Boulevard, by mixed residential and commercial properties (Figure 1-2).

1.2.2 Site Ownership History

TRC Environmental Corporation conducted, for EPA Region 2, a chain of title search for the Cornell-Dubilier Electronics facility. Documentation regarding the chain of title search is included in EPA's Potentially Responsible Party Search Report.

1.2.3 Site Development History

The Spicer Manufacturing Company established operations at the facility in 1912 (South Plainfield Bicentennial Committee, 1976). Most of the major structures on-site were erected by 1918. Table 1-1 presents construction dates and Cornell-Dubilier Electronic's usage of the structures on the property, as shown on a Factory Insurance Association Map (FIA, 1956). The Spicer Manufacturing Company ceased its operations at the facility in the mid to late 1920s. When the Spicer Manufacturing Company ceased operations at the facility, the property consisted of approximately 210,000 square feet of buildings.

According to personnel at the South Plainfield building department, Hamilton Boulevard, located west of the facility property, was initially a concrete roadway, first paved in the 1930s as a Works Progress Administration (WPA) project. This road was paved with asphalt in the 1960s or 1970s.

1.2.4 Site Manufacturing History

The Spicer Manufacturing Company operated a manufacturing plant on the property from 1912 through the mid- to late 1920s. The plant manufactured universal joints and drive shafts, clutches,

drop forgings, sheet metal stampings, screw products and coil springs for the automobile industry. The plant included a machine shop, a box shop, a lumber shop, a scrap shop, a heat treating building, a transformer platform, a forge shop, a shear shed, a boiler room, an acid pickle building and a die sinking shop. A chemical laboratory for the analysis of steel was added in 1917. The Spicer Manufacturing Company is Dana Corporation's predecessor (EPA, 2001c).

Cornell-Dubilier Electronics operated at what is now the Hamilton Industrial Park from 1936 to 1962, manufacturing electronic components including capacitors. It has been reported that the company also tested transformer oils for an unknown period of time. Polychlorinated biphenyls (PCBs) and chlorinated organic degreasing solvents were used in the manufacturing process, and it has been alleged that during Cornell-Dubilier Electronics' period of operation, the company disposed of PCB-contaminated materials and other hazardous substances at the facility. A former employee has claimed that the rear of the property was saturated with transformer oils and that capacitors were also buried behind the facility during the same time period (EPA, 1996a).

PCBs are a group of chemical compounds consisting of mixtures of numerous chlorinated biphenyl molecules. The compounds differ both in the number and/or position of chlorine atoms attached to the biphenyl rings and in the degree of chlorination, for a total of 209 possible individual compounds (i.e., congeners). For commercial purposes, common mixtures of PCBs were given names/ identification numbers, indicating the degree of chlorination, type of formulation, or other properties. For example, one series of mixtures was named "Aroclor," and the specific mixture was then further distinguished by the percentage of chlorine (e.g., Aroclor-1248 contained 48 percent chlorine).

The PCB-containing capacitors were manufactured by winding together thin sheets of aluminum foil and paper (Foley, Hoag & Eliot, 1988; 1996). This bundle was then wrapped in insulation and placed inside a canister. The canister unit was sealed, except for small fill holes through which dielectric material was introduced. The capacitors underwent initial testing, and if working properly, were subsequently placed in an impregnation tank. Here the capacitors were evacuated and filled with Aroclor-1254, with some capacitors also being impregnated with vegetable oil, mineral oil, or boric acid.

The fill holes were sealed, and the entire unit was then placed in a degreasing unit. The degreasing agent utilized was trichloroethene (TCE). Excess Aroclor was drained through a closed filtration system linked to the impregnation tanks, and the filter medium used was diatomaceous material ("fuller's earth").

The capacitors which failed specifications were drained of Aroclor-1254, and if the canister and/or capacitor parts could not be reused, these materials may have been disposed on the site (Foley, Hoag & Eliot; 1988; 1996). The diatomaceous material used in the filtering process and any residue that had accumulated on the interior of the degreasing units may also have been disposed on the facility property. Small accidental leaks or spills of Aroclor occurred occasionally in the factory; these spills likely were dealt with through gutters along the edges of work benches to contain the spills or cleaned by spreading an absorbent substance, such as fuller's earth, on the spill.

Following Cornell-Dubilier Electronic's departure from the property, the facility was operated as a rental property consisting of warehouses and light industries. Since the early 1960s, numerous tenants have occupied the complex, also known as the Hamilton Industrial Park.

1.2.5 Previous Investigations

The following is a brief chronological summary of the reconnaissance and sampling and analytical programs conducted, prior to the RI, on or in the vicinity of the Cornell-Dubilier Electronics site by the EPA and the New Jersey Department of Environmental Protection (NJDEP).

- 4 January 1985 – NJDEP personnel visited the facility property and noted in the *Preliminary Assessment Report* (11 August 1986) that a portion of the lot located in the back of the facility contained a black soil unnatural to the area (EPA, 1995a). In addition, NJDEP personnel noted that four large black tanks were present on the edge of a large filled-in area near the rear of the property. The tanks were at the top of an embankment leading down to Bound Brook. (Additional discussion of the tanks and their location is provided in Section 4.4.)

- 11 September 1986 – NJDEP conducted a Site Inspection and collected three surface soil, two surface water, and two sediment samples at the facility property. Exact sample locations are not available. Several metals, volatile organic compounds (VOCs), and Aroclor-1254 were detected in the soil and sediment samples. Information on the investigation event is presented in the *Site Inspection Report*, dated 12 September 1986, and the *Data Validation Review Memorandum*, dated 13 April 1987 (EPA, 1995a).

- January 1987 through October 1990 – NJDEP sampled wells in the vicinity of the site for VOCs, and the sampling results are provided in a report titled *Pitt Street Private Wells, South Plainfield Borough, Middlesex County, Interim Ground-Water Impact Area* (September 1990, revised February 1991). Elevated levels of chlorinated solvents, such as TCE up to 6,850 micrograms per liter (ug/L) and tetrachloroethene (PCE) up to 3,800 ug/L, were detected. Due to widespread contamination, residential wells in the area were reportedly closed, and NJDEP has denoted this area (which does not include the site) as an "Interim Ground-Water Impact Area" (Figure 1-1).

- March to July 1990 – NJDEP investigated an oil and water mixture that was leaching into a pit in the basement of Building No. 15. D.S.C. of Newark Enterprises, Inc., the owner of the property, dug 14 test holes in the vicinity of the building, between the building and a 125,000-gallon aboveground oil tank, and in the vicinity of two former 8,000 gallon and one former 11,000-gallon aboveground oil tanks (DSC, 1990a; 1990b). Oil was present on the water in seven locations, of which five were along the piping from the present oil tank to the building, one was in the former tank area, and one was between the former tank area and the present tank piping. The two test holes dug closest to the 125,000-gallon tank did not indicate floating oil.

- 30 March 1994 – Five tanks were observed in the northeast embankment area during an EPA Site Inspection Prioritization (SIP) reconnaissance visit (EPA, 1995a). However, the "black

soil" previously reported by NJDEP was not visible during this inspection. Two small soil piles, covered with plastic, were observed in front of Building No. 14. The boiler system leaked heating oil onto the soil in the vicinity of Building No. 18, and the piles contained the excavated soil.

- 8 June 1994 – EPA collected six surface soil, four sediment, and four surface water samples from the facility property during a SIP sampling event. Results of the sampling are summarized in the *Site Inspection Prioritization Evaluation Report*, dated 23 January 1995 (EPA, 1995a). VOCs, semi-volatile organic compounds (SVOCs), Aroclor-1254, and various metals were detected in soils at concentrations significantly exceeding background levels. Aroclor-1254, TCE, 1,2-dichloroethene (1,2-DCE), and lead were detected in a sediment sample from Bound Brook near the rear of the property. In addition, elevated concentrations of polycyclic aromatic hydrocarbons (PAHs, a class of SVOCs), Aroclor-1254, lead and zinc were present in the sediment collected near the outfall pipe. Aroclor-1254, Aroclor-1248, 1,2-DCE, and various metals were also detected at elevated concentrations in surface water samples from Bound Brook.

- 13 October 1994 – EPA collected two additional sediment samples from Bound Brook to obtain appropriate background concentrations to compare to the SIP sampling event results (EPA, 1995a). These background samples contained total PCB concentrations of 0.7 milligrams per kilogram (mg/kg) and 0.35 mg/kg.

- 29 February 1996 – EPA collected four additional surface soil samples (and a duplicate sample) and four additional sediment samples from the facility property and Bound Brook, respectively. Aroclor-1254 was detected at concentrations up to 77 mg/kg in the soils and up to 520 mg/kg in the sediments, as described in the *Hazard Ranking System Documentation Report*, dated December 1996 (EPA, 1996a). During this Hazard Ranking System (HRS) sampling event, it was noted that the tanks were no longer present on the edge of the northeast embankment.

- 23 April 1996 – EPA collected four air samples, one from each of the four perimeter sides of the truck driving school area (in the center of the open portion of the property). During the sampling, visible dust was noted with the winds out of the west to northwest at approximately 10 to 20 miles per hour (mph). The samples were analyzed for PCBs, lead, cadmium, silver, and arsenic. No PCBs were present at a detection limit of 3.3 micrograms per cubic meter (ug/m^3). Lead was detected in two of the air samples, at concentrations of 3.5 ug/m^3 and 7.2 ug/m^3, with the higher concentration present in the background upwind sample location.

- 11 June 1996 – EPA completed a Screening Level Ecological Risk Assessment (EPA, 1996c), which included a comparison of surface water and sediment contaminant levels to available screening values. The risk assessment indicated that contamination of stream sediments adjacent to, and apparently associated with, the site was present at levels that have been linked to adverse impacts in benthic organisms in other freshwater systems.

- 27 and 29 June 1996 – EPA collected surface and subsurface soil samples from the facility roadway, the vacant open field area, a foot/bicycle path that crossed the property, and the southeastern and eastern floodplain areas. Two depth intervals were sampled, 0 to 3 inches and 3 to 12 inches below ground surface (bgs) (3 to 18 inches bgs for the roadway only). Aroclor-1254 was detected in facility surface soils at concentrations as high as 51,000 mg/kg from the field area and at 100 mg/kg in a sample from the floodplain of Bound Brook. Concentrations of Aroclor-1254 ranged up to 5,000 mg/kg in the surface soils along the foot/bicycle path. Lead concentrations ranging from 1,740 mg/kg to 66,600 mg/kg were measured in surface soil samples collected near the foot/bicycle path and the northeast corner of the fenced area, within the area where exposed waste materials were located. Aroclor-1254 was present in the soils at the surface and beneath the gravel/stone layer of the roadway, up to 340 mg/kg and 22,000 mg/kg, respectively. Lead was detected on the surface of the facility roadway at concentrations as high as 340 mg/kg, and beneath the gravel/stone layer at concentrations as high as 7,460 mg/kg. In addition, EPA collected one sediment sample for total organic carbon (TOC, at 840 mg/kg) and grain size analyses. (Additional discussion of the sampling is provided in Section 4.3.)

- 16 July 1996 – Six test pits were excavated in the vacant open field area, and 18 soil samples were collected. The test pits revealed stained subsurface soils, drum carcasses, electrical parts, paper-thin mica-like chips, wood, and debris. Aroclor-1254 and lead were detected at concentrations as high as 1,900 mg/kg and 1,970 mg/kg, respectively. Water was present in Test Pit No. 1 at a depth of 4.5 feet bgs; the remainder of the test pits revealed some groundwater infiltration between 7 and 9 feet bgs. (Additional discussion of the sampling is provided in Section 4.3).

- 21 March 1997 – EPA conducted wipe sampling in 12 buildings located at the former Cornell-Dubilier Electronics facility. Aroclor-1254, Aroclor-1260, lead, and cadmium contamination were identified on building surfaces. The results for the 27 samples are presented in the *Final Report, Wipe Sampling*, dated May 1997 (Weston, 1997g).

- 5 and 9 June 1997 – EPA conducted chip, air, and vacuum dust sampling of two building interiors at the facility, with additional air samples also being collected at "trucking fenceline" and "roadway corner, trucking facility." Concentrations of Aroclor-1248 and Aroclor-1254 as high as 31,000 mg/kg and 57,000 mg/kg, respectively, were measured in the chip samples. The dust and chip samples also indicated lead (maximum concentration of 3,800 mg/kg) and cadmium (maximum concentration of 130 mg/kg). Detected concentrations in the air samples ranged up to 33 ug/m^3 for PCBs, 0.971 ug/m^3 for lead and 0.054 ug/m^3 for cadmium The *Trip Report* (23 June 1997) and *Analytical Report* (August 1997) summarize the results of the building investigation (Weston, 1997e; 1997c).

- 16 through 20 and 27 June 1997 – EPA initiated a study to determine the impacts of contamination of Bound Brook to human health and the environment. Soil, sediment, water, and biota (fish, crayfish, and small mammals) samples were collected along Bound Brook adjacent to and downgradient of the site. Samples of edible fish were collected from Bound Brook, New Market Pond, and Spring Lake for use in assessing human health risks. Results

of the sampling are presented in the *Bound Brook Sampling and Edible Fish Tissue Data Report*, dated August 1997 (EPA, 1997b).

- 26 and 27 June 1997 – EPA collected 20 surface soil samples and a field duplicate sample from residential properties in the vicinity of the facility, and the investigation is summarized in a *Sampling Trip Report*, dated 7 July 1997, and two data package transmittals, dated 4 August 1997 (Weston, 1997d; 1997a; 1997b). The soil samples were analyzed for PCBs, lead, and cadmium. Detected concentrations ranged up to 4.8 mg/kg for Aroclor-1254, up to 291 mg/kg for lead, and up to 2.3 mg/kg for cadmium.

- 7 August 1997 – EPA collected additional soil, sediment, surface water, and biota samples along the Bound Brook adjacent to and downstream of the industrial park. Aroclor-1254 concentrations as high as 13 mg/kg (wet weight) and 6.2 mg/kg (wet weight) were measured in the sediment and floodplain soils, respectively. Copper, zinc, lead, and barium were detected in the soils and sediments, at concentrations up to 210 mg/kg, 620 mg/kg, 540 mg/kg, and 380 mg/kg (dry weight), respectively. The fish fillet samples contained detections of two PCBs and seven pesticides. Data collected during this sampling event, in conjunction with the June 1997 concentrations, were utilized to conduct an ecological risk assessment, and the results are presented in the *Final Report, Ecological Evaluation for the Cornell Dubilier Electronics Site* (EPA, 1999e).

- August 1997 through November 1997 – EPA conducted sampling along the Bound Brook floodplain, collecting surface and subsurface soils from the banks and sediments from the streambed. As described in the *Soil and Sediment Sampling and Analysis Summary Report* (8 September 1998), one hundred transects were established along approximately 2.4 miles of the brook, with transects located upstream, midstream, and downstream of the site (Weston, 1998b). Four of the transects were located downstream of the New Market Pond spillway. Mean total PCB concentrations were 7.59 mg/kg for the surface soils; 11.97 mg/kg for the subsurface soils; 2.93 mg/kg for the surface sediments; and 2.34 mg/kg for the subsurface sediments.

- 27 through 30 October 1997 – EPA collected surface soil samples (0 to 2 inches in depth) from the following residential properties which were chosen based on location and potential wind direction: 130 Spicer Avenue, 501 Garibaldi Avenue, 500 Garibaldi Avenue, 320 Spicer Avenue, 204 Spicer Avenue, 210 Spicer Avenue, 214 Spicer Avenue, 336 Spicer Avenue, 305 Spicer Avenue, 507 Hamilton Boulevard, 311 Delmore Avenue, 228 Spicer Avenue, 233 Delmore Avenue, 501 Hamilton Boulevard, 108 Spicer Avenue, and 345 Metuchen Road. Aroclor-1254 and Aroclor-1260 concentrations as high as 22 mg/kg and 2.2 mg/kg, respectively, were measured in these "Tier I" soil samples. The results are summarized in the *Tier I Residential Sampling and Analysis Summary Report*, dated 25 June 1998 (Weston, 1998f).

- 17 and 18 November 1997 – EPA collected interior dust samples from residential properties, and the results are provided in the *Final Report, Vacuum Dust Sampling*, dated February 1998 (Weston, 1998g). Sampled properties included residences on Hamilton Boulevard (one), Spicer Avenue (eight), Garibaldi Avenue (two), and Delmore Avenue (one). Aroclor-

1254 and Aroclor-1260 concentrations as high as 120 mg/kg and 85 mg/kg, respectively, were measured in the dust samples.

- 20 through 23 April 1998 – Based on the PCB concentrations detected in the "Tier I" sampling event, EPA conducted "Tier II" soil sampling at additional properties, progressively moving away from the former facility. These residential properties were: 127 Delmore Avenue, 135 Delmore Avenue, 201 Delmore Avenue, 221 Delmore Avenue, 207 Delmore Avenue, 403 Hamilton Boulevard, 237 Delmore Avenue, 115 Delmore Avenue, 131 Delmore Avenue, 215 Delmore Avenue, 346 Hamilton Boulevard, 511 Hamilton Boulevard, 119 Delmore Avenue, 229 Delmore Avenue, and 123 Delmore Avenue. Maximum PCB concentrations were 60 mg/kg for Aroclor-1254 and 4.6 mg/kg for Aroclor-1260. Results of the investigation are presented in the *Tier II Residential Sampling and Analysis Summary Report*, dated 2 July 1998 (Weston, 1998d).

- 21 through 28 April 1998 – EPA conducted vacuum sampling in residential properties on Hamilton Boulevard (twelve), Delmore Avenue (fifteen), Forest Haven Boulevard (one), Garibaldi Avenue (two), and Spicer Avenue (six). These dust samples contained Aroclor-1242, Aroclor-1254, and Aroclor-1260, and detected PCB concentrations ranged from 0.11 to 27 mg/kg. The *Final Report, Vacuum Dust Sampling* (July 1998) summarizes the results of this investigation (Weston, 1998e).

- 4 and 5 May 1998 – As results of the previous "Tier I" and "Tier II" sampling events indicated PCB concentrations greater than EPA's screening level (1 mg/kg), EPA conducted "Tier III" soil sampling at four residential property areas in the vicinity of the facility property. The results are summarized in the *Tier III Residential/Neighborhood Sampling and Analysis Summary Report,* dated 10 July 1998 (Weston, 1998c). Sampling was typically conducted at approximately 100-foot intervals along the area roadways.

  Area 1 was defined as the block of land bounded by Delmore Avenue, Belmont Avenue, Arlington Avenue, and Hamilton Boulevard. Thirty-nine surface soil samples were collected for PCB analysis from the following residential roadways: Hamilton Boulevard, Arlington Avenue, Delmore Avenue, Garibaldi Avenue, and Fulton Street. Aroclor-1254 concentrations ranged from 0.027 to 2.9 mg/kg. Aroclor-1260 concentrations ranged from undetected to 0.64 mg/kg.

  Fifteen surface soil samples were collected within Area 2, defined as the northeast side of Delmore Avenue, between Fulton Street and Belmont Avenue. Soil samples were collected for PCB analysis from Belmont Avenue and Delmore Avenue. Concentrations of Aroclor-1254 ranged from 0.022 to 1.5 mg/kg, and Aroclor-1260 concentrations ranged from undetected to 0.75 mg/kg.

  Area 3 was defined as the south side of Belmont Avenue, between Arlington Avenue and Metuchen Road. Ten surface soil samples were collected for PCB analysis from the following roadways: Arlington Avenue, Delmore Avenue, and Belmont Avenue. Concentrations of Aroclor-1254 ranged from 0.085 to 0.93 mg/kg. Aroclor-1260 concentrations ranged from undetected to 0.14 mg/kg.

Ten surface soil samples were collected for PCB analysis from residential properties in Area 4, defined as the southeast side of Hancock Street, between Lakeview and Amboy Avenues. Aroclor- 1254 concentrations ranged from 0.037 to 1.2 mg/kg, and Aroclor-1260 concentrations ranged from 0.017 to 0.2 mg/kg.

- 26 through 28 October 1998 – EPA collected indoor wipe samples at 13 businesses located in the vicinity of the former Cornell-Dubilier Electronics facility, along Hamilton Boulevard and Spicer Avenue. No PCBs were detected in these wipe samples.

  In addition, EPA collected one to two surface soil samples from five of these commercial properties, where soil was available for sampling. The five properties included 417 Hamilton Boulevard, 321 Spicer Avenue, 405 Spicer Avenue, 408 Hamilton Boulevard, and 340 Hamilton Boulevard. Aroclor-1254 was detected at concentrations between 0.12 and 7.1 mg/kg.

  Five residential properties in the vicinity of the facility property, along Delmore Avenue, Spicer Avenue, and Hamilton Boulevard, were vacuum sampled by EPA. Weathered Aroclor-1254 was present at concentrations as high as 39 mg/kg.

  The results of the October 1998 sampling are presented in the *Final Report, Vacuum, Wipe and Soil Sampling*, dated December 1998 (Weston, 1998a).

- 14 November 1998 – EPA collected 31 surface soil samples and 2 duplicate samples from Property FF located on Spicer Avenue (referred to as "Addendum to Tier I") and presented in a 16 February 1999 report, *Tier I Residential Sampling and Analysis Summary Report, Addendum No. 1* (Weston, 1999b).

- 21 November 1998 – EPA resampled soils at the following Bound Brook transect locations: CCSD1 (Transect CC), DDSS1 (Transect DD), HHSD1 (Transect HH), PPPND2 (Transect PPP), and UUUSD1 (Transect UUU). One surface soil sample and four subsurface soil samples were collected and analyzed for PCBs, as described in the *Soil and Sediment Sampling and Analysis Summary Report, Addendum No. 1*, dated 3 March 1999 (Weston, 1999a). Results indicated Aroclor-1254 at detected concentrations ranging from 1.2 mg/kg to 580 mg/kg. These results revised the mean total PCB concentrations for surface (from 7.59 to 6.88 mg/kg) and subsurface (from 11.97 to 12.28 mg/kg) soils.

- 20 and 21 April 1999 – The Environmental Measurements and Site Assessment (EMSA) section of NJDEP conducted surface (0 to 6 inches) and shallow subsurface (18 to 24 inches) sediment sampling in Spring Lake and along Cedar Brook from Plainfield High School to the lake (NJDEP, 1999a). Sediment samples were also collected along a feeder stream from Maple Avenue to Cedar Brook. No PCBs were detected in any of the samples collected. Alpha- and gamma-chlordane were the most prevalent contaminants detected, with concentrations as high as 0.17 mg/kg and 0.13 mg/kg, respectively. DDT and DDD were also listed as primary contaminants, with concentrations as high as 0.69 mg/kg and 0.091 mg/kg, respectively.

- 21 through 23 June 1999 – Additional samples from the Bound Brook floodplain, downstream of Spring Lake, were collected by EPA and analyzed for PCBs. Four areas were sampled: Area 1 (Veteran's Memorial Park), Area 2 (north side of Cedar Brook, between Lowden and Oakmoor Avenues), Area 3 (north side of Bound Brook, in the vicinity of Fred Allen Drive), and Area 4 (located adjacent to stream 14-14-2-3 as identified on the Flood Insurance Map for the Township of Piscataway, south of New Market Avenue and east of Highland Avenue). The investigation results are presented in the *Floodplain Soil/Sediment Sampling and Analysis Summary Report*, dated January 2000 (Weston, 2000). Area 1 samples had total PCB concentrations ranging from non-detect to 25 mg/kg, Area 2 samples had total PCB concentrations ranging from 0.060 mg/kg to 2.0 mg/kg, Area 3 samples had total PCB concentrations ranging from 2.5 mg/kg to 7.5 mg/kg, and Area 4 samples had total PCB concentrations ranging from non-detect to 0.21 mg/kg.

- 4 June, 23 June, and 28 through 30 July 1999 – Environ Corporation, on behalf of Foley, Hoag & Elliot, LLP and Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P.C. who represent D.S.C. of Newark Enterprises, Inc., conducted a preliminary evaluation of groundwater conditions at the property in June 1999. The results are presented in the *Preliminary Ground Water Assessment Report for the Hamilton Industrial Park Site,* dated October 1999 (Environ, 1999). Bedrock was encountered at depths of 6 to 13 feet bgs. Permanent groundwater was present only in the bedrock at depths between 50 and 55 feet bgs. Environ installed three temporary wells (TW03, TW05, and TW06) and collected groundwater samples using dedicated disposable Teflon bailers. TCE and 1,2-DCE were detected at concentrations as high as 29,000 micrograms per liter (ug/L) and 14,000 ug/L, respectively. Aroclor-1254 and Aroclor-1242 were detected at concentrations as high as 14 ug/L and 130 ug/L, respectively.

The overall results of the above sampling and analyses indicate elevated concentrations of VOCs, SVOCs, PCBs, and metals in the soils and sediments. Building interiors at the facility were found to contain elevated levels of PCBs and metals. Investigations at residential and commercial properties in the vicinity of the property identified the presence of PCBs in soils and/or in-house dust at several residences. Fish collected from Bound Brook were found to contain PCBs at concentrations higher than allowed by the Food and Drug Administration (2 parts per million (ppm)).

To date, the following actions have been taken to reduce the potential for exposure to site contaminants and limit the off-site migration of contaminants:

- 25 March 1997 – A unilateral administrative order was issued to the current owner of the Hamilton Industrial Park, D.S.C. of Newark Enterprises Inc., which required that a removal action be taken to stabilize the property. The scope of work included paving facility driveways and parking areas, installing security fencing and warning signs to limit access to the property, and installing silt fencing to limit off-site migration of surface soils.

- 7 April 1997 – EPA installed temporary fencing and posted warning signs at both ends of the footpath that crossed the eastern portion of the facility property to block pedestrian access. In addition, EPA personnel overpacked several large capacitors that were leaking oil.

- 8 August 1997 – NJDEP issued an interim fish consumption advisory for Bound Brook and New Market Pond due to EPA findings of elevated PCB concentrations in sediments and fish samples.

- 29 March 1998 – EPA initiated a removal action to clean the interiors of homes where PCBs were found in indoor dust at levels of potential health concern, i.e., above the risk range used in the Superfund Program.

- 6 August 1998 – Cornell-Dubilier and D.S.C. of Newark Enterprises, Inc. entered into an Administrative Consent Order for a removal action that included the removal and disposal of contaminated soil from five residential properties, and delineation of the vertical and horizontal extent of PCB contamination at one additional property.

- 8 August 1998 – NJDEP issued a final fish consumption advisory. The advisory included all parts of the Bound Brook and its tributaries, New Market Pond and Spring Lake.

- 23 February 1999 – EPA ordered the former owners, Cornell-Dubilier and Dana Corporation, to conduct a removal action at seven additional residential properties.

- 28 April 1999 - A "Participate and Cooperate Order" was issued to D.S.C. of Newark Enterprises, Inc. and Federal Pacific Electric Company for the remediation of Tier II residential properties.

- 14 April 2000 - EPA ordered D.S.C. of Newark Enterprises, Inc. to conduct a removal action of contaminated soils at a property on Spicer Avenue.

1.2.6 Current Site Conditions

Currently, facility land use is commercial/light industrial. The Hamilton Industrial Park is located in the western portion of the former Cornell-Dubilier Electronics facility, which is largely paved or occupied by buildings. All areas used as driveways, parking areas and walkways were paved by the property owner pursuant to an administrative order issued by the EPA in March 1997. Site control measures including the installation of a six-foot chain link fence, posting of warning signs, and implementing engineering controls to limit the migration of contaminants through surface water run-off were also instituted pursuant to this order. It is anticipated that future land use for the facility property will remain commercial and/or light industrial.

The northwestern property area is gently sloping, with elevations ranging from approximately 70 to 82 feet above mean sea level (msl). The central portion of the facility property is primarily an open field, with some wooded areas to the south and a semi-paved area in the fenced area in the middle. This area is relatively level, with elevations ranging from approximately 71 to 76 feet above msl. The property drops steeply to the northeast and southeast, and the eastern portion of the property consists primarily of wetland areas bordering Bound Brook. Elevations in this area range from approximately 71 feet above msl at the top of the bank to approximately 60 feet above msl along Bound Brook.

1.3 Report Organization

This Remedial Investigation Report was prepared in accordance with the following primary guidance documents:

- Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA, 1988a);
- Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual, Part A, Interim Final (EPA, 1989) and associated guidelines, policies, and guidances; and
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final (EPA, 1997g).

Other guidance documents, policies, etc. were utilized during the development of this report. These documents, policies, etc. are identified throughout the report in the applicable sections and are listed in the reference section (Section 9.0).

This Remedial Investigation Report for OU-2 is organized into two volumes. Volume I includes the text, the associated tables and figures, and Appendices A and B. Text sections are described below. Volume II contains Appendices C through P to this Remedial Investigation Report (Volume I).

- Section 1.0 - Introduction: presents the purpose of the OU-2 RI, a description of the site (including location, history, previous investigations, and current conditions), and the organization of this report.
- Section 2.0 - Study Area Investigation: describes the specific activities performed during the investigation of the facility soils and buildings. The section is divided into separate subsections for each of the investigated matrices, and the sampling program objectives, procedures, and locations are explained. Field screening data which were collected during the initial phase of the investigation to guide subsequent activities (e.g., the geophysical survey) are also described in this section.
- Section 3.0 - Physical Characteristics of the Study Area: provides a general description of the study area in terms of surface features, climate, demography, land use, geology, hydrogeology, ecology, and cultural resources, utilizing current literature and information/observations directly obtained during the RI investigation, as applicable.
- Section 4.0 - Nature and Extent of Contamination: summarizes and interprets the analytical results of previous sampling events and the OU-2 RI investigation by matrix and constituent class. In addition, the applicable screening criteria used during the contamination interpretation are defined in this section.
- Section 5.0 - Contaminant Fate and Transport: presents a general discussion on environmental fate and transport data and processes, followed by an analysis of site-specific mechanisms of migration and constituent fate and transport.

- Section 6.0 - Baseline Human Health Risk Assessment: provides a quantitative evaluation of the public health risks associated with the facility soils and buildings.

- Section 7.0 - Ecological Risk Assessment: presents an assessment of the potential risks to ecological receptors from site-related contamination.

- Section 8.0 - Summary and Conclusions: restates the major findings and conclusions presented in the preceding sections.

- Section 9.0 - References: provides a list of the references cited throughout this report.

- Section 10.0 - Glossary of Abbreviations and Acronyms: presents a list of the acronyms and abbreviations cited throughout the OU-2 Remedial Investigation Report.

SECTION 1

TABLES

TABLE 1-1

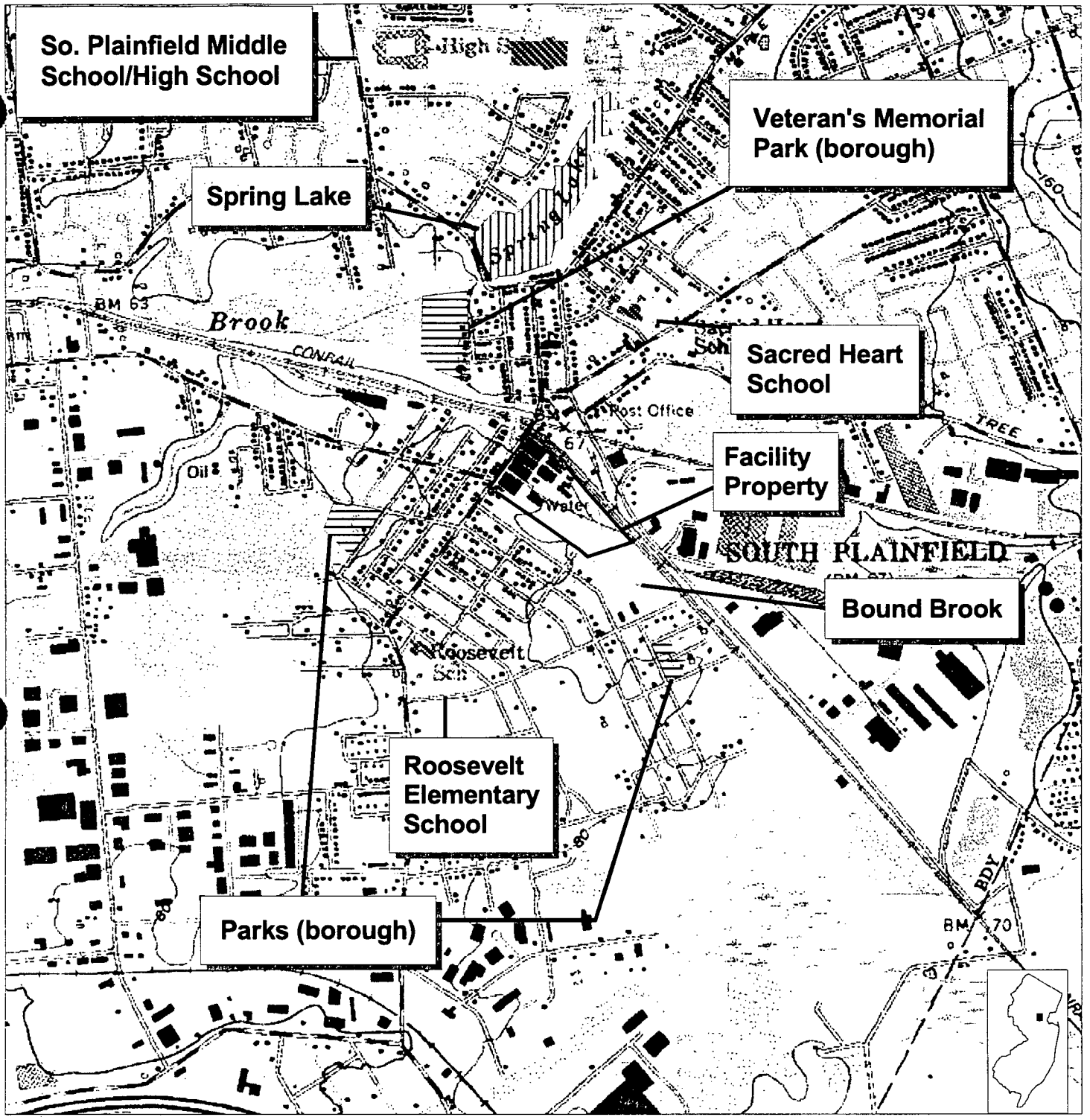
CONSTRUCTION AND USAGE HISTORY OF STRUCTURES AT THE CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

Building No. (Figure 1-2)	Building No. (1956 Survey)	Year Constructed	Usage/Functional Space*
1	1	1911-1918	Offices, Storage, Staking Etching
1A	1	1911-1918	Offices, Staking Testing
1B	1	1911-1918	Staking Testing, Forming Tanks, Spray Booth
1C	1	1911-1918	Staking Testing, Forming Tanks, Reactors
2	2	1917	Storage, Spray Booth
2A	2	1917	Ageing Racks
3	16	1918	First Aid, Photo Gravure Dept.
4	14, 15, 16	1917, 1918, 1918	Photo Gravure Dept., Plating, Storage, Shipping
4A	14, 15	1917, 1918	Storage, Shipping, Sub-assembly
5	28	1946	Capacitor Manufacturing, Test House, Winding Room
5A	28	1946	Office, Spray Booth, Drying Area
6	3	1918	Wax Room
7	17	1916	Carpentry Shop
8	29	1950	Electric Generator Area, Forming and Edging Tanks
9	22	1918	Etching, Forming Tanks, Washing & Ageing
9A	6, 22	1917, 1918	Etching, Forming Tanks, Generator Room
9B	6	1917	Forming Tanks, Generator Room, Glycol Impregnating, Switch Room
9C	22 ADD	1950	Unknown
10	24	1918	Oil House
11	30	1950	Unknown
12	31	1950	Unknown
13	8	1912	Machine Shop
14	5	1910	Storage
15	9	Unknown	Engine Room for Boiler House
16	9	Unknown	Boiler House
18	9	Unknown	Engine Room/Boiler House

*Usage/Functional Space is for the period of 1956 when Cornell-Dubilier Electronics was occupying the property.

SECTION 1

FIGURES



Source: US Geological Survey 7.5-minute topographic map for Plainfield, New Jersey.

Scale: 1: 25000

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Title: Site Location Map Cornell-Dubilier Electronics Superfund Site Facility Soils and Buildings FS Report	DWN: CTS	DES.: LEN	Project No. 1945.1018
	CHKD: GJ	APPD: LH	Figure No. 1-1
	DATE: 12/06/02	REV.: 2	

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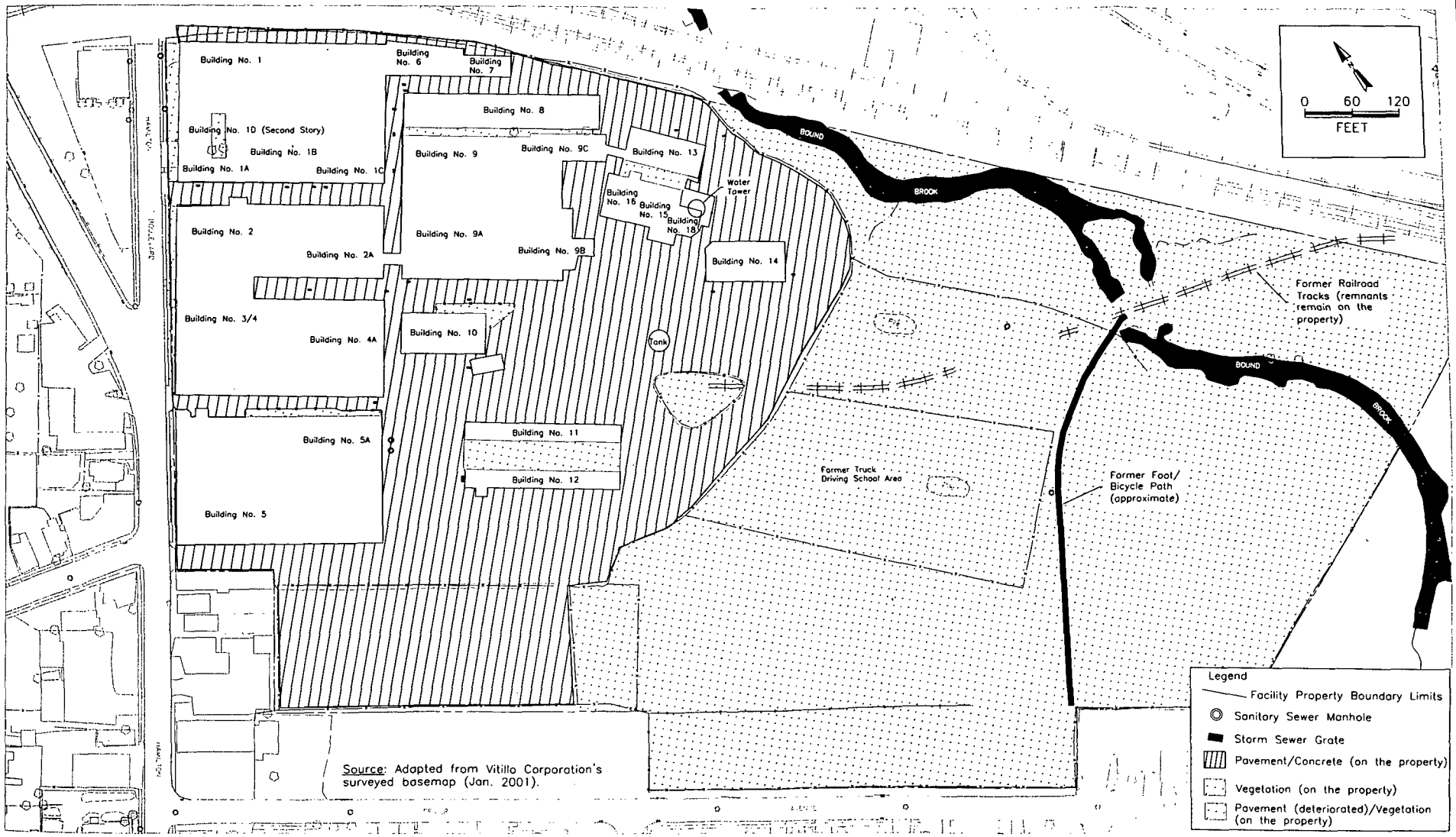


Source: Adapted from Vitillo Corporation's surveyed basemap (Jan. 2001).

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Facility Property Map
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
CTS	11/26/02	1945.1018
CHKD:	REV.:	FIGURE NO.:
GJ	1	1-2
DES.:	APPD:	
LEN	LH	

2.0 STUDY AREA INVESTIGATION

The purpose of the RI was to characterize the nature and extent of contamination associated with the site, and to accomplish this, Foster Wheeler Environmental's field investigation program for the three operable units was divided into two major phases: Site Reconnaissance and Phase I Environmental Sampling. The work performed by Foster Wheeler Environmental during these investigation phases followed the procedures provided in the EPA-approved Final Work Plan, Final Field Sampling Plan, and Final Quality Assurance Project Plan (Foster Wheeler Environmental, 2000a; 2000b; 2000c), with minor modifications that were discussed with, and approved by, EPA prior to implementation.

The Site Reconnaissance focused on defining the boundaries of the dump/fill area in the center portion of the facility property and locating potential source areas. Tasks performed during this phase of work included a geophysical survey, a soil gas survey, a drainage system survey, test pit excavations, building floor dust sampling, and an ecological resources investigation. The geophysical survey area is presented in Figures 2-1 and 2-2. Site Reconnaissance sampling locations are denoted on Figure 2-3.

Soil sampling from nearby residential, commercial and municipal properties also occurred during the Site Reconnaissance for OU-1. This investigation was described in a separate Remedial Investigation Report for OU-1, dated August 2001.

The Phase I investigation for OU-2 focused on determining local geologic conditions, delineating potential source areas, and characterizing site contaminants. Tasks performed during this phase of work included the drilling of soil borings and the sampling of shallow and subsurface soils, perched water, and drainage system water and sediment. Figure 2-4 presents the Phase I sampling locations.

The Phase I investigation also included the installation and sampling of 12 monitoring wells and the evaluation of previous sampling of the Bound Brook Corridor. The results of this portion of the investigation will be addressed in a separate report (OU-3) after additional site activities are performed.

2.1 Mobilization/Demobilization

Mobilization activities began in April 2000. An inventory of available Foster Wheeler Environmental equipment and supplies was performed, and any additional equipment/supplies were either rented or purchased. A field office trailer and a storage trailer were set up on the facility property starting on 27 April 2000. Sampling locations were finalized prior to each phase of field operations, and staked/marked for subsequent surveying. Prior to work activities at the site, all field team members attended an on-site orientation meeting, which included discussions about the history of the site, health and safety requirements/procedures, and field investigation requirements/ procedures.

Demobilization of equipment and personnel occurred at the completion of each phase of the investigation, as appropriate. The site trailers, and all remaining equipment, were demobilized

between 23 and 27 October 2000. In addition, an inventory of investigative derived wastes (IDW) present at the site at this time was performed (see Section 2.10).

2.2 Site Survey

The site survey was conducted by Vitillo Corporation, a New Jersey licensed surveyor, and overseen by Foster Wheeler Environmental personnel in April, May, and November 2000. The survey included the establishment of both horizontal and vertical control points for the location of soil borings, test pits, surface soil samples, drainage system samples, the stream gauge, and wetland delineation flags. Concurrent with the geophysical survey, numerous grid points over the survey area were established. The topographic mapping of the site and environs was performed using aerial photography taken on 1 April 2000. Horizontal control was referenced to the New Jersey State Plane coordinate system using the North American Datum of 1983 (NAD83). Vertical control was referenced to the North American Vertical Datum of 1988 (NAVD88).

2.3 Geophysical Survey

A geophysical investigation was performed by Foster Wheeler Environmental, from 4 May to 11 May 2000, to delineate possible areas of subsurface disposal. This delineation allowed for a more focused sampling program in subsequent activities, such as test pit excavation.

Instrumentation

A Geonics EM31 MK2 terrain conductivity meter and Geometrics G858 G magnetic gradiometer were used to acquire data for this project. The EM31 operates as a frequency domain electromagnetic induction (EMI) methodology, whereby a primary magnetic field is generated beneath the ground surface by a current in the transmitter coil. This primary magnetic field induces current to flow within the ground (i.e., eddy currents), which produce a secondary magnetic field that is detected along with the primary field at the receiver coil. The ratio of the secondary field to the primary field is linearly related to terrain conductivity under certain constraints. Two components of the secondary magnetic field are digitally measured; quadrature phase (terrain conductivity) as millimhos per meter (mmhos/m), and the in-phase component expressed in parts per thousand of the primary signal (a measure of signal amplitude). The in-phase component of the signal recorded by the instrument is particularly sensitive to ferrous and non-ferrous metallic material.

EMI surveys are used to detect contrasts in ground conductivity and metallic (ferrous and non-ferrous) materials. Conductivity contrasts in the earth can be caused by natural phenomena, such as variations in lithology or moisture content, or man-made phenomena, such as disturbed ground, buried metal, and (in certain cases) contaminants in the soil and groundwater. The depth of investigation is related to the separation between the transmitter and receiver coils, the operational frequency, and the coil orientation(s). In general, the EM31 MK2 used in the vertical dipole mode is sensitive to conductivity variations at depths approaching 5 to 6 meters.

The Geometrics G858 G magnetic gradiometer digitally records variations in the earth's natural magnetic field due to contrasts in the magnetic susceptibility of surface and subsurface materials. The variations in an otherwise homogenous magnetic field are often termed magnetic anomalies.

All materials subjected to the earth's magnetic field develop an induced magnetization, the intensity of which is proportional to the applied magnetic field and the magnetic susceptibility of the material. Ferromagnetic materials, such as iron or steel, may have very high magnetic susceptibilities; however, some types of iron and steel have very low magnetic susceptibilities and are not detectable under normal magnetic surveying conditions.

A reference (i.e., base station) magnetometer was used to digitally record the intensity of the earth's magnetic field during the same time that the field magnetometer (i.e., rover) was used to survey the site of interest. This procedure allowed the naturally occurring diurnal changes in the earth's magnetic field to be accounted for during data analysis and interpretation.

Data Acquisition

Terrain conductivity and magnetic data were acquired over approximately five acres of the Cornell-Dubilier Electronics Superfund site, generally in the central portion of the facility property. Two Leica SR530 global positioning systems (GPS) used in differential mode (DGPS) were used to provide position data for the conductivity and magnetic measurements. The DGPS base station location was positioned in the fenced area in the central portion of the property at a surveyed grid point.

Numerous traffic cones, spaced at approximately 100-foot intervals, were positioned in each survey sub-area, in the direction of travel of the geophysical instrumentation to provide real-time navigation assistance. Magnetic data were acquired at a nominal line spacing of approximately 3 to 5 feet and a station spacing of approximately 0.25 to 0.75 feet in all accessible areas. Terrain conductivity data were acquired at a 5- to 8-foot line spacing and an approximately 0.75- to 1-foot station spacing. The ground location for all geophysical measurements was referenced in feet to NAD83, New Jersey State Plane coordinate system. Data were not acquired over terrain characterized by excessive slopes (e.g., large debris piles) or in localized, densely vegetated areas that could not be sufficiently cleared.

Concurrent with the geophysical survey, the DGPS was used to create a site features map of the area. Aboveground objects/debris (e.g., telephone poles, metal drums, boat, debris piles, soil piles) and man-made cultural features (e.g., fences, buildings, railroad tracks) were surveyed to aid in a better understanding of the significance of geophysical anomalies detected.

Data Processing

The terrain conductivity and magnetic data were processed daily with internally developed software. In general, the processing sequence consisted of ensuring the repeatability of the data measurements and merging the sensor measurements with the position data from the GPS instrumentation. The processing parameters were stored in digital computer files so that the processing sequence could be reconstructed in the future, if necessary. Raw geophysical data are provided in Appendix A.

At the conclusion of the survey and associated data processing, color-coded maps of the EMI and magnetic signal intensity were generated to exhibit areas of large-scale waste disposal (Figures 2-1 and 2-2, respectively). Information from the site features survey was also transcribed onto these maps to aid in a better understanding of the objects and features detected.

Data Interpretation

The geophysical data were interpreted by assessing the signal intensity and shape of the measurements from the EMI and magnetic data sets. Information from the site features survey was utilized to confirm responses from large, aboveground objects and features. Significant instrument responses from cultural features include a railroad track in the northern section of the survey area, the fence line surrounding the borders of the property, and a pipeline under the asphalt near the one-story frame building (Building No. 14) near the northern terminus of the survey area.

Results of the geophysical survey are presented in Section 4.4.2.

2.4 Soil Gas Survey

A soil gas survey was conducted from 22 May to 7 June 2000, by Columbia Technologies, LLC (Columbia) and overseen by Foster Wheeler Environmental. The survey was performed to determine the extent of volatile organic contamination within the vadose soil zone in order to direct future investigation activities. A total of 199 soil gas samples and 11 duplicate samples were collected from depths between 2 and 4 feet bgs (Figure 2-3). Due to subsurface obstructions (despite multiple attempts) and elevated soil moisture levels encountered, 35 locations could not be sampled during the survey. This reduction in scope, though, did not significantly affect the assessment, as the property was still adequately sampled to determine the potential extent of vadose soil VOC contamination and to use the result data to direct future investigation activities. In addition, these complications accounted for the variation in depth of the sampled locations.

A report detailing the survey was prepared by Columbia and is presented in Appendix B. The following information summarizes the survey procedures:

The soil gas samples were collected mainly by a truck-mounted Geoprobe® rig that advanced connected sections of decontaminated narrow diameter, threaded steel casing to the desired depth. Once positioned, the casing was hydraulically raised several inches, which released a disposable drive point. Disposable polyethylene tubing with a threaded stainless steel tip was inserted into the casing, isolating the bottom-hole sampling chamber from the up-hole annulus. The sampling system was purged via syringe vacuum to displace the atmospheric air, after which the sample was collected from the location and injected into a pre-evacuated glass vial.

As necessary due to access restrictions, a manual slide hammer or drive rod was used to produce a ½-inch hole. A specially designed stainless steel probe was then inserted into the hole, and packed off to isolate the probe's perforations from the atmospheric air. The *in situ* soil gas was collected using the purging method described above.

The soil gas samples were analyzed in an on-site mobile laboratory using a gas chromatograph equipped with an electron capture detector (for chlorinated hydrocarbons) and a flame ionization detector (for petroleum hydrocarbons). The analytical equipment was calibrated by injecting standards of known concentration and plotting a 3-point response curve. Field equipment blanks were collected at the beginning and the end of the day's field activities, and after every tenth soil gas sample by drawing ambient air through the decontaminated sampling equipment. In addition,

method blanks were analyzed to confirm that the instrument was not contaminated with target constituents (such as due to sample carry-over).

A discussion of the results from the soil gas survey is presented in Section 4.4.3.

2.5 Building Floor Dust Investigation

The building floor dust investigation was conducted between 30 May and 13 June 2000, to determine levels of indoor particulate contamination on floor surfaces. One floor dust sample was collected for up to every approximately 10,000 square feet of floor space in the facility buildings (Figure 2-3). A total of 32 dust samples and 2 duplicate samples were collected for Target Compound List (TCL) PCB and Target Analyte List (TAL) metal analyses (Table 2-1).

The sampling apparatus used was a CS_3 Incorporated® High Volume-Small Surface Sampler (HVS_3) Model 1020D vacuum dust sampler. Dust and other particulate matter were withdrawn from the floor surfaces (covered or bare) by the HVS_3 apparatus, which had air flow passing through the sampler nozzle at a specific velocity and flow rate. Particulate matter approximately 5 micrometers (um) in diameter and larger was separated and collected in a sampling container. A full flow calibration of the sampling apparatus using a spirometer with a minimum capacity of 10 cubic feet was performed at CS_3 Incorporated prior to shipment. The flow settings used during dust and particulate sampling was the proper air volume for the floor surfaces sampled, as detailed in the manufacturer's operations manual.

Prior to the initial sample collection and between subsequent samples, the HVS_3 apparatus was decontaminated. The unit was disassembled and all of the parts that would contact the floor dust sample (i.e., from the nozzle to the cyclone to the catch bottle) were decontaminated. Prior to collection of a sample, the wheels and nozzle lip of the HVS_3 apparatus were cleaned with laboratory tissue. A leak check was also preformed before each sample collection event, utilizing the procedures described in the HVS_3 operations manual. A file folder was placed underneath the nozzle of the apparatus to seal off the air flow and the unit was switched on. The flow magnehelic gauge was then checked to ensure that it read between 0.00 and 0.02 inches of water. As necessary (i.e., if the reading varied from this range), the unit was inspected for leaks and adjusted.

The 32 locations sampled within the building spaces varied from high traffic office areas to low traffic, unused warehouse areas. A majority of the sampled surfaces were bare floors. There were also several level loop and plush carpeted floors, tile covered floors, and a floor with multiple cover types; a list of sample locations and corresponding floor type descriptions is provided as Table 2-1. The size of the sample areas varied depending on the amount of visible dust and particulate cover on the floor surface, the available space to operate the HVS_3 apparatus, and the volume of traffic through the sample collection location. Traffic volume was determined by information provided by personnel working in specific leased space or by the Hamilton Industrial Park property manager. The sample areas were delineated by placing two measuring tapes parallel to each other, separated by an average of 1 to 2 meters (Table 2-1), and then securing the measuring tapes to the floor surface with adhesive tape.

After each dust sample was vacuumed from the floor, material larger than 5 um, including pieces of metal, wood, rock, and plastic, were removed with steel tweezers. The remaining particulate

material was divided into two equal portions. One portion was folded into a piece of decontaminated aluminum foil, placed in a laboratory-supplied jar, sealed with Teflon® tape, and shipped for TCL PCB analysis. The other portion was transferred to a polyethylene ziploc bag, sealed with adhesive tape, and shipped for TAL metals analyses.

The analytical results for the building floor dust sampling are discussed in Section 4.5.

2.6 Soils Investigation

The unconsolidated materials overlying bedrock at the property were evaluated as part of the OU-2 RI. These materials consist of, in descending order, man-made materials derived from on-site activities, a mixture of native soils developed primarily on glacial outwash, and the underlying unconsolidated material (saprolite) resulting from in-place weathering of native bedrock. Further discussion of the encountered soils is presented in Section 3.4. Facility soils were investigated using the methods discussed in the following sections to determine the nature of the materials, their water-bearing characteristics, the extent of potential chemical contamination related to former activities, and the role of the unconsolidated materials in the fate and transport of contaminants.

In addition, any water encountered in facility overburden soils and weathered bedrock (saprolite) during drilling/excavation was sampled and analyzed to characterize potential source areas, evaluate potential zones of contamination, and to identify potential contamination migration pathways.

Field activities conducted during the soils investigation included:

- Test Pit Investigation;
- Shallow Soil Investigation;
- Monitoring Well Boring Investigation; and
- Building Soil Boring Investigation.

2.6.1 Test Pit Investigation

Ten test pits were excavated within the central portion of the facility property between 7 June and 14 June 2000, by Tabasco Drilling Corporation (Mount Laurel, New Jersey) using a CASE 580 Super L backhoe under the supervision of a Foster Wheeler Environmental geologist. The test pits were excavated to investigate the boundaries and determine the physical characteristics of the subsurface debris, and to identify and characterize potential source areas. Sampling of soil was performed during test pitting to evaluate the absence or presence of contamination at each location. If groundwater was encountered during the excavation, a perched water sample was collected.

Proposed test pit locations were provided in the Final Work Plan (Foster Wheeler Environmental, 2000a); modifications to some of these locations occurred during the field investigation based on an evaluation of the results provided by the geophysical and soil gas surveys. Final test pit locations are shown on Figure 2-3.

The following procedure was used during test pit excavation:

- The upper two feet of soil was removed from an area approximately five feet square and placed to one side of the excavation on plastic sheeting.

- As the excavation was advanced downward, soils were placed on the opposite side of the excavation on a separate piece of plastic sheeting. The pit was extended vertically and horizontally until the appropriate depth and length were obtained. Approximate dimensions of 10 feet deep and 10 feet long were outlined in the Final Work Plan; final dimensions were based on the extent of buried material and/or visually contaminated soils, presence of native soils/weathered bedrock, obstructions, etc.

- Where visible or olfactory evidence of contaminated soils was present, a soil sample was collected from that interval using the backhoe bucket.

- Soil was then subsampled from the bucket. The TCL VOC sample was collected directly into EnCore® sampling devices. For the other parameters, soil from the bucket was transferred to the appropriate sample containers using a decontaminated stainless steel spoon. Sample containers were immediately placed into a chilled cooler.

- The Foster Wheeler Environmental geologist recorded all visual observations and findings in a bound field logbook, and took photographs for documentation. A diagram of each test pit showing the location (horizontally and vertically) of any stained soil layers, buried debris, subsurface soil description, perched water encountered, samples collected, etc. was prepared, and the Test Pit Records are presented in Appendix C.

- Upon completion, each test pit was backfilled with the material removed from it. The soils from the deeper portion of the pit were returned first, followed by a cover of the material from the upper two feet. In addition, the asphalt cover over TP04 and TP05 was replaced following backfilling.

- The boundary corners of the test pits were marked on the ground surface with either stakes or painted marks for subsequent surveying.

All test pit soil samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL metals and cyanide. In general, one soil sample was collected from each test pit. Sampling was not conducted at TP07 as no indication of soil contamination was present. Two soil samples were collected from test pits TP08 and TP10 at distinct, separate areas of potential contamination. Analytical results for these soil samples are discussed in Section 4.6.

Groundwater was encountered during the excavation of test pits TP03, TP06, TP08, TP09, and TP10 (Figure 2-3). A sample of the perched water in these locations was collected for analysis of Low Concentration VOCs, Low Concentration SVOCs, Low Concentration pesticides and PCBs, and TAL metals and cyanide. Samples were collected in the following manner:

- When water seepage occurred, the test pit was excavated to a depth below the groundwater seep to allow collection of a sufficient volume for sampling;

- Depth to the groundwater seep below ground surface was measured;

- Any odors, discolorations, sheens, or other observations were noted in the field logbook, and photographs were taken;

- A clean, 1-liter glass bottle clipped to a steel pole or attached to a wire line was lowered into the water for sample collection. Sample containers were filled by pouring from the glass sampling bottle. Care was taken to minimize aeration of the sample. Sample containers were then immediately placed into a chilled cooler; and

- All sample information and visual observations were recorded in the logbook.

Perched water results are presented in Section 4.6.3.

2.6.2 Shallow Soil Investigation

Twenty-four shallow (0 to 2 feet below ground surface/surface cover) soil samples and two duplicate samples were collected to determine potential source areas and delineate the extent of surficial contamination at the industrial park property. As shown on Figure 2-4, sampling occurred from 20 July to 19 September 2000, at the following locations:

- 11 completed monitoring well locations (MW01A, MW03 through MW12);
- 2 abandoned monitoring well locations (MW01, MW02);
- 2 locations in the east-southeastern portion of the property, in the floodplain along Bound Brook (SS01 and SS02);
- 2 locations in the northeastern portion of the property, in the floodplain along Bound Brook (SS03 and SS04);
- 1 location in the eastern portion of the property, along Bound Brook (SS05);
- 1 location in the eastern portion of the property (SS06); and
- 3 locations in the southwestern portion of the property (SS07, SS08, and SS09).

These locations differ slightly from those presented in the Final Work Plan (Foster Wheeler Environmental, 2000a). Four surface soil locations were added by EPA after the discovery of several piles of drums and containers during the field investigation. A fifth additional surface soil location resulted from the observation of a partially buried capacitor along Bound Brook. The six shallow soil samples planned along the railroad right-of-way as stated in the Final Work Plan were not collected at this time as access permission was not obtained. These locations may be attempted in a later phase of sampling.

In addition to the above locations, 0 to 2-foot interval samples were collected at 59 building soil boring and 3 test pit locations. Information on these investigations (e.g., sampling procedures, analytical parameters) is provided in Sections 2.6.4 and 2.6.1, respectively.

Depending on location, requested depth, and sample volume requirements, the shallow soil samples were collected using one of the following three procedures.

- When the ground surface was not covered with asphalt (e.g., in the open area of the property, in the Bound Brook floodplain) and a surface sample (0 to 6 inches bgs, with 6 to 12 inches for VOCs) was required, the sampling was conducted utilizing decontaminated stainless steel trowels/spoons;

- When a deeper sample (12 to 24 inches bgs, with 18 to 24 inches for VOCs) was required in these areas as requested by EPA, a decontaminated hand auger was used; and

- For those locations where an asphalt cover was present (e.g., in the northwestern portion of the property), the surface soil sample was collected from the soil beneath the sub-base in the first split-spoon advanced down the borehole. Due to the necessity of collecting sufficient volume, the entire 0 to 2-foot soil interval was typically sampled from these locations.

For all shallow soil locations, a small sample coring device (i.e., an EnCore® sampler) was used to collect the VOC sample.

All of the shallow soil samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL metals and cyanide. In addition, surface soil collected from the monitoring well boring locations were analyzed for TOC and grain size, and samples from locations SS02, SS03, and MW09 underwent PCB congener and/or dioxin/furan analyses.

2.6.3 Monitoring Well Boring Investigation

The primary objective of the drilling program was to characterize the subsurface conditions at the facility property. Drilling and monitoring well installation were conducted from 25 July through 22 September 2000, to define the shallow subsurface geology and characterize the shallow groundwater system. Tabasco Drilling Corporation of Mount Laurel, New Jersey and their affiliate, Belasco Drilling Services, Inc. of Columbus, Ohio, performed the drilling and well construction. All soil boring, bedrock coring, and monitoring well installation activities were conducted under the supervision of a Foster Wheeler Environmental geologist.

Soil borings were advanced to the top of competent bedrock at the locations shown in Figure 2-4, with a Diedrich model D-120 truck mounted drill rig using 6¼-inch inner diameter (ID) hollow-stem augers and 3-inch ID carbon steel split-spoon samplers. Two boreholes, MW01 and MW02, had to be relocated from their original proposed locations during drilling activities.

MW01 was originally located near the corner of Hamilton Boulevard and the alleyway between Building Nos. 1A and 2 (Figure 2-4). The borehole was advanced to the top of bedrock at a depth of 6 feet bgs. Due to current tenant activities in Building No. 2, the borehole was relocated approximately 40 feet to the south-southeast in the alleyway. Re-sampling of the overburden was not conducted at the new location. The new borehole/well location was designated MW01A.

Monitoring well MW02 was advanced to a depth of 6 feet bgs approximately 9 feet northeast of Building No. 8 (Figure 2-4). Refusal was encountered at this depth, and it was determined that the borehole likely encountered a man-made obstruction, possibly a concrete sewer line. The borehole was backfilled with native materials, grouted to the ground surface, and covered with an asphalt patch. A second borehole was successfully drilled approximately 90 feet north-northwest of the

original location (between Building Nos. 7 and 8). The new borehole/well location was designated MW02A.

Split-spoons were advanced ahead of the auger, to obtain a continuous vertical profile of the unconsolidated materials overlying bedrock. The unconsolidated materials encountered typically consisted of reddish-brown to black silt to silty sand, containing man-made fill (e.g., brick and glass fragments, cinders, ash, and slag), clay, organic matter, and fine to coarse, rounded to sub-angular gravel and weathered bedrock fragments. Further discussion of the encountered soils is presented in Section 3.4. Geologic logs containing detailed descriptions of the materials encountered at each boring location are provided in Appendix D.

Soil samples for analytical testing were obtained using the following procedure:

- A decontaminated carbon steel 3-inch outer diameter split-spoon sampler was driven into the soil with blows from a 300 pound hammer falling 30 inches until either approximately 2 feet was penetrated or 100 blows within a 6-inch interval were applied. The number of blows required for each 6 inches of penetration or fraction thereof was recorded in the field logbook by the Foster Wheeler Environmental geologist.

- The split-spoon sampler was then brought to the surface, where both ends and one half of the split-spoon were removed so that the recovered soil rested in the remaining half of the split-spoon barrel. The recovered soil was thoroughly described by the Foster Wheeler Environmental geologist, including approximate recovery, color, composition, etc.

- Split-spoon samples were field screened with a photoionization detector (PID) and flame-ionization detector (FID) to determine the presence of VOCs.

- Based on visual evidence (e.g., apparent staining) and PID/FID readings, selected intervals were sampled. TCL VOC samples were collected directly from the split-spoon using EnCore® samplers. The remaining soil was homogenized in a decontaminated stainless steel bowl, using a decontaminated stainless steel spatula or spoon, prior to filling the sample containers for TCL SVOCs, TCL pesticides and PCBs, and TAL metals and cyanide. Selected samples were also analyzed for TOC, grain size distribution, and/or PCB congeners.

A discussion of the analytical results for the soil boring samples is presented in Section 4.6.

Perched water samples were collected during the drilling of five boreholes (MW02, MW04, MW06, MW11, and MW12). The intended method of groundwater sample collection from the unconsolidated overburden materials was through the use of direct push Hydropunch® or equivalent methods. However, this method was found to be ineffective under field conditions, as suspended sediment in the water did not allow proper closing of the check valve. Therefore, a disposable polyethylene bailer was used to collect the perched water through the hollow-stem augers.

The following protocol was followed during sample collection when groundwater was encountered in the unconsolidated materials during drilling:

- The depth to groundwater was measured using a water level indicator;

- A groundwater sample was retrieved from the borehole through the hollow-stem auger using a clean disposable bailer. No purging of the borehole was attempted prior to sampling;

- Samples were transferred from the bailer to the appropriate sample bottles for analysis of Low Concentration VOCs and Low Concentration PCBs. Care was exercised not to aerate the samples. Bottles were then immediately placed into a chilled cooler; and

- All sample information and visual observations were recorded in the field logbook by the Foster Wheeler Environmental geologist.

A discussion of the perched water analytical results is provided in Section 4.6.3.

2.6.4 Building Soil Boring Investigation

Seventy-eight building soil borings (BSB01 through BSB78) were completed from 10 August to 19 September 2000, as part of the soil sampling program (Figure 2-4). The intent of this effort was to delineate potential shallow and upper subsurface soil contamination beneath the northwestern portion of the property. Based on information obtained during the Site Reconnaissance, locations were chosen to create a broad characterization of this area by placing approximately three borings in and around each building. Due to the proximity of the buildings and their variations in size, a few of these locations were moved during field activities to create a more uniform distribution. Some locations were also shifted slightly due to current tenant activities, subsurface utilities, or other obstructions.

As shown on Figure 2-4, 62 of the 78 locations were sampled during the RI investigation. A majority of the borings required the drilling of holes through either asphalt or concrete, and then the removal of sub-base fill (i.e., generally crushed stone), before sampling could occur. Soil samples could not be collected from the remaining 16 locations, generally due to striking shallow bedrock or impenetrable fill directly beneath the cored surface covering.

The Foster Wheeler Environmental geologist recorded all visual observations and findings in a bound field logbook. Appendix E contains detailed geologic logs that describe the materials encountered in the building soil boring locations. Further discussion of the encountered soils is presented in Section 3.4.

Sampling of the soils for this task was performed using the following procedure:

- As required, the cement or pavement cover was cored. If additional sub-base material was present, this material was removed from the cored hole using a decontaminated trowel.

- A decontaminated hand-auger was used to collect the building soil boring samples. The auger was hand-driven into the cored hole, with the bucket being turned in a clockwise direction until the desired sampling depth was obtained or the bucket was filled.

- The auger was then removed from the hole, and the collected soil was placed into a decontaminated stainless steel bowl.

- Augering continued until sufficient sample volume and/or the appropriate depth interval was obtained.

- Upper interval samples were collected from 0 to 12 inches below the sub-base, or to refusal, whichever was encountered first, for all parameters (i.e., TCL SVOCs, TCL Pesticides and PCBs, and TAL metals and cyanide) except TCL VOCs. EnCore® samplers were used to collect the VOC sample directly from the auger head, beginning at approximately 6 inches in depth. For those locations where the upper sample was less than 6 inches in depth, the VOC sample was collected from the lowest possible augered interval.

- The soil was homogenized in the decontaminated stainless steel bowl, using a decontaminated stainless steel spoon, and then placed in the appropriate sample containers for TCL SVOCs, TCL pesticides/PCBs, and TAL metals and cyanide analyses.

- Where possible, a second, deeper interval sample was collected from 12 to up to 24 inches below the sub-base (18 to 24 inches for VOCs) depending on refusal depth.

At one location (BSB41), a white, pasty material was encountered between two concrete layers. This material was denoted BSB41A and shipped for full TCL/TAL laboratory analyses. The lower concrete layer was then cored, and the soil beneath sampled as described above.

Analytical results from the building soil boring investigation samples are discussed in Section 4.6.

2.7 Drainage System Investigation

An investigation of the on-site drainage system was conducted:

- To determine the locations of active or former sumps, pits, floor drains, catch basins, etc.;
- To determine the discharge locations, if any, of these sumps, pits, drains, basins, etc.;
- To determine the presence or absence of standing water and/or sediment within the drainage system locations;
- To determine the level of contamination within the facility drainage system; and
- To determine the potential for the system to be a source and/or a facilitated transport mechanism for contamination.

2.7.1 Drain/Outfall Inventory

On 8 May 2000, a visual survey was performed within and around the facility buildings. Open floor drains, metal plates, possible historic floor trenches, etc. were noted and mapped in a field logbook. Foster Wheeler Environmental personnel then traveled the length of the facility property's boundary along Bound Brook on 11 May 2000, and surveyed potential outfall locations. Pipe ends that might be connected to the drainage system were noted and marked with colored flagging tape. A total of 11 possible pipe outfalls were found, as noted on Figure 2-4. Information obtained during both of these surveys was used to select the locations for dye testing.

2.7.2 Dye Test Investigation

Dye testing was conducted on 12, 16, and 17 May 2000. As shown on Figure 2-5, the following eight locations were investigated:

- Building No. 1C, open hole/former floor drain in old lavatory;
- Building No. 2, open hole in shower area;
- Building No. 3/4, lavatory floor drain (however, water did not drain as the trap was filled with sediment);
- Building No. 5, floor drain in men's lavatory;
- Building No. 5A, sink drain;
- Building No. 13, open hole/former floor drain in lavatory;
- Building No. 18, pipe connection for pit sump; and
- Catch basin southwest of Building No. 14.

The dye test investigation indicated that the open hole/former floor drain in Building No. 13 is connected to the large catch basin between Building No. 13 and the property's northeast fenceline. It was further determined that this large catch basin is connected to an outfall in Bound Brook near the railroad bridge (denoted #8; Figure 2-5).

Dye testing also indicated that the catch basin southwest of Building No. 14 is connected to the catch basin on the southeast side of Building No. 14, and subsequently connected to an outfall location, denoted #1 (Figure 2-5). This outfall location flows into an unnamed tributary to Bound Brook, near the boundary of the wetlands area.

2.7.3 Standing Water and Sediment Investigation

A second, more detailed visual survey of the catch basins around the facility buildings was performed on 10 and 11 August 2000. The physical condition of the catch basin; the presence or absence of pipe connections, standing water, sediment, debris, etc.; and, if standing water was present, the approximate flow direction were described for each catch basin. From this survey, several representative locations were chosen for sampling of the standing water and/or sediment. Sampling occurred 24 August, 5 September, and 20 through 22 September 2000 at the following locations shown on Figure 2-4:

- Sump pit in the basement of Building No. 15 (DS01, both water and sediment);
- Catch basin between Building No. 13 and property fence line (DS02, water only);
- Catch basin southwest of Building No. 14 (DS03, water only);
- Two connected catch basins between Building Nos. 1, 6, and 8 (DS04A, water only; DS04B, sediment only);
- Catch basin along outer wall of Building No. 1B (DS05, both water and sediment);
- Two connected catch basins near corners of Building Nos. 2A, 4A, and 9A (DS06A, water only; DS06B, sediment only); and
- Catch basin between the corners of Building Nos. 4A and 5A (DS07, sediment only).

The six water samples (and one duplicate sample) were analyzed for Low Concentration VOCs, Low Concentration SVOCs, Low Concentration pesticides and PCBs, and TAL metals and cyanide.

Standing water samples were collected using one of the following methodologies, generally dependent on depth to water:

- Teflon®-coated bailer;
- Direct collection into sample bottleware; and
- Direct collection into certified contaminant-free glass bottle attached to bailer line, followed by transfer to sample bottleware.

Five sediment samples (and one duplicate sample) were collected using decontaminated stainless steel spoons and/or trowels, and placed into a decontaminated stainless steel bowl for homogenization. With the exception of location DS07, EnCore® samplers were pushed directly into the sediment layer to first collect the VOC sample. As there was a problem with accessibility at location DS07, the sediment was collected by spoon prior to EnCore® sampling. Samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL metals and cyanide, and the analytical results are discussed in Section 4.7.

2.8 Ecological Investigation

An ecological investigation was performed for the Cornell-Dubilier Electronics site. On-site wetland, upland, and aquatic habitats were identified during the field investigation and a qualitative wildlife survey was also performed. The objective of the field investigation was to characterize on-site aquatic and terrestrial habitats and collect the requisite data to conduct an Ecological Risk Assessment (ERA) in accordance with the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (EPA, 1997g).

2.8.1 Wetland and Habitat Investigation

Wetlands on and adjacent to the facility property were delineated on 20 and 21 June 2000, using the routine on-site determination method of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989). The 1989 Federal Manual incorporates a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands.

Wetland boundaries on and adjacent to the property were initially identified through visual assessment of vegetation and hydrology. After the initial assessment, paired sample stations were located along the identified wetland boundary, one on either side of the perceived boundary line. Generally, only two stations, a wetland and an upland station, were sampled at each location. If an upland and wetland determination were not made from the initial two sample stations, additional stations were sampled along a transect perpendicular to the perceived wetland boundary line. The wetland boundary was finally located between a paired wetland and upland station. Vegetation, soil, and hydrology indicators were examined at each station, and dominant plant species and their estimated cover were recorded by stratum. Soil borings generally were dug to a depth of 20 inches, and soil characteristics and depth to saturation, were noted. Soil log locations, indicating the center of each sample station, were flagged. The data forms for the wetland and habitat investigation are provided in Appendix F.

A qualitative terrestrial habitat survey was performed during the wetland delineation and wildlife survey, which identified the vegetation communities present within the site. Communities were characterized by identifying and recording dominant vegetation within four stratum: tree, woody shrub/sapling, herbs, and woody vines. Data from representative vegetation stations were recorded to characterize the vegetation communities.

The floodplain of the Bound Brook was also included on the Ecological Settings Map (Figure 3-11). The floodplain boundaries (i.e., flood hazard area, 100-year floodplain, and 500-year floodplain) were determined from the NJDEP flood hazard area maps for the Bound Brook and the Federal Emergency Management Agency (FEMA) flood insurance rate maps.

2.8.2 Wildlife Survey

A qualitative wildlife survey was performed within the facility property and the Bound Brook Corridor during 26 through 30 June 2000. The survey was performed to provide a baseline characterization of wildlife occurrence in these areas. As part of this task, direct and indirect field observations of mammals, birds, reptiles, and amphibians were recorded. Wildlife observations were used to document faunal composition within the study area and identify ecological resources and values for use in the ERA.

Wildlife occurrence within the study area was based upon qualitative observations, both direct (i.e., visual observation of wildlife species) and indirect (i.e., tracks, dens, scat, or calls/songs for birds). A limited search of habitats was performed to locate the more secretive species of reptiles and amphibians in riparian and upland areas. Wildlife surveys were conducted along transects located in the floodplain corridor of the Bound Brook, extending from the property downstream to New Market Pond. A reference station (i.e., background) was located immediately upstream of the facility property, along Bound Brook.

Three separate segments were identified within transects on both sides, north and south, of Bound Brook. A minimum of two segments from a north bank and a south bank transect were surveyed twice a day for five consecutive days. The daily surveys were conducted once during the early morning and once during early evening (i.e., crepuscular periods) to qualitatively document wildlife occurrence.

Segments N1 through N3 were located on the north side of Bound Brook and ranged from 800 to 1,500 feet in length. Segment N1, approximately 800 feet in length, was located through a broad-leaved deciduous forest. Landfill debris, i.e., bottles and plates, were observed in Segment N1. The segment continued to the east, entering a palustrine emergent wetland complex. Segment N2, approximately 1,000 feet in length, traversed a palustrine broad-leaved deciduous forest and residential yards and continued into a palustrine emergent and scrub/shrub wetland complex. Segment N3, approximately 1,500 feet in length, was located within a large palustrine emergent wetland complex.

Segments S1 through S3 were located on the south side of Bound Brook and ranged from 1,200 to 1,500 feet in length. Segment S1, approximately 1,500 feet in length, began along the eastern edge of New Market Pond and continued northeast within an edge habitat adjacent to a successional field and broad-leaved deciduous forest, near New Market Pond. This segment continued northwest along

Bound Brook crossing over railroad tracks and continuing through a broad-leaved deciduous forest, which contained relic mounds of landfill and construction debris and dirt. Segment S2, approximately 1,200 feet in length, traversed a broad-leaved deciduous forest and palustrine emergent wetland. Segment S3, approximately 1,400 feet in length, was contained within a broad-leaved deciduous forest.

The reference transect, approximately 500 feet in length, was located immediately upstream of the facility property and traversed a broad-leaved deciduous forest. As the transect continued east, the canopy opened and a dense shrub layer was present. The transect continued east along Bound Brook, to a tributary of Bound Brook, as a palustrine emergent wetland.

Data collected included type of observation (i.e., direct or indirect), a description of the observation (i.e., track, call, scat, etc.), species observed, a general description of the habitat, and any other significant information. Incidental observations made during the wetland delineation were also included. An on-site qualitative survey was also performed to identify wildlife species that may use undeveloped portions of the site.

A threatened and endangered species documentation search was requested from the NJDEP-Natural Heritage Program, and the United States Fish and Wildlife Service (USFWS). Responses were received (Breden, 2000; Walsh and Staples, 2001), and the provided information and the results of the ecological investigation are discussed in Section 3.6.

2.9 Field Procedural Blanks

The following subsections identify the field samples used during the OU-2 RI investigation to assess quality control (QC) during sampling procedures. The use of these blank samples assists in assessing whether contamination was introduced into the sampled material from outside sources. QC samples were subjected to the same laboratory analyses as the associated samples. The results obtained from the analysis of the field procedural blanks were utilized in the evaluation of the usability of the investigation data.

2.9.1 Water Supply Blanks

Deionized Water Blanks

Deionized (DI) water was used extensively during the decontamination of sampling equipment. A DI water blank was collected from each of the three lots of water (i.e., for a total of three DI water samples), to ensure that the water used in the decontamination procedures was not a source of contamination. The samples were prepared by pouring the DI water directly into the sample containers, and preserving accordingly. The blanks were then isolated from the other site samples and shipped separately to the laboratory to prevent cross-contamination. DI water blanks were analyzed for Low Concentration VOCs, Low Concentration SVOCs, Low Concentration pesticides and PCBs, and TAL metals and cyanide.

Drilling Water Blanks

The procedures for drilling required the application of water to the drill bit in order to provide an environment conducive to augering. Non-potable water from the nearby Department of Public Works facility was used to fill the tank on the drill rig. A sample of this water was collected for laboratory analysis of Low Concentration VOCs, Low Concentration SVOCs, Low Concentration pesticides and PCBs, and TAL metals and cyanide, to determine if any constituents were introduced into the soil by this method.

2.9.2 Field Equipment Rinsate Blanks

Field equipment rinsate blanks were collected to demonstrate the quality of the decontamination events and prove that contaminants had not been introduced into the environmental samples by the equipment (e.g., hand-augers, bowls, etc.). A total of 45 field blanks were prepared for this portion of the RI investigation, by pouring DI water over/through the decontaminated or disposable equipment that would later come in contact with the sample material. The water was then collected, preserved as applicable, and sent with the rest of the associated environmental samples, to be analyzed for the same parameters.

2.9.3 Trip Blanks

Trip blanks measure whether aqueous volatile organic samples have been contaminated during collection, transport, and/or storage. Trip blanks consisted of three volatile organic analysis (VOA) vials filled in the field with DI water (and preserved accordingly), which traveled with the associated day's VOC samples from the time of their collection, until their analysis at the laboratory. During this portion of the field investigation, a total of 11 trip blanks were shipped with each container containing aqueous samples for Low Concentration VOC analysis (i.e., the perched water and drainage system water samples).

2.10 Investigative Derived Waste

IDW generated during the field sampling efforts (e.g., soil cuttings, decontamination water, personal protective clothing, etc.) was staged on-site prior to characterization and off-site disposal. Characterization sampling and procurement of acceptable treatment, storage, or disposal facilities (TSDFs) for disposal were performed by Eco-Tron, Incorporated under the supervision of Foster Wheeler Environmental. IDW removal was performed on 31 August 2000, 5 September 2000, 30 November 2000, 21 December 2000, 7 February 2001, and 19 April 2001.

SECTION 2

TABLES

TABLE 2-1 (Sheet 1 of 2)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
BUILDING FLOOR DUST INVESTIGATION INFORMATION

Solid Dust Samples	Sampled Length (m)	Sampled Width (m)	Sampled Area (m^2)	Total Mass of Sample (g)	Location Description
BFD01-01	1	2	2	26.81	Outer office, carpet in front of couch.
BFD01-02	1	3	3	12.13	Warehouse, bare floor.
BFD1A-01	1	7	7	106.38	Open area near stairs, bare floor.
BFD1B-01	1	4	4	25.12	Center of open area, bare floor.
BFD1C-01	1	4	4	18.48	Open area, bare floor.
BFD1D-01	1	4	4	78.8	Second floor room near door, tile floor.
BFD02-01	1	2	2	11.41	Warehouse/production area, bare floor.
BFD02-02	1	4	4	8.81	Front office, carpet between desks.
BFD2A-01	2	4	8	30.07	Open area near door to office, bare floor.
BFD03-01	2	6	12	25.23	Front office, carpet perpendicular to desks/bookcase.
BFD03-02	1	4	4	27.22	Warehouse/storage area, bare floor.
BFD4A-01	1	4	4	96.72	Office, carpet in front of office door.
BFD05-01	1	4	4	46.59	Machine shop (behind Building 5A), bare floor.
BFD05-02	1	4	4	50.68	Production area (front), bare floor between work bench and table, near time clock and door to front office.
BFD05-03	1	4	4	48.12	Production area (rear), bare floor approximately 45 feet inside overhead doors.
BFD5A-01	1	4	4	19.42	Warehouse/storage area, bare floor.
BFD5A-02	1	4	4	43.19	Loading dock in front of offices/men's room, tile floor.
BFD06-01	1	3	3	139.5	Warehouse area by women's room, carpet and bare floor.
BFD07-01	2	1	2	110.37	Garage area, bare floor.
BFD08-01	0.4	4	1.6	128.86	Open area next to overhead doors, bare floor.
BFD09-01	1	4	4	21.7	Center of open area, bare floor.
BFD9A-01	1	4	4	36.8	Production area (rear), perpendicular to tables, bare floor.
BFD9A-91	1	4	4	33.9	Duplicate of sample BFD9A-01.
BFD9B-01	0.95	3	2.85	23.33	Entry hallway in front of office, carpet between cabinets.
BFD9C-01	1	4	4	62.83	Storage area, bare floor.
BFD10-01	1	3	3	59.27	Corner office, carpet.

TABLE 2-1 (Sheet 2 of 2)

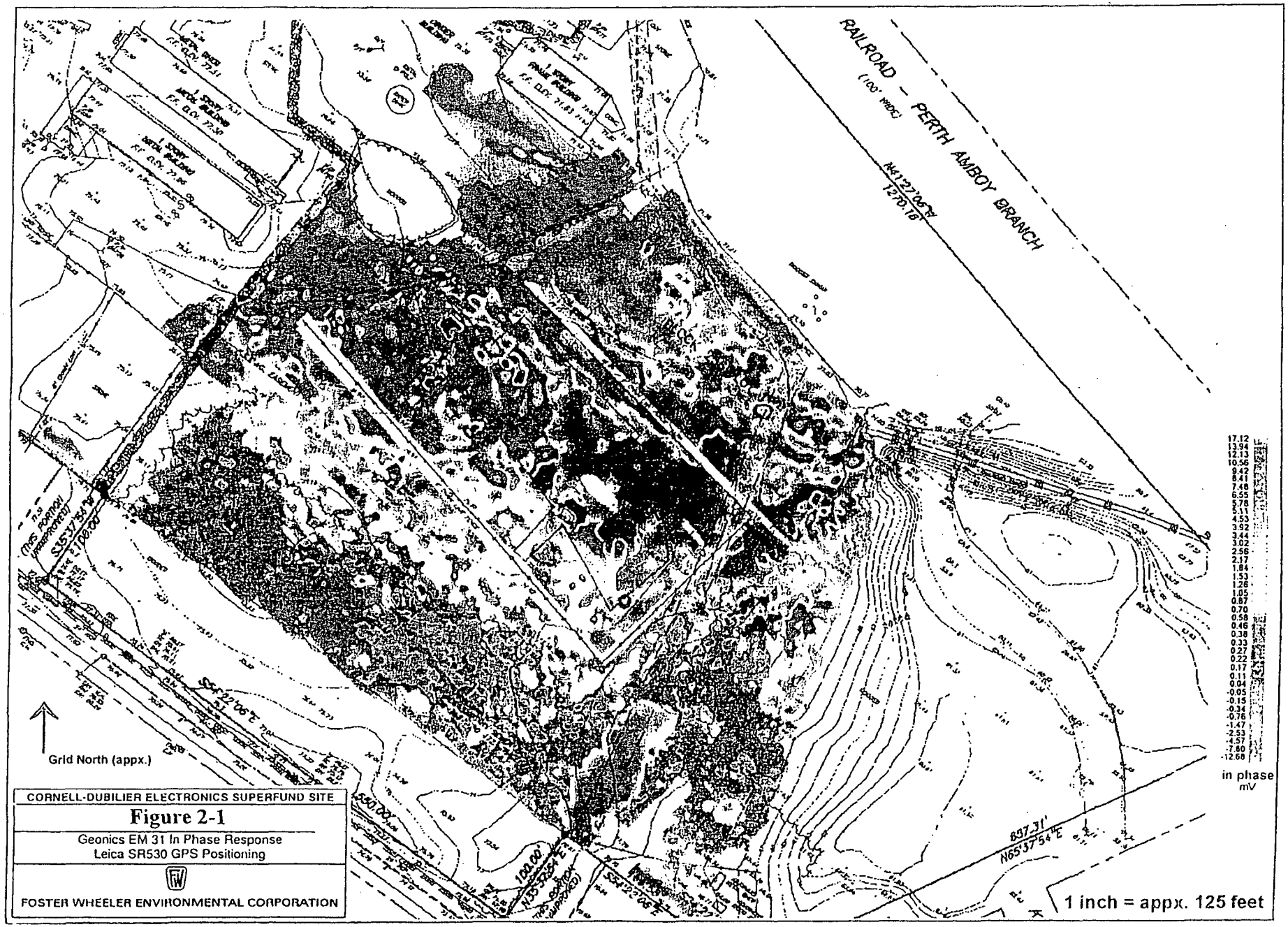
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
BUILDING FLOOR DUST INVESTIGATION INFORMATION

Solid Dust Samples	Sampled Length (m)	Sampled Width (m)	Sampled Area (m^2)	Total Mass of Sample (g)	Location Description
BFD12-01	--	--	20	22.11	Center of open area, bare floor.
BFD13-01	1	4	4	18.08	Office, carpet between cabinets.
BFD14-01	2	1	2	44.08	Production area, bare floor next to drafting table.
BFD15-01	2	3	6	54.56	Office, carpet parallel to desks.
BFD16-01	1	4	4	70.35	Open area, bare floor.
BFD16-91	1	4	4	53.43	Duplicate of sample BFD16-01.
BFD18-01	2.5	3	7.5	30.08	Main room (next to office), bare floor by door.

Note:
For sample BFD12-01, sampled length and width were not noted in the field logbook; however, the overall sampled area was noted.

SECTION 2

FIGURES



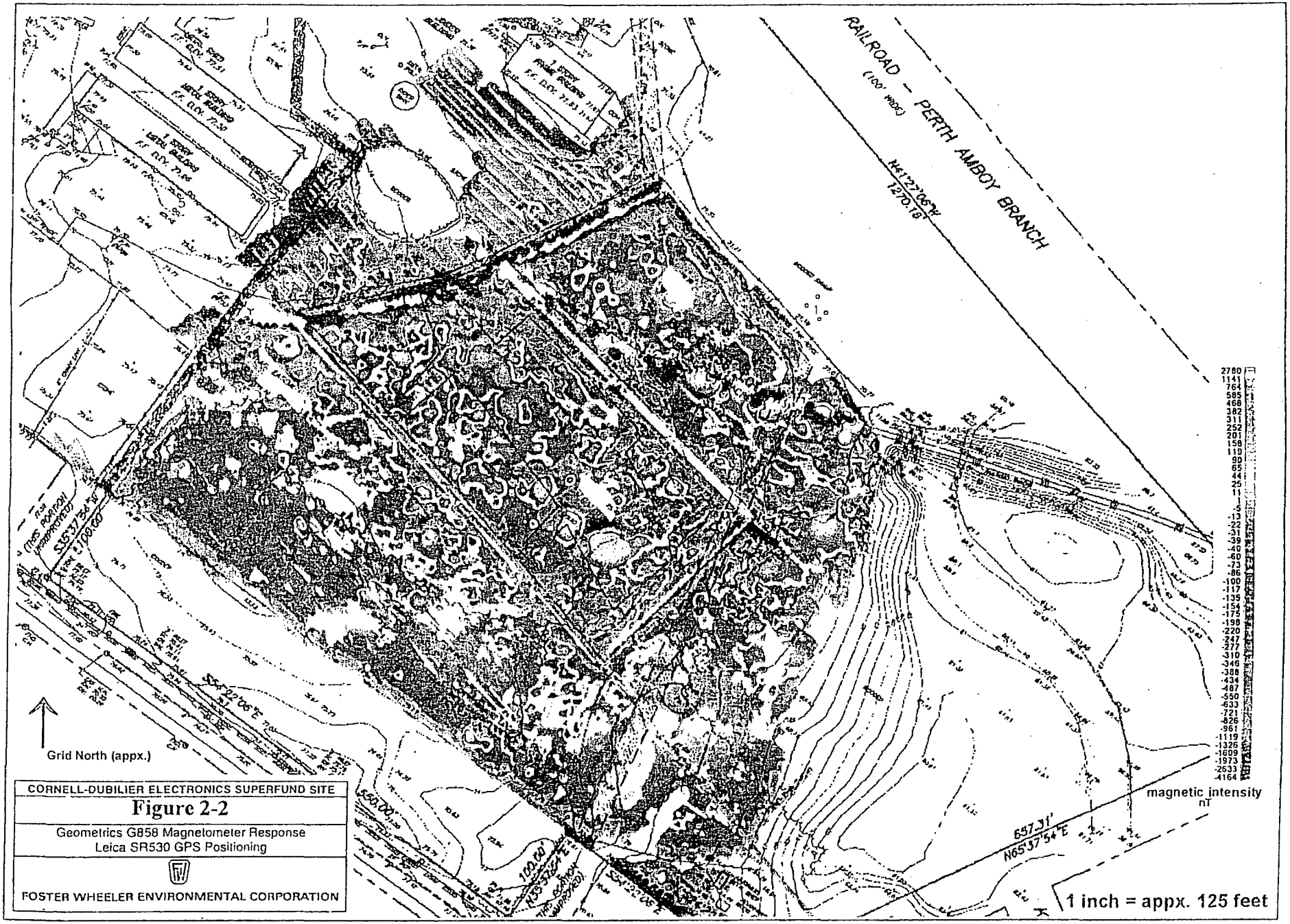
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

Figure 2-1

Geonics EM 31 In Phase Response
Leica SR530 GPS Positioning

FOSTER WHEELER ENVIRONMENTAL CORPORATION

300062



CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

Figure 2-2

Geometrics G858 Magnetometer Response
Leica SR530 GPS Positioning

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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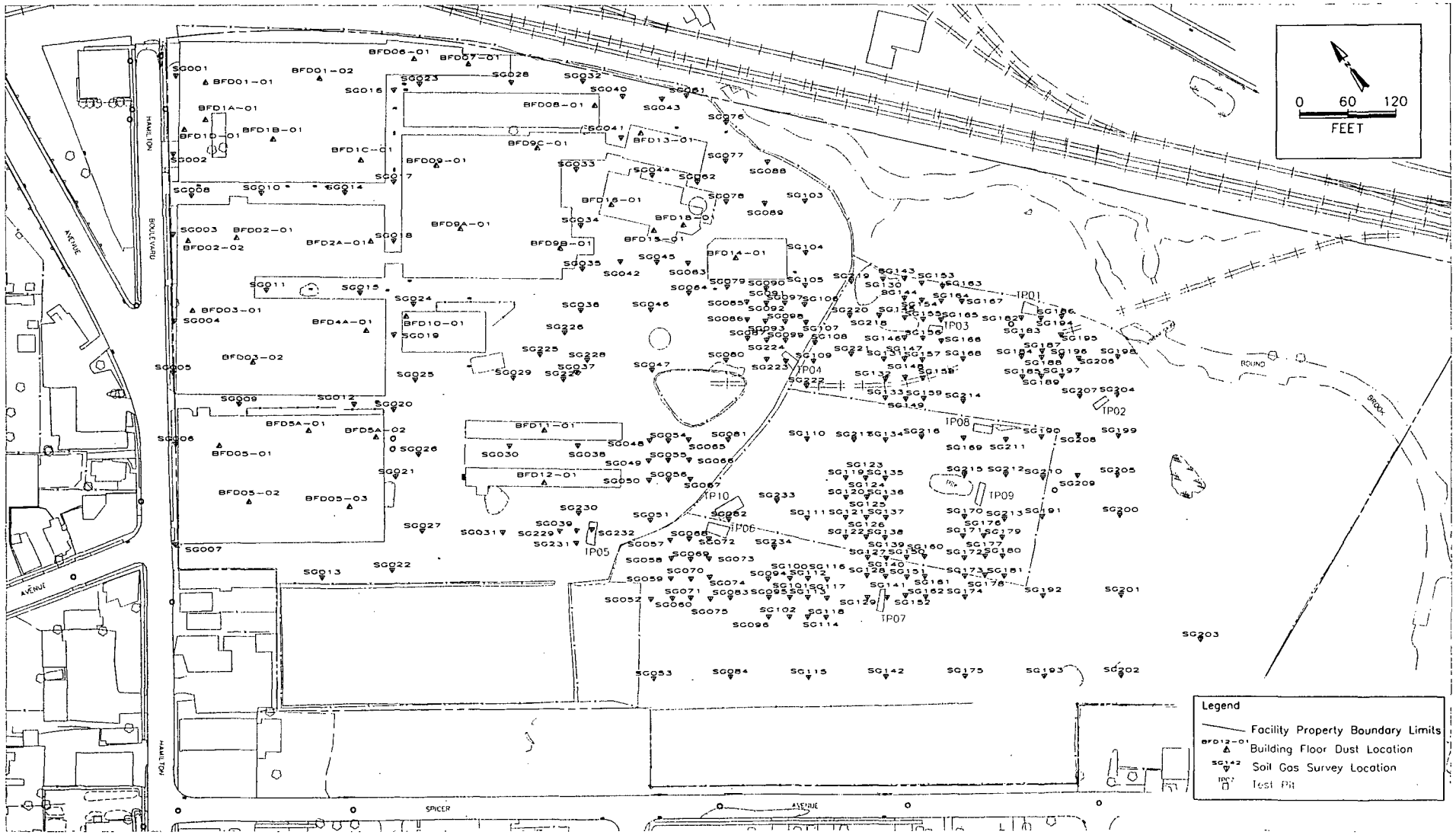
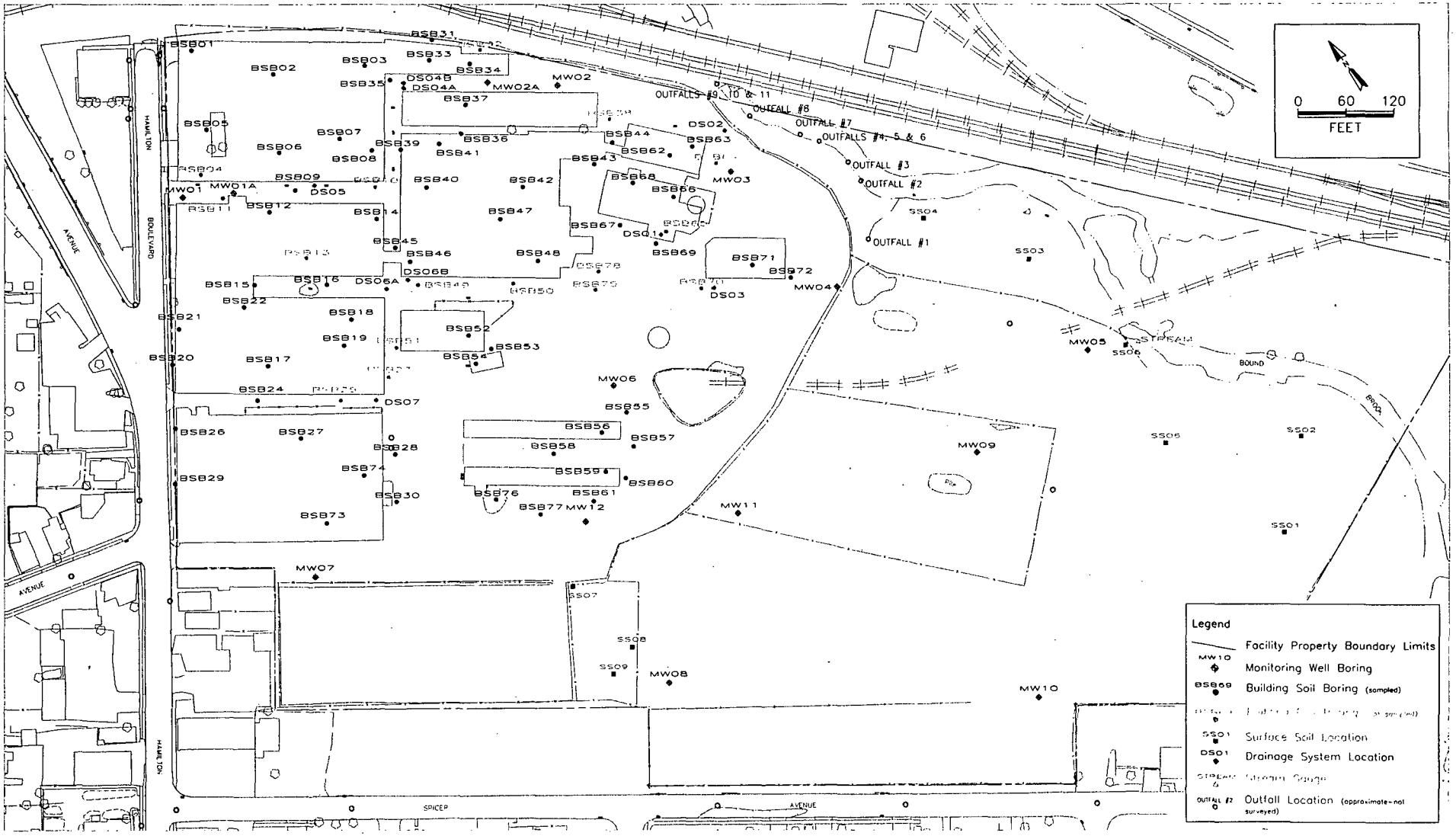


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Site Reconnaissance Sampling Locations
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 03/12/01	PROJECT NO.: 1945.1018	
CHKD: GJ	REV.: 0	FIGURE NO.: 2-3	
DES.: LEN	APPD: LH		

300065

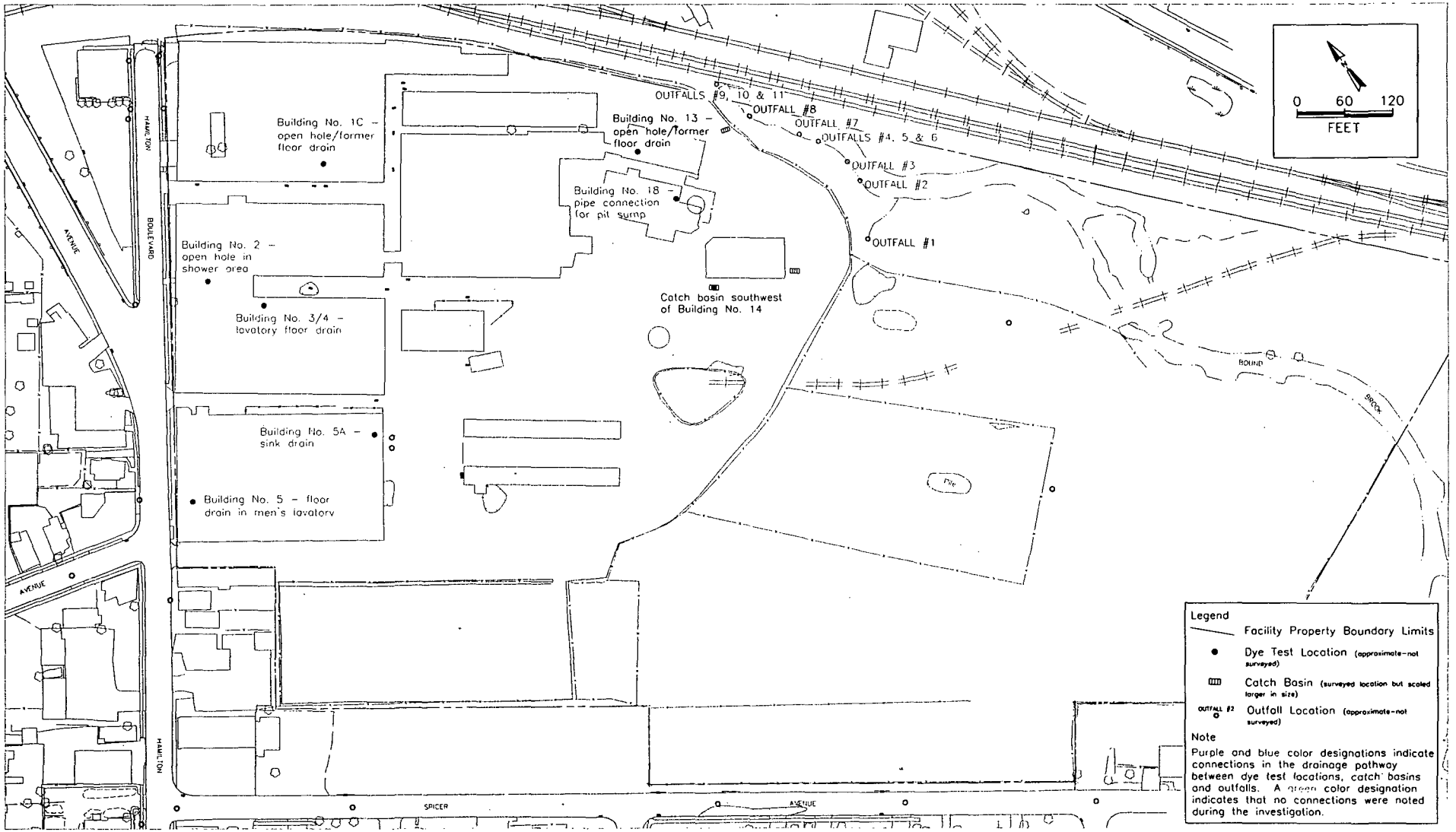


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Phase I Sampling Locations
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/21/02	PROJECT NO.: 1945.1018	
CHKD: GJ	REV.: 2	FIGURE NO.: 2-4	
DES.: LEN	APPD: LH		

300066



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Drainage Connections
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/21/02	PROJECT NO.: 1945.1018	
CHKD: MM	REV.: 0	FIGURE NO.: 2-5	
DES.: LEN	APPD: LH		

300067

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

This section provides a description of the study area in terms of surface features, climate, demography, land use, geology, hydrogeology, ecology, and cultural resources. Discussions of the surface features, land use, geology, hydrogeology, ecology, and cultural resources are derived from current literature and information/observations directly obtained during the RI investigation. Descriptions of the climate and demography are based solely on current literature.

3.1 Surface Features

Based on the characteristic surface features of the facility property, two major areas can be described. The northwest area of the property (hereafter referred to as the "developed portion") is characterized by the buildings and roadways, and comprises approximately 45 percent of the land area (Figure 1-2). Topography in this area is gently sloping, with elevations ranging from approximately 70 to 82 feet above msl (Figure 3-1). The developed portion is currently active. Numerous building structures are located here, numbered 1 through 18 (Figure 1-2), often subdivided into separate units. In general, open areas on this portion of the property were paved as a result of a unilateral administrative order (EPA, 1997d); only small areas of vegetation remain and these areas are fenced. A system of catch basins is present throughout this area to channel stormwater flow. Based on dye testing results, several of these catch basins drain into two outfalls along Bound Brook (Figure 2-5, see Section 2.7). In addition, stormwater that collects in a low-lying area near the western end of Building No. 12 is pumped into a wetland area on the southeastern side of the nearby fence (denoted W6; see Section 3.6.1). A sump located in this low-lying area pumps the stormwater through a polyvinyl chloride (PVC) pipe located aboveground along the southwestern wall of Building No. 12. At the building's south-southeastern corner, the pipe goes underground and then re-surfaces on the other side of the roadway, in the wetlands.

The southeast area of the property (hereafter referred to as the "undeveloped portion") is predominately vegetated with a fenced semi-paved area in the middle (Figure 1-2). Bound Brook flows from the eastern corner across the northeastern border of this area. Comprising approximately 55 percent of the land area, the undeveloped portion is separated from the developed portion by a chain-link fence with locked gates. The central area of this portion is primarily an open field, with some wooded areas to the northeast and south and the semi-paved area in the middle. As shown on Figure 3-1, this area is relatively level, with elevations ranging from approximately 71 to 76 feet above msl. The topography of the undeveloped portion drops steeply to the northeast and southeast, and these areas of the property consist primarily of wetland areas bordering Bound Brook. Elevations range from approximately 71 feet above msl at the top of the bank to approximately 60 feet above msl along Bound Brook (Figure 3-1). In the undeveloped portion of the property, stormwater either collects in low lying areas (such as the wetlands in the southern part) or flows toward Bound Brook, its unnamed tributaries and/or the associated wetland areas via one man-made drainage ditch (constructed pursuant to the site stabilization order issued in 1997) and several smaller natural preferential drainage channels.

3.2 Climate

The climate of the South Plainfield area is classified as temperate (SPEC, 1990). Monthly climatological data for temperature and precipitation for South Plainfield are presented in Table 3-1. The temperatures range from an average of 29°Fahrenheit (F) in January to an average of 75°F in July, with an average annual temperature of about 53°F (WC, 2001). Summer temperatures occasionally exceed 100°F, and temperatures in the middle to upper 80s occur frequently. Winter temperatures generally are not below 20°F for long periods (WC, 2001).

The average annual precipitation is approximately 49 inches, and the monthly averages provided in Table 3-1 indicate that precipitation occurs fairly evenly throughout the year, with the least precipitation during the winter months (WC, 2001). Rainfall is heaviest in July.

In nearby Newark, the average wind velocity is 10.2 miles per hour from the southwest. The average relative humidity is 72 percent and 54 percent at 1 a.m. and 1 p.m., respectively (SPEC, 1990).

3.3 Demography and Land Use

The Borough of South Plainfield is located in northern Middlesex County, in the central portion of New Jersey. According to the 2000 Census, South Plainfield has a population of approximately 21,810 people (Bowman, 2001). The total land area is 8.31 square miles, and the total amount of surface water is about 0.04 square miles (SPEC, 1990). The town is unevenly divided by the Conrail Railroad right-of-way. The site is located in the southern portion of South Plainfield, which is largely industrial with some commercial and residential sections (Figure 3-2). The northern portion of the town is comprised primarily of residential development, with some commercial and limited industrial development.

3.4 Geology

This section provides a description of the bedrock and overburden present at the former Cornell-Dubilier Electronics facility and in the surrounding area, as determined from current literature and information/observations directly obtained during the RI investigation.

3.4.1 Regional Geology

The site lies within the Piedmont Physiographic Province and is underlain by the late Triassic to early Jurassic Age Brunswick Formation of the Newark Group. The Brunswick Formation occupies the Newark Basin (Figure 3-3), the largest of a series of fault-block basins extending from Nova Scotia to South Carolina (Froelich and Olsen, 1985). These basins were formed in the Triassic Period during initial continental rifting (Van Houten, 1969), infilled with stream- and lake-deposited sediments, and intruded and overlain by basaltic magma. The sedimentary units have subsequently been lithified and folded. From the site area northward, bedrock units are overlain by unconsolidated Quaternary and pre-Quaternary glacial deposits.

Brunswick Formation Bedrock

The Brunswick Formation, also known as the Passaic Formation, is the youngest formation unit of the Newark Group, which consists of (oldest to youngest) the Stockton, the Lockatong, and the Brunswick Formations. The Brunswick Formation consists predominantly of reddish-brown feldspathic mudstone and micaceous siltstone, with some claystone and fine-grained sandstone. The reddish color originates from reworked hematite, which comprises 5 to 10 percent of the unit (Boch, 1959). The presence of ripple marks, raindrop impressions, reptile footprints, and plant, reptile, and fish fossils indicates the Brunswick sediments were deposited in a shallow-water, continental environment. When exposed to weathering, the Brunswick units disintegrate into blocky and nodular-shaped fragments and chips that flake along the bedding plane. The shaley units ultimately disintegrate into a hard clay or saprolite (Anderson, 1968).

The sedimentary units of the Brunswick Formation generally dip at about 5° to 15° to the northwest. At an exposure in the Rahway area (northeast of the site), Brunswick Formation units strike N50°E and dip 9° to 12° NW. The predominant system of fractures at that location strikes about N45°E and is vertical. A second, less prominent system strikes N75°W and is also nearly vertical (Anderson, 1968).

A more recent study on the Rutgers University-Busch Campus in Piscataway (approximately 4 miles southwest of the site) indicates that bedding in that area strikes N57°E and dips 11° to the northwest. This same study found that the primary set of fractures were both parallel and perpendicular to bedding (Lewis-Brown and dePaul, 2000). Fractures parallel to the formation bedding are reportedly more continuous and extensive than the vertical fractures (Michalski, 1990).

Glacial Deposits

Quaternary and pre-Quaternary glacial and fluvioglacial deposits overlie bedrock across much of the northern portion of the state. Evidence of Kansan and Illinoisan glaciation occurs as patches of highly leached till south of the Wisconsin terminal moraine. The terminal moraine deposits, marking the southern limit of the glacial advance, are located within 2 miles northeast of the site (Figure 3-3). Wisconsin glaciation has removed or covered older glacial deposits north of the terminal moraine (Stanford, 2000). The southernmost extent of the Wisconsin ice sheet that covered much of northern New Jersey lies roughly along a curved line from Plainfield to Metuchen and the mouth of the Raritan River near Perth Amboy.

Many of the Wisconsin drift deposits in New Jersey, which resulted from the ice sheet advancement and subsequent retreat, are locally derived. The grain size and coloration of these materials reflect that of the bedrock immediately upglacier of the depositional area (Stanford, 2000). The off-site properties in the vicinity of the site are located in an outwash area that extends southerly from the Wisconsin terminal moraine and is covered by glacial stream deposits. These deposits, where undisturbed, consist of reddish-brown to reddish-yellow sand and gravel with minor amounts of silt, and have been locally modified by construction activities.

Several areas within 1/4 mile of the site have been mapped as "artificial fill" (af) and "trash fill" (aft) units (Stanford, 1999). The area 0.1 mile to the south and west of the site is mapped as Qsw

consisting of weathered shale, mudstone, and sandstone. The materials consist of reddish-brown to yellow sandy, silty clay to clayey, silty sand containing some shale, mudstone, and sandstone fragments. These unconsolidated materials can be as much as 30 feet thick but are generally less than 10 feet in thickness (Stanford, 1999).

Soils

The Soil Survey of Middlesex County (Powley, 1987) identifies the soils in the vicinity of the site as Ellington Variant-Urban Land Complex (ESA), Reaville-Urban Land Complex (RFA), and Rowland Silt Loam (Ro).

The ESA soil complex, which is present on the northern half of the site, consists of nearly level to gently sloping (0 to 5 percent), moderately well drained soils that formed on glacial outwash or glacial terrace deposits, often comprising areas used for urban development. ESA soils typically consist of soils with a thickness less than 20 inches to bedrock, including dark brown sandy loams, approximately 4 inches thick, with a strong brown sandy loam subsurface layer 16 inches thick. These soils have reported permeabilities ranging from 0.6 to 6.0 inches per hour. Soil pH ranges from 5.1 to 6.0; runoff potential is medium; erosion hazard is moderate; and available water capacity is moderate. This unit includes areas that have been covered by more than 20 inches of fill material, commonly from adjacent soil units that have been cut or graded.

The RFA soil complex, which covers the southern half of the site, consists of nearly level to gently sloping (0 to 5 percent) moderately well drained soils and areas used for urban development. Approximately 40 percent of the unit is composed of Reaville soils; 40 percent is composed of developed lands; 15 percent consists of inclusions of Ellington Variant, Lansdowne, and Klinesville soils; and 5 percent consists of inclusions of Rowland soils. The RFA soil complex includes areas that have been covered by more than 20 inches of fill material, commonly from adjacent soil units that have been cut or graded. The soil is a dark reddish-brown silt loam approximately 8 inches thick, and the subsoil is a light reddish-brown shaly silt loam approximately 12 inches thick. Reported RFA soil permeabilities range from 0.06 to 2.0 inches per hour. Soil pH ranges from 5.1 to 6.0; runoff is medium; erosion hazard is moderate, and excess water storage occurring in perched zones in the subsoil during wet periods.

The Ro soils cover the floodplain of Bound Brook near the southernmost boundary of the site, are nearly level, and moderately well drained to somewhat poorly drained. Areas where this unit is found typically flood once a year. The Rowland silt loam is brown and approximately 7 inches thick. The subsoil is a dark brown to reddish-brown silt loam approximately 33 inches thick, and the substratum is a gray silt loam to a dark gray sandy loam 30 or more inches thick.

3.4.2 Site-Specific Geology

The following paragraphs are based on information obtained from test pit excavations and soil boring and monitoring well installation during the RI investigation. Figure 3-4 indicates the locations of the geologic cross-sections.

Bedrock

The top of the consolidated bedrock ranges from 4 to 15 feet bgs, except in the far northwest corner of the property, where bedrock was encountered immediately underlying the building slabs (Figure 3-5). The bedrock (the Brunswick Formation) generally slopes to the south-southeast and consists of red-brown to purplish-red mudstone and siltstone with localized beds of fine-grained sandstone. Both units contain heavily fractured zones, generally occurring along bedding planes. Thick sequences of heavily bioturbated siltstones and mudstones with trace fossils were observed in the bedrock cores. Sedimentary features, including cross-bedding, and bedding typical of zones of intermittent turbulence and siltstone laminations in the form of plano-convex lenses, were also noted. Carbonate, generally in the form of calcite, was found as an accessory mineral in many of the siltstones and mudstones and often occurred as irregular grains and aggregates up to 0.06 millimeters (mm) in size. Evidence of groundwater movement included weathered pits, vugs, and voids, indicating possible fluid movement through the formation at various depths. Weathered fracture zones within the bedrock ranged from near vertical to horizontal. The majority of these features were low angle (20 to 30 degrees), and the average spacing between fractures ranged from less than one inch to six inches. At several locations on the facility property (MW07, MW09, and MW10), a white-gray to blue-black, fine to medium sandstone layer interbedded with a sandy mudstone was encountered approximately 25 to 28 feet bgs. The sandstone layer had numerous breaks and fractures.

Soils

The overburden on the property consists of an unconsolidated unit and a weathered bedrock unit. The unconsolidated unit ranges in thickness from 0.5 to 15 feet. Cross-sections developed from data gathered during the RI investigation indicate the unconsolidated unit is thin in the northwest and southwest portions of the property, and thickens towards the Bound Brook. As indicated by cross-section B-B' (Figure 3-7), soil borings MW01, MW02, and MW03 revealed a thin layer of dry, red-brown silt and sand. As the unconsolidated unit thickens towards Bound Brook, soil borings MW04 and MW05 indicated fill material intermixed with red-brown silt and sand; however, the two-foot interval immediately above the weathered bedrock layer consisted of silt and clay in MW04 and gravel in MW05. The thin unconsolidated layer across the southwestern and southeastern portion of the site consisted of silt and clay (MW07 and MW08). In MW10, the unconsolidated layer consisted of silt and fine sand. The sandstone gravel found in boring MW09 is likely weathered residue from the underlying sedimentary formation.

The building soil borings indicate the overburden thickness beneath the buildings ranges from 0 to less than 30 inches in the majority (80 percent) of the borings. Approximately 20 percent of the borings were completed, without refusal, to depths ranging from 30 to 39 inches below the buildings. The overburden was absent beneath a number of the buildings in the northwest corner of the property. The variable thickness of the overburden appears related to a locally high bedrock elevation and the probable removal of soil to allow for the construction of the building slabs directly on the bedrock. No apparent pattern of overburden distribution was discernable from the building borings. This finding is consistent with the ESA and RFA soil units described in the Middlesex soil survey.

A weathered siltstone unit, approximately 1 to 8 feet thick above the bedrock surface, extends beneath most of the property. Cross-sections A-A' and C-C' (Figures 3-6 and 3-8) show the weathered zone to be thinnest at MW06, MW07, MW08, MW10, and MW12, along the southwestern boundary. Cross-sections B-B' and C-C' (Figures 3-7 and 3-8) show the weathered zone to be thickest in the area of MW01A, MW02A, and MW03. Cross-section D-D' (Figure 3-9) indicates that the weathered zone starts to thin at MW10 and thickens only minimally in the northeast direction, only to become very thin again near the Bound Brook (MW05). The weathered zone consisted mainly of red-brown silt to fine sand, with sub-rounded to angular, fine to coarse siltstone gravel and silty clay. This weathered zone interfingers with the urban fill material at a number of locations on the property. Little evidence of mottled soils, which would indicate a seasonally high water table, was observed during the OU-2 investigation.

Fill material identified throughout the facility property consisted predominately of cinders, ash, brick, glass, metal, slag, and wood fragments. Fill material in the central part of the property, identified in soil borings MW04, MW05, MW06, MW09, and MW11, is described further in Section 4.4.4 and in detail in the Test Pit Records (Appendix C). The records for test pits TP01 and TP02 describe the fill material as including scrap metal, automobile parts, steel cables, styrofoam sheeting, ceramic electrical components, and empty/crushed drums. The records for test pits TP03 through TP10 describe the fill material as consisting of cinders, ash, brick, glass, metal, slag, and wood fragments.

3.5 Hydrogeology

The following section presents a summary of regional and site-specific hydrogeological conditions, based on data obtained from current literature and information/observations directly obtained during the RI investigation. Both the regional and site-specific hydrogeology will be discussed in greater detail in the Remedial Investigation Report for OU-3.

3.5.1 Regional Hydrogeology

Bedrock Units

The Brunswick Formation bedrock aquifer is a gently dipping, multi-unit leaky aquifer system that consists of thin water-bearing units separated by thick intervening confining beds. The units have little primary porosity or permeability as a result of compaction and cementation. The principal means of groundwater flow within the Brunswick Formation is through secondary permeability resulting from a series of interconnected fractures.

Two types of water-bearing units have been described in the Brunswick Formation. The first is comprised of major fractures parallel to the bedding. The other consists of thin, intensely fractured (both parallel and perpendicular to the bedding) geologic strata. Confining units bound both types of water-bearing units. These confining layers may be locally fractured, allowing leakage between units (Michalski, 1990).

The upper portion of the Brunswick Formation aquifer system is typically unconfined. However, near-surface bedrock units are usually highly weathered. Silt and clay derived from the weathering

process typically fill fractures, thereby reducing permeability. This relatively low permeability surface zone reportedly extends 50 to 60 feet bgs (Michalski, 1990). Groundwater in the lower portion of the Brunswick Formation is semiconfined. Recharge is by leakage through fractures in the confining units (Houghton, 1990). At least 23 separate fracture zones were identified in the Rutgers study; however, only four of these zones reportedly were capable of transmitting significant volumes of water. Evidence from drilling and geophysical logging indicate that these water-bearing zones consist of relatively coarse-grained siltstone and sandstone (Lewis-Brown and dePaul, 2000).

Reported horizontal hydraulic conductivity in the unconfined units in the Rutgers study ranged from 0 to 1.2 feet per day, resulting in a median transmissivity value of 4.8 feet squared per day. Reported transmissivity values for the confined units in that study ranged from 2 to 910 feet squared per day (Lewis-Brown and dePaul, 2000). Published vertical hydraulic conductivity values (estimated from computer model calibration) for the Brunswick Formation are about 32 feet per day in rocks less than 75 feet bgs and 0.032 feet per day in rocks at depths between 75 and 500 feet bgs in parts of Mercer, Somerset, and Hunterdon counties (Lewis-Brown and Jacobson, 1995).

Surficial/Glacial Deposits

Although units mapped as Qwf (fluvioglacial outwash) are characterized as having high permeability, the thin deposits covering the general project area are not considered a significant groundwater aquifer. However, these deposits can promote recharge by allowing infiltration and readily transmitting water to underlying bedrock units. Thicker deposits, where present, can locally produce moderate quantities of good quality water. The weathered bedrock zone may inhibit this recharge to the bedrock aquifer.

3.5.2 Site-Specific Hydrogeology

The hydrogeologic investigation at the facility property focused on characterization of the shallow groundwater system in the upper part of the Brunswick Formation. A site-specific discussion of bedrock hydrogeology will be presented in the OU-3 Remedial Investigation Report. An evaluation of the water-bearing properties of the overlying unconsolidated materials was also undertaken, although these units do not serve as an aquifer in the vicinity of the site.

Perched Water

Perched water was encountered during the completion of the test pits (Figure 2-3) and the drilling of the monitoring well borings (Figure 2-4). Bedrock occurred at depths typically less than 12 feet bgs. The shallow unconsolidated materials, overlying the bedrock, exhibited discontinuous zones of perched water.

At the original MW02 location (Figure 2-4) in the northern part of the developed portion, fill consisting of red-brown silt became moist below 2 feet bgs. Auger refusal, apparently concrete, was encountered at 7.25 feet bgs. Saturated conditions occurred immediately above this depth. In comparison, dry soils were encountered in the nearby locations, i.e., in the 12 feet of silty sand and weathered siltstone at MW02A and in the 6 feet of silty sand at MW01A.

Perched water was also noted in the developed portion in the borings for monitoring wells MW12 and MW06 (Figure 2-4) and, to a lesser extent, in nearby test pit TP05 (Figure 2-3). At MW12, the stratigraphy grades from sand to weathered siltstone from 4.5 to 8 feet bgs, and the formation was moist to wet in this interval to 8 feet bgs where the competent siltstone was first observed. For comparison, the potentiometric level in shallow bedrock (regional water table) at MW12 was considerably deeper, approximately 18 feet bgs. The weathered siltstone appeared to form a localized aquitard, thereby creating this perched zone.

At MW06 (Figure 2-4), located approximately 200 feet to the northeast of MW12, moist to wet sand occurred from 4.5 feet to 6.6 feet bgs. From 6.6 feet to 7.7 feet bgs, silty clay graded to weathered siltstone and was wet. The underlying weathered siltstone interval (8 to 10 feet bgs) was also wet. An oily water seep was observed between 2 and 3 feet bgs at the northern end of TP05. At this end of the test pit, weathered siltstone occurred at a depth shallower than 3 feet bgs.

With the exception of the deeper overburden intervals of MW04, the other locations on the developed portion of the property contained relatively dry soils. Dry soils were encountered in the 6 feet of silty sand at MW04. Sand, silt and clay progressed from moist to wet from 6 to 13 feet bgs at MW04 where weathered siltstone was encountered and water infiltrated the boring. Dry soils were noted at nearby TP04 to the excavated depth of 6 feet bgs. Dry to slightly moist soils were encountered in the 7 feet of silt and weathered siltstone at MW03. In addition, dry soils were encountered in the 6 feet of silty clay and weathered siltstone at MW07.

Little perched water was noted in the southwestern part of the undeveloped portion. The boring for MW08 exhibited slightly moist silt to 4 feet bgs and slightly moist weathered siltstone from 4 feet to 6 feet bgs, becoming dry at 6 feet bgs. The topsoil and weathered siltstone to 4 feet bgs at MW10 were dry, and competent siltstone occurred below 4 feet bgs. At TP07, excavated to 6.5 feet bgs, no infiltration of water into the test pit was noted.

In the western corner of the former truck driving facility area, perched water was noted in test pits TP06 and TP10 (Figure 2-3) and in the MW11 boring (Figure 2-4). In TP06, the encountered fill (consisting of clay, bricks and capacitors) was wet at 3 feet bgs, and wet conditions continued down to the gravelly silt at 6 feet bgs. In TP10, the encountered fill (consisting of sandy silt and debris) was wet at 6 feet bgs. The underlying silt was wet to the bottom of the test pit at 10 feet bgs. At MW11, wet, silty sand occurred from 2 to 4 feet bgs and wet, sandy silt from 4 to 6 feet bgs. The clays, silts, sands, and gravels from 6 feet to 10 feet bgs at MW11, overlying weathered siltstone (10 feet bgs), became wet near the bottom of the interval.

In the eastern corner of the former truck driving facility area, the encountered fill to 3 feet bgs at TP09 was dry. Silt and sand, excavated to 7 feet bgs, became wet at 5 feet bgs. MW09, also located in this area, contained fill (consisting mainly of sand) which became moist to wet at 6 to 8.5 feet bgs. The underlying sand was merely moist. The weathered siltstone at 10.2 feet bgs appeared dry.

At TP03, to the northeast of the former truck driving facility area in the undeveloped portion of the property (Figure 2-3), the encountered fill consisted of silt and debris and was excavated to 9.5 feet bgs. Saturated conditions were encountered at 8 feet bgs, as water infiltrated the excavation trench. TP02 contained silty fill which was dry through its 6 feet of depth. The underlying clayey silt,

excavated to 8 feet bgs, was moist; however, no infiltration of water into the test pit was noted. At nearby MW05 (Figure 2-4), sandy, gravelly fill was moist from 4 to 8.2 feet bgs. The sand from 8.2 to 11 feet bgs was wet; however, the weathered siltstone at 11 feet bgs was dry.

These discontinuous zones of perched water occur frequently where unconsolidated natural and fill materials are variable in composition. The depths of the perched zones are variable across the property, although they typically occur in the range of 4 to 8 feet bgs. In comparison, the potentiometric surface of the shallow bedrock, the regional water table, typically ranges from 11 to 20 feet bgs. The layers of silt, clay, and weathered siltstone and the probable underground concrete slab encountered during the investigation provide the relative resistance to vertical flow that allows these perched zones to occur during sufficiently wet periods.

3.6 Ecological Assessment

An ecological assessment was conducted at the site to identify and characterize biota and habitats. This characterization will assist in evaluating the actual or potential effects of site contaminants on plants and animals, as well as assessing the need for remediation, including considering remedial alternatives and their potential effects on ecological resources. The ecological assessment consisted of number of field investigations conducted between 20 June and 12 July 2000 and included a wetland investigation, a terrestrial and aquatic habitat characterization, a wildlife survey, and a floodplain assessment. In addition, an evaluation of documented endangered and threatened species in the vicinity of the site was conducted through contact with State and Federal agencies.

3.6.1 Wetlands Investigation Results

Wetlands at the site were identified and delineated using the methodology explained in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, dated 1989. This manual incorporates a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands. This manual defines wetlands as "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Information compiled and reviewed for this delineation included the following:

- U.S. Geological Survey 7.5 Minute Series, Plainfield, NJ Quadrangle
- National Wetlands Inventory Maps, Plainfield, NJ Quadrangle
- New Jersey Freshwater Wetlands Map, Plainfield SE, NJ Quadrangle
- Middlesex County Soil Survey
- Flood Insurance Rate Maps for the Borough of South Plainfield, New Jersey, Middlesex County (Community Panel Number 340279-0001-B, 1 August 1980) and Borough of Bound Brook, New Jersey, Somerset County (Community Panel Number 340430-0001-C, 4 July 1988)
- NJDEP Delineation of Floodway and Flood Hazard Area Bound Brook, Plate No. 6, June 1977.

Seven wetlands consisting of four palustrine emergent (PEM) (designated W1, W2, W6, and W7), two PEM/palustrine scrub/shrub (PSS) (designated W3 and W4), and one palustrine forested broad leaved deciduous (PFO1) (designated W5) were delineated on the facility property (Figure 3-11). Wetlands W1 through W4 are adjacent to the Bound Brook and wetlands W5 through W7 are isolated. Appendix F presents the wetland field data sheets.

Approximate acreage of the wetland areas is as follows:

- W1 - 0.25 acres;
- W2 - 0.83 acres;
- W3 - 0.07 acres;
- W4 - 1.03 acres;
- W5 - 0.25 acres;
- W6 - 0.05 acres; and
- W7 - 0.02 acres.

Total acreage by community type was 1.15 acres for PEM, 1.10 acres for PSS and 0.25 acres for PFO1.

Vegetation

Dominant vegetation within the PEM wetlands included Canada clearweed (*Pilea pumila*), spotted touch-me-not (*Impatiens capensis)* and marshpepper smartweed (*Polygonum hydropiper)* in wetland W1, and marshpepper smartweed, arrow arum *(Peltandra virginica)*, skunk cabbage (*Symplocarpus foetidus*), common reed (*Phragmites australis*), and deer-tongue witchgrass (*Dichanthelium clandestinum*) in wetland W2. A sparse shrub layer of speckled alder (*Alnus rugosa*) was also present in wetland W2. Common reed dominated the herbaceous layer of wetland W6, with sparse shrub and tree layers consisting of silky dogwood (*Cornus amomum*), and silver maple (*Acer saccharinum*) and northern catalpa (*Catalpa speciosa*), respectively. Fox sedge (*Carex vulpinoidea*), silky dogwood, goldenrod (*Solidago* sp.) and path rush (*Juncus tenuis*) were dominant in wetland W7.

Shrub species present within the two PEM/PSS wetlands consisted of silky dogwood, black willow (*Salix nigra*), and buttonbush (*Cephalanthus occidentalis*). Silky dogwood dominated the shrub layer of wetland W3. The understory in wetland W3 was composed of sweetflag (*Acorus calamus*), arrow-leaf tearthumb (*Polygonum sagittatum*), Canada clearweed, marshpepper smartweed, spotted touch-me-not, common boneset (*Eupatorium perfoliatum*), arrow arum, and spatterdock (*Nuphar luteum*).

Wetland W4 is a large wetland complex composed of areas of PEM and PEM/PSS wetlands. In the PEM/PSS wetlands, black willow, silky dogwood, and buttonbush comprised the shrub layer, while common reed, marshpepper smartweed, spotted touch-me-not, purple loosestrife (*Lythrum salicaria*), broad-leaf cattail (*Typha latifolia*), and arrow arum dominated the herbaceous layer.

One PFO1 wetland was identified within the south-central portion of the property (Figure 3-11). Silver maple, red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), and green ash (*Fraxinus*

pennsylvanica) dominated the tree layer. The sparse shrub layer was dominated by silky dogwood and sedges, including fox sedge and pointed broom sedge (*Carex scoparia*), while silver maple and poison ivy (*Toxicodendron radicans*) dominated the herbaceous layer. Poison ivy also comprised the vine layer.

The remainder of the property consisted of successional fields, broad-leaved deciduous forests, and developed land, i.e., buildings and impervious surfaces. The successional fields were located within the southeast portion of the facility and were composed of grasses, mugwort (*Artemisia vulgaris*), goldenrods (*Solidago* spp.), common yarrow (*Achillea millefolium*), and northern catalpa (*Catalpa speciosa*) and eastern cottonwood (*Populus deltoides*) saplings. A fringe of broad-leaved deciduous forests were present in the northeast, east, and south portions of the property. Red maple (*Acer rubrum)*, black oak (*Quercus velutina*), red oak (*Quercus rubra*), tree-of-heaven (*Ailanthus altissima*), and black cherry (*Prunus serotina*) dominated the tree layer of the forests, with sassafras (*Sassafras albidum*) and sugar maple (*Acer saccharum*) also present. The shrub layer was vegetated by Japanese honeysuckle (*Lonicera japonica*), tree-of-heaven, and multiflora rose (*Rosa multiflora*). White snakeroot (*Eupatorium rugosum*), garlic mustard (*Alliaria petiolata*), great Solomon's-seal (*Polygonatum commutatum*), an unknown grass, and poison ivy dominated the herbaceous layer, and grape vine (*Vitis* sp.) and Virginia creeper (*Parthenocissus quinquefolia*) comprised the vine layer.

Soils

Site soils were examined by coring with a hand-held auger. Soil cores were generally extracted to a depth of 24 inches. Soil horizons were described and compared to the Munsell soils color charts to determine the hue, value, and chroma of the soil. The texture of the soils and presence or absence of mottling and hydric indicators were also noted. Soil profiles were described at 18 locations (SS-1 thorough SS-18) along the delineated wetland boundaries.

Soil cores advanced within the wetlands were composed of alluvial soils and clays. Alluvial soils were observed in several of the wetlands (W1, W3, and W4) adjacent to the Bound Brook, were recorded to depths of 24 inches, and ranged in color from very dark gray (10YR 3/1) to dark brown (10YR 3/3). Fluvial deposits within wetlands W3 and W4 were stratified, with subsoil (B-horizon) containing evidence of reduced (i.e., low chroma matrix) and oxidized (i.e., mottles) soil conditions.

The remainder of the wetlands were composed of silty clay and clay soils in the B-horizon. Wetland W2 soils consisted of silt loam and silty clay mottled below six inches, and wetland W5 soils consisted of clay silt and silty clay soils covered by one inch of organic material. Soils of wetlands W6 consisted of organic material and sandy clay. The soils associated with wetland W7 were highly compacted, and therefore, a sample was not obtained.

Soils obtained from the uplands primarily consisted of silt loams throughout the soil profile. A thin layer, 0 to 2 inches, of organic litter was observed in several soil samples collected in the site uplands. Upland soils within the vicinity of wetlands W3, W6, and W7 were composed of disturbed soils including fill material and compacted soils.

Soils within the property are identified as ESA, RFA, and Ro in the Soil Survey of Middlesex County (see Section 3.4.1). The RFA comprises approximately 60 percent, or the majority of the

site. The ESA comprises approximately 30 percent of the site, and the Ro comprises 10 percent, located along the Bound Brook.

Hydrology

During the field investigation, hydrology conditions appeared normal for the time of year. Evidence of hydrology was pronounced at all wetlands. Inundated and saturated soils were indicators commonly observed in the wetlands, and the depth to freestanding water ranged from 6 inches at wetlands W2 and W4 to greater than 22 inches at wetland W5. Wetlands appear to be seasonally flooded, i.e., standing water visible for more than one month, but usually by late summer, the water table drops to within 18 inches from the surface (Tiner, 1985).

Additional primary and secondary indicators of hydrology were used to document the presence of wetland hydrology. Drainage patterns in wetlands and oxidized root channels in the upper 12 inches were all indicators commonly observed in the wetlands. Drift lines several feet above normal channel flow were observed along the Bound Brook.

3.6.2 Functional Assessment

Terrestrial Setting

The site is located in an urban landscape with developed lands (i.e. industrial/commercial and residential properties, ball fields, parks, and cemeteries) surrounding the facility property. Approximately 45 percent of the property is composed of developed lands, i.e., buildings and pavement (Figure 3-11). The remainder of the property consists of successional fields, broad-leaved deciduous forests, and wetlands. The successional fields are located within the southeast portion and are composed of grasses and perennial forbs. A fringe of broad-leaved deciduous forest is present in the northeast, east, and south portions of the property, and is predominantly composed of an oak/maple forest. In the northeast portion, the oak/maple forest is adjacent to the Bound Brook. A detailed description of on-site vegetation cover types is presented in Section 7.0, Ecological Risk Assessment.

The Bound Brook Corridor, an undeveloped area located within the floodplain of the Bound Brook, provides habitats for wildlife within the area. Wildlife species that use the Bound Brook Corridor could also use the undeveloped portion of the facility property, based on similarities in habitats and the contiguous nature of the Bound Brook Corridor.

Seven wetlands consisting of four PEM wetlands, two PEM/PSS wetlands, and one PFO1 wetland were delineated within the eastern, undeveloped portion of the property. A detailed description of the wetlands is provided in Section 3.6.1.

Aquatic Setting

Bound Brook is a perennial stream located within an urban landscape. The stream traverses the southeast corner of the facility property and flows northwest for over one mile where it discharges into the eastern end of New Market Pond. Stream width varies from 10 to 25 feet across the

property. Submerged vegetation was sparse throughout the Bound Brook and New Market Pond, and scattered plants of bur reed (*Sparganium* sp.) and small communities of spatterdock were observed. Substrates within Bound Brook are composed of coarse to medium sand, with areas of alluvial deposits (gravel and sand).

3.6.3 Wildlife Survey Results

A qualitative survey of wildlife resources within the property and the Bound Brook Corridor was performed in support of a baseline characterization of wildlife occurrence. Direct and indirect wildlife observations of mammals, birds, reptiles, and amphibians were recorded during a 5-day survey along transects located in the floodplain corridor of the Bound Brook. A reference station was located immediately upstream of the former Cornell-Dubilier Electronics facility, along the Bound Brook. Three separate segments were identified within transects on both sides, north and south, of the Bound Brook.

A total of 40 bird, 11 mammal, and 6 reptile and amphibian species were observed within the property, the Bound Brook Corridor, and New Market Pond. A total of nine bird, three mammal, and four reptile and amphibian species were identified within the upstream reference transect. All of the species observed within the reference transect were also observed within the Bound Brook Corridor. Table 3-2 identifies species observed within the property, Bound Brook Corridor, and New Market Pond. Table 3-3 identifies species observed within the reference transect located on Bound Brook. A detailed description of the species observed is provided in Section 7.0, Ecological Risk Assessment.

Bound Brook supports a warm water fishery as verified by the species collected and identified by EPA (1998c). Species identified during the June 1997 field investigation included bullhead (*Ictalurus* sp.), carp (*Cyprinus carpio*), white sucker (*Catostomus commersoni*), sunfish including bluegill (*Lepomis macrochirus*) and pumpkinseed (*Lepomis gibbosus*), and largemouth bass (*Micropterus salmoides*) (EPA, 1998c). During the 2000 Foster Wheeler Environmental field investigation, evidence of the presence and predation of crayfish (*Orconectes* sp.) and Asian clams (*Corbicula fluminea*) was observed along the Bound Brook. Sunfish, carp, catfish, and largemouth bass were also observed in the Bound Brook during the 2000 field investigation.

Bound Brook and New Market Pond have a surface water quality standard of freshwater, non-trout, or FW2-NT. In August 1998, NJDEP issued a final fish consumption advisory for the entire length of Bound Brook and its tributaries, including New Market Pond and Spring Lake. The advisory warned the public not to consume any fish from these waters.

Endangered Species and Others of Special Concern

A request for information regarding the presence of endangered and threatened species was submitted to NJDEP - Natural Heritage Program, and the USFWS. A 13 December 2000 response from NJDEP identified the presence of migrant loggerhead shrike (*Lanius ludovicianus migrans*) within the immediate vicinity of the Bound Brook Corridor (Breden, 2000). The documented shrike sighting was within a riparian forest along a floodplain tributary of Bound Brook. Loggerhead shrikes prefer open fields and scrubby clearings with thickets and hedgerows having trees and shrubs

with thorns, which are used to impale larger prey (Andrle and Carroll, 1988). Correspondence from the USFWS (USFWS, 2001), indicated that except for an occasional transient bald eagle (*Haliaeetus leucocephalus)*, no other federally-listed or proposed threatened or endangered flora or fauna under USFWS jurisdiction are known to occur within the vicinity of the site.

3.6.4 Floodplain Assessment

Most of the facility property, including the portion containing the buildings and structures, is located outside of the flood hazard area, and the 100- and 500-year floodplains as depicted on the NJDEP Delineation of Floodway and Flood Hazard Area Map for Bound Brook and the FEMA New Jersey Flood Insurance Rate Maps for the Borough of South Plainfield and Township of Piscataway, Middlesex County. The southeast portion of the property, which is currently undeveloped, is located within the flood hazard area, and the 100- and 500-year floodplains of Bound Brook (Figure 3-11). Based on the NJDEP maps, the 100-year flood and flood hazard area limit is 72 feet above msl.

3.7 Cultural Resources Assessment

An assessment of the potential for the site area to contain cultural resources was conducted on 28 September 2001 (Foster Wheeler Environmental, 2001c). Research was performed at the New Jersey Division of Historic Preservation, which functions as the New Jersey Historic Preservation Office (NJHPO), and the New Jersey Special Collections, Alexander Library, Rutgers University. In addition, a telephone consultation was conducted with the Department of Anthropology, American Museum of Natural History in New York on 2 October 2001, and archeological field records were provided to Foster Wheeler Environmental from their anthropology archives on 9 October 2001.

Cultural resources survey maps from NJHPO indicate that archeological sites, as well as many lithic scatters, have been identified along the banks of Bound Brook. Five prehistoric sites were identified in the general vicinity of the former Cornell-Dubilier Electronics facility, and a large prehistoric site was excavated to the east of the facility property. In addition, results of interviews with local residents were reviewed, and it was alleged that a Native American burial ground was located in the vicinity of the former Plainfield Pond, southeast of the site. Excavations in the former pond area had a large prehistoric-period argillite chipped stone tool assemblage.

The facility property was identified as the location for a circa 1800 sawmill. The NJHPO files indicate that the Brooklyn Mills historic mill complex (circa 1702) was formerly located in South Plainfield, and in 1974, surviving foundations were nominated for the National Register of Historic Places (NRHP); however, no action was taken to list the property. It is unknown if any of the mill structures were present on/around the site. A blacksmith shop (circa 1895) and the destroyed Randolph Burial Ground (circa 1790) were located north of the Cornell-Dubilier Electronics site. No properties in South Plainfield are presently listed on the NRHP.

Based on the above information, the facility property has the potential to contain archeological and/or architectural resources. A Stage IA Cultural Resource Investigation will be performed pursuant to Section 106 of the National Historic Preservation Act, 16 U.S.C. 470f.

SECTION 3

TABLES

TABLE 3-1
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
MEAN MONTHLY TEMPERATURE AND PRECIPITATION
FOR SOUTH PLAINFIELD, NEW JERSEY

Month	Mean temperature (°F)	Mean precipitation (inches)
January	29	3.5
February	32	3.1
March	42	4.0
April	51	4.1
May	62	4.6
June	70	3.7
July	75	5.2
August	74	4.7
September	66	4.3
October	55	3.6
November	45	4.2
December	34	3.9

TABLE 3-2

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

WILDLIFE OBSERVATIONS WITHIN THE SITE AND BOUND BROOK CORRIDOR

Common Name	Scientific Name	Habitat Observations[1]	Field Notes
Birds			
Red-Winged Blackbird	*Agelaius phoeniceus*	Open, PEM	Individuals observed on the site and Bound Brook Corridor
Wood Duck	*Aix sponsa*	Bound Brook [2]	Individuals observed
Mallard	*Anas platyrhynchos*	Bound Brook	Individuals observed
Canada Goose	*Branta canadensis*	Bound Brook	Observed individuals and tracks along brook
Northern Cardinal	*Cardinalis cardinalis*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Gray Catbird	*Dumetella carolinensis*	Open/Forest [3]	Individuals observed on the site and Bound Brook Corridor
Northern Mockingbird	*Mimus polyglottos*	Open, Forest	Individuals observed
Song Sparrow	*Melospiza melodia*	Open	Individuals observed on the site and Bound Brook Corridor
House Sparrow	*Passer domesticus*	Open	Observed on the site
Black-Capped Chickadee	*Parus atricapillus*	Open, Forest	Heard call
Tufted Titmouse	*Parus bicolor*	Forest	Heard call
White-breasted Nuthatch	*Sitta carolinensis*	PFO1, Forest	Individuals observed
American Robin	*Turdus migratorius*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
American Crow	*Corvus brachyrhynchos*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Common Flicker	*Colaptes auratus*	Open, Forest	Individuals observed and heard call
Barn Swallow	*Hirundo rustica*	Bound Brook, PEM	Individuals observed
Tree Swallow	*Tachycineta bicolor*	Bound Brook, PEM	Individuals observed
Great Blue Heron	*Ardea herodias*	Bound Brook, PEM	Individuals observed
Green Heron	*Butorides virescens*	Bound Brook, Forest	Observed individuals and tracks
Eastern Kingbird	*Tyrannus tyrannus*	Open, Residential	Individuals observed
Common Grackle	*Quiscalus quiscula*	Open	Individuals observed on the site and Bound Brook Corridor
European Starling	*Sturnus vulgaris*	Open	Individuals observed
Red-Tailed Hawk	*Buteo jamaicensis*	Flying over Bound Brook Corridor	Observed individuals and heard call
Mourning Dove	*Zenaida macroura*	Open, Residential	Individuals observed
Blue Jay	*Cyanocitta cristata*	Forest	Individuals observed on the site and Bound Brook Corridor
Brown Thrasher	*Toxostoma rufum*	Forest	Individuals observed
Hairy Woodpecker	*Picoides villosus*	Forest	Individuals observed
Red-bellied Woodpecker	*Melanerpes carolinus*	Forest	Heard call
Downy Woodpecker	*Picoides pubescens*	Open, Forest	Individuals observed
Yellow Warbler	*Dendroica petechia*	Open/Forest, Forest	Individuals observed
American Goldfinch	*Carduelis tristis*	Open/Forest	Individuals observed
Rufous-sided Towhee	*Pipilo erythrophthalmus*	Forest, PFO1	Observed individuals and heard call
Common Yellowthroat	*Geothlypis trichas*	Forest, PFO1	Individuals observed
Great-Crested Flycatcher	*Myiarchus crinitus*	Forest	Individuals observed
Wood Thrush	*Hylocichla mustelina*	PFO1	Heard call
Belted Kingfisher	*Ceryle alcyon*	Bound Brook	Individuals observed
Northern Oriole	*Icterus galbula*	Forest, PSS	Individuals observed
Killdeer	*Charadrius vociferus*	Open	Individuals observed
House Wren	*Troglodytes aedon*	Forest, Open	Individuals observed in dense understory of open forests
Domestic Pigeon	*Columba livia*	Developed land	Observed in developed portions of site
Mammals			
Red Fox	*Vulpes vulpes*	PEM/PSS	Den and scent post observed in N3
Muskrat	*Ondatra zibethicus*	Bound Brook, PEM, PFO1	Observed individuals, scat, burrow, slides
Eastern Chipmunk	*Tamias striatus*	Forest, Open	Individuals observed on the site and Bound Brook Corridor
Rat	*Rattus sp.*	Open, Forest	Tracks observed along banks of Bound Brook
Groundhog	*Marmota monax*	Open, Forest	Observed burrow
White-tail Deer	*Odocoileus virginianus*	Open, Forest, PEM, PSS, PFO1	Observed tracks and beds
Raccoon	*Procyon lotor*	Open, Forest, PEM, PFO1	Observed tracks
Eastern Gray Squirrel	*Sciurus carolinensis*	Forest, PFO1	Individuals observed
Eastern Cottontail	*Sylvilagus floridanus*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Domestic Dog	*Canis sp.*	Forest, PFO1, PEM	Tracks observed
Opossum	*Didelphis virginiana*	Open	Observed (dead on railroad tracks)
Reptiles and Amphibians			
Stinkpot	*Sternotherus odoratus*	Open, Forest	Individuals observed
Eastern Painted Turtle	*Chrysemys picta picta*	Open, Forest, Wetland	Individuals observed in Bound Brook, shell found on the site
Green Frog	*Rana clamitans melonata*	PEM, Bound Brook	Heard call
Bull Frog	*Rana catesbeiana*	PEM, Bound Brook	Heard call
Snapping Turtle	*Chelydra serpentina*	PEM, Bound Brook	Individuals observed
Eastern Box Turtle	*Terrapene carolina*	Open	Individuals observed

[1] Habitat Types
Open: successional field and residential yards
Forest: broad-leaved deciduous forest
PFO1: palustrine broad-leaved deciduous forest
PEM: palustrine emergent wetland
PSS: palustrine scrub/shrub wetland

[2] Species observed in, on, or flying over Bound Brook and its tributaries

[3] Species observed in Open/Forest edge habitat

TABLE 3-3
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
WILDLIFE OBSERVATIONS WITHIN UPSTREAM TRANSECT

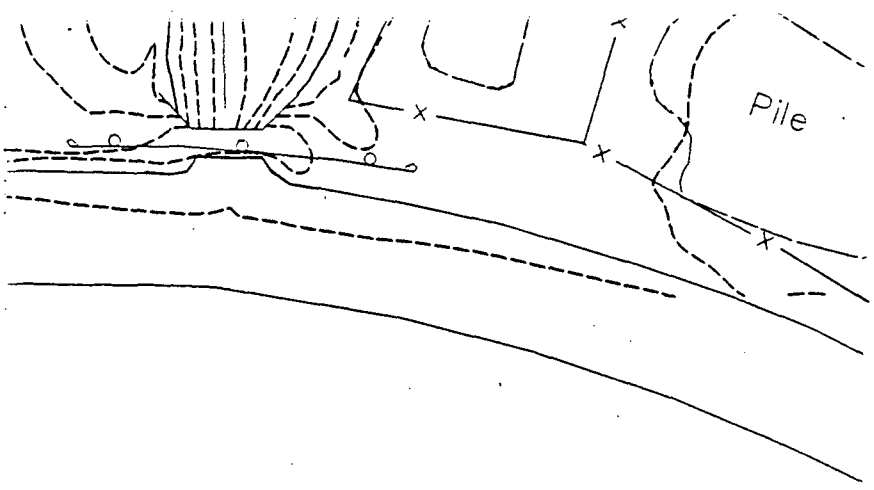
Common Name	Scientific Name	Habitat Observations[1]	Field Notes
Birds			
Red-Winged Blackbird	*Agelaius phoeniceus*	Scrub/shrub,Bound Brook[2]	Individuals observed
Common Flicker	*Colaptes auratus*	Scrub/shrub, Forest	Individual observed
Song Sparrow	*Melospiza melodia*	PEM, Scrub/shrub	Individuals observed
American Robin	*Turdus migratorius*	PEM, Scrub/shrub, Forest	Individuals observed and heard call
Belted Kingfisher	*Ceryle alcyon*	Bound Brook	Individual observed
American Crow	*Corvus brachyrhynchos*	PEM, Scrub/shrub	Individuals observed
Gray Catbird	*Dumetella carolinensis*	PEM, Scrub/shrub	Individuals observed
Mourning Dove	*Zenaida macroura*	PEM, Scrub/shrub	Individuals observed
Tree Swallow	*Tachycineta bicolor*	PEM, Scrub/shrub, Bound Brook	Individuals observed
Mammals			
Raccoon	*Procyon lotor*	PEM, Scrub/shrub	Observed tracks
White-tail Deer	*Odocoileus virginianus*	PEM, Scrub/shrub, Forest	Observed tracks
Muskrat	*Ondatra zibethicus*	PEM, Scrub/shrub	Observed burrow
Reptiles and Amphibians			
Bull Frog	*Rana catesbeiana*	PEM, Bound Brook	Heard call
Unidentified Frog	*Rana sp.*	Bound Brook	Heard call
Eastern Painted Turtle	*Chrysemys picta*	PEM, Bound Brook	Individuals observed
Eastern Box Turtle	*Terrapene carolina*	Forest	Individual observed

[1] Habitat Types
Open: successional field and residential yards
Forest: broad-leaved deciduous forest
PFO1: palustrine broad-leaved deciduous forest
PEM: palustrine emergent wetland
Scrub/Shrub: upland woody shrub community

[2] Bound Brook: Species observed in, on, or flying over Bound Brook and its tributaries

SECTION 3

FIGURES



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	DATE: 09/05/01	REV.: 0	

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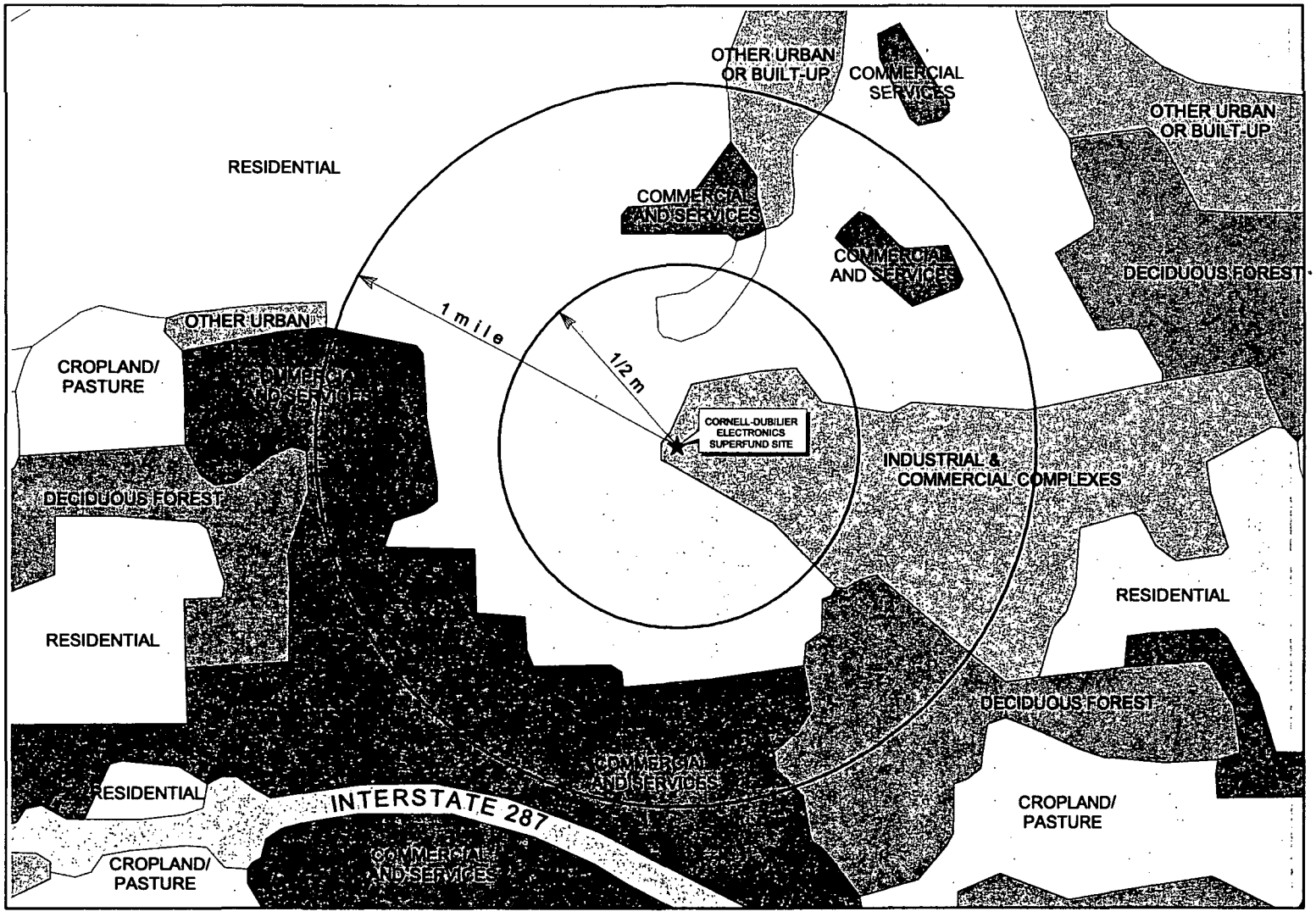

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CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
Figure 3-2 Surrounding Land Use Facility Soils and Buildings RI Report
FOSTER WHEELER ENVIRONMENTAL CORPORATION

LEGEND:

Land Use.
- COMMERCIAL AND SERVICES
- CROPLAND AND PASTURE
- DECIDUOUS FOREST LAND
- INDUSTRIAL & COMMERCIAL COMPLEXES
- OTHER URBAN OR BUILT-UP
- RESIDENTIAL
- TRANSPORTATION, UTILITY
- RESERVOIRS

0 0.5 1 Miles

SCALE

N

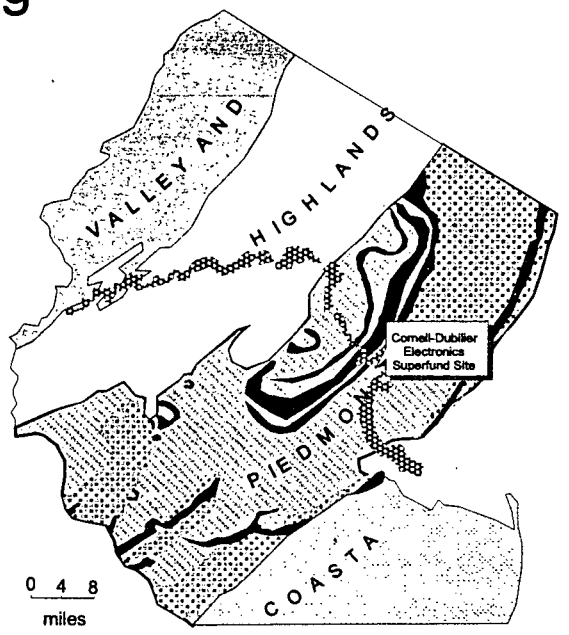
Source: 1:250,000 Scale Quadrangles of Landuse/Landcover GIRAS Spatial Data of CONUS in BASINS, EPA, Office of Water/OST

Regional Geologic Setting

LEGEND:

Physiographic Provinces

- Valley & Ridge
- Highlands
- Piedmont
- Coastal Plain
- Sandstone facies
- Shale facies
- Igneous Bedrock Units
- Terminal moraine

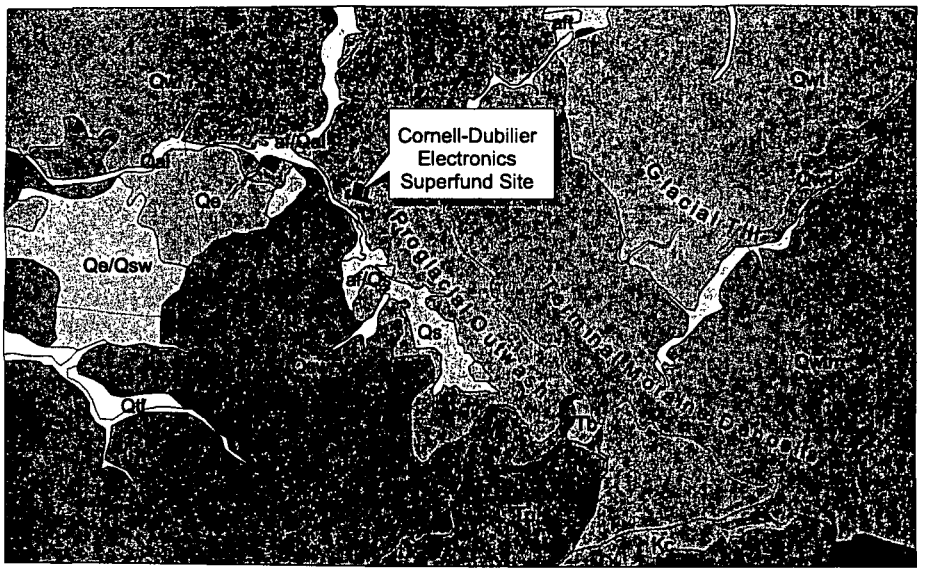


Surficial Geology

LEGEND:

Surficial Deposits

- Qal - Quaternary alluvium
- Qe - Eolian deposits
- Qe/Qsw - Eolian/weathered bedrock
- Qs - Freshwater swamp and marsh deposits
- Qsw - Weathered shale, mudstone, sandstone
- Qtl - Lower stream terrace deposits
- Qwd - Weathered Diabase
- Qwf - Glacial stream deposits
- Qwt - Glacial till
- Qwtm - Terminal moraine deposits
- Tb - Tertiary
- Tp - Tertiary Pennsauken Formation
- Kc - Cretaceous clay
- af - Artificial fill
- af/Qal - Artificial fill/native alluvium
- af/Qs - Artificial fill/native soil
- aft - Artificial fill (trash)



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Source: State of New Jersey, Dept of Environmental Protection
Office of Information Management
GIS Resource Data

Cornell-Dubilier Electronics Superfund Site

Figure 3-3
Geologic Setting
Facility Soils and Buildings RI Report

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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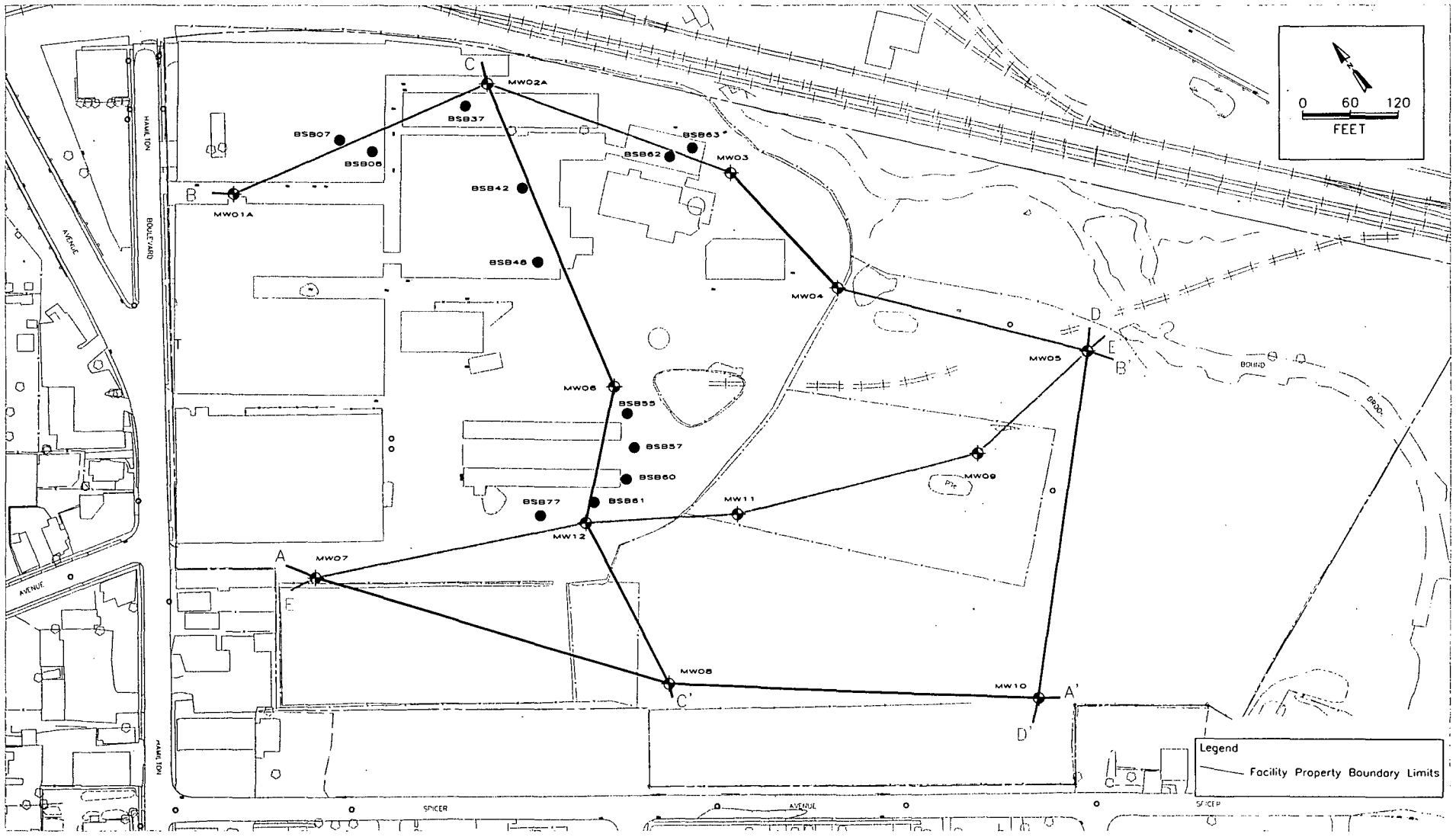

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Location of Cross-Sections
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

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CHKD: GJ	REV.: 1	FIGURE NO.: 3-4	
DES.: TF	APPD: LH		

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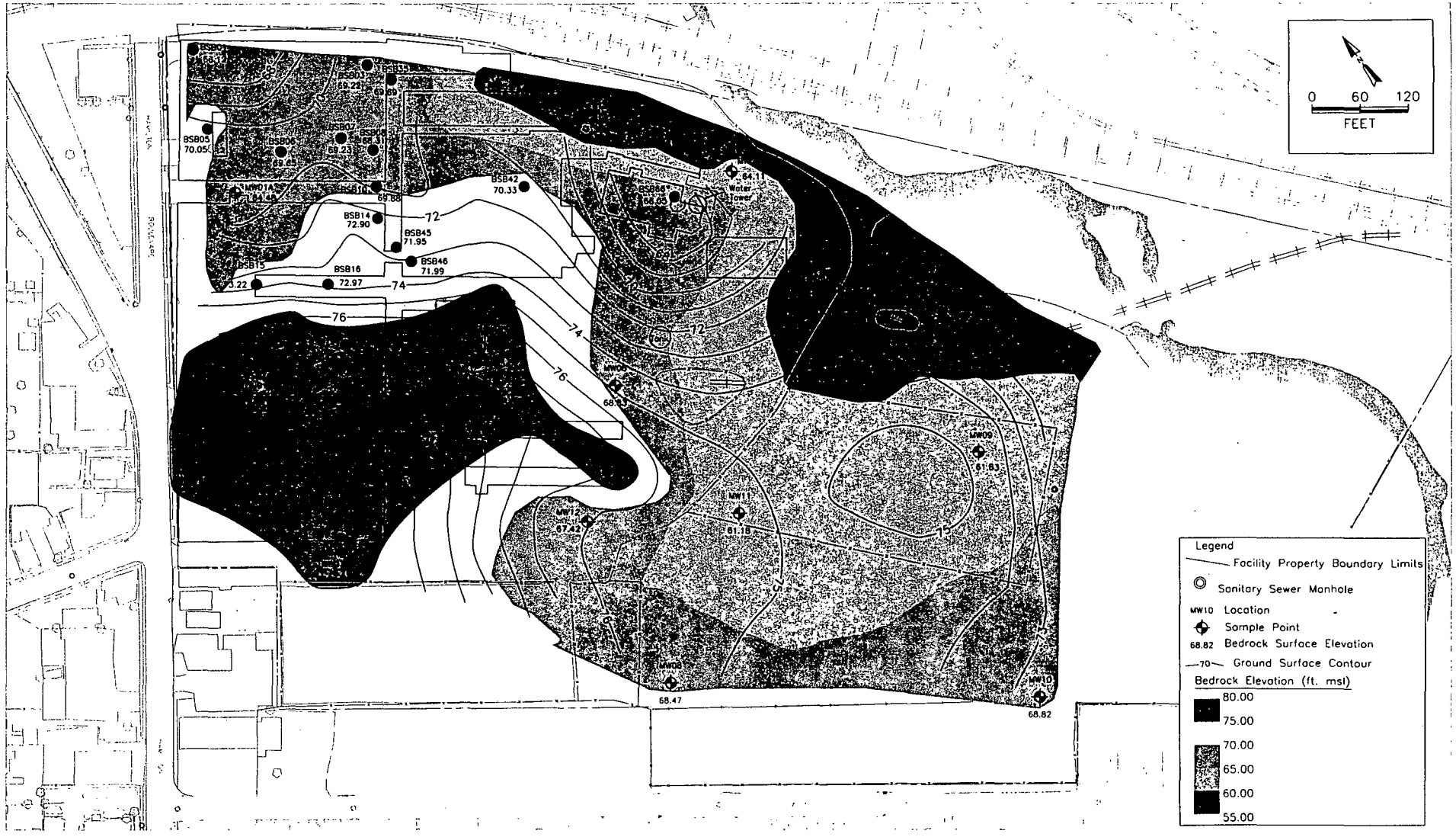

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Bedrock Surface Elevations
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

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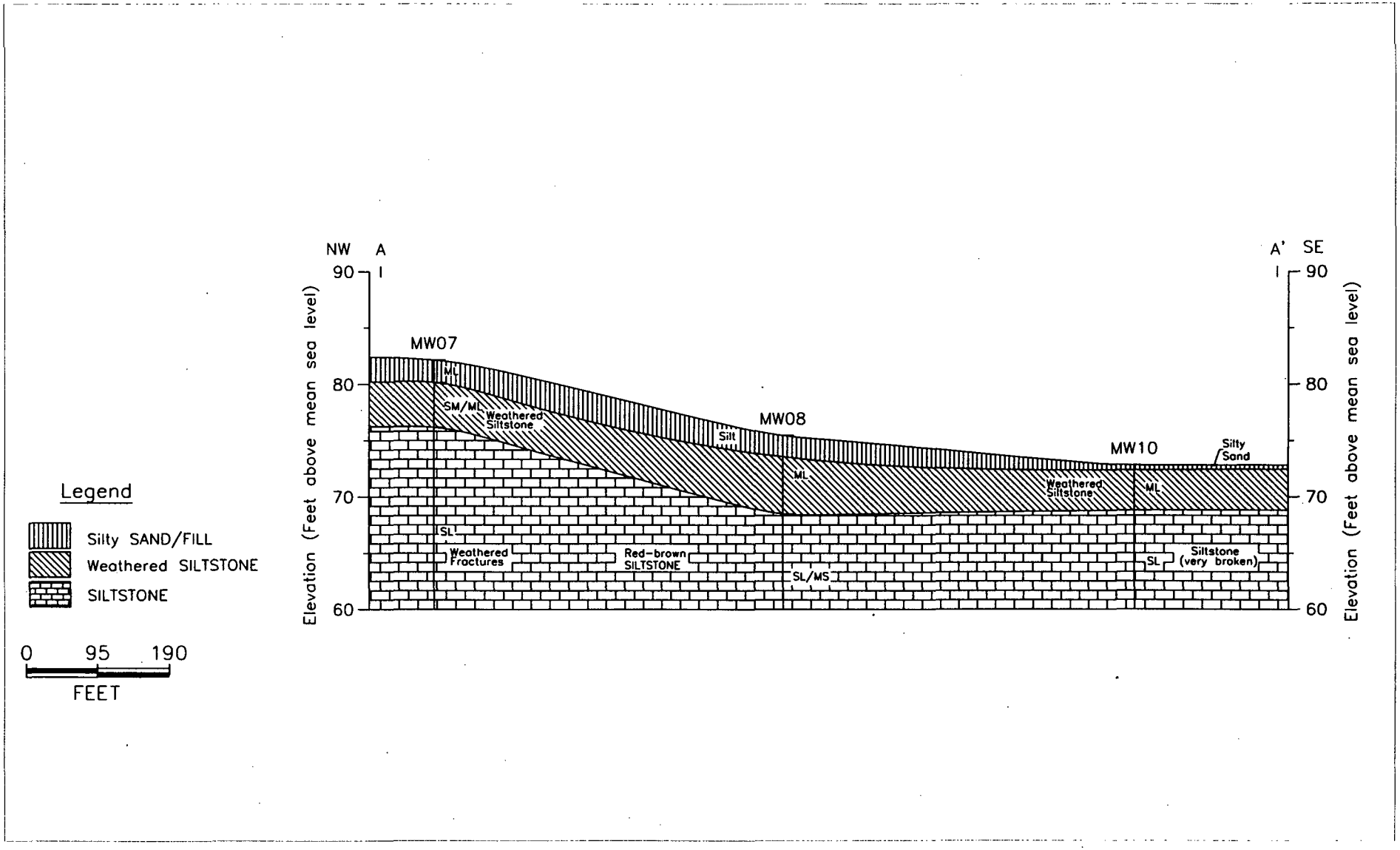

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FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:

Cross-Section from A – A'

Cornell-Dubilier Electronics Superfund Site

Facility Soils and Buildings RI Report

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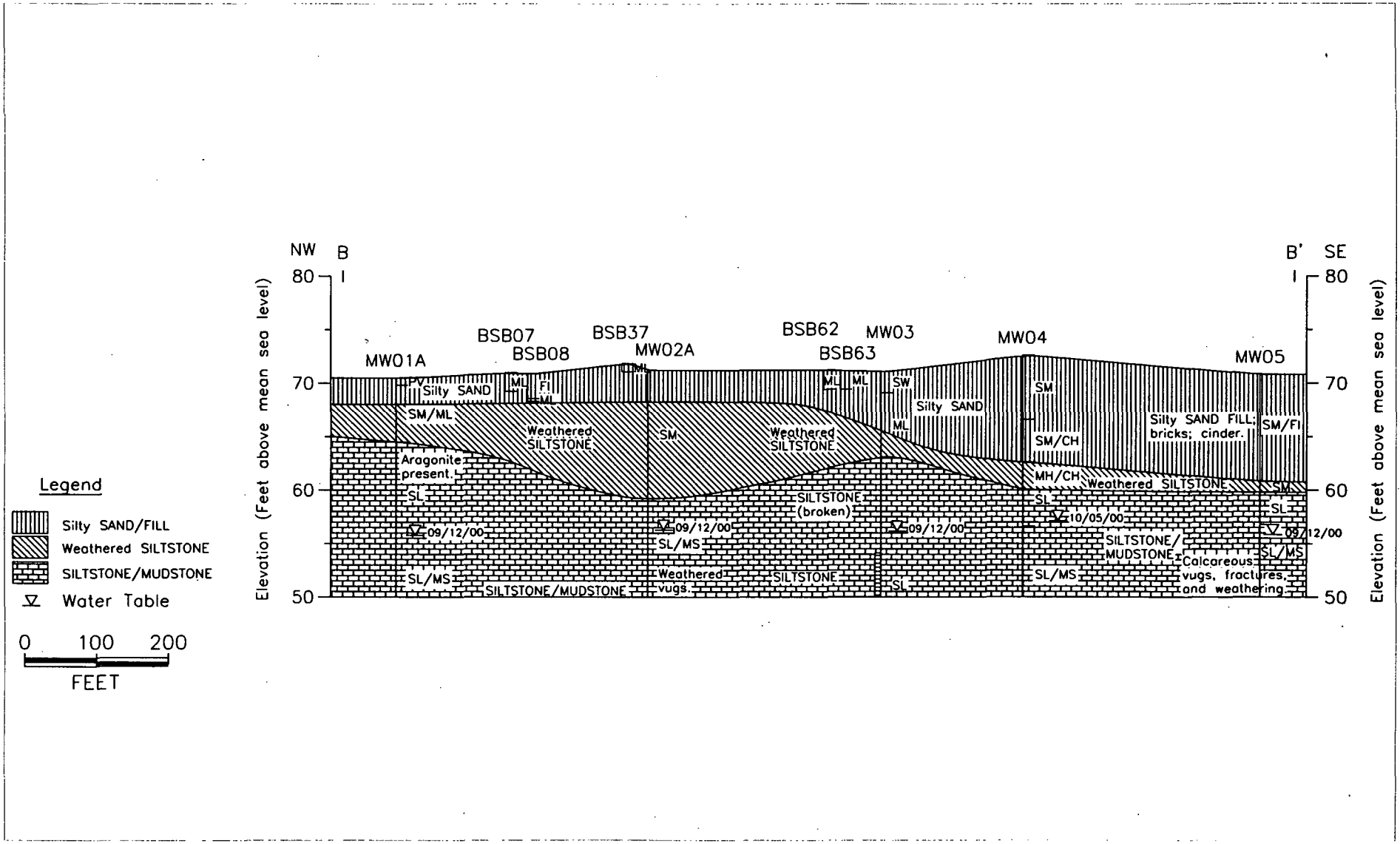
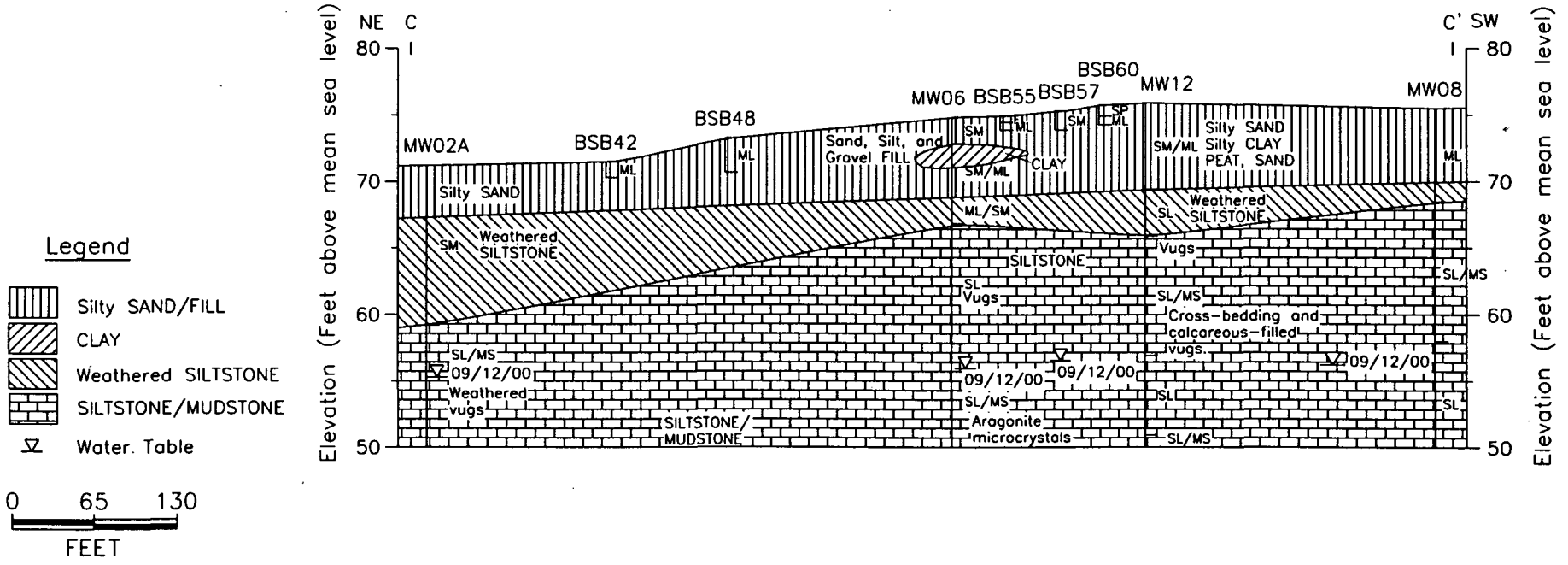
CHKD:	APPD:	FIGURE NO.:
GJ	LH	3-6
DATE:	REV.:	
09/17/01	0	



300093

FOSTER WHEELER ENVIRONMENTAL CORPORATION	TITLE: Cross-Section from B – B' Cornell-Dubilier Electronics Superfund Site Facility Soils and Buildings RI Report	DWN: CTS	DES.: TF	PROJECT NO.: 1945.1018
		CHKD: GJ	APPD: LH	FIGURE NO.: 3-7
		DATE: 09/17/01	REV.: 0	

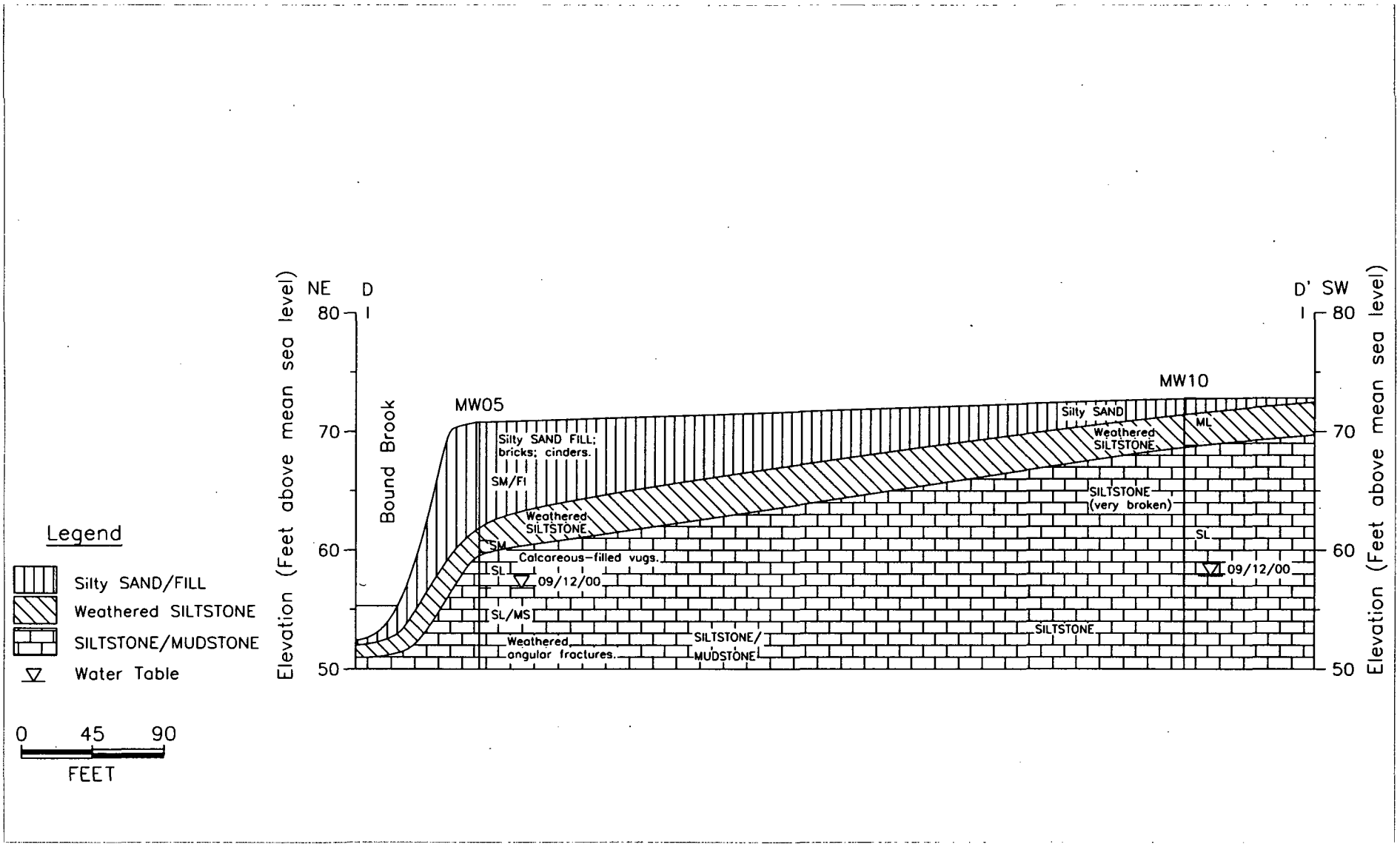


300094

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Cross-Section from C – C'
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
CTS	TF	1945.1018
CHKD:	APPD:	FIGURE NO.:
GJ	LH	3-8
DATE:	REV.:	
09/17/01	0	



300095

FOSTER WHEELER ENVIRONMENTAL CORPORATION

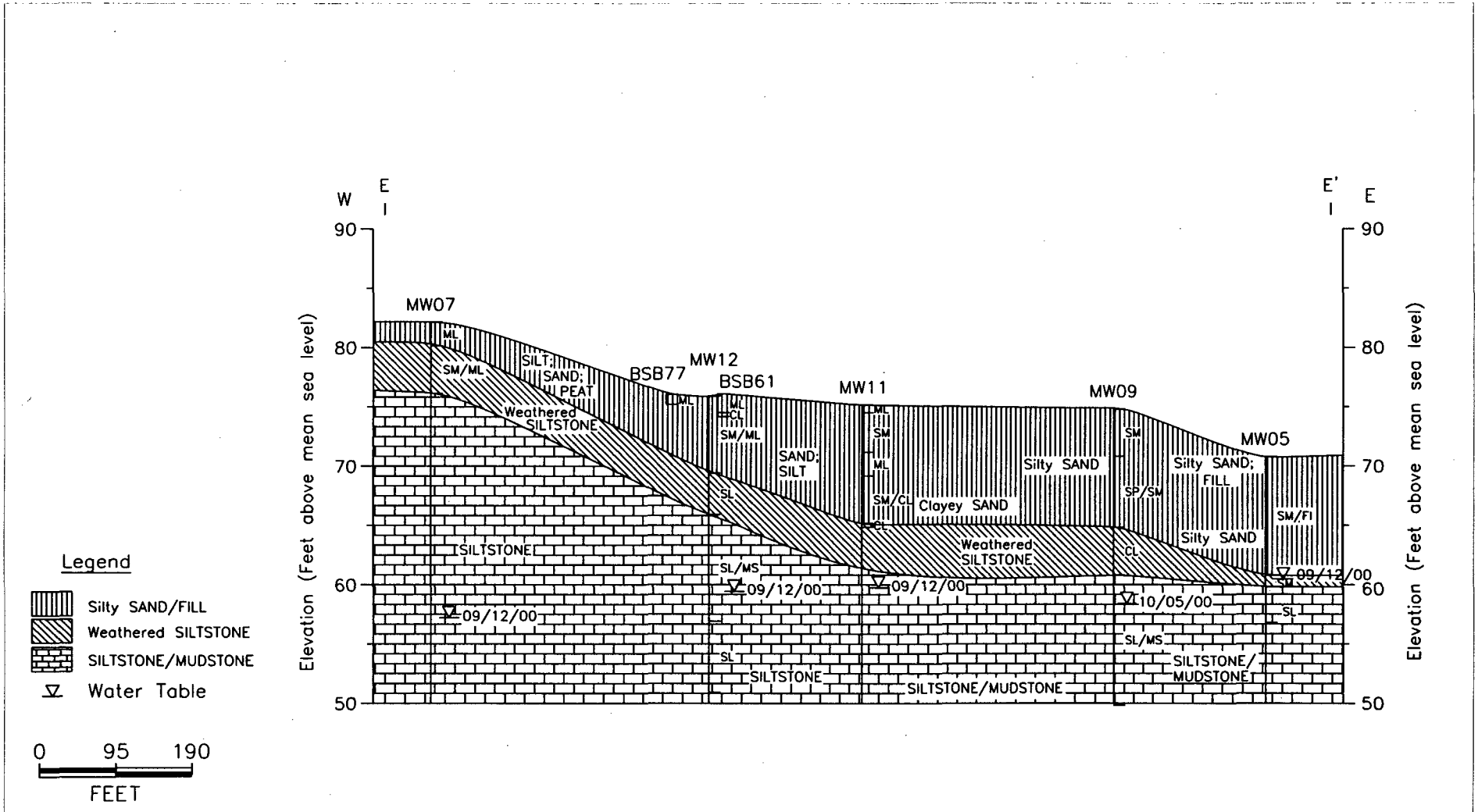
TITLE:

Cross-Section from D - D'

Cornell-Dubilier Electronics Superfund Site

Facility Soils and Buildings RI Report

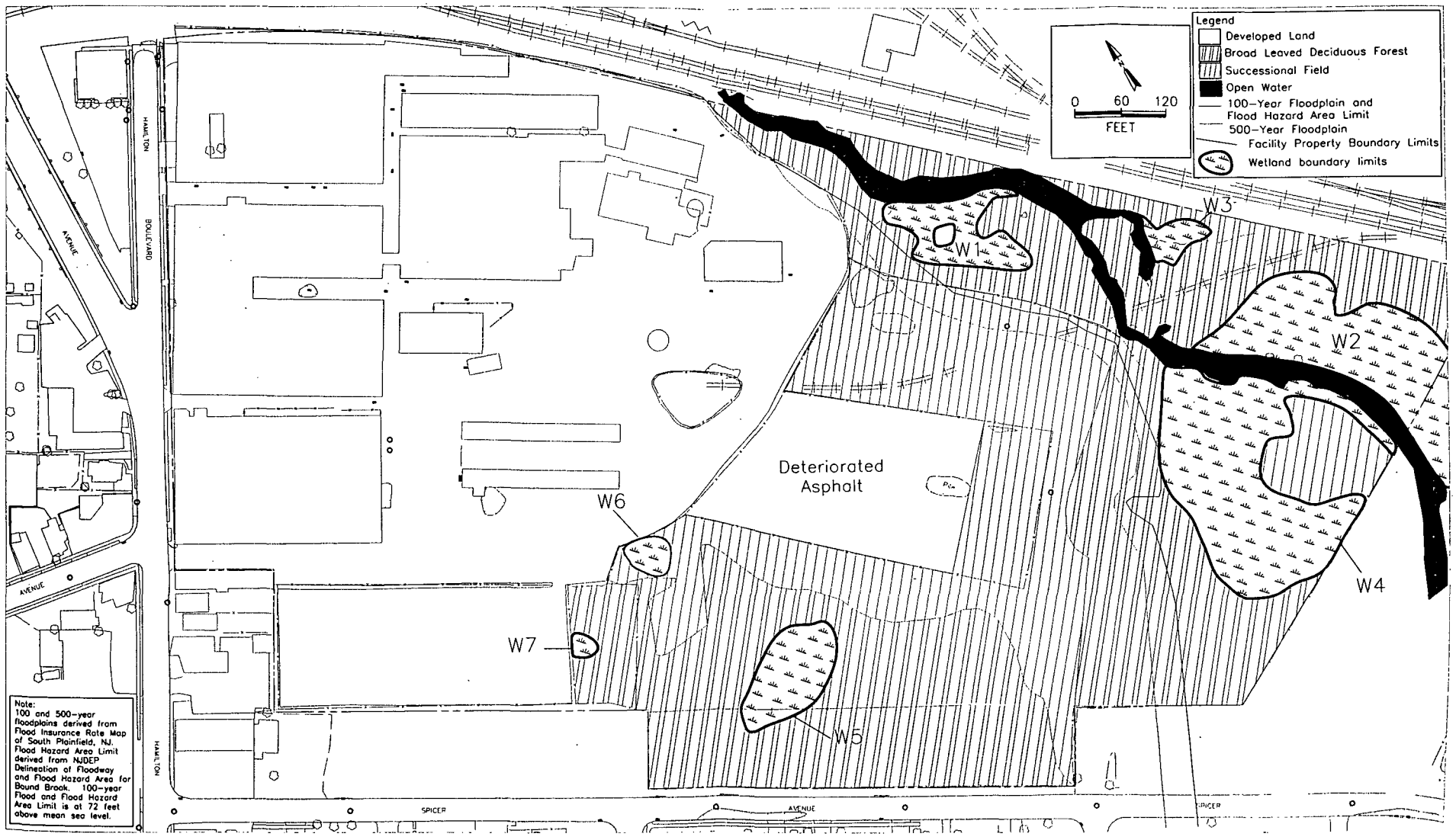
DWN: CTS	DES.: TF	PROJECT NO.: 1945.1018	
CHKD: GJ	APPD: LH	FIGURE NO.: 3-9	
DATE: 09/17/01	REV.: 0		



300096

FOSTER WHEELER ENVIRONMENTAL CORPORATION	TITLE: Cross-Section from E – E' Cornell-Dubilier Electronics Superfund Site Facility Soils and Buildings RI Report	DWN: CTS / DES.: TF	PROJECT NO.: 1945.1018	
		CHKD: GJ / APPD: LH	FIGURE NO.: 3-10	
		DATE: 09/17/01 / REV.: 0		

300097



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Ecological Settings
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/08/01	PROJECT NO.: 1945.1018	
CHKD: GD	REV.: 0	FIGURE NO.: 3-11	
DES.: JS/LBR	APPD: LH		

300098

4.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination for the facility soils and buildings was assessed as part of the OU-2 evaluation. Due to historic practices, areas of the property have the potential to be contaminated with PCBs, TCE and its dechlorination products, and other constituents (see Section 1.2).

4.1 Data Collection and Analyses

The OU-2 RI investigation included the surveying of areas for buried materials and possible source areas. In addition, the sampling of soil gas, soils, perched groundwater, building floor dust, and drainage system sediments and waters was performed to delineate the nature and extent of potential contamination in the facility soils and in/around the facility buildings.

As stated in Section 2.3, an on-site mobile laboratory analyzed soil gas samples from vadose zone soils for selected volatile organics. A gas chromatograph, equipped with an electron capture detector (for chlorinated hydrocarbons) and a flame ionization detector (for petroleum hydrocarbons), was used during on-site analysis of the vapor samples.

The shallow soil, subsurface soil and drainage system sediment samples were analyzed for the full list of TCL organic and TAL metal and cyanide constituents, as per the EPA Contract Laboratory Program (CLP) Statements of Work (SOWs) OLM04.2 and ILM04.1, respectively. Soil samples from the monitoring well borings were also analyzed for TOC and grain size distribution. In addition, selected soil samples from locations SS02, SS03, MW04, MW09, and MW11 underwent PCB congener and/or dioxin/furan analyses.

The test pit perched water and the drainage system water samples were analyzed for Low Concentration organics and TAL metals and cyanide, as per the EPA CLP SOWs OLC02.1 and ILM04.1, respectively. The perched water collected during drilling of the monitoring well boreholes was only analyzed for Low Concentration VOCs and Low Concentration PCBs due to the limited amount of water available.

The building floor dust samples were collected for TCL PCB and TAL metal analyses following EPA CLP SOWs OLM04.2 and ILM04.1, respectively.

For those samples analyzed for TCL PCBs as per the EPA CLP SOWs, which provide quantitative measurement of seven Aroclor compounds, the concentrations of the detected Aroclor compounds for a sample were summed and reported as "Total PCBs."

The analytical sample results from the off-site laboratories underwent a systematic data validation to provide assurance that the data was adequate for its intended use (i.e., in the performance of human health and ecological risk assessments, and a feasibility study). Validation was performed by personnel with the appropriate training and/or experience in performing data validation for the analyses of interest associated with the project. The validation was based on an evaluation of method-specific QC information (such as holding times, calibration records, laboratory and field blanks, duplicate precision, and surrogate and matrix spike recovery), the best professional

judgement of the validator, and EPA Region 2 Data Validation Standard Operating Procedures (SOPs). Qualifiers (as applicable) were added to the data based on the results of the validation.

Data qualifiers are noted throughout the text and tables to indicate constituent concentrations which are undetected (designated with a "U", "ND" or "-"), estimated ("J"), presumed present ("N"), and/or rejected ("R"). Additional data qualifiers include "D" (concentration provided from dilution analysis), "B" (for organics, constituent also detected in associated blank; for inorganics, constituent concentration detected between the instrument detection limit and the contract required quantitation limit), and "P" (constituent had a greater than 25 percent difference in concentration between two gas chromatograph columns). Where values are not followed by such designations, the compounds were detected at the given concentrations and in the measurement units indicated (e.g., micrograms per kilogram or ug/kg, mg/kg, ug/L).

An evaluation of the RI and previous investigative data was performed to determine the usability of the data in the conceptual site model, risk assessments and feasibility study. The data fulfilled the site-specific quality assurance requirements with only minor exceptions (e.g., 3.2 percent of the results were deemed unusable). Therefore, the site database is considered acceptable for use to support decisions during remedial activities.

Tables of the validated analytical results from the OU-2 RI sampling investigation are presented in Appendix G by fraction and matrix.

4.2 Selection of Screening Criteria

Screening criteria were used to assist in the interpretation of the nature and extent of contamination. These values include Applicable or Relevant and Appropriate Requirements (ARARs), i.e., standards promulgated under federal or state law, and "to be considered" (TBC) guidance values, which are not promulgated. Sections 4.2.1 through 4.2.3 define the specific screening criteria that will be used for comparison for shallow/subsurface soil, perched water and drainage system constituents. At this time, no applicable screening criteria exist for comparison to the floor dust samples collected during the investigation; however, the shallow soil levels may be utilized as an approximate comparison. For all matrices, when there was more than one criterion value for a specific constituent, the most conservative value (i.e., the lowest) was utilized during the comparison evaluation.

In addition, NJDEP's *Technical Requirements for Site Remediation* (NJAC 7:26E) were reviewed as an ARAR for the Cornell-Dubilier Electronics site. Included in this document are the minimum requirements for investigation and remediation of contamination at sites in New Jersey (NJDEP, 1997c). Section 7:26E-4.1(b) of this NJDEP document was of specific importance to the evaluation of the nature and extent of contamination, as this section defines the requirements for the delineation of contaminants at a site.

Matrix-specific cleanup goals for the facility will be evaluated during the FS.

4.2.1 Shallow/Subsurface Soils

Screening criteria for shallow and subsurface soils are provided on Tables 4-1 and 4-2, respectively.

EPA has developed Generic Soil Screening Levels (SSLs), using default values in the standardized equations (EPA, 1996b; 2001g). There are Generic SSLs for ingestion of and direct contact with soil, inhalation of volatiles and particulates, and migration to groundwater. The values for the migration to groundwater are based on a Dilution-Attenuation Factor (DAF) of 20 to account for natural processes that reduce contaminant concentrations in the subsurface. The SSL values provided in the 2001 EPA document (EPA, 2001g) are divided into residential and commercial/industrial (indoor and outdoor worker) scenarios. For the purpose of assisting in the interpretation of the nature and extent of contamination, the more conservative residential values were chosen, even though, depending on the constituent, these SSLs may be based on previous (i.e., at least 6 years old) studies. The human health risk assessment also compares constituent concentrations to screening levels for determination of chemicals of potential concern, and the latest toxicity information were utilized during this comparison (see Section 6.2.3 and Appendix I, Tables 2.1 through 2.5).

Additional Superfund Guidance Values for residential soil were obtained from EPA for Total PCBs and dioxin (EPA, 2002a), as shown on Table 4-1.

NJDEP has developed Soil Cleanup Criteria for direct contact (DCSCC) and impact to groundwater (IGWSCC) (NJDEP, 1999b). These values are TBC guidance levels. Direct contact values are further divided into residential (R) and non-residential (NR) criteria. At this time, there is no "restricted use" deed notice associated with the site property, which negates the use of the non-residential values according to NJDEP. Therefore, the residential criteria values are presented.

For the shallow soils (Table 4-1), the ecological soil screening values presented are the Preliminary Remediation Goals (PRGs) for Ecological Endpoints derived by the U.S. Department of Energy (Efroymson et al., 1997a).

4.2.2 Perched Water

As indicated in Table 4-3, groundwater screening criteria include Maximum Contaminant Levels (MCLs) found in EPA *Drinking Water Regulations and Health Advisories* (EPA, 2001a; 2001h) and NJDEP *Drinking Water Standards* (NJDEP, 1996; 1997b). In addition, Class IIA standards present in NJDEP *Groundwater Quality Standards* (NJDEP, 1993; 2002a); were selected as potential screening criteria. Although both the EPA and NJDEP criteria are based on the aquifer being a source of potable groundwater, these values were utilized for the perched water based on the likelihood that the perched water percolates through the soils and recharges the underlying bedrock aquifer groundwater, which has the potential for use as a potable water source.

As stated previously, bedrock groundwater will be evaluated during OU-3 activities.

4.2.3 Drainage System

The shallow soil criteria presented in Table 4-1 were used for interpretation and comparison of drainage system sediment results, as these sediments are likely the result of deposition of surface soil particles transported within storm water runoff.

The drainage system water results were compared to surface water quality standard values determined by EPA (1999g) and NJDEP (2002b), based on the knowledge that water from the drainage system flows through two of the outfalls to Bound Brook (see Section 2.7.2). The screening criteria are provided in Table 4-4. For the EPA values, the lower of the freshwater "criterion maximum concentration" and "criterion continuous concentration" (denoted in freshwater column) and the lower of "water and organism" and "organism" values (denoted in human health column) were chosen. The NJDEP values shown are for protection of human health, and the lower of the values (i.e., the most conservative) for the acute or chronic protection of aquatic life.

4.3 Previous Investigations of Site Soils and Buildings

4.3.1 EPA Investigations

Soil Investigations

Between June 1994 and July 1996, EPA conducted soil sampling at the facility property (see Section 1.2.5). Surface and subsurface soil samples were collected from the facility roadways which, at that time, were generally a combination of dirt, gravel and stone (EPA, 1997d); the open field area in the center of the property (including the area of the former truck driving school and along the former foot/bicycle path); and in the southeastern and eastern floodplain areas. Six test pits were excavated, and stained subsurface soils, drum carcasses, electrical parts, paper-thin mica-like chips, wood, and debris were revealed (EPA, 1997d). VOCs, SVOCs, PCBs, and metals were detected in the various soil samples. Elevated concentrations were especially noted for Aroclor-1254 and lead, and the concentrations for these constituents from the June/July 1996 event are presented on Table 4-5. Figure 4-1 shows the estimated sampling locations for this investigation.

Aroclor-1254 concentrations ranged up to 51,000 mg/kg, and this maximum concentration was located near the northeast corner of the fenced area. As shown on Table 4-5 and Figure 4-1, elevated Aroclor-1254 concentrations were also present on the surface of the facility roadway (up to 340 mg/kg); below the partial gravel/stone layer of the roadway (up to 22,000 mg/kg); and near/along the foot/bicycle path (up to 5,000 mg/kg). Subsurface soils from the test pit investigation were found to contain detectable levels of Aroclor-1254 from 4 mg/kg (TP3B) to 1,900 mg/kg (TP5A) (Table 4-5).

Lead was detected at concentrations ranging from 8 mg/kg to 66,600 mg/kg in the open area (i.e., near the northeastern corner of the fenced area and along the foot/bicycle path). Lower concentrations of this analyte were present on the surface of the roadway (up to only 340 mg/kg); however, beneath the partial gravel/stone layer of the on-site roadway, lead was detected between 46 mg/kg and 7,460 mg/kg (Table 4-5 and Figure 4-1). Test pit subsurface soils contained lead concentrations up to 1,970 mg/kg (TP6A).

Building Investigations

A total of 27 wipe samples were collected from 12 facility buildings on 21 March 1997, and analyzed for PCBs, lead and cadmium (Table 4-6). Aroclor-1254 was detected from 0.4 micrograms per 100 square centimeters (ug/100 cm^2) to 500 ug/100 cm^2. Also present in 12 of the samples was weathered Aroclor-1260, with concentrations up to 180 ug/100 cm^2. Lead (0.67 ug/100 cm^2 to 780 ug/100 cm^2) and cadmium (0.09 ug/100 cm^2 to 34 ug/100 cm^2) were identified in 27 and 26 of the building wipe samples, respectively.

In June 1997, EPA conducted additional sampling (chip, air and/or vacuum dust sampling) of three building interiors at the facility (Building Nos. 5, 5A and 18), with additional air samples also collected at "trucking fenceline" and "roadway corner, trucking facility." As shown in Table 4-7, the samples were analyzed for PCBs, lead and cadmium. Concentrations of Aroclor-1248 and Aroclor-1254 as high as 31,000 mg/kg and 57,000 mg/kg, respectively, were measured in the chip samples. The dust and chip samples also indicated occurrences of lead (maximum concentration of 3,800 mg/kg) and cadmium (maximum concentration of 130 mg/kg). Detected concentrations in the air samples ranged up to 33 ug/m^3 for PCBs, up to 0.971 ug/m^3 for lead, and up to 0.054 ug/m^3 for cadmium (Table 4-7).

4.3.2 NJDEP Investigations

In September 1986, NJDEP personnel performed surface soil sampling at the facility (exact locations are unknown). The samples were analyzed for organics and metals. 1,1-Dichloroethene (1,1-DCE; 38 ug/kg to 88 ug/kg) and TCE (35 ug/kg to 79 ug/kg) were detected, as was Aroclor-1254 (up to 680 mg/kg). Twelve metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc) were also present in these soil samples.

4.4 Contaminant Source Investigation

4.4.1 Historical Information

An evaluation of available historical information was performed to determine potential contaminant source areas. Aerial photographs dating from the 1940s to the 1990s were reviewed in order to acquire a representative understanding of property developments. Attention was specifically paid to discolored areas, tank-like objects, potential debris piles, etc. In addition, a 1956 insurance map of the western portion of the facility property was examined (FIA, 1956), as were various property owner documents (DSC, 1990a; 1990b). Figure 4-2 presents the possible areas of concern for the property determined from the available historical information.

In general, the aerial photographs indicated extensive areas of surface discolorment in the central portion of the property. As shown in Figure 4-2, to the south of the former railroad tracks, the discolored areas were generally light colored, typically indicating a lack of vegetation and/or disturbance of the land surface. These light colored patches were noted beginning on the 1940 aerial photograph, and may originally be related to construction of the railroad spurs. The size and shape of the areas changed during the years, with the largest tract present in the mid 1960s and the smallest in the 1995 aerial photograph.

Between the historic railroad spurs, the discolorment was of a darker nature, which may be related to land disturbance or saturated/stained soils (Figure 4-2). This area was not present until the 1951 aerial photograph, and by 1963, had decreased significantly in size. Large circular structures, possibly tanks, were noted in and directly south of this discolored area, as shown in Figure 4-2. In addition, during their 1985 inspection of the facility, NJDEP personnel reported observing stained soil and four tanks at the top of the embankment in this general portion of the property (EPA, 1995a).

A small area of light discolorment was also noted in the north-northeastern portion of the property during review of the 1947 aerial photograph. Building No. 8 was not present on this photograph; however, it was present on the next available aerial photograph (1951). Therefore, it is likely that this discolored area is related to land disturbance during construction of Building No. 8.

The review of the aerial photographs indicated two areas containing numerous unidentifiable objects, potentially debris. An area to the northeast of the former railroad tracks was noted beginning in 1974. The 1994 aerial photograph showed activity in the fenced area to the south-southwest of Building No. 12 (Figure 4-2).

As shown on Figure 4-2, fuel oil tanks were historically located to the northeast (one 11,000-gallon and two 8,000-gallon aboveground tanks), east (one 125,000-gallon aboveground tank) and south (one 5,000-gallon tank) of Building No. 11 (FIA, 1956; NJDEP, 1990). The eastern tank is still present on the property; however, it reportedly no longer contains fuel oil. The southern tank is believed to have been located below ground. Additional information on the tanks, including removal dates of the northeastern and southern tanks, was unavailable. According to communication between the property owner and NJDEP (DSC, 1990a; 1990b), "oil [was found] on top of the ground water" and in a pit in the basement of Building No. 15 in July 1990. The extent of the contamination was determined to encompass the area between Building No. 15, the "former location" of the northeastern tanks, and the eastern tank (DSC, 1990b), and this area is shown on Figure 4-2.

4.4.2 Geophysical Survey

As stated in Section 2.3, a geophysical survey was conducted from 4 May to 11 May 2000, generally in the central portion of the property. The geophysical data were interpreted by assessing the signal intensity and shape of the measurements from the EMI and magnetic datasets. Raw data results are provided in Appendix A. Color-coded maps of the EMI and magnetic signal intensity were generated to exhibit areas of large-scale waste disposal (Figures 2-1 and 2-2, respectively). Those areas which generally showed the greatest signal intensity are also presented on Figure 4-3.

The results indicate that the amount of buried material decreases toward the south and east of the survey area. In the southwestern section of the survey area, the geophysical data suggest that the debris is widely scattered and shallow (i.e., less than 3 feet deep). The eastern border of the survey area is characterized by increased subsurface debris; however, the largest amount of material exists within the central, western and northern sections of the geophysical survey area.

From the northeastern portion of the former truck driving school area (i.e., in the central section of the survey) to the embankment leading to Bound Brook, the geophysical data suggest that there is an increased metallic component to the shallow buried material. As shown on Figure 4-3, this area

trends approximately east-west and is approximately 300 feet in length and up to 140 feet in width. Based on the geophysical survey results, test pits TP02, TP08 and TP09 were located in the southeastern, western and southwestern portions of this anomalous area, respectively (Figure 4-3). Excavation of these test pits relatively confirmed the geophysical interpretation (further discussed in Section 4.4.4).

Smaller anomalous areas were noted in the northern and western portions of the survey area. The data suggest that there is more mixed material (i.e., metallic and non-metallic) waste in these areas when compared to the eastern one.

4.4.3 Soil Gas Survey

A report detailing the soil gas survey was prepared by Columbia and is presented in Appendix B. Tabulated results from the survey are also provided in Appendix G, Table G-1.

The main contaminant of concern detected during the soil gas survey at elevated levels was TCE. TCE was present across most of the interior of the facility property, along with several of its chlorinated breakdown products. As shown in Figure 4-3, four areas of elevated chlorinated hydrocarbon occurrences (i.e., sum total greater than 100 ug/L) were noted, including near the northeastern corner of the former truck driving school fence; in the vicinity of the southwestern corner of the former truck driving school fence; to the southwest of Building No. 12; and to the northeast of Building No. 11. *In situ* soil gas from locations SG190, SG082, SG039, and SG037 (Figure 2-3) contained the maximum concentrations of TCE in these areas (420 ug/L; 2,200 ug/L; 14,000 ug/L; and 35 ug/L, respectively).

Non-chlorinated VOC compounds detected during the soil gas survey, including a presence of "FID Total Volatiles," were more scattered around the property. As noted in Columbia's report, "FID Total Volatiles" is a quantitative representation of the flame ionization detector response to the toluene calibration response factor, as the occurrence did not match any target analyte retention time. As shown on Figure 4-3, possible areas of concern for the non-chlorinated VOCs (i.e., sum totals greater than 1,000 ug/L) included the following:

- Northern portion of the property, between Building Nos. 1B and 2 (36,000 ug/L at SG010);
- East of Building No. 9B (2,500 ug/L at SG034);
- Southeast of Building Nos. 11 and 12, near the former fuel tank area (maximum of 40,014 ug/L at SG048/SG049/SG050/SG054/SG055/SG065);
- Southwest of Building No. 12 (maximum of 16,004 ug/L at SG039/SG231/SG232);
- Southwest of Test Pit TP06 (7,400 ug/L at SG075);
- South-southeast of Building No. 14, near the property's northeastern fenceline (2,349 ug/L at SG144); and
- Southern portion of former truck driving school, near TP09 (2,300 ug/L at SG213).

The areas with elevated soil gas concentrations were typically investigated further during the test pit excavations, monitoring well boring activities, and building soil boring activities.

4.4.4 Test Pit Excavations

Ten test pits were excavated within the central portion of the property between 7 June and 14 June 2000 (Figure 4-3). Various types of debris were noted during the excavations, and full descriptions of the test pit contents are presented on the Test Pit Records provided in Appendix C. The results from the soil and perched water samples collected from the test pits are discussed in Section 4.6.

General construction/demolition debris, such as bricks, wood, concrete, etc., was present in a majority of the test pit locations. TP01, located in the east-northeastern portion of the facility property along the embankment, contained scrap metal, automobile parts, and steel cable. Miscellaneous metallic debris was also excavated from TP02, including sheet metal, steel blocks, and metal buckets. In addition, test pit TP02 was found to contain ceramic electrical parts and drum components.

Capacitors, denoted as "electrical boxes" on the Test Pit Records, were unearthed during excavation of locations TP06, TP08, and TP09. As shown on Figure 4-3, these three test pits were located in anomalous areas from the geophysical survey, confirming the geophysical interpretation of buried metallic material. Further inspection of the TP08 and TP09 capacitors, performed by EPA and Foster Wheeler Environmental personnel after test pit removal, revealed that some of the capacitor boxes appeared corroded and/or partially burned. Other indications of disposal in these areas were the presence of white and blue crystalline powder (TP08 and TP10), "mica-like" and "battery-shaped" pieces of material (TP08), 2-inch long white cylindrical objects (TP09), 5-inch diameter cardboard disks (TP09), and ceramic electrical components (TP09). Selected photographs taken during excavation of test pits TP08, TP09, and TP10 are presented in Appendix H.

In comparison to the other excavations, debris was not noted in test pits TP04 and TP05. TP04 contained dark brown ash-like material within the upper 3 feet. Additionally, a pocket of light gray ash-like material, approximately 3 feet wide and up to 1 foot thick, was observed in the western portion of the test pit. Gravel layers were found in TP05, with light gray gravel present from approximately 0.5 to 2 feet bgs and dark gray gravel present from approximately 2 to 3 feet bgs on the northern side of the test pit and almost non-existent on the southern end. An oily water seep appeared within this dark gray gravel layer, approximately 3 feet from the northern end of TP05.

4.5 Building Floor Dust Investigation

A total of 32 building floor dust samples, and 2 duplicate samples, were collected in the facility buildings during the RI field activities, and these samples were analyzed for TCL PCBs and TAL metals (Appendix G, Tables G-2 and G-3). Table 4-8 provides a summary of the constituents detected in the floor dust samples, and figures indicating relative ranges of concentrations (i.e., not risk or screening level based values) were generated for selected constituents (Figures 4-4 through 4-9).

Aroclor-1254 was detected in all of the floor dust samples collected, and concentrations ranged from 4.9 mg/kg in a sample from Building No. 3/4 to 8,300 mg/kg in a sample from Building No. 1. As indicated in Table 4-8 and Figure 4-4, the more elevated concentrations of Aroclor-1254 (i.e., greater than 500 mg/kg) were present in Building Nos. 1, 1B, 5, and 6. A majority of these high

concentration samples were collected from bare floors in warehouse or production areas of the buildings (refer to Table 2-1 for location descriptions).

As shown in Table 4-8, with the exceptions of selenium and thallium, all of the metals were detected in at least one of the samples collected from each of the facility buildings. Selenium and thallium were present in 19 and 12 leasable spaces, respectively. A discernible, consistent concentration pattern was not generally present for the detected metals. Elevated concentrations varied across the locations, with maximum metal values present in 14 different buildings. Typically, the floor dust samples from Building Nos. 1, 2A, 5, 9, 9C, 14, and/or 15 contained numerous metals (e.g., arsenic, lead, mercury) at higher concentrations (although not necessarily the maximum value for a specific individual metal). With the exceptions of samples BFD01-01 and BFD15-01, which were collected from carpeted floors, these buildings had bare floors (Table 2-1). To illustrate the varying distributions of metals, concentrations for five potential contaminants of concern (arsenic, cadmium, chromium, lead, and mercury) were mapped on Figures 4-5 through 4-9 using arbitrary concentration ranges.

4.6 Soils Investigation

To investigate the potential source areas and determine the extent of soil contamination for the facility property, various sampling events occurred during the field investigation. Analytical results for the soil samples are presented in Appendix G, as follows:

Investigation Event	Appendix Tables
Test Pit Soil	G-4 through G-7
Shallow Soil	G-8 through G-13
Monitoring Well Boring Installation Soil	G-14 through G-19
Building Boring Soil	G-20 through G-23

The results of these investigations were separated into shallow (i.e., 0 to 2 feet below ground surface/cover) and subsurface (i.e., greater than 2 feet below ground surface/cover). For the monitoring well boring samples collected under asphalt, the sampling interval depth was based on the bottom of the surface covering (i.e., if the asphalt layer was 0.5 feet thick, the shallow sample was collected from 0.5 to 2 feet). For the building boring soil investigation, the samples were collected beginning at the bottom of the concrete or asphalt layer and then continuing up to 2 feet in depth, depending on refusal (i.e., if the concrete layer was 0.5 feet thick, the building boring soil samples were collected from 0.5 to 1.5 feet and from 1.5 to 2.5 feet). Only those building boring soil samples collected less than 2 feet in depth from the bottom of the surface covering were included in the shallow soil results.

In addition, separation of the data results occurred based on topography/surface features, sampling location, potential source, and concentration distribution. The property was divided into six general areas for ease of discussion, as follows: northern developed portion, southern developed portion, southwestern undeveloped portion, central undeveloped portion, northeastern undeveloped portion, and floodplain undeveloped portion (Figure 4-10).

4.6.1 Shallow Soils

A total of 96 samples (and 6 duplicate samples) were collected from the 0 to 2-foot interval across the property, and the results of the shallow soil investigation are summarized, by facility property area, in Table 4-9. Exceedances of the most conservative screening criteria values (for at least the maximum value per concentration range) are noted on the table with shading, and these constituents and their respective concentrations are also presented on Figure 4-11 by sample location. In addition, isoconcentration contour maps (Figures 4-12 through 4-24) were generated for specific constituents to illustrate the horizontal extent of known contamination in the shallow soils; further discussion of these figures is provided in the applicable subsections. Acetate overlays depicting the facility property boundary and the location of the seven delineated wetlands (see Section 3.6.1) are provided at the start of the isoconcentration figures, to assist in determining the relationship between the facility contamination and the property features.

Polychlorinated Biphenyls

PCBs were present in the shallow soils across the entire facility property. Only six of the samples contained non-detectable levels of these compounds (i.e., a frequency of detection of approximately 0.94), and all of these locations were in the northern developed area. As shown in Table 4-9, with the exceptions of Aroclor-1242 and Aroclor-1260, the northern developed and the southwestern undeveloped portions generally had lower concentrations of PCBs than the other four sampled areas. Aroclor-1242 was present just in the northern and southern developed portions. Aroclor-1260 was detected in the shallow soils of only the northern developed and southwestern undeveloped portions of the property. However, as noted in Table 4-9 and Figure 4-11, all of the portions contained concentrations of both one or more individual Aroclor constituents and Total PCBs exceeding screening criteria by factors ranging from 1.1 to 51,000.

An isoconcentration contour map was developed for Total PCBs in the shallow soils utilizing the sampling results from both the 1996 EPA investigation (see Section 4.3.1) and the OU-2 RI. The maximum concentration detected at a sampling location (if more than one sample was collected in the 0 to 2-foot interval) was used in the contouring, and Figure 4-12 presents the known horizontal extent of shallow soil contamination. The contouring indicates that a majority of the facility property contains Total PCB concentrations greater than the most conservative screening criteria for shallow soils (0.371 mg/kg).

Figure 4-12 also shows six relatively distinct areas of significantly elevated concentrations (i.e., greater than 3,700 mg/kg, which is approximately 10,000 times the screening criteria), trending in a general eastward direction starting near the western corner of the property (west-southwest of Building No. 12) and continuing to the floodplain of Bound Brook. These "hot spot" areas appear to coincide with possible source areas determined in Section 4.4, especially areas of potential land disturbance, geophysical survey anomalies, and test pit debris locations (Figures 4-2 and 4-3). Therefore, the elevated PCB concentrations are likely related to the on-site disposal of PCB-contaminated materials and/or the direct application of PCB-contaminated transformer oils to the shallow soils.

A second representation of the horizontal extent of shallow soil contamination was generated to evaluate the shallow soils in terms of areas that exceed specific criteria values (Figure 4-13). The contour intervals for this figure were based on NJDEP residential DCSCC (0.49 mg/kg), non-residential DCSCC (2 mg/kg), and IGWSCC (50 mg/kg) levels and the EPA Toxic Substances Control Act (TSCA) value of 100 mg/kg.

PCB Congeners

The shallow soil from two sample locations in the floodplain undeveloped portion, SS02 and SS03, underwent analysis for PCB congeners. Of the 94 congener compounds or compound combinations analyzed by the off-site laboratory, 61 were present in the shallow soils (Table 4-9).

Location SS02 contained congener concentrations ranging from 0.65 ug/kg to 49 ug/kg, with a total PCB congener concentration of 460 ug/kg. Congeners were generally present at more elevated levels (i.e., between 81 ug/kg and 6,000 ug/kg) in the shallow soils from SS03. Total PCB congeners in this sample summed to 53,000 ug/kg. The maximum individual congener concentration was detected for the combination BZ 110/77 (Table 4-9), and BZ 77 is 3,3',4,4'-tetrachlorobiphenyl which is a "dioxin-like" congener (see Section 6.2.2.2 for the definitions of "dioxin-like" and "non-dioxin-like" congeners).

Dioxins/Furans

Due to the presence of charred debris material in the test pits and the fact that burning PCBs can result in the generation of dioxins/furans, a limited set of soil samples were subjected to dioxins and furans analysis.

Three shallow soil samples (SS02, SS03, and MW09) were analyzed for dioxins and furans, and all three of the locations contained detectable concentrations of these compounds. As shown in Table 4-9, concentrations were generally lowest in SS02 (floodplain undeveloped portion) and highest in MW09 (central undeveloped portion). Individual dioxin/furan constituents ranged up to 173 picograms per gram (pg/g) in SS02, up to 2,520 pg/g in SS03, and up to 13,510 pg/g in MW09. Maxima for the dioxin/furan homologs (i.e., compounds with an equal number of chlorine substitutions) were 4,430 pg/g (SS02); 14,420 pg/g (SS03); and 52,850 pg/g (MW09), as shown in Table 4-9.

2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is the only constituent in this class of compounds with a screening criterion (i.e., 3.15 pg/g). 2,3,7,8-TCDD was detected in the shallow soils from both SS03 and MW09 at concentrations above this value. As shown in Table 4-9, these concentrations were 10.1 pg/g (SS03) and 56.7 pg/g (MW09), which exceed by factors of 3.2 and 18, respectively.

Volatile Organic Compounds

A total of 30 individual VOCs were detected in the shallow soils, and as shown in Table 4-9, a majority of these constituents (i.e., 23 of the 30; or 77 percent) were present at concentrations less than their respective screening criteria values. In addition, the VOCs were relatively infrequently

detected (i.e., 26 VOCs had frequencies of detection less than 0.20; or 87 percent). Exceptions included cis-1,2-DCE (0.26), acetone (0.35), toluene (0.50), and TCE (0.59).

Seven VOC compounds (cis-1,2-DCE, trans-1,2-DCE, 1,2,4-trichlorobenzene, methylene chloride, PCE, TCE, and vinyl chloride) occurred above screening criteria. As indicated on Figure 4-11, the only exceedance concentration of 1,2,4-trichlorobenzene (5,900 ug/kg) was detected in test pit TP10, and methylene chloride was present above criteria just in shallow soil location SS04 (1,700 ug/kg). The more elevated concentrations of the other VOCs exceeding screening criteria were present in the southern developed (MW06/BSB61), central undeveloped (TP10/MW11) and/or floodplain (SS04) portions of the site (Table 4-9 and Figure 4-11). This distribution trend is illustrated in Figures 4-14 and 4-15, which show the known extent of TCE contamination in the shallow soils utilizing isoconcentration contouring of the maximum concentration in the 0 to 2-foot depth interval. Contour intervals for Figure 4-14 are based on the most conservative screening criteria for TCE (60 ug/kg), while Figure 4-15 was generated using NJDEP residential DCSCC (23,000 ug/kg), non-residential DCSCC (54,000 ug/kg), and IGWSCC (1,000 ug/kg) values. As the magnitude and distribution of concentrations were typically similar for the dechlorination products of TCE (e.g., cis-1,2-DCE, vinyl chloride), separate isoconcentration contour figures were not generated for each of these constituents exceeding screening criteria.

Semi-Volatile Organic Compounds

Thirty-two SVOC compounds were detected within the shallow soil collected during the OU-2 RI sampling. Frequencies of detection ranged from 0.01 (2-chloronaphthalene, caprolactam, and hexachlorobenzene) to 0.69 (fluoranthene, phenanthrene, and pyrene). In general, two classes of semi-volatile constituents - phthalate compounds and PAH compounds - constituted a majority of the occurrences (Table 4-9).

Thirteen individual PAH compounds, biphenyl and carbazole had concentrations greater than their respective shallow soil screening criteria values. As shown on Table 4-9 and Figure 4-11, the more elevated concentrations and the higher number of exceeding compounds occurred for the southern developed portion (MW06/BSB55) and the southwestern undeveloped portion (SS09). This distribution is further illustrated on Figure 4-16, which presents the known extent of on-site Total PAH contamination (i.e., the sum of the detected individual PAH constituents) in the 0 to 2-foot soil interval. The "hot spot" in the middle of the southern developed portion partially coincides with the elevated non-chlorinated soil gas results (see Section 4.4.3 and Figure 4-3), and may be related to the fuel oil tank areas historically present on the property and/or the oil found "on top of the ground water" by the property owner and NJDEP in 1990 (see Section 4.4.1 and Figure 4-2). The sample collected from SS09, in the location of the second, smaller "hot spot," had the appearance of semi-dried tar with a discernible petroleum-based odor, and this likely accounts for the elevated amounts of PAHs. During the duration of RI activities at the site, drums were removed from this location by an environmental consultant to the property owner, and the contents of the drums seemed to be roofing tar. In addition, this part of the southwestern undeveloped portion appeared to contain debris and other objects during review of the aerial photographs (see Section 4.4.1).

Pesticides

Nineteen pesticides, as listed in Table 4-9, were detected across the facility during the shallow soil investigation. The northern developed and southern developed portions had the highest number of constituents (i.e., 18 and 16 pesticides, respectively). Of the 19 detected pesticides, 12 were present at concentrations above screening criteria, and as indicated in Table 4-9 and Figure 4-11, exceedances were found in all portions of the property.

The distribution of concentrations for a majority of the pesticides was similar, with the more elevated concentrations typically appearing in the following areas: boundary of the northeastern undeveloped portion and the floodplain undeveloped portion (SS03/SS05/MW05), eastern corner of the central undeveloped portion (MW09), western corner of the central undeveloped portion (MW11/TP10), southern corner of the southern developed portion near Building Nos. 11 and 12 (BSB56/BSB57/BSB59/BSB60/BSB61), and/or the northern corner of the northern developed portion in Building No. 1 (BSB02/BSB03). Additional elevated concentrations were noted for specific pesticides, such as aldrin in MW06 (55,000 ug/kg), endrin in BSB41 (26,000 ug/kg in the sample from between the concrete layers), and heptachlor in BSB24 (32,000 ug/kg). To illustrate the general concentration trends, three isoconcentration contour maps showing the known horizontal extent of shallow soil contamination were prepared for 4,4'-DDE, dieldrin, and aldrin (Figures 4-17, 4-18, and 4-19).

Metals and Cyanide

The shallow soils contained detectable concentrations of 23 metals and cyanide, and as shown in Table 4-9 and Figure 4-11, most of the metals with available screening criteria exceeded their respective values across the entire property, regardless of portion. Cyanide was not detected above its screening criteria value. A majority of the maximum concentrations for the inorganic constituents (i.e., 18 of 24, or 75 percent) was present on the developed portion.

Numerous areas across the facility property indicated elevated concentrations during isoconcentration contouring of the metals. Figures 4-20 through 4-24 were generated to illustrate the relatively scattered nature of the elevated concentrations, utilizing arsenic, cadmium, chromium, lead, and mercury as examples. As shown on these figures, areas of "hot spot" contamination are located throughout the developed portion of the property, depending on the particular metal. Specifically noteworthy are the soils beneath Building Nos. 1 and 1A (BSB02/BSB05) and in the vicinity of Building Nos. 11 and 12 (BSB55 through BSB61/RA-S21-SS21 [lead only]) which contained numerous metals at elevated concentrations.

The undeveloped portion of the site also showed exceedances for many metals, and as indicated on the figures, locations for these elevated concentrations were generally dependent on the particular metal constituent contoured. For example, both arsenic and cadmium had a "hot spot" within the central undeveloped portion, near MW11 (Figures 4-20 and 4-21). Chromium, although also present at a relatively high concentration near MW11, was even more elevated in the floodplain soils of SS01, SS03, and SS04 (Figure 4-22). Lead, in comparison, was present in the eastern corner of the site, from the northwest corner of the central undeveloped portion (RA-S5-SS5) to the northeastern

undeveloped portion (MW05), and within the floodplain undeveloped portion (RA-S6-SS6), as shown in Figure 4-23.

4.6.2 Subsurface Soils

A total of 59 samples (and 3 duplicate samples) were collected from greater than 2 feet bgs to 14 feet bgs. Table 4-10 presents the results of the subsurface soil investigation, summarized by on-site area. As noted on Table 4-10, no samples of the subsurface soils were collected in the floodplain undeveloped portion of the property. Exceedances of the most conservative screening criteria values (for at least the maximum value per concentration range) are noted on the table with shading. These constituents and their respective concentrations are also presented, by sample location, on Figures 4-25 (2 to 6 feet bgs) and 4-26 (6 to 14 feet bgs). In addition, isoconcentration contour maps (Figures 4-27 through 4-48) were generated for specific constituents to illustrate the horizontal extent of known contamination in the subsurface soils; further discussion of these figures is provided in the applicable subsections that follow. Acetate overlays depicting the facility property boundary and the location of the seven delineated wetlands (see Section 3.6.1) are provided at the start of the shallow soils isoconcentration figures, to assist in determining the relationship between the facility contamination and the property features.

Polychlorinated Biphenyls

PCBs were detected throughout the subsurface soils of the former Cornell-Dubilier Electronics facility, at frequencies up to approximately 0.90. Only six of the 59 samples did not contain a detectable amount of any individual Aroclor constituent, and these samples were located in the northern developed area (five samples) or the southwestern undeveloped area (one sample). As shown in Table 4-10, with the exception of the southwestern undeveloped portion, all of the sampled on-site areas contained concentrations of both individual Aroclors and Total PCBs exceeding screening criteria, by factors up to approximately 265,000.

In the northern developed portion of the property, PCBs were generally present in the subsurface soils at concentrations less than the most conservative screening criteria values. As shown in Figure 4-25, four samples from this portion contained exceedances, as follows: BSB08 at 2.33 to 2.58 feet bgs (320 mg/kg Total PCBs); BSB39 at 1.83 to 2.83 feet bgs (22 mg/kg Total PCBs); MW02 at 2 to 4 feet bgs (0.85 mg/kg Total PCBs in the duplicate sample); and BSB43 at 1.25 to 2.33 feet bgs (20.7 mg/kg Total PCBs with a duplicate of 15.6 mg/kg). Location BSB08 was present within a floor trench of Building No. 1C, and the sample was collected from beneath the sand/gravel sub-base. The other three points with exceedance concentrations were located in site roadways/parking areas, with BSB39 approximately present on the other side of the building wall from BSB08.

The southern developed portion indicated PCB concentrations greater than screening criteria during the OU-2 RI investigation. Locations in the east (MW04/TP04) and west (BSB30/MW07) parts of this portion of the property contained exceedances in the upper soil intervals (i.e., from 2 to 6 feet bgs). Total PCB exceedance concentrations for these four locations ranged from 0.51 mg/kg to 21 mg/kg (Figure 4-25). For three of the four locations, no sample was collected below the interval which contained the exceedance concentration. The 12 to 14-foot bgs subsurface soil sample

collected from MW04 had a Total PCB concentration of 0.308 mg/kg, which is less than its screening criterion by a factor of 1.6.

The central (MW06) and southern (MW12/TP05) parts of the southern developed portion of the property typically contained more elevated Total PCB concentrations than the east and west parts. As shown in Figures 4-25 and 4-26, these more elevated concentrations, all of which were above screening criteria, included 1,900 mg/kg (MW06 at 2 to 4 feet bgs); 110 mg/kg (MW06 at 6 to 6.5 feet bgs); 3,000 mg/kg (TP05 at 3 feet bgs); and 160 mg/kg (MW12 at 4 to 6 feet bgs). In addition, lower concentration exceedances were noted from 4 to 6 feet bgs in MW06 (3.3 mg/kg) and from 8 to 10 feet bgs in MW12 (44 mg/kg) (Figures 4-25 and 4-26).

Subsurface soil samples were collected in the northeastern undeveloped portion from MW05 (6 to 8 feet bgs and 10 to 12 feet bgs), TP01 (approximately 6.5 feet bgs) and TP02 (approximately 4 feet bgs). Exceedances of screening criteria were detected in all of these samples for both individual Aroclors and Total PCBs (Figures 4-25 and 4-26). Test pit TP01 contained the minimum exceedance concentration for Total PCBs (0.64 mg/kg), while the maximum subsurface exceedance was present in MW05 at 6 to 8 feet bgs (258 mg/kg). Total PCBs found in the deepest overburden soil interval of MW05 (i.e., 10 to 12 feet bgs) were lower in concentration by an order of magnitude (53.8 mg/kg); however, the concentration was still above the screening criteria value by a factor of approximately 110.

During the OU-2 RI investigation, sampling of the central undeveloped portion occurred in the eastern (MW09/TP08/TP09) and western (MW11/TP06/TP10) corners. In the east, exceedance concentrations for Total PCBs in the upper subsurface intervals (i.e., less than 6 feet bgs) were 130,000 mg/kg for MW09; 8,300 mg/kg for TP08; and 29,000 mg/kg for TP09 (Figure 4-25). As stated in Section 4.4.4, capacitors were excavated from this part of the property (TP08/TP09), and direct disposal of PCB-contaminated materials could account for the extremely elevated concentrations detected. Total PCB concentrations were significantly reduced in the deeper soil intervals of MW09 (i.e., five orders of magnitude). However, the concentrations detected from 8 to 10 feet bgs (4.1 mg/kg Total PCBs, with a duplicate of 2.2 mg/kg) and 12 to 14 feet bgs (2.0 mg/kg Total PCBs) still exceeded the most conservative screening criterion, as shown in Figure 4-26.

In the western corner locations of the central undeveloped portion, individual Aroclor and Total PCB concentrations were also present above most conservative screening criteria in all of the sampled subsurface soil intervals (i.e., 4 to 6 feet bgs, 6 to 8 feet bgs and 12 to 14 feet bgs), as shown in Figures 4-25 and 4-26. Total PCBs ranged from 310 mg/kg (12 to 14 feet bgs) to 10,600 mg/kg (6 to 8 feet bgs) in MW11. Locations TP06 and TP10 (both sampled at approximately 8 feet bgs) contained Total PCBs at concentrations of 6,600 mg/kg and 5.2 mg/kg, respectively. Capacitors were unearthed during excavation of TP06, while TP10 contained white and blue crystalline powder in the soils. These findings increase the probability that the elevated PCB concentrations are the result of direct disposal of PCB-contaminated materials. In addition, the soil samples from locations MW11 and TP06 contained TCE and some of its dechlorination products (e.g., cis-1,2-DCE, vinyl chloride) at concentrations above their respective screening criteria. These compounds enhance the downward migration of PCBs in soils through co-solvency, which may account for the relatively elevated concentrations of PCBs in the deeper subsurface soils (i.e., greater than 600 times its

screening criterion in the 12 to 14-foot bgs sample collected at the top of fractured bedrock in MW11).

Isoconcentration contour maps were developed for Total PCBs in the subsurface soils, utilizing the sampling results from both the 1996 EPA investigation (see Section 4.3.1) and this OU-2 RI. The maximum concentration detected at a sampling location for the specified depth interval (if more than one sample was collected) was used in the contouring. Figures 4-27 and 4-28 present the known horizontal extent of subsurface soil PCB contamination at depth intervals of 2 to 6 feet bgs and 6 to 14 feet bgs, respectively, using the most conservative screening criteria value (0.49 mg/kg).

Figure 4-27 indicates that, for the 2 to 6-foot bgs interval, a majority of the site contours at Total PCB concentrations greater than the most conservative screening criteria for subsurface soils (0.49 mg/kg). Exceptions include the contour boundary areas to the south-southwest, northwest, and north-northeast. Significantly elevated concentrations (i.e., greater than 4,900 mg/kg, which is 10,000 times the screening criteria) are present in the central undeveloped portion of the property, where test pit excavations unearthed capacitor boxes that appeared corroded and/or partially burned.

Total PCB concentrations in the deeper overburden soils (i.e., 6 to 14 feet bgs) generally showed the same distribution pattern as the upper soil interval. With the exceptions of an area between MW02A, MW03 and MW04 in the north-northeastern portion of the property and an area adjacent to location MW08 in the south-southeast, most of the sampled soils contained Total PCBs which contoured above screening criteria (Figure 4-28). In addition, significantly elevated concentrations (i.e., greater than 4,900 mg/kg) were again present in the central undeveloped portion of the property. However, a noted difference between the two soil depth isoconcentration maps was the lack of "significant elevated concentrations" in the eastern corner of the central undeveloped portion of the site (i.e., near MW09) in the 6 to 14-foot bgs soils. Concentrations for MW09 decreased five orders of magnitude between the upper and deeper subsurface soils, while the concentrations in MW11, in the western corner of this portion, were approximately equivalent between the upper and deeper overburden (i.e., 7,300 mg/kg versus 10,600 mg/kg). As stated previously, co-solvency due to the presence of chlorinated volatiles (e.g., TCE) may have enhanced the downward migration of PCBs in this part of the facility property.

Using contour intervals of 0.49 mg/kg (NJDEP residential DCSCC), 2 mg/kg (NJDEP non-residential DCSCC), 50 mg/kg (NJDEP IGWSCC) and 100 mg/kg (EPA TSCA value), additional figures of the horizontal extent of Total PCB contamination in the 2 to 6-foot bgs and 6 to 14-foot bgs soils were generated (Figures 4-29 and 4-30). Contouring indicates concentrations greater than 100 mg/kg in one area of the northern developed portion (2 to 6-feet bgs only) and areas of the southern developed, southwestern undeveloped, central undeveloped, and northwestern undeveloped portions of the property.

PCB concentrations appear to be principally dependent on the specific sampled location. During the contamination evaluation, it was noted that concentrations for certain samples collected relatively close to each other differed by orders of magnitude. For example, soil samples were collected around 8 feet bgs in MW11, TP06, and TP10. As shown in Figure 4-28, these locations are approximately 20 to 40 feet apart. Total PCB concentrations for this depth in MW11 and TP06 were 10,600 mg/kg and 6,600 mg/kg, respectively, while the soil from TP10 only contained 5.2 mg/kg

Total PCBs. Concurrently, the chlorinated solvent concentrations detected generally followed this pattern (e.g., TCE concentrations in the MW11, TP06, and TP10 samples were 7,800 ug/kg; 5,000 ug/kg; and 15 ug/kg, respectively).

PCB Congeners

Three subsurface soil samples (4 to 6 feet bgs from MW04, 8 to 10 feet bgs from MW09, and 4 to 6 feet bgs for MW11) underwent PCB congener analysis. Of the 94 congener compounds or compound combinations analyzed by the off-site laboratory, 65 and 72 constituents were present in the subsurface soils from the southern developed (MW04) and central undeveloped (MW09/MW11) portions, respectively (Table 4-10).

The 4 to 6-foot soils from MW04 contained congener concentrations between 0.95 ug/kg and 77 ug/kg, with a total PCB congener concentration of 770 ug/kg. Congeners were generally present at concentrations at least an order of magnitude higher in the MW09 soils (i.e., from 16 ug/kg to 1,800 ug/kg for the individual compounds or compound combinations, and 15,000 ug/kg for the total). The most elevated concentrations, though, were present in the 4 to 6-foot soils collected from MW11. This sample contained PCB congener compounds or compound concentrations up to 2,200,000 ug/kg (BZ 110/77), as shown in Table 4-10. This compound is 3,3',4,4'-tetrachlorobiphenyl, a "dioxin-like" congener, and was also present at the maximum concentration in the surface soils. Total PCB congeners in the MW11 sample summed to 39,000,000 ug/kg.

Dioxins/Furans

None of the subsurface soil samples were analyzed for dioxin and furan compounds during the OU-2 RI investigation.

Volatile Organic Compounds

The subsurface soils contained 32 identifiable VOCs and VOC TICs. Frequencies of detection for seven VOCs were greater than 0.20, as follows: trichlorofluoromethane at 0.22; xylenes at 0.24; 1,1,1-trichloroethane (TCA) at 0.27; cis-1,2-DCE at 0.32; acetone at 0.37; toluene at 0.37; and TCE at 0.53. The remaining constituents had detection frequencies ranging between 0.02 and 0.20. Twenty-four of the VOC constituents were present at concentrations less than their respective screening criteria (Table 4-10).

As shown in Table 4-10, eight VOC compounds (1,2-dichloropropane; 1,1-DCE; cis-1,2-DCE, 1,2,4-trichlorobenzene, methylene chloride, PCE, TCE, and vinyl chloride) occurred above screening criteria. Six of these eight VOCs were also detected at concentrations greater than screening criteria values in the surface soil. A majority of the exceedances, and those with the most elevated concentrations, were present in the southern developed (MW04/MW06/MW12/TP04/TP05) and/or central undeveloped (MW11/TP06/TP08) portions of the property (Table 4-10 and Figures 4-25 and 4-26). In addition, one occurrence each for methylene chloride (21 ug/kg) and TCE (110 ug/kg) in the northern developed portion exceeded screening criteria, along with one occurrence for TCE (220 ug/kg) in the northeastern undeveloped portion.

The known horizontal extent of TCE contamination for the 2 to 6-foot and 6 to 14-foot bgs depth intervals is provided in Figures 4-31 and 4-32, respectively, using the most conservative screening criteria value (60 ug/kg) and in Figures 4-33 and 4-34, respectively, using NJDEP criteria values (23,000 ug/kg for residential DCSCC; 54,000 ug/kg for non-residential DCSCC and 1,000 ug/kg for IGWSCC). Using isoconcentration contouring of the maximum concentration per depth range, the figures indicate that TCE is concentrated in TP04 and TP05 (and to a lesser extent in MW04 and TP08) in the upper overburden and in MW11 and TP06 in the lower subsurface soils. As stated previously, the presence of TCE and its dechlorination products in the subsurface (especially the deeper overburden) would typically expedite the migration of PCBs and other less mobile organic compounds through the soils.

Semi-Volatile Organic Compounds

A total of 29 individual SVOCs were detected during the subsurface soil investigation, along with SVOC TICs. A majority of these constituents (i.e., 22; or 76 percent) are PAH, phthalate or phenolic compounds (Table 4-10). Frequencies of detection in the subsurface soils ranged between 0.02 (2,4-dimethylphenol, 2-chloronaphthalene, butyl benzyl phthalate, diethyl phthalate, pentachlorophenol, and phenol) and 0.37 (pyrene).

The subsurface soils contained exceedance concentrations of 12 SVOCs (mostly PAHs), as shown on Table 4-10 and Figures 4-25 and 4-26. With the exceptions of nine relatively low concentration exceedances (i.e., less than 425 ug/kg) of benzo(a)pyrene, the SVOC concentrations which were greater than their respective screening criteria were detected from four locations: MW06 (2 to 4 feet bgs) in the southern developed portion, TP01 (approximately 6.5 feet bgs) and TP02 (approximately 4 feet bgs) in the northeastern undeveloped portion, and TP06 (approximately 8 feet bgs) in the central undeveloped portion. This distribution is further illustrated on Figures 4-35 and 4-36 which present the known extent of on-site Total PAH contamination (i.e., the sum of the detected individual PAH constituents) in the 2 to 6-foot and 6 to 14-foot bgs soil intervals, respectively. With the exception of MW06, the elevated concentrations may be related to the debris present in the excavated test pits. For example, TP02 (which had the highest summed total at 1,554,900 ug/kg) contained wooden floor blocks and a railroad tie. These materials were likely pressure-treated with creosote, which contains numerous PAHs. The MW06 "hot spot" may be related to the fuel oil tank areas historically present at the property and/or the oil found "on top of the ground water" by the property owner and NJDEP in 1990 (see Section 4.4.1 and Figure 4-2). Elevated PAH concentrations were also detected in the shallow soils near this location (see Section 4.6.1 and Figure 4-16).

Pesticides

As shown in Table 4-10, 18 pesticides were detected in the subsurface soils; however, their frequencies of detection were relatively low (i.e., range: 0.02 to 0.29). Concentrations of 11 of the pesticides were above their respective screening criteria values, and exceedances were present in all of the sampled on-site areas except the southwestern undeveloped portion.

Elevated concentrations were typically found in the same areas of the property as during the shallow soil investigation, as follows: boundary of the northeastern undeveloped portion and the floodplain

undeveloped portion (MW05), eastern corner of the central undeveloped portion (MW09/TP09), western corner of the central undeveloped portion (MW11), and/or the northern corner of the northern developed portion in Building No. 1 (BSB08). Additional elevated concentrations were noted for specific pesticides, such as aldrin in MW06 (maximum of 53,000 ug/kg) and MW12 (maximum of 7,000 ug/kg); and endrin aldehyde in TP05 (3,700 ug/kg), TP06 (16,000 ug/kg) and TP08 (27,000 ug/kg). To illustrate the general concentration trends, isoconcentration contour maps showing the known horizontal extent of subsurface soil contamination (2 to 6 feet bgs and 6 to 14 feet bgs) were prepared for three pesticides: 4,4'-DDE, dieldrin, and aldrin (Figures 4-37 through 4-42).

Metals and Cyanide

As indicated on Table 4-10, the subsurface soils of the former Cornell-Dubilier Electronics facility contained detectable concentrations of all 23 metals analyzed and cyanide. Maximum concentrations for over half of these constituents (i.e., 14 of 24; or 58 percent) were detected in the central undeveloped portion. This is in opposition to the maximum concentrations present in the shallow soils which trended to the developed portion of the property. Of the 16 constituents with available screening criteria, 12 exceeded their respective values in at least one of the on-site area portions, and exceedances were detected above criteria values up to a factor of 838 (arsenic).

Isoconcentration contour maps were generated to illustrate distribution trends for the inorganic constituents in the 2 to 6-foot bgs subsurface soils, and Figures 4-43, 4-44 and 4-45 are provided as examples for cadmium, chromium and lead, respectively. Areas of more elevated concentrations are present around locations BSB08, MW09/TP09, MW11, TP02/RA-TP5 [lead only], and MW04/RA-TP6 [lead only]. In the deeper subsurface soils (i.e., 6 to 14 feet bgs), the most elevated concentrations were generally found in MW11/TP06, and Figures 4-46, 4-47 and 4-48 present graphical representations of this "hot spot" area for arsenic, cadmium and lead, respectively. To a lesser degree, depending on the specific inorganic constituent, elevated concentrations were also detected in the soils of MW09, MW12, and TP01/MW05/RA-TP5 [lead only]. The overall distribution trend for the inorganics in subsurface soils appears to mirror that for Total PCBs in regard to locations with the most elevated concentrations.

Non-Aqueous Phase Liquid

Based on the disposal practices at the facility (see Section 1.2.4), the historic fuel oil leak (see Section 4.4.1), and the elevated PCB concentrations detected in the subsurface soils, the potential for a non-aqueous phase liquid (NAPL) to exist in the soils was evaluated. For soils, if greater than 10,000 mg/kg of contamination exists (i.e., one percent of the soil mass), then a NAPL may be present (Bedient et al., 1994).

Total PCBs were detected above 10,000 mg/kg in the following three locations: MW09 at 4 to 6 feet bgs (130,000 mg/kg); MW11 at 6 to 8 feet bgs (10,600 mg/kg); and TP09 at 5 feet bgs (29,000 mg/kg). MW09 and TP09 are located in the eastern corner of the central undeveloped portion of the property, while MW11 is present in the western corner.

Therefore, the potential exists for a NAPL to be present in the eastern part (MW09/TP09), and to a lesser extent the western part (MW11), of the central undeveloped portion of the property. Significant accumulation of NAPL was not present in the descriptions of the MW09, MW11 and/or TP09 samples; some coloration of the soils (MW09, TP09), an "oily sheen" on the split-spoon (MW11) and/or staining and an odor (TP09) were noted. In addition, staining, "oily sheen" and/or odors were also observed in other sample locations such as TP03, TP08, MW02A, and MW06.

4.6.3 Perched Water

Water encountered in the overburden soil and weathered bedrock intervals during field activities was sampled to characterize potential source areas, to evaluate potential zones of contamination, and to identify potential contamination migration pathways. Samples were collected from five test pits (TP03, TP06, TP08, TP09, and TP10) for full organic and inorganic analyses and from five monitoring well borings (MW02, MW04, MW06, MW11, and MW12) for VOCs and PCBs and/or PCB congeners. Due to sample size constraints and the amount of water encountered during the monitoring well boring installation, additional parameters were not able to be analyzed. The procedures for collection of perched water (see Sections 2.6.1 and 2.6.3) may have generated sufficient suspended soil particulates to increase the amount of certain constituents (e.g., PCBs, metals) detected in these samples. Tabulated results are presented in Tables G-24 through G-27 for the perched water from the test pit excavations and in Tables G-28 through G-30 for the perched water from the monitoring well boring installation.

Table 4-11 provides a summary of the constituents detected during the perched water investigation. These water results were compared to the most conservative groundwater screening criteria values, and exceedances are noted on the summary table with shading. These constituents and their respective concentrations are also presented, by perched water sample location, on Figure 4-49. In addition, the horizontal extent of known Total PCB and TCE contamination in the perched water is presented on Figures 4-50 and 4-51, respectively; further discussion of these figures is provided in the applicable subsections.

Polychlorinated Biphenyls

The perched water samples contained three individual PCB constituents (Aroclor-1242, Aroclor-1248 and Aroclor-1254), and detected concentrations ranged from 0.65 ug/L to 5,100 ug/L. All of the occurrences exceeded screening criteria by factors up to 10,200 (Table 4-11 and Figure 4-49). The northeastern undeveloped portion (TP03) and the contiguous boundary of the southern developed portion (MW04) had the least amount of PCBs in the perched water (i.e., 2.35 ug/L Total PCBs and non-detect, respectively). As shown in Table 4-11, the most elevated Total PCB concentrations were present in the central undeveloped portion of the property (i.e., up to 7,400 ug/L).

The approximate horizontal extent of Total PCB contamination in the perched water is presented as isoconcentration contours on Figure 4-50. The horizontal extent is estimated for PCB constituents as (1) the concentration from MW12 utilized in the contouring was the sum of the PCB congeners detected in this location (due to an analytical error, the sample was not analyzed for TCL PCBs); and (2) perched water possibly does not exist in the entire shaded region based on a lack of water in

various sampling locations in and/or nearby the shaded areas. The figure does indicate that perched water for a majority of the contoured portion of the property contains PCB concentrations not only greater than the most conservative screening criteria (0.5 ug/L), but also potentially above 100 times the screening criteria (i.e., 50 ug/L), if perched water is present.

Location MW11, and to a lesser degree test pits TP10 and TP09, contained the highest amounts of Total PCBs in the perched water. These "hot spot" areas also contained the more elevated concentrations of PCB constituents in the soils. The elevated concentrations (i.e., up to ppm levels) of chlorinated VOCs in both the subsurface soil and the perched water within and/or immediately adjacent to these areas have likely contributed to the leaching and solubilization of these constituents through co-solvent effects.

PCB Congeners

Two perched water samples, from monitoring well borings MW11 and MW12, were analyzed for PCB congeners, and 74 individual congener compounds/compound combinations were detected. Location MW11, in the central undeveloped portion of the property, contained congener concentrations in the perched water ranging from 2.9 ug/L to 240 ug/L, with a total PCB congener concentration of 3,200 ug/L. The concentrations present in MW12 were relatively similar in magnitude, as individual occurrences were between 2.2 ug/L and 190 ug/L, and total PCB congeners summed to 2,300 ug/L. The cogener combination BZ 110/77 had the maximum individual concentration for both well locations (Table 4-11), and BZ 77 is a "dioxin-like" congener (3,3',4,4'-tetrachlorobiphenyl).

Volatile Organic Compounds

Nineteen VOC compounds were identified in the perched water samples (Table 4-11), and detected concentrations ranged from 0.4 ug/L (1,1,2,2-TCA; benzene) to 15,000 ug/L (TCE). Locations MW11 and MW12 contained the highest number of constituents (i.e., both samples contained 17 VOCs plus VOC TICs) and the most elevated concentrations (i.e., the samples contained maximum concentrations for 53 percent of the detected VOCs, at levels up to 15,000 ug/L).

Screening criteria exceedances for the perched water occurred for a total of 10 compounds, including: 1,2,4-trichlorobenzene; 1,4-dichlorobenzene; chlorobenzene; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; methylene chloride; PCE; TCE; and vinyl chloride. Six, two and nine VOCs, respectively, were detected at concentrations above screening criteria in the southern developed, northeastern undeveloped and central undeveloped portions, as shown in Table 4-11 and Figure 4-49. A majority of these constituents (i.e., 8 of 10, or 80 percent) were also present in the surface and/or subsurface soils of these areas at concentrations exceeding soil screening criteria values, indicating the VOCs in the perched water samples are likely related to the direct dissolution of these constituents from the soils.

An isoconcentration contour map of the approximate extent of TCE contamination was developed for the perched water, and is provided in Figure 4-51. The extent of contamination is only estimated, as perched water may not exist in the entire shaded region based on a lack of water in various sampling locations in and/or nearby to the shaded areas. Elevated levels of TCE are present in

MW11 (15,000 ug/L) and MW12 (12,000 ug/L), and this trend is generally followed by most of the chlorinated VOCs detected in the perched water (e.g., cis-1,2-DCE; trans-1,2-DCE; vinyl chloride). The presence of TCE and its dechlorination products in the soils and perched water would typically expedite the dissolution and migration of PCBs and other less soluble (in water) organic compounds.

Semi-Volatile Organic Compounds

The perched water samples collected from the test pits contained 26 identifiable SVOCs (including phenols, PAHs, and phthalate esters) and SVOC TICs. As shown in Table 4-11, individual compound concentrations were relatively low (i.e., the detected range was between 1 ug/L and 35 ug/L). Screening criteria exceedances occurred for the following seven PAH compounds in locations TP03 and/or TP06: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (Table 4-9 and Figure 4-49). PAHs were detected in the soils above screening criteria, and co-solvency mediated by the VOC constituents present increases the likelihood that these constituents may become solubilized by percolating rainwater.

Pesticides

Ten pesticides were detected in the test pit perched water samples (Table 4-11). TP03 in the northeastern undeveloped portion contained relatively low concentrations of these compounds, as the detected range was only from 0.02 ug/L to 0.2 ug/L. Pesticide concentrations in the central undeveloped portion of the property (TP06/TP08/TP09/TP10) were more elevated (i.e., between 0.87 ug/L and 33 ug/L). As shown in Table 4-11 and Figure 4-49, exceedance concentrations occurred for six of the ten pesticides (i.e., 4,4'-DDE; aldrin; alpha-BHC; dieldrin; gamma-chlordane; and heptachlor), and these concentrations were detected up to 825 times greater than screening criteria.

Metals and Cyanide

The test pit water was also analyzed for inorganic constituents, and 22 metals and cyanide were detected, as shown in Table 4-11. Concentrations typically followed the same distribution pattern as SVOCs and pesticides (i.e., detected at more elevated concentrations in the central undeveloped portion when compared to the northeastern undeveloped portion). Aluminum, iron, lead, and manganese were present in TP03 (northeastern undeveloped portion) at concentrations above their screening criteria values (Table 4-11 and Figure 4-49). As shown in Figure 4-49, test pits TP08 and TP09 also contained exceedances of these four metals, plus arsenic and cadmium in TP08 only. A total of 14 metals had concentrations up to 1,190 times greater than screening criteria in TP06 and/or TP10 (Figure 4-49).

Non-Aqueous Phase Liquid

The existence of NAPL was evaluated based on the disposal practices at the facility (see Section 1.2.4), the historic fuel oil leak (see Section 4.4.1), and the elevated PCB and VOC (particularly TCE) concentrations detected during the perched water investigation. It is a general rule that if a constituent is detected at a concentration greater than one percent of its solubility in a water sample, then a NAPL may be present (Bedient et al., 1994).

Using the maximum possible solubility value for the individual Aroclor constituents detected at the site (3.4×10^{-1} mg/L; Section 5.1.2), the "one percent rule" solubility value for comparison would be 3.4×10^{-3} mg/L, or 3.4 ug/L. With the exceptions of MW04 and TP03, all of the sampled locations had PCB concentrations in the perched water above 3.4 ug/L. The most elevated Total PCB concentration, detected in MW11, was over 2,000 times this comparison solubility value.

TCE has a water solubility of 1.1×10^{3} mg/L (Section 5.4.2). One percent of this value would be 1.1×10^{1} mg/L, or 11,000 ug/L. Two locations, MW11 and MW12, contained TCE at concentrations greater than this comparison solubility value.

Therefore, the potential exists for a NAPL to be present, especially in the vicinity of MW11 and MW12. During the OU-2 field investigation, no significant accumulation of NAPL was discovered for the perched water. Sheens were observed on the water infiltrating TP09 and BSB58, and location TP05 contained an "oily water seep" three feet from the end of the test pit.

4.7 Drainage System Investigation

Samples of representative drainage system locations around the developed portion of the property were collected to determine the level of contamination in the on-site drainage system and the potential for the system to be a source and/or facilitated transport mechanism for contamination. Five sediment samples (and one duplicate sample) and six standing water samples (and one duplicate sample) were analyzed, and the results are presented, respectively, in Appendix G, Tables G-31 through G-34 and G-35 through G-38.

Summaries of the constituents detected during the drainage system investigation are provided in Tables 4-12 (sediment) and 4-13 (water). To facilitate interpretation of the data, the drainage system sediment and water results were compared to shallow soil and surface water screening criteria, respectively. Exceedances are noted on the tables with shading, and are mapped on Figures 4-52 (sediment) and 4-53 (water).

Polychlorinated Biphenyls

The five catch basin sediment sample locations contained relatively elevated concentrations of PCBs, and all of these occurrences exceeded screening criteria (Table 4-12 and Figure 4-52). Individual constituent concentrations ranged from 10,000 ug/kg (Aroclor-1254 in DS01) to 140,000 ug/kg (Aroclor-1254 in DS04B). Total PCBs summed to a maximum of 210 mg/kg in the sediments from location DS07. The roadways on the property were previously a combination of dirt, gravel and stone, and PCBs have been detected in roadway soils (see Sections 4.3.1 and 4.6). The elevated levels of PCBs currently present in the drainage system sediments may be due to deposition of intrained soil particles from past storm water events and/or historic discharges into building drains/catch basins.

As shown in Table 4-13 and Figure 4-53, PCBs were also detected in the drainage system water, again above screening criteria in all occurrences. Samples contained Aroclor-1248, Aroclor-1254, and/or Aroclor-1260 at concentrations between 0.13 ug/L (DS05) and 11 ug/L (DS02). The elevated concentration in DS02 is of specific note, as it has been determined that this location is connected

to Outfall #8 in Bound Brook (Section 2.7.2). Total PCBs for the standing water samples summed up to 13.7 ug/L (DS01, the basement pit of Building No. 15). Although PCBs typically have low aqueous solubilities, the elevated concentrations noted in the drainage system water samples may be due to co-solvent effects exerted by other dissolved organic constituents (e.g., TCE, methylene chloride). In addition, the procedures to collect the drainage system water (see Section 2.7.3) may also have generated sufficient suspended sediment particulates to increase the amount of PCBs detected in the water during analysis.

Volatile Organic Compounds

As indicated on Tables 4-12 and 4-13, 17 VOCs were detected in the drainage system samples, with 10 and 12 compounds present in the sediment and water, respectively. Occurrences of individual VOCs in the drainage system sediments were at relatively low concentrations (i.e., less than 70 ug/kg), and none of the VOCs were present above screening criteria.

Detected standing water concentrations ranged from 0.3 ug/L (chlorobenzene) to 27 ug/L (TCE), and VOCs were detected in all of the samples except DS05 (Table 4-13). As shown on Figure 4-53, exceedances of screening criteria occurred for four constituents: methylene chloride (13 ug/L in DS02 and DS04A), TCE (2 ug/L in DS03 and 27 ug/L in DS06A), PCE (0.4 ug/L in DS06A), and vinyl chloride (0.9 ug/L in DS01 and 0.4 ug/L in DS03). Drainage system locations DS02 and DS03 are known to connect to outfalls to Bound Brook (see Section 2.7.2).

Semi-Volatile Organic Compounds

Tables 4-12 and 4-13 show that, for the SVOCs, the detected constituents in the drainage system samples were generally phthalate esters, PAHs or TICs.

The sediment samples contained phthalate compounds up to 13,000 ug/kg (bis(2-ethylhexyl)phthalate in location DS05); however, there were no exceedances of screening criteria for these compounds. Bis(2-ethylhexyl)phthalate was present in the standing water sample from DS01 (which is the sump pit located in the basement of Building No. 15), at an exceedance concentration of 10 ug/L (Table 4-13 and Figure 4-53).

Seventeen PAHs were detected in the drainage system sediments, and constituent concentrations ranged from 150 ug/kg to 11,000 ug/kg. Maxima for the individual PAHs were mainly present in DS05 (i.e., 10 of the 17; or 59 percent), where a sheen was visible on the water after disturbance of the sediment layer and a petroleum odor was noted during sampling. Seven compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) had sediment concentrations above their respective screening criteria values (Table 4-12 and Figure 4-52). PAHs were not detected in the drainage system water collected as part of the OU-2 RI.

Pesticides

A total of 11 pesticides, as noted on Table 4-12, was present in the drainage system sediment samples. Detected concentrations in the catch basin sediments ranged from 58 ug/kg (alpha-BHC)

to 33,000 ug/kg (DDT), and the more elevated sediment concentrations generally occurred in DS04B and/or DS07. Exceedances occurred at all of the sampled locations, and 9 of the 11 pesticides detected in the drainage system sediments were present above screening criteria (Table 4-12 and Figure 4-52).

The drainage system water sample from DS03 contained gamma-BHC (0.036 ug/L). Three pesticides (alpha-BHC at 0.012 ug/L, gamma-BHC at 0.024 ug/L and heptachlor at 0.028 ug/L) were detected in the DS06A sample. All of these occurrences were above most conservative surface water screening criteria (Table 4-13 and Figure 4-53).

Metals and Cyanide

All 24 inorganic constituents (23 metals and cyanide) were detected in the drainage system sediments. Of these, 14 had concentrations that were above their respective screening criteria values (Table 4-12). These constituents were also present in site shallow soils at exceedance concentrations, and deposition of soil particles from storm water run-off likely accounts for their presence in the drainage system sediments.

As shown in Table 4-13 and Figure 4-53, the drainage system water contained occurrences of 20 metals, with nine constituents (aluminum, arsenic, chromium, copper, iron, lead, manganese, mercury, and zinc) detected at concentrations exceeding screening criteria. At least a portion of the metal concentrations in the water samples may be related to suspended sediment particulates generated during sampling activities

4.8 Summary

The nature and extent of contamination found on the former Cornell-Dubilier Electronics facility was assessed through sampling of building floor dust, shallow and subsurface soils, perched water, and drainage system sediments and standing water. In addition, an evaluation of available historical information and the results of the geophysical survey, soil gas survey and test pit excavations was performed to determine potential contaminant source areas.

Areas of surface discolorment were formerly present in the central portion of the property according to aerial photography. Lack of vegetation, disturbance of the land surface, and/or saturated/stained soils may have been present in these areas. The review of the aerial photographs also indicated numerous unidentifiable objects, potentially debris, to the northeast of the former railroad tracks and in the fenced area to the south-southwest of Building No. 12.

A geophysical survey of the central portion of the property indicated the presence of buried material, especially from the northeastern portion of the former truck driving school to the embankment leading to Bound Brook. During excavation of test pits within this anomalous area, capacitors, white and blue crystalline powder, electrical components, and other materials were unearthed.

Chlorinated and non-chlorinated VOC compounds were detected during the soil gas survey. Elevated chlorinated occurrences (predominately TCE) were present in the northeastern corner of the former truck driving school fence (TCE at 420 ug/L); in the vicinity of the southwestern corner

of the former truck driving school fence (TCE at 2,200 ug/L); to the southwest of Building No. 12 (TCE at 14,000 ug/L); and to the northeast of Building No. 11 (TCE at 35 ug/L). Possible areas of concern for non-chlorinated VOCs were more scattered around the property, and included the former fuel tank area in the vicinity of Building No. 11.

A total of 32 floor dust samples collected in the facility buildings contained Aroclor-1254 up to 8,300 mg/kg (Building No. 1). The more elevated PCB concentrations (i.e., greater than 500 mg/kg) were present in Building Nos. 1, 1B, 5, and 6. Metals analysis indicated no discernible, consistent concentration pattern; however, floor dust samples from Buildings Nos. 1, 2A, 5, 9, 9C, 14, and/or 15 typically contained numerous metals at more elevated concentrations than those noted in the other buildings.

Shallow and subsurface soil indicated the presence of PCB compounds in almost all of the collected samples (i.e., only 12 of 155 samples contained non-detectable levels, for a frequency of detection of approximately 0.92). Both individual Aroclor constitutents and Total PCBs exceeded screening criteria, by factors up to approximately 265,000. As shown in Figures 4-12, 4-27 and 4-28, a majority of the property contains Total PCB contours greater than screening criteria. The highest levels of Total PCBs (i.e., greater than 10,000 times the screening criteria) occurred for all depth intervals in the central undeveloped portion of the property. In addition, shallow soils in parts of the southern developed, northeastern undeveloped and floodplain undeveloped portions contained concentrations greater than 10,000 times screening criteria (Figure 4-12). These "hot spot" areas coincide with possible source areas, especially within the central undeveloped portion where test pit excavations unearthed capacitors that appeared corroded and/or partially burned. Although PCBs typically exhibit limited mobility in soils, elevated concentrations were still noted in the deeper overburden soils (e.g., the 12 to 14-foot bgs sample collected at the top of fractured bedrock in MW11 contained Total PCBs at greater than 600 times screening criteria). This enhanced downward migration may be due to co-solvent effects exerted by the presence of TCE and its dechlorination products.

Although analyzed in only a few soil samples, PCB congeners and dioxins/furans were detected during the OU-2 RI soils investigation. Maximum concentrations included 2,200,000 ug/kg (individual congeners); 39,000,000 ug/kg (total PCB congeners); 13,510 pg/g (individual dioxins/furans); and 52,850 pg/g (dioxin/furan homologs). 2,3,7,8-TCDD exceeded its screening criterion in shallow soil locations SS03 and MW09 by factors of 3.2 and 18, respectively.

A majority of the VOCs detected in the soils (i.e., 25 of 34; or almost 74 percent) occurred at concentrations less than their respective screening criteria. The other nine (cis-1,2-DCE; trans-1,2-DCE; PCE; TCE; vinyl chloride; methylene chloride; 1,2,4-trichlorobenzene; and 1,2-dichloropropane) exceeded screening criteria values, by factors up to approximately 783. A majority of the exceedances (especially those with the greater concentrations) were present in the southern developed and central undeveloped portions, and to a lesser degree, in the floodplain undeveloped portion of the facility property.

The soils contained PAH, phthalate and phenolic constituents; however, in relation to frequency of detection and frequency of exceedance, PAHs were the dominant compounds. Elevated concentrations were noted only in certain distinct property locations, including MW06 and BSB55

in the southern developed portion, TP01 and TP02 in the northeastern undeveloped portion, TP06 in the central undeveloped portion, and SS09 in the southwestern undeveloped portion. The MW06/BSB55 "hot spot" may be related to the fuel oil tanks historically present at the property. For the northeastern and central undeveloped portions, the elevated concentrations likely result from the debris present in the excavated test pits. The sample collected from SS09 had the appearance of semi-dried tar with a discernible petroleum-based odor.

Although present at relatively elevated concentrations (i.e., up to 25,000,000 ug/kg), pesticides were detected at relatively low frequencies (i.e., 0.01 to 0.36). The more elevated concentrations typically appeared near the boundary of the northeastern and the floodplain undeveloped portions, the eastern and western corners of the central undeveloped portion, the southern corner of the southern developed portion (shallow soils only), and/or the northern corner of the northern developed portion.

For the metals, locations of elevated concentrations were distributed across the property and were typically dependent on the particular constituent. The shallow soils of the developed portion of the former Cornell-Dubilier Electronics facility contained a majority of the maximum concentrations for the metals (i.e., 18 of 24; or 75 percent). In contrast, for the subsurface soils, higher amounts of metals were present in the central undeveloped portion, and appeared to mirror the distribution trend for Total PCBs in regard to locations with elevated concentrations.

PCBs were detected in the perched water encountered during drilling in the overburden soil/weathered bedrock during the OU-2 RI. Perched water in the MW11 soil boring contained the maximum Total PCB concentration (7,400 ug/L), with elevated levels also present in TP09 (1,560 ug/L) and TP10 (1,550 ug/L). These and/or nearby locations had elevated levels of PCBs during the soils investigation. Samples from MW11 and MW12 were analyzed for PCB congeners, and total concentrations for these constituents were 3,200 ug/L and 2,300 ug/L, respectively.

The perched water had significantly elevated levels of chlorinated VOCs (i.e., up to 15,000 ug/L), and screening criteria exceedances occurred for a total of 10 compounds, including: 1,2,4-trichlorobenzene; 1,4-dichlorobenzene; chlorobenzene; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; methylene chloride; PCE; TCE; and vinyl chloride. Although present in the southern developed, northeastern undeveloped, and central undeveloped portions of the property, the most elevated concentrations were typically present at locations MW11 and MW12 (Figure 4-45). The presence of TCE and its dechlorination products may enhance the dissolution/migration of PCBs and other less soluble (in water) organic compounds in soil and groundwater via co-solvency.

SVOCs, pesticides and metals were detected in the perched water samples at concentrations up to 5,800; 825; and 1,190 times above screening criteria, respectively. The semi-volatile exceedances occurred in test pits TP03 and/or TP06. Pesticide concentrations were more elevated in the central portion of the property (TP06, TP08, TP09, and/or TP10 depending on specific constituent) than in other areas. A total of 14 metals had concentrations which exceeded screening criteria in TP06 and/or TP10. Exceedances were also noted for metals (although fewer constituents and at lower concentrations) at locations TP03, TP08, and/or TP09.

During the drainage system investigation, PCB compounds were detected at exceedance concentrations in all sediment and standing water samples. Total PCBs summed to maxima of 210

mg/kg (DS07) in the sediments and 13.7 ug/L (DS01) in the water. The elevated levels of PCBs may be due to deposition (historically and/or presently) of contaminated soil particles into the drainage system during storm events and/or past discharges into the drains/catch basins.

Sediment samples contained VOCs at relatively low concentrations (i.e., less than 70 ug/kg), and none of the VOCs present exceeded screening criteria. The water samples, in comparison, had concentrations of four constituents (methylene chloride, TCE, PCE, and vinyl chloride) which were above screening criteria values. Concentrations ranged up to 27 ug/L (TCE in DS06A).

Location DS05 contained the maximum sediment concentrations for just over half of the SVOCs detected (i.e., 12 of 23; or 52 percent), and this location had a visible sheen on the water surface and a petroleum odor after disturbance of the sediment layer. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene had concentrations above their respective screening criteria values for the sediments. Only bis(2-ethylhexyl)phthalate was identified in the water samples, and it was present in DS01 at an exceedance concentration of 10 ug/L.

Exceedances of screening criteria occurred for nine pesticides in the catch basin sediments, and concentrations ranged up to 33,000 ug/kg. Three pesticides (alpha-BHC, gamma-BHC and heptachlor) were present above their respective most conservative surface water screening criteria values in the drainage system standing water at DS03 and/or DS06A.

Fifteen and nine metals had concentrations greater than screening criteria in the drainage system sediment and water samples, respectively. All of these constituents were also present in the shallow soils at exceedance concentrations. Entrainment of soil particulates during storm events, and subsequent deposition in the drainage system, likely accounts for the more elevated levels of metals noted.

The potential for NAPL to exist at the facility was evaluated. No significant accumulation of NAPL was noted during the OU-2 RI investigation. Based on the PCB concentrations detected in the subsurface soils, the eastern part (MW09/TP09), and to a lesser extent the western part (MW11), of the central undeveloped portion of the property may contain NAPL. Perched water concentrations of PCBs and TCE indicate possible NAPL in the vicinity of MW11 and MW12. Staining of soil, odors, sheens and an "oily water seep" were observed during the field investigation.

SECTION 4

TABLES

TABLE 4-1 (Sheet 1 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Volatile Organics								
Dichlorodifluoromethane	--	--	--	--	--	--	--	--
Chloromethane (1)	--	--	--	--	520	10	--	10
Vinyl Chloride	0.9	0.6	0.01	--	2	10	--	0.01
Bromomethane	110	9	0.2	--	79	1	--	0.2
Chloroethane	--	--	--	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--	--	--	--
1,1-Dichloroethene	1	0.07	0.06	--	8	10	--	0.06
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	--	--	--	--	--	--
Acetone	7800	--	16	--	1000	100	--	16
Carbon Disulfide	7800	720	32	--	--	--	--	32
Methyl Acetate	--	--	--	--	--	--	--	--
Methylene Chloride	85	13	0.02	--	49	1	--	0.02
trans-1,2-Dichloroethene	1600	--	0.7	--	1000	50	--	0.7
Methyl tert-Butyl Ether	--	--	--	--	--	--	--	--
1,1-Dichloroethane	7800	1200	23	--	570	10	--	10
cis-1,2-Dichloroethene	780	--	0.4	--	79	1	--	0.4
2-Butanone (2)	--	--	--	--	1000	50	--	50
Chloroform	100	0.3	0.6	--	19	1	--	0.3
1,1,1-Trichloroethane	--	1200	2	--	210	50	--	2
Cyclohexane	--	--	--	--	--	--	--	--
Carbon Tetrachloride	5	0.3	0.07	--	2	1	--	0.07
Benzene	22	0.8	0.03	--	3	1	--	0.03
1,2-Dichloroethane	7	0.4	0.02	--	6	1	--	0.02
Trichloroethene	58	5	0.06	--	23	1	--	0.06
Methylcyclohexane	--	--	--	--	--	--	--	--
1,2-Dichloropropane	9	15	0.03	--	10	--	--	0.03
Bromodichloromethane	10	--	0.6	--	11	1	--	0.6
cis-1,3-Dichloropropene	6	1	0.004	--	4	1	--	0.004
4-Methyl-2-Pentanone (3)	--	--	--	--	1000	50	--	50
Toluene	16000	650	12	--	1000	500	200	12

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TABLE 4-1 (Sheet 2 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
trans-1,3-Dichloropropene	6	1	0.004	--	4	1	--	0.004
1,1,2-Trichloroethane	11	1	0.02	--	22	1	--	0.02
Tetrachloroethene	12	10	0.06	--	4	1	--	0.06
2-Hexanone	--	--	--	--	--	--	--	--
Dibromochloromethane	8	--	0.4	--	110	1	--	0.4
1,2-Dibromoethane	--	--	--	--	--	--	--	--
Chlorobenzene	1600	130	1	--	37	1	40	1
Ethylbenzene	7800	400	13	--	1000	100	--	13
Xylenes (total)	160000	--	190	--	410	67	--	67
Styrene	16000	1500	4	--	23	100	300	4
Bromoform	81	52	0.8	--	86	1	--	0.8
Isopropylbenzene (4)	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	3	0.6	0.003	--	34	1	--	0.003
1,3-Dichlorobenzene	--	--	--	--	5100	100	--	100
1,4-Dichlorobenzene	20	--	2	--	570	100	20	2
1,2-Dichlorobenzene	5500	600	17	--	5100	50	--	17
1,2-Dibromo-3-chloropropane	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	610	3200	5	--	68	100	20	5
Semi-Volatile Organics								
Benzaldehyde	--	--	--	--	--	--	--	--
Phenol	37000	--	100	--	10000	50	30	30
bis(2-Chloroethyl) ether	0.4	0.2	0.0004	--	0.66	10	--	0.0004
2-Chlorophenol	310	--	4	--	280	10	--	4
2-Methylphenol	3100	--	15	--	2800	--	--	15
2,2'-oxybis(1-Chloropropane)	--	--	--	--	2300	10	--	10
Acetophenone	--	--	--	--	--	--	--	--
4-Methylphenol	--	--	--	--	2800	--	--	2800
N-Nitroso-di-n-propylamine	0.7	--	0.00005	--	0.66	10	--	0.00005
Hexachloroethane	35	54	0.5	--	6	100	--	0.5
Nitrobenzene	31	90	0.1	--	28	10	--	0.1
Isophorone	510	--	0.5	--	1100	50	--	0.5

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TABLE 4-1 (Sheet 3 of 6)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
2-Nitrophenol	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	1200	--	9	--	1100	10	--	9
bis(2-Chloroethoxy)methane	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	180	--	1	--	170	10	--	1
Naphthalene	1100	170	84	--	230	100	--	84
4-Chloroaniline	240	--	0.7	--	230	--	--	0.7
Hexachlorobutadiene	6	8	2	--	1	100	--	1
Caprolactam	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	10000	100	--	100
2-Methylnaphthalene	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	430	10	400	--	400	100	10	10
2,4,6-Trichlorophenol	44	200	0.2	--	62	10	4	0.2
2,4,5-Trichlorophenol	6100	--	270	--	5600	50	9	9
1,1'-Biphenyl	--	--	--	--	--	--	60	60
2-Chloronaphthalene	--	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	--	--	--	--
Dimethylphthalate	--	--	--	--	10000	50	--	50
2,6-Dinitrotoluene	0.7	--	0.0007	--	1	10	--	0.0007
Acenaphthylene	--	--	--	--	--	--	--	--
3-Nitroaniline	--	--	--	--	--	--	--	--
Acenaphthene	3400	--	570	--	3400	100	20	20
2,4-Dinitrophenol	120	--	--	--	110	10	20	0.2
4-Nitrophenol	--	--	--	--	--	--	7	7
Dibenzofuran	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	0.7	--	0.0008	--	1	10	--	0.0008
Diethylphthalate	49000	--	470	--	10000	50	100	50
Fluorene	2300	--	560	--	2300	100	--	100
4-Chlorophenyl-phenylether	--	--	--	--	--	--	--	--
4-Nitroaniline	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	99	--	1	--	140	100	--	1

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TABLE 4-1 (Sheet 4 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
4-Bromophenyl-phenylether	--	--	--	--	--	--	--	--
Hexachlorobenzene	0.3	1	2	--	0.66	100	--	0.3
Atrazine	--	--	--	--	--	--	--	--
Pentachlorophenol	3	--	0.03	--	6	100	3	0.03
Phenanthrene	--	--	--	--	--	--	--	--
Anthracene	17000	--	12000	--	10000	100	--	100
Carbazole	24	--	0.6	--	--	--	--	0.6
Di-n-butylphthalate	6100	--	2300	--	5700	100	200	100
Fluoranthene	2300	--	4300	--	2300	100	--	100
Pyrene	1700	--	4200	--	1700	100	--	100
Butylbenzylphthalate	12000	--	930	--	1100	100	--	100
3,3'-Dichlorobenzidine	1	--	0.007	--	2	100	--	0.007
Benzo(a)anthracene	0.6	--	2	--	0.9	500	--	0.6
Chrysene	62	--	160	--	9	500	--	9
bis(2-Ethylhexyl)phthalate	35	--	3600	--	49	100	--	35
Di-n-octylphthalate	1200	--	10000	--	1100	100	--	100
Benzo(b)fluoranthene	0.6	--	5	--	0.9	50	--	0.6
Benzo(k)fluoranthene	6	--	49	--	0.9	500	--	0.9
Benzo(a)pyrene	0.06	--	8	--	0.66	100	--	0.06
Indeno(1,2,3-cd)pyrene	0.6	--	14	--	0.9	500	--	0.6
Dibenz(a,h)anthracene	0.06	--	2	--	0.66	100	--	0.06
Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--
Pesticides/PCBs								
alpha-BHC	0.1	0.7	0.0005	--	--	--	--	0.0005
beta-BHC	0.4	6	0.003	--	--	--	--	0.003
delta-BHC	--	--	--	--	--	--	--	--
gamma-BHC (Lindane)	0.4	--	0.009	--	0.52	50	--	0.009
Heptachlor	0.1	4	23	--	0.15	50	--	0.1
Aldrin	0.04	3	0.5	--	0.04	50	--	0.04
Heptachlor epoxide	0.07	5	0.7	--	--	--	--	0.07
Endosulfan I	470	--	18	--	340	50	--	18

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TABLE 4-1 (Sheet 5 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Dieldrin	0.04	1	0.004	--	0.042	50	--	0.004
4,4'-DDE	2	--	54	--	2	50	--	2
Endrin	23	--	1	--	17	50	--	1
Endosulfan II	470	--	18	--	340	50	--	18
4,4'-DDD	3	--	16	--	3	50	--	3
Endosulfan sulfate	--	--	--	--	--	--	--	--
4,4'-DDT	2	--	32	--	2	500	--	2
Methoxychlor	390	--	160	--	280	50	--	50
Endrin ketone	--	--	--	--	--	--	--	--
Endrin aldehyde	--	--	--	--	--	--	--	--
alpha-Chlordane	2	72	10	--	--	--	--	2
gamma-Chlordane	2	72	10	--	--	--	--	2
Toxaphene	0.6	87	31	--	0.1	50	--	0.1
Aroclor-1016	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1221	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1232	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1242	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1248	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1254	--	--	--	--	0.49***	50 ***	0.371***	0.371
Aroclor-1260	--	--	--	--	0.49***	50 ***	0.371*	0.371
Total PCBs	--	--	--	1**	0.49	50	0.371	0.371
Dioxins/Furans								
2,3,7,8-TCDD	--	--	--	0.001**	--	--	0.00000315	0.00000315
Metals and Cyanide								
Aluminum	--	--	--	--	--	--	--	--
Antimony	31	--	5	--	14	SS	5	5
Arsenic	0.4	770	29	--	20	SS	9.9	0.4
Barium	5500	710000	1600	--	700	SS	283	283
Beryllium	160	1400	63	--	2	SS	10	2
Cadmium	70	1800	8	--	39	SS	4	4
Calcium	--	--	--	--	--	--	--	--

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TABLE 4-1 (Sheet 6 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SHALLOW SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	DOE Soil Preliminary Remediation Goals for Ecological Endpoints (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Chromium	230****	280****	38****	--	240****	SS	0.4	0.4
Cobalt	--	--	--	--	--	--	20	20
Copper	--	--	--	--	600	SS	60	60
Iron	--	--	--	--	--	--	--	--
Lead	400	--	--	--	400	SS	40.5	40.5
Magnesium	--	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--	--
Mercury	23	10	2	--	14	SS	0.00051	0.00051
Nickel	1600	14000	130	--	250	SS	30	30
Potassium	--	--	--	--	--	--	--	--
Selenium	390	--	5	--	63	SS	0.21	0.21
Silver	390	--	34	--	110	SS	2	2
Sodium	--	--	--	--	--	--	--	--
Thallium	6	--	0.7	--	2	SS	1	0.7
Vanadium	550	--	6000	--	370	SS	2	2
Zinc	23000	--	12000	--	1500	SS	8.5	8.5
Cyanide	1600	--	40	--	1100	SS	--	40

Notes:
All soil criteria values are provided in mg/kg.
DAF = Dilution-Attenuation Factor.
SS = Site-specific.
-- = No criterion value available.
* = SSLs provided directly from guidance document; in Section 6.0, screening criteria updated using latest toxicity information.
** = Criteria values are for residential soil and were provided by EPA Region 2 (EPA, 2002a). Industrial soil criteria are 10 mg/kg and 0.005 mg/kg for PCBs and 2,3,7,8-TCDD, respectively.
*** = Criteria values correspond to sum of all PCBs.
**** = Criteria values correspond to total (if available) or hexavalent chromium.
(1) = Also known as methyl chloride.
(2) = Also known as methyl ethyl ketone (MEK)
(3) = Also known as methyl isobutyl ketone (MIBK).
(4) = Also known as 1-methyl ethyl benzene.

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TABLE 4-2 (Sheet 1 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Volatile Organics							
Dichlorodifluoromethane	--	--	--	--	--	--	--
Chloromethane (1)	--	--	--	--	520	10	10
Vinyl Chloride	0.9	0.6	0.01	--	2	10	0.01
Bromomethane	110	9	0.2	--	79	1	0.2
Chloroethane	--	--	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--	--	--
1,1-Dichloroethene	1	0.07	0.06	--	8	10	0.06
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	--	--	--	--	--
Acetone	7800	--	16	--	1000	100	16
Carbon Disulfide	7800	720	32	--	--	--	32
Methyl Acetate	--	--	--	--	--	--	--
Methylene Chloride	85	13	0.02	--	49	1	0.02
trans-1,2-Dichloroethene	1600	--	0.7	--	1000	50	0.7
Methyl tert-Butyl Ether	--	--	--	--	--	--	--
1,1-Dichloroethane	7800	1200	23	--	570	10	10
cis-1,2-Dichloroethene	780	--	0.4	--	79	1	0.4
2-Butanone (2)	--	--	--	--	1000	50	50
Chloroform	100	0.3	0.6	--	19	1	0.3
1,1,1-Trichloroethane	--	1200	2	--	210	50	2
Cyclohexane	--	--	--	--	--	--	--
Carbon Tetrachloride	5	0.3	0.07	--	2	1	0.07
Benzene	22	0.8	0.03	--	3	1	0.03
1,2-Dichloroethane	7	0.4	0.02	--	6	1	0.02
Trichloroethene	58	5	0.06	--	23	1	0.06
Methylcyclohexane	--	--	--	--	--	--	--
1,2-Dichloropropane	9	15	0.03	--	10	--	0.03

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TABLE 4-2 (Sheet 2 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Bromodichloromethane	10	--	0.6	--	11	1	0.6
cis-1,3-Dichloropropene	6	1	0.004	--	4	1	0.004
4-Methyl-2-Pentanone (3)	--	--	--	--	1000	50	50
Toluene	16000	650	12	--	1000	500	12
trans-1,3-Dichloropropene	4	1	0.004	--	4	1	0.004
1,1,2-Trichloroethane	11	1	0.02	--	22	1	0.02
Tetrachloroethene	12	10	0.06	--	4	1	0.06
2-Hexanone	--	--	--	--	--	--	--
Dibromochloromethane	8	--	0.4	--	110	1	0.4
1,2-Dibromoethane	--	--	--	--	--	--	--
Chlorobenzene	1600	130	1	--	37	1	1
Ethylbenzene	7800	400	13	--	1000	100	13
Xylenes (total)	160000	--	190	--	410	67	67
Styrene	16000	1500	4	--	23	100	4
Bromoform	81	52	0.8	--	86	1	0.8
Isopropylbenzene (4)	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	3	0.6	0.003	--	34	1	0.003
1,3-Dichlorobenzene	--	--	--	--	5100	100	100
1,4-Dichlorobenzene	20	--	2	--	570	100	2
1,2-Dichlorobenzene	5500	600	17	--	5100	50	17
1,2-Dibromo-3-chloropropane	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	610	3200	5	--	68	100	5
Semi-Volatile Organics							
Benzaldehyde	--	--	--	--	--	--	--
Phenol	37000	--	100	--	10000	50	50
bis(2-Chloroethyl) ether	0.4	0.2	0.0004	--	0.66	10	0.0004
2-Chlorophenol	310	--	4	--	280	10	4

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TABLE 4-2 (Sheet 3 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
2-Methylphenol	3100	--	15	--	2800	--	15
2,2'-oxybis(1-Chloropropane)	--	--	--	--	2300	10	10
Acetophenone	--	--	--	--	--	--	--
4-Methylphenol	--	--	--	--	2800	--	2800
N-Nitroso-di-n-propylamine	0.7	--	0.00005	--	0.66	10	0.00005
Hexachloroethane	35	54	0.5	--	6	100	0.5
Nitrobenzene	31	90	0.1	--	28	10	0.1
Isophorone	510	--	0.5	--	1100	50	0.5
2-Nitrophenol	--	--	--	--	--	--	--
2,4-Dimethylphenol	1200	--	9	--	1100	10	9
bis(2-Chloroethoxy)methane	--	--	--	--	--	--	--
2,4-Dichlorophenol	180	--	1	--	170	10	1
Naphthalene	1100	170	84	--	230	100	84
4-Chloroaniline	240	--	0.7	--	230	--	0.7
Hexachlorobutadiene	6	8	2	--	1	100	1
Caprolactam	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	--	--	--	--	10000	100	100
2-Methylnaphthalene	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	430	10	400	--	400	100	10
2,4,6-Trichlorophenol	44	200	0.2	--	62	10	0.2
2,4,5-Trichlorophenol	6100	--	270	--	5600	50	50
1,1'-Biphenyl	--	--	--	--	--	--	--
2-Chloronaphthalene	--	--	--	--	--	--	--
2-Nitroaniline	--	--	--	--	--	--	--
Dimethylphthalate	--	--	--	--	10000	50	50
2,6-Dinitrotoluene	0.7	--	0.0007	--	1	10	0.0007
Acenaphthylene	--	--	--	--	--	--	--

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TABLE 4-2 (Sheet 4 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
3-Nitroaniline	--	--	--	--	--	--	--
Acenaphthene	3400	--	570	--	3400	100	100
2,4-Dinitrophenol	120	--	0.2	--	110	10	0.2
4-Nitrophenol	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	--	--	--
2,4-Dinitrotoluene	0.7	--	0.0008	--	1	10	0.0008
Diethylphthalate	49000	--	470	--	10000	50	50
Fluorene	2300	--	560	--	2300	100	100
4-Chlorophenyl-phenylether	--	--	--	--	--	--	--
4-Nitroaniline	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	99	--	1	--	140	100	1
4-Bromophenyl-phenylether	--	--	--	--	--	--	--
Hexachlorobenzene	0.3	1	2	--	0.66	100	0.3
Atrazine	--	--	--	--	--	--	--
Pentachlorophenol	3	--	0.03	--	6	100	0.03
Phenanthrene	--	--	--	--	--	--	--
Anthracene	17000	--	12000	--	10000	100	100
Carbazole	24	--	0.6	--	--	--	0.6
Di-n-butylphthalate	6100	--	2300	--	5700	100	100
Fluoranthene	2300	--	4300	--	2300	100	100
Pyrene	1700	--	4200	--	1700	100	100
Butylbenzylphthalate	12000	--	930	--	1100	100	100
3,3'-Dichlorobenzidine	1	--	0.007	--	2	100	0.007
Benzo(a)anthracene	0.6	--	2	--	0.9	500	0.6
Chrysene	62	--	160	--	9	500	9
bis(2-Ethylhexyl)phthalate	35	--	3600	--	49	100	35

TABLE 4-2 (Sheet 5 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Di-n-octylphthalate	1200	--	10000	--	1100	100	100
Benzo(b)fluoranthene	0.6	--	5	--	0.9	50	0.6
Benzo(k)fluoranthene	6	--	49	--	0.9	500	0.9
Benzo(a)pyrene	0.06	--	8	--	0.66	100	0.06
Indeno(1,2,3-cd)pyrene	0.6	--	14	--	0.9	500	0.6
Dibenz(a,h)anthracene	0.06	--	2	--	0.66	100	0.06
Benzo(g,h,i)perylene	--	--	--	--	--	--	--
Pesticides/PCBs							
alpha-BHC	0.1	0.7	0.0005	--	--	--	0.0005
beta-BHC	0.4	6	0.003	--	--	--	0.003
delta-BHC	--	--	--	--	--	--	--
gamma-BHC (Lindane)	0.4	--	0.009	--	0.52	50	0.009
Heptachlor	0.1	4	23	--	0.15	50	0.1
Aldrin	0.04	3	0.5	--	0.04	50	0.04
Heptachlor epoxide	0.07	5	0.7	--	--	--	0.07
Endosulfan I	470	--	18	--	340	50	18
Dieldrin	0.04	1	0.004	--	0.042	50	0.004
4,4'-DDE	2	--	54	--	2	50	2
Endrin	23	--	1	--	17	50	1
Endosulfan II	470	--	18	--	340	50	18
4,4'-DDD	3	--	16	--	3	50	3
Endosulfan sulfate	--	--	--	--	--	--	--
4,4'-DDT	2	--	32	--	2	500	2
Methoxychlor	390	--	160	--	280	50	50
Endrin ketone	--	--	--	--	--	--	--
Endrin aldehyde	--	--	--	--	--	--	--
alpha-Chlordane	2	72	10	--	--	--	2

TABLE 4-2 (Sheet 6 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
gamma-Chlordane	2	72	10	--	--	--	2
Toxaphene	0.6	87	31	--	0.1	50	0.1
Aroclor-1016	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1221	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1232	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1242	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1248	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1254	--	--	--	--	0.49***	50 ***	0.49
Aroclor-1260	--	--	--	--	0.49***	50 ***	0.49
Total PCBs	--	--	--	1**	0.49	50	0.49
Dioxins/Furans							
2,3,7,8-TCDD	--	--	--	0.001**	--	--	0.001
Metals and Cyanide							
Aluminum	--	--	--	--	--	--	--
Antimony	31	--	5	--	14	SS	5
Arsenic	0.4	770	29	--	20	SS	0.4
Barium	5500	710000	1600	--	700	SS	700
Beryllium	160	1400	63	--	2	SS	2
Cadmium	70	1800	8	--	39	SS	8
Calcium	--	--	--	--	--	--	--
Chromium	230****	280****	38****	--	240****	SS	38
Cobalt	--	--	--	--	--	--	--
Copper	--	--	--	--	600	SS	600
Iron	--	--	--	--	--	--	--
Lead	400	400 or --	400	--	400	SS	400
Magnesium	--	--	--	--	--	--	--
Manganese	--	--	--	--	--	--	--

TABLE 4-2 (Sheet 7 of 7)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR SUBSURFACE SOILS

Constituents	EPA Generic Soil Screening Levels (SSLs)* Ingestion/ Direct Contact (mg/kg)	EPA Generic Soil Screening Levels (SSLs)* Inhalation (mg/kg)	EPA Generic Migration to Groundwater 20 DAF (mg/kg)	Superfund Guidance Values** (mg/kg)	NJDEP Soil Cleanup Criteria Residential Direct Contact (mg/kg)	NJDEP Soil Cleanup Criteria Impact to Groundwater (mg/kg)	Most Conservative Screening Criteria Value (mg/kg)
Mercury	23	10	2	--	14	SS	2
Nickel	1600	14000	130	--	250	SS	130
Potassium	--	--	--	--	--	--	--
Selenium	390	--	5	--	63	SS	5
Silver	390	--	34	--	110	SS	34
Sodium	--	--	--	--	--	--	--
Thallium	6	--	0.7	--	2	SS	0.7
Vanadium	550	--	6000	--	370	SS	370
Zinc	23000	--	12000	--	1500	SS	1500
Cyanide	1600	--	40	v	1100	SS	40

Notes:
All soil criteria values are provided in mg/kg.
DAF = Dilution Attenuation Factor.
SS = Site-specific.
-- = No criterion value available.
* = SSLs provided directly from guidance document; in Section 6.0, screening criteria updated using latest toxicity information.
** = Criteria values are for residential soil and were provided by EPA Region 2 (EPA, 2002a). Industrial soil criteria are 10 mg/kg and 0.005 mg/kg for PCBs and 2,3,7,8-TCDD, respectively.
*** = Criteria values correspond to sum of all PCBs.
**** = Criteria values correspond to total (if available) or hexavalent chromium.
(1) = Also known as methyl chloride.
(2) = Also known as methyl ethyl ketone (MEK).
(3) = Also known as methyl isobutyl ketone (MIBK).
(4) = Also known as 1-methyl ethyl benzene.

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TABLE 4-3 (Sheet 1 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR PERCHED WATER

Constituents	EPA Drinking Water Regulations (MCLs) (ug/L)	NJDEP Safe Drinking Water Act Standards (MCLs) (ug/L)	NJDEP Groundwater Quality Criteria (Class IIA) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Volatile Organics				
Chloromethane (1)	--	--	30	30
Bromomethane	--	--	10	10
Vinyl Chloride	2	2	5	2
Chloroethane	--	--	100 **	100
Methylene Chloride	5	3	3 **	3
Acetone	--	--	700	700
Carbon Disulfide	--	--	800 **	800
1,1-Dichloroethene	7	2	2	2
1,1-Dichloroethane	--	50	50 **	50
cis-1,2-Dichloroethene	70	70	70 **	70
trans-1,2-Dichloroethene	100	100	100	100
1,2-Dichloroethene (total)	70	70	10	10
Bromochloromethane	--	--	100 *	100
Chloroform	100	--	6	6
1,2-Dichloroethane	5	2	2	2
2-Butanone (2)	--	--	300	300
1,1,1-Trichloroethane	200	30	30	30
Carbon Tetrachloride	5	2	2	2
Bromodichloromethane	80	--	1	1
1,2-Dichloropropane	5	5	1	1
cis-1,3-Dichloropropene	--	--	0.2	0.2
Trichloroethene	5	1	1	1
Dibromochloromethane	80	--	10	10
1,1,2-Trichloroethane	5	3 **	3	3
Benzene	5	1	1	1
trans-1,3-Dichloropropene	--	--	0.2	0.2
Bromoform	80	--	4	4
4-Methyl-2-Pentanone (3)	--	--	400	400
2-Hexanone	--	--	100 **	100
Tetrachloroethene	5	1	1	1
1,1,2,2-Tetrachloroethane	--	1	1 **	1
1,2-Dibromoethane	--	--	0.05	0.05
Toluene	1000	1000	1000	1000
Chlorobenzene	100	50		50
Ethylbenzene	700	700	700	700
Styrene	100	100	100	100
m&p-Xylenes	--	1000	100 *	100
o-Xylene	--	1000	100 *	100
Xylenes (total)	10000	1000 **	1000	1000
1,3-Dichlorobenzene	--	600	600	600
1,4-Dichlorobenzene	75	75	75	75
1,2-Dichlorobenzene	600	600	600	600
1,2-Dibromo-3-chloropropane	0.2	--	1 **	0.2
1,2,4-Trichlorobenzene	70	9	9	9

TABLE 4-3 (Sheet 2 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR PERCHED WATER

Constituents	EPA Drinking Water Regulations (MCLs) (ug/L)	NJDEP Safe Drinking Water Act Standards (MCLs) (ug/L)	NJDEP Groundwater Quality Criteria (Class IIA) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Semi-Volatile Organics				
Phenol	--	--	4000	4000
bis(2-Chloroethyl) ether	--	--	10	10
2-Chlorophenol	--	--	40	40
2-Methylphenol	--	--	100 *	100
2,2'-oxybis(1-Chloropropane)	--	--	300 **	300
4-Methylphenol	--	--	100 *	100
N-Nitroso-di-n-propylamine	--	--	20	20
Hexachloroethane	--	--	10	10
Nitrobenzene	--	--	10	10
Isophorone	--	--	100	100
2-Nitrophenol	--	--	100 **	100
2,4-Dimethylphenol	--	--	100	100
bis(2-Chloroethoxy)methane	--	--	100 **	100
2,4-Dichlorophenol	--	--	20	20
Naphthalene	--	300	300 **	300
4-Chloroaniline	--	--	30 ***	30
Hexachlorobutadiene	--	--	1	1
4-Chloro-3-methylphenol	--	--	100 **	100
2-Methylnaphthalene	--	--	100 **	100
Hexachlorocyclopentadiene	50	50	50	50
2,4,6-Trichlorophenol	--	--	10	10
2,4,5-Trichlorophenol	--	--	700	700
2-Chloronaphthalene	--	--	600 **	600
2-Nitroaniline	--	--	100 *	100
Dimethylphthalate	--	--	100 *	100
Acenaphthylene	--	--	100 *	100
2,6-Dinitrotoluene	--	--	100 *	100
3-Nitroaniline	--	--	100 *	100
Acenaphthene	--	--	400	400
2,4-Dinitrophenol	--	--	40	40
4-Nitrophenol	--	--	100 **	100
Dibenzofuran	--	--	100 **	100
2,4-Dinitrotoluene	--	--	10	10
Diethylphthalate	--	--	5000	5000
4-Chlorophenyl-phenylether	--	--	100 **	100
Fluorene	--	--	300	300
4-Nitroaniline	--	--	100 *	100
4,6-Dinitro-2-methylphenol	--	--	100 **	100
N-Nitrosodiphenylamine	--	--	20	20
4-Bromophenyl-phenylether	--	--	100 *	100
Hexachlorobenzene	1	1	10	1
Pentachlorophenol	1	1	1	1
Phenanthrene	--	--	100 **	100
Anthracene	--	--	2000	2000

TABLE 4-3 (Sheet 3 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR PERCHED WATER

Constituents	EPA Drinking Water Regulations (MCLs) (ug/L)	NJDEP Safe Drinking Water Act Standards (MCLs) (ug/L)	NJDEP Groundwater Quality Criteria (Class IIA) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Carbazole	--	--	100 *	100
Di-n-butylphthalate	--	--	900	900
Fluoranthene	--	--	300	300
Pyrene	--	--	200	200
Butylbenzylphthalate	--	--	100	100
3,3'-Dichlorobenzidine	--	--	60	60
Benzo(a)anthracene	--	--	0.2 **	0.2
Chrysene	--	--	5 **	5
bis(2-Ethylhexyl)phthalate	6	--	30	6
Di-n-octylphthalate	--	--	100	100
Benzo(b)fluoranthene	--	--	10 **	10
Benzo(k)fluoranthene	--	--	1 **	1
Benzo(a)pyrene	0.2	0.2	0.2 **	0.2
Indeno(1,2,3-cd)pyrene	--	--	10 **	10
Dibenz(a,h)anthracene	--	--	0.5 **	0.5
Benzo(g,h,i)perylene	--	--	100 **	100
Pesticides/PCBs				
alpha-BHC	--	--	0.02	0.02
beta-BHC	--	--	0.2	0.2
delta-BHC	--	--	100 *	100
gamma-BHC (Lindane)	0.2	0.2	0.2	0.2
Heptachlor	0.4	0.4	0.4	0.4
Aldrin	--	--	0.04	0.04
Heptachlor epoxide	0.2	0.2	0.2	0.2
Endosulfan I	--	--	0.4	0.4
Dieldrin	--	--	0.03	0.03
4,4'-DDE	--	--	0.1	0.1
Endrin	2	2	2	2
Endosulfan II	--	--	0.4	0.4
4,4'-DDD	--	--	0.1	0.1
Endosulfan sulfate	--	--	0.4	0.4
4,4'-DDT	--	--	0.1	0.1
Methoxychlor	40	40	40	40
Endrin ketone	--	--	100 *	100
Endrin aldehyde	--	--	100 *	100
alpha-Chlordane	2	0.5	0.5	0.5
gamma-Chlordane	2	0.5	0.5	0.5
Toxaphene	3	3	3	3
Aroclor-1016	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1221	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1232	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1242	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1248	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1254	0.5 ***	0.5 ***	0.5 ***	0.5
Aroclor-1260	0.5 ***	0.5 ***	0.5 ***	0.5

TABLE 4-3 (Sheet 4 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR PERCHED WATER

Constituents	EPA Drinking Water Regulations (MCLs) (ug/L)	NJDEP Safe Drinking Water Act Standards (MCLs) (ug/L)	NJDEP Groundwater Quality Criteria (Class IIA) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Total PCBs	0.5	0.5	0.5	0.5
Dioxins/Furans				
2,3,7,8-TCDD	0.00003	0.00003	0.01	0.00003
Metals				
Aluminum	50-200 ****	200	200	200
Antimony	6	6	20	6
Arsenic	10	50	8	8
Barium	2000	2000	2000	2000
Beryllium	4	4	20	4
Cadmium	5	5	4	4
Calcium	--	--	--	--
Chromium	100	100	100	100
Cobalt	--	--	100 **	100
Copper	1300	1300	1000	1000
Iron	300 ****	300	300	300
Lead	15	15	10	10
Magnesium	--	--	--	--
Manganese	50 ****	50	50	50
Mercury	2	2	2	2
Nickel	--	--	100	100
Potassium	--	--	--	--
Selenium	50	50	50	50
Silver	100 ****	100	30 **	30
Sodium	--	--	50000	50000
Thallium	2	2	10	2
Vanadium	--	--	--	--
Zinc	5000 ****	5000	5000	5000
Cyanide	200	--	200	200

Notes:

All groundwater criteria are provided in ug/L.

Criteria provided for 1,2-dichloroethene (total) are the most conservative values for the cis- and trans- isomers.

Criteria provided for alpha-chlordane and gamma-chlordane are the values for chlordane.

-- indicates no criterion value available.

* indicates criterion value corresponds to NJDEP Interim Generic "Synthetic Organic Chemicals (SOC) Criteria" for carcinogenic (5 ug/L) and non-carcinogenic (100 ug/L) constituents.

** indicates criterion value corresponds to NJDEP "Interim Specific Groundater Quality Criteria."

*** indicates criterion value corresponds to the sum of all PCBs.

**** indicates criterion value corresponds to EPA "Secondary Drinking Water Regulations."

(1) Also known as methyl chloride.

(2) Also known as methyl ethyl ketone (MEK).

(3) Also known as methyl isobutyl ketone (MIBK).

TABLE 4-4 (Sheet 1 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR DRAINAGE SYSTEM WATER

Constituents	NJDEP Surface Water Quality Standards (Aquatic) (ug/L)	NJDEP Surface Water Quality Standards (Human Health) (ug/L)	EPA Water Quality Criteria (Freshwater) (ug/L)	EPA Water Quality Criteria (Human Health) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Volatile Organics					
Chloromethane (1)	--	--	--	--	--
Bromomethane	--	48.4	--	48	48
Vinyl Chloride	--	0.083	--	2	0.083
Chloroethane	--	--	--	--	--
Methylene Chloride	--	2.49	--	4.7	2.49
Acetone	--	--	--	--	--
Carbon Disulfide	--	--	--	--	--
1,1-Dichloroethene	--	4.81	--	0.057	0.057
1,1-Dichloroethane	--	--	--	--	--
cis-1,2-Dichloroethene	--	--	--	--	--
trans-1,2-Dichloroethene	--	592	--	700	592
Chloroform	--	5.67	--	5.7	5.67
1,2-Dichloroethane	--	0.291	--	0.38	0.291
2-Butanone (2)	--	--	--	--	--
Bromochloromethane	--	--	--	--	--
1,1,1-Trichloroethane	--	127	--	--	127
Carbon Tetrachloride	--	0.363	--	0.25	0.25
Bromodichloromethane	--	0.266	--	0.56	0.266
1,2-Dichloropropane	--	--	--	0.52	0.52
cis-1,3-Dichloropropene	--	0.193	--	10	0.193
Trichloroethene	--	1.09	--	2.7	1.09
Dibromochloromethane	--	72.6	--	0.41	0.41
1,1,2-Trichloroethane	--	13.5	--	0.6	0.6
Benzene	--	0.15	--	1.2	0.15
trans-1,3-Dichloropropene	--	0.193	--	10	0.193
Bromoform	--	4.38	--	4.3	4.3
4-Methyl-2-Pentanone (3)	--	--	--	--	--
2-Hexanone	--	--	--	--	--
Tetrachloroethene	--	0.388	--	0.8	0.388
1,1,2,2-Tetrachloroethane	--	1.72	--	0.17	0.17
1,2-Dibromoethane	--	--	--	--	--
Toluene	--	6800	--	6800	6800
Chlorobenzene	--	7440	--	680	680
Ethylbenzene	--	3030	--	3100	3030
Styrene	--	--	--	--	--
Xylenes (total)	--	--	--	--	--
1,3-Dichlorobenzene	--	400	--	400	400
1,4-Dichlorobenzene	--	2620	--	400	400
1,2-Dichlorobenzene	--	2520	--	2700	2520
1,2-Dibromo-3-chloropropane	--	--	--	--	--
1,2,4-Trichlorobenzene	--	30.6	--	260	30.6

TABLE 4-4 (Sheet 2 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR DRAINAGE SYSTEM WATER

Constituents	NJDEP Surface Water Quality Standards (Aquatic) (ug/L)	NJDEP Surface Water Quality Standards (Human Health) (ug/L)	EPA Water Quality Criteria (Freshwater) (ug/L)	EPA Water Quality Criteria (Human Health) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Semi-Volatile Organics					
Phenol	--	20900	--	21000	20900
bis(2-Chloroethyl) ether	--	0.0311	--	0.031	0.031
2-Chlorophenol	--	122	--	120	120
2-Methylphenol	--	--	--	--	--
2,2'-oxybis(1-Chloropropane)	--	1250	--	1400	1250
4-Methylphenol	--	--	--	--	--
N-Nitroso-di-n-propylamine	--	--	--	0.005	0.005
Hexachloroethane	--	2.73	--	1.9	1.9
Nitrobenzene	--	16	--	17	16
Isophorone	--	552	--	36	36
2-Nitrophenol	--	--	--	--	--
2,4-Dimethylphenol	--	--	--	540	540
bis(2-Chloroethoxy)methane	--	--	--	--	--
2,4-Dichlorophenol	--	92.7	--	93	92.7
Naphthalene	--	--	--	--	--
4-Chloroaniline	--	--	--	--	--
Hexachlorobutadiene	--	6.94	--	0.44	0.44
4-Chloro-3-methylphenol	--	--	--	--	--
2-Methylnaphthalene	--	--	--	--	--
Hexachlorocyclopentadiene	--	245	--	240	240
2,4,6-Trichlorophenol	--	2.14	--	2.1	2.1
2,4,5-Trichlorophenol	--	2580	--	2600	2580
2-Chloronaphthalene	--	--	--	1700	1700
2-Nitroaniline	--	--	--	--	--
Dimethylphthalate	--	313000	--	313000	313000
Acenaphthylene	--	--	--	--	--
2,6-Dinitrotoluene	--	--	--	--	--
3-Nitroaniline	--	--	--	--	--
Acenaphthene	--	--	--	1200	1200
2,4-Dinitrophenol	--	69.7	--	70	69.7
4-Nitrophenol	--	--	--	--	--
Dibenzofuran	--	--	--	--	--
2,4-Dinitrotoluene	--	0.11	--	0.11	0.11
Diethylphthalate	--	21200	--	23000	21200
4-Chlorophenyl-phenylether	--	--	--	--	--
Fluorene	--	1340	--	1300	1300
4-Nitroaniline	--	--	--	--	--
4,6-Dinitro-2-methylphenol	--	13.4	--	13.4	13.4
N-Nitrosodiphenylamine	--	4.95	--	5	4.95
4-Bromophenyl-phenylether	--	--	--	--	--
Hexachlorobenzene	--	0.000748	--	0.00075	0.000748
Pentachlorophenol	--	0.282	15	0.28	0.28
Phenanthrene	--	--	--	--	--

TABLE 4-4 (Sheet 3 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR DRAINAGE SYSTEM WATER

Constituents	NJDEP Surface Water Quality Standards (Aquatic) (ug/L)	NJDEP Surface Water Quality Standards (Human Health) (ug/L)	EPA Water Quality Criteria (Freshwater) (ug/L)	EPA Water Quality Criteria (Human Health) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Anthracene	--	9570	--	9600	9570
Di-n-butylphthalate	--	3530	--	2700	2700
Fluoranthene	--	310	--	300	300
Pyrene	--	797	--	960	797
Butylbenzylphthalate	--	239	--	3000	239
3,3'-Dichlorobenzidine	--	0.0386	--	0.04	0.0386
Benzo(a)anthracene	--	0.0028	--	0.0044	0.0028
Chrysene	--	0.0028	--	0.0044	0.0028
bis(2-Ethylhexyl)phthalate	--	1.76	--	1.8	1.76
Di-n-octylphthalate	--	--	--	--	--
Benzo(b)fluoranthene	--	0.0028	--	0.0044	0.0028
Benzo(k)fluoranthene	--	0.0028	--	0.0044	0.0028
Benzo(a)pyrene	--	0.0028	--	0.0044	0.0028
Indeno(1,2,3-cd)pyrene	--	0.0028	--	0.0044	0.0028
Dibenz(a,h)anthracene	--	0.0028	--	0.0044	0.0028
Benzo(g,h,i)perylene	--	--	--	--	--
Pesticides/PCBs					
alpha-BHC	--	0.00391	--	0.0039	0.0039
beta-BHC	--	0.137	--	0.014	0.014
delta-BHC	--	--	--	--	--
gamma-BHC (Lindane)	0.08	--	0.16	0.019	0.019
Heptachlor	0.0038	0.000208	0.0038	0.00021	0.000208
Aldrin	3	0.000135	1.3	0.00013	0.00013
Heptachlor epoxide	0.0038	0.000103	0.0038	0.0001	0.0001
Endosulfan I	0.056	0.932	0.056	110	0.056
Dieldrin	0.0019	0.000135	0.056	0.00014	0.000135
4,4'-DDE	--	0.000588	--	0.00059	0.000588
Endrin	0.0023	0.629	0.036	0.76	0.0023
Endosulfan II	0.056	0.932	0.056	110	0.056
4,4'-DDD	--	0.000832	--	0.00083	0.00083
Endosulfan sulfate	--	0.93	--	110	0.93
4,4'-DDT	0.001	0.000588	0.001	0.00059	0.000588
Methoxychlor	0.03	40	0.03	100	0.03
Endrin ketone	--	--	--	--	--
Endrin aldehyde	--	0.76	--	0.76	0.76
alpha-Chlordane	0.0043	0.000277	0.0043	0.0021	0.000277
gamma-Chlordane	0.0043	0.000277	0.0043	0.0021	0.000277
Toxaphene	0.0002	0.00073	0.0002	0.00073	0.0002
Aroclor-1016	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1221	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1232	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1242	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1248	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1254	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Aroclor-1260	0.014 *	0.00017 *	0.014 *	0.00017 *	0.00017
Total PCBs	0.014	0.00017	0.014	0.00017 *	0.00017

TABLE 4-4 (Sheet 4 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING CRITERIA FOR DRAINAGE SYSTEM WATER

Constituents	NJDEP Surface Water Quality Standards (Aquatic) (ug/L)	NJDEP Surface Water Quality Standards (Human Health) (ug/L)	EPA Water Quality Criteria (Freshwater) (ug/L)	EPA Water Quality Criteria (Human Health) (ug/L)	Most Conservative Screening Criteria Value (ug/L)
Metals and Cyanide					
Aluminum	--	--	87	--	87
Antimony	--	12.2	--	14	12.2
Arsenic	--	0.017	150	0.018	0.017
Barium	--	2000	--	1000	1000
Beryllium	--	--	--	--	--
Cadmium	--	10	2.2	--	2.2
Calcium	--	--	--	--	--
Chromium	--	160	74 **	--	74
Cobalt	--	--	--	--	--
Copper	--	--	9	1300	9
Iron	--	--	1000	300	300
Lead	5.4	5	2.5	--	2.5
Magnesium	--	--	--	--	--
Manganese	--	--	--	50	50
Mercury	--	0.144	0.77	0.05	0.05
Nickel	--	516	52	610	52
Potassium	--	--	--	--	--
Selenium	--	10	5	170	5
Silver	--	164	3.4	--	3.4
Sodium	--	--	--	--	--
Thallium	--	1.7	--	1.7	1.7
Vanadium	--	--	--	--	--
Zinc	--	--	120	9100	120
Cyanide	5.2	768	5.2	700	5.2

Notes:

All surface water values are provided in ug/L.

-- indicates no criteria value available.

* indicates criterion value corresponds to the sum of all PCBs.

** indicates criterion value corresponds to trivalent chromium (Cr+3).

(1) Also known as methyl chloride.

(2) Also known as methyl ethyl ketone (MEK)

(3) Also known as methyl isobutyl ketone (MIBK).

TABLE 4-5 (Sheet 1 of 2)
CORNELL- DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED BY EPA
(27 AND 29 JUNE, 16 JULY 1996)

Sample Number	Sample Depth (inches)	Aroclor-1254 (mg/kg)	Lead (mg/kg)
S1	0-3	6	66 J
SS1	3-6	37	28 J
S2	0-3	59	97 J
SS2	3-6	88	147 J
S3	0-3	3	29 J
SS3	3-12	<1	8 J
S4	0-3	16	105 J
SS4	3-12	14	30 J
S5	0-3	1000	1770 J
SS5	3-12	5000	6820 J
S6	0-3	3000	21800 J
SS6	3-12	2700	66600 J
S7	0-3	100 J	169 J
SS7	3-12	3	44 J
S8	0-3	90	543 J
SS8	3-12	1	37 J
S9	0-3	73	387 J
SS9	3-12	5	81 J
S10	0-3	11 J	546 J
SS10	3-12	100 J	494 J
S11	0-3	4 J	297 J
SS11	3-12	1	97 J
S12	0-3	190	127 J
SS12	3-15	7	46 J
S13	0-3	29	87
SS13	3-11	37 J	1740
S14	0-2	28	268
SS14	3-15	2	95
S15	0-3	45	140
SS15	3-15	12	157
S16	0-3	9	55
SS16	6-15	30	395
S17	0-3	32	144
SS17	4-16	2	233
S18	0-3	8	210
SS18	3-13	U	338
S19	0-3	340	236
SS19	3-13	22000	353
S20	0-3	11	150
SS20	4-16	1600	369

TABLE 4-5 (Sheet 2 of 2)
CORNELL- DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM SOIL SAMPLES COLLECTED BY EPA
(27 AND 29 JUNE, 16 JULY 1996)

Sample Number	Sample Depth (inches)	Aroclor-1254 (mg/kg)	Lead (mg/kg)
S21	0-3	180	340
SS21	6-14	5500	7460
S22	0-3	83	87
SS22	14-18	1000	478
S23	0-6	270	297
SS23	6-12	34 J	126
S24	0-6	98	283
SS24	9	41	349
S25	0-3	4700	441
S26 (dup. of S6)	0-3	3900	22500 J
SS26 (dup. of SS6)	3-12	1900	57300
S28 (dup. of S17)	0-3	26	111
SS28 (dup. of SS17)	4-16	<1 J	226
S29	0-6	51000 J	1740
TP1A	2.0 feet	180	294
TP1B	4.5 feet	100 J	55
TP2A	2.0 feet	150	139
TP2B	4.0 feet	14	11
TP3A	4.0 feet	23 J	318
TP3B	9.0 feet	4	7
TP4A	6.0 feet	400	459
TP5A	4.0 feet	1900 J	1180
TP5B	9.0 feet	4	480
TP6A	3.5 feet	U	1970
TP6B	8.5 feet	<1 J	25
TP8A (dup. of TP6A)	3.5 feet	<1 J	1870

Notes:

Except for concentrations detected at less than 1 mg/kg (denoted with "<") all other analytical data presented above have been rounded to the next whole number.

J - Estimated value.

U - Not detected.

TABLE 4-6
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM WIPE SAMPLES COLLECTED BY EPA
(21 MARCH 1997)

Sample Numbers	Sample Location	Aroclor-1254	Aroclor-1260	Cadmium	Lead
BLK 03249701	--	0.8 U	0.8 U	--	--
--	MEDIA BLANK 1	--	--	0.08 U	0.12
--	MEDIA BLANK 2	--	--	0.08 U	0.14
08561/08562	BLDG. 6 SHELF	5.0	0.8 U	0.83	14
08563/08564	BLDG. 6 TABLE	0.4 J	0.8 U	0.08 U	0.91
08565/08566	BLDG. 13 FLOOR	7.3	0.8 U	23	780
08567/08568	BLDG. 13 TABLE	1.5	0.8 U	3.3	160
08569/08570	BLDG. 13 COUNTER	0.8 U	0.8 U	0.10	1.4
08571/08572	BLDG. 18 OVEN	3.2	0.8 U	0.41	25
08573/08574	BLDG. 18 BENCH	89	82 W	6.3	450
08575/08576	BLDG. 18 FLOOR	7.5	4.9 W	5.9	320
08577/08578	BLDG. 14 LOW CONTACT	6.4	0.8 U	7.9	320
08579/08580	BLDG. 14 FLOOR	1.9	0.8 U	2.6	100
08581/08582	BLDG. 14 DESK	0.8 U	0.8 U	0.32	7.0
08585/08586	BLDG. 11 FLOOR	9.2	3.9 W	1.1	25
08587/08588	BLDG. 12 FLOOR	13	12 W	6.1	250
08589/08590	BLDG. 12 TABLE	0.8 U	0.8 U	0.14	0.67
08591/08592	BLDG. 5a FLOOR	70	17	4.2	75
08593/08594	BLDG. 5a OFFICE	2.0	0.8 U	0.16	4.1
08595/08596	BLDG. 5a WORK	0.8 U	0.8 U	0.11	3.8
08597/08598	BLDG. 10 COMP	2.0	0.9 W	16	260
08599/08600	BLDG. 9a FLOOR	16 W	0.8 U	13	550
08601/08602	BLDG. 5a FLOOR	210	24 W	18	240
08603/08604	BLDG. 5 AISLE	62	5.9 W	12	86
08605/08606	BLDG. 5 WORK	9.9	1.1 W	1.8	40
08607/08608	BLDG. 5 AC	500	180 W	34	270
08609/08610	BLDG. 5 TABLE	350	21 W	4.4	28
08611/08612	BLDG. 2 FLOOR	4.6	0.8 U	3.6	260
08613/08614	BLDG. 3 COUNTER	0.8 U	0.8 U	0.09	0.92
08615/08616	BLDG. 3 FLOOR	8.6	4.7 W	6.5	320
08619/08620	FIELD BLANK	0.8 U	0.8 U	0.08 U	0.37

Notes:
Concentrations provided in micrograms per 100 square centimeters (ug/100cm2).
"U" denotes not detected above the given method detection limit.
"W" denotes weathered.

TABLE 4-7 (Sheet 1 of 3)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM AIR, CHIP AND VACUUM DUST SAMPLES COLLECTED BY EPA
(5 AND 9 JUNE 1997)

AIR SAMPLES:

Sample Numbers	Sample Location	Units	Aroclor-1016	Aroclor-1248	Aroclor-1254	Cadmium	Lead
00331/00332	Bldg. 5/Columbia/Back Storage Bin by Bay Door	ug/m3	7	2	0.3 U	0.054	0.971
00333/00334	Bldg. 5/Columbia/Shelf, Mid Work Area	ug/m3	12	5	0.3 U	0.037	0.578
00335/00336	Bldg. 5/Columbia/3rd Mid Bench Storage Shelf	ug/m3	18	6	0.3 U	0.021	0.117
00337/00338	Bldg. 5/Columbia/ Storage Bin by Back Room	ug/m3	33	12	0.3 U	0.011	0.115
00339/00340	Bldg. 5/Columbia/Back Room Work Bench	ug/m3	10	5	0.3 U	0.013	0.354
00341/00342	Bldg. 5/Columbia/Pole 20 Back Room	ug/m3	16	7	0.3 U	0.008	0.253
00343/00344	Bldg. 5A/Robalo/Pole Near Breaker, behind Conveyor Rolls	ug/m3	3.7	2.3	0.3 U	0.017	0.417
00345/00346	Bldg. 5A/Robalo/Shelf inside Front Bay Door	ug/m3	0.6	0.4	0.3 U	0.007	0.185
00347/00348	Truck Fenceline	ug/m3	0.3 U	0.2 J	0.3 U	0.005	0.134
00349/00350	Roadway Corner, Trucking Facility	ug/m3	0.3 U	0.5 U	0.2 J	0.002	0.083
09553	Field Blank	ug/filter	--	--	--	0.005 U	0.100
09554	Field Blank	ng	250 U	250 U	250 U	--	--
09555	Lot Blank	ug/filter	--	--	--	0.005 U	0.073
09556	Lot Blank	ng	250 U	250 U	250 U	--	--

TABLE 4-7 (Sheet 2 of 3)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM AIR, CHIP AND VACUUM DUST SAMPLES COLLECTED BY EPA
(5 AND 9 JUNE 1997)

CHIP SAMPLES:

Sample Numbers	Sample Location	Units	Aroclor-1248	Aroclor-1254	Cadmium	Lead
09894A/B	Bldg. 5/Columbia/Chip 1/Pole 20/Top	mg/kg	21,000	57,000	4.1 U	1,000
09895A/B	Bldg. 5/Columbia/Chip 1/Pole 20/Bottom	mg/kg	19,000	41,000	4.6 U	68
09896A/B	Bldg. 5/Columbia/Chip 2/Pole 14/Top	mg/kg	190	590	4.2 U	360
09897A/B	Bldg. 5/Columbia/Chip 2/Pole 14/Bottom	mg/kg	42	81	3.9 U	48
09898A/B	Bldg. 5/Columbia/Chip 3/Beam near Office/Top	mg/kg	400	870	3.5 U	71
02343A/B	Bldg. 5/Columbia/Chip 3/Beam near Office/Bottom	mg/kg	320	530	5.1 U	33
02344A/B	Bldg. 5/Columbia/Chip 4/Right Side of Water Fountain/Top	mg/kg	28,000	17,000	9.4	100
02345A/B	Bldg. 5/Columbia/Chip 4/Right Side of Water Fountain/Bottom	mg/kg	31,000	15,000	3.9 U	22
02346A/B	Bldg. 5A/Robalo/Chip 5/Right Side Wall of Office Bathroom/Top	mg/kg	150	200	4.3 U	39
02347A/B	Bldg. 5A/Robalo/Chip 5/Right Side Wall of Office Bathroom/Bottom	mg/kg	94	100	5.9 U	24
02348A/B	Bldg. 5A/Robalo/Chip 6/Floor to Left of Garage Door/Top	mg/kg	1,800	1,000	3.2 U	190
02349A/B	Bldg. 5A/Robalo/Chip 6/Floor to Left of Garage Door/Bottom	mg/kg	540	250	3.4 U	16
02350A/B	Bldg. 18/Norpak/Chip 7/Next to Workbench/Top	mg/kg	23	73	5.4 U	100
02351A/B	Bldg. 18/Norpak/Chip 7/Next to Workbench/Bottom	mg/kg	48	58	4.4 U	40
Method Blank	--	mg/kg	--	--	5.2 U	7.1 U

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TABLE 4-7 (Sheet 3 of 3)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ANALYTICAL RESULTS FROM AIR, CHIP AND VACUUM DUST SAMPLES COLLECTED BY EPA
(5 AND 9 JUNE 1997)

VACUUM DUST SAMPLES:

Sample Numbers	Sample Location	Units	Aroclor-1248	Aroclor-1254	Cadmium	Lead
09889A/B	Bldg. 5/Columbia Composite	mg/kg	4,500	15,000	130	3,800
09890A/B	Bldg. 5A/Robalo Composite	mg/kg	5,200	16,000	120	2,600
09891A/B	Bldg. 5A/Robalo Composite	mg/kg	360	2,500	24	1,500
09892A/B	Bldg. 18/Norpak Composite	mg/kg	16	81	44	1,700

Notes:

"U" denotes not detected above the given method detection limit.
"J" denotes estimated value.

TABLE 4-8 (Sheet 1 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF BUILDING FLOOR DUST ANALYTICAL RESULTS

Constituent	Units	Building No. 1	Building No. 1A	Building No. 1B	Building No. 1C	Building No. 1D	Building No. 2	Building No. 2A	Building No. 3/4	Building No. 4A
PCBs										
Aroclor-1254	mg/kg	910 D - 8,300 D	130 D	520 D	270 D	14 D	18 D - 20 JD	46 D	4.9 D - 71 D	63 D
Metals										
Aluminum	mg/kg	4,670 - 6,850	23,700 J	6,370 J	4,490 J	1,640 J	10,700 - 11,700	7,240 J	5,410 - 5,730	12,300 J
Antimony	mg/kg	6.7 B - 42.1	64.9	3.1 B	1.6 B	931	7.9 B - 12.9	126	6 B - 6.7 B	10.4 B
Arsenic	mg/kg	8.8 J - 11.5 J	10.9 J	44.3 J	4.2 J	5.5 J	4.3 J - 6.5 J	20.1 J	6.8 J - 8.2 J	11.9 J
Barium	mg/kg	3,180 - 5,600	2,410	6,250	805	682	1,020 - 2,230	2,550	1,150 - 4,440	1,240
Beryllium	mg/kg	0.27 B - 0.36 B	0.17 B	0.27 B	0.22 B	0.06 B	0.42 B - 0.45 B	0.2 B	ND - 0.17 B	0.29 B
Cadmium	mg/kg	105 - 192	48.3	12.2	8.7	6.2	4.8 - 10.5	65	7.9 - 8.4	76.2
Calcium	mg/kg	36,000 - 41,100	42,600 J	67,200	50,500 J	205,000 J	74,600 - 77,900	32,200 J	23,100 - 42,300	27,000 J
Chromium	mg/kg	340 - 894	214 J	139	34.7 J	24.8 J	59.8 - 60.5	158 J	47.4 - 47.9	75.9 J
Cobalt	mg/kg	19.9 - 25.5	33.1 J	22.2 J	12.5 J	3.8 B	7.4 B - 8.1 B	106 J	16.8 - 58.6	44.4 J
Copper	mg/kg	727 - 7670	242 J	216 J	70 J	69.8 J	227 - 310	3,080 J	180 - 266	562 J
Iron	mg/kg	19,700 - 39,400	23,800 J	18,800	23,300 J	5,320 J	13,100 - 13,700	59,200 J	15,100 - 21,100	32,400 J
Lead	mg/kg	2,720 - 23,000	1,630 J	853	394 J	9,140 J	880 - 3,140	61,700 J	334 - 1,440	1,650 J
Magnesium	mg/kg	5,360 - 8,420	7,310 J	4,080 J	4,140 J	16,300 J	6,340 - 12,700	3,940 J	3,840 - 4,990	5,570 J
Manganese	mg/kg	373 - 487	284 J	220	219 J	98.4 J	303 - 331	626 J	240	364 J
Mercury	mg/kg	7.2 J - 8.8 J	1.4 J	3.1	4.6 J	0.16 J	0.41 J - 0.63 J	1.4 J	0.48 J - 1.3 J	1.1 J
Nickel	mg/kg	29.8 J - 50.5 J	87 J	26.9	10.7 J	32.4 J	66.4 J - 71.5 J	104	49.9 J - 65.9 J	64 J
Potassium	mg/kg	1,580 J - 2,130 J	5,180 J	1,380 J	718 JB	1,360 J	3,970 J - 6,020 J	3,860	2,880 J - 10,200 J	6,060 J
Selenium	mg/kg	0.25 B - 0.73 B	--	--	--	--	ND - 1.3	1.9 J	1.4 - 1.6 J	1.2 J
Silver	mg/kg	9.1 J - 12.7 J	6.1 J	4.8 J	2.2 J	2.7 J	3.7 J - 14.8 J	11.3 J	8 J - 12.5 J	42.3 J
Sodium	mg/kg	2,330 J - 4,490 J	8,140 J	2,680 J	697 JB	2,860 J	3,950 J - 9,910 J	12,200 J	5,130 J - 12,400 J	11,300 J
Thallium	mg/kg	ND - 1.4 B	--	--	1.1 B	--	0.52 B - 0.61 B	3.4	--	--
Vanadium	mg/kg	20.3 - 23.8	20.7	16.1	14.7	4.8 B	17.7 - 18.9	49.3	14.3 - 25.9	32.7
Zinc	mg/kg	2,770 J - 5,090 J	8,850 J	7,320	693 J	1,820 J	2,040 J - 2,280 J	38,400 J	1,590 J - 8,440 J	4,490 J

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TABLE 4-8 (Sheet 2 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF BUILDING FLOOR DUST ANALYTICAL RESULTS

Constituent	Units	Building No. 5	Building No. 5A	Building No. 6	Building No. 7	Building No. 8	Building No. 9	Building No. 9A	Building No. 9B	Building No. 9C
PCBs										
Aroclor-1254	mg/kg	500 D - 3,300 D	69 JD - 190 D	2,700 D	29 JD	9.5 D	430 D	22 D	5.7 JD	28 D
Metals										
Aluminum	mg/kg	14,400 - 20,500	6,070 - 6,580	10,800	9,200	1,580 J	5,130 J	5,800 J	5,660	5,800 J
Antimony	mg/kg	15.9 - 126	4.6 B - 5.9 B	9.3 B	12.5	4 B	68.7	9.2 B	1.8 B	37.5
Arsenic	mg/kg	9.5 J - 20.7 J	5.2 - 5.4	12.7 J	8.9 J	8.1 J	11.8 J	16.7 J	2.6	23.3 J
Barium	mg/kg	330 - 711	1,210 - 1,620	631	2,400	200	4,170	360	145	10,000
Beryllium	mg/kg	0.12 B - 0.37 B	0.22 B - 0.41 B	0.43 B	0.52 B	0.08 B	0.18 B	0.35 B	0.13 B	0.37 B
Cadmium	mg/kg	61.1 - 346	5.8 - 6.9	45.7	26.3	2.2	40.2	16.9	1.9	59.7
Calcium	mg/kg	14,900 - 24,100	31,900 - 40,100	47,600	16,000	6,450 J	45,300 J	42,200 J	12,100	31,200 J
Chromium	mg/kg	258 - 736	180 - 394	91.9	288	48.6 J	115 J	304 J	18.3	344 J
Cobalt	mg/kg	19.3 - 33.9	14.7 - 16.6	16.5	19.8	16.2 J	18.3 J	26.5 J	7.4 B	17.8 J
Copper	mg/kg	23,100 - 42,600	226 - 262	7,950	314	428 J	1,930 J	873 J	101	1,230 J
Iron	mg/kg	152,000 - 349,000	20,600 - 23,200	69,800	47,900	287,000 J	143,000 J	181,000 J	9,120	80,400 J
Lead	mg/kg	3,880 - 24,600	431 - 2,370	3,090	1,080	279 J	1,050 J	1,120 J	67.3	1,980 J
Magnesium	mg/kg	2,870 - 3,810	5,710 - 19,300	7,640	4,380	1,290 J	5,170 J	4,980 J	3,120	10,500 J
Manganese	mg/kg	1,150 - 1,390	263 - 312	561	1,060	1,070 J	882 J	1,660 J	175	754 J
Mercury	mg/kg	0.28 J - 1.8 J	0.6 J - 0.79 J	24.4 J	0.23 J	1.4 J	3.5 J	2.3 J	0.08 JB	4 J
Nickel	mg/kg	179 J - 253 J	50.9 J - 112 J	79.9 J	48.8 J	43.5 J	59.5 J	150 J	27.8 J	170 J
Potassium	mg/kg	3,080 J - 6,630 J	2,490 J - 2,800 J	2,760 J	1,520 J	689 B	2,020 J	2,450 J	2,530 J	2,490 J
Selenium	mg/kg	5.4 J - 9.8 J	1.4 J	3.7 J	5.1 J	1.8 J	0.56 JB	2.7 J	0.97 B	2.1 J
Silver	mg/kg	20.6 J - 85.9 J	2.9 J - 5.1 J	11.6 J	2.1 J	5 J	7.1 J	10.8 J	2.1 J	19 J
Sodium	mg/kg	2,800 J - 4,800 J	3,610 J - 4,530 J	5,450 J	1,210 J	1,570 J	14,000 J	2,250 J	2,080 J	4,290 J
Thallium	mg/kg	R	--	R	R	17.6 J	5.9 J	9.6 J	--	4.2
Vanadium	mg/kg	18.5 - 31	15.4 - 27.6	35.4	35	15.6	24	20.4	25.6	44.7
Zinc	mg/kg	3,610 J - 6,160 J	2,660 J - 2,760 J	4,250 J	981 J	883 J	41,500 J	1,900 J	420 J	2,190 J

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TABLE 4-8 (Sheet 3 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF BUILDING FLOOR DUST ANALYTICAL RESULTS

Constituent	Units	Building No. 10	Building No. 11	Building No. 12	Building No. 13	Building No. 14	Building No. 15	Building No. 16	Building No. 18
PCBs									
Aroclor-1254	mg/kg	33 D	45 D	13 D	14 D	6.3 D	8.4	51 D	41 D
Metals									
Aluminum	mg/kg	15,000 J	28,600 J	155,000	3,150 J	7,520 J	8,370 J	11,800 J	7,620 J
Antimony	mg/kg	44.9	6.3 B	12.2	4.4 B	4.3 B	15.8	2 B	14.2
Arsenic	mg/kg	22.9 J	11.3 J	21.6 J	15.3 J	10.1 J	27.9 J	100 J	6.8 J
Barium	mg/kg	820	451	2,460	661	195	4,830	572	315
Beryllium	mg/kg	0.21 B	0.23 B	0.15 B	0.14 B	0.82 B	0.34 B	0.65 B	0.26 B
Cadmium	mg/kg	428	40.4	14.5	10.6	17.6	33.3	12.2	7.4
Calcium	mg/kg	33,400 J	19,700 J	12,700	12,900 J	10,000 J	35,200	18,100 J	22,600
Chromium	mg/kg	148 J	666 J	471	57.9 J	321 J	523	95.2 J	38.9
Cobalt	mg/kg	25.3 J	22 J	49.7	8.3 B	117 J	72.4 J	24.7 J	31 J
Copper	mg/kg	448 J	401 J	1,650	135 J	3,040 J	1,410 J	480 J	454 J
Iron	mg/kg	68,500 J	72,700 J	382,000	9,560 J	66,100 J	62,400	64,800 J	42,700
Lead	mg/kg	6,800 J	1,510 J	91.7	470 J	407 J	3,700	1,550 J	1,300
Magnesium	mg/kg	6,380 J	4,060 J	3,430	2,770 J	3,290 J	13,000 J	8,770 J	4,740 J
Manganese	mg/kg	734 J	553 J	1,870	170 J	689 J	579	697 J	362
Mercury	mg/kg	1.1 J	0.31 J	1.8 J	0.2 J	1.2 J	4.2	2.8 J	0.83
Nickel	mg/kg	188 J	69.9 J	253 J	24.3 J	182 J	545	117 J	66
Potassium	mg/kg	3,960 J	1,440 J	3,550 J	3,980 J	20,300 J	5,070 J	1,600 J	2,990 J
Selenium	mg/kg	2 J	1.1 J	9.6 J	0.63 JB	7.5 J	5.2 J	--	--
Silver	mg/kg	26.9 J	6.4 J	6.2 J	2.2 J	51.3 J	27 J	7.9 J	2.5 J
Sodium	mg/kg	10,500 J	1,400 J	1,040 J	3,810 J	20,200 J	4,280 J	1,090 J	7,780 J
Thallium	mg/kg	2 B	3.6	R	--	4.4	--	3.3	--
Vanadium	mg/kg	40.6	55.2	32.2	18.4	70.9	217	335	74.2
Zinc	mg/kg	3,410 J	1,490 J	1,100 J	1,070 J	996 J	4,100	1,650 J	1,710

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TABLE 4-8 (Sheet 4 of 4)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF BUILDING FLOOR DUST ANALYTICAL RESULTS

Notes:

ND or -- = Not detected.
J = Estimated value.
D = Value obtained from dilution analysis.
B (metals only) = Value between instrument detection limit and practical quantitation limit.
R = Rejected (unusable) value.

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TABLE 4-9 (Sheet 1 of 6)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
PCBs								
Aroclor-1242	ug/kg	371	ND - 140,000 JD	ND - 39,000 D	--	--	--	--
Aroclor-1248	ug/kg	371	ND - 1,100,000 JD	ND - 850,000 J	410 J - 1,300,000	ND - 2,100,000 D	--	--
Aroclor-1254	ug/kg	371	ND - 1,000,000 D	85 J - 4,400,000 D	5,900,000 JD	310,000 JD - 3,400,000 D	ND - 1,600,000 JD	430 J - 19,000,000 J
Aroclor-1260	ug/kg	371	ND - 2,900 JD	--	--	--	ND - 220 JN	--
Total PCBs (3)	mg/kg	0.371	ND - 1,220	0.085 - 5,250	0.41 - 7,200	310 - 5,500	0.2 - 1,600	0.43 - 19,000
PCB Congeners								
BZ 101/90	ug/kg	NC	NA	NA	NA	NA	NA	38 JN - 3300 JN
BZ 105	ug/kg	NC	NA	NA	NA	NA	NA	8.1 JN - 1700 JN
BZ 107	ug/kg	NC	NA	NA	NA	NA	NA	3.9 JN - 470 JN
BZ 110/77	ug/kg	NC	NA	NA	NA	NA	NA	46 JN - 6000 JN
BZ 114	ug/kg	NC	NA	NA	NA	NA	NA	ND - 1.7 JN
BZ 118	ug/kg	NC	NA	NA	NA	NA	NA	19 JN - 3900 JN
BZ 128	ug/kg	NC	NA	NA	NA	NA	NA	13 N - 1400 N
BZ 132/168	ug/kg	NC	NA	NA	NA	NA	NA	12 JN - 1400 JN
BZ 135/144	ug/kg	NC	NA	NA	NA	NA	NA	8.1 JN - 410 JN
BZ 136	ug/kg	NC	NA	NA	NA	NA	NA	3.4 JN - 450 JN
BZ 137	ug/kg	NC	NA	NA	NA	NA	NA	4.5 JN - 420 JN
BZ 138/163	ug/kg	NC	NA	NA	NA	NA	NA	49 JN - 4700 JN
BZ 141	ug/kg	NC	NA	NA	NA	NA	NA	6.4 JN - 670 JN
BZ 146	ug/kg	NC	NA	NA	NA	NA	NA	6.6 N - 570 N
BZ 149/123	ug/kg	NC	NA	NA	NA	NA	NA	23 JN - 2100 JN
BZ 151	ug/kg	NC	NA	NA	NA	NA	NA	9.1 JN - 600 JN
BZ 153/184	ug/kg	NC	NA	NA	NA	NA	NA	33 JN - 2900 JN
BZ 156/171	ug/kg	NC	NA	NA	NA	NA	NA	10 JN - 1400 JN
BZ 157	ug/kg	NC	NA	NA	NA	NA	NA	1.9 JN - 200 JN
BZ 158	ug/kg	NC	NA	NA	NA	NA	NA	5.1 JN - 600 JN
BZ 170	ug/kg	NC	NA	NA	NA	NA	NA	5.4 JN - 490 JN
BZ 172	ug/kg	NC	NA	NA	NA	NA	NA	1.7 JN - 160 JN
BZ 174	ug/kg	NC	NA	NA	NA	NA	NA	4.1 JN - 330 JN
BZ 176	ug/kg	NC	NA	NA	NA	NA	NA	ND - 720 JN
BZ 177	ug/kg	NC	NA	NA	NA	NA	NA	2.5 JN - 220 JN
BZ 178/126	ug/kg	NC	NA	NA	NA	NA	NA	6.5 JN - 690 JN
BZ 18	ug/kg	NC	NA	NA	NA	NA	NA	0.65 - 95
BZ 180	ug/kg	NC	NA	NA	NA	NA	NA	7 N - 610 N
BZ 183	ug/kg	NC	NA	NA	NA	NA	NA	2.7 JN - 230 JN
BZ 187/182	ug/kg	NC	NA	NA	NA	NA	NA	4.2 JN - 540 JN
BZ 19	ug/kg	NC	NA	NA	NA	NA	NA	1.5 JN - 120 JN

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300160

TABLE 4-9 (Sheet 2 of 6)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
BZ 190	ug/kg	NC	NA	NA	NA	NA	NA	ND - 1 JN
BZ 194	ug/kg	NC	NA	NA	NA	NA	NA	1.3 N - 96
BZ 201	ug/kg	NC	NA	NA	NA	NA	NA	ND - 1.5 JN
BZ 203/196	ug/kg	NC	NA	NA	NA	NA	NA	ND -1.8 JN
BZ 206	ug/kg	NC	NA	NA	NA	NA	NA	0.82 N - 81
BZ 209	ug/kg	NC	NA	NA	NA	NA	NA	1.3 N - 95
BZ 22	ug/kg	NC	NA	NA	NA	NA	NA	ND -1.5 JN
BZ 28	ug/kg	NC	NA	NA	NA	NA	NA	0.98 JN - 120 JN
BZ 31	ug/kg	NC	NA	NA	NA	NA	NA	4.1 JN - 130 JN
BZ 33	ug/kg	NC	NA	NA	NA	NA	NA	ND - 0.91 JN
BZ 37/42	ug/kg	NC	NA	NA	NA	NA	NA	ND - 2.4 JN
BZ 44	ug/kg	NC	NA	NA	NA	NA	NA	2.2 N - 340 N
BZ 45	ug/kg	NC	NA	NA	NA	NA	NA	ND - 1.5 JN
BZ 47	ug/kg	NC	NA	NA	NA	NA	NA	1.8 JN - 200 JN
BZ 49	ug/kg	NC	NA	NA	NA	NA	NA	2.2 JN - 390 JN
BZ 52	ug/kg	NC	NA	NA	NA	NA	NA	4.8 N - 1100 N
BZ 56	ug/kg	NC	NA	NA	NA	NA	NA	ND - 19 JN
BZ 60/92	ug/kg	NC	NA	NA	NA	NA	NA	4.4 JN - 1000 JN
BZ 64/41	ug/kg	NC	NA	NA	NA	NA	NA	ND - 370 JN
BZ 66/95	ug/kg	NC	NA	NA	NA	NA	NA	14 JN - 2400 JN
BZ 70	ug/kg	NC	NA	NA	NA	NA	NA	4.7 JN - 1400 JN
BZ 71	ug/kg	NC	NA	NA	NA	NA	NA	ND - 1.4 JN
BZ 74	ug/kg	NC	NA	NA	NA	NA	NA	2.7 JN - 300 JN
BZ 82	ug/kg	NC	NA	NA	NA	NA	NA	ND - 370 JN
BZ 84	ug/kg	NC	NA	NA	NA	NA	NA	ND - 480 JN
BZ 85	ug/kg	NC	NA	NA	NA	NA	NA	6.6 JN - 820 JN
BZ 87/81	ug/kg	NC	NA	NA	NA	NA	NA	12 JN - 2600 JN
BZ 91	ug/kg	NC	NA	NA	NA	NA	NA	4.2 JN - 510 JN
BZ 97	ug/kg	NC	NA	NA	NA	NA	NA	6.5 JN - 1300 JN
BZ 99	ug/kg	NC	NA	NA	NA	NA	NA	14 JN - 1600 JN
PCB Congeners (total)	ug/kg	NC	NA	NA	NA	NA	NA	460 JN - 53000 JN
Dioxins/Furans								
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	NC	NA	NA	NA	13190 J	NA	56 - 906
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	NC	NA	NA	NA	1780	NA	173 - 413
1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	NC	NA	NA	NA	4270 J	NA	5.2-119
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	NC	NA	NA	NA	13510 J	NA	21.3-1020
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	NC	NA	NA	NA	123	NA	2.2 J - 12.5
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	NC	NA	NA	NA	10020 J	NA	8.4-327

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TABLE 4-9 (Sheet 3 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	NC	NA	NA	NA	241	NA	7.6-30.3
1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	NC	NA	NA	NA	311	NA	2.1 J - 13.7 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	NC	NA	NA	NA	349	NA	7.6-33.8
1,2,3,7,8-Pentachlorodibenzofuran	pg/g	NC	NA	NA	NA	7880 J	NA	16.1-606
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	NC	NA	NA	NA	128	NA	1.7 J - 12.8
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	NC	NA	NA	NA	5150 J	NA	8.2-197
2,3,4,7,8-Pentachlorodibenzofuran	pg/g	NC	NA	NA	NA	7720 J	NA	18.6-623
2,3,7,8-Tetrachlorodibenzofuran	pg/g	NC	NA	NA	NA	7880 J	NA	86.3 - 2520 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	3.15	NA	NA	NA	56.7	NA	1.3 J - 10.1
Heptachlorodibenzofurans	pg/g	NC	NA	NA	NA	1340	NA	ND - 122 J
Heptachlorodibenzo-p-dioxins	pg/g	NC	NA	NA	NA	3530	NA	362-859
Hexachlorodibenzofurans	pg/g	NC	NA	NA	NA	52850 J	NA	115 J - 2670 J
Hexachlorodibenzo-p-dioxins	pg/g	NC	NA	NA	NA	3080	NA	76.7 J - 351 J
Octachlorodibenzofurans	pg/g	NC	NA	NA	NA	16450 J	NA	69.5-605
Octachlorodibenzo-p-dioxins	pg/g	NC	NA	NA	NA	5600 J	NA	4430 J - 6750 J
Pentachlorodibenzofurans	pg/g	NC	NA	NA	NA	70770 J	NA	220 J - 5810 J
Pentachlorodibenzo-p-dioxins	pg/g	NC	NA	NA	NA	1420 J	NA	24.4 J - 149 J
Tetrachlorodibenzo-p-dioxins	pg/g	NC	NA	NA	NA	1370 J	NA	25.5 J - 365 J
Tetrachlorodibenzofurans	pg/g	NC	NA	NA	NA	75480 J	NA	523 J - 14420 J
Volatile Organics								
1,1,1-Trichloroethane	ug/kg	2,000	ND - 160 J	ND - 5 J	--	ND - 3 J	ND - 16 J	ND - 3 J
1,1-Dichloroethane	ug/kg	10,000	ND - 2 J	--	--	--	--	--
1,1-Dichloroethene	ug/kg	60	ND - 1 J	ND - 13 J	ND - 2 J	ND - 6 J	--	--
1,2-Dichlorobenzene	ug/kg	17,000	--	ND - 7 J	--	--	--	--
1,2,4-Trichlorobenzene	ug/kg	5,000	ND - 1 J	ND - 220 J	--	ND - 5,900	--	--
1,3-Dichlorobenzene	ug/kg	100,000	--	ND - 7 J	--	ND - 4 J	--	--
1,4-Dichlorobenzene	ug/kg	2,000	--	--	--	ND - 5 J	--	--
2-Butanone	ug/kg	50,000	ND - 76 J	ND - 17	ND - 17 J	--	ND - 14 J	--
4-Methyl-2-pentanone	ug/kg	150,000	ND - 2 J	--	--	--	--	--
Acetone	ug/kg	16,000	ND - 430 J	ND - 450 J	ND - 65 J	ND - 30	ND - 93	ND - 65 J
Benzene	ug/kg	30	ND - 1 J	ND - 13 J	ND - 1 J	--	ND - 9 J	--
Carbon disulfide	ug/kg	32,000	ND - 4 J	ND - 10 J	ND - 32 J	--	--	--
Chlorobenzene	ug/kg	1,000	--	ND - 8 J	--	ND - 2 J	--	--
Chloroform	ug/kg	300	ND - 1 J	--	--	--	--	--
Chloromethane	ug/kg	10,000	--	--	--	ND - 19	--	--
cis-1,2-Dichloroethene	ug/kg	400	ND - 4 J	ND - 6,600 D	ND - 250 J	ND - 55,000	ND - 5 J	ND - 22,000 J
Cyclohexane	ug/kg	NC	ND - 7 J	ND - 12 J	--	ND - 2 J	--	--
Ethylbenzene	ug/kg	13,000	ND - 1 J	ND - 9 J	ND - 0.6 J	ND - 2 J	ND - 150 J	ND -2 J

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TABLE 4-9 (Sheet 4 of 6)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Isopropylbenzene	ug/kg	NC	--	--	ND - 6 J	--	ND - 9 J	--
Methyl acetate	ug/kg	NC	ND - 15 J	ND - 47	--	--	--	--
Methylcyclohexane	ug/kg	NC	ND - 8 J	ND - 19 J	ND - 7 J	--	--	--
Methylene chloride	ug/kg	20	ND - 17	ND - 19	ND - 0.8 J	ND - 19	--	ND - 1,700 J
Styrene	ug/kg	4,000	--	--	--	--	ND - 32 J	--
Tetrachloroethene	ug/kg	60	ND - 14 J	ND - 6,600 JD	--	ND - 37	--	ND - 430 JD
Toluene	ug/kg	12,000	ND - 45	ND - 29 J	1 J - 4 J	ND - 28	ND - 7,500 JD	ND - 13 J
trans-1,2-Dichloroethene	ug/kg	700	--	ND - 120	ND - 5 J	ND - 1,400 J	--	ND - 970 J
Trichloroethene	ug/kg	60	ND - 250 J	ND - 8,600 JD	ND - 18 J	12 J - 47,000 JD	ND - 47 J	ND - 1,300 J
Trichlorofluoromethane	ug/kg	NC	ND - 4 J	ND - 2 J	--	--	ND - 5 J	--
Vinyl chloride	ug/kg	10	--	ND - 2,800 J	ND - 120 J	ND - 640 J	--	--
Xylenes (total)	ug/kg	67,000	ND - 3 J	ND - 57 J	--	ND - 10 J	ND - 2,700 JD	ND - 13 J
Total VOC TICs	ug/kg	NC	ND - 1,687 JN	ND - 888 JN	ND - 13,818 JN	11 J - 3,000 JN	ND - 12,358 JN	ND - 172 J
Semi-Volatile Organics								
2-Chloronaphthalene	ug/kg	NC	--	--	--	ND - 59 J	--	--
2-Methylnaphthalene	ug/kg	NC	ND - 1,600 J	ND - 5,700	ND - 630 J	ND - 340 J	ND - 460,000 J	ND - 720
Acenaphthene	ug/kg	20000	ND - 840 J	ND - 61,000 J	ND - 850 J	ND - 66 J	ND - 2,800,000	ND - 220 J
Acenaphthylene	ug/kg	NC	ND - 500	ND - 3,300 J	--	ND - 180 J	ND - 71 J	ND - 960
Acetophenone	ug/kg	NC	ND - 88 J	ND - 760 J	--	ND - 130 J	ND - 340 J	ND - 140 J
Anthracene	ug/kg	100000	ND - 2,700 J	ND - 89,000 J	--	ND - 190 J	ND - 1,200,000 J	ND - 910
Benzaldehyde	ug/kg	NC	ND - 790 J	ND - 170 J	--	ND - 190 J	ND - 100 J	ND - 950J
Benzo(a)anthracene	ug/kg	600	ND - 8,700	ND - 340,000 J	510 - 2,100J	ND - 850 J	ND - 920,000 J	ND - 2,700
Benzo(a)pyrene	ug/kg	60	ND - 3,100 D	ND - 430,000 J	ND - 410 J	ND - 780 J	ND - 520,000 J	ND - 2,800 J
Benzo(b)fluoranthene	ug/kg	600	ND - 6,700	ND - 460,000 J	ND - 490 J	ND - 860 J	ND - 450,000 J	ND - 3,300 J
Benzo(ghi)perylene	ug/kg	NC	ND - 2,800	ND - 220,000 D	--	ND - 850	ND - 200,000 J	ND - 2,600 J
Benzo(k)fluoranthene	ug/kg	900	ND - 7,800	ND - 310,000 J	ND - 440 J	ND - 1,200 J	ND - 450,000 J	ND - 2,700
Biphenyl	ug/kg	60000	ND - 88 J	ND - 1,600	--	ND - 140 J	ND - 100,000 J	ND - 110 J
Bis(2-ethylhexyl)phthalate (BEHP)	ug/kg	35000	ND - 1,200	ND - 1,600	--	--	ND - 4,200 D	ND - 21,000 D
Butyl benzyl phthalate	ug/kg	100000	ND - 950 J	--	--	--	ND - 380 J	ND - 20,000 D
Caprolactam	ug/kg	NC	--	ND - 100 J	--	--	--	--
Carbazole	ug/kg	600	ND - 2,000 J	ND - 68,000 J	--	ND - 100 J	ND - 360 J	ND - 330 J
Chrysene	ug/kg	9000	ND - 9,100	ND - 360,000 J	1,300 J- 2,100 J	ND - 1,200 J	ND - 830,000 J	ND - 3,400
Dibenzo(a,h)anthracene	ug/kg	460	ND - 810 J	ND - 75,000 J	--	ND - 280 J	ND - 66,000 J	ND - 830 J
Dibenzofuran	ug/kg	NC	ND - 890 J	ND - 25,000 J	ND - 240 J	ND - 49 J	ND - 1,700,000 J	ND - 260
Diethyl phthalate	ug/kg	50000	--	ND - 2,500	--	--	--	--
Dimethyl phthalate	ug/kg	50000	ND - 9,200 J	ND - 170 J	--	--	--	--
Di-n-butyl phthalate	ug/kg	100000	ND - 140 J	--	--	--	--	ND - 1,700
Di-n-octyl phthalate	ug/kg	100000	ND - 120 J	--	--	--	--	ND - 1,200 J

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TABLE 4-9 (Sheet 5 of 6)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Fluoranthene	ug/kg	100000	ND - 15,000	ND - 540,000	--	ND - 750	53 - 4,000,000	ND - 3,800
Fluorene	ug/kg	100000	ND - 950 J	ND - 41,000 J	ND - 1,600 J	ND - 53 J	ND - 2,000,000 J	ND - 270 J
Hexachlorobenzene	ug/kg	300	--	--	--	ND - 23	--	--
Indeno(1,2,3-cd)pyrene	ug/kg	600	ND - 2,200	ND - 190,000 J	--	ND - 620	ND - 260,000 J	ND - 2,300 J
Naphthalene	ug/kg	84000	ND - 950 J	ND - 10,000	ND - 320 J	ND - 170 J	ND - 130,000 J	ND - 460 J
Phenanthrene	ug/kg	NC	ND - 13,000	ND - 400,000 J	ND - 870 J	33 J - 930 J	ND - 7,000,000 JD	ND - 2,100
Phenol	ug/kg	30000	ND - 56 J	--	--	--	ND - 59 J	ND - 50 J
Pyrene	ug/kg	100000	ND - 8,400	ND - 490,000 J	220 J - 4,800 J	ND - 1,400 J	56 J - 2,600,000 J	ND - 6,000 D
Total SVOC TICs	ug/kg	NC	ND - 321,900 JN	79 - 671,300 JN	136,030 JN - 293,700 JN	39,560 JN - 2,490,900 JN	1,450 JN - 10,140,000 JN	510 JN - 1,077,800 JN
Pesticides								
4,4'-DDD	ug/kg	3000	ND - 82 JN	ND - 500 JN	--	--	--	--
4,4'-DDE	ug/kg	2000	ND - 13,000 JDN	ND - 50,000 JN	ND - 150,000 JN	ND - 40,000 JN	ND - 140 JDN	ND - 1,200,000 JD
4,4'-DDT	ug/kg	2000	ND - 410 JDN	ND - 1,000 JN	ND - 5.2 J	ND - 42,000	--	--
Aldrin	ug/kg	40	ND - 27,000	ND - 55,000 JDN	9.4 JN - 130,000 JN	--	--	--
alpha-BHC	ug/kg	0.5	ND - 1,000 J	ND - 1,500 JD	--	ND - 2,400	ND - 75 J	--
alpha-Chlordane	ug/kg	2000	ND - 710 JN	ND - 2,100 JN	--	--	--	ND - 230 JN
beta-BHC	ug/kg	3	ND - 29	--	--	--	--	--
delta-BHC	ug/kg	NC	ND - 11 JN	ND - 23 J	--	--	--	--
Dieldrin	ug/kg	4	ND - 43,000	ND - 310,000 D	ND - 520,000	ND - 38,000 JN	--	ND - 180,000 J
Endosulfan II	ug/kg	18000	ND - 120 JD	--	--	--	--	--
Endosulfan sulfate	ug/kg	NC	ND - 2,500 JD	ND - 8,100 JN	--	ND - 59,000 JD	ND - 190	--
Endrin	ug/kg	1000	ND - 26,000 JD	ND - 15,000 J	--	--	--	--
Endrin aldehyde	ug/kg	NC	ND - 1,300 JN	ND - 9,300 JN	--	ND - 4,500 JN	--	ND - 120,000 J
Endrin ketone	ug/kg	NC	ND - 20 J	ND - 52	--	--	--	--
gamma-Chordane	ug/kg	2000	ND - 5.7 J	--	--	ND - 20,000 JD	--	ND - 320 JN
Heptachlor	ug/kg	100	ND - 32,000 JDN	ND - 30,000 JDN	--	ND - 1,900 J	--	--
Heptachlor epoxide	ug/kg	70	ND - 12,000 JDN	ND - 98,000 D	ND - 100,000 JN	ND - 3,000 JN	--	ND - 250,000 JN
gamma-BHC (Lindane)	ug/kg	9	--	ND - 9.7 J	--	--	--	--
Methoxychlor	ug/kg	50000	ND - 44	ND - 54 J	ND - 67 J	--	--	--
Metals and Cyanide								
Aluminum	mg/kg	NC	534 - 60,200	3,220 - 16,500	5,490 - 10,000	5,480 - 228,000	5,840 - 14,400	7,330 J - 35,800 J
Antimony	mg/kg	5	ND - 14.9	ND - 26.4	ND - 6.4 B	7.4 JB - 21.5 JB	ND - 1.7 B	ND - 7 B
Arsenic	mg/kg	0.4 - 19	ND - 92.1	1.55 B - 1,060	4.2 J - 21.1 J	8.3 - 55.1	2.1 B - 22.9	8.6 - 38.3 J
Barium	mg/kg	283	8.8 B - 1,170	54.5 - 1,560	104 - 4,170	206 - 827	38.6 - 223	171 - 590
Beryllium	mg/kg	2	ND - 1.6	ND - 1.3	0.34 - 0.74 B	0.25 JB - 0.68 B	ND - 2.6 J	0.99 B - 9.2 J
Cadmium	mg/kg	4	ND - 162	ND - 72.7	ND - 17.6	1.5 - 123	ND - 3.3	ND - 40.2 J
Calcium	mg/kg	NC	515 B - 58,800 J	1,220 - 38,400 J	793 B - 1,520 J	2,030 J - 33,400 J	358 B - 51,300	2,260 - 6,200 J
Chromium	mg/kg	0.4	5.7 - 129 J	9.4 - 619 J	20.4 J - 27.5	27.4 J - 52	8.7 J - 32.2	12.5 J - 77.5 J

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TABLE 4-9 (Sheet 6 of 6)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SHALLOW SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Cobalt	mg/kg	20	0.92 B - 96.8	4.9 B - 31.4	5.5 B - 8.5	7.5 JB - 14.3	4.3 B - 7.1 B	9.7 B - 30.1 J
Copper	mg/kg	60	5.6 B - 2,630	7.1 - 1,850	29.8 - 171 J	ND - 13,600	11.6 - 256	ND - 140
Iron	mg/kg	NC	4,600 - 147,000	11,000 - 108,000	21,400 - 51,000	43,800 J - 108,000	11,300 - 33,900	9,120 J - 47,700 J
Lead	mg/kg	40.5	5.8 - 52,600	6.6 J - 5,020	18.4 - 3,130	858 - 1,160 J	4.8 - 363	31.9 J - 1,100
Magnesium	mg/kg	NC	203 B - 12,500	692 - 17,000	862 JB - 2,460 J	894 B- 4,190	1,350 - 12,900	450 JB - 5,730
Manganese	mg/kg	NC	23.6 - 2,000	167 - 1,070	136 - 413	ND - 739	174 - 745	ND - 555
Mercury	mg/kg	0.0005	ND - 8.1 J	ND - 5.5	0.07 B - 0.9	0.22 - 0.9	ND - 0.38	ND - 0.7
Nickel	mg/kg	30	2 B - 377	14.8 - 146	15 J - 41	44 J - 72.2	9 - 25.7	20.7 J - 92.8 J
Potassium	mg/kg	NC	171 B - 6,180	316 B- 2,560 J	441 B - 749 B	314 JB - 999 B	459 B - 2,920 J	465 JB - 1,310 JB
Selenium	mg/kg	0.21	ND - 1.6 J	ND - 9.7	1.3 J - 1.4 J	ND - 9	ND - 1.3	ND - 3.2
Silver	mg/kg	2	ND - 34.4	ND - 42.4	ND - 1.1 B	ND - 26.8 J	ND - 10.5	0.62 B - 13.6 J
Sodium	mg/kg	NC	ND - 1,150 B	207 B - 1,530	81.6 B - 425 B	81.1 B - 629 JB	ND - 613 B	140 B - 774 JB
Thallium	mg/kg	0.7	ND - 12.9	ND - 7	ND - 0.93 B	--	ND - 2.7	ND - 7.6 J
Vanadium	mg/kg	2	2.1 B - 122	13.6 - 244	16.2 - 20.5	13.2 - 129 J	14.8 - 31.4	30.3 - 87.9 J
Zinc	mg/kg	8.5	ND - 1,610	ND - 1,040	36.2 - 579	336 - 14,000 J	31.6 - 499	78.3 J - 647 J
Cyanide	mg/kg	40	ND - 6.8	ND - 0.59	0.12 B - 2.3 J	ND - 0.5 JB	ND - 1.3	ND - 7.6

Notes:

1. Most Conservative Screening Criteria Values are described in Section 4.2.1 and Table 4-1.
2. Figure 4-10 presents the locations of the six on-site areas.
3. Sum of detected Aroclor compounds; see Section 4.1
4. Shaded entries exceed their respective screening criteria value in at least the maximum amount per concentration range.
5. Abbreviations include:

   NC = No criteria available.

   TIC = Tentatively identified compound.

   VOC = Volatile organic compound.

   SVOC = Semi-volatile organic compound.

   ND or -- = Not detected.

   J = Estimated value.

   D = Value obtained from dilution analysis.

   N = Presumptive evidence for the presence of the compound exists.

   B (metals only) = Value between practical quantitation limit and instrument detection limit.

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TABLE 4-10 (Sheet 1 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
PCBs								
Aroclor-1242	ug/kg	490	ND - 5,700	ND - 1,900,000	--	ND - 5,600,000 D	--	NS
Aroclor-1248	ug/kg	490	ND - 210 J	ND - 1,700,000 JD	ND - 38,000 J	ND - 29,000,000 JD	--	NS
Aroclor-1254	ug/kg	490	ND - 320,000 D	ND - 1,300,000 JD	640 J - 220,000 D	ND - 130,000,000 JD	ND - 110 J	NS
Aroclor-1260	ug/kg	490	ND - 250 J	--	--	--	--	NS
Total PCBs (3)	mg/kg	0.49	ND - 320	0.308 - 3,000	0.64 - 258	2 - 130,000	ND - 0.11	NS
PCB Congeners								
BZ 101/90	ug/kg	NC	NS	45 JN	NS	1,100 JN - 1,400,000 JN	NS	NS
BZ 105	ug/kg	NC	NS	26 JN	NS	470 JN - 1,000,000 JN	NS	NS
BZ 107	ug/kg	NC	NS	5.6 JN	NS	110 JN - 150,000 JN	NS	NS
BZ 110/77	ug/kg	NC	NS	77 JN	NS	1,800 JN - 2,200,000 JN	NS	NS
BZ 114	ug/kg	NC	NS	1.4 JN	NS	30 JN - 39,000 JN	NS	NS
BZ 118	ug/kg	NC	NS	54 JN	NS	1,000 N - 1,300,000 N	NS	NS
BZ 119	ug/kg	NC	NS	1.3 JN	NS	28 JN - 35,000 JN	NS	NS
BZ 128	ug/kg	NC	NS	16 JN	NS	320 N - 330,000 N	NS	NS
BZ 132/168	ug/kg	NC	NS	18 JN	NS	370 JN - 420,000 JN	NS	NS
BZ 135/144	ug/kg	NC	NS	5.4 JN	NS	110 JN - 160,000 JN	NS	NS
BZ 136	ug/kg	NC	NS	5.1 JN	NS	140 JN - 170,000 JN	NS	NS
BZ 137	ug/kg	NC	NS	4.3 JN	NS	87 JN - 110,000 JN	NS	NS
BZ 138/163	ug/kg	NC	NS	57 JN	NS	1,100 JN - 1,300,000 JN	NS	NS
BZ 141	ug/kg	NC	NS	8.2 JN	NS	170 JN - 220000 JN	NS	NS
BZ 146	ug/kg	NC	NS	6.3 JN	NS	130 N - 160,000 N	NS	NS
BZ 149/123	ug/kg	NC	NS	25 JN	NS	550 JN - 700,000 JN	NS	NS
BZ 153/184	ug/kg	NC	NS	34 JN	NS	670 JN - 840,000 JN	NS	NS
BZ 156/171	ug/kg	NC	NS	17 JN	NS	290 JN - 330,000 JN	NS	NS
BZ 157	ug/kg	NC	NS	2.6 JN	NS	32 JN - 40,000 JN	NS	NS
BZ 158	ug/kg	NC	NS	6.8 JN	NS	160 JN - 170,000 JN	NS	NS
BZ 16/32	ug/kg	NC	NS	5 JN	NS	ND - 1,300,000 JN	NS	NS
BZ 17	ug/kg	NC	NS	3.2 JN	NS	ND - 960,000 JN	NS	NS
BZ 170	ug/kg	NC	NS	5.4 JN	NS	140 JN - 150,000 JN	NS	NS
BZ 172	ug/kg	NC	NS	1.5 JN	NS	31 JN - 43,000 JN	NS	NS
BZ 174	ug/kg	NC	NS	3.8 JN	NS	77 JN - 110,000 JN	NS	NS
BZ 176	ug/kg	NC	NS	5.8 JN	NS	ND - 110 JN	NS	NS
BZ 177	ug/kg	NC	NS	2.6 JN	NS	49 JN - 70,000 JN	NS	NS
BZ 178/126	ug/kg	NC	NS	--	NS	ND - 140 JN	NS	NS
BZ 18	ug/kg	NC	NS	5.2 JN	NS	19 - 1,900,000 JN	NS	NS
BZ 180	ug/kg	NC	NS	7.2 JN	NS	130 N - 200,000 N	NS	NS
BZ 183	ug/kg	NC	NS	2.7 JN	NS	49 JN - 86,000 JN	NS	NS
BZ 187/182	ug/kg	NC	NS	3.3 JN	NS	62 JN - 100,000 JN	NS	NS
BZ 19	ug/kg	NC	NS	3.3 JN	NS	ND - 290,000 JN	NS	NS
BZ 190	ug/kg	NC	NS	0.95 JN	NS	--	NS	NS
BZ 194	ug/kg	NC	NS	--	NS	20 N - 35,000	NS	NS
BZ 201	ug/kg	NC	NS	--	NS	19 JN - 36,000 JN	NS	NS

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TABLE 4-10 (Sheet 2 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
BZ 206	ug/kg	NC	NS	--	NS	16-30,000	NS	NS
BZ 209	ug/kg	NC	NS	--	NS	19-35,000	NS	NS
BZ 22	ug/kg	NC	NS	4.4 JN	NS	ND - 750,000 JN	NS	NS
BZ 25	ug/kg	NC	NS	0.97 JN	NS	ND - 200,000 JN	NS	NS
BZ 26	ug/kg	NC	NS	1.7 JN	NS	ND - 370,000 JN	NS	NS
BZ 27	ug/kg	NC	NS	--	NS	ND - 250,000 JN	NS	NS
BZ 28	ug/kg	NC	NS	10 JN	NS	ND - 1,600,000 JN	NS	NS
BZ 31	ug/kg	NC	NS	8.5 JN	NS	ND - 1,500,000 JN	NS	NS
BZ 33	ug/kg	NC	NS	6.2 JN	NS	--	NS	NS
BZ 37/42	ug/kg	NC	NS	6.5 JN	NS	39 JN - 690,000 JN	NS	NS
BZ 4	ug/kg	NC	NS	2.2 JN	NS	ND - 660,000 JN	NS	NS
BZ 40	ug/kg	NC	NS	2.2 JN	NS	29 JN - 220,000 JN	NS	NS
BZ 44	ug/kg	NC	NS	12 N	NS	310 N - 1,000,000 JN	NS	NS
BZ 45	ug/kg	NC	NS	1.6 JN	NS	ND - 270,000 JN	NS	NS
BZ 46	ug/kg	NC	NS	--	NS	ND - 120,000 JN	NS	NS
BZ 47	ug/kg	NC	NS	2.8 JN	NS	70 JN - 270,000 JN	NS	NS
BZ 48	ug/kg	NC	NS	2.8 JN	NS	ND - 320,000 JN	NS	NS
BZ 49	ug/kg	NC	NS	8.5 JN	NS	190 JN - 790,000 JN	NS	NS
BZ 52	ug/kg	NC	NS	20 JN	NS	660 N - 1,500,000 JN	NS	NS
BZ 53	ug/kg	NC	NS	--	NS	ND - 1,600,000 JN	NS	NS
BZ 56	ug/kg	NC	NS	6.7 JN	NS	--	NS	NS
BZ 59	ug/kg	NC	NS	1 JN	NS	ND - 100,000 JN	NS	NS
BZ 6	ug/kg	NC	NS	--	NS	ND - 220,000 JN	NS	NS
BZ 60/92	ug/kg	NC	NS	11 JN	NS	230 JN - 900,000 JN	NS	NS
BZ 64/41	ug/kg	NC	NS	6.9 JN	NS	110 JN - 610,000 JN	NS	NS
BZ 66/95	ug/kg	NC	NS	40 JN	NS	890 JN - 1,900,000 JN	NS	NS
BZ 7	ug/kg	NC	NS	--	NS	ND - 56,000 JN	NS	NS
BZ 70	ug/kg	NC	NS	25 JN	NS	370 JN - 1,300,000 JN	NS	NS
BZ 71	ug/kg	NC	NS	3.2 JN	NS	26 JN - 280,000 JN	NS	NS
BZ 74	ug/kg	NC	NS	8.2 JN	NS	110 JN - 490,000 JN	NS	NS
BZ 76	ug/kg	NC	NS	1.3 JN	NS	ND - 43 JN	NS	NS
BZ 8	ug/kg	NC	NS	3.4 JN	NS	ND - 780,000 JN	NS	NS
BZ 82	ug/kg	NC	NS	7.6 JN	NS	250 JN - 320,000 JN	NS	NS
BZ 84	ug/kg	NC	NS	11 JN	NS	300 JN - 430,000 JN	NS	NS
BZ 85	ug/kg	NC	NS	10 JN	NS	220 JN - 290,000 JN	NS	NS
BZ 87/81	ug/kg	NC	NS	36 JN	NS	840 JN - 1,000,000 JN	NS	NS
BZ 91	ug/kg	NC	NS	5.7 JN	NS	170 JN - 220,000 JN	NS	NS
BZ 97	ug/kg	NC	NS	17 JN	NS	440 JN - 460,000 JN	NS	NS
BZ 99	ug/kg	NC	NS	20 JN	NS	480 JN - 640,000 JN	NS	NS
PCB Congeners (total)	ug/kg	NC	NS	770 JN	NS	15,000 JN - 39,000,000 JN	NS	NS
Volatile Organics								
1,1,1-Trichloroethane	ug/kg	2,000	ND - 32 J	ND - 6 J	ND - 7 J	ND - 3 J	6 J - 11 J	NS
1,1-Dichloroethane	ug/kg	10,000	--	--	--	ND - 6 J	--	NS

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TABLE 4-10 (Sheet 3 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
1,1-Dichloroethene	ug/kg	60	--	ND - 4 J	--	ND - 80	--	NS
1,1,2-Trichloroethane	ug/kg	20	--	--	--	ND - 2 J	--	NS
1,2-Dichlorobenzene	ug/kg	17,000	--	ND - 120 J	--	ND - 580 J	--	NS
1,2-Dichloropropane	ug/kg	30	--	--	--	ND - 96	--	NS
1,2,4-Trichlorobenzene	ug/kg	5,000	--	ND - 12,000	--	ND - 10,000 J	--	NS
1,3-Dichlorobenzene	ug/kg	100,000	--	ND - 190 DJ	--	ND - 1,800 J	--	NS
1,4-Dichlorobenzene	ug/kg	2,000	--	ND - 190 J	--	ND - 1,100 J	--	NS
2-Hexanone	ug/kg	NC	--	--	--	--	ND - 2 J	NS
4-Methyl-2-pentanone	ug/kg	50,000	ND - 5 J	ND - 4 J	--	--	ND - 1 J	NS
Acetone	ug/kg	16,000	ND - 56 J	ND - 120	ND - 50 J	ND - 79 J	--	NS
Benzene	ug/kg	30	--	ND - 2 J	ND - 2 J	ND - 10 J	--	NS
Carbon disulfide	ug/kg	32,000	ND - 3 J	ND - 5 J	ND - 16 J	ND - 8 J	ND - 3 J	NS
Chlorobenzene	ug/kg	1,000	--	ND - 50 J	--	ND - 920 J	--	NS
Chloroform	ug/kg	300	ND - 3 J	--	--	--	--	NS
cis-1,2-Dichloroethene	ug/kg	400	--	ND - 10,000	ND - 10 J	ND - 8,200 J	--	NS
Cyclohexane	ug/kg	NC	--	--	--	ND - 4 J	--	NS
Ethylbenzene	ug/kg	13,000	--	ND - 6 J	ND - 2 J	ND - 430 J	--	NS
Isopropyl benzene	ug/kg	NC	ND - 6 J	--	--	ND - 130	--	NS
Methyl Acetate	ug/kg	NC	ND - 5 J	ND - 6 J	--	--	--	NS
Methyl ethyl ketone	ug/kg	50,000	ND - 8 J	ND - 4 J	--	ND - 20 J	ND - 8 J	NS
Methyl tert-butyl ether	ug/kg	NC	ND - 1 J	--	--	--	--	NS
Methylcyclohexane	ug/kg	NC	ND - 9 J	ND - 6 J	ND - 3 J	ND - 630 J	ND - 1 J	NS
Methylene chloride	ug/kg	20	ND - 21 J	ND - 3 J	--	ND - 11	--	NS
Tetrachloroethene	ug/kg	60	ND - 4 J	ND - 500 J	ND - 24 J	ND - 110	--	NS
Toluene	ug/kg	12,000	ND - 29	ND - 31 J	ND - 6 J	ND - 85 J	--	NS
trans-1,2-dichloroethene	ug/kg	700	--	ND - 230 J	--	ND - 690 J	--	NS
Trichloroethene	ug/kg	60	ND - 110	ND - 33,000 J	7 J - 220	ND - 7,800 J	--	NS
Trichlorofluoromethane	ug/kg	NC	ND - 3 J	ND - 2 J	--	ND - 3 J	3 J - 5 J	NS
Vinyl chloride	ug/kg	10	--	ND - 260 J	--	ND - 650 J	--	NS
Xylene (total)	ug/kg	67,000	ND - 2 J	ND - 47 J	ND - 9 J	ND - 2,400 J	--	NS
Total VOC TICs	ug/kg	NC	ND - 22,700 NJ	ND - 2,800 NJ	ND - 1,350 NJ	ND - 104,100 NJ	10 J - 336 J	NS
Semi-Volatile Organics								
2,4-Dimethylphenol	ug/kg	9,000	--	--	ND - 760 J	--	--	NS
2-Chloronaphthalene	ug/kg	NC	--	--	--	ND - 170 J	--	NS
2-Methylnaphthalene	ug/kg	NC	ND - 2,700	ND - 110 J	ND - 2,800 J	ND - 420 J	--	NS
Acenaphthene	ug/kg	100,000	ND - 320 J	ND - 340 J	ND - 22,000	--	--	NS
Acenaphthylene	ug/kg	NC	--	ND - 62 J	ND - 1,400 J	--	--	NS
Acetophenone	ug/kg	NC	--	ND - 34 J	ND - 590 J	--	--	NS
Anthracene	ug/kg	100,000	ND - 850	ND - 230 J	ND - 44,000	ND - 420 J	--	NS
Benzo(a)anthracene	ug/kg	600	ND - 560 J	ND - 1,500	ND - 170,000 D	ND - 2,600 J	--	NS
Benzo(a)pyrene	ug/kg	60	ND - 360 J	ND - 2,200	ND - 42,000	ND - 2,400 J	--	NS
Benzo(b)fluoranthene	ug/kg	600	ND - 640 J	ND - 2,500	ND - 180,000 D	ND - 3,200 J	--	NS
Benzo(ghi)perylene	ug/kg	NC	ND - 230 J	ND - 1,600	ND - 2,700 J	ND - 1,600 J	--	NS

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TABLE 4-10 (Sheet 4 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Benzo(k)fluoranthene	ug/kg	900	ND - 480 J	ND - 1,000	ND - 73,000	ND - 1,200 J	--	NS
Biphenyl	ug/kg	NC	--	ND - 100 J	ND - 700 J	ND - 3,500 J	--	NS
Bis(2-ethylhexyl)phthalate	ug/kg	35,000	ND - 980	ND - 200 J	--	ND - 780	ND - 200 J	NS
Butyl benzyl phthalate	ug/kg	100,000	--	--	--	ND - 47 J	--	NS
Carbazole	ug/kg	600	ND - 87 J	ND - 160 J	ND - 23,000	--	--	NS
Chrysene	ug/kg	9,000	ND - 550 J	ND - 1,700	ND - 170,000 D	ND - 3,300 J	--	NS
Dibenzo(a,h)anthracene	ug/kg	60	ND - 58 J	ND - 350 J	ND - 23,000	--	--	NS
Dibenzofuran	ug/kg	NC	ND - 370 J	ND - 110 J	ND - 5,900 J	--	--	NS
Diethyl phthalate	ug/kg	50,000	--	--	ND - 52,000	--	--	NS
Di-n-butyl phthalate	ug/kg	100,000	ND - 71 J	ND - 42 J	ND - 47,000	ND - 24 J	--	NS
Fluoranthene	ug/kg	100,000	ND - 1,100	ND - 1,500	ND - 390,000 D	ND - 3,400 J	--	NS
Fluorene	ug/kg	100,000	ND - 890	ND - 210 J	ND - 15,000 J	--	--	NS
Indeno(1,2,3-cd)pyrene	ug/kg	600	--	ND - 1,600	ND - 38,000	ND - 1,500 J	--	NS
Naphthalene	ug/kg	84,000	--	ND - 79 J	ND - 11,000 J	ND - 260 J	--	NS
Pentachlorophenol	ug/kg	30	--	--	--	ND - 1,300 J	--	NS
Phenanthrene	ug/kg	NC	ND - 3,800	ND - 1,000	ND - 250,000 D	ND - 1,500 J	--	NS
Phenol	ug/kg	50,000	--	--	ND - 1,200 J	--	--	NS
Pyrene	ug/kg	100,000	ND - 1,900	ND - 2,400	ND - 120,000	ND - 3,100 J	--	NS
Total SVOC TICs	ug/kg	NC	ND - 162,710 NJ	566 NJ - 1,199,000 ANJ	8,240 NJ - 453,400 NJ	3,222 NJ -17,480,100 NJ	ND - 80 J	NS
Pesticides								
4,4'-DDD	ug/kg	3,000	--	ND - 48 NJ	--	--	--	NS
4,4'-DDE	ug/kg	2,000	ND - 5,200 J	ND - 39 NJ	ND - 4,500 NJ	ND - 9,700,000 DJ	ND - 2.4 NJ	NS
4,4'-DDT	ug/kg	2,000	ND - 77 NJ	--	--	ND - 25,000,000 D	--	NS
Aldrin	ug/kg	40	ND - 5.9 J	ND - 53,000 DNJ	ND - 4,100 NJD	ND - 1,100,000JD	--	NS
alpha-BHC	ug/kg	0.50	ND - 12	ND - 4.8 NJ	--	ND - 3,000	--	NS
alpha-Chlordane	ug/kg	2000	ND - 600	ND - 4.6 NJ	ND - 59 NJ	--	--	NS
beta-BHC	ug/kg	3.0	ND - 5.9 J	ND - 7.4 NJ	--	--	--	NS
delta-BHC	ug/kg	NC	--	ND - 3.2 NJ	--	--	--	NS
Dieldrin	ug/kg	4.0	ND - 16,000 J	ND - 37 J	ND - 18,000 D	ND - 11,000,000 DNJ	ND - 2.4 J	NS
Endosulfan II	ug/kg	18,000	--	--	--	ND - 40,000 J	--	NS
Endosulfan sulfate	ug/kg	NC	ND - 5.6 J	ND - 35 J	ND - 1,400 NJ	ND - 76,000 JD	ND - 3.5 J	NS
Endrin	ug/kg	1,000	ND - 1,300	ND - 9.9 NJ	ND - 1,200 J	--	--	NS
Endrin aldehyde	ug/kg	NC	ND - 2.3 NJ	ND - 3,700 NJ	--	ND - 1,700,000 NJ	ND - 0.29 J	NS
Endrin ketone	ug/kg	NC	--	ND - 11 J	ND - 13 NJ	--	--	NS
gamma-Chlordane	ug/kg	2000	--	--	--	ND - 8,200,000 DJ	--	NS
Heptachlor	ug/kg	100	ND - 220 J	ND - 7.3 NJ	--	ND - 2.3 NJ	--	NS
Heptachlor epoxide	ug/kg	70	ND - 3,800 NJ	ND - 21 JD	ND - 3,400 NJD	ND - 1,200,000 NJ	--	NS
Methoxychlor	ug/kg	50,000	--	ND - 34 J	ND - 32 J	--	ND - 1.3 J	NS
Metals and Cyanide								
Aluminum	mg/kg	NC	ND - 26,900	3,250 - 19,900	2,180 - 8,340	5,710-44,000	8,140 - 13,100	NS
Antimony	mg/kg	5	ND - 3.8 B	ND - 2.2 B	ND - 13.9 BJ	ND - 18.1 J	--	NS
Arsenic	mg/kg	0.4	ND - 7.8	ND - 21.6 J	2.4 - 34.8	1.2 BJ - 335	0.77 B - 1.8 B	NS
Barium	mg/kg	700	48.1 - 697	46.8 B - 118	117 - 777	49.1 B - 3,690	51.6-90.2	NS

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TABLE 4-10 (Sheet 5 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Beryllium	mg/kg	2	0.1 B - 1.4	ND - 2	0.18 B - 0.65 B	0.34 B - 0.92 B	ND - 0.38 B	NS
Cadmium	mg/kg	8	ND - 12.5	ND - 1.1	ND - 23.8	ND - 195	--	NS
Calcium	mg/kg	NC	527 B - 29,800	384 B - 17,000	572 B - 3,580 J	516 B - 46,500	395 B - 10,800 J	NS
Chromium	mg/kg	38	4.7 - 111	7.7 - 53.2 J	8.5 J - 107	9.8 - 408	12.7 - 20.5	NS
Cobalt	mg/kg	NC	0.65 B - 20.1	6.3 B - 23.5	6.1 B - 14.2 B	3.6 B - 18	5.8 B - 13.6	NS
Copper	mg/kg	600	4.4 B - 1,360	5.9 - 111 J	23.2 J - 411	ND - 57,600	5.6 - 281	NS
Iron	mg/kg	NC	4,850 - 58,900	11,500 - 56,200	17,300 - 97,800	10,000 - 106,000	12,600 - 19,200	NS
Lead	mg/kg	400	8.7 - 1,380	7.3 - 142	61.2 - 472	7.4 - 6,410	ND - 11.7	NS
Magnesium	mg/kg	NC	71.1 B - 10,300	943 B - 12,500	431 B - 4,400	1,130 B - 6,150	2,300 - 7,100	NS
Manganese	mg/kg	NC	10.4 - 2,050	89.6 - 704	92.2 - 419	ND - 780	224 JN - 670 JN	NS
Mercury	mg/kg	2	ND - 5 J	ND - 0.48	ND - 0.45	ND - 3.4	--	NS
Nickel	mg/kg	130	1.7 B - 79.1	7.5 B - 41.2 J	15.9 J - 119 J	8.3 BJ - 72.6	11.6 - 33.6	NS
Potassium	mg/kg	NC	184 B - 4,900	376 B - 6,860 B	268 B - 1,440 J	320 B - 3,770	702 B - 2,280 J	NS
Selenium	mg/kg	5	ND - 0.72 BJ	ND - 1.3 J	ND - 7.9	ND - 2.3 J	0.51 B - 0.99 B	NS
Silver	mg/kg	34	ND - 2.9	ND - 2.6 J	ND - 0.25 B	ND - 3.4 J	--	NS
Sodium	mg/kg	NC	83.7 B - 564 BJ	146 B - 590 BJ	ND - 129 B	ND - 611 BJ	ND - 137 B	NS
Thallium	mg/kg	0.7	ND - 7.5	ND - 2.6 J	--	--	--	NS
Vanadium	mg/kg	370	12.7 - 46	16 - 44.6	10.8 B - 19	15 - 532	10.8 - 22	NS
Zinc	mg/kg	1,500	10 - 1,270	ND - 110 J	32.2 - 2,800	19.4 J - 4,630	61 - 77.5	NS
Cyanide	mg/kg	40	ND - 0.38 B	ND - 0.17	ND - 1.1	ND - 0.64	--	NS

Notes:

1. Most Conservative Screening Criteria Values are described in Section 4.2.1 and Table 4-2.
2. Figure 4-10 presents the locations of the six on-site areas.
3. Sum of detected Aroclor compounds; see Section 4.1.
4. Shaded entries exceed their respective screening criteria value in at least the maximum amount per concentration range.
5. Abbreviations include:
   - NC = No criteria available.
   - TIC = Tentatively identified compound.
   - VOC = Volatile organic compound.
   - SVOC = Semi-volatile organic compound.
   - ND or -- = Not detected.
   - J = Estimated value.
   - D = Value obtained from dilution analysis.
   - B (metals only) = Value between practical quantitation limit and instrument detection limit.
   - N = Presumptive evidence for the presence of the compound exists.
   - NC = No criteria available.
   - NS = Not sampled.

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TABLE 4-11 (Sheet 1 of 5)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF PERCHED WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
PCBs								
Aroclor-1242	ug/L	0.5	--	--	0.65 JN	ND - 1,200 D	NS	NS
Aroclor-1248	ug/L	0.5	--	550 D	--	ND - 2,300 D	NS	NS
Aroclor-1254	ug/L	0.5	590 D	ND - 220 JPD	1.7 JN	210 D - 5,100 D	NS	NS
Total PCBs (3)	ug/L	0.5	590	ND - 770	2.35	218.7 - 7,400	NS	NS
PCB Congeners								
BZ 101/90	ug/L	NC	NS	ND - 160 JN	NS	ND - 150 JN	NS	NS
BZ 105	ug/L	NC	NS	38 JN	NS	ND - 85 JN	NS	NS
BZ 107	ug/L	NC	NS	ND - 15 JN	NS	ND - 16 JN	NS	NS
BZ 110/77	ug/L	NC	NS	ND - 190 JN	NS	ND - 240 JN	NS	NS
BZ 118	ug/L	NC	NS	ND - 130 JN	NS	ND - 140 N	NS	NS
BZ 119	ug/L	NC	NS	ND - 3.7 JN	NS	ND - 4.4 JN	NS	NS
BZ 128	ug/L	NC	NS	ND - 30 N	NS	ND - 38 N	NS	NS
BZ 132/168	ug/L	NC	NS	ND - 47 JN	NS	ND - 47 JN	NS	NS
BZ 135/144	ug/L	NC	NS	ND - 12 JN	NS	ND - 17 JN	NS	NS
BZ 136	ug/L	NC	NS	ND - 20 JN	NS	ND - 18 JN	NS	NS
BZ 137	ug/L	NC	NS	ND - 12 JN	NS	ND - 12 JN	NS	NS
BZ 138/163	ug/L	NC	NS	ND - 150 JN	NS	ND - 140 JN	NS	NS
BZ 141	ug/L	NC	NS	ND - 26 JN	NS	ND - 24 JN	NS	NS
BZ 146	ug/L	NC	NS	ND - 19 N	NS	ND - 17 N	NS	NS
BZ 149/123	ug/L	NC	NS	ND - 82 JN	NS	ND - 75 JN	NS	NS
BZ 151	ug/L	NC	NS	ND - 27 JN	NS	--	NS	NS
BZ 153/184	ug/L	NC	NS	ND - 96 JN	NS	ND - 91 JN	NS	NS
BZ 156/171	ug/L	NC	NS	ND - 35 JN	NS	ND - 46 JN	NS	NS
BZ 157	ug/L	NC	NS	ND - 4.4 JN	NS	ND - 5.2 JN	NS	NS
BZ 158	ug/L	NC	NS	ND - 22 JN	NS	ND - 19 JN	NS	NS
BZ 16/32	ug/L	NC	NS	ND - 13 JN	NS	ND - 85 JN	NS	NS
BZ 17	ug/L	NC	NS	ND - 19 JN	NS	ND - 56 JN	NS	NS
BZ 170	ug/L	NC	NS	ND - 20 JN	NS	ND - 15 JN	NS	NS
BZ 172	ug/L	NC	NS	ND - 4.5 JN	NS	ND - 3.9 JN	NS	NS
BZ 174	ug/L	NC	NS	ND - 13 JN	NS	ND - 11 JN	NS	NS
BZ 176	ug/L	NC	NS	ND - 17 JN	NS	ND - 15 JN	NS	NS
BZ 177	ug/L	NC	NS	ND - 7.7 JN	NS	ND - 7.1 JN	NS	NS
BZ 178/126	ug/L	NC	NS	ND - 20 JN	NS	--	NS	NS
BZ 18	ug/L	NC	NS	ND - 36 JN	NS	ND - 110 N	NS	NS
BZ 180	ug/L	NC	NS	ND - 22 N	NS	ND - 20 N	NS	NS
BZ 183	ug/L	NC	NS	ND - 8.2 JN	NS	ND - 8.2 JN	NS	NS
BZ 187/182	ug/L	NC	NS	ND - 11 JN	NS	ND - 9.1 JN	NS	NS
BZ 19	ug/L	NC	NS	--	NS	ND - 46 JN	NS	NS

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TABLE 4-11 (Sheet 2 of 5)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF PERCHED WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
BZ 194	ug/L	NC	NS	ND - 2.8 N	NS	ND - 3.4	NS	NS
BZ 201	ug/L	NC	NS	ND - 2.9 JN	NS	--	NS	NS
BZ 202	ug/L	NC	NS	ND - 2.8 JN	NS	--	NS	NS
BZ 206	ug/L	NC	NS	ND - 2.5	NS	ND - 3.3	NS	NS
BZ 209	ug/L	NC	NS	ND - 2.2	NS	ND - 2.9	NS	NS
BZ 22	ug/L	NC	NS	--	NS	ND - 40 JN	NS	NS
BZ 25	ug/L	NC	NS	ND - 4.9 JN	NS	ND - 10 JN	NS	NS
BZ 26	ug/L	NC	NS	ND - 7.9 JN	NS	ND - 20 JN	NS	NS
BZ 27	ug/L	NC	NS	--	NS	ND - 14 JN	NS	NS
BZ 28	ug/L	NC	NS	ND - 39 JN	NS	ND - 89 JN	NS	NS
BZ 31	ug/L	NC	NS	ND - 30 JN	NS	ND - 81 JN	NS	NS
BZ 33	ug/L	NC	NS	--	NS	ND - 100 JN	NS	NS
BZ 37/42	ug/L	NC	NS	ND - 13 JN	NS	ND - 31 JN	NS	NS
BZ 4	ug/L	NC	NS	--	NS	ND - 68 JN	NS	NS
BZ 40	ug/L	NC	NS	--	NS	ND - 13 JN	NS	NS
BZ 44	ug/L	NC	NS	ND - 47 N	NS	ND - 74 N	NS	NS
BZ 45	ug/L	NC	NS	--	NS	ND - 14 JN	NS	NS
BZ 46	ug/L	NC	NS	--	NS	ND - 6.2 JN	NS	NS
BZ 47	ug/L	NC	NS	ND - 9.6 JN	NS	ND - 14 JN	NS	NS
BZ 48	ug/L	NC	NS	ND - 11 JN	NS	ND - 19 JN	NS	NS
BZ 49	ug/L	NC	NS	ND - 38 JN	NS	ND - 51 JN	NS	NS
BZ 52	ug/L	NC	NS	ND - 120 JN	NS	ND - 130 N	NS	NS
BZ 53	ug/L	NC	NS	ND - 29 JN	NS	--	NS	NS
BZ 59	ug/L	NC	NS	ND - 2.4 JN	NS	ND - 5.5 JN	NS	NS
BZ 6	ug/L	NC	NS	ND - 6 JN	NS	ND - 16 JN	NS	NS
BZ 60/92	ug/L	NC	NS	ND - 34 JN	NS	ND - 65 JN	NS	NS
BZ 64/41	ug/L	NC	NS	ND - 16 JN	NS	ND - 38 JN	NS	NS
BZ 66/95	ug/L	NC	NS	ND - 150 JN	NS	ND - 160 JN	NS	NS
BZ 7	ug/L	NC	NS	--	NS	ND - 3.9 JN	NS	NS
BZ 70	ug/L	NC	NS	ND - 85 JN	NS	ND - 98 JN	NS	NS
BZ 71	ug/L	NC	NS	ND - 8.6 JN	NS	ND - 16 JN	NS	NS
BZ 74	ug/L	NC	NS	ND - 22 JN	NS	ND - 34 JN	NS	NS
BZ 76	ug/L	NC	NS	--	NS	ND - 5.5 JN	NS	NS
BZ 8	ug/L	NC	NS	ND - 27 JN	NS	ND - 51 N	NS	NS
BZ 82	ug/L	NC	NS	--	NS	ND - 34 JN	NS	NS
BZ 84	ug/L	NC	NS	ND - 19 JN	NS	ND - 44 JN	NS	NS
BZ 85	ug/L	NC	NS	ND - 27 JN	NS	ND - 31 JN	NS	NS
BZ 87/81	ug/L	NC	NS	ND - 120 JN	NS	ND - 120 JN	NS	NS
BZ 91	ug/L	NC	NS	ND - 26 JN	NS	ND - 23 JN	NS	NS

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TABLE 4-11 (Sheet 3 of 5)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF PERCHED WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
BZ 97	ug/L	NC	NS	ND - 58 JN	NS	ND - 52 JN	NS	NS
BZ 99	ug/L	NC	NS	ND - 65 JN	NS	ND - 68 JN	NS	NS
PCB Congeners (total)	ug/L	NC	NS	ND - 2,300	NS	ND - 3,200	NS	NS
Volatile Organics								
1,1,2,2-Tetrachloroethane	ug/L	1	--	ND - 0.4 J	--	--	NS	NS
1,1-Dichloroethene	ug/L	2	--	ND - 4	--	ND - 0.6 J	NS	NS
1,1,2-Trichloroethane	ug/L	3	--	--	--	ND - 2	NS	NS
1,2-Dichlorobenzene	ug/L	600	--	ND - 12	--	ND - 40	NS	NS
1,2,4-Trichlorobenzene	ug/L	9	--	ND - 450 J	--	ND - 400 J	NS	NS
1,3-Dichlorobenzene	ug/L	600	--	ND - 32 J	--	ND - 32	NS	NS
1,4-Dichlorobenzene	ug/L	75	--	ND - 35 J	--	ND - 140	NS	NS
Acetone	ug/L	800	14 J	ND - 11 J	--	ND - 31	NS	NS
Benzene	ug/L	1	--	ND - 0.4 J	--	ND - 0.6 J	NS	NS
Chlorobenzene	ug/L	50	--	ND - 7	--	ND - 250	NS	NS
cis-1,2-Dichloroethene	ug/L	70	--	57.6 - 3,900 D	740	ND - 2,300 D	NS	NS
Ethylbenzene	ug/L	700	--	ND - 6	--	ND - 18 J	NS	NS
Methylene chloride	ug/L	3	--	--	--	140 J	NS	NS
Tetrachloroethene	ug/L	1	--	ND - 67.3	--	ND - 10	NS	NS
Toluene	ug/L	1,000	--	ND - 1	100 J	ND - 0.7 J	NS	NS
trans-1,2-Dichloroethene	ug/L	100	--	ND - 38 J	--	ND - 140 J	NS	NS
Trichloroethene	ug/L	1	--	27.9 - 12,000 D	120	ND - 15,000 D	NS	NS
Vinyl chloride	ug/L	2	--	ND - 270 J	--	ND - 380	NS	NS
Xylene (total)	ug/L	1,000	--	ND - 34 J	--	ND - 87	NS	NS
Total VOC TICs	ug/L	NC	697 JN	ND - 43 JN	--	ND - 234 JN	NS	NS
Semi-Volatile Organics								
2,4-Dimethylphenol	ug/L	100	NS	NS	--	ND - 5	NS	NS
2-Chloronaphthalene	ug/L	600	NS	NS	--	ND - 11 J	NS	NS
2-Methylnaphthalene	ug/L	100	NS	NS	--	ND - 2 J	NS	NS
Acenaphthene	ug/L	400	NS	NS	--	ND - 4 J	NS	NS
Acenaphthylene	ug/L	100	NS	NS	--	ND - 5 J	NS	NS
Anthracene	ug/L	2,000	NS	NS	--	ND - 11 J	NS	NS
Benzo(a)anthracene	ug/L	0.2	NS	NS	7	ND - 35 J	NS	NS
Benzo(a)pyrene	ug/L	0.2	NS	NS	5	ND - 29 J	NS	NS
Benzo(b)fluoranthene	ug/L	10	NS	NS	--	ND - 35 J	NS	NS
Benzo(ghi)perylene	ug/L	100	NS	NS	4 J	ND - 13 J	NS	NS
Benzo(k)fluoranthene	ug/L	1	NS	NS	--	ND - 12 J	NS	NS
Bis(2-ethylhexyl)phthalate	ug/L	6	NS	NS	--	ND - 2 J	NS	NS
Chrysene	ug/L	5	NS	NS	9	ND - 4 J	NS	NS
Dibenzo(a,h)anthracene	ug/L	0.5	NS	NS	--	ND - 4 J	NS	NS

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TABLE 4-11 (Sheet 4 of 5)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF PERCHED WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Dibenzofuran	ug/L	100	NS	NS	--	ND - 5 J	NS	NS
Fluoranthene	ug/L	300	NS	NS	--	ND - 18 J	NS	NS
Fluorene	ug/L	300	NS	NS	6	ND - 8 J	NS	NS
Indeno(1,2,3-cd)pyrene	ug/L	10	NS	NS	1 J	ND - 16 J	NS	NS
Naphthalene	ug/L	300	NS	NS	--	ND - 9 J	NS	NS
2,4-Dichlorophenol	ug/L	20	NS	NS	--	ND - 4 J	NS	NS
2-Chlorophenol	ug/L	40	NS	NS	--	ND - 4 J	NS	NS
2-Methylphenol	ug/L	100	NS	NS	--	ND - 3 J	NS	NS
4-Methylphenol	ug/L	100	NS	NS	--	ND - 6	NS	NS
Phenanthrene	ug/L	100	NS	NS	--	ND - 30 J	NS	NS
Phenol	ug/L	4,000	NS	NS	--	ND - 15	NS	NS
Pyrene	ug/L	200	NS	NS	20	ND - 12 J	NS	NS
Total SVOC TICs	ug/L	NC	NS	NS	334 JN	213 JN - 1,666 JN	NS	NS
Pesticides							NS	
4,4'-DDE	ug/L	0.1	NS	NS	R	6.6 JND - 25 JN	NS	NS
4,4'-DDT	ug/L	0.1	NS	NS	0.04 JN	--	NS	NS
Aldrin	ug/L	0.04	NS	NS	R	5.3 JD - 33 D	NS	NS
alpha-BHC	ug/L	0.02	NS	NS	R	ND - 4.1 JN	NS	NS
Dieldrin	ug/L	0.03	NS	NS	R	ND - 20 JND	NS	NS
Endrin	ug/L	2	NS	NS	0.2 J	--	NS	NS
Endrin ketone	ug/L	100	NS	NS	0.05 JN	ND - 5.4 J	NS	NS
gamma-Chlordane	ug/L	0.5	NS	NS	0.02 JN	3.8 JND - 32 JD	NS	NS
Heptachlor	ug/L	0.4	NS	NS	0.021 JN	ND - 14 JN	NS	NS
Methoxychlor	ug/L	40	NS	NS	R	ND - 1.9 JN	NS	NS
Metals and Cyanide							NS	
Aluminum	ug/L	200	NS	NS	4,530	8,260 - 238,000	NS	NS
Antimony	ug/L	6	NS	NS	--	ND - 4.2 JB	NS	NS
Arsenic	ug/L	8	NS	NS	7.4 B	ND - 334	NS	NS
Barium	ug/L	2000	NS	NS	158 B	204 - 4,320	NS	NS
Beryllium	ug/L	4	NS	NS	0.4 B	0.3 B - 15.2 J	NS	NS
Cadmium	ug/L	4	NS	NS	--	1.4 B - 1,890	NS	NS
Calcium	ug/L	NC	NS	NS	46,500	53,800 - 93,500	NS	NS
Chromium	ug/L	100	NS	NS	10.4	12.6 - 1,110	NS	NS
Cobalt	ug/L	100	NS	NS	15.4 B	3.8 B - 161	NS	NS
Copper	ug/L	1000	NS	NS	26.4 J	131 J - 9,060 J	NS	NS
Iron	ug/L	300	NS	NS	14,700	7,420 - 126,000	NS	NS
Lead	ug/L	10	NS	NS	52.4	73.9 - 11,900	NS	NS
Magnesium	ug/L	NC	NS	NS	10,000	19,100 - 66,300	NS	NS
Manganese	ug/L	50	NS	NS	546	313 - 5,210	NS	NS

TABLE 4-11 (Sheet 5 of 5)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF PERCHED WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	On-Site Areas (2)					
			Northern Developed Portion	Southern Developed Portion	Northeastern Undeveloped Portion	Central Undeveloped Portion	Southwestern Undeveloped Portion	Floodplain Undeveloped Portion
Mercury	ug/L	2	NS	NS	--	0.11 B - 4	NS	NS
Nickel	ug/L	100	NS	NS	32.5 B	15.1 B - 557	NS	NS
Potassium	ug/L	NC	NS	NS	4,210 B	5,240 - 15,200	NS	NS
Selenium	ug/L	50	NS	NS	--	1.8 B - 8.8 J	NS	NS
Silver	ug/L	30	NS	NS	1.1 B	ND - 22.6	NS	NS
Sodium	ug/L	50000	NS	NS	6,500 J	7,490 J - 14,600 J	NS	NS
Vanadium	ug/L	NC	NS	NS	10.5 B	8.4 J - 1,330	NS	NS
Zinc	ug/L	5000	NS	NS	68.4	188 - 15,000	NS	NS
Cyanide	ug/L	200	NS	NS	--	ND - 2.6 JB	NS	NS

Notes:

1. Most Conservative Screening Criteria Values are described in Section 4.2.2 and Table 4-3.
2. Figure 4-10 presents the locations of the six on-site areas.
3. Sum of detected Aroclor compounds; see Section 4.1.
4. Shaded entries exceed their respective screening criteria value in at least the maximum amount per concentration range.
5. Abbreviations include:

   NC = No criteria available.

   TIC = Tentatively identified compound.

   VOC = Volatile organic compound.

   SVOC = Semi-volatile organic compound.

   ND or -- = Not detected.

   J = Estimated value.

   D = Value obtained from dilution analysis.

   B (metals only) = Value between practical quantitation limit and instrument detection limit.

   N = Presumptive evidence for the presence of the compound exists.

   NC = No criteria available.

   NS = Not sampled.

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TABLE 4-12 (Sheet 1 of 2)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF DRAINAGE SYSTEM SEDIMENT ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	Location DS01	Location DS04B	Location DS05	Location DS06B	Location DS07
PCBs							
Aroclor-1232	ug/kg	371	22,000 JD	--	--	--	--
Aroclor-1248	ug/kg	371	--	--	--	12,000 J	100,000 J
Aroclor-1254	ug/kg	371	10,000 JD	140,000 J	63,000 J	19,000 J	110,000 J
Total PCBs (2)	mg/kg	0.371	32	140	63	31	210
Volatile Organics							
1,2,4-Trichlorobenzene	ug/kg	5,000	9 J	--	--	--	--
1,2-Dichlorobenzene	ug/kg	17,000	9 J	--	--	--	--
1,4-Dichlorobenzene	ug/kg	2,000	6 J	--	--	--	--
Acetone	ug/kg	16,000	70 J	--	24 J	22 J	--
cis-1,2-Dichloroethene	ug/kg	400	21 J	--	--	--	--
Ethylbenzene	ug/kg	13,000	--	--	4 J	--	--
Methyl Acetate	ug/kg	NC	8 J	--	--	--	--
Toluene	ug/kg	12,000	--	--	5 J	--	--
Trichloroethene	ug/kg	60	--	3 J	--	--	3 J
Xylene (total)	ug/kg	67,000	--	3 J	24 J	--	--
Total VOC TICs	ug/kg	NC	370 JN	7 J	R	17 J	R
Semi-Volatile Organics							
Acenaphthene	ug/kg	20,000	--	--	--	250 J	150 J
Acenaphthylene	ug/kg	NC	--	--	--	--	370 J
Anthracene	ug/kg	100,000	--	--	950 J	470 J	790 J
Benzo(a)anthracene	ug/kg	600	460 J	290 J	4,100 J	2,700 J	3,400 J
Benzo(a)pyrene	ug/kg	60	550 J	400 J	4,000 J	3,400 J	3,500 J
Benzo(b)fluoranthene	ug/kg	600	740 J	770 J	3,900 J	--	--
Benzo(ghi)perylene	ug/kg	NC	450 J	420 J	3,500 J	3,700 J	2,600 J
Benzo(k)fluoranthene	ug/kg	900	290 J	--	4,500 J	11,000 J	8,000 J
Bis(2-ethylhexyl)phthalate	ug/kg	35000	380 J	4400	13,000 J	11,000 J	4,100 J
Butyl benzyl phthalate	ug/kg	100,000	--	910 J	--	--	--
Carbazole	ug/kg	600	--	--	640 J	450 J	240 J
Chrysene	ug/kg	9,000	550 J	590 J	5,700 J	4,800 J	4,200 J
Dibenzo(a,h)anthracene	ug/kg	60	--	--	1,300 J	540 J	990 J
Diethyl phthalate	ug/kg	50,000	--	--	--	--	1,600 J
Dimethyl phthalate	ug/kg	50,000	350 J	--	--	--	230 J
Di-n-butyl phthalate	ug/kg	100,000	--	--	530 J	690 J	240 J
Di-n-octyl phthalate	ug/kg	100,000	--	--	1,000 J	--	--
Fluoranthene	ug/kg	100,000	870 J	640 J	9,500 J	5,400	4,600 J
Fluorene	ug/kg	100,000	--	--	--	--	200 J
Indeno(1,2,3-cd)pyrene	ug/kg	600	440 J	350 J	2,700 J	4,400 J	2,900 J
Naphthalene	ug/kg	84,000	--	--	--	--	210 J
Phenanthrene	ug/kg	NC	470 J	300 J	4,800 J	2,500 J	2,300 J
Pyrene	ug/kg	100,000	880 J	720 J	7,700 J	7,500 J	7,300 J
Total SVOC TICs	ug/kg	NC	8,880 JN	132,000 JN	229,800 JN	93,300 JN	65,000 JN
Pesticides							
4,4'-DDE	ug/kg	2,000	--	12,000 D	3,100 J	1,500 JD	4,400 J
4,4'-DDT	ug/kg	2,000	--	33,000 D	13,000 JD	5,800 JD	28,000 JD
Aldrin	ug/kg	40	340 J	--	--	--	--
alpha-BHC	ug/kg	0.5	--	91 J	58 J	150 J	1,600 J
beta-BHC	ug/kg	3	320 JD	--	--	120 JN	1,200 JN
Dieldrin	ug/kg	4	--	15,000 JND	3,500 JN	2,000 JND	R

TABLE 4-12 (Sheet 2 of 2)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SUMMARY OF DRAINAGE SYSTEM SEDIMENT ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	Location DS01	Location DS04B	Location DS05	Location DS06B	Location DS07
Endosulfan II	ug/kg	18000	120 J	--	--	--	--
Endrin aldehyde	ug/kg	NC	R	--	--	250 JN	1,200 JN
gamma-Chlordane	ug/kg	2000	R	9,600 JD	3,400 JD	1,400 JD	10,000 JD
gamma-BHC (Lindane)	ug/kg	9	--	--	--	86 JN	920 JN
Heptachlor epoxide	ug/kg	70	--	R	520 JN	--	--
Metals and Cyanide							
Aluminum	mg/kg	NC	7,590 J	6,290	5,970 J	9,190	9,350
Antimony	mg/kg	5	8 JB	5.7 B	4.3 JB	2.3 B	2.3 B
Arsenic	mg/kg	0.4	89.9 J	4	3.1 JB	8.1	7.3
Barium	mg/kg	283	1,010 J	92.8	143 J	155	91.5
Beryllium	mg/kg	2	0.75 JB	0.42 B	0.48 JB	0.43 B	0.7 B
Cadmium	mg/kg	4	2.7 JB	4.1	3 J	5.7	3.3
Calcium	mg/kg	NC	14,300 J	24,400	8,160 J	8,980	8,160
Chromium	mg/kg	0.4	23.7 J	40.7	47.9 J	37.3	23.8
Cobalt	mg/kg	20	12.2 JB	7.2 B	6.8 JB	13 B	13.8
Copper	mg/kg	60	112 J	233	92.6 J	113	125
Iron	mg/kg	NC	122,000 J	43,200	21,400 J	30,500	30,200
Lead	mg/kg	40.5	330 J	7,780	515 J	225	150
Magnesium	mg/kg	NC	3,150 JB	8,850	3,200 J	7,670	6,060
Manganese	mg/kg	NC	64,100 J	332	142 J	280	524
Mercury	mg/kg	0.00051	1.9 J	0.48 J	0.4 J	0.22 J	0.147
Nickel	mg/kg	30	63 J	26.5 J	24.2 J	36.8 J	29.2 J
Potassium	mg/kg	NC	983 JB	427 B	707 JB	558 B	545 B
Selenium	mg/kg	0.21	--	--	--	0.97 JB	0.99 JB
Silver	mg/kg	2	1.4 JB	2.7	13.6 J	5	2.3 B
Sodium	mg/kg	NC	1,170 JB	591 JB	1,810 JB	854 JB	799 JB
Thallium	mg/kg	0.7	--	2.8	--	2 B	--
Vanadium	mg/kg	2	177 J	25.4	41.3 J	73.6	83.4
Zinc	mg/kg	8.5	258 J	929 J	420 J	561 J	386 J
Cyanide	mg/kg	40	7.5 J	--	--	1.5 J	0.37 JB

Notes:

1. Most Conservative Screening Criteria Values are described in Section 4.2.3 and Table 4-1.
2. Sum of detected Aroclor compounds; see Section 4.1.
3. Shaded entries exceed their respective screening criteria value in at least the maximum amount per concentration range.
4. Abbreviations include:
   - NC = No criteria available.
   - *TIC = Tentatively identified compound.*
   - VOC = Volatile organic compound.
   - SVOC = Semi-volatile organic compound.
   - ND or -- = Not detected.
   - J = Estimated value.
   - D = Value obtained from dilution analysis.
   - R = Rejected value.
   - B (metals only) = Value between practical quantitation limit and instrument detection limit.
   - N = Presumptive evidence for the presence of the compound exists.
   - NC = No criteria available.
   - NS = Not sampled.

TABLE 4-13 (Sheet 1 of 2)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF DRAINAGE SYSTEM WATER ANALYTICAL RESULTS

Constituent	Units	Most Conservative Screening Criteria Value (1)	Location DS01	Location DS02	Location DS03	Location DS04A	Location DS05	Location DS06A
PCBs								
Aroclor-1248	ug/L	0.00017	2.8 J	--	--	--	--	--
Aroclor-1254	ug/L	0.00017	9.5 D	11 D	0.54	5.1 D	0.13 J	1.5
Aroclor-1260	ug/L	0.00017	1.4	--	--	--	--	--
Total PCBs (2)	ug/L	0.00017	13.7	11	0.54	5.1	0.13	1.5
Volatile Organics								
1,1-Dichloroethane	ug/L	NC	--	--	0.4 J	--	--	--
1,2,4-Trichlorobenzene	ug/L	30.6	--	--	0.5	2	--	--
Chlorobenzene	ug/L	680	--	--	--	.3 J	--	--
Chloroform	ug/L	5.67	0.8 J	--	--	--	--	0.5
cis-1,2-Dichloroethene	ug/L	NC	3	0.6 J	5	--	--	11
1,3-Dichlorobenzene	ug/L	400	--	--	--	2	--	--
Methylene chloride	ug/L	2.49	--	13	--	13	--	--
1,2-Dichlorobenzene	ug/L	2520	--	--	--	0.7 J	--	--
1,4-Dichlorobenzene	ug/L	400	--	--	--	1	--	--
Tetrachloroethene	ug/L	0.388	--	--	--	--	--	0.4 J
Trichloroethene	ug/L	1.09	--	--	2	--	--	27 D
Vinyl chloride	ug/L	0.083	0.9 J	--	0.4 J	--	--	--
Total VOC TICs	ug/L	NC	--	238 JN	--	--	--	--
Semi-Volatile Organics								
Bis(2-ethylhexyl)phthalate	ug/L	1.76	10	--	--	--	--	--
Total SVOC TICs	ug/L	NC	--	294 JN	--	31 J	--	--
Pesticides								
alpha-BHC	ug/L	0.0039	--	R	--	--	--	0.012 JN
gamma-BHC (Lindane)	ug/L	0.019	--	--	0.036 JN	--	--	0.024 JN
Heptachlor	ug/L	0.000208	--	--	--	--	--	0.028
Metals and Cyanide								
Aluminum	ug/L	87	1270	204	29.1 B	324	137 B	141 B
Antimony	ug/L	12.2	--	--	--	--	5.1 B	--
Arsenic	ug/L	0.017	15.8	10.8	--	--	--	--
Barium	ug/L	1000	159 B	88.9 B	82.6 B	37.6 B	39.3 B	93.4 B
Cadmium	ug/L	2.2	1.3 B	--	--	--	--	1.3 B
Calcium	ug/L	NC	72700	28600	25800	8290	26900	20900
Chromium	ug/L	74	5.6 B	248	--	--	--	--
Cobalt	ug/L	NC	2.4 B	--	--	--	--	--
Copper	ug/L	9	38.2 J	26.7	4.1 B	33.4	9.4 B	9.4 B
Iron	ug/L	300	6,050	1,640 J	198	868 J	442 J	279

TABLE 4-13 (Sheet 2 of 2)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF DRAINAGE SYSTEM WATER ANALYTICAL RESULTS

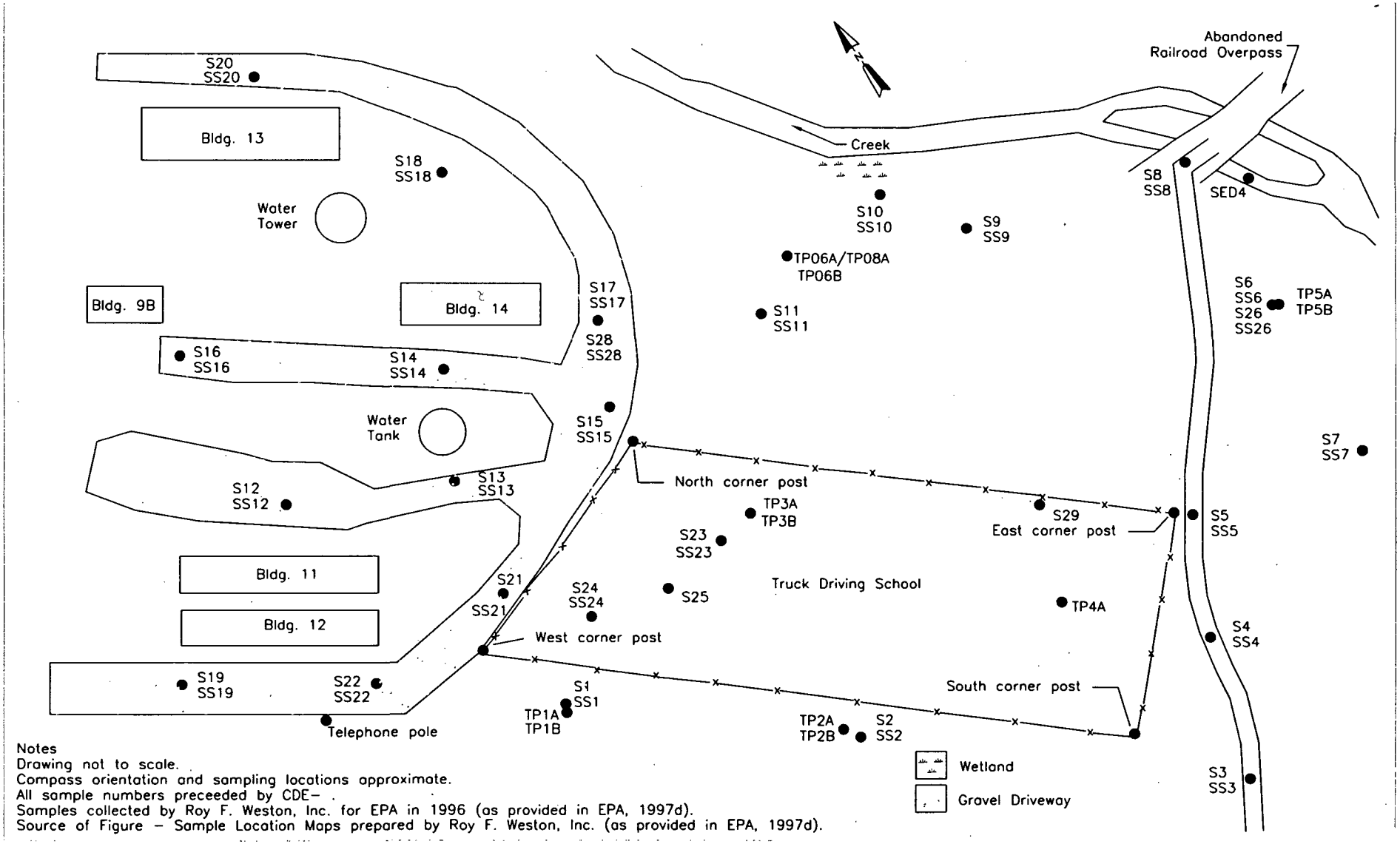
Constituent	Units	Most Conservative Screening Criteria Value (1)	Location DS01	Location DS02	Location DS03	Location DS04A	Location DS05	Location DS06A
Lead	ug/L	2.5	320	R	--	R	R	13.8
Magnesium	ug/L	NC	9,250	4,570 B	5,730	855 B	1,330 B	4,800 B
Manganese	ug/L	50	2,670	50.7	552	25.1	41.7	51.8
Mercury	ug/L	0.05	0.89 J	0.19 B	0.17 B	0.22	0.18 B	0.14 B
Nickel	ug/L	52	9.6 B	2.6 B	2.7 B	2.7 B	--	--
Potassium	ug/L	NC	6,120 J	5,450	2,170 B	458 B	2,330 B	1,810 B
Selenium	ug/L	5	--	3 B	--	--	--	--
Sodium	ug/L	NC	23,600	19,000	15,600 J	3,160 B	13,400	13,600 J
Vanadium	ug/L	NC	93.1	99.1	7.2 B	2.5 B	5.5 B	2.1 B
Zinc	ug/L	120	209	R	R	R	R	R

Notes:

1. Most Conservative Screening Criteria Values are described in Section 4.2.3 and Table 4-4.
2. Sum of detected Aroclor compounds; see Section 4.1.
3. Shaded entries exceed their respective screening criteria value in at least the maximum amount per concentration range.
4. Abbreviations include:
   - NC = No criteria available.
   - TIC = Tentatively identified compound.
   - VOC = Volatile organic compound.
   - SVOC = Semi-volatile organic compound.
   - ND or -- = Not detected.
   - J = Estimated value.
   - D = Value obtained from a dilution analysis.
   - B (metals only) = Value between practical quantitation limit and instrument detection limit.
   - R = Rejected value.
   - N = Presumptive evidence for the presence of the compound exists.
   - NC = No criteria available.
   - NS = Not sampled.

SECTION 4

FIGURES



Notes
Drawing not to scale.
Compass orientation and sampling locations approximate.
All sample numbers preceeded by CDE- .
Samples collected by Roy F. Weston, Inc. for EPA in 1996 (as provided in EPA, 1997d).
Source of Figure - Sample Location Maps prepared by Roy F. Weston, Inc. (as provided in EPA, 1997d).

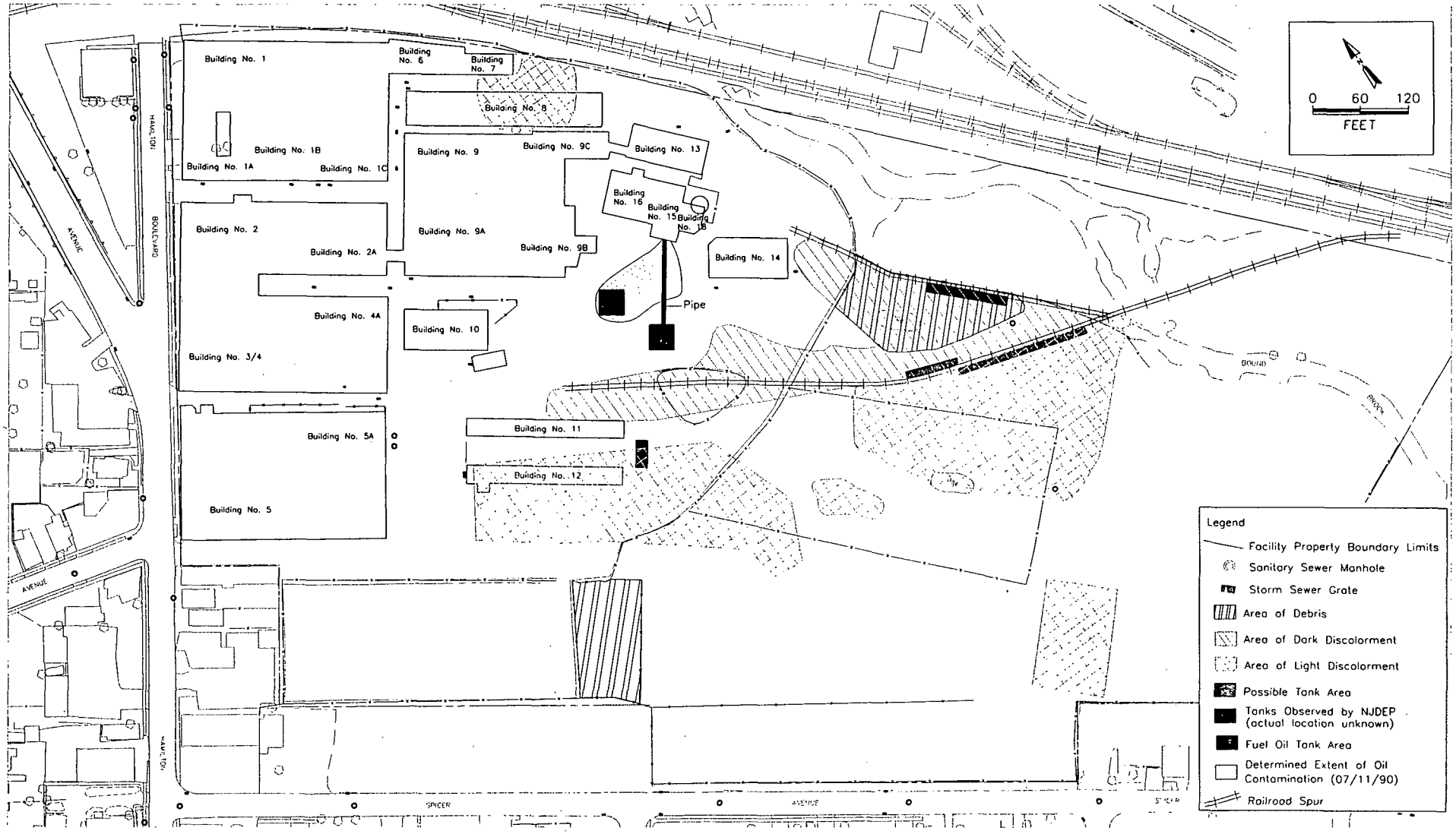
300180

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Soil Sample and Test Pit Locations from 1996
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
CTS	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-1
DATE:	REV.:	
05/09/01	0	

300181

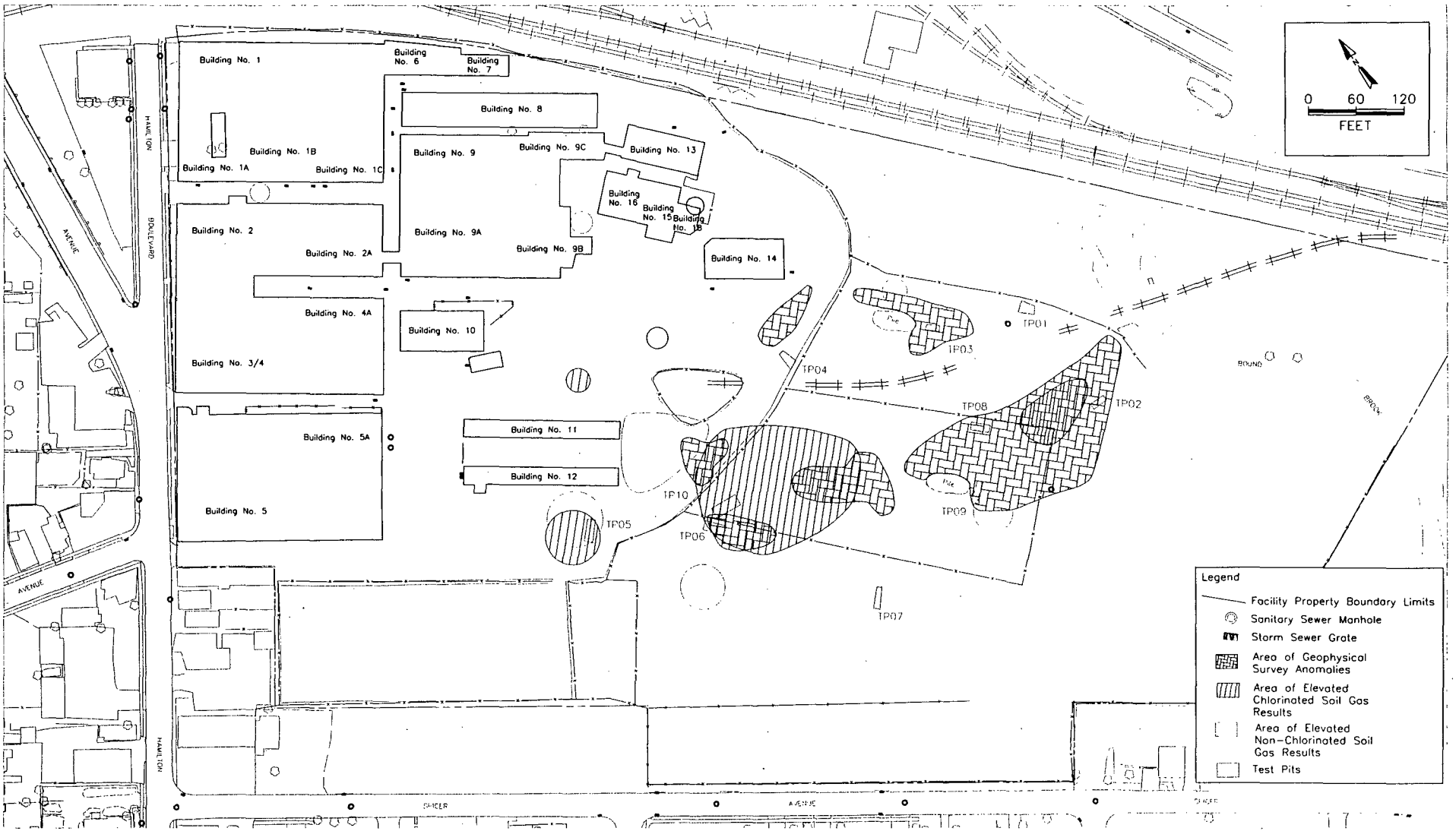


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Possible Source Areas from Historic Information
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/09/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-2	
DES.: LEN	APPD: LH		

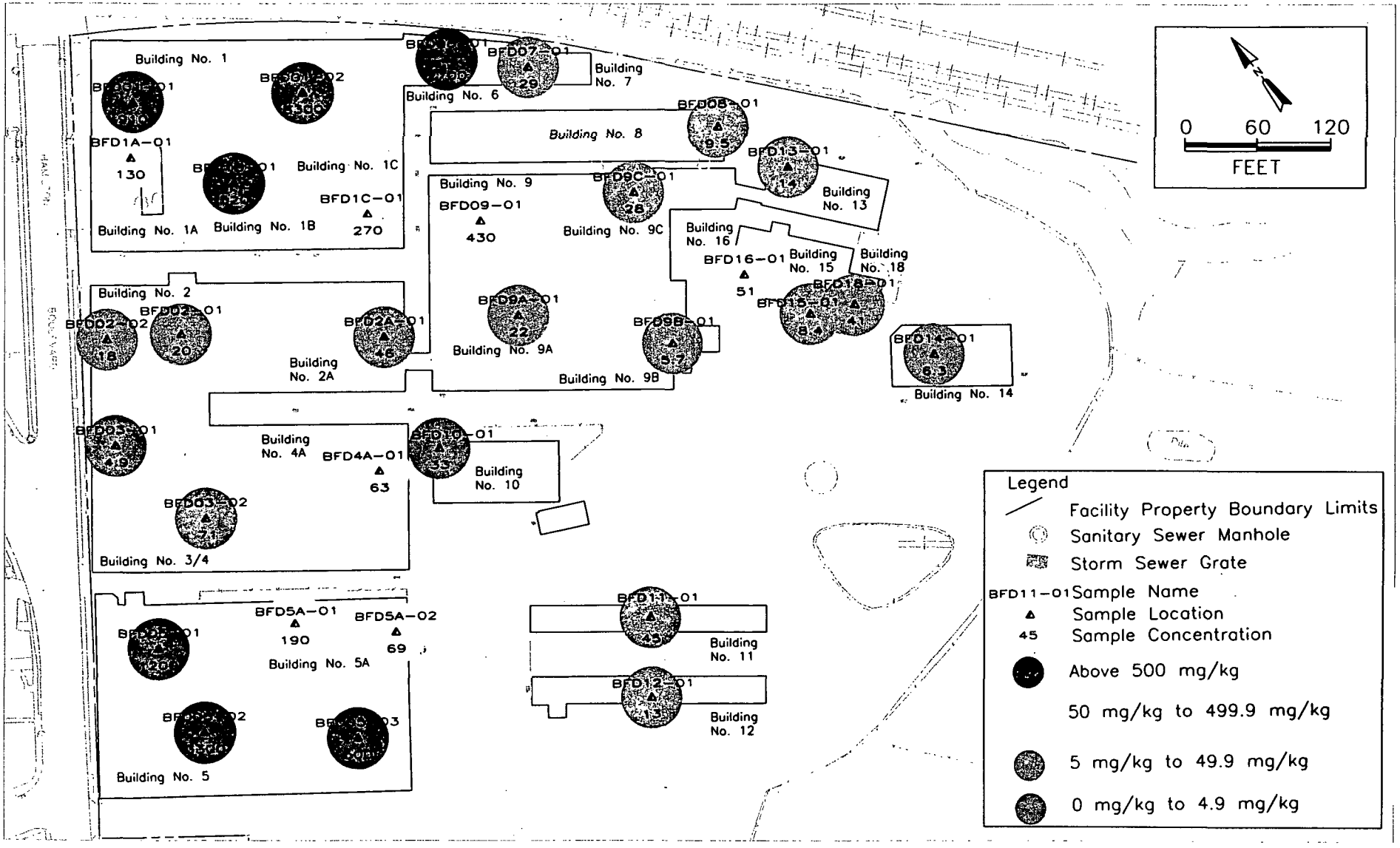
300182



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Possible Source Areas from OU-2 RI Investigation
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/09/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-3	
DES.: LEN	APPD: LH		



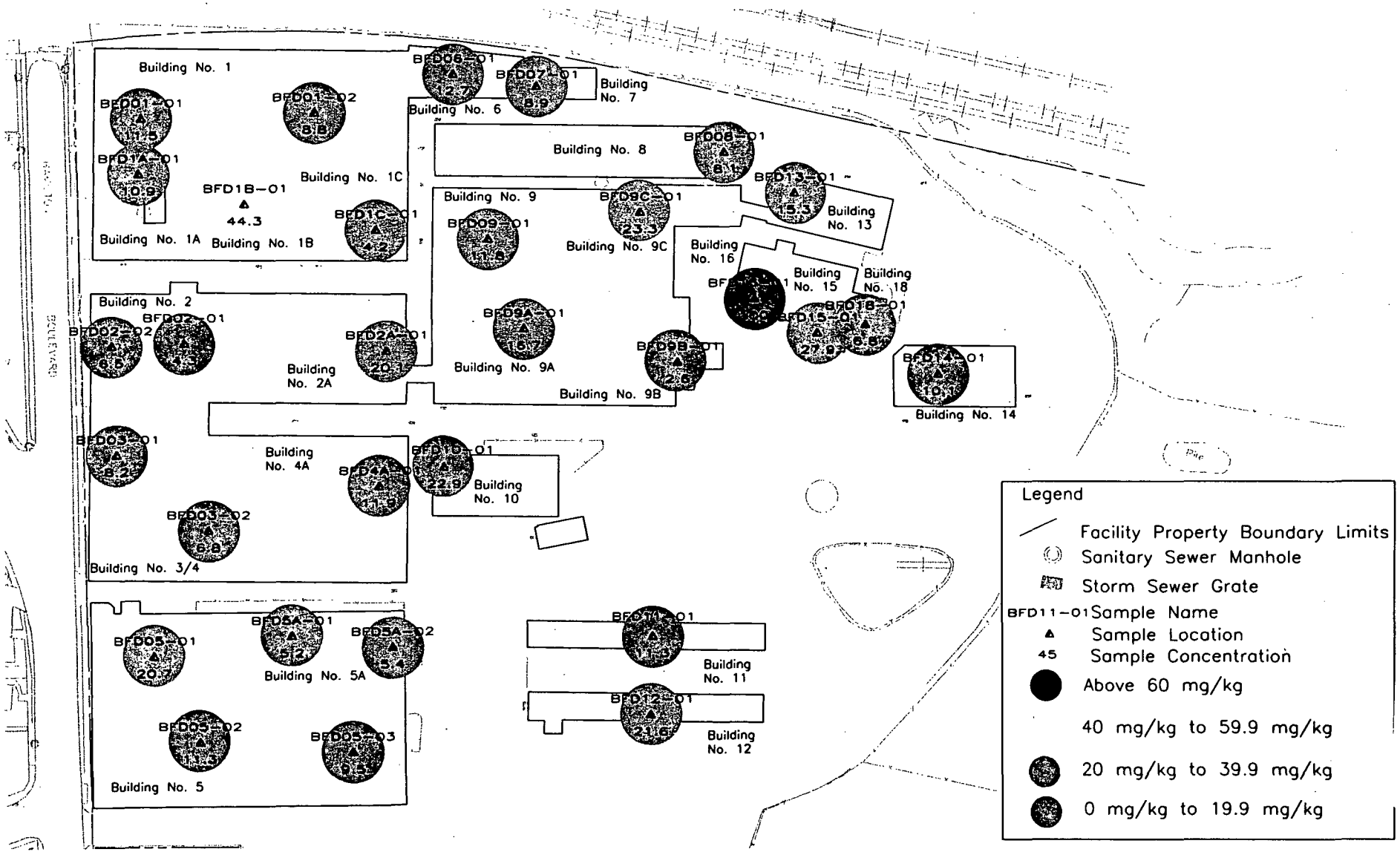
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:

Concentration of Total PCBs in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-4
DATE:	REV.:	
05/18/01	0	

300183



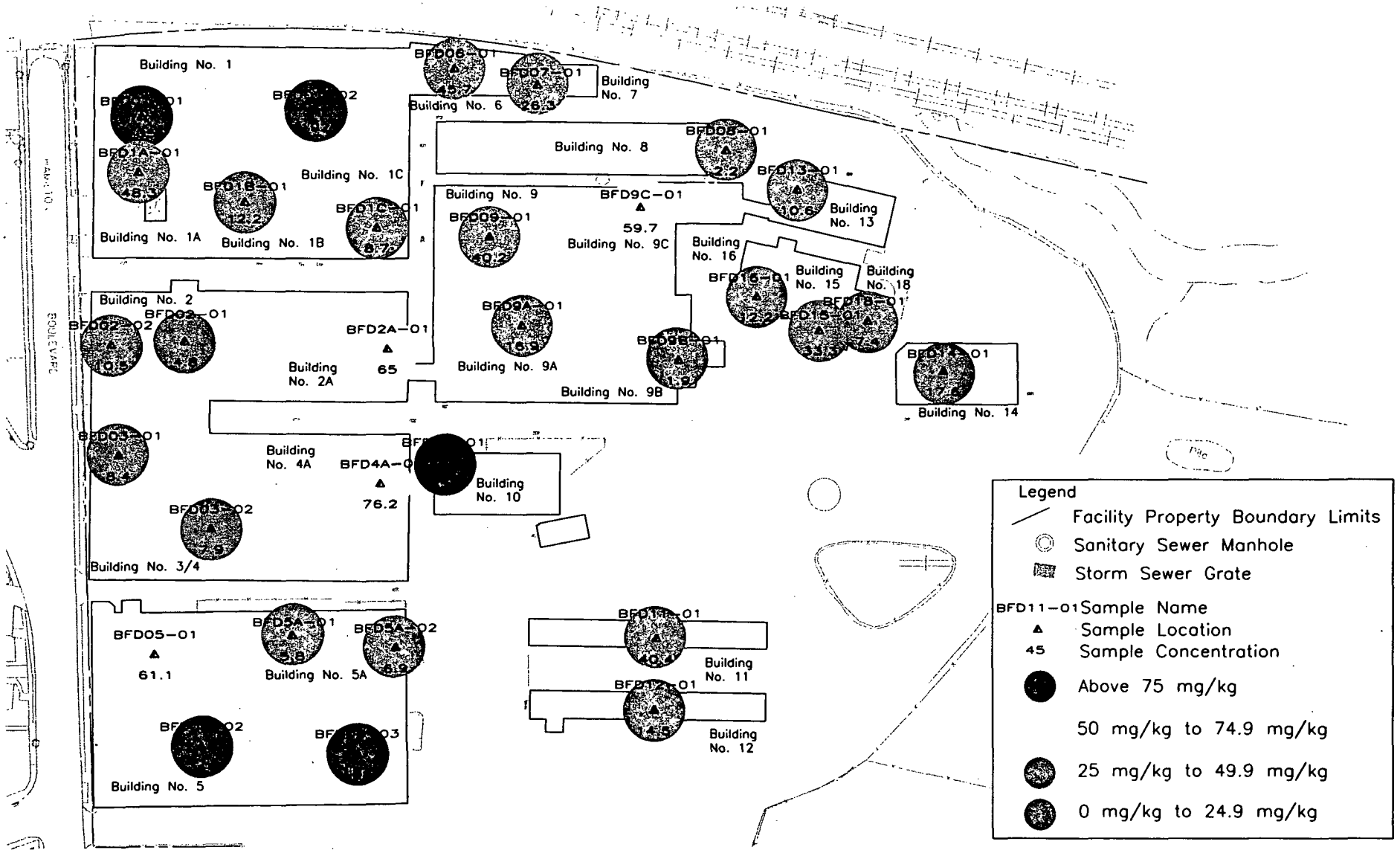
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:

Concentration of Arsenic in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-5
DATE:	REV.:	
05/21/01	0	

300184

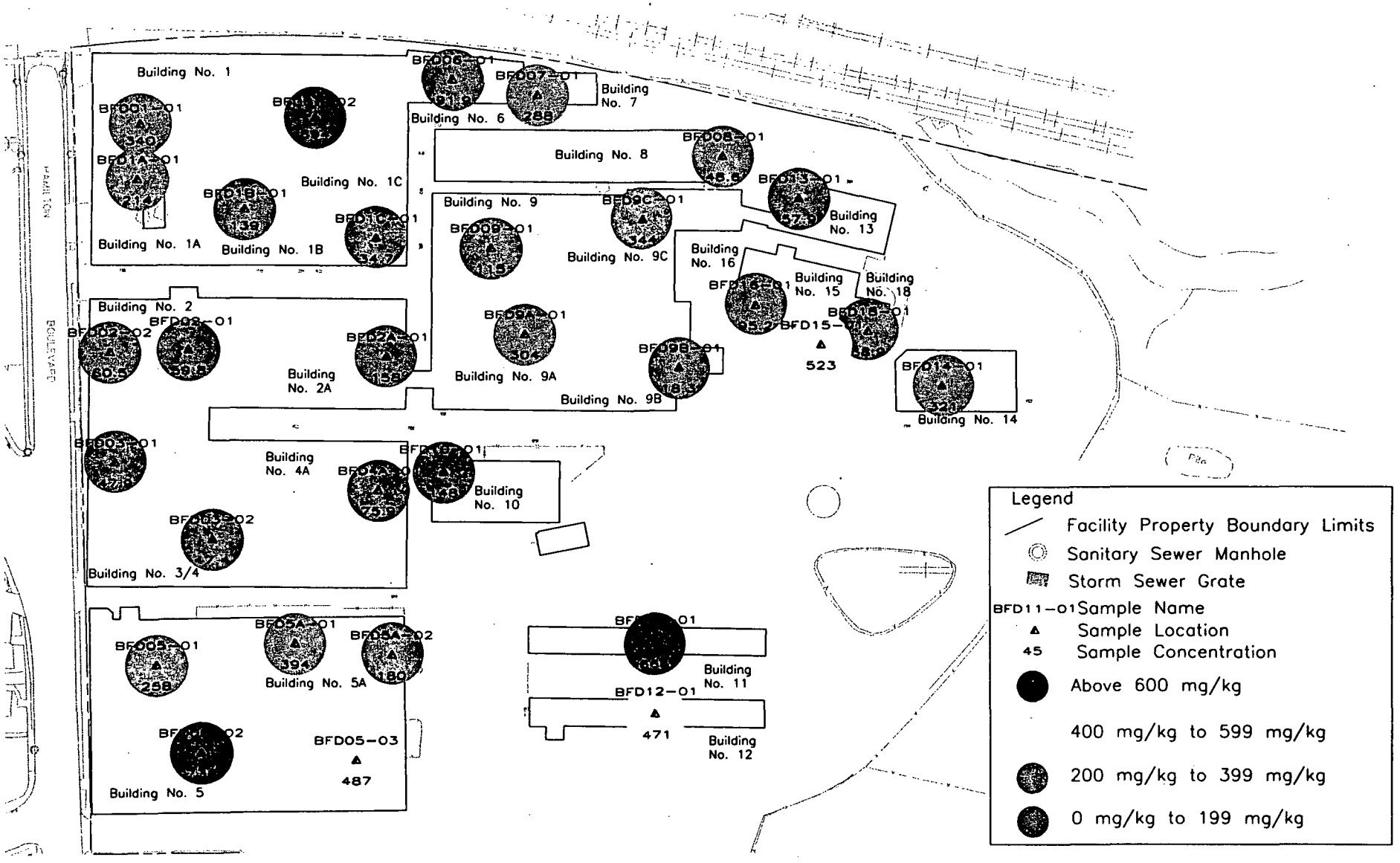


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Concentration of Cadmium in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-6
DATE:	REV.:	
05/21/01	0	

300185

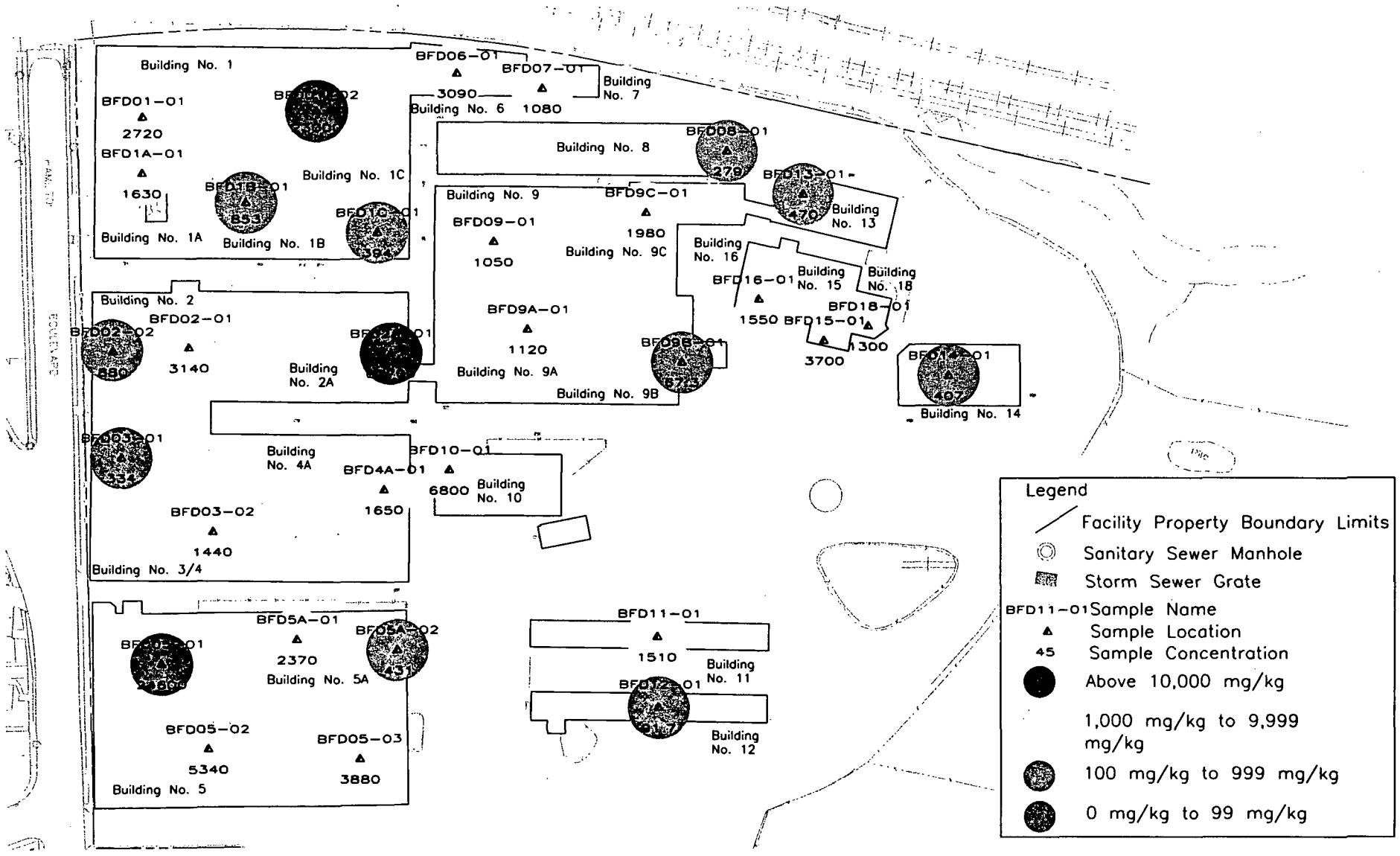


300186

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Concentration of Chromium in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-7
DATE:	REV.:	
05/21/01	0	



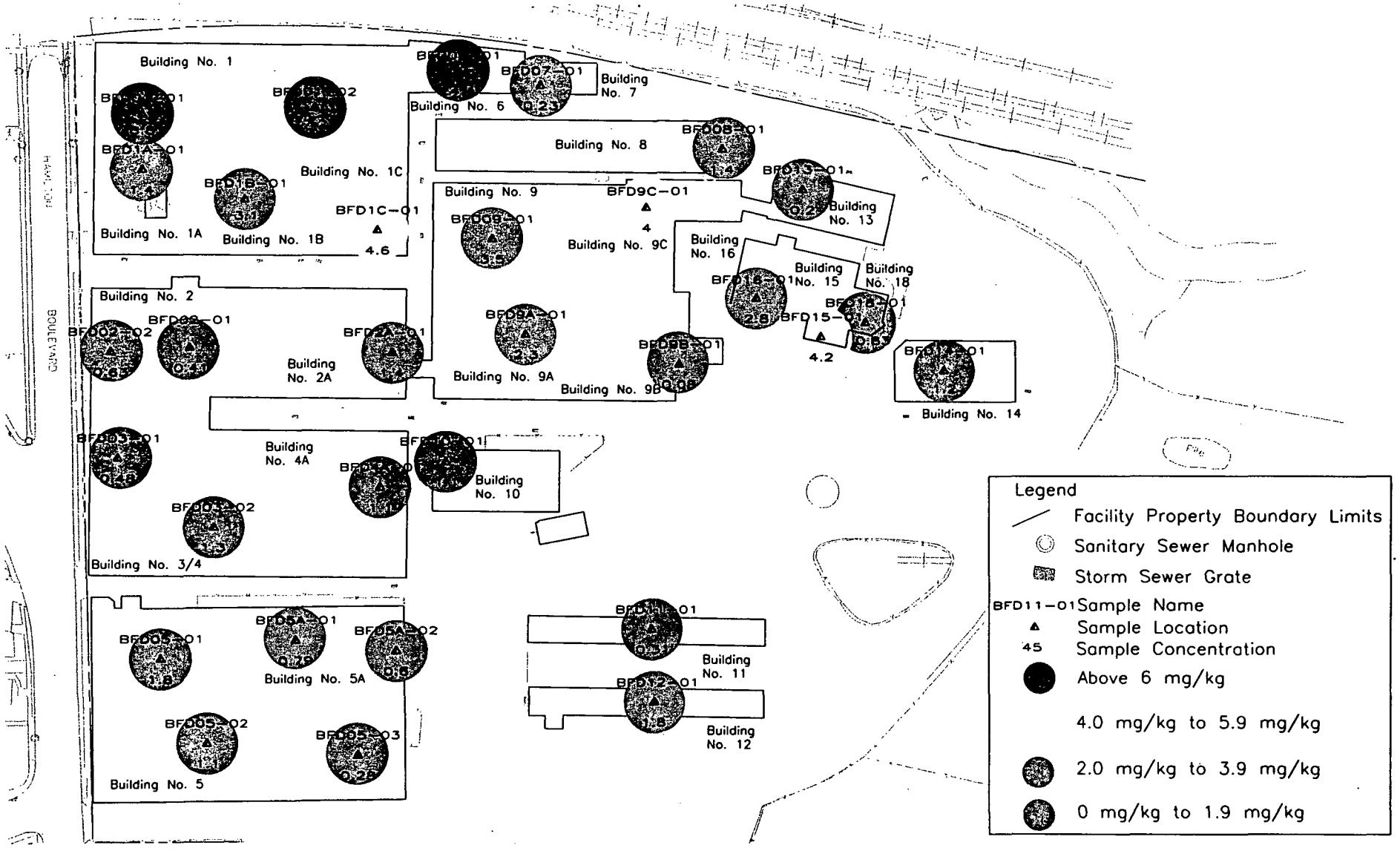
FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:

Concentration of Lead in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-8
DATE:	REV.:	
05/21/01	0	

300187



FOSTER WHEELER ENVIRONMENTAL CORPORATION

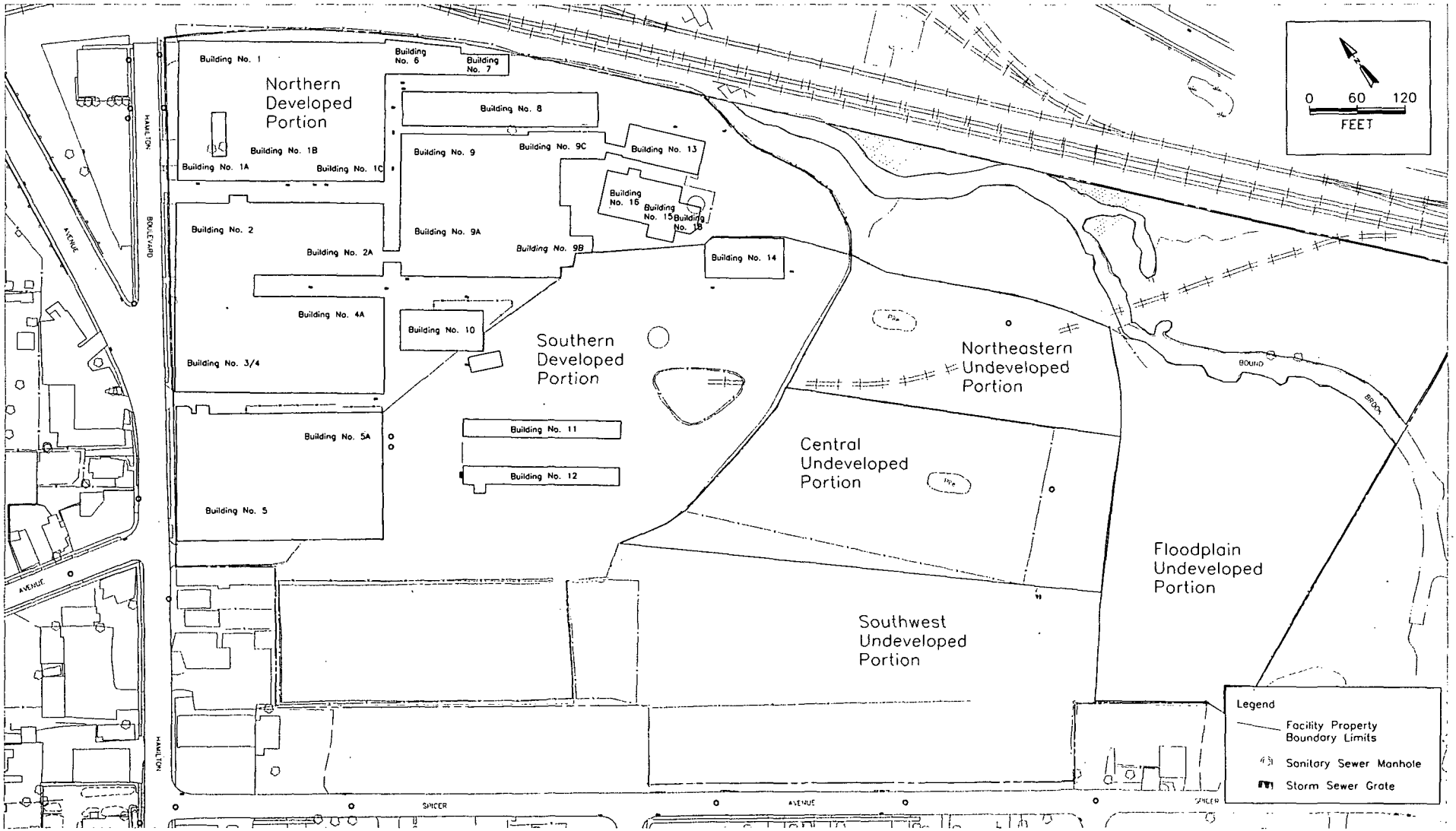
TITLE:

Concentration of Mercury in Building Floor Dust
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN:	DES.:	PROJECT NO.:
LEN	LEN	1945.1018
CHKD:	APPD:	FIGURE NO.:
JG	LH	4-9
DATE:	REV.:	
05/21/01	0	

300188

300189



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
General Divided Facility Property Soil Areas
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/10/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-10	
DES.: LEN	APPD: LH		

39.7 J	140
31.9 J	1100
20.7 J	32.4
7.6 J	U
42.3 J	32.4
78.3 J	235

Trichloroethylene	(ug/kg)	60	300
Aroclor 1254	(ug/kg)	371	310000 JD
Total PCBs	(mg/kg)	0.371	310
Antimony	(mg/kg)	5	21.5 BJ
Arsenic	(mg/kg)	0.4	31.4 J
Barium	(mg/kg)	283	605 J
Cadmium	(mg/kg)	4	21.5 J
Chromium	(mg/kg)	0.4	27.4 J
Copper	(mg/kg)	60	13600 J
Lead	(mg/kg)	40.5	1160 J
Mercury	(mg/kg)	0.00051	0.22 J
Nickel	(mg/kg)	30	44 J
Selenium	(mg/kg)	0.21	9 J
Vanadium	(mg/kg)	2	129 J
Zinc	(mg/kg)	8.5	14000 J

CDE-BSB71-00 08/28/2000
1.670
150 J
6
21
31.4
92
0.1 B
17

SS02 CONSTITUENT	UNITS	Criteria	CDE-SS02-00 09/15/2000
Sample Depth			0.500
Benzo(a)pyrene	(ug/kg)	60	90 J
Aroclor 1254	(ug/kg)	371	600 DJ
Total PCBs	(mg/kg)	0.371	0.6
Arsenic	(mg/kg)	0.4	8.6
Cadmium	(mg/kg)	4	8.1
Chromium	(mg/kg)	0.4	30.9
Lead	(mg/kg)	40.5	66.1
Silver	(mg/kg)	2	3.2
Vanadium	(mg/kg)	2	30.3
Zinc	(mg/kg)	8.5	127

TS	Criteria	CDE-MW09-00 09/18/2000
		0.500
g)	600	740
g)	600	840
g)	60	770
g)	600	620
g)	60	280 J
g)	0.50	2400
g)	100	1900 J
g)	70	3000 NJ
g)	4.0	29000 DNJ
g)	2000	25000 DJ
g)	2000	42000
g)	2000	20000 DJ
g)	371	330000 J
g)	5	10.2 B
g)	0.371	330
g)	0.4	8.3
g)	283	765
g)	4	39.7 J
g)	0.4	37.8
g)	40.5	967
g)	0.00051	0.47
g)	30	56.3
g)	0.21	0.9 B
g)	2	26.8 J
g)	2	49.3
g)	8.5	1550 J
g)	3.2	56.7

TP03 CONSTITUENT	UNITS	Criteria	CDE-TP03-01 06/08/2000	CDE-TP33-01 06/08/2000 Dup. of TP03-01
Sample Depth			1.500	1.500
Vinyl chloride	(ug/kg)	10	120 J	U
Trichloroethylene	(ug/kg)	60	18 J	63 J
Benzo(a)anthracene	(ug/kg)	600	2100 J	2400 J
Benzo(b)fluoranthene	(ug/kg)	600	UJ	3900 J
Benzo(k)fluoranthene	(ug/kg)	900	UJ	1300 J
Benzo(a)pyrene	(ug/kg)	60	UJ	4200 J
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	UJ	2500 J
Aroclor 1248	(ug/kg)	371	410 J	UJ
Total PCBs	(mg/kg)	0.371	0.41	UJ
Arsenic	(mg/kg)	0.4	4.2 J	3 J
Chromium	(mg/kg)	0.4	27.5	19.6
Mercury	(mg/kg)	0.00051	0.07 B	0.07 B
Selenium	(mg/kg)	0.21	1.3 J	0.67 BJ
Vanadium	(mg/kg)	2	20.5	17.9
Zinc	(mg/kg)	8.5	36.2	32.9

DWN: CTS	DES.: LEN	PROJECT NO.: 1945.1018	
CHKD: JG/PB	APPD: LH	FIGURE NO.: 4-11	
DATE: 08/21/02	REV.: 2		

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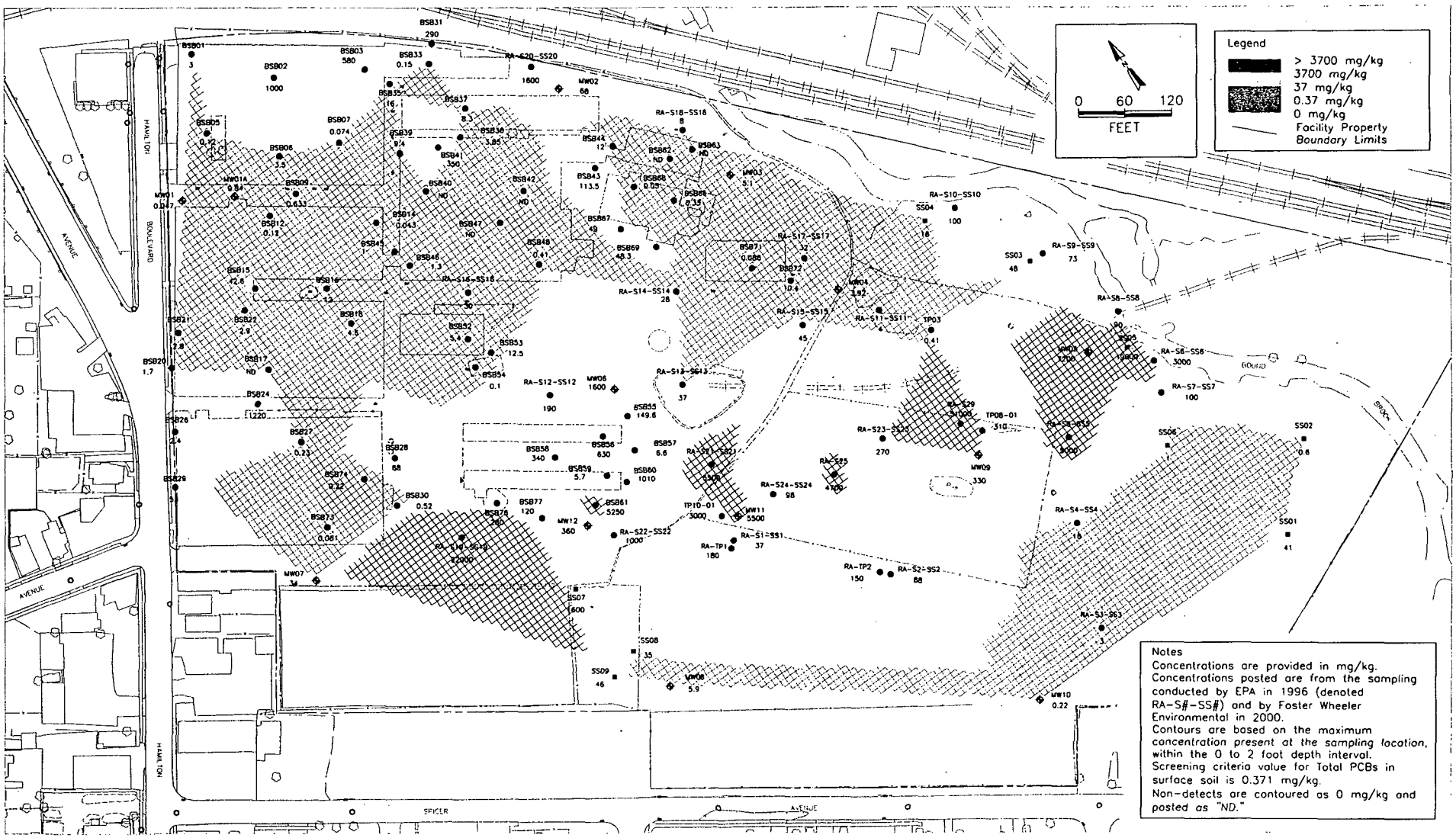
300191

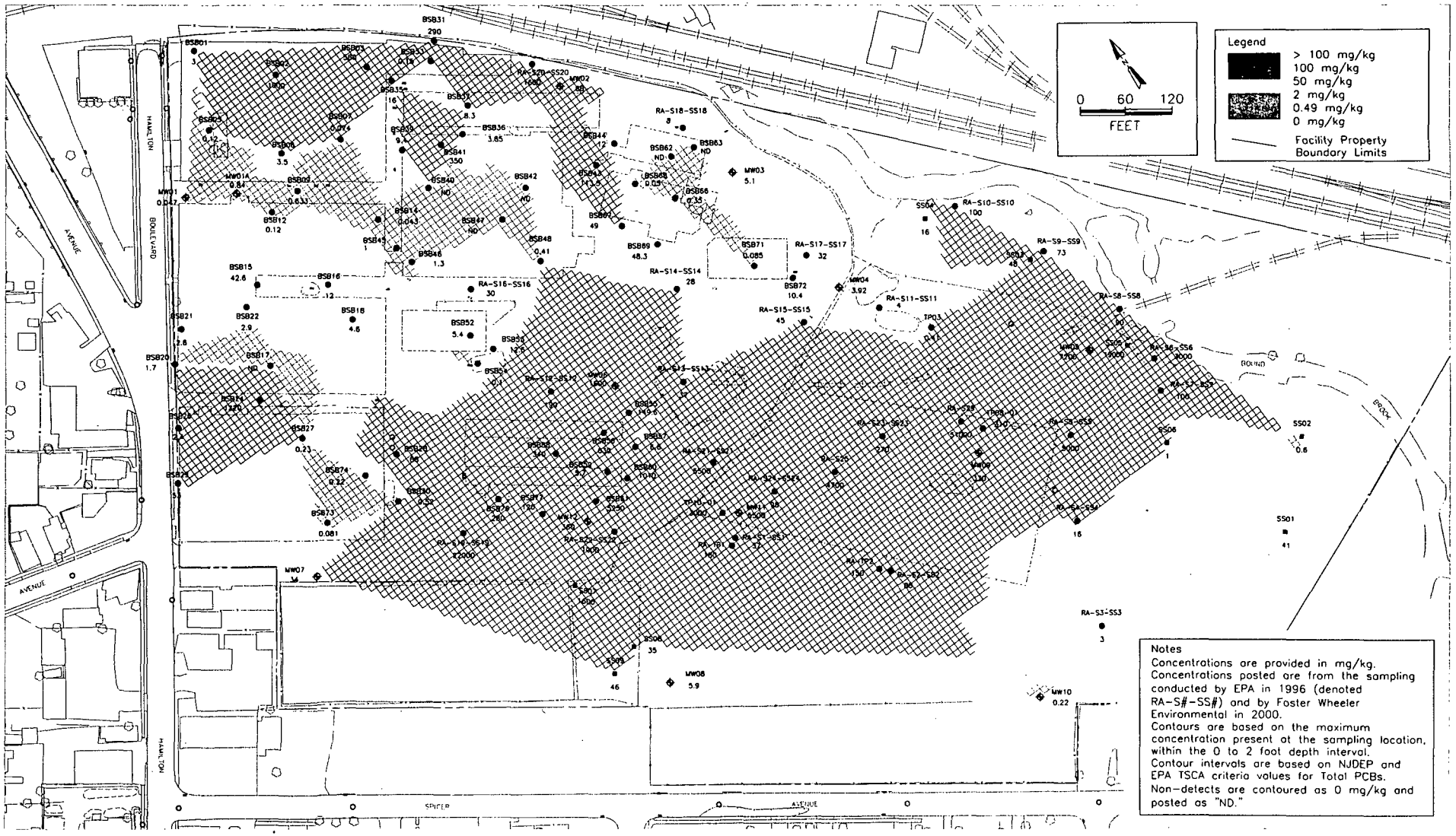


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PCB Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/25/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-12	
DES.: LEN	APPD: LH		

300192

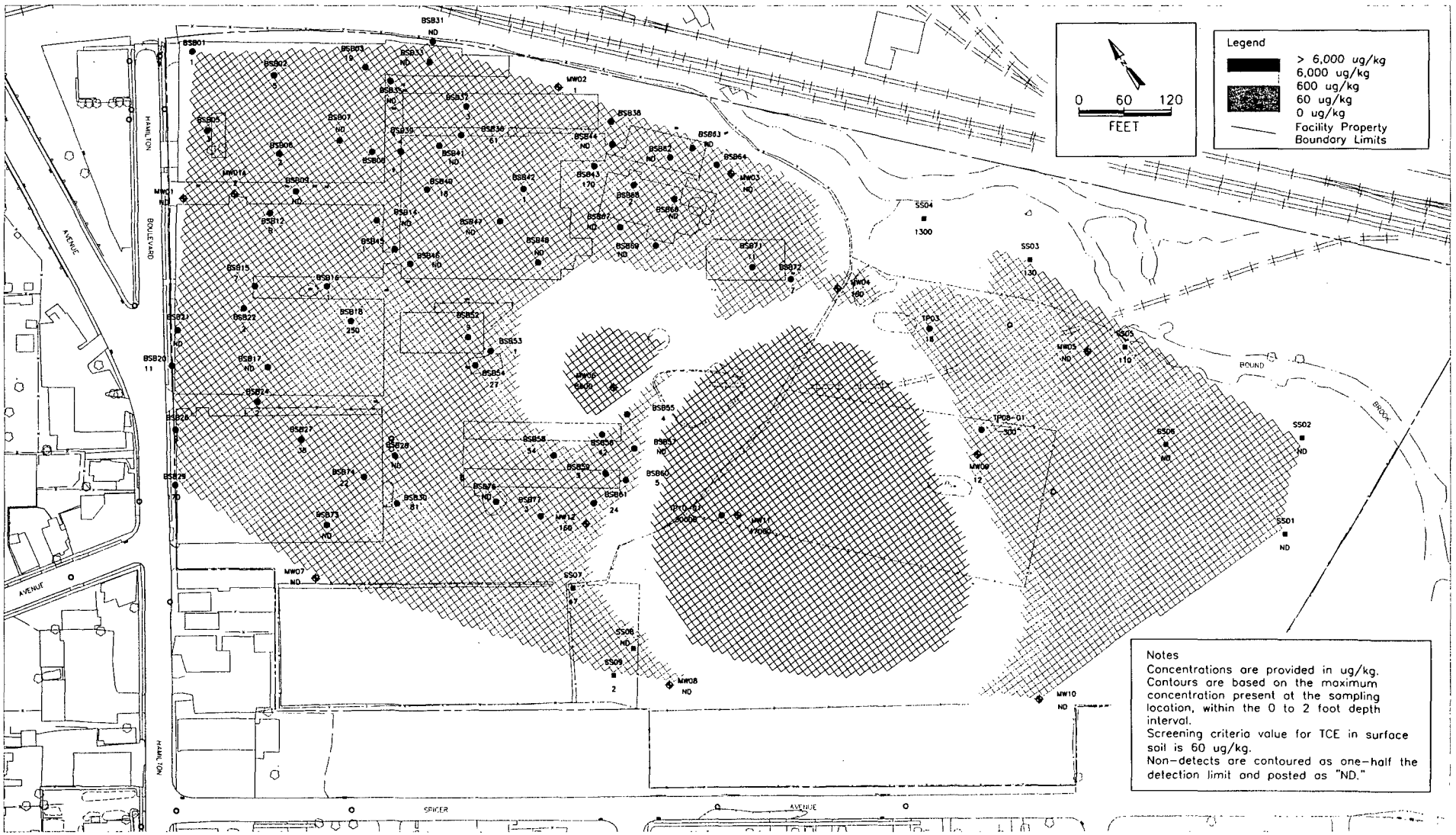


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Total PCB Contamination above NJDEP Criteria in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/20/02	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-13	
DES.: LEN	APPD: LH		

300193



FOSTER WHEELER ENVIRONMENTAL CORPORATION

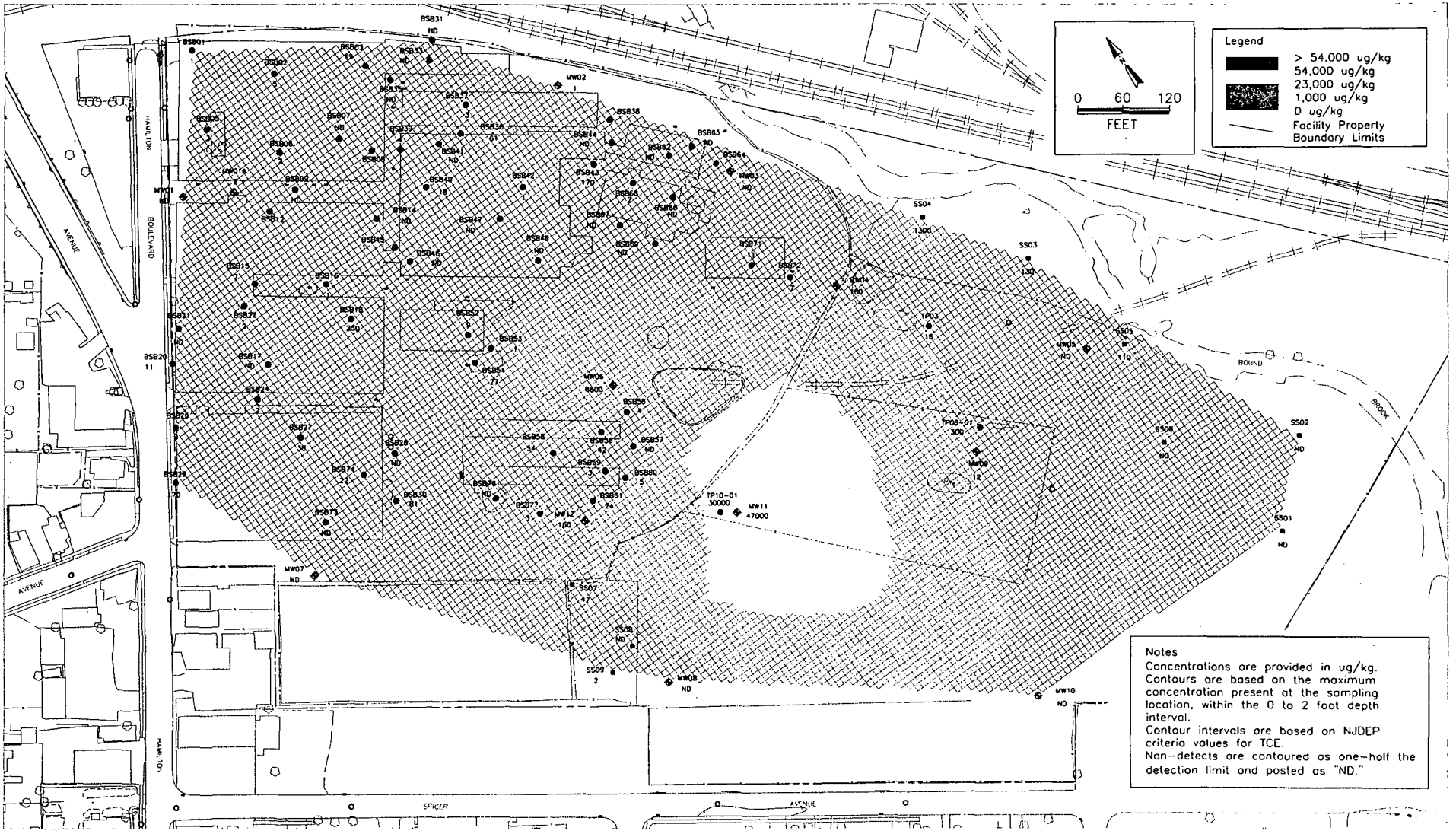
TITLE:
Horizontal Extent of TCE Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/25/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-14	
DES.: LEN	APPD: LH		

300194

300195

300196

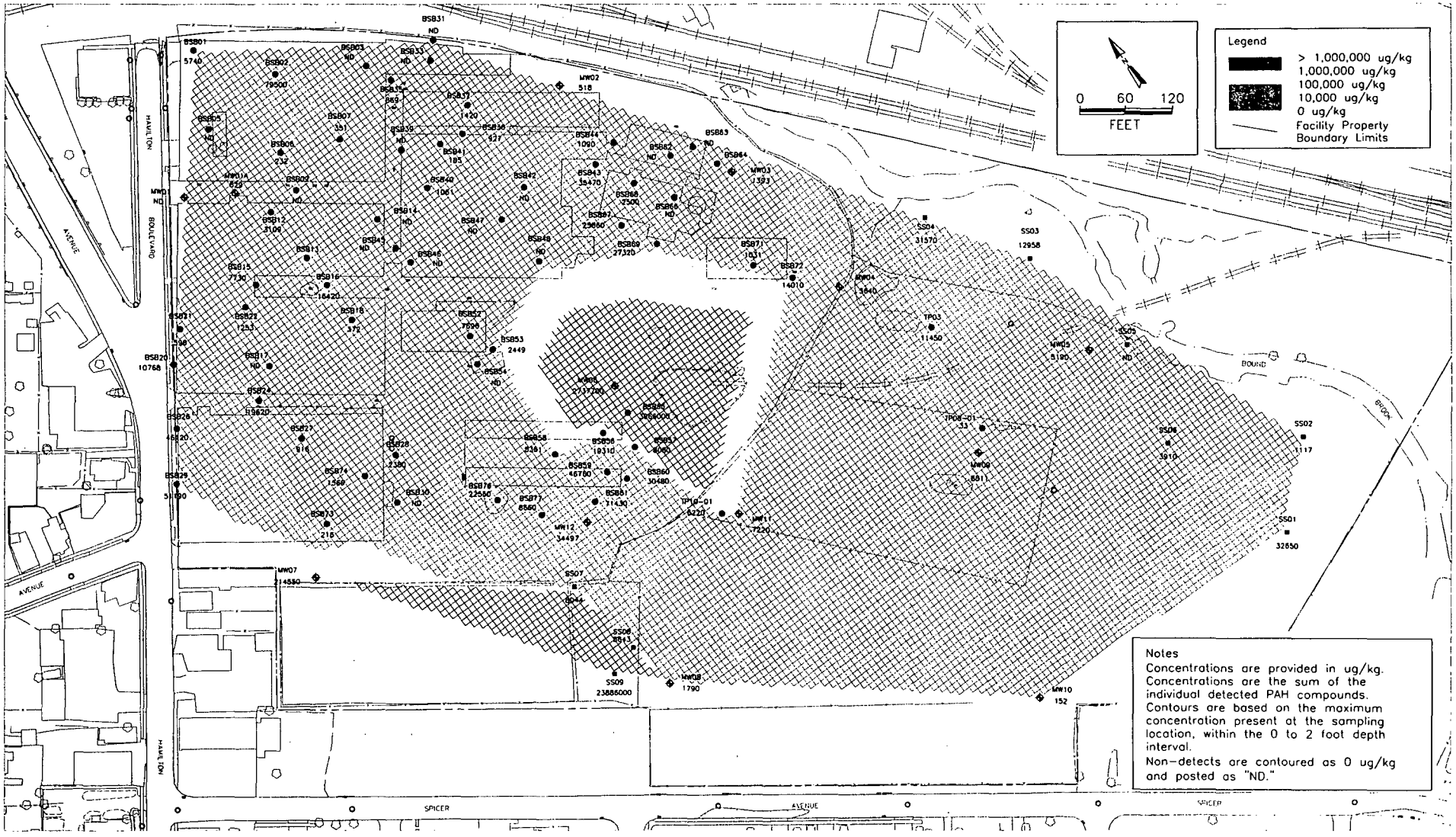


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
TCE Contamination above NJDEP Criteria in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/20/22	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-15	
DES.: LEN	APPD: LH		

300197

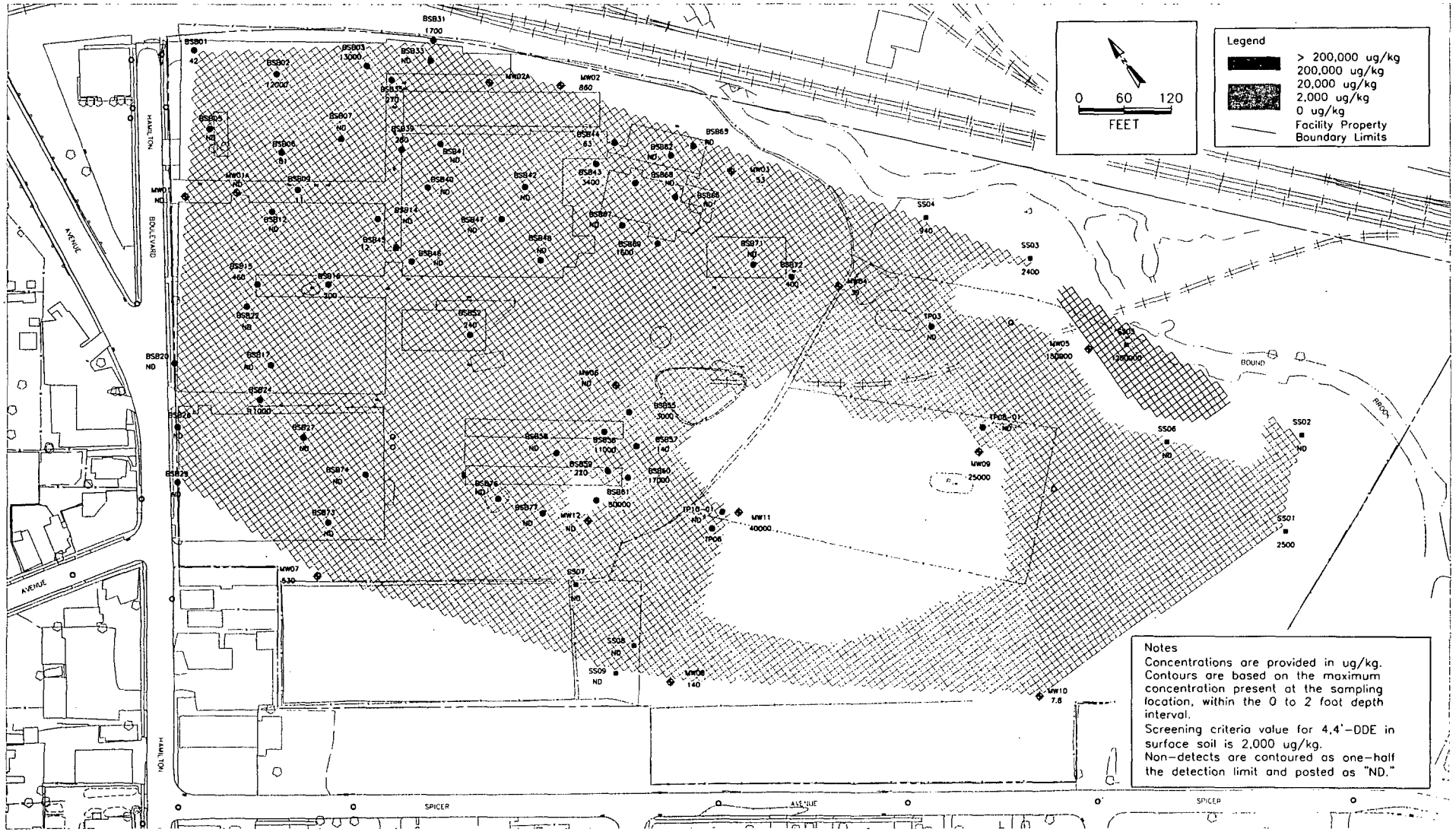


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PAH Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-16	
DES.: LEN	APPD: LH		

300198

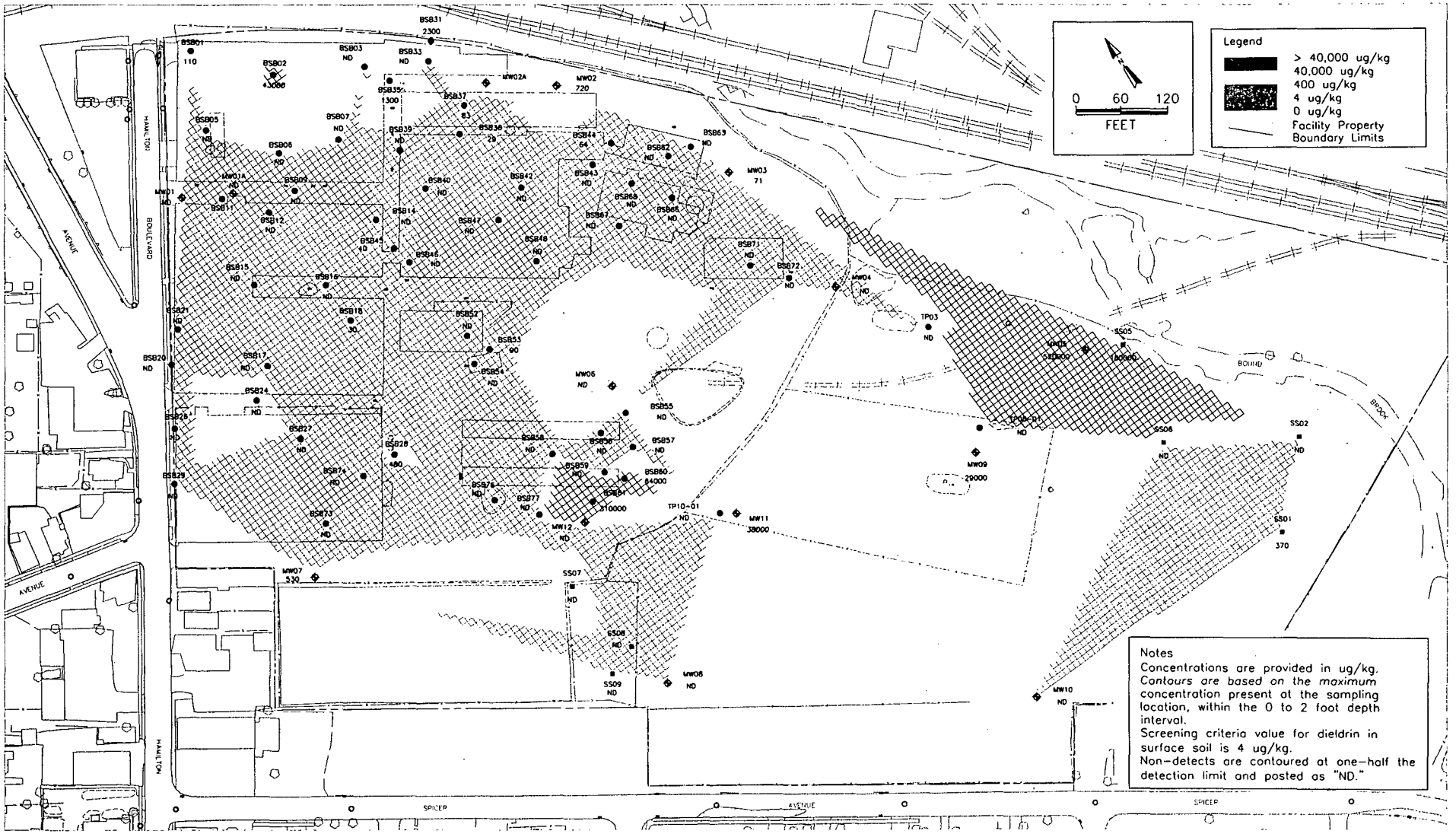


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of 4,4'-DDE Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-17	
DES.: LEN	APPD: LH		

300199

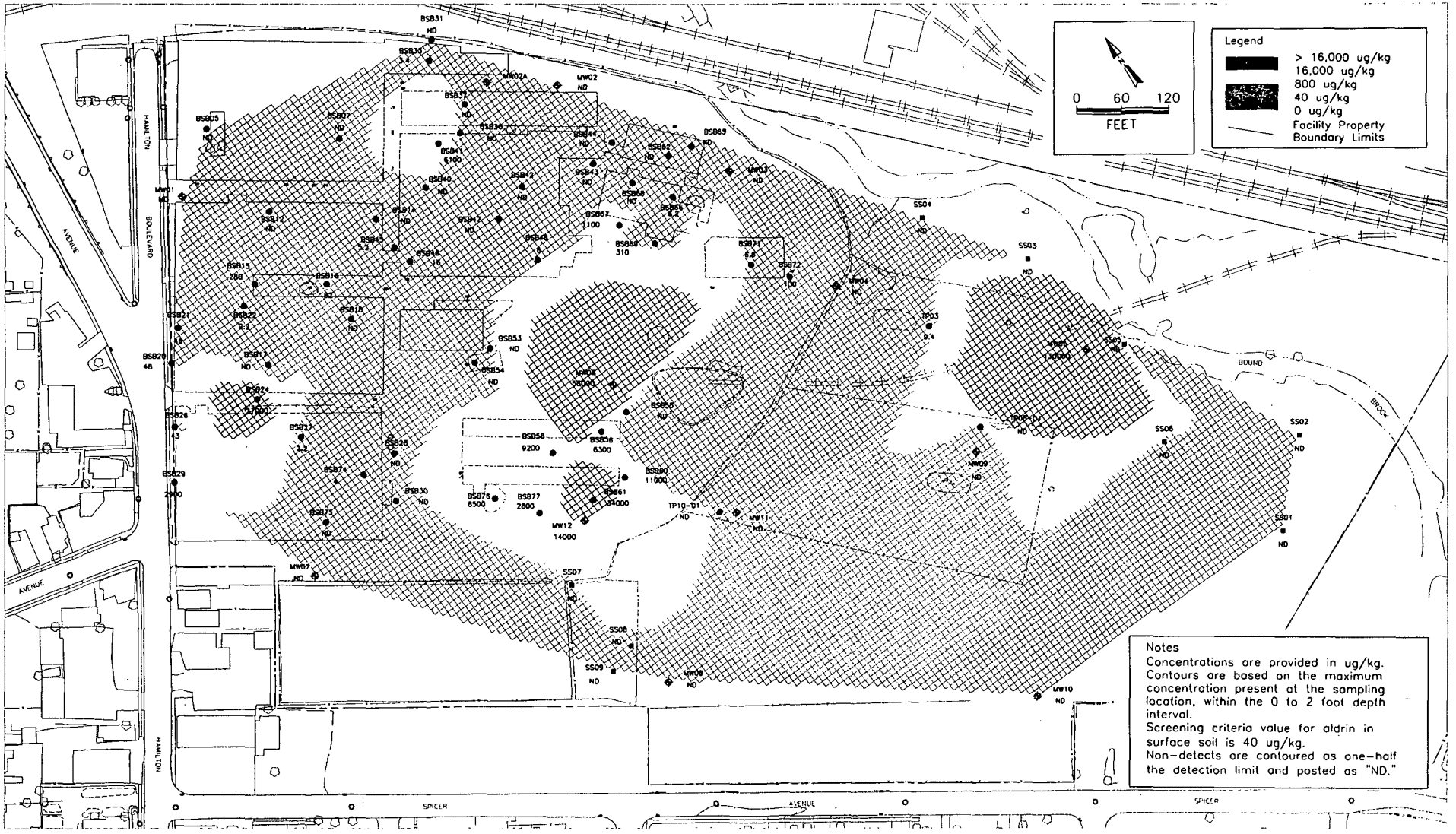


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Dieldrin Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-18	
DES.: LEN	APPD: LH		

300200

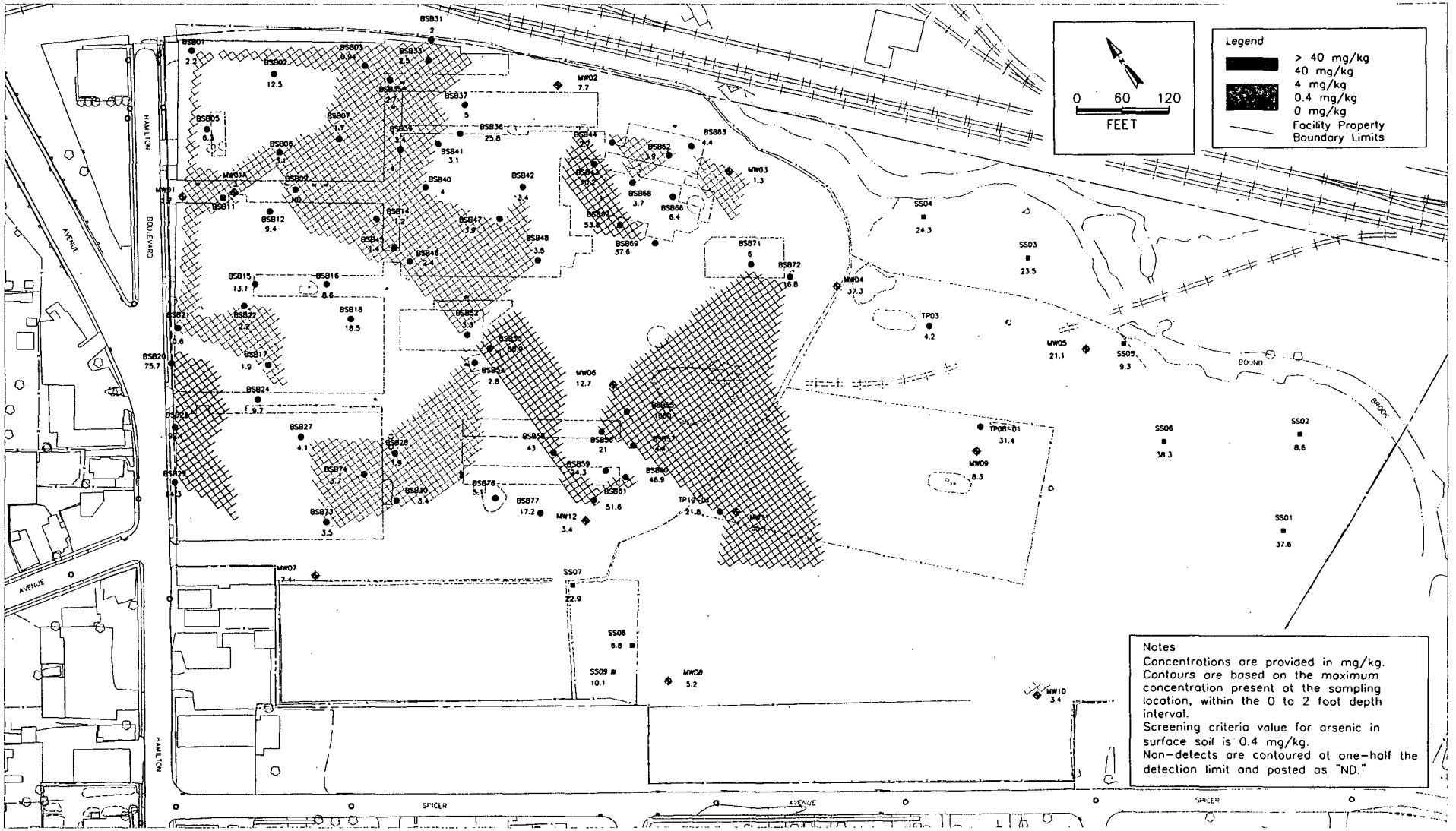


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Aldrin Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-19	
DES.: LEN	APPD: LH		

300201

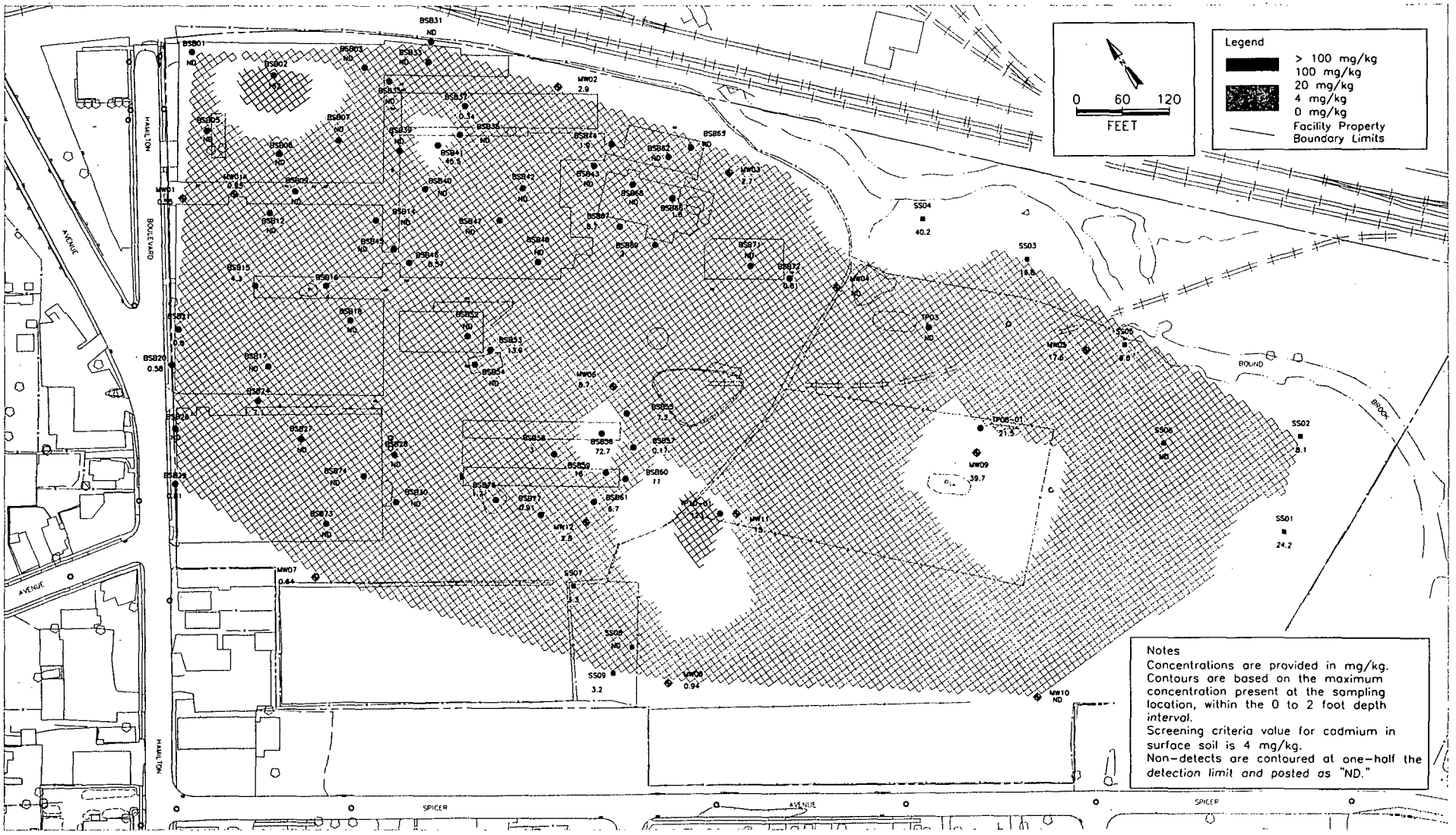


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Arsenic Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-20	
DES.: LEN	APPD: LH		

300202

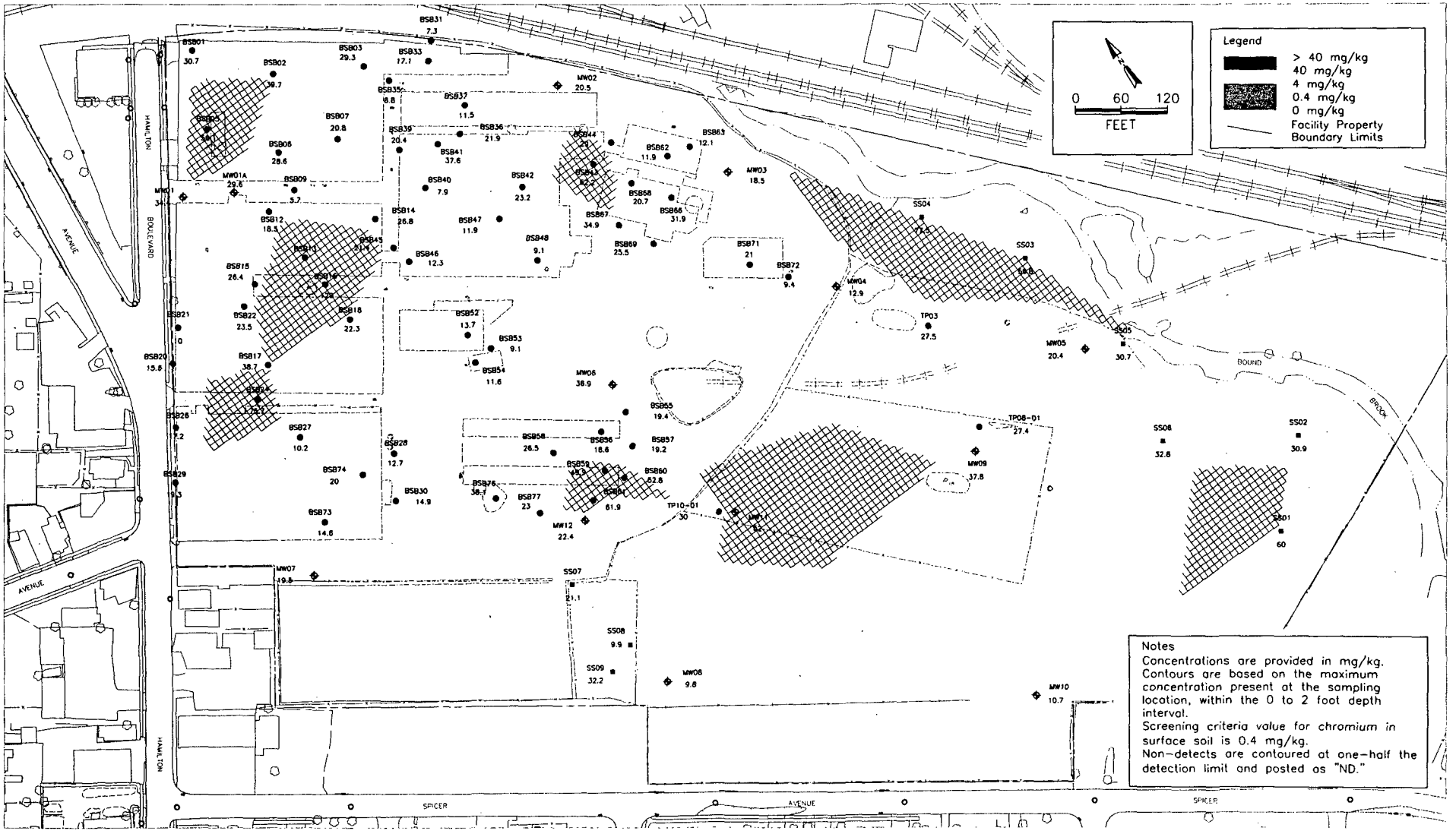


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Cadmium Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-21	
DES.: LEN	APPD: LH		

300203

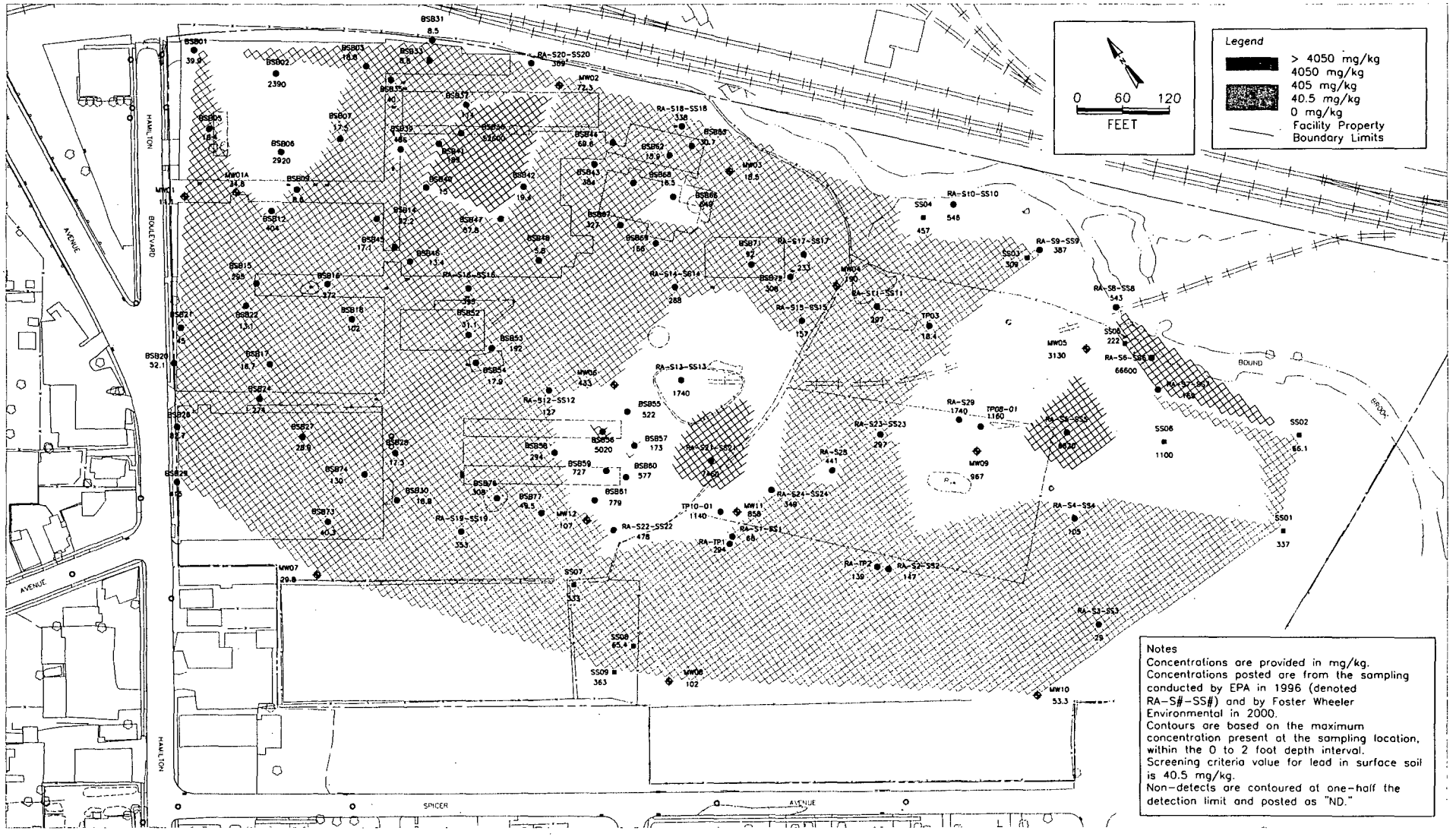


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Chromium Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-22	
DES.: LEN	APPD: LH		

300204

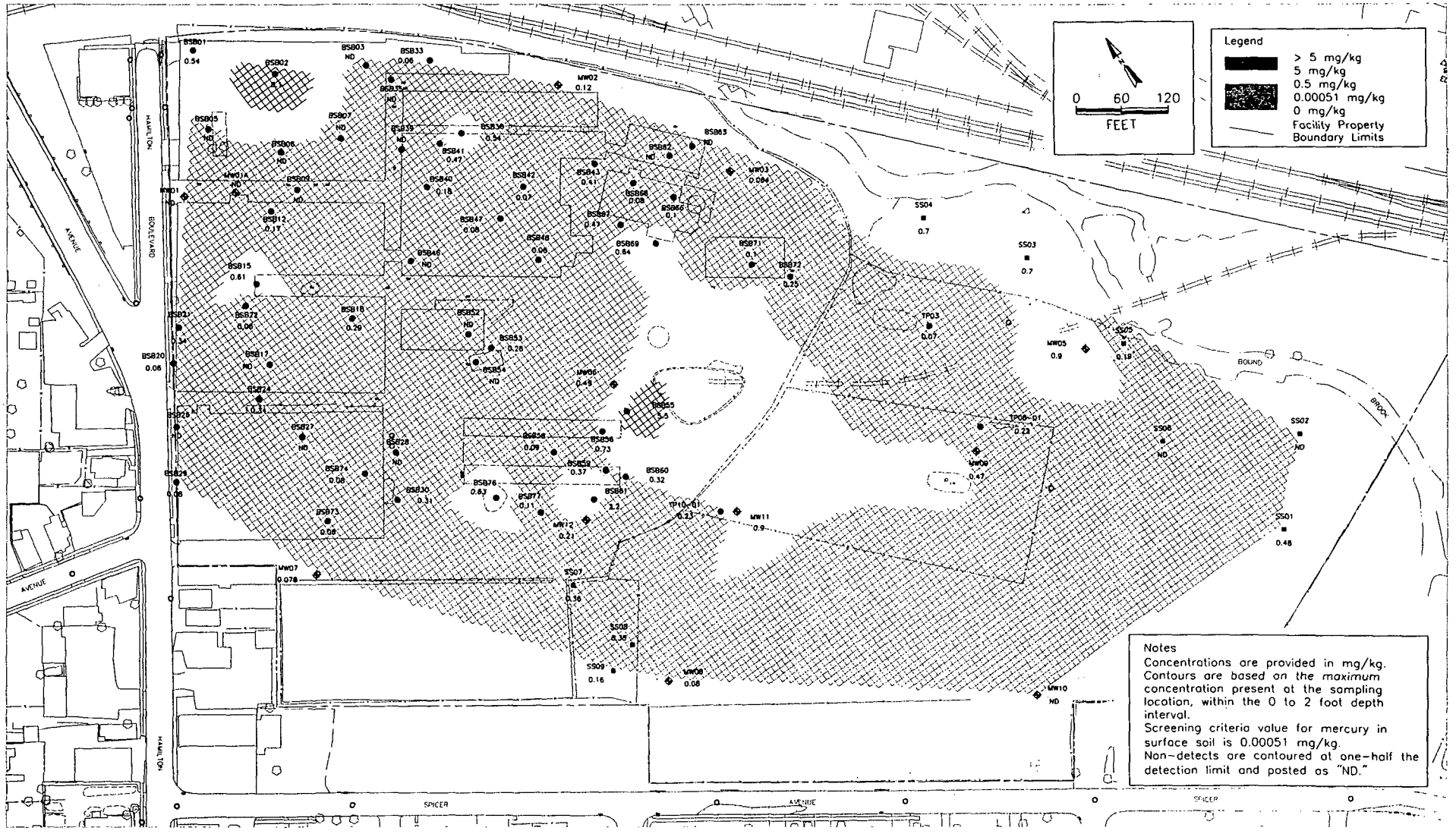


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Lead Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-23	
DES.: LEN	APPD: LH		

300205



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Mercury Contamination in Shallow (0 to 2 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 05/29/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-24	
DES.: LEN	APPD: LH		

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Sample Depth		(feet)	
Trichloroethylene	(ug/kg)	60	2100 D
Aroclor 1254	(ug/kg)	490	1500 JD
Total PCBs	(mg/kg)	0.49	1.63
Arsenic	(mg/kg)	0.4	21.6 J
Chromium	(mg/kg)	38	53.2 J
Thallium	(mg/kg)	0.7	1.9 B

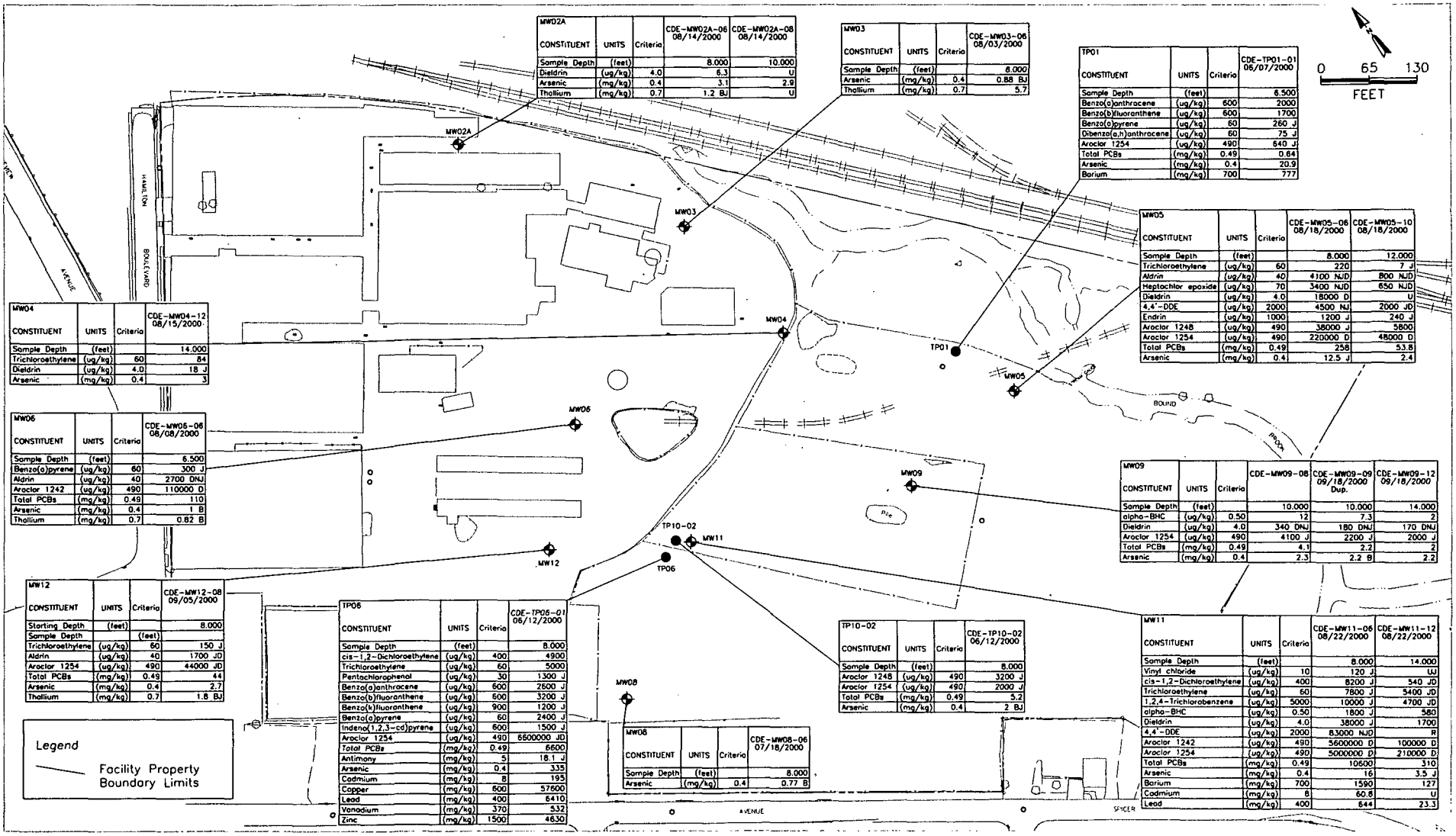
eria	CDE-TP08-02 06/09/2000
	3.500
60	5300 J
490	8300000 JD
.49	8300
0.4	10 J
8	11
400	639

TP02 CONSTITUENT	UNITS	Criteria	CDE-TP02-01 06/08/2000
Sample Depth	(feet)		4.000
Diethyl phthalate	(ug/kg)	50000	52000
Carbazole	(ug/kg)	600	23000
Fluoranthene	(ug/kg)	100000	390000 D
Pyrene	(ug/kg)	100000	120000
Benzo(a)anthracene	(ug/kg)	600	170000 D
Chrysene	(ug/kg)	9000	170000 D
Benzo(b)fluoranthene	(ug/kg)	600	180000 D
Benzo(k)fluoranthene	(ug/kg)	900	73000
Benzo(a)pyrene	(ug/kg)	60	42000
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	38000
Dibenzo(a,h)anthracene	(ug/kg)	60	23000
Aroclor 1254	(ug/kg)	490	49000 JD
Total PCBs	(mg/kg)	0.49	49
Antimony	(mg/kg)	5	13.9 BJ
Arsenic	(mg/kg)	0.4	34.8
Cadmium	(mg/kg)	8	23.8
Chromium	(mg/kg)	38	107
Lead	(mg/kg)	400	472
Selenium	(mg/kg)	5	7.9
Zinc	(mg/kg)	1500	2880

ria	CDE-MW09-04 09/18/2000
	6.000
70	1200000 NJ
.0	11000000 DNJ
00	9700000 DJ
00	25000000 D
00	8200000 DJ
90	130000000 J
49	130000
.4	2.4 B
00	2960
58	248
2	3.4
00	1970 J

S	DES.: LEN	PROJECT NO.: 1945.1018
PB	APPD: LH	FIGURE NO.: 4-25
2/02	REV.: 2	

300207



MW02A CONSTITUENT	UNITS	Criteria	CDE-MW02A-06 08/14/2000	CDE-MW02A-08 08/14/2000
Sample Depth	(feet)		8.000	10.000
Dieldrin	(ug/kg)	4.0	6.3	U
Arsenic	(mg/kg)	0.4	3.1	2.9
Thallium	(mg/kg)	0.7	1.2 BJ	U

MW03 CONSTITUENT	UNITS	Criteria	CDE-MW03-06 08/03/2000
Sample Depth	(feet)		6.000
Arsenic	(mg/kg)	0.4	0.88 BJ
Thallium	(mg/kg)	0.7	5.7

TP01 CONSTITUENT	UNITS	Criteria	CDE-TP01-01 06/07/2000
Sample Depth	(feet)		6.500
Benzo(a)anthracene	(ug/kg)	600	2000
Benzo(b)fluoranthene	(ug/kg)	600	1700
Benzo(a)pyrene	(ug/kg)	60	260 J
Dibenzo(a,h)anthracene	(ug/kg)	60	75 J
Aroclor 1254	(ug/kg)	490	640 J
Total PCBs	(mg/kg)	0.49	0.64
Arsenic	(mg/kg)	0.4	20.9
Barium	(mg/kg)	700	777

MW05 CONSTITUENT	UNITS	Criteria	CDE-MW05-06 08/18/2000	CDE-MW05-10 08/18/2000
Sample Depth	(feet)		8.000	12.000
Trichloroethylene	(ug/kg)	60	220	7 J
Aldrin	(ug/kg)	40	4100 NJD	800 NJD
Heptachlor epoxide	(ug/kg)	70	3400 NJD	650 NJD
Dieldrin	(ug/kg)	4.0	18000 D	U
4,4'-DDE	(ug/kg)	2000	4500 NJ	2000 JD
Endrin	(ug/kg)	1000	1200 J	240 J
Aroclor 1248	(ug/kg)	490	38000 J	5800
Aroclor 1254	(ug/kg)	490	220000 D	48000 D
Total PCBs	(mg/kg)	0.49	258	53.8
Arsenic	(mg/kg)	0.4	12.5 J	2.4

MW04 CONSTITUENT	UNITS	Criteria	CDE-MW04-12 08/15/2000
Sample Depth	(feet)		14.000
Trichloroethylene	(ug/kg)	60	84
Dieldrin	(ug/kg)	4.0	18 J
Arsenic	(mg/kg)	0.4	3

MW06 CONSTITUENT	UNITS	Criteria	CDE-MW06-06 08/08/2000
Sample Depth	(feet)		6.500
Benzo(a)pyrene	(ug/kg)	60	300 J
Aldrin	(ug/kg)	40	2700 DNJ
Aroclor 1242	(ug/kg)	490	110000 D
Total PCBs	(mg/kg)	0.49	110
Arsenic	(mg/kg)	0.4	1 B
Thallium	(mg/kg)	0.7	0.82 B

MW09 CONSTITUENT	UNITS	Criteria	CDE-MW09-08	CDE-MW09-09 09/18/2000 Dup.	CDE-MW09-12 09/18/2000
Sample Depth	(feet)		10.000	10.000	14.000
alpha-BHC	(ug/kg)	0.50	12	7.3	2
Dieldrin	(ug/kg)	4.0	340 DNJ	180 DNJ	170 DNJ
Aroclor 1254	(ug/kg)	490	4100 J	2200 J	2000 J
Total PCBs	(mg/kg)	0.49	4.1	2.2	2
Arsenic	(mg/kg)	0.4	2.3	2.2 B	2.2

MW12 CONSTITUENT	UNITS	Criteria	CDE-MW12-08 09/05/2000
Starting Depth	(feet)		8.000
Sample Depth	(feet)		
Trichloroethylene	(ug/kg)	60	150 J
Aldrin	(ug/kg)	40	1700 JD
Aroclor 1254	(ug/kg)	490	44000 JD
Total PCBs	(mg/kg)	0.49	44
Arsenic	(mg/kg)	0.4	2.7
Thallium	(mg/kg)	0.7	1.8 BJ

TP06 CONSTITUENT	UNITS	Criteria	CDE-TP06-01 06/12/2000
Sample Depth	(feet)		8.000
cis-1,2-Dichloroethylene	(ug/kg)	400	4900
Trichloroethylene	(ug/kg)	60	5000
Pentachlorophenol	(ug/kg)	30	1300 J
Benzo(a)anthracene	(ug/kg)	600	2600 J
Benzo(b)fluoranthene	(ug/kg)	600	3200 J
Benzo(k)fluoranthene	(ug/kg)	900	1200 J
Benzo(a)pyrene	(ug/kg)	60	2400 J
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	1500 J
Aroclor 1254	(ug/kg)	490	6600000 JD
Total PCBs	(mg/kg)	0.49	6600
Antimony	(mg/kg)	5	18.1 J
Arsenic	(mg/kg)	0.4	335
Cadmium	(mg/kg)	8	195
Copper	(mg/kg)	600	57600
Lead	(mg/kg)	400	6410
Vanadium	(mg/kg)	370	532
Zinc	(mg/kg)	1500	4630

TP10-02 CONSTITUENT	UNITS	Criteria	CDE-TP10-02 06/12/2000
Sample Depth	(feet)		8.000
Aroclor 1248	(ug/kg)	490	3200 J
Aroclor 1254	(ug/kg)	490	2000 J
Total PCBs	(mg/kg)	0.49	5.2
Arsenic	(mg/kg)	0.4	2 BJ

MW08 CONSTITUENT	UNITS	Criteria	CDE-MW08-06 07/18/2000
Sample Depth	(feet)		8.000
Arsenic	(mg/kg)	0.4	0.77 B

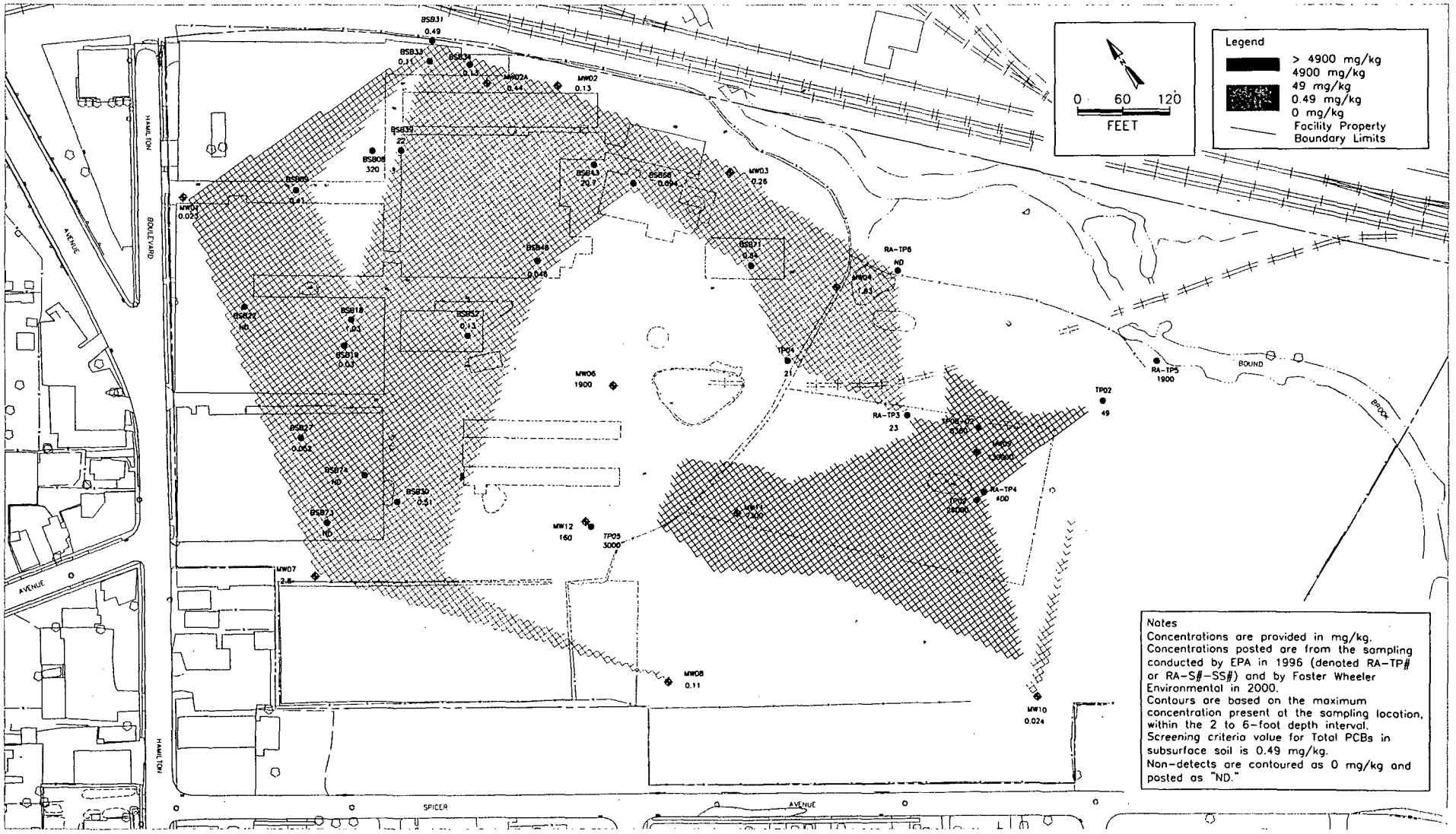
MW11 CONSTITUENT	UNITS	Criteria	CDE-MW11-06 08/22/2000	CDE-MW11-12 08/22/2000
Sample Depth	(feet)		8.000	14.000
Vinyl chloride	(ug/kg)	10	120 J	UJ
cis-1,2-Dichloroethylene	(ug/kg)	400	8200 J	540 JD
Trichloroethylene	(ug/kg)	60	7800 J	5400 JD
1,2,4-Trichlorobenzene	(ug/kg)	5000	10000 J	4700 JD
alpha-BHC	(ug/kg)	0.50	1800 J	580
Dieldrin	(ug/kg)	4.0	38000 J	1700
4,4'-DDE	(ug/kg)	2000	83000 NJD	R
Aroclor 1242	(ug/kg)	490	5600000 D	100000 D
Aroclor 1254	(ug/kg)	490	5000000 D	210000 D
Total PCBs	(mg/kg)	0.49	10600	310
Arsenic	(mg/kg)	0.4	16	3.5 J
Barium	(mg/kg)	700	1590	127
Cadmium	(mg/kg)	8	60.8	U
Lead	(mg/kg)	400	644	23.3

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Constituents Exceeding Screening Criteria in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
CTS	08/22/02	1945.1018
CHKD:	REV.:	FIGURE NO.:
JG	2	4-26
DES.:	APPD:	
LEN	LH	

300208

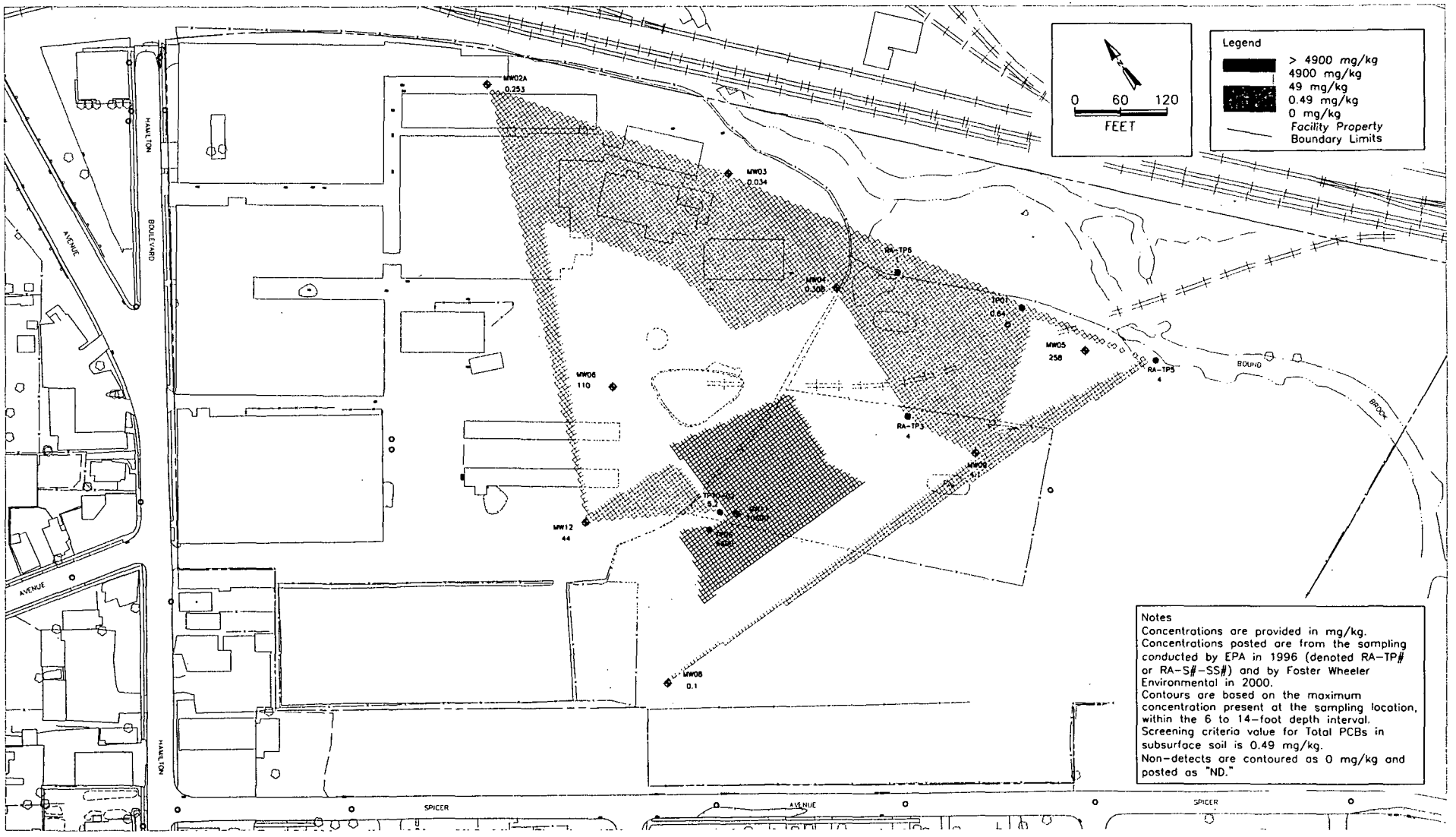


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PCB Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/24/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-27	
DES.: LEN	APPD: LH		

300209

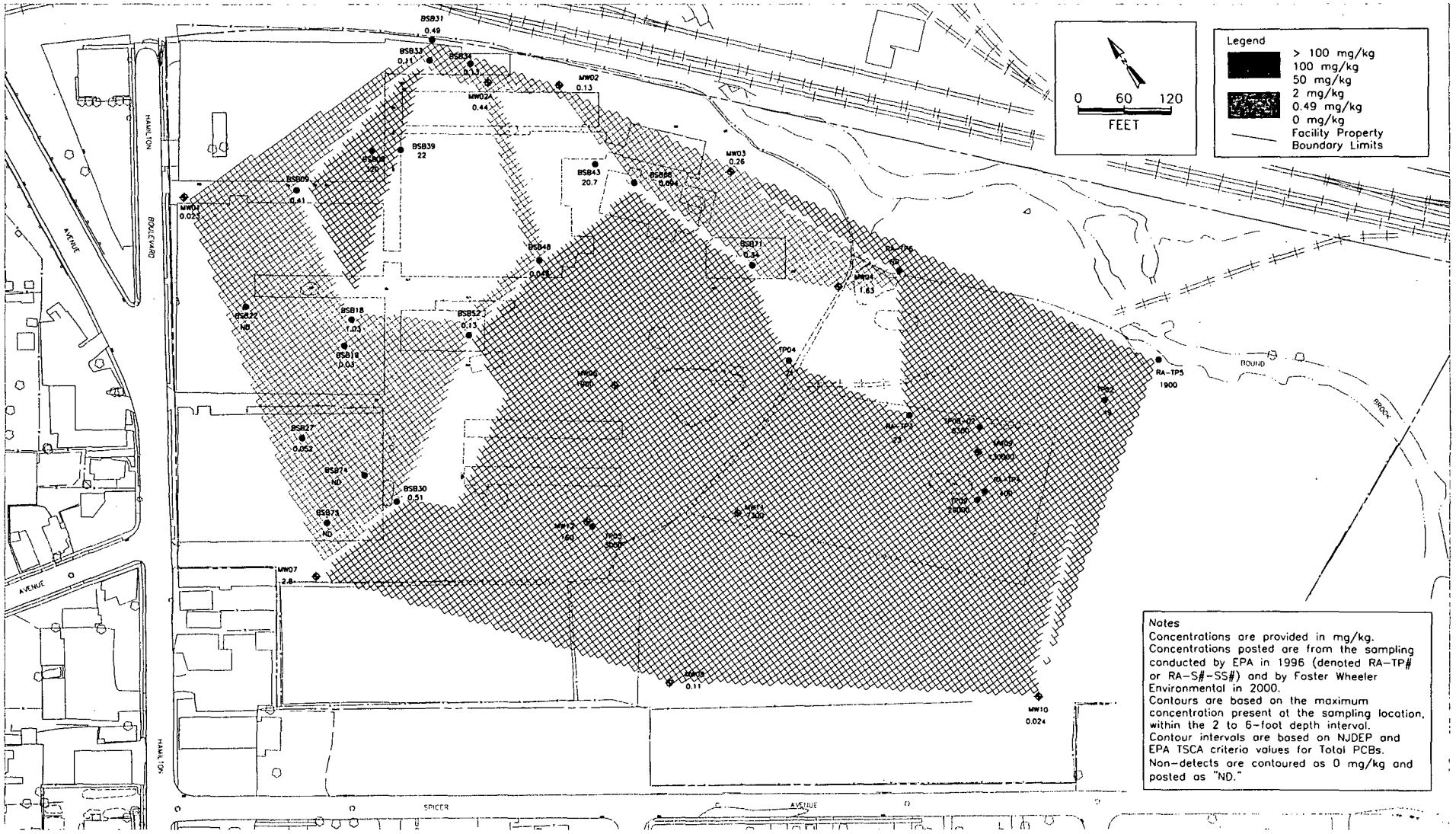


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PCB Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/24/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-28	
DES.: LEN	APPD: LH		

300210

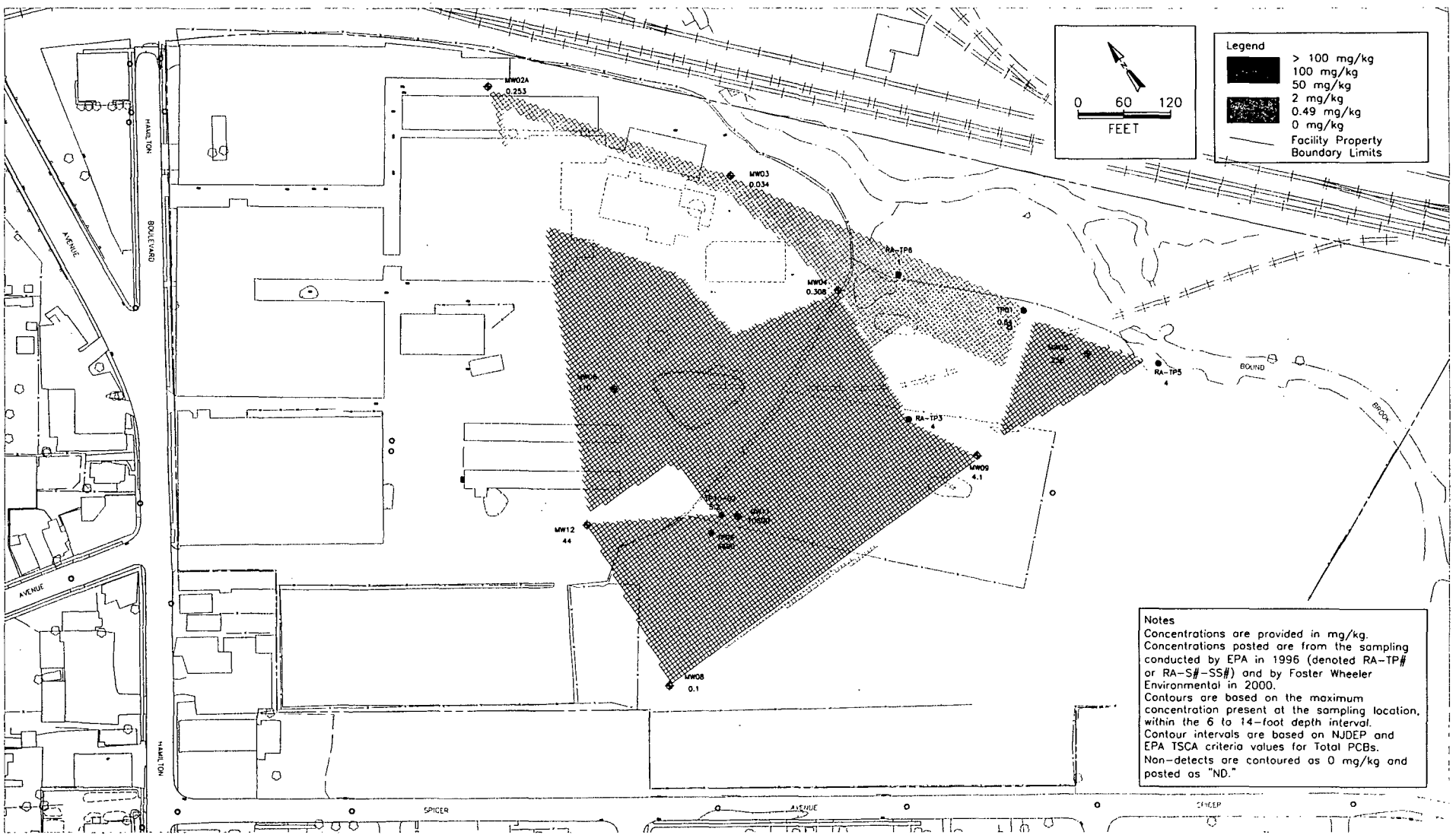


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Total PCB Contamination above NJDEP Criteria in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/20/02	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-29	
DES.: LEN	APPD: LH		

300211

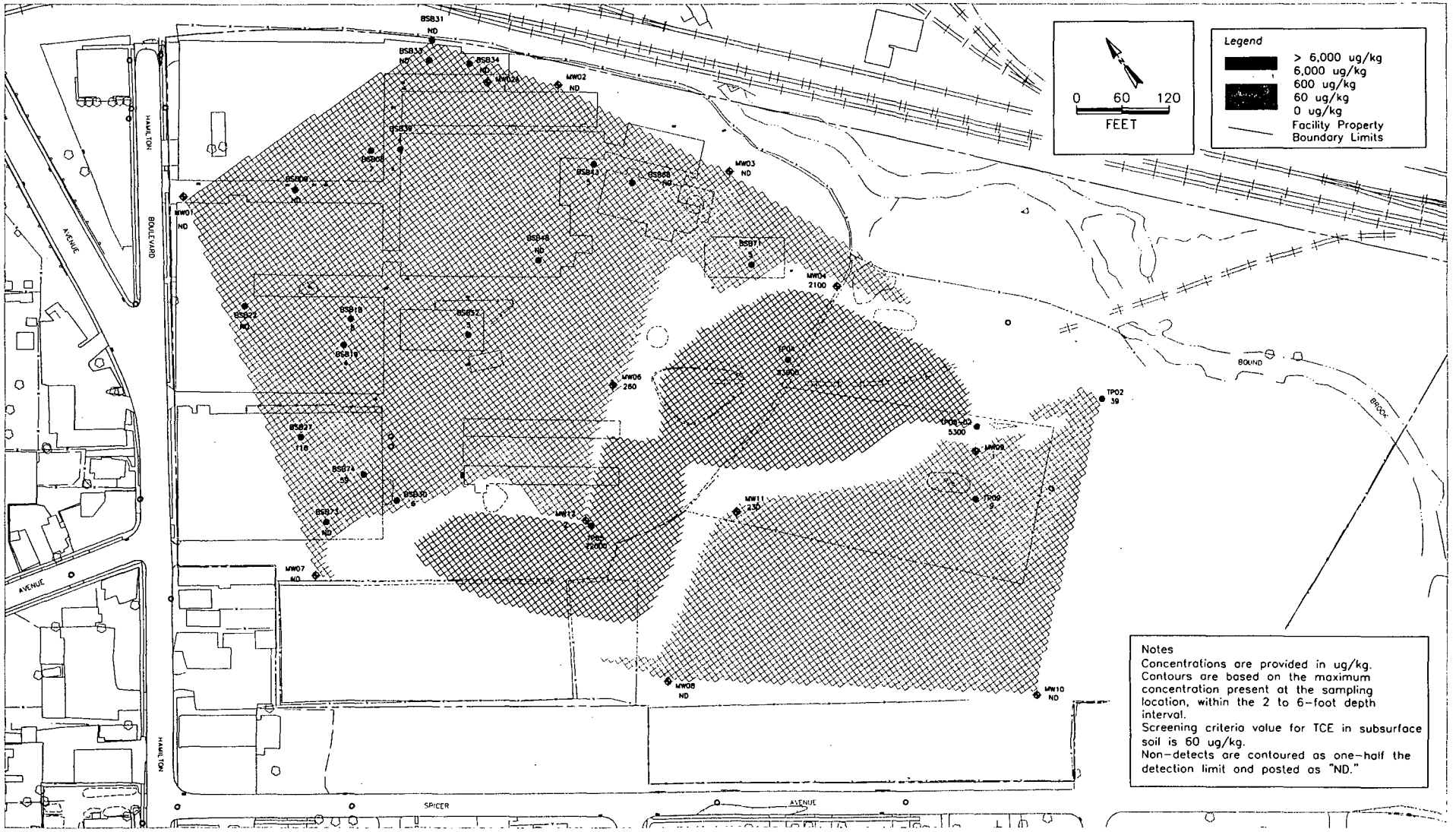


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Total PCB Contamination above NJDEP Criteria in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/20/02	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-30	
DES.: LEN	APPD: LH		

300212



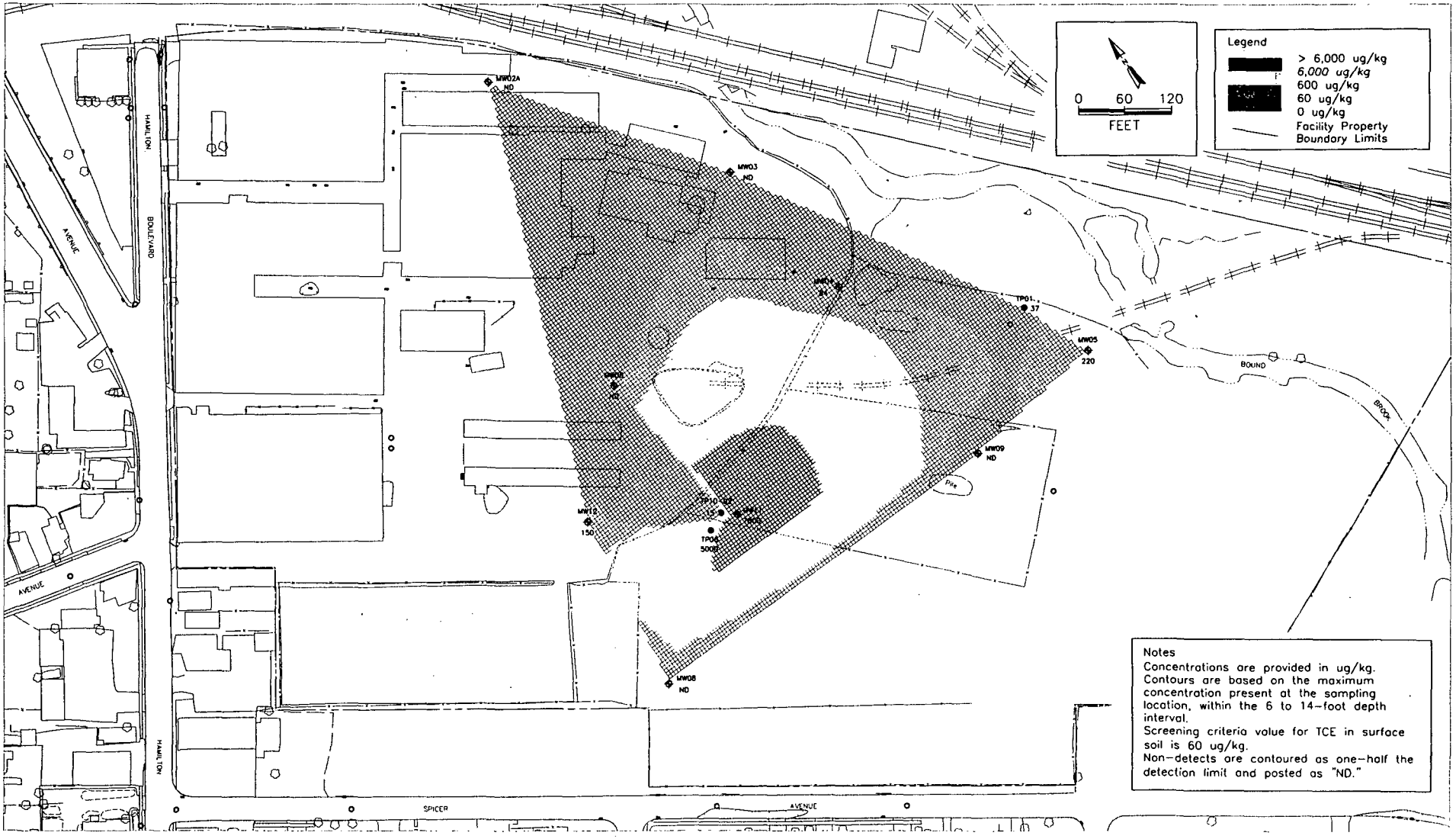
Notes
Concentrations are provided in ug/kg.
Contours are based on the maximum concentration present at the sampling location, within the 2 to 6-foot depth interval.
Screening criteria value for TCE in subsurface soil is 60 ug/kg.
Non-detects are contoured as one-half the detection limit and posted as "ND."

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of TCE Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
LEN	07/24/01	1945.1018
CHKD:	REV.:	FIGURE NO.:
JG	1	4-31
DES.:	APPD:	
LEN	LH	

300213

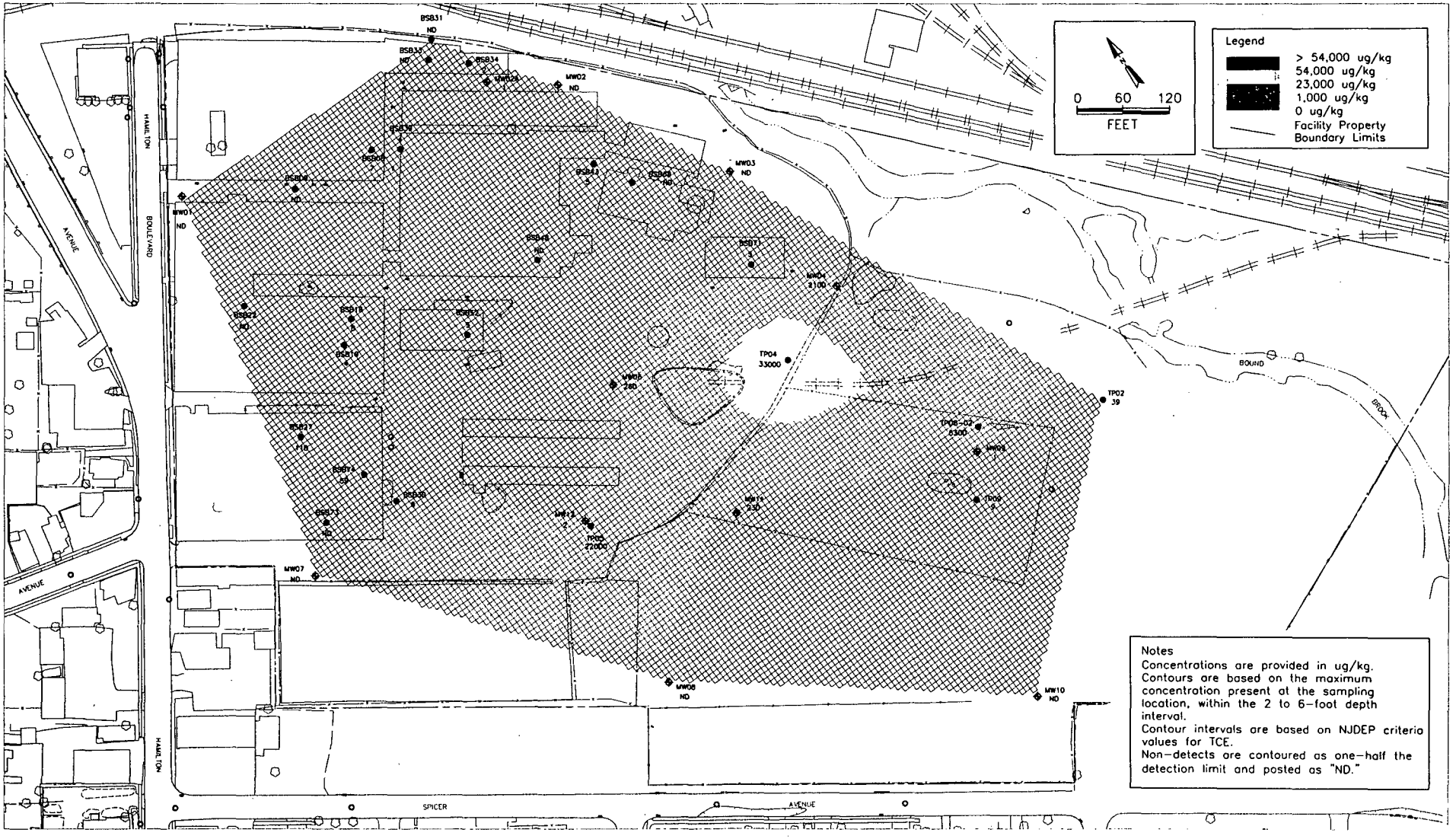


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of TCE Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/24/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 1	FIGURE NO.: 4-32	
DES.: LEN	APPD: LH		

300214

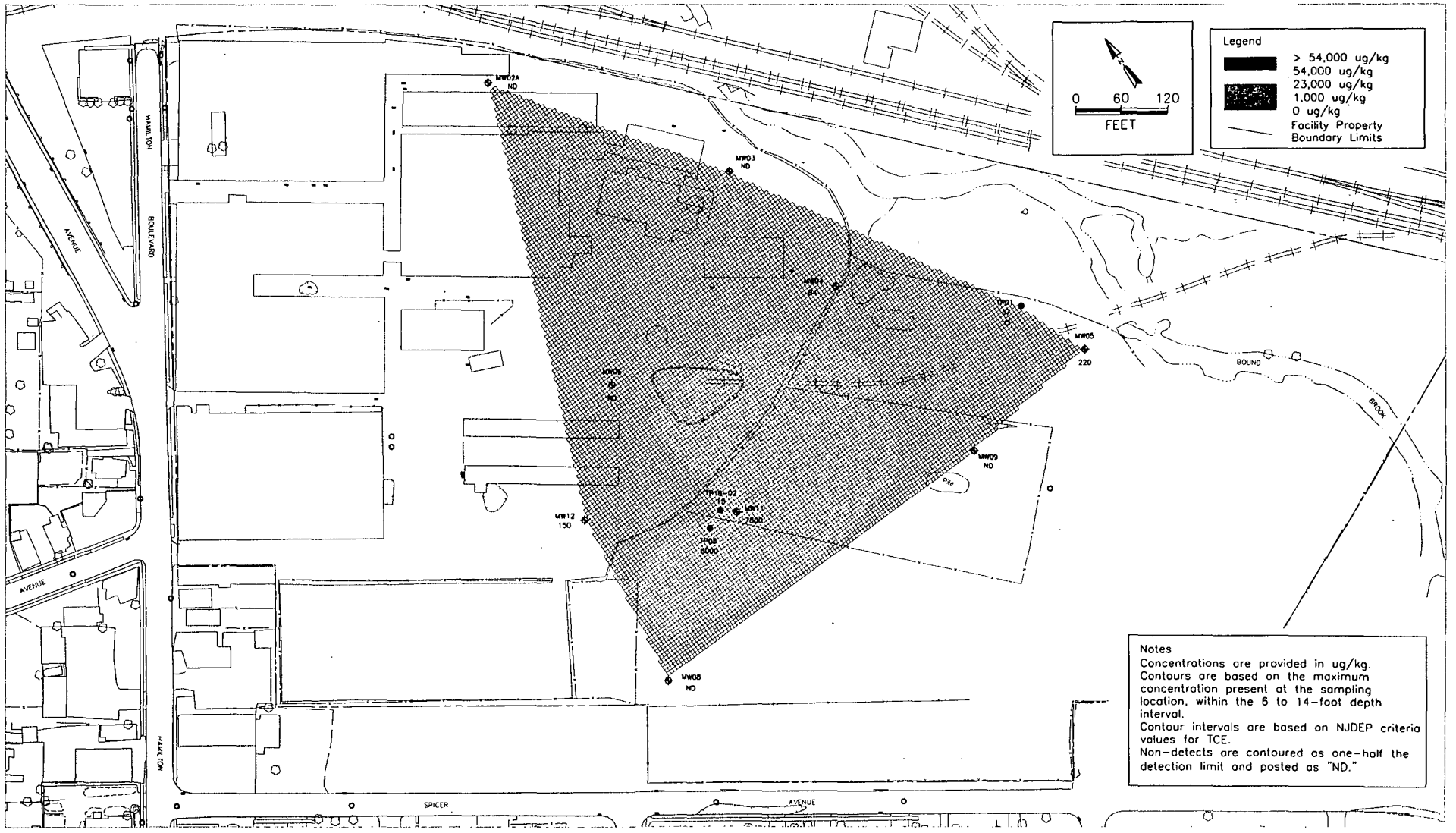


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
TCE Contamination above NJDEP Criteria in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/22/02	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-33	
DES.: LEN	APPD: LH		

300215

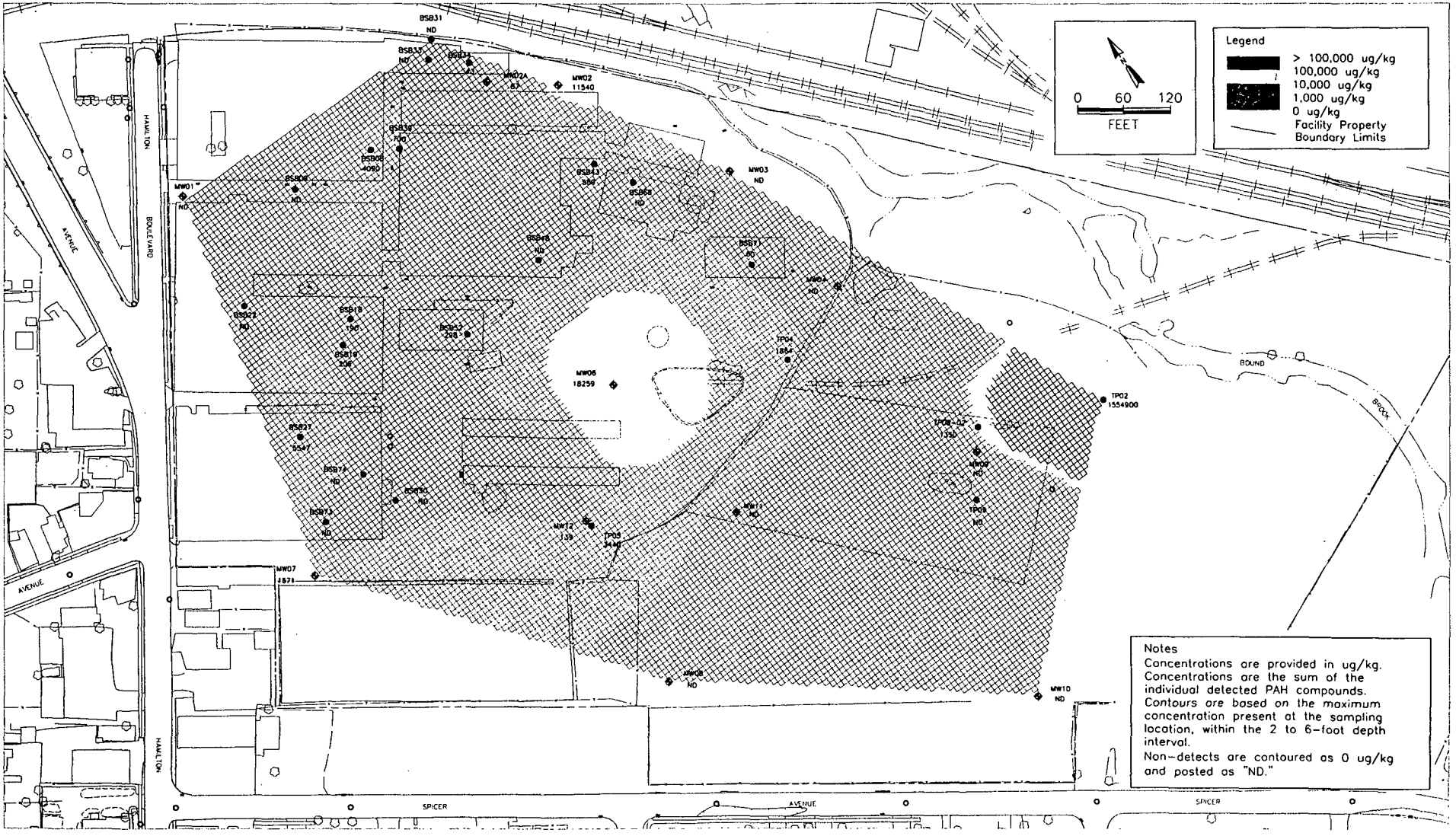


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
TCE Contamination above NJDEP Criteria in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 11/22/02	PROJECT NO.: 1945.1018	
CHKD:	REV.: 0	FIGURE NO.: 4-34	
DES.: LEN	APPD:		

300216

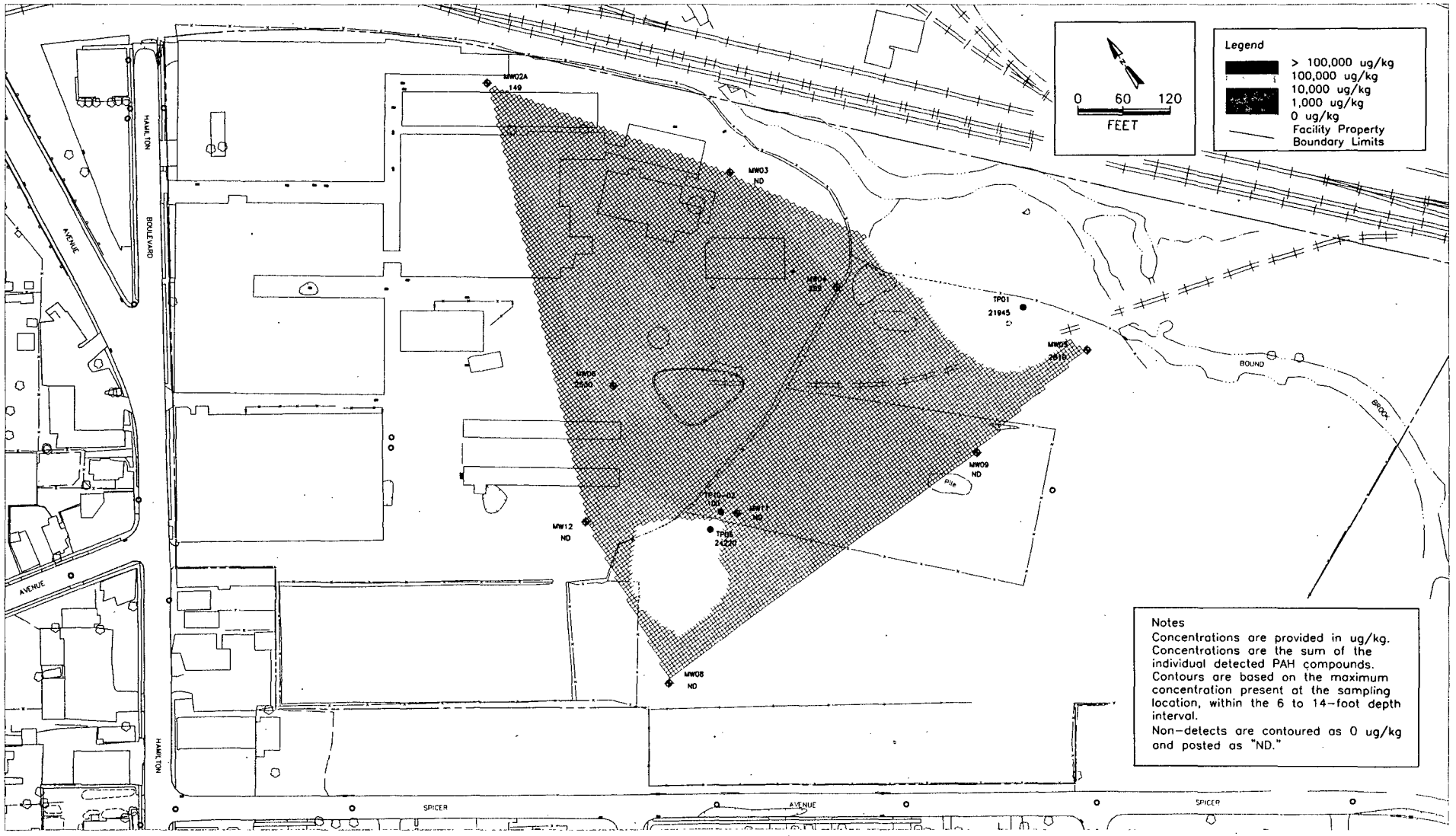


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PAH Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/25/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-35	
DES.: LEN	APPD: LH		

300217

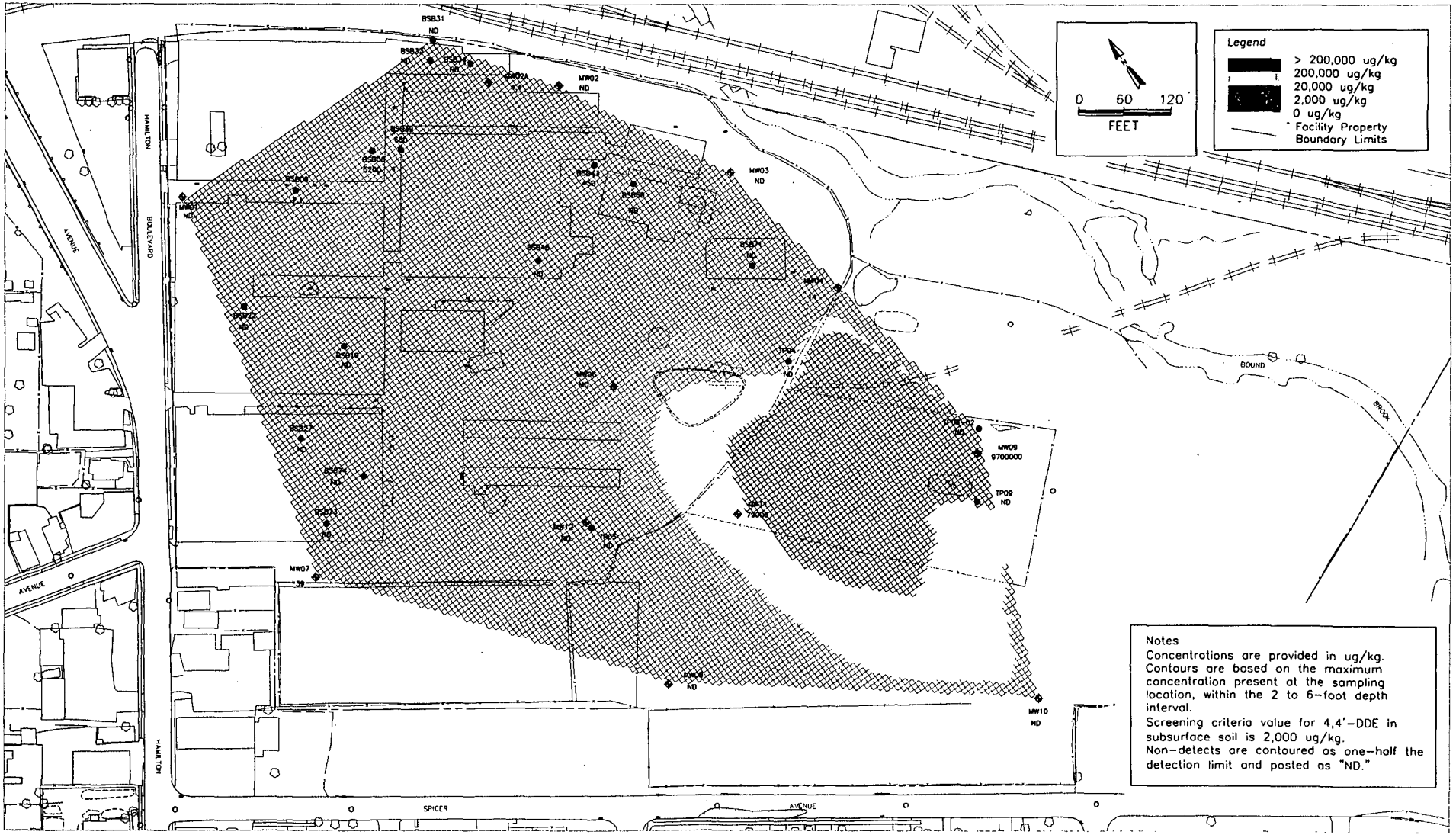


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PAH Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/25/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-36	
DES.: LEN	APPD: LH		

300218

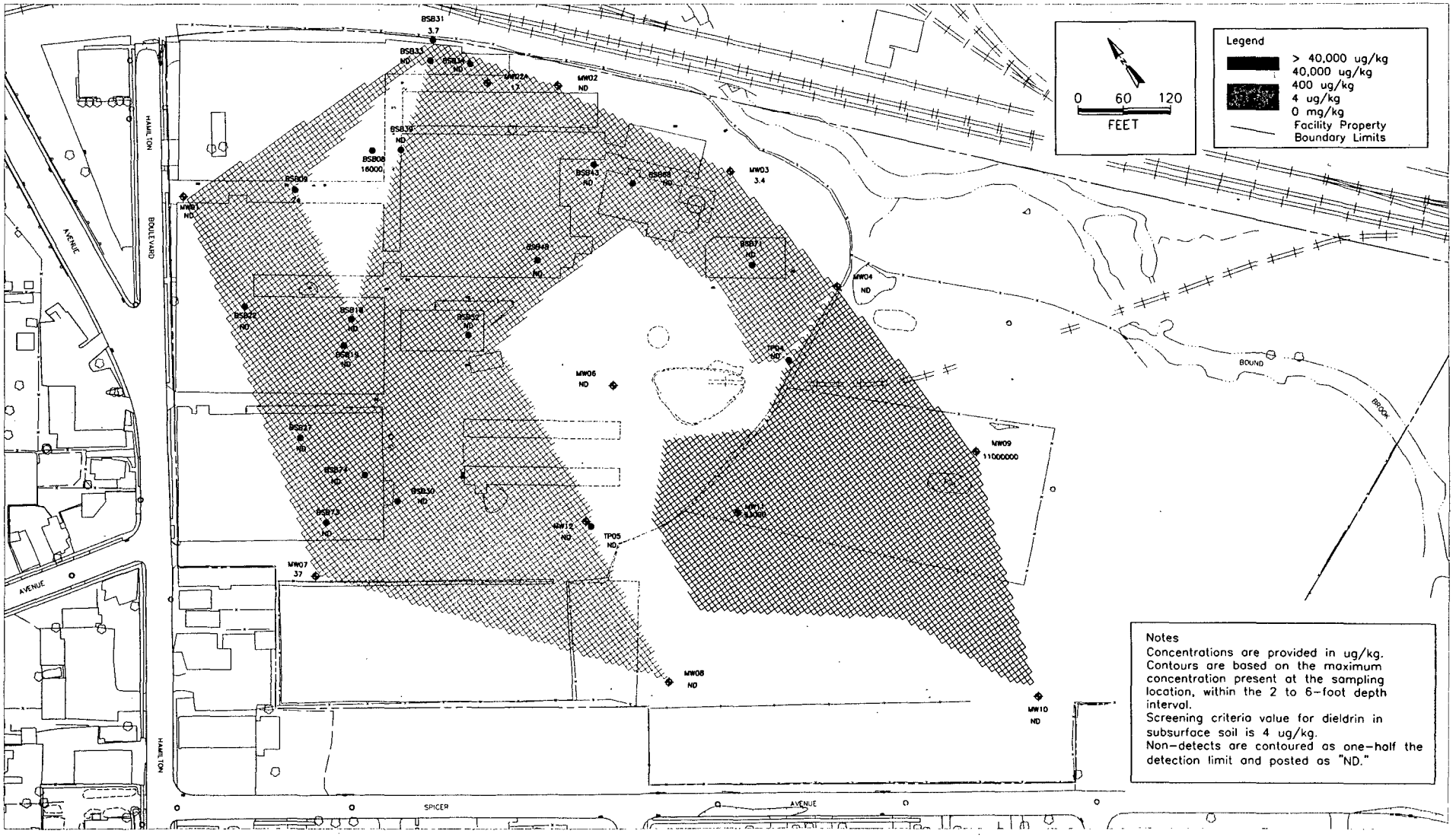


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of 4,4'-DDE Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/26/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-37	
DES.: LEN	APPD: LH		

300219

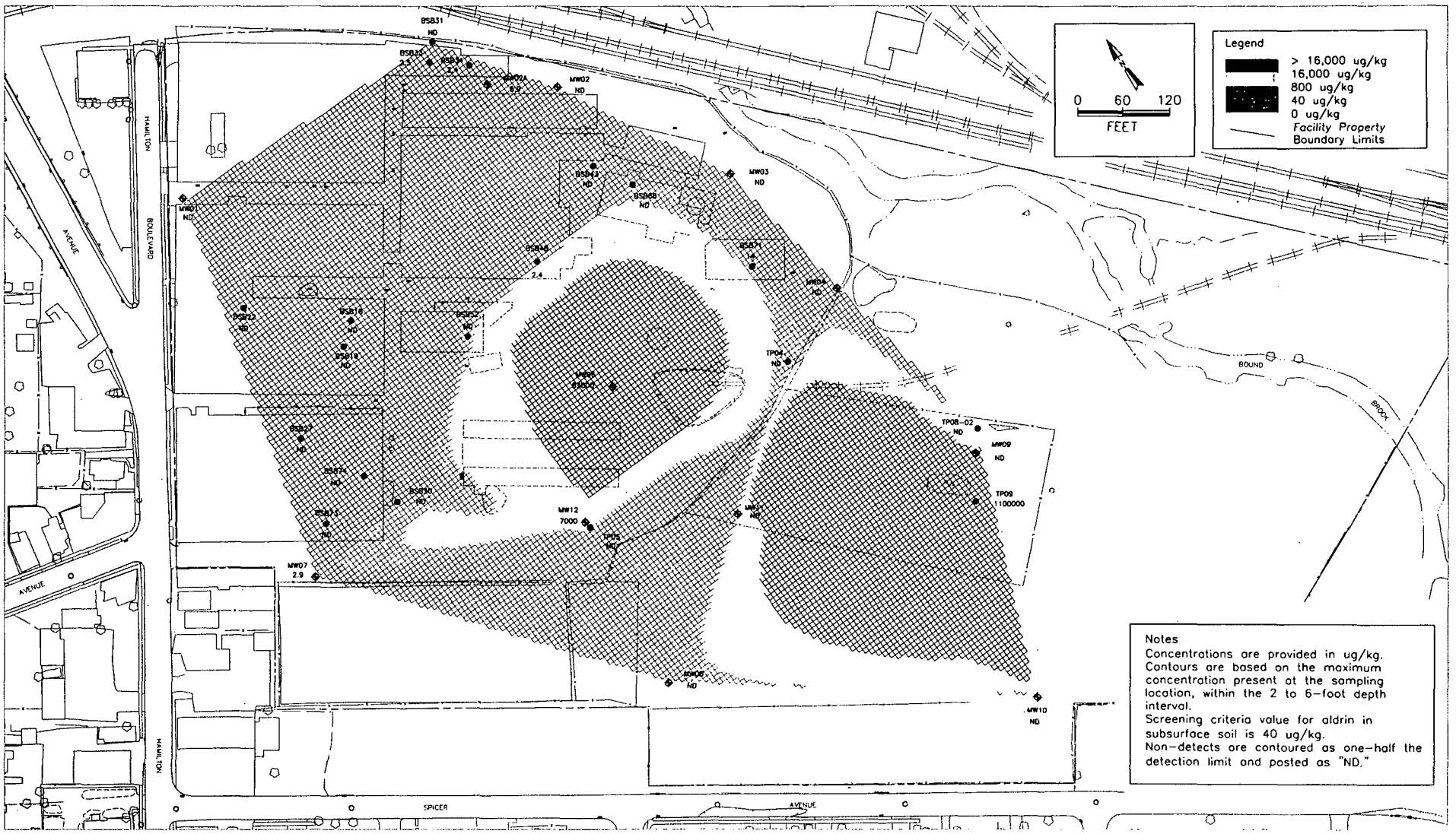


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Dieldrin Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/26/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-38	
DES.: LEN	APPD: LH		

300220

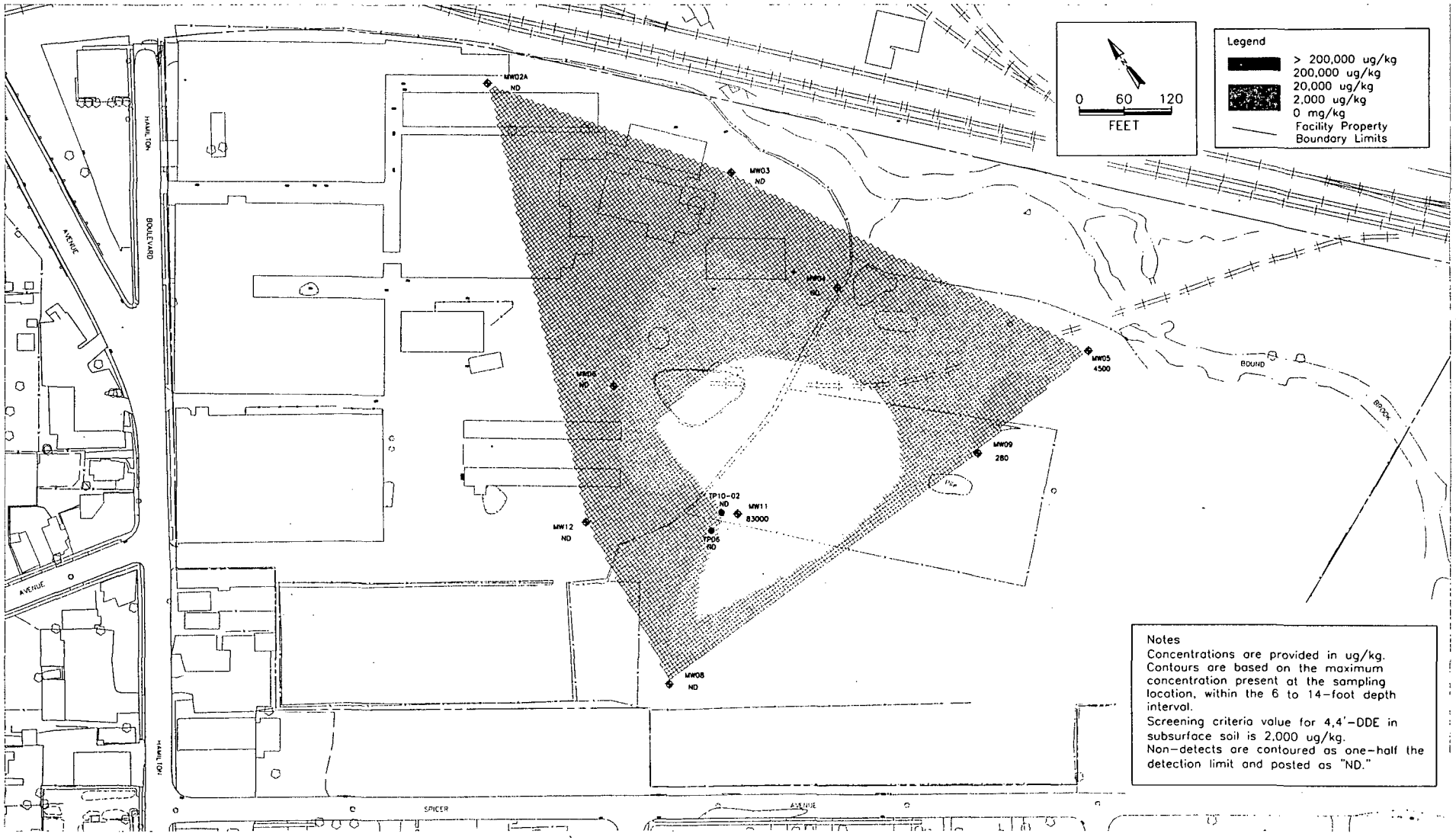


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Aldrin Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/26/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-39	
DES.: LEN	APPD: LH		

300221

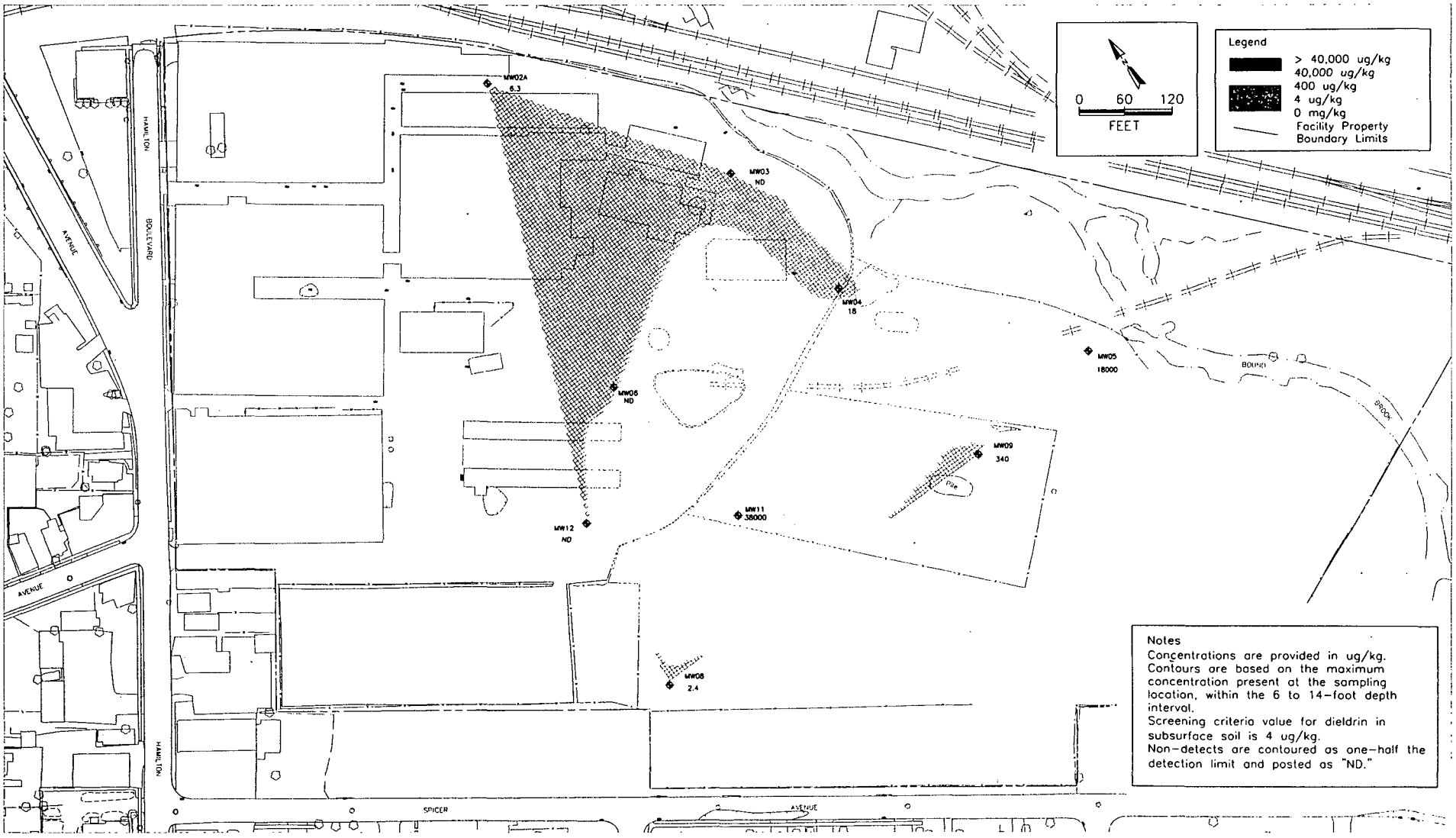


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of 4,4-DDE Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/26/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-40	
DES.: LEN	APPD: LH		

300222

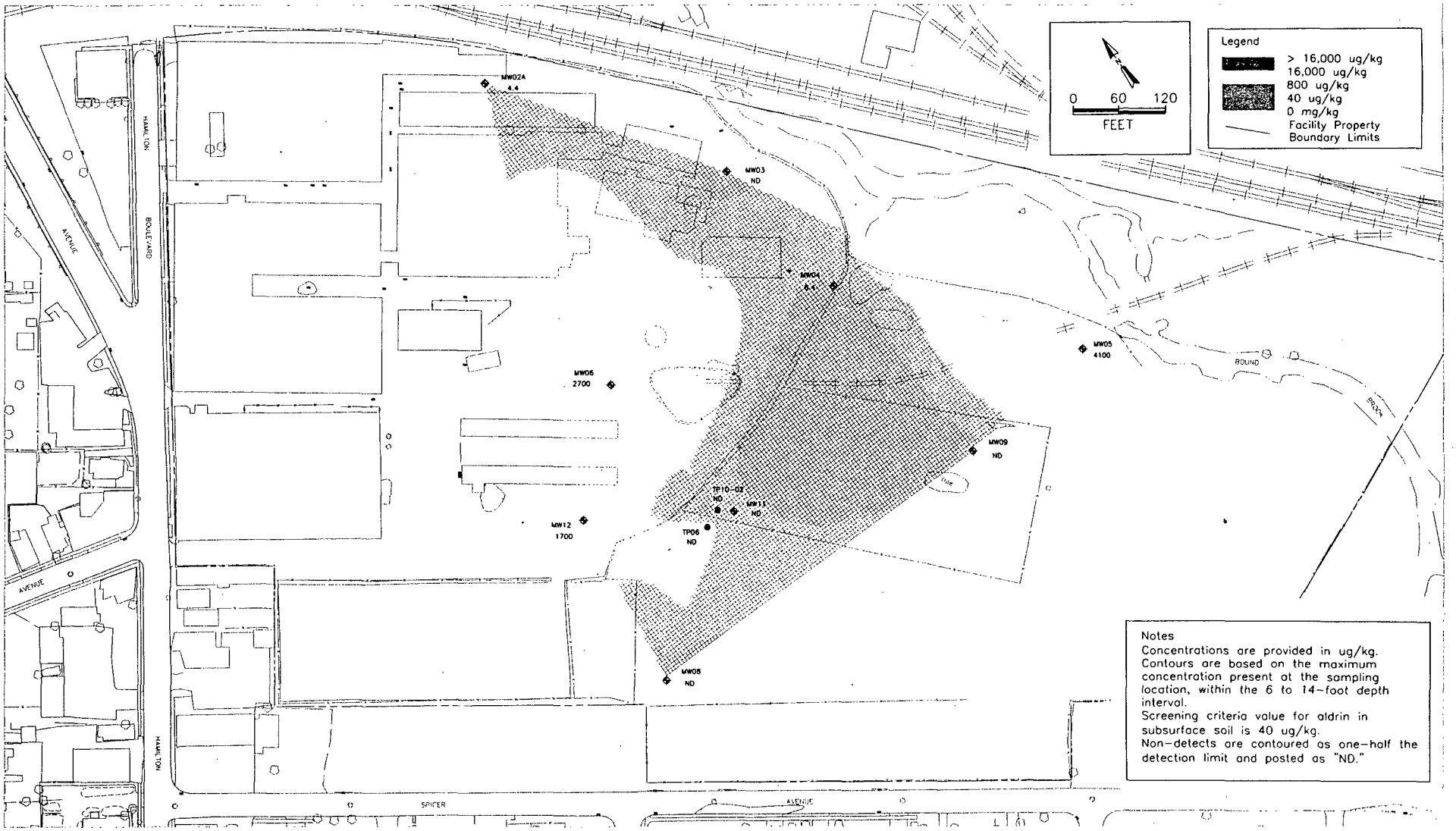


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Dieldrin Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
LEN	07/26/01	1945.1018
CHKD:	REV.:	FIGURE NO.:
JG	0	4-41
DES.:	APPD:	
LEN	LH	

300223

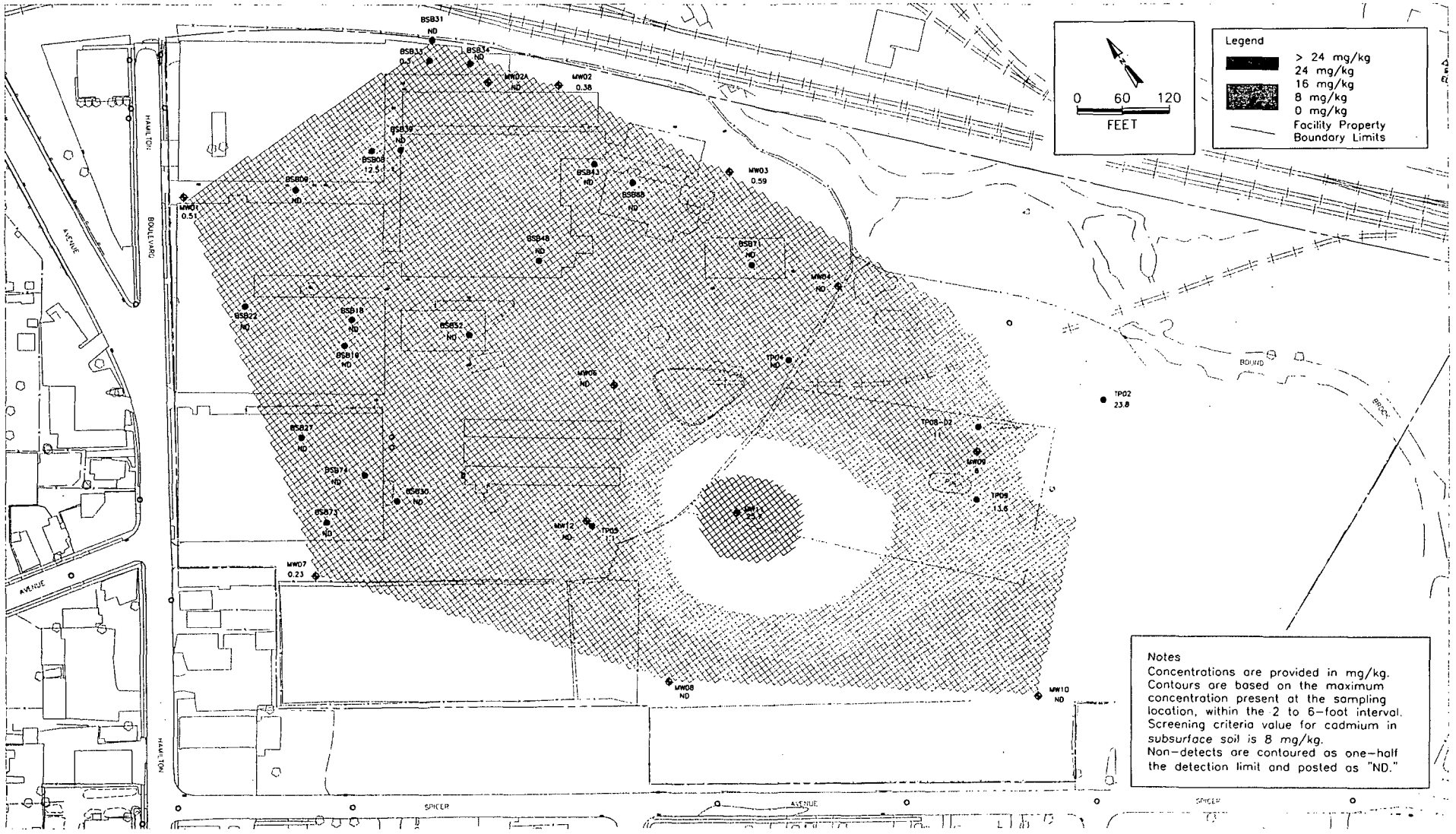


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Aldrin Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 07/26/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-42	
DES.: LEN	APPD: LH		

300224

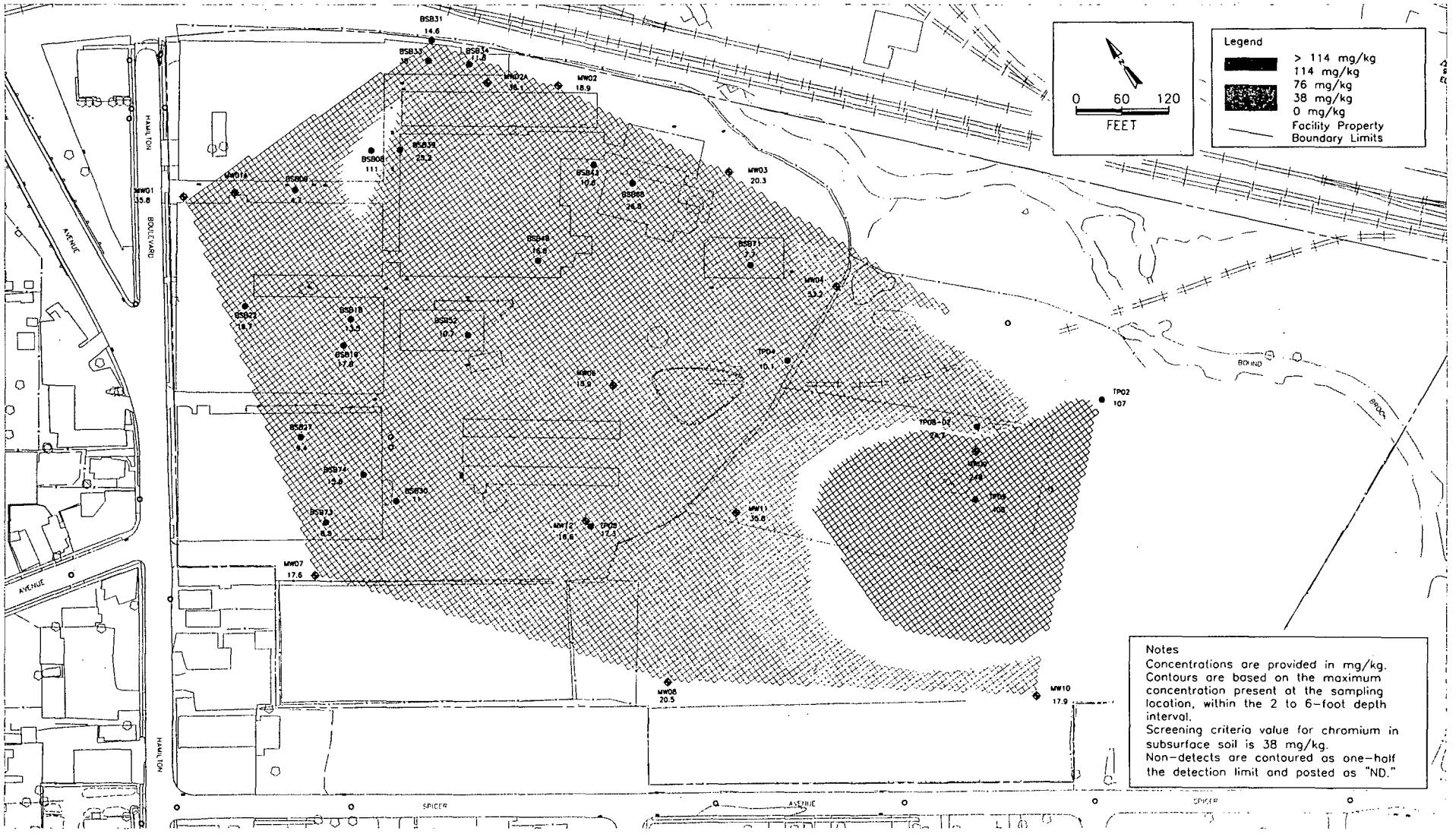


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Cadmium Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/02/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-43	
DES.: LEN	APPD: LH		

300225

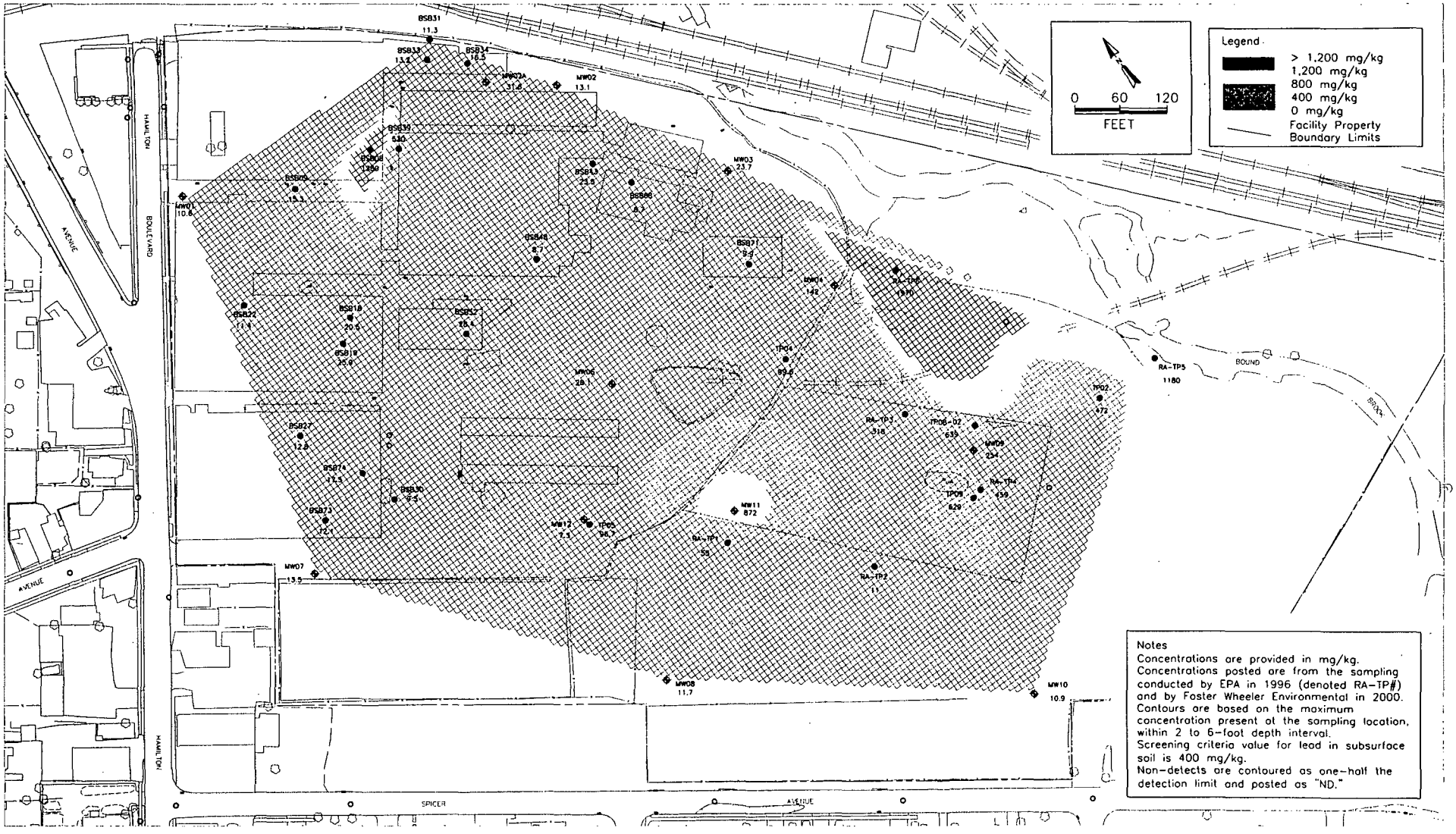


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Chromium Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/02/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-44	
DES.: LEN	APPD: LH		

300226

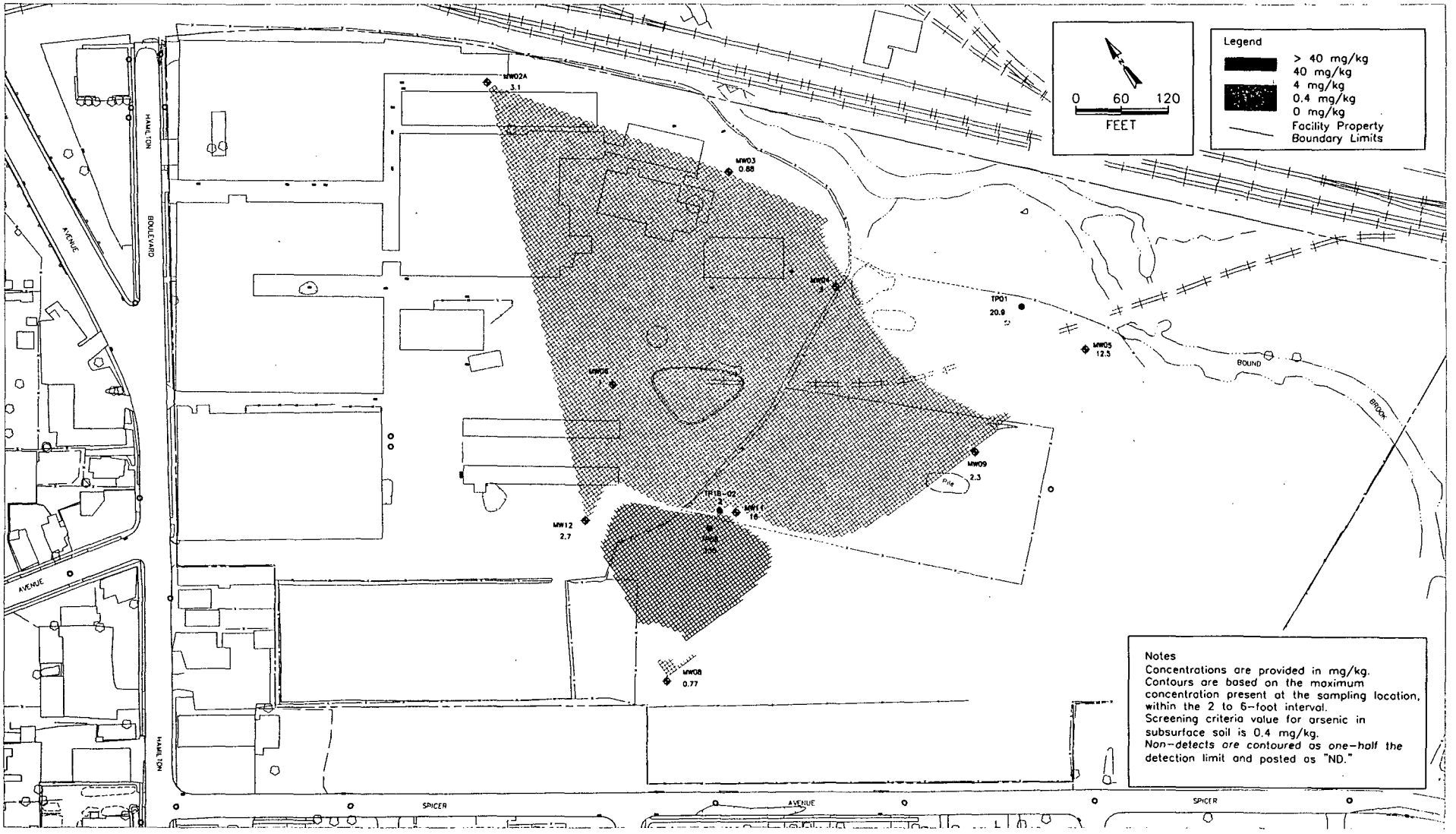


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Lead Contamination in Subsurface (2 to 6 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/02/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-45	
DES.: LEN	APPD: LH		

300227

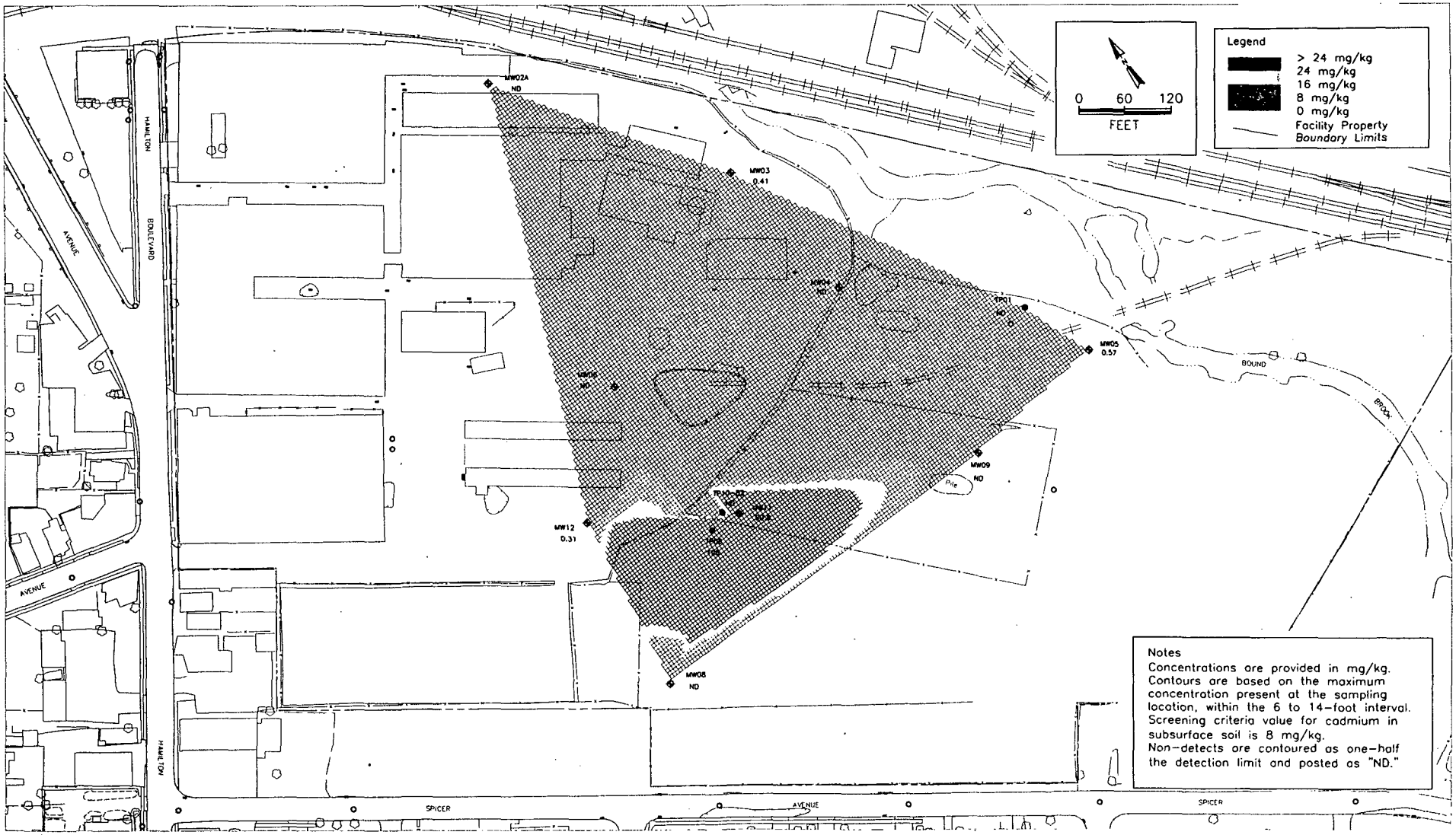


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Arsenic Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/02/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-46	
DES.: LEN	APPD: LH		

300228

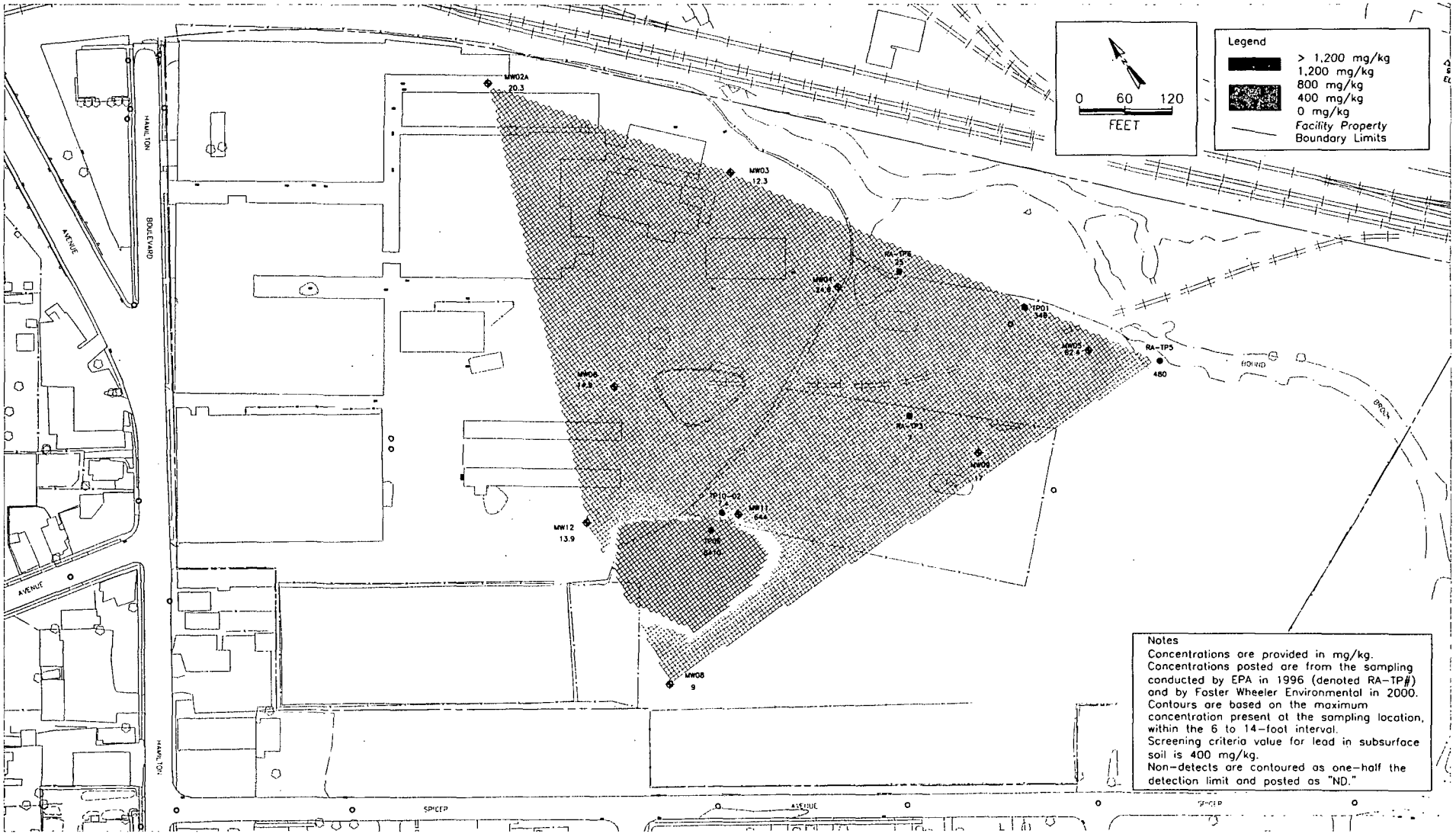


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Cadmium Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/02/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-47	
DES.: LEN	APPD: LH		

300229

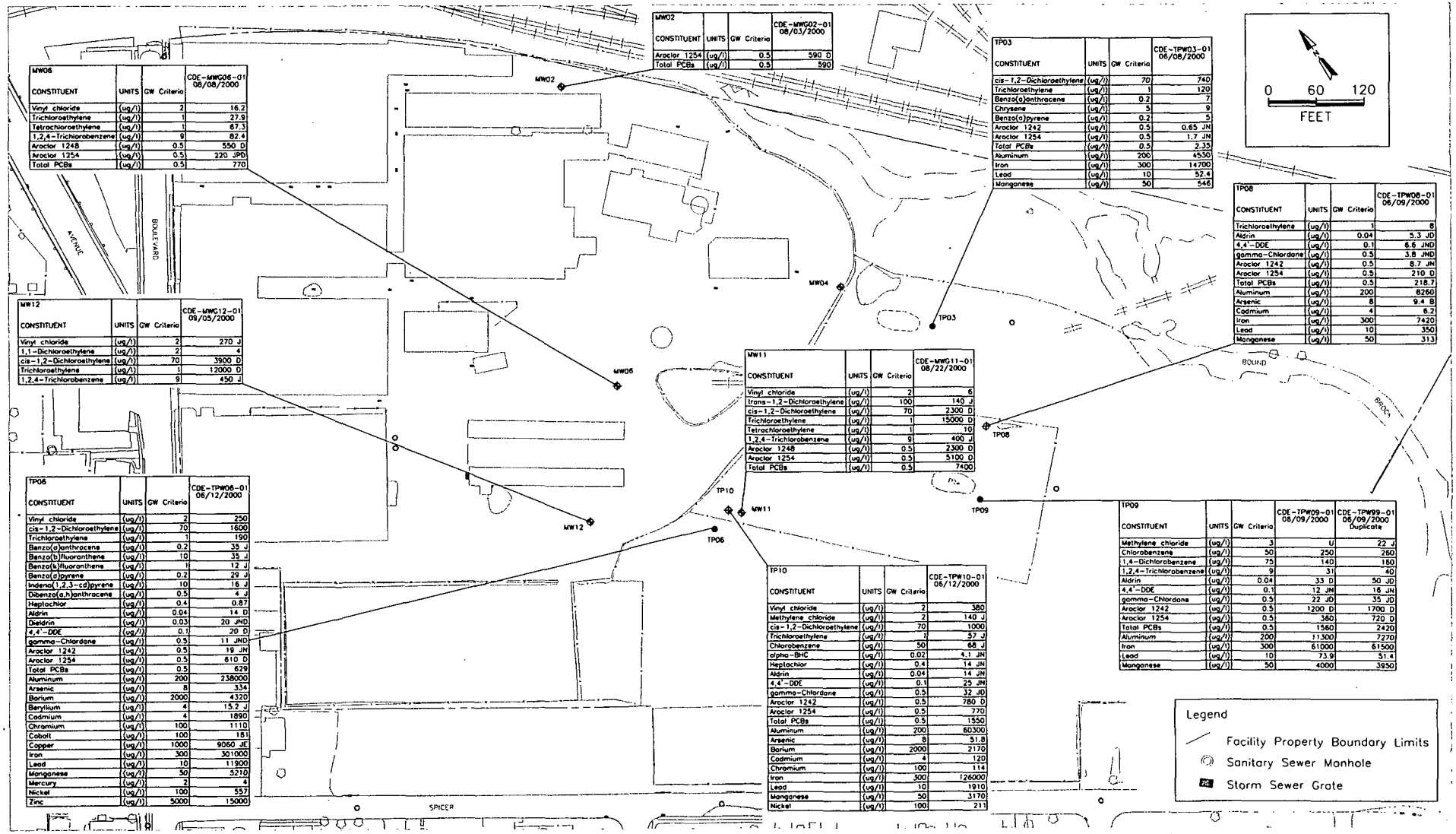


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Lead Contamination in Subsurface (6 to 14 feet bgs) Soil
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
LEN	08/02/01	1945.1018
CHKD:	REV.:	FIGURE NO.:
JG	0	4-48
DES.:	APPD:	
LEN	LH	

300230



MW06 CONSTITUENT	UNITS	GW Criteria	CDE-MWG06-01 08/08/2000
Vinyl chloride	(ug/l)	2	16.2
Trichloroethylene	(ug/l)	1	27.9
Tetrachloroethylene	(ug/l)	1	67.3
1,2,4-Trichlorobenzene	(ug/l)	9	82.4
Aroclor 1248	(ug/l)	0.5	550 D
Aroclor 1254	(ug/l)	0.5	220 JPD
Total PCBs	(ug/l)	0.5	770

MW02 CONSTITUENT	UNITS	GW Criteria	CDE-MWG02-01 08/03/2000
Aroclor 1254	(ug/l)	0.5	590 D
Total PCBs	(ug/l)	0.5	590

TP03 CONSTITUENT	UNITS	GW Criteria	CDE-TPW03-01 06/08/2000
cis-1,2-Dichloroethylene	(ug/l)	70	740
Trichloroethylene	(ug/l)	1	120
Benzo(a)anthracene	(ug/l)	0.2	7
Chrysene	(ug/l)	5	9
Benzo(a)pyrene	(ug/l)	0.2	5
Aroclor 1242	(ug/l)	0.5	0.65 JN
Aroclor 1254	(ug/l)	0.5	1.7 JN
Total PCBs	(ug/l)	0.5	2.35
Aluminum	(ug/l)	200	4550
Iron	(ug/l)	300	14700
Lead	(ug/l)	10	52.4
Manganese	(ug/l)	50	546

TP08 CONSTITUENT	UNITS	GW Criteria	CDE-TPW08-01 06/09/2000
Trichloroethylene	(ug/l)	1	8
Aldrin	(ug/l)	0.04	5.3 JD
4,4'-DDE	(ug/l)	0.1	6.6 JND
gamma-Chlordane	(ug/l)	0.5	3.8 JND
Aroclor 1242	(ug/l)	0.5	8.7 JN
Aroclor 1254	(ug/l)	0.5	210 D
Total PCBs	(ug/l)	0.5	218.7
Aluminum	(ug/l)	200	8260
Arsenic	(ug/l)	8	9.4 B
Cadmium	(ug/l)	4	6.2
Iron	(ug/l)	300	7420
Lead	(ug/l)	10	350
Manganese	(ug/l)	50	313

MW12 CONSTITUENT	UNITS	GW Criteria	CDE-MWG12-01 09/05/2000
Vinyl chloride	(ug/l)	2	270 J
1,1-Dichloroethylene	(ug/l)	2	4
cis-1,2-Dichloroethylene	(ug/l)	70	3900 D
Trichloroethylene	(ug/l)	1	12000 D
1,2,4-Trichlorobenzene	(ug/l)	9	450 J

MW11 CONSTITUENT	UNITS	GW Criteria	CDE-MWG11-01 08/22/2000
Vinyl chloride	(ug/l)	2	6
trans-1,2-Dichloroethylene	(ug/l)	100	140 J
cis-1,2-Dichloroethylene	(ug/l)	70	2300 D
Trichloroethylene	(ug/l)	1	15000 D
Tetrachloroethylene	(ug/l)	1	10
1,2,4-Trichlorobenzene	(ug/l)	9	400 J
Aroclor 1248	(ug/l)	0.5	2300 D
Aroclor 1254	(ug/l)	0.5	5100 D
Total PCBs	(ug/l)	0.5	7400

TP06 CONSTITUENT	UNITS	GW Criteria	CDE-TPW06-01 06/12/2000
Vinyl chloride	(ug/l)	2	250
cis-1,2-Dichloroethylene	(ug/l)	70	1600
Trichloroethylene	(ug/l)	1	190
Benzo(a)anthracene	(ug/l)	0.2	35 J
Benzo(b)fluoranthene	(ug/l)	10	35 J
Benzo(k)fluoranthene	(ug/l)	1	12 J
Benzo(a)pyrene	(ug/l)	0.2	29 J
Indeno(1,2,3-cd)pyrene	(ug/l)	10	16 J
Dibenzo(a,h)anthracene	(ug/l)	0.5	4 J
Heptachlor	(ug/l)	0.4	0.87
Aldrin	(ug/l)	0.04	14 D
Dieldrin	(ug/l)	0.03	20 JND
4,4'-DDE	(ug/l)	0.1	20 D
gamma-Chlordane	(ug/l)	0.5	11 JND
Aroclor 1242	(ug/l)	0.5	19 JN
Aroclor 1254	(ug/l)	0.5	610 D
Total PCBs	(ug/l)	0.5	629
Aluminum	(ug/l)	200	238000
Arsenic	(ug/l)	8	334
Barium	(ug/l)	2000	4320
Beryllium	(ug/l)	4	15.2 J
Cadmium	(ug/l)	4	1890
Chromium	(ug/l)	100	1110
Cobalt	(ug/l)	100	151
Copper	(ug/l)	1000	9060 JE
Iron	(ug/l)	300	301000
Lead	(ug/l)	10	11900
Manganese	(ug/l)	50	5210
Mercury	(ug/l)	2	4
Nickel	(ug/l)	100	557
Zinc	(ug/l)	5000	15000

TP10 CONSTITUENT	UNITS	GW Criteria	CDE-TPW10-01 06/12/2000
Vinyl chloride	(ug/l)	2	380
Methylene chloride	(ug/l)	2	140 J
cis-1,2-Dichloroethylene	(ug/l)	70	1000
Trichloroethylene	(ug/l)	1	57 J
Chlorobenzene	(ug/l)	50	68 J
alpha-BHC	(ug/l)	0.02	4.1 JN
Heptachlor	(ug/l)	0.4	14 JN
Aldrin	(ug/l)	0.04	14 JN
4,4'-DDE	(ug/l)	0.1	25 JN
gamma-Chlordane	(ug/l)	0.5	32 JD
Aroclor 1242	(ug/l)	0.5	780 D
Aroclor 1254	(ug/l)	0.5	770
Total PCBs	(ug/l)	0.5	1550
Aluminum	(ug/l)	200	60300
Arsenic	(ug/l)	8	51.8
Barium	(ug/l)	2000	2170
Cadmium	(ug/l)	4	120
Chromium	(ug/l)	100	114
Iron	(ug/l)	300	126000
Lead	(ug/l)	10	1910
Manganese	(ug/l)	50	3170
Nickel	(ug/l)	100	211

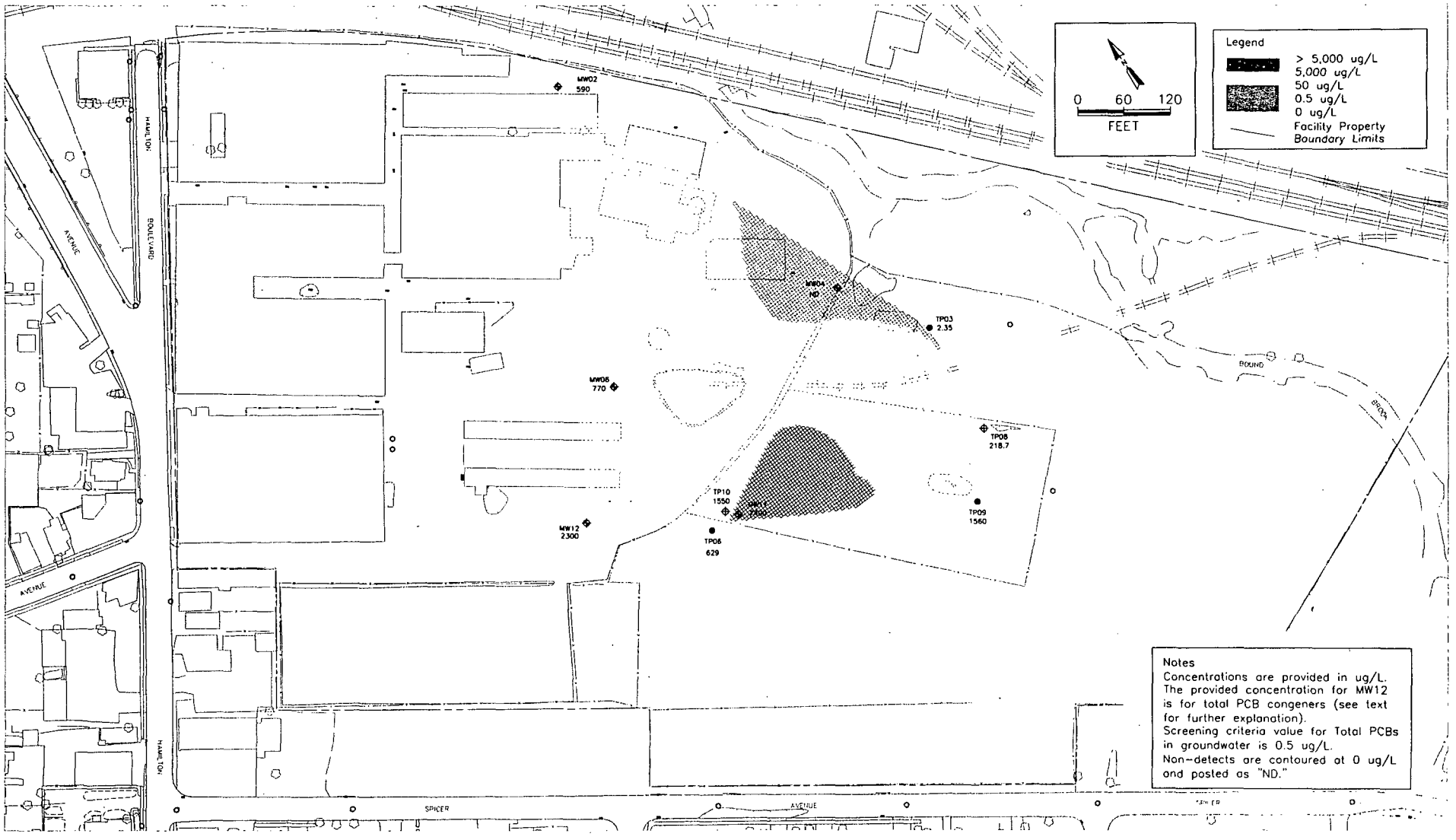
TP09 CONSTITUENT	UNITS	GW Criteria	CDE-TPW09-01 08/09/2000	CDE-TPW99-01 06/09/2000 Duplicate
Methylene chloride	(ug/l)	3	U	22 J
Chlorobenzene	(ug/l)	50	250	260
1,4-Dichlorobenzene	(ug/l)	75	140	180
1,2,4-Trichlorobenzene	(ug/l)	9	31	40
Aldrin	(ug/l)	0.04	33 D	50 JD
4,4'-DDE	(ug/l)	0.1	12 JN	16 JN
gamma-Chlordane	(ug/l)	0.5	22 JD	35 JD
Aroclor 1242	(ug/l)	0.5	1200 D	1700 D
Aroclor 1254	(ug/l)	0.5	360	720 D
Total PCBs	(ug/l)	0.5	1560	2420
Aluminum	(ug/l)	200	11300	7270
Iron	(ug/l)	300	61000	61500
Lead	(ug/l)	10	73.9	51.4
Manganese	(ug/l)	50	4000	3950

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Constituents Exceeding Screening Criteria in Perched Water
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.:	DATE:	PROJECT NO.:
CTS	12/06/02	1945.1018
CHKD: JG	REV.: 1	FIGURE NO.: 4-49
DES.: LEN	APPD: LH	

300231

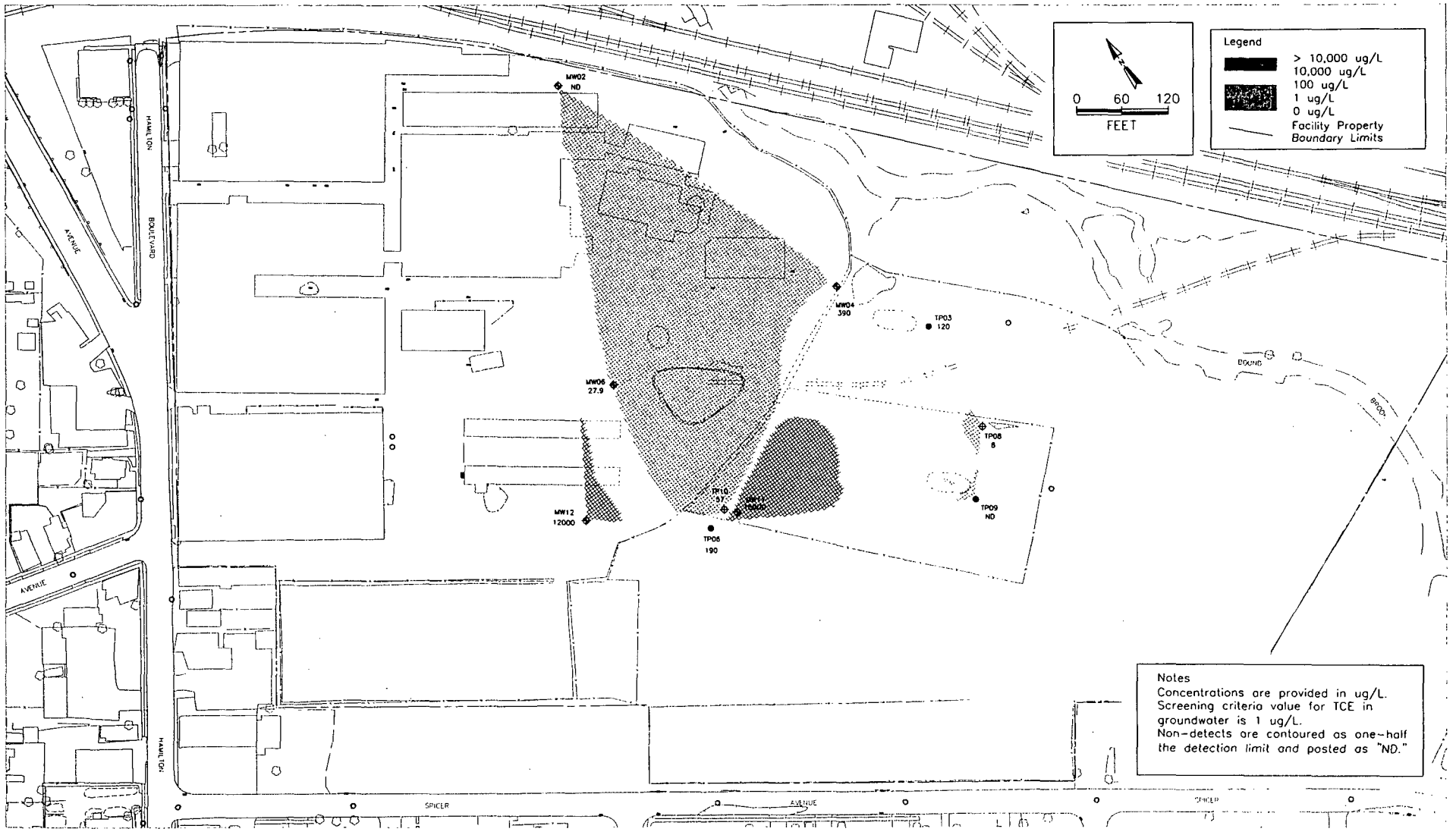


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of Total PCB Contamination in Perched Water
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/22/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-50	
DES.: LEN	APPD: LH		

300232

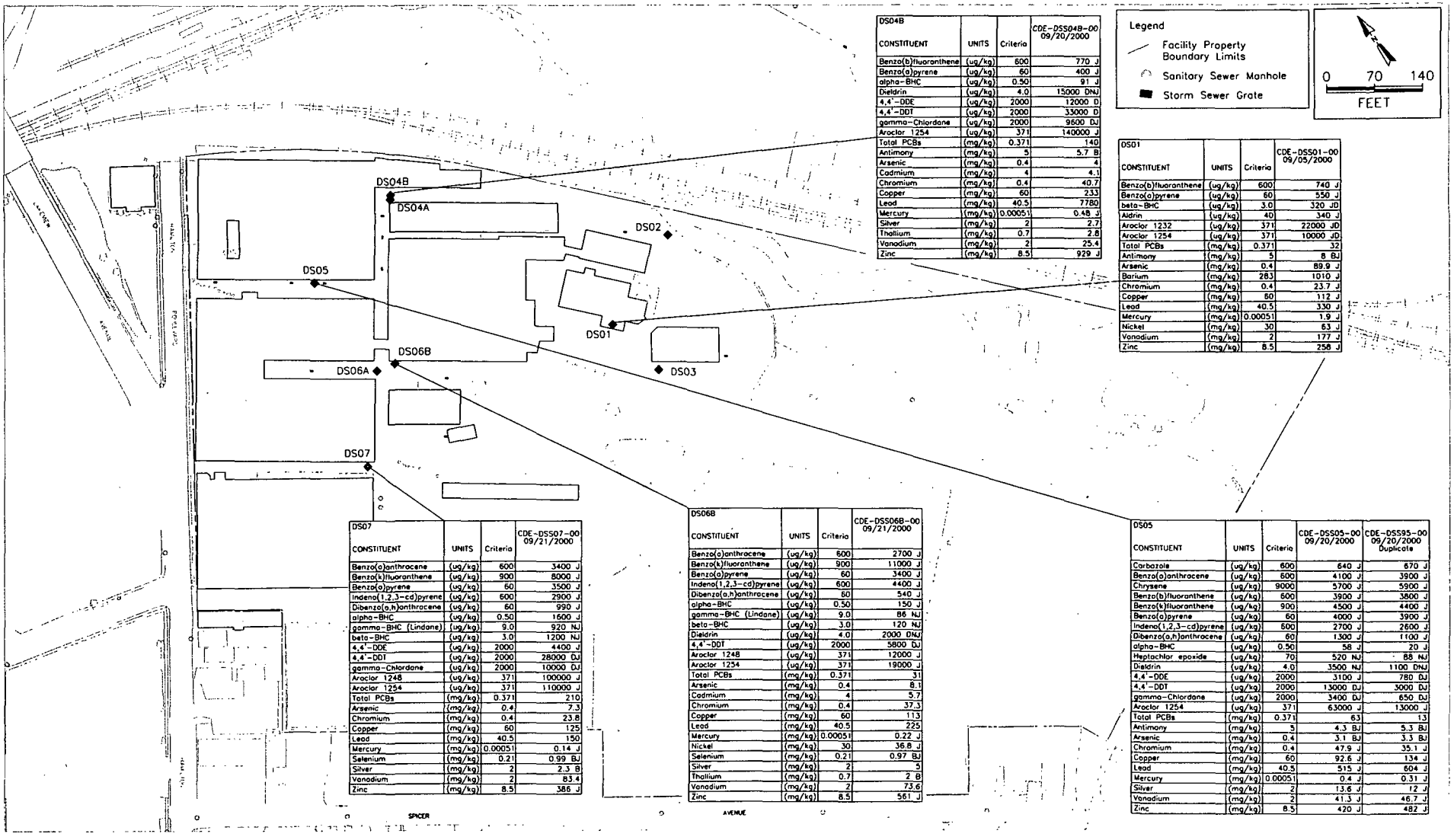


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Horizontal Extent of TCE Contamination in Perched Water
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/22/01	PROJECT NO.: 1945.1018	
CHKD: JG	REV.: 0	FIGURE NO.: 4-51	
DES.: LEN	APPD: LH		

300233



DS04B CONSTITUENT	UNITS	Criteria	CDE-DSS04B-00 09/20/2000
Benzo(b)fluoranthene	(ug/kg)	600	770 J
Benzo(a)pyrene	(ug/kg)	60	400 J
alpha-BHC	(ug/kg)	0.50	91 J
Dieldrin	(ug/kg)	4.0	15000 DNJ
4,4'-DDE	(ug/kg)	2000	12000 D
4,4'-DDT	(ug/kg)	2000	33000 D
gamma-Chlordane	(ug/kg)	2000	9600 DJ
Aroclor 1254	(ug/kg)	371	140000 J
Total PCBs	(mg/kg)	0.371	140
Antimony	(mg/kg)	5	5.7 B
Arsenic	(mg/kg)	0.4	4
Cadmium	(mg/kg)	4	4.1
Chromium	(mg/kg)	0.4	40.7
Copper	(mg/kg)	60	233
Lead	(mg/kg)	40.5	7780
Mercury	(mg/kg)	0.00051	0.48 J
Silver	(mg/kg)	2	2.7
Thallium	(mg/kg)	0.7	2.8
Vanadium	(mg/kg)	2	25.4
Zinc	(mg/kg)	8.5	929 J

DS01 CONSTITUENT	UNITS	Criteria	CDE-DSS01-00 09/05/2000
Benzo(b)fluoranthene	(ug/kg)	600	740 J
Benzo(a)pyrene	(ug/kg)	60	550 J
beta-BHC	(ug/kg)	3.0	320 JD
Aldrin	(ug/kg)	40	340 J
Aroclor 1232	(ug/kg)	371	22000 JD
Aroclor 1254	(ug/kg)	371	10000 JD
Total PCBs	(mg/kg)	0.371	32
Antimony	(mg/kg)	5	8 BJ
Arsenic	(mg/kg)	0.4	89.9 J
Barium	(mg/kg)	283	1010 J
Chromium	(mg/kg)	0.4	23.7 J
Copper	(mg/kg)	60	112 J
Lead	(mg/kg)	40.5	330 J
Mercury	(mg/kg)	0.00051	1.9 J
Nickel	(mg/kg)	30	63 J
Vanadium	(mg/kg)	2	177 J
Zinc	(mg/kg)	8.5	258 J

DS07 CONSTITUENT	UNITS	Criteria	CDE-DSS07-00 09/21/2000
Benzo(a)anthracene	(ug/kg)	600	3400 J
Benzo(k)fluoranthene	(ug/kg)	900	8000 J
Benzo(a)pyrene	(ug/kg)	60	3500 J
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	2900 J
Dibenzo(a,h)anthracene	(ug/kg)	60	990 J
alpha-BHC	(ug/kg)	0.50	1600 J
gamma-BHC (Lindane)	(ug/kg)	9.0	920 NJ
beta-BHC	(ug/kg)	3.0	1200 NJ
4,4'-DDE	(ug/kg)	2000	4400 J
4,4'-DDT	(ug/kg)	2000	28000 DJ
gamma-Chlordane	(ug/kg)	2000	10000 DJ
Aroclor 1248	(ug/kg)	371	100000 J
Aroclor 1254	(ug/kg)	371	110000 J
Total PCBs	(mg/kg)	0.371	210
Arsenic	(mg/kg)	0.4	7.3
Chromium	(mg/kg)	0.4	23.8
Copper	(mg/kg)	60	125
Lead	(mg/kg)	40.5	150
Mercury	(mg/kg)	0.00051	0.14 J
Selenium	(mg/kg)	0.21	0.99 BJ
Silver	(mg/kg)	2	2.3 B
Vanadium	(mg/kg)	2	83.4
Zinc	(mg/kg)	8.5	386 J

DS06B CONSTITUENT	UNITS	Criteria	CDE-DSS06B-00 09/21/2000
Benzo(a)anthracene	(ug/kg)	600	2700 J
Benzo(k)fluoranthene	(ug/kg)	900	11000 J
Benzo(a)pyrene	(ug/kg)	60	3400 J
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	4400 J
Dibenzo(a,h)anthracene	(ug/kg)	60	540 J
alpha-BHC	(ug/kg)	0.50	150 J
gamma-BHC (Lindane)	(ug/kg)	9.0	86 NJ
beta-BHC	(ug/kg)	3.0	120 NJ
Dieldrin	(ug/kg)	4.0	2000 DNJ
4,4'-DDT	(ug/kg)	2000	5800 DJ
Aroclor 1248	(ug/kg)	371	12000 J
Aroclor 1254	(ug/kg)	371	19000 J
Total PCBs	(mg/kg)	0.371	31
Arsenic	(mg/kg)	0.4	8.1
Cadmium	(mg/kg)	4	5.7
Chromium	(mg/kg)	0.4	37.3
Copper	(mg/kg)	60	113
Lead	(mg/kg)	40.5	225
Mercury	(mg/kg)	0.00051	0.22 J
Nickel	(mg/kg)	30	36.8 J
Selenium	(mg/kg)	0.21	0.97 BJ
Silver	(mg/kg)	2	5
Thallium	(mg/kg)	0.7	2 B
Vanadium	(mg/kg)	2	73.6
Zinc	(mg/kg)	8.5	561 J

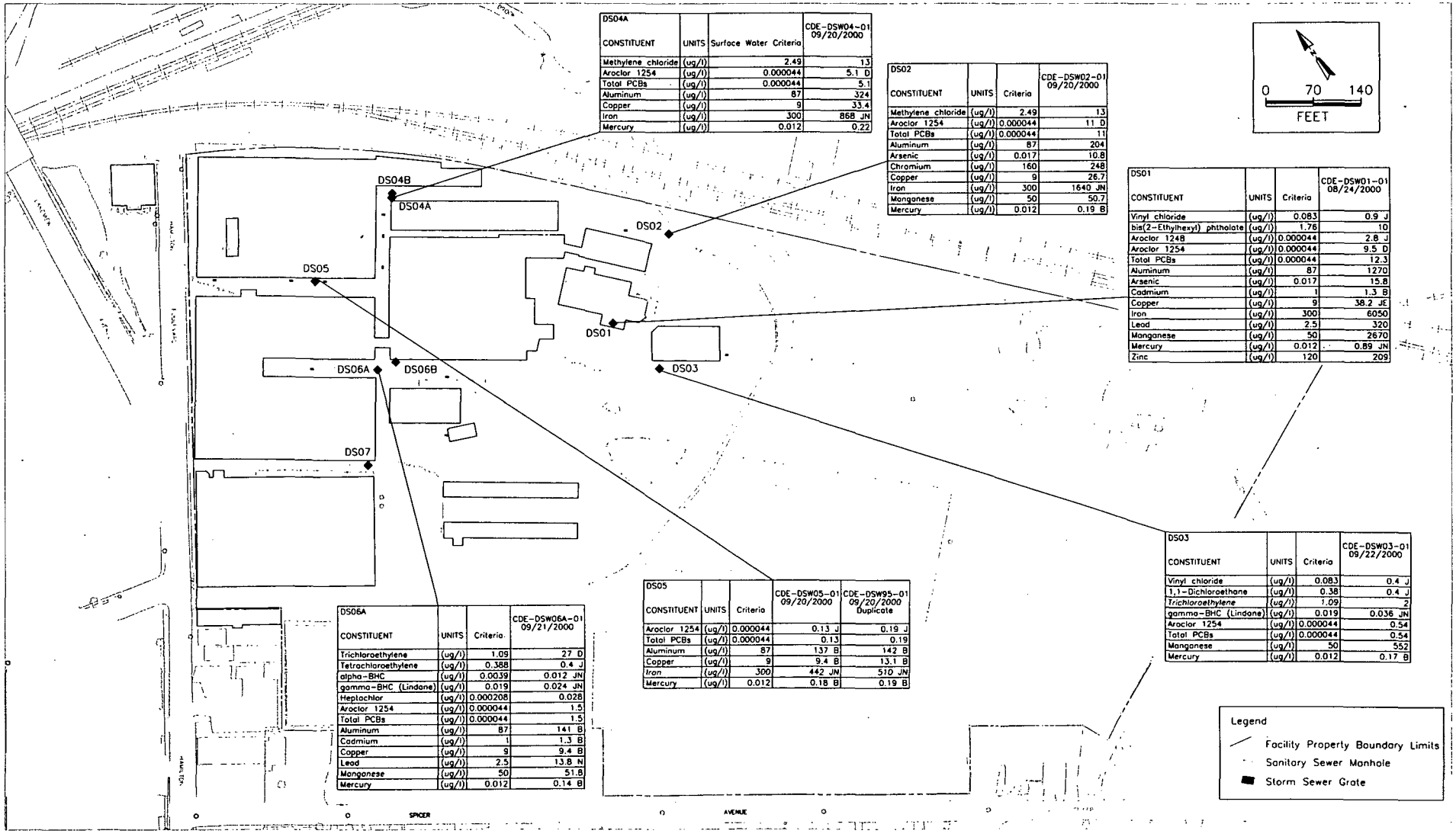
DS05 CONSTITUENT	UNITS	Criteria	CDE-DSS05-00 09/20/2000	CDE-DSS95-00 09/20/2000 Duplicate
Carbazole	(ug/kg)	600	640 J	670 J
Benzo(a)anthracene	(ug/kg)	600	4100 J	3900 J
Chrysene	(ug/kg)	9000	5700 J	5900 J
Benzo(b)fluoranthene	(ug/kg)	600	3900 J	3800 J
Benzo(k)fluoranthene	(ug/kg)	900	4500 J	4400 J
Benzo(a)pyrene	(ug/kg)	60	4000 J	3900 J
Indeno(1,2,3-cd)pyrene	(ug/kg)	600	2700 J	2600 J
Dibenzo(a,h)anthracene	(ug/kg)	60	1300 J	1100 J
alpha-BHC	(ug/kg)	0.50	58 J	20 J
Heptachlor epoxide	(ug/kg)	70	520 NJ	88 NJ
Dieldrin	(ug/kg)	4.0	3500 NJ	1100 DNJ
4,4'-DDE	(ug/kg)	2000	3100 J	780 DJ
4,4'-DDT	(ug/kg)	2000	13000 DJ	3000 DJ
gamma-Chlordane	(ug/kg)	2000	3400 DJ	650 DJ
Aroclor 1254	(ug/kg)	371	63000 J	13000 J
Total PCBs	(mg/kg)	0.371	63	13
Antimony	(mg/kg)	5	4.3 BJ	5.3 BJ
Arsenic	(mg/kg)	0.4	3.1 BJ	3.3 BJ
Chromium	(mg/kg)	0.4	47.9 J	35.1 J
Copper	(mg/kg)	60	92.6 J	134 J
Lead	(mg/kg)	40.5	515 J	604 J
Mercury	(mg/kg)	0.00051	0.4 J	0.31 J
Silver	(mg/kg)	2	13.6 J	12 J
Vanadium	(mg/kg)	2	41.3 J	46.7 J
Zinc	(mg/kg)	8.5	420 J	482 J

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Constituents Exceeding Screening Criteria in Drainage System Sediments
Cornell-Dubilier Electronics Superfund Site
RI Report of Facility Buildings and Soil

DWN.: CTS	DATE: 08/21/02	PROJECT NO.: 1945.1018
CHKD: JG	REV.: 1	FIGURE NO.: 4-52
DES.: LEN	APPD: LH	

300234



DS04A CONSTITUENT	UNITS	Surface Water Criteria	CDE-DSW04-01 09/20/2000
Methylene chloride	(ug/l)	2.49	13
Aroclor 1254	(ug/l)	0.000044	5.1 D
Total PCBs	(ug/l)	0.000044	5.1
Aluminum	(ug/l)	87	324
Copper	(ug/l)	9	33.4
Iron	(ug/l)	300	868 JN
Mercury	(ug/l)	0.012	0.22

DS02 CONSTITUENT	UNITS	Criteria	CDE-DSW02-01 09/20/2000
Methylene chloride	(ug/l)	2.49	13
Aroclor 1254	(ug/l)	0.000044	11 D
Total PCBs	(ug/l)	0.000044	11
Aluminum	(ug/l)	87	204
Arsenic	(ug/l)	0.017	10.8
Chromium	(ug/l)	160	248
Copper	(ug/l)	9	26.7
Iron	(ug/l)	300	1640 JN
Manganese	(ug/l)	50	50.7
Mercury	(ug/l)	0.012	0.19 B

DS01 CONSTITUENT	UNITS	Criteria	CDE-DSW01-01 08/24/2000
Vinyl chloride	(ug/l)	0.083	0.9 J
bis(2-Ethylhexyl) phthalate	(ug/l)	1.76	10
Aroclor 1248	(ug/l)	0.000044	2.8 J
Aroclor 1254	(ug/l)	0.000044	9.5 D
Total PCBs	(ug/l)	0.000044	12.3
Aluminum	(ug/l)	87	1270
Arsenic	(ug/l)	0.017	15.8
Cadmium	(ug/l)	1	1.3 B
Copper	(ug/l)	9	38.2 JE
Iron	(ug/l)	300	6050
Lead	(ug/l)	2.5	320
Manganese	(ug/l)	50	2670
Mercury	(ug/l)	0.012	0.89 JN
Zinc	(ug/l)	120	209

DS03 CONSTITUENT	UNITS	Criteria	CDE-DSW03-01 09/22/2000
Vinyl chloride	(ug/l)	0.083	0.4 J
1,1-Dichloroethane	(ug/l)	0.38	0.4 J
Trichloroethylene	(ug/l)	1.09	2
gamma-BHC (Lindane)	(ug/l)	0.019	0.036 JN
Aroclor 1254	(ug/l)	0.000044	0.54
Total PCBs	(ug/l)	0.000044	0.54
Manganese	(ug/l)	50	552
Mercury	(ug/l)	0.012	0.17 B

DS05 CONSTITUENT	UNITS	Criteria	CDE-DSW05-01 09/20/2000	CDE-DSW95-01 09/20/2000 Duplicate
Aroclor 1254	(ug/l)	0.000044	0.13 J	0.19 J
Total PCBs	(ug/l)	0.000044	0.13	0.19
Aluminum	(ug/l)	87	137 B	142 B
Copper	(ug/l)	9	9.4 B	13.1 B
Iron	(ug/l)	300	442 JN	510 JN
Mercury	(ug/l)	0.012	0.18 B	0.19 B

DS06A CONSTITUENT	UNITS	Criteria	CDE-DSW06A-01 09/21/2000
Trichloroethylene	(ug/l)	1.09	27 D
Tetrachloroethylene	(ug/l)	0.388	0.4 J
alpha-BHC	(ug/l)	0.0039	0.012 JN
gamma-BHC (Lindane)	(ug/l)	0.019	0.024 JN
Heptachlor	(ug/l)	0.000208	0.028
Aroclor 1254	(ug/l)	0.000044	1.5
Total PCBs	(ug/l)	0.000044	1.5
Aluminum	(ug/l)	87	141 B
Cadmium	(ug/l)	1	1.3 B
Copper	(ug/l)	9	9.4 B
Lead	(ug/l)	2.5	13.8 N
Manganese	(ug/l)	50	51.8
Mercury	(ug/l)	0.012	0.14 B

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Constituents Exceeding Screening Criteria in Drainage System Water
Cornell-Dubilier Electronics Superfund Site
RI Report of Facility Buildings and Soil

DWN.:	DATE:	PROJECT NO.:
CTS	05/17/01	1945.1018
CHKD:	REV.:	FIGURE NO.:
JG	0	4-53
DES.:	APPD:	
LEN	LH	

300236

5.0 CONTAMINANT FATE AND TRANSPORT

This section discusses environmental fate and transport processes that may influence chemical contaminant distributions at the former Cornell-Dubilier Electronics facility property. Environmental fate processes are considered generically and in terms of key site-specific contaminants of concern and migration pathways. The discussion focuses primarily on contaminant migration with respect to facility soils and buildings. Contaminant environmental fate and transport processes for other matrices associated with the site (i.e., groundwater, surface water and sediments, biota) are not discussed in detail in this section; however, they are mentioned briefly where appropriate only in the context of how they relate to historic data and the facility soils, drainage system, and buildings findings to complete a potential contaminant migration pathway. The potential migration pathway discussions for these other matrices will be addressed in further detail in a future report (OU-3) after additional site investigations are completed.

An understanding of the environmental fate and potential transport mechanisms of the contaminants present at the facility is necessary to determine the potential for continued on-site and off-site migration and to assess the potential for exposure to the contaminants.

Two major characteristics affecting the fate and transport of a chemical are the mobility and the persistence of the chemical in environmental media.

Mobility is the tendency of a chemical to migrate through the environment. Mobility is controlled by both the physicochemical environment at a site and the behavioral characteristics of individual chemicals. Important factors controlling the physicochemical environment of a site include the local climate, configuration of surface water and groundwater bodies, and nature of underlying soils and bedrock. Factors that control the behavior of individual chemicals include aqueous solubility, the susceptibility of a chemical to sorption, volatility, and the interactions that various chemicals have on each other (i.e., complexes and competition for sorption sites, co-solvent effects, etc.).

Persistence is the tendency of a chemical to remain in the environment. Persistence is influenced by many of the factors affecting chemical mobility, including solubility, sorption, and volatility, but is also a function of oxidation rates, hydrolytic and photolytic reactions, and biochemical processes (such as biodegradation and bioaccumulation).

Major physical/chemical and biological factors affecting the environmental fate and transport of chemicals are briefly defined below:

Solubility is the measure of a chemical's ability to dissolve in a solvent and is expressed in units of chemical mass per unit volume of solvent (e.g., ug/L or mg/L). Aqueous solubility is an important determinant of chemical concentration and residence time in water. Highly soluble chemicals readily dissolve in water and remain in solution, whereas chemicals having low solubility tend to be unstable in solution. In addition, solubility often predicts the ease with which chemicals are leached from wastes and soils.

Volatilization describes the movement of a chemical from the surface of a liquid or solid matrix to a gas or vapor phase. Only the neutral (uncharged) form of a chemical can volatilize, and the

fraction of the chemical in the uncharged form may be calculated using pKa (acids) or pKb (bases) under site pH conditions. Volatilization is calculated from the equilibrium vapor pressure which is a measure of chemical solubility in air (when the initial chemical concentration is in the liquid phase). Volatilization losses to air are correlated with chemical concentration, molecular weight, solubility, and ambient temperature. Volatilization is a particularly important environmental fate process for chemicals having low aqueous solubility and polarity. Chemicals are described as readily, significantly, or limitedly volatilized based on the values of their Henry's Law constants (Lyman et. al., 1982). These values in atm-m^3/mol are $\geq 10^{-3}$, 10^{-3} to 10^{-5} and $< 10^{-5}$, respectively.

Sorption (adsorption/desorption) is the reversible binding of a chemical to a solid matrix. Both soluble nonpolar and insoluble chemicals usually adsorb strongly to sediments, suspended solids, and soils. Sorption of these constituents limits the fraction available for other fate processes such as volatilization and hydrolysis. Partition coefficients, which are important measures of sorptive characteristics, define the relative concentration of a given chemical in two phases or matrices.

Partition coefficients are expressed as concentration ratios; higher values indicate a greater tendency to associate with the non-aqueous phase. Partition coefficients useful in describing the environmental behavior of a chemical include K_{ow}, K_d, and K_{oc} and are defined:

K_{ow}: The octanol-water partition coefficient is the ratio of chemical concentration in octanol (organic solvent) to that in water at steady-state conditions.

K_d: Ratio of chemical concentration in aqueous and solid phases at steady-state conditions (usually applied to inorganic constituents).

K_{oc}: The organic carbon partition coefficient is the K_d normalized to the concentration of organic carbon in the solid phase. High K_{oc} values usually indicate a high tendency of a chemical to sorb to organic matter in soils or sediments.

Bioaccumulation is the accumulation and transport of a chemical through the food chain. The potential for bioaccumulation may be quantified by equilibrium bioconcentration factors (BCFs), which define the ratio of a chemical concentration in animal or plant tissue to the concentrations of the same chemical in the environmental media of contact. Organic chemicals with high BCFs (such as pesticides, PCBs, dioxin, etc.) are typically insoluble and lipophilic (non-polar) and, thus, tend to reside in animal fat tissue. Some heavy metals, notably mercury and silver, may also bioaccumulate. Literature values of BCFs most commonly pertain to fish species.

Biotransformation/biodegradation is the metabolic transformation of complex molecules into other chemicals/molecules by microorganisms. Products of biotransformation/biodegradation may or may not be toxic to other organisms, and these products may undergo further biotransformation/ biodegradation. Biological transformation includes a variety of enzyme-catalyzed reactions such as oxidation and reduction.

Hydrolysis is the reaction of a chemical with water or with hydrogen (H+) or hydroxyl (OH-) ions. These components of water interact with or attack sites of a chemical resulting in subsequent

breakdown or modification in the environment. The extent of chemical hydrolytic reactivity depends on both pH (acidity/alkalinity) and the molecular structure of the specific chemical.

Photolysis is a chemical decomposition process induced by radiant energy (sunlight). The rate of loss of a chemical from photochemical reactions depends on both its molecular structure and the proximity and character (i.e., wavelength) of the light source.

Oxidation is a chemical reaction which involves the removal of electrons from an element or compound. Conversely, electrons are added to chemical substrates in reduction reactions. Both oxidation and reduction reactions are environmentally significant in that they influence the mobility and fate of chemicals in environmental matrices. Oxidized and reduced forms of the same element or compound may have totally different chemical, ecological, and toxicological properties. For example, hexavalent chromium (i.e., Cr(+6)) is an oxidized valence state of chromium that is generally highly toxic, whereas trivalent chromium (i.e., Cr(+3)) is a reduced form of chromium that is generally less toxic. Oxidation-reduction reactions are commonly referred to as "redox" reactions.

This section of the Remedial Investigation Report for OU-2 focuses on the fate and transport processes that may affect contaminants associated with the former facility property for OU-2. Factors affecting environmental fate and transport processes are discussed and pertinent physicochemical data for the classes of chemicals of concern (i.e., identified as chemicals of potential concern (COPCs) in Section 6.0 and/or above screening criteria) at the former Cornell-Dubilier Electronics facility are summarized. Characteristics of specific compounds are elaborated upon where available and particularly relevant; however, due to the large number of chemicals detected in the on-site matrices sampled, the discussion that follows is focused on the general characteristics of the classes of chemical compounds/elements identified as COPCs and/or above screening criteria identified in Section 4.0. Therefore, for purposes of discussion, the detected chemicals of concern were grouped into six generalized classes sharing similar physicochemical and behavioral characteristics, and these classes are: 1) polychlorinated biphenyls: 2) polychorinated dioxins/furans, 3) volatile organics, 4) pesticides, 5) semi-volatile organics, and 6) metals/cyanide.

Sections 5.1 through 5.6 discuss the environmental processes driving the environmental fate of the chemical classes of PCBs, polychorinated dioxins/furans, volatile organics, pesticides, semi-volatile organics, and metals/cyanide, respectively. The sections introduce sources of compounds within the chemical class and briefly account for their presence and/or occurrence at the facility. Each section includes a class-specific table which summarizes the principal data used to predict the environmental fate and transport of chemicals within that class. Summarizing available environmental fate and transport data for the class-specific contaminants detected during the OU-2 investigation, the tables include: water solubility, vapor pressure and Henry's Law constants (specific to volatilization rates), photolytic, hydrolytic, and oxidation rates (where available), adsorption factors (K_{oc} and log K_{ow}), and known biodegradation/bioaccumulation rates/factors (BCFs). The industrial nature of the facility, coupled with the focus of this report solely on the facility building dust and soils and not on groundwater or nearby surface water/sediment, results in the bioaccumulation of chemicals detected at the facility, generally being insignificant. Bioaccumulation potential of chemicals detected during the OU-2 RI is discussed in the following sections only to complete the fate and transport profile for those chemicals detected. Sections 5.1 through 5.6 conclude with a summary of the anticipatable fate for each chemical class, given both chemical characteristics and the environmental features of

the property. In Section 5.7, specific transport and migration pathways that may affect the contaminants are discussed in light of both the data collected during the investigation and the relevant environmental characteristics of the site-related contaminants. Finally, Section 5.8 summarizes the contaminant fate and transport analysis findings.

5.1 Polychlorinated Biphenyls (PCBs)

5.1.1 PCBs: Sources and Background

PCBs are actually mixtures of numerous chlorinated biphenyl molecules that differ in both the number and/or position of chlorine atoms attached to the biphenyl rings (209 combinations possible) and degree of chlorination. To simplify nomenclature, common mixtures of PCBs were given names/identification numbers, such as Aroclor-1260 (60 percent Cl) or Aroclor-1248 (48 percent Cl). PCBs are stable, inert synthetic products used in a wide variety of commercial applications. Their dielectric properties result in them being excellent insulators. As a consequence, PCBs were used extensively in transformers and capacitors in the past, which when spilled, emptied or otherwise disposed of improperly, served as a major source of PCB contamination. Past operations and/or disposal practices at the facility have resulted in high concentrations of PCBs being present in on-site matrices.

5.1.2 PCBs: Chemical Characteristics

Table 5-1 summarizes the available data on environmental fate parameters for the detected PCBs.

PCBs: Solubility

PCBs exhibit low solubility in water primarily due to their aromaticity. Variations in individual PCB congener solubilities are due principally to differences in polarity (resulting from the position of the chlorine molecules on the biphenyl molecule and degree of chlorination). The aqueous solubilities of PCBs detected range from 5.7×10^{-2} mg/L to 3.4×10^{-1} mg/L (ATSDR, 2000). Although typically not a principal environmental fate process for PCBs in small scale aquatic systems, water column transport of dissolved PCBs can be significant in large, high volume and flow rivers (i.e., Hudson River). In these types of aquatic systems, PCBs are transported by bed lead, and as dissolved and particulate phase PCBs. Runoff and/or groundwater transport of dissolved PCBs in the water column can also be enhanced via co-solvent effects if more soluble (and hence more mobile) organic compounds are also present.

PCBs: Volatilization

Vapor pressures of the PCBs detected during the investigation range from 4.05×10^{-5} to 4.94×10^{-4} millimeters (mm) mercury. As shown on Table 5-1, Henry's Law constants for PCBs range from 5.20×10^{-4} to 4.60×10^{-3} atm-m^3/mole for the specific PCB Aroclors (1242, 1248, 1254, 1260) detected. These levels indicate that limited volatilization from contaminated matrices will be anticipated to occur, and thus volatilization is an environmental fate process at the site for PCBs and is one means by which the lesser chlorinated biphenyls are lost primarily from aquatic systems. In lakes, volatilization is a dominant fate-determining process for PCBs that occurs under ambient

environmental conditions with increased volatilization occurring during high mixing/low productivity periods (Eisler, 2000). Although limited, once volatilized, PCBs exist primarily in the vapor phase (Eisenreich et al., 1981), subject to rapid dilution by ambient air and atmospheric removal mechanisms which include physically mediated wet and dry deposition, with dry deposition occurring only for PCBs adsorbed to particulate phases.

PCBs: Sorption

Adsorption to soils/sediments or organic matter is a major environmental fate/transport process for PCBs detected at the facility. The pronounced tendency of PCBs to be adsorbed is reflected in the partition coefficients (high K_{oc} and log K_{ow} values) exhibited by these chlorinated biphenyls. The majority of K_{oc} values range from 6.30×10^3 to 6.70×10^6 and log K_{ow} values range from 5.6 to 6.8, as shown in Table 5-1. Among the Aroclors detected, the order of PCBs with respect to greatest adsorptive affinity is 1260 >1254 >1248 >1242.

PCBs: Bioaccumulation

PCBs are bioconcentrated in terrestrial plants and organisms, and other aquatic organisms to relatively high levels in some species (EPA, 1979a; Clark and Krynitsky, 1978; Henry et. al., 1981; Flemming et. al., 1983; Larsson, 1984; Rohrer et. al., 1982, Sawhney and Hawkin, 1984; PWRC, 2002). Algae and terrestrial macrophytes, invertebrates, fish, reptiles, birds mammals are all affected (PWRC, 2002). PCBs exhibit significant bioaccumulation in fish, with BCFs typically ranging from 6.00×10^2 to 2.70×10^5 L/kg. Note that the majority of bioaccumulation data refers to fish in direct contact with PCB-contaminated water. Lack of aquatic fish habitat on the facility property precludes this as a possible environmental fate of PCBs for OU-2. However, in the wetlands on the property and in the adjacent Bound Brook and its associated waterbodies, bioaccumulation is an extremely important environmental fate/transport process for site-related PCBs in aquatic organisms. Within terrestrial plants and organisms at the facility, bioaccumulation is an extremely important fate process.

PCBs: Biodegradation/Biotransformation

The PCBs detected are extremely resistant to biodegradation and biotransformation. Although degradation can occur, it typically proceeds at an extremely low rate. The resistance of PCBs to microbial degradation indicates that biodegradation/biotransformation is not a significant environmental fate removal process for the PCBs detected during the OU-2 investigation.

PCBs: Hydrolysis/Photolysis

PCBs are strongly bonded compounds which are not readily hydrolyzed (EPA, 1979a). PCBs may undergo photolysis in the atmosphere where they react with photo-chemically produced hydroxy radicals (EPA, 1979a). However, this is apparently a slow process, particularly for the highly chlorinated congeners (such as within Aroclors-1248, -1254, and -1260). Insufficient data are available to assess the importance of hydrolysis in aquatic systems. Hence, the extent to which photolysis factors into the ultimate environmental fate of PCBs has yet to be clearly defined.

PCBs: Oxidation

The PCBs associated with the former Cornell-Dubilier Electronics facility are relatively resistant to oxidation under normal environmental conditions. Consequently, oxidation is not considered a process which will affect the fate and transport of PCBs attributable to the facility.

5.1.3 PCBs: Summary

PCBs are highly persistent chemicals which strongly adsorb to soils, sediments, and organic matter, and sorption is the dominant environmental process affecting the fate of PCBs for OU-2. The relatively low water solubility of these chemical compounds indicates that, although it may occur to a very limited extent, groundwater transport is still a contributing mechanism affecting the fate of PCBs. Additionally, groundwater transport of small particles to which strongly sorbed PCBs adhere (i.e., colloids), and/or possibly enhanced migration caused by co-solvent effects exerted by more mobile organic contaminants and/or naturally occurring organic compounds (i.e., VOCs and/or humic/fluvic acids) in the water, may occur, which would further increase the importance of this mechanism. Similarly, the fate of PCBs within surface water would be dominated by sorption to the underlying sediments with transport within streams/rivers being primarily a physically based process mediated via sediment bed load transport mechanisms (i.e., erosion/deposition processes). Although transport in the water column of dissolved and particulate phase PCBs in surface waters can occur, it is assessed to be minimal within on-site water matrices due to their small size and low volume/flow, unless enhanced by co-solvent effects from other more mobile site-related contaminants. Volatilization can occur and it would primarily involve the lesser chlorinated PCBs. The processes of photolysis, hydrolysis, oxidation, and biodegradation are insignificant factors in determining the fate of these compounds either on- or off-site. Bioaccumulation in fish is assessed to be of minimal importance for OU-2 due to the lack of aquatic habitat directly on the facility property. However, within the wetlands on the property and immediately adjacent aquatic habitat (i.e., Bound Brook and its associated downstream waterbodies), bioaccumulation is an extremely important environmental fate process for site-related PCBs in aquatic organisms. Within terrestrial plants and organisms on the facility property, bioaccumulation is an extremely important fate process.

5.2 Polychlorinated Dioxins/Furans

5.2.1 Polychlorinated Dioxins/Furans: Sources and Background

The principal source of polychlorinated dioxins/furans in the environment is from the combustion of wastes and fuels. Dioxins/furans are also produced as by-products from other processes, such as pulp and paper or herbicide production. Low temperature combustion (i.e., <800°F) of PCBs or PCB-containing material (i.e., capacitors, transformers) also generates polychlorinated dioxins/furans and is the most probable source of these compounds at the facility.

Tetra-dioxin (TCDD) and other polychlorinated dioxin (PCDDs)/furan (PCDFs) isomers were detected in facility soils. In addition to the 2,3,7,8-isomer, several other PCDDs and PCDFs were also present. Environmental fate and transport data available for PCDDs and PCDFs are primarily limited to the 2,3,7,8-TCDD isomer. This "bias" in available data is due to the reduced toxic effects

exhibited by PCDD/PCDF isomers and congeners relative to TCDD. Thus, the following discussion of chemical characteristics is limited primarily to the most toxic dioxin compound 2,3,7,8-TCDD.

5.2.2 Polychlorinated Dioxins/Furans: Chemical Characteristics

Relevant data concerning the environmental fate and transport of 2,3,7,8-TCDD is summarized in Table 5-1.

Polychlorinated Dioxins/Furans: Solubility

Because dioxin exhibits a very low aqueous solubility (2.0×10^{-4} mg/L; EPA 1986), runoff and groundwater transport of dioxin would be expected to be a negligible environmental fate process if dioxin was the only contaminant present. However, in the presence of more water soluble organic co-contaminants, partitioning may occur between dioxin and the co-contaminants such that the solubility of dioxin within the water/co-contaminant mixture would increase (EPA, 1988c). Given the organic co-contaminants (i.e., primarily chlorinated solvents) present at the former Cornell-Dubilier Electronics facility, runoff and groundwater transport of dioxin may be enhanced and, as a result, be an important environmental fate process.

Polychlorinated Dioxins/Furans: Volatilization

Dioxin is capable of volatilizing, but as the vapor pressure and Henry's Law constant data in Table 5-1 indicate, volatilization from environmental matrices would be minimal. The vapor pressure of dioxin is 1.70×10^{-6} mm mercury and the Henry's Law constant is 3.60×10^{-5} atm-m^3/mole (EPA, 1986). These are relatively low volatilization rate constants, indicating that TCDD volatilization should not be a significant environmental fate process for OU-2.

Polychlorinated Dioxins/Furans: Sorption

Dioxin exhibits a very high affinity for sorbing to clay and organic matter (EPA, 1979a; EPA, 1988c; Arthur and Frea, 1989). This high affinity for organic matter is reflected in elevated K_{oc} (3.3×10^6 mL/g) and log K_{ow} (6.72) partition coefficients (EPA, 1986). Studies by Jackson et al. (1986) have indicated that increased soil electrolytes can increase soil adsorption of dioxin, whereas chlorinated organic co-contaminants can exert the opposite effect. Therefore, the significance of adsorption of dioxin to clay and/or organic matter in determining environmental fate may be countered by the antagonistic effects of chlorinated compounds (i.e., pesticides and volatile organics). Adsorption by soils followed by subsequent desorption via leaching into groundwater is a significant environmental fate process for dioxins.

Polychlorinated Dioxins/Furans: Bioaccumulation

Dioxin is bioconcentrated in terrestrial plants and aquatic organisms to relatively high levels in some species (EPA, 1979a; EPA, 1988c; Arthur and Frea, 1989). Bioconcentration studies have clearly shown that the 2,3,7,8 isomer is preferentially bioaccumulated over other dioxin congeners (EPA, 1988c). As Table 5-1 illustrates, the fish BCF for 2,3,7,8-TCDD is 6.60×10^4 L/kg (ATSDR, 1998). Dioxin has been shown conclusively to bioaccumulate in higher terrestrial organisms, but it has also

been shown to accumulate in plants with the greatest dioxin concentrations occurring in the roots and/or tubers of some plant species (Arthur and Frea, 1989). Bioaccumulation is therefore considered to be an important environmental fate process for dioxins.

Polychlorinated Dioxins/Furans: Biodegradation/Biotransformation

Microbial populations exhibit limited metabolism of dioxin (Arthur and Frea, 1989). The inability of microbial populations to metabolize dioxin apparently results from the lack of the enzymatic or biological potential to degrade the compound, rather than toxicity effects (Arthur and Frea, 1987; 1989). Recent studies (Barkovskii and Adriaens, 1998) have shown that model humic substances can promote the perilateral dechlorination of PCDD during biotic dechlorination of dioxins such that an increase of 2,3,7,8-TCDD concentrations may result. Further microbial activity resulted in additional dechorination to tri-, di-, and mono-CDDs. Biodegradation is therefore an environmental removal process for dioxin and under certain conditions (i.e., the presence of humic substances) can actually increase the concentration of 2,3,7,8-TCDD until additional microbial activity causes further dechlorination to less chlorinated isomers.

Polychlorinated Dioxins/Furans: Hydrolysis/Photolysis

Hydrolysis of dioxin does not occur (EPA, 1979a). Direct photodegradation or indirect photolysis of dioxins mediated through proton donor or hydroxyl radicals has been demonstrated under some conditions (EPA, 1988c; Arthur and Frea, 1989). However, in natural environments, photolytic degradation is generally considered to be an insignificant environmental fate process (EPA, 1988c; EPA, 1979a). Therefore, photolysis is not an important environmental fate and transport process.

Polychlorinated Dioxins/Furans: Oxidation

Dioxins are not readily oxidized in environmental matrices (EPA, 1979a). Thus, oxidation of dioxin is not an important environmental fate process.

5.2.3 Polychlorinated Dioxins/Furans: Summary

Dioxin is very persistent in the environment due to its low aqueous solubility, volatility, reactivity (i.e., susceptibility to photolysis, hydrolysis and oxidation), high resistance to microbial degradation, high sorptive affinity to clays and organic matter, and high bioaccumulation potential.

Sharing similar characteristics as to those for PCBs, dioxins/furans are highly persistent chemicals which strongly adsorb to soils, sediments, and organic matter, and sorption is the predominant environmental process affecting the fate of dioxins at the facility. The very low water solubility of these chemical compounds indicates that surface water and/or groundwater transport is not a driving mechanism affecting the fate of dioxin. However, groundwater transport of small particles to which strongly sorbed dioxin adhere (i.e., colloids), and/or possibly enhanced migration caused by co-solvent effects exerted by more mobile organic contaminants and/or naturally occurring organic compounds (i.e., VOCs and/or humic/fluvic acids) in the water, may occur, which would increase the importance of this mechanism. Similarly, the fate of dioxin within surface water would be dominated by sorption to the underlying sediments with transport within streams/rivers being

primarily a physically based process mediated via sediment bed load transport mechanisms (i.e., erosion/deposition processes). Although transport in the water column of surface waters is not expected, minimal amounts may enter the water, particularly if enhanced by co-solvent effects from other more mobile site-related contaminants. Very limited volatilization is expected. The processes of photolysis, hydrolysis, oxidation, and biodegradation are insignificant factors in determining the fate of these compounds either on- or off-site. Bioaccumulation in fish is assessed to be of minimal importance on the facility property due to the lack of aquatic habitat directly on-site. However, within the wetlands on the property and immediately adjacent aquatic habitat (i.e., Bound Brook), bioaccumulation is an extremely important environmental process for dioxin and its related compounds in aquatic organisms Within terrestrial plants and organisms on the property, bioaccumulation is an extremely important fate process.

5.3 Volatile Organics

Volatile organic compounds were detected in the soils, drainage system surface water and sediments, and perched groundwater sampled during the OU-2 field investigation. Of these, some compounds are halogenated; the remaining compounds are not halogenated. Because of differences in their behavior and in their environmental fate and transport characteristics, discussion of the volatiles has been broken into halogenated volatiles, as discussed in Section 5.3.1, and non-halogenated volatiles, as discussed in Section 5.3.2. Summary data for environmental fate and transport parameters are given in Table 5-2.

5.3.1 Halogenated Volatiles

5.3.1.1 Halogenated Volatiles: Sources and Background

Halogenated volatile organics constitute a diverse group of organic compounds characterized by an open-chain or ring structure which has undergone halogenation. Industrial halogenation processes yield polychlorinated derivatives that are widely applied as solvents, degreasers, dry-cleaning agents, refrigerants, and chemical intermediates. Because of their widespread application in many industrial processes, chlorinated organics are generally present in the environment, particularly in urban/industrial areas, originating from numerous point and nonpoint sources. Their widespread use as solvents/degreasers in electronics manufacturing processes accounts for their presence at the facility.

5.3.1.2 Halogenated Volatiles: Chemical Characteristics

Relevant chemical fate and transport data are presented in Table 5-2 for the halogenated volatile organics.

Halogenated Volatiles: Solubility

Halogenated volatile organic compounds are highly soluble in water, with reported solubilities ranging from 1.50×10^2 mg/L (tetrachloroethene) to 2.00×10^4 mg/L (methylene chloride). These high solubilities are principally due to the small molecular size and high polarity of these compounds. Given the highly soluble nature of these compounds in water, surface runoff and

groundwater transport of halogenated volatile organic compounds are principal environmental fate processes.

Halogenated Volatiles: Volatilization

As the vapor pressure and Henry's Law constant data in Table 5-2 illustrate, volatile halogenated organics are readily transported into the atmosphere from soil and water matrices. Vapor pressures (in mm mercury) range from 1.78×10^{1} to 2.66×10^{3} and Henry's Law constants range from 2.03×10^{-3} to 3.40×10^{-2} atm-m^3/mole for the volatile halogenated organics associated with the facility. Thus, volatilization will be a major environmental fate process for halogenated volatile organics associated with OU-2.

Halogenated Volatiles: Sorption

Adsorption to soils/sediments or to organic matter is not a significant environmental fate process for the halogenated volatile organics. Low affinity for adsorption to organic matter for these compounds is reflected in the relatively low K_{oc} (range: 8.8 to 364 mL/g) and log K_{ow} (range: 0.48 to 2.60) partition coefficients for these halogenated organics (Table 5-2). These data, in conjunction with the relatively high water solubility and volatility of these compounds, indicate adsorption is an insignificant environmental fate process in relation to water and airborne transport mechanisms.

Halogenated Volatiles: Bioaccumulation

Halogenated volatile organics do not bioaccumulate appreciably in terrestrial or aquatic organisms. BCFs for compounds associated with the facility typically range between 1.17 and 31 L/kg (EPA, 1986). Therefore, the potential bioaccumulation of halogenated volatile organics is not a significant environmental fate process.

Halogenated Volatiles: Biodegradation/Biotransformation

Data to define biodegradation/biotransformation of the halogenated volatile organic compounds associated with OU-2 are not extensive. From the available data (EPA, 1979a), biodegradation of halogenated volatiles appears to be a very slow process. Tetrachloroethene, trichloroethene, and 1,2-dichloroethane have been shown to be metabolized by higher organisms with their metabolic products then biodegraded by microbial organisms. Biodegradation data for other halogenated volatile organics associated with the site are generally lacking.

Halogenated Volatiles: Hydrolysis/Photolysis

Hydrolysis of halogenated volatile organics occurs too slowly to be a significant environmental fate process. Several of the detected halogenated volatile organics (i.e., 1,1-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and tetrachloroethene) are not susceptible to hydrolysis at all, as shown in Table 5-2, making hydrolysis a negligible fate process for the halogenated volatile organics associated with OU-2.

Direct photolytic degradation of halogenated volatile organics via photodissociation is usually restricted to the stratosphere (Clement Associates, 1985; EPA, 1979a). In aqueous environments, direct photodissociation is generally negligible or non-existent. For most of the halogenated volatile organic compounds detected during the RI investigation, photooxidation mediated by hydroxyl radicals is the predominant process of degradation in the atmosphere. Photolytic degradation of halogenated volatile organic compounds is not a significant mechanism for the alteration of chemicals at the facility.

Halogenated Volatiles: Oxidation

Direct oxidation of halogenated volatile organics is generally an insignificant process in natural environments (EPA, 1979a). As mentioned previously, photooxidation within the troposphere is the predominant, though relatively insignificant, degradation removal process.

5.3.1.3 Halogenated Volatiles: Summary

Halogenated volatile organic compounds are in general not very persistent in the environment, principally due to their high volatility, low adsorption to soils, inability to substantially bioaccumulate, and high water solubility. These attributes make halogenated volatile organic compounds highly mobile in environmental matrices.

5.3.2 Non-Halogenated Volatiles

5.3.2.1 Non-Halogenated Volatiles: Sources and Background

Non-halogenated volatile organic compounds are low molecular weight open-chain or single ring structures that are widely utilized as industrial solvents, degreasers, and chemical intermediates. Their widespread application in many industrial processes, and as typical constituents of and octane-boosting additives in fuel (e.g., benzene, toluene, xylenes), results in their being common environmental contaminants originating from various point and non-point sources.

5.3.2.2 Non-Halogenated Volatiles: Chemical Characteristics

Chemical data important in assessing the fate and transport of non-halogenated volatile organics above Screening Criteria are summarized in Table 5-2.

Non-Halogenated Volatiles: Solubility

Non-halogenated volatile organic compounds typically exhibit high solubility in aqueous matrices. Xylenes (total), the only non-halogenated volatile organic compound above screening criteria, has an aqueous solubility of 1.98×10^2 mg/L. Solubilities of other non-halogenated volatile organic compounds also present, but not above screening criteria, range from 1.52×10^2 mg/L (ethylbenzene) to 1.00×10^6 mg/L (acetone). These relatively high water solubilities are primarily due to small molecular size and the high polarity imparted by the carbonyl functional group in the ketonic (i.e., acetone, etc.) volatile organic compounds. Considering the highly soluble nature of these

compounds in water, groundwater transport of non-halogenated volatile organic compounds will be a principal environmental fate process.

Non-Halogenated Volatiles: Volatilization

As the vapor pressure and Henry's Law constant data in Table 5-2 illustrate, volatile non-halogenated organic compounds are readily transported into the atmosphere from soil and water matrices. Xylenes vapor pressure (in mm mercury) is 1.00×10^{1}, and its Henry's Law constant is 7.04×10^{-3} atm-m^3/mole (EPA, 1986). Thus, volatilization will be a major environmental fate process for xylenes (and other non-halogenated volatile compounds) at the facility.

Non-Halogenated Volatiles: Sorption

Although exceptions occur, particularly for the more aromatic non-halogenated volatile compounds, adsorption to soils/sediments or organic matter is typically not a significant environmental fate process. However, due to their aromatic ring, xylenes exhibit moderate affinity for adsorption to organic matter, as reflected in their elevated K_{oc} and log K_{ow} values (240 mL/g and 3.26, respectively). These data, coupled with the high water solubility and volatility of xylenes (and other members of this class of compounds), make adsorption an environmental fate process of moderate importance for xylenes in relation to water and airborne transport mechanisms.

Non-Halogenated Volatiles: Bioaccumulation

Non-halogenated volatile organics do not exhibit a high bioaccumulation potential in terrestrial or aquatic organisms. Although unavailable for xylenes, BCFs of non-halogenated volatiles for fish typically range between 0 and approximately 50 L/kg. Therefore, the bioaccumulation of non-halogenated volatile organics is not a significant environmental fate process for this subclass of chemicals, and it is not anticipated to be important for xylenes.

Non-Halogenated Volatiles: Biodegradation/Biotransformation

Biodegradation of non-halogenated volatile organic compounds occurs via microbial populations and/or higher organisms, but it is generally a slow process (particularly for the larger aromatic compounds; EPA, 1979). Hence, it is not typically an important environmental fate process.

Non-Halogenated Volatiles: Hydrolysis/Photolysis

Hydrolysis of non-halogenated volatile organic compounds is negligible or non-existent. Atmospheric photooxidation mediated by hydroxyl radicals is the predominant photolytic process affecting non-halogenated volatile organic compounds. However, this photolytic degradation process is usually negligible due to slow removal rates. Direct photodissociation within aqueous and/or atmospheric matrices is typically insignificant or negligible (Clement Associates, 1985; EPA, 1979a).

Non-Halogenated Volatiles: Oxidation

Direct oxidation of non-halogenated volatile organics is generally an insignificant process in natural environments (EPA, 1979). Photooxidation within the troposphere is the predominant (though relatively insignificant) degradation removal process.

5.3.2.3 Non-Halogenated Volatiles: Summary

Non-halogenated volatile organic compounds are in general not very persistent in the environment due to high volatility, low adsorption to soils (excluding to a lesser extent, xylenes), low bioaccumulation, and high water solubility. These attributes make xylenes and other non-halogenated volatile organic compounds highly mobile and transient in environmental matrices.

5.4 Chlorinated Pesticides

5.4.1 Chlorinated Pesticides: Sources and Background

Chlorinated pesticides are man-made chemicals characterized by a cyclic structure and a variable number of chlorine atoms. Pesticides were first produced in the early 1940s after discovery of their insecticidal properties. DDT, a stable white amorphous powder, was first synthesized in 1874, but its insecticidal properties were only discovered in 1939. Discovery of the effective insecticidal activity of hexachlorocyclohexane (BHC isomers), chlordane, and other pesticides followed shortly thereafter. Production of these pesticides peaked in the early 1960s but has decreased markedly in the last decades due to their extreme persistence and tendency to bioaccumulate. DDT production was banned in 1969. Production/consumption of most other chlorinated pesticides has decreased similarly with the exception of lindane (gamma-BHC), for which fewer restrictions have been imposed.

5.4.2 Chlorinated Pesticides: Chemical Characteristics

Table 5-3 summarizes the available data on environmental fate parameters for the detected pesticides.

Chlorinated Pesticides: Solubility

Water solubilities for the pesticides associated with the facility range from a minimum of 5.0×10^{-3} mg/L (DDT) to a maximum of 5.00×10^{1} mg/L (Endrin Aldehyde). With the exception of the beta isomer, BHC pesticides exhibit some of the highest water solubilities of the chlorinated pesticides present on-site, while DDT and DDE exhibit the lowest water solubilities. The greater solubility of the BHCs as compared to DDT and its metabolites typically results in their relatively higher frequencies of detection in surface water and groundwater samples. Variations in chlorinated pesticide solubility are due principally to differences in molecular structure, polarity (resulting from the degree of chlorination), and/or the presence of other functional groups on the molecule which enhance aqueous solubility.

Chlorinated Pesticides: Volatilization

Vapor pressures of the chlorinated pesticides range from 1.78×10^{-7} to 3.00×10^{-4} millimeters (mm) mercury. As shown on Table 5-3, Henry's Law constants range from 2.00×10^{-9} to 8.19×10^{-4} atm-m^3/mole for the chlorinated pesticides detected on-site. These levels indicate that very limited volatilization from contaminated matrices for chlorinated pesticides would be expected, and once volatilized, these compounds would exist primarily in the vapor phase, subject to rapid dilution by ambient air. The limited volatilization of some of the chlorinated pesticides explains their distinctive odors.

Chlorinated Pesticides: Sorption

Adsorption to soils/sediments or organic matter is the major environmental fate/transport process for a majority of the chlorinated pesticides detected during the OU-2 investigation. The pronounced tendency of chlorinated pesticides to be adsorbed is reflected in the partition coefficients (high K_{oc} and log K_{ow} values) exhibited by most of these chlorinated pesticides. The majority of K_{oc} values range from 2.20×10^2 to 4.40×10^6 mL/g and log K_{ow} values range from 2.70 to 7.00, as shown in Table 5-3. The BHC isomers, dieldrin, endrin and its aldehyde, and heptachlor and its epoxide typically exhibit lower adsorption affinities, while chlordane, DDT, and DDE are more strongly sorbed.

Chlorinated Pesticides: Bioaccumulation

The chlorinated pesticides found at the facility exhibit a large variability in their potential for bioaccumulation. Endosulfans are not bioaccumulated appreciably (Clement Associates, 1985). Aldrin and the BHC isomers exhibit moderate bioaccumulation, with BCFs ranging from 28 to 130 L/kg for fish, as shown in Table 5-3. In contrast, chlordane, DDE, DDT, dieldrin, endrin, heptachlor, and heptachlor epoxide exhibit significant bioaccumulation in fish, with BCFs typically ranging from 4.0×10^3 to 5.4×10^4 L/kg. Note that the majority of bioaccumulation data refers to fish in direct contact with pesticide-contaminated water. Lack of aquatic habitat on the property precludes this as a possible environmental fate of chlorinated pesticides directly on-site. However, within the wetlands on the property and Bound Brook and its associated waterbodies adjacent and downstream of the facility, the bioaccumulation of site-related pesticides transported to these surface waters would be a very important environmental fate mechanism, particularly for the more highly chlorinated pesticide compounds.

Chlorinated Pesticides: Biodegradation/Biotransformation

The chlorinated pesticides detected in the OU-2 RI samples show varying degrees of susceptibility to biodegradation and biotransformation. Dieldrin, chlordane, DDT, DDD, DDE, and heptachlor epoxide are highly resistant to biodegradation. DDT degrades to DDE under aerobic microbial degradation, whereas DDD is the degradation product under anaerobic conditions. Aldrin can be epoxified to dieldrin by most microorganisms. The BHC isomers (alpha-, beta-, gamma-, and delta-) are also susceptible to microbial biodegradation, most notably under anaerobic conditions. Biodegradation data for other pesticides associated with the property are generally not available. The resistance of chlorinated pesticides to microbial degradation indicates that biodegradation/

biotransformation is not a significant environmental fate removal process for the chlorinated pesticides detected at the facility.

Chlorinated Pesticides: Hydrolysis/Photolysis

Most chlorinated pesticides either do not hydrolyze or exhibit only negligible hydrolysis under extreme conditions. Pesticides exhibiting some degree of hydrolysis include heptachlor, and DDT and its metabolites, as shown in Table 5-3. The rate of pesticide hydrolysis is strongly dependent upon pH. Hydrolysis is not expected to be a significant environmental fate process for pesticides detected during the field investigation.

Direct photolysis of chlorinated pesticides under natural light is negligible. Indirect photolysis of aldrin, the BHC isomers, chlordane, DDT, dieldrin, and heptachlor can occur (Clement Associates, 1985), but current data concerning photolysis are insufficient and/or conflicting. Consequently, the extent to which photolysis affects environmental fate of chlorinated pesticides at the facility is inconclusive.

Chlorinated Pesticides: Oxidation

The chlorinated pesticides associated with contamination at the former Cornell-Dubilier Electronics facility are relatively resistant to oxidation under normal environmental conditions. Consequently, oxidation is not considered a process which will affect the fate and transport of chlorinated pesticides associated with the property.

5.4.3 Chlorinated Pesticides: Summary

Chlorinated pesticides are typically highly persistent chemicals which strongly adsorb to soils, sediments, and organic matter, and sorption is the dominant environmental process affecting the fate of pesticides at the facility. As such, soils and/or sediments typically serve as sinks for pesticide residuals. The relatively low water solubility of the chlorinated pesticides indicates that surface water and/or groundwater transport is a likely mechanism affecting the fate of the more water soluble pesticides such as the BHC isomers, but not as important a mechanism for compounds with more reduced aqueous solubilities such as DDE and DDT. However, transport of particles to which strongly sorbed pesticides adhere, and/or possibly enhanced migration caused by co-solvent effects exerted by more mobile organic contaminants, may occur, which would increase the importance of this mechanism in surface water and groundwater. Very limited volatilization is expected, and the processes of photolysis, hydrolysis, oxidation, and biodegradation are not likely to be major factors in determining the fate of these compounds either on- or off-site. Bioaccumulation within terrestrial and aquatic organisms, particularly within fish, will be of major importance due to the strong tendency for chlorinated pesticides to substantially bioaccumulate.

5.5 Semi-Volatile Organics

Semi-volatile organic compounds were detected in various environmental matrices associated with the facility. Of these, some compounds were acid extractable organics and some compounds were base/neutral extractable organics. Due to differences in environmental fate and transport

characteristics, acid and base/neutral extractable organics are discussed separately in Sections 5.5.1 and 5.5.2, respectively.

5.5.1 Acid Extractables

5.5.1.1 Acid Extractables: Sources and Background

Acid extractables identified as COPCs and/or detected above screening criteria during the OU-2 RI consist primarily of one phenolic compound, pentachlorophenol. Phenols are a diverse group of chemicals consisting of a basic benzene ring and one or more hydroxyl (OH) groups. Simple phenol (hydroxy-benzene) was isolated in 1834 from coal tar, the only known source until World War I. Synthetic production subsequently grew in importance, and by 1930 exceeded natural production. Currently, most phenol is manufactured by sulfonation of benzene. The more complex pentachlorophenol is obtained by replacing five of the hydrogen atoms attached to the benzene ring with chlorine. Pentachlorophenol was used extensively in the past as a wood preservative until it was banned due to its toxicity.

5.5.1.2 Acid Extractables: Chemical Characteristics

Relevant data for pentachlorophenol are presented in Table 5-4.

Acid Extractables: Solubility

Pentachlorophenol exhibits a relatively high solubility (1.40×10^{1} mg/L) in aqueous matrices due primarily to the high polarity of the molecule imparted by the multiple chlorine atoms. Consequently, surface water and/or groundwater transport of pentachlorophenol would be a major environmental fate process.

Acid Extractables: Volatilization

Semi-volatile acid extractable organic compounds, by definition, are capable of volatilizing although this volatilization occurs at much lower rates than lighter volatile organic compounds. The vapor pressure (in mm mercury) for pentachlorophenol is 1.10×10^{-4}, and its Henry's Law constant is 2.75×10^{-6} atm-m^3/mole. This indicates very limited volatilization of pentachlorophenol is expected to occur.

Acid Extractables: Sorption

Among acid extractable compounds, pentachlorophenol exhibits a very high affinity for organic matter as evident in its high K_{oc} ($5.3 \times 10^{4)}$ and log K_{ow} (5.0) partition coefficient values. These values indicate strong binding to organic matter in soils will occur.

Acid Extractables: Bioaccumulation

Pentachlorophenol is not appreciably bioaccumulated by terrestrial or aquatic organisms. As its BCF of 109 L/kg indicates, bioaccumulation in fish is a relatively unimportant potential environmental fate process for the phenolic compounds associated with the facility.

Acid Extractables: Biodegradation/Biotransformation

In general, biodegradation by microbial populations will not be a significant environmental fate process for pentachlorophenol. This compound is resistant to biodegradation and can inhibit microbial growth under certain conditions (EPA, 1979a).

Acid Extractables: Hydrolysis/Photolysis

As shown on Table 5-4, pentachlorophenol does not hydrolyze (Clement Associates, 1985). Direct photolysis and/or photo-oxidation (via hydroxyl radicals) can occur for pentachlorophenol in aqueous and/or atmospheric matrices (EPA, 1979a). However, these photolytic processes usually proceed at a slow rate and can be considered to represent a minor environmental fate process for this compound for OU-2.

Acid Extractables: Oxidation

Oxidation of pentachlorophenol may occur via hydroxyl radicals in aqueous and/or atmospheric matrices, and/or via metal-catalyzed oxidation in aerobic matrices (EPA, 1979). Considering this, oxidation may be an important environmental fate process for this compound at the facility.

5.5.1.3 Acid Extractables: Summary

The semi-volatile acid extractable organic compound pentachlorophenol associated with the property is relatively persistent in environmental matrices. This is primarily due to its high affinity for organic matter and/or clay, and inhibition of microbial populations.

5.5.2 Base/Neutral Extractables

5.5.2.1 Base/Neutral Extractables: Sources and Background

Base/neutral extractables consist of a number of chemical subclasses including: acetyl benzenes, PAHs, dichlorobenzenes, and phthalate esters. Most are ubiquitous in industrial/urban environments, principally occurring as a result of various manufacturing processes, fuel usage, and/or past utilization/disposal of products or raw materials containing these chemical constituents. Chemicals known to have been produced or handled at the facility that contain base/neutral extractable compounds include fuel oil and various chlorinated solvents. Although dichlorobenzenes are sometimes reported and/or discussed with volatile organic compounds due to their physicochemical characteristics (they are intermediate between those of volatiles and semi-volatiles and can be detected by either analytical method), in this report they will be addressed with the semi-

volatile compounds since their characteristics most important to environmental fate are more akin to semi-volatiles.

5.5.2.2 Base/Neutral Extractables: Chemical Characteristics

Relevant environmental fate and transport data for the base/neutral extractable compounds associated with the property are summarized in Table 5-4.

Base/Neutral Extractables: Solubility

The solubility of base/neutral semi-volatile organic compounds is highly variable as a function of molecular structure, degree of aromaticity, and presence and type of functional groups attached to the parent molecule. Solubility is positively correlated with molecular polarity and negatively correlated with degree of aromaticity. With some exceptions (most notably the acetyl benzenes, naphthalene and 2-methylnaphthalene), base/neutral extractable semivolatile organics are generally less soluble in water than acid extractable compounds.

Water solubilities for the base/neutral organics identified as COPCs and/or exceeding screening criteria associated with OU-2 range from 5.0×10^{-4} mg/L (dibenzo(a,h)anthracene) to 6.13×10^{3} mg/L (acetophenone). As the data in Table 5-7 illustrate, base/neutral compounds exhibiting the highest water solubilities are those containing highly polar functional groups or atoms that impart polarity to the molecule (i.e., acetyl group in acetophenone, carboxyl groups in diethylphthalate, chlorine atoms in chlorobenzene and 1,2,4-trichlorobenzene, etc.) and/or are relatively small molecules, whereas the compounds showing the lowest water solubility have a higher degree of aromaticity (i.e., high molecular weight PAHs). The environmental fate of base/neutral compounds associated with the facility that have high aqueous solubilities is strongly associated with surface water and/or groundwater transport. For the remaining low solubility base/neutral compounds, surface water or groundwater transport is not as significant a process, with adsorption to soils/sediments the dominant fate process, unless more mobile organic compounds exert co-solvent effects that facilitate their transport in aqueous media.

Base/Neutral Extractables: Volatilization

Semi-volatile base/neutral extractable organic compounds volatilize, but at much lower rates than lighter, volatile organic compounds, primarily because of increased molecular size (i.e., smaller molecular size results in higher volatility). The more volatile of the compounds in this chemical class (e.g., mono- and dichlorobenzenes, trichlorobenzenes) have vapor pressures typically greater than 1.0 mm mercury, whereas less volatile compounds (e.g., PAHs, phthalates) generally have vapor pressures ranging from 1.0×10^{-10} to 8.7×10^{-2} mm mercury (Table 5-4). Once volatilized, the base/neutral compounds associated with the facility will be in the vapor phase (Eisenreich et al., 1981). Although limited volatilization into the atmosphere may occur for chlorobenzene, dichlorobenzenes and trichlorobenzenes, volatilization of base/neutrals is assessed to be a minor or negligible environmental fate process.

Base/Neutral Extractables: Sorption

Depending on their particular molecular structure, base/neutral extractable compounds detected during the field investigation exhibit varying degrees of binding affinity to organic matter and soil particles. Higher molecular weight, more highly aromatic compounds are more strongly sorbed, whereas lighter base/neutrals are not as strongly sorbed. K_{oc} values ranged from 4.50×10^{1} to 2.00×10^{9} mL/g, while log K_{ow} partition coefficients range from 1.58 to 9.61 (Table 5-4). Therefore, adsorption to organic matter and/or soil particles can be an important environmental fate process, particularly for certain higher molecular weight compounds (i.e., bis(2-ethylhexyl)phthalate, indeno(1,2,3-c,d)pyrene, etc.) found on the property, whereas for others (i.e., acetophenone, chlorobenzenes, naphthalene, etc.), adsorption is of lesser importance.

Base/Neutral Extractables: Bioaccumulation

Bioaccumulation data are not available for many of the base/neutral extractable organic compounds associated with the facility. Bioaccumulation by aquatic organisms of base/neutral compounds where data exist is highly variable and compound-specific. As shown on Table 5-4, BCFs for these compounds range from 1.25 L/kg (acetophenone) to 2,800 L/kg (1,2,4-trichlorobenzene). No discernible pattern among compounds with similar molecular structure is evident, although in general, the greater the degree of chlorination (if present), the greater is the potential for substantial bioaccumulation to occur. Bioaccumulation of PAHs is a transitory process, since most PAHs with less than five rings are readily metabolized by higher organisms. Thus, for OU-2, bioaccumulation potential varies with the degree of chlorination and specific compound in question.

Base/Neutral Extractables: Biodegradation/Biotransformation

Biodegradation of base/neutral extractable compounds associated with the facility is a significant environmental fate process. The chlorinated benzenes are degraded very slowly by microbial populations, but other compounds are degraded by microbial populations and/or metabolized by higher organisms relatively rapidly under most conditions (EPA, 1979a).

Base/Neutral Extractables: Hydrolysis/Photolysis

With the exception of the phthalate esters and acetophenone, most base/neutral compounds are not susceptible to hydrolytic reactions (Clement Associates, 1985; EPA, 1979a). While hydrolytic reactions of these compounds are possible, such reactions typically proceed at slow rates.

Many of the base/neutral extractable compounds in aqueous and/or atmospheric matrices are vulnerable to direct photolysis and/or photooxidation. However, these processes are usually slow and highly compound specific, with most base/neutral compounds being at best slightly susceptible to photolysis.

Base/Neutral Extractables: Oxidation

Oxidation of some base/neutral extractable organics (via hydroxyl radicals) found in aqueous matrices and/or soils at the facility is possible. However, it is generally a slow, insignificant

transformation mechanism. As a result, the oxidation of base/neutral compounds is not considered to be a significant environmental fate process.

5.5.2.3 Base/Neutral Extractables: Summary

With few exceptions (i.e., acetophenone, naphthalene and 2-methylnaphthalene), the semi-volatile base/neutral extractable organic compounds associated with the facility property are relatively persistent in soil matrices. This is due primarily to low water solubility, high resistance to photolytic, oxidative, and hydrolytic degradation, and high affinity for organic matter and soil particles. Several of the compounds in this class may also persist in soil, as a result of their slow microbial degradation (i.e., chlorinated benzenes). Some of the base/neutral extractable compounds may exhibit substantial bioaccumulation, especially if they exhibit a high degree of chlorination. However, this is usually an ephemeral effect for acetylbenzenes and/or PAHs since most organisms have the ability to metabolize these compounds.

Organic Contaminants Overall Summary

Important behavioral characteristics of the classes of site-related organic contaminants discussed in prior sections that control the mobility and ultimate fate of these contaminants are summarized in Table 5-5.

5.6 Inorganics

Cyanide and numerous metals were detected in the soils, drainage system surface water and sediments, and perched groundwater associated with the facility. Many of the metals are normal constituents of uncontaminated soil/sediment parental material or in aqueous matrices due to the normal leaching process from uncontaminated parental material. However, several metals detected during OU-2 were present in various matrices at concentrations in excess of screening criteria levels and/or were identified as COPCs. This section will focus only on summarized environmental fate data for cyanide and those metals exhibiting atypical environmental concentrations that have been identified as contaminants exceeding screening criteria and/or as COPCs (i.e., arsenic, antimony, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc).

5.6.1 Inorganic Metals and Cyanide: Sources and Background

Metals are ubiquitous in the environment, consisting of a suite of naturally occurring elements such as arsenic, magnesium, iron, copper, cadmium, lead, zinc, etc. The inorganic forms of these metals typically occur with their combination with oxygen, chlorine, sulfur, and/or other organic and/or inorganic ligands. Although most inorganics are naturally occurring, their widespread occurrence in the environment is also attributable to manufacturing (e.g., smelting, machining, etc.) and refining processes. Additionally, low levels of inorganics, such as arsenic and lead, are emitted in the burning of most fossil fuels.

Cyanides are commonly used in metal electroplating/pickling processes, photographic solutions, silver and metal polishes, rat and pest poisons, and fumigating products. Cyanides are also typical

minor by-products generated during the gas manufacturing process, particularly in plants that utilized coal carbonization.

The important characteristics related to environmental fate and transport pertaining to metals and cyanide are discussed in the sections that follow.

5.6.2 Inorganic Metals: Chemical Characteristics

Relevant data for the metals associated with the facility that have been identified as COPCs in Section 6.0 and/or exceeded screening criteria (see Section 4.0) are presented in Table 5-6. A brief synopsis of the important characteristics affecting the environmental fate of these metals was compiled from several data sources (Fetter, 1999; Drever, 1997; EPA, 1979; Clement Associates, 1985) and is presented in subsequent sections.

Unlike the organic compounds discussed in preceding sections, the metals are difficult to discuss in terms of behaviorally similar groups. Additionally, many of the fate and transport mechanisms that may be important for organic compounds have little impact on the metals. Volatilization, for example, only applies to a select few metals or metallic compounds (e.g., Hg, some organo-metallic compounds), and then only under special conditions. Photolysis is also of negligible importance to the environmental behavior of metals and most metallic compounds. The environmental behavior (i.e., the low temperature geochemistry) of the metals has been widely studied and the characteristics of individual metals are generally better understood than those of individual organic compounds. On the other hand, it is sometimes difficult to distinguish between naturally-occurring and introduced metals, particularly in the case of geochemical major (Al, Ca, Fe, Mg, K, and Na) and minor (Ba and Mn) elements.

The most important factors controlling metal fate and transport are solubility, redox behavior, aqueous speciation, and sorption behavior, which are functions of the ambient geochemical environment. As mentioned above, volatilization and photolysis are of limited importance for most metals, except for mercury and its associated compounds. Biotransformation processes can be important for some metals (e.g., Hg, As) under certain environmental conditions. Metals are, to variable extents, subject to cation-exchange reactions with minerals present in the environment. The extent to which cation-exchange occurs is dependent on the mineral species present and on pH, as well as on the characteristics of individual metals.

The mobility of metals within environmental matrices depends upon numerous factors such as the relative stabilities of individual valence states that are element-specific, oxygen content, pH and Eh conditions, and the presence of available complexing agents. The expected predominant dissolved species or minerals of the metals in aqueous systems usually can be deduced from geochemical equilibrium models expressed in Eh-pH diagrams. However, such predictions are highly speculative and therefore, they will not be attempted or presented here.

In general, metals have a high adsorptive affinity for inorganic mineral surfaces and organic matter. Adsorption, for most metals, is highly pH-dependent, with desorption generally more favored at low pH and sorption mechanisms dominating at higher pH conditions. However, the types of clays and their surface charges, in relation to soil pH values, dictate whether sorption or desorption will occur.

Additionally, chemical speciation determines the relative degree of adsorption among different species of a particular metal at various pHs. Based on the data available for site soils, sorption is most probably a significant fate process for metals in site groundwater. The aerobic conditions in the groundwater is likely to promote the precipitation of ferromanganese oxides and oxyhydroxides (probably nucleating on sand and soil grains) to which other metals will readily adsorb. A brief discussion of the important controls on fate and transport of the metals of potential concern at the facility follows in the subsequent paragraphs.

Arsenic

In the environment, arsenic occurs predominantly in the As(+3) and As(+5) valence states and, although certain conditions may promote the formation of arsenious (H_3AsO_3) or arsenic (H_3AsO_4) acid, the oxidation state of arsenic is the factor that seems to control arsenic solubilization. The inorganic state is dominant even though arsenic is involved in biological cycling that can form soluble organic complexes. A number of studies have shown that arsenic is both methylated and demethylated during biological cycling, and that the processes seem to more or less cancel each other out.

The redox chemistry of arsenic is highly analogous to that of iron and manganese, and arsenic tends to be closely associated with these two elements in aqueous systems. Under aerobic conditions, As(+5) is the predominant species. Pentavalent arsenic is highly insoluble and tends to be strongly adsorbed on ferromangoan precipitates; i.e., As(+5) follows the oxidized species of iron (Fe+3) and manganese (Mn+4). Thus, in oxidated water, arsenic is primarily associated with particulate phases. Under reducing conditions, arsenic is reduced to As(+3), which is soluble in anoxic waters. It should be noted that arsenic may also form complexes with anthropogenically introduced organic compounds that may affect the geochemical behavior of arsenic. The arsenate and arsenite ions, when present, may behave in a manner similar to the phosphate ion in aqueous systems (Smith et al, 1996).

Arsenic is adsorbed principally onto clays, aluminum hydroxides, ferromanganese oxides, and organic compounds. In general, pentavalent arsenic has a greater adsorptive affinity than trivalent arsenic. For arsenic, adsorption is most important in aerobic, acidic fresh water with adsorption decreasing above pH 9 for As(+3) and above pH 7 for As(+5).

The mobility of arsenic has been reported to increase with increasing pH and decreasing Fe/As molar ratios (Krause and Ettel, 1989). The relationship of increasing arsenic solubility, and hence mobility, with decreasing Fe/As molar ratios will be assessed/verified in the groundwater data and discussed in a future report (OU-3). However, it is important to note that while increased arsenic mobility may be enhanced by elevated iron concentrations, this may only be accomplished provided that other factors (i.e., desorption, dissolution, etc.) favor or result in the presence of arsenic within groundwater from other contaminated media (i.e., soil). Arsenic is not appreciably bioaccumulated in aquatic organisms (BCF = 44). Arsenic does bioaccumalate in terrestrial plants, however, its toxicity limits the amount bioaccumulated.

Antimony

The hydrogeochemical behavior of antimony is analogous to that of arsenic and, therefore, to iron and manganese as well. Like arsenic, antimony most commonly occurs in the Sb(+3) and Sb(+5) valence states. Antimony in natural waters has not been as well studied as arsenic; however, in existing field and laboratory investigations, antimony also appears to be largely controlled by redox conditions. In aerobic waters, insoluble Sb(+5) is adsorbed to ferromangoan oxides and oxyhydroxides; however, the adsorption of Sb(+5) may not be as strong as As(+5), and the solubility of Sb(+5) is generally higher than that of As(+5). In anaerobic waters, antimony as Sb(+5) is reduced to Sb(+3), which is soluble.

The sorptive behavior of antimony is similar to that of arsenic, described in the preceding section. Sorption of antimony has also been described in the discussion of solubility above. Antimony is not bioaccumulated in aquatic organisms (BCF = 1) and can slightly bioaccumulate in terrestrial plants and organisms. Higher concentrations may accumulate in invertebrates.

Barium

Barium is an alkaline earth element, which is to say that it belongs to Group IIA of the Periodic Table of the elements. Barium is also a geochemical minor element, occurring in most geologic materials in concentrations of a few tenths of a percent to a few percent. Like alkaline earths, barium occurs exclusively in the +2 valence state in nature. The aqueous solubility of barium is low in natural waters. Because of its low solubility, little data are available regarding the bioaccumulation of barium in aquatic fish species or on the sorption behavior of barium; however, barium is thought to be readily sorbed to clay mineral surfaces. Existing data suggests barium is moderately bioaccumulated in aquatic organisms (BCF = 663). Little data are available regarding bioaccumulation in terrestrial or aquatic biota.

Beryllium

Beryllium is always found in the +2 valence state in aqueous matrices and may form stable compounds with small anions if they are present (e.g., fluoride). At low pH (below 4), Be(+2) ions are the predominant species, whereas at very high pH (>12), $HBeO_2$ is the more prevalent form in water. Within normal pH ranges in the environment, the very slightly soluble $Be(OH)_2$ is the dominant species. Very little data exist for beryllium sorption behavior because of its very low solubility; however, some of the available data suggest that beryllium sorbs to clay at low pH. At high pH, complexation into insoluble compounds appears to be favored over adsorptive mechanisms. Beryllium is not readily bioaccumulated in aquatic organisms (BCF = 19), and little data are available regarding bioaccumulation in terrestrial or aquatic biota.

Cadmium

Cadmium may exist in soluble organic complexes or as an ionic species in water. Cadmium ions in solution are always present in the +2 valence state in aqueous environmental matrices and, based upon the site-specific Eh-pH conditions, they are expected to be the predominant species in on-site aqueous matrices. Cadmium may also be associated with the particulate phase. Cadmium is principally adsorbed by clays, organics, carbonates, and aluminum and iron oxides, with adsorption generally increasing as the pH increases. Cadmium is not appreciably bioaccumulated in aquatic

organisms (BCF = 81), due to its toxicity. Cadmium is readily taken up by plants and accumulated, and may also bioaccumulate in terrestrial biota.

Chromium

Chromium is an essential micronutrient that, at elevated levels, can have toxic effects. In aqueous systems, chromium can theoretically occur in two oxidation states: Cr(+3) and Cr(+6). In many ways, the hydrogeochemical behavior of chromium is the opposite of iron, manganese, arsenic, and antimony. The oxidized state of chromium, Cr(+6), is relatively soluble, forming complex anions in aqueous solution. The most important of these are chromate (CrO_4^{-2}) and hydrochromate ($HCrO_4^-$). However, Cr(+6) species are not stable aqueous complexes under virtually all naturally occurring redox conditions. Hexavalent chromium is stable at Eh approaching and above the limit of atmospheric oxidation. In virtually all natural waters, trivalent chromium is the stable and predominant aqueous form of chromium. In its trivalent form, chromium rapidly precipitates as insoluble oxides or hydroxides or adsorbs onto clays or oxides of other metals. Chromium is not bioaccumulated in fish (BCF = 16), and although high accumulations may occur in lower trophic level organisms, there is little evidence that chromium is biomagnified within food chains to higher trophic levels.

Cobalt

Cobalt is an essential nutrient that rarely occurs in soluble form in natural aquatic systems, and its hydrogeochemical behavior is therefore little studied. Available evidence suggests that cobalt behavior is analogous to that of iron and manganese in that cobalt is strongly absorbed to metal oxides and oxyhydroxides, and to clay mineral surfaces. Desorption of cobalt may be important at lower pH values. Data regarding the bioaccumulation of cobalt in terrestrial and aquatic species are lacking.

Copper

Copper is an essential nutrient that, at elevated levels, can have toxic effects. Copper(+2) is the most prevalent form of copper in aqueous systems as most of the stable cuprous (+1) forms in toxic waters are highly insoluble. Copper may also exist in water as the hydrated divalent cupric ion. However, in general, most copper in aqueous solution is in a complex form with organic or inorganic ligands, and these are expected to be the predominant dissolved aqueous species of copper at the site. Copper is sorbed by clays, mineral surfaces, organics, carbonate, and iron and manganese oxide precipitates. Copper adsorption is highly pH dependent and the presence of other anionic species can increase copper adsorption. Copper is not appreciably bioconcentrated in aquatic organisms (BCF = 200), since its toxicity to aquatic vegetation and fish limits the extent to which bioaccumulation can occur. Similarly, its toxicity also limits copper's bioaccumulation in terrestrial plants. Copper is bioaccumulated in terrestrial biota, but it is not biomagnified in the food chain.

Lead

Lead(+2) is the most common stable ionic aqueous species with hydroxyl, carbonate, sulfide, and sulfate anions acting as solubility controls. Under aerobic conditions, $PbSO_4$, and to a lesser extent $PbCO_3$, control lead solubility; whereas under anaerobic conditions, PbS concentrations mediate aqueous lead solubility. Lead may also exist in soluble organic complexes (i.e., humic and fulvic

acids) in aqueous matrices. Lead-containing organo-metallic complexes may be other forms of dissolved lead in aqueous matrices on site. Lead adsorbs principally to clays, hydrous iron and manganese oxides, mineral surfaces, and organic compounds. Lead adsorption is very pH-dependent, with low pH conditions favoring desorption. Lead is not appreciably bioaccumulated in terrestrial or aquatic organisms (BCF = 49) and is not biomagnified in the food chain.

Manganese

Manganese occurs in the +2 and +4 oxidation states in aqueous systems. In oxidized waters, Mn(+4) is the stable form. Mn(+4) is insoluble and precipitates, along with Fe(+3), to form ferromangoan oxides and oxyhydroxides. In anaerobic waters, manganese is reduced to Mn(+2), which is soluble under continuing reducing conditions. Studies of natural systems have shown that Mn(+4) is the first metal to precipitate (i.e., the least soluble) of the behaviorally analogous group manganese, iron and arsenic. Similarly, the reduction of Mn(+4) to Mn(+2) and the accompanying resolution occurs before the reduction of Fe(+3) or As(+5). As long as aerobic conditions persist in the groundwater, transport of manganese in aqueous solution will be of minor significance. Manganese readily forms insoluble oxides in aerobic waters. The formation of manganese oxides often requires nucleation on a particle resulting in "manganese coatings." The formation and continued growth of manganese coatings is an adsorption process. Adsorption is an important process under aerobic conditions but is readily reversed if conditions become anaerobic. The bioaccumulation of manganese in terrestrial and aquatic biota has not been studied extensively.

Mercury

Mercury may exist in the 0, +1, or +2 valence states in natural waters, depending on Eh-pH conditions. Above pH 5 and under moderately oxidizing conditions, dissolved elemental mercury is expected to be the predominant inorganic aqueous species. Mercury readily complexes with organic matter via biologically and non-biologically mediated processes. As a result, dissolved methyl mercury ion and undissociated dimethyl mercury may be present in aqueous matrices if mercury is present. Some studies have found mercury concentrations in surface waters vary with the biological cycle (i.e., vary seasonally with biological activity). Mercury is strongly absorbed to many inorganic surfaces and organic matter. Desorption may occur under low pH conditions. Mercury can bioaccumulate to high levels within aquatic organisms (BCFs = 3750 and 5500 for alkyl and inorganic forms, respectively), with a large percentage of the mercury being present as organo-mercurial compounds formed by microbes within the slim coat of the fish. Mercury is readily biomagnified in terrestrial and aquatic organisms within the food chain, with higher trophic levels bioaccumulating significant mercury concentrations via the ingestion of contaminated prey species. Bioaccumulation is negligible in terrestrial plants.

Nickel

Nickel almost always occurs as Ni(+2) in aquatic environments. Although, in general, groundwater Eh-pH conditions seem to favor the presence of dissolved nickel, in aqueous matrices nickel may be primarily associated with the particulate phases because of its strong adsorptive affinity. Nickel sorbs to hydrous iron, manganese oxides, clay minerals, and organic material. Nickel is not appreciably bioaccumulated in terrestrial or aquatic organisms (BCF = 47).

Selenium

Selenium is an essential nutrient, but can be toxic when only slightly above required levels. The geochemical behavior of selenium is similar to that of sulfur, and selenium occurs in both cationic (mostly +4) and anionic (-2) states. More rarely, selenium can occur in the native (0) state. However, this occurs only under anoxic conditions. Selenium does not bioaccumulate in terrestrial or aquatic organisms (BCF = 16).

Silver

Silver almost always occurs as Ag(+1) in natural waters, although it may also occur in the +2 and +3 valence states as a complexed ion. Silver tends to be closely associated with iron-manganese oxide and oxyhydroxide precipitates under aerobic conditions. Strong adsorption to metal precipitates, clay minerals and organic matter limits the mobility of silver, especially at higher (>7.0) pH values. Silver also forms insoluble silver salts with many of the common inorganic ligands (e.g., chloride, carbonate). Silver is substantially bioaccumulated in aquatic organisms (BCF = 3080); however, its toxicity limits the extent to which this occurs. Bioaccumulation can occur in terrestrial organisms and plants, however, there is little biomagnification due to its toxicity.

Thallium

Thallium occurs predominantly in the +2 valence state in natural systems, and is quite insoluble over the typically encountered Eh-pH range of most natural waters. Because of its low solubility and resultant low aqueous concentrations, thallium behavior is not well studied. There is some evidence that thallium is strongly adsorbed to metal oxides and clays and that it may be involved in the biological cycle. Thallium is substantially bioaccumulated in aquatic organisms (BCF = 10000) and can accumulate in terrestrial plants, particularly in herbaceous and woody species. Little data regarding biomagnification are available in the current literature.

Vanadium

Vanadium can occur in the +3, +4, and +5 valence states in the normal range of environmental conditions. In addition to the complexity introduced by the multiple oxidation states, the aqueous geochemistry of vanadium is further complicated by the bewildering variety of complex ions that vanadium may form. In simplified form, however, the chemical behavior of vanadium somewhat resembles that of chromium. In reducing environments, vanadium is insoluble, and its solubility increases as conditions becoming increasingly oxidizing. Vanadium is readily adsorbed by clays and organic matter. Adsorption by organic matter is probably more correctly a reductive, and therefore an immobilizing, reaction. Data regarding the bioaccumulation of vanadium in terrestrial and aquatic species is lacking.

Zinc

In most natural waters, zinc occurs as the hydrated divalent (+2) cation. In organically polluted waters, complexing with organic compounds may be an important process. The solubility of zinc is strongly dependent on pH, with low pH favoring increased solubility. Zinc has a strong affinity for adsorption to hydrous metal oxides, clays, and organic matter. Adsorption of zinc is strongly favored at higher (>7) pH values. Zinc can be appreciably bioaccumulated in aquatic organisms

(BCF = 1000), and as a biologically essential microelement, is accumulated by all terrestrial and aquatic biota.

5.6.3 Inorganic Cyanides: Chemical Characteristics

Cyanides were detected (as total cyanide) in the soils sampled within the on-site areas. It is important to note that cyanides consist of a diverse group of compounds such as free hydrogen cyanide or cyanogen, metallo-cyanides/cyanates/isocyanates/thiocyanates, nitriles and/or cyanohydrins. However, the exact species of cyanide present was not determined by the analytical method used (i.e., samples were only analyzed for total cyanide). Since the exact species of cyanide is currently unknown, the discussion that follows addresses all potential species, which may not actually be present on-site. Relevant data for cyanides are presented in Table 5-3 and summarized in Table 5-5. A brief synopsis of the important characteristics affecting the environmental fate of cyanides was compiled from EPA (1979a), Clement Associates (1985), and other sources, and is presented in the subsequent discussion.

The cyanide functional group (-CN) can exist in a diverse group of organic or inorganic compounds whose fate and transport in the environment can vary greatly. The most common and toxic of the cyanides, free hydrogen cyanide (HCN), is extremely volatile, soluble in water, and reactive. Due to these characteristics, it rarely occurs in the environment and is not expected to be a component of the total cyanide detected at the former Cornell-Dubilier Electronics facility. Cyanide ion typically forms complexes with a variety of metals, especially transition series metals, with ferricyanides and ferrocyanides being the most prominent form typically encountered in the environment. Iron cyanides are very stable in the absence of light, yet rapidly undergo photolytic decomposition reactions to release hydrogen cyanide upon exposure to sunlight or ultraviolet radiation. Complex metallo-cyanides (i.e., ferricyanides, ferrocyanides, etc.) are quite soluble and can be readily transported in aqueous solution. Cyanogen [$(CN)_2$] is a highly toxic, flammable, gaseous form that undergoes slow hydrolytic reactions in water to produce hydrogen cyanide, cyanic acid, and other compounds. In contrast, metallo-cyanates (-OCN) readily hydrolyze in water to form ammonia and bicarbonate ion as decomposition products. Organocyanates, if sufficiently concentrated, may also readily trimerize to generate cyanurates. Organoisocyanates (-NCO) can be formed from cyanates and they too are rapidly hydrolyzed. Thiocyanates (-SCN) can be produced from cyanates and sulfur containing compounds under anaerobic conditions and are more stable than cyanates; however, in acidic media, thiocyanates can decompose to form free hydrogen cyanide. Nitriles also contain the cyanide functional group, are generally much less toxic than the metal cyanides or free hydrogen cyanide, and exhibit similar environmental fate characteristics as that for hydrogen cyanide. Cyanohydrins [$R_2C(OH)CN$] can also decompose with the release of HCN or CN under normal environmental conditions.

In general, cyanides may occur in water as: 1) free hydrocyanic acid (HCN); 2) simple cyanides (alkali and alkaline earth cyanides); 3) easily decomposable complex cyanides such as $Zn(CN)_2$; and, 4) relatively stable complex cyanides such as $[Fe(CN)_6]^{-3}$, $[Fe(CN)_6]^{-4}$ and $Co(CN)_4$. Complex nickel and copper cyanides exhibit intermediate stability when compared to the easily decomposable and relatively stable cyanide containing compounds.

When present in soil, cyanides typically occur as complexes with transitional metals (i.e., Ni, Cd, Zn, and Cu), or in iron cyanide complexes such as ferric ferrocyanide (i.e., Prussian Blue or Berlin Blue) (Aronstein et al., 1994; Meeussen et al., 1992). Iron cyanide complexes generally represent the largest portion of these mixtures at industrial area contaminated sites due to iron oxide typically being present at elevated concentrations within soils at these sites. Theis et al. (1992) reported that complexed iron cyanide accounted for 97 percent of the total cyanide in soil samples from two industrial sites; and, that in aqueous solution, ferric ferrocyanide dissociates into the hexacyanoferrate (II) ion ($[Fe(CN)_6]^{-4}$) and iron hydroxide solids. Other forms of cyanide that may be present at contaminated sites include ammonium cyanide, $[Cu(CN)_3]^{-2}$, and $[Ni(CN)_4]^{-2}$.

Cyanides are adsorbed to a variety of materials, including clays, biological solids and sediments; however, sorption is typically not a significant immobilizing process due to the relatively high volatility, solubility and/or reactivity of most cyanide containing compounds. Thus, cyanides are fairly mobile in soils with mobility being greatest at high pH, high concentrations of free $CaCO_3$ (i.e., high negative charge) and low clay content.

Hydrogen cyanide, metallo-cyanide complexes and nitriles are all subject to aerobic and anaerobic microbial degradation, and the importance of this process varies according to such factors as cyanide concentrations, pH, temperature, concentration of microbes, availability of nutrients, and whether the microbes are acclimated to cyanide. Additionally, all organisms have the ability to rapidly metabolize low concentrations (i.e., below lethal doses) of cyanide containing compounds. This, combined with the high toxicity of some of the cyanide compounds, results in an extremely low potential for terrestrial or aquatic organisms to bioaccumulate these compounds.

Summary of Environmental Tendencies – In general, most cyanide compounds are typically mobile and not very persistent in the environment due to their high volatility (hydrogen cyanide, nitriles), high reactivity (principally hydrogen cyanide), high aqueous solubility (except for insoluble simple metal cyanides), low adsorption to soil, low bioaccumulation potential, and susceptibility to microbial, metabolic, photolytic (primarily iron cyanides) and hydrolytic degradation. However, since many of these compounds can be converted to other cyanide containing compounds during various degradation/decomposition reactions, various forms may exist for some time in the environment, particularly if insoluble and/or stable cyanide containing compounds are produced.

5.6.4 Inorganic Metals and Cyanide: Summary

In general, the metals of potential concern associated with the facility are persistent and of limited mobility within environmental matrices under normal environmental conditions. This persistence is primarily related to recycling mechanisms within environmental matrices for some metals (e.g., arsenic, copper, lead, and mercury), and removal mechanisms (precipitation, cationic exchange, adsorption, etc.) which decrease mobility. Important environmental fate and transport parameters/conditions, and behavioral characteristics that control the persistence and/or mobility of metals within the environment are summarized in Table 5-6. Chemical speciation of metals in the environment results in metals in both solid and aqueous media. However, the fate reactions and the behavior of these metals under site geochemical conditions may lead to an increase or decrease in their concentrations in specific matrices. With respect to the inorganic contaminants on the property, the geochemical conditions favor leaching from the contaminated soil into surface stormwater runoff

and/or may also favor metals leaching to the groundwater with subsequent off-site transport. The latter mechanism will be assessed and discussed in greater detail in the Remedial Investigation Report for OU-3.

In general, most cyanide compounds are typically mobile and not very persistent in the environment due to their high volatility (hydrogen cyanide, nitriles), high reactivity (principally hydrogen cyanide), high aqueous solubility (except for insoluble simple metal cyanides), low adsorption to soil, low bioaccumulation potential, and susceptibility to microbial, metabolic, photolytic (primarily iron cyanides) and hydrolytic degradation. However, since many of these compounds can be converted to other cyanide containing compounds during various degradation/decomposition reactions, various forms may exist for some time in the environment, particularly if insoluble and/or stable cyanide-containing compounds are produced.

5.7 Transport and Mechanisms of Migration

Contaminants may migrate from a source area via a variety of mechanisms. The importance of a given mechanism is controlled by the specific physical, geochemical, climatic, and hydrologic conditions at a given site, as well as by the physicochemical characteristics of the contaminated media. In this section of the report, the following potential pathways for the fate and transport of contaminants of concern identified at the facility and adjacent environs will be considered:

- Migration of contaminants from potential source areas to environmental media;
- Migration of contaminants into air;
- Migration of contaminants via vehicular traffic;
- Migration within transitory impounded surface water and surface runoff/drainage system;
- Percolation and migration of contaminants in soils into groundwater;
- Migration of contaminated groundwater off the property;
- Migration of contaminants to/within surface water and sediments; and
- Migration of contaminants into biota.

It is important to note that this report focuses on the facility soils, drainage system, and buildings (OU-2). As a consequence, only the first four potential pathways listed above are applicable. However, due to the close interrelationship of contaminant migration within the facility soils and drainage system to off-property groundwater, surface water/sediments and/or biota, they will briefly be discussed. Therefore, the following discussions on contaminant transport and mechanisms of migration consider, as applicable, groundwater, surface water/sediment and biota only in the context of how they relate to historic data and the facility soils, drainage system, and buildings findings to complete a potential contaminant migration pathway.

5.7.1 Migration of Contaminants from Potential Source Areas to Environmental Media

Contamination of the facility has occurred in the past as a result of electronics manufacturing, storage and raw material handling operations, and/or improper disposal/fill practices. As a consequence of these activities, a former dump/fill area and drainage system containing contaminants, contaminated dust within buildings, and localized areas of contaminated soil are present on the property. Chemicals from these potential sources of contamination may migrate within and/or into the surrounding environment in several ways. Potential sources that are localized contaminated soil areas, the former dump/fill area and/or past leaking fuel tanks/chemical spills contain contaminants that may be transported to underlying soils and groundwater (perched and/or bedrock) by the percolation of rain. Additionally, since surface water runoff and ponding occur on-site during heavy rainfall events in localized areas that are within or adjacent to areas of contaminated soil (see Sections 3.0 and 4.0), the more water-soluble contaminants may migrate within the surface runoff and ponded water and spread to surrounding soils and/or the unnamed tributary/Bound Brook either overland or via the existing stormwater drainage system. Surface runoff may also transport fine particulates that have contaminants adsorbed to them to other areas if the surface runoff flow is sufficient to entrain contaminated soil particles.

Chemicals may also leach or become solubilized within rainwater in contact with contaminated buildings or asphalt and be transported within rainfall runoff to surrounding soils adjacent to these structures or through the drainage system to Bound Brook. Due to the poor condition of the floors, dust can be generated from the degradation of the concrete slabs/floor within the buildings. Contaminants present in the surficial layer of the building floors can become incorporated in the resulting dust generated within the buildings. Additionally, there is a potential for this contaminated dust to be tracked outside of the buildings by the operations/employees at the industrial park. Dry, windy weather may result in the entrainment of contaminated soil or dust particles from exposed soil or building dust sources into the atmosphere, with subsequent deposition over adjacent areas onto soils that may then cause contaminants to be transported by percolating rainwater into underlying soils and/or groundwater, or by surface runoff to other surficial site areas, the drainage system and/or the unnamed tributary/Bound Brook. Finally, volatile contaminants may volatilize from contaminated matrices and be emitted into the atmosphere and subsequently transported by prevailing winds.

It is likely that each of the above processes has occurred at the former Cornell-Dubilier Electronics facility and is continuing to occur; however, the extent to which contamination observed in individual environmental media samples may be due solely to a specific given point source or an areal concentration of contamination is highly speculative. For example, it is not possible to conclude that aeolian deposition of entrained contaminated surface soil particles during dry, windy periods was the only (or even primary) source of PCBs in surface soils adjacent to the paved areas or within the Bound Brook corridor, because of the wide variety of ways (e.g., discrete spill/dumping events, migration of contaminants within the drainage system, etc.) that PCBs (or other contaminants) may have been introduced into the soils/sediments in these areas.

5.7.2 Migration of Contaminants into Air

Contaminants may migrate into air via two distinct emission mechanisms: entrainment of contaminated particulates by the wind (i.e., fugitive dust emissions), and volatilization, primarily of organic compounds. The extent of particulate entrainment at a site is governed in large part by climatic conditions (dry, windy conditions are more conducive to entrainment than wet, calm conditions). Other factors that affect entrainment of particulates include the activities that occur or have occurred on the site, the extent of paved and/or vegetative areas, and the grain size distribution of the surficial soils. Volatile organic compounds can migrate into air from surface and subsurface soils. Volatilization from surface materials is essentially unrestricted, and as such is governed only by the physicochemical characteristics of a given compound under ambient conditions. Volatilization from subsurface materials is more complex and factors such as soil moisture and permeability must be taken into account.

Currently, at the former Cornell-Dubilier Electronics facility, a majority of the developed portion of the facility is paved (as part of an administrative order issued by EPA in 1997) or covered by buildings. The undeveloped portion of the facility is predominately vegetated. Exposed, non-vegetative soil areas (e.g., the former foot/bike path, truck training area, etc.) that contain contaminated surface soil, however, may also be present on the facility property. Many of the soil contaminants present exhibit elevated adsorptive affinities to soil particles (e.g., PCBs, dioxins/furans, SVOCs, and metals). As a result of this, exposed surficial soil particles with contaminants adsorbed to their surfaces can become entrained into the air during dry, windy periods and be transported with the prevailing winds until they are deposited off the property or in other areas within the facility via wet or dry deposition processes. Prior investigative results indicate that the airborne entrainment of contaminated soil particulates has been a significant environmental transport mechanism since prior on-site and fenceline air monitoring detected PCBs and metals in ambient air, facility building interior dust was found to contain elevated levels of PCBs and metals, and nearby residential/commercial/municipal properties contained PCBs in soils and in-house dust at several residences. While this transport mechanism has been considerably reduced from that in the past due to the paving of the facility roadways and discontinuance of the truck driving training facility operations on the central undeveloped portion of the property, it can and may still occur on a much more reduced scale in a few limited on-site areas (i.e., exposed surficial soil areas).

The emission of volatile organic compounds from exposed surficial and subsurface soils/near surface perched groundwater is expected in the undeveloped portion of the property, since volatile contaminants (primarily TCE and its breakdown products) were present in vadose zone soils and near surface (3 feet to 8 feet bgs) perched groundwater at concentrations up to 47 mg/kg and 15 mg/L, respectively, in some locales. Additionally, soil gas results indicated TCE and its associated breakdown products up to 14 ppmv, while FID total volatile compounds up to approximately 40 ppmv were detected in the soil vadose zone interstitial voids. The paved areas of the developed portion of the property would restrict volatile emissions. Although the vegetative cover over most areas of the undeveloped portion of the property, particularly grass mats, would inhibit volatile emissions somewhat, they would most probably still occur. As will be discussed in Section 5.7.3 that follows, volatile compounds may also be emitted from surface runoff and transitory ponded stormwater. Therefore, volatile emissions, with their concomitant migration via the prevailing wind,

would be a viable transport mechanism for some areas (southern/eastern) of the undeveloped portion of the former Cornell-Dubilier Electronics facility.

5.7.3 Migration of Contaminants via Vehicular Traffic

Surficial soil particles are typically disturbed by vehicles driving on non-paved (i.e., dirt, gravel) roads, especially during very dry periods (i.e., dusty conditions) and/or very wet periods (i.e., muddy conditions). These particles can then become attached to parts of the vehicle (e.g., tires, undercarriage), and subsequent travel by the vehicles may re-deposit the dust/mud on other portions of the road or other roads, driveways, etc.

Prior to 1997, the facility roadways were a mixture of dirt, gravel and stone (EPA, 1997d), and elevated concentrations of constituents of concern were present in the shallow soils collected from the roadway areas (e.g., Total PCBs ranged up to 22,000 mg/kg during previous investigations and up to 5,250 mg/kg during the OU-2 RI). As many of these soil contaminants exhibit elevated adsorptive affinities to soil particles (i.e., PCBs, SVOCs, and metals), it is likely that soil particles with contaminants adsorbed to their surfaces adhered to vehicles transversing the facility property, such as tractor trailer trucks. Subsequent travel by the vehicles around the facility and/or off the property may have re-deposited the contaminated soil particulates.

With the paving of the facility roadways, migration of contaminants via vehicle traffic has been significantly reduced. This transport mechanism, however, can still occur when vehicles transverse any non-paved area of the property, such as the undeveloped portion.

5.7.4 Migration Within Transitory Impounded Surface Water and Surface Runoff/Drainage System

Although no permanent surface water bodies exist on the property, transitory ponding of stormwater was observed at several locations in puddles, ruts, and low lying areas/wetlands during extremely wet periods or intense rainstorms (see Section 3.0). While these ponded areas in depressions are relatively short-lived, contaminants may become solubilized from underlying contaminated soils and spread laterally to uncontaminated soils by adsorption or by residuals remaining when the ponded water recedes and/or percolates into the soil. Contaminated soil transport would not be involved, since water flow in these shallow depressions would be insufficient to move the surface soil particles.

Stormwater ponding areas where this type of contaminant migration is likely to occur are the three wetland areas adjacent to the paved developed area near the southwestern property line, and numerous wetland/non-wetland areas throughout the Bound Brook floodplain along the southern and eastern undeveloped portions of the property. Among the contaminants near or within these areas, only volatile organic compounds, acetophenone, cyanide and/or metals would be expected to be dispersed within the ponded stormwater based solely on their aqueous solubilities and adsorptive affinities. However, the dissolved volatile organics would be short-lived within the unconfined ponded water, due to subsequent volatilization. Thus, primarily acetophenone, cyanide and/or metals would be expected to be dispersed within the ponded water to adjacent soils. However, PCBs, PAHs and pesticides may also be dispersed in ponded stormwater due to co-solvent effects exerted by the dissolved organic constituents. This type of co-contaminant mediated dispersal is expected

considering the high levels of volatile organic compounds detected in surficial soils (i.e., over 25 mg/kg of total volatiles at one location in the top 6 inches of soil and over 90 mg/kg at a location 2 feet below grade). Although this type of migration may be occurring infrequently for short durations over relatively small areas within the property boundaries, the migration of contaminants within transitory ponded stormwater would be a significant transport mechanism for redistributing contaminants (primarily acetophenone, cyanide and/or metals, but also PCBs, PAHs and pesticides as well) to adjacent soils.

Although no permanent surface water streams occur directly on the former Cornell-Dubilier Electronics facility, several site features exist that direct stormwater surface runoff from the property to off-site areas. Currently, in the undeveloped portion of the property, one man-made surface water drainage ditch (designed and constructed pursuant to the site stabilization order of 1997) and several other natural drainage ditches/preferential stormwater routes exist that direct stormwater surface runoff from the facility to Bound Brook or unnamed tributaries thereof. Additionally, numerous catch basins/storm sewer lines form a system for the developed portion that discharge via outfall pipes to an unnamed tributary of or to Bound Brook directly. It was discovered in this investigation that an open hole/former floor drain in Building No. 13, a catch basin between Building No. 13 and the property's northeast fenceline, and the catch basins on the southwest and southeast of Building No. 14 connect to/are part of the storm sewer drainage system and ultimately discharge to Bound Brook or the unnamed tributary to Bound Brook, respectively (see Section 2.7 and Figure 2-5).

During historic storm events, contaminants may have become solubilized in the surface runoff from underlying contaminated soil and transported via these drainage pathways. During transport, some infiltration of contaminated rainwater and limited subsequent adsorption of contaminants to the underlying soils/sediments during infiltration may occur along unlined surface water drainage ditches/preferential stormwater routes in unpaved areas. If the stormwater runoff flow was sufficient, contaminated soil may also have been or can be transported from the facility areas that are unpaved or vegetated to the stormwater drainage system catch basins or ditches/preferential stormwater routes with subsequent transport and/or deposition within the catch basins/storm sewer lines and/or the unnamed tributary or Bound Brook.

The OU-2 results and past historical data substantiate the above contaminant transport scenario since numerous site-related contaminants were detected in the drainage system (water-PCBs, VOCs, metals; sediment-PCBs, VOCs, acetophenone, PAHs, pesticides, cyanide, metals) and in the unnamed tributary and Bound Brook (PCBs, VOCs, SVOCs, pesticides, metals) adjacent to and downstream of the facility property. Site-related contaminants that exhibit high affinities to soil particles/organic matter (i.e., PCBs, pesticides, and to a limited extent, some PAHs and metals) are present at elevated concentrations in the sediments of these systems/waterbodies (PCBs and pesticides up to 140 mg/kg and 70 mg/kg, respectively, in the drainage system; PCBs up to 520 mg/kg in Bound Brook). Additionally, VOCs, PCBs, pesticides, and metals have been detected in the water column of these systems/waterbodies. Although contaminated surface water is involved, the sediments within these conduits serve as the primary sinks for site-related contaminants migrating off the former Cornell-Dubilier Electronics facility property, particularly within the drainage system, unnamed tributary, and Bound Brook.

Thus, the migration of contaminants dissolved within and/or adsorbed onto entrained soil particles within surface runoff, particularly during heavy rainfall events, was and still remains a significant transport mechanism for contaminants to migrate off property. However, as stated previously, deposition within the storm sewer conduits has occurred, and contaminant residuals are present within the sediments in the pipes that serve as a continuing source of contamination. Migration from the drainage system to the soil material surrounding the storm sewer pipes may also be occurring (or have already occurred), as the integrity of the drainage system piping is unknown, and contaminant residuals are present within the stormwater drainage system at very high (i.e., up to ppm) levels. However, this additional potential migration pathway associated with the drainage system is assessed to be of lesser concern since it would primarily affect soils only in close proximity of the drainage system piping on the facility property proper and adjacent Bound Brook floodplain, which are already contaminated with site-related chemical constituents.

5.7.5 Percolation and Migration of Contaminants in Soil into Groundwater

Contaminants of concern present in soils at the facility may migrate from surficial to deeper subsurface layers and eventually into groundwater by the percolation of rainwater through contaminated media. Incorporation of contaminants within this percolating rainwater will be through direct dissolution of contaminants from soil into the percolating water, by dissolution into more water soluble organic compounds already entrained within the percolating rainwater (i.e., co-solvent effects) or, to some extent, by transport of very fine particulates (i.e., colloids) to which chemical constituents are adsorbed. Principal contaminant classes present on-site that have likely migrated via this potential pathway are discussed in the subsections that follow.

PCBs and Pesticides

PCBs and pesticides were detected at high concentrations in facility soils. The PCBs and pesticides present typically exhibit high adsorptive affinities and low aqueous solubilities which tend to limit their mobility in the environment. Although typically exhibiting limited mobility in soils, subsurface soil data collected during the OU-2 RI investigation indicate a much greater migration for PCBs and pesticides in soil, up to 14 feet bgs at the top of the fractured bedrock, than expected based upon individual constituent physicochemical characteristics, assuming an original surficial or near surface (i.e., up to 5 feet bgs) source. This phenomenon may be due to the presence of more mobile volatile organic compounds, some of which were present up to ppm levels in soil at the same depths/locations, and/or perched groundwater, enhancing the downward migration in soil and solubilization into groundwater of these chemical contaminants via co-solvent effects. In general, while adsorption is an important fate mechanism for these contaminants in soils, enhanced migration and solubilization into groundwater (perched and/or fractured bedrock) by co-solvent effects is expected to be a significant environmental fate process for PCBs and pesticides. Considering that fractured bedrock groundwater recently sampled in 1999 as part of a preliminary groundwater investigation by the PRP and in 2000 during a preliminary investigation by Foster Wheeler Environmental (additional work to be performed as OU-3) has been shown to be contaminated with TCE, 1,2-DCE and PCBs (up to 100 mg/L, 160 mg/L, and 130 ug/L, respectively), enhanced migration and solubilization into bedrock groundwater by co-solvent effects appears to be a very significant environmental fate process for the transport of PCBs and potentially pesticides as well, at the facility.

Dioxins

Dioxins are characterized by very low aqueous solubilities and very high adsorptive affinities for soils. Due to these characteristics, solubilization from contaminated soil into percolating rainwater with their eventual transport into groundwater is not typically expected to be a major environmental fate mechanism for these compounds. However, as discussed previously, co-solvent effects mediated by the more mobile volatile organic compounds present could enhance the downward migration of dioxins in soil and solubilization into perched and/or fractured bedrock groundwater. This potential enhanced migration effect for dioxins will be either refuted or substantiated by the future OU-3 groundwater investigation. However, considering the close similarities of the environmental fate and transport behavioral/physicochemical characteristics of PCBs to dioxins, in concert with the fact that fractured bedrock groundwater has been shown to be contaminated with TCE, 1,2-DCE and PCBs (see previous paragraph) and individual dioxin/furan constituents (i.e., up to 33.9 picograms per liter, pg/L, in the one well sampled for these parameters during the 2000 preliminary OU-3 investigation), enhanced migration and solubilization into groundwater by co-solvent effects is expected to be a potentially significant environmental fate process for dioxins at the facility.

Volatile Organic Compounds

The volatile organic compounds of concern are characterized by high aqueous solubilities and low adsorptive affinities for soils. Due to the permeable nature of the facility soils in conjunction with these characteristics, incorporation into percolating rainwater with their eventual dissolution and transport in groundwater is a major environmental fate mechanism for these VOCs. This is substantiated by the historical groundwater and recent perched groundwater data, which indicated numerous volatile contaminants in groundwater, some of which occurred up to ppm levels that were also present in facility soils at elevated concentrations (i.e., up to ppm levels).

Semi-Volatile Organic Compounds

PAHs, phthalate esters, and substituted benzenes were detected in perched groundwater during the OU-2 RI investigation. These contaminants were also present in facility soils at elevated concentrations above screening criteria and/or were identified as COPCs. Although PAHs are typically not readily transported through soil due to their generally low aqueous solubilities and high adsorptive affinities, co-solvent effects mediated by the more mobile volatile organic compounds present may have enhanced PAH downward migration in soils. This is suggested by the soils data, which noted some PAHs occurring up to 14 feet bgs in association with detected volatile organic compounds. Similarly, the phthalate esters and substituted benzenes present are low to moderately soluble and have moderate to high affinities for organics, and thus, their migration into groundwater via percolating rainwater may also be enhanced by the presence of volatile organic compounds exerting co-solvent effects. In contrast, acetophenone is highly soluble in water and has a low affinity for organics, and would be expected to migrate more readily in percolating rainwater. In general, while adsorption is typically an important fate mechanism for most of these SVOC compounds in soils, enhanced migration via percolating rainwater into groundwater (perched or fractured bedrock) due to co-solvent effects exerted by VOCs is anticipated to be a very important environmental fate mechanism for these compounds in facility soils.

Metals and Cyanide

The transport of metals into groundwater is a function of the solubility (and related leachability) of a given metal in a specific water mass under specific conditions. Transport of metals into groundwater may also occur, to some extent, with particulate phases to which the metals are adsorbed. In water-bearing zones, transport of particulates is principally limited to colloid-size (i.e., extremely small, generally defined as less than 0.7 μm in diameter) particles, or particles smaller than the available pore space. Larger particles cannot pass through water-bearing zones because of their size (generally larger than pore space) and because the energy of the water that is slowly percolating through the ground is usually insufficient to carry particles larger than colloids in suspension.

Perched groundwater concentrations for numerous metals exceeded screening criteria values, as discussed in Section 4.0, and cyanide was detected. The metals exhibiting elevated levels and cyanide present in perched groundwater were also typically present at high concentrations in the overlying facility soils. This implies that metals and cyanide have migrated from soils to perched groundwater via percolating rainwater. Hence, migration into perched groundwater by metals and cyanide, either dissolved and/or associated with fine entrained particulates, is an important transport and migration mechanism for soil cyanide and metal contaminants.

5.7.6 Migration of Contaminated Groundwater Off the Property

Groundwater that is contaminated at the facility may migrate through subsurface water-bearing zones, thereby spreading and dispersing the contaminants. Migration of contaminants in groundwater is controlled by two processes: advection and dispersion. Advection is the process by which dissolved contaminants are transported by the bulk motion of groundwater flow. Dispersion is the spreading of dissolved contaminants as they move with groundwater and results from two basic processes: molecular diffusion and mechanical mixing. Both advection and dispersion act on contaminants in solution. Contaminants associated with large solid phases generally are not transported by groundwater; however, some limited transport of very fine particles (i.e., colloids) may occur.

Based on newly installed bedrock monitoring well groundwater elevations obtained during the OU-2 investigation in October 2000, the bedrock (upper portion of the Brunswick Formation) groundwater generally flows to the northwest. Contaminants present in groundwater emanating from the property will migrate/will have migrated to off-property areas following this local groundwater flow direction.

Based upon past historical (1999) and preliminary current (2000) groundwater data, principal site-related contaminants that are migrating to and undoubtedly within groundwater at a minimum include VOCs (TCE, PCE) and metals. The volatile organic compounds present in groundwater would be expected to migrate a great distance with the groundwater flow, until diluted to below detection limit values, primarily due to their high aqueous solubilities and low adsorptive affinities. Considering the very high concentrations of VOCs detected (TCE up to 6.85 mg/L; PCE up to 3.80 mg/L) in wells sampled in the vicinity of the facility property in the past, co-solvent effects mediated by these more mobile, water soluble organic compounds could enhance the migration of other site-related contaminants (i.e., PCBs, dioxins/furans, pesticides, etc.) that would typically not be expected

to be present/transported in groundwater due to their relatively high adsorptive affinities which would restrict their transport within groundwater over any great distance. The metals detected in groundwater, particularly those present as ionic species, would be expected to migrate a great distance with the groundwater flow until they are adsorbed by surrounding soil particles. Considering the porous nature of the parental material through which the bedrock groundwater is moving (e.g., primarily weathered/fractured bedrock), groundwater transport of site-related contaminants could occur for a long distance.

Based upon general physicochemical characteristics of the site-related contaminants, off-property migration within groundwater will be an important transport mechanism primarily for volatile organic compounds, cyanide, acetophenone and dissolved metals associated with the facility. However, co-solvent effects from the high levels of VOCs present may also cause the inclusion of PCBs, dioxin/furans, pesticides, and/or PAHs as well. Although the definitive extent of this migration is currently unknown, it will be controlled principally by groundwater flow and dilution effects, and contaminant removal mechanisms such as adsorption, equilibrium dissolution-precipitation conditions, hydrolytic degradation (primarily herbicides and endosulfan), and for some constituents, limited volatilization from groundwater into interstitial voids within the overlying vadose zone soils.

5.7.7 Migration of Contaminants to/within Surface Water and Sediments

As discussed in Section 5.7.4, off property migration of contaminants can occur during storm events primarily via surface runoff overland and/or within the stormwater drainage system/unnamed tributary, and ultimately to Bound Brook. Once within Bound Brook, further migration may occur to downstream and/or adjacent floodplain areas within the water column or sediment bed load. The significance and importance of this migration pathway is verified by historical and OU-2 RI data which show elevated concentrations of site-related contaminants primarily within the sediments and/or floodplain soils (PCBs, pesticides, VOCs, acetophenone, PAHs, cyanide, metals), and also in the water column (PCBs, VOCs, metals) of the unnamed tributary to Bound Brook and/or Bound Brook and its associated downstream receiving waterbodies (i.e., New Market Pond).

5.7.8 Migration of Contaminants into Biota

Contaminants may migrate within surface runoff via the drainage system and other site-specific surface runoff pathways previously discussed, into Bound Brook. Although undetermined at this time, contaminated groundwater may also recharge Bound Brook. Once within Bound Brook, the biota present may accumulate contaminants directly through bioconcentration or indirectly by bioaccumulation through the food chain. Since edible fish fillet samples collected by EPA from Bound Brook adjacent to the facility property (August 1997) contained two PCBs and seven pesticides, and NJDEP has issued a final fish consumption advisory for all parts of Bound Brook or its tributaries, New Market Pond and Spring Lake (August 1998) due to PCB concentrations present in rounds of fish sampling, the migration of contaminants into biota, especially edible fish species, is an extremely important environmental transport mechanism. Based on fish bioconcentration factors and organism depuration rates, this transport mechanism will be especially important for PCBs, dioxins/furans, pesticides, mercury, thallium and silver, and of lesser importance for zinc and barium.

Contaminants present in facility soil, surface water and/or wetland sediments may accumulate in terrestrial plants or organisms directly through bioconcentration or indirectly by bioaccumulation through the food chain. This migration of contaminants into terrestrial biota is an extremely important environmental transport mechanism at the facility potentially affecting algae and terrestrial plants, invertebrates, fish, reptiles, birds and mammals. This transport mechanism will be especially important for PCBs, dioxins/furans, pesticides, arsenic, lead, cadmium, copper, chromium, manganese, mercury, and zinc.

5.8 Summary

The migration of contaminants into air via the entrainment of contaminated soil particles by the wind (i.e., fugitive dust emissions) and volatilization, primarily of organic compounds, is an important environmental fate and transport mechanism at the facility. This contaminant migration pathway was, and still continues to be (although to a much lesser extent), the principle means by which PCBs associated with fine soil particles have contaminated and may still continue to contaminant the interiors of the facility buildings and the adjacent residential properties' surface soils and interiors.

Due to the poor condition of the floors, dust can be generated from the degradation of the concrete slabs/floor within the buildings. Contaminants present in the surficial layer of the building floors can become incorporated in the resulting dust generated within the buildings. Additionally, there is a potential for this contaminated dust to be tracked outside of the buildings by the operations/employees at the industrial park.

Prior to 1997, migration of contaminants by vehicle traffic via disturbance of surficial soil particulates to which constituents are adsorbed was an important environmental fate and transport mechanism at the former Cornell-Dubilier Electronics facility. The paving of the facility roadways in 1997 significantly reduced this transport mechanism; however, it still occurs when vehicles transverse any non-paved area of the property, such as the undeveloped portion.

The migration of contaminants to and within transitory impounded surface water and surface runoff either directly or via the stormwater drainage system and eventually to Bound Brook is a major environmental fate and transport mechanism at the facility. This migration has resulted in site-related contaminants migrating to the sediments and/or floodplain soils (PCBs, pesticides, VOCs, and to a limited extent acetophenone, PAHs, cyanide and metals) and the water column (PCBs, VOCs, metals) of the unnamed tributary to Bound Brook, and Bound Brook and its associated downstream receiving waterbodies (i.e., New Market Pond). This mechanism also has resulted in elevated concentrations of PCBs, VOCs, PAHs, metals and pesticides in the drainage system, and PCBs (up to 520 mg/kg in Bound Brook) and other site-related contaminants in the sediments of these receiving waterbodies. Additionally, VOCs, PCBs, pesticides and metals have been detected in the water column of these drainage systems/surface waterbodies. Although contaminated surface water is also involved, the contaminant residuals within the drainage system conduits' sediments serve as primary sinks for site-related contaminants migrating off the former Cornell-Dubilier Electronics property and as a continuing source of contamination. Migration from the drainage system to the soil material surrounding the storm sewer pipes may also be occurring; however, little is known about the integrity of this system. Based upon the data that exist to date, site-related PCBs

have migrated a substantial distance (~ 1 mile) within Bound Brook and its associated downstream receiving waterbodies via this important fate and transport mechanism.

Irrespective of precisely how contaminant migration in stormwater runoff and/or sediment occurs, once transported to the wetlands on the property and within adjacent Bound Brook and its associated waterbodies, the biota (fish) present can and have been shown to accumulate site-related contaminants (e.g., PCBs) directly through bioconcentration or indirectly by bioaccumulation through the food chain. Based on bioconcentration factors and organism depuration rates, this transport mechanism will only be important for PCBs, dioxins/furans, pesticides, mercury and silver, and of lesser importance for zinc and barium. As a direct result of data collected to date, NJDEP has issued a final fish consumption advisory for all parts of Bound Brook or its tributaries, New Market Pond and Spring Lake (August 1998) due to PCB concentrations present in edible fish fillets collected.

Contaminants present in soil, surface water and/or sediments may accumulate in terrestrial plants or organisms directly through bioconcentration or indirectly by bioaccumulation through the food chain. This migration of contaminants into terrestrial biota is an extremely important environmental transport mechanism at the facility affecting various plants and animals. This transport mechanism will be especially important for PCBs, dioxins/furans, pesticides, and several metals.

The migration of contaminants to underlying subsurface soils and fractured bedrock groundwater by the percolation of rainwater through contaminated soils and/or the former dump/fill area is a major environmental fate and transport mechanism at the facility. The OU-2 RI soils data indicate that numerous organic contaminants have migrated to a greater extent in subsurface soil than expected based solely on physicochemical characteristics. For some contaminants, this migration has extended down to fractured bedrock. This enhanced migration for some of the organic contaminants is speculated to be due to co-solvent effects exerted by the more mobile volatile organic (i.e., TCE, 1,2-DCE) contaminants. The historical and current preliminary groundwater data show that on-site migration of site-related contaminants through soil via percolating rainwater into groundwater was especially important for volatile organic compounds and PCBs. Data obtained during the performance of the OU-2 RI investigation indicate that perched groundwater areas exist beneath the property surface that are heavily contaminated with VOCs, PCBs, metals and, to a more limited extent, pesticides, cyanide and PAHs, that have migrated from the overlying soil via percolating groundwater.

Upon entering groundwater, contaminants are expected to migrate with the local groundwater flow until dilution and removal mechanisms such as adsorption, precipitation, and limited volatilization result in a reduction in their concentrations to below detectable levels. Preliminary data collected during the installation of monitoring wells during the OU-2 RI field investigation indicated that groundwater in the upper fractured bedrock aquifer generally flows to the northwest. Vertically, past/preliminary groundwater data have shown that site-related contaminants (VOCs and PCBs) have migrated to and within groundwater present in the upper fractured bedrock.

Based solely upon physicochemical characteristics, volatile organic compounds, acetophenone, cyanide and dissolved metals would be expected to migrate the farthest in groundwater, until eventually being diluted to below detection limit values, while PCBs, dioxins/furans, PAHs,

phthalate esters, pesticides, and metals associated with fine particulates are expected to migrate with the groundwater flow for only a limited distance. However, co-solvent effects exerted by more mobile organic contaminants present in groundwater may enhance the migration of PCBs, dioxins/furans, PAHs, phthalate esters, and pesticides.

SECTION 5

TABLES

TABLE 5-1
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS: PCBs AND DIOXIN

CONSTITUENT	WATER SOLUBILITY[1] (mg/L)	VAPOR PRESSURE[1] (mm Hg)	HENRY'S LAW CONSTANT[1] (atm-m^3/mol)	K_{oc}[2] (mL/g)	Log K_{ow}[1]	FISH BCF[1] (L/kg)	SUSCEPTIBLE TO HYDROLYSIS[2]	SUSCEPTIBLE TO PHOTOLYSIS[2]
PCBs								
Aroclor 1242 [a][b]	3.40×10^{-1}	4.06×10^{-4}	5.20×10^{-4}	6.30×10^{3}	5.6	6.00×10^{2}	No	Negligible
Aroclor 1248 [a][b]	6.00×10^{-2} [3]	4.94×10^{-4} [3]	2.80×10^{-3} [3]	2.77×10^{5}	6.2 [3]	5.42×10^{4} [4]	No	Negligible
Aroclor 1254 [a][b]	5.70×10^{-2}	7.71×10^{-5}	2.00×10^{-3}	5.30×10^{5}	6.5	4.68×10^{4} [4]	No	Negligible
Aroclor 1260 [a][b]	8.00×10^{-2}	4.05×10^{-5}	4.60×10^{-3}	6.70×10^{6}	6.8	2.70×10^{5}	No	Negligible
DIOXIN								
2,3,7,8-TCDD [a][b]	2.00×10^{-4} [2]	1.70×10^{-6} [2]	3.60×10^{-5} [2]	3.30×10^{6} [2]	6.72 [2]	6.60×10^{4} [5]	No	Negligible[5]

(1) - ATSDR, 2000.
(2) - EPA, 1986.
(3) - ATSDR,1996.
(4) - Mean value for edible fish species.
(5) - ATSDR, 1998.
(a) - COPC identified in Section 6.0.
(b) - Constituent above screening criteria (see Section 4.0).

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TABLE 5-2
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS: HALOGENATED AND NON-HALOGENATED VOLATILE ORGANICS

CONSTITUENT	WATER SOLUBILITY[1] (mg/L)	VAPOR PRESSURE[1] (mm Hg)	HENRY'S LAW CONSTANT[1] (atm-m^3/mol)	K_{OC}[1] (mL/g)	LOG K_{ow}[1]	FISH BCF[1] (L/kg)	SUSCEPTIBLE TO HYDROLYSIS[2]	SUSCEPTIBLE TO PHOTOLYSIS[2]
HALOGENATED								
1,1-Dichloroethene [b]	2.25×10^3	6.00×10^2	3.40×10^{-2}	65	1.84	5.6	No	Negligible
t-1,2-Dichloroethene [b]	6.30×10^3	3.24×10^2	6.56×10^{-3}	59	0.48	1.6	No	Negligible
c-1,2-Dichloroethene [a][b]	3.50×10^3	2.08×10^2	7.58×10^{-3}	49	0.70	1.6	Unavailable	Unavailable
1,2-Dichloropropane [b]	$2.80 \times 10^{3[4]}$	4.20×10^1	$2.80 \times 10^{-3[4]}$	47[4]	2.02	Unavailable	Negligible	Negligible
Methylene chloride [b]	2.00×10^4	3.62×10^2	2.03×10^{-3}	8.8	1.30	5	Unavailable	Unavailable
Trichloroethene [a][b]	1.10×10^3	5.79×10^1	9.10×10^{-3}	126	2.38	10.6	No	Negligible
Tetrachloroethene [b]	1.50×10^2	1.78×10^1	2.59×10^{-2}	364	2.60	31	No	Negligible
Vinyl chloride [a][b]	2.67×10^3	2.66×10^3	8.19×10^{-3}	57	1.38	1.17	Negligible	Negligible
NON-HALOGENATED								
Xylenes (total) [b]	1.98×10^2	1.00×10^1	7.04×10^{-3}	240	3.26	Unavailable	Unavailable	Unavailable

(1) - EPA, 1986.
(2) - Clement Associates, 1985.
(3) - Howard, 1989-93.
(4) - EPA, 2001b.
(a) - COPC identified in Section 6.0.
(b) - Constituent above screening criteria (see Section 4.0).

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TABLE 5-3
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS: PESTICIDES AND CYANIDE

CONSTITUENT	WATER SOLUBILITY[1] (mg/L)	VAPOR PRESSURE[1] (mm Hg)	HENRY'S LAW CONSTANT[1] (atm-m^3/mol)	K_{oc} (mL/g)[1]	Log K_{ow}[1]	FISH BCF[1] (L/kg)	SUSCEPTIBLE TO HYDROLYSIS[2]	SUSCEPTIBLE TO PHOTOLYSIS[2]
PESTICIDES								
Aldrin [a][b]	1.80×10^{-1}	6.00×10^{-6}	1.60×10^{-5}	9.60×10^{4}	5.30	2.8×10^{1}	No	Negligible
alpha-BHC [a][b]	1.63×10^{0}	2.50×10^{-5}	5.87×10^{-6}	3.80×10^{3}	3.90	1.3×10^{2}	No	Negligible
beta-BHC [b]	2.40×10^{-1}	2.80×10^{-7}	4.47×10^{-7}	3.80×10^{3}	3.90	1.3×10^{2}	No	Negligible
Lindane (gamma-BHC) [b]	7.80×10^{0}	1.60×10^{-4}	7.85×10^{-6}	1.08×10^{3}	3.90	1.3×10^{2}	No	Negligible
Chlordane [a][b]	5.60×10^{-1}	1.00×10^{-5}	9.63×10^{-6}	1.40×10^{5}	3.32	1.4×10^{4}	No	Negligible
DDE [a][b]	4.00×10^{-2}	6.50×10^{-6}	6.80×10^{-5}	4.40×10^{6}	7.00	5.1×10^{4}	Negligible	Negligible
DDT [a][b]	5.00×10^{-3}	5.50×10^{-6}	5.13×10^{-4}	2.43×10^{5}	6.19	5.4×10^{4}	Negligible	Negligible
Dieldrin [a][b]	1.95×10^{-1}	1.78×10^{-7}	4.58×10^{-7}	1.70×10^{3}	3.50	4.8×10^{3}	No	Slight
Endosulfan Sulfate [a]	$2.20 \times 10^{-1(3)}$	$1.00 \times 10^{-5(3)}$	$2.60 \times 10^{-5(3)}$	$2.20 \times 10^{3(4)}$	$3.26^{(4)}$	Unavailable	No	Unavailable
Endrin [b]	$2.50 \times 10^{-1(2)}$	$2.00 \times 10^{-7(2)}$	$4.00 \times 10^{-7(2)}$	$1.70 \times 10^{3(2)}$	$3.54^{(2)}$	4.0×10^{3}	No	Unavailable
Endrin Aldehyde [a]	$5.00 \times 10^{1(3)}$	2.00×10^{-7}	$2.00 \times 10^{-9(3)}$	$6.70 \times 10^{2(3)}$	$3.15^{(3)}$	Unavailable	Unavailable	Unavailable
Heptachlor [a][b]	1.80×10^{-1}	3.00×10^{-4}	8.19×10^{-4}	1.20×10^{4}	4.40	1.6×10^{4}	Negligible	Negligible
Heptachlor epoxide [a][b]	3.50×10^{-1}	3.00×10^{-4}	4.39×10^{-4}	2.20×10^{2}	2.70	1.4×10^{4}	No	Unavailable
CYANIDES								
Cyanide [a]	1.00×10^{6} (for HCN)	7.60×10^{2} (for HCN)	Unavailable	Unavailable	-0.25	Yes	Yes	Negligible

1 - EPA, 1986.
2 - Clement Associates, 1985.
3 - EPA, 1982.
4 - Howard, 1989-93.
(a) - COPC identified in Section 6.0.
(b) - Constituent above screening criteria (see Section 4.0).

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TABLE 5-4 (Sheet 1 of 2)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS: ACID AND BASE/NEUTRAL EXTRACTABLE SEMI-VOLATILES

CONSTITUENT	WATER SOLUBILITY[1] (mg/L)	VAPOR PRESSURE[1] (mm Hg)	HENRY'S LAW CONSTANT[1] (atm-m^3/mol)	K_{oc}[1] (mL/g)	Log K_{ow}[1]	FISH BCF[1] (L/kg)	SUSCEPTIBLE TO HYDROLYSIS[2]	SUSCEPTIBLE TO PHOTOLYSIS[2]
ACID EXTRACTABLES:								
Pentachlorophenol [b]	1.40×10^{1}	1.10×10^{-4}	2.75×10^{-6}	5.3×10^{4}	5.0	109[6]	No	Slight
BASE/NEUTRAL EXTRACTABLES:								
ACETYL BENZENES								
Acetophenone [a]	6.13×10^{3}[5]	3.97×10^{-1}[5]	1.07×10^{-5}[5]	4.50×10^{1}[5]	1.58[5]	1.25[5]	Slight[5]	Yes[5]
PAHs:								
Acenaphthene [a][b]	3.42×10^{0}	1.55×10^{-3}	9.20×10^{-5}	4.60×10^{3}	4.00	242	No	Negligible
Acenaphthylene [a]	3.93×10^{0}	2.90×10^{-2}	1.84×10^{-3}	2.50×10^{3}	3.70	119[2]	No	Negligible
Benzo(a)anthracene [a][b]	5.70×10^{-3}	2.20×10^{-8}	1.16×10^{-6}	1.38×10^{5}	5.60	500[6]	No	Negligible
Benzo(a)pyrene [a][b]	1.20×10^{-3}	5.60×10^{-9}	1.55×10^{-6}	5.50×10^{6}	6.06	500[6]	No	Negligible
Benzo(b)fluoranthene [a][b]	1.40×10^{-2}	5.00×10^{-7}	1.19×10^{-5}	5.50×10^{5}	6.06	500[6]	No	Unavailable
Benzo(g,h,i)perylene [a]	7.00×10^{-4}	1.03×10^{-10}	5.34×10^{-8}	1.60×10^{6}	6.51	Unavailable	No	Negligible
Benzo(k)fluoranthene [a][b]	4.30×10^{-3}	5.10×10^{-7}	3.94×10^{-5}	5.50×10^{5}	6.06	500[6]	No	Unavailable
Biphenyl [a][b]	7.45×10^{0}[5]	9.64×10^{-3}[5]	3.00×10^{-4}[5]	1.40×10^{3}[5]	4.09[5]	436[5]	No	Yes[5]
Carbazole [b]	1.20×10^{0}[5]	7.00×10^{-4}[5]	Unavailable	6.31×10^{2}[5]	3.72[5]	115[5]	No	Yes[5]
Chrysene [a][b]	1.80×10^{-3}	6.30×10^{-9}	1.05×10^{-6}	2.00×10^{5}	5.61	500[6]	No	Unavailable
Dibenzo(a,h)anthracene [a][b]	5.00×10^{-4}	1.00×10^{-10}	7.33×10^{-8}	3.30×10^{6}	6.80	500[6]	No	Unavailable
Dibenzofuran [a]	3.10×10^{0}[5]	1.80×10^{-4}[5]	1.26×10^{-5}[5]	8.13×10^{3}[5]	4.12[5]	1350[5]	No	Unavailable
Fluoranthene [a][b]	2.06×10^{-1}	5.00×10^{-6}	6.46×10^{-6}	2.80×10^{4}	4.90	1150	No	Unavailable
Fluorene [a][b]	1.69×10^{0}	7.10×10^{-4}	6.42×10^{-5}	7.30×10^{3}	4.20	1300	No	Unavailable
Indeno(1,2,3-c,d)pyrene [a][b]	5.30×10^{-4}	1.00×10^{-10}	6.86×10^{-8}	1.60×10^{6}	6.50	500[6]	No	Unavailable

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TABLE 5-4 (Sheet 2 of 2)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS: ACID AND BASE/NEUTRAL EXTRACTABLE SEMI-VOLATILES

CONSTITUENT	WATER SOLUBILITY[1] (mg/L)	VAPOR PRESSURE[1] (mm Hg)	HENRY'S LAW CONSTANT[1] (atm-m^3/mol)	K_{oc}[1] (mL/g)	Log K_{ow}[1]	FISH BCF[1] (L/kg)	SUSCEPTIBLE TO HYDROLYSIS[2]	SUSCEPTIBLE TO PHOTOLYSIS[2]
BASE/NEUTRAL EXTRACTABLES (Cont'd)								
PAHs: (Cont'd)								
2-Methylnaphthalene [a]	2.50×10^{1}[2]	5.50×10^{-2}[5]	5.18×10^{-4}[5]	8.50×10^{3}[5]	3.86[5]	30[5]	No	Negligible[5]
Naphthalene [a][b]	3.20×10^{1}[2]	8.70×10^{-2}[2]	4.60×10^{-4}[2]	9.40×10^{2}[2]	3.29[2]	30[4]	No	Yes[4]
Phenanthrene [a]	1.00×10^{0}	6.80×10^{-4}	1.59×10^{-4}	1.40×10^{4}	4.46	2630	No	Negligible
Pyrene [a][b]	1.32×10^{-1}	2.60×10^{-6}	5.04×10^{-6}	3.80×10^{4}	4.88	Unavailable	No	Unavailable
PHTHALATE ESTERS:								
bis(2-Ethylhexyl) phthalate [b]	4.0×10^{-1}	2.0×10^{-7} (20°C)	3.00×10^{-7}	2.00×10^{9}	9.61	70[6]	Negligible	Negligible
Diethyl phthalate [b]	8.96×10^{2}	3.50×10^{-3}	1.14×10^{-6}	1.40×10^{2}	2.50	117	Slight	Negligible
CHLOROBENZENES:								
Chlorobenzene [b]	4.66×10^{2}	1.17×10^{1}	3.72×10^{-3}	3.30×10^{3}	2.84	10	No	Negligible
1,4-Dichlorobenzene [b]	7.90×10^{-1}	1.18×10^{0}	2.84×10^{-3}	1.70×10^{3}	3.60	56	No	Negligible
1,2,4-Trichlorobenzene [b]	3.00×10^{1}	2.90×10^{-1}	2.31×10^{-3}	6.70×10^{2}[4]	4.30	2800	Unavailable	Unavailable

(1) -EPA, 1986.
(2) - Clement Associates, 1985.
(3) - Verschueran, K., 1983.
(4) - Howard, P.H., 1990.
(5) - SRC, 2001.
(6) - EPA, 1999a.
(a) - COPC identified in Section 6.0.
(b) - Constituent above screening criteria (see Section 4.0).

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TABLE 5-5
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF BEHAVIORAL CHARACTERISTICS THAT CONTROL ENVIRONMENTAL FATE AND TRANSPORT OF CLASSES OF ORGANIC CONTAMINANTS AND CYANIDE

Contaminant Class	Aqueous Solubility	Volatility	Adsorptive Affinity	Biodegradation/ Biotransformation	Photolysis Susceptibility	Hydrolysis Susceptibility	Oxidation	Bioconcentration in Fish
PCBs								
Aroclors 1242, 1248, 1254, and 1260	V. Low	V. Low	V. High	V. Low	Low	V. Low	V. Low	V. High
DIOXIN								
2,3,7,8-TCDD	V. Low	V. Low	V. High	V. Low	Low	V. Low	V. Low	V. High
VOLATILE ORGANIC COMPOUNDS (VOCs)								
Halogenated VOCs	High to V. High	V. High	V. Low	Low	V. Low	V. Low	V. Low	V. Low
Non-halogenated VOCs	High	V. High	Medium	High	V. Low	V. Low	V. Low	V. Low
PESTICIDES								
Pesticides	V. Low to Low	V. Low	High to V. High	Low	Low	V. Low	V. Low	High to V. High
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)								
Acetyl Benzenes	V. High	Low	V. Low	Medium to High	Low	Low	Low	V. Low
PAHs	Low to Medium	Low	Medium to High	Medium to High	Low	V. Low	Low	V. Low to Medium
Phthalate Esters	Medium to High	Low	V. High	Medium to High	Low	Low	V. Low	Low
Chlorobenzenes	Medium to High	Medium to High	Medium to High	Low	V. Low	V. Low	V. Low	V. Low to Hig
CYANIDES								
Cyanide	High to V. High	V. Low to V. High	V. Low to Low	High	Medium to V. High	Medium to V. High	Low	V. Low

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TABLE 5-6
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS AND BEHAVIORAL CHARACTERISTICS THAT CONTROL ENVIRONMENTAL FATE AND TRANSPORT OF METALS

ELEMENT	Vapor Pressure [d] (mm Hg)	Kd [c] (l/kg)	BCF [b] (l/kg)	Mobility Under pH Conditions [a]			Immobilization Factors [a]		
				Acid < 5.5	Neutral 5.5 - 7.0	Alkaline > 7.0	Fe/Mn Oxides	Organic Matter	Other
Antimony [1][2]	NA	45	1	Low	Low	Low	Yes	-	Sulfide; reducing conditions
Arsenic [1][2]	NA	200	44	Medium	Medium	Medium to High	Yes	Yes	Sulfide: clay; reducing conditions
Barium [1][2]	NA	60	633 [e]	Low	Low	Low	-	-	Sulfate; reducing conditions; clay
Beryllium [2]	NA	650	19	Low	Low	Low	Yes	Yes	Clay
Cadmium [1][2]	NA	6.5	81	Medium	Medium	Medium	Yes	Yes-	Clay; reducing conditions
Chromium [2]	NA	850	16	V. Low	V. Low	V. Low	-	-	NA
Cobalt [2]	NA	45	-	High	Medium	V. Low to Low	Yes	-	Carbonate; reducing conditions
Copper [1][2]	NA	35	200	High	Medium to Low	V. Low	Yes	Yes	Sulfide; adsorption; reducing conditions
Iron [1][2]	NA	25	-	High to V. Low	V. Low to Medium	V. Low	Yes	Yes	Oxidizing conditions; photoreduction
Lead [1][2]	NA	900	49	Low	Low	Low	Yes	Yes	Insoluble carbonate, sulfate, phosphate; reducing conditions
Manganese [1][2]	NA	65	-	High	High	High to v. Low	Yes	Yes	Clay; reducing conditions; photoreduction
Mercury (alkyl) [2]	-	NA	3750	High	High	High	-	Yes	NA
Mercury (inorganic) [2]	2.0×10^{-3}	10	5500	Medium	Low	Low	Yes	Yes	Sulfide; chloride
Nickel [2]	NA	150	47	High	Medium to Low	V. Low	-	-	Sulfide; adsorption; silicate minerals; oxidation; carbonate
Selenium [2]	NA	300	16	Low	Medium	V. High	Yes	Yes	Sulfide; reducing conditions; adsorption
Silver [2]	NA	45	3080	Low	Low	V. Low	Yes	Yes	Sulfide; chloride; reducing conditions
Thallium [1][2]	NA	1500	10000 [e]	Low	Low	Low	-	-	Reducing conditions; sulfide
Vanadium [1][2]	NA	1000	-	High	High	V. High	Yes	-	Silicate minerals; reducing conditions; adsorption; oxides; hydroxides
Zinc [2]	NA	40	1000	High	High to Medium	V. Low to Low	Yes	Yes	Sulfide; carbonate; phosphate

NOTES:
(a) = Drever, 1997; Fetter, 1999. The listed tendencies apply primarily to conditions in aqueous media.
(b) = EPA, 1979a.
(c) = Dissociation constant (K_d) between soil and water matrices, from Baes, et al., 1984.
(d) = EPA, 1986.
(e) = EPA, 1999a.

- = Not Available
NA = Not Applicable
(1) = COPC identified in Section 6.0.
(2) = Constituent above screening criteria (see Section 4.0).

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6.0 BASELINE HUMAN HEALTH RISK ASSESSMENT

6.1 Introduction

This section presents an evaluation of human health risks associated with exposure to chemical contaminants detected in the facility soils and buildings (OU-2). The objectives of the Baseline Human Health Risk Assessment (BHHRA) are to (1) provide an analysis of potential health risks, in the absence of any further action to control or mitigate contamination (i.e., determine baseline risks); and (2) assist in determining the need for, and the extent of, remediation. The BHHRA examines potential risks that could reasonably impact populations under current site conditions and under assumed future site conditions. Risks are estimated only for potentially complete exposure pathways involving contaminated facility soils and indoor building dust.

This risk assessment is based on analytical data collected during the OU-2 RI (see Section 4.0). This BHHRA was conducted in accordance with EPA's Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual Part A (EPA, 1989) and Part D (EPA, 2001f), and in accordance with methodologies approved by EPA Region 2. Also in accordance with EPA RAGS Part D guidance, Tables 1 through 10 which present information pertinent to each step of the BHHRA, accompany this risk assessment. These tables are presented in Appendix I. Table 1 of Appendix I provides information that was used to identify potential exposure pathways and focus the subsequent analysis. The remaining tables are referenced within each step presented below. Sections 6.1.1 and 6.1.2 present an overview of the risk assessment process and a guide to the overall organization of this BHHRA section.

6.1.1 Overview of the Risk Assessment Process

A human health risk assessment is generally conducted using a four-step process. This process consists of a data evaluation, an exposure assessment, a toxicity assessment, and the risk characterization. These steps are shown in Figure 6-1 and discussed below.

- **Data Evaluation and Identification of Chemicals of Potential Concern:** In the first step of a risk assessment, the data regarding the chemicals detected in media sampled during the RI are compiled and data quality issues are discussed. The data are taken through a multi-step screening process that results in a list of those chemicals warranting further evaluation. The selected chemicals are referred to as chemicals of potential concern (COPCs).

- **Exposure Assessment:** In the second step of a risk assessment, the potential ways in which individuals may be exposed to the COPCs are discussed, and the pathways warranting evaluation are selected. For each pathway selected for quantitative evaluation, the chemical concentrations at the point of possible exposure are estimated. Then the intensity, frequency, and duration of exposure are estimated for each pathway, and the exposure intakes are quantified.

- **Toxicity Assessment:** *In the third step of a risk assessment, the chemical-specific health effects* criteria to be used in the assessment are presented. The health effects criteria are discussed according to noncarcinogenic and carcinogenic effects. The health effects criteria are selected from available toxicological databases such as the Integrated Risk Information System (IRIS) (EPA, 2002). COPCs lacking published criteria are assigned surrogate toxicity factors or are discussed qualitatively.

- **Risk Characterization:** In the last step, quantitative risk estimates for each exposure pathway selected for evaluation are developed by combining the estimated intakes of the potentially exposed populations with toxicity criteria. A discussion of the major sources of uncertainty in the risk assessment that may contribute to over- or underestimation of the true risk is also presented.

6.1.2 Organization of this Section

In accordance with the general outline for a risk assessment, the remainder of this section is organized as follows:

- **Section 6.2 - Data Evaluation and Identification of COPCs:** In this section, the chemical data collected for the OU-2 RI for the Cornell-Dubilier Electronics site are summarized and discussed. Facility surface soil, subsurface soil, and indoor dust samples were collected and are the focus of this OU-2 risk assessment. The data are discussed by medium, sample type and location, and use in the risk assessment. The data are then evaluated using a multi-step screening process to identify the COPCs that will be carried through the remainder of this risk assessment.

- **Section 6.3 - Exposure Assessment:** In this section, the populations potentially exposed to the COPCs in facility soil and/or indoor dust and the pathways by which they may be exposed are identified. The concentrations of the COPCs at the points of exposure are determined, and the magnitude, frequency, and duration of exposure are identified. The algorithms representing the exposure scenarios used to calculate chronic daily intakes (CDIs) are presented.

- **Section 6.4 - Toxicity Assessment:** In this section, the chemical-specific health effects criteria or toxicity values for the COPCs are identified. Toxicity values include noncarcinogenic reference doses and carcinogenic slope factors. Sources of toxicological information and criteria in order of preference, are IRIS, the EPA's Health Effects Assessment Summary Tables (HEAST), and the EPA National Center for Environmental Assessment's (NCEA) Superfund Technical Support Center. HEAST values have been reviewed and updated by NCEA where appropriate. Also, special considerations for toxicity equivalency factors for dioxin congeners, PCB congeners, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) are discussed.

- **Section 6.5 - Risk Characterization:** In this section, the human health risks associated with exposure to the COPCs are calculated using the information developed in the exposure and toxicity steps of the BHHRA. The noncarcinogenic health effects and carcinogenic risk results are discussed separately. In addition, key uncertainties that may lead to over- or underestimatation of risk estimates are identified and discussed.

6.2 Data Evaluation and Identification of COPCs

The purpose of this section is to compile and evaluate the data, to identify those COPCs that will be retained for further evaluation in the BHHRA. Specifically, Sections 6.2.1 and 6.2.2 present the process used for data compilation and data analysis and reduction, respectively. Section 6.2.3 describes the process used for the identification of COPCs, and Section 6.2.4 presents a summary of the COPCs selected for evaluation.

6.2.1 Data Compilation

The facility property was divided into two areas (Area A and Area B) that reflected the historical property use for purposes of managing the analytical data. Figure 6-2 shows the division of the property. Area A is currently the developed portion of the property, which contains the commercial/industrial buildings and is where most of the worker activity is presently conducted. Area B is currently the undeveloped, eastern portion of the property extending to Bound Brook.

Prior to selecting COPCs, the relevant analytical data from the RI sampling were compiled. This BHHRA focuses only on the facility soil and indoor dust samples collected to assess the potential for direct and indirect exposures. As such, chemical concentrations in soil, divided into "surface" soil (samples collected from 0 to 1 foot bgs) and "subsurface" soil (samples collected from 1 to 14 feet bgs), and building dust were evaluated for direct contact exposures. The surface and subsurface soil data were also combined, and this data set was labeled as "all soils." To assess the potential for indirect contact, VOCs from all soil samples in both Area A and Area B were summarized. A summary of the number and source of samples grouped for use in the risk assessment is presented in Table 6-1.

All surface and subsurface soil samples were analyzed for full TCL Organic and TAL Metal and Cyanide constituents, as per the EPA CLP SOWs OLM04.2 and ILM04.1, respectively. Soil samples from the monitoring well borings were also analyzed for TOC and grain size distribution. In addition to these analytes, dioxin/furan congeners were measured in three surface soil samples, and PCB congeners were measured in five soil samples. Finally, indoor dust samples were analyzed for TAL Metals and PCBs. The samples were analyzed for TCL PCBs by EPA SOW OLM04.2, which provides quantitative measurement of seven Aroclor compounds. Aroclor is the common trade name given to commercially manufactured mixtures of PCBs. For commercial purposes, common mixtures of PCBs were given names/identification numbers, indicating the degree of chlorination, type of formulation, or other properties. For example, one series of mixtures was named "Aroclor" and was further distinguished by the percentage of chlorine (e.g., Aroclor-1248 contained 48 percent chlorine). The Aroclors analyzed for in this risk assessment include 1016, 1221, 1232, 1242, 1248, 1254, and 1260. The concentrations of detected Aroclor compounds for a sample were summed and reported as "Total PCBs."

The analytical sample results underwent a systematic data validation to determine that the data were adequate for their intended use (i.e., the performance of human health and ecological risk assessments, and a feasibility study). A thorough discussion of the soil and indoor dust sampling programs, including maps showing sample locations, is presented in Sections 2.6 and 2.5, respectively.

6.2.2 Data Analysis and Reduction

Summaries of the analytical results for the surface soil, all soils and indoor dust are presented by area in Tables 2.1 through Table 2.5 in Appendix I based on the considerations discussed in Sections 6.2.2.1 and 6.2.2.2.

6.2.2.1 General Considerations for Data Reduction

The compiled analytical data were converted to a useable format for the screening process used to identify COPCs as follows:

- Data that were rejected during validation ("R" qualified) were eliminated from consideration.
- Data for chemicals that were detected in any sample, including estimated concentrations ("J" qualified), were tabulated.
- Duplicate samples were averaged and the arithmetic mean of the two values was reported as the concentration for the sampling point. For the screening assessment, when a duplicate pair consisted of one detected value and one non-detected value ("U" or "UJ" qualified), the detected value was averaged with one-half of the sample quantitation limit of the non-detected value.

Tables 2-1 through 2-5 in Appendix I present a summary of the reduced data. This summary includes: minimum and maximum detected concentrations, location of maximum concentration, data qualifiers associated with the minimum and maximum concentrations, units, detection frequency, range of detection limits, concentration used for screening, background value, screening toxicity value, potential ARAR/TBC value and source, whether or not that chemical was selected as a COPC for this BHHRA (i.e., COPC flag), and the rationale for the deletion or selection of that chemical as a COPC.

6.2.2.2 Special Consideration for Some Chemical Analyses

A number of related chemicals that are best assessed as chemical classes have been detected on-site, including polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and PCBs. The methods employed to present and evaluate the environmental data for these chemical classes are described as follows.

The PCDDs and PCDFs are a family of chemical compounds whose molecular structure consists of two benzene rings attached with an oxygen bridge between them. Each of these structures contains one to eight chlorine atoms attached to the rings at various combinations of the eight available connection sites (each combination is referred to as a congener). 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is considered the most potent of the congeners and elicits toxic responses in humans and wildlife. Several PCDDs, PCDFs, and PCBs congeners have been shown to cause toxic responses similar to those associated with 2,3,7,8-TCDD. EPA's current practice is to assess mixtures of PCDDs and PCDFs based on their predicted toxicity relative to 2,3,7,8-TCDD. For this purpose, the concept of toxic equivalency factors (TEFs) is applied. The World Health Organization's (WHO) set of toxicity equivalency factors, as included in the Draft Dioxin

Reassessment (EPA, 2000e), was used in the BHHRA. For each of the soil samples with PCDD or PCDF congener data, congener concentrations were multiplied by their respective TEFs to generate a 2,3,7,8-TCDD toxicity equivalency quotient (TEQ). All of the individual TEQs are summed to generate a 2,3,7,8-TCDD total TEQ for the sample location. The WHO-TEF values are listed in Table 6-2 and dioxin equivalency calculations are presented in Appendix J.

PCBs are a group of chemical compounds consisting of mixtures of numerous chlorinated biphenyl molecules. The compounds differ in both the number and/or position of chlorine atoms attached to the biphenyl rings, for a total of 209 possible individual compounds (i.e., congeners). The WHO has assigned 14 of the PCB congeners a 2,3,7,8-TCDD TEF based on their "dioxin-like" toxic responses. Therefore, the PCB congener data were divided into dioxin-like and non-dioxin-like groups. For each of the five samples analyzed for PCB congeners, the concentrations of 14 dioxin-like congeners were multiplied by their respective TEFs and summed to generate a PCB TEQ per sample. The remaining non-dixoin-like congeners were simply summed per sample and are reported as total non-dioxin PCBs. The WHO-TEF values are listed in Table 6-3 and the PCB dioxin-like equivalency calculations are presented in Appendix K. In the risk characterization, the PCB congener data are not combined in the cumulative risks but is discussed separately in Section 6.5.3.2. The congener data were collected at sample locations where total PCB analysis was also conducted. Therefore, combining the risks from both analyses would double count and over-estimate the risks attributable to PCBs.

6.2.3 Process Used for Identification of COPCs

Once the data were compiled, a multi-step screening process was used to identify the COPCs to be carried through the BHRRA. This process identifies those COPCs that if contacted may pose potential risks to human health. The specific steps followed in this process are discussed below.

Comparison with Screening Toxicity Criteria

The maximum concentration of each chemical was compared to a risk-based screening value. Chemicals whose maximum detected concentration (MDC) was below the screening value were eliminated from the COPC list. Screening toxicity values were selected from the EPA Region 9 PRGs for residential use (EPA, 2000b). A 2002 version of the PRG table was issued after work on the OU-2 RI had began. The 2000 PRGs utilized were checked against and are consistent with the 2002 version. Only PRGs that were derived using toxicity criteria from IRIS, HEAST or NCEA were used in the screenings. Those PRGs derived from toxicity criteria from other than the aforementioned sources were not used in the screening process as directed by EPA Region 2. The PRGs correspond to a 10^{-6} risk for carcinogenic effects or a noncarcinogenic hazard index (HI) of 0.1. Screening using a targeted HI of 0.1 for noncarcinogens is recommended by EPA to protect against underestimation of noncancer hazards in the event of multiple noncarcinogens being present.

Consistent with the recommendations from NCEA in a memorandum dated 26 February 2002 and EPA Region 2, the new provisional reference dose (RfD) and slope factor (SF) range for TCE were used in the BHHRA. The TCE assessment has been externally reviewed by the Science Advisory Board. The new assessment updates the previous Health Assessment Document developed by EPA's Office of Health and Environmental Assessment (OHEA - now NCEA) in 1985. The new assessment represents an analysis based on state-of-the-art methodology. In addition, the provisional reference concentration (RfC) for PCE issued by the NCEA (dated 20 June 1997) was used in the

risk assessment. The new toxicity factors were used to calculate the PRG used in the COPC screening (Appendix I, Tables 2.1 through 2.5). Both noncancer and cancer PRGs were calculated, and the more conservative value (i.e., the lower of the two) was listed in the COPC screening.

EPA Region 9 PRGs were not available for numerous chemicals, and therefore, EPA Region 2 provided surrogate chemicals to use during noncancer/cancer toxicity screening, based on recommendations from NCEA. The surrogate chemicals are listed in Table 6-4 and in the footnotes of Appendix I, Tables 2.1 through 2.5.

Known Human Carcinogens

All chemicals designated by the EPA as Group A carcinogens (i.e., known human carcinogens; see Section 6.4) were retained for evaluation in the BHHRA regardless of their concentration. Arsenic, benzene, and vinyl chloride are all Group A carcinogens that were detected in soil or dust samples during the investigation. These COPCs were retained for evaluation in the risk assessment.

Frequency of Detection

Chemicals that are infrequently detected or present at a less than five percent frequency can be eliminated from the COPC list in accordance with Section 5.9.3 of RAGS Part A Guidance (EPA, 1989). To eliminate COPCs on this basis, the data set must contain a minimum of 20 samples. Therefore, for sample sizes greater than or equal to 20, if the detection frequency of a chemical was less than five percent, it was eliminated as a COPC.

Background Screening

Screening of media concentrations of COPCs against site-specific background or reference area concentrations may be a step taken in the identification of COPCs. The purpose of background screening is to focus the risk assessment on COPCs that are related to the facility activities or operations. Background levels of COPCs were not established for OU-2, therefore this screening step was not performed.

Essential Nutrients

In accordance with EPA guidance (EPA, 1989), chemicals that are considered essential human nutrients and that are only toxic at very high doses (i.e., doses much higher than those in environmental media) can be eliminated from consideration in the quantitative risk assessment. These chemicals include calcium, magnesium, potassium, and sodium.

6.2.4 Summary of Selected COPCs

The COPCs selected for inclusion in the risk assessment are presented in Appendix I, Tables 2.1 through 2.5. Following the screening process there were 19 COPCs identified for surface soil in Area A; 45 COPCs identified for surface soil in Area B; 37 COPCs identified for all soils (surface plus subsurface) in Area A; 59 COPCs identified for all soils in Area B; and 17 COPCs identified for indoor dust.

6.3 Exposure Assessment

This section presents the exposure assessment step of the BHHRA. The purpose of the exposure assessment is to identify the potential pathways and populations that may be exposed to the COPCs identified in site media and to quantify the exposure.

Specifically, Section 6.3.1 describes the facility property and identifies the populations that may be exposed to COPCs in facility soils and/or indoor dust. Section 6.3.2 identifies the pathways by which these populations may be exposed to the COPCs, and Section 6.3.3 presents the calculation of the concentration of the COPC at the point of exposure. Section 6.3.4 describes the method for calculating chronic daily intakes (i.e., the amount of COPCs that an individual would be exposed to each day [mg/kg-day]) for each route of exposure using population-specific exposure factors.

6.3.1 Potentially Exposed Populations

A summary of the potentially exposed populations selected for evaluation in the BHHRA is presented in Appendix I, Table 1. The current land use at the facility is commercial and industrial with both active businesses (occupied buildings) and unoccupied buildings. Approximately one-half of the property is undeveloped, consisting of grass-covered areas, wooded areas, and wooded wetlands bordering Bound Brook. It is anticipated that future land use of the facility will remain similar to the present usage (i.e., commercial and/or light industrial).

Historic documentation has indicated several paths were present on the property, and current observations of the wooded areas and wetlands appear to indicate that trespassers may still utilize the undeveloped portion (Area B) of the property. In addition, the commercial building area (Area A) does not have restricted access and trespassers could gain access there as well. Therefore, trespassers were evaluated as a potentially exposed population in both Area A and Area B. The trespassers were assumed to be local youth between the ages of 10 and 18.

Due to the current and probable future industrial/commercial land use, current and future on-site workers were identified as potentially exposed populations. Indoor workers (i.e., active businesses) as well as outdoor workers (i.e., landscaped maintenance) were assessed. Additionally, due to the possibility of future commercial development, construction workers were also identified as a potentially exposed population because they could be exposed to contaminated soils during excavation and construction activities.

In summary, three categories of human receptors (termed potentially exposed populations) were identified and evaluated quantitatively:

- Current and Future Trespassers;
- Current and Future Site Workers (indoor and outdoor); and
- Future Construction Workers.

6.3.2 Exposure Pathways

An exposure pathway describes a chemical's route of transport from its source to an exposed individual. In order for a COPC to pose a risk to human health, a complete exposure pathway must be present. As stated in EPA's RAGS (EPA, 1989), a complete exposure pathway consists of the following four elements:

1. A source and mechanism of COPC release to the environment (e.g., site-related chemicals leaked into the soil during electronics manufacturing);

2. An environmental transport medium for the released COPC (e.g., wind);

3. An exposure point (i.e., a point of potential human contact with the contaminated medium, such as contaminated soil in an industrial area); and

4. An exposure route at the point of exposure (e.g., incidental ingestion of, or dermal absorption with soil).

The selection of exposure pathways is provided in Appendix I, Table 1. Individuals could potentially be exposed to chemical contamination in soil and indoor dust directly via incidental ingestion and dermal absorption, or indirectly via inhalation. Inhalation pathways can be divided into the inhalation of airborne particulates and inhalation of volatile chemicals. In this BHHRA, inhalation of airborne particulates from soil is of concern in outdoor areas where wind could disturb contaminated soil. Inhalation of volatiles is of concern in both outdoor and indoor areas due to volatilization of chemicals in exposed soils in outdoor areas and due to infiltration of volatile chemicals into enclosed building areas from soil based on soil vapor intrusion from the groundwater. Groundwater pathways were not included in this risk assessment because groundwater will be evaluated as a separate operable unit (OU-3).

Therefore, the potential exposure routes evaluated in this risk assessment include the following:

- Incidental ingestion, dermal absorption, and inhalation (of particulates and volatiles) of soil;
- Inhalation of indoor air (from infiltrated volatiles from soil); and
- Incidental ingestion and dermal absorption of indoor dust.

An identified pathway does not imply that exposures are actually occurring, only that the potential exists for the pathway to be complete. Incidental ingestion of indoor dust, inhalation of volatiles in indoor air, and dermal absorption with indoor dust are considered complete pathways for site workers (who are assumed to be office workers) and were evaluated for current and future scenarios. Current indoor site workers are assumed to be exposed to volatiles in soil that is currently in Area A. Assuming no remediation occurs in Area A, the potential risk and hazards would not change for future Area A indoor site workers. Future indoor site workers are assumed to be exposed to volatiles in soils from Area B, since that portion is not currently developed.

Incidental ingestion of surface soil, inhalation of volatiles and particulates (in outdoor air), and dermal absorption were considered complete pathways for the current site outdoor worker and

trespasser populations in both Area A and Area B. It is assumed that if development occurs, soil from both surface and subsurface could become mixed. Therefore, incidental ingestion of all soil, inhalation of volatiles and particulates (in outdoor air), and dermal absorption were considered complete pathways for the future site outdoor worker and trespasser populations in both Area A and Area B. Incidental ingestion of all soils, inhalation (of volatiles and particulates), and dermal absorption were considered complete pathways for the future construction worker in both Area A and Area B.

6.3.3 Calculation of Exposure Point Concentrations

In order to quantify the magnitude of exposure that occurs to a receptor, exposure point concentrations (EPCs) must first be estimated for the identified COPCs from the applicable data sets. The EPC is the estimated concentration of the COPC in the medium to which a receptor would be exposed. The EPCs are used in conjunction with other exposure factors to calculate chronic daily intakes. The objective of this BHHRA is to evaluate the risk to the receptors based on a reasonable maximum exposure (RME) and a central tendency (CT) exposure. The RME is defined as the "highest exposure that is reasonably expected to occur at the site" and the CT is defined as the average exposure. The EPC for the RME and CT exposure scenarios are chosen to be the same value; however, the exposure factors used to calculate the RME and CT chronic daily intakes differ as described below.

For this BHHRA, the EPCs for surface soil and all soils in Areas A and B, and for dust samples were calculated separately using the analytical data summarized in Tables 2.1 through 2.5. EPCs were calculated in a manner consistent with RAGS Part A (EPA, 1989) and "Supplemental Guidance to RAGS: Calculating the Concentration Term" (EPA, 1992). A summary of the EPCs is presented in Appendix I, Tables 3.1 through 3.5 (Note: This set includes a total of eight tables because of the analysis of statistical outliers - see below).

The following criteria were used to calculate an EPC from the appropriate data set:

- Duplicate values were averaged. When a duplicate pair consisted of one detected value and one non-detected value, the detected value was averaged with one-half the sample quantitation limit of the non-detected value.

- If a COPC was not detected in a sample, it was assumed to be present at one-half its sample quantitation limit.

In accordance with EPA guidance (EPA 1989; EPA 1992), the lower of the maximum detected value, or the 95 percent upper confidence limit (95% UCL) on the mean for each COPC was used as the EPC. The EPA program ProUCL (Version 2.0) developed for EPA by Lockheed Martin (EPA, 2001d) was used to calculate the EPCs. The equation used to calculate the 95% UCL is dependent upon the distribution of the data set. The most appropriate distribution for characterizing each data set was determined by the Shapiro-Wilk Test or the Lillifors Test. The Shapiro-Wilk Test can be applied to a data set if the data set contains 50 or less samples, while the Lillifors Test is applied to sample sets larger than 50. The equation for calculating the 95% UCL of the arithmetic mean for a normally distributed data set is as follows:

$$95\%\ \text{UCL} = \overline{x} + t_{df,0.05} \cdot \frac{S_x}{\sqrt{n}}$$

Where:

$\bar{x}$	=	Arithmetic mean of the untransformed data
S_x	=	Standard deviation of the untransformed data.
n	=	Number of sample analyses
$t_{df,0.05}$	=	Student -t statistic depends on the degrees of freedom (df) and the probability confidence level (0.05)

The equation for calculating the 95% UCL of the arithmetic mean for a log normally distributed data set is as follows:

$$Lognormal\ 95\%\,UCL = \exp\left[\bar{y} + 0.5S_y^2 + \frac{S_y H_{Sy,0.95}}{\sqrt{n-1}}\right]$$

Where:

exp	=	Constant (base of the natural log equal to 2.718
$\bar{y}$	=	Arithmetic mean of the transformed data [$y_i = \ln X_I$]
S_y	=	Standard Deviation of the transformed data [$y_i = \ln X_I$]
n	=	Number of sample analyses
$H_{Sy,0.95}$	=	H statistic depends on S_y and n for the 95% confidence level

If a data set was found to be neither normally nor log normally distributed, the data distribution was considered non-parametric. The data distribution for a majority of the chemicals tested in each data set were non-parametric. The ProUCL guidance lists recommendations for which UCL to select based on the data distribution's standard deviation. However, the data sets were very skewed, indicative of a highly variable, heterogeneous data set. EPA Technical Support Center, Las Vegas, Nevada (EPA Las Vegas) provided technical support by reviewing the data sets and recalculating UCLs. The resulting recommended UCLs per data set are provided in Appendix M, Tables 1 through 4. It should be noted that some of the maximum concentrations cited were corrected in Appendix I, Tables 3.1 through 3.5. The data sets for statistical analysis include one-half of non-detected values that can exceed the maximum detected concentration. Also, some chemicals listed in Tables 1 through 4 of Appendix M may not be included in the BHHRA as the COPC list has been reduced through the use of surrogate toxicity screening values since the UCLs were provided.

During the evaluation of the chemicals found in soil, the statistical analysis identified a number of data points that were considered statistical outliers by EPA Las Vegas. To calculate an EPC, a statistical analysis of the upper confidence limit on the mean was conducted based on the full data set including the outliers and a second EPC was calculated using a data set that excluded the outliers.

Both EPC data sets, including outliers and excluding outliers, were used to calculate the noncancer hazards and cancer risks. If the data set did not have a minimum of 10 samples, statistical analysis could not be completed and the maximum detected concentration was used as the EPC. If the recommended UCL was greater than the maximum detected concentration, then the maximum detected concentration was used as the EPC.

All of the EPCs are presented in Appendix I, Tables 3.1 through 3.5. For the three data sets that contained outliers - Surface Soil Area B, All Soil Area A, and All Soil Area B - two data tables are included. For Surface Soil Area B, Table 3.2.1 provides the EPCs that contain the outliers and Table 3.2.2 provides the EPCs that exclude the outliers. For All Soil Area A, Table 3.3.1 provides the EPCs that contain the outliers and Table 3.3.2 provides the EPCs that exclude the outliers. For All Soil Area B, Table 3.4.1 provides the EPCs that contain the outliers and Table 3.4.2 provides the EPCs that exclude the outliers. The BHHRA provides a comparison of the calculated noncancer hazards and cancer risks including and excluding the outliers in Section 6.5.3.

Volatile organic compound contamination in indoor air originating from subsurface soil beneath the buildings on the property was modeled using the Johnson and Ettinger Model for Subsurface Vapor Intrusion into Buildings (EPA, 2000d). The Johnson and Ettinger (J&E) Model addresses both convective and diffusive vapor transport to estimate an attenuation coefficient that relates the vapor concentration in indoor air to the vapor concentration at the source of contamination (i.e., subsurface soil). EPA developed a series of spreadsheets that calculates the chemical-specific infinite source attenuation coefficient using the J&E Model. These spreadsheets, downloaded from the EPA website, were used in the BHHRA.

The J&E Model requires many site-specific input parameters, including building dimensions, depth of contamination, and soil characteristics. Where site-specific parameters were not used, conservative default values were taken from the User's Guide. In addition, many of the J&E Model inputs are chemical-specific values. These chemical-specific values are presented on the calculation tables included in Appendix N.

6.3.4 Estimates of Chronic Daily Intake

Identifying the magnitude, frequency, and duration of exposure for the identified adult or youth receptors via each pathway is the last step in the exposure assessment. The intake of a COPC is estimated from at least six basic factors: exposure frequency, exposure duration, contact rate, EPC, body weight, and averaging time. References for the exposure parameters include the Soil Screening Guidance residential (EPA, 1996b) and nonresidential (EPA, 2001g) exposures. In addition, the EPA Standard Default Exposure Factors Guidance (EPA, 1991) and the Exposure Factors Handbook (EPA, 1997e) were used.

Estimates of the chronic daily intake of COPCs were typically developed to reflect both RME and CT exposure scenarios. Per EPA Region 2, if the estimated risk or hazard index for a potentially exposed receptor under the RME scenario exceeds the EPA benchmark risk levels (Section 6.5.3), then the risk should be re-evaluated under the CT exposure scenario. Both RME and CT scenarios are presented for each population except the construction worker. No CT scenario was considered

for the construction worker due to the short exposure duration in the RME scenario. The equations and exposure factors used to estimate chronic daily intake are described below for the various populations and are presented in Appendix I, Tables 4.1 through 4.7. The reference for each exposure factor is also identified in these tables. Exposure factors such as body weight, exposure duration and exposure frequency are consistent for a population across all exposure pathways.

The trespasser is assumed to be a youth between the ages of 10 and 18 years. His or her body weight is assumed to be 53.1 kg for both the RME and CT scenarios, the mean weight for boys and girls in that age range. The RME and CT exposure durations are assumed to be 9 years to correspond with the age range of the trespasser. The RME exposure frequency is 104 days/year, based on an assumption of visiting the property two days per week for the entire year. This value is based on professional judgement noting occupational considerations, school attendance days, and limitations on outdoor activities due to climate. The CT exposure frequency is 52 days per year, based on an assumption of visiting the property one day per week for the entire year. This value was based on professional judgement assuming one-half of the RME value.

The outdoor site worker is assumed to be an adult who is 18 years of age or older. His or her body weight is assumed to be 70 kg for both the RME and CT scenarios. The RME exposure frequency and exposure duration for the outdoor site worker are 225 days/year and 25 years, respectively. The CT exposure frequency and exposure duration for the outdoor site worker are based on a 50th percentile worker profile of 219 days/year and 6.6 years, respectively.

The indoor site worker also is assumed to be an adult who is 18 years of age or older. His or her body weight is assumed to be 70 kg for both the RME and CT scenarios. The RME exposure frequency and exposure duration for the indoor site worker are based on a 95th percentile worker profile of 250 days/year and 25 years, respectively. The CT exposure frequency and exposure duration for the indoor site worker are based on a 50th percentile worker profile of 219 days/year and 6.6 years, respectively.

The construction worker is assumed to be an adult who is 18 years of age or older. His or her body weight is assumed to be 70 kg. The RME exposure time, exposure frequency, and exposure duration are 10 hours/day, 216 days/year, and one year, respectively (professional judgement based on a 9 month, 6 days per week construction period).

6.3.4.1 Incidental Soil or Dust Ingestion

The equations used to estimate chronic daily intake through incidental soil ingestion are:

Carcinogen:

$$CDI = \frac{CS \times IRS \times EF \times ED \times CF1}{BW \times AT_C}$$

Non-Carcinogen:

$$CDI = \frac{CS \times IRS \times EF \times ED \times CF1}{BW \times AT_N}$$

Where:

Parameter	Definition
CDI	Chronic Daily Intake (mg of COPC per kg of body weight per day [mg/kg-day])
CS	Concentration of the COPC in Soil or Dust (mg/kg)
IRS	Ingestion Rate of Soil or Dust (mg/day)
EF	Exposure Frequency (days/year)
ED	Exposure Duration (years)
CF1	Conversion Factor 1 (kg/mg)
BW	Body Weight (kg)
AT_C	Averaging Time (Cancer) (days)
AT_N	Averaging Time (Noncancer) (days)

The indoor site worker is assumed to ingest dust at a rate of 50 mg/day for both the RME and CT scenarios. The outdoor site worker is assumed to ingest soil at a rate of 100 mg/day for both the RME and CT scenarios. The youth trespasser is assumed to ingest soil at a rate of 100 mg/day for the RME scenario and 50 mg/day for the CT scenario (professional judgement based on one-half RME time on-site). The construction worker is assumed to ingest soil at a rate of 330 mg/day.

6.3.4.2 Dermal Absorption of Chemicals in Soil or Dust

The equations used to estimate the dermally absorbed dose resulting from dermal absorption with soil are:

Carcinogen:

$$DAD = \frac{CS \times SA \times DABS \times SSAF \times EF \times ED \times CF1}{BW \times AT_c}$$

Non-Carcinogen:

$$DAD = \frac{CS \times SA \times DABS \times SSAF \times EF \times ED \times CF1}{BW \times AT_n}$$

Where:

Parameter	Definition
DAD	Dermally Absorbed Dose (mg of COPC per kg of body weight per day [mg/kg-day])
CS	Concentration of the COPC in Soil or Dust (mg/kg)
SA	Skin Surface Area (cm^2)
DABS	Dermal Absorption Factor (unitless)
SSAF	Soil to Skin Adherence Factor (mg/cm^2-event)
EF	Exposure Frequency (days/year)
ED	Exposure Duration (years)
CF1	Conversion Factor 1 (kg/mg)
BW	Body Weight (kg)
AT_C	Averaging time (Cancer) (days)
AT_N	Averaging time (Noncancer) (days)

For the indoor worker, the exposed skin surface area for dermal absorption is assumed to be 3,300 cm^2 for both the RME and CT scenarios. This value corresponds to a worker wearing short sleeves, long pants, and shoes (i.e., exposed head, neck, arms, and hands). The soil to skin adherence factor was set at 0.2 and 0.02 mg/cm^2-event, for the RME and CT scenarios, respectively.

For the outdoor worker, the exposed skin surface area for dermal absorption is assumed to be 3,300 cm^2 for both the RME and CT scenarios. This value corresponds to a worker wearing short sleeves, long pants, and shoes (i.e., exposed head, neck, arms, and hands). The soil to skin adherence factor was set at 0.2 and 0.02 mg/cm^2-event, for the RME and CT scenarios, respectively.

For the trespasser, the exposed skin surface area for dermal absorption is assumed to be 4,770 cm^2 for both the RME and CT scenarios. This value represents the mean surface area of arms, hands, and lower legs for boys and girls 10 to 18 years of age. The soil to skin adherence factor was set at 0.2 mg/cm^2-event for the RME scenario, based on the recommended residential child RME value. The soil to skin adherence factor was set at 0.04 mg/cm^2-event for the CT scenario.

For the construction worker, the exposed skin surface area for dermal absorption is assumed to be 3,300 cm^2 for the RME scenario. This value corresponds to a worker wearing short sleeves, long pants, and shoes (i.e., exposed head, neck, arms and hands). The soil to skin adherence factor was set at 0.3 mg/cm^2-event for the RME scenario.

6.3.4.3 Inhalation of (Outdoor) Volatiles and Soil Particulates

The chronic daily intake of volatiles (in outdoor air) was derived from volatile COPC concentrations in surface soil for the outdoor site worker and trespasser scenarios and from volatiles in surface and subsurface soil for the construction worker scenarios using chemical-specific volatilization factors from the EPA Soil Screening Guidance. The volatilization factor (VF) is derived using the following equation: (EPA, 1996b).

$$VF = Q/C \times \frac{\sqrt{(3.14 \times Da \times T)}}{(2 \times \rho_b \times Da)} \times 10E-04\ m^2/cm^2$$

Where:

Parameter	Definition
VF	Volatilization Factor (m^3/kg)
Q/C	Inverse of Mean Concentration at Center of Square Source [$(g/m^2\text{-}s)/(kg/m^3)$]
Da	Apparent Diffusivity (cm^2/s)
T	Exposure interval (s)
ρ_b	Dry Soil Bulk Density (g/cm^3)

The particulate emissions factor (PEF) was derived using the following equation from the Soil Screening Guidance (EPA, 1996b):

$$PEF = Q/C \times \frac{3600\ (s/h)}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$$

Where:

Parameter	Definition
PEF	Particulate Emission Factor (m^3/kg)
Q/C	Inverse of Mean Concentration at Center of Square [$(g/m^2\text{-}s)/(kg/m^3)$]
V	Fraction of Vegetative Cover (unitless)
U_m	Mean Annual Wind Speed (m/s)
U_t	Equivalent Threshold Value of Wind Speed at 7m (m/s)
F(x)	Function Dependent on Um/Ut (unitless)
3600 (s/h)	Conversion Factor for Seconds per Hour

The PEF equation is used for all non-VOC COPCs.

The Q/C value used in this assessment was the average of the Q/C values from Hartford, Harrisburg, Philadelphia, and Cleveland. Default values from the Soil Screening Guidance were used for the remainder of the parameters (EPA, 1996b). The PEF value calculated for use in this risk assessment was 6.12E+08 m^3/kg.

Per EPA Region 2, a chemical-specific PEF was used for Total PCBs. The value of 1.3E+09 m^3/kg was taken from the Draft Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (EPA, 2001g) currently under peer review.

The equations used to estimate chronic daily intake through inhalation of particulates and volatiles from soil are:

Carcinogen:

$$CDI = \frac{CS \times \left(\frac{1}{PEF} + \frac{1}{VF}\right) \times IN \times EF \times ED}{BW \times AT_C}$$

Non-Carcinogen:

$$CDI = \frac{CS \times \left(\frac{1}{PEF} + \frac{1}{VF}\right) \times IN \times EF \times ED}{BW \times AT_N}$$

Where:

Parameter	Definition
CDI	Chronic Daily Intake (mg of COPC per kg of body weight per day [mg/kg-day])
CS	Concentration of the COPC in Surface Soil and All Soil (mg/kg)
PEF	Particulate Emission Factor (m^3/kg)
VF	Volatilization Factor (m^3/kg)
IN	Inhalation Rate (m^3/day)
EF	Exposure Frequency (days/year)
ED	Exposure Duration (years)
BW	Body Weight (kg)
AT_C	Averaging Time (Cancer) (days)
AT_N	Averaging Time (Noncancer) (days)

The inhalation rate for the outdoor site worker is assumed to be 20 m^3/day for both the RME and CT scenarios.

The inhalation rate for the trespasser is assumed to be 1.2 m^3/hr for 2 hours/day for the RME scenario. These values are based on moderate activity levels for children and residential outdoor activity patterns (based on professional judgement). The inhalation rate for the trespasser is assumed to be 1.0 m^3/hr for 1 hour/day for the CT scenario. These values are based on light activity levels for children and one half of the RME residential outdoor activity pattern (based on professional judgement).

The inhalation rate for the construction worker is assumed to be 3.3 m^3/hr for 10 hours/day for the RME scenario. These values are based on the upper percentile inhalation rate for hourly workers and an extended workday (based on professional judgement).

6.3.4.4 Indoor Air Inhalation (of Volatiles from Soil)

The equations used to estimate chronic daily intake through indoor air inhalation are:

Carcinogen:

$$CDI = \frac{CS \times alpha \times SP \times IN \times EF \times ED}{BW \times AT_C}$$

Non-Carcinogen:

$$CDI = \frac{CS \, x \, alpha \, x \, SP \, x \, IN \, x \, EF \, x \, ED}{BW \, x \, AT_N}$$

Where:

Parameter	Definition
CDI	Chronic Daily Intake (mg of COPC per kg of body weight per day [mg/kg-day])
CS	Concentration of the COPC in All Soil (mg/kg)
alpha	Infinite Source Attenuation Coefficient (unitless) – Calculated using J&E Model
SP	Soil Properties Term (kg/m^3) – from J&E Model
CA	Concentration in Air = CS * alpha * SP (mg/m^3)
IN	Inhalation Rate (m^3/day)
EF	Exposure Frequency (days/year)
ED	Exposure Duration (years)
BW	Body Weight (kg)
AT_C	Averaging Time (Cancer) (days)
AT_N	Averaging Time (Noncancer) (days)

The RME and CT inhalation rates for indoor site workers are both 20 m^3/day.

6.4 Toxicity Assessment

This section describes the process used to identify route-specific toxicity factors for each COPC selected for further evaluation. Toxicity factors are used in conjunction with the information presented in the exposure assessment (Section 6.3) to calculate risks presented in the risk characterization (Section 6.5).

EPA has performed toxicity assessments for numerous chemicals and has published the corresponding toxicity factors, which have undergone peer review. These toxicity factors include reference doses (RfDs) and reference concentrations (RfCs) for evaluating the noncarcinogenic health effects associated with exposure, and carcinogenic slope factors (CSFs) and unit risks (URs) for evaluating the carcinogenic health effects associated with exposure. Section 6.4.1 presents information regarding the identification of noncarcinogenic health criteria, and Section 6.4.2 presents the information regarding the identification of carcinogenic health criteria used in this BHHRA.

Specific toxicity factors are available from EPA in the IRIS database (EPA, 2002) to evaluate both noncarcinogenic and carcinogenic endpoints. However, EPA has not developed RfDs or CSFs for all of the COPCs. For these chemicals, HEAST (EPA, 1997h) and the EPA's NCEA were consulted. For some chemicals, where neither IRIS nor HEAST criteria were available, EPA Region 2 was consulted for recommendations regarding surrogate toxicity criteria. The treatment of these COPCs is presented in Section 6.5.4.3 in the uncertainty section. A summary of the toxicity data for each noncarcinogenic and carcinogenic COPC is presented in Appendix I, Tables 5.1 and 5.2 (noncarcinogenic), and Tables 6.1 and 6.2 (carcinogenic).

6.4.1 Noncarcinogenic Health Criteria

For noncarcinogens, EPA publishes RfDs and RfCs that are the chemical-specific doses or concentrations, respectively, below which adverse health effects are not expected to occur. For chemicals to have noncarcinogenic effects, organisms' repair and detoxification capabilities must be exceeded by some critical level (threshold) before the health effect is manifested. For example, an organ can have a large number of cells performing the same or similar functions that must be significantly depleted before an effect on the organ is seen. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without an appreciable risk of adverse effects.

Oral/Dermal Factors

The chronic oral/dermal RfD factors used in this BHHRA were compiled from the hierarchy of sources listed above. An RfD, expressed in units of milligrams of chemical per kilogram body weight per day or mg/kg-day, is an estimate of a daily exposure level for humans (including sensitive individuals) that is likely to be without an appreciable risk of deleterious effects during the period of exposure. The daily dose is averaged over the period of a year for the years of exposure. The purpose of the RfD is to provide a benchmark value against which estimated doses (e.g., those projected for human exposures to various environmental media) might be compared. Doses that are higher than the RfD may indicate that an inadequate margin of safety could exist for exposure to that substance and that an adverse health effect could occur. The RfD is derived using modifying/uncertainty factors (e.g., to adjust exposures from animals to humans and to protect sensitive sub-populations), so it is unlikely to underestimate the potential for adverse noncarcinogenic effects to occur. The chronic oral RfD values are listed on Table 5.1 in Appendix I.

The chronic dermal RfD values are also listed on Table 5.1. There are, at present, no EPA-derived RfDs for the dermal route of exposure. Dermal RfDs presented in Table 5.1 were calculated from the oral RfD value using an oral-to-dermal adjustment factor. The oral-to-dermal adjustment factor is based on chemical-specific gastrointestinal absorption efficiencies listed in Exhibit 4-1 of "Draft RAGS Part E: Dermal Risk Assessment" (EPA, 2001e). The methodologies developed for evaluating dermal absorption are based on an estimation of absorbed doses. The IRIS-verified RfDs, the HEAST values with updates by NCEA, and NCEA values, are typically based on an administered dose. Therefore, an adjustment of the oral toxicity factor to represent an absorbed rather than an administered dose is necessary. The adjustment accounts for the absorption efficiency in the critical clinical or epidemiological study forming the basis of the published toxicity factor. The magnitude of the toxicity factor adjustment is inversely proportional to the absorption fraction in the critical study. As the absorption efficiency decreases, the difference between the absorbed dose and the administered dose increases. Consistent with "Draft RAGS Part E: Dermal Risk Assessment" (EPA, 2001e), an adjustment was made when the following conditions were met:

- The toxicity factor derived from the critical study is based on an administered dose (e.g., delivery in diet or by gavage) in its study design; and
- A scientifically defensible database demonstrates that the gastrointestinal (GI) absorption of the chemical in question from a medium (e.g., water, feed) similar to the one employed in the critical study is significantly less than 100% (i.e., <50%).

If these conditions were not met, complete (i.e., 100%) absorption was assumed, and no adjustment of the oral toxicity value was made to obtain a toxicity value to be used for the dermal absorption route. However, only chemicals that also have a dermal absorption fraction cited in Table 3-4 of the "Draft RAGS Part E: Dermal Risk Assessment" (EPA, 2001e) were adjusted. A dermal absorption factor (Section 6.3.4.2) is necessary in order to calculate the dermally absorbed dose. Table 6-5 presents the GI absorption percentages published for the COPCs that also have a dermal absorption fraction.

Inhalation Criteria

Noncarcinogenic toxicity values for the inhalation pathway are typically expressed as RfCs. The inhalation RfC is analogous to the RfD and is an estimate of the air concentration in mg/m^3 that an individual can breathe over the period of exposure without a risk of deleterious effects. The inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrarespiratory effects). The chronic inhalation RfC values used in this BHHRA are listed on Appendix I, Table 5.2. The RfCs were compiled from the hierarchy of sources previously listed. The inhalation RfD values (RfDi) were calculated from the RfC using an inhalation rate of 20 m^3/day and a body weight of 70 kg. This relationship is shown below:

$$RfDi\ (mg/kg/day) = RfC\ (mg/m^3) \times [(20\ m^3/day)/(70\ kg)]$$

Consistent with the recommendations from NCEA in a memorandum dated 26 February 2002 and EPA Region 2, the new provisional RfD for TCE was used in this BHHRA. The new assessment represents an analysis based on state of the art methodology. In addition, the provisional RfC for PCE issued by the NCEA, dated 20 June 1997, was used in this BHHRA.

6.4.2 Carcinogenic Health Criteria

EPA currently uses a system for classifying chemicals according to their likelihood as a human carcinogen. This system is based on five categories that make up the "weight-of-evidence" system of carcinogenicity that is used to classify each chemical. The weight-of-evidence classification system is summarized below:

Group	Classification
A	This category indicates there is sufficient evidence from epidemiological studies to support a causal association between an agent and human cancer.
B1	This category generally indicates there is at least limited evidence from epidemiological studies of carcinogenicity to humans.
B2	This category generally indicates, in the absence of data on humans, there is sufficient evidence of carcinogenicity in animals.
C	This category indicates that there is limited evidence of carcinogenicity in animals in the absence of data on humans.
D	This category indicates that the evidence for carcinogenicity in animals is inadequate, or no data are available.
E	This category indicates that there is evidence of noncarcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies.

The toxicity values used to evaluate carcinogenicity are CSFs and URs. These values reflect the relative probability that the incidence of cancer is increased in target populations exposed to that chemical.

Oral/Dermal Criteria

The oral and dermal CSF values used in this risk assessment are listed in Table 6.1 of Appendix I. A CSF is a numerical estimate of the potency of a chemical, which, when multiplied by the average lifetime dose, gives the probability of an individual developing cancer over a lifetime. CSFs are expressed in units of the inverse of milligrams of chemical per kilogram of body weight per day, or $[(mg/kg\text{-}day)^{-1}]$. CSFs are usually derived by EPA by means of a linearized multi-stage model and reflect the upper-bound limit of cancer potency of a chemical. As a result, the calculated carcinogenic risk is likely to represent a plausible upper limit to the risk. The actual risk is unknown but is likely to be lower than the predicted risk, and may be as low as zero (EPA, 1989). The oral CSFs used in this BHHRA were compiled from the hierarchy of sources listed in Section 6.4. Some chemicals do not have published oral CSF values.

There are, at present, no EPA-derived CSFs for the dermal route of exposure. The dermal CSF values listed on Appendix I, Table 6.1 were calculated from the oral CSF value using an oral-to-dermal adjustment factor. The adjustment for the oral CSFs was performed using the same process applied for the oral RfDs, as described in Section 6.4.1.1. It should be noted, however, that adjustment of the RfD required its multiplication with the oral-to-dermal adjustment factor, while adjustment of the CSF requires its division by the oral-to-dermal adjustment factor.

Inhalation Criteria

Carcinogenic toxicity values for the inhalation pathway are typically expressed as URs. The inhalation CSF and UR values used in the risk assessment are listed in Table 6.2 of Appendix I. The URs were compiled from the hierarchy of sources listed in the beginning of this section. The inhalation CSF values (CSFi) were calculated from the URs using an inhalation rate of 20 m^3/day and a body weight of 70 kg. This relationship is shown below:

$$CSFi\ (mg/kg/day)^{-1} = UR\ (mg/m^3)^{-1} \times [(70kg)/(20m^3/day)]$$

6.4.3 Dermal Toxicity Values

As stated in Section 6.4.1, chemical-specific gastrointestinal absorption information is needed in order to derive dermal toxicity factors. Adjustments in oral cancer toxicity factors were completed as described for the noncancer toxicity factors.

6.4.4 Evaluation of Dioxins and Furans

PCDDs and PCDFs are chemically classified as halogenated aromatic hydrocarbons. Depending on the positioning of the chlorine(s), there are 75 individual compounds comprising the PCDDs, and 135 different PCDFs (Section 6.2.2.2) and these are called individual congeners. The most widely studied of these compounds is 2,3,7,8-TCDD. This compound, often called simply "dioxin,"

represents the reference compound for this class of compounds. Only 7 of the 75 congeners of PCDDs are thought to have dioxin-like toxicity; these are ones with chlorine substitutions in, at least, the 2, 3, 7, and 8 positions. Only 10 of the 135 possible congeners of PCDFs are thought to have dioxin-like toxicity. These also are ones with chlorine substitutions in the 2, 3, 7, and 8 positions (EPA, 1994). Therefore, dioxin toxicity factors were applied to the 2,3,7,8-TCDD TEQ for the risk characterization.

6.4.5 Evaluation of Polychlorinated Biphenyls

In accordance with the recommendations presented in the 1996 Cancer Reassessment for PCBs and the recommendations from IRIS, a three-tier approach was used in the application of the cancer slope factors for total PCBs. In Tier 1, a cancer slope factor of 2 $(mg/kg\text{-}day)^{-1}$ was used for the RME exposures through ingestion of soil based on the "High Risk and Persistence" category which is applicable for food chain exposures, sediment or soil ingestion, dust or aerosol inhalation, dermal exposure (when an absorption factor is applied), early-life exposures, and mixtures with dioxin-like, tumor promoting, or persistent congeners. The cancer slope factor of 1 $(mg/kg\text{-}day)^{-1}$ was used for the central tendency or average exposure. A second tier, "Low Risk and Persistence," was applied for ingestion of water soluble congeners, inhalation of evaporated congeners, and dermal exposures (if no absorption factor has been applied), with an upper bound cancer slope factor of 0.4 $(mg/kg\text{-}day)^{-1}$ and an average cancer slope factor of 0.3 $(mg/kg\text{-}day)^{-1}$. The third tier, "Lowest Risk and Persistence," is applicable only to mixtures where congeners with more than four chlorines comprise less than one-half percent of the total PCBs, and the upper bound cancer slope factor is 0.07 $(mg/kg\text{-}day)^{-1}$ and the average cancer slope factor is 0.04 $(mg/kg\text{-}day)^{-1}$.

For non-cancer health effects, there are three IRIS chemical files available. Quantitative Reference Doses (RfDs) are available for Aroclor-1016 and Aroclor-1254, and a qualitative statement is available for Aroclor-1248. Due to various environmental processes, PCB mixtures in the environment no longer resemble the Aroclor mixture originally released into the environment. The sampling results indicate a pattern more similar to Aroclor-1254 and therefore, this RfD was used in the calculation of Hazard Indices for PCBs.

For purposes of this BHHRA, the PCB congener data were separated into dioxin-like PCBs and nondioxin-like PCBs. Dioxin-like PCBs are defined to include the subset of this class of compounds, which are generally agreed to produce dioxin-like toxicity. Therefore, dioxin toxicity factors were applied to the dioxin-like PCB TEQ and the total PCB toxicity factors were applied to the non-dioxin-like PCB TEQ for the risk characterization

6.4.6 Evaluation of Polycyclic Aromatic Hydrocarbons

PAHs are generally found together in a mixture of structurally related compounds. EPA classifies seven of the PAHs as probable human carcinogens with sufficient animal evidence but limited human evidence. The toxicity of these seven compounds, referred to collectively as cPAHs, was evaluated in this assessment using TEF values defined by EPA. The TEF values used in this assessment are presented in Table 6-6.

6.4.7 Evaluation of Lead

The traditional risk assessment approach for evaluating noncancer effects from exposure to COPCs involves comparison of COPC intakes to an RfD. This approach is inappropriate for lead because a "no observable adverse effects level" (NOAEL) for lead has not been identified (i.e., there is no RfD for lead). The IRIS file for lead describes the Agency's decision not to develop a RfD for lead (EPA, 2002b). In the absence of a RfD for lead, noncancer risks for lead exposures were evaluated qualitatively by comparing soil lead concentrations to the lead screening level of 1,250 mg/kg in soil. This screening value was developed by EPA's Technical Review Workgroup for Lead using the Adult Lead Model. Modeling was performed assuming different effect level blood lead concentrations and the default commercial/industrial exposure parameters (EPA, 2000b). The modeling produced a range of corresponding soil lead concentrations from 750 to 1,750 mg/kg. The screening value of 1,250 mg/kg was selected as it is the mean of the calculated range. The RAGS Part D Adult Lead Worksheets for each exposed population are presented in Appendix O.

6.4.8 COPCs Evaluated Using Surrogate Toxicity Factors

Surrogate toxicity factors were used for evaluating both noncancer hazards and cancer risks for COPCs with no available chemical-specific values. These surrogate factors were recommended by NCEA and are identified in Table 6-3.

6.5 Risk Characterization

This section presents the final step in the risk assessment process, the risk characterization. Risk characterization requires integrating exposure and toxicity information into quantitative estimates of noncarcinogenic hazard and carcinogenic risks. Quantitative evaluation of risks involves combining exposure point concentrations, exposure scenarios, chemical intake models, and toxicity values using methods defined by EPA to calculate potential carcinogenic and noncarcinogenic risks associated with present and future use scenarios. Specifically, Section 6.5.1 presents the methods used to calculate noncancer hazard quotients and indices, and Section 6.5.2 presents the methods used to calculate cancer risks. Section 6.5.3 presents a discussion of the hazard indices and cancer risks calculated for each population assessed in this BHHRA. Section 6.5.4 presents a discussion of the uncertainties involved in the preparation of these risk estimates.

6.5.1 Evaluation of Noncancer Risk

6.5.1.1 Calculation of Noncancer Hazard Quotients and Hazard Indices

The potential noncarcinogenic effect was evaluated by dividing chemical-specific CDIs by their associated RfDs for the oral, dermal, and inhalation pathways. The ratio of the CDI to the RfD is the chemical-specific Hazard Quotient (HQ). The sum of all the ratios, for the COPCs for each exposure pathway and each medium, is called the Hazard Index (HI). The HQs and HI were calculated as shown below:

$$HI = \sum_{i=1}^{n} CDI_i / RfD_i$$

Where: HI = Hazard Index [unitless]

CDI_i = Chronic Daily Intake for chemical *i* (mg/kg/day)

n = Number of COPCs in each medium [unitless]

RfD_i = Reference Dose for chemical i (mg/kg/day)

An HI less than 1.0 is unlikely to be associated with adverse health effects and is therefore less likely to be of concern than an HI greater than 1.0. However, a conclusion should not be categorically drawn that all HIs greater than 1.0 indicate that health effects will occur. This is due to uncertainties inherent in derivation of the RfD and uncertainties associated with adding individual terms in the HI calculation.

6.5.1.2 Segregation of Hazard Index by Toxic Endpoints and Critical Effects

For noncancer health effects, as an initial screening step, hazard quotients are added across all COPCs and potentially complete exposure pathways to derive a total HI. When this initial screening step results in a total HI greater than the benchmark value of concern (i.e., 1.0), HIs are refined to reflect only the summation of the HQs for COPCs that target the same organ or produce the same critical effect. This results in the calculation of segregated HIs (i.e., a separate HI is calculated for each toxic endpoint or critical effect). Segregation of hazard indices requires the identification of the major effects associated with each COPC. Major effect categories include:

- Neurotoxicity;
- Developmental toxicity;
- Reproductive toxicity;
- Immunotoxicity; and
- Adverse effects by target organ (i.e., hepatic, renal, respiratory, cardiovascular, gastrointestinal, hematological, musculoskeletal, and dermal/ocular effects).

Although higher exposure levels may be required to produce adverse health effects other than the critical effect, the effect used as an endpoint in calculation of the RfD can be used as the toxicity value for each effect category as a conservative and simplifying step (EPA, 1989).

6.5.2 Evaluation of Cancer Risk

The potential incremental lifetime cancer risk due to exposure to a specific carcinogenic chemical is calculated by multiplying chemical-specific CDIs with their associated CSFs for the oral, dermal, and inhalation pathways. For the purposes of this assessment, cancer risks for exposure to multiple carcinogenic chemicals were assumed to be additive. The sum of all CDIxCSF products for the COPCs for each receptor in each medium is called the Excess Lifetime Cancer Risk (ELCR) and was calculated as shown below:

$$ELCR = \sum_{i=1}^{n} CDI_i \times CSF_i$$

Where:

CDI_i	=	Chronic Daily Intake for chemical *i* (mg/kg-day)
ELCR	=	Excess Lifetime Cancer Risk (unitless)
n	=	Number of COPCs in each medium (unitless)
CSF_i	=	Cancer Slope Factor for chemical i [$(mg/kg\text{-}day)^{-1}$]

The linear equation presented above for estimating carcinogenic risks is applicable for low doses and low risks levels (i.e., estimated risks less than 1E-02). For instances where chemical intakes result in higher risk levels (i.e., risks greater than 1E-02), EPA's one-hit equation should be used instead of the linear low-dose equation presented above (EPA, 1989). The one-hit equation is presented below:

$$ELCR = 1 - exp(-CDI \times CSF)$$

EPA has determined that the acceptable risk range is between 1E-06 and 1E-04 for purposes of remediation decision-making and site management. A 1 in 1,000,000 cancer risk (i.e., 1E-06) means that in a population of 1,000,000 people exposed under an identical exposure scenario (i.e., had exactly the same daily intake of a carcinogen over the same period), there could be one additional case of cancer in the population. An ELCR below or within this range is unlikely to be associated with cancer effects and is less likely to be of concern than an ELCR exceeding this range.

6.5.3 Risk Characterization Results Associated with Cornell-Dubilier Electronics Site

This section contains a receptor-specific summary of the results of calculations of potential noncarcinogenic HIs and carcinogenic risks associated with exposures to facility soils and indoor floor dust at the Cornell-Dubilier Electronics Superfund site. The risk calculations are presented in Appendix I, Tables 7.1 through 7.21 and Tables 8.1 through 8.21 for noncarcinogenic hazards and carcinogenic risks, respectively. The results of these calculations are summarized in Appendix I, Tables 9.1 through 9.20. The following benchmarks were used to evaluate the estimated HIs and cancer risks.

- The HQ provides a comparison of the exposure dose to a RfD where increased concerns regarding non-cancer health effects are based on a HQ of 1 or more. A HQ or HI greater than 1 indicated that unacceptable exposures may be occurring, and there may be an increased concern for potential non-cancer health effects, although the relative value of the HI greater than 1 can not be translated into an estimate of the severity of the hazard. The RfD is defined as an estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. Within this definition, exposures somewhat higher than the RfD are associated with increased potential of adverse effects. However, it is not a certainty that adverse health effects will occur. Similarly, based on the definition of the RfD, exposures less than the RfD are not expected to lead to adverse effects. However, the absence of all risk to all people cannot be assured at this level.

- Cancer risks are characterized as the incremental increase in the probability that an individual will develop cancer during his or her lifetime due to site-specific exposure. The term "incremental" implies the risk due to environmental chemical exposure above the background cancer risk experiences by all individuals in the course of daily life. Cancer risks are expressed as a probability (e.g., one in a million or 1E-6) of an individual developing cancer over a lifetime, above background cancer risk, as a result of exposure. The acceptable risk range established in the NCP is 1E-4 to 1E-6. Stated another way, EPA's goal of protection for human health is defined as a cancer risk of 1 in 1,000,000 or 1E-6, while the highest cancer risk level allowed under the federal Superfund law is 1 in 10,000 or 1E-4.

COPCs that individually contributed a carcinogenic risk greater than 1E-06 when the pathway exceeded 1E-04 or had a HQ greater than 1.0 when the HI exceeded 1.0 for a given population were found to "contribute significantly" to site risks and are summarized in Tables 10.1 through Table 10.20.

6.5.3.1 Noncancer Hazard

Youth Trespassers (Current)

Surface Soil Area A

The noncancer hazard quotients calculated for each COPC and exposure route for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 7.1RME and 7.1CT.

The total HI associated with RME exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 22, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a chemical-specific HI of 21. The exposure was recalculated using the CT scenario values and the HI was reduced to 3.6, which still exceeds EPA's acceptable limit of 1.0.

Surface Soil Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 7.2RME and 7.2CT for EPCs calculated using the data set outliers and Tables 7.3RME and 7.3CT for EPCs calculated without the outliers.

The total HI with outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 560, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 550. The hazard index was recalculated using a CT scenario and the HI was reduced to 92, which still exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 35, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 34. The hazard index was recalculated using a CT scenario and the HI was reduced to 5.8, which still exceeds EPA's acceptable limit of 1.0.

Youth Trespassers (Future)

All Soils Area A

The noncancer hazard quotients calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 7.10RME and 7.10CT for EPCs calculated using the data set outliers and Tables 7.11RME and 7.11CT for EPCs calculated without the outliers.

The total HI with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 11 which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 6.9 and 3.9, respectively. The hazard index was recalculated using a CT scenario and the total HI was reduced to 1.8 which slightly exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 6.1, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 5.1. The hazard index was recalculated using a CT scenario and the HI was reduced to 1.0, which meets EPA's acceptable limit of 1.0.

All Soils Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 7.12RME and 7.12CT for EPCs calculated using the data set outliers and Tables 7.13RME and 7.13CT for EPCs calculated without the outliers.

The total HI with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1,100, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 900 and 200, respectively. The hazard index was recalculated using a CT scenario and the total HI was reduced to 190, which still exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 140, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 110 and 28, respectively. The hazard index was recalculated using a CT scenario and the total HI was reduced to 24, which still exceeds EPA's acceptable limit of 1.0.

Outdoor Site Worker (Current)

Surface Soil Area A

The noncancer hazard quotients calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.4RME and 7.4CT. The total HI associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 33, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 32. The hazard index was

recalculated using a CT scenario and the HI was reduced to 20, which still exceeds EPA's acceptable limit of 1.0.

Surface Soil Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.5RME and 7.5CT for EPCs calculated using data set outliers and Tables 7.6RME and 7.6CT for EPCs calculated without outliers.

The total HI with outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 820, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 810. The hazard index was recalculated using a CT scenario and the HI was reduced to 490, which still exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 52, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 51. The hazard index was recalculated using a CT scenario and the HI was reduced to 31, which still exceeds EPA's acceptable limit of 1.0.

Outdoor Site Worker (Future)

All Soils Area A

The noncancer hazard quotients calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.14RME and 7.14CT for EPCs calculated using data set outliers and Tables 7.15RME and 7.15CT for EPCs calculated without outliers.

The total HI with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 17, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 10 and 6, respectively. The hazard index was recalculated using a CT scenario and the total HI was reduced to 10, which still exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 9, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 with a HI of 7.5. The hazard index was recalculated using a CT scenario and the HI was reduced to 5.4, which still exceeds EPA's acceptable limit of 1.0.

All Soils Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.16RME and 7.16CT for EPCs using data set outliers and Tables 7.17RME and 7.17CT for EPCs calculated without outliers.

The total HI with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1,700, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 1,300 and 300, respectively. The hazard index was recalculated using a CT scenario and the total HI was reduced to 1,000, which still exceeds EPA's acceptable limit of 1.0.

The total HI without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 200, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 160 and 40, respectively The hazard index was recalculated using a CT scenario and the total HI was reduced to 120, which still exceeds EPA's acceptable limit of 1.0.

Indoor Site Worker (Current)

Building Dust

The noncancer hazard quotients calculated for each COPC and exposure pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.7RME and 7.7CT.

The total HI associated with exposure to dust by incidental ingestion and dermal absorption is 150, which exceeds EPA's acceptable limit of 1.0. The entire hazard is attributable to Aroclor-1254.

The hazard index was recalculated using a CT scenario and the HI was reduced to 53, which still exceeds EPA's acceptable limit of 1.0.

VOCs in All Soils Area A

The noncancer hazard quotients calculated for each COPC and exposure pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.8RME and 7.8CT. The total HI associated with inhalation of VOCs projected to migrate into indoor air is 0.0034, which is significantly lower than EPA's acceptable limit of 1.0.

Indoor Site Worker (Future)

VOCs in All Soils Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 7.9RME and 7.9CT.

The total HI associated with inhalation of VOCs projected to migrate into indoor air is 0.67, which is lower than EPA's acceptable limit of 1.0.

Adult Construction Workers (Future)

All Soils Area A

The noncancer hazard quotients calculated for each COPC and exposure pathway for construction workers for the RME case is presented in Appendix I, Table 7.18RME for EPCs calculated using the data set outliers and Tables 7.19RME without outliers. A CT scenario was not evaluated.

The total HI with outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 38, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 23 and 13, respectively.

The total HI without outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 21, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 17 and 2.3, respectively.

All Soils Area B

The noncancer hazard quotients calculated for each COPC and exposure pathway for construction workers for the RME and CT cases are presented in Appendix I, Table 7.20RME for EPCs calculated using the data set outliers and Table 7.21RME for EPCs calculated without outliers. A CT scenario was not evaluated.

The total HI with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 3,800, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 3,000 and 650, respectively.

The total HI without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 460, which exceeds EPA's acceptable limit of 1.0. The majority of the hazard is attributable to Aroclor-1254 and Aroclor-1248 with chemical-specific HIs of 360 and 96, respectively.

6.5.3.2 Cancer Risk

Youth Trespassers (Current)

Surface Soil Area A

The cancer risks calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 8.1RME and 8.1CT.

The total risk associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1.4E-04, which exceeds the upper bound of EPA's acceptable risk range of 1E-04. The majority of the risk is attributable to Total PCBs with a risk of 1.1E-04. The risk was recalculated using a CT scenario, and the risk was reduced to 2.5E-05, which is within EPA's acceptable risk range.

Surface Soil Area B

The cancer risks calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 8.2RME and 8.2CT for EPCs calculated using the data set outliers and Tables 8.3RME and 8.3CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 3.6E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 2.9E-03. The cancer risk was recalculated using a CT scenario, and the risk was reduced to 6.1E-04, which also exceeds EPA's acceptable risk range.

The total risk without outliers associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 4.4E-04, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 3E-04. The risk was recalculated using a CT scenario, and the risk was reduced to 8E-05, which is within EPA's acceptable risk range.

Youth Trespassers (Future)

All Soils Area A

The cancer risks calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 8.10RME and 8.10CT for EPCs calculated using the data set outliers and Tables 8.11RME and 8.11CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 6.2E-05, which is within EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 5E-05.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 4.7E-05, which is within EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 4E-05.

All Soils Area B

The cancer risks calculated for each COPC and exposure pathway for youth trespassers for the RME and CT cases are presented in Appendix I, Tables 8.12RME and 8.12CT for EPCs calculated using the data set outliers and Tables 8.13RME and 8.13CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 7.1E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 5.1E-03. The risk was recalculated using a CT scenario, and the risk was reduced to 1.3E-03, which also exceeds EPA's acceptable risk range.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 9E-04, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 7.3E-04. The risk was recalculated using a CT scenario, and the risk was reduced to 1.6E-04, which slightly exceeds the upper bound of EPA's acceptable risk range.

Outdoor Site Worker (Current)

Surface Soil Area A

The cancer risks calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.4RME and 8.4CT.

The total risk associated with exposure to surface soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 5.6E-04, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 4E-04. The cancer risk was recalculated using a CT scenario, and the risk was reduced to 9.2E-05, which is within EPA's acceptable risk range.

Surface Soil Area B

The cancer risks calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.5RME and 8.5CT for EPCs calculated using the data set outliers and Tables 8.6RME and 8.6CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1.4E-02, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 1.1E-02. The next highest risks are for dieldrin (contributing 6.5E-03) and aldrin (contributing 6.5E-04) to the risk total. The cancer risk was recalculated using a CT scenario, and the total risk was reduced to 2.2E-03, which also exceeds EPA's acceptable risk range.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1.7E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 1.13E-03. The risk was recalculated using a CT scenario, and the risk was reduced to 3E-04, which also exceeds EPA's acceptable risk range.

Outdoor Site Worker (Future)

All Soils Area A

The cancer risks calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.14RME and 8.14CT for EPCs calculated using the data set outliers and Tables 8.15RME and 8.15CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 2.5E-04, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 1.9E-04. The cancer risk was recalculated using a CT scenario, and the risk was reduced to 4.1E-05, which is within EPA's acceptable risk range.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1.8E-04, which slightly exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 1.5E-04. The

risk was recalculated using a CT scenario, and the risk was reduced to 2.9E-05, which is within EPA's acceptable risk range.

All Soils Area B

The cancer risks calculated for each COPC and exposure pathway for outdoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.16RME and 8.16CT for EPCs calculated using the data set outliers and Tables 8.17RME and 8.17CT for EPCs calculated without outliers.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 2.9E-02, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 1.9E-02. The cancer risk was recalculated using a CT scenario, and the risk was reduced to 5.2E-03, which also exceeds EPA's acceptable risk range.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 3.5E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 1.13E-03. The risk was recalculated using a CT scenario, and the risk was reduced to 5.9E-04, which also exceeds EPA's acceptable risk range.

Indoor Site Worker (Current)

Building Dust

The cancer risks calculated for each COPC and exposure pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.7RME and 8.7CT.

The total cancer risk associated with exposure to building dust by incidental ingestion and dermal absorption is 7.1E-06, which is within EPA's acceptable risk range.

VOCs in All Soils Area A

The cancer risks calculated for each COPC in the inhalation pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.8RME and 8.8CT.

The total cancer risk associated with inhalation of VOCs from indoor air is 4.7E-06, which is within EPA's acceptable risk range.

Indoor Site Worker (Future)

VOCs in All Soils Area B

The cancer risks calculated for each COPC and exposure pathway for indoor site workers for the RME and CT cases are presented in Appendix I, Tables 8.9RME and 8.9CT.

The total cancer risk associated with inhalation of VOCs from indoor air is 1.0E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to TCE with a risk of 9.9E-04. The cancer risk was recalculated using a CT scenario, and the risk was reduced to 2.4E-04, which also exceeds EPA's acceptable risk range.

Adult Construction Workers (Future)

All Soils Area A

The cancer risks calculated for each COPC and exposure pathway for adult construction workers for the RME case are presented in Appendix I, Tables 8.18RME for EPCs calculated using the data set outliers and Tables 8.19RME for EPCs calculated without outliers. A CT scenario was not evaluated.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 2.4E-05, which is within EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 1.8E-05.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 1.8E-05, which is within EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 1.4E-05.

All Soils Area B

The cancer risks calculated for each COPC and exposure pathway for adult construction workers for the RME case are presented in Appendix I, Tables 8.20RME for EPCs calculated including outliers and Tables 8.21RME for EPCs calculated without outliers. A CT scenario was not evaluated.

The total cancer risk with outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 3.0E-03, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk of 1.8E-03.

The total risk without outliers associated with exposure to all soil by incidental ingestion, dermal absorption and inhalation of particulates and volatiles is 3.5E-04, which exceeds EPA's acceptable risk range. The majority of the risk is attributable to Total PCBs with a risk 2.6E-04.

6.5.3.3 Impact of the Data Set Outliers on the Risk Characterization

The non-cancer HIs were presented by discussing the results based on whether the data set outliers were included or excluded in the exposure route EPC. As shown in Table 6-7, for the majority of analyses, the non-cancer HIs exceeded 1.0 for most chemicals where outliers were identified.

The cancer risks were presented by discussing the results based on whether the data set outliers were included or excluded in the exposure route EPC. For the majority of analyses, the cancer risks exceeded 1E-4 for most chemicals where outliers were identified, as shown in Table 6-8.

6.5.3.4 PCB Congener Risk Summary

Three surface soil samples were collected in Area B where PCB-contaminated material is suspected of being disposed and analyzed for PCB congeners. The PCB congener data were evaluated separately and summed relative to dioxin-like and non-dioxin-like effects (Section 6.2.2.2). Based on the EPC selection process cited in Section 6.3.3, the maximum detected concentration from the three samples was used since the data set was less than ten and no data set outliers were considered.

For the dioxin-like PCBs, dioxin toxicity factors were used for the risk characterization. For the non-dioxin-like PCBs, total PCB toxicity factors were used for the risk characterization. The trespasser, outdoor site worker and the construction worker were the populations assumed exposed to the soil in Area B.

Comparing the EPCs used to calculate the CDIs for all three populations, the dioxin-like PCB congener EPC was 3.8 mg/kg (maximum) verses the 2,3,7,8-TCDD EPC of 0.008 (maximum). The non-dioxin-like PCB congener EPC was 31,588 mg/kg (maximum) verses the total PCBs 9,033 mg/kg (UCL-NP) for the surface soil data set with outliers and 926 mg/kg (revised maximum) for the surface soil data set without outliers. For All Soils Area B, the EPC for total PCBs was 15,783 mg/kg (UCL-T) for the data set with outliers and 2,246 mg/kg (UCL-NP) for the data set without outliers.

The non-cancer HIs and cancer risks for the dioxin-like PCBs, non-dioxin-like PCBs and Total PCBs exceed the acceptable risk range for the EPC calculations that include outliers and those without outliers (see Tables 6-7 and 6-8, respectively).

Current and Future Trespasser

For the current trespasser exposed to Surface Soil in Area B, the total risk to both dioxin-like and non-dioxin-like PCBs was 6E-02. The risks calculated using total PCB data (Section 6.2.1) presented previously ranges from 3.6E-3 to 6.2E-4 for the RME and CT scenarios respectively that included the data set outliers to 4.4E-4 to 8E-5 for the RME and CT scenarios respectively that did not include the data set outliers.

For the future trespasser exposed to All Soil in Area B, the total risk to both dioxin-like and non-dioxin-like PCBs remains 6E-02. Because the maximum detected concentration was used, the EPC for the future scenario did not change. The risks calculated using total PCB data presented previously ranges from 7.1E-3 to 1.3E-3 for the RME and CT scenarios respectively that included the data set outliers and 9E-4 to 1.6E-4 for the RME and CT scenarios respectively that did not include the data set outliers.

Current and Future Outdoor Worker

For the current outdoor worker exposed to Surface Soil in Area B, the total risk to both dioxin-like and non-dioxin-like PCBs was 2.4E-1. The risks calculated using total PCB data (Section 6.2.1) presented previously ranges from 1.4E-2 to 2.2E-3 for the RME and CT scenarios respectively that included the data set outliers to 1.7E-3 to 3E-4 for the RME and CT scenarios respectively that did not include the data set outliers.

For the future outdoor worker exposed to All Soil in Area B, the total risk to both dioxin-like and non-dioxin-like PCBs remains 2.4E-1. Because the maximum detected concentration was used, the EPC for the future scenario did not change. The risks calculated using total PCB data presented previously ranges from 2.9E-2 to 5.2E-3 for the RME and CT scenarios respectively that included the data set outliers and 3.5E-3 to 5.9E-4 for the RME and CT scenarios respectively that did not include the data set outliers.

Future Construction Worker

For the future construction worker exposed to All Soil in Area B, the total risk to both dioxin-like and non-dioxin-like PCBs was 2.8E-2. The risks calculated using total PCB data presented previously ranges from 3E-3 for the RME scenario that included the data set outliers to 3.5E-4 for the RME scenario that did not include the data set outliers.

6.5.3.5 Lead Evaluation

Lead was retained as a COPC in four data sets: surface soil in Area A, all soil in Area A, all soil in Area B, and indoor dust. The mean lead concentration for each data set was compared to the average industrial lead cleanup value of 1,250 mg/kg. The RAGS Part D adult lead worksheets are included in Appendix O. Only the mean lead concentrations in Area A surface soil and indoor dust exceeded the screening levels. The mean lead concentration in Area A surface soil is 11,000 mg/kg, and the mean lead concentration in indoor dust is 5,248 mg/kg. Therefore, lead is a chemical of concern for adult industrial exposures to these media.

6.5.4 Uncertainty Analysis

This section presents an evaluation of the uncertainties that enter the risk assessment at each step of the process. The risks presented in this assessment are conditional estimates based on a number of assumptions about exposure and toxicity. The key uncertainties associated with the soil concentrations, exposure assumptions, and toxicity values are discussed below.

6.5.4.1 Soil Concentrations

A variety of assumptions applied to the soil concentrations are associated with uncertainties that affect how much confidence can be placed in risk estimates. Uncertainties associated with the derivation of soil concentrations include the following:

- *Sample size.* The small number of soil samples for certain analytes (i.e., dioxins/furans) or media (e.g., surface soil in Area A) limited the amount of data available for use in the risk assessment. Confidence in risk estimates typically increases with increasing sample size. Incorporation of more data may increase, decrease, or have no effect on risk estimates.

- *Sample locations.* The RI sampling strategy included random sampling, as well as biased sampling focusing on areas with suspected disposal activities. The analytical data demonstrated a high degree of variability based on the statistical evaluation of the data sets. Efforts were made to minimize the impact to the results of the risk characterization by dividing the property into separate areas based on activities and evaluate the risk with and without the data set outliers.

- *Data Set Outliers.* In most cases, the data set outliers are contributing significantly to the calculated noncancer hazards and cancer risks.

6.5.4.2 Exposure Assumptions

Key uncertainties associated with exposure assumptions include the following:

- *Use of one half the method detection limit.* The use of one half the sample quantitation limit for samples with undetected chemicals (a.k.a. "non-detects") introduces uncertainty in deriving representative EPCs, because the actual value is unknown. This uncertainty may cause either overestimation or underestimation of the actual concentrations present, and consequently either an over- or underestimation of risk.

- *Use of arithmetic mean to represent exposure point concentrations.* An arithmetic mean, or UCL of the mean (for the RME), is recommended by EPA for representing exposure point concentrations. For data that had a lognormal distribution, an arithmetic mean may overestimate exposure point concentrations.

- *Dust EPCs.* A total of 32 floor dust samples were collected in the facility buildings. One dust sample was generally collected every 10,000 square feet of floor space, and the data set was combined to determine an EPC per chemical. This may cause either overestimates or underestimates of the actual concentrations present in a given building, and consequently either over- or underestimate the risk.

- *Soil EPCs.* The majority of the COPCs had non-parametric distributions and the data was highly skewed creating difficulty in assigning an UCL. Through assistance from the EPA Technical Support Group in Las Vegas, Nevada, a nonparametric statistic was assigned. This uncertainty may cause either overestimates or underestimates of the actual concentrations present, and consequently either an over- or underestimation of risk.

- *Assumption of constant chemical concentrations.* Chemical concentrations were assumed to remain constant over the exposure periods considered. Should chemicals degrade, be washed away or be diluted over time, risks may be overestimated. Degradation or transformation of COPCs could lead to intermediates that are more or less toxic.

- *Use of default exposure assumptions.* In several instances, EPA default exposure assumptions were used to characterize potential exposures for OU-2. Should actual exposures be different than these default assumptions, risk may be either over- or underestimated.

- *Assumption that COPCs are 100 percent bioavailable.* All COPCs are expected to be 100 percent bioavailable to people. It is likely that some COPCs, due to chemical form or other factors, may not be completely bioavailable to people. In such a case, risks will be overestimated.

- *Use of Johnson and Ettinger Model for Subsurface Vapor Intrusion to Buildings.* The Johnson and Ettinger Model used to evaluate the soil to indoor air pathway is considered to be conservative and may overestimate the levels of COPCs in the indoor air. Site-specific

parameters were used in the model, where appropriate. The use of these site-specific data greatly reduces the level of uncertainty associated with the model.

6.5.4.3 Toxicity Values

A variety of contributing factors may result in uncertainties associated directly with toxicity values, particularly those factors associated with the derivation of the individual values.

- *Derivation of toxicity values.* Although uncertainty factors are applied to account for these many factors, they may still lead to over- or underestimation of risks. The toxicity values used in this risk assessment represent the most current values recommended by EPA in IRIS or by the NCEA. The uncertainties surrounding the CSF estimates extend in both directions (i.e., possible underestimate or overestimate of cancer potency factors). The cancer slope factors represent plausible upper bound estimates, which means that the EPA is reasonably confident that the actual cancer risks will not exceed the estimated risk calculated using the CSF but it may be lower (EPA, 1996d; EPA, 1999g).

  Due to the high concentrations of PCBs and the resultant high HQ values, there is uncertainty associated with the estimated HQ values, primarily due to potential unknown dose-response mechanisms at these concentrations. However, although the hazard may be over- or underestimated, the magnitude of exceedance of EPA's benchmark of acceptable noncancer hazard indicates the likelihood of noncancer health effects associated with industrial exposure to soil.

- *Use of oral toxicity values to evaluate risk via exposure through the dermal pathway.* As discussed in the Toxicity Assessment, use of oral toxicity values to evaluate toxicity through the dermal route is highly uncertain, and may result in either an over- or underestimation of risk via the dermal route. If the GI absorption processes serve to detoxify a COPC, risk would be underestimated; if the GI absorption processes increase the toxicity of a particular COPC, risk would be overestimated.

- *Surrogate Toxicity Factors.* The dioxin cancer slope factor for 2,3,7,8-TCDD listed in the 1997 Health Effects Assessment Summary Tables was used in the calculation of the cancer risks. The use of this factor may potentially underestimate the cancer risks based on the Agency's ongoing reassessment of dioxin risks by a factor of six. The newly proposed cancer slope factor for dioxin is 1,000,000 and has completed the Science Advisory Board and external review. The differences in cancer slope factors may result in an underestimate of cancer risk of a factor of six. In addition, based on the ongoing reassessment of dioxin, an assessment of noncancer health effects was not conducted. This may also result in a potential underestimate of noncancer health effects for dioxin.

  The new provisional cancer slope factors and noncancer reference doses for oral and inhalation risks for TCE were used in the BHHRA at the recommendation of the NCEA. The new toxicity information for TCE has completed an external peer-review by the EPA Science Advisory Board.

The provisional cancer slope factors and noncancer reference doses for oral and inhalation risks for PCE were used in the BHHRA at the recommendation of the NCEA.

- *Derivation of toxicity values used for PCBs.* Although uncertainty factors are applied to account for these many factors, they may still lead to over- or underestimation of risks.

  1. The toxicity values used in this risk assessment for PCBs represent the most current values recommended by EPA in IRIS or by the NCEA. The uncertainties surrounding the CSF estimates extend in both directions (i.e., possible underestimate or overestimate of cancer potency factors). The cancer slope factors represent plausible upper bound estimates, which means that the EPA is reasonably confident that the actual cancer risks due to PCBs will not exceed the estimated risk calculated using the CSF but it may be lower (EPA, 1996d; EPA, 1999g).

  2. Use of dose-response information from animal studies to predict effects in humans. The PCB toxicity values used in this risk assessment were derived from studies conducted on monkeys (RfDs) and rats (CSFs).

  3. Use of dose-response information from homogeneous animal populations to predict the effects likely to be observed in a general population consisting of individuals with a wide range of sensitivities.

  4. EPA's 1996 Reassessment of the Cancer Toxicity of PCBs concluded that the CSF indicates that the uncertainty around the CFS estimates extends in both directions (i.e., contributing to possible underestimation or overestimation of cancer potency factors). Details are provided within the peer-reviewed document section on uncertainty.

  5. Slope factors are based on studies using commercial mixtures of PCBs. In the environment the composition of PCB mixtures changes over time, through partitioning, chemical transformation, and preferential bioaccumulation.

  6. Based on the systemic toxicity of PCBs, the Superfund Technical Support Center recommended using the oral RfD as an inhalation RfD. The oral RfD for Aroclor-1254 was used as a surrogate for Aroclor-1248 and Aroclor-1260, while the oral RfD for Aroclor-1016 was used as a surrogate for Aroclor-1242 as recommended by EPA Region 2.

- *Weight of evidence for PCB carcinogenicity.* PCBs are currently classified as probable human carcinogens, meaning that there is suggestive evidence of carcinogenicity in humans and adequate evidence in animals.

SECTION 6

TABLES

TABLE 6-1

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SUMMARY OF THE NUMBER AND SOURCE OF SAMPLES USED IN THE OU-2 BHHRA

Medium	Exposure Medium	Sample Type	Number of Samples	Use in Risk Assessment
Surface Soil	Surface Soil Area A	Building Borings (samples not taken under asphalt)	5 samples	Current Outdoor Site Worker or Current Trespasser
	Surface Soil Area B	Surface Soil	9 samples	Current Outdoor Site Worker or Current Trespasser
		Monitoring Well Borings	3 samples	
All Soils-surface and subsurface	All Soils, Area A	Building Borings	83 samples	Future Construction or Outdoor Site Worker; Trespasser
		Monitoring Well Borings	17 samples	
	All Soils Area A VOCs only	Building Borings/ Monitoring Well Borings	100 samples	Current Indoor Site Worker
	All Soils, Area B	Surface Soil	11 samples	Future Construction or Outdoor Site Worker; Trespasser
		Monitoring Well Borings	28 samples	
		Test Pits	11 sample	
		Building Borings	5 samples	
	All Soils Area B VOCs only	Surface Soil/ Monitoring Well Borings/Test Pits/ Building Borings	55 samples	Future Indoor Site Worker
Building Dust	Indoor Dust	Indoor Dust on Floor	32 samples	Current/Future Indoor Site Worker

TABLE 6-2

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
TOXICITY EQUIVALENCY FACTORS FOR POLYCHLORINATED DIBENZO-P- DIOXINS AND POLYCHLORINATED DIBENZOFURANS

COPC	WHO-TEF
Dibenzo dioxins	
Mono-, Di-, and Tri-CDDs	0
2,3,7,8-TCDD	1.0
Other TCDDs	0
2,3,7,8-PeCDD	1.0
Other PeCDDs	0
2,3,7,8-HxCDD	0.1
Other HxCDDs	0
2,3,7,8-HpCDD	0.01
Other HpCDDs	0
OCDD	0.0001
Dibenzo furans	
Mono-, Di-, and Tri-CDFs	0
2,3,7,8-TCDF	0.1
Other TCDFs	0
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
Other PeCDFs	0
2,3,7,8-HxCDF	0.1
Other HxCDFs	0
2,3,7,8-HpCDF	0.01
Other HpCDFs	0
OCDF	0.0001

Van Leeuwen, 1997 as presented in EPA, 2000.

TABLE 6-3

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
TOXICITY EQUIVALENCY FACTORS FOR DIOXIN-LIKE POLYCHLORINATED BIPHENYLS

IUPAC NUMBER	STRUCTURE	WHO-TEF
77	3,3',4,4'-TCB	0.0001
81	3,4,4',5-TCB	0.0001
105	2,3,3',4,4'-PeCB	0.0001
114	2,3,4,4',5-PeCB	0.0005
118	2,3',4,4',5-PeCB	0.0001
123	2',3,4,4',5-PeCB	0.0001
126	3,3',4,4',5-PeCB	0.1
156	2,3,3',4,4',5-HxCB	0.0005
157	2,3,3',4,4',5'HxCB	0.0005
167	2,3',4,4',5,5'-HxCB	0.00001
169	3,3',4,4',5,5'-HxCB	0.01
170	2,2',3,3',4,4',5-HpCB	-
180	2,2',3,4,4',5,5'-HpCB	-
189	2,3,3',4,4',5,5'-HpCB	0.0001

TABLE 6-4

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE SURROGATE CHEMICALS USED TO EVALUATE NONCANCER OR CANCER TOXICITY

Detected Chemical	Surrogate Chemical
Acenapthalene	Pyrene
Phenanthrene	Pyrene
Benzo(g,h,i)perylene	Pyrene
2-Methylnaphthalene	Naphthalene
Endosulfan II	Endosulfan
Endosulfan ketone	Endrin
Endosulfan aldehyde	Endrin
Endosulfan sulfate	Endrin
alpha-Chlordane	Heptachlor
gamma-Chlordane	Chlordane
delta-BHC	gamma-BHC
Aroclor–1242	Aroclor–1016
Aroclor–1248	Aroclor–1254
Aroclor–1260	Aroclor–1254
Chromium (total)	Chromium VI
Nickel	Nickel Soluble Salts

TABLE 6-5

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE PERCENT GASTROINTESTINAL ABSORPTION FOR COPCS

COPC	Percent Gastrointestinal Absorption
Aroclors-1254/1242 and other PCBs	100%
Benzo(a)pyrene and other PAHs	100%
Chlordane	100%
DDT	100%
TCDD and other dioxins	100%
Arsenic	100%
Cadmium	2.5%

TABLE 6-6

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
TOXICITY EQUIVALENCY FACTORS FOR CARCINOGENIC PAHs

COPC	TEF[(a)]
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

[(a)]EPA, 1995c.

TABLE 6-7 (Sheet 1 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF HAZARD INDICES

Area	Media	Receptor	Chemical of Concern	HQ With Outliers	HQ Without Outliers	Conclusions
B	Surface Soil	Trespasser	Aroclor-1254	230 (ingestion) 310 (dermal) 5.6 (inhalation)	15 (ingestion) 19 (dermal) 0.35 (inhalation	Both exceed HI of 1.
			Heptachlor epoxide	5.1 (ingestion)	0.28 (ingestion)	Outliers only exceed HI = 1.
B	Surface Soil	Site worker (outdoor)	Aroclor-1254	380 (ingestion) 350 (dermal) 76 (inhalation)	24 (ingestion) 22 (dermal) 4.8 (inhalation	Both exceed HI of 1.
			Dieldrin	1.6 (ingestion)	0.29 (ingestion)	Outliers only exceed HI = 1.
			Heptachlor epoxide	8.3 (ingestion)	0.45 (ingestion)	Outliers only exceed HI = 1.
A	All Soils	Trespasser	Aroclor-1248	1.7 (ingestion) 2.2 (dermal) 0.04 (inhalation)	0.3 (ingestion) 0.39 (dermal) 0.007 (inhalation)	Outliers only exceed HI = 1.
			Aroclor-1254	2.9 (ingestion) 3.9 (dermal) 0.07 (inhalation)	2.1 (ingestion) 2.9 (dermal) 0.05 (inhalation)	Both exceed HI of 1.

300330

TABLE 6-7 (Sheet 2 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF HAZARD INDICES

Area	Media	Receptor	Chemical of Concern	HQ With Outliers	HQ Without Outliers	Conclusions
B	All Soils	Trespasser	DDT	2.7 (ingestion)	0.001 (ingestion)	Outliers only exceed HI = 1.
			Aldrin	2.1 (ingestion)	0.3 (ingestion)	Outliers only exceed HI = 1.
			Aroclor-1242	6.2 (ingestion) 8.3 (dermal) 0.15 (inhalation)	0.22 (ingestion) 0.3 (dermal) 0.005 (inhalation)	Outliers only exceed HI = 1.
			Aroclor-1248	83 (ingestion) 110 (dermal) 2.0 (inhalation)	12.0 (ingestion) 16.0 (dermal) 0.29 (inhalation)	Both exceed HI of 1.
			Aroclor-1254	380 (ingestion) 510 (dermal) 9.2 (inhalation)	47 (ingestion) 63 (dermal) 1.1 (inhalation)	Both exceed HI of 1.
			Dieldrin	13 (ingestion)	0.33 (ingestion)	Outliers only exceed HI = 1.
			Heptachlor epoxide	5.9 (ingestion)	0.17 (ingestion)	Outliers only exceed HI = 1.
A	All Soils	Outdoor Worker	Aroclor-1248	2.8 (ingestion) 2.6 (dermal) 0.55 (inhalation)	0.48 (ingestion) 0.45 (dermal) 0.097 (inhalation)	Outliers only exceed HI = 1.
			Aroclor-1254	4.8 (ingestion) 4.4 (dermal) 0.95 (inhalation)	3.5 (ingestion) 3.3 (dermal) 0.71 (inhalation)	Both exceed HI of 1.

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TABLE 6-7 (Sheet 3 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF HAZARD INDICES

Area	Media	Receptor	Chemical of Concern	HQ With Outliers	HQ Without Outliers	Conclusions
B	All Soils	Site Worker (outdoor)	DDT	4.4 (ingestion) 0.87 (dermal)	0.0017 (ingestion) 0.00034 (dermal)	Outliers only exceed HI = 1.
			Aldrin	3.5 (ingestion)	0.51 (ingestion)	Outliers only exceed HI = 1.
			Aroclor-1242	10.0 (ingestion) 2.0 (dermal) 0.55 (inhalation)	0.36 (ingestion) 0.34 (dermal) 0.073 (inhalation)	Outliers only exceed HI = 1.
			Aroclor-1248	140.0 (ingestion) 27 (dermal) 0.55 (inhalation)	20.0 (ingestion) 18 (dermal) 4.0 (inhalation)	Both exceed HI of 1.
			Aroclor-1254	630.0 (ingestion) 130 (dermal) 0.95 (inhalation)	77 (ingestion) 71 (dermal) 15.0 (inhalation)	Both exceed HI of 1.
			Dieldrin	22 (ingestion)	0.55 (ingestion)	Outliers only exceed HI = 1.
			Heptachlor expoxide	9.7 (ingestion)	0.28 (ingestion)	Outliers only exceed HI = 1.

TABLE 6-7 (Sheet 4 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF HAZARD INDICES

Area	Media	Receptor	Chemical of Concern	HQ With Outliers	HQ Without Outliers	Conclusions
A	All Soils	Construction Worker	Aroclor-1248	8.7 (ingestion) 3.7 (dermal) 0.88 (inhalation)	1.5 (ingestion) 0.64(dermal) 0.15 (inhalation)	Both exceed HI of 1.
			Aroclor-1254	15.0 (ingestion) 6.3 (dermal) 1.5 (inhalation)	11 (ingestion) 4.7 (dermal) 1.1 (inhalation)	Both exceed HI of 1.
B	All Soils	Construction Worker	Aroclor-1242	32.0 (ingestion) 14 (dermal) 3.2 (inhalation)	1.2 (ingestion) 0.49(dermal) 0.12 (inhalation)	Both exceed HI of 1.
			Aroclor-1248	430 (ingestion) 180(dermal) 43.0 (inhalation)	63 (ingestion) 27.0 (dermal) 6.3 (inhalation)	Both exceed HI of 1.
			Aroclor-1254	2000 (ingestion) 830 (dermal) 200 (inhalation)	240 (ingestion) 100 (dermal) 24.0 (inhalation)	Both exceed HI of 1.
			Dieldrin	70 (ingestion)	1.7 (ingestion)	Both exceed HI of 1.
			gamma-Chlordane	6.8 (ingestion) 0.82 (dermal)	0.0018 (ingestion) 0.00021 (dermal)	Outliers only exceed HI = 1.
			Heptachlor epoxide	31 (ingestion)	0.88 (ingestion)	Outliers only exceed HI = 1.

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TABLE 6-8 (Sheet 1 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF CANCER RISKS

Area	Media	Receptor	Chemical of Concern	Cancer Risk With Outliers	Cancer Risk Without Outliers	Conclusions
B	Surface Soil	Trespasser	Dioxin-like PCBs	3.9 E-2 (ingestion) 1.1 E-02 (dermal) 1.5E-06 (inhalation)	3.9 E-2 (ingestion) 1.1 E-02 (dermal) 1.5E-06 (inhalation)	Exceed cancer risk of 10E-4.
			Non-dioxin-like PCBs	4.4 E-03 (ingestion) 5.8 E-03 (dermal) 2.1E-05 (inhalation)	4.4 E-03 (ingestion) 5.8 E-03 (dermal) 2.1E-05 (inhalation)	Exceed cancer risk of 10E-4.
			Total PCBs	1.2E-03 (ingestion) 1.7E-03 (dermal) 6.0E-06 (inhalation)	3.3E-04 (ingestion) 1.7E-04 (dermal) 6.0E-07 (inhalation)	Exceed cancer risk of 10E-4.
B	Surface Soil	Site worker (outdoor)	Benzo(a)pyrene	5.3 E-04 (ingestion) 4.6E-004 (dermal)	6.4 E-06 (ingestion) 5.5E-06 (dermal)	Exceed cancer risk of 10E-4 for EPC with outliers.
			2,3,7,8-TCDD	3.8E-04 (ingestion) 7.5E-05 (dermal) 1.2E-07 (inhalation)	3.8E-04 (ingestion) 7.5E-05 (dermal) 1.2E-07 (inhalation)	Exceed cancer risk of 10E-4.
			Dieldrin	4.6 E-04 (ingestion) 1.7E-05 (inhalation)	8.3 E-05 (ingestion) 3.1E-06 (inhalation)	Exceed cancer risk of 10E-4 for EPC with outliers.
			Heptachlor epoxide	3.5 E-04 (ingestion) 5.6 E-06 (inhalation)	1.9 E-05 (ingestion) 3.1 E-07 (inhalation)	Exceed cancer risk of 10E-4 for EPC with outliers.

TABLE 6-8 (Sheet 2 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF CANCER RISKS

Area	Media	Receptor	Chemical of Concern	Cancer Risk With Outliers	Cancer Risk Without Outliers	Conclusions
			Dioxin-like PCBs	1.6 E-1 (ingestion) 3.5 E-02 (dermal) 5.9 E-05 (inhalation)	1.6 E-1 (ingestion) 1.1 E-02 (dermal) 5.9E-05 (inhalation)	Exceed cancer risk of 10E-4.
			Non-dioxin-like PCBs	2.0 E-02 (ingestion) 1.8 E-02 (dermal) 8.0E-04 (inhalation)	2.0 E-02 (ingestion) 5.8 E-03 (dermal) 7.9E-04 (inhalation)	Exceed cancer risk of 10E-4.
			Total PCBs	5.7 E-03 (ingestion) 5.3E-03 (dermal) 2.3E-04 (inhalation)	5.8E-04 (ingestion) 1.7E-04 (dermal) 2.3E-05 (inhalation)	Exceed cancer risk of 10E-4.
B	All Soils	Trespasser	Dieldrin	1.4 E-03 (ingestion) 1.0 E-05 (inhalation)	3.4 E-05 (ingestion) 2.6E-07 (inhalation)	Outliers only exceed risk of 10E-4.
			Dioxin-like PCBs	3.9 E-2 (ingestion) 1.1 E-02 (dermal) 1.5 E-06 (inhalation)	3.9 E-2 (ingestion) 1.1 E-02 (dermal) 1.5E-06 (inhalation)	Exceed cancer risk of 10E-4.
			Non-dioxin-like PCBs	4.4 E-03 (ingestion) 5.8 E-03 (dermal) 2.1E-05 (inhalation)	4.4 E-03 (ingestion) 5.8 E-03 (dermal) 2.1E-05 (inhalation)	Exceed cancer risk of 10E-4.

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TABLE 6-8 (Sheet 3 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF CANCER RISKS

Area	Media	Receptor	Chemical of Concern	Cancer Risk With Outliers	Cancer Risk Without Outliers	Conclusions
			Total PCBs	2.2 E-03 (ingestion) 2.9E-03 (dermal) 1.0E-05 (inhalation)	3.1E-04 (ingestion) 4.1E-04 (dermal) 1.5E-06 (inhalation)	Exceed cancer risk of 10E-4.
B	All Soils	Outdoor Worker	2,3,7,8-TCDD	3.8 E-04 (ingestion) 7.5E-05 (dermal) 1.2 E-07 (inhalation)	3.8 E-04 (ingestion) 7.5E-05 (dermal) 1.2 E-07 (inhalation)	Both exceed 10E-4.
			DDT	2.7 E-04 (ingestion) 5.3 E-05 (dermal) 7.9 E-07 (inhalation)	1.0 E-07 (ingestion) 2.1 E-08 (dermal) 3.1 E-10 (inhalation)	Cancer risk exceeded with outliers.
			Dieldrin	8.3 E-03 (ingestion) 2.4 E-04 (inhalation)	1.6 E-04 (ingestion) 5.9 E-06 (inhalation)	Both exceed cancer risk of 10E-4.
			Heptachlor epoxide	4.1 E-04 (ingestion) 3.7 E-07 (inhalation)	1.2 E-05 (ingestion) 1.9 E-07 (inhalation)	Cancer risk exceeded with outliers.
			Dioxin-like PCBs	1.6 E-01 (ingestion) 3.5 E-02 (dermal) 5.9 E-05 (inhalation)	1.6 E-01 (ingestion) 3.5 E-02 (dermal) 5.9 E-05 (inhalation)	Both exceed cancer risk of 10E-4.
			Non-dioxin-like PCBs	2.0 E-02 (ingestion) 1.8 E-02 (dermal) 7.9 E-04 (inhalation)	2.0 E-02 (ingestion) 1.8 E-02 (dermal) 7.9 E-04 (inhalation)	Both exceed cancer risk of 10E-4.

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TABLE 6-8 (Sheet 4 of 4)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
COMPARISON OF CANCER RISKS

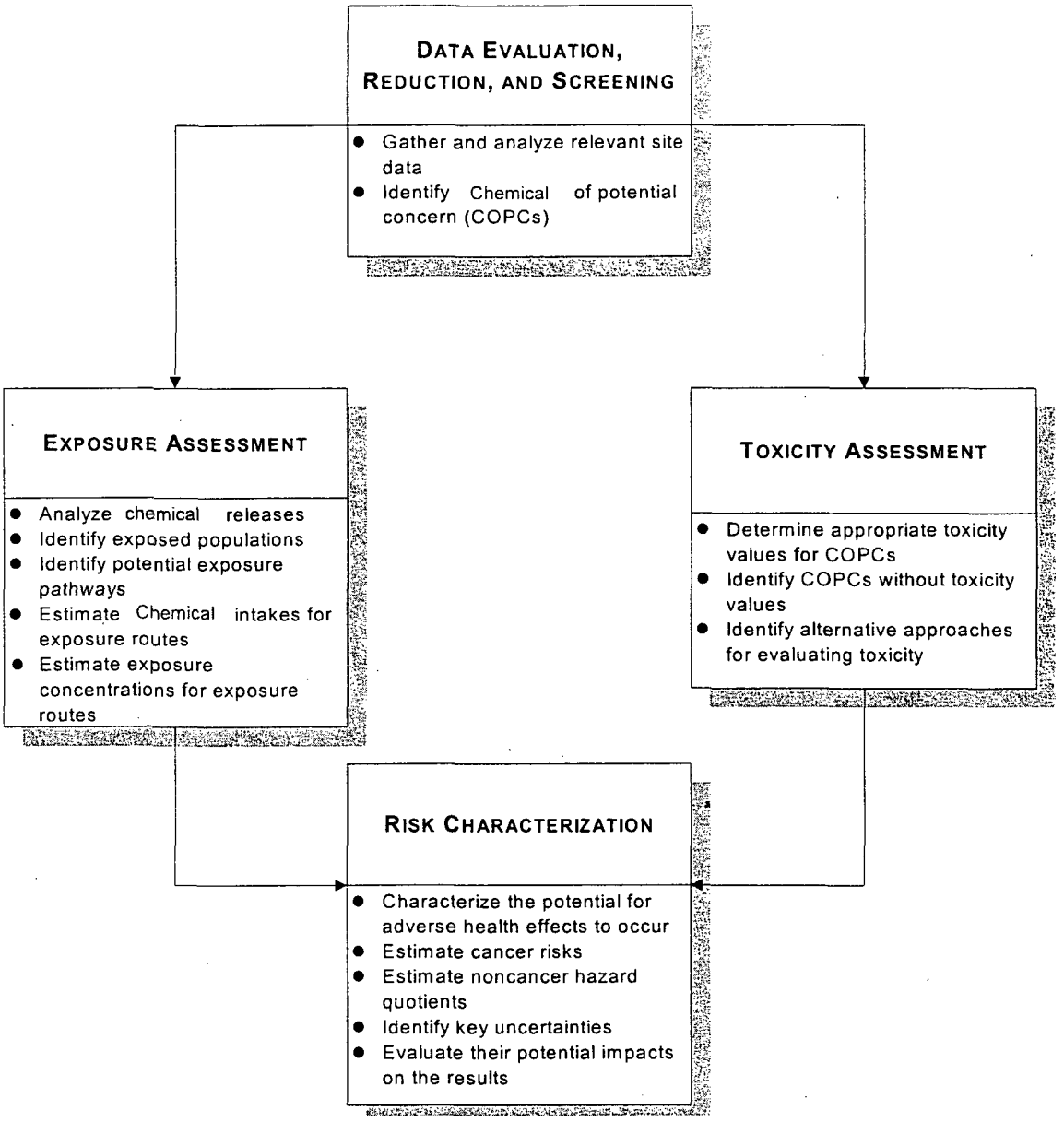
Area	Media	Receptor	Chemical of Concern	Cancer Risk With Outliers	Cancer Risk With Outliers	Cancer Risk Without Outliers
			Total PCBs	9.9 E-03 (ingestion) 9.2 E-03 (dermal) 4.0 E-04 (inhalation)	1.4 E-03 (ingestion) 1.3 E-03 (dermal) 5.7 E-05 (inhalation)	Both exceed cancer risk of 10E-4.
B	All Soils	Construction Worker	Dieldrin	8.0 E-04 (ingestion) 7.5 E-05 (inhalation)	2.0 E-05 (ingestion) 1.9 E-06 (inhalation)	Exceeds 10E-4 with outliers.
			Dioxin-like PCBs	2.2 E-02 (ingestion) 2.0 E-03 (dermal) 3.2 E-06 (inhalation)	2.2 E-02 (ingestion) 2.0 E-03 (dermal) 3.2 E-06 (inhalation)	Both exceed cancer risk of 10E-4.
			Non-dioxin-like PCBs	2.5 E-03 (ingestion) 1.1 E-03 (dermal) 5.0 E-05 (inhalation)	2.5 E-03 (ingestion) 1.1 E-03 (dermal) 5.0 E-05 (inhalation)	Both exceed cancer risk of 10E-4.
			Total PCBs	1.3 E-03 (ingestion) 5.3 E-04 (dermal) 2.5 E-05 (inhalation)	1.8 E-04 (ingestion) 7.5 E-05 (dermal) 3.6 E-06 (inhalation)	Both exceed cancer risk of 10E-4.

300337

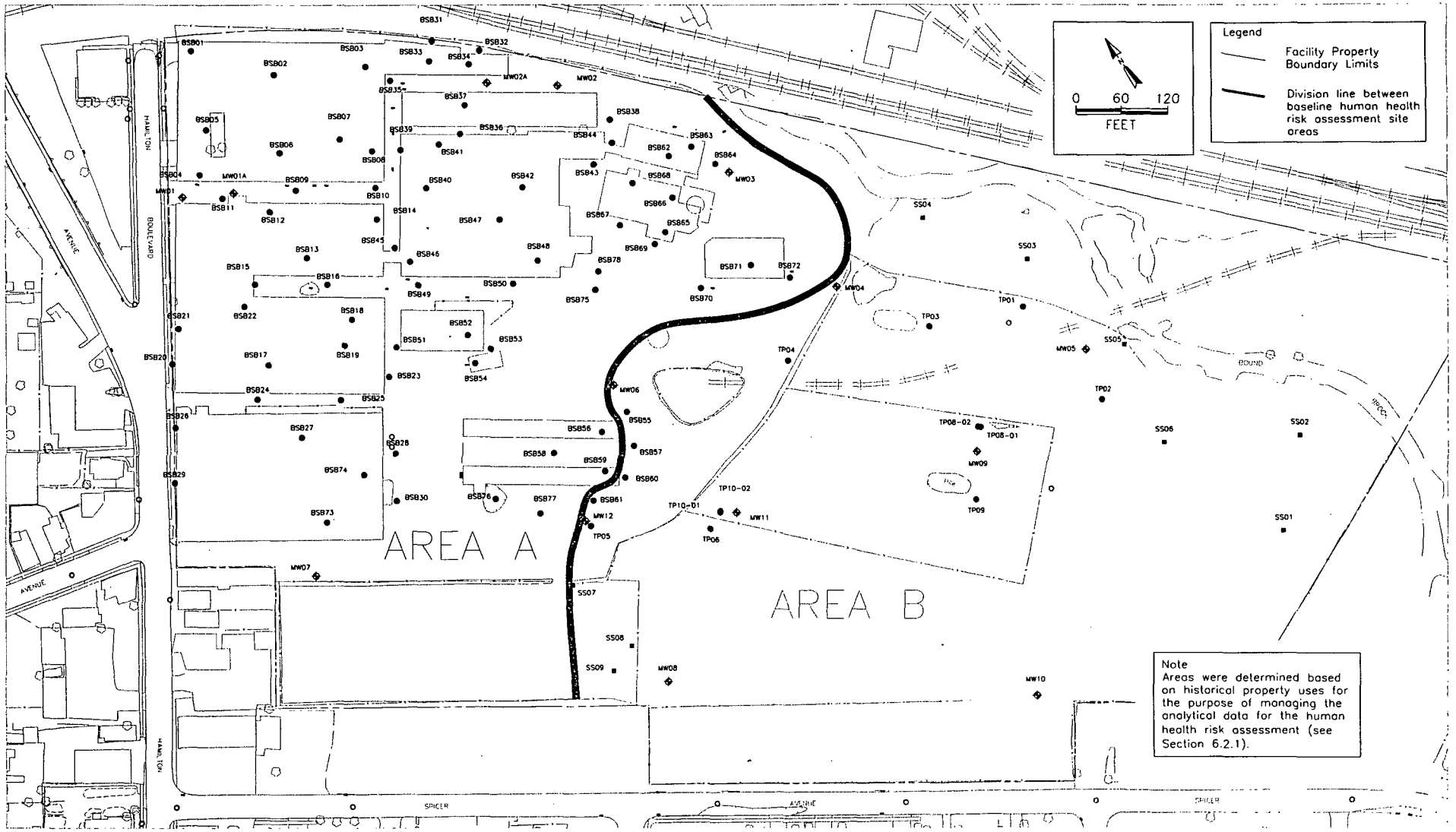
SECTION 6

FIGURES

Figure 6-1 Human Health Risk Assessment Process



300340



FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Site Areas for Baseline Human Health Risk Assessment
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: LEN	DATE: 08/20/02	PROJECT NO.: 1945.1018	
CHKD: RM	REV.: 1	FIGURE NO.: 6-2	
DES.: MC	APPD: LH		

300341

7.0 ECOLOGICAL RISK ASSESSMENT

An ecological risk assessment (ERA) was performed for the facility surface soils at the facility. The objective of the ERA was to assess risks to terrestrial receptors from contaminants found in the facility surface soils in support of the OU-2 RI. The ERA was performed using methodology consistent with current guidance (EPA, 1997g) for performing ecological risk assessments. The scope for completion of this ERA for the facility soils included:

- Characterization of the environmental setting of the site with respect to ecological receptors and habitats present;
- Identification of exposure pathways and contaminants of potential ecological concern as related to historical facility activities;
- Comparison of maximum exposure concentrations of contaminants in surface soils to ecological screening values for identification of contaminants of potential ecological concern (COPECs);
- Evaluation of risks from identified COPECs to terrestrial plants, soil invertebrates and wildlife receptors; and
- Development of a preliminary Baseline Problem Formulation for the Baseline Ecological Risk Assessment (BERA).

The ERA followed Steps 1 and 2 consistent with the EPA Ecological Risk Assessment Guidance for Superfund (ERAGS, EPA, 1997g) to evaluate risk to terrestrial receptors posed by contaminants in facility surface soils. Additionally, Step 3 the Baseline Problem Formulation was prepared at the request of the Biological Technical Assistance Group (BTAG). Soil sampling of floodplain soils, sediments and surface waters of Bound Brook had been previously performed by the EPA and NJDEP. This OU-2 ERA addresses facility surface soils defined as soils located within the existing property boundary and occurring within a depth interval of 0 to 0.5 feet (bgs). The property boundary for which the soils shall be evaluated is depicted in Figure 7-1. The existing property area covers approximately 26 acres and includes portions of industrial and commercial developments, areas of open fields, gravel lots and undeveloped forested uplands and emergent wetlands. The scope for this risk assessment was developed based upon submission and comment of a scope of work to the EPA Region 2 BTAG and modifications based upon their review.

7.1 Screening Level Problem Formulation (ERAGS Step 1)

Step 1 of ERAGS is used to focus the environmental risk assessment based upon review and knowledge of the environmental setting and contaminants present. In addition, contaminant fate and transport, the ecotoxicity of the contaminants, potential environmental receptors present, the pathways for receptor exposure to contaminants, and identification of the assessment and measurement endpoints for the screening level exposure estimate and risk calculation performed in Section 7.2.

7.1.1 Environmental Setting

The facility property is approximately 26 acres in area and currently supports active light industrial and commercial land uses consisting of staffed buildings and warehouses that cover about 11.6 acres. This developed portion is generally covered by impervious surfaces including asphalt driveways, parking spaces, concrete slabs, and building slabs. This area accounts for approximately 45 percent of the existing property. A limited number of small, fragmented areas of exposed soils in alleyways or associated with utility support structures occur in the developed area of the property. No significant vegetation was noted in any of these areas, and they are not classified as being significant habitat for wildlife receptors. The developed portion of the property is fenced and access remains limited to driveways and side streets of the City of South Plainfield. The remaining area (approximately 14.4 acres or 55 percent) of the facility consists of undeveloped land associated with field and gravel/deteriorated asphalt areas adjacent to the developed area and habitats inclusive of multiple vegetation covertypes associated with forested uplands, isolated wetland areas and floodplain wetlands adjacent to the channel of Bound Brook. It is this undeveloped portion of the property that affords the most significant value to ecological receptors. These terrestrial habitats were surveyed for use by and occurrence of ecological receptors.

Wetland, upland and aquatic habitats on the property were identified during the field investigation, and a qualitative wildlife survey was also performed. The habitat survey consisted of identifying the vegetation communities present within the site. Communities were characterized by identifying and recording dominant vegetation within four strata: tree, woody shrub/sapling, herbs, and woody vines. Representative vegetation stations were recorded within the vegetation communities.

Wetlands on and adjacent to the facility property were delineated on 20 and 21 June 2000, using the routine on-site determination method of the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989). The 1989 Federal manual incorporates a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands.

Terrestrial Uplands

Approximately 45 percent of the property is composed of developed lands (i.e., buildings and pavement) which afford very limited value to support ecological receptors (Figure 7-1). The remainder of the facility consists of successional fields, broad-leaved deciduous forests, and wetlands. The successional fields are located within the southeast portion of the property and are composed of grasses, mugwort (*Artemisia vulgaris*), goldenrods (*Solidago* spp.), common yarrow (*Achillea millefolium*), and northern catalpa (*Catalpa speciosa*) and eastern cottonwood (*Populus deltoides*) saplings. A fringe of broad-leaved deciduous forests is present in the northeast, eastern and southern portions of the property. Red maple (*Acer rubrum)*, black oak (*Quercus velutina*), red oak (*Quercus rubra*), and black cherry (*Prunus serotina*) dominate the tree layer of the forests, with sassafras (*Sassafras albidum*) and sugar maple (*Acer saccharum*) also present. The shrub layer is vegetated by Japanese honeysuckle (*Lonicera japonica*), tree-of-heaven (*Ailanthus altissima*), and multiflora rose (*Rosa multiflora*). White snakeroot (*Eupatorium rugosum*), garlic mustard (*Alliaria petiolata*), great Solomon's-seal (*Polygonatum commutatum*), an unknown grass, and poison ivy

(*Toxicodendron radicans*) dominate the herbaceous layer, and grape vine (*Vitis* sp.) and Virginia creeper (*Parthenocissus quinquefolia*) comprise the vine layer.

Wetlands

Seven wetlands consisting of four palustrine emergent (PEM) wetlands (W1, W2, W6 and W7), two PEM/palustrine scrub/shrub (PSS) wetlands (W3 and W4), and one palustrine forested broad leaved deciduous (PFO1) wetland (W5) were delineated within the eastern, undeveloped portion of the property (Figure 7-1). Wetlands W1 through W4 are adjacent to Bound Brook and wetlands W5 through W7 are isolated. Dominant vegetation within the PEM wetlands included Canada clearweed (*Pilea pumila*), spotted touch-me-not (*Impatiens capensis),* marshpepper smartweed (*Polygonum hydropiper*), arrow arum *(Peltandra virginica)*, fox sedge (*Carex vulpinoidea*), path rush (*Juncus tenuis*), and skunk cabbage (*Symplocarpus foetidus*). Common reed (*Phragmites australis*), a nuisance species which can invade and ultimately dominate an area, was dominant in several of the PEM wetlands on the site. Also present, but not dominant, within the PEM wetlands were shrub species: speckled alder (*Alnus rugosa*), silver maple (*Acer saccharinum*), northern catalpa, and silky dogwood (*Cornus amomum*).

Shrub species present within the two PEM/PSS wetlands consisted of silky dogwood, black willow (*Salix nigra*), and buttonbush (*Cephalanthus occidentalis*). Plant species that dominated these wetlands included sweetflag (*Acorus calamus*), arrow-leaf tearthumb (*Polygonum sagittatum*), Canada clearweed, marshpepper smartweed, spotted touch-me-not, common boneset (*Eupatorium perfoliatum*), arrow arum, and spatterdock (*Nuphar luteum*). Common reed, purple loosestrife (*Lythrum salicaria*), and broad-leaved cattail (*Typha latifolia*), all of which are considered nuisance species, were present in one of the PEM/PSS wetlands.

One PFO1 wetland was located within the south-central portion of the property. Silver maple, red maple, sugar maple, and green ash (*Fraxinus pennsylvanica*) dominated the tree layer. The sparse shrub layer was dominated by silky dogwood and sedges, including fox sedge and pointed broom sedge (*Carex scoparia*), and silver maple, and poison ivy dominated the herbaceous layer. Poison ivy also comprised the vine layer.

Aquatic Habitats

Bound Brook is a perennial stream that traverses the southeast corner of the former Cornell-Dubilier Electronics facility and flows northwest for over one mile before it discharges into the eastern end of New Market Pond. Stream width varies from 10 to 25 feet across, where it traverses the property. Submerged vegetation was sparse throughout Bound Brook, scattered plants of burreed (*Sparganium* sp.) and small stands of spatterdock were observed throughout the stream. Substrates within Bound Brook are composed of coarse to medium sand, with areas of alluvial deposits (gravel and sand).

Bound Brook has a surface water quality standard of freshwater, non-trout, or FW2-NT. The designated uses for these waters are:

- Maintenance, migration, and propagation of the natural and established biota;
- Primary and secondary contact recreation;

- Industrial and agricultural water supply;
- Public potable water supply after conventional filtration treatment and disinfection; and
- All other reasonable uses.

Fish Communities

Bound Brook supports a warm-water fishery as verified by the species collected and identified by EPA. Species identified during the June 1997 field investigation included bullhead (*Ictalurus* sp.), carp (*Cyprinus carpio*), white sucker (*Catostomus commersoni*), sunfish including bluegill (*Lepomis macrochirus*) and pumpkinseed (*Lepomis gibbosus*), and largemouth bass (*Micropterus salmoides*) (EPA, 1998c). During the 2000 Foster Wheeler Environmental field investigation, evidence of the presence and predation of crayfish (*Orconectes* sp.) and Asian clams (*Corbicula fluminea*) was observed along Bound Brook. Sunfish, carp, catfish, and largemouth bass also were observed in Bound Brook during the 2000 field investigation. Review of the lists of warmwater and coolwater sportfish reared and stocked by the New Jersey Division of Fish, Game and Wildlife during 1990-1996 and 1994-2000 revealed that New Market Pond had been stocked with young or yearling channel catfish (*Ictalurus punctatus*) during the 1993 and 1995 stocking seasons.

A Bound Brook Fish Advisory was posted in the January 2001 New Jersey Fish and Wildlife Digest, Volume 14. The advisory states:

> *"In August 1998, NJDEP issued a final fish consumption advisory for the entire length of Bound Brook and its tributaries, including New Market Pond and Spring Lake. The action followed an interim advisory issued in 1997 when as a part of an EPA Investigation of the Cornell-Dubilier Superfund site in South Plainfield, NJ excessive polychlorinated biphenyls (PCBs) contamination was identified in fish collected from the Bound Brook. This final NJDEP advisory warns the public "**do not consume any fish** from the waters described above." The final advisory extends beyond the Bound Brook to include Spring Lake (tributary to the Bound Brook) as a second round of fish testing conducted by EPA identified levels of PCBs in excess of the FDA action level."*

The Bound Brook and its associated floodplain area will be addressed as part of a separate RI/FS investigation (OU-3) and are not be addressed as part of this OU-2 RI/FS.

Wildlife Survey

The property is located in an urban landscape with developed lands (i.e., industrial/commercial, and residential properties, ball fields, parks and cemeteries) surrounding the facility. The Bound Brook Corridor, an undeveloped area located within the floodplain of Bound Brook, provides habitats for wildlife within the area. Wildlife species which use the Bound Brook Corridor would also use the undeveloped portion of the property. Similarities in habitats and the contiguous nature of the brook corridor would allow utilization of the undeveloped portions of the property by wildlife also using the Bound Brook Corridor.

A qualitative survey of wildlife resources within the property and along the Bound Brook Corridor was performed in support of a baseline characterization of wildlife occurrence for OU-2. Direct and indirect wildlife observations of mammals, birds, reptiles and amphibians were recorded during a 5-day survey. Wildlife surveys were conducted on-site and along transects located in the floodplain corridor of the Bound Brook, extending from the facility property downstream to New Market Pond. A reference station was located immediately upstream of the property, along Bound Brook. Three separate segments were identified within transects on both sides, north and south, of Bound Brook.

A total of 40 bird, 11 mammal, and six reptile and amphibian species were observed within the property and the Bound Brook Corridor. Within the upstream reference station, a total of 12 bird, six mammal, and two reptile and amphibian species were observed. Table 7-1 identifies species observed within the on-site habitats. Table 7-2 identifies species observed within the reference station located on Bound Brook.

The vegetation communities in the Bound Brook Corridor provide habitat for a variety of wildlife species. The open water habitat of the brook channel provides wildlife with a perrennial water source; and the oaks, maples and black cherry trees observed within the upland and wetland forests provide abundant food, shelter, and nesting opportunities.

Six of the bird species (wood duck, mallard, Canada goose, great blue heron, green heron, and belted kingfisher) were observed feeding, foraging, or wading in the stream channel. Several additional species including the red-winged blackbird, barn swallow, and tree swallow were observed using Bound Brook and the adjacent palustrine emergent wetlands for feeding, resting, and/or nesting. Ten of the bird species (tufted titmouse, white-breasted nuthatch, blue jay, brown thrasher, hairy woodpecker, red-bellied woodpecker, rufous-sided towhee, common yellowthroat, great-crested flycatcher, and wood thrush) were observed primarily within the upland and wetland broad-leaved deciduous forests.

Some of the bird species observed on-site are generalists, adapting to a variety of vegetation communities and/or usually found in ecotone, or edge habitats. Twelve species (Northern cardinal, gray catbird, Northern mockingbird, black-capped chickadee, American robin, American crow, common flicker, downy woodpecker, yellow warbler, American goldfinch, Northern oriole, and house wren) were observed in forests, open habitats and associated overlapping habitats, or edge habitats. Red-tailed hawks were observed flying over the Bound Brook Corridor, and are expected to utilize the edge habitats for hunting and resting. Seven species (song sparrow, house sparrow, Eastern kingbird, common grackle, European starling, mourning dove, and killdeer) were observed in open lands, which include successional fields, residential yards, cemeteries, and parklands. These species commonly inhabit residential and cosmopolitan habitats. The domestic pigeon was observed resting on the ledges and exposed beams of facility buildings.

The 11 mammal species observed on-site and in the adjacent habitats occur in similar habitats throughout New Jersey. One mammal species, the muskrat, was observed in and around Bound Brook. The muskrat is a semi-aquatic species, spending most of its time in and around the brook and wetland ecotone. Four species (Eastern chipmunk, rat, groundhog, and eastern cottontail) were observed within the forests, open habitats and associated overlapping habitats, or edge habitats.

Signs of the white-tailed deer, eastern gray squirrel and raccoon were observed throughout the corridor area and on the property. Domestic dog tracks were observed along the Bound Brook Corridor within the palustrine emergent wetlands, and wetland and upland forests.

A red fox den and scent post was observed within the large PEM/PSS wetland on the northern border of Bound Brook. The typical habitat of the red fox is a mixture of forest and open country (Burt and Grossenheider, 1980). Therefore, it is believed that the red fox will use most of the habitats observed along the Bound Brook Corridor.

Four reptile and two amphibian species were observed on-site during the field investigation. Green frogs and bullfrogs were heard in and around Bound Brook and the palustrine emergent wetlands. Snapping turtles and Eastern painted turtles were observed in Bound Brook. Eastern painted turtles were also observed in the palustrine emergent and broad-leaved deciduous forest wetlands. Two stinkpots were observed in the Bound Brook Corridor, one was observed in Bound Brook and the second was observed in a forest fringe adjacent to Bound Brook and a residential property. The Eastern box turtle was observed in the open habitats located along the Bound Brook Corridor.

Most of the wildlife species observed within the Bound Brook Corridor could potentially be observed within the on-site portion of Bound Brook. Similarities in habitats and the contiguous nature of the Bound Brook Corridor would allow utilization of the undeveloped portions of the site by wildlife.

A total of nine bird, three mammal and four reptile and amphibian species were identified within the upstream reference transect (Table 7-2). Most of the wildlife species observed were identified within the emergent wetland and scrub/shrub habitats. All of the species observed within the reference transect were also observed within the Bound Brook Corridor.

A request for information regarding the presence of endangered and threatened species was submitted to the NJDEP Natural Heritage Program and the USFWS. The response from NJDEP identified the presence of migrant loggerhead shrike (*Lanius ludovicianus migrans*) within the immediate vicinity of the Bound Brook Corridor. The recorded shrike sighting was within a riparian forest along a floodplain tributary of Bound Brook. Loggerhead shrikes prefer open fields and scrubby clearings with thickets and hedgerows having trees and shrubs with thorns, which are used to impale larger prey (Andrle and Carroll, 1988).

7.1.2 Site Contaminants

Cornell-Dubilier Electronics manufactured electronic components at the property from 1936 through 1962. It has been reported that the company also tested transformer oils for an unknown period of time. PCBs and chlorinated solvents and degreasing agents such as TCE were used in the manufacturing process, and it has been alleged that during its period of operation the company disposed of PCB-contaminated materials and other hazardous substances on the property.

Contaminants detected in facility soils include volatile organics, semi-volatile compounds, pesticides, PCBs, dioxins, and metals. The principal manufacturing process for the facility was the construction and assembly of electronic components and electrical capacitors. This process included

the use of quantities of PCB-oil mixtures for use as cooling fluids in electronic components. Semi-volatile organic compounds including PAHs are associated with transformer oils and VOCs such as TCE and other similar VOCs were used as solvents for cleaning and degreasing of metal components. Metals are common materials used in the manufacture of electronic components and in assembly based applications (i.e., solder material). These contaminants have been detected in the soils sampled from the developed and undeveloped areas. Detailed descriptions of historical investigations and their findings are provided in Foster Wheeler Environmental (2000a). The presence of dioxin was not anticipated, and this group of compounds was analyzed for and their presence confirmed in surface soils, following discovery of evidence of historical burning of capacitors during test pit investigations at the facility (see Section 4.4.4).

Approximately 45 percent of the property remains covered by impervious surfaces or building foundations and afford limited habitat value for ecological receptors. An ecological survey of the undeveloped portion of the property revealed these terrestrial environments to support a diverse assemblage of plant and animal species as part of a larger corridor habitat complex for the Bound Brook floodplain. Surface soils which are not stabilized by a cover of natural vegetation or manmade cover are subject to weathering and mobilization by storm events which can weather and erode surface material via surface water runoff and/or wind erosion. Historical activities in the undeveloped portion of the property may have included the filling and disposal of equipment (i.e., capacitors and other electronic hardware), occasional spills/releases of transformer oils containing PCBs, and burning of waste oils and equipment contaminated with PCBs, as well as the potential burning of spent solvents and oils on-site. Releases of site-related contaminants to the surface soils would allow for the exposure of ecological receptors to contaminants from the site. The most likely scenario for such exposure to occur would be through the interaction of the receptor with permeable surficial soils in areas deemed suitable for supporting ecological receptors. For these reasons, the surface soils collected from the undeveloped portion of the property were identified as being the most susceptible media for exposing ecological receptors to site-related contaminants, as well as introducing site-related contaminants to local food webs present in the Bound Brook Corridor. Figure 7-2 depicts the surface soil sample locations collected from the undeveloped area of the property that are considered in this ERA evaluation. The developed portion of the facility was deemed insignificant as supporting potential habitat for regular use of by ecological receptors.

7.1.3 Ecotoxicity and Potential Receptors

As part of an initial evaluation, compounds or elements that could represent COPECs were screened to prioritize those contaminants that pose the most significant risks. The soils data evaluated in this ERA represented data collected as part of the OU-2 RI. Maximum exposure concentrations, defined as the maximum detected concentrations of contaminants in facility surface soils, were compared to conservative ecological screening level values (SLVs). The ecological soil screening benchmarks were obtained from Preliminary Remediation Goals for Ecological Endpoints (Efroymson et. al., 1997a), EPA Region 3 BTAG Draft Ecological Screening Values (EPA, 1995a) or the soil screening values developed for select contaminants in Crommentuijn et. al. (1995). Where a contaminant was cited in more than one document, consistent with ERAGS (1997g), the lowest screening level value was used. Evidence of burned electronic equipment was encountered during on-site test pit investigations and in addition to the target compound list of contaminants, dioxin and its congeners were measured in select surface soils to assess relative exposure to this group of contaminants. To

assess risks from this diverse group of compounds, all congeners were normalized to 2,3,7,8–tetrachlorodibenzodioxin (2,3,7,8-TCDD) equivalency using toxic equivalency factors presented in WHO (1998) for mammals and birds.

Contaminants were retained as COPECs if the maximum detected concentration exceeded the SLV. In addition, those compounds for which SLVs were not available were also retained. This conservative approach was applied to avoid an underestimation of the potential risks posed to terrestrial communities on the property. Table 7-3 presents the comparison between SLVs and the maximum observed concentrations in surface soils from the undeveloped areas of the proprty. Seventy-one chemical constituents were retained as COPECs as a result of the initial screening. The COPECs retained included VOCs, SVOCs, pesticides, PCBs, dioxins, and metals. This conservative approach was applied to avoid an underestimation of the potential risks posed to terrestrial communities on the property.

Results of the terrestrial habitat assessments and Step 1 of the screening level risk assessment were used to develop a conceptual site model for the facility surface soils in the identified habitats. This conceptual model considered the following:

- Ecological receptors common to or expected to occur at the property;
- A simple food chain applicable to the habitats observed on and surrounding the property;
- Key endpoint receptors in the food chain which may have the potential to bioaccumulate/ bioconcentrate contaminants through contact with abiotic media or consumption of contaminated biota; and
- A basis for empirically determining potential threats to select trophic level receptors based upon the scientific literature and fate and transport characteristics for the contaminants of concern.

Figure 7-3 presents the conceptual site model for the facility surface soil evaluation.

Potential ecological receptors include terrestrial plants, soil organisms and terrestrial wildlife that have been observed on-site or are expected to occur on the site based upon the habitat and wildlife surveys. Selection of representative wildlife receptors for evaluation in the screening level assessment considered life history characteristics that were deemed as placing these receptors at risk. Based upon submission of a scope of work for the Screening Level Ecological Risk Assessment (SLERA) to the BTAG, species selected for the evaluation included the short-tailed shrew (*Blarnia brevicauda*), American robin (*Turdus migratorius*), red fox (*Vulpes vulpes*) and red-tailed hawk (*Buteo jamaciaensis*). These receptors were selected based upon their observed or expected presence in the on-site habitats.

7.1.4 Exposure Pathways for Endpoint Ecological Receptors

An exposure assessment model was developed using the conceptual site model (Figure 7-3) for estimating the average daily dosages (ADD_{Total}) of site-related contaminants from the surface soils in the on-site habitats to the identified receptors. The primary routes of exposure to site-related contaminants for the exposure assessments were:

- Direct contact with contaminants in soils;
- Dietary ingestion of contaminated prey items; and
- Incidental ingestion of contaminated abiotic media during feeding.

The primary abiotic medium of concern for the terrestrial receptors was surface soils (0 to 5 feet bgs). Exposure via the drinking of water from the channels was not considered because this media shall be considered as part of a separate investigation for Operable Unit 3-Groundwater and Bound Brook Corridor.

For the identified exposure pathways, risks to receptors were evaluated using a maximum exposure assessment. This approach considers a single, maximum exposure point concentration scenario to which the receptor is exposed. This scenario is considered the most conservative and will maximize the estimated risk to the receptor being evaluated.

7.1.5 Migration of Contaminants and Complete Exposure Pathways

Exposure pathways are pathways by which a contaminant travels in the environment from a source to receptor populations. Mechanisms which allow for ecological receptors to be exposed to the contaminants are defined as exposure pathway routes. For contaminants in surface soils, the principal exposure pathways are direct contact with contaminated soils and incidental ingestion during feeding. Secondary exposure will occur as a result of ingestion of a dietary source which, through biaccumulation in a dietary component results in exposure. Contact with a contaminant via a specific exposure route such as inhalation of contaminants via volatilization to the atmosphere or inhalation of wind-borne particles may also be possible. Both volatilization and inhalation of wind-borne particles will be minimized given the presence of vegetated cover on surface soils and the depth of contamination. Additionally, both of these pathways are likely to be insignificant relative to other direct routes (i.e., ingestion) of exposure. Therefore, the most complete and direct exposure pathway considered in this evaluation is through direct contact with surface soils and/or ingestion of contaminated resident biota in the surface soils. For terrestrial plants and soil organisms, the exposure route is through direct contact with contaminated soils or soil pore water. For terrestrial wildlife species, the exposure routes would include ingestion of contaminated dietary items and incidental ingestion of soils. Soil invertebrates exposed to contaminants that are highly lipophilic will concentrate such contaminants and incorporate these compounds in their tissues. This pathway allows for the introduction of such bioaccumulating contaminants into the local food chain resulting in the potential exposure of upper trophic level receptors.

7.1.6 Preliminary Assessment and Measurement Endpoints

Assessment endpoints are defined as "explicit expressions of the actual environmental values (e.g., ecological resources) that are to be protected" (EPA, 1997g). Valued ecological resources include those which would potentially impair ecosystem function, those providing critical resources such as habitat for significant renewable resources (i.e., fisheries habitat), or those deemed important as socially significant ecological resources (e.g., endangered or threatened species, or other issues protected by regulatory legislation).

The preliminary assessment endpoints for the facility surface soils were identified as:

- Protection of terrestrial plants;
- Protection of soil community structure and function; and
- Protection of representative terrestrial wildlife species from exposure to site-related contaminants via incidental and dietary pathways.

A measurement endpoint is a measurable biological response to a stressor that can be related to a valued characteristic chosen as the assessment endpoint (EPA, 1997g). Typically, measurement endpoints are inclusive of both measures of effect and measures of exposure (EPA, 1997g). To address the above assessment endpoints, the following measurement endpoints were employed.

The measurement endpoints for the first and second assessment endpoints employed similar methods. This approach uses the comparison of maximum concentrations of COPECs to ecological benchmarks available in Oak Ridge National Laboratory (ORNL) documents for terrestrial plants, soil invertebrates and microbial processes.

The measurement endpoint for the third assessment endpoint uses exposure parameters for the wildlife receptors being evaluated to estimate a daily exposure dosage of the contaminants present. This dosage estimate will be compared to toxicity reference values (TRVs) available in Sample et al. (1996) and ecological/toxicological databases inclusive of ecological toxicity thresholds (ECOTOX), EPA's IRIS and the Hazardous Substances Database (HSDB).

7.2 Screening Level Ecological Effects Evaluation Methodology

The principal exposure routes to be considered are direct contact with contaminated soils (i.e., plants, soil invertebrates and microbial processes) and ingestion of contaminated dietary material and incidental ingestion of soils by terrestrial wildlife. Sources for the screening level benchmarks and toxicity reference values for this screening level assessment were the ecological screening level documents from the Oak Ridge National Laboratory: Efroymson et al. (1997b) and EPA (1995b) for terrestrial plant benchmarks; Efroymson et al. (1997b) and EPA (1995b) for soil invertebrates and microbial processes, and Sample et al. (1996) and sources from the primary scientific literature for terrestrial wildlife TRVs.

7.2.1 NOAELs and LOAELs

Those chemical constituents which were retained as COPECs after the initial screening were then compared to screening benchmarks for phytotoxicity, invertebrate toxicity, and toxicity to microorganisms. Screening level values derived in Efroymson et al. (1997b) for terrestrial plants and Efroymson et al. (1997c) for soil invertebrates and microbial processes were developed as the 10th percentile value from lowest observable effect concentrations. This approach affords the assessor a 90 percent certainty of protecting plants, soil invertebrates and microbial processes in site soils. No observable adverse effects levels (NOAELs) and lowest observable adverse effects levels (LOAELs) for terrestrial wildlife were taken from toxicity reference values derived in Sample et al. (1996). For select compounds where NOAEL or LOAEL values were not available, LD_{50} or LC_{50}

values obtained from the literature were used. To estimate representative LOAELs from LD_{50} or LC_{50} data, an uncertainty factor of 0.01 was applied to estimate the LOAEL for corresponding compounds. The uncertainty factor of 100 was applied as a conservative approach to a corresponding LOAEL value, which is consistent with approaches used by Sample et al. (1996). Where a LOAEL was available but a NOAEL was not, an uncertainty factor of 0.1 was applied to estimate a NOAEL value (EPA, 1997).

7.2.2 Exposure Duration

Most toxicological evaluations considered chronic or sub-chronic effects and thus resulted in chronic or sub-chronic NOAELs and LOAELs. The only exceptions are acute studies that considered lethal endpoints expressed as LD_{50} or LC_{50} values with mortality as the final toxicological endpoint. Such evaluations are of short duration (i.e., single oral dose) and employ acute endpoints such as overt mortality in test organisms.

7.2.3 Exposure Route

The principal exposure route evaluated for terrestrial plants, soil invertebrates and microbial processes was through direct contact with contaminants in surface soils. In the toxicological studies used for the wildlife assessment, the principal route of exposure was via dietary ingestion which includes sources from both dietary ingestion of prey items that have bioaccumulated contaminants and incidental ingestion of abiotic media.

7.2.4 Field Versus Laboratory Exposure

The majority of the derived values for terrestrial plants, soil invertebrates and microbial processes described in Efroymson et al. (1997b, 1997c) were based upon controlled studies performed under laboratory or microcosm conditions. All of the toxicological studies evaluated by Sample et al. (1996) and other TRV sources from the primary literature employed for the wildlife assessment were conducted under controlled exposures with controlled dosage administration.

7.2.5 Dose Conversions

Toxicity reference values derived in Efroymson et al. (1997b, 1997c) are based upon in-situ soil concentration data and thus do not require any dosage conversions. Dosage values (mg/Kg/day) from toxicological studies used by Sample et al. (1996) were converted to dose equivalents to representative wildlife receptors used in this assessment from guidance cited in Sample et al. (1996).

7.2.6 Uncertainties

The NOAEL/LOAEL values provided in Sample et al. (1996) are derived for a number of species based upon evaluations with laboratory animals. Derivation was based upon similarity of phylogenetic groups and relative sensitivity of test species and receptors being evaluated. Therefore, some uncertainty can be attributed to the species-specific NOAEL/LOAEL values for the receptors considered. In an effort to minimize interspecies uncertainties, the NOAEL and LOAEL values for the mammalian test species were normalized to receptor specific characteristics (i.e., body weight)

using the conversion equation in Sample et al. (1996). The NOAEL and LOAEL endpoints considered in this assessment focused on reproductive impairment or failure for most of the compounds and elements considered. The form to which this endpoint was assessed depended upon the test species and design of the toxicity evaluation used in study. It assumes that the receptors considered will respond and be sensitive to the endpoint observed in the test species. Species-specific sensitivities were minimized to the extent possible by normalizing to the wildlife receptor considered in the exposure assessment.

7.3 Screening Level Exposure Estimate (ERAGS Step 2)

Maximum concentrations for COPECs in facility surface soils from the investigation were used to assess risks to representative terrestrial receptors. Terrestrial receptor groups included soil invertebrates (i.e., earthworms), terrestrial plants and selected wildlife species.

The principal exposure pathway for both soil invertebrates and plants was direct contact with maximum concentrations in facility soils. Risks to plants, invertebrates and soil microorganisms were quantitatively assessed by comparison to screening benchmarks for phytotoxicity, invertebrate toxicity, and toxicity to microorganisms (Efroymson et.al., 1997b, 1997c, EPA, 1995b). The principal exposure route for these comparisons is through direct contact with surface soils by the above receptor groups. Four candidate wildlife species were assessed for their exposure risks to facility surface soils: the short-tailed shrew, the red fox, the American robin, and the red-tailed hawk. For these receptors exposure parameters considered an area-use factor, bioavailability, life stage, body weight, ingestion rates, bioaccumulation, and dietary composition.

7.3.1 Area-Use Factor

For this screening level risk evaluation, the area use factor for the wildlife receptors considered was 100 percent.

7.3.2 Bioavailability

For this screening level risk evaluation, the maximum concentration of COPECs present in the surface soils were assumed to be 100 percent bioavailable.

7.3.3 Life Stage

The life stage considered for the terrestrial wildlife species are adult females as the majority of NOAEL and LOAEL values employed consider reproductive endpoints associated with prenatal or postnatal endpoints. Additionally, minimal body weights are associated with females in the receptors evaluated.

7.3.4 Body Weight and Food Ingestion Rates

Body weights and food ingestion rates for the short-tailed shrew, American robin, red fox, and red-tailed hawk were derived using guidance from EPA (1993b) or Sample et al. (1996).

7.3.5 Bioaccumulation

The bioaccumulation of site-related contaminants in representative invertebrates and small mammals was evaluated as part of the dietary ingestion pathway for the short-tailed shrew, American robin, red fox, and red-tailed hawk. Bioaccumulation factors are predictive ratios for estimating the transfer of contaminants present in biotic environmental media (i.e., soil, sediment, water) to organisms present in the local food chain. Available contaminant-specific bioaccumulation factors (BAFs) for estimating concentrations in soil invertebrates were applied to evaluate the dietary ingestion pathway for the shrew and robin. Sources for the soil to soil invertebrate bioaccumulation factors were taken from Sample et al. (1998), EPA (1999a) and Baes et.al. (1984). A default bioaccumulation (BAF) value of 1.0 was applied to the invertebrate portion of the diet for those compounds/elements which lacked specific BAFs cited in the available sources. Little information regarding the accumulation of volatile organics and some semi-volatile organics were available. Therefore a default bioaccumulation factor of 1.0 was used. Based upon octanol – water partition coefficients (K_{ow}), this is likely an overestimate of accumulation because K_{ow} values for volatile organic compounds are indicative of a low risk of accumulation in sediments or animal tissues.

BAFs for metals, PCBs and TCDD for predicting body burden levels from surface soil data for small mammals were available from Sample et al. (1998). EPA (1999a) collected replicate small mammal samples (i.e., white footed mice) for PCB and pesticide analysis in on-site habitats. These data were used to directly assess risks to the red fox and red-tailed hawk. Maximum BAFs for metals and TCDD reported in Sample et al. (1998) were used to predict body burden levels of these contaminants in relation to on-site habitats. All BAFs applied in the models are identified in the individual species exposure models discussed in Section 7.4.

7.3.6 Dietary Composition

Dietary compositions for the short-tailed shrew, American robin, red fox, and red-tailed hawk were derived from reviews of the primary literature summarized by EPA (1993b). The principal exposure pathways considered were dietary ingestion of animal prey (i.e., earthworms and white footed mice) and incidental ingestion of soils during feeding. These are the only pathways to be deemed complete for surface soils. Inhalation pathways for volatile organics or particulate bound contamination while deemed possible and complete were deemed as minor exposure pathways relative to other exposure routes. Development of an estimated exposure dosage was performed using the following exposure model:

$$ADD_{Potential} = (ADD_{Diet}) + (ADD_{Incid.Ingestion}) \qquad \text{(Equation 1)}$$

where:

$ADD_{Potential}$ = Exposure dosage of COPEC (mg/Kg/day) to receptor;
ADD_{Diet} = Dosage of COPEC via dietary sources (mg/Kg/day);
$ADD_{Incid.Ingestion}$ = Average daily dosage of COPEC via incidental ingestion of soils (mg/Kg/day).

Studies on dietary composition of wildlife species have noted that many species incidentally ingest small quantities of soils and sediment. To account for this exposure, incidental ingestion studies were reviewed to identify rates of ingestion of biotic media. Where species-specific ingestion rates were unavailable, available ingestion rates were reviewed and a value selected for a species analogous to those evaluated.

Using the study by Beyer et al. (1994), percent dietary ingestion of soils for the raccoon (9.4% dry weight) was applied to the short-tailed shrew, the estimate for soil ingestion by the woodcock (10.4%) was applied to the American robin in the absence of species-specific ingestion values. These values for ingestion of abiotic matter were deemed conservative estimates of exposure for the ingestion of abiotic material. An ingestion fraction of 2.8% was available for the red fox as cited in Beyer et al. (1994). In the absence of an abiotic fraction for the red-tailed hawk, the estimate for the red fox of 2.8% was used.

Receptor-specific exposure parameters used for the mammalian and avian exposure assessment in the SLERA were as follows:

Exposure Parameter	Short-tailed Shrew *(Blarina brevicauda))*	American Robin *(Turdus migratorius)*
Body Weight (Kg)	0.012[a]	0.064[a]
Food Ingestion (Kg/day w.w.)	0.009[a]	0.124[a]
Soil Ingestion (%)	9.4%[b,c]	10.4%[b,c]
Areal Forage Estimate	100%	100%
Dietary Composition (%)	100% Earthworms[a]	100% Earthworms [a]

Exposure Parameter	Red Fox *(Vulpes vulpes)*	Red-tailed Hawk *(Buteo jamaicensis)*
Body Weight (Kg)	3.94[a]	1.028[a]
Food Ingestion (Kg/day w.w.)	0.63[a]	0.33[a]
Soil Ingestion (%)	2.8%[b,c]	2.8%[b,c]
Areal Forage Estimate	100%	100%
Dietary Composition (%)	100% Small Mammals[a]	100% Small Mammals[a]

w.w. = wet weight
[a]EPA (1993).
[b]Beyer et. al. (1994).
[c]The soil ingestion estimate for raccoon and woodcock provided in Beyer et al. (1994) was used as an estimate for the shrew and robin, respectively. The estimate for the red fox cited in Beyer et al. (1994) was applied to the red-tailed hawk.

7.3.7 Uncertainties

The exposure assessment does not consider metabolic pathways for the elimination of contaminants by both the endpoint and intermediate receptors (i.e., prey items). The exposure point value and accumulation factors assume a 100 percent bioavailability of COPECs in soils to terrestrial receptors. Higher vertebrates can excrete select metals inclusive of zinc, copper, manganese, magnesium, iron, and others, as these function as important microelements in the vertebrate body. Organic compounds

such as select semi-volatiles (i.e., benzaldehyde, carbazole, methylnaphthalene, etc.) and pesticides (i.e., aldrin, BHC, methoxychlor, dieldrin, endrin and its metabolites, endosulfan and its metabolites, and chlordane) did not have corresponding soil to invertebrate uptake factors, and surrogate values from closely related compounds were used. In the absence of any available BAF values, a default value of 1.0 was applied. This factor may underestimate or overestimate actual bioaccumulation of COPECs from surface soils at the site. True accumulation factors can only be assessed based upon bioaccumulation studies with resident soils. Additionally, the exposure assessment considers a maximum COPEC exposure point concentration for all receptors and thus is a conservative estimate in the exposure assessment and risk characterization. Use of conservative exposure scenarios and parameters in the wildlife screening assessment will result in an overly conservative estimate of risk to the receptors. Such assumptions include minimum body weights, maximum dietary ingestion rates, maximum exposure point concentrations, and assumptions regarding a sole source for the dietary prey.

7.4 Screening-Level Risk Calculation Methodology

Risks to wildlife receptors were characterized by calculation of a HQ through comparison to available NOAELs and LOAELs. NOAELs and LOAELs presented in Sample et al. (1996) were used in the calculation of hazard quotients. Where NOAELS and LOAELs were not available from Sample et al. (1996), the EPA IRIS, ECOTOX database or the HSDB were consulted to identify compound specific toxicity reference values. Estimates to derive a NOAEL or LOAEL value, an uncertainty factor of 0.01 for derivation of a NOAEL, and an uncertainty factor of 0.1 for deriving a LOAEL estimate from an LD50 value were used for those compounds which lacked NOAEL and LOAEL values. These compounds included chloromethane, trichlorofluoromethane and carbazole.

Exposure via Incidental Ingestion of Media

Incidental ingestion of abiotic media follows the general equation for the terrestrial receptors. The fraction of soil in the diet of the receptor was calculated as:

$$ADD_{Incid.\ Ingestion} = [((ME_{Media})(FS_{Media})(IR_{Total}))/(BW)] \qquad \text{(Equation 2)}$$

where:

$ADD_{Incid.\ Ingestion}$	=	Daily dosage of contaminant via incidental ingestion of biotic media (mg/Kg-day);
ME_{Media}	=	Maximum media exposure concentration (mg/Kg) in soil;
FS_{Media}	=	Fraction of abiotic media in diet;
IR_{Total}	=	Total food ingestion rate (Kg dry wt./day) (estimated by $0.301(BW)^{0.751}$ for birds and $0.0687(BW)^{0.822}$ for mammals (EPA, 1993);
BW	=	Body weight (wet wt., Kg) of receptor.

The fraction of media in the diet remains specific to each of the endpoint receptors. For all the wildlife receptors evaluated, the primary abiotic media considered are surface soils incidentally ingested during feeding. As species-specific data regarding the fraction of abiotic media ingested by the above receptors were limited (Beyer et al. 1994), available secondary literature sources or similarity in trophic level exposure were used in assigning incidental ingestion percentages.

Dietary Ingestion of Prey Organisms

To evaluate the dietary sources for contaminants to the identified receptors from their principal prey items, a dietary model consisting of the representative prey item along with species-specific exposure parameters were applied. Daily dosage estimates were developed using the equation:

$$ADD_{Diet} = (ADD_{Prey}) \quad \text{(Equation 3)}$$

where:

$$ADD_{Prey} = [(ME_{Prey})(IR_{Prey})/(BW)] \quad \text{(Equation 4)}$$

where:

ADD_{Prey} = Average daily dietary dosage of COPC from ingestion of prey (mg/Kg/day);

ME_{Prey} = Maximum estimated prey tissue COPC concentration estimated from the maximum soil concentration and a conservative bio-accumulation factor (mg/Kg);

IR_{Prey} = Ingestion rate for prey (Kg/day);

BW = Body weight (Kg) of receptor.

Toxicity Reference Values

The calculated ADD for the identified receptors was compared to TRVs reported in available published literature. TRVs included NOAEL values and LOAEL values. The NOAEL is defined (EPA, 1995) as:

> "the highest exposure level at which no adverse effects have been demonstrated."

For this risk assessment, the stressors would be the concentration of site-related contaminants expressed in daily dosage exposures (i.e., mg/Kg/day) to the identified receptors. The NOAELs for average daily dosage of contaminants represent the threshold concentration below which no effects to the receptor are anticipated and exceedance of a NOAEL value alone does not relate to any effect in the receptor considered (Sample et al., 1996).

The LOAEL is defined (EPA, 1995b) as:

> "the lowest concentration of a material used in a toxicity test that has a statistically significant adverse effect on the exposed population of test organisms as compared with the controls."

An exceedance of a LOAEL dosage value can be considered as evidence for the potential for harm or impairment. Where there is the occurrence of a LOAEL value but no NOAEL is available, an estimate of the NOAEL may be inferred by a protective factor of 0.1 of the LOAEL (Sample et al., 1996). The above NOAEL estimation method was used where a LOAEL value existed but no NOAEL value was presented for this assessment. To account for dosage effects due to body mass

differences between test species and wildlife receptors of concern, the TRV values for test species were normalized based upon a ratio of body weight using the equations:

For Mammals:

$$NOAEL_{Receptor\ sp} = (NOAEL_{Test\ sp})(BWTSP/BWRSP)^{0.25} \quad \text{(Equation 5)}$$

For Birds:

$$NOAEL_{Receptor\ sp} = (NOAEL_{Test\ sp})(1) \quad \text{(Equation 6)}$$

where:

$NOAEL_{Receptor\ sp}$ = Receptor equivalent benchmark dosage (mg/Kg/day) for the NOAEL;
$NOAEL_{Test\ sp}$ = Test species benchmark dosage (mg/Kg/day) for the NOAEL;
BWTSP = Body weight of test species individuals (Kg);
BWRSP = Body weight of receptor species

Almost all of the TRVs consulted dealt with some form of reproductive impairment, growth, development, or survival endpoint in the toxicological evaluation. For the avian receptors, toxicological endpoints related to reproductive impairment or nest failure included egg shell thinning, nestling, fledgling or adult mortality, or reduction in fitness (i.e., reduced body weight or size in offspring) and postnatal endpoints affecting survival of offspring to maturity. For mammals, toxicological endpoints included embryo toxicity, reduction in number of successful pregnancies, mortality or reduction in fitness (i.e., reduced body weight or size in offspring), as well as survival of offspring to maturity. The resulting receptor specific NOAEL values were used in calculating a HQ for each contaminant evaluated.

For this screening level assessment, NOAEL HQs >1 was considered as the primary selection for retaining a contaminant as a COPEC. Hazard quotients were calculated as:

$$HQ = \Sigma ADD/NOAEL \quad \text{(Equation 7)}$$

Where:

HQ = Hazard quotient (unitless);
Σ ADD = Cumulative Exposure Point Dosage as Sum of all Routes of Exposure (mg/Kg/day);
NOAEL = No Observable Adverse Effects Level (mg/Kg/day).

In some cases where no NOAELs are available for specific contaminants, a lowest observable adverse effect level (LOAEL) may be used in conjunction with an uncertainty factor of 0.1 to derive an estimated NOAEL dosage. If a NOAEL or LOAEL was not available, an acute, lethal endpoint (LC50) or an acute sublethal endpoint (EC50) was used.

Those contaminants with hazard quotients in excess of 1.0 were identified and retained as COPECs for further evaluation in a baseline risk assessment. COPECs were identified by endpoint, considered for better refinement of assessment endpoints and definition of measurement endpoints as part of scoping for the BERA.

7.4.1 Preliminary Screening for COPECs for Detected Contaminants in Surface Soils

Table 7-3 provides the initial screening level assessment for identification of contaminants of potential ecological concern for further assessment in facility surface soils. This initial screening revealed that of the 104 compound/elements detected, 71 were retained as COPECs for further evaluation.

7.4.2 Screening of COPECs with Relevant Plant, Soil Invertebrate, and Microorganism Benchmarks

For those chemical constituents which were retained as COPECs after the initial screening, maximum concentrations were then compared to screening benchmarks for phytotoxicity, soil invertebrate toxicity, and toxicity to microorganisms (Table 7-4). Screening level benchmarks included Efroymson et al. (1997b) for microbial processes and earthworm benchmarks, and Efroymson et al. (1997c) for phytotoxicity benchmarks. The EPA (1995) screening level values were used as a secondary source of soil fauna and flora numbers in the absence of values listed in the Efroymson et al. documents for specific COPECs. Chloromethane, trichloromethane, isopropylbenzene, benzaldehyde, acetophenone, carbazole, methoxychlor, cyanide, and iron lacked corresponding benchmarks and could not be assessed for these specific endpoints. All contaminants were identified as exceeding multiple benchmarks at the maximum concentrations observed in soils from habitats associated with the property. COPECs were retained if the maximum detected concentration of the COPEC exceeded at least one of the identified benchmarks. Sixty-three compounds/elements were retained for those contaminants with corresponding benchmarks for these endpoints (Table 7-4).

7.4.3 Screening of COPECs with Wildlife Benchmarks

Exposure calculations, HQ development and TRV derivation are presented in Tables 7-5 through 7-18 for the short-tailed shrew, red fox, American robin, and red-tailed hawk. For the shrew and robin evaluations, BAF values for earthworms were not available for many of the COPECs; therefore, a surrogate default BAF value of 1.0 was applied. In some cases where BAF values were available for degradation products or parent compounds for contaminants listed, the value was applied to the corresponding compound detected. The surrogate BAF values are from closely related or parent compounds with similar characteristics (i.e., partition coefficients, chemical structure, etc.). For heptachlor epoxide, endrin aldehyde, and DDT and DDD, the BAFs for heptachlor, endrin, and DDE, respectively, were used to estimate earthworm concentrations. The value for methyl mercury was used as a surrogate for mercury. Elemental mercury is not expected to occur, and methyl mercury is a common, and highly toxic, form of this element. To convert the earthworm body burden from a dry wet to a wet weight basis, an assumed percent moisture content of 83 percent was applied (Sample et al., 1998). For the fox and hawk evaluations, small mammal body burden data for pesticides and PCBs collected from the undeveloped areas of the property (EPA, 1999a) were

used in concert with small mammal BAF values cited in Sample et al. (1998). Body burden data from EPA (1999a) consisted of analyses for pesticides and PCBs. BAFs for metals were taken from Sample et al. (1998). No BAFs for the uptake of semi-volatile compounds, including PAHs, were available, and this was not deemed significant, as these are not expected to accumulate to any great degree in small mammals (Eisler, 1987a).

7.4.3.1 Short-tailed Shrew

Table 7-5 presents the calculated hazard quotients for shrews exposed to the maximum concentrations for facility surface soils in habitats of the Bound Brook floodplain within the site boundary. Table 7-6 provides the body weight normalized toxicity reference values for the short-tailed shrew evaluation. A NOAEL HQ >1 for volatile organic compounds was limited to trichloroethene, and all other volatile compounds remained < 1 for corresponding NOAEL and LOAEL HQs. Dibenzofuran and cobalt were the only COPECs which lacked toxicity information and could not be fully evaluated. Distribution of NOAEL HQs >1 for the detected compounds/elements were categorized in the following groupings:

NOAEL HQ >1 to ≤10: Trichloroethene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, alpha-BHC, heptachlor, 4,4-DDT, antimony, chromium, selenium, vanadium, and zinc.

NOAEL HQ >10 to ≤ 60: Anthracene, chrysene, benzo(b)fluoranthrene, benzo(k)fluoranthrene, benzo(a)pyrene, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, aldrin, endosulfan sulfate, barium, cadmium, copper, lead, and mercury.

NOAEL HQ >60 to ≤ 100: Fluorene and thallium.

NOAEL HQ >100 to ≤ 300: Acenaphthene, fluoranthene, pyrene, 4,4-DDE, Total DDT and metabolites, and endrin aldehyde.

NOAEL HQ >300 to ≤ 1000: Phenanthrene, heptachlor epoxide, and silver.

NOAEL HQ >1000: Dieldrin, Aroclor-1248, Aroclor-1254, Total PCBs, dioxin-like PCB congeners, TCDD and equivalents, and aluminum.

PCBs and dioxins present in the facility surface soils of the habitats sampled had the highest hazard quotients observed for any of the contaminants detected. Hazard quotients for Aroclor-1248, Aroclor-1254 and Total PCBs all resulted in NOAEL HQ values in excess of 40,000 for the shrew. LOAEL HQs for these compounds ranged from 4,135 to 9,074 (Table 7-5). The HQ for Aroclor-1260 remained <1.0 and was not deemed as contributing significantly to the overall total PCB exposure. Aroclor-1248 and Aroclor-1254 contributed 90 percent and 9.9 percent, respectively, of the total PCB value in this evaluation. Exposure dosages for TCDD and equivalents for the short-tailed shrew exceeded both the NOAEL and LOAEL values to the extent that resulted in hazard quotients of 11,000 and 1,102 respectively (Table 7-5). The corresponding NOAEL HQ for dioxin-like PCB congeners (PCB 77, 81, 126, 169, 105, 114, 118, 123, 156, 157, 167 and 189) also resulted in elevated HQs >400,000 for the NOAEL and 40,000 for the LOAEL comparisons.

Thirteen metals were associated with exposure dosages in excess of corresponding NOAEL and LOAEL dosages for the shrew. These metals included aluminum, antimony, barium, cadmium, copper, lead, mercury, selenium, silver, thallium, vanadium, and zinc. Elements including calcium, potassium, sodium, iron, and magnesium are essential microelements and are capable of being metabolically regulated in the vertebrate body. Therefore, these elements were excluded from this evaluation.

Results of this evaluation identified significant risks from the surface soil exposure pathways to insectivorous mammalian receptors from PAHs, pesticides, PCBs, dioxins, and metals. Of particular significance are hazard quotients exceeding 40,000 for NOAEL exposures and in excess of 4,000 for LOAEL exposures to Aroclor-1254 and Arclor-1248. Cumulatively, these two Aroclors contributed to 99.9 percent of the total PCB exposure for the shrew with Aroclor-1260 contributing less than 0.1 percent of total dosage for this receptor. NOAEL and LOAEL hazard quotients >11,000 and >1,100 for 2,3,7,8-TCDD and its equivalence were also predicted. Pesticides including aldrin, BHC, dieldrin, endrin and its metabolite endrin aldehyde, heptachlor and its metabolite heptachlor epoxide, DDT and its metabolites, and endosulfan sulfate all had corresponding NOAEL HQs in excess of 1.0. Ranking in order of elevated HQs for the above pesticides identified dieldrin, heptachlor epoxide, endrin aldehyde, and DDT and its metabolites as having HQs up to several orders of magnitude higher than other pesticides with HQs in excess of 1.0. All remaining pesticides had NOAEL HQs in the range of 4 to 41 (Table 7-5). All pesticides with NOAEL HQs in excess of 1.0 with the exclusion of heptachlor had LOAEL HQs in the range of 1 to 164.

The dietary pathway for exposure (i.e., ingestion of earthworms) was predicted to contribute over 85 percent for the listed pesticides, greater than 97 percent for the PCBs and over 98 percent for the TCDD exposures. Inorganic HQs in excess of 1.0 for NOAEL dosages included aluminum, antimony, barium, cadmium, chromium, copper, lead mercury, selenium, thallium, vanadium, and zinc. Excluding antimony and vanadium, all dosages for the listed metals also exceeded LOAEL dosage values for the shrew. The excessive hazard quotients observed suggest that maximum concentrations of select PAHs, pesticides, Aroclor-1248 and Arclor-1254, dioxins, and metals in the facility surface soils present an excess risk to small, insectivorous mammals. Specific contaminants which should be considered as potentially problematic under maximum exposure scenarios based on this evaluation include the following surface soil contaminants: trichloroethene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, DDT, DDD, DDE, alpha-BHC, heptachlor, heptachlor epoxide, endrin aldehyde, dieldrin, endosulfan, Aroclor-1254, Aroclor-1248, 2,3,7,8-TCDD TEQ equivalents, aluminum, antimony, barium, cadmium, chromium, copper, lead, mercury, selenium, thallium, vanadium, and zinc.

7.4.3.2 Red Fox

Table 7-7 presents the calculated NOAEL hazard quotients for the red fox exposed to the maximum concentrations observed in facility surface soils from habitats associated within the existing facility property perimeter. Table 7-8 provides the body weight normalized toxicity reference values for the red fox evaluation. No NOAEL hazard quotients >1 were observed for any volatile compounds observed in facility surface soils. Dibenzofuran was the only semi-volatile compound which lacked

toxicity information and could not be fully evaluated for this receptor. Distribution of NOAEL HQs >1 for the detected compounds/elements were categorized in the following groupings:

- NOAEL HQ >1 to ≤10: Fluorene, anthracene, fluoranthene, pyrene, chrysene, benzo(a)pyrene, benzo(a)anthracene, aldrin, heptachlor epoxide, endrin aldehyde, 4,4-DDE, total DDT and its metabolites, endosulfan sulfate, antimony, barium, selenium, and vanadium.

- NOAEL HQ >10 to ≤ 60: Acenaphthene, phenanthrene, cadmium, copper, lead, silver, thallium and zinc.

- NOAEL HQ >60 to ≤ 100: Dieldrin.

- NOAEL HQ >100 to ≤ 350: Aroclor-1254, Aroclor-1248, and Total PCBs

- NOAEL HQ > 2200: Dioxin-like PCB congeners, TCDD TEQ Equivalents, and aluminum.

All remaining compounds/elements for the red fox exposure assessment had NOAEL HQs <1.

PCBs and dioxins present in the surface soils of the property resulted in the highest hazard quotients observed for any of the contaminants detected. Hazard quotients for Aroclor-1248, Aroclor-1254 and Total PCBs all resulted in NOAEL HQ values >290 for the fox evaluation under a maximum exposure scenario. The HQ for Aroclor 1260 remained <1.0 and was not deemed as contributing significantly to the overall total PCB exposure. Aroclor-1254 and Aroclor-1248 contributed 89 percent and 9.6 percent, respectively, of the total PCB dosage value for this evaluation. Exposure dosages for TCDD and equivalents for the red fox evaluation exceeded both the NOAEL and LOAEL values to the extent that resulted in HQs of 2,212 and 221 (Table 7-7). The corresponding NOAEL HQ for dioxin-like PCB congeners (PCB 77, 81, 126, 169, 105, 114, 118, 123, 156, 157, 167 and 189) also resulted in a NOAEL HQ of 2,445, and a LOAEL HQ of 245.

Eleven metals were associated with exposure dosages in excess of corresponding NOAEL and LOAEL dosages for the fox. These metals included aluminum, barium, cadmium, copper, lead, selenium, thallium, and zinc. Elements including calcium, potassium, iron, and magnesium are essential microelements and are capable of being metabolically regulated in the vertebrate body. Therefore, these elements were excluded from this evaluation.

Results of this evaluation identify significant risks from surface soil exposure pathways to carnivorous mammalian receptors from a limited potential number of PAHs, pesticides, PCBs, dioxins, and metals. Of particular significance are hazard quotients exceeding 294 for NOAEL comparisons and HQs >30 for LOAEL comparisons to Aroclor-1254 and Arcolor-1248. Cumulatively, these two Aroclors contributed to 98.6 percent of the total PCB exposure for the fox with Aroclor-1260 only contributing to 1.4 percent of total exposure to PCBs for the fox. NOAEL and LOAEL hazard quotients >2,400 for dioxin-like PCBs and >2,200 for 2,3,7,8-TCDD and its equivalence were predicted.

Pesticides including aldrin, dieldrin, endrin/endrin aldehyde, heptachlor/heptachlor epoxide, DDT and its metabolites, and endosulfan sulfate all had corresponding NOAEL HQs in excess of 1 but less than 10. The only pesticide with corresponding HQs >10 was dieldrin.

The dietary pathway for the maximized exposure (i.e., ingestion of small mammals) was predicted to contribute less than 20 percent for the majority of the listed pesticides,<3 percent for the PCBs and greater than 97 percent for TCDD exposures.

The excessive hazard quotients observed suggest that maximum concentrations of select PAHs, pesticides, Aroclor-1248 and Arclor-1254, dioxins, and metals in the facility surface soils may present an excess risk to carnivorous mammals. Compounds or elements with HQs <10 are typically considered to represent less of a risk under a maximized exposure scenario given the conservative assumptions applied in the exposure assessment. Specific contaminants which should be considered as potentially problematic under maximized exposure scenarios based on this evaluation include the following surface soil contaminants: acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, DDT, DDD, DDE, alpha-BHC, heptachlor, heptachlor epoxide, endrin aldehyde, dieldrin, endosulfan, Aroclor -254, Aroclor-1248, 2,3,7,8-TCDD and equivalents, aluminum, antimony, barium, cadmium, copper, lead, mercury, selenium, thallium, vanadium, and zinc.

7.4.3.3 American Robin

Table 7-9 presents the calculated hazard quotients for the American robin exposed to the maximum concentrations in facility surface soils. Table 7-10 presents the available toxicity reference values used in the hazard quotient assessment for the American robin. Hazard quotients for all volatile compounds, dibenzofuran, carbazole, benzaldehyde, acetophenone, methoxychlor, and toxaphene could not be fully evaluated due the lack of pertinent toxicity reference values for birds for these compounds. Distribution of NOAEL HQs >1 for the detected compounds/elements were categorized in the following groupings:

- NOAEL HQ >1 to ≤10: Acenaphthylene, fluorene, phenanthrene, fluoranthene, pyrene, alpha-BHC, heptachlor, endosulfan sulfate, gamma-chlordane, Aroclor-1260, antimony, nickel, mercury, selenium, and silver.

- NOAEL HQ >10 to ≤60: Barium and copper.

- NOAEL HQ >60 to ≤200: Endrin aldehyde, 4,4-DDD, aluminum, chromium, silver, and zinc.

- NOAEL HQ >200 to ≤1000: Heptachlor epoxide, 4,4-DDD, cadmium, and lead.

- NOAEL HQ >1000: Aldrin, dieldrin, 4,4-DDE, 4,4-DDT, Total 4,4-DDT and metabolites, Aroclor-1248, Aroclor-1254, Total PCBs, Dioxin-like PCB congeners, and TCDD and Equivalents.

For PCBs , estimated dosages of Aroclor-1254 resulted in a NOAEL HQ in excess of 240,000. The predicted Aroclor-1260 dosage estimate resulted in a NOAEL HQ of 18. Aroclor-1248 could not be directly evaluated as a specific NOAEL or LOAEL TRVs were not available for avian receptors from the available literature. Therefore, the TRV for Aroclor-1254 was employed for HQ estimation purposes. The estimated dosage of Aroclor-1248 resulted in a NOAEL HQ in excess of 26,600. Total PCB dosage estimates using the TRV datum for Aroclor-1254 was equivalent to a NOAEL HQ in excess of 267,000. Dioxin-like PCB congeners were evaluated based upon a 2,3,7,8-TCDD equivalence and resulted in a HQ greater than 47,600. Aroclor-1248 and Aroclor-1254 dosage estimates also exceeded their corresponding LOAEL TRV, resulting in LOAEL HQs in excess of 2,600 for Aroclor-1248 and 24, 000 for Aroclor-1254. Exposure dosages for TCDD and equivalents for the robin exceeded both the NOAEL and LOAEL value for this receptor. The corresponding NOAEL HQ for TCDD and its equivalents was 4,470 and the LOAEL HQ was 447 (Table 7-9).

Ten metals were associated with exposure dosages in excess of NOAEL dosages for the robin. These metals included aluminum, barium, cadmium, copper, chromium, lead, mercury, nickel, selenium, and zinc. Toxicological information for cobalt and iron was lacking and therefore these metals could not be evaluated. It should be noted that both metals are essential elements and thus are capable of being metabolically assimilated and excreted in vertebrates. Thus, the lack of toxicological information for these metals does not affirm their effect to be absolutely problematic through their exclusion in the risk assessment.

Results of this evaluation identify significant potential risks from surface soil exposure pathways to the American robin from select SVOCs, pesticides, PCBs, dioxins, and metals. Of particular significance are hazard quotients exceeding 260,000 for NOAEL exposures and in excess of 26,000 for LOAEL exposures for PCBs, and over 4,400 for NOAEL exposures and in excess of 440 for LOAEL exposures to 2,3,7,8-TCDD. Numerous pesticides were also found to have HQs for both NOAEL and LOAEL thresholds well in excess of 1.0. Pesticides of potential ecological concern for the robin include alpha-BHC, aldrin, heptachlor, heptachlor epoxide, dieldrin, DDT and its metabolites, endrin aldehyde, endosulfan sulfate, and gamma-chlordane. Inorganic COPECs included aluminum, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc. The excessive hazard quotients observed suggest that the maximum concentrations of the observed compounds and elements in facility surface soils present an excess risk to avian insectivores.

7.4.3.4 Red-tailed Hawk

Table 7-11 presents the calculated NOAEL hazard quotients for the red-tailed hawk exposed to the maximum concentrations observed in facility surface soils and biota from habitats associated within the existing site perimeter. Table 7-12 provides the toxicity reference values for the red-tailed hawk evaluation. Benzo(a)pyrene was the only PAH compound with a TRV for avian receptors and this value was applied to evaluate individual PAH compounds. No TRV related to NOAELs or LOAELs were available for avian receptors for any volatile compounds observed in facility surface soils. Benzaldehyde, acetophenone, dibenzofuran, nearly all of the PAHs, carbazole, methoxychlor, toxaphene, and cobalt lacked TRVs for avian test species and could not be fully evaluated for this receptor. Distribution of NOAEL HQs >1 for the detected compounds/elements were categorized in the following groupings:

- NOAEL HQ >1 to ≤10: Heptachlor epoxide, endrin aldehyde, 4,4-DDD, barium, cadmium, and selenium.

- NOAEL HQ >10 to ≤60: Aldrin, dieldrin, 4,4-DDT, Aroclor-1248 and copper.

- NOAEL HQ >60 to ≤100: Lead.

- NOAEL HQ >100 to ≤ 200: Dioxin-like PCB congeners, TCDD and equivalents, and aluminum

- NOAEL HQ > 200 to ≤500: Aroclor-1254, Total PCBs, and zinc.

- NOAEL HQ >1000: 4,4-DDE, and Total DDT and metabolites.

All remaining compounds/elements for the red-tailed hawk exposure assessment had NOAEL HQs <1.

DDE individually and in the sum of DDT and its metabolites had the highest hazard quotients observed for any of the contaminants detected for the red-tailed hawk. Hazard quotients for Aroclor-1254, Total PCBs and zinc all resulted in NOAEL HQ values >200. The HQ for Aroclor-1260 remained <1.0 and was not deemed as contributing significantly to the overall total PCB value observed. Aroclor-1254 and Aroclor-1248 contributed 89 percent and 9.6 percent of the total PCB dosage value in this evaluation. Exposure dosages for TCDD and equivalents for the red-tailed hawk evaluation exceeded both the NOAEL and LOAEL values to the extent that resulted in HQs of 173 and 17, respectively (Table 7-11). The corresponding NOAEL HQ for dioxin-like PCB congeners (PCB 77, 81, 126, 169, 105, 114, 118, 123, 156, 157, 167 and 189) also resulted in HQs of 191 for the NOAEL HQ evaluation and 19 for the LOAEL HQ based comparison.

Eleven metals were associated with exposure in excess of corresponding NOAELs and LOAELs for the fox. These metals included aluminum, antimony, barium, cadmium, copper, lead, selenium, silver, thallium, vanadium, and zinc. Elements including calcium, iron, magnesium, potassium, and sodium are essential microelements and are capable of being metabolically regulated in the vertebrate body. Therefore, these elements were excluded from this evaluation. NOAEL HQs for barium, cadmium, copper, and selenium remained ≤ 15. The highest NOAEL HQs were associated with aluminum, lead and zinc (Table 7-11). NOAEL HQs for these metals remained significantly higher relative to other metal HQs for this receptor.

Results of this evaluation identified the potential for significant risks from surface soil exposure pathways to carnivorous avian receptors from pesticides, PCBs, dioxins, and metals. Of particular significance are hazard quotients exceeding >1,000 for NOAEL comparisons for DDT and its metabolites for this receptor. This significant HQ value is attributed to the sensitivity of avian receptors to DDT and its metabolites. The lack of site-specific background concentrations for these compounds did not allow for attributing these and other pesticides solely to the property. Aroclor-1254 and Arcolar-1248, two compounds known to occur on the facility property, also were associated with elevated HQs of >200 for this receptor. Cumulatively, these two Aroclors contributed to 98.6 percent of the total PCB exposure for the red-tailed hawk with Aroclor-1260

contributing to 1.4 percent of total exposure to PCBs. NOAEL and LOAEL hazard quotients >190 for dioxin-like PCB congeners and >170 for 2,3,7,8-TCDD and its equivalence were predicted for this receptor.

The dietary pathway for the maximized exposure (i.e., ingestion of small mammals) was predicted to contribute greater than 20 percent for the majority of the listed pesticides, less than/equal to three percent for the PCBs and over1 percent for the TCDD exposures. The incidental ingestion of soil was estimated to contribute to greater than 90 percent of the exposure through the ingestion pathway for the hawk when maximized exposure point concentrations are evaluated.

The excessive hazard quotients observed suggest that maximum concentrations of select PAHs, pesticides, Aroclor-1248 and Aroclor-1254, dioxins, and metals in the facility surface soils may present an excess risk to carnivorous mammals. PAH compounds can be metabolically degraded in the vertebrate body and excreted. Specific contaminants which should be considered as potentially problematic under maximized exposure scenarios include the following surface soil contaminants: DDT, DDD, DDE, heptachlor epoxide, endrin aldehyde, dieldrin, Aroclor-1254, Aroclor-1248, 2,3,7,8-TCDD and equivalents, dioxin-like PCB congeners, aluminum, antimony, barium, cadmium, copper, lead, selenium, and zinc.

7.4.4 Uncertainties for the Maximum Exposure Assessment

The exposure assessment does not consider metabolic pathways for the elimination of contaminants by both the endpoint and intermediate receptors (i.e., prey or forage items). The exposure point value and accumulation factors assume a 100 percent bioavailability of COPECs in soils to terrestrial receptors. Site-specific bioaccumulation factors can only be directly assessed based upon bioassays with the soils in question. The use of a conservative BAF will result in a conservative estimate for exposure. This conservative estimate will not reflect any site-specific effects related to binding of hydrophobic compounds such as PCBs to soil micelles. Additionally, this exposure assessment considers a maximum COPEC exposure scenario for all receptors and thus limits exposure to a single conservative estimate in the risk characterization. It is only where this maximum concentration occurs in surface soils that the risk characterization will approach the maximum exposure scenario evaluated. Use of a maximized exposure scenario and parameters in the wildlife screening assessment results in an overly conservative estimate of risk to the receptors. Such assumptions include minimum body weights, maximum dietary ingestion rates, maximum exposure point concentrations, and assumptions regarding a sole source for the dietary prey.

7.5 Summary of SLERA and Identification of COPECs in Facility Surface Soils

A screening level ecological risk assessment was performed consistent with EPA (1997g) ERAGS for facility surface soils found on the property. Based upon an initial evaluation, 104 contaminants were evaluated as part of this assessment for potential risks to terrestrial receptors. Following the initial screening of maximum concentrations with conservative ecological screening level benchmarks, this list was reduced to 71 contaminants for further evaluation. The next part of the evaluation considered comparison of the maximum concentration to receptor-specific benchmarks for terrestrial plants, soil invertebrates, microbial processes, and representative insectivorous and

carnivorous mammals and birds. The representative mammal and bird species were the short-tailed shrew, red fox, American robin, and red-tailed hawk.

The following COPECs were identified based upon maximum concentrations observed from surface soils in habitats found on the property:

Terrestrial Plants: Vinyl chloride, dichloroethene, trichloroethene, tetrachloroethene, methylene chloride, ethylbenzene, toluene, xylene, naphthalene, methylnaphthalene, dibenzofuran, PAHs, alpha-BHC, aldrin, heptachlor and its metabolites, dieldrin, endrin aldehyde, DDT and its metabolites, endosulfan sulfate, chlordane, toxaphene, Aroclors-1248, -1254 and -1260, 2,3,7,8-TCDD and equivalents, aluminum, antimony, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

Soil Invertebrates and Microbial Processes: Vinyl chloride, dichloroethene, trichloroethene, tetrachloroethene, methylene chloride, ethylbenzene, toluene, xylene, naphthalene, methylnaphthalene, dibenzofuran, PAHs, alpha-BHC, aldrin, heptachlor and its metabolites, dieldrin, endrin aldehyde, DDT and its metabolites, endosulfan sulfate, chlordane, toxaphene, Aroclors-1248, -1254 and -1260, 2,3,7,8-TCDD and equivalents, aluminum, antimony, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

Insectivorous Small Mammals: Trichloroethene, PAHs, DDT and its metabolites, alpha-BHC, aldrin, heptachlor and its metabolites, dieldrin, endrin aldehyde, endosulfan sulfate, Aroclors-1248 and -1254, Total PCBs, 2,3,7,8-TCDD and equivalents, dioxin-like PCB congeners, aluminum, antimony, barium, cadmium, chromium, copper, lead, mercury, thallium, vanadium, and zinc.

Insectivorous Small Birds: Acenaphthene, fluorene, phenanthrene, fluoranthene, pyrene, DDT and its metabolites, alpha-BHC, aldrin, heptachlor and its metabolites, dieldrin, endrin aldehyde, endosulfan sulfate, chlordane, Aroclors-1248, -1254 and -1260, Total PCBs, 2,3,7,8-TCDD and equivalents, dioxin-like PCB congeners, aluminum, antimony, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc.

Carnivorous Mammals: Acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(a,h,i)perylene, benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, aldrin, DDE, Total DDT and metabolites, heptachlor epoxide, endrin aldehyde, dieldrin, endosulfan, Aroclors-1254 and -1248, Total PCBs, 2,3,7,8-TCDD and equivalents, dioxin-like PCB congeners, aluminum, antimony, barium, cadmium, copper, lead, selenium, thallium, vanadium, and zinc.

Carnivorous Birds: DDT, DDD, DDE, heptachlor/heptachlor epoxide, endrin aldehyde, dieldrin, Aroclors-1254, and -1248, 2,3,7,8-TCDD and equivalents, dioxin-like PCB congeners, aluminum, barium, cadmium, copper, lead, selenium, and zinc.

7.6 Baseline Ecological Risk Assessment (BERA) Problem Formulation (ERAGS Step 3)

7.6.1 BERA Problem Formulation

A SLERA was performed for the facility soils. Under conservative assumptions, the SLERA considered multiple receptors and trophic levels from the terrestrial communities associated with

areas on the property supporting ecological receptors. Representative ecological communities or specific wildlife species considered included soil invertebrates and microbial process, terrestrial plants and representative mammals and birds. The SLERA determined that risks to the representative receptor groups were potentially associated with the site under maximized exposure scenarios.

The findings of the SLERA for OU-2 determined, as part of scientific management decision point #1 (SMDP #1), to continue the ERA process through use of site-specific studies and refined exposure scenarios. This effort was to assist in reducing uncertainties in the SLERA and assist in the risk management phase for OU-2. This continuance followed the stepped approach of the ERAGS (EPA, 1997g) process and provides for the site-specific studies to better quantify risks through refined problem formulation, toxicological evaluation, exposure assessment, and risk characterization.

The purpose of the refined problem formulation (Step 3 ERAGS) is to identify and further define assessment endpoints for the BERA and propose measurement endpoints which allow for testable hypotheses. The refined problem formulation includes a refined list of COPECs, toxicological characteristics, and ecological effects potential in the terrestrial environment.

Contaminant Fate and Transport, Ecosystems Potentially at Risk and Complete Exposure Pathways

Volatile organic compounds in surface soils are not persistent as their low volatilization points and low water-octanol partition coefficients suggest that volatilization into the atmosphere is a major fate and transport mechanism in relation to their fate in the environment. They are not expected to bioaccumulate to any significant degree and thus are not anticipated to account for significant risks to ecological receptors based on average exposure point concentrations. Many higher vertebrates can metabolically degrade PAHs into simpler metabolites that can be effectively excreted. Plants and lower animals such as soil invertebrates may still be at risk through direct contact with contaminants in facility soils. Many hydrophobic compounds including PAHs, PCBs, dioxins, and pesticides are highly stable in soils and are tightly bound to organic material associated with soils. Often these compounds become mobile through erosion of contaminated particulate matter or through bioturbation by soil fauna. Metals can also be mobilized via these processes and may also dissolve into surface runoff from contaminated areas.

Contaminant Fate and Transport

In the surface soils on the property, volatile organics, PAHs, pesticides, Aroclor-1260, Aroclor-1254 and Aroclor-1248, dioxin and its equivalents, and metals were detected at levels that exceeded one or more of the endpoints considered in the SLERA. The observed maximum levels were possibly present from past disposal activities as these compounds were detected in test pit soils and groundwater, surface soils and subsurface soils/debris. The observed concentrations suggested from the SLERA that acute and chronic effects were possible but accumulation of PCBs, pesticides and dioxins by plants and soil animals remained a viable pathway. Generally these compounds are lipophilic and thus tend to accumulate in animal tissues to a greater degree than plant tissues. Soil invertebrates can accumulate these contaminants and provide a mechanism for exposure of site-related contaminants to higher trophic level vertebrates in the terrestrial food chain. Results of the

evaluation of insectivorous wildlife for these compounds suggest that potential food chain introduction accumulation could be occurring.

Ecosystems Potentially at Risk

Results of the ecological characterization for the SLERA revealed that several vegetation covertypes are present on the undeveloped portion of the property. The developed portion of the property does not afford significant value for use by ecological receptors as it is comprised of large paved, parking lots and concrete slab building foundations and wildlife usage of these areas is likely minimal. The undeveloped area of the property includes Bound Brook and its associated floodplain. Habitats present support several different vegetation cover types and habitats. These habitat covertypes included broad-leaved deciduous forests, successional fields and emergent wetland areas. These terrestrial habitats represent a smaller fraction of a larger contiguous area of floodplain habitats associated with the Bound Brook Corridor that extends up and downstream from the facility. Corresponding analytical data from these areas confirmed the presence of site-related constituents at concentrations in excess of eco-screening level values. Thus receptors which use these habitats may be at risk from contaminants in surface soils via direct exposure or by accumulation of bioaccumulating compounds (i.e., pesticides and PCBs) in lower animals (i.e., soil organisms). Subsequent ingestion of these soil organisms would expose ecological receptors to these COPECs. Additionally, insectivorous species may also bioaccumulate these compounds, placing carnivorous species at risk of exposure via bioaccumulation within the local food chain. The presence of site-related contaminants in the floodplain soils have been documented in areas of the floodplain contiguous to the existing property boundary (EPA, 1999a).

Complete Exposure Pathways

The presence of observed contamination in surface soils confirms that the direct exposure of terrestrial plant and soil communities is a complete exposure pathway for the vegetated portions of the property. Higher trophic level receptors including insectivorous and carnivorous species have been documented as using the on-site habitats. Historical data for small mammal body burdens confirm the presence of PCBs in terrestrial receptors (EPA, 1999a). The presence of receptors, contaminants and exposure routes, and confirmational data affirm that the potential for bioaccumlation by resident biota for introduction to higher trophic level receptors (i.e., insectivores and carnivores) is occurring. For larger species such as the red fox and red-tailed hawk, it is likely that these receptors also have the potential to be exposed to site-related contaminants via surface water ingestion. This pathway was not considered in this assessment as the focus was only for facility soils, and surface water will be addressed in a separate investigation (OU-3).

Selection of Assessment Endpoints

Assessment endpoints are defined as "explicit expressions of an environmental value that is to be protected." Based upon the results of the ecological characterization (Step 1) and screening level assessment (Step 2) the following assessment endpoints were developed for the facility surface soils for the Cornell-Dubilier Electronics Superfund site BERA:

1. Protection of soil fauna and heterotrophic processes in surface soils of the terrestrial habitats of the property;
2. Protection of insectivorous wildlife species feeding in surface soils of the terrestrial habitats of the property; and
3. Protection of carnivorous wildlife species feeding in and around the terrestrial habitats of the property.

Conceptual Site Model and Hypotheses

The conceptual site model depicted in Figure 7-3 identifies multiple primary sources for OU-2 including contaminated soils, buried waste debris and capacitors, and deposited dust and particulate matter from historical facility operations. The OU-2 evaluation focused exclusively on the facility surface and subsurface soils. Contaminated facility surface soils were identified as as the primary environmental medium for exposure of ecological receptors to site-related contaminants. Facility surface soils have been characterized to contain site-related contaminants including metals, PAHs and bioaccumulating compounds including various pesticides, PCBs, and dioxins as detected during this OU-2 investigation and historical investigations.

The undeveloped portion of the property contain areas of significant wildlife habitat and are documented to support a variety of ecological receptors including terrestrial plants, soil invertebrates, and wildlife species including birds, mammals, reptiles, and amphibians. In addition, the channel and associated floodplain of Bound Brook also traverses the undeveloped portion of the property. The brook supports a warmwater fishery and currently has a fish advisory for the presence of PCBs in fish tissues. The developed portion of the property does not support ecological receptors, and the presence of impervious areas of asphalt and concrete slabs render the exposure to the surface soils pathway incomplete.

Major source migration pathways to soils supporting ecological receptors include:

- Windborne, fugitive soil matter being entrained by air current from the developed portion of the property and redeposited in terrestrial and wetland habitats;
- Erosion of contaminated subsurface and surface soils by runoff from developed areas being re-deposited in wetland areas of the Bound Brook floodplain via overland flow or via discharge from the on-site storm sewer system;
- Wet or dry airborne deposition from historical burning of capacitors and uncontrolled releases to the atmosphere during waste disposal; and
- Direct releases of liquid or solid wastes into the adjoining floodplains of the Bound Brook and the isolated wetlands present as of result of past filling and disposal activities on the property.

The above pathways would facilitate the release of potential site-related contaminants to the surface soils of habitats present in the undeveloped portion of the property. Terrestrial habitats present and capable of supporting ecological receptors include forested woodlands, wetlands and open fields. A variety of terrestrial receptors are documented in the habitats present on-site including plants, soil invertebrates, birds, mammals, reptiles, and amphibians.

Facility soil contaminant exposure pathways and routes for terrestrial receptors include direct contact with contaminants in soils, bioaccumulation of contaminants via exposure through ingestion of contaminated prey, or incidental ingestion of soil. Ecological receptors such as terrestrial and wetland plants, soil invertebrates and soil microbes would be exposed via the direct contact with contaminants present in the soils. These receptors will also be subject to bioaccumulation of contaminants through the direct contact pathway. The SLERA evaluated the risks to the lower trophic level receptors based upon a point estimate of exposure to a maximum concentration. Higher trophic level receptors including birds, mammals, reptiles and amphibians will be exposed through dietary ingestion of prey previously exposed to the contaminants present and through incidental ingestion of soils.

Facility surface soils have been characterized to contain site-related contaminants including metals, PAHs and bioaccumulating compounds including various pesticides, PCBs, and dioxins. These groups of compounds were identified as COPECs in the SLERA for OU-2.

Surface soils in the terrestrial habitats act as the primary medium for soil invertebrates and plants. Soil invertebrates exposed to contaminants with a high affinity to concentrate in lipophilic tissues will provide a pathway to introduce these contaminants into the local terrestrial food chain. Secondary receptors, such as insectivorous birds and mammals, would be exposed to these contaminants via dietary ingestion of soil invertebrates and have the potential to accumulate and concentrate these contaminants to a higher degree than ambient media. Such contaminants with a high affinity to accumulate in animal tissues at concentrations in excess of those present in environmental media include mercury, detected pesticides, PCBs and dioxins. The characteristics of compounds such as PCBs, dioxin and mercury to bioconcentrate in the food chain places higher trophic level receptors at greater risk of exposure to these COPECs.

Predation of secondary receptors (i.e., insectivorous birds and mammals) by tertiary, carnivorous receptors results in further potential exposures to higher trophic level receptors at dosages with the potential to be significantly higher than the original primary source. However, larger predatory receptors occupy larger areal territories that extend beyond the limits of the current property boundaries. Given the contiguous nature of the wetland and floodplain habitats of Bound Brook, the area encompassed by the facility property would only approximate a fraction of the normal home range for species such as the red fox and red-tailed hawk. The portions of the habitats present within the current on-site boundaries would support smaller, insectivorous species whose home range would be contained wholly within habitats present in the on-site property. Further evaluation of carnivorous or piscivorous species with larger home ranges should be considered in the context of the availability of the Bound Brook Corridor for use as potential habitat. Other potential pathways of exposure include ingestion of surface water and ingestion of aquatic prey species. A comprehensive analysis of all potential pathways in the Bound Brook Corridor will be assessed as part of the OU-3 investigation.

The presence of COPECs in facility soils with complete exposure pathways and the presence of ecological receptors to come into contact with the identified COPECs, allows for development of testable risk hypotheses.

The following risk hypotheses were developed to assist in the risk characterization process for the identified assesssment endpoints:

- Do COPECs which are prone to bioaccumulate in the terrestrial food chain present an unacceptable risk to insectivorous birds and mammals in the on-site habitats?

- Do COPECs which are prone to bioaccumulate in the terrestrial food chain present an unacceptable risk to carnivorous birds and mammals in the on-site habitats?

The above risk hypotheses will form the basis for focusing the refined exposure assessment and risk characterization for the OU-2 ERA.

7.6.2 Refinement of Contaminants of Ecological Concern

Based upon predictive modeling results in the SLERA, representative ecological receptors were determined to be potentially at risk from a variety of organic compounds and metals associated with the facility surface soils. For birds and mammals, bioaccumulating compounds in representative prey items included PAHs, PCBs, pesticides, dioxin, and select metals. Risks to the birds and mammals were largely derived from dietary sources as a result of bioaccumulation in prey items. Plants and lower animals such as soil invertebrates may still be at risk through direct contact with contaminants in on-site soils. For terrestrial communities such as soil fauna and flora, exposure is largely derived from direct contact of the receptors with contaminated surface soils. Plants and lower animals such as soil invertebrates may still be at risk through direct contact with contaminants in facility soils. It is implied that for higher level receptors (i.e., insectivorous/carnivorous terrestrial species) the major pathway of exposure to site-related contaminants will be through the consumption of contaminated prey (i.e., soil invertebrates and small vertebrates) for bioaccumulating compounds and metals, and incidental ingestion of soils during feeding. Volatile organic compounds are not expected to bioaccumulate to any significant degree and thus are not anticipated to account for significant risks to ecological receptors based on average exposure point concentrations. Higher vertebrates, such as mammals and birds, can metabolically degrade PAHs into simpler metabolites that can be effectively detoxified and eliminated from the vertebrate body.

7.6.3 Literature Search for Ecological Effects

A literature search for representative ecological and toxicological effects for the refined COPEC list was performed to assist in identifying important fate and transport properties and exposure pathways for the site. Given the large number of COPECs, the toxicological profiles are meant to provide an overview of the available scientific and regulatory literature and do not represent an exhaustive evaluation. The toxicity profiles are provided in Appendix P.

7.7 Refined Exposure Assessment and Risk Characterization

To better understand how risks to the endpoint receptors may be manifested using an areal exposure point concentration, a more realistic exposure scenario considered the application of an exposure point concentration assessed across the range of detected concentrations of COPECs across the facility property. The mean concentration of each COPEC was assessed to better represent the overall risks to the wildlife receptors based on an exposure point concentration estimate. The

exposure parameters for the wildlife receptors were modified to better reflect values typical for the species under consideration.

Receptor specific exposure parameters used for the mammalian and avian refined exposure assessment were as follows:

Exposure Parameter	American Robin *(Turdus migratorius)*	Short-tailed Shrew *(Blarnia brevicauda)*
Body Weight (Kg)	0.080[a]	0.015[a]
Food Ingestion (Kg/day w.w.)	0.083[a]	0.010[a]
Soil Ingestion (%)	10.4%[b,c]	9.4%[b,c]
Areal Forage Estimate	100%	100%
Dietary Composition (%)	93% earthworm [b]	41% earthworm[b]

Exposure Parameter	Red Fox *(Vulpes vulpes)*	Red-tailed Hawk *(Buteo jamaicensis)*
Body Weight (Kg)	4.13[a]	1.224[a]
Food Ingestion (Kg/day w.w.)	0.58[a]	0.34[a]
Soil Ingestion (%)	2.8%[b,c]	2.8%[b,c]
Areal Forage Estimate	100%	100%
Dietary Composition (%)	92 % Small Mammals[a]	74% Small Mammals[a]

[a]Sample et al. (1996).
[b]EPA (1993b) and Beyer et. al. (1994).
[c]EPA soil ingestion estimate for woodcock and raccoon provided in Beyer et al. used as an estimate for the robin and shrew, respectively.
w.w. = wet weight.

Modified exposure parameters included an increased body weight for typical individuals for the species. Review of the studies by Wheelwright (1986) and summarized in EPA (1993) revealed that the earthworm/invertebrate component is highly seasonal for the robin ranging from 8-93 percent of the total dietary ingestion. Because the highest component for earthworms occurs during the spring breeding period, the upper value of 93 percent was selected given the reproductive effects attributable to PCBs. The remaining portion of the diet is composed of seeds and berries. For the shrew, studies by Hamilton (1941) and Whittaker and Ferraro (1963), as summarized in EPA (1993b), revealed that the earthworm/invertebrate component for the shrew ranges from 31 to 41 percent. For risk estimation purposes the upper value of 41 percent for the shrew is applied for the refined exposure evaluation.

Review of the study by Knable (1974) as summarized in EPA (1993b) revealed that the small mammal component for the red fox remains highly seasonal and ranges from 37 to 92 percent of the total annual dietary ingestion. Because spring represented the highest period for consumption of this prey item and it occurs during a high demand period for food consumption (i.e., denning period and kit growth) the upper value of 92 percent was selected given the reproductive effects attributable to PCBs. The remaining portion of the diet (8 percent) is composed of birds and invertebrates. For the red-tailed hawk, the small mammal component of the diet ranges from 74 to 78 percent based upon the studies by Adamcik et al. (1979), Janes (1984) and Fitch et al. (1946) as summarized in EPA (1993b) for nesting pairs. For risk estimation purposes, the value of 74 percent for the hawk in

partially developed habitat is applied for the refined exposure evaluation. No change in the areal forage factor or percent soil ingestion was made as the shrew and robin have relatively small home ranges (<1 hectare) and soil ingestion data for the surrogate species appeared representative based upon similar trophic guilds for the receptors with available data. Both the red fox and the red-tailed hawk have home ranges in excess of the existing site boundary. However, the possibility does exist for both species to use associated habitats to a great extent given its contiguous nature to the Bound Brook floodplain corridor.

Both the American robin and short-tailed shrew will likely be associated with the highest potential exposure to the facility soils given the large soil invertebrate component in their diet and higher fractional proportion of incidental ingestion of surface soils. For the average exposure assessment, select parameters including the body weight, ingestion rate and dietary representation were adjusted to values deemed representative for the on-site conditions. For the exposure point concentration, the maximum concentration for contaminants observed in soils were replaced by the mean concentration for those COPECs that were identified from the maximum screening level evaluation.

Short-tailed Shrew

Table 7-13 presents the calculated exposure dosages and hazard quotients for the short-tailed shrew using the mean exposure point concentration. Table 7-14 presents the derived NOAEL and LOAEL values for the mean exposure point concentration evaluation. Total dietary exposure for the shrew was derived from ingestion of the prey portion of diet for pesticides, PCBs, and dioxins ranging from 85 to 98 percent of the dietary dosage, whereas the soil portion of diet was found to contribute <2 to 15 percent of the total exposure for the various COPECs.

NOAEL and LOAEL HQs for average exposure dosages for the short-tailed shrew found multiple contaminants to exceed their TRVs. The following presents a summary of compounds found and their HQ ranges.

- NOAEL HQ's >1 to ≤10: Acenaphthene, fluorene, phenanthrene, anthracene, pyrene, fluoranthene, alpha-BHC, aldrin, 4,4'-DDE, Total 4,4'-DDT and metabolites, endosulfan sulfate, endrin aldehyde, antimony, barium, cadmium, copper, lead, mercury, and vanadium.

- NOAEL HQs >10 to <280: Heptachlor epoxide, dieldrin, endrin aldehyde, aluminum, and thallium.

- NOAEL HQs >1,363 to <9,802: Aroclor-1248, Aroclor-1254, and 2,3,7,8-TCDD and equivalents.

- NOAEL HQ >72,000: Dioxin-like PCB congeners.

- Compounds with LOAEL HQs ≥1 to ≤10 included aldrin, heptachlor epoxide, 4,4'-DDE, Total 4,4-DDT and metabolites, mercury, and thallium.

- Compounds with LOAEL HQs ≥11 to ≤30 included dieldrin and aluminum.

- All remaining compounds had significantly higher LOAEL HQs ranging between ≥130 to ≤7,291. This group of COPECs included Aroclor-1248 and Aroclor-1254; and 2,3,7,8-TCDD and equivalents.

Results of the assessment revealed that significant risks to insectivorous mammals exist from exposure to site-related contaminants in the on-site habitats. Compounds such as PAHs can be metabolized and excreted by mammals and the exposure and risks from these compounds are probably overestimated for this receptor. PCBs and pesticides are not readily metabolized and bioaccumulate in tissues. Metals such as copper, chromium and zinc are key microelements and levels of these metals can be regulated within the vertebrate body. Mercury is not a key microelement and can be accumulated to significant degrees in vertebrate tissues. Other metals such as antimony, cadmium, lead, vanadium, silver, and thallium can be bioaccumulated but are not concentrated to significant degrees in tissues.

Red Fox

Table 7-15 presents the calculated exposure dosages and hazard quotients for the red fox using the mean exposure point concentration. Table 7-16 presents the derived NOAEL and LOAEL values for the mean exposure point concentration evaluation. Total dietary exposure for the fox was derived largely from the incidental ingestion of soil. This exposure route accounted for greater than 90 percent of the total dietary exposure for this receptor to organic compounds including PCBs. Metals revealed a greater exposure via the small mammal ingestion pathway. Compounds and elements with corresponding HQs in excess of one included the following:

- NOAEL HQ >1 to ≤10: Acenaphthene, phenanthrene, flouranthene, antimony, cadmium, copper, lead, vanadium, and zinc.

- NOAEL HQ >10 to ≤50: Dieldrin, Aroclor-1254, silver and thallium.

- NOAEL HQ >100 to ≤300: Aroclor-1248, Total PCBs and aluminum.

- NOAEL HQ >600: Dioxin-like PCB congener and Total TCDD and Equivalents.

- Compounds with LOAEL HQ's ≥1 to ≤10 included Dieldrin, Aroclor-1254, Total PCBs and thallium.

- Compounds with LOAEL HQ's ≥11 to ≤30 included Aroclor-1248 and aluminum.

- Total TCDD and equivalents and dioxin-like PCB congeners had LOAEL HQs >60.

Results of the assessment reveal that significant risks to carnivorous mammals exist from exposure to site-related contaminants in the on-site habitats. Compounds such as acenaphthene, phenanthrene and fluoranthene can be metabolized and excreted by mammals and the exposure and risks from these compounds are probably overestimated for this receptor. PCBs, dioxins and pesticides are not readily metabolized and bioaccumulate in tissues. Metals such as copper and zinc are key microelements, and levels of these metals can be regulated within the vertebrate body. Other metals

such as antimony, cadmium, lead, vanadium, silver, and thallium are not bioaccumulated to significant degrees and are not key micro-elements in the vertebrate body.

American Robin

Table 7-17 presents the calculated exposure dosages and hazard quotients for the American robin using a mean exposure point concentration. TRVs used in the refined exposure evaluation were referenced from Table 7-10. The robin's total dietary exposure from ingestion of the prey portion of the diet was higher in pesticides, PCBs, and dioxins ranging from 91 to 99 percent of the total exposure. Metals were higher for the prey portion of the dietary pathway which contributed 54 to 99 percent of the total exposure for this group of COPECs.

Exceedance of the NOAEL and LOAEL dosages at average exposure dosages for the American robin exposed to facility surface soils identified multiple contaminants including SVOCs, pesticides/PCBs, dioxins, and metals. The following presents a summary of compounds found and their corresponding HQ ranges.

- NOAEL HQs >1 to <10: Phenanthrene, aluminum, barium, and zinc.
- NOAEL HQs >11 to <60: Heptachlor epoxide, endrin aldehyde, cadmium, chromium, lead, and silver.
- NOAEL HQs >150 to <17,000: Aldrin, dieldrin, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, Total 4,4-DDT and its metabolites, Aroclor-1248, and Aroclor-1254 had high corresponding NOAEL HQs ranging from ≥8,342 to ≤12,100; and 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD and its equivalents) and dioxin-like PCB congeners had high corresponding NOAEL HQs.
- Compounds with LOAEL HQs ≥1 to ≤10 included cadmium, chromium and silver.
- Compounds with LOAEL HQs ≥ 11 to ≤200 included aldrin, 4,4'-DDD, and 4,4'-DDT.
- 4,4,'-DDE, Aroclor-1248, and Aroclor-1254 had LOAEL HQs ranging between ≥740 to ≤1,350 and dioxin-like PCB congeners had a high corresponding LOAEL HQ of 19,497.

Results of the assessment reveal that significant risks to insectivorous birds exist from exposure to site-related contaminants in the on-site habitats. Compounds such as phenanthrene can be metabolized and excreted by birds, and the exposure and risks from this compound are probably overestimated for this receptor. PCBs, pesticides and dioxins are not readily metabolized and bioaccumulate in tissues. Long term risks from these contaminants remain more significant. Metals such as copper, chromium and zinc are key microelements, and levels of these metals can be regulated within the vertebrate body. Cadmium and lead can be bioaccumulated but are not bioconcentrated within the food chain.

Red-tailed Hawk

Table 7-18 presents the calculated exposure dosages and hazard quotients for the red-tailed hawk using the mean exposure point concentration. Total dietary exposure for the hawk was derived largely from the incidental ingestion of soil. This exposure route accounted for over 90 percent of the total dietary exposure of this receptor to organic compounds including PCBs. Metals revealed a greater exposure via the small mammal ingestion pathway. Compounds and elements with corresponding HQs in excess of 1.0 included the following:

- NOAEL HQ >1 to ≤10: Aldrin, dieldrin, 4,4-DDD, aluminum and lead.
- NOAEL HQ >10 to ≤50: 4,4-DDT, Aroclor-1248, Aroclor-1254, Total PCBs, Total TCDD and equivalents, and zinc.
- NOAEL HQ >100 to ≤200: 4,4-DDE, and Total DDT and metabolites.
- NOAEL HQ>400: Dioxin-like PCB congener TCDD equivalents.
- Compounds with LOAEL HQs ≥1 to ≤10 included 4,4-DDT, Aroclor-1248, Aroclor-1254, Total PCBs, Total TCDD and equivalents, and zinc.
- Compounds with LOAEL HQs ≥ 11 to ≤200 included 4,4'-DDE, Total DDT and metabolites, and PCB congener TCDD equivalents

Results of exceedance for the NOAEL and LOAEL HQs at mean exposure dosages for the red-tailed hawk of COPECs in surface soils found multiple contaminants including pesticides/PCBs, dioxins, and select metals. These results indicate that significant risks to raptors from site-related contaminants are present in the habitats of the property. PCBs and pesticides are not readily metabolized and bioaccumulate in tissues. Long-term risks from these contaminants remain more significant. Metals such as copper, chromium and zinc are key microelements and levels of these metals can be regulated within the vertebrate body. Cadmium and lead can be bioaccumulated but are not bioconcentrated within the food chain.

7.8 Uncertainties and Limitations in Ecological Risk Assessments

Sources of uncertainties associated with the ecological risk assessment include three major categories at CERCLA sites: (1) conceptual model uncertainties; (2) natural variation and parameter error; and (3) model error. Uncertainties contribute to the overall risk through application of assumptions or generic parameters and how these assumptions and parameters may influence the risk estimation. Based upon this knowledge of potential influences of these uncertainties, an informed decision can then be made regarding the overall influence of uncertainties on the risk prediction.

7.8.1 Conceptual Model Uncertainties

Development of the conceptual model was based upon qualitative observations of wildlife present at the site and quantitative analytical data for facility soils. The collection of small mammals for

body burden analysis was undertaken to reduce the conservative assumptions applied in the ERA for OU2. The major effect of using the site-specific small mammal data cited in EPA (1998c) was to reduce the conservative estimates of exposures developed in the terrestrial and aquatic exposure models based on BAF estimates of body burdens. Like the SLERA, the BERA exposure assessment does not consider metabolic pathways for the depauperation of contaminants by both the endpoint and intermediate receptors (i.e., prey items). Metals such as calcium, potassium, iron, magnesium, and sodium are required macorelements, which can be regulated by invertebrates and vertebrates and were not considered as being problematic and not considered in the risk characterization. Select metals that were included in the exposure assessment and risk characterization inclusive of zinc, copper, manganese, selenium and chromium are essential microelements, which can be regulated to some degree and depaulpated by higher vertebrates (Eisler, 1986a; Eisler, 1993). Organic compounds such as PAHs can be metabolized and excreted by higher vertebrates (Eisler, 1987a; EPA, 1980d). The potential mechanism for excretion or regulation were not considered, but rather, an assumption of cumulative exposure was applied.

Additional uncertainty is associated with the bioaccumulation factors used to estimate concentrations of COPECs in earthworms and small mammals from soil data In applying a generic BAF, it was assumed that any detected COPECs in surface soil was 100 percent bioavailable. This assumption follows that in the absence of usable tissue data for earthworms, that a worst case scenario be considered for the endpoint receptor. This site-specific factor could enhance or limit the accommodation in earthworms and small mammals on the property.

7.8.2 Natural Variation and Parameter Error

Estimation of exposure parameters such as ingestion rates were estimated using allometric equations provided by Nagy (1987) and species-specific parameters from primary literature as summarized in EPA (1993b). Such estimates are based upon a range of species-specific exposure parameters measured from several populations of the same species. All estimates are subject to the limits of the equations from which the allometric relationships were derived.

The NOAEL/LOAEL values provided in Sample et al. (1996) are derived for a number of species based upon toxicity tests in laboratory studies. Derivation of TRVs was based upon similarity of phylogenetic groups and relative sensitivity of test species and receptors being evaluated. Therefore, some uncertainty can be attributed to the species-specific NOAEL/LOAEL values for the receptors considered. In an effort to minimize interspecies uncertainties, the observed NOAEL and LOAEL values for the test species were normalized to receptor-specific characteristics (i.e., body weight) using the conversion equations proposed by Sample et al. (1996). Additionally, select compounds did not have toxicity data for species of the same phylogenetic class. Inter-class derivation of benchmarks (i.e., mammal to bird) is not recommended as the primary method for deriving wildlife TRVs. Therefore, in the absence of phylogenetic studies for deriving toxicity reference values, select constituents could not be fully assessed for each phylogenetic class of receptors considered. A larger number of TRVs for avian receptors were lacking than for mammalian receptors.

7.8.3 Model Error

There is uncertainty associated with how well a conceptual site model approximates the exposure pathways considered. The applied models consider simple linear pathways for exposure, uptake and

accumulation. Generally, this linear path does not consider intricate relationships often associated with a localized food web. Rather, the model relies upon a simple food chain approach with supporting assumptions regarding representative pathways for contaminants that are implied in the exposure assessment.

7.8.4 Proposed Study Design and Measurement Endpoints for Further Reduction in Uncertainty

Measurement endpoints are "measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint." Measurement endpoints often are expressed as the statistical or arithmetic summaries of observations that make up the measurement. Measurement endpoints can be measures of either exposure or effects (EPA, 1997g).

The following proposed measurement endpoints were selected to support Lines of Evidence to answer the above risk hypotheses developed from the BERA Assessment Endpoints.

Measurement Endpoints to be used as Lines of Evidence for Assessment Endpoint #1

1. Evaluate risks of COPECs to representative soil fauna through supplemental soil sampling for biological evaluations and comparison to screening level benchmarks provided in Efroymson et al. (1997a) and the primary literature.

2. Directly evaluate risks and bioaccumulative potential of COPECs in surface soils through earthworm toxicity and bioaccumulation testing.

Measurement Endpoints to be used as Lines of Evidence for Assessment Endpoint #2

1. Revisit exposure parameters and conduct a literature search for site-specific application for key endpoint receptors to better refine the exposure assessment to site-specific conditions for the Bound Brook Corridor inclusive of the non-developed portions of the site.

2. Use results of earthworm bioaccumulation studies to directly assess soil invertebrate body burdens and quantify the soil invertebrate exposure pathway and risk characterization to insectivorous wildlife species.

Measurement Endpoints to be used as Lines of Evidence for Assessment Endpoints #3 and #4

1. Utilize existing ominvorous, small mammal data (i.e., white-footed mice) from terrestrial habitats to better quantify the dietary exposure pathway in the exposure assessment and risk characterization for carnivorous wildlife species.

2. Use verification sampling of surface soils in support of the bioaccumulation studies to reduce uncertainty in carnivore dietary pathway.

3. Compare exposure dosages of the above wildlife receptors to representative toxicity reference values to better quantify the exposure assessment and risk characterization.

The above lines of evidence will be used to better evaluate and characterize risks to environmental receptors through quantification of exposure pathways for contaminants of concern and the reduction in overall uncertainty in the risk characterization.

It is recommended that the study design for the above lines of evidence be developed in concert with the Bound Brook floodplain operable unit (OU-3) assessment as the contiguous habitats and pathways for Bound Brook and its floodplains soils remain complete for the receptors considered. It also anticipated that similar findings and hypotheses will be formulated for the Baseline Ecological Risk Assessment for OU-3.

7.9 Summary of the Ecological Risk Assessment

The ERA was performed to (1) provide a preliminary list of contaminants of potential ecological concern, (2) confirm the presence of complete exposure pathways and exposure routes to ecological receptors and (3) compare concentrations of contaminants present to conservative ecological screening level benchmarks. Results of this evaluation are summarized as follows:

- The principal media of concern for exposure of ecological receptors was facility surface soils (0 to 0.5 feet bgs).

- The developed portion of the property afforded no significant habitat and the impervious nature of the ground service in this area rendered the direct contact with facility surface soils extremely limited. Given the lack of habitat and the impervious cover over the surface soils, the exposure pathway for ecological receptors to come into contact with contaminants present in this part of the property was deemed incomplete.

- The undeveloped areas of the property including the upland forests, open fields and wetland areas were deemed as significant habitat supporting ecological receptors. The direct contact with surface soils pathway in the undeveloped portion of the property remained complete. Analytical sampling of the surface soils in this undeveloped part of the property revealed the presence of 104 organic compounds and elements including VOCs, SVOCs, pesticides/PCBs, dioxins, and metals.

- A conceptual site model was developed to identify exposure pathways and routes of exposure for ecological receptors. Exposure pathways included direct contact with soils, ingestion of contaminated biota, and incidental ingestion of soils during feeding or grooming.

- A screening level assessment using generic, conservative screening values and maximum observed concentrations revealed 71 contaminants to exceed these screening values.

- Maximum concentrations of these 71 contaminants were further screened using ecological benchmarks deemed protective of heterotrophic soil microbial processes, soil invertebrates and terrestrial plants. Additionally, food chain evaluations using maximum concentrations and maximized exposure parameters and bioaccumulation factors were performed for four wildlife receptors: the short-tailed shrew, red fox, American robin, and red-tailed hawk.

- Sixty-three contaminants exceeded at least one of the benchmarks for the direct contact pathway considering microbial, soil invertebrate and terrestrial plant endpoints.

- Results of the screening level food chain evaluation revealed NOAEL HQs of <1 to 499,000 for the shrew; NOAEL HQs of <1 to 2,445 for the red fox; NOAEL HQs of <1 to 267,000 for the American robin; and NOAEL HQs of <1 to 1,339 for the red-tailed hawk. The highest observed HQs for all receptors were associated with PCBs, dioxins and DDT and its metabolites.

A refined exposure assessment for the wildlife receptors was developed as part of a baseline problem formulation assessment for OU-2. Results of this evaluation included:

- The refined exposure assessment utilized mean concentrations of all contaminants with NOAEL HQs >1 observed in the screening level assessment and modified exposure parameters to reflect species-specific feeding and behavioral characteristics.

- The exposure assessment models were re-evaluated in consideration of the revised exposure parameters.

- LOAEL HQs ranged from 1.2 to 7,291 for the short-tailed shrew, with the highest HQs being associated with DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dixoin-like PCB congeners.

- LOAEL HQs ranged from 2 to 84 for the red fox, with the highest HQs being associated with Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, aluminum and dioxin-like PCB congeners.

- LOAEL HQs ranged from 2 to 1,950 for the American robin, with the highest HQs being associated with aldrin, DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dioxin-like PCB congeners.

- LOAEL HQs ranged from 2 to 46.5 for the red-tailed hawk, with the highest HQs being associated with Total DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dioxin-like PCB congeners.

Results of the ecological risk assessment revealed that ecological receptors associated with the undeveloped areas of the property may be at excess risk from site-related contaminants. Contaminants associated with historical practices of electronics and capacitor manufacture at the facility including PCBs, PAHs and metals. High concentrations of pesticides were also associated with risk to ecological receptors, though direct linkage to the historical site operations remains unclear.

SECTION 7

TABLES

TABLE 7-1
CORNELL- DUBILIER ELECTRONICS SUPERFUND SITE
WILDLIFE OBSERVATIONS WITHIN THE SITE AND BOUND BROOK CORRIDOR

Common Name	Scientific Name	Habitat Observations[1]	Field Notes
Birds			
Red-Winged Blackbird	*Agelaius phoeniceus*	Open, PEM	Individuals observed on the site and Bound Brook Corridor
Wood Duck	*Aix sponsa*	Bound Brook[2]	Individuals observed
Mallard	*Anas platyrhynchos*	Bound Brook	Individuals observed
Canada Goose	*Branta canadensis*	Bound Brook	Observed individuals and tracks along brook
Northern Cardinal	*Cardinalis cardinalis*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Gray Catbird	*Dumetella carolinensis*	Open/Forest[3]	Individuals observed on the site and Bound Brook Corridor
Northern Mockingbird	*Mimus polyglottos*	Open, Forest	Individuals observed
Song Sparrow	*Melospiza melodia*	Open	Individuals observed on the site and Bound Brook Corridor
House Sparrow	*Passer domesticus*	Open	Observed on the site
Black-Capped Chickadee	*Parus atricapillus*	Open, Forest	Heard call
Tufted Titmouse	*Parus bicolor*	Forest	Heard call
White-breasted Nuthatch	*Sitta carolinensis*	PFO1, Forest	Individuals observed
American Robin	*Turdus migratorius*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
American Crow	*Corvus brachyrhynchos*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Common Flicker	*Colaptes auratus*	Open, Forest	Individuals observed and heard call
Barn Swallow	*Hirundo rustica*	Bound Brook, PEM	Individuals observed
Tree Swallow	*Tachycineta bicolor*	Bound Brook, PEM	Individuals observed
Great Blue Heron	*Ardea herodias*	Bound Brook, PEM	Individuals observed
Green Heron	*Butorides virescens*	Bound Brook, Forest	Observed individuals and tracks
Eastern Kingbird	*Tyrannus tyrannus*	Open, Residential	Individuals observed
Common Grackle	*Quiscalus quiscula*	Open	Individuals observed on the site and Bound Brook Corridor
European Starling	*Sturnus vulgaris*	Open	Individuals observed
Red-Tailed Hawk	*Buteo jamaicensis*	Flying over Bound Brook Corridor	Observed individuals and heard call
Mourning Dove	*Zenaida macroura*	Open, Residential	Individuals observed
Blue Jay	*Cyanocitta cristata*	Forest	Individuals observed on the site and Bound Brook Corridor
Brown Thrasher	*Toxostoma rufum*	Forest	Individuals observed
Hairy Woodpecker	*Picoides villosus*	Forest	Individuals observed
Red-bellied Woodpecker	*Melanerpes carolinus*	Forest	Heard call
Downy Woodpecker	*Picoides pubescens*	Open, Forest	Individuals observed
Yellow Warbler	*Dendroica petechia*	Open/Forest, Forest	Individuals observed
American Goldfinch	*Carduelis tristis*	Open/Forest	Individuals observed
Rufous-sided Towhee	*Pipilo erythrophthalmus*	Forest, PFO1	Observed individuals and heard call
Common Yellowthroat	*Geothlypis trichas*	Forest, PFO1	Individuals observed
Great-Crested Flycatcher	*Myiarchus crinitus*	Forest	Individuals observed
Wood Thrush	*Hylocichla mustelina*	PFO1	Heard call
Belted Kingfisher	*Ceryle alcyon*	Bound Brook	Individuals observed
Northern Oriole	*Icterus galbula*	Forest, PSS	Individuals observed
Killdeer	*Charadrius vociferus*	Open	Individuals observed
House Wren	*Troglodytes aedon*	Forest, Open	forests
Domestic Pigeon	*Columba livia*	Developed land	Observed in developed portions of site
Mammals			
Red Fox	*Vulpes vulpes*	PEM/PSS	Den and scent post observed in N3
Muskrat	*Ondatra zibethicus*	Bound Brook, PEM, PFO1	Observed individuals, scat, burrow, slides
Eastern Chipmunk	*Tamias striatus*	Forest, Open	Individuals observed on the site and Bound Brook Corridor
Rat	*Rattus sp.*	Open, Forest	Tracks observed along banks of Bound Brook
Groundhog	*Marmota monax*	Open, Forest	Observed burrow
White-tail Deer	*Odocoileus virginianus*	Open, Forest, PEM, PSS, PFO1	Observed tracks and beds
Raccoon	*Procyon lotor*	Open, Forest, PEM, PFO1	Observed tracks
Eastern Gray Squirrel	*Sciurus carolinensis*	Forest, PFO1	Individuals observed
Eastern Cottontail	*Sylvilagus floridanus*	Open, Forest	Individuals observed on the site and Bound Brook Corridor
Domestic Dog	*Canis sp.*	Forest, PFO1, PEM	Tracks observed
Opossum	*Didelphis virginiana*	Open	Observed (dead on railrod tracks)
Reptiles and Amphibians			
Stinkpot	*Sternotherus odoratus*	Open, Forest	Individuals observed
Eastern Painted Turtle	*Chrysemys picta picta*	Open, Forest, Wetland	Individuals observed in Bound Brook, shell found on the site
Green Frog	*Rana clamitans melonata*	PEM, Bound Brook	Heard call
Bullfrog	*Rana catesbeiana*	PEM, Bound Brook	Heard call
Snapping Turtle	*Chelydra serpentina*	PEM, Bound Brook	Individuals observed
Eastern Box Turtle	*Terrapene carolina*	Open	Individuals observed

1 Habitat Types
Open: successional field and residential yards
Forest: broad-leaved deciduous forest
PFO1: palustrine broad-leaved deciduous forest
PEM: palustrine emergent wetland
PSS: palustrine scrub/shrub wetland
2 Species observed in, on, or flying over Bound Brook and its tributaries
3 Species observed in Open/Forest edge habitat

TABLE 7-2
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
WILDLIFE SPECIES OBSERVED WITHIN UPSTREAM TRANSECT

Common Name	Scientific Name	Habitat Observations[1]	Field Notes
Birds			
Red-Winged Blackbird	*Agelaius phoeniceus*	Scrub/shrub,Bound Brook[2]	Individuals observed
Common Flicker	*Colaptes auratus*	Scrub/shrub, Forest	Individual observed
Song Sparrow	*Melospiza melodia*	PEM, Scrub/shrub	Individuals observed
American Robin	*Turdus migratorius*	PEM, Scrub/shrub, Forest	Individuals observed and heard
Belted Kingfisher	*Ceryle alcyon*	Bound Brook	Individual observed
American Crow	*Corvus brachyrhynchos*	PEM, Scrub/shrub	Individuals observed
Gray Catbird	*Dumetella carolinensis*	PEM, Scrub/shrub	Individuals observed
Mourning Dove	*Zenaida macroura*	PEM, Scrub/shrub	Individuals observed
Tree Swallow	*Tachycineta bicolor*	PEM, Scrub/shrub, Bound Brook	Individuals observed
Mammals			
Raccoon	*Procyon lotor*	PEM, Scrub/shrub	Observed tracks
White-tail Deer	*Odocoileus virginianus*	PEM, Scrub/shrub, Forest	Observed tracks
Muskrat	*Ondatra zibethicus*	PEM, Scrub/shrub	Observed burrow
Reptiles and Amphibian			
Bull Frog	*Rana catesbeiana*	PEM, Bound Brook	Heard
Unidentified Frog	*Rana sp.*	Bound Brook	Heard
Eastern Painted Turtle	*Chrysemys picta*	PEM, Bound Brook	Individuals observed
Eastern Box Turtle	*Terrapene carolina*	Forest	Individual observed

1 Habitat Types
Open: successional field and residential yards
Forest: broad-leaved deciduous forest
PFO1: palustrine broad-leaved deciduous forest
PEM: palustrine emergent wetland
Scrub/Shrub: upland woody shrub community

2 Bound Brook: Species observed in, on, or flying over Bound Brook and its tributaries

TABLE 7-3 (Sheet 1 of 3)
CORNEL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING VALUES FOR CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN

Compound/Element	Max. Conc. (mg/Kg)	Screening Level Value (SLV) (mg/Kg)		Max. Conc. Exceeds SLV	Retain as COPEC
Volatile Organic Compounds (VOCs)					
Chloromethane	1.90E-002	NC		NC	Yes
Trichlorofluoromethane	8.00E-003	NC		NC	Yes
Vinyl chloride	6.40E-001	3.00E-001	1	Yes	Yes
1,1-Dichloroethylene	6.00E-003	2.99E-001	7	No	No
Total 1,2-Dichloroethylene	5.64E+001	2.99E-001	1	Yes	Yes
Trichloroethylene	4.70E+001	2.99E-001	1	Yes	Yes
Tetrachloroethylene	4.30E-001	2.99E-001	1	Yes	Yes
1,1,1-Trichloroethane	1.60E-002	2.99E-001	1	No	No
Acetone	9.30E-002	NC		NC	No*
Carbon disulfide	3.20E-002	NC		NC	Yes
Methylene chloride	1.70E+000	2.99E-001	1	Yes	Yes
2-Butanone	1.70E-002	NC		NC	No*
Cyclohexane	2.00E-003	NC		NC	No*
Benzene	9.00E-003	1.00E-001	1	No	No
Chlorobenzene	2.00E-003	1.00E-001	1	No	No
Ethylbenzene	1.50E-001	1.00E-001	1	Yes	Yes
Methylcyclohexane	7.00E-003	NC		NC	No*
Toluene	7.50E+000	1.00E-001	1	Yes	Yes
Xylene (total)	2.70E+000	9.90E-002	1	Yes	Yes
Styrene	3.20E-002	1.00E-001	1	No	No
Isopropylbenzene	9.00E-003	NC		NC	Yes
1,3-Dichlorobenzene	4.00E-003	4.00E+001	2	No	No
1,4-Dichlorobenzene	5.00E-003	9.90E-002	1	No	No
1,2,4-Trichlorobenzene	5.90E+000	2.00E+001	2	No	No
Semi-Volatile Organic Compounds (SVOCs)					
Benzaldehyde	9.50E-001	NC		NC	Yes
Phenol	5.90E-002	1.00E-001	1	No	No
Acetophenone	3.40E-001	NC		NC	Yes
Biphenyl, 1,1-	1.00E+002	6.00E+001	2	No	No
Naphthalene	1.30E+002	1.00E-001	1	Yes	Yes
2-Methylnaphthalene	4.60E+002	1.00E-001	1	Yes	Yes
2-Chloronaphthalene	5.90E-002	1.00E-001	1	No	No
Acenaphthylene	9.60E-001	1.00E-001	1	Yes	Yes
Acenaphthene	2.80E+003	1.00E-001	1	Yes	Yes
Dibenzofuran	1.70E+003	6.00E+002	2	Yes	Yes
Fluorene	2.00E+003	1.00E-001	1	Yes	Yes
Hexachlorobenzene	2.30E-002	5.00E+002		No	No
Phenanthrene	7.00E+003	1.00E-001	4	Yes	Yes
Anthracene	1.20E+003	1.00E-001	1	Yes	Yes
Carbazole	3.60E-001	NC		NC	Yes
Fluoranthene	4.00E+003	1.00-01	1	Yes	Yes
Pyrene	2.60E+003	1.00E-001	1	Yes	Yes

TABLE 7-3 (Sheet 2 of 3)
CORNEL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING VALUES FOR CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN

Compound/Element	Max. Conc. (mg/Kg)	Screening Level Value (SLV) (mg/Kg)		Max. Conc. Exceeds SLV	Retain as COPEC
Di-n-butyl phthalate	1.80E+000	2.00E+002	2	No	No
Butyl benzyl phthalate	2.00E+001	1.00E+002	5	No	No
bis(2-Ethylhexyl) phthalate	2.10E+001	1.00E+002	5	No	No
Di-n-octyl phthalate	1.20E+000	1.00E+002	5	No	No
Chrysene	8.30E+002	1.00E-001	1	Yes	Yes
Benzo(b)fluoranthene	4.50E+002	1.00E-001	1	Yes	Yes
Benzo(k)fluoranthene	4.50E+002	1.00E-001	1	Yes	Yes
Benzo(a)pyrene	5.20E+002	1.00E-001	1	Yes	Yes
Benzo(g,h,i)perylene	2.00E+002	1.00E-001	1	Yes	Yes
Benzo(a)anthracene	9.20E+002	1.00E-001	1	Yes	Yes
Dibenzo(a,h)anthracene	6.60E+001	1.00E-001	1	Yes	Yes
Indeno(1,2,3-cd)pyrene	2.60E+002	1.00E-001	1	Yes	Yes
Pesticides/PCBs/Dioxin					
alpha-BHC	2.40E+000	1.00E-001	9	Yes	Yes
delta-BHC	2.00E-003	1.00E-001	9	No	No
gamma-BHC (Lindane)	2.00E-003	1.00E-001	1	No	No
beta-BHC	2.00E-003	1.00E-001	9	No	No
Aldrin	1.30E+002	1.00E-001	1	Yes	Yes
Heptachlor epoxide	2.50E+002	9.90E-002	1	Yes	Yes
Heptachlor	1.90E+000	9.90E-002	6	Yes	Yes
Dieldrin	5.20E+002	1.00E-001	1	Yes	Yes
4,4'-DDE	1.20E+003	1.00E-001	1	Yes	Yes
4,4'-DDD	2.10E+000	1.00E-001	1	Yes	Yes
4,4'-DDT	4.20E+001	1.00E-001	1	Yes	Yes
Endrin	3.90E-003	1.00E-001	1	No	No
Endrin aldehyde	1.20E+002	1.00E-001	1	Yes	Yes
Endrin ketone	3.80E-003	1.00E-001	1	No	No
Endosulfan I	1.10E-002	7.14E+000	3	No	No
Endosulfan II	3.90E-003	7.14E+000	8	No	No
Endosulfan sulfate	5.90E+001	7.14E+000	8	Yes	Yes
Methoxychlor	2.00E+000	NC		NC	Yes
alpha-Chlordane	2.30E-001	1.00E-001	1	Yes	Yes
gamma-Chlordane	2.00E+001	1.00E-001	1	Yes	Yes
Toxaphene	2.00E-001	NC		NC	Yes
Aroclor-1016	3.90E-002	1.00E-001	1	No	No
Aroclor-1221	8.00E-002	1.00E-001	1	No	No
Aroclor-1232	3.90E-002	1.00E-001	1	No	No
Aroclor-1242	3.90E-002	1.00E-001	1	No	No
Aroclor-1248	2.10E+003	1.00E-001	1	Yes	Yes
Aroclor-1254	1.90E+004	1.00E-001	1	Yes	Yes
Aroclor-1260	2.20E-001	1.00E-001	1	Yes	Yes
Total PCBs PPM	1.90E+004	1.00E-001	1	Yes	Yes
PCB Congener TCDD Equivalent	8.95E-001	3.15E-006	2	Yes	Yes
Total TCDD and Equivalent	8.39E+000	3.15E-006	2	Yes	Yes

TABLE 7-3 (Sheet 3 of 3)
CORNEL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING VALUES FOR CONTAMINANTS OF POTENTIAL ECOLOGICAL CONCERN

Compound/Element	Max. Conc. (mg/Kg)	Screening Level Value (SLV) (mg/Kg)		Max. Conc. Exceeds SLV	Retain as COPEC
Metals					
Aluminum	2.28E+005	1.00E+003	1	Yes	Yes
Antimony	2.15E+001	5.00E+000	2	Yes	Yes
Arsenic	5.51E+001	9.90E+000	2	No	No
Barium	4.17E+003	2.83E+002	2	Yes	Yes
Beryllium	9.20E+000	1.00E+001	2	No	No
Cadmium	1.23E+002	4.00E+000	2	Yes	Yes
Chromium	7.75E+001	4.00E-001	2	Yes	Yes
Cobalt	3.01E+001	2.00E+001	2	Yes	Yes
Copper	1.36E+004	1.50E+001	2	Yes	Yes
Cyanide	7.60E+000	5.00E-003	1	Yes	Yes
Iron	1.08E+005	1.20E+001	1	Yes	Yes
Lead	4.32E+003	1.00E+001	2	Yes	Yes
Manganese	7.45E+002	3.30E+005	1	No	No
Mercury	1.10E+000	5.10E-004	2	Yes	Yes
Nickel	9.28E+001	3.00E+001	2	Yes	Yes
Selenium	9.00E+000	2.10E-001	2	Yes	Yes
Silver	2.68E+001	2.00E+000	2	Yes	Yes
Thallium	7.60E+000	1.00E-003	1	Yes	Yes
Vanadium	1.29E+002	2.00E+000	2	Yes	Yes
Zinc	1.40E+004	8.50E+000	2	Yes	Yes

1 - Draft Region 3 BTAG, 1995b.

2 - Efroymson et.al., 1997a.

3 - Crommentuijn, et.al, 1995.

4 - Toxical. Environ. Health 15:93-108.

5 - SLV Unavailable, .SLV for Diethylphthalate used for phthalate compounds where criteria was unavailable.

6 - SLV Unavailable, SLV for Heptachlor Epoxide used for Heptachlor.

7 - SLV Unavailable, SLV for Total 1,2-Dichloroethylene used for 1,1-Dichloroethylene.

8 - SLV Unavailable, SLV for Endosulfan I used for Endosulfan II and Endosulfan Sulfate.

9 - SLV Unavailable, SLV for gamma-BHC (Lindane) used for all BHC compounds.

NC - No Screening Level Value Available.

*Acetone, cyclohexane, 2-butanone, and methylcyclohexane are not included as COPECs as they may be laboratory derived.

TABLE 7-4 (Sheet 1 of 2)

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

SCREENING LEVEL EVALUATION FOR ASSESSING RISKS TO TERRESTRIAL FLORA, SOIL INVERTEBRATES AND MICROBIAL

Compound/Element	Max. Conc. (mg/Kg)	Screening Level Values (mg/Kg)			Max. Conc. Exceeds SLV	Retain as COPEC
		Plants	Microbial	Soil Invertebrates		
Volatile Organics Compounds (VOCs)						
Chloromethane	1.90E-002	NC	NC	NC	NC	NC
Trichlorofluoromethane	8.00E-003	NC	NC	NC	NC	NC
Vinyl chloride	**6.40E-001**	**3.00E-001** 1	**3.00E-001** 1	**3.00E-001** 1	**Yes**	**Yes**
Total 1,2-Dichloroethylene	**5.64E+001**	**2.99E-001** 1,4	**2.99E-001** 1	**2.99E-001** 1,4	**Yes**	**Yes**
Trichloroethylene	**4.70E+001**	**2.99E-001** 1	**2.99E-001** 1	**2.99E-001** 1	**Yes**	**Yes**
Tetrachloroethylene	**4.30E-001**	**2.99E-001** 1	**2.99E-001** 1	**2.99E-001** 1	**Yes**	**Yes**
Carbon disulfide	3.20E-002	NC	NC	NC	NC	NC
Methylene chloride	**1.70E+000**	**2.99E-001** 1	**2.99E-001** 1	**2.99E-001** 1	**Yes**	**Yes**
Ethylbenzene	**1.50E-001**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Toluene	**7.50E+000**	**2.00E+002** 2	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Xylene (total)	**2.70E+000**	**9.90E-002** 1	**9.90E-002** 1	**9.90E-002** 1	**Yes**	**Yes**
Isopropylbenzene	9.00E-003	NC	NC	NC	NC	NC
Semi-Volatile Organic Compounds (SVOCs)						
Benzaldehyde	9.50E-001	NC	NC	NC	NC	NC
Acetophenone	3.40E-001	NC	NC	NC	NC	NC
Naphthalene	**1.30E+002**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
2-Methylnaphthalene	**4.60E+002**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Acenaphthylene	**9.60E-001**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Acenaphthene	**2.80E+003**	**2.00E+001** 2	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Dibenzofuran	**1.70E+003**	**6.00E+002** 2	**6.00E+002** 2	**6.00E+002** 2	**Yes**	**Yes**
Fluorene	**2.00E+003**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Phenanthrene	**7.00E+003**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Anthracene	**1.20E+003**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Carbazole	3.60E-001	NC	NC	NC	NC	NC
Fluoranthene	**4.00E+003**	**1.00-01** 1	**1.00-01** 1	**3.00E+001** 2	**Yes**	**Yes**
Pyrene	**2.60E+003**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Chrysene	**8.30E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Benzo(b)fluoranthene	**4.50E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Benzo(k)fluoranthene	**4.50E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Benzo(a)pyrene	**5.20E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Benzo(g,h,i)perylene	**2.00E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Benzo(a)anthracene	**9.20E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Dibenzo(a,h)anthracene	**6.60E+001**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Indeno(1,2,3-cd)pyrene	**2.60E+002**	**1.00E-001** 1	**1.00E-001** 1	**3.00E+001** 2	**Yes**	**Yes**
Pesticides						
alpha-BHC	**2.40E+000**	**1.00E-001** 1,6	**1.00E-001** 1,6	**1.00E-001** 1,6	**Yes**	**Yes**
Aldrin	**1.30E+002**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Heptachlor epoxide	**2.50E+002**	**9.90E-002** 1	**9.90E-002** 1	**9.90E-002** 1	**Yes**	**Yes**
Heptachlor	**1.90E+000**	**9.90E-002** 1,3	**9.90E-002** 1,3	**9.90E-002** 1,3	**Yes**	**Yes**
Dieldrin	**5.20E+002**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
4,4'-DDE	**1.20E+003**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
4,4'-DDD	**2.10E+000**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
4,4'-DDT	**4.20E+001**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Endrin aldehyde	**1.20E+002**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Endosulfan sulfate	**5.90E+001**	**7.14E+000** 1,5	**7.14E+000** 1,5	**7.14E+000** 1,5	**Yes**	**Yes**
Methoxychlor	2.00E+000	NC	NC	NC	NC	NC
alpha-Chlordane	**2.30E-001**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
gamma-Chlordane	**2.00E+001**	**1.00E-001** 1	**1.00E-001** 1	**1.00E-001** 1	**Yes**	**Yes**
Toxaphene	**2.00E-001**	**NC**	**NC**	**NC**	**NC**	**Yes**

TABLE 7-4 (Sheet 2 of 2)
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SCREENING LEVEL EVALUATION FOR ASSESSING RISKS TO TERRESTRIAL FLORA, SOIL INVERTEBRATES AND MICROBIAL

Compound/Element	Max. Conc. (mg/Kg)	Screening Level Values (mg/Kg)			Max. Conc. Exceeds SLV	Retain as COPEC
		Plants	Microbial	Soil Invertebrates		
PCBs/Dioxin						
Aroclor 1248	2.10E+003	1.00E-001 1	1.00E-001 1	1.00E-001 1	Yes	Yes
Aroclor 1254	1.90E+004	1.00E-001 1	1.00E-001 1	1.00E-001 1	Yes	Yes
Aroclor 1260	2.20E-001	1.00E-001 1	1.00E-001 1	1.00E-001 1	Yes	Yes
Total PCBs PPM	2.11E+004	4.00E+001 2	1.00E-001 1	1.00E-001 1	Yes	Yes
PCB Congener TCDD Equivalent	8.95E-001	3.15E-006 1	3.15E-006 1	3.15E-006	Yes	Yes
Total TCDD and Equivalent	8.39E+000	3.15E-006 1	3.15E-006 1	3.15E-006	Yes	Yes
Metals						
Aluminum	2.28E+005	5.00E+001 2	6.00E+002 2	1.00E+003 1	Yes	Yes
Antimony	2.15E+001	5.00E+000 2	5.00E+000 2	5.00E+000 2	Yes	Yes
Barium	4.17E+003	5.00E+002 2	3.00E+003 2	2.83E+002 2	Yes	Yes
Cadmium	1.23E+002	4.00E+000 2	2.00E+001 2	2.00E+001 2	Yes	Yes
Chromium	7.75E+001	1.00E+000 2	1.00E+001 2	4.00E-001 2	Yes	Yes
Cobalt	3.01E+001	2.00E+001 2	1.00E+003 2	2.00E+001 2	Yes	Yes
Copper	1.36E+004	1.00E+002 2	1.00E+002 2	5.00E+001 2	Yes	Yes
Cyanide	7.60E+000	NC	5.00E-003 1	5.00E-003 1	Yes	Yes
Iron	1.08E+005	NC	2.00E+002 2	1.20E+001 1	Yes	Yes
Lead	4.32E+003	5.00E+001 2	9.00E+002 2	5.00E+002 2	Yes	Yes
Mercury	1.10E+000	3.00E-001 2	3.00E+001 2	1.00E-001 2	Yes	Yes
Nickel	9.28E+001	3.00E+001 2	9.00E+001 2	2.00E+002 2	Yes	Yes
Selenium	9.00E+000	1.00E+000 2	1.00E+002 2	7.00E+001 2	Yes	Yes
Silver	2.68E+001	2.00E+000 2	5.00E+001 2	2.00E+000 2	Yes	Yes
Thallium	7.60E+000	1.00E+000 2	1.00E-003 1	1.00E-003 1	Yes	Yes
Vanadium	1.29E+002	2.00E+000 2	2.00E+001 2	2.00E+000 2	Yes	Yes
Zinc	1.40E+004	5.00E+001 2	1.00E+002 2	2.00E+002 2	Yes	Yes

1 - Draft Region 3 BTAG, 1995b.
2 - Efroymson et.al., 1997a.
3 - SLV Unavailable, SLV for Heptachlor Epoxide used for Heptachlor.
4 - SLV Unavailable, SLV for Total 1,2-Dichloroethylene used for 1,1-Dichloroethylene.
5 - SLV Unavailable, SLV for Endosulfan I used for Endosulfan II and Endosulfan Sulfate.
6 - SLV Unavailable, SLV for gamma-BHC (Lindane) used for all BHC compounds.
NC - No Screening Level Value Available.

TABLE 7-5

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR SHORT-TAILED SHEWS EXPOSED TO MAXIMUM CONCENTRATIONS OF COPECS IN SURFACE SOILS

Contaminants	Max. Soil Concen. (mg/kg)	Invertebrate Uptake Factor (Unitless)	Predicted Invertebrate Concen.* (mg/kg w.w.)	Ingestion Rate		Body Weight (Kg)	Percent Comp. Invertebrate (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Invertebrate (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value		NOAEL HQ	LOAEL HQ
				Wet Wt. (Kg/day)	Dry Wt. (Kg/day)							NOAEL Dosage (mg/Kg/day)	LOAEL Dosage (mg/Kg/day)		
Volatile Organic Compounds (VOCs)															
Chloromethane	1.90E-002	1.00E+000	3.23E-003	0.009	0.0022	0.012	1	0.094	3.27E-004	2.42E-003	2.75E-003	7.44E+000	7.44E+001	<1	<1
Trichlorofluoromethane	8.00E-003	1.00E+000	1.36E-003	0.009	0.0022	0.012	1	0.094	1.38E-004	1.02E-003	1.16E-003	1.60E-001	1.16E+000	<1	-
Vinyl chloride	6.40E-001	1.00E+000	1.09E-001	0.009	0.0022	0.012	1	0.094	1.10E-002	8.16E-002	9.26E-002	3.95E-001	3.95E+000	<1	<1
Total 1,2-Dichloroethylene	5.64E+001	1.00E+000	9.59E+000	0.009	0.0022	0.012	1	0.094	9.72E-001	7.19E+000	8.16E+000	5.68E+001	-	<4	-
Trichloroethylene	4.70E+001	1.00E+000	7.99E+000	0.009	0.0022	0.012	1	0.094	8.10E-001	5.99E+000	6.80E+000	8.80E-001	8.80E+000	**8**	<1
Tetrachloroethylene	4.30E-001	1.00E+000	7.31E-002	0.009	0.0022	0.012	1	0.094	7.41E-003	5.48E-002	6.22E-002	1.76E+000	8.80E+000	<1	<1
Carbon disulfide	3.20E-002	1.00E+000	5.44E-003	0.009	0.0022	0.012	1	0.094	5.51E-004	4.08E-003	4.63E-003	4.64E+001	-	<1	-
Methylene chloride	1.70E+000	1.00E+000	2.89E-001	0.009	0.0022	0.012	1	0.094	2.93E-002	2.17E-001	2.46E-001	1.36E+001	1.16E+002	<1	<1
Ethylbenzene	1.50E-001	1.00E+000	2.55E-002	0.009	0.0022	0.012	1	0.094	2.59E-003	1.91E-002	2.17E-002	2.26E+002	-	<1	-
Toluene	7.50E+000	1.00E+000	1.28E+000	0.009	0.0022	0.012	1	0.094	1.29E-001	9.56E-001	1.09E+000	3.27E+001	3.27E+002	<1	<1
Xylene (total)	2.70E+000	1.00E+000	4.59E-001	0.009	0.0022	0.012	1	0.094	4.65E-002	3.44E-001	3.91E-001	2.64E+000	3.27E+000	<1	<1
Isopropylbenzene	9.00E-003	1.00E+000	1.53E-003	0.009	0.0022	0.012	1	0.094	1.55E-004	1.15E-003	1.30E-003	2.56E+002	-	<1	-
Semi-Volatile Organic Compounds (SVOCs)															
Benzaldehyde	9.50E-001	1.00E+000	1.62E-001	0.009	0.0022	0.012	1	0.094	1.64E-002	1.21E-001	1.37E-001	1.80E+002	NC	<1	-
Acetophenone	3.40E-001	1.00E+000	5.78E-002	0.009	0.0022	0.012	1	0.094	5.86E-003	4.34E-002	4.92E-002	9.83E+002	NC	<1	-
Naphthalene	1.30E+002	1.00E+000	2.21E+001	0.009	0.0022	0.012	1	0.094	2.24E+000	1.66E+001	1.88E+001	1.65E+002	NC	<1	-
2-Methylnaphthalene	4.60E+002	1.00E+000	7.82E+001	0.009	0.0022	0.012	1	0.094	7.93E+000	5.87E+001	6.66E+001	1.65E+002	NC	<1	-
Acenaphthylene	9.60E-001	3.00E-001	4.90E-002	0.009	0.0022	0.012	1	0.094	1.65E-002	3.67E-002	5.33E-002	1.26E+000	1.26E+001	<1	<1
Acenaphthene	2.80E+003	3.00E-001	1.43E+002	0.009	0.0022	0.012	1	0.094	4.83E+001	1.07E+002	1.55E+002	1.26E+000	1.26E+001	**123**	**12**
Dibenzofuran	1.70E+003	1.00E+000	2.89E+002	0.009	0.0022	0.012	1	0.094	2.93E+001	2.17E+002	2.46E+002	NC	NC	-	-
Fluorene	2.00E+003	3.00E-001	1.02E+002	0.009	0.0022	0.012	1	0.094	3.45E+001	7.65E+001	1.11E+002	1.26E+000	1.26E+001	**88**	**9**
Phenanthrene	7.00E+003	3.00E-001	3.57E+002	0.009	0.0022	0.012	1	0.094	1.21E+002	2.68E+002	3.88E+002	*1.26E+000*	*1.26E+001*	***308***	**31**
Anthracene	1.20E+003	3.00E-001	6.12E+001	0.009	0.0022	0.012	1	0.094	2.07E+001	4.59E+001	6.66E+001	1.26E+000	1.26E+001	**53**	**5**
Carbazole	3.60E-001	1.00E+000	6.12E-002	0.009	0.0022	0.012	1	0.094	6.20E-003	4.59E-002	5.21E-002	3.25E+000	3.30E+001	<1	<1
Fluoranthene	4.00E+003	3.00E-001	2.04E+002	0.009	0.0022	0.012	1	0.094	6.89E+001	1.53E+002	2.22E+002	1.26E+000	1.26E+001	**176**	**18**
Pyrene	2.60E+003	3.00E-001	1.33E+002	0.009	0.0022	0.012	1	0.094	4.48E+001	9.95E+001	1.44E+002	1.26E+000	1.26E+001	**114**	**11**
Chrysene	8.30E+002	2.40E-001	3.39E+001	0.009	0.0022	0.012	1	0.094	1.43E+001	2.54E+001	3.97E+001	1.26E+000	1.26E+001	**32**	**3**
Benzo(b)fluoranthene	4.50E+002	4.20E-001	3.21E+001	0.009	0.0022	0.012	1	0.094	7.76E+000	2.41E+001	3.19E+001	1.26E+000	1.26E+001	**25**	**3**
Benzo(k)fluoranthene	4.50E+002	4.80E-001	3.67E+001	0.009	0.0022	0.012	1	0.094	7.76E+000	2.75E+001	3.53E+001	1.26E+000	1.26E+001	**28**	**3**
Benzo(a)pyrene	5.20E+002	3.00E-001	2.65E+001	0.009	0.0022	0.012	1	0.094	8.96E+000	1.99E+001	2.89E+001	1.26E+000	1.26E+001	**23**	**2**
Benzo(g,h,i)perylene	2.00E+002	3.00E-001	1.02E+001	0.009	0.0022	0.012	1	0.094	3.45E+000	7.65E+000	1.11E+001	1.26E+000	1.26E+001	**9**	**0.9**
Benzo(a)anthracene	9.20E+002	1.80E-001	2.82E+001	0.009	0.0022	0.012	1	0.094	1.59E+001	2.11E+001	3.70E+001	1.26E+000	1.26E+001	**29**	**3**
Dibenzo(a,h)anthracene	6.60E+001	4.20E-001	4.71E+000	0.009	0.0022	0.012	1	0.094	1.14E+000	3.53E+000	4.67E+000	1.26E+000	1.26E+001	**4**	<1
Indeno(1,2,3-cd)pyrene	2.60E+002	4.80E-001	2.12E+001	0.009	0.0022	0.012	1	0.094	4.48E+000	1.59E+001	2.04E+001	1.26E+000	1.26E+001	**16**	**2**
Pesticides/PCBs/Dioxin															
alpha-BHC	2.40E+000	1.00E+000	4.08E-001	0.009	0.0022	0.012	1	0.094	4.14E-002	3.06E-001	3.47E-001	4.20E-002	4.20E-001	**8.3**	<1
Aldrin	1.30E+002	1.00E+000	2.21E+001	0.009	*0.0022*	*0.012*	1	*0.094*	*2.24E+000*	*1.66E+001*	*1.88E+001*	*4.60E-001*	*2.30E+000*	**41**	**8**
Heptachlor epoxide	2.50E+002	8.40E-000	3.57E+002	0.009	0.0022	0.012	1	0.094	4.31E+000	2.68E+002	2.72E+002	3.00E-001	3.00E+000	**907**	**91**
Heptachlor	1.90E+000	8.40E+000	2.71E+000	0.009	0.0022	0.012	1	0.094	3.27E-002	2.03E+000	2.07E+000	3.00E-001	3.00E+000	**7**	<1
Dieldrin	5.20E+002	1.00E+000	8.84E+001	0.009	0.0022	0.012	1	0.094	8.96E+000	6.63E+001	7.53E+001	4.60E-002	4.60E-001	**1636**	**164**
4,4'-DDE	1.20E+003	1.26E+000	2.57E+002	0.009	0.0022	0.012	1	0.094	2.07E+001	1.93E+002	2.13E+002	1.86E+000	9.30E+000	**115**	**23**
4,4'-DDD	2.10E+000	1.26E+000	4.50E-001	0.009	0.0022	0.012	1	0.094	3.62E-002	3.37E-001	3.74E-001	1.86E+000	9.30E+000	<1	<1
4,4'-DDT	4.20E+001	1.26E+000	9.00E+000	0.009	0.0022	0.012	1	0.094	7.24E-001	6.75E+000	7.47E+000	1.86E+000	9.30E+000	**4**	**1**
Total DDT and metabolites	*1.24E+003*	*1.26E+000*	*2.66E+002*	0.009	0.0022	0.012	1	0.094	2.14E+001	2.00E+002	2.21E+002	1.86E+000	9.30E+000	**119**	**24**
Endrin aldehyde	1.20E+002	1.00E+000	2.04E+001	0.009	0.0022	0.012	1	0.094	2.07E+000	1.53E+001	1.74E+001	1.16E-001	1.16E+000	**150**	**15**
Endosulfan sulfate	5.90E+001	1.00E+000	1.00E+001	0.009	0.0022	0.012	1	0.094	1.02E+000	7.52E+000	8.54E+000	3.49E-001	NC	**24**	-
Methoxychlor	2.00E+000	1.00E+000	3.40E-001	0.009	0.0022	0.012	1	0.094	3.45E-002	2.55E-001	2.89E-001	9.30E+000	1.86E+001	<1	<1
alpha-Chlordane	2.30E-001	1.00E+000	3.91E-002	0.009	0.0022	0.012	1	0.094	3.96E-003	2.93E-002	3.33E-002	5.50E+000	1.09E+001	<1	<1
gamma-Chlordane	2.00E+001	1.00E+000	3.40E+000	0.009	0.0022	0.012	1	0.094	3.45E-001	2.55E+000	2.89E+000	5.50E+000	1.09E+001	<1	<1
Toxaphene	2.00E-001	1.00E+000	3.40E-002	0.009	0.0022	0.012	1	0.094	3.45E-003	2.55E-002	2.89E-002	1.00E+001	NC	<1	-
Aroclor 1248	2.10E+003	6.80E+000	2.43E+003	0.009	0.0022	0.012	1	0.094	3.62E+001	1.82E+003	1.86E+003	4.50E-002	4.50E-001	**41264**	**4126**
Aroclor 1254	*1.90E+004*	*6.80E+000*	*2.20E+004*	*0.009*	*0.0022*	*0.012*	1	*0.094*	*3.27E+002*	*1.65E+004*	*1.68E+004*	4.20E-001	2.08E+000	**40001**	**8077**
Aroclor 1260	2.20E-001	6.80E+000	2.54E-001	0.009	0.0022	0.012	1	0.094	3.79E-003	1.91E-001	1.95E-001	4.20E-001	2.08E+000	<1	<1
Total PCBs	2.11E+004	6.80E+000	2.44E+004	0.009	0.0022	0.012	1	0.094	3.64E+002	1.83E+004	1.87E+004	4.20E-001	2.08E+000	**44423**	**8970**
PCB Congener TCDD Equivalent	8.95E-001	9.50E+000	1.44E+000	0.009	0.0022	0.012	1	0.094	1.54E-002	1.08E+000	1.10E+000	2.20E-006	2.20E-005	**499490**	**49949**
Total TCDD and Equivalent	1.97E-002	9.50E+000	3.18E-002	0.009	0.0022	0.012	1	0.094	3.39E-004	2.39E-002	2.42E-002	2.20E-006	2.20E-005	**11001**	**1100**
Metals															
Aluminum	2.28E+005	1.18E-001	4.57E+003	0.009	0.0022	0.012	1	0.094	3.93E+003	3.43E+003	7.36E+003	2.30E+000	2.30E+001	**3200**	**320**
Antimony	2.15E+001	1.00E+000	3.66E+000	0.009	0.0022	0.012	1	0.094	3.71E-001	2.74E+000	3.11E+000	3.80E-001	3.80E+000	**8**	<1
Barium	4.17E+003	1.60E-001	1.13E+002	0.009	0.0022	0.012	1	0.094	7.19E+001	8.51E+001	1.57E+002	1.19E+001	4.60E+001	**13**	**3**
Cadmium	1.23E+002	8.82E+000	1.84E+002	0.009	0.0022	0.012	1	0.094	2.12E+000	1.38E+002	1.40E+002	2.32E+000	2.32E+001	**60**	**6**
Chromium	7.75E+001	3.16E+000	4.17E+001	0.009	0.0022	0.012	1	0.094	1.34E+000	3.12E+001	3.26E+001	7.21E+000	2.89E+001	**5**	**1**
Cobalt	3.01E+001	2.91E-001	1.49E+000	0.009	0.0022	0.012	1	0.094	5.19E-001	1.12E+000	1.64E+000	NC	NC	-	-
Copper	1.36E+004	8.10E-002	1.87E+002	0.009	0.0022	0.012	1	0.094	2.34E+002	1.40E+002	3.75E+002	9.37E+000	3.75E+001	**40**	**10**
Cyanide	7.60E+000	1.00E+000	1.29E+000	0.009	0.0022	0.012	1	0.094	1.31E-001	9.69E-001	1.10E+000	1.60E+002	NC	<1	-
Lead	4.32E+003	1.52E+000	1.12E+003	0.009	0.0022	0.012	1	0.094	7.44E+001	8.38E+002	9.13E+002	1.86E+001	1.86E+002	**49**	**5**
Mercury	*1.10E+000*	*4.45E+000*	*8.32E-001*	*0.009*	*0.0022*	*0.012*	1	*0.094*	1.90E-002	6.24E-001	6.43E-001	4.53E-002	7.55E-002	**14**	**9**
Nickel	9.28E+001	4.73E+000	7.46E+001	0.009	0.0022	0.012	1	0.094	1.60E+000	5.60E+001	5.76E+001	9.30E+001	1.86E+002	<1	<1
Selenium	9.00E+000	8.10E-001	1.24E+000	0.009	0.0022	0.012	1	0.094	1.55E-001	9.29E-001	1.08E+000	4.65E-001	7.67E-001	**2.3**	**1.4**
Silver	2.68E+001	1.54E+001	7.02E+001	0.009	0.0022	0.012	1	0.094	4.82E-001	5.26E+001	5.31E+001	6.04E-002	NC	**879**	-
Thallium	7.60E+000	1.00E+000	1.29E+000	0.009	0.0022	0.012	1	0.094	1.31E-001	9.69E-001	1.10E+000	1.72E-002	1.72E-001	**64**	**6**
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.009	0.0022	0.012	1	0.094	2.22E+000	1.45E+000	3.67E+000	4.88E-001	4.88E+000	**8**	<1
Zinc	1.40E+004	4.60E-001	1.09E+003	0.009	0.0022	0.012	1	0.094	2.41E+002	8.21E+002	1.06E+003	3.72E+002	7.44E+002	**3**	**1**

*Assure an average percent moisture content of 83%.
NC = No TRV available for contaminant.
- = No HQ available.

300390

RAC\Cornell\RI\07\Soils_Bldg\Tab7-5.123

TABLE 7-6

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL CALCULATIONS FOR THE SHORT-TAILED SHREW (Blarina brevicauda) fFOR THE MAXIMUM EXPOSURE EVALUATION

NOAEL(wildlife sp.) = (NOAELtest sp.)(bwtsp)/(bwwsp)0.25

Contaminant	Test Species	Body Weight (Kg) Test Species	Wildlife Species	Test Species NOAEL	Test Species LOAEL	Short-tailed Shrew NOAEL	Short-tailed Shrew LOAEL	Toxicological Endpoint	Reference
Volatile Organic Compounds									
Chloromethane	rat	0.35	0.012	3.20E+000	3.20E+001	7.44E+000	7.44E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Trichlorofluoromethane	rat	0.35	0.012	5.00E-002	5.00E-001	1.16E-001	1.16E+000	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Vinyl chloride	rat	0.35	0.012	1.70E-001	1.70E+000	3.95E-001	3.95E+000	Reduced surviorship	Feron et al. (1981) In Sample et al. (1996)
Total 1,2-Dichloroethylene	mouse	0.03	0.012	4.52E+001	-	5.68E+001	-	Enzyme inhibition	Palmer et al. (1979) In Sample et al. (1996)
Trichloroethylene	mouse	0.03	0.012	7.00E-001	7.00E+000	8.80E-001	8.80E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Tetrachloroethylene	mouse	0.03	0.012	1.40E+000	7.00E+000	1.76E+000	8.80E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Carbon disulfide	rabbit	3.8	0.012	1.10E+001	-	4.64E+001	-	No observed reproductive effects	IRIS Database
Methylene chloride	rat	0.35	0.012	5.85E+000	5.00E+001	1.36E+001	1.16E+002	Histological effects in liver	Cox et al. In Sample et al. (1996)
Ethylbenzene	rat	0.35	0.012	9.71E+001	-	2.26E+002	-	Histological effects in liver/kidney	IRIS Database
Toluene	mouse	0.03	0.012	2.60E+001	2.60E+002	3.27E+001	3.27E+002	Reduced fetal body mass	Nawrot and Staples (1979) In Sample et al. (1996)
Xylene (total)	mouse	0.03	0.012	2.10E+000	2.60E+000	2.64E+000	3.27E+000	Reduced body mass/Incr. Deformaties	Marks et al. (1982) In Sample et al. (1996)
Isopropylbenzene	rat	0.35	0.012	1.10E+002	-	2.56E+002	-	Increased kidney mass	IRIS Database
Semi-Volatile Compounds									
Acetophenone	rat	0.35	0.012	4.23E+002	-	9.83E+002	-	No observed toxcity	IRIS Database
Methylnapthalene	rat	0.35	0.012	7.10E+001	-	1.65E+002	-	Decrease in body weight of adults	BCL (1980)
Benzaldehyde	mouse	0.03	0.012	1.43E+002	-	1.80E+002	-	Lesions in forestomach, kidney toxicity	Kluwe et al. (1983)
Napthalene	rat	0.35	0.012	7.10E+001	-	1.65E+002	-	Decrease in body weight of adults	BCL (1980)
Carbazole	rat	0.35	0.012	1.40E+000	1.40E+001	3.25E+000	3.25E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Benzo(a)pyrene	mouse	0.03	0.012	1.00E+000	1.00E+001	1.26E+000	1.26E+001	Reduction in viable litters and pregnancies	Mackenzie and Angevine (1981) In Sample et al. (1987)
PCBs/Dioxin									
Aroclor 1248	monkey	5.0	0.012	1.00E-002	1.00E-001	4.52E-002	4.52E-001	Increased neonatal mortality	Barsotti et al. (1976) In Sample et al. (1996)
Aroclor 1254/1260	mink	1	0.012	1.40E-001	6.90E-001	4.23E-001	2.08E+000	Reduction in number of live kits born	Aulerich and Ringer (1977)
2,3,7,8-TCDD	rat	0.35	0.012	1.00E-006	1.00E-005	2.32E-006	2.32E-005	Decreased fertility and neonatal mortality	Murray et al. (1979) In Sample et al. (1996)
Pesticides									
Aldrin	rat	0.35	0.012	2.00E-001	1.00E+000	4.65E-001	2.32E+000	Increased offspring mortality	Treon and Cleveland (1985) In Sample et al. (1996)
DDT	rat	0.35	0.012	8.00E-001	4.00E+000	1.86E+000	9.30E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDD	rat	0.35	0.012	8.00E-001	4.00E+000	1.86E+000	9.30E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDE	rat	0.35	0.012	8.00E-001	4.00E+000	1.86E+000	9.30E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
Dieldrin	rat	0.35	0.012	2.00E-002	2.00E-001	4.65E-002	4.65E-001	Reduction in pregnancies in treated rats	Treon and Cleveland (1985) In Sample et al. (1996)
Endrin	mouse	0.03	0.012	9.20E-002	9.20E-001	1.16E-001	1.16E+000	Reduced parental survival and litter size	Good and Ware (1969) In Sample et al. (1996)
Endosulfan	rat	0.35	0.012	1.50E-001	-	3.49E-001	-	Maximum dose no reproductive effects	Dikshith et al. (1984) In Sample et al. (1996)
Methoxychlor	rat	0.35	0.012	4.00E+000	8.00E+000	9.30E+000	1.86E+001	Reduced litter size	Gray et al. (1988) In Sample et al. (1996)
BHC (mixed isomers)	mink	1	0.012	1.40E-002	1.40E-001	4.23E-002	4.23E-001	Increased kit mortality	Bleavins et al. (1984) In Sample et al. (1996)
Hepatchlor	mink	1	0.012	1.00E-001	1.00E+000	3.02E-001	3.02E+000	Increased kit mortality	Crum et al. (1993) In Sample et al. (1996)
Chlordane	mouse	0.03	0.012	4.60E+000	9.20E+000	5.78E+000	1.09E+001	Decreased viability in pups	WHO (1984) In Sample et al. (1996)
Toxaphene	mouse	0.03	0.012	8.00E+000	-	1.01E+001	-	No adverse effects over two generations	Kennedy et al. (1973) In Sample et al. (1996)
Metals									
Aluminum	mouse	0.03	0.012	1.93E+000	1.93E+001	2.30E+000	2.30E+001	Reduction growth rate in pups	Ondreicka et al. (1966) In Sample et al. (1996)
Antimony	mouse	1.03	0.012	1.25E-001	1.25E+000	3.80E-001	3.80E+000	Reduction in life span of treated adults	Schroeder et al. (1976) In Sample et al. (1996)
Barium	rat	0.35	0.012	5.10E+000	1.98E+001	1.19E+001	4.60E+001	Adult mortality	Perry et al. (1983) In Sample et al. (1996)
Cadmium	rat	0.35	0.012	1.00E+000	1.00E+001	2.32E+000	2.32E+001	Embryo toxicity	Sutuo et al. (1980) In Sample et al. (1996)
Chromium	rat	0.35	0.012	3.28E+000	1.31E+001	7.21E+000	2.89E+001	Reduced body wt., increased adult mortality	Mackenzie et al.(1958)/Steven et als.(1976)In sample et al. (1987)
Cobalt	NC	NC	NC	NC	NC	NC	NC	NC	-
Copper	mink	1.0	0.012	3.28E+000	1.31E+001	9.37E+000	3.75E+001	Increased kit mortality	Aluerich et al. (1996)
Cyanide	rat	0.35	0.012	6.87E+001	-	1.60E+002	-	Reduced growth rate in young individuals	Tewe and Maner (1981) In Sample et al. (1996)
Lead	rat	0.35	0.012	8.00E+000	8.00E+001	1.86E+001	1.86E+002	Reduced body wt., increased kidney damage	Azar et la. (1973) In Sample et al. (1996)
Mercury	mink	1.0	0.012	1.50E-002	2.50E-002	4.53E-002	7.55E-002	Mortality and weight loss	Wobeser et al. (1976) In Sample et al. (1996)
Nickel	rat	0.35	0.012	4.00E+001	8.00E+001	9.30E+001	1.86E+002	Reduced body weight in offspring	Ambrose et al. (1976) In Sample et al. (1996)
Selenium	rat	0.35	0.012	2.00E-001	3.30E-001	4.65E-001	7.67E-001	Reduced litter sizes	Rosenfield and Beath (1954) In Sample et al. (1996)
Silver	rat	0.35	0.012	2.60E-002	-	6.04E-002	-	Maximum dose no reproductive effects	ASTDR (1990)
Thallium	rat	0.35	0.012	7.40E-003	7.40E-002	1.72E-002	1.72E-001	Reduced fertility in male rats	Formigli et al. (1986) In Sample et al. (1996)
Vanadium	rat	0.35	0.012	2.10E-001	2.10E+000	4.88E-001	4.88E+000	Reduced fetal growth, increased mortality	Domingo et al. (1986) In Sample et al. (1996)
Zinc	rat	0.35	0.012	1.60E+002	3.20E+002	3.72E+002	7.44E+002	Reduced fetal growth, increased mortality	Schlicker and Cox (1968) In Sample et al. (1996)

NC = No TRV available for contaminant.
- = No TRV available for contaminant.

300391

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR THE RED FOX EXPOSED TO MAXIMUM CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Max. Soil Concen. (mg/kg)	Small Mammal Uptake Factor (Unitless)	Predicted or Observed Sm. Mammal Concen.* (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Sm. Mammal (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Sm. Mammal (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Volatile Organic Compounds (VOCs)															
Chloromethane	1.90E-002	-	-	0.63	0.21	3.94	1	0.028	2.84E-005	-	2.84E-005	1.75E+000	1.75E+001	<1	-
Trichlorofluoromethane	8.00E-003	-	-	0.63	0.21	3.94	1	0.028	1.19E-005	-	1.19E-005	2.70E-002	2.70E-001	<1	-
Vinyl chloride	6.40E-001	-	-	0.63	0.21	3.94	1	0.028	9.55E-004	-	9.55E-004	9.28E-002	9.30E-001	<1	<1
Total 1,2-Dichloroethylene	5.84E+001	-	-	0.63	0.21	3.94	1	0.028	8.42E-002	-	8.42E-002	1.34E+001	NC	<1	-
Trichloroethylene	4.70E+001	-	-	0.63	0.21	3.94	1	0.028	7.01E-002	-	7.01E-002	2.07E-001	2.07E+000	<1	<1
Tetrachloroethylene	4.30E-001	-	-	0.63	0.21	3.94	1	0.028	6.42E-004	-	6.42E-004	4.10E-001	2.07E+000	<1	<1
Carbon disulfide	3.20E-002	-	-	0.63	0.21	3.94	1	0.028	4.78E-005	-	4.78E-005	1.09E+001	NC	<1	-
Methylene chloride	1.70E+000	-	-	0.63	0.21	3.94	1	0.028	2.54E-003	-	2.54E-003	3.19E+000	1.16E+002	<1	<1
Ethylbenzene	1.50E-001	-	-	0.63	0.21	3.94	1	0.028	2.24E-004	-	2.24E-004	5.30E+001	NC	<1	-
Toluene	7.50E+000	-	-	0.63	0.21	3.94	1	0.028	1.12E-002	-	1.12E-002	7.68E+000	3.27E+002	<1	<1
Xylene (total)	2.70E+000	-	-	0.63	0.21	3.94	1	0.028	4.03E-003	-	4.03E-003	6.20E-001	3.27E+000	<1	<1
Isopropylbenzene	9.00E-003	-	-	0.63	0.21	3.94	1	0.028	1.34E-005	-	1.34E-005	6.01E+001	NC	<1	-
Semi-Volatile Organic Compounds (SVOCs)			-												
Benzaldehyde	9.50E-001	-	-	0.63	0.21	3.94	1	0.028	1.42E-003	-	1.42E-003	1.80E+002	NC	<1	-
Acetophenone	3.40E-001	-	-	0.63	0.21	3.94	1	0.028	5.07E-004	-	5.07E-004	2.31E+002	NC	<1	-
Naphthalene	1.30E+002	-	-	0.63	0.21	3.94	1	0.028	1.94E-001	-	1.94E-001	1.65E+002	NC	<1	-
2-Methylnaphthalene	4.60E+002	-	-	0.63	0.21	3.94	1	0.028	6.86E-001	-	6.86E-001	3.88E+001	NC	<1	-
Acenaphthylene	9.60E-001	-	-	0.63	0.21	3.94	1	0.028	1.43E-003	-	1.43E-003	2.90E-001	2.90E+000	<1	<1
Acenaphthene	2.80E+003	-	-	0.63	0.21	3.94	1	0.028	4.18E+000	-	4.18E+000	2.90E-001	2.90E+000	14	1.4
Dibenzofuran	1.70E+003	-	-	0.63	0.21	3.94	1	0.028	2.54E+000	-	2.54E+000	NC	NC	-	-
Fluorene	2.00E+003	-	-	0.63	0.21	3.94	1	0.028	2.98E+000	-	2.98E+000	2.90E-001	2.90E+000	10	1.0
Phenanthrene	7.00E+003	-	-	0.63	0.21	3.94	1	0.028	1.04E+001	-	1.04E+001	2.90E-001	2.90E+000	36	4
Anthracene	1.20E+003	-	-	0.63	0.21	3.94	1	0.028	1.79E+000	-	1.79E+000	2.90E-001	2.90E+000	6	<1
Carbazole	3.60E-001	-	-	0.63	0.21	3.94	1	0.028	5.37E-004	-	5.37E-004	7.60E-001	7.60E+000	<1	<1
Fluoranthene	4.00E+003	-	-	0.63	0.21	3.94	1	0.028	5.97E+000	-	5.97E+000	7.60E-001	7.60E+000	8	<1
Pyrene	2.60E+003	-	-	0.63	0.21	3.94	1	0.028	3.88E+000	-	3.88E+000	7.60E-001	7.60E+000	5	<1
Chrysene	8.30E+002	-	-	0.63	0.21	3.94	1	0.028	1.24E+000	-	1.24E+000	7.60E-001	7.60E+000	2	<1
Benzo(b)fluoranthene	4.50E+002	-	-	0.63	0.21	3.94	1	0.028	6.72E-001	-	6.72E-001	7.60E-001	7.60E+000	<1	<1
Benzo(k)fluoranthene	4.50E+002	-	-	0.63	0.21	3.94	1	0.028	6.72E-001	-	6.72E-001	7.60E-001	7.60E+000	<1	<1
Benzo(a)pyrene	5.20E+002	-	-	0.63	0.21	3.94	1	0.028	7.76E-001	-	7.76E-001	7.60E-001	7.60E+000	1.0	<1
Benzo(g,h,i)perylene	2.00E+002	-	-	0.63	0.21	3.94	1	0.028	2.98E-001	-	2.98E-001	7.60E-001	7.60E+000	<1	<1
Benzo(a)anthracene	9.20E+002	-	-	0.63	0.21	3.94	1	0.028	1.37E+000	-	1.37E+000	7.60E-001	7.60E+000	2	<1
Dibenzo(a,h)anthracene	6.60E+001	-	-	0.63	0.21	3.94	1	0.028	9.85E-002	-	9.85E-002	7.60E-001	7.60E+000	<1	<1
Indeno(1,2,3-cd)pyrene	2.60E+002	-	-	0.63	0.21	3.94	1	0.028	3.88E-001	-	3.88E-001	7.60E-001	7.60E+000	<1	<1
Pesticides/PCBs/Dioxin															
alpha-BHC	2.40E+000	-	2.50E-003	0.63	0.21	3.94	1	0.028	3.58E-003	4.00E-004	3.98E-003	9.94E-003	9.94E-002	<1	<1
Aldrin	1.30E+002	-	2.50E-003	0.63	0.21	3.94	1	0.028	1.94E-001	4.00E-004	1.94E-001	1.09E-001	5.46E-001	1.8	<1
Heptachlor epoxide	2.50E+002	-	2.50E-003	0.63	0.21	3.94	1	0.028	3.73E-001	4.00E-004	3.73E-001	7.10E-002	7.10E-001	5	<1
Heptachlor	1.90E+000	-	2.50E-003	0.63	0.21	3.94	1	0.028	2.84E-003	4.00E-004	3.24E-003	7.10E-002	7.10E-001	<1	<1
Dieldrin†	5.20E+002	-	6.00E-002	0.63	0.21	3.94	1	0.028	7.76E-001	9.59E-003	7.86E-001	1.09E-002	1.09E-001	72	7
4,4'-DDE†	1.20E+003	-	6.00E-002	0.63	0.21	3.94	1	0.028	1.79E+000	9.59E-003	1.80E+000	8.00E-001	4.00E+000	2	<1
4,4'-DDD	2.10E+000	-	5.00E-003	0.63	0.21	3.94	1	0.028	3.13E-003	7.99E-004	3.93E-003	8.00E-001	4.00E+000	<1	<1
4,4'-DDT	4.20E+001	-	5.00E-003	0.63	0.21	3.94	1	0.028	6.27E-002	7.99E-004	6.35E-002	8.00E-001	4.00E+000	<1	<1
Total DDT and metabolites	1.24E+003	-	7.00E-002	0.63	0.21	3.94	1	0.028	1.86E+000	1.12E-002	1.87E+000	8.00E-001	4.00E+000	2	<1
Endrin aldehyde	1.20E+002	-	5.00E-003	0.63	0.21	3.94	1	0.028	1.79E-001	7.99E-004	1.80E-001	2.72E-002	2.72E-001	7	<1
Endosulfan sulfate	5.90E+001	-	5.00E-003	0.63	0.21	3.94	1	0.028	8.81E-002	7.99E-004	8.89E-002	8.19E-002	NC	1	-
Methoxychlor	2.00E+000	-	2.50E-002	0.63	0.21	3.94	1	0.028	2.98E-003	4.00E-003	6.98E-003	2.2E+000	4.4E+000	<1	<1
alpha-Chlordane	2.30E-001	-	2.50E-002	0.63	0.21	3.94	1	0.028	3.43E-004	4.00E-003	4.34E-003	1.36E+000	1.09E+001	<1	<1
gamma-Chlordane	2.00E+001	-	-	0.63	0.21	3.94	1	0.028	2.98E-002	-	2.98E-002	1.36E+000	1.09E+001	<1	<1
Toxaphene	2.00E-001	-	2.50E-001	0.63	0.21	3.94	1	0.028	2.98E-004	4.00E-002	4.03E-002	2.36E+000	NC	<1	-
Aroclor 1248	2.10E+003	-	5.00E-002	0.63	0.21	3.94	1	0.028	3.13E+000	7.99E-003	3.14E+000	1.06E-002	1.06E-001	296	30
Aroclor 1254 †	1.90E+004	-	5.40E+000	0.63	0.21	3.94	1	0.028	2.84E+001	8.63E-001	2.92E+001	9.94E-002	4.90E-001	294	60
Aroclor 1260	2.20E-001	-	5.00E-002	0.63	0.21	3.94	1	0.028	3.28E-004	7.99E-003	8.32E-003	9.94E-002	4.90E-001	<1	<1
Total PCBs	2.13E+004	-	5.75E+000	0.63	0.21	3.94	1	0.028	3.18E+001	9.19E-001	3.27E+001	9.94E-002	4.90E-001	329	67
PCB Congener TCDD Equivalent	8.95E-001	-	-	0.63	0.21	3.94	1	0.028	1.33E-003	-	1.33E-003	5.46E-007	5.46E-006	2445	245
Total TCDD and Equivalent	1.97E-002	2.20E+000	7.37E-003	0.63	0.21	3.94	1	0.028	2.94E-005	1.18E-003	1.21E-003	5.46E-007	5.46E-006	2212	221
Metals															
Aluminum	2.28E+005	1.00E+000	3.88E+004	0.63	0.21	3.94	1	0.028	3.40E+002	6.20E+003	6.54E+003	2.30E+000	2.30E+001	2843	284
Antimony	2.15E+001	1.00E+000	3.66E+000	0.63	0.21	3.94	1	0.028	3.21E-002	5.84E-001	6.17E-001	8.94E-002	8.94E-001	7	<1
Barium	4.17E+003	6.90E-002	4.89E+001	0.63	0.21	3.94	1	0.028	6.22E+000	7.82E+000	1.40E+001	2.78E+000	1.08E+001	5	1.3
Cadmium	1.23E+002	1.71E+000	3.57E+001	0.63	0.21	3.94	1	0.028	1.84E-001	5.70E+000	5.88E+000	5.46E-001	5.46E+000	11	1.1
Chromium	7.75E+001	8.00E-001	1.05E+001	0.63	0.21	3.94	1	0.028	1.16E-001	1.69E+000	1.80E+000	7.21E+000	2.89E+001	<1	<1
Cobalt	3.01E+001	2.50E-002	1.28E-001	0.63	0.21	3.94	1	0.028	4.49E-002	2.05E-002	6.54E-002	NC	NC	-	-
Copper	1.36E+004	8.67E-001	2.00E+003	0.63	0.21	3.94	1	0.028	2.03E+001	3.21E+002	3.41E+002	9.37E+000	3.75E+001	36	9
Cyanide	7.60E+000	1.00E+000	1.29E+000	0.63	0.21	3.94	1	0.028	1.13E-002	-	1.13E-002	3.75E+001	NC	<1	-
Lead	4.32E+003	9.95E-001	7.31E+002	0.63	0.21	3.94	1	0.028	6.45E+000	1.17E+002	1.23E+002	4.37E+000	4.37E+001	28	3
Mercury	1.10E+000	1.92E-001	3.59E-002	0.63	0.21	3.94	1	0.028	1.64E-003	5.74E-003	7.38E-003	1.06E-002	1.77E-002	<1	<1
Nickel	9.28E+001	4.73E+000	7.46E+001	0.63	0.21	3.94	1	0.028	1.38E-001	1.19E+001	1.21E+001	2.18E+001	4.37E+001	<1	<1
Selenium	9.00E+000	8.00E-001	1.22E+000	0.63	0.21	3.94	1	0.028	1.34E-002	1.96E-001	2.09E-001	1.09E-001	1.80E-001	2	1
Silver	2.68E+001	1.00E+000	4.56E+000	0.63	0.21	3.94	1	0.028	4.00E-002	7.28E-001	7.68E-001	1.42E-002	NC	54	-
Thallium	7.60E+000	1.00E+000	1.29E+000	0.63	0.21	3.94	1	0.028	1.13E-002	2.07E-001	2.18E-001	4.04E-003	4.04E-002	54	5
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.63	0.21	3.94	1	0.028	1.93E-001	3.09E-001	5.01E-001	1.15E-001	1.15E+000	4	<1
Zinc	1.40E+004	5.85E+000	1.39E+004	0.63	0.21	3.94	1	0.028	2.09E+001	2.23E+003	2.25E+003	8.74E+001	1.75E+002	26	13

*Assume an average percent moisture content of 83%.
NC = No TRV available for contaminant.
- = No HQ available.

TABLE 7-8

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL CALCULATIONS FOR THE RED FOX (Vulpes vulpes) FOR THE MAXIMUM EXPOSURE EVALUATION

NOAEL(wildlife sp.) = (NOAELtest sp.)(bwtsp)/(bwwsp)0.25

Contaminant	Test Species	Body Weight (Kg) Test Species	Wildlife Species	Test Species NOAEL	Test Species LOAEL	Red Fox NOAEL	Red Fox LOAEL	Toxicological Endpoint	Reference
Volatile Organic Compounds									
Chloromethane	rat	0.35	3.94	3.20E+000	3.20E+001	1.75E+000	1.75E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Trichlorofluoromethane	rat	0.35	3.94	5.00E-002	5.00E-001	2.73E-002	2.73E-001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Vinyl chloride	rat	0.35	3.94	1.70E-001	1.70E+000	9.28E-002	9.28E-001	Reduced surviorship	Feron et al. (1981) In Sample et al. (1996)
Total 1,2-Dichloroethylene	mouse	0.03	3.94	4.52E+001	-	1.34E+001	-	Enzyme inhibition	Palmer et al. (1979) In Sample et al. (1996)
Trichloroethylene	mouse	0.03	3.94	7.00E-001	7.00E+000	2.07E-001	2.07E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Tetrachloroethylene	mouse	0.03	3.94	1.40E+000	7.00E+000	4.14E-001	2.07E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Carbon disulfide	rabbit	3.8	3.94	1.10E+001	-	1.09E+001	-	No observed reproductive effects	IRIS Database
Methylene chloride	rat	0.35	3.94	5.85E+000	5.00E+001	3.19E+000	2.73E+001	Histological effects in liver	Cox et al. In Sample et al. (1996)
Ethylbenzene	rat	0.35	3.94	9.71E+001	-	5.30E+001	-	Histological effects in liver/kidney	IRIS Database
Toluene	mouse	0.03	3.94	2.60E+001	2.60E+002	7.68E+000	7.68E+001	Reduced fetal body mass	Nawrot and Staples (1979) In Sample et al. (1996)
Xylene (total)	mouse	0.03	3.94	2.10E+000	2.60E+000	6.20E-001	7.68E-001	Reduced body mass/Incr. Deformaties	Marks et al. (1982) In Sample et al. (1996)
Isopropylbenzene	rat	0.35	3.94	1.10E+002	-	6.01E+001	-	Increased kidney mass	IRIS Database
Semi-Volatile Compounds									
Acetophenone	rat	0.35	3.94	4.23E+002	-	2.31E+002	-	No observed toxicity	IRIS Database
Methylnapthalene	rat	0.35	3.94	7.10E+001	-	3.88E+001	-	Decrease in body weight of adults	BCL (1980)
Benzaldehyde	mouse	0.03	3.94	1.43E+002	-	4.22E+001	-	Lesions in forestomach, kidney toxicity	Kluwe et al. (1983)
Napthalene	rat	0.35	3.94	7.10E+001	-	3.88E+001	-	Decrease in body weight of adults	BCL (1980)
Carbazole	rat	0.35	3.94	1.40E+000	1.40E+001	7.64E-001	7.64E+000	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Benzo(a)pyrene	mouse	0.03	3.94	1.00E+000	1.00E+001	2.95E-001	2.95E+000	Reduction in viable litters and pregnancies	Mackenzie and Angevine (1981) In Sample et al. (1987)
PCBs/Dioxin									
Aroclor 1248	monkey	5.0	3.94	1.00E-002	1.00E-001	1.06E-002	1.06E-001	Increased neonatal mortality	Barsotti et al. (1976) In Sample et al. (1996)
Aroclor 1254/1260	mink	1	3.94	1.40E-001	6.90E-001	9.94E-002	4.90E-001	Reduction in number of live kits born	Aulerich and Ringer (1977)
2,3,7,8-TCDD	rat	0.35	3.94	1.00E-006	1.00E-005	5.46E-007	5.46E-006	Decreased fertility and neonatal mortality	Murray et al. (1979) In Sample et al. (1996)
Pesticides									
Aldrin	rat	0.35	3.94	2.00E-001	1.00E+000	1.09E-001	5.46E-001	Increased offspring mortality	Treon and Cleveland (1985) In Sample et al. (1996)
DDT	rat	0.35	3.94	8.00E-001	4.00E+000	4.37E-001	2.18E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDD	rat	0.35	3.94	8.00E-001	4.00E+000	4.37E-001	2.18E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDE	rat	0.35	3.94	8.00E-001	4.00E+000	4.37E-001	2.18E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
Dieldrin	rat	0.35	3.94	2.00E-002	2.00E-001	1.09E-002	1.09E-001	Reduction in pregnancies in treated rats	Treon and Cleveland (1985) In Sample et al. (1996)
Endrin	mouse	0.03	3.94	9.20E-002	9.20E-001	2.72E-002	2.72E-001	Reduced parental survival and litter size	Good and Ware (1969) In Sample et al. (1996)
Endosulfan	rat	0.35	3.94	1.50E-001	-	8.19E-002	-	Maximum dose no reproductive effects	Dikshith et al. (1984) In Sample et al. (1996)
Methoxychlor	rat	0.35	3.94	4.00E+000	8.00E+000	2.18E+000	4.37E+000	Reduced litter size	Gray et al. (1988) In Sample et al. (1996)
BHC (mixed isomers)	mink	1	3.94	1.40E-002	1.40E-001	9.94E-003	9.94E-002	Increased kit mortality	Bleavins et al. (1984) In Sample et al. (1996)
Hepatchlor	mink	1	3.94	1.00E-001	1.00E+000	7.10E-002	7.10E-001	Increased kit mortality	Crum et al. (1993) In Sample et al. (1996)
Chlordane	mouse	0.03	3.94	4.60E+000	9.20E+000	1.36E+000	1.09E+001	Decreased viability in pups	WHO (1984) In Sample et al. (1996)
Toxaphene	mouse	0.03	3.94	8.00E+000	-	2.36E+000	-	No adverse effects over two generations	Kennedy et al. (1973) In Sample et al. (1996)
Metals									
Aluminum	mouse	0.03	3.94	1.93E+000	1.93E+001	2.30E+000	2.30E+001	Reduction growth rate in pups	Ondreicka et al. (1966) In Sample et al. (1996)
Antimony	mouse	1.03	3.94	1.25E-001	1.25E+000	8.94E-002	8.94E-001	Reduction in life span of treated adults	Schroeder et al. (1976) In Sample et al. (1996)
Barium	rat	0.35	3.94	5.10E+000	1.98E+001	2.78E+000	1.08E+001	Adult mortality	Perry et al. (1983) In Sample et al. (1996)
Cadmium	rat	0.35	3.94	1.00E+000	1.00E+001	5.46E-001	5.46E+000	Embryo toxicity	Sutuo et al. (1980) In Sample et al. (1996)
Chromium	rat	0.35	3.94	3.28E+000	1.31E+001	7.21E+000	2.89E+001	Reduced body wt., increased adult mortality	Mackenzie et al.(1958)/Steven et als.(1976)In sample et al. (198
Cobalt	NC	NC	NC	NC	NC	NC	NC	NC	-
Copper	mink	1.0	3.94	3.28E+000	1.31E+001	9.37E+000	3.75E+001	Increased kit mortality	Aluerich et al. (1996)
Cyanide	rat	0.35	3.94	6.87E+001	-	3.75E+001	-	Reduced growth rate in young individuals	Tewe and Maner (1981) In Sample et al. (1996)
Lead	rat	0.35	3.94	8.00E+000	8.00E+001	4.37E+000	4.37E+001	Reduced body wt., increased kidney damage	Azar et la. (1973) In Sample et al. (1996)
Mercury	mink	1.0	3.94	1.50E-002	2.50E-002	1.06E-002	1.77E-002	Mortality and weight loss	Wobeser et al. (1976) In Sample et al. (1996)
Nickel	rat	0.35	3.94	4.00E+001	8.00E+001	2.18E+001	4.37E+001	Reduced body weight in offspring	Ambrose et al. (1976) In Sample et al. (1996)
Selenium	rat	0.35	3.94	2.00E-001	3.30E-001	1.09E-001	1.80E-001	Reduced litter sizes	Rosenfield and Beath (1954) In Sample et al. (1996)
Silver	rat	0.35	3.94	2.60E-002	-	1.42E-002	-	Maximum dose no reproductive effects	ASTDR (1990)
Thallium	rat	0.35	3.94	7.40E-003	7.40E-002	4.04E-003	4.04E-002	Reduced fertility in male rats	Formigli et al. (1986) In Sample et al. (1996)
Vanadium	rat	0.35	3.94	2.10E-001	2.10E+000	1.15E-001	1.15E+000	Reduced fetal growth, increased mortality	Domingo et al. (1986) In Sample et al. (1996)
Zinc	rat	0.35	3.94	1.60E+002	3.20E+002	8.74E+001	1.75E+002	Reduced fetal growth, increased mortality	Schlicker and Cox (1968) In Sample et al. (1996)

NC = No TRV available for contaminant.
- = No LOAEL available.

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TABLE 7-9

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR AMERICAN ROBIN EXPOSED TO MAXIMUM CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Max. Soil Concen. (mg/kg)	Invertebrate Uptake Factor (Unitless)	Predicted Invertebrate Concen. (mg/kg w.w.)	Ingestion Rate		Body Weight (Kg)	Percent Comp. Invertebrate (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Invertebrate (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value		NOAEL HQ	LOAEL HQ
				Wet Wt. (Kg/day)	Dry Wt. (Kg/day)							NOAEL Dosage (mg/Kg/day)	LOAEL Dosage (mg/Kg/day)		
Volatile Organic Compounds (VOCs)															
Chloromethane	1.90E-002	1.00E+000	3.23E-003	0.124	0.014	0.0635	1	0.104	4.36E-004	6.31E-003	6.74E-003	NC	NC	-	-
Trichlorofluoromethane	8.00E-003	1.00E+000	1.36E-003	0.124	0.014	0.0635	1	0.104	1.83E-004	2.66E-003	2.84E-003	NC	NC	-	-
Vinyl chloride	6.40E-001	1.00E+000	1.09E-001	0.124	0.014	0.0635	1	0.104	1.47E-002	2.12E-001	2.27E-001	NC	NC	-	-
Total 1,2-Dichloroethylene	5.64E+001	1.00E+000	9.59E+000	0.124	0.014	0.0635	1	0.104	1.29E+000	1.87E+001	2.00E+001	NC	NC	-	-
Trichloroethylene	4.70E+001	1.00E+000	7.99E+000	0.124	0.014	0.0635	1	0.104	1.08E+000	1.56E+001	1.67E+001	NC	NC	-	-
Tetrachloroethylene	4.30E-001	1.00E+000	7.31E-002	0.124	0.014	0.0635	1	0.104	9.86E-003	1.43E-001	1.53E-001	NC	NC	-	-
Carbon disulfide	3.20E-002	1.00E+000	5.44E-003	0.124	0.014	0.0635	1	0.104	7.34E-004	1.06E-002	1.14E-002	NC	NC	-	-
Methylene chloride	1.70E+000	1.00E+000	2.89E-001	0.124	0.014	0.0635	1	0.104	3.90E-002	5.64E-001	6.03E-001	NC	NC	-	-
Ethylbenzene	1.50E-001	1.00E+000	2.55E-002	0.124	0.014	0.0635	1	0.104	3.44E-003	4.98E-002	5.32E-002	NC	NC	-	-
Toluene	7.50E+000	1.00E+000	1.28E+000	0.124	0.014	0.0635	1	0.104	1.72E-001	2.49E+000	2.66E+000	NC	NC	-	-
Xylene (total)	2.70E+000	1.00E+000	4.59E-001	0.124	0.014	0.0635	1	0.104	6.19E-002	8.96E-001	9.58E-001	NC	NC	-	-
Isopropylbenzene	9.00E-003	1.00E+000	1.53E-003	0.124	0.014	0.0635	1	0.104	2.06E-004	2.99E-003	3.19E-003	NC	NC	-	-
Semi-Volatile Organic Compounds (SVOCs)															
Benzaldehyde	9.50E-001	1.00E+000	1.62E-001	0.124	0.014	0.0635	1	0.104	2.18E-002	3.15E-001	3.37E-001	NC	NC	-	-
Acetophenone	3.40E-001	1.00E+000	5.78E-002	0.124	0.014	0.0635	1	0.104	7.80E-003	1.13E-001	1.21E-001	NC	NC	-	-
Naphthalene	1.30E+002	1.00E+000	2.21E+001	0.124	0.014	0.0635	1	0.104	2.98E+000	4.32E+001	4.61E+001	2.29E+002	2.29E+003	<1	<1
2-Methylnaphthalene	4.60E+002	1.00E+000	7.82E+001	0.124	0.014	0.0635	1	0.104	1.05E+001	1.53E+002	1.63E+002	2.29E+002	2.29E+003	<1	<1
Acenaphthylene	9.60E-001	3.00E-001	4.90E-002	0.124	0.014	0.0635	1	0.104	2.20E-002	9.56E-002	1.18E-001	2.29E+002	2.29E+003	<1	<1
Acenaphthene	2.80E+003	3.00E-001	1.43E+002	0.124	0.014	0.0635	1	0.104	6.42E+001	2.79E+002	3.43E+002	2.29E+002	2.29E+003	1.5	<1
Dibenzofuran	1.70E+003	1.00E+000	2.89E+002	0.124	0.014	0.0635	1	0.104	3.90E+001	5.64E+002	6.03E+002	-	-	-	-
Fluorene	2.00E+003	3.00E-001	1.02E+002	0.124	0.014	0.0635	1	0.104	4.59E+001	1.99E+002	2.45E+002	2.29E+002	2.29E+003	1.1	<1
Phenanthrene	7.00E+003	3.00E-001	3.57E+002	0.124	0.014	0.0635	1	0.104	1.61E+002	6.97E+002	8.58E+002	2.29E+002	2.29E+003	3.7	<1
Anthracene	1.20E+003	3.00E-001	6.12E+001	0.124	0.014	0.0635	1	0.104	2.75E+001	1.20E+002	1.47E+002	2.29E+002	2.29E+003	<1	<1
Carbazole	3.60E-001	1.00E+000	6.12E-002	0.124	0.014	0.0635	1	0.104	8.25E-003	1.20E-001	1.28E-001	-	-	-	-
Fluoranthene	4.00E+003	3.00E-001	2.04E+002	0.124	0.014	0.0635	1	0.104	9.17E+001	3.98E+002	4.90E+002	2.29E+002	2.29E+003	2.1	<1
Pyrene	2.60E+003	3.00E-001	1.33E+002	0.124	0.014	0.0635	1	0.104	5.96E+001	2.59E+002	3.19E+002	2.29E+002	2.29E+003	1.4	<1
Chrysene	8.30E+002	2.40E-001	3.39E+001	0.124	0.014	0.0635	1	0.104	1.90E+001	6.61E+001	8.52E+001	2.29E+002	2.29E+003	<1	<1
Benzo(b)fluoranthene	4.50E+002	4.20E-001	3.21E+001	0.124	0.014	0.0635	1	0.104	1.03E+001	6.27E+001	7.31E+001	2.29E+002	2.29E+003	<1	<1
Benzo(k)fluoranthene	4.50E+002	4.80E-001	3.67E+001	0.124	0.014	0.0635	1	0.104	1.03E+001	7.17E+001	8.20E+001	2.29E+002	2.29E+003	<1	<1
Benzo(a)pyrene	5.20E+002	3.00E-001	2.65E+001	0.124	0.014	0.0635	1	0.104	1.19E+001	5.18E+001	6.37E+001	2.29E+002	2.29E+003	<1	<1
Benzo(g,h,i)perylene	2.00E+002	3.00E-001	1.02E+001	0.124	0.014	0.0635	1	0.104	4.59E+000	1.99E+001	2.45E+001	2.29E+002	2.29E+003	<1	<1
Benzo(a)anthracene	9.20E+002	1.80E-001	2.82E+001	0.124	0.014	0.0635	1	0.104	2.11E+001	5.50E+001	7.61E+001	2.29E+002	2.29E+003	<1	<1
Dibenzo(a,h)anthracene	6.60E+001	4.20E-001	4.71E+000	0.124	0.014	0.0635	1	0.104	1.51E+000	9.20E+000	1.07E+001	2.29E+002	2.29E+003	<1	<1
Indeno(1,2,3-cd)pyrene	2.60E+002	4.80E-001	2.12E+001	0.124	0.014	0.0635	1	0.104	5.96E+000	4.14E+001	4.74E+001	2.29E+002	2.29E+003	<1	<1
Pesticides/PCBs/Dioxin															
alpha-BHC	2.40E+000	1.00E+000	4.08E-001	0.124	0.014	0.0635	1	0.104	5.50E-002	7.97E-001	8.52E-001	5.60E-001	2.25E+000	1.5	<1
Aldrin	1.30E+002	1.00E+000	2.21E+001	0.124	0.014	0.0635	1	0.104	2.98E+000	4.32E+001	4.61E+001	3.00E-002	3.00E-001	1538	154
Heptachlor epoxide	2.50E+002	1.40E+000	5.95E+001	0.124	0.014	0.0635	1	0.104	5.73E+000	1.16E+002	1.22E+002	3.00E-001	5.93E+001	406	2.1
Heptachlor	1.90E+000	1.40E+000	4.52E-001	0.124	0.014	0.0635	1	0.104	4.36E-002	8.83E-001	9.27E-001	3.00E-001	5.93E+001	3.1	<1
Dieldrin	5.20E+002	1.00E+000	8.84E+001	0.124	0.014	0.0635	1	0.104	1.19E+001	1.73E+002	1.85E+002	7.70E-002	NC	2397	-
4,4'-DDE	1.20E+003	1.00E+000	2.04E+002	0.124	0.014	0.0635	1	0.104	2.75E+001	3.98E+002	4.26E+002	2.80E-003	2.80E-002	152099	15210
4,4'-DDD	2.10E+000	1.00E+000	3.57E-001	0.124	0.014	0.0635	1	0.104	4.82E-002	6.97E-001	7.45E-001	2.80E-003	2.80E-002	266	27
4,4'-DDT	4.20E+001	1.00E+000	7.14E+000	0.124	0.014	0.0635	1	0.104	9.63E-001	1.39E+001	1.49E+001	2.80E-003	2.80E-002	5323	532
Total DDT and metabolites	1.24E+003	1.00E+000	2.11E+002	0.124	0.014	0.0635	1	0.104	2.85E+001	4.13E+002	4.42E+002	2.80E-003	2.80E-002	157689	15769
Endrin aldehyde	1.20E+002	1.00E+000	2.04E+001	0.124	0.014	0.0635	1	0.104	2.75E+000	3.98E+001	4.26E+001	3.00E-001	NC	142	-
Endosulfan sulfate	5.90E+001	1.00E+000	1.00E+001	0.124	0.014	0.0635	1	0.104	1.35E+000	1.96E+001	2.09E+001	1.00E+001	NC	2.1	-
Methoxychlor	2.00E+000	1.00E+000	3.40E-001	0.124	0.014	0.0635	1	0.104	4.59E-002	6.64E-001	7.10E-001	NC	NC	-	-
alpha-Chlordane	2.30E-001	1.00E+000	3.91E-002	0.124	0.014	0.0635	1	0.104	5.27E-003	7.64E-002	8.16E-002	2.10E+000	1.07E+001	<1	<1
gamma-Chlordane	2.00E+001	1.00E+000	3.40E+000	0.124	0.014	0.0635	1	0.104	4.59E-001	6.64E+000	7.10E+000	2.10E+000	1.07E+001	3.4	<1
Toxaphene	2.00E-001	1.00E+000	3.40E-002	0.124	0.014	0.0635	1	0.104	4.59E-003	6.64E-002	7.10E-002	NC	NC	-	-
Aroclor 1248	2.10E+003	6.80E+000	2.43E+003	0.124	0.014	0.0635	1	0.104	4.82E+001	4.74E+003	4.79E+003	1.80E-001	1.80E+000	26804	2660
Aroclor 1254	1.90E+004	6.80E+000	2.20E+004	0.124	0.014	0.0635	1	0.104	4.36E+002	4.29E+004	4.33E+004	1.80E-001	1.80E+000	240700	24070
Aroclor 1260	2.20E-001	6.80E+000	2.54E-001	0.124	0.014	0.0635	1	0.104	5.04E-003	4.97E-001	5.02E-001	1.80E-001	1.80E+000	3	<1
Total PCBs	2.11E+004	6.80E+000	2.44E+004	0.124	0.014	0.0635	1	0.104	4.84E+002	4.76E+004	4.81E+004	1.80E-001	1.80E+000	267306	26731
PCB Congener TCDD Equivalent	2.10E-001	9.50E+000	3.39E-001	0.124	0.014	0.0635	1	0.104	4.82E-003	6.62E-001	6.67E-001	1.40E-005	1.40E-004	47649	4765
Total TCDD and Equivalent	1.97E-002	9.50E+000	3.18E-002	0.124	0.014	0.0635	1	0.104	4.52E-004	6.21E-002	6.26E-002	1.40E-005	1.40E-004	4470	447
Metals															
Aluminum	2.28E+005	1.18E-001	4.57E+003	0.124	0.014	0.0635	1	0.104	5.23E+003	8.93E+003	1.42E+004	1.10E+002	NC	129	-
Antimony	2.15E+001	1.00E+000	3.66E+000	0.124	0.014	0.0635	1	0.104	4.93E-001	7.14E+000	7.63E+000	4.70E+000	NC	2	-
Barium	4.17E+003	1.60E-001	1.13E+002	0.124	0.014	0.0635	1	0.104	9.56E+001	2.21E+002	3.17E+002	2.08E+001	4.17E+001	15	8
Cadmium	1.23E+002	8.82E+000	1.84E+002	0.124	0.014	0.0635	1	0.104	2.82E+000	3.60E+002	3.63E+002	1.45E+000	2.00E+001	250	18
Chromium	7.75E+001	3.16E+000	4.17E+001	0.124	0.014	0.0635	1	0.104	1.78E+000	8.14E+001	8.31E+001	1.00E+000	5.00E+000	83	17
Cobalt	3.01E+001	2.91E-001	1.49E+000	0.124	0.014	0.0635	1	0.104	6.90E-001	2.91E+000	3.60E+000	NC	NC	-	-
Copper	1.36E+004	8.10E-002	1.87E+002	0.124	0.014	0.0635	1	0.104	3.12E+002	3.66E+002	6.78E+002	4.70E+001	6.17E+001	14	11
Cyanide	7.80E+000	1.00E+000	1.29E+000	0.124	0.014	0.0635	1	0.104	1.74E-001	2.52E+000	2.70E+000	8.50E+000	NC	<1	-
Iron	1.08E+005	7.80E-002	1.43E+003	0.124	0.014	0.0635	1	0.104	2.48E+003	2.80E+003	5.27E+003	NC	NC	-	-
Lead	4.32E+003	1.52E+000	1.12E+003	0.124	0.014	0.0635	1	0.104	9.91E+001	2.18E+003	2.28E+003	3.85E+000	NC	593	-
Mercury	1.10E+000	4.45E+000	8.32E-001	0.124	0.014	0.0635	1	0.104	2.52E-002	1.62E+000	1.65E+000	4.50E-001	9.00E-001	4	2
Nickel	9.28E+001	4.73E+000	7.46E+001	0.124	0.014	0.0635	1	0.104	2.13E+000	1.46E+002	1.48E+002	7.74E+001	1.07E+002	1.9	1.4
Selenium	9.00E+000	8.10E-001	1.24E+000	0.124	0.014	0.0635	1	0.104	2.06E-001	2.42E+000	2.63E+000	4.00E-001	8.00E-001	7	3
Silver	2.68E+001	1.54E+001	7.02E+001	0.124	0.014	0.0635	1	0.104	6.15E-001	1.37E+002	1.38E+002	1.65E+000	1.65E+001	83	8
Thallium	7.60E+000	1.00E+000	1.29E+000	0.124	0.014	0.0635	1	0.104	1.74E-001	2.52E+000	2.70E+000	1.61E+002	NC	<1	-
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.124	0.014	0.0635	1	0.104	2.96E+000	3.77E+000	6.73E+000	1.14E+001	NC	<1	-
Zinc	1.40E+004	4.60E-001	1.09E+003	0.124	0.014	0.0635	1	0.104	3.21E+002	2.14E+003	2.46E+003	1.45E+001	1.31E+002	170	19

*Assumes an average percent moisture content of 83%.
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.

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TABLE 7-10

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL FOR THE AMERICAN ROBIN (Turdus migratorius) FOR THE MAXIMUM EXPOSURE EVALUATION

NOAEL(wildlife sp.) = (NOAELtest sp.)(1)

Contaminant	Test Species	Body Weight (Kg) Test Species	Body Weight (Kg) Wildlife Species	Test Species NOAEL	Test Species LOAEL	American Robin NOAEL	American Robin LOAEL	Toxicological Endpoint	Reference
Volatile Organic CompouNCs									
Chloromethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichlorofluoromethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 1,2-Dichloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbon disulfide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Methylene chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylene (total)	NC	NC	NC	NC	NC	NC	NC	NC	NC
Isopropylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Semi-Volatile Compounds									
Acetophenone	NC	NC	NC	NC	NC	NC	NC	NC	NC
Methylnapthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzaldehyde	NC	NC	NC	NC	NC	NC	NC	NC	NC
Napthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	Mallard	1.04	0.08	2.29E+002	2.29E+003	2.29E+002	2.29E+003	Adult/Juvenile mortaility	Patton and Dieter (1980) In Eisler (1987)
Pesticides									
Aldrin									
DDT	Brown Pelican	3.5	0.08	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	Anderson et al. (1975) In Sample et al. (1996)
DDD	Brown Pelican	3.5	0.08	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	Anderson et al. (1975) In Sample et al. (1996)
DDE	Brown Pelican	3.5	0.08	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	ANCerson et al. (1975) In Sample et al. (1996)
Dieldrin	Barn Owl	0.466	0.08	7.70E-002	-	7.70E-002	-	Reduction in egg shell thickness	Mencenhall et al. (1983) In Sample et al. (1996)
ENCrin	Mallard Duck	1.15	0.08	3.00E-001	-	3.00E-001	-	Reduction in clutch size	Spann et al. (1986) In Sample et al. (1986)
ENCosulfan	Gray Partridge	0.4	0.08	1.00E+001	-	1.00E+001	-	Maximum dose no reproductive effects	Abiola (1992) In Sample et al. (1996)
Methoxychlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
BHC (mixed isomers)	Japanese Quail	0.072	0.08	5.60E-001	2.25E+000	5.60E-001	2.25E+000	Reduction in egg hatchability	Vos et al. (1971) In Sample et al. (1996)
Heptachlor	Japanese Quail	0.072	0.08	3.00E-001	5.93E+001	3.00E-001	5.93E+001	Maximum dose no effects	
Chlordane	Red-winged Blackbird	0.064	0.08	2.14E+000	1.07E+001	2.14E+000	1.07E+001	Mortality	Stickel et al. (1983) In Sample et al. (1983)
Toxaphene	NC	NC	NC	NC	NC	NC	NC	NC	NC
PCBs/Dioxin									
Aroclor 1248	NC	NC	NC	NC	NC	NC	NC	NC	NC
Aroclor 1254/1260	Ringed-neck Pheasent	1	0.08	1.80E-001	1.80E+000	1.80E-001	1.80E+000	Reduced egg hatchability	Dahlgren et al. (1972) In Sample et al. (1996)
2,3,7,8-TCDD	Ringed-neck Pheasent	1	0.08	1.40E-005	1.40E-004	1.40E-005	1.40E-004	Reduced egg hatchability aNC productio	Nosek et al. (1992) In Sample et al. (1992)
Metals									
Aluminum	Ringed Dove	0.155	0.08	1.10E+002	-	1.10E+002	-	Reproductive Impairment	Carriere et al. (1986) In Sample et al. (1996)
Antimony	Bobwhite Quail	0.072	0.08	8.40E+002	-	8.40E+002	-	Maximum dose no effect on growth	Damron aNC Wilson (1975)
Barium	Domestic Chickens	0.121	0.08	2.08E+001	4.17E+001	2.08E+001	4.17E+001	Mortality	Johnson et al. (1960) In Sample et al. (1996)
Cadmium	Mallard	1.15	0.08	1.45E+000	2.00E+001	1.45E+000	2.00E+001	Reproductive Impairment	White aNC Finley (1978) In Sample et al. (1978)
Chromium	Black Duck	1.25	0.08	1.00E+000	5.00E+000	1.00E+000	5.00E+000	Reduced body weight	Haseltine et al. (unpublished data) In Sample et al. (1996)
Cobalt	NC	NC	NC	NC	NC	NC	NC	NC	-
Copper	Domestic Chickens(Juv.)	0.534	0.08	4.70E+001	6.17E+001	4.70E+001	6.17E+001	Juvenile mortality	Mehring et al. (1960) In Sample et al. (1996)
Cyanide	Domestic Chickens(Juv.)	0.534	0.08	8.50E+000	-	8.50E+000	-	NOAEL for growth, hematology, histology	Gomez et al. (1988) In Eisler (1991)
Lead	American Kestrel	0.13	0.08	3.85E+000	-	3.85E+000	-	Reproductive Impairment	Edens et al. (1976) In Sample et al. (1996)
Mercury	Japanese Quail	0.15	0.08	4.50E-001	9.00E-001	4.50E-001	9.00E-001	Decreased fertility aNC hatchability	Hill aNC Schaffner (1976) In Sample et al. (1996)
Nickel	Mallard	0.78	0.08	7.74E+001	1.07E+002	7.74E+001	1.07E+002	Impaired growth, mortality, abnorm. beh	Cain aNC Pafford (1981) In Sample et. Al. (1996)
Selenium	Mallard	1	0.08	4.00E-001	8.00E-001	4.00E-001	8.00E-001	Reduced duckling survival	Heinz (1986) In Sample et al. (1996)
Silver	Domestic Chickens(Juv.)	0.534	0.08	1.65E+000	1.65E+001	1.65E+000	1.65E+001	Reduced Growth	Smith aNC Carson (1977) In Eisler (1996)
Thallium	Red-winged Blackbird	0.064	0.08	1.62E+002	-	1.62E+002	-	LD50 for Mortality	Schafer, E.W. et al. (1983)
Vanadium	Mallard	1.2	0.08	1.14E+001	-	1.14E+001	-	Mortality, reduced body weight	White aNC Dieter (1978) In Sample et al. (1996)
Zinc	White Leghorn Hen	1.76	0.08	1.45E+001	1.31E+002	1.45E+001	1.31E+002	Reduced hatchability	Stahl et al. (1990) In Sample et al. (1996)

All toxicological information derived from Sample et al. (1996).
NC = No TRV available for contaminant.
- = No LOAEL value or not applicable.

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TABLE 7-11

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR THE RED-TAILED HAWK EXPOSED TO MAXIMUM CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Max. Soil Concen. (mg/kg)	Small Mammal Uptake Factor (Unitless)	Predicted or Observed Sm. Mammal Concen.* (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Sm. Mammal (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Sm. Mammal (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Volatile Organic Compounds (VOCs)															
Chloromethane	1.90E-002	-	-	0.33	0.11	1.028	1	0.028	5.69E-005	-	5.69E-005	NC	NC	-	-
Trichlorofluoromethane	8.00E-003	-	-	0.33	0.11	1.028	1	0.028	2.40E-005	-	2.40E-005	NC	NC	-	-
Vinyl chloride	6.40E-001	-	-	0.33	0.11	1.028	1	0.028	1.92E-003	-	1.92E-003	NC	NC	-	-
Total 1,2-Dichloroethylene	5.64E+001	-	-	0.33	0.11	1.028	1	0.028	1.69E-001	-	1.69E-001	NC	NC	-	-
Trichloroethylene	4.70E+001	-	-	0.33	0.11	1.028	1	0.028	1.41E-001	-	1.41E-001	NC	NC	-	-
Tetrachloroethylene	4.30E-001	-	-	0.33	0.11	1.028	1	0.028	1.29E-003	-	1.29E-003	NC	NC	-	-
Carbon disulfide	3.20E-002	-	-	0.33	0.11	1.028	1	0.028	9.59E-005	-	9.59E-005	NC	NC	-	-
Methylene chloride	1.70E+000	-	-	0.33	0.11	1.028	1	0.028	5.09E-003	-	5.09E-003	NC	NC	-	-
Ethylbenzene	1.50E-001	-	-	0.33	0.11	1.028	1	0.028	4.49E-004	-	4.49E-004	NC	NC	-	-
Toluene	7.50E+000	-	-	0.33	0.11	1.028	1	0.028	2.25E-002	-	2.25E-002	NC	NC	-	-
Xylene (total)	2.70E+000	-	-	0.33	0.11	1.028	1	0.028	8.09E-003	-	8.09E-003	NC	NC	-	-
Isopropylbenzene	9.00E-003	-	-	0.33	0.11	1.028	1	0.028	2.70E-005	-	2.70E-005	NC	NC	-	-
Semi-Volatile Organic Compounds (SVOCs)															
Benzaldehyde	9.50E-001	-	-	0.33	0.11	1.028	1	0.028	2.85E-003	-	2.85E-003	NC	NC	<1	-
Acetophenone	3.40E-001	-	-	0.33	0.11	1.028	1	0.028	1.02E-003	-	1.02E-003	NC	NC	<1	-
Naphthalene	1.30E+002	-	-	0.33	0.11	1.028	1	0.028	3.89E-001	-	3.89E-001	2.29E+002	2.29E+003	<1	<1
2-Methylnaphthalene	4.60E+002	-	-	0.33	0.11	1.028	1	0.028	1.38E+000	-	1.38E+000	2.29E+002	2.29E+003	<1	<1
Acenaphthylene	9.60E-001	-	-	0.33	0.11	1.028	1	0.028	2.88E-003	-	2.88E-003	2.29E+002	2.29E+003	<1	<1
Acenaphthene	2.80E+003	-	-	0.33	0.11	1.028	1	0.028	8.39E+000	-	8.39E+000	2.29E+002	2.29E+003	<1	<1
Dibenzofuran	1.70E+003	-	-	0.33	0.11	1.028	1	0.028	5.09E+000	-	5.09E+000	6.50E+001	-	<1	-
Fluorene	2.00E+003	-	-	0.33	0.11	1.028	1	0.028	5.99E+000	-	5.99E+000	2.29E+002	2.29E+003	<1	<1
Phenanthrene	7.00E+003	-	-	0.33	0.11	1.028	1	0.028	2.10E+001	-	2.10E+001	2.29E+002	2.29E+003	<1	<1
Anthracene	1.20E+003	-	-	0.33	0.11	1.028	1	0.028	3.60E+000	-	3.60E+000	2.29E+002	2.29E+003	<1	<1
Carbazole	3.60E-001	-	-	0.33	0.11	1.028	1	0.028	1.08E-003	-	1.08E-003	NC	NC	-	-
Fluoranthene	4.00E+003	-	-	0.33	0.11	1.028	1	0.028	1.20E+001	-	1.20E+001	2.29E+002	2.29E+003	<1	<1
Pyrene	2.60E+003	-	-	0.33	0.11	1.028	1	0.028	7.79E+000	-	7.79E+000	2.29E+002	2.29E+003	<1	<1
Chrysene	8.30E+002	-	-	0.33	0.11	1.028	1	0.028	2.49E+000	-	2.49E+000	2.29E+002	2.29E+003	<1	<1
Benzo(b)fluoranthene	4.50E+002	-	-	0.33	0.11	1.028	1	0.028	1.35E+000	-	1.35E+000	2.29E+002	2.29E+003	<1	<1
Benzo(k)fluoranthene	4.50E+002	-	-	0.33	0.11	1.028	1	0.028	1.35E+000	-	1.35E+000	2.29E+002	2.29E+003	<1	<1
Benzo(a)pyrene	5.20E+002	-	-	0.33	0.11	1.028	1	0.028	1.56E+000	-	1.56E+000	2.29E+002	2.29E+003	<1	<1
Benzo(g,h,i)perylene	2.00E+002	-	-	0.33	0.11	1.028	1	0.028	5.99E-001	-	5.99E-001	2.29E+002	2.29E+003	<1	<1
Benzo(a)anthracene	9.20E+002	-	-	0.33	0.11	1.028	1	0.028	2.76E+000	-	2.76E+000	2.29E+002	2.29E+003	<1	<1
Dibenzo(a,h)anthracene	6.60E+001	-	-	0.33	0.11	1.028	1	0.028	1.98E-001	-	1.98E-001	2.29E+002	2.29E+003	<1	<1
Indeno(1,2,3-cd)pyrene	2.60E+002	-	-	0.33	0.11	1.028	1	0.028	7.79E-001	-	7.79E-001	2.29E+002	2.29E+003	<1	<1
Pesticides/PCBs/Dioxin															
alpha-BHC	2.40E+000	-	2.50E-003	0.33	0.11	1.028	1	0.028	7.19E-003	8.03E-004	7.99E-003	5.60E-001	2.25E+000	<1	<1
Aldrin	1.30E+002	-	2.50E-003	0.33	0.11	1.028	1	0.028	3.89E-001	8.03E-004	3.90E-001	3.00E-002	3.00E-001	13	1.3
Heptachlor epoxide	2.50E+002	-	2.50E-003	0.33	0.11	1.028	1	0.028	7.49E-001	8.03E-004	7.50E-001	3.00E-001	5.93E+001	2	<1
Heptachlor	1.90E+000	-	2.50E-003	0.33	0.11	1.028	1	0.028	5.69E-003	8.03E-004	6.50E-003	3.00E-001	5.93E+001	<1	<1
Dieldrin1	5.20E+002	-	6.00E-002	0.33	0.11	1.028	1	0.028	1.56E+000	1.93E-002	1.58E+000	7.70E-002	NC	20	-
4,4'-DDE1	1.20E+003	-	6.00E-002	0.33	0.11	1.028	1	0.028	3.60E+000	1.93E-002	3.61E+000	2.80E-003	2.80E-002	1291	129
4,4'-DDD	2.10E+000	-	5.00E-003	0.33	0.11	1.028	1	0.028	6.29E-003	1.61E-003	7.90E-003	2.80E-003	2.80E-002	3	<1
4,4'-DDT	4.20E+001	-	5.00E-003	0.33	0.11	1.028	1	0.028	1.26E-001	1.61E-003	1.27E-001	2.80E-003	2.80E-002	46	5
Total DDT and metabolites	1.24E+003	-	7.00E-002	0.33	0.11	1.028	1	0.028	3.73E+000	2.25E-002	3.75E+000	2.80E-003	2.80E-002	1339	134
Endrin aldehyde	1.20E+002	-	5.00E-003	0.33	0.11	1.028	1	0.028	3.60E-001	1.61E-003	3.61E-001	3.00E-001	NC	1.2	-
Endosulfan sulfate	5.90E+001	-	5.00E-003	0.33	0.11	1.028	1	0.028	1.77E-001	1.61E-003	1.78E-001	1.00E+001	NC	<1	-
Methoxychlor	2.00E+000	-	2.50E-002	0.33	0.11	1.028	1	0.028	5.99E-003	8.03E-003	1.40E-002	NC	NC	-	-
alpha-Chlordane	2.30E-001	-	2.50E-002	0.33	0.11	1.028	1	0.028	6.89E-004	8.03E-003	8.71E-003	2.10E+000	1.07E+001	<1	<1
gamma-Chlordane	2.00E+001	-	-	0.33	0.11	1.028	1	0.028	5.99E-002	-	5.99E-002	2.10E+000	1.07E+001	<1	<1
Toxaphene	2.00E-001	-	2.50E-001	0.33	0.11	1.028	1	0.028	5.99E-004	8.03E-002	8.09E-002	NC	NC	-	-
Aroclor 1248	2.10E+003	-	5.00E-002	0.33	0.11	1.028	1	0.028	6.29E+000	1.61E-002	6.31E+000	1.80E-001	1.80E+000	35	3.5
Aroclor 1254 1	1.90E+004	-	5.40E+000	0.33	0.11	1.028	1	0.028	5.69E+001	1.73E+000	5.87E+001	1.80E-001	1.80E+000	326	33
Aroclor 1260	2.20E-001	-	5.00E-002	0.33	0.11	1.028	1	0.028	6.59E-004	1.61E-002	1.67E-002	1.80E-001	1.80E+000	<1	<1
Total PCBs	2.11E+004	-	5.75E+000	0.33	0.11	1.028	1	0.028	6.32E+001	1.85E+000	6.51E+001	1.80E-001	1.80E+000	361	36
PCB Congener TCDD Equivalent	8.95E-001	-	-	0.33	0.11	1.028	1	0.028	2.68E-003	-	2.68E-003	1.40E-005	1.40E-004	191	19
Total TCDD and Equivalent	1.97E-002	2.20E+000	7.37E-003	0.33	0.11	1.028	1	0.028	5.90E-005	2.37E-003	2.42E-003	1.40E-005	1.40E-004	173	17
Metals															
Aluminum	2.28E+005	1.00E+000	3.88E+004	0.33	0.11	1.028	1	0.028	6.83E+002	1.24E+004	1.31E+004	1.10E+002	NC	119	-
Antimony	2.15E+001	1.00E+000	3.66E+000	0.33	0.11	1.028	1	0.028	6.44E-002	1.17E+000	1.24E+000	8.40E-002	NC	<1	-
Barium	4.17E+003	6.90E-002	4.89E+001	0.33	0.11	1.028	1	0.028	1.25E+001	1.57E+001	2.82E+001	2.08E+001	4.17E+001	1.4	<1
Cadmium	1.23E+002	1.71E+000	3.57E+001	0.33	0.11	1.028	1	0.028	3.69E-001	1.14E+001	1.18E+001	1.45E+000	2.00E+001	8	<1
Chromium	7.75E+001	8.00E-001	1.05E+001	0.33	0.11	1.028	1	0.028	2.32E-001	3.38E+000	3.62E+000	1.00E+000	5.00E+000	<1	<1
Cobalt	3.01E+001	2.50E-002	1.28E-001	0.33	0.11	1.028	1	0.028	9.02E-002	4.11E-002	1.31E-001	NC	NC	-	-
Copper	1.38E+004	8.67E-001	2.00E+003	0.33	0.11	1.028	1	0.028	4.07E+001	6.43E+002	6.84E+002	4.70E+001	6.17E+001	15	11
Cyanide	7.60E+000	1.00E+000	1.29E+000	0.33	0.11	1.028	1	0.028	2.28E-002	-	2.28E-002	8.50E+000	NC	<1	-
Lead	4.32E+003	9.95E-001	7.31E+002	0.33	0.11	1.028	1	0.028	1.29E+001	2.35E+002	2.48E+002	3.85E+000	NC	64	-
Mercury	1.10E+000	1.92E-001	3.59E-002	0.33	0.11	1.028	1	0.028	3.30E-003	1.15E-002	1.48E-002	4.50E-001	9.00E-001	<1	<1
Nickel	9.28E+001	4.73E+000	7.46E+001	0.33	0.11	1.028	1	0.028	2.78E-001	2.40E+001	2.42E+001	7.74E+001	1.07E+002	<1	<1
Selenium	9.00E+000	8.00E-001	1.22E+000	0.33	0.11	1.028	1	0.028	2.70E-002	3.93E-001	4.20E-001	4.00E-001	8.00E-001	1.0	<1
Silver	2.68E+001	1.00E+000	4.56E+000	0.33	0.11	1.028	1	0.028	8.03E-002	1.46E+000	1.54E+000	1.65E+000	1.65E+001	<1	<1
Thallium	7.60E+000	1.00E+000	1.29E+000	0.33	0.11	1.028	1	0.028	2.28E-002	4.15E-001	4.38E-001	3.46E+000	NC	<1	-
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.33	0.11	1.028	1	0.028	3.86E-001	6.20E-001	1.01E+000	1.14E+001	NC	<1	-
Zinc	1.40E+004	5.85E+000	1.39E+004	0.33	0.11	1.028	1	0.028	4.19E+001	4.47E+003	4.51E+003	1.45E+001	1.31E+002	311	34

*Assume an average percent moisture content of 83%.
NC = No TRV available for contaminant.
- = No HQ or not applicable.
*Concentration based upon measured body burden reported in EPA (1999).

TABLE 7-12

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL VALUES FOR THE RED-TAILED HAWK FOR COPECs IN SURFACE SOIL

EL(wildlife sp.) = (NOAELtest sp.)(1)

Contaminant	Test Species	Body Weight (Kg) Test Species	Body Weight (Kg) Wildlife Species	Test Species NOAEL	Test Species LOAEL	American Robin NOAEL	American Robin LOAEL	Toxicological Endpoint	Reference
Volatile Organic Compounds									
Chloromethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichlorofluoromethane	NC	NC	NC	NC	NC	NC	NC	NC	NC
Vinyl chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total 1,2-Dichloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Trichloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Tetrachloroethylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Carbon disulfide	NC	NC	NC	NC	NC	NC	NC	NC	NC
Methylene chloride	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylene (total)	NC	NC	NC	NC	NC	NC	NC	NC	NC
Isopropylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Semi-Volatile CompouNCs									
Acetophenone	NC	NC	NC	NC	NC	NC	NC	NC	NC
Methylnapthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzaldehyde	NC	NC	NC	NC	NC	NC	NC	NC	NC
Napthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzofuran	Red-winged Blackbird	0.064	1.028	65	-	65	-	Adult mortality	Schaefer et al. (1983)
Carbazole	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	Mallard	1.04	1.028	2.29E+002	2.29E+003	2.29E+002	2.29E+003	Adult/Juvenile mortality	Patton and Dieter (1980) In Eisler (1987)
Pesticides									
Aldrin	Quail	0.072	1.028	3.00E-002	3.00E-001	3.00E-002	3.00E-001	Residue Tolerance Limit	Bleavins (1979)
DDT	Brown Pelican	3.5	1.028	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	Anderson et al. (1975) In Sample et al. (1996)
DDD	Brown Pelican	3.5	1.028	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	Anderson et al. (1975) In Sample et al. (1996)
DDE	Brown Pelican	3.5	1.028	2.80E-003	2.80E-002	2.80E-003	2.80E-002	Reduction in fledgling rate	Anderson et al. (1975) In Sample et al. (1996)
Dieldrin	Barn Owl	0.466	1.028	7.70E-002	-	7.70E-002	-	Reduction in egg shell thickness	Mencenhall et al. (1983) In Sample et al. (1996)
ENCrin	Mallard Duck	1.15	1.028	3.00E-001	-	3.00E-001	-	Reduction in clutch size	Spann et al. (1986) In Sample et al. (1996)
Endosulfan	Gray Partridge	0.4	1.028	1.00E+001	-	1.00E+001	-	Maximum dose no reproductive effects	Abiola (1992) In Sample et al. (1996)
Methoxychlor	NC	NC	NC	NC	NC	NC	NC	NC	NC
BHC (mixed isomers)	Japanese Quail	0.072	1.028	5.60E-001	2.25E+000	5.60E-001	2.25E+000	Reduction in egg hatchability	Vos et al. (1971) In Sample et al. (1996)
Heptachlor	Japanese Quail	0.072	1.028	3.00E-001	5.93E+001	3.00E-001	5.93E+001	Maximum dose no effects	
Chlordane	Red-winged Blackbird	0.064	1.028	2.14E+000	1.07E+001	2.14E+000	1.07E+001	Mortality	Stickel et al. (1983) In Sample et al. (1983)
Toxaphene	NC	NC	NC	NC	NC	NC	NC	NC	NC
PCBs/Dioxin									
Aroclor 1248	NC	NC	NC	NC	NC	NC	NC	NC	NC
Aroclor 1254/1260	Ringed-neck Pheasent	1	1.028	1.80E-001	1.80E+000	1.80E-001	1.80E+000	Reduced egg hatchability	Dahlgren et al. (1972) In Sample et al. (1996)
2,3,7,8-TCDD	Ringed-neck Pheasent	1	1.028	1.40E-005	1.40E-004	1.40E-005	1.40E-004	Reduced egg hatchability aNC production	Nosek et al. (1992) In Sample et al. (1992)
Metals									
Aluminum	Ringed Dove	0.155	1.028	1.10E+002	-	1.10E+002	-	Reproductive Impairment	Carriere et al. (1986) In Sample et al. (1996)
Antimony	Bobwhite Quail	0.072	1.028	8.40E+002	-	8.40E+002	-	Maximum dose no effect on growth	Damron aNC Wilson (1975)
Barium	Domestic Chickens	0.121	1.028	2.08E+001	4.17E+001	2.08E+001	4.17E+001	Mortality	Johnson et al. (1960) In Sample et al. (1996)
Cadmium	Mallard	1.15	1.028	1.45E+000	2.00E+001	1.45E+000	2.00E+001	Reproductive Impairment	White aNC Finley (1978) In Sample et al. (1978)
Chromium	Black Duck	1.25	1.028	1.00E+000	5.00E+000	1.00E+000	5.00E+000	Reduced body weight	Haseltine et al. (unpublished data) In Sample et al. (1996)
Cobalt	NC	NC	NC	NC	NC	NC	NC	NC	NC
Copper	Domestic Chickens(Juv.)	0.534	1.028	4.70E+001	6.17E+001	4.70E+001	6.17E+001	Juvenile mortality	Mehring et al. (1960) In Sample et al. (1996)
Cyanide	Domestic Chickens(Juv.)	0.534	1.028	8.50E+000	NC	8.50E+000	NC	No effect on histology, growth, hematology	Gomez et al. (1988) In Eisler (1991)
Lead	American Kestrel	0.13	1.028	3.85E+000	-	3.85E+000	-	Reproductive impairment	Edens et al. (1976) In Sample et al. (1996)
Mercury	Japanese Quail	0.15	1.028	4.50E-001	9.00E-001	4.50E-001	9.00E-001	Decreased fertility aNC hatchability	Hill aNC Schaffner (1976) In Sample et al. (1996)
Nickel	Mallard	0.78	1.028	7.74E+001	1.07E+002	7.74E+001	1.07E+002	Impaired growth, mortality, abnorm. behav.	Cain aNC Pafford (1981) In Sample et. Al. (1996)
Selenium	Mallard	1	1.028	4.00E-001	8.00E-001	4.00E-001	8.00E-001	Reduced duckling survival	Heinz (1986) In Sample et al. (1996)
Silver	Domestic Chickens(Juv.)	0.534	1.028	1.65E+000	1.65E+001	1.65E+000	1.65E+001	Reduced Growth	Smith aNC Carson (1977) In Eisler (1996)
Vanadium	Mallard	1.2	1.028	1.14E+001	-	1.14E+001	-	Mortality, reduced body weight	White aNC Dieter (1978) In Sample et al. (1996)
Zinc	White Leghorn Hen	1.78	1.028	1.45E+001	1.31E+002	1.45E+001	1.31E+002	Reduced hatchability	Stahl et al. (1990) In Sample et al. (1996)

All toxicological information derived from Sample et. al. (1996)
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.

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TABLE 7-13

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTSFOR SHORT-TAILED SHREW EXPOSED TO MEAN CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Mean Soil Concen. (mg/kg)	Invertebrate Uptake Factor (Unitless)	Predicted Invertebrate Concen.* (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Invertebrate (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Invertebrate (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Volatile Organic Compounds (VOCs)															
Trichloroethylene	6.60E+000	1.00E+000	1.12E+000	0.010	0.002	0.015	0.41	0.094	8.27E-002	3.07E-001	3.89E-001	8.32E-001	8.32E+000	<1	<1
Semi-Volatile Organic Compounds (SVOCs)															
Acenaphthene	2.33E+002	3.00E-001	1.19E+000	0.010	0.002	0.015	0.41	0.094	2.92E+000	3.25E-001	3.25E+000	1.19E+000	1.19E+001	3	<1
Dibenzofuran	1.70E+002	1.00E+000	2.89E+000	0.010	0.002	0.015	0.41	0.094	2.13E+000	7.90E-001	2.92E+000	-	-	-	-
Fluorene	1.82E+002	3.00E-001	9.28E-001	0.010	0.002	0.015	0.41	0.094	2.28E+000	2.54E-001	2.53E+000	1.19E+000	1.19E+001	2	<1
Phenanthrene	3.90E+002	3.00E-001	1.99E+000	0.010	0.002	0.015	0.41	0.094	4.89E+000	5.44E-001	5.43E+000	1.19E+000	1.19E+001	5	<1
Anthracene	1.09E+002	3.00E-001	5.56E-001	0.010	0.002	0.015	0.41	0.094	1.37E+000	1.52E-001	1.52E+000	1.19E+000	1.19E+001	1.3	<1
Fluoranthene	2.68E+002	3.00E-001	1.37E+000	0.010	0.002	0.015	0.41	0.094	3.36E+000	3.74E-001	3.73E+000	1.19E+000	1.19E+001	3	<1
Pyrene	1.47E+002	3.00E-001	7.50E-001	0.010	0.002	0.015	0.41	0.094	1.84E+000	2.05E-001	2.05E+000	1.19E+000	1.19E+001	1.7	<1
Chrysene	5.01E+001	2.40E-001	2.04E-001	0.010	0.002	0.015	0.41	0.094	6.28E-001	5.59E-002	6.84E-001	1.19E+000	1.19E+001	<1	<1
Benzo(b)fluoranthene	2.75E+001	4.20E-001	1.96E-001	0.010	0.002	0.015	0.41	0.094	3.45E-001	5.37E-002	3.98E-001	1.19E+000	1.19E+001	<1	<1
Benzo(k)fluoranthene	2.90E+001	4.80E-001	2.37E-001	0.010	0.002	0.015	0.41	0.094	3.63E-001	6.47E-002	4.28E-001	1.19E+000	1.19E+001	<1	<1
Benzo(a)pyrene	3.35E+001	3.00E-001	1.71E-001	0.010	0.002	0.015	0.41	0.094	4.20E-001	4.67E-002	4.67E-001	1.19E+000	1.19E+001	<1	<1
Benzo(g,h,i)perylene	1.74E+001	3.00E-001	8.87E-002	0.010	0.002	0.015	0.41	0.094	2.18E-001	2.43E-002	2.42E-001	1.19E+000	1.19E+001	<1	<1
Benzo(a)anthracene	5.51E+001	1.80E-001	1.69E-001	0.010	0.002	0.015	0.41	0.094	6.91E-001	4.61E-002	7.37E-001	1.19E+000	1.19E+001	<1	<1
Dibenzo(a,h)anthracene	6.90E+000	4.20E-001	4.93E-002	0.010	0.002	0.015	0.41	0.094	8.65E-002	1.35E-002	9.99E-002	1.19E+000	1.19E+001	<1	<1
Indeno(1,2,3-cd)pyrene	2.10E+001	4.80E-001	1.71E-001	0.010	0.002	0.015	0.41	0.094	2.63E-001	4.68E-002	3.10E-001	1.19E+000	1.19E+001	<1	<1
Pesticides/PCBs/Dioxin															
alpha-BHC	6.50E-001	1.00E+000	1.11E-001	0.010	0.002	0.015	0.41	0.094	8.15E-003	3.02E-002	3.84E-002	4.00E-002	4.00E-001	1.0	<1
Aldrin	4.30E+001	1.00E+000	7.31E+000	0.010	0.002	0.015	0.41	0.094	5.39E-001	2.00E+000	2.54E+000	4.40E-001	2.20E+000	6	1.2
Heptachlor epoxide	3.68E+001	8.40E+000	5.26E+001	0.010	0.002	0.015	0.41	0.094	4.61E-001	1.44E+001	1.48E+001	2.86E-001	2.86E+000	52	5
Heptachlor	6.50E-001	8.40E+000	9.28E-001	0.010	0.002	0.015	0.41	0.094	8.15E-003	2.54E-001	2.62E-001	5.47E+000	1.09E+001	<1	<1
Dieldrin	1.31E+002	1.00E+000	2.23E+001	0.010	0.002	0.015	0.41	0.094	1.64E+000	6.09E+000	7.73E+000	4.40E-002	4.40E-001	176	18
4,4'-DDE	1.60E+002	1.26E+000	3.43E+001	0.010	0.002	0.015	0.41	0.094	2.01E+000	9.37E+000	1.14E+001	1.76E+000	8.79E+000	6	1.3
4,4'-DDD	2.10E+000	1.26E+000	4.50E-001	0.010	0.002	0.015	0.41	0.094	2.63E-002	1.23E-001	1.49E-001	1.76E+000	8.79E+000	<1	<1
4,4'-DDT	1.93E+001	1.26E+000	4.13E+000	0.010	0.002	0.015	0.41	0.094	2.42E-001	1.13E+000	1.37E+000	1.76E+000	8.79E+000	<1	<1
Total DDT and metabolites	1.81E+002	1.26E+000	3.89E+001	0.010	0.002	0.015	0.41	0.094	2.27E+000	1.06E+001	1.29E+001	1.76E+000	8.79E+000	7	1.5
Endrin aldehyde	1.76E+001	1.00E+000	2.99E+000	0.010	0.002	0.015	0.41	0.094	2.21E-001	8.18E-001	1.04E+000	1.09E-001	1.09E+000	9	<1
Endosulfan sulfate	1.18E+001	1.00E+000	2.01E+000	0.010	0.002	0.015	0.41	0.094	1.48E-001	5.48E-001	6.96E-001	3.30E-001	-	2	-
gamma-Chlordane	3.40E+000	1.00E+000	5.78E-001	0.010	0.002	0.015	0.41	0.094	4.26E-002	1.58E-001	2.01E-001	5.47E+000	1.09E+001	<1	<1
Aroclor 1248	1.28E+003	6.80E+000	1.47E+003	0.010	0.002	0.015	0.41	0.094	1.60E+001	4.03E+002	4.19E+002	4.27E-002	4.27E-001	9802	980
Aroclor 1254	1.84E+003	6.80E+000	2.13E+003	0.010	0.002	0.015	0.41	0.094	2.31E+001	5.83E+002	6.06E+002	4.00E-001	1.97E+000	1514	307
Aroclor 1260	9.90E-002	6.80E+000	1.14E-001	0.010	0.002	0.015	0.41	0.094	1.24E-003	3.13E-002	3.25E-002	4.00E-001	1.97E+000	<1	<1
Total PCBs PPM	3.12E+003	6.80E+000	3.61E+003	0.010	0.002	0.015	0.41	0.094	3.91E+001	9.86E+002	1.02E+003	4.00E-001	1.97E+000	2561	520
PCB Congener TCDD Equivalent	3.53E-001	9.50E+000	5.70E-001	0.010	0.002	0.015	0.41	0.094	4.42E-003	1.56E-001	1.60E-001	2.20E-006	2.20E-005	72913	7291
Total TCDD and Equivalent	6.60E-003	9.50E+000	1.07E-002	0.010	0.002	0.015	0.41	0.094	8.27E-005	2.91E-003	3.00E-003	2.20E-006	2.20E-005	1363	136
Metals															
Aluminum	2.33E+004	1.18E-001	4.68E+002	0.010	0.002	0.015	0.41	0.094	2.93E+002	1.28E+002	4.21E+002	2.30E+000	2.30E+001	183	18
Antimony	6.60E+000	1.00E+000	1.12E+000	0.010	0.002	0.015	0.41	0.094	8.27E-002	3.07E-001	3.89E-001	3.60E-001	3.60E+000	1.1	<1
Barium	5.89E+002	1.60E-001	1.60E+001	0.010	0.002	0.015	0.41	0.094	7.38E+000	4.38E+000	1.18E+001	1.12E+001	4.35E+001	1.0	<1
Cadmium	2.09E+001	8.82E+000	3.13E+001	0.010	0.002	0.015	0.41	0.094	2.62E-001	8.57E+000	8.83E+000	2.20E+000	2.20E+001	4	<1
Chromium	3.24E+001	3.16E+000	1.74E+001	0.010	0.002	0.015	0.41	0.094	4.06E-001	4.76E+000	5.17E+000	7.21E+000	2.89E+001	<1	<1
Copper	1.05E+003	8.10E-002	1.45E+001	0.010	0.002	0.015	0.41	0.094	1.32E+001	3.95E+000	1.71E+001	9.37E+000	3.75E+001	1.8	<1
Lead	7.01E+002	1.52E+000	1.81E+002	0.010	0.002	0.015	0.41	0.094	8.79E+000	4.96E+001	5.84E+001	1.76E+001	1.76E+002	3	<1
Mercury	4.50E-001	4.45E+000	3.40E-001	0.010	0.002	0.015	0.41	0.094	5.64E-003	9.30E-002	9.87E-002	4.29E-002	7.14E-002	2	1.4
Nickel	3.85E+001	4.73E+000	3.10E+001	0.010	0.002	0.015	0.41	0.094	4.83E-001	8.46E+000	8.94E+000	8.79E+001	1.76E+002	<1	<1
Selenium	2.20E+000	8.10E-001	3.03E-001	0.010	0.002	0.015	0.41	0.094	2.76E-002	8.28E-002	1.10E-001	4.40E-001	7.25E-001	<1	<1
Thallium	3.40E+000	1.00E+000	5.78E-001	0.010	0.002	0.015	0.41	0.094	4.26E-002	1.58E-001	2.01E-001	1.63E-002	1.63E-001	12	1.2
Vanadium	3.99E+001	8.80E-002	5.97E-001	0.010	0.002	0.015	0.41	0.094	5.00E-001	1.63E-001	6.63E-001	4.62E-001	4.62E+000	1.4	<1
Zinc	1.01E+003	4.60E-001	7.88E+001	0.010	0.002	0.015	0.41	0.094	1.26E+001	2.15E+001	3.42E+001	3.52E+002	7.03E+002	<1	<1

*Assume an average percent moisture content of 83%.
- = No LOAEL or not applicable.

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TABLE 7-14

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL CALCULATIONS FOR THE SHORT-TAILED SHREW (Blarina brevicauda) FOR THE MEAN EXPOSURE EVALUATION

NOAEL(wildlife sp.) = (NOAELtest sp.)(bwtsp)/(bwwsp)0.25

Contaminant	Test Species	Body Weight (Kg) Test Species	Wildlife Species	Test Species NOAEL	Test Species LOAEL	Short-tailed Shrew NOAEL	Short-tailed Shrew LOAEL	Toxicological Endpoint	Reference
Volatile Organic Compounds									
Chloromethane	rat	0.35	0.015	3.20E+000	3.20E+001	7.03E+000	7.03E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Trichlorofluoromethane	rat	0.35	0.015	5.00E-002	5.00E-001	1.10E-001	1.10E+000	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Vinyl chloride	rat	0.35	0.015	1.70E-001	1.70E+000	3.74E-001	3.74E+000	Reduced surviorship	Feron et al. (1981) In Sample et al. (1996)
Total 1,2-Dichloroethylene	mouse	0.03	0.015	4.52E+001	-	5.38E+001	-	Enzyme inhibition	Palmer et al. (1979) In Sample et al. (1996)
Trichloroethylene	mouse	0.03	0.015	7.00E-001	7.00E+000	8.32E-001	8.32E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Tetrachloroethylene	mouse	0.03	0.015	1.40E+000	7.00E+000	1.66E+000	8.32E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Carbon disulfide	rabbit	3.8	0.015	1.10E+001	-	4.39E+001	-	No observed reproductive effects	IRIS Database
Methylene chloride	rat	0.35	0.015	5.85E+000	5.00E+001	1.29E+001	1.10E+002	Histological effects in liver	Cox et al. In Sample et al. (1996)
Ethylbenzene	rat	0.35	0.015	9.71E+001	-	2.13E+002	-	Histological effects in liver/kidney	IRIS Database
Toluene	mouse	0.03	0.015	2.60E+001	2.60E+002	3.09E+001	3.09E+002	Reduced fetal body mass	Nawrot and Staples (1979) In Sample et al. (1996)
Xylene (total)	mouse	0.03	0.015	2.10E+000	2.60E+000	2.50E+000	3.09E+000	Reduced body mass/Incr. Deformaties	Marks et al. (1982) In Sample et al. (1996)
Isopropylbenzene	rat	0.35	0.015	1.10E+002	-	2.42E+002	-	Increased kidney mass	IRIS Database
Semi-Volatile Compounds									
Acetophenone	rat	0.35	0.015	4.23E+002	-	9.30E+002	-	No observed toxcity	IRIS Database
Methylnapthalene	rat	0.35	0.015	7.10E+001	-	1.56E+002	-	Decrease in body weight of adults	BCL (1980)
Benzaldehyde	mouse	0.03	0.015	1.43E+002	-	1.70E+002	-	Lesions in forestomach, kidney toxicity	Kluwe et al. (1983)
Napthalene	rat	0.35	0.015	7.10E+001	-	1.56E+002	-	Decrease in body weight of adults	BCL (1980)
Carbazole	rat	0.35	0.015	1.40E+000	1.40E+001	3.08E+000	3.08E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Benzo(a)pyrene	mouse	0.03	0.015	1.00E+000	1.00E+001	1.19E+000	1.19E+001	Reduction in viable litters and pregnancies	Mackenzie and Angevine (1981) In Sample et al. (1987)
PCBs/Dioxin			0.015						
Aroclor 1248	monkey	5.0	0.015	1.00E-002	1.00E-001	4.27E-002	4.27E-001	Increased neonatal mortality	Barsotti et al. (1976) In Sample et al. (1996)
Aroclor 1254/1260	mink	1	0.015	1.40E-001	6.90E-001	4.00E-001	1.97E+000	Reduction in number of live kits born	Aulerich and Ringer (1977)
2,3,7,8-TCDD	rat	0.35	0.015	1.00E-008	1.00E-005	2.20E-008	2.20E-005	Decreased fertility and neonatal mortality	Murray et al. (1979) In Sample et al. (1996)
Pesticides			0.015						
Aldrin	rat	0.35	0.015	2.00E-001	1.00E+000	4.40E-001	2.20E+000	Increased offspring mortality	Treon and Cleveland (1985) In Sample et al. (1996)
DDT	rat	0.35	0.015	8.00E-001	4.00E+000	1.76E+000	8.79E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDD	rat	0.35	0.015	8.00E-001	4.00E+000	1.76E+000	8.79E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDE	rat	0.35	0.015	8.00E-001	4.00E+000	1.76E+000	8.79E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
Dieldrin	rat	0.35	0.015	2.00E-002	2.00E-001	4.40E-002	4.40E-001	Reduction in pregnancies in treated rats	Treon and Cleveland (1985) In Sample et al. (1996)
Endrin	mouse	0.03	0.015	9.20E-002	9.20E-001	1.09E-001	1.09E+000	Reduced parental survival and litter size	Good and Ware (1969) In Sample et al. (1996)
Endosulfan	rat	0.35	0.015	1.50E-001	-	3.30E-001	-	Maximum dose no reproductive effects	Dikshith et al. (1984) In Sample et al. (1996)
Methoxychlor	rat	0.35	0.015	4.00E+000	8.00E+000	8.79E+000	1.76E+001	Reduced litter size	Gray et al. (1988) In Sample et al. (1996)
BHC (mixed isomers)	mink	1	0.015	1.40E-002	1.40E-001	4.00E-002	4.00E-001	Increased kit mortality	Bleavins et al. (1984) In Sample et al. (1996)
Hepatchlor	mink	1	0.015	1.00E-001	1.00E+000	2.86E-001	2.86E+000	Increased kit mortality	Crum et al. (1993) In Sample et al. (1996)
Chlordane	mouse	0.03	0.015	4.60E+000	9.20E+000	5.47E+000	1.09E+001	Decreased viability in pups	WHO (1984) In Sample et al. (1996)
Toxaphene	mouse	0.03	0.015	8.00E+000	-	9.51E+000	-	No adverse effects over two generations	Kennedy et al. (1973) In Sample et al. (1996)
Metals			0.015						
Aluminum	mouse	0.03	0.015	1.93E+000	1.93E+001	2.30E+000	2.30E+001	Reduction growth rate in pups	Ondreicka et al. (1966) In Sample et al. (1996)
Antimony	mouse	1.03	0.015	1.25E-001	1.25E+000	3.60E-001	3.60E+000	Reduction in life span of treated adults	Schroeder et al. (1976) In Sample et al. (1996)
Barium	rat	0.35	0.015	5.10E+000	1.98E+001	1.12E+001	4.35E+001	Adult mortality	Perry et al. (1983) In Sample et al. (1996)
Cadmium	rat	0.35	0.015	1.00E+000	1.00E+001	2.20E+000	2.20E+001	Embryo toxicity	Sutuo et al. (1980) In Sample et al. (1996)
Chromium	rat	0.35	0.015	3.28E+000	1.31E+001	7.21E+000	2.89E+001	Reduced body wt., increased adult mortality	Mackenzie et al.(1958)/Steven et als.(1976)In sample et al. (1987)
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	-
Copper	mink	1.0	0.015	3.28E+000	1.31E+001	9.37E+000	3.75E+001	Increased kit mortality	Aluerich et al. (1996)
Cyanide	rat	0.35	0.015	6.87E+001	-	1.51E+002	-	Reduced growth rate in young individuals	Tewe and Maner (1981) In Sample et al. (1996)
Lead	rat	0.35	0.015	8.00E+000	8.00E+001	1.76E+001	1.76E+002	Reduced body wt., increased kidney damage	Azar et la. (1973) In Sample et al. (1996)
Mercury	mink	1.0	0.015	1.50E-002	2.50E-002	4.29E-002	7.14E-002	Mortality and weight loss	Wobeser et al. (1976) In Sample et al. (1996)
Nickel	rat	0.35	0.015	4.00E+001	8.00E+001	8.79E+001	1.76E+002	Reduced body weight in offspring	Ambrose et al. (1976) In Sample et al. (1996)
Selenium	rat	0.35	0.015	2.00E-001	3.30E-001	4.40E-001	7.25E-001	Reduced litter sizes	Rosenfield and Beath (1954) In Sample et al. (1996)
Silver	rat	0.35	0.015	2.60E-002	-	5.71E-002	-	Maximum dose no reproductive effects	ASTDR (1990)
Thallium	rat	0.35	0.015	7.40E-003	7.40E-002	1.63E-002	1.63E-001	Reduced fertility in male rats	Formigli et al. (1986) In Sample et al. (1996)
Vanadium	rat	0.35	0.015	2.10E-001	2.10E+000	4.62E-001	4.62E+000	Reduced fetal growth, increased mortality	Domingo et al. (1986) In Sample et al. (1996)
Zinc	rat	0.35	0.015	1.60E+002	3.20E+002	3.52E+002	7.03E+002	Reduced fetal growth, increased mortality	Schlicker and Cox (1968) In Sample et al. (1996)

All toxicological information derived from Sample et al. (1996)
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.

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TABLE 7-15

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR THE RED FOX EXPOSED TO MEAN CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Mean Soil Concen. (mg/kg)	Small Mammal Uptake Factor (Unitless)	Predicted or Observed Sm. Mammal Concen.* (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Sm. Mammal (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Sm. Mammal (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Acenaphthene	2.33E+002	-	-	0.58	0.19	4.13	0.92	0.028	3.00E-001	-	3.00E-001	2.92E-001	2.92E+000	1.0	<1
Fluorene	1.82E+002	-	-	0.58	0.19	4.13	0.92	0.028	2.34E-001	-	2.34E-001	2.92E-001	2.92E+000	<1	<1
Phenanthrene	3.90E+002	-	-	0.58	0.19	4.13	0.92	0.028	5.02E-001	-	5.02E-001	2.92E-001	2.92E+000	2	<1
Anthracene	1.09E+002	-	-	0.58	0.19	4.13	0.92	0.028	1.40E-001	-	1.40E-001	2.92E-001	2.92E+000	<1	<1
Fluoranthene	2.68E+002	-	-	0.58	0.19	4.13	0.92	0.028	3.45E-001	-	3.45E-001	2.92E-001	2.92E+000	1.2	<1
Pyrene	1.47E+002	-	-	0.58	0.19	4.13	0.92	0.028	1.89E-001	-	1.89E-001	2.92E-001	2.92E+000	<1	<1
Chrysene	5.01E+001	-	-	0.58	0.19	4.13	0.92	0.028	6.45E-002	-	6.45E-002	2.92E-001	2.92E+000	<1	<1
Benzo(a)pyrene	3.35E+001	-	-	0.58	0.19	4.13	0.92	0.028	4.32E-002	-	4.32E-002	2.92E-001	2.92E+000	<1	<1
Benzo(a)anthracene	5.51E+001	-	-	0.58	0.19	4.13	0.92	0.028	7.10E-002	-	7.10E-002	2.92E-001	2.92E+000	<1	<1
Pesticides/PCBs/Dioxin															
Aldrin	4.30E+001	-	2.50E-003	0.58	0.19	4.13	0.92	0.028	5.54E-002	3.23E-004	5.57E-002	1.08E-001	5.40E-001	<1	<1
Heptachlor epoxide	3.68E+001	-	2.50E-003	0.58	0.19	4.13	0.92	0.028	4.74E-002	3.23E-004	4.77E-002	7.01E-002	7.01E-001	<1	<1
Dieldrin1	1.31E+002	-	6.00E-002	0.58	0.19	4.13	0.92	0.028	1.69E-001	7.75E-003	1.76E-001	1.08E-002	1.08E-001	16	2
4,4'-DDE1	1.60E+002	-	6.00E-002	0.58	0.19	4.13	0.92	0.028	2.06E-001	7.75E-003	2.14E-001	4.32E-001	4.32E+000	<1	<1
Total DDT and metabolites	1.81E+002	-	6.00E-002	0.58	0.19	4.13	0.92	0.028	2.33E-001	7.75E-003	2.41E-001	4.32E-001	4.32E+000	<1	<1
Endrin aldehyde	1.76E+001	-	5.00E-003	0.58	0.19	4.13	0.92	0.028	2.27E-002	6.46E-004	2.33E-002	2.69E-002	2.69E-001	<1	<1
Endosulfan sulfate	1.18E+001	-	5.00E-003	0.58	0.19	4.13	0.92	0.028	1.52E-002	6.46E-004	1.58E-002	8.09E-002	-	<1	-
Aroclor 1248	1.28E+003	-	5.00E-002	0.58	0.19	4.13	0.92	0.028	1.65E+000	6.46E-003	1.66E+000	1.05E-002	1.05E-001	158	16
Aroclor 1254 1	1.84E+003	-	3.30E+000	0.58	0.19	4.13	0.92	0.028	2.37E+000	4.26E-001	2.80E+000	9.82E-002	4.84E-001	28	6
Total PCBs	3.12E+003	-	3.35E+000	0.58	0.19	4.13	0.92	0.028	4.02E+000	4.33E-001	4.45E+000	9.82E-002	4.84E-001	186	22
PCB Congener TCDD Equivalent	3.53E-001	-	-	0.58	0.19	4.13	0.92	0.028	4.55E-004	-	4.55E-004	5.40E-007	5.40E-006	842	84
Total TCDD and Equivalent	6.60E-003	2.20E+000	2.47E-003	0.58	0.19	4.13	0.92	0.028	8.50E-006	3.19E-004	3.27E-004	5.40E-007	5.40E-006	606	61
Metals															
Aluminum	2.33E+004	1.00E+000	3.96E+003	0.58	0.19	4.13	0.92	0.028	3.00E+001	5.12E+002	5.42E+002	2.30E+000	2.30E+001	236	24
Antimony	6.60E+000	1.00E+000	1.12E+000	0.58	0.19	4.13	0.92	0.028	8.50E-003	1.45E-001	1.53E-001	8.83E-002	8.83E-001	2	<1
Barium	5.89E+002	6.90E-002	6.91E+000	0.58	0.19	4.13	0.92	0.028	7.59E-001	8.93E-001	1.65E+000	2.75E+000	1.07E+001	<1	<1
Cadmium	2.09E+001	1.71E+000	6.06E+000	0.58	0.19	4.13	0.92	0.028	2.69E-002	7.83E-001	8.10E-001	5.40E-001	5.40E+000	1.5	<1
Copper	1.05E+003	8.67E-001	1.55E+002	0.58	0.19	4.13	0.92	0.028	1.35E+000	2.00E+001	2.13E+001	9.37E+000	3.75E+001	2	<1
Lead	7.01E+002	9.95E-001	1.19E+002	0.58	0.19	4.13	0.92	0.028	9.03E-001	1.53E+001	1.62E+001	4.32E+000	4.32E+001	4	<1
Selenium	2.20E+000	8.00E-001	2.99E-001	0.58	0.19	4.13	0.92	0.028	2.83E-003	3.87E-002	4.15E-002	1.08E-001	1.78E-001	<1	<1
Silver	2.68E+001	1.00E+000	4.56E+000	0.58	0.19	4.13	0.92	0.028	3.45E-002	5.69E-001	6.23E-001	1.40E-002	-	44	-
Thallium	3.40E+000	1.00E+000	5.78E-001	0.58	0.19	4.13	0.92	0.028	4.38E-003	7.47E-002	7.91E-002	3.99E-003	3.99E-002	20	2
Vanadium	3.99E+001	8.80E-002	5.97E-001	0.58	0.19	4.13	0.92	0.028	5.14E-002	7.71E-002	1.29E-001	1.13E-001	1.13E+000	1.1	<1
Zinc	1.01E+003	5.85E+000	1.00E+003	0.58	0.19	4.13	0.92	0.028	1.30E+000	1.30E+002	1.31E+002	8.63E+001	1.73E+002	2	<1

*Assume an average percent moisture content of 83%
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.
'Concentration based upon measured body burden reported in EPA (1999)
COPECs withHQ >1 bolded.

TABLE 7-16

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

NOAEL-LOAEL CALCULATIONS FOR THE RED FOX (Vulpes vulpes) FOR THE MEAN EXPOSURE EVALUATION

NOAEL(wildlife sp.) = (NOAELtest sp.)(bwtsp)/(bwwsp)0.25

Contaminant	Test Species	Body Weight (Kg) Test Species	Wildlife Species	Test Species NOAEL	Test Species LOAEL	Red Fox NOAEL	Red Fox LOAEL	Toxicological Endpoint	Reference
Volatile Organic Compounds									
Chloromethane	rat	0.35	4.13	3.20E+000	3.20E+001	1.73E+000	1.73E+001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Trichlorofluoromethane	rat	0.35	4.13	5.00E-002	5.00E-001	2.70E-002	2.70E-001	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Vinyl chloride	rat	0.35	4.13	1.70E-001	1.70E+000	9.17E-002	9.17E-001	Reduced surviorship	Feron et al. (1981) In Sample et al. (1996)
Total 1,2-Dichloroethylene	mouse	0.03	4.13	4.52E+001	-	1.32E+001	-	Enzyme inhibition	Palmer et al. (1979) In Sample et al. (1996)
Trichloroethylene	mouse	0.03	4.13	7.00E-001	7.00E+000	2.04E-001	2.04E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Tetrachloroethylene	mouse	0.03	4.13	1.40E+000	7.00E+000	4.09E-001	2.04E+000	Hepatotoxicity	Buben and O'Flaherty (1985) In Sample et al. (1996)
Carbon disulfide	rabbit	3.8	4.13	1.10E+001	-	1.08E+001	-	No observed reproductive effects	IRIS Database
Methylene chloride	rat	0.35	4.13	5.85E+000	5.00E+001	3.16E+000	2.70E+001	Histological effects in liver	Cox et al. In Sample et al. (1996)
Ethylbenzene	rat	0.35	4.13	9.71E+001	-	5.24E+001	-	Histological effects in liver/kidney	IRIS Database
Toluene	mouse	0.03	4.13	2.60E+001	2.60E+002	7.59E+000	7.59E+001	Reduced fetal body mass	Nawrot and Staples (1979) In Sample et al. (1996)
Xylene (total)	mouse	0.03	4.13	2.10E+000	2.60E+000	6.13E-001	7.59E-001	Reduced body mass/Incr. Deformaties	Marks et al. (1982) In Sample et al. (1996)
Isopropylbenzene	rat	0.35	4.13	1.10E+002	-	5.94E+001	-	Increased kidney mass	IRIS Database
Semi-Volatile Compounds									
Acetophenone	rat	0.35	4.13	4.23E+002	-	2.28E+002	-	No observed toxcity	IRIS Database
Methylnapthalene	rat	0.35	4.13	7.10E+001	-	3.83E+001	-	Decrease in body weight of adults	BCL (1980)
Benzaldehyde	mouse	0.03	4.13	1.43E+002	-	4.17E+001	-	Lesions in forestomach, kidney toxicity	Kluwe et al. (1983)
Napthalene	rat	0.35	4.13	7.10E+001	-	3.83E+001	-	Decrease in body weight of adults	BCL (1980)
Carbazole	rat	0.35	4.13	1.40E+000	1.40E+001	7.55E-001	7.55E+000	Oral LD50 multiplied by 0.01 and 0.1UF	IRIS Database
Benzo(a)pyrene	mouse	0.03	4.13	1.00E+000	1.00E+001	2.92E-001	2.92E+000	Reduction in viable litters and pregnancies	Mackenzie and Angevine (1981) In Sample et al. (1987)
PCBs/Dioxin									
Aroclor 1248	monkey	5.0	4.13	1.00E-002	1.00E-001	1.05E-002	1.05E-001	Increased neonatal mortality	Barsotti et al. (1976) In Sample et al. (1996)
Aroclor 1254/1260	mink	1	4.13	1.40E-001	6.90E-001	9.82E-002	4.84E-001	Reduction in number of live kits born	Aulerich and Ringer (1977)
2,3,7,8-TCDD	rat	0.35	4.13	1.00E-006	1.00E-005	5.40E-007	5.40E-006	Decreased fertility and neonatal mortality	Murray et al. (1979) In Sample et al. (1996)
Pesticides									
Aldrin	rat	0.35	4.13	2.00E-001	1.00E+000	1.08E-001	5.40E-001	Increased offspring mortality	Treon and Cleveland (1985) In Sample et al. (1996)
DDT	rat	0.35	4.13	8.00E-001	4.00E+000	4.32E-001	2.16E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDD	rat	0.35	4.13	8.00E-001	4.00E+000	4.32E-001	2.16E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
DDE	rat	0.35	4.13	8.00E-001	4.00E+000	4.32E-001	2.16E+000	Reduced litter size	Fitzhugh (1948) In Sample et al. (1996)
Dieldrin	rat	0.35	4.13	2.00E-002	2.00E-001	1.08E-002	1.08E-001	Reduction in pregnancies in treated rats	Treon and Cleveland (1985) In Sample et al. (1996)
Endrin	mouse	0.03	4.13	9.20E-002	9.20E-001	2.69E-002	2.69E-001	Reduced parental survival and litter size	Good and Ware (1969) In Sample et al. (1996)
Endosulfan	rat	0.35	4.13	1.50E-001	-	8.09E-002	-	Maximum dose no reproductive effects	Dikshith et al. (1984) In Sample et al. (1996)
Methoxychlor	rat	0.35	4.13	4.00E+000	8.00E+000	2.16E+000	4.32E+000	Reduced litter size	Gray et al. (1988) In Sample et al. (1996)
BHC (mixed isomers)	mink	1	4.13	1.40E-002	1.40E-001	9.82E-003	9.82E-002	Increased kit mortality	Bleavins et al. (1984) In Sample et al. (1996)
Hepatchlor	mink	1	4.13	1.00E-001	1.00E+000	7.01E-002	7.01E-001	Increased kit mortality	Crum et al. (1993) In Sample et al. (1996)
Chlordane	mouse	0.03	4.13	4.60E+000	9.20E+000	1.34E+000	1.09E+001	Decreased viability in pups	WHO (1984) In Sample et al. (1996)
Toxaphene	mouse	0.03	4.13	8.00E+000	-	2.34E+000	-	No adverse effects over two generations	Kennedy et al. (1973) In Sample et al. (1996)
Metals									
Aluminum	mouse	0.03	4.13	1.93E+000	1.93E+001	2.30E+000	2.30E+001	Reduction growth rate in pups	Ondreicka et al. (1966) In Sample et al. (1996)
Antimony	mouse	1.03	4.13	1.25E-001	1.25E+000	8.83E-002	8.83E-001	Reduction in life span of treated adults	Schroeder et al. (1976) In Sample et al. (1996)
Barium	rat	0.35	4.13	5.10E+000	1.98E+001	2.75E+000	1.07E+001	Adult mortality	Perry et al. (1983) In Sample et al. (1996)
Cadmium	rat	0.35	4.13	1.00E+000	1.00E+001	5.40E-001	5.40E+000	Embryo toxicity	Sutuo et al. (1980) In Sample et al. (1996)
Chromium	rat	0.35	4.13	3.28E+000	1.31E+001	7.21E+000	2.89E+001	Reduced body wt., increased adult mortality	Mackenzie et al.(1958)/Steven et als.(1976)In sample et al. (1987)
Cobalt	ND	ND	4.13	NC	NC	NC	NC	NC	NC
Copper	mink	1.0	4.13	3.28E+000	1.31E+001	9.37E+000	3.75E+001	Increased kit mortality	Aluerich et al. (1996)
Cyanide	rat	0.35	4.13	6.87E+001	-	3.71E+001	-	Reduced growth rate in young individuals	Tewe and Maner (1981) In Sample et al. (1996)
Lead	rat	0.35	4.13	8.00E+000	8.00E+001	4.32E+000	4.32E+001	Reduced body wt., increased kidney damage	Azar et la. (1973) In Sample et al. (1996)
Mercury	mink	1.0	4.13	1.50E-002	2.50E-002	1.05E-002	1.75E-002	Mortality and weight loss	Wobeser et al. (1976) In Sample et al. (1996)
Nickel	rat	0.35	4.13	4.00E+001	8.00E+001	2.16E+001	4.32E+001	Reduced body weight in offspring	Ambrose et al. (1976) In Sample et al. (1996)
Selenium	rat	0.35	4.13	2.00E-001	3.30E-001	1.08E-001	1.78E-001	Reduced litter sizes	Rosenfield and Beath (1954) In Sample et al. (1996)
Silver	rat	0.35	4.13	2.60E-002	-	1.40E-002	-	Maximum dose no reproductive effects	ASTDR (1990)
Thallium	rat	0.35	4.13	7.40E-003	7.40E-002	3.99E-003	3.99E-002	Reduced fertility in male rats	Formigli et al. (1986) In Sample et al. (1996)
Vanadium	rat	0.35	4.13	2.10E-001	2.10E+000	1.13E-001	1.13E+000	Reduced fetal growth, increased mortality	Domingo et al. (1986) In Sample et al. (1996)
Zinc	rat	0.35	4.13	1.60E+002	3.20E+002	8.63E+001	1.73E+002	Reduced fetal growth, increased mortality	Schlicker and Cox (1968) In Sample et al. (1996)

All toxicological information derived from Sample et al. (1996).
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.

TABLE 7-17

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR AMERICAN ROBIN EXPOSED TO MEAN CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Mean Soil Concen. (mg/kg)	Invertebrate Uptake Factor (Unitless)	Predicted Invertebrate Concen. (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Invertebrate (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Invertebrate (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Volatile Organic Compounds (VOCs)															
Chloromethane	1.90E-002	1.00E+000	3.23E-003	0.083	0.014	0.0806	0.93	0.104	3.43E-004	3.09E-003	3.44E-003	NC	NC	-	-
Trichlorofluoromethane	8.00E-003	1.00E+000	1.36E-003	0.083	0.014	0.0806	0.93	0.104	1.45E-004	1.30E-003	1.45E-003	NC	NC	-	-
Vinyl chloride	6.40E-001	1.00E+000	1.09E-001	0.083	0.014	0.0806	0.93	0.104	1.16E-002	1.04E-001	1.16E-001	NC	NC	-	-
Total 1,2-Dichloroethylene	5.64E+001	1.00E+000	9.59E+000	0.083	0.014	0.0806	0.93	0.104	1.02E+000	9.18E+000	1.02E+001	NC	NC	-	-
Trichloroethylene	4.70E+001	1.00E+000	7.99E+000	0.083	0.014	0.0806	0.93	0.104	8.49E-001	7.65E+000	8.50E+000	NC	NC	-	-
Tetrachloroethylene	4.30E-001	1.00E+000	7.31E-002	0.083	0.014	0.0806	0.93	0.104	7.77E-003	7.00E-002	7.78E-002	NC	NC	-	-
Carbon disulfide	3.20E-002	1.00E+000	5.44E-003	0.083	0.014	0.0806	0.93	0.104	5.78E-004	5.21E-003	5.79E-003	NC	NC	-	-
Methylene chloride	1.70E+000	1.00E+000	2.89E-001	0.083	0.014	0.0806	0.93	0.104	3.07E-002	2.77E-001	3.07E-001	NC	NC	-	-
Ethylbenzene	1.50E-001	1.00E+000	2.55E-002	0.083	0.014	0.0806	0.93	0.104	2.71E-003	2.44E-002	2.71E-002	NC	NC	-	-
Toluene	7.50E+000	1.00E+000	1.28E+000	0.083	0.014	0.0806	0.93	0.104	1.35E-001	1.22E+000	1.36E+000	NC	NC	-	-
Xylene (total)	2.70E+000	1.00E+000	4.59E-001	0.083	0.014	0.0806	0.93	0.104	4.88E-002	4.40E-001	4.88E-001	NC	NC	-	-
Isopropylbenzene	9.00E-003	1.00E+000	1.53E-003	0.083	0.014	0.0806	0.93	0.104	1.63E-004	1.47E-003	1.63E-003	NC	NC	-	-
Semi-Volatile Organic Compounds (SVOCs)															
Benzaldehyde	9.50E-001	1.00E+000	1.62E-001	0.083	0.014	0.0806	0.93	0.104	1.72E-002	1.55E-001	1.72E-001	NC	NC	-	-
Acetophenone	3.40E-001	1.00E+000	5.78E-002	0.083	0.014	0.0806	0.93	0.104	6.14E-003	5.54E-002	6.15E-002	NC	NC	-	-
Naphthalene	1.30E+002	1.00E+000	2.21E+001	0.083	0.014	0.0806	0.93	0.104	2.35E+000	2.12E+001	2.35E+001	2.29E+002	2.29E+003	<1	-
2-Methylnaphthalene	4.60E+002	1.00E+000	7.82E+001	0.083	0.014	0.0806	0.93	0.104	8.31E+000	7.49E+001	8.32E+001	2.29E+002	2.29E+003	<1	-
Acenaphthylene	9.60E-001	3.00E-001	4.90E-002	0.083	0.014	0.0806	0.93	0.104	1.73E-002	4.69E-002	6.42E-002	2.29E+002	2.29E+003	<1	<1
Acenaphthene	2.80E+003	3.00E-001	1.43E+002	0.083	0.014	0.0806	0.93	0.104	5.06E+001	1.37E+002	1.87E+002	2.29E+002	2.29E+003	<1	<1
Dibenzofuran	1.70E+003	1.00E+000	2.89E+002	0.083	0.014	0.0806	0.93	0.104	3.07E+001	2.77E+002	3.07E+002	-	-	-	-
Fluorene	2.00E+003	3.00E-001	1.02E+002	0.083	0.014	0.0806	0.93	0.104	3.61E+001	9.77E+001	1.34E+002	2.29E+002	2.29E+003	0.6	<1
Phenanthrene	7.00E+003	3.00E-001	3.57E+002	0.083	0.014	0.0806	0.93	0.104	1.26E+002	3.42E+002	4.68E+002	2.29E+002	2.29E+003	2.0	<1
Anthracene	1.20E+003	3.00E-001	6.12E+001	0.083	0.014	0.0806	0.93	0.104	2.17E+001	5.86E+001	8.03E+001	2.29E+002	2.29E+003	0.4	<1
Carbazole	3.60E-001	1.00E+000	6.12E-002	0.083	0.014	0.0806	0.93	0.104	6.50E-003	5.86E-002	6.51E-002	-	-	-	-
Fluoranthene	2.68E+002	3.00E-001	1.37E+001	0.083	0.014	0.0806	0.93	0.104	4.84E+000	1.31E+001	1.79E+001	2.29E+002	2.29E+003	<1	<1
Pyrene	1.47E+002	3.00E-001	7.50E+000	0.083	0.014	0.0806	0.93	0.104	2.66E+000	7.18E+000	9.84E+000	2.29E+002	2.29E+003	<1	<1
Chrysene	8.30E+002	2.40E-001	3.39E+001	0.083	0.014	0.0806	0.93	0.104	1.50E+001	3.24E+001	4.74E+001	2.29E+002	2.29E+003	<1	<1
Benzo(b)fluoranthene	4.50E+002	4.20E-001	3.21E+001	0.083	0.014	0.0806	0.93	0.104	8.13E+000	3.08E+001	3.89E+001	2.29E+002	2.29E+003	<1	<1
Benzo(k)fluoranthene	4.50E+002	4.80E-001	3.67E+001	0.083	0.014	0.0806	0.93	0.104	8.13E+000	3.52E+001	4.33E+001	2.29E+002	2.29E+003	<1	<1
Benzo(a)pyrene	5.20E+002	3.00E-001	2.65E+001	0.083	0.014	0.0806	0.93	0.104	9.39E+000	2.54E+001	3.48E+001	2.29E+002	2.29E+003	<1	<1
Benzo(g,h,i)perylene	2.00E+002	3.00E-001	1.02E+001	0.083	0.014	0.0806	0.93	0.104	3.61E+000	9.77E+000	1.34E+001	2.29E+002	2.29E+003	<1	<1
Benzo(a)anthracene	9.20E+002	1.80E-001	2.82E+001	0.083	0.014	0.0806	0.93	0.104	1.66E+001	2.70E+001	4.36E+001	2.29E+002	2.29E+003	<1	<1
Dibenzo(a,h)anthracene	6.60E+001	4.20E-001	4.71E+000	0.083	0.014	0.0806	0.93	0.104	1.19E+000	4.51E+000	5.71E+000	2.29E+002	2.29E+003	<1	<1
Indeno(1,2,3-cd)pyrene	2.60E+002	4.80E-001	2.12E+001	0.083	0.014	0.0806	0.93	0.104	4.70E+000	2.03E+001	2.50E+001	2.29E+002	2.29E+003	<1	<1
Pesticides/PCBs/Dioxin															
alpha-BHC	6.50E-001	1.00E+000	1.11E-001	0.083	0.014	0.0806	0.93	0.104	1.17E-002	1.06E-001	1.18E-001	5.60E-001	2.25E+000	<1	<1
Aldrin	4.30E+001	1.00E+000	7.31E+000	0.083	0.014	0.0806	0.93	0.104	7.77E-001	7.00E+000	7.78E+000	3.00E-002	3.00E-001	259	26
Heptachlor epoxide	3.68E+001	1.40E+000	8.76E+000	0.083	0.014	0.0806	0.93	0.104	6.65E-001	8.39E+000	9.05E+000	3.00E-001	5.93E+001	30	<1
Heptachlor	6.50E-001	1.40E+000	1.55E-001	0.083	0.014	0.0806	0.93	0.104	1.17E-002	1.48E-001	1.60E-001	3.00E-001	5.93E+001	<1	<1
Dieldrin	1.31E+002	1.00E+000	2.23E+001	0.083	0.014	0.0806	0.93	0.104	2.37E+000	2.13E+001	2.37E+001	7.70E-002	NC	308	-
4,4'-DDE	1.60E+002	1.26E+000	3.43E+001	0.083	0.014	0.0806	0.93	0.104	2.89E+000	3.28E+001	3.57E+001	2.80E-003	2.80E-002	12754	1275
4,4'-DDD	2.10E+000	1.26E+000	4.50E-001	0.083	0.014	0.0806	0.93	0.104	3.79E-002	4.31E-001	4.69E-001	2.80E-003	2.80E-002	167	17
4,4'-DDT	1.93E+001	1.26E+000	4.13E+000	0.083	0.014	0.0806	0.93	0.104	3.49E-001	3.96E+000	4.31E+000	2.80E-003	2.80E-002	1539	154
Total DDT and metabolites	1.81E+002	1.26E+000	3.89E+001	0.083	0.014	0.0806	0.93	0.104	3.28E+000	3.72E+001	4.05E+001	2.80E-003	2.80E-002	14460	1446
Endrin aldehyde	1.76E+001	1.00E+000	2.99E+000	0.083	0.014	0.0806	0.93	0.104	3.18E-001	2.87E+000	3.18E+000	3.00E-001	NC	11	-
Endosulfan sulfate	1.18E+001	1.00E+000	2.01E+000	0.083	0.014	0.0806	0.93	0.104	2.13E-001	1.92E+000	2.13E+000	1.00E+001	NC	<1	-
Methoxychlor	2.00E+000	1.00E+000	3.40E-001	0.083	0.014	0.0806	0.93	0.104	3.61E-002	3.26E-001	3.62E-001	NC	NC	-	-
alpha-Chlordane	2.30E-001	1.00E+000	3.91E-002	0.083	0.014	0.0806	0.93	0.104	4.15E-003	3.74E-002	4.16E-002	2.10E+000	1.07E+001	<1	<1
gamma-Chlordane	3.40E+000	1.00E+000	5.78E-001	0.083	0.014	0.0806	0.93	0.104	6.14E-002	5.54E-001	6.15E-001	2.10E+000	1.07E+001	<1	<1
Toxaphene	2.00E-001	1.00E+000	3.40E-002	0.083	0.014	0.0806	0.93	0.104	3.81E-003	3.26E-002	3.62E-002	NC	NC	-	-
Aroclor 1248	1.28E+003	8.80E+000	1.47E+003	0.083	0.014	0.0806	0.93	0.104	2.30E+001	1.41E+003	1.43E+003	1.80E-001	1.80E+000	7970	797
Aroclor 1254	1.84E+003	8.80E+000	2.13E+003	0.083	0.014	0.0806	0.93	0.104	3.33E+001	2.04E+003	2.07E+003	1.80E-001	1.80E+000	11527	1153
Aroclor 1260	9.90E-002	8.80E+000	1.14E-001	0.083	0.014	0.0806	0.93	0.104	1.79E-003	1.10E-001	1.11E-001	1.80E-001	1.80E+000	<1	<1
Total PCBs	3.12E+003	8.80E+000	3.81E+003	0.083	0.014	0.0806	0.93	0.104	5.63E+001	3.45E+003	3.51E+003	1.80E-001	1.80E+000	19497	1950
PCB Congener TCDD Equivalent	8.20E-002	9.50E+000	1.32E-001	0.083	0.014	0.0806	0.93	0.104	1.48E-003	1.27E-001	1.28E-001	1.40E-005	1.40E-004	9165	916
Total TCDD and Equivalent	6.60E-003	9.50E+000	1.07E-002	0.083	0.014	0.0806	0.93	0.104	1.19E-004	1.02E-002	1.03E-002	1.40E-005	1.40E-004	738	74
Metals															
Aluminum	2.33E+004	1.18E-001	4.88E+002	0.083	0.014	0.0806	0.93	0.104	4.22E+002	4.48E+002	8.70E+002	1.10E+002	NC	8	-
Antimony	2.15E+001	1.0E+000	3.66E+000	0.083	0.014	0.0806	0.93	0.104	3.88E-001	3.50E+000	3.89E+000	4.70E+000	NC	<1	-
Barium	5.89E+002	1.60E-001	1.60E+001	0.083	0.014	0.0806	0.93	0.104	1.06E+001	1.53E+001	2.60E+001	2.08E+001	4.17E+001	1.2	<1
Cadmium	2.09E+001	8.82E+000	3.13E+001	0.083	0.014	0.0806	0.93	0.104	3.78E-001	3.00E+001	3.04E+001	1.45E+000	2.00E+001	21	2
Chromium	3.24E+001	3.18E+000	1.74E+001	0.083	0.014	0.0806	0.93	0.104	5.85E-001	1.67E+001	1.73E+001	1.00E+000	5.00E+000	17	3
Copper	1.05E+003	8.10E-002	1.45E+001	0.083	0.014	0.0806	0.93	0.104	1.90E+001	1.38E+001	3.28E+001	4.70E+001	8.17E+001	<1	<1
Cyanide	7.60E+000	1.0E+000	1.29E+000	0.083	0.014	0.0806	0.93	0.104	1.37E-001	1.24E+000	1.37E+000	8.50E+000	NC	<1	-
Iron	1.08E+005	7.80E-002	1.43E+003	0.083	0.014	0.0806	0.93	0.104	1.95E+003	1.37E+003	3.32E+003	NC	NC	-	-
Lead	7.01E+002	1.52E+000	1.81E+002	0.083	0.014	0.0806	0.93	0.104	1.27E+001	1.74E+002	1.86E+002	3.85E+000	NC	48	-
Mercury	4.50E-001	4.45E+000	3.40E-001	0.083	0.014	0.0806	0.93	0.104	8.13E-003	3.26E-001	3.34E-001	4.50E-001	9.00E-001	<1	<1
Nickel	3.85E+001	4.73E+000	3.10E+001	0.083	0.014	0.0806	0.93	0.104	6.95E-001	2.96E+001	3.03E+001	7.74E+001	1.07E+002	<1	<1
Selenium	2.20E+000	8.10E-001	3.03E-001	0.083	0.014	0.0806	0.93	0.104	3.97E-002	2.90E-001	3.30E-001	4.00E-001	8.00E-001	<1	<1
Silver	2.68E+001	1.54E+001	7.02E+001	0.083	0.014	0.0806	0.93	0.104	4.84E-001	6.72E+001	6.77E+001	1.65E+000	1.65E+001	41	4
Thallium	7.60E+000	1.00E+000	1.29E+000	0.083	0.014	0.0806	0.93	0.104	1.37E-001	1.24E+000	1.37E+000	1.62E+002	NC	<1	-
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.083	0.014	0.0806	0.93	0.104	2.33E+000	1.85E+000	4.18E+000	1.14E+001	NC	<1	-
Zinc	1.01E+003	4.60E-001	7.88E+001	0.083	0.014	0.0806	0.93	0.104	1.82E+001	7.55E+001	9.37E+001	1.45E+001	1.31E+002	6	<1

* Assumes an average percent moisture content of 83%.
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.
COPECs HQs >1 bolded

300402

TABLE 7-18

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE

CALCULATED HAZARD QUOTIENTS FOR THE RED-TAILED HAWK EXPOSED TO MEAN CONCENTRATIONS OF COPECs IN SURFACE SOILS

Contaminants	Mean Soil Concen. (mg/kg)	Small Mammal Uptake Factor (Unitless)	Predicted or Observed Sm. Mammal Concen.* (mg/kg w.w.)	Ingestion Rate Wet Wt. (Kg/day)	Ingestion Rate Dry Wt. (Kg/day)	Body Weight (Kg)	Percent Comp. Sm. Mammal (unitless)	Percent Comp. Soil (unitless)	Dietary Dosage Soil (mg/Kg/day)	Dietary Dosage Sm. Mammal (mg/Kg/day)	Total Daily Dietary Dosage (mg/Kg/day)	Toxicity Reference Value NOAEL Dosage (mg/Kg/day)	Toxicity Reference Value LOAEL Dosage (mg/Kg/day)	NOAEL HQ	LOAEL HQ
Pesticides/PCBs/Dioxin															
Aldrin	4.30E+001	-	2.50E-003	0.34	0.11	1.224	0.74	0.028	1.08E-001	5.14E-004	1.09E-001	3.00E-002	3.00E-001	4	<1
Heptachlor epoxide	3.68E+001	-	2.50E-003	0.34	0.11	1.224	0.74	0.028	9.26E-002	5.14E-004	9.31E-002	3.00E-001	5.93E+001	<1	<1
Dieldrin1	1.31E+002	-	6.00E-002	0.34	0.11	1.224	0.74	0.028	3.30E-001	1.23E-002	3.42E-001	7.70E-002	NC	4	-
4,4'-DDE1	1.60E+002	-	1.00E-002	0.34	0.11	1.224	0.74	0.028	4.03E-001	2.06E-003	4.05E-001	2.80E-003	2.80E-002	145	14
4,4'-DDD	2.10E+000	-	5.00E-003	0.34	0.11	1.224	0.74	0.028	5.28E-003	1.03E-003	6.31E-003	2.80E-003	2.80E-002	2	<1
4,4'-DDT	1.93E+001	-	5.00E-003	0.34	0.11	1.224	0.74	0.028	4.86E-002	1.03E-003	4.96E-002	2.80E-003	2.80E-002	18	2
Total DDT and metabolites	1.81E+002	-	2.00E-002	0.34	0.11	1.224	0.74	0.028	4.56E-001	4.11E-003	4.61E-001	2.80E-003	2.80E-002	164	16
Endrin aldehyde	1.76E+001	-	5.00E-003	0.34	0.11	1.224	0.74	0.028	4.43E-002	1.03E-003	4.53E-002	3.00E-001	NC	<1	-
Aroclor 1248	1.28E+003	-	5.00E-002	0.34	0.11	1.224	0.74	0.028	3.21E+000	1.03E-002	3.22E+000	1.80E-001	1.80E+000	18	2
Aroclor 1254 1	1.84E+003	-	3.30E+000	0.34	0.11	1.224	0.74	0.028	4.64E+000	6.78E-001	5.32E+000	1.80E-001	1.80E+000	30	3
Total PCBs	3.12E+003	-	3.35E+000	0.34	0.11	1.224	0.74	0.028	7.85E+000	6.89E-001	8.54E+000	1.80E-001	1.80E+000	47	5
PCB Congener TCDD Equivalent	8.20E-002	2.20E+000	3.07E-002	0.34	0.11	1.224	0.74	0.028	2.06E-004	6.30E-003	6.51E-003	1.40E-005	1.40E-004	465	46.5
Total TCDD and Equivalent	6.60E-003	2.20E+000	2.47E-003	0.34	0.11	1.224	0.74	0.028	1.66E-005	5.07E-004	5.24E-004	1.40E-005	1.40E-004	37	4
Metals															
Aluminum	2.33E+004	1.00E+000	3.97E+003	0.34	0.11	1.224	0.74	0.028	5.87E+001	8.16E+002	8.74E+002	1.10E+002	NC	8	-
Antimony	2.15E+001	1.00E+000	3.66E+000	0.34	0.11	1.224	0.74	0.028	5.41E-002	7.51E-001	8.05E-001	8.40E+002	NC	<1	-
Barium	5.89E+002	6.90E-002	6.91E+000	0.34	0.11	1.224	0.74	0.028	1.48E+000	1.42E+000	2.90E+000	2.08E+001	4.17E+001	<1	<1
Cadmium	2.09E+001	1.71E+000	6.06E+000	0.34	0.11	1.224	0.74	0.028	5.26E-002	1.25E+000	1.30E+000	1.45E+000	2.00E+001	<1	<1
Copper	1.05E+003	8.67E-001	1.55E+002	0.34	0.11	1.224	0.74	0.028	2.64E+000	3.18E+001	3.45E+001	4.70E+001	6.17E+001	<1	<1
Lead	7.01E+002	9.95E-001	1.19E+002	0.34	0.11	1.224	0.74	0.028	1.76E+000	2.44E+001	2.61E+001	3.85E+000	NC	7	-
Selenium	2.20E+000	8.00E-001	2.99E-001	0.34	0.11	1.224	0.74	0.028	5.54E-003	6.15E-002	6.70E-002	4.00E-001	8.00E-001	<1	<1
Silver	2.68E+001	1.00E+000	4.56E+000	0.34	0.11	1.224	0.74	0.028	6.74E-002	9.37E-001	1.00E+000	NC	NC	-	-
Thallium	7.60E+000	1.00E+000	1.29E+000	0.34	0.11	1.224	0.74	0.028	1.91E-002	2.66E-001	2.85E-001	3.46E+000	NC	<1	-
Vanadium	1.29E+002	8.80E-002	1.93E+000	0.34	0.11	1.224	0.74	0.028	3.25E-001	3.97E-001	7.21E-001	1.14E+001	NC	<1	-
Zinc	1.01E+003	5.85E+000	1.00E+003	0.34	0.11	1.224	0.74	0.028	2.54E+000	2.06E+002	2.09E+002	1.45E+001	1.31E+002	14	2

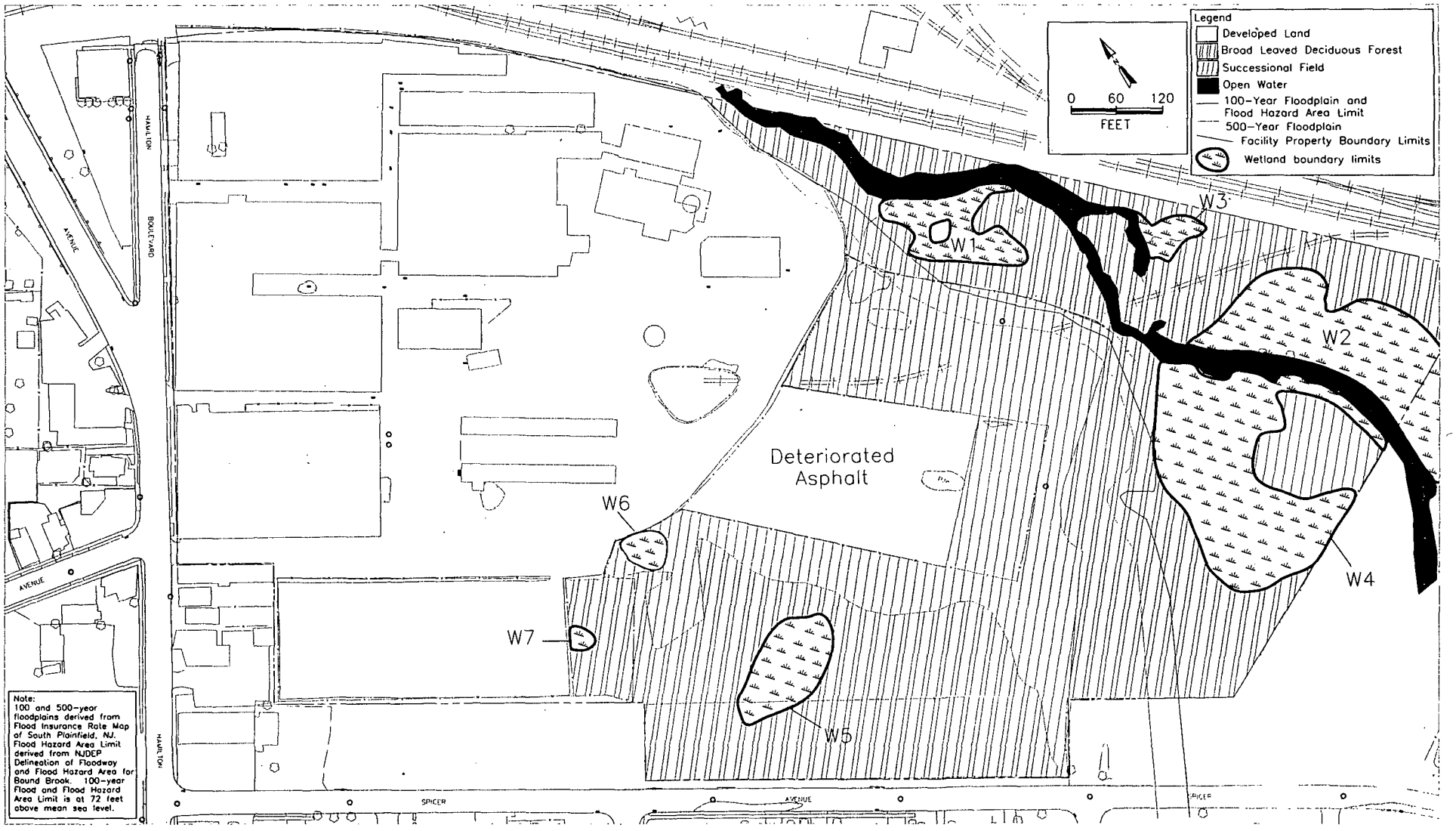
NC = No TRV available for contaminant.
- = No LOAEL available or not applicable.
*Concentration based upon measured body burden reported in EPA (1999).
COPECs HQ >1 bolded

300403

SECTION 7

FIGURES

300405

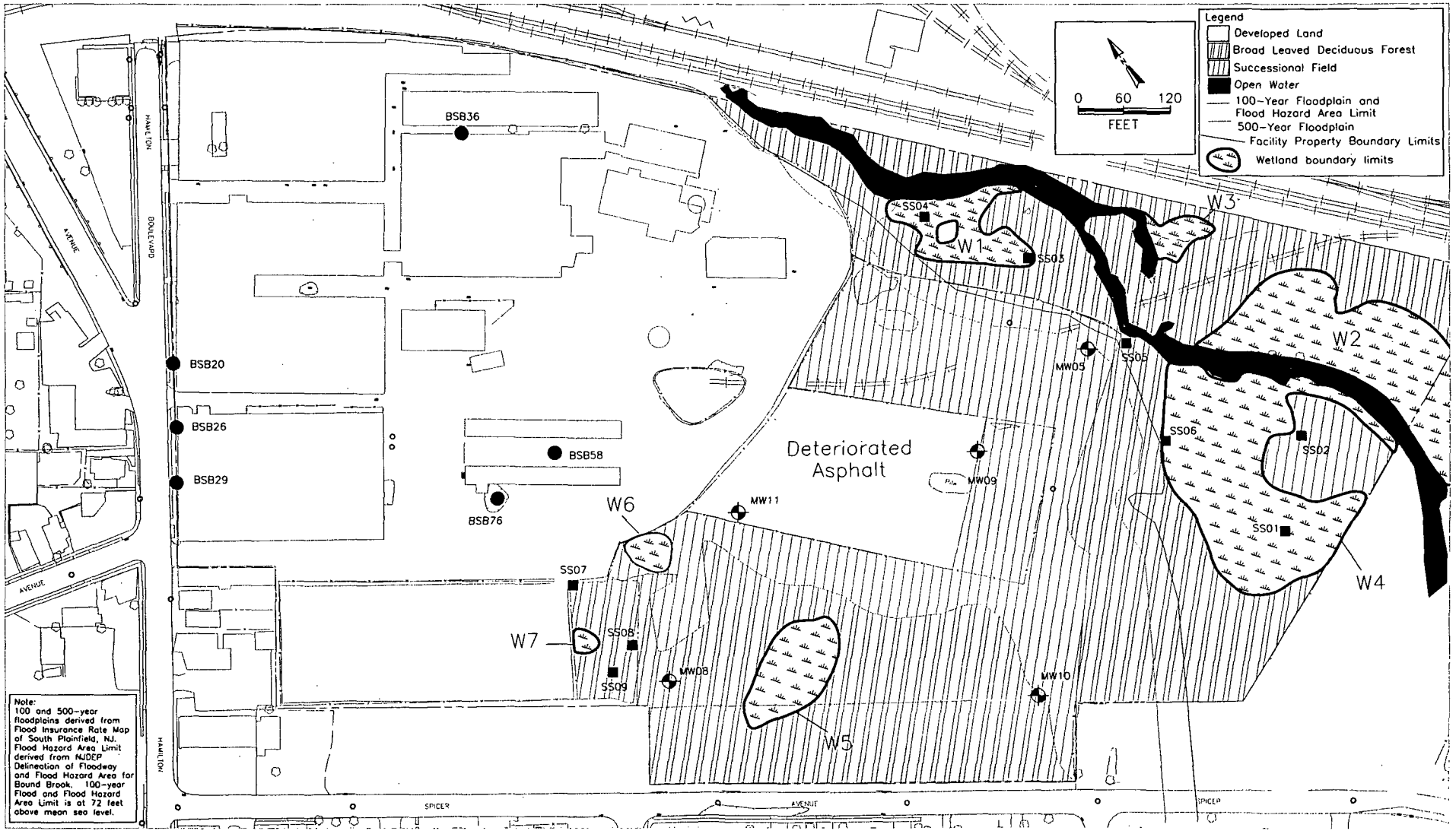


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Vegetation Cover Types and Habitats Observed on the Undeveloped Portion
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/08/01	PROJECT NO.: 1945.1018	
CHKD: GD	REV.: 0	FIGURE NO.: 7-1	
DES.: JS/LBR	APPD: LH		

300406

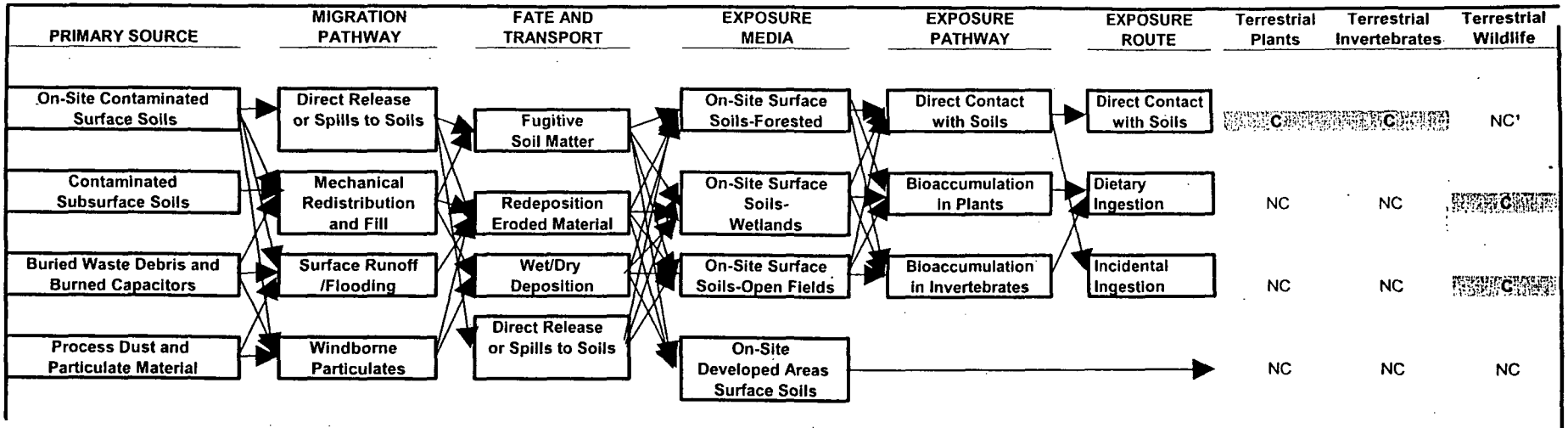


FOSTER WHEELER ENVIRONMENTAL CORPORATION

TITLE:
Surface Soil Sample Locations within Habitat Areas
Cornell-Dubilier Electronics Superfund Site
Facility Soils and Buildings RI Report

DWN.: CTS	DATE: 05/09/01	PROJECT NO.: 1945.1018	
CHKD: GD	REV.: 0	FIGURE NO.: 7-2	
DES.: JS/LBR	APPD: LH		

FIGURE 7-3



Notes:
'Direct contact pathway evaluated in incidental ingestion pathway.
Inhalation pathway was deemed insignificant relative to dietary exposure.
C = Pathway/Exposure Route Complete for receptors.
NC = Pathway/Exposure Route Not Complete for receptors.

300407

SECTION 8.0

8.0 SUMMARY AND CONCLUSIONS

8.1 Summary

Remedial investigative activities were performed for the facility soils and buildings (OU-2) of the Cornell-Dubilier Electronics site. Building floor dust, shallow and subsurface soil, perched water, drainage system sediment, and drainage system standing water samples were collected and analyzed during the investigation. The following subsections restate the major conclusions presented in Sections 3.0 through 7.0 of this Remedial Investigation Report.

8.1.1 Physical Characteristics

The developed portion of the property (i.e., the northwestern area) comprises approximately 45 percent of the land area, and contains the facility buildings, a system of catch basins to channel stormwater flow, and paved roadways. Based on dye testing results, several of the catch basins drain into outfalls along Bound Brook. The other 55 percent of the property is predominately vegetated (i.e., undeveloped). The central part is primarily an open field, with some wooded areas to the northeast and south and a deteriorated, partially paved area in the middle. The northeast and southeast boundaries consist primarily of wetland areas associated with Bound Brook, which flows from the eastern corner across the northeastern border of the undeveloped portion of the facility property.

The Cornell-Dubilier Electronics site lies within the Piedmont Physiographic Province and is underlain by the late Triassic to early Jurassic Age Brunswick Formation of the Newark Group. At the property, the Brunswick Formation bedrock consists of red-brown to purplish-red mudstone and siltstone with localized beds of fine-grained sandstone. The unit contains heavily fractured zones, generally occurring along bedding planes. The top of the consolidated bedrock ranges from 4 to 15 feet bgs, except in the far northwest corner of the facility property where bedrock was encountered immediately underlying the building slabs.

The overburden on the property consists of an unconsolidated unit and a weathered bedrock unit. The unconsolidated unit ranges in thickness from 0 to 15 feet, and is thin or absent (beneath building slabs) in the northwest and southwest portions of the facility and thickens toward Bound Brook. Depending on location, the unconsolidated unit consisted of red-brown silt and sand, silt and clay, silt and fine sand, gravel, and/or fill material. A weathered siltstone unit, approximately 1 to 8 feet thick above the bedrock surface, extends beneath most of the property. This weathered zone is thinnest along the southwestern boundary and thickest in the northern area of the facility. Consisting mainly of red-brown silt to fine sand, with sub-rounded to angular, fine to coarse siltstone gravel and silty clay, this unit interfingers with the urban fill material at a number of locations on the property.

The Brunswick Formation bedrock aquifer is a gently dipping, multi-unit leaky aquifer system that consists of thin water-bearing units separated by thick intervening confining beds. Two types of water-bearing units have been described in this formation: major fractures parallel to the bedding and thin, intensely fractured (both parallel and perpendicular to the bedding) geologic strata. A more detailed discussion of bedrock hydrogeology will be presented in the Remedial Investigation Report for OU-3 (groundwater and Bound Brook Corridor).

The saturated conditions and the high percentage of silt and clay present in the soils suggest that a seasonally-influenced, discontinuous perched water table exists in the unconsolidated material across parts of the property. Although not a significant hydrogeologic unit, the perched water table may recharge the underlying bedrock aquifer.

Seven wetlands (four PEM, two PEM/PSS, and one PF01) were delineated on the property during the OU-2 RI. Wetland acreage ranged from 0.02 acres to 1.03 acres. Four of the wetlands are located adjacent to Bound Brook, and three are in the southwestern portion of the property. The remainder of the facility consists of successional fields, broad-leaved deciduous forests, and developed land.

Forty bird, 11 mammal, and 6 reptile and amphibian species were observed (directly and/or indirectly) within the property, the Bound Brook Corridor, and New Market Pond. Crayfish, Asian clams, sunfish, carp, catfish, and largemouth bass are present in and along Bound Brook.

Most of the facility property, including the portion containing the buildings and structures, lies outside of the flood hazard area, and the 100- and 500-year floodplains. The southeastern portion, however, is located within the flood hazard area, and the 100- and 500-year floodplains of Bound Brook.

8.1.2 Nature and Extent of Contamination

An evaluation of historical information and the results of the geophysical survey, soil gas survey, and test pit excavations was performed to determine potential contaminant source areas. Historical conditions in the central portion of the facility property may have included lack of vegetation, disturbance of the land surface, and/or discolored (saturated or stained) soils according to Foster Wheeler Environmental's review of aerial photographs. A geophysical survey of the central portion of the property indicated the presence of buried material, especially in the area between the northeastern portion of the former truck driving school and the embankment leading to Bound Brook (i.e., an area of anomalies). During excavation of test pits within this anomalous area, capacitors, white and blue crystalline powder, electrical components, and other materials were unearthed. The soil gas survey showed elevated chlorinated VOC concentrations (e.g., concentrations of TCE as high as 14,000 ug/L) in the northeastern and southwestern corners of the central portion of the property. Additional source areas of chlorinated VOCs, as determined by the soil gas survey, were identified southwest of Building No. 12 and northeast of Building No. 11. Potential source areas for non-chlorinated VOCs were more scattered around the facility property than the identified chlorinated VOC source areas, and included the former fuel tank area in the vicinity of Building No. 11.

A total of 32 floor dust samples were collected from the facility buildings. The more elevated PCB concentrations (i.e., greater than 500 mg/kg) were present in Building Nos. 1, 1B, 5, and 6. Metals were detected in all of the 32 floor dust samples with the exception of selenium (22) and thallium (14). Buildings Nos. 1, 2A, 5, 9, 9C, 14, and 15 typically contained more elevated concentrations of metals than the concentrations found in the other buildings.

PCBs are the most prevalent contaminants found on the property, and are a direct result of former Cornell-Dubilier Electronic facility activities. Shallow and subsurface soil sample analytical results indicated the presence of PCB compounds in almost all of the samples collected (92 percent). Four individual Aroclor constitutents (-1242, -1248, -1254, and -1260) and Total PCBs exceeded screening criteria by factors up to approximately 265,000. Isoconcentration contouring indicated that a majority of the facility property (approximately 74 percent) would contain Total PCB concentrations greater than screening criteria. The highest levels of these compounds, regardless of the depth interval, occurred in the central undeveloped portion of the facility where test pit excavations unearthed capacitors that appeared corroded and/or partially burned. In addition, shallow soils in parts of the southern developed, northeastern undeveloped and floodplain undeveloped portions contained elevated concentrations greater than 10,000 times screening criteria. Although PCBs typically exhibit limited mobility in soils, elevated concentrations were noted in the deeper overburden soils (e.g., the 12 to 14-foot bgs sample collected at the top of fractured bedrock in MW11 contained Total PCBs at greater than 600 times screening criteria). The enhanced downward migration of PCBs is likely due to co-solvent effects of TCE and its dechlorination products.

Although analyzed in only a few shallow and/or subsurface soil samples, PCB congeners and dioxins/furans were detected during the OU-2 RI soils investigation. 2,3,7,8-TCDD (the only one of these constituents with a screening criterion, 3.15 pg/g) was detected at exceedance concentrations in shallow soil locations SS03 and MW09 by factors of 3.2 and 18, respectively.

Although a majority (73 percent) of the VOCs detected in the soils occurred at concentrations less than their respective screening criteria, nine compounds (cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; PCE; TCE; vinyl chloride; methylene chloride; 1,2,4-trichlorobenzene; and 1,2-dichloropropane) exceeded screening criteria values, by factors up to approximately 783. A majority (about 75 percent) of the exceedances (especially those with the higher concentrations) were present in the southern developed and central undeveloped portions, and to a lesser degree, in the floodplain undeveloped portion of the property.

Elevated concentrations for SVOCs (mainly PAHs) were noted only in certain distinct locations: (1) the MW06/BSB55 "hot spot" in the southern developed portion which may be related to the former fuel oil tank areas; (2) near TP01, TP02 and TP06 and the debris found in these test pits may account for the more elevated concentrations (i.e., up to 1,554,900 ug/kg Total PAHs); and (3) the sample collected from SS09 which had the appearance of semi-dried tar and a discernible petroleum-based odor.

Pesticide compounds were present at relatively high concentrations (i.e., up to 12,500 times the respective screening criteria values). The more elevated concentrations typically appeared near: (1) the boundary of the northeastern and the floodplain undeveloped portions of the property; (2) the eastern and western corners of the central undeveloped portion of the property; (3) the southern corner of the southern developed portion of the property (shallow soils only); and (4) the northern corner of the northern developed portion of the property.

Elevated concentrations of metals were detected across the facility property. The industrial operations may have contributed to the property-wide distribution of the levels detected, especially

in the shallow soils. Subsurface soil concentrations of metals appear to mirror the distribution trend for PCBs (i.e., in the central undeveloped portion of the property).

PCBs and PCB congeners were detected in the perched water encountered during drilling in the overburden soil/weathered bedrock at elevated concentrations (i.e., over 14,000 times the screening criteria for Total PCBs of 0.5 ug/L in MW11). The perched water also had high levels (i.e., up to 15,000 times screening criteria values) of chlorinated VOCs (e.g., TCE). Although present in the southern developed, northeastern undeveloped, and central undeveloped portions of the property, the most elevated VOC concentrations were typically present at locations MW11 (e.g., 15,000 ug/L TCE) and MW12 (e.g., 12,000 g/L TCE) present near the center of the facility. These locations also contained elevated levels of PCBs and VOCs in the soils. The presence of TCE and its dechlorination products may enhance the dissolution/migration of PCBs and other less soluble-in-water organic compounds in soil and groundwater via co-solvency. SVOCs, pesticides and metals were also detected in the perched water samples at concentrations up to 5,800 times, 825 times, and 1,190 times their respective screening criteria, respectively.

Dye testing indicated that the facility drainage system is connected to outfalls to Bound Brook. PCB compounds were detected at exceedance concentrations in all catch basin sediment and standing water samples. Total PCBs summed to maxima of 210 mg/kg in the sediments (DS07) and 13.7 ug/L in the water (DS01). The elevated levels of PCBs are likely due to deposition (historical and/or present) of contaminated soil particles into the drainage system during storm events.

Drainage system sediment samples contained VOCs at relatively low concentrations (i.e., less than 70 ug/kg), and none of the VOCs present exceeded their respective screening criteria. The standing water samples collected from DS01, DS02, DS03, DS04A, and DS06A had concentrations of four constituents (methylene chloride, TCE, PCE, and vinyl chloride) which were above screening criteria values.

SVOCs were detected in the sediment samples collected from the catch basins. Location DS05 had a visible sheen on the water surface and a petroleum odor after disturbance of the sediment layer. Only bis(2-ethylhexyl)phthalate was identified in the drainage system water samples, and it was present at DS01 at a concentration of 10 ug/L which is greater than its screening criteria value (1.76 ug/L).

Screening criteria were exceeded for pesticides (up to 3,750 times the screening criteria) and metals (up to 3,725 times the screening criteria) in the catch basin sediments and standing water. As these constituents were also present in the facility shallow soils at exceedance concentrations, entrainment of contaminated soil particulates during storm events, and subsequent deposition in the drainage system, are likely sources of the pesticides and metals.

Although no significant accumulation of NAPL was noted during the OU-2 RI investigation, the levels of PCB concentrations detected in the subsurface soils indicate the potential for NAPL. The eastern part (and to a lesser extent the western part) of the central undeveloped portion of the facility may contain NAPL. Perched water concentrations of PCBs and TCE also indicate possible NAPL in the vicinity of MW11 and MW12. Staining, odors, sheens and an "oily water seep" were observed during the field investigation.

8.1.3 Contaminant Fate and Transport

Prior investigative results indicate that the airborne entrainment of contaminated soil particulates has been a significant environmental transport mechanism at the Cornell-Dubilier Electronics site that has resulted in site-related contaminants (primarily PCBs) spreading to facility building interiors (dust) and several residential, commercial and municipal properties in the vicinity of the former facility (soils and/or in-house dust). While this transport mechanism has been considerably reduced from that in the past due to (1) the paving of facility roadways, (2) the presence of vegetation on a majority of the undeveloped portion of the property, and (3) the reduction in vehicular traffic (e.g., the cessation of the truck training facility operations in the central undeveloped portion of the property) that had existed at the industrial park, airborne entrainment can and may still occur on a much more reduced scale in a few limited on-property areas (i.e., exposed surficial soil areas).

Due to the poor condition of the floors, dust can be generated from the degradation of the concrete slabs/floor within the buildings. Contaminants present in the surficial layer of the building floors can become incorporated in the resulting dust generated within the buildings. Additionally, there is a potential for this contaminated dust to be tracked outside of the buildings by the operations/employees at the industrial park.

The emission of volatile organic compounds from exposed surficial and subsurface soils and near surface, perched groundwater is expected in the undeveloped portion of the property, since high concentrations of volatile contaminants are present in: (1) the vadose zone soils and near surface, perched groundwater; and (2) soil gas in the vadose zone interstitial voids. The pavement and/or concrete slabs on the developed portion of the facility would restrict volatile emissions from subsurface source materials. The vegetative cover (particularly grass mats) would also inhibit volatile emissions. In addition, volatile compounds may be emitted from surface runoff and transitory ponded stormwater. Therefore, volatile emissions, with their concomitant migration via the prevailing wind, would be a viable (although minor) transport mechanism for most of the undeveloped portion of the property.

Prior to the implementation of the site stabilization order in 1997, migration of contaminants by vehicle traffic was an important environmental fate and transport mechanism at the facility. Elevated concentrations of constituents of concern were present in the shallow soils collected from the roadway areas, and it is likely that surficial soil particles to which these constituents were adsorbed adhered to vehicles transversing the property. Subsequent travel around the property and off-site may have redeposited the contaminated soil particulates. The paving of the roadways in 1997 significantly reduced this transport mechanism.

Transitory ponding of stormwater occurs at several on-property locations in puddles, ruts, and low lying areas and wetlands during extremely wet periods or intense rainstorms. Contaminants may become solubilized in these locations from underlying contaminated soils and spread laterally to uncontaminated soils by adsorption or by residuals remaining when the ponded water recedes and/or percolates into the soil. Stormwater ponding areas where this type of contaminant migration is likely to occur are the three wetland areas adjacent to the paved area near the southwestern property line and numerous wetland/non-wetland areas throughout the Bound Brook floodplain along the southern and eastern portions of the property. Among the contaminants near or within these areas, primarily

acetophenone, cyanide and metals would be expected to be dispersed within the ponded water to adjacent soils. The dispersion of PCBs, PAHs and pesticides may also be augmented at these locations due to the co-solvent effects of dissolved organic constituents. As a result of this migration (although infrequent and only for short durations over relatively small areas within the property boundaries), contaminants (primarily metals) are being redistributed to adjacent soils.

During storm events, contaminants may become solubilized in the surface runoff from underlying contaminated soil. This runoff would then be transported via a man-made surface water drainage ditch (designed and constructed as part of the site stabilization order issued to the property owner in 1997) and several other natural drainage ditches/preferential stormwater routes (undeveloped portion of the property) and numerous catch basins of the storm sewer system (developed portion of the property) that discharge via outfall pipes to an unnamed tributary of Bound Brook or to Bound Brook directly. During transport, some infiltration of contaminated rainwater to the underlying soils/sediments would occur, and contaminated soil particles entrained within the rainwater may also be transported from the property and deposited to the storm sewer, and the unnamed tributary or Bound Brook. The sediments within these conduits serve as the primary sinks for site-related contaminants migrating from the property, particularly within the drainage system, unnamed tributary, and Bound Brook. Thus, the migration of contaminants dissolved within or adsorbed onto entrained soil particles within surface runoff (particularly during heavy rainfall events) was and still remains a significant transport mechanism for contaminants to migrate off-site. Migration from the drainage system to the soil surrounding the storm sewer pipes (i.e., leaks) may also be occurring (or may have already occurred), as the integrity of the drainage system piping is unknown.

The migration of contaminants to underlying groundwater by the percolation of rainwater through contaminated soils and/or the former dump/fill area is a major environmental fate and transport mechanism at the facility. The OU-2 RI data indicate that numerous organic contaminants have migrated to a greater extent in subsurface soil (to fractured bedrock) than expected based solely on physicochemical characteristics. This enhanced migration for some of the organic contaminants is speculated to be due to co-solvent effects exerted by the more mobile volatile organic contaminants, primarily TCE and 1,2-DCE. The previous (1999) and preliminary current (2000) bedrock groundwater data indicate that migration of volatile organic compounds and PCBs through soil via percolating rainwater into groundwater was occurring. Data obtained during the performance of the OU-2 RI indicate that perched groundwater areas exist beneath the facility property that are contaminated with VOCs, PCBs, metals, and to a more limited extent, pesticides, acetophenone, cyanide and PAHs. These contaminants have migrated from the overlying soil via percolating rainwater to the perched zone. The weathered bedrock layer, where present on the property, limits downward migration.

Upon entering groundwater, contaminants are expected to migrate with the local groundwater flow until dilution and removal mechanisms such as adsorption, hydrolytic degradation (endosulfan), precipitation, and limited volatilization result in a reduction of their concentrations to below detectable levels. Preliminary data collected during the installation of the monitoring wells during this OU-2 investigation indicated that groundwater in the upper fractured bedrock aquifer generally flows to the northwest. Vertically, the available data has shown that site-related contaminants (VOCs and PCBs) have migrated to and within groundwater present in the upper fractured bedrock.

Based solely upon physicochemical characteristics, VOCs, acetophenone, cyanide, and dissolved metals would be expected to migrate the farthest in groundwater, until eventually being diluted to below detection limit values. PCBs, dioxin/furans, PAHs, phthalate esters, pesticides, and metals associated with fine particulates are expected to migrate with the groundwater flow for only a limited distance. However, co-solvent effects exerted by more mobile organic contaminants present in the groundwater may enhance the migration of PCBs, dioxin/furans, PAHs, phthalate esters, and pesticides.

Migration of contaminants to and within surface water and sediments was verified by the historical data (1999) for Bound Brook and its associated downstream receiving waterbodies (i.e., New Market Pond). The historical data indicated that PCBs, pesticides, VOCs, PAHs, and metals are present in the sediments and/or floodplain soil. PCBs, VOCs, and metals were detected in the surface water samples. Based on physicochemical characteristics, this transport mechanism also would likely be important for dioxins/furans; however, no surface water or sediment data exist for these compounds.

The migration of contaminants into biota, especially edible fish species within Bound Brook and its tributaries, New Market Pond and Spring Lake, is of concern. Currently, NJDEP has issued (August 1998) an extensive fish consumption advisory for these waters due to measured PCB levels in edible fish species. Based on bioconcentration factors and organism depuration rates, this transport mechanism is important for PCBs, dioxins/furans, pesticides, mercury and silver, and, to a lesser extent, zinc and barium.

8.1.4 Human Health Risk Assessment

The approach taken in preparing the BHHRA used EPA-approved exposure models coupled with conservative assumptions about exposure conditions, to generate RME and CT estimates of the baseline (no further remedial action assumed) health risks associated with chemicals present in facility soils and indoor building dust. For the purpose of the BHHRA, the facility property was divided into two areas, denoted Area A (generally the western part of the property) and Area B (generally the eastern part of the property), reflecting the historical property usage relative to managing the analytical data. The data was subsequently subdivided by type: surface soil, all soil (surface soil combined with subsurface soil samples) and building dust samples, resulting in a total of five data sets.

COPCs were selected by data type on the basis of a multi-step screening process. The media concentration used in the screening process was the maximum detected concentration. The list of COPCs ranged from 17 in building dust to 59 in Area B All Soil and included VOCs, SVOCs, pesticides, PCBs, and metals.

RME scenarios were evaluated using the 95th percentile UCL of the mean chemical concentrations, in the exposure medium, or the maximum detected concentration if the UCL value exceeded the maximum concentration, combined with conservative but realistic exposure parameters. CT exposure scenarios were evaluated using the 95th percentile chemical concentrations in the exposure medium, combined with 50th percentile exposure parameters from EPA guidance. The statistical analysis identified a number of data points that were considered statistical outliers within the data

sets. Therefore, for those data sets, a chemical-specific EPC was calculated including the outliers and another EPC was calculated excluding the outliers for use in the risk characterization.

Conservative exposure pathways chosen for quantitative analysis consisted of ingestion and dermal contact with soil and dust, and inhalation of chemicals (particulates and volatile chemicals) in soil by the following populations:

- Current and Future Trespassers;
- Current and Future Site Workers (indoor and outdoor); and
- Future Construction Workers

Results of the BHHRA are summarized as follows:

- Constituents that were deemed "significant contributors" during the risk assessment of the various soils or indoor dust included:

1,1-DCE	benzo(a)pyrene	heptachlor
2,3,7,8-TCDD	benzo(b)fluoranthene	heptachlor epoxide
aldrin	benzo(k)fluoranthene	indeno(1,2,3-cd)pyrene
alpha-BHC	chrysene	non-dioxin-like PCBs
Aroclor-1242	DDE	PCE
Aroclor-1248	DDT	TCE
Aroclor-1254	dibenz(a,h)anthracene	Total PCBs
arsenic	dieldrin	vinyl chloride
benzene	dioxin-like PCBs	
benzo(a)anthracene	gamma-chlordane	

- Both noncancer and cancer health effects were evaluated in the BHHRA. The benchmark for the noncancer hazard index is 1.0 and the benchmark for the cancer risks is 1.0E-04 with an acceptable risk range for 1.0E-04 to 1.0E-06.

  - The noncancer hazards for all populations regardless of the exposure scenario (RME or CT; current or future) and the data set, exceeded the EPA benchmark of 1.0. However, it should be noted that the HIs from data sets excluding the outliers were usually 50 percent lower than the HIs that included the data set outliers, but still exceeded the benchmark of 1.0.

  - The cancer risks for current trespassers in Area A exceeded the EPA risk range under the RME scenario but was within the risk range under the CT scenario. In Area B, the RME and CT scenarios using the data set including the outliers and the RME scenario excluding the outliers exceeded the EPA risk range. However, the CT scenario using the data set excluding the outliers was within the EPA risk range. The cancer risks for future trespassers in Area A were within the EPA risk range for the RME scenarios using both the data sets including the outliers and excluding the outliers. In Area B, the RME and CT scenarios using both the data sets (including the outliers and excluding the outliers) exceeded the EPA risk range.

- The cancer risks for current outdoor workers in Area A exceeded the EPA risk range under the RME scenario but was within the risk range under the CT scenario. In Area B, the RME and CT scenarios using both the data sets (including the outliers and excluding the outliers) exceeded the EPA risk range. The cancer risks for future outdoor workers in Area A exceeded risk range for the RME scenarios using both the data sets (including the outliers and excluding the outliers). However, both of the CT scenarios (using the data sets including the outliers and excluding the outliers) were within the EPA risk range. In Area B, the RME and CT scenarios using both the data sets including the outliers and excluding the outliers exceeded the EPA risk range.

- The cancer risks for current indoor workers in Area A was within the EPA risk range under the RME scenario. The cancer risks for future indoor workers in Area B exceeded the EPA risk range for both the RME and CT scenarios.

- The cancer risks for future construction workers in Area A were within the EPA risk range for the RME scenarios using both the data set including the outliers and the data set excluding the outliers. In Area B, the RME scenarios using both data sets (including the outliers and excluding the outliers) exceeded the EPA risk range.

- The COPC responsible for generating the elevated hazard index was Aroclor-1254, while Total PCBs generated the high cancer risks. Other long-term adverse health effects of PCBs observed in laboratory animals include a reduced ability to fight infections, low birth weights, and learning problems.

- Lead was assessed separately due to a lack of a published reference dose. Lead was retained as a COPC in four data sets: surface soil in Area A, all soil in Area A, all soil in Area B, and indoor dust. The mean lead concentration for each data set was compared to the average industrial lead cleanup value of 1,250 mg/kg. Only the mean lead concentrations in Area A Surface Soil and indoor dust exceeded the screening levels. The mean lead concentration in Area A Surface Soil was 11,000 mg/kg, and the mean lead concentration in indoor dust was 5,248 mg/kg.

8.1.5 Ecological Risk Assessment

An ERA was performed for the property using methodology consistent with current guidance (EPA, 1997g). The ERA considered only a single environmental media as the primary, abiotic media of concern, facility soils found within the existing property boundary. The ERA performed included both a SLERA, consistent with ERAGS Steps 1 and 2, and a baseline problem formulation and refined exposure assessment (BERA), consistent with Step 3 of the ERAGS process.

An ecological assessment was performed to characterize the existing habitats and land use present on the facility property to determine if adequate habitat was present to support ecological receptors. Results of this assessment are summarized in the following:

- No significant habitat for ecological receptors was noted in the developed portion of the property (11.6 acres).

- Pathways of direct exposure by ecological receptors to contaminated surface soils in the developed areas were deemed incomplete as large areas remained covered by impervious areas of asphalt and concrete slabs.

- Habitats present within the undeveloped portion (14.4 acres) of the property included multiple vegetation covertypes associated with forested uplands, isolated wetlands, and floodplain wetlands which were all associated with the contiguous habitats continuing off-site along the channel of Bound Brook.

- Forty bird species, 11 mammal species and six reptile and amphibian species were recorded as observed within the Bound Brook Corridor (a significant habitat for ecological receptors).

The SLERA was performed to: (1) provide a preliminary list of contaminants of potential ecological concern; (2) confirm the presence of complete exposure pathways and exposure routes to ecological receptors; and (3) compare concentrations of contaminants present to conservative ecological screening level benchmarks. Results of this evaluation are summarized as follows:

- The principal media of concern for exposure of ecological receptors was facility surface soils (0 to 0.5 feet bgs).

    - The developed portions of the property afforded no significant habitat and the impervious nature of the ground service in this area rendered the direct contact with facility surface soils extremely limited. Given the lack of habitat and the impervious cover over the surface soils, the exposure pathway for ecological receptors to come into contact with contaminants present in this part of the property was deemed incomplete.

    - The undeveloped areas of the property including the upland forests, open fields and wetland areas were deemed as significant habitat supporting ecological receptors. The direct contact with surface soils pathway in the undeveloped portion of the property was deemed complete. Analytical sampling of the surface soils in this undeveloped part revealed the presence of 104 organic compounds and elements including VOCs, SVOCs, pesticides/PCBs, dioxins, and metals.

- A conceptual site model was developed to identify exposure pathways and routes of exposure for ecological receptors. Exposure pathways included direct contact with soils, ingestion of contaminated biota, and incidental ingestion of soils during feeding or grooming.

- A screening level assessment using generic, conservative screening values and maximum observed concentrations revealed 71 contaminants to exceed these screening values. Maximum concentrations of these 71 contaminants were further screened using ecological benchmarks deemed protective of heterotrophic soil microbial processes, soil invertebrates and terrestrial plants. Additionally, food chain evaluations using maximum concentrations

and maximized exposure parameters and bioaccumulation factors were performed for four wildlife receptors: the short-tailed shrew, red fox, American robin, and red-tailed hawk. Sixty-three of the contaminants exceeded at least one of the benchmarks for the direct contact pathway considering microbial, soil invertebrate and terrestrial plant endpoints.

- Results of the screening level food chain evaluation revealed NOAEL HQs of <1 to 499,000 for the shrew; NOAEL HQs of <1 to 2,445 for the red fox; NOAEL HQs of <1 to 267,000 for the American robin; and NOAEL HQs of <1 to 1,339 for the red-tailed hawk. The highest observed HQs for all receptors were associated with PCBs, dioxins, and DDT and its metabolites.

A refined exposure assessment for the wildlife receptors was developed as part of a baseline problem formulation assessment for the property. Results of this evaluation are as follows:

- The refined exposure assessment utilized mean concentrations of all contaminants with NOAEL HQs >1 observed in the screening level assessment and modified exposure parameters to reflect species-specific feeding and behavioral characteristics.

- The exposure assessment models were re-evaluated in consideration of the revised exposure parameters.

- LOAEL HQs ranged from 1.2 to 7,291 for the short-tailed shrew, with the highest HQs being associated with DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dixoin-like PCB congeners.

- LOAEL HQs ranged from 2 to 84 for the red fox, with the highest HQs being associated with Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, aluminum, and dixoin-like PCB congeners.

- LOAEL HQs ranged from 2 to 1,950 for the American robin, with the highest HQs being associated with aldrin, DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dixoin-like PCB congeners.

- LOAEL HQs ranged from 2 to 46.5 for the red-tailed hawk, with the highest HQs being associated with Total DDT and its metabolites, Total PCBs, Aroclor-1248, Aroclor-1254, dioxins, and dixoin-like PCB congeners.

Results of the ecological risk assessment revealed that ecological receptors associated with the undeveloped areas of the facility property may be at excess risk from site-related contaminants associated with historical practices of electronics and capacitor manufacturing (i.e., PCBs, PAHs and metals). High concentrations of pesticides were also associated with risk to ecological receptors, though direct linkage to the historical operations remains unclear.

8.2 Conclusions

The data collected during the RI field investigation are sufficient to characterize the physical site conditions and provide an understanding of the nature and extent of facility soil and building contamination, fate and transport mechanisms, and public health and ecological impacts of the contamination. The data indicate that the facility soils and buildings are contaminated at levels above applicable screening criteria identified in Section 4.2, and warrant additional evaluation in a Feasibility Study.

The OU-2 RI has developed the necessary technical database to proceed into the FS stage of the project. The Feasibility Study Report for OU-2 will present the evaluation of potential remedies for the facility soils and buildings.

SECTION 9.0

9.0 REFERENCES

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10.0 GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
BAF	Bioaccumulation Factor
BCF	Bioconcentration Factor
BERA	Baseline Ecological Risk Assessment
bgs	Below Ground Surface
BHHRA	Baseline Human Health Risk Assessment
BTAG	Biological Technical Assistance Group
CDD	Chlorinated dibenzo-p-dioxins
CDI	Chronic Daily Intake
CLP	Contract Laboratory Program
COPC	Chemicals of Potential Concern
COPEC	Contaminants of Potential Ecological Concern
CRQL	Contract Required Quantitation Limit
CSF	Carcinogenic Slope Factors
CT	Central Tendency
DAD	Dermally Absorbed Dose
DAF	Dilution-Attenuation Factor
DCE	Dichloroethene
DCSCC	Direct Contact for Soil Cleanup Criteria
DER	Data Evaluation Report
DGPS	Differential Global Positioning System
DI	Deionized
DQO	Data Quality Objective
ELCR	Excess Lifetime Cancer Riski
EMI	Electromagnetic Induction
EMSA	Environmental Measurements and Site Assessment
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESA	Ellington Variant-Urban Land Complex
FCR	Field Change Request
FEMA	Federal Emergency Management Agency
FID	Flame Ionization Detector
FS	Feasibility Study
GC/MS	Gas Chromatography/Mass Spectrometry
GI	Gastrointestional
GIS	Geographic Information System
GPS	Global Positioning System
HEAST	Health Effects Summary Tables
HI	Hazard Index
HQ	Hazard Quotient
HRS	Hazard Ranking System
HSDB	Hazardous Substances Database

HVS_3	High Volume-Small Surface Sampler
ID	Inner Diameter
IDW	Investigative Derived Waste
IGWSCC	Impact to Groundwater for Soil Cleanup Criteria
IRIS	Integrated Risk Information System
J&E	Johnson and Ettinger
LOAEL	Lowest Observable Adverse Effects Levels
MCAWW	Methods of Chemical Analysis of Water and Wastes
MCL	Maximum Contaminant Level
MDC	Maximum Detected Concentration
MDL	Method Detection Limit
MEK	Methyl ethyl ketone
mg/kg	Milligrams Per Kilogram
MIBK	Methyl isobutyl ketone
mm	millimeter
mmhos/m	millimhos per meter
mph	Miles Per Hour
msl	Mean Sea Level
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NCEA	National Center for Environmental Assessment
NJDEP	New Jersey Department of Environmental Protection
NJHPO	New Jersey Historic Preservation Office
NOAEL	No Observable Adverse Effects Level
NR	Non-Residential
NTU	Nephelometric Turbidity Unit
NWI	National Wetland Inventory
OD	Outer Diameter
ORNL	Oak Ridge National Laboratory
OU-2	Operable Unit 2
PAH	Polycyclic Aromatic Hydrocarbon
PARCC	Precision, Accuracy, Representativeness, Comparability, and Completeness
PCB	Polychlorinated Biphenyl
PCDD	Polychlorinated dibenzo-p-dioxins
PCDF	Polychlorinated dibenzofurans
PCE	Tetrachloroethane
%R	Percent Recovery
PEM	Palustrine Emergent
PFO1	Palustrine Forested Broad Leaved Deciduous
pg/g	Picograms per gram
PID	Photoionization Detector
ppm	parts per million
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
PSS	Palustrine Scrub/Shrub
PVC	Polyvinyl chloride

QA/QC	Quality Assurance/Quality Control
QC	Quality Control
R	Residential
RAS	Routine Analytical Service
RFA	Reaville-Urban Land Complex
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference
Ro	Rowland Silt Loam
RSD	Relative Standard Deviation
SD	Standard Deviation
SF	Slope Factor
SIP	Site Inspection Prioritization
SLERA	Screening Level Ecological Risk Assessment
SLV	Screening Level Value
SOP	Standard Operating Procedure
SOW	Statement of Work
SSL	Soil Screening Level
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TBC	To Be Considered
TCA	Trichloroethane
TCDD	Tetra-dioxin
TCE	trichloroethene
TCL	Target Compound List
TEF	Toxic Equivalency Factors
TEQ	Toxicity Equivalency Quotient
TOC	Total Organic Carbon
TRV	Toxicity Reference Value
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, or Disposal Facility
UCL	Upper Confidence Limit
ug/L	Micrograms Per Liter
ug/kg	Micrograms Per Kilogram
ug/m^3	Micrograms Per Cubic Meter
um	Micrometers
UR	Unit Risk
USFWS	United States Fish and Wildlife Service
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
WET	Wetland Evaluation Technique
WHO	World Health Organization
WPA	Works Progress Administration

APPENDIX A

APPENDIX A

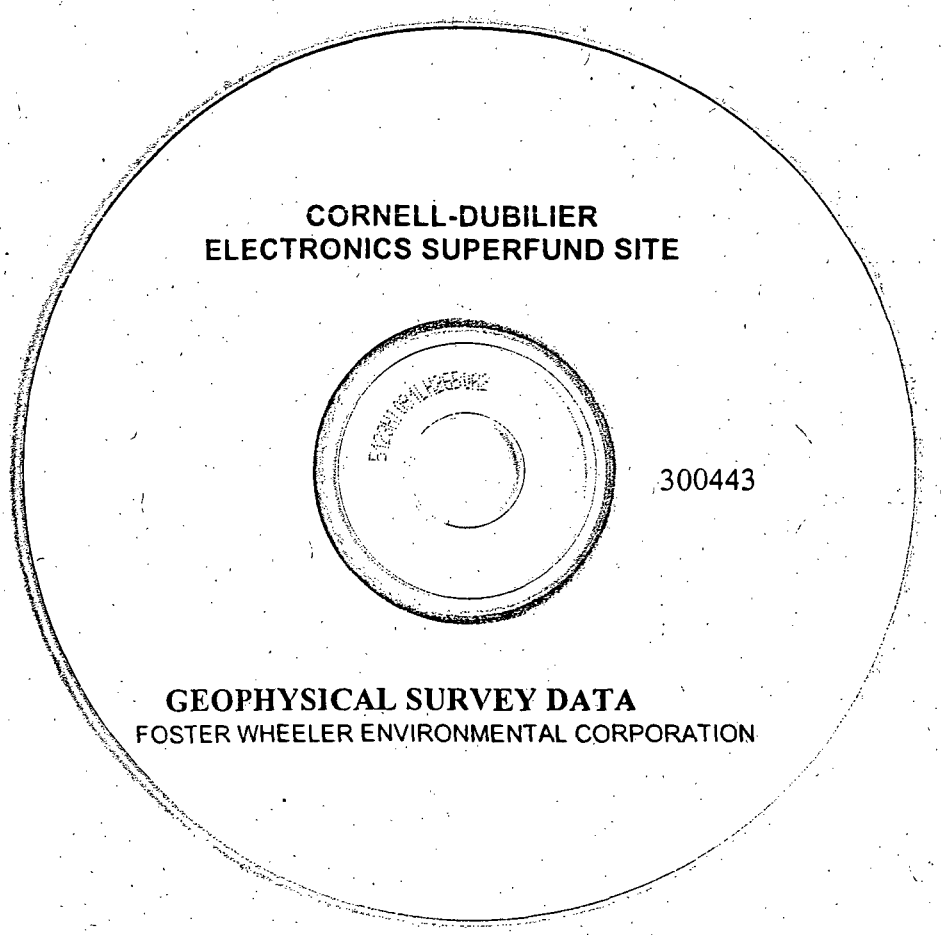
GEOPHYSICAL DATA

SDMS Reference Sheet
Part of Document on CD

The part of this document is on CD. It is available for review at:

U.S. EPA SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007
(212) 637-4308

DOC ID # 109030



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APPENDIX B

SOIL GAS REPORT

COLUMBIA
TECHNOLOGIES

SOIL GAS SURVEY RESULTS

Cornell-Dubilier

South Plainfield, NJ

PREPARED FOR

Foster Wheeler
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Livingston, NJ 07039

PREPARED BY

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June 2000

COLUMBIA
TECHNOLOGIES

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COLUMBIA
TECHNOLOGIES

EXECUTIVE SUMMARY

COLUMBIA Technologies, LLC. (COLUMBIA) conducted a soil gas survey at the Cornell-Dubilier site in South Plainfield, NJ. A total of 199 soil gas samples were collected from depths of two to four feet. The objective of the survey was to determine the extent of volatile contamination in order to direct future investigative activities. The samples were analyzed on a gas chromatograph equipped with an electron capture detector (GC/ECD) for chlorinated hydrocarbons and a flame ionization detector (GC/FID) for petroleum hydrocarbons. A wide range of compounds was found in the soil gas samples from the site, with the main contaminant present being TCE.

Introduction

Foster Wheeler contracted **COLUMBIA Technologies, LLC. (COLUMBIA)** to conduct a soil gas survey at the Cornell-Dubilier site in South Plainfield, NJ. The samples were collected using both a truck mounted sampling system, and a manual system. After collection, the samples were then brought to **COLUMBIA**'s mobile laboratory for on-site analysis.

Sample Collection and Analysis

Soil gas samples were collected at a total of 199 locations between the depth of two and four feet. The sample depth was adjusted due to subsurface obstructions that were encountered at several locations. All collected soil gas samples were submitted to **COLUMBIA's** mobile laboratory for analysis.

The sample locations were marked out prior to **COLUMBIA** arriving on-site to facilitate the soil gas survey. To collect the soil gas samples, a Geoprobe was used to advance connected 4 foot sections of narrow diameter threaded steel casing down to the sampling depth. Once at depth, the casing was hydraulically raised several inches in order to release a disposable drive point and open the bottom of the casing. Polyethylene tubing with a threaded stainless steel tip and "O" ring was inserted into the casing to the bottom of the hole, and threaded through a plug which isolates the bottom-hole sampling chamber from the up-hole annulus. At the surface, the tubing was attached to a vacuum volume system. A small volume of in-situ soil gas was then withdrawn through the probe and used to displace the atmospheric air from the sampling system. A syringe equipped with a special three-way

valve is then used to collect a sample from the soil gas stream, and inject it into a pre-evacuated glass vial. All sampling holes were backfilled with bentonite and the surface repaired with like material upon completion of the sampling.

In the event that a sample location was not accessible to the truck, a manual system was used. To collect the sample, a ½-inch hole was produced to the sampling depth using a manual slide hammer or drive rod. After the slide hammer was withdrawn from the hole, a specially designed stainless steel probe is inserted to the full depth of the hole, and packed off to isolate the probe's perforations from the atmosphere. In-situ soil gas is then collected using the sampling method described above.

Prior to the day's field activities and between each sampling location, all sampling equipment was decontaminated by washing with a Liquinox solution, before rinsing thoroughly with potable water. New tubing, syringes and needles were used for each sample to prevent cross contamination between locations.

As soon as the samples were collected, they were delivered to **COLUMBIA**'s mobile laboratory. The laboratory is equipped with an analytical system complete with a temperature programmable gas chromatograph (Shimadzu GC 14A) suitable for automated heated static headspace introduction (Shimadzu HSS-2B). **COLUMBIA**'s mobile laboratory preformed a formal quality control program. This included, but was not limited to, an initial demonstration of laboratory capability and an ongoing analysis of quality control samples to evaluate and document data quality.

Quality Assurance/Quality Control (QA/QC) Evaluation

Field QA/QC Samples

Field control samples (blanks) were collected at the beginning and end of each day's field activities and after every tenth soil gas sample. These QA/QC blanks were obtained by drawing ambient air through the equipment used for sample collection. The laboratory results are reported in Table 1. Concentrations of all analytes were below the reporting limit in all field control blanks, indicating that the QA/QC measures employed were sufficient to prevent cross-contamination of the samples during collection.

Laboratory QA/QC Samples

The analytical equipment was calibrated using a 3-point instrument-response curve and injection of known concentrations of the target analytes. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples, and their response factors were used to calculate the analyte concentrations. Continuing calibrations were run on an on-going basis to confirm that the instruments remained in calibration. Method blanks were run to confirm that the instrument was not contaminated with target analytes or sample carryover. The results of initial and continuing calibrations were within acceptable limits. With the exception of 1,1-DCE in the final day's laboratory blank, concentrations of all analytes were below the reporting limit in all laboratory blanks.

Results

Several chlorinated compounds were found at varying levels of concentration across the site (Table 1). The main contaminant of concern on the site due to its elevated levels is TCE, which was found along with several of its breakdown products across the entire site. In addition to TCE, a presence of FID Total Volatiles was detected across the site at varying levels of concentrations. FID Total Volatiles is a quantitative representation of the FID response to a sample using the Toluene calibration factor. The findings of this soil gas survey support the need for further investigation into the subsurface of the Cornell-Dubilier site in South Plainfield, NJ.

TABLE 1

23-May-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
EB-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-001	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-008	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-010	ND	ND	ND	ND	ND	36000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1 E	ND	ND
SG-015 (5X)															2.3		
SG-019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	0.28	ND	6.3 E	ND	ND
SG-019 (10X)															7.8		
SG-035	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	0.20	ND	ND	ND	ND	ND
SG-036	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	0.24	ND	ND	0.62	ND	ND
SG-037	ND	ND	ND	ND	ND	41	ND	ND	2.8	ND	110 E	0.94	ND	ND	28 E	ND	3.2 E
SG-037 (20X)											114				35		3.8
EB-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.5 E	ND	0.75
SG-029	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.47	ND	ND
SG-047	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	ND	ND	3.2 E	ND	0.13 J
SG-947	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	ND	ND	ND	4.7 E	ND	0.21 J
EB-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

24-May-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
EB-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-009	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17 J	ND	ND
SG-012	ND	ND	ND	ND	ND	27	ND	ND	ND	ND	ND	1.2	ND	ND	24 E	ND	ND
SG-021	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	ND	0.55	ND	ND
SG-026	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	ND	ND	0.77	ND	ND
SG-027	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	22	0.49	ND	ND	4.4 E	ND	0.18 J
SG-003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14 J	ND	ND
SG-004	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.99	ND	ND
SG-007	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36	ND	ND
EB-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-031	ND	ND	ND	ND	ND	25	ND	ND	ND	ND	ND	1.2	ND	ND	0.25	ND	ND
SG-039	ND	ND	3.8	ND	ND	16000	40 E	ND	50 E	ND	23 E	11 E	0.93	ND	1100 E	ND	1.3
SG-039 (1000 X)															14000 E		
SG-048	14	ND	ND	ND	ND	40000	ND	ND	ND	ND	ND	0.92	ND	ND	0.34	ND	ND
SG-049	31	ND	4.8	ND	1.32	17000	ND	ND	2.6	ND	ND	0.78	ND	ND	0.63	ND	ND
SG-050	5.9	ND	ND	ND	ND	3100	ND	ND	7.0	ND	6.4	0.24	ND	ND	10 E	ND	ND
SG-054	ND	ND	ND	ND	ND	25000	1.9	ND	ND	ND	40 E	2.36	ND	ND	8.4 E	ND	ND
SG-055	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	2.3	ND	ND	ND	1.3	ND	ND
SG-065	ND	ND	3.6	ND	ND	4300	4.7	ND	3.6	ND	90 E	0.67	ND	ND	79 E	ND	ND
SG-965	ND	ND	2.8	ND	ND	4600	4.4	ND	3.7	ND	86 E	0.63	ND	ND	81 E	ND	ND
SG-080	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9	0.70	ND	ND	3.6 E	ND	ND
EB-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

25-May-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
SG-013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND
SG-016	ND	ND	ND	ND	ND	ND	ND	3.7	ND	ND	ND	ND	ND	ND	0.90	ND	ND
SG-022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-023	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-028	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-088	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	0.35	ND	ND
SG-089	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	2.6 E	ND	ND
SG-033	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND
SG-034	ND	ND	ND	ND	ND	2500	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	ND
SG-040	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.43	ND	0.51
SG-041	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-044	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-062	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-076	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.46	ND	ND
SG-077	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-078	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	0.69	ND	ND
SG-103	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8 E	ND	ND
SG-104	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	5.2	0.40	ND	ND	13 E	ND	ND
SG-804	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	5.7	0.28	ND	ND	14 E	ND	ND
SG-105	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	7.7	ND	ND	ND	15 E	ND	ND
SG-106	ND	ND	ND	ND	ND	40	ND	ND	ND	ND	31 E	0.33	ND	ND	48 E	ND	ND
EB-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

300456

26-May-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
EB-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-086	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND
SG-087	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	7.4	ND	ND	5.5 E	ND	ND
SG-085	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.60	ND	ND
SG-091	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	0.76	ND	ND
SG-092	ND	ND	ND	ND	ND	31	ND	ND	ND	ND	ND	0.30	ND	ND	69 E	ND	ND
SG-093	ND	ND	1.7	ND	ND	38	ND	ND	ND	ND	24	0.31	ND	ND	65 E	ND	ND
SG-097	ND	ND	1.8	ND	ND	17	ND	ND	ND	ND	8.9	ND	ND	ND	16 E	ND	ND
SG-098	ND	ND	2.0	ND	ND	19	ND	ND	ND	ND	19	0.24	ND	ND	14 E	ND	ND
SG-099	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	18	ND	ND	ND	15 E	ND	ND
SG-079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-090	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	0.21 J
SG-990	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.96	ND	0.17 J
EB-11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

300457

30-May-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
SG-011	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.4 E	ND	ND
SG-024	ND	ND	ND	ND	ND	180	ND	ND	ND	ND	ND	ND	6.3 E	ND	0.18 J	ND	ND
SG-924	ND	ND	ND	ND	ND	174	ND	ND	ND	ND	ND	ND	4.3 E	ND	0.16 J	ND	ND
SG-042	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.69	0.20	0.09 J	0.45	ND	ND
SG-045	ND	ND	ND	ND	ND	22	ND	ND	ND	ND	ND	ND	ND	ND	0.59	ND	0.12 J
SG-046	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-063	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-064	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	0.25	ND	0.26
SG-053	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-084	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-115	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-142	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-173	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-174	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-175	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-192	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-201	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-202	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
SG-112	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.20 J	ND	ND	0.28	ND	ND
SG-113	ND	ND	ND	ND	ND	33	ND	ND	ND	ND	ND	0.88	ND	ND	0.38	ND	ND
SG-116	ND	ND	ND	ND	ND	21	ND	ND	ND	ND	ND	0.21	ND	ND	0.17 J	ND	ND
SG-117	ND	ND	ND	ND	ND	710	ND	ND	ND	ND	ND	0.30	0.50	ND	0.38	ND	ND
SG-128	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	0.59	ND	ND
SG-129	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	ND	ND	ND
SG-139	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16 J	ND	ND	1.6 E	ND	0.19 J
SG-141	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-151	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-152	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-161	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-162	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-074	ND	ND	ND	ND	ND	1300	ND	ND	ND	ND	ND	0.15 J	ND	ND	0.17 J	ND	ND
SG-075	ND	ND	ND	ND	ND	7400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-127	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	2.8 E	ND	ND
EB-15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-182	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3 E	ND	ND
SG-882	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.5 E	ND	ND
SG-183	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-184	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-185	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.16 J	0.83	ND	1.3 E	ND	ND
SG-186	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.87	ND	ND
SG-187	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-188	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	1.0	ND	ND
SG-888	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23	ND	1.1	ND	ND
SG-189	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.96	ND	1.2	ND	ND
SG-194	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-195	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-196	ND	ND	ND	ND	ND	43	ND	ND	ND	ND	ND	ND	0.22	ND	0.30	ND	ND
SG-197	ND	ND	ND	ND	ND	282	ND	ND	3.4	ND	ND	ND	1.6	ND	3.3 E	ND	ND
SG-198	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44	ND	3.7 E	ND	0.58
SG-199	ND	ND	ND	ND	ND	66	ND	ND	ND	ND	ND	ND	ND	ND	0.48	ND	2.1
SG-200	ND	ND	ND	ND	ND	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15
EB-18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
EB-19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-163	ND	ND	ND	ND	ND	15	ND	ND	1.5 J	ND	7.6 E	0.20 J	ND	ND	14 E	ND	ND
SG-164	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	0.33	ND	ND	2.4 E	ND	ND
SG-165	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35	ND	ND	0.15 J	ND	ND
SG-166	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	ND	0.37	ND	ND	7.7 E	ND	ND
SG-167	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4 E	ND	ND
SG-168	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2 E	ND	ND
SG-148	ND	ND	ND	ND	ND	22	ND	ND	1.3 J	ND	25 E	0.16 J	0.15 J	ND	21 E	ND	0.25 J
EB-20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-149	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	3.5	0.19 J	0.77	ND	17 E	ND	ND
SG-156	ND	ND	ND	ND	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	0.19 J	ND	ND
SG-157	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2 E	ND	ND
SG-158	ND	ND	ND	ND	ND	10	ND	ND	ND	ND	5.2	ND	ND	ND	7.3 E	ND	ND
SG-159	ND	ND	ND	ND	ND	59	ND	ND	ND	ND	11 E	ND	0.24	ND	17 E	ND	0.15 J
SG-108	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	15 E	ND	ND	ND	21 E	ND	ND
SG-109	ND	ND	ND	ND	ND	25	ND	ND	1.8 J	ND	17 E	ND	ND	ND	23 E	ND	ND
SG-909	ND	ND	ND	ND	ND	24	ND	ND	1.8 J	ND	20 E	ND	ND	ND	28 E	ND	ND
SG-130	ND	ND	ND	ND	ND	19	ND	ND	1.3 J	ND	19 E	0.18 J	ND	ND	12 E	ND	ND
SG-131	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	5.0	0.15 J	ND	ND	9.5 E	ND	ND
SG-132	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	8.2 E	ND	ND	ND	13 E	ND	ND
SG-143	ND	ND	ND	ND	ND	12	ND	ND	ND	ND	5.0	ND	ND	ND	3.4 E	ND	ND
SG-144	33 E	8.8	3.6	3.3	ND	2300	ND	ND	8.9	1.6	46 E	0.17 J	ND	ND	35 E	ND	ND
SG-146	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	6.7 E	0.19 J	ND	ND	1.3 E	ND	ND
SG-147	ND	ND	ND	ND	ND	13	ND	ND	ND	ND	5.5 E	0.17 J	ND	ND	5.6 E	ND	ND
SG-153	ND	ND	ND	ND	ND	120	ND	ND	2.3	ND	13 E	0.48	ND	ND	14E	ND	ND
SG-154	ND	ND	ND	ND	ND	180	ND	ND	6.8 E	1.2	74 E	ND	ND	ND	60 E	ND	ND
SG-203	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-204	ND	ND	ND	ND	ND	18	ND	ND	ND	ND	ND	ND	ND	ND	3.0 E	ND	0.81
SG-205	ND	ND	1.7	ND	ND	15	ND	ND	ND	ND	ND	ND	ND	ND	0.15 J	ND	1.4 E
EB-21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

2-Jun-00

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
SG-082	ND	3.7	ND	ND	1.8	1200	5.1	ND	23 E	ND	520 E	ND	ND	ND	430 E	ND	2.9 E
SG-082 (1000X)															2200 E		
SG-110	ND	ND	ND	ND	ND	150	ND	ND	6.1	ND	200 E	ND	ND	ND	74 E	ND	0.54
SG-111	ND	ND	ND	ND	ND	72	ND	ND	2.9	ND	82 E	ND	ND	ND	29 E	ND	ND
SG-119	ND	ND	ND	ND	ND	15	ND	ND	ND	ND	12 E	ND	ND	ND	9.9 E	ND	0.13 J
SG-120	ND	ND	ND	ND	ND	17	ND	ND	ND	ND	5.3	ND	ND	ND	9.7 E	ND	ND
SG-121	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	0.15 J	ND	ND	3.3 E	ND	ND
SG-122	ND	ND	ND	ND	ND	22	ND	ND	ND	ND	ND	ND	ND	ND	2.5 E	ND	ND
SG-123	ND	ND	ND	ND	ND	29	ND	ND	ND	ND	4.2	ND	ND	ND	2.7 E	ND	ND
SG-124	ND	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	2.1 E	ND	ND
SG-125	ND	ND	ND	ND	ND	49	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND
SG-126	ND	ND	ND	ND	ND	15	ND	ND	ND	ND	ND	ND	ND	ND	1.8 E	ND	0.11 J
SG-135	ND	ND	ND	ND	ND	190	ND	ND	ND	ND	ND	ND	ND	ND	0.68	ND	ND
SG-133	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	3.9	0.39	1.4	ND	19 E	ND	0.27
SG-134	ND	ND	ND	ND	ND	19	ND	ND	1.6 J	ND	17 E	ND	ND	ND	11 E	ND	0.11 J
SG-136	ND	ND	ND	ND	ND	400	ND	ND	ND	ND	ND	ND	ND	ND	0.30	ND	ND
SG-137	ND	ND	ND	ND	ND	23	ND	ND	ND	ND	ND	ND	ND	ND	0.20	ND	ND
SG-138	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	ND	ND
SG-150	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-850	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-169	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.82	ND	ND
EB-24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-190	ND	ND	ND	ND	ND	ND	2.0	ND	21 E	ND	65 E	0.92	ND	ND	240 E	ND	0.29
SG-190 (1000x)															420		
EB-25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
SG-160	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-171	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-172	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-176	ND	ND	ND	ND	ND	290	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-177	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	0.30	ND	ND
SG-178	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-179	ND	ND	ND	ND	ND	1200	ND	ND	ND	ND	ND	ND	ND	ND	0.18 J	ND	ND
SG-180	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.20	ND	ND
SG-181	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15 J	ND	ND
SG-191	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17 J	ND	ND	0.61	ND	ND
SG-210	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.85	ND	1.4 E
SG-211	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-212	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-213	ND	ND	ND	ND	ND	2300	ND	ND	ND	ND	ND	ND	ND	ND	0.25	ND	ND
SG-215	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-216	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND
SG-217	ND	ND	ND	ND	ND	48	ND	ND	2.8	ND	93 E	0.32	ND	ND	22 E	ND	0.30
SG-094	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-095	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND
SG-101	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19 J	ND	ND
SG-206	ND	ND	1.9	ND	ND	710	ND	ND	3.5	ND	ND	0.79	1.2	ND	2.1 E	ND	ND
SG-207	ND	ND	ND	ND	ND	59	ND	ND	ND	ND	4.6	ND	0.69	ND	180 E	ND	1.2 E
SG-208	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3	ND	0.77
SG-209	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.64
SG-809	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.63
SG-214	ND	ND	ND	ND	ND	23	ND	ND	ND	ND	10	0.21	0.25	ND	27 E	ND	0.21
EB-26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-218	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.24	ND	ND	1.8 E	ND	ND
EB-27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6 J	ND	ND	ND	3.8 E	ND	ND
EB-28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-221	ND	ND	ND	ND	ND	34	ND	ND	1.9 J	ND	29 E	ND	ND	ND	30 E	ND	0.13 J
EB-29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-222	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	4.8	ND	ND	ND	11 E	ND	ND

ANALYTE	Benzene	Toluene	Ethylbenzene	m&p-Xylene	o-Xylene	FID Volatiles	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
PQL (µg/L)	(1.2)	(1.3)	(1.2)	(2.4)	(1.1)	(10.0)	(1.8)	(1.2)	(2.0)	(2.1)	(2.6)	(0.21)	(0.20)	(0.26)	(0.20)	(0.36)	(0.26)
SAMPLE ID																	
EB-30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SG-219	ND	ND	ND	ND	ND	33	ND	ND	2.8	ND	35 E	ND	ND	ND	50 E	ND	ND
SG-223	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1 J	ND	ND	ND	7.4 E	ND	ND
SG-224	ND	ND	ND	ND	ND	26	ND	ND	ND	ND	7.8	0.18 J	ND	ND	11 E	ND	ND
SG-225	ND	ND	ND	ND	ND	260	ND	ND	ND	ND	4.7	0.68	ND	ND	2.1 E	ND	ND
SG-226	ND	ND	ND	ND	ND	1200	ND	ND	ND	ND	5.6	1.4	ND	ND	5.7	ND	0.31
SG-227	ND	ND	ND	ND	ND	700	ND	ND	4.4	ND	36 E	0.16 J	ND	ND	19 E	ND	12 E
SG-228	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.61	ND	ND
SG-229	ND	ND	ND	ND	ND	3300	ND	ND	9.1	ND	31 E	0.34	ND	ND	210 E	ND	0.12 J
SG-229 (1000X)															300		
SG-230	ND	ND	ND	ND	ND	390	ND	ND	3.4	ND	28 E	0.25	ND	ND	3.6 E	ND	0.35
SG-730	ND	ND	ND	ND	ND	290	ND	ND	2.5	ND	22 E	ND	ND	ND	2.8 E	ND	0.31
SG-231	ND	3.1	ND	ND	ND	2300	22 E	ND	50 E	ND	1900 E	0.47	ND	ND	540 E	ND	1.5 E
SG-231 (1000X)											2600				3100 E		
SG-232	ND	ND	ND	ND	ND	1900	ND	ND	56 E	ND	400 E	0.48	ND	ND	23 E	ND	ND
SG-233	ND	ND	ND	ND	ND	340	ND	ND	28 E	ND	430 E	0.61	0.60	ND	230 E	ND	0.24 J
SG-233 (1000X)											650 J				380		
SG-234	ND	ND	ND	ND	ND	100	ND	ND	7.2	ND	160 E	0.35	0.92	ND	64 E	ND	ND
EB-31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND

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TABLE 2

23-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-052300F-1	13.83	15.71	16.38	34.52	16.82
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**7.2%**	**3.4%**	**2.5%**	**1.1%**	**1.1%**
CC-052300F-2	14.7	16.4	17.9	37.6	19.70
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**14.0%**	**7.9%**	**6.5%**	**7.7%**	**15.9%**
CC-052300F-3	14.2	16.3	17.7	36.3	18.90
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**10.1%**	**7.2%**	**5.4%**	**4.0%**	**11.2%**

23-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-052300-FID	1.08	1.31	1.37	3.07	1.43
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**16.3%**	**13.8%**	**18.5%**	**12.0%**	**15.9%**

23-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-052300E-1	5.17	2.71	5.69	4.76	6.47	0.56	0.58	0.72	0.58	0.93	0.76
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**14.9%**	**5.9%**	**11.6%**	**8.1%**	**1.2%**	**5.1%**	**13.7%**	**11.6%**	**16.5%**	**4.7%**	**19.1%**
CC-052300E-2	5.5	3.10	5.19	5.36	8.23	0.61	0.58	0.71	0.54	1.07	0.7
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**22.2%**	**7.6%**	**1.8%**	**3.5%**	**25.6%**	**14.4%**	**13.7%**	**10.1%**	**8.4%**	**20.5%**	**9.7%**
CC-052300E-3	4.08	2.47	4.51	4.98	6.39	0.52	0.5	0.63	0.49	0.91	0.65
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**9.3%**	**14.2%**	**11.6%**	**3.9%**	**2.4%**	**2.4%**	**2.0%**	**2.3%**	**1.6%**	**2.5%**	**1.9%**

23-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-052300-ECD	2.19	1.64	2.45	2.46	3.65	0.28	0.26	0.33	0.27	0.48	0.35
ACTUAL CONCENTRATION	2.70	1.73	3.06	3.11	3.93	0.320	0.310	0.390	0.300	0.530	0.380
% DIFFERENCE (QC LIMIT 25%)	**18.9%**	**5.2%**	**19.9%**	**20.9%**	**7.1%**	**12.5%**	**16.1%**	**15.4%**	**10.0%**	**9.4%**	**7.9%**

24-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-052400F-1	14.6	16.3	17.9	36.8	18.40
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**13.2%**	**7.2%**	**6.5%**	**5.4%**	**8.2%**
CC-052400F-2	14.8	17.2	18.5	38.5	19.90
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**14.7%**	**13.2%**	**10.1%**	**10.3%**	**17.1%**
CC-052400F-3	16	16.96	18.79	38.5	19.93
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**24.0%**	**11.6%**	**11.8%**	**10.3%**	**17.2%**

24-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-052400-FID	1.18	1.26	1.52	3.23	1.61
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**8.5%**	**17.1%**	**9.5%**	**7.4%**	**5.3%**

24-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-052400E-1	4.73	2.54	5.20	5.66	6.34	0.51	0.5	0.62	0.48	0.90	0.64
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**5.1%**	**11.8%**	**2.0%**	**9.3%**	**3.2%**	**4.3%**	**2.0%**	**3.9%**	**3.6%**	**1.4%**	**0.3%**
CC-052400E-2	4.23	2.41	4.28	5.29	5.6	0.48	0.47	0.59	0.51	0.76	0.56
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**6.0%**	**16.3%**	**16.1%**	**2.1%**	**14.5%**	**9.9%**	**7.8%**	**8.5%**	**2.4%**	**14.4%**	**12.2%**

24-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-052400-ECD											
ACTUAL CONCENTRATION					*** Recalibrated 5/24/00**						
% DIFFERENCE (QC LIMIT 25%)											

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25-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-052500F-1	12.97	14.36	15.21	31.97	15.92
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**0.5%**	**5.5%**	**9.5%**	**8.4%**	**6.4%**
CC-052500F-2	15.7	15.9	16.6	34.3	17.6
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**21.7%**	**4.6%**	**1.2%**	**1.7%**	**3.5%**
CC-052500F-3	13.97	15.51	16.33	34.15	17.22
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**8.3%**	**2.0%**	**2.8%**	**2.1%**	**1.3%**
CC-052500F-4	14.29	16.19	17.43	35.08	18.00
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**10.8%**	**6.5%**	**3.7%**	**0.5%**	**5.9%**

25-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-052500-FID	1.41	1.34	1.96	3.29	1.57
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**9.3%**	**11.8%**	**16.7%**	**5.7%**	**7.6%**

25-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-052500E-1	3.89	2.17	5.57	5.22	7.12	0.55	0.51	0.66	0.53	0.95	0.66
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**13.6%**	**24.7%**	**9.2%**	**0.8%**	**8.7%**	**3.2%**	**0.0%**	**2.3%**	**6.4%**	**7.0%**	**3.4%**
CC-052500E-2	4.22	2.54	4.59	5.53	6.3	0.53	0.5	0.62	0.49	0.86	0.62
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**6.2%**	**11.8%**	**10.0%**	**6.8%**	**3.8%**	**0.6%**	**2.0%**	**3.9%**	**1.6%**	**3.2%**	**2.8%**
CC-052500E-3	4.12	2.90	4.46	5.78	5.77	0.48	0.46	0.58	0.41	0.72	0.48
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**8.4%**	**0.7%**	**12.5%**	**11.6%**	**11.9%**	**9.9%**	**9.8%**	**10.1%**	**17.7%**	**18.9%**	**24.8%**
CC-052500E-4	4.62	3.09	4.78	5.45	6.76	0.5	0.49	0.61	0.51	0.92	0.64
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**2.7%**	**7.3%**	**6.3%**	**5.2%**	**3.2%**	**6.2%**	**3.9%**	**5.4%**	**2.4%**	**3.6%**	**0.3%**

25-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-052500-ECD	1.93	1.40	2.07	2.5	3.22	0.25	0.24	0.3	0.24	0.38	0.3
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**7.2%**	**21.7%**	**1.5%**	**20.8%**	**22.9%**	**17.4%**	**17.6%**	**16.3%**	**20.6%**	**8.6%**	**20.0%**

300470

26-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-052600F-1	12.85	14.43	14.96	30.16	15.65
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**0.4%**	**5.1%**	**11.0%**	**13.6%**	**7.9%**
(QC LIMIT 25%)					
CC-052600F-2	12.6	14.5	14.9	29.2	17.0
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**2.3%**	**4.6%**	**11.3%**	**16.3%**	**0.0%**
(QC LIMIT 25%)					

26-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-052600-FID	1.58	1.56	1.74	3.17	1.52
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE	**22.5%**	**2.6%**	**3.6%**	**9.2%**	**10.6%**
(QC LIMIT 25%)					

26-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-052600E-1	4.25	2.74	5.38	4.97	5.95	0.52	0.49	0.58	0.43	0.75	0.48
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**5.6%**	**4.9%**	**5.5%**	**4.1%**	**9.2%**	**2.4%**	**3.9%**	**10.1%**	**13.7%**	**15.5%**	**24.8%**
CC-052600E-2	4.58	2.84	5.30	5.87	6.66	0.53	0.51	0.63	0.51	0.89	0.61
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**1.8%**	**1.4%**	**3.9%**	**13.3%**	**1.7%**	**0.6%**	**0.0%**	**2.3%**	**2.4%**	**0.2%**	**4.4%**

26-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-052500-ECD	1.65	1.17	2.38	2.85	3.01	0.25	0.24	0.28	0.24	0.42	0.3
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**8.3%**	**1.7%**	**16.7%**	**37.7%**	**14.9%**	**17.4%**	**17.6%**	**8.5%**	**20.6%**	**20.0%**	**20.0%**

30-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-053000F-1	12.55	13.99	16.59	34.3	16.39
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**2.7%**	**8.0%**	**1.3%**	**1.7%**	**3.6%**
(QC LIMIT 25%)					
CC-053000F-2	13.71	15.25	16.36	33.84	16.1
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**6.3%**	**0.3%**	**2.6%**	**3.0%**	**5.1%**
(QC LIMIT 25%)					

30-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-053000-FID		*** Recalibrated 5/30/00**			
ACTUAL CONCENTRATION					
% DIFFERENCE					
(QC LIMIT 25%)					

30-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-053000E-1	4.08	2.70	5.50	5.87	6.16	0.54	0.53	0.65	0.51	0.91	0.63
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**9.3%**	**6.2%**	**7.8%**	**13.3%**	**6.0%**	**1.3%**	**3.9%**	**0.8%**	**2.4%**	**2.5%**	**1.3%**
CC-053000E-2	4.59	3.18	5.17	5.17	5.95	0.56	0.55	0.62	0.5	0.90	0.63
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**2.0%**	**10.4%**	**1.4%**	**0.2%**	**9.2%**	**5.1%**	**7.8%**	**3.9%**	**0.4%**	**1.4%**	**1.3%**

30-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-053000-ECD											
ACTUAL CONCENTRATION											
% DIFFERENCE (QC LIMIT 25%)											

*** Recalibrated 5/30/00**

31-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-053100F-1	12.7	14.48	15.68	31.87	14.82
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**1.6%**	**4.7%**	**6.7%**	**8.7%**	**12.8%**
CC-053100F-2	13.92	16.6	18.35	38	17.78
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**7.9%**	**9.2%**	**9.2%**	**8.9%**	**4.6%**
CC-053100F-3	13.32	15.86	17.34	35.45	16.42
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**3.3%**	**4.3%**	**3.2%**	**1.6%**	**3.4%**

31-May-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-053100-FID	1.37	1.56	1.6	3.27	1.66
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**6.2%**	**2.6%**	**4.8%**	**6.3%**	**2.4%**

31-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-053100E-1	3.99	2.52	5.38	6.06	5.98	0.54	0.51	0.63	0.5	0.91	0.6
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**11.3%**	**12.5%**	**5.5%**	**17.0%**	**8.7%**	**1.3%**	**0.0%**	**2.3%**	**0.4%**	**2.5%**	**6.0%**
CC-053100E-2	4	2.70	5.01	5.97	5.83	0.52	0.51	0.62	0.48	0.83	0.6
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**11.1%**	**6.2%**	**1.8%**	**15.3%**	**11.0%**	**2.4%**	**0.0%**	**3.9%**	**3.6%**	**6.5%**	**6.0%**
CC-053100E-3	4.73	2.64	5.87	5.73	6.61	0.56	0.53	0.65	0.5	0.91	0.61
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**5.1%**	**8.3%**	**15.1%**	**10.6%**	**0.9%**	**5.1%**	**3.9%**	**0.8%**	**0.4%**	**2.5%**	**4.4%**

31-May-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-053100-ECD	2.01	1.02	2.38	2.36	2.78	0.26	0.25	0.3	0.24	0.43	0.29
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**11.7%**	**11.3%**	**16.7%**	**14.0%**	**6.1%**	**22.1%**	**22.5%**	**16.3%**	**20.6%**	**22.9%**	**16.0%**

1-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-060100E-1	4.23	2.72	5.59	5.55	6.26	0.56	0.54	0.65	0.51	0.92	0.62
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**6.0%**	**5.6%**	**9.6%**	**7.1%**	**4.4%**	**5.1%**	**5.9%**	**0.8%**	**2.4%**	**3.6%**	**2.8%**
CC-060100E-2	4.14	2.37	4.70	6.28	5.5	0.51	0.5	0.61	0.46	0.81	0.57
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**8.0%**	**17.7%**	**7.8%**	**21.2%**	**16.0%**	**4.3%**	**2.0%**	**5.4%**	**7.6%**	**8.8%**	**10.7%**

1-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-060100-ECD	1.86	0.96	1.89	2.11	2.66	0.25	0.25	0.29	0.22	0.36	0.27
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**3.3%**	**16.5%**	**7.4%**	**1.9%**	**1.5%**	**17.4%**	**22.5%**	**12.4%**	**10.6%**	**2.9%**	**8.0%**

1-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-060100F-1	12.92	15.04	16.59	34.49	16.23
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**0.2%**	**1.1%**	**1.3%**	**1.2%**	**4.5%**
(QC LIMIT 25%)					
CC-060100F-2	12.27	16.15	17.23	35.74	16.91
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE	**4.9%**	**6.3%**	**2.6%**	**2.4%**	**0.5%**
(QC LIMIT 25%)					

1-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-060100-FID	1.23	1.44	1.54	3.01	1.80
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE	**4.7%**	**5.3%**	**8.3%**	**13.8%**	**5.9%**
(QC LIMIT 25%)					

2-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-060200E-1	3.45	2.50	4.30	5.24	5.33	0.44	0.44	0.54	0.4	0.84	0.5
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**23.3%**	**13.2%**	**15.7%**	**1.2%**	**18.6%**	**17.4%**	**13.7%**	**16.3%**	**19.7%**	**5.4%**	**21.6%**
CC-060200E-2	3.95	2.56	5.07	5.29	5.79	0.52	0.52	0.62	0.48	0.83	0.57
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**12.2%**	**11.1%**	**0.6%**	**2.1%**	**11.6%**	**2.4%**	**2.0%**	**3.9%**	**3.6%**	**6.5%**	**10.7%**
CC-060200E-3	4.1	2.39	4.63	5.57	6.22	0.52	0.5	0.63	0.48	0.87	0.58
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**8.9%**	**17.0%**	**9.2%**	**7.5%**	**5.0%**	**2.4%**	**2.0%**	**2.3%**	**3.6%**	**2.0%**	**9.1%**
CC-060200E-4	3.96	3.18	5.14	6.04	5.55	0.52	0.5	0.62	0.48	0.85	0.56
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**12.0%**	**10.4%**	**0.8%**	**16.6%**	**15.3%**	**2.4%**	**2.0%**	**3.9%**	**3.6%**	**4.3%**	**12.2%**

2-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-060200-ECD	1.91	1.36	2.01	2.54	2.28	0.22	0.21	0.27	0.19	0.31	0.24
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**6.1%**	**18.3%**	**1.5%**	**22.7%**	**13.0%**	**3.3%**	**2.9%**	**4.7%**	**4.5%**	**11.4%**	**4.0%**

2-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-060200F-1	12.59	14.69	16.12	33.31	14.80
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**2.4%**	**3.4%**	**4.0%**	**4.6%**	**12.9%**
CC-060200F-2	12.65	14.66	15.33	30.73	15.46
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**1.9%**	**3.6%**	**8.8%**	**11.9%**	**9.1%**
CC-060200F-3	13.36	15.52	16.53	33.68	16.22
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**3.6%**	**2.1%**	**1.6%**	**3.5%**	**4.6%**
CC-060200F-4	12.3	13.68	14.01	27.75	13.66
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**4.7%**	**10.0%**	**16.6%**	**20.5%**	**19.6%**

2-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-060200-FID	1.31	1.53	1.46	2.83	1.58
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**1.6%**	**0.7%**	**13.1%**	**18.9%**	**7.1%**

5-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-060500E-1	4.34	2.52	5.30	5.03	6.21	0.48	0.48	0.62	0.43	0.85	0.51
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE	**3.6%**	**12.5%**	**3.9%**	**2.9%**	**5.2%**	**9.9%**	**5.9%**	**3.9%**	**13.7%**	**4.3%**	**20.1%**
(QC LIMIT 25%)											
CC-060500E-2	4.19	2.86	4.51	5.39	5.64	0.48	0.48	0.6	0.47	0.79	0.52
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE	**6.9%**	**0.7%**	**11.6%**	**4.1%**	**13.9%**	**9.9%**	**5.9%**	**7.0%**	**5.6%**	**11.0%**	**18.5%**
(QC LIMIT 25%)											
CC-060500E-3	4.72	2.95	5.00	5.7	5.96	0.53	0.51	0.64	0.48	0.86	0.53
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE	**4.9%**	**2.4%**	**2.0%**	**10.0%**	**9.0%**	**0.6%**	**0.0%**	**0.8%**	**3.6%**	**3.2%**	**16.9%**
(QC LIMIT 25%)											

5-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-060500-ECD	1.87	1.05	2.02	2.07	2.29	0.23	0.24	0.3	0.22	0.35	0.27
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE	**3.9%**	**8.7%**	**1.0%**	**0.0%**	**12.6%**	**8.0%**	**17.6%**	**16.3%**	**10.6%**	**0.0%**	**8.0%**
(QC LIMIT 25%)											

5-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-060500F-1	12.99	15	16.72	35.09	16.54
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**0.7%**	**1.3%**	**0.5%**	**0.5%**	**2.7%**
CC-060500F-2	13.34	16.14	17.69	37.58	17.50
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**3.4%**	**6.2%**	**5.3%**	**7.7%**	**2.9%**
CC-060500F-3	12.35	14.91	16.12	33.47	15.49
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**4.3%**	**1.9%**	**4.0%**	**4.1%**	**8.9%**

5-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-060500-FID	1.22	1.54	1.71	3.19	1.72
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**5.4%**	**1.3%**	**1.8%**	**8.6%**	**1.2%**

6-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
CC-060600F-1	11.57	15.37	17.33	36.6	17.26
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**10.3%**	**1.1%**	**3.2%**	**4.9%**	**1.5%**
CC-060600F-2	13.64	16.09	17.16	35.71	17.11
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**5.7%**	**5.9%**	**2.1%**	**2.3%**	**0.6%**
CC-060600F-3	12.6	13.33	13.16	26.76	16.00
ACTUAL CONCENTRATION	12.9	15.2	16.8	34.9	17.0
% DIFFERENCE (QC LIMIT 25%)	**2.3%**	**12.3%**	**21.7%**	**23.3%**	**5.9%**

6-Jun-00

STANDARD ANALYTES	Benzene	Toluene	Ethyl-Benzene	m&p-Xylene	o-Xylene
LLC-060600-FID	1.34	1.31	1.51	2.87	1.70
ACTUAL CONCENTRATION	1.29	1.52	1.68	3.49	1.70
% DIFFERENCE (QC LIMIT 25%)	**3.9%**	**13.8%**	**10.1%**	**17.8%**	**0.0%**

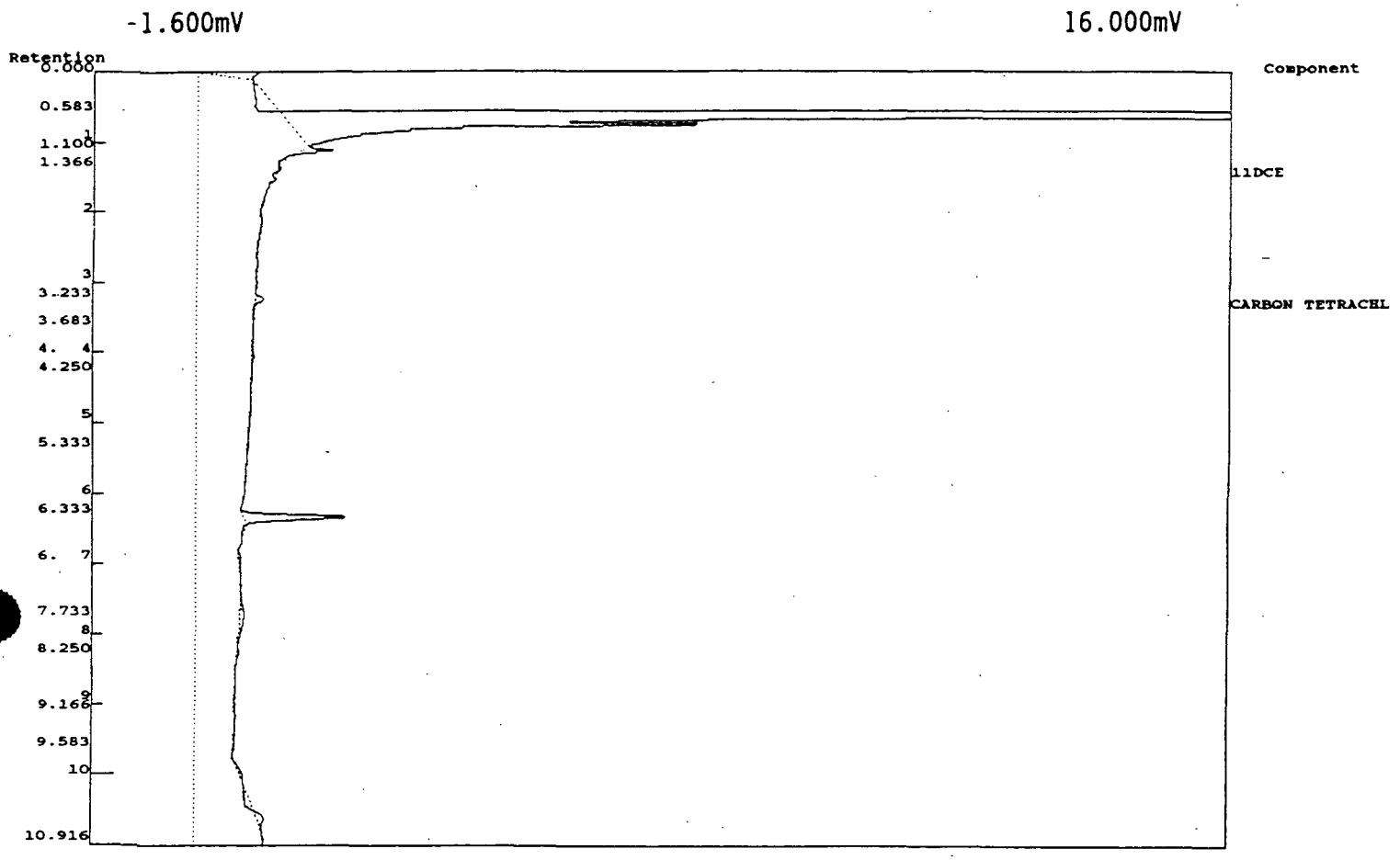
6-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
CC-060600E-1	4.2	2.82	4.69	5.13	5.95	0.54	0.52	0.65	0.49	0.83	0.55
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**6.7%**	**2.1%**	**8.0%**	**1.0%**	**9.2%**	**1.3%**	**2.0%**	**0.8%**	**1.6%**	**6.5%**	**13.8%**
CC-060600E-2	4.29	2.60	5.13	5.49	5.93	0.53	0.51	0.64	0.5	0.82	0.53
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**4.7%**	**9.7%**	**0.6%**	**6.0%**	**9.5%**	**0.6%**	**0.0%**	**0.8%**	**0.4%**	**7.7%**	**16.9%**
CC-060600E-3	4.16	2.84	5.09	5.45	6.16	0.54	0.53	0.64	0.49	0.84	0.52
ACTUAL CONCENTRATION	4.50	2.88	5.10	5.18	6.55	0.533	0.510	0.645	0.498	0.888	0.638
% DIFFERENCE (QC LIMIT 25%)	**7.6%**	**1.4%**	**0.2%**	**5.2%**	**6.0%**	**1.3%**	**3.9%**	**0.8%**	**1.6%**	**5.4%**	**18.5%**

6-Jun-00

STANDARD ANALYTES	11DCE	MeCl2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CT	TCE	112TCA	PCE
LLC-060600-ECD	1.65	1.17	2.23	2.28	2.82	0.26	0.24	0.29	0.22	0.34	0.23
ACTUAL CONCENTRATION	1.80	1.15	2.04	2.07	2.62	0.213	0.204	0.258	0.199	0.350	0.250
% DIFFERENCE (QC LIMIT 25%)	**8.3%**	**1.7%**	**9.3%**	**10.1%**	**7.6%**	**22.1%**	**17.6%**	**12.4%**	**10.6%**	**2.9%**	**8.0%**

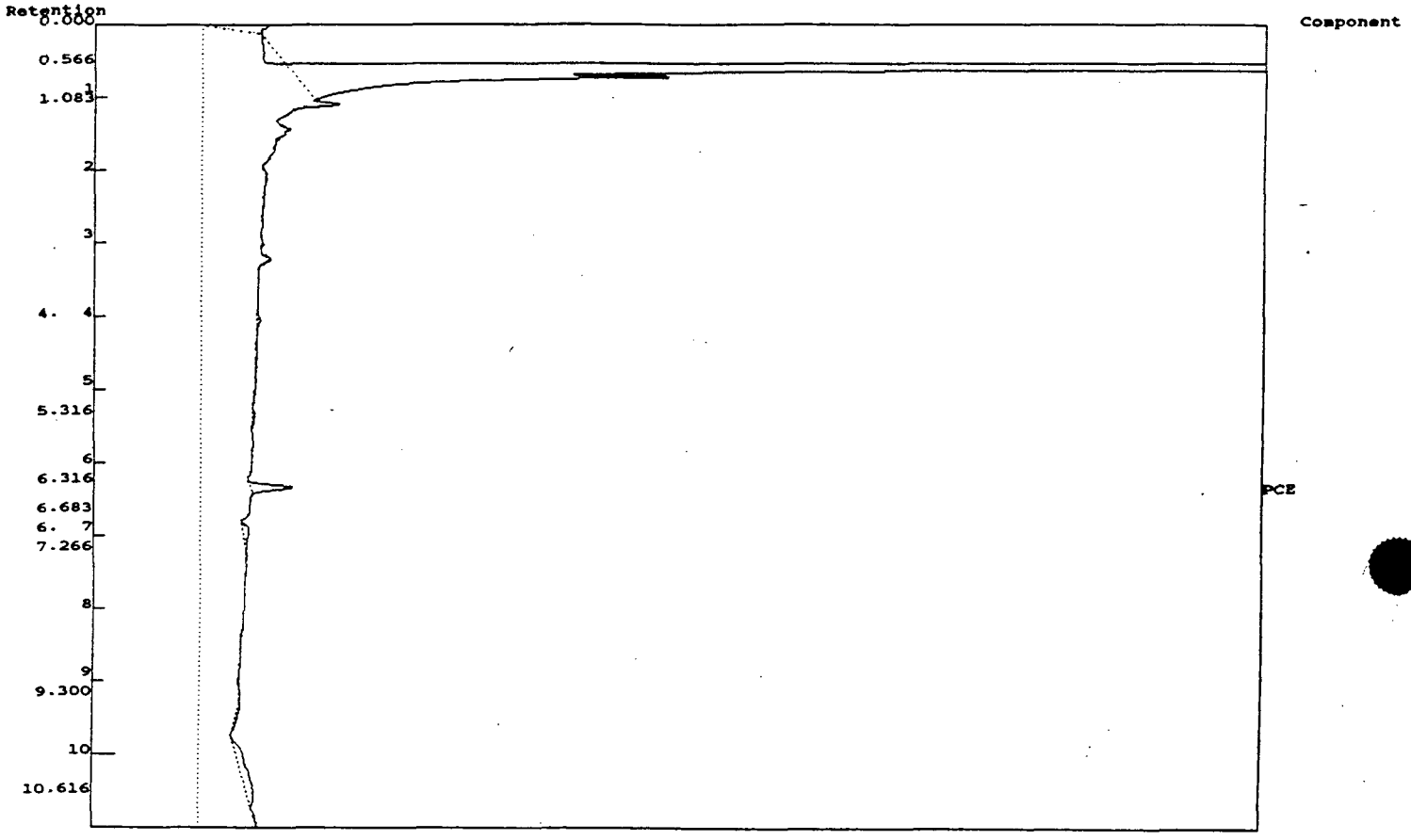
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 10:36:53
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E7.CHR (A:\)
Sample : EB-01
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	0.12 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.233	0.62 M	0.00	ug/L
	2		0.74	0.02	

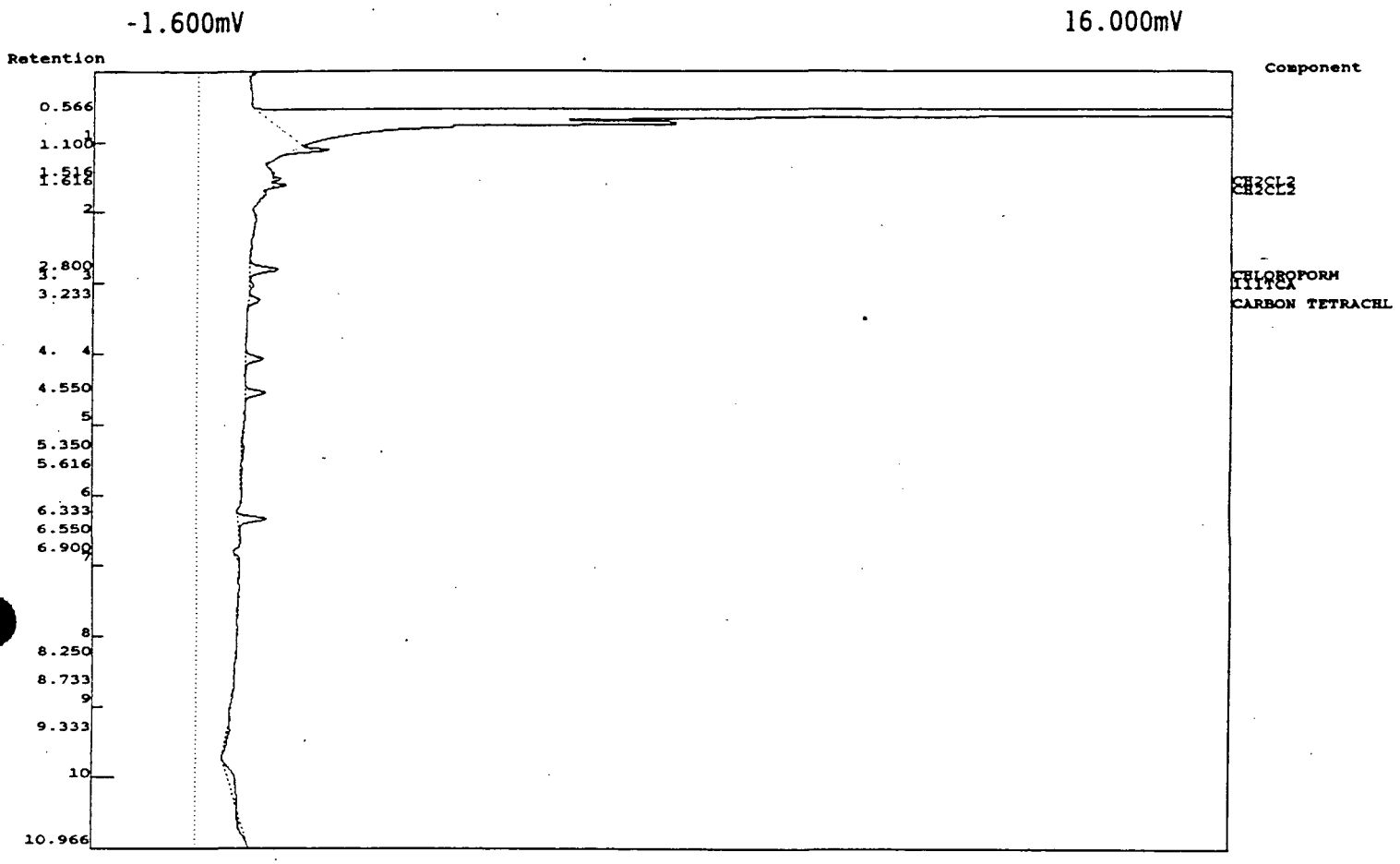
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 10:56:01
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E8.CHR (A:\)
Sample : SG-001
Operator : SGN

-1.600mV 16.000mV



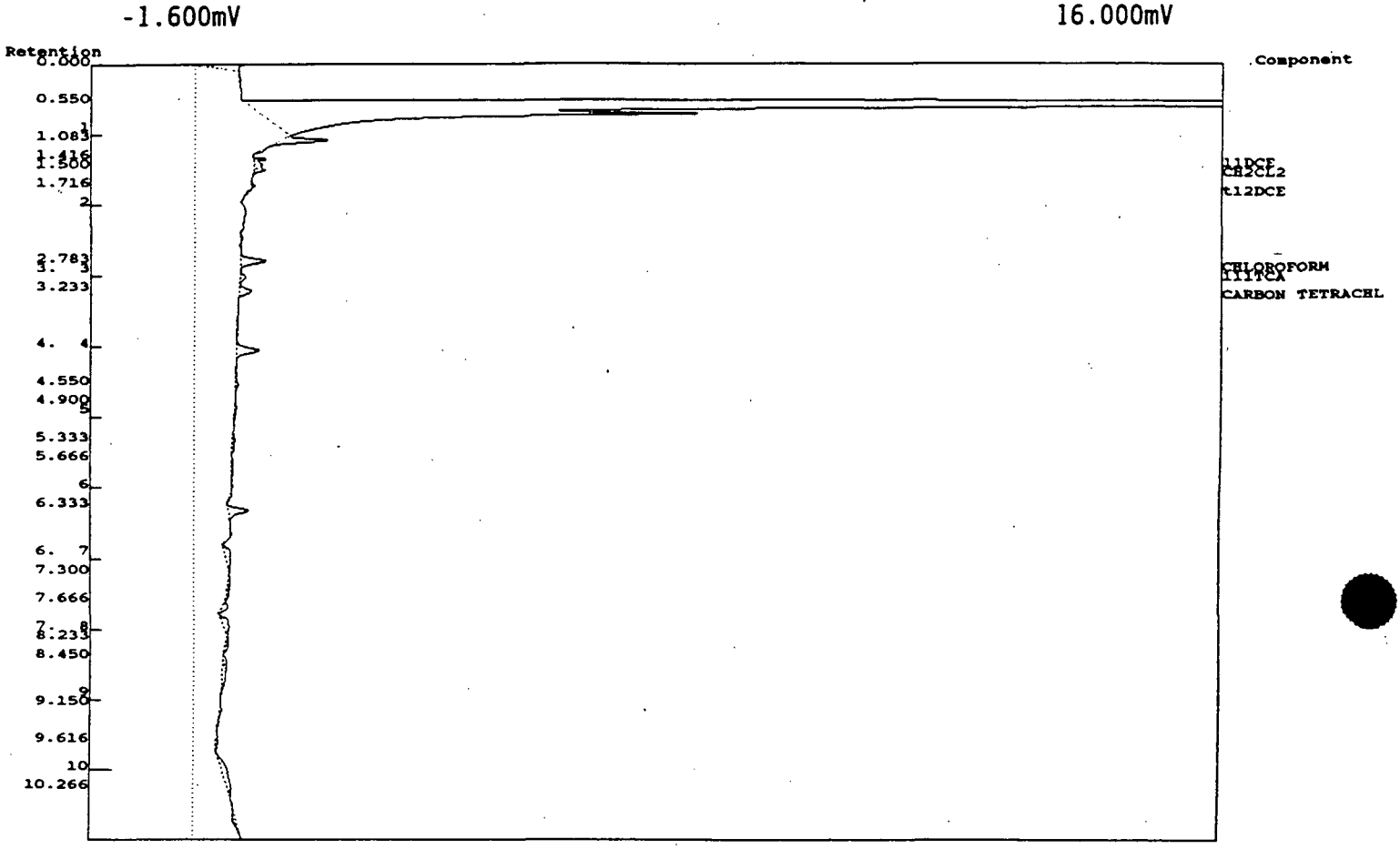
Component	Number	Retention	Area	External	Units
PCE	11	6.316	3.24 M	0.01	ug/L
1			3.24	0.01	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 11:15:01
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E9.CHR (A:\)
Sample : SG-002
Operator : SGN



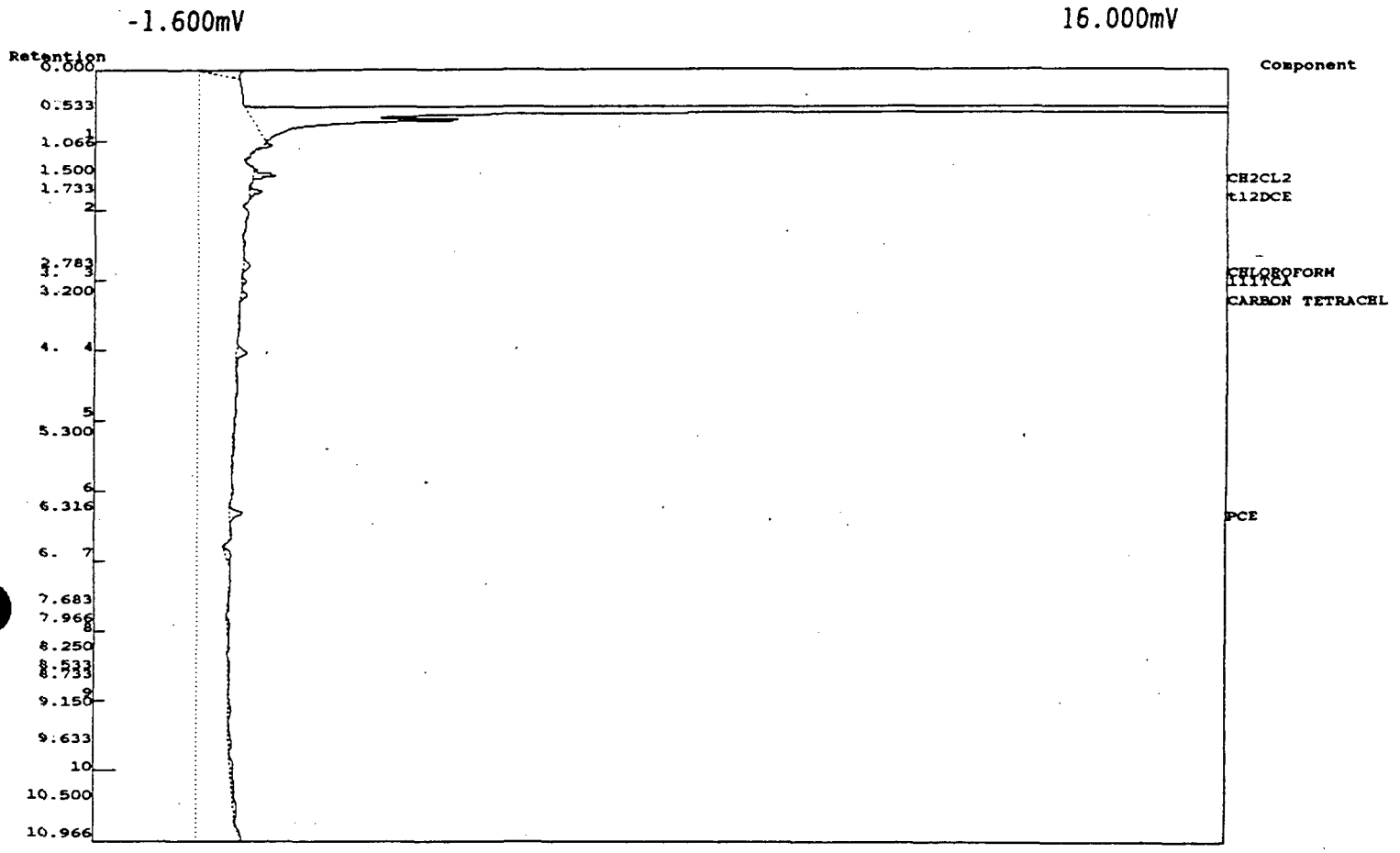
Component	Number	Retention	Area	External	Units
CH2CL2	2	1.516	0.33 M	0.29	ug/L
CH2CL2	2	1.616	0.55 M	0.48	ug/L
CHLOROFORM	6	2.800	2.41 M	0.04	ug/L
111TCA	7	3.033	0.27 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	0.95 M	0.00	ug/L
	5		4.52	0.82	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 11:39:39
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E10.CHR (A:\)
Sample : SG-008
Operator : SGN



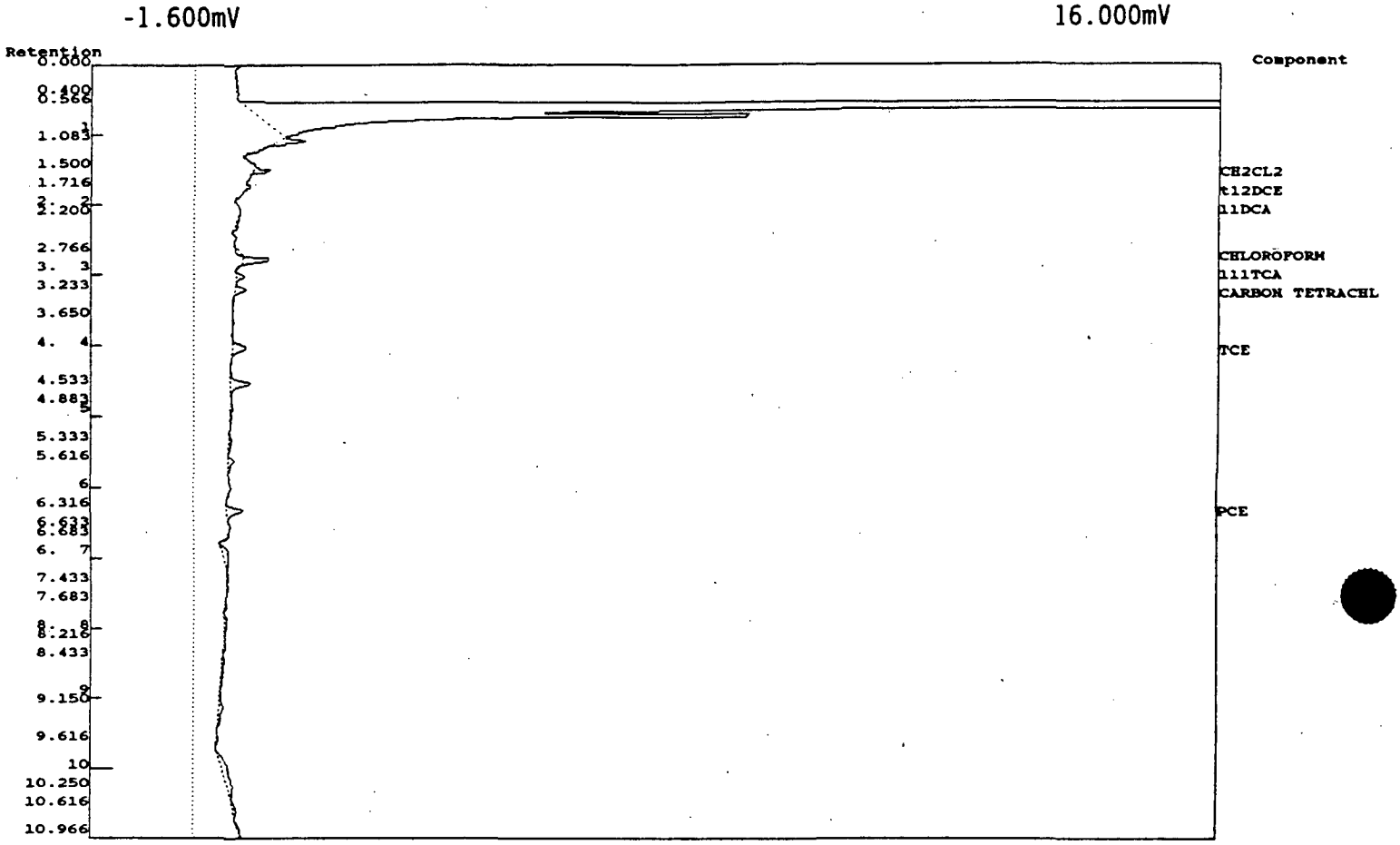
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	0.41 M	0.06	ug/L
11DCE	1	1.416	0.39 M	0.06	ug/L
CH2CL2	2	1.500	0.68 M	0.59	ug/L
t12DCE	3	1.716	0.20 M	0.44	ug/L
CHLOROFORM	6	2.783	2.05 M	0.04	ug/L
111TCA	7	3.016	0.47 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	1.04 M	0.00	ug/L
	7		5.24	1.21	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 12:04:22
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E11.CHR (A:\)
Sample : SG-010
Operator : SGN



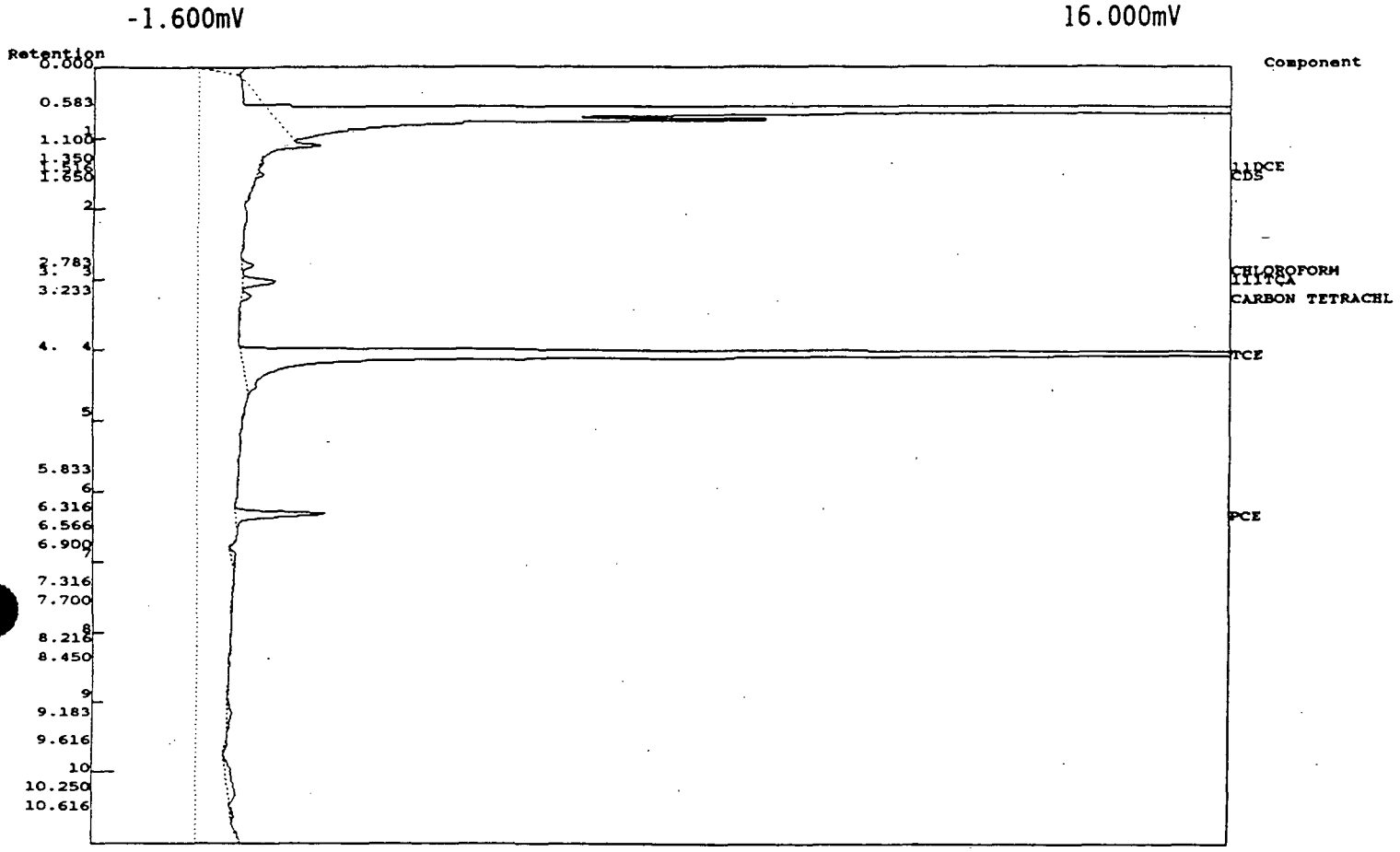
Component	Number	Retention	Area	External	Units
~~CH2CL2~~	~~2~~	~~1.500~~	~~1.32 M~~	~~1.15~~	~~ug/L~~
~~t12DCE~~	~~3~~	~~1.733~~	~~0.95 M~~	~~2.09~~	~~ug/L~~
CHLOROFORM	6	2.783	0.67 M	0.01	ug/L
111TCA	7	3.016	0.29 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.200	0.51 M	0.00	ug/L
PCE	11	6.316	1.21	0.01	ug/L
	6		4.95	3.27	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 13:04:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E13.CHR (A:\)
Sample : SG-014
Operator : SGN



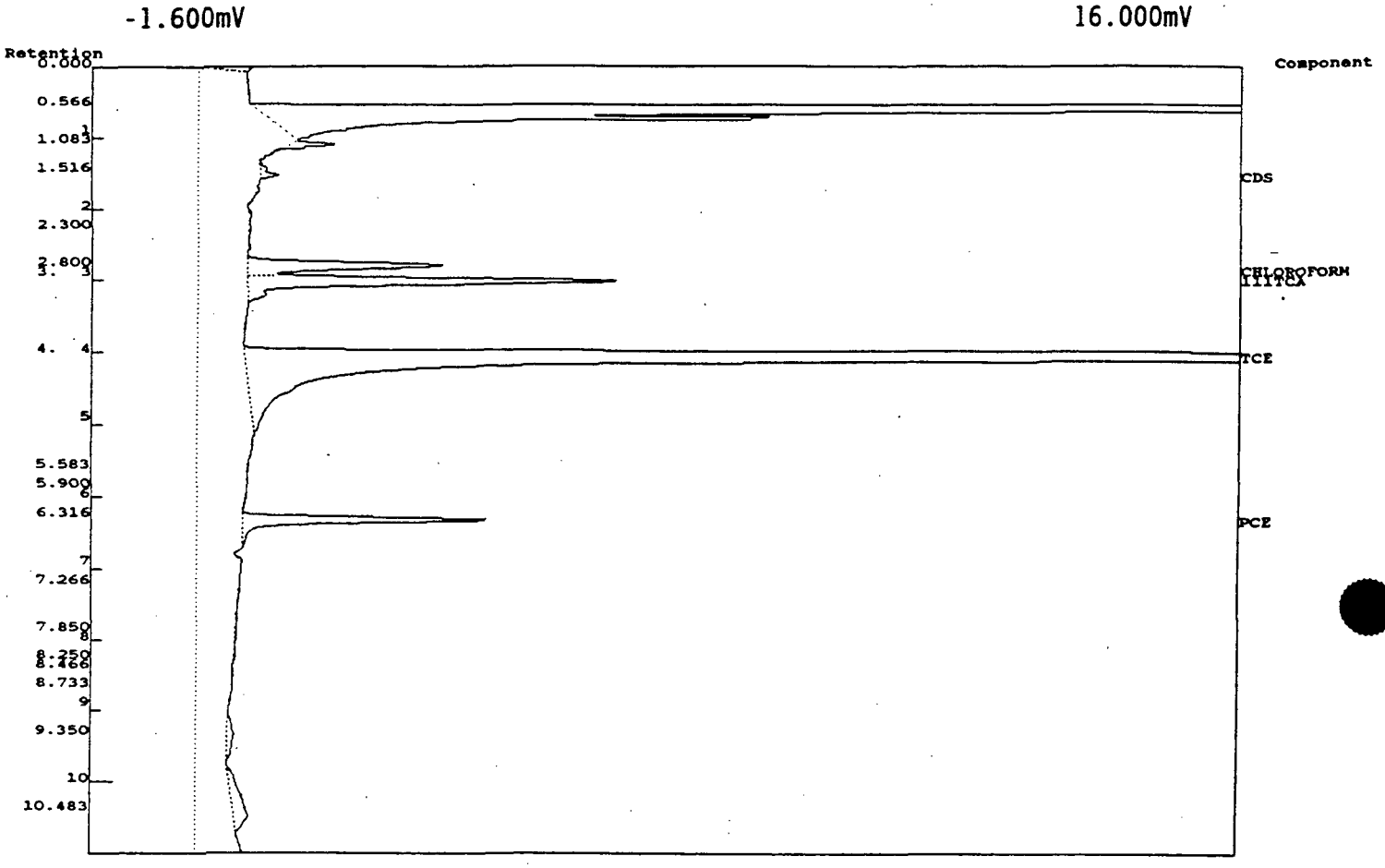
Component	Number	Retention	Area	External	Units
CH2CL2	2	1.500	0.76 M	0.66	ug/L
t12DCE	3	1.716	0.13 M	0.29	ug/L
11DCA	4	2.100	0.53 M	0.51	ug/L
CHLOROFORM	6	2.766	1.91 M	0.04	ug/L
111TCA	7	3.033	0.64 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	0.79 M	0.00	ug/L
TCE	9	4.033	1.39 M	0.02	ug/L
PCE	11	6.316	1.44 M	0.01	ug/L
	8		7.58	1.53	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 14:15:23
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E16.CHR (A:\)
Sample : SG-015
Operator : SGN



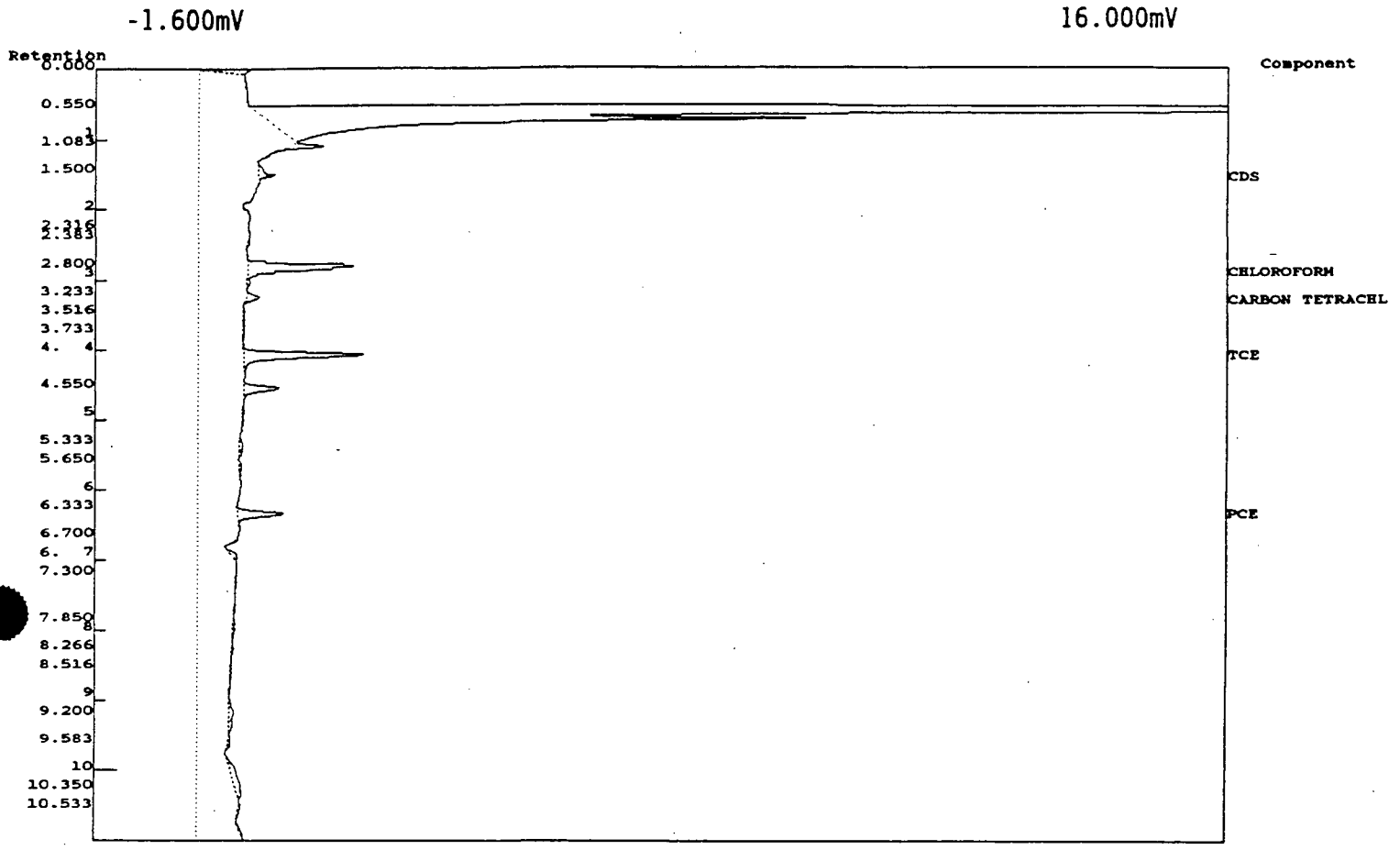
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	0.20 M	0.03	ug/L
CDS	0	1.516	0.40 M	N/A	
CHLOROFORM	6	2.783	0.94 M	0.02	ug/L
111TCA	7	3.016	3.09 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.233	0.74 M	0.00	ug/L
TCE	9	4.066	132.92 M	2.11	ug/L
PCE	11	6.316	7.59 M	0.03	ug/L
	7		145.89	1.21	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 14:34:29
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E17.CHR (A:\)
Sample : SG-019
Operator : SGN



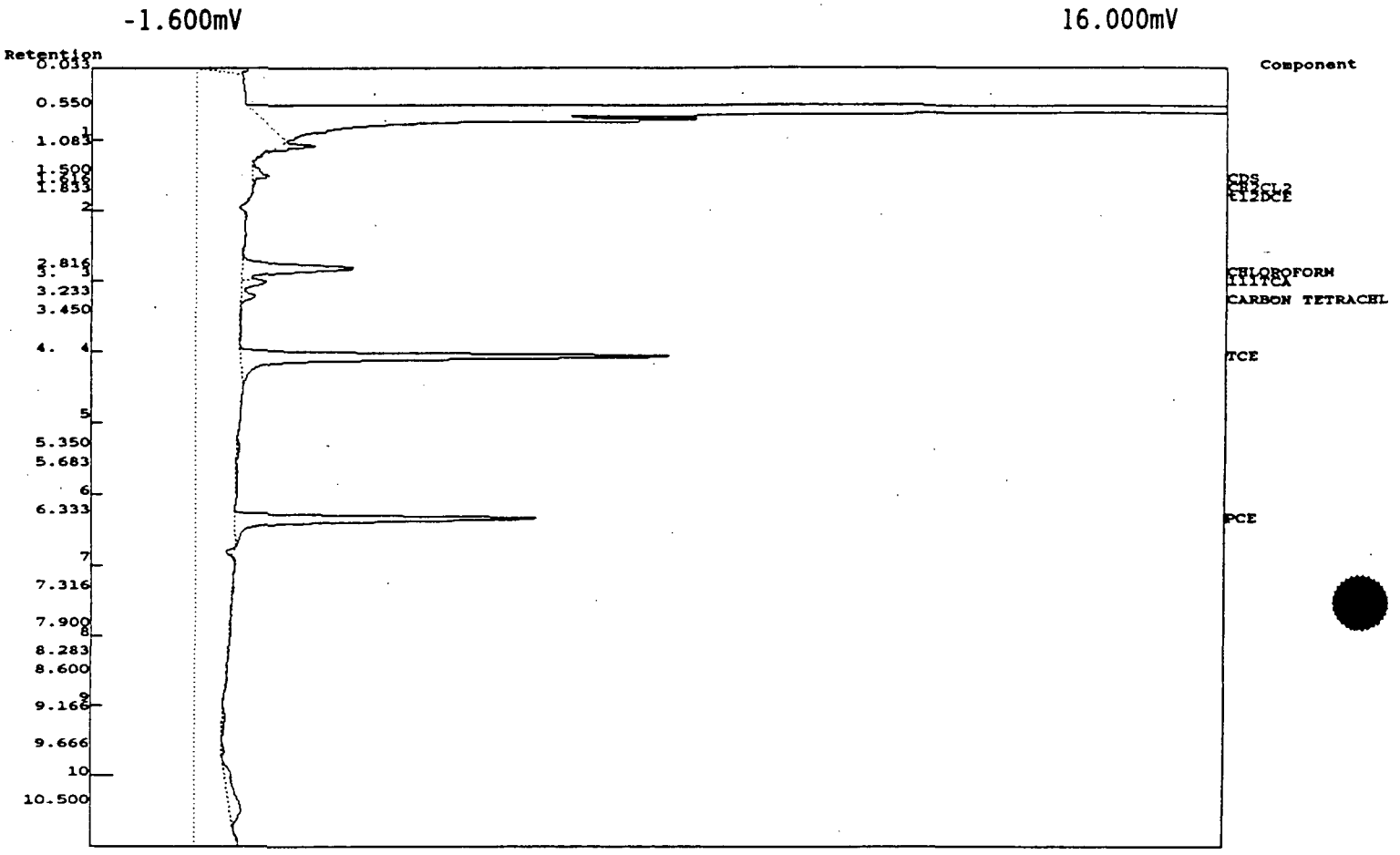
Component	Number	Retention	Area	External	Units
CDS	0	1.516	1.52 M	N/A	
CHLOROFORM	6	2.800	20.30 M	0.38	ug/L
111TCA	7	3.016	39.51 M	0.28	ug/L
TCE	9	4.066	396.51 M	6.28	ug/L
PCE	11	6.316	21.82 M	0.10	ug/L
	5		479.66	6.03	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 15:32:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E19.CHR (A:\)
Sample : SG-035
Operator : SGN



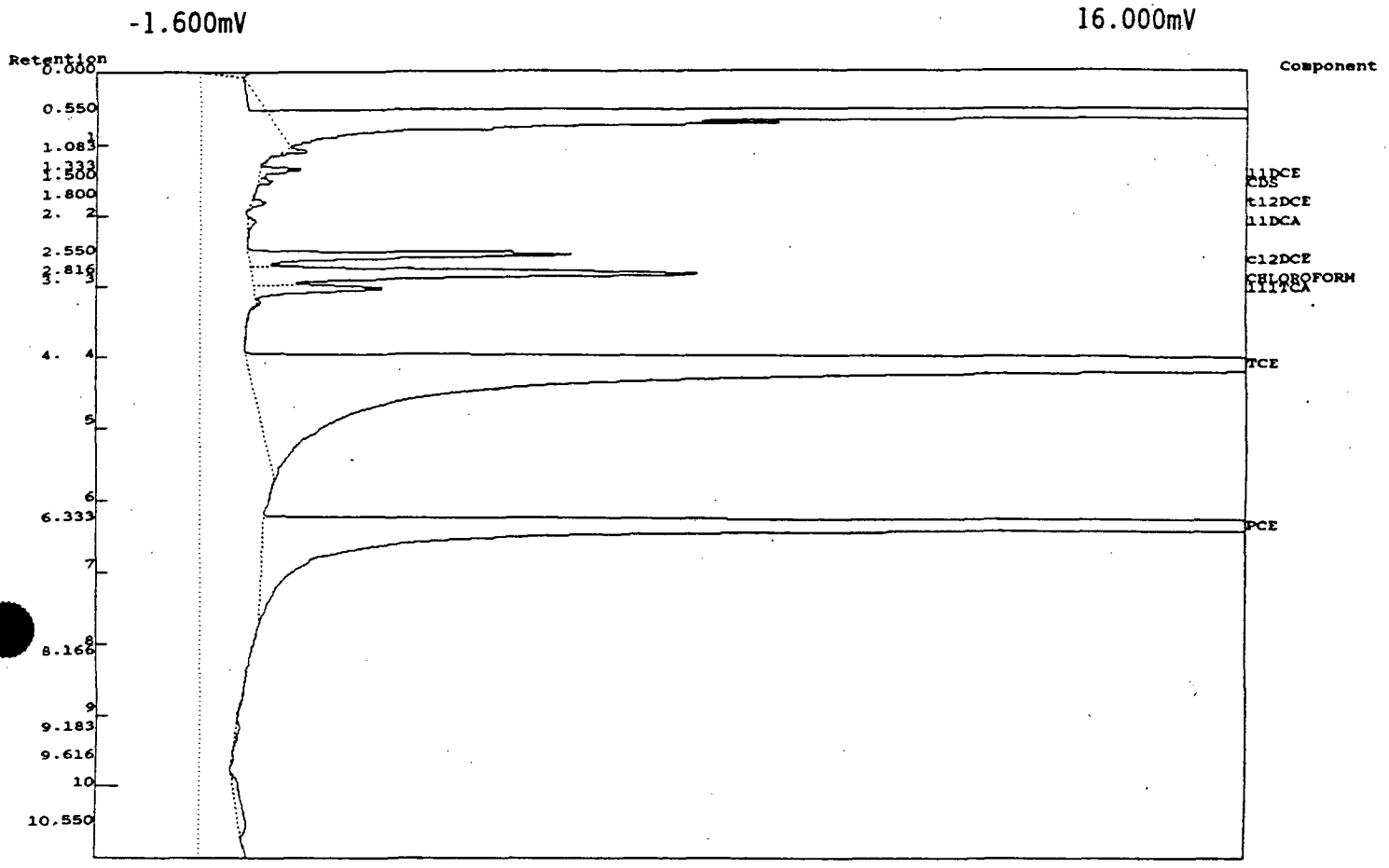
Component	Number	Retention	Area	External	Units
CDS	0	1.500	1.26 M	N/A	
CHLOROFORM	6	2.800	11.01 M	0.20	ug/L
CARBON TETRACHLORIDE	8	3.233	1.03 M	0.00	ug/L
TCE	9	4.066	10.31 M	0.16	ug/L
PCE	11	6.333	3.76 M	0.02	ug/L
	5		27.36	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 15:56:13
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E20.CHR (A:\)
Sample : SG-036
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.500	1.70 M	N/A	
CH2CL2	2	1.616	0.10 M	0.09	ug/L
t12DCE	3	1.833	0.13 M	0.29	ug/L
CHLOROFORM	6	2.816	12.95 M	0.24	ug/L
111TCA	7	3.033	2.56 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.233	1.50 M	0.00	ug/L
TCE	9	4.066	39.29 M	0.62	ug/L
PCE	11	6.333	27.35 M	0.12	ug/L
	8		85.59	0.39	

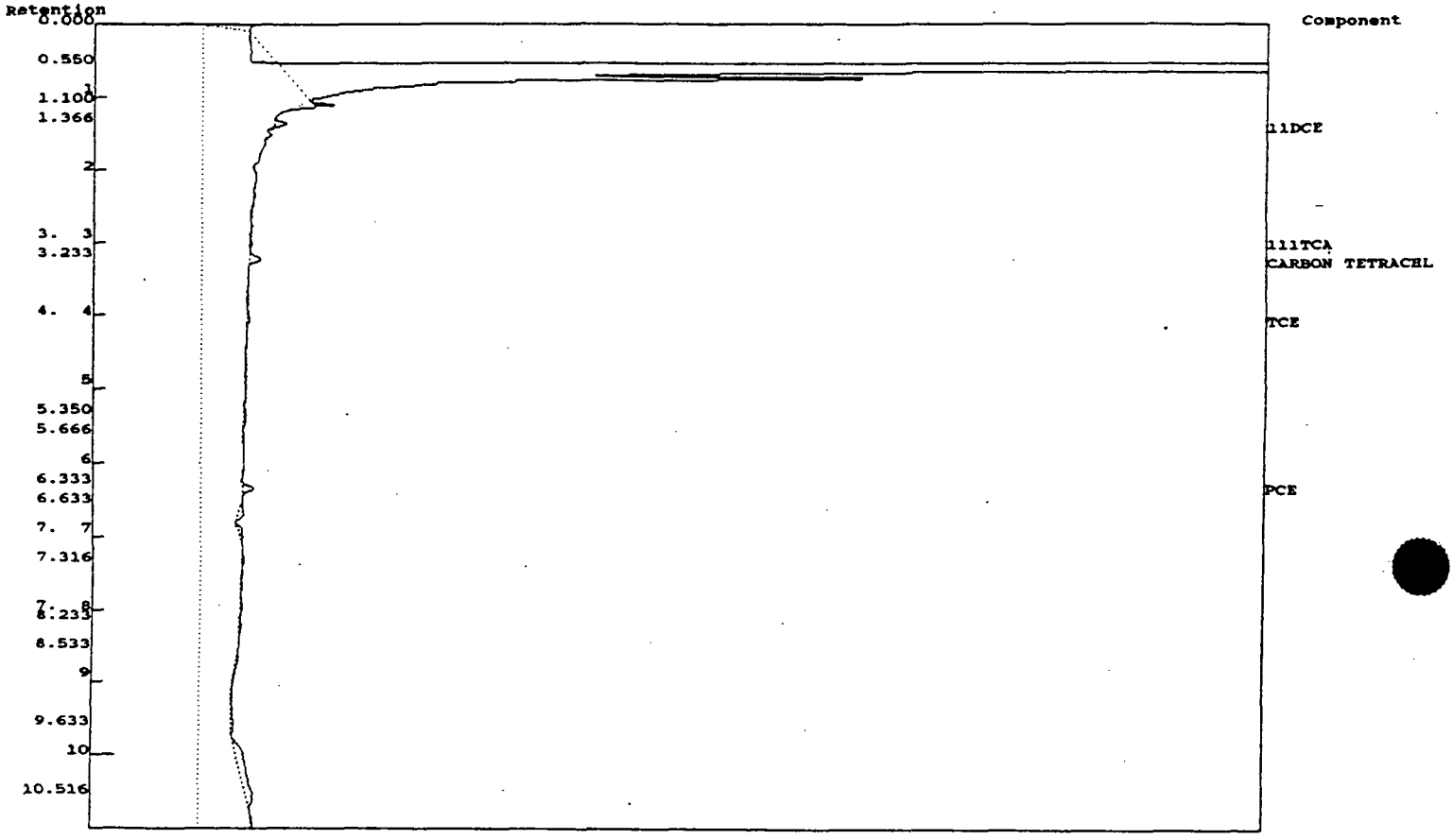
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 16:19:37
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E21.CHR (A:\)
Sample : SG-037
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	2.82 M	0.45	ug/L
CDS	0	1.500	1.11 M	N/A	
t12DCE	3	1.800	1.25 M	2.75	ug/L
11DCA	4	2.083	0.87 M	0.84	ug/L
c12DCE	5	2.550	28.19 M	105.97	ug/L
CHLOROFORM	6	2.816	51.09 M	0.94	ug/L
111TCA	7	3.033	13.33 M	0.09	ug/L
TCE	9	4.066	1755.92 M	27.83	ug/L
PCE	11	6.333	721.14 M	3.21	ug/L
	9		2575.73	141.08	

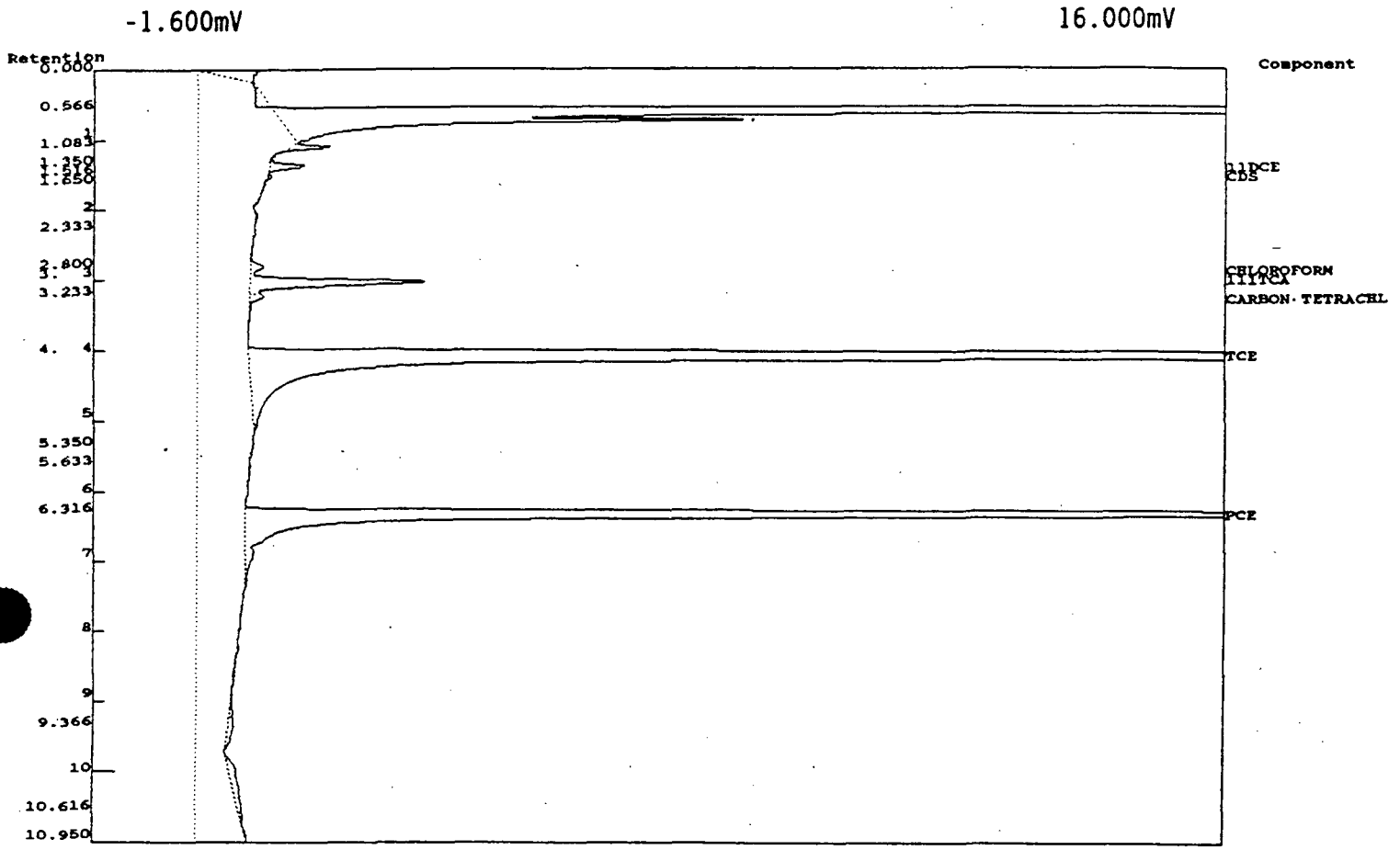
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 17:10:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E22.CHR (A:\)
Sample : EB-02
Operator : SGN

-1.600mV 16.000mV



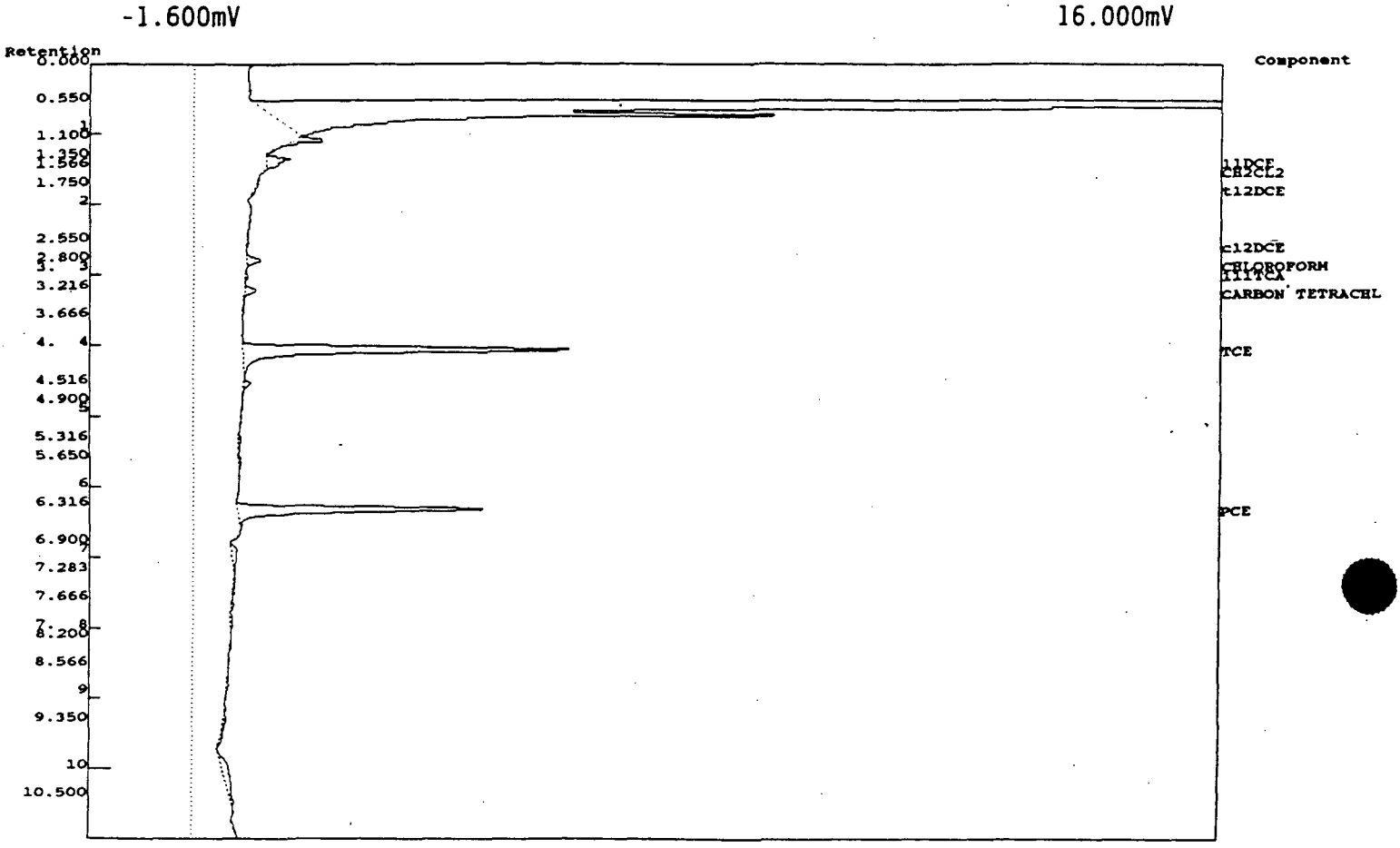
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	0.74 M	0.12	ug/L
111TCA	7	3.016	0.17 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	0.89 M	0.00	ug/L
TCE	9	4.066	0.16 M	0.00	ug/L
PCE	11	6.333	0.89 M	0.00	ug/L
	5		2.84	0.12	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 17:29:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E23.CHR (A:\)
Sample : SG-025
Operator : SGN



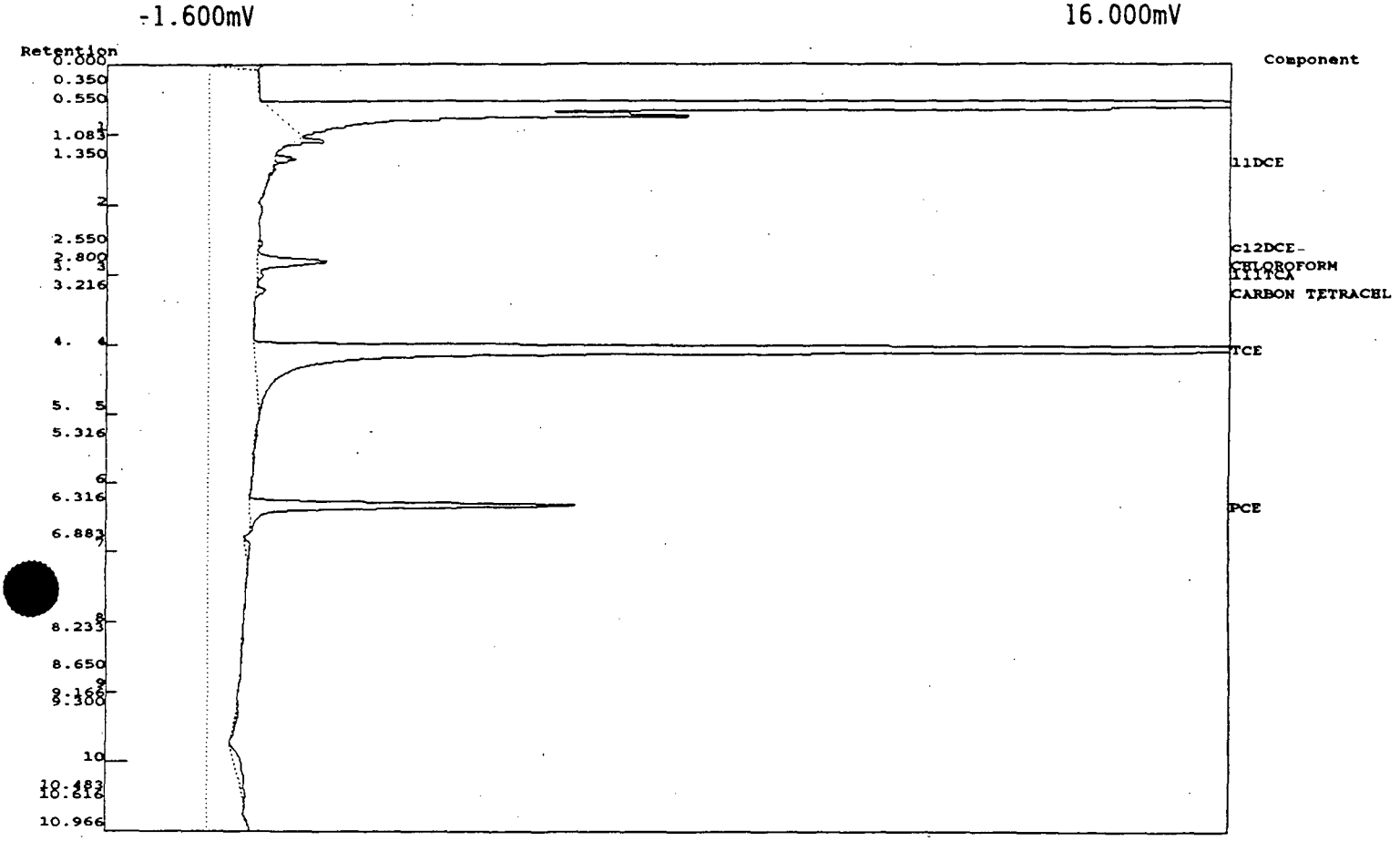
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.78 M	0.44	ug/L
CDS	0	1.516	0.19 M	N/A	
CHLOROFORM	6	2.800	1.35 M	0.03	ug/L
111TCA	7	3.033	17.81 M	0.13	ug/L
CARBON TETRACHLORIDE	8	3.233	1.67 M	0.00	ug/L
TCE	9	4.066	284.63 M	4.51	ug/L
PCE	11	6.316	168.28 M	0.75	ug/L
	7		476.70	4.85	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 17:48:12
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E24.CHR (A:\)
Sample : SG-039
Operator : SGN



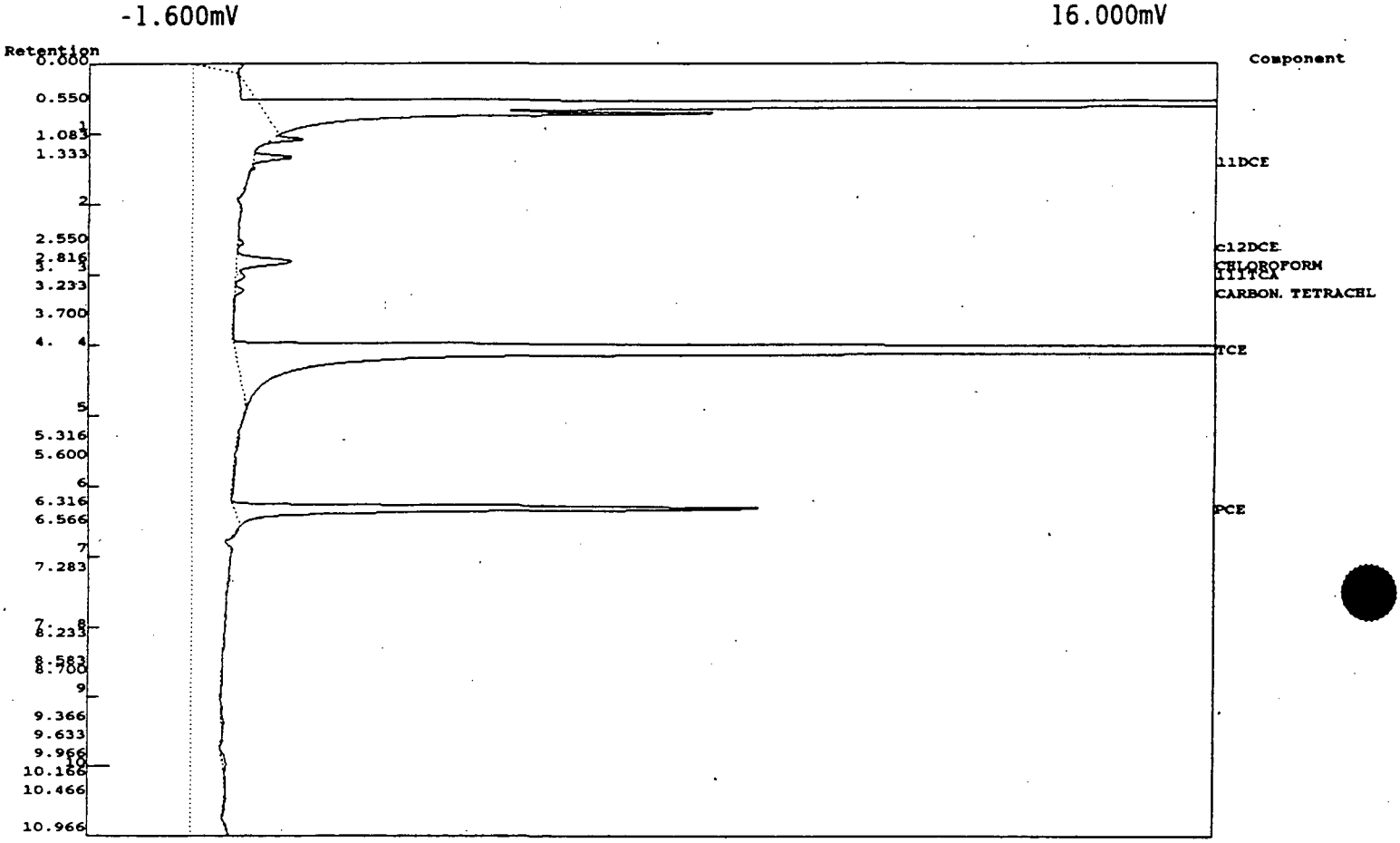
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.13 M	0.34	ug/L
CH2CL2	2	1.566	0.11 M	0.10	ug/L
t12DCE	3	1.750	0.17 M	0.37	ug/L
c12DCE	5	2.550	0.10 M	0.38	ug/L
CHLOROFORM	6	2.800	1.13 M	0.02	ug/L
111TCA	7	3.016	0.18 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	0.98 M	0.00	ug/L
TCE	9	4.050	29.70 M	0.47	ug/L
PCE	11	6.316	21.09 M	0.09	ug/L
	9		55.59	1.77	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 18:07:13
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E25.CHR (A:\)
Sample : SG-047
Operator : SGN



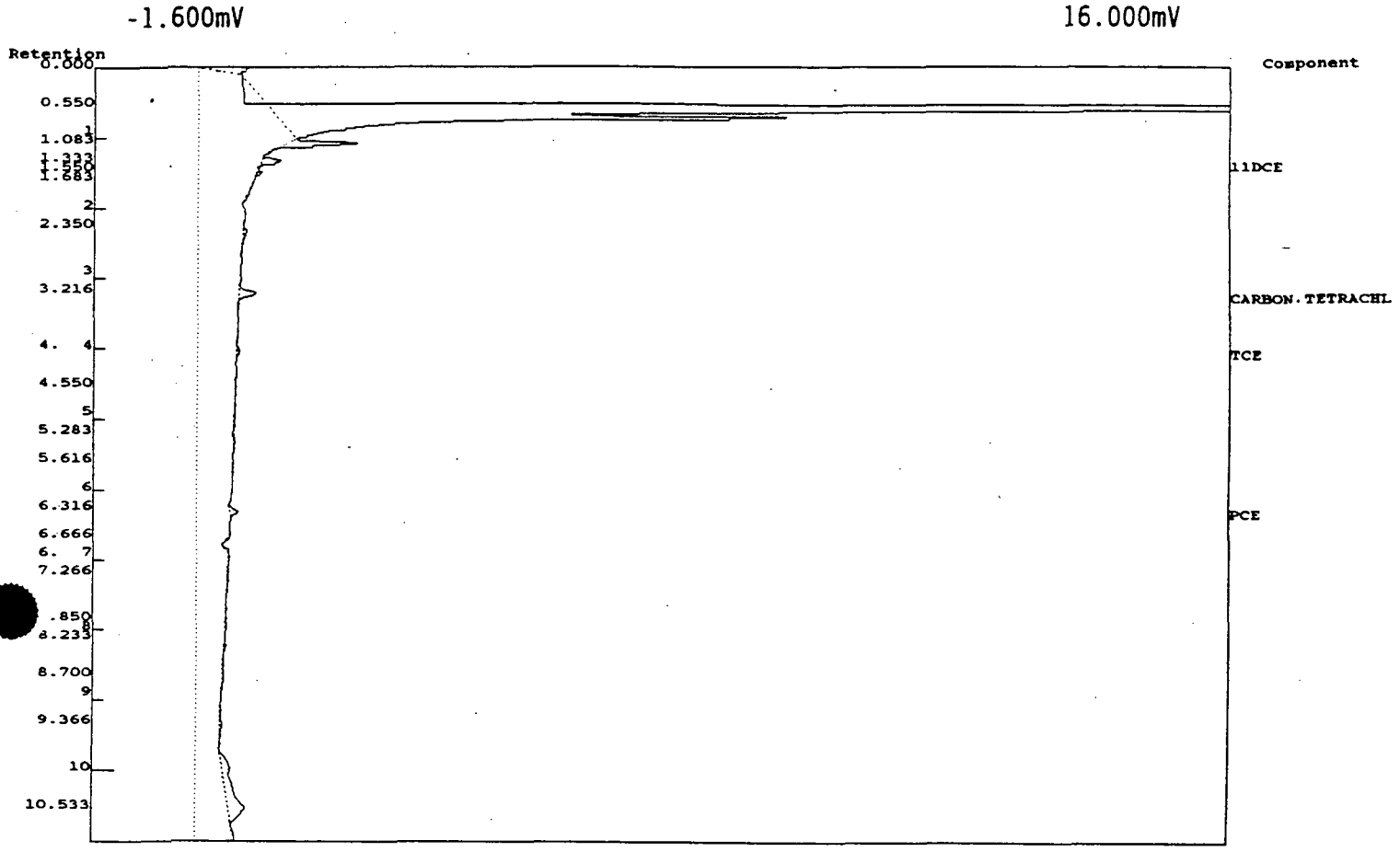
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	1.50 M	0.24	ug/L
c12DCE	5	2.550	0.35 M	1.30	ug/L
CHLOROFORM	6	2.800	7.98 M	0.15	ug/L
111TCA	7	3.000	0.48 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	0.74 M	0.00	ug/L
TCE	9	4.050	199.72 M	3.17	ug/L
PCE	11	6.316	29.75 M	0.13	ug/L
	7		**240.52**	**4.99**	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 18:26:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E26.CHR (A:\)
Sample : SG-947
Operator : SGN



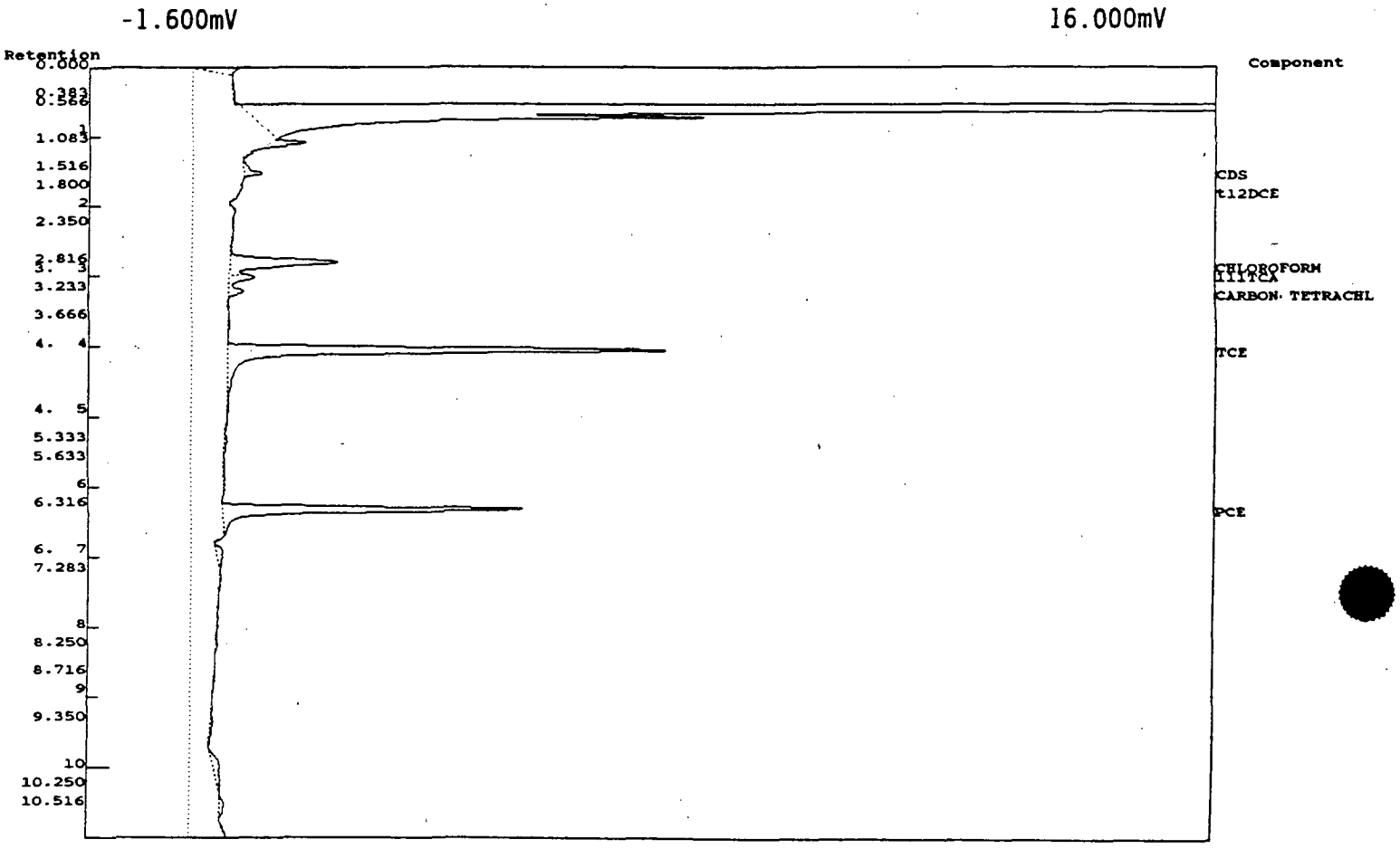
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	2.85 M	0.45	ug/L
c12DCE	5	2.550	0.41 M	1.54	ug/L
CHLOROFORM	6	2.816	6.31 M	0.12	ug/L
111TCA	7	3.016	0.90 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.233	0.85 M	0.00	ug/L
TCE	9	4.066	294.74 M	4.67	ug/L
PCE	11	6.316	46.76 M	0.21	ug/L
	7		352.81	7.00	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 18:45:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E27.CHR (A:\)
Sample : EB-03
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	1.41 M	0.22	ug/L
CDS	0	1.500	0.24 M	N/A	
CARBON TETRACHLORIDE	8	3.216	1.44 M	0.00	ug/L
TCE	9	4.050	0.37	0.01	ug/L
PCE	11	6.316	0.57 M	0.00	ug/L
	5		4.03	N/A	

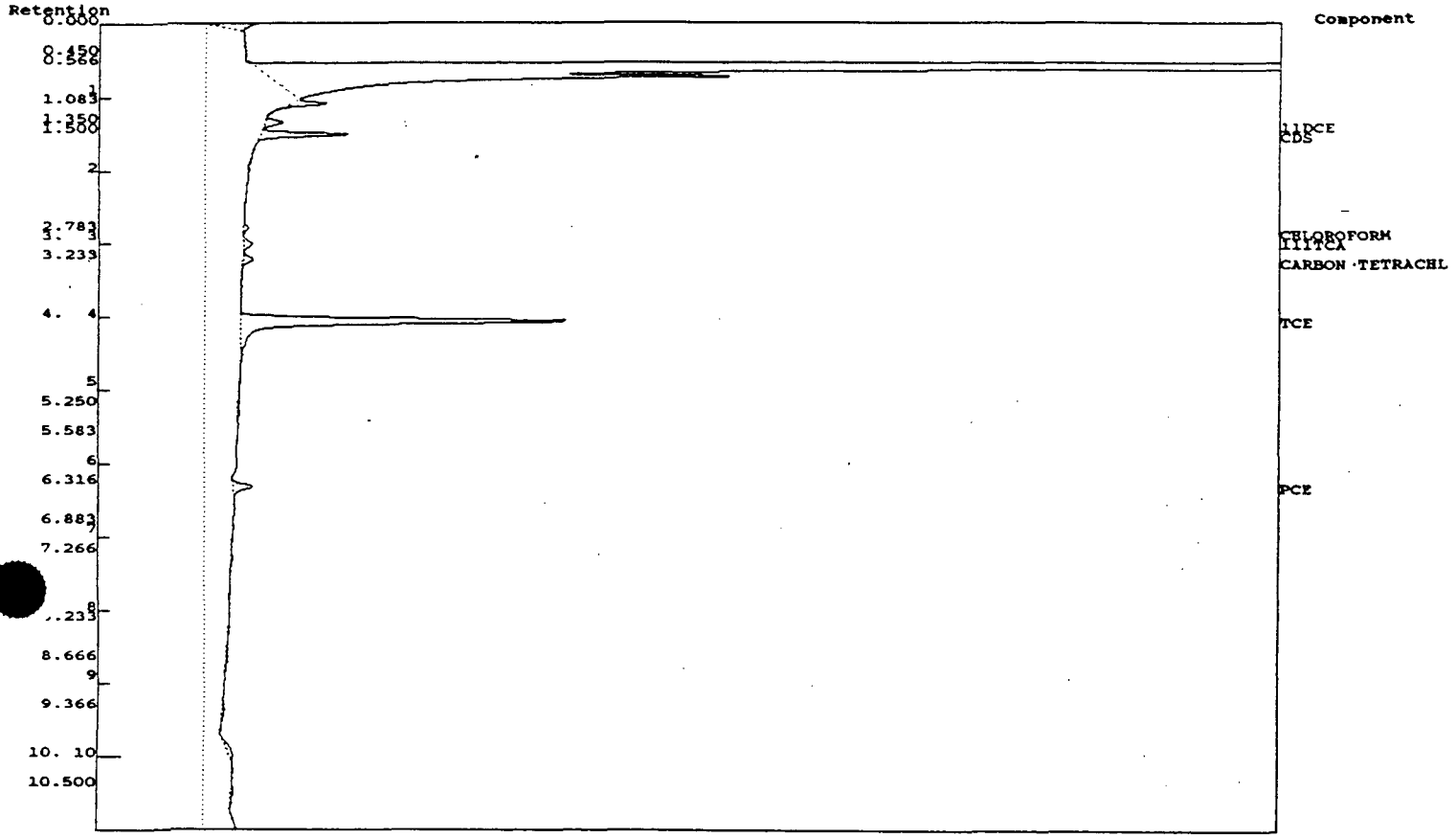
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 19:04:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E28.CHR (A:\)
Sample : SG-036-R
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.516	1.54 M	N/A	
t12DCE	3	1.800	0.16 M	0.35	ug/L
CHLOROFORM	6	2.816	12.66 M	0.23	ug/L
111TCA	7	3.016	2.53 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.233	1.50 M	0.00	ug/L
TCE	9	4.066	41.63 M	0.66	ug/L
PCE	11	6.316	27.19 M	0.12	ug/L
	7		87.21	0.38	

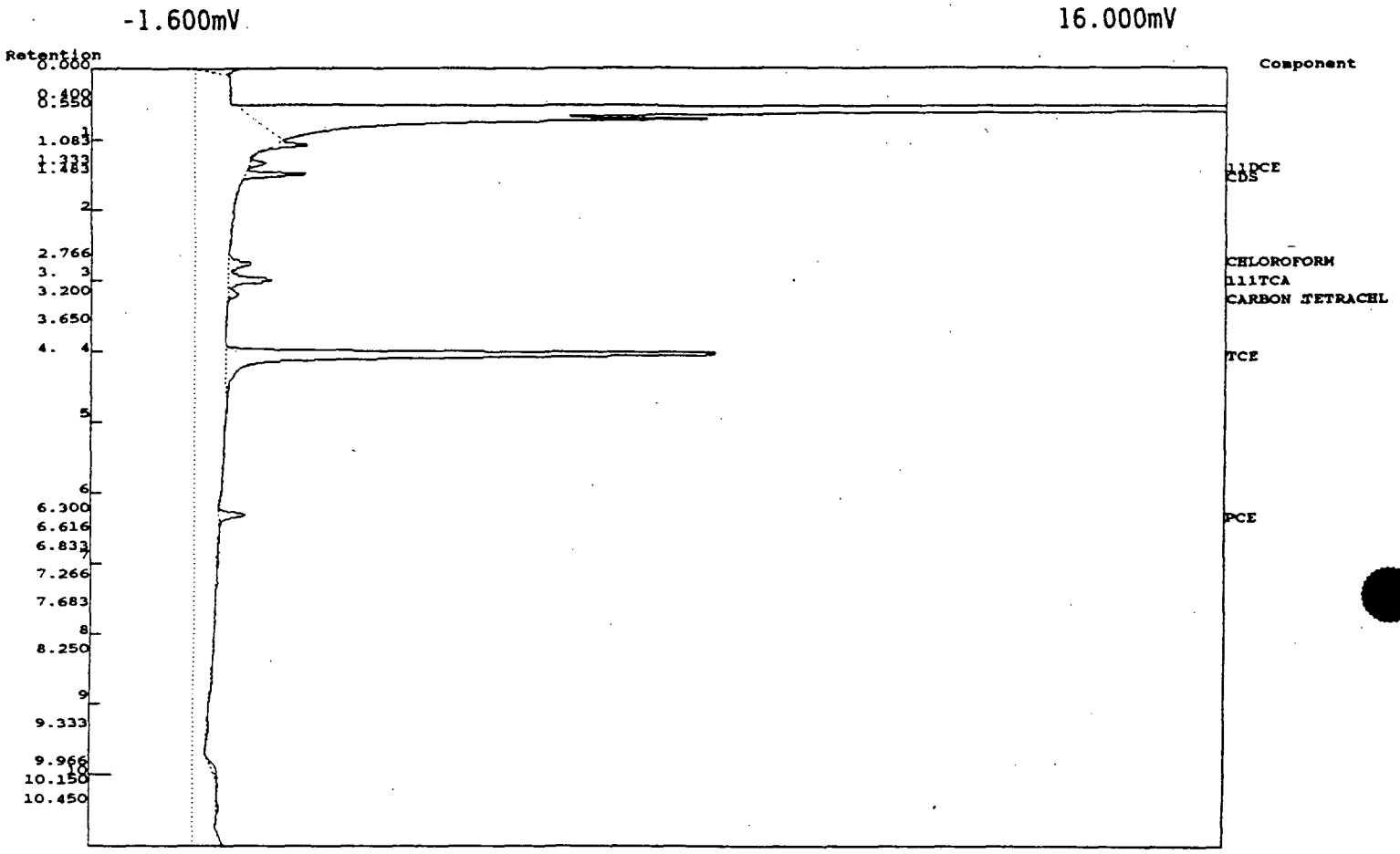
Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 19:23:15
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E29.CHR (A:\)
Sample : SG-015 (5X)
Operator : SGN

-1.600mV 16.000mV



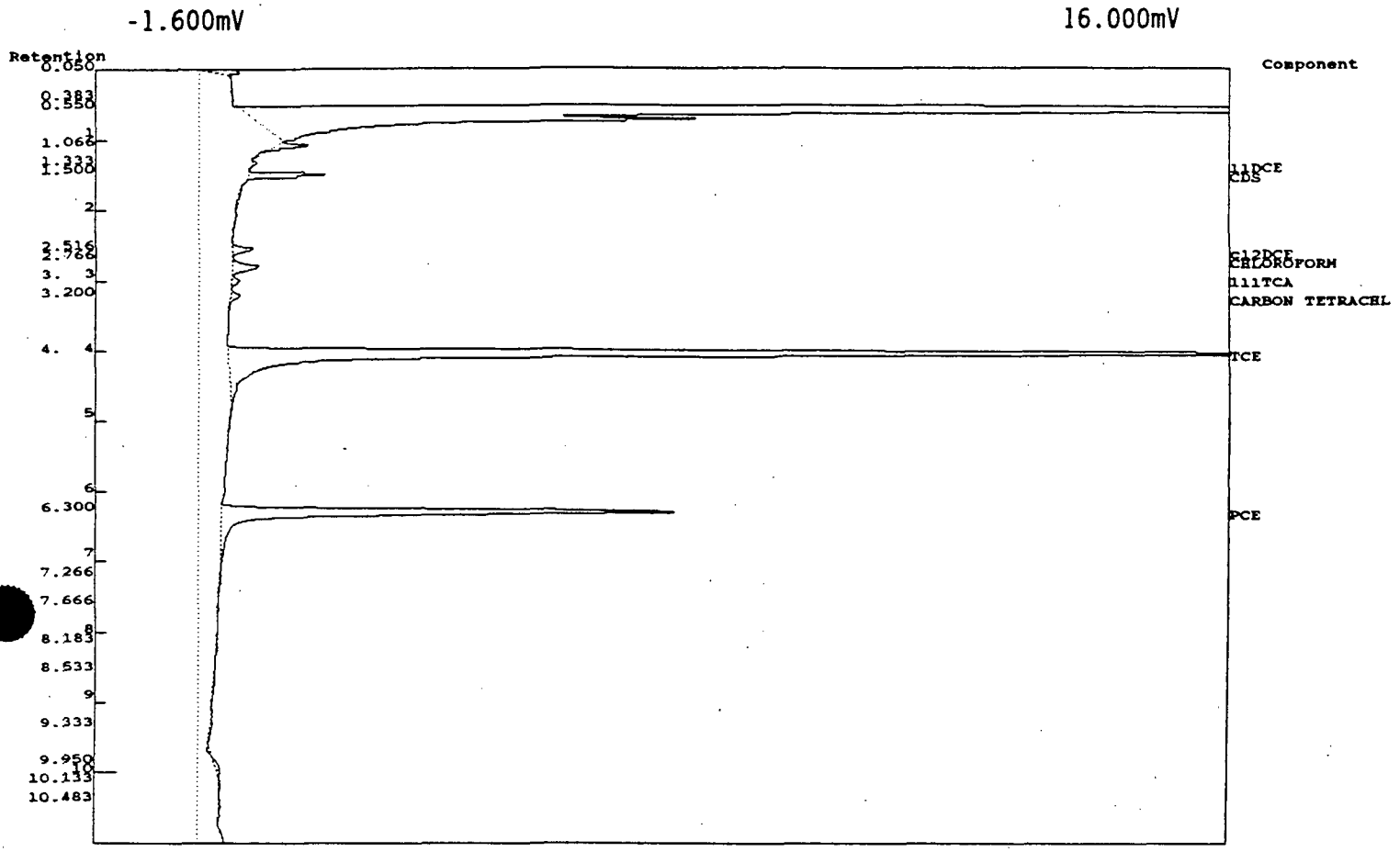
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	1.23 M	0.19	ug/L
CDS	0	1.500	4.99 M	N/A	
CHLOROFORM	6	2.783	0.35 M	0.01	ug/L
111TCA	7	3.016	0.74 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.233	0.89 M	0.00	ug/L
TCE	9	4.050	29.09 M	0.46	ug/L
PCE	11	6.316	1.76 M	0.01	ug/L
	7		39.04	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 19:42:16
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E30.CHR (A:\)
Sample : SG-019 (10X)
Operator : SGN



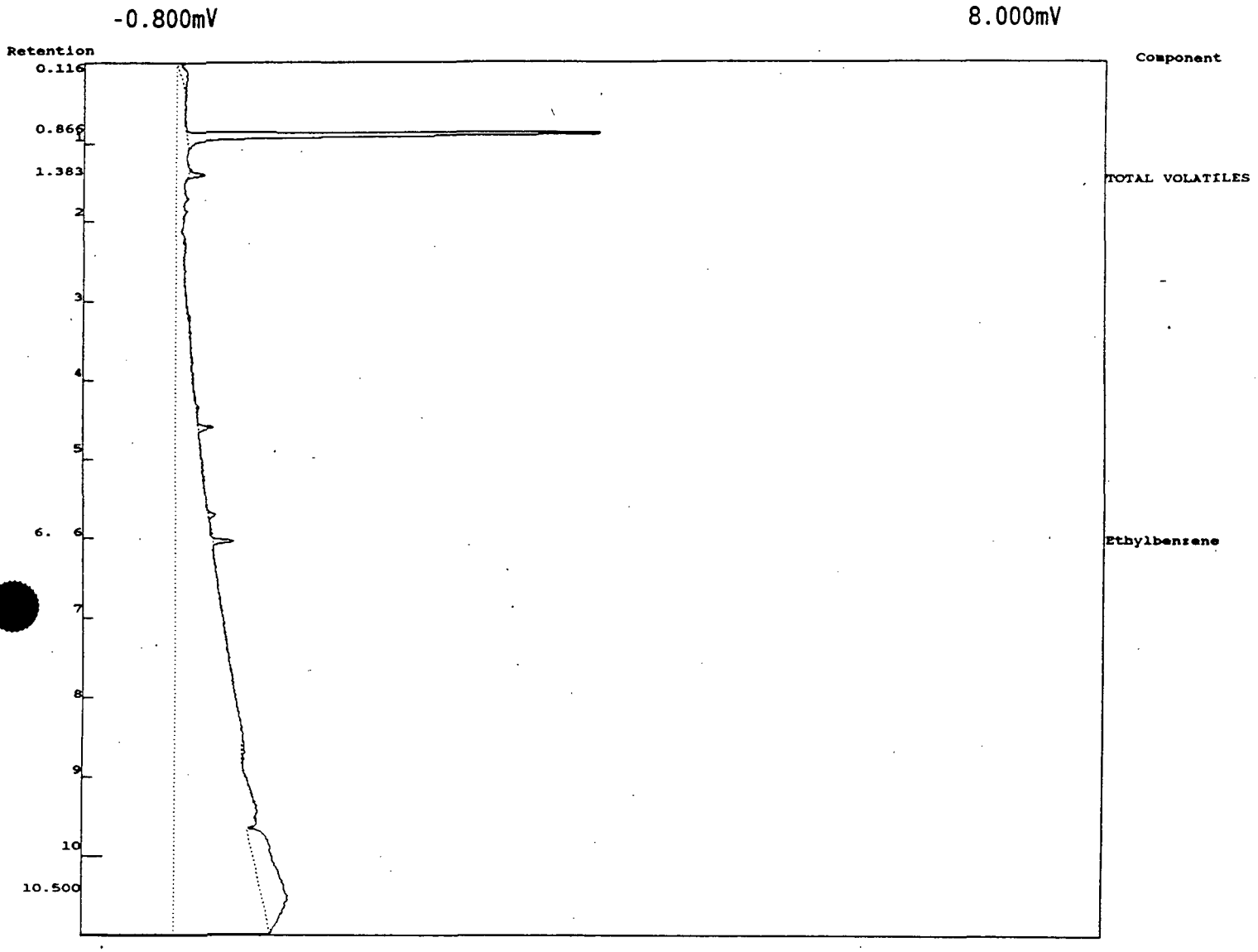
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	1.09 M	0.17	ug/L
CDS	0	1.483	3.71 M	N/A	
CHLOROFORM	6	2.766	2.21 M	0.04	ug/L
111TCA	7	3.000	4.25 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.200	1.02 M	0.00	ug/L
TCE	9	4.016	48.92 M	0.78	ug/L
PCE	11	6.300	2.33 M	0.01	ug/L
	7		63.53	0.03	

Lab name : COLUMBIA TECH
Analysis date : 05/23/2000 20:01:16
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY23E31.CHR (A:\)
Sample : SG-037 (20X)
Operator : SGN



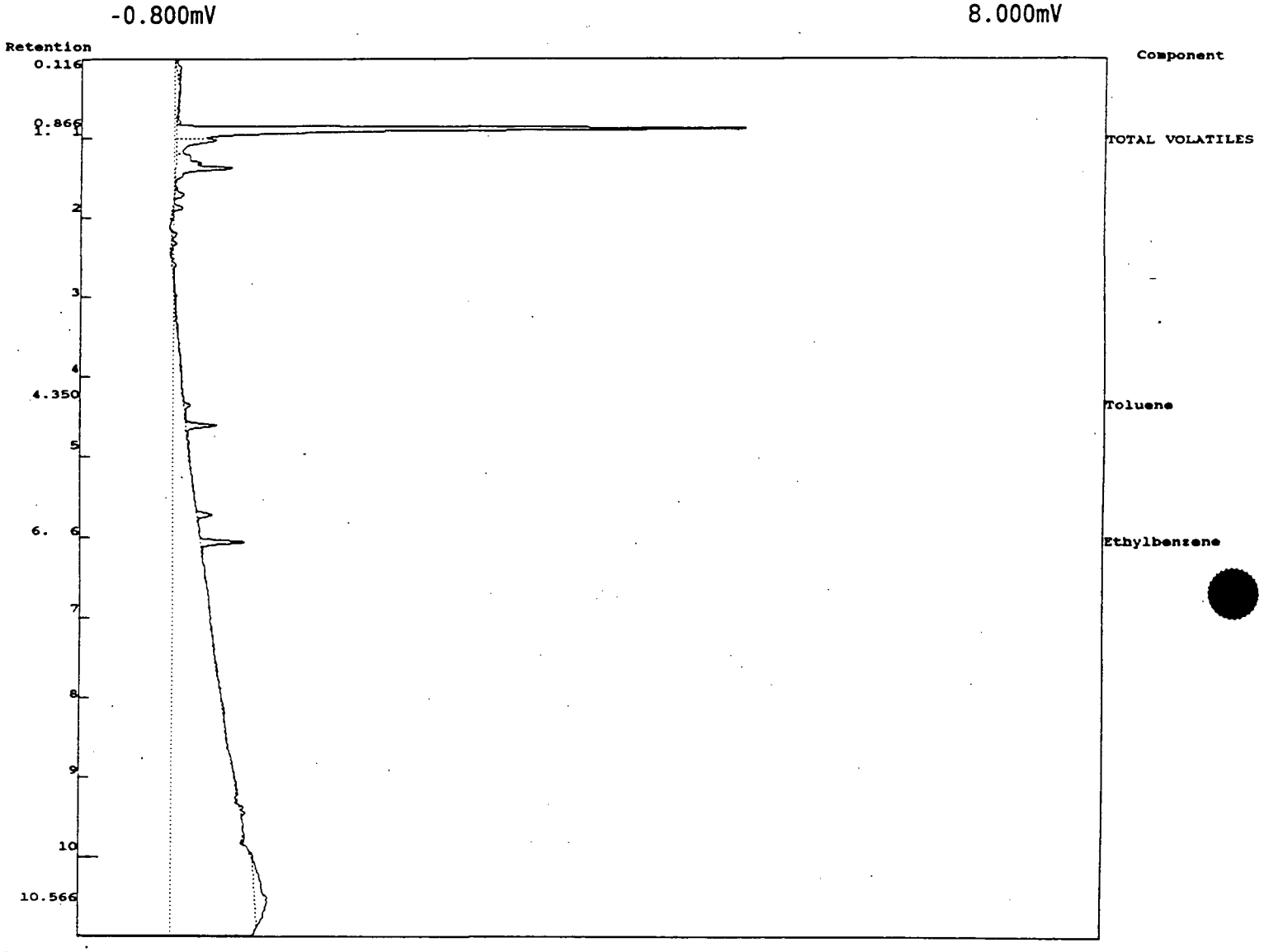
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	0.21 M	0.03	ug/L
CDS	0	1.500	4.64 M	N/A	
c12DCE	5	2.516	1.52	5.71	ug/L
CHLOROFORM	6	2.766	2.78 M	0.05	ug/L
111TCA	7	3.000	0.71 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.200	0.83	0.00	ug/L
TCE	9	4.033	110.38 M	1.75	ug/L
PCE	11	6.300	43.46 M	0.19	ug/L
	8		164.52	6.74	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F7.CHR (A:\)
Sample : EB-01
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	1.68 M	1.76	ug/L
Ethylbenzene	4	6.050	0.56 M	0.69	ug/L
	2		2.24	2.45	

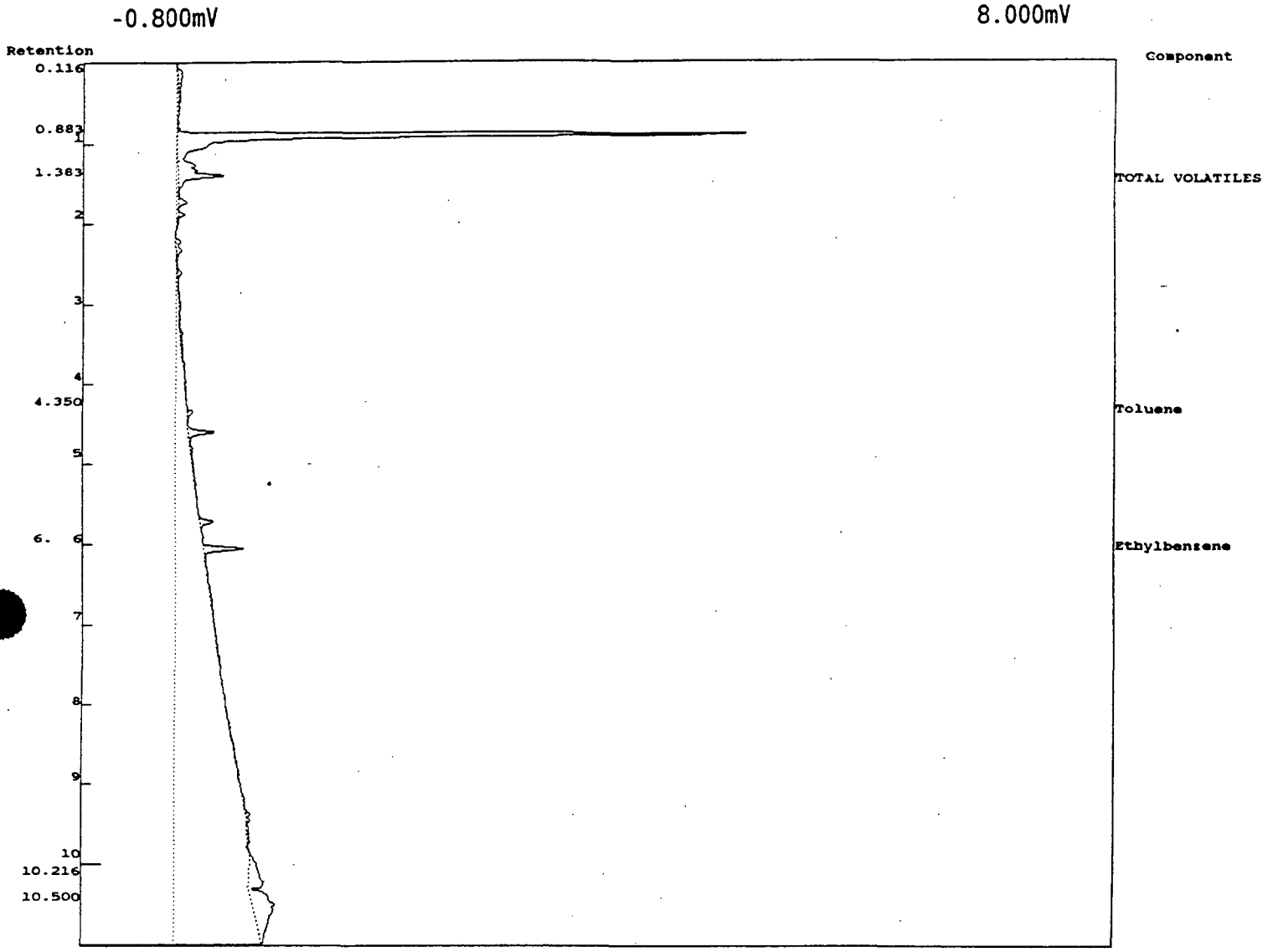
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F8.CHR (A:\)
Sample : SG-001
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	9.67 M	10.17	ug/L
Toluene	3	4.350	0.22 M	0.23	ug/L
~~Ethylbenzene~~	~~4~~	~~6.050~~	~~1.28 M~~	~~1.57~~	~~ug/L~~
	3		11.17	11.98	

300507

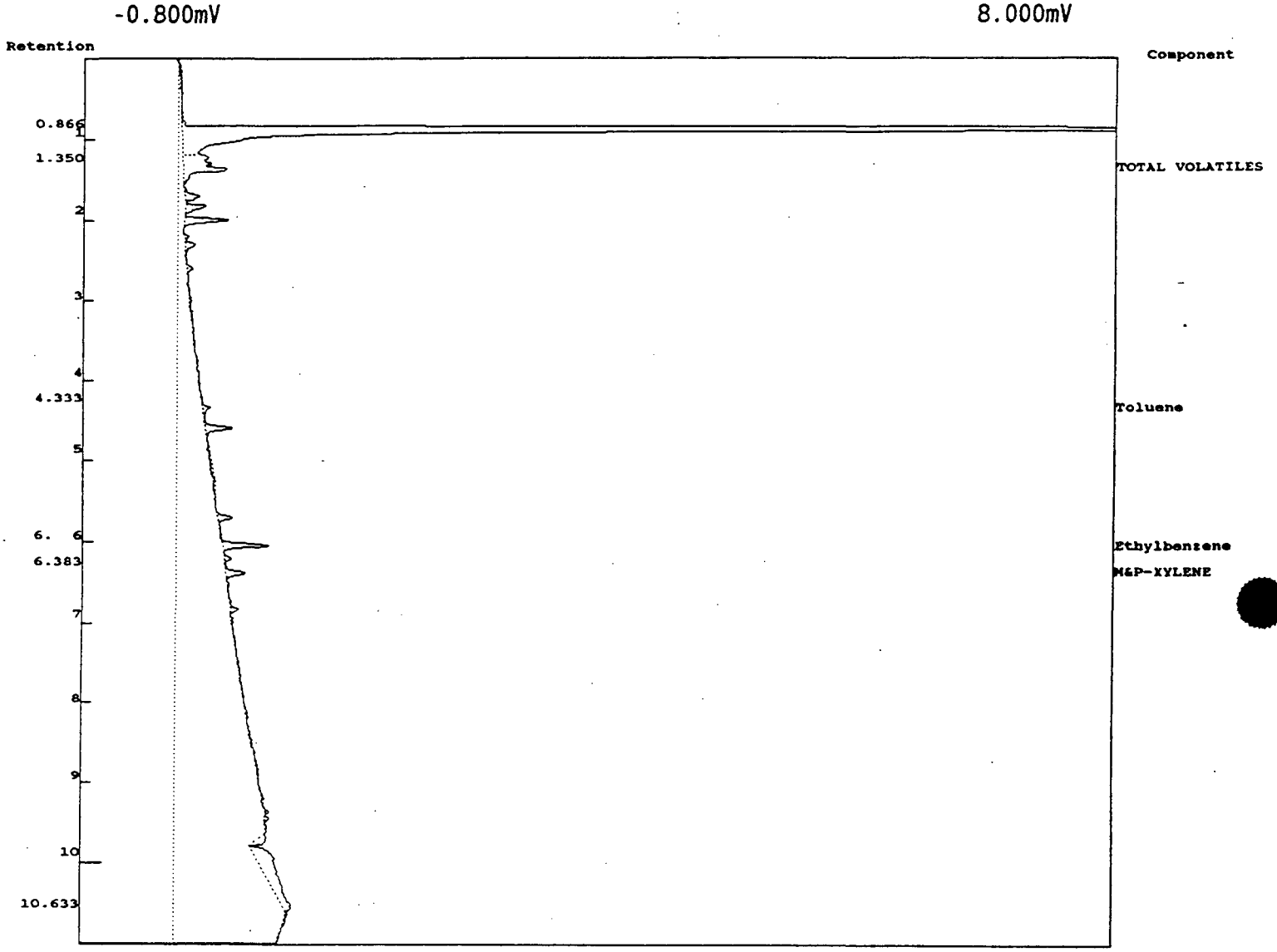
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F9.CHR (A:\)
Sample : SG-002
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	6.33 M	6.66	ug/L
Toluene	3	4.350	0.21 M	0.23	ug/L
~~Ethylbenzene~~	~~4~~	~~6.050~~	~~1.17 M~~	~~1.44~~	~~ug/L~~
	3		7.71	8.33	

300508

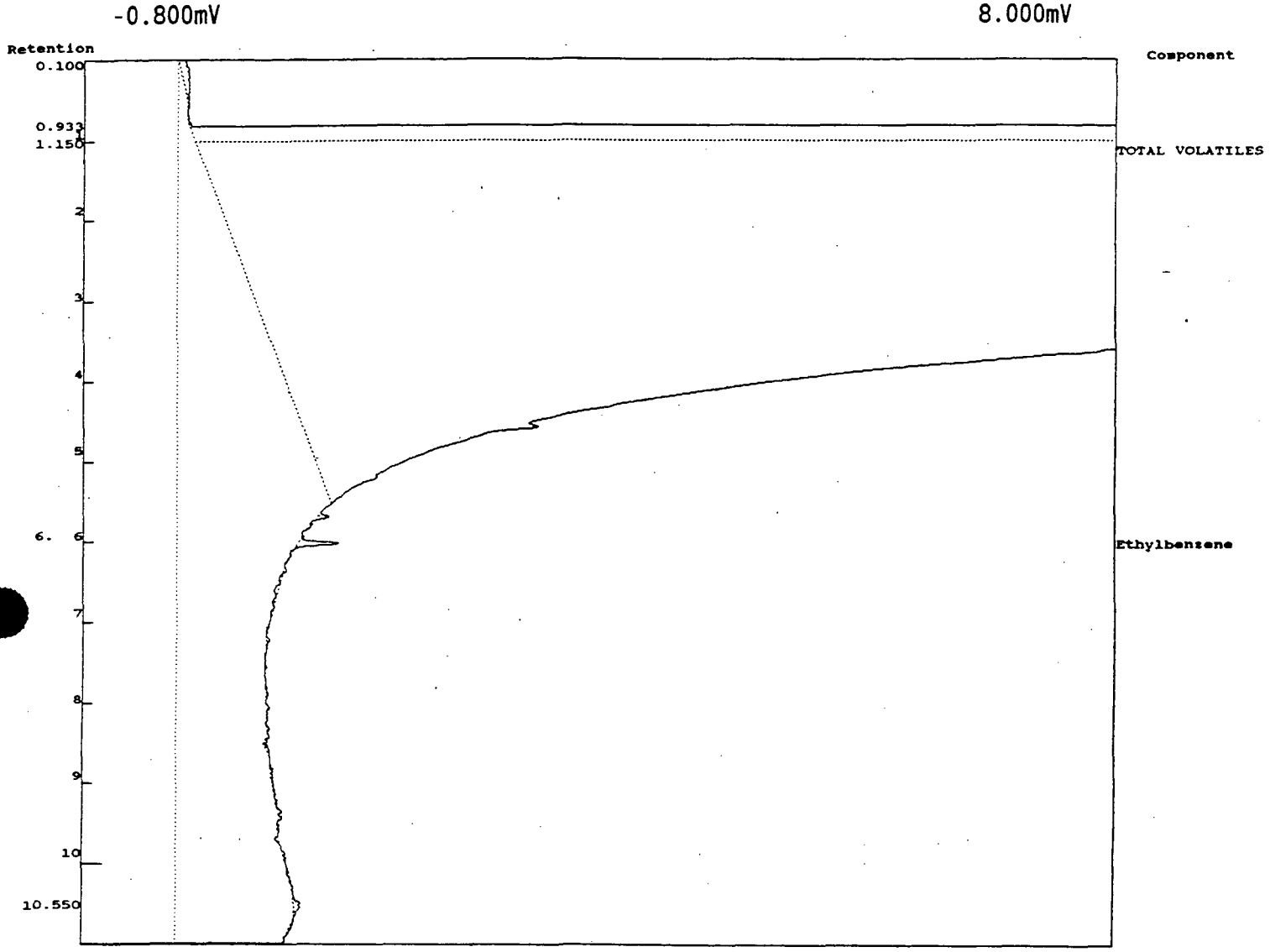
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F10.CHR (A:\)
Sample : SG-008
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	10.68 M	11.24	ug/L
Toluene	3	4.333	0.27 M	0.29	ug/L
~~Ethylbenzene~~	~~4~~	~~6.033~~	~~1.26 M~~	~~1.55~~	ug/L
M&P-XYLENE	5	6.383	0.66 M	0.87	ug/L
	4		12.88	13.95	

300509

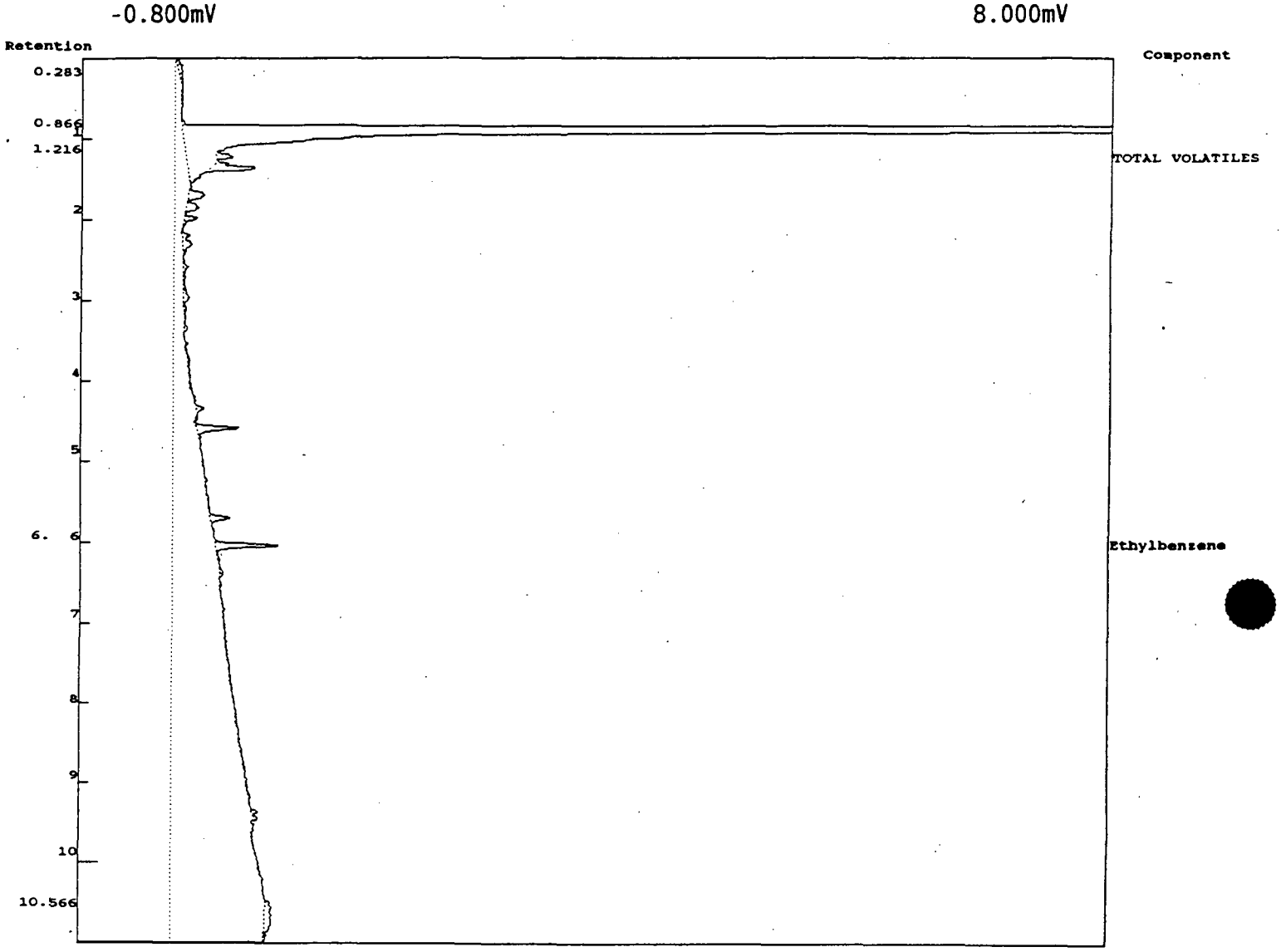
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F11.CHR (A:\)
Sample : SG-010
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.150	34646.81 M	36458.81	ug/L
~~Ethylbenzene~~	~~4~~	~~6.033~~	~~1.13 M~~	~~1.40~~	~~ug/L~~
	2		34647.94	36460.21	

300510

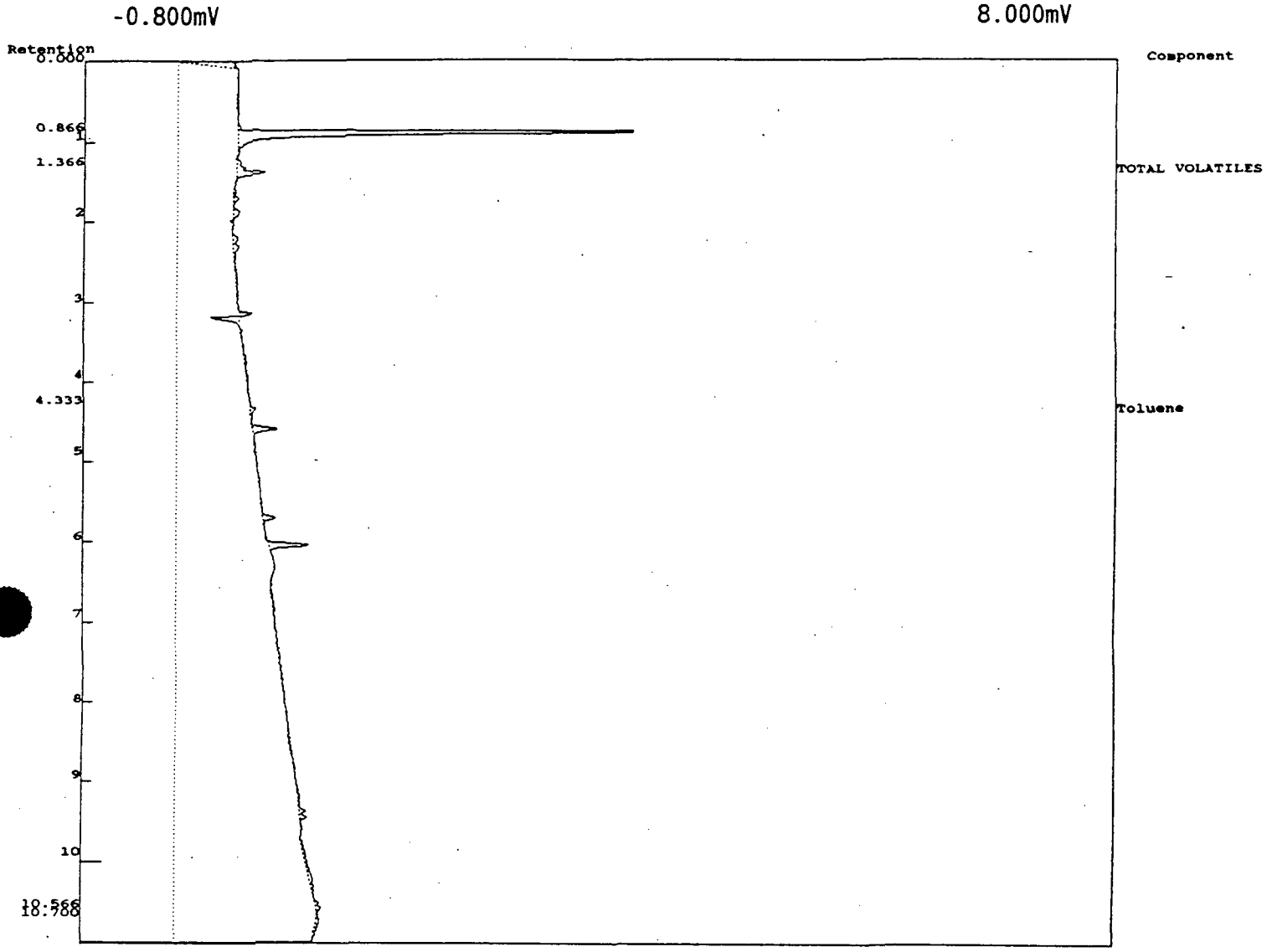
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F13.CHR (A:\)
Sample : SG-014
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	8.55 M	9.00	ug/L
~~Ethylbenzene~~	~~4~~	~~6.033~~	~~1.81 M~~	~~2.22~~	ug/L
	2		10.36	11.22	

300511

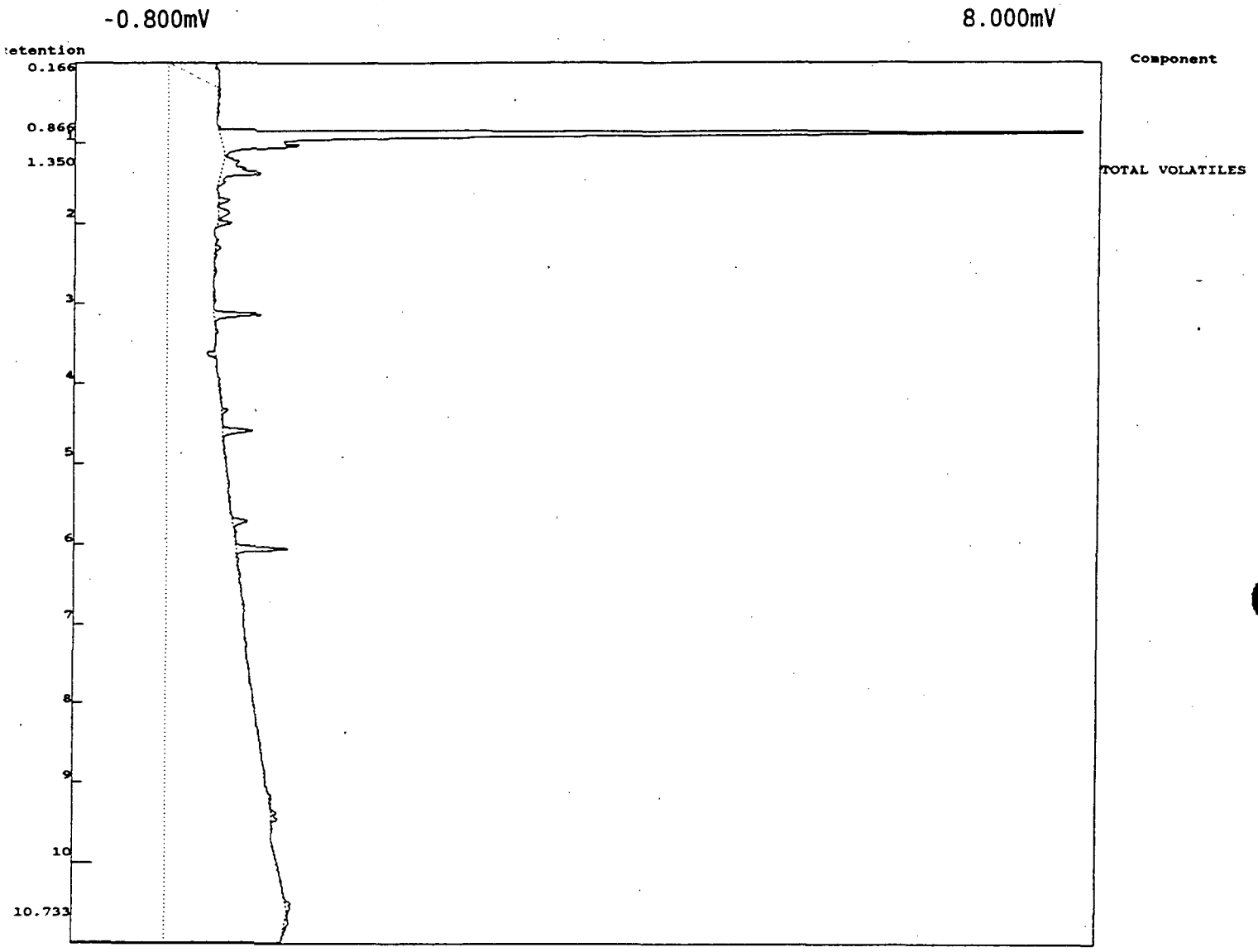
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F16.CHR (A:\)
Sample : SG-015
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.96 M	5.22	ug/L
Toluene	3	4.333	0.21 M	0.22	ug/L
	2		5.17	5.44	

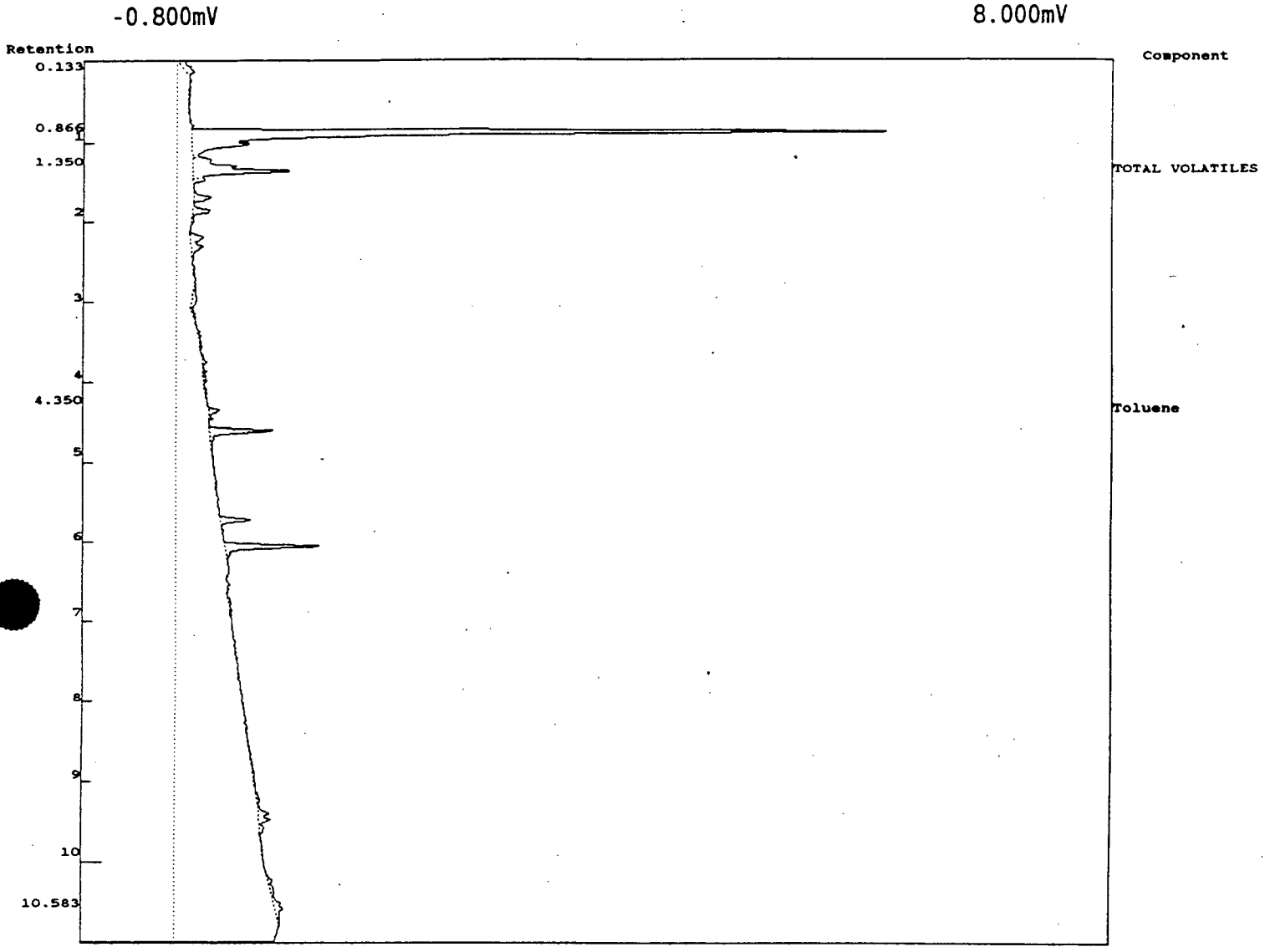
300512

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F17.CHR (A:\)
Sample : SG-019
Operator : SGN



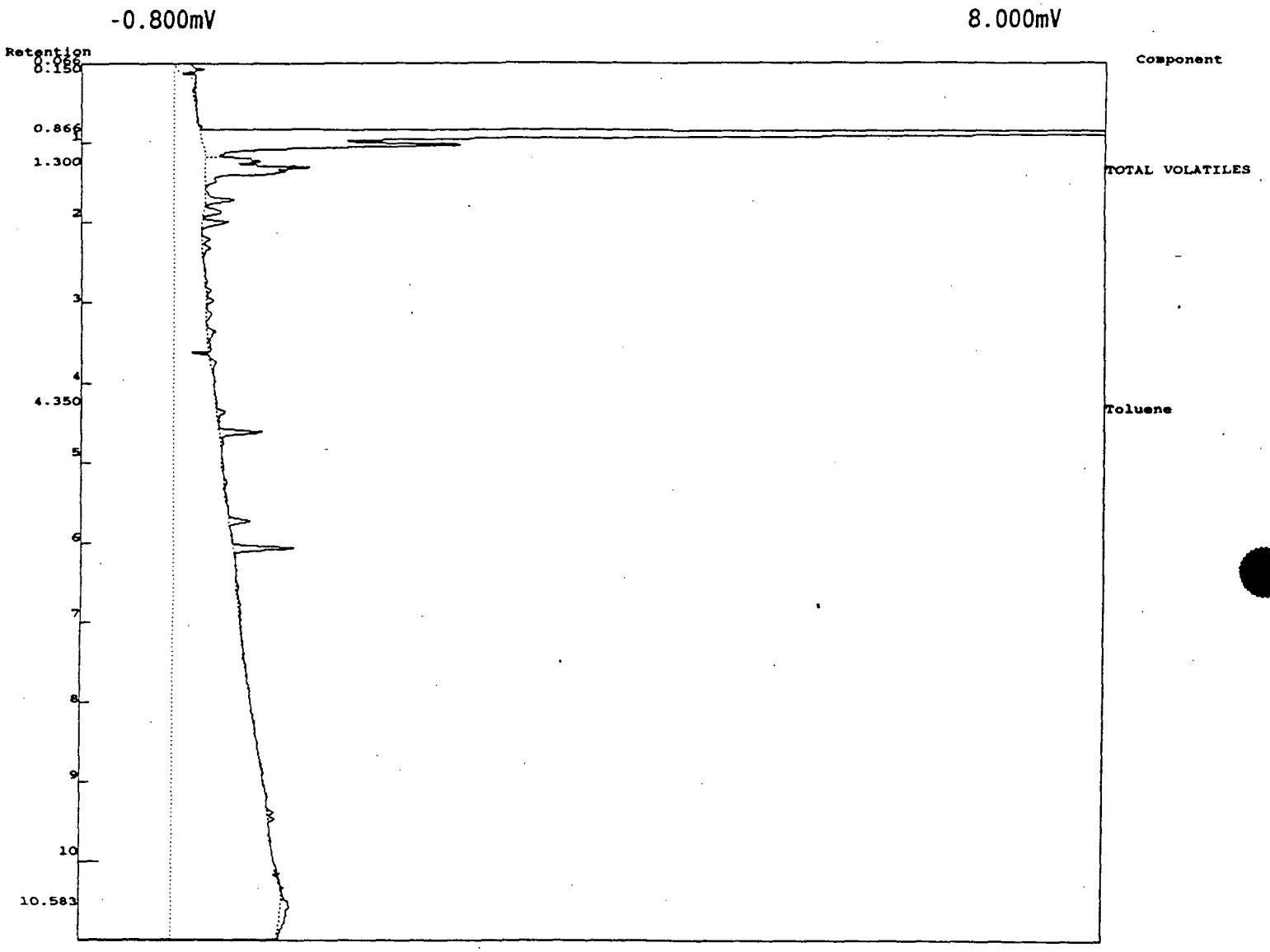
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	8.90 M	9.37	ug/L
	1		**8.90**	**9.37**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F19.CHR (A:\)
Sample : SG-035
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	15.25 M	16.05	ug/L
Toluene	3	4.350	0.30 M	0.32	ug/L
	2		15.55	16.36	

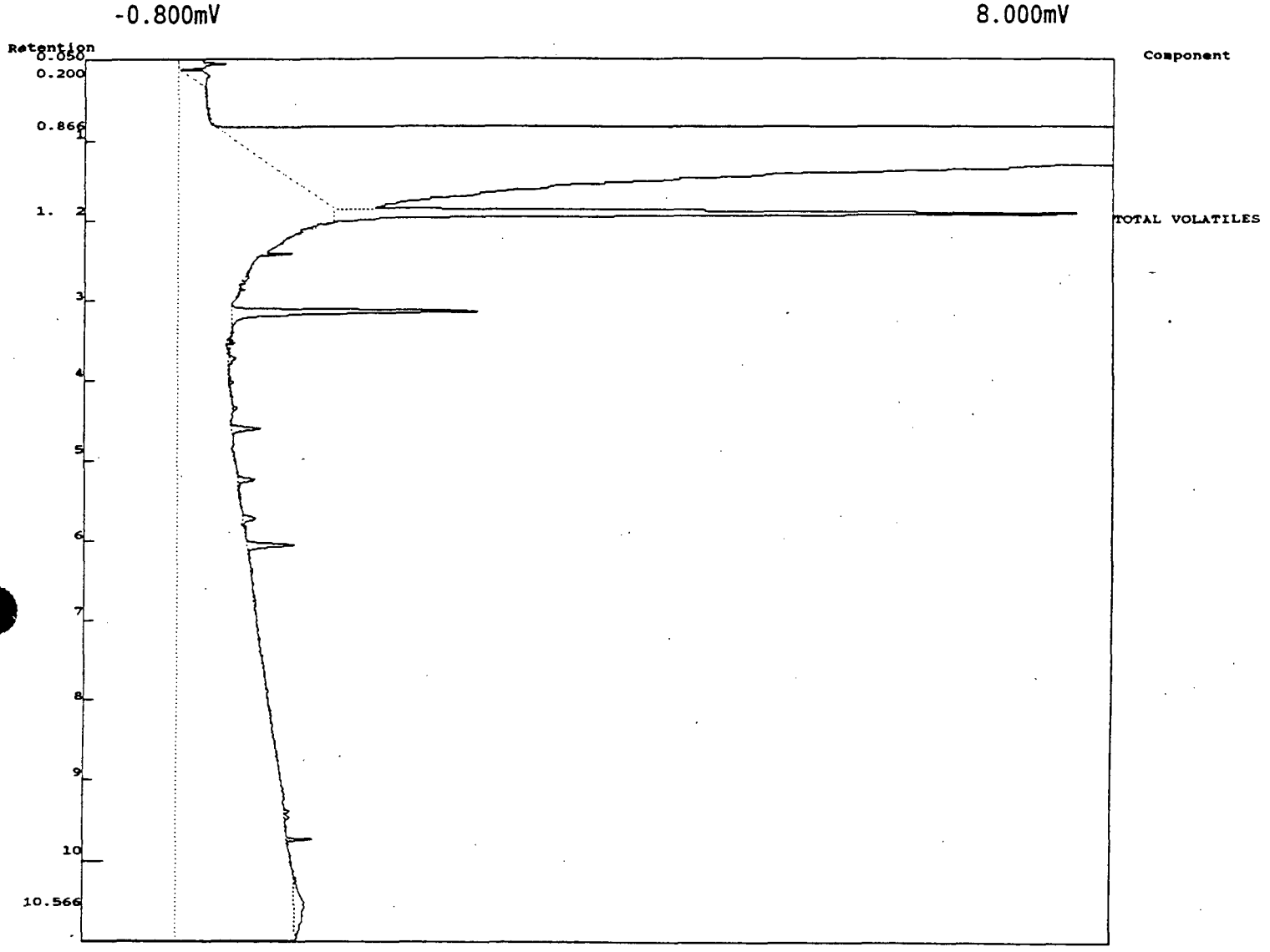
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F20.CHR (A:\)
Sample : SG-036
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.300	16.74 M	17.62	ug/L
Toluene	3	4.350	0.30 M	0.32	ug/L
	2		17.04	17.93	

300515

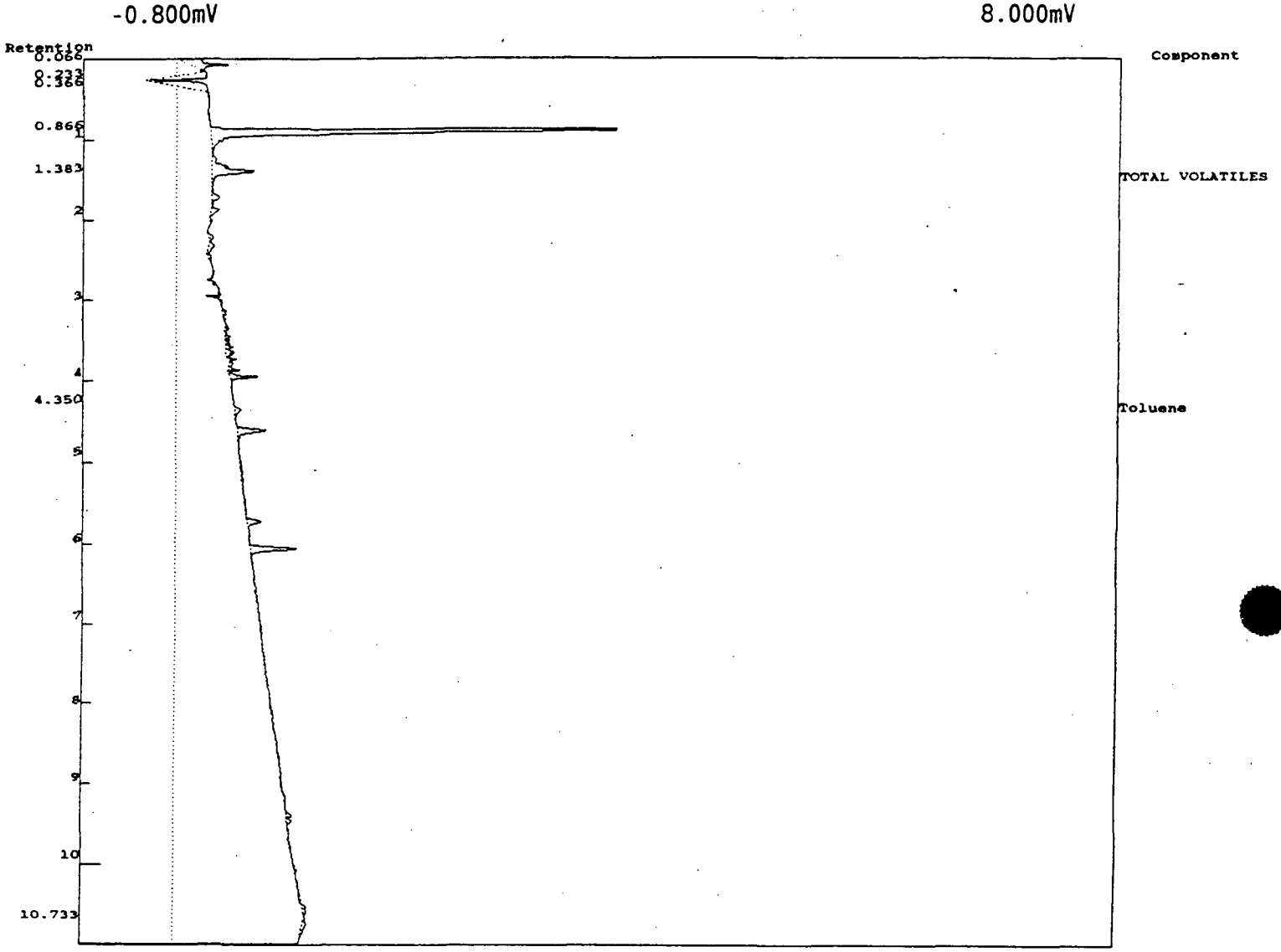
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F21.CHR (A:\)
Sample : SG-037
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.916	39.00 M	41.04	ug/L
	1		**39.00**	**41.04**	

300516

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F22.CHR (A:\)
Sample : EB-02
Operator : SGN

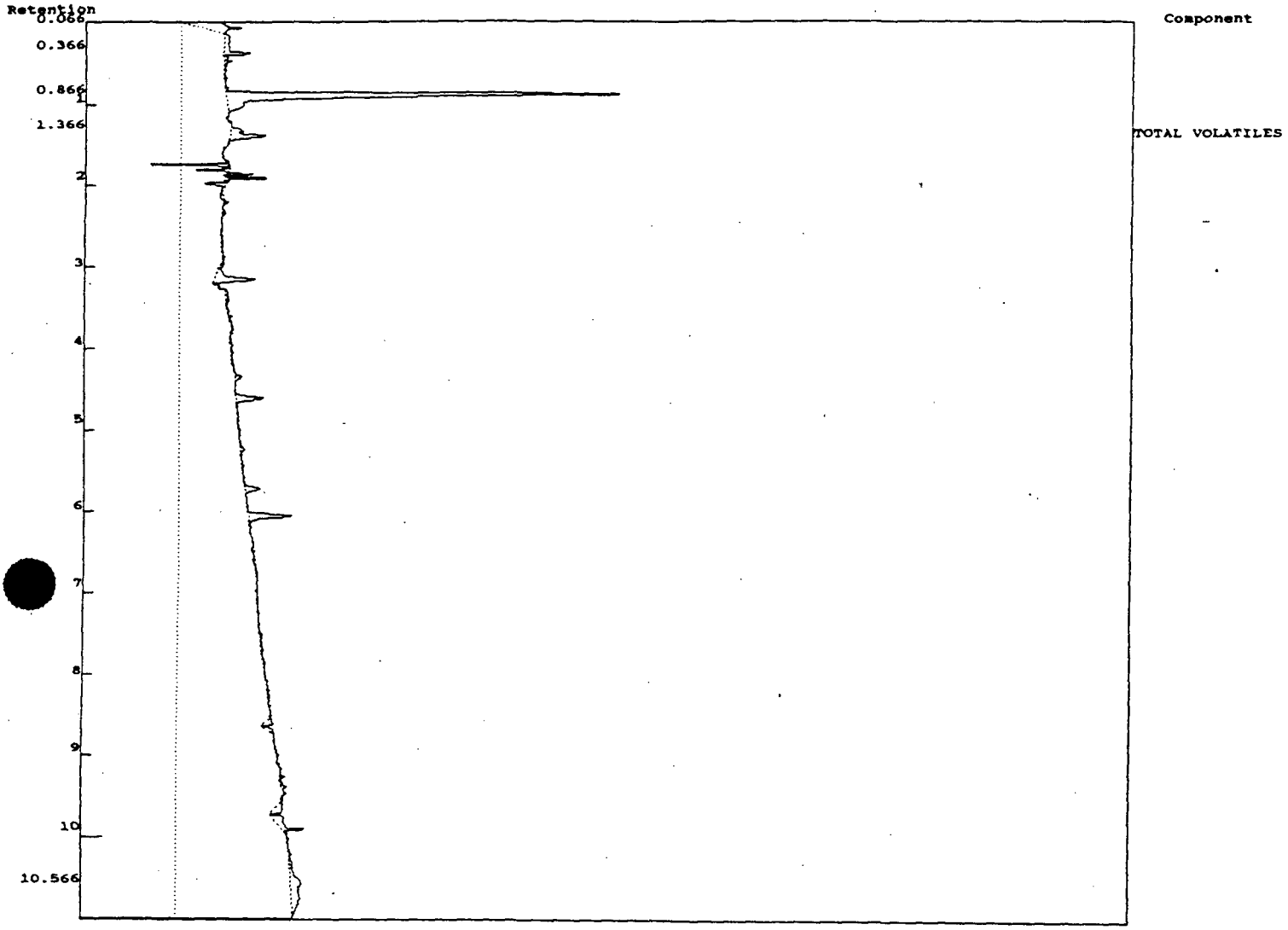


Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	7.05 M	7.42	ug/L
Toluene	3	4.350	0.23 M	0.24	ug/L
	2		7.28	7.66	

300517

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F23.CHR (A:\)
Sample : SG-025
Operator : SGN

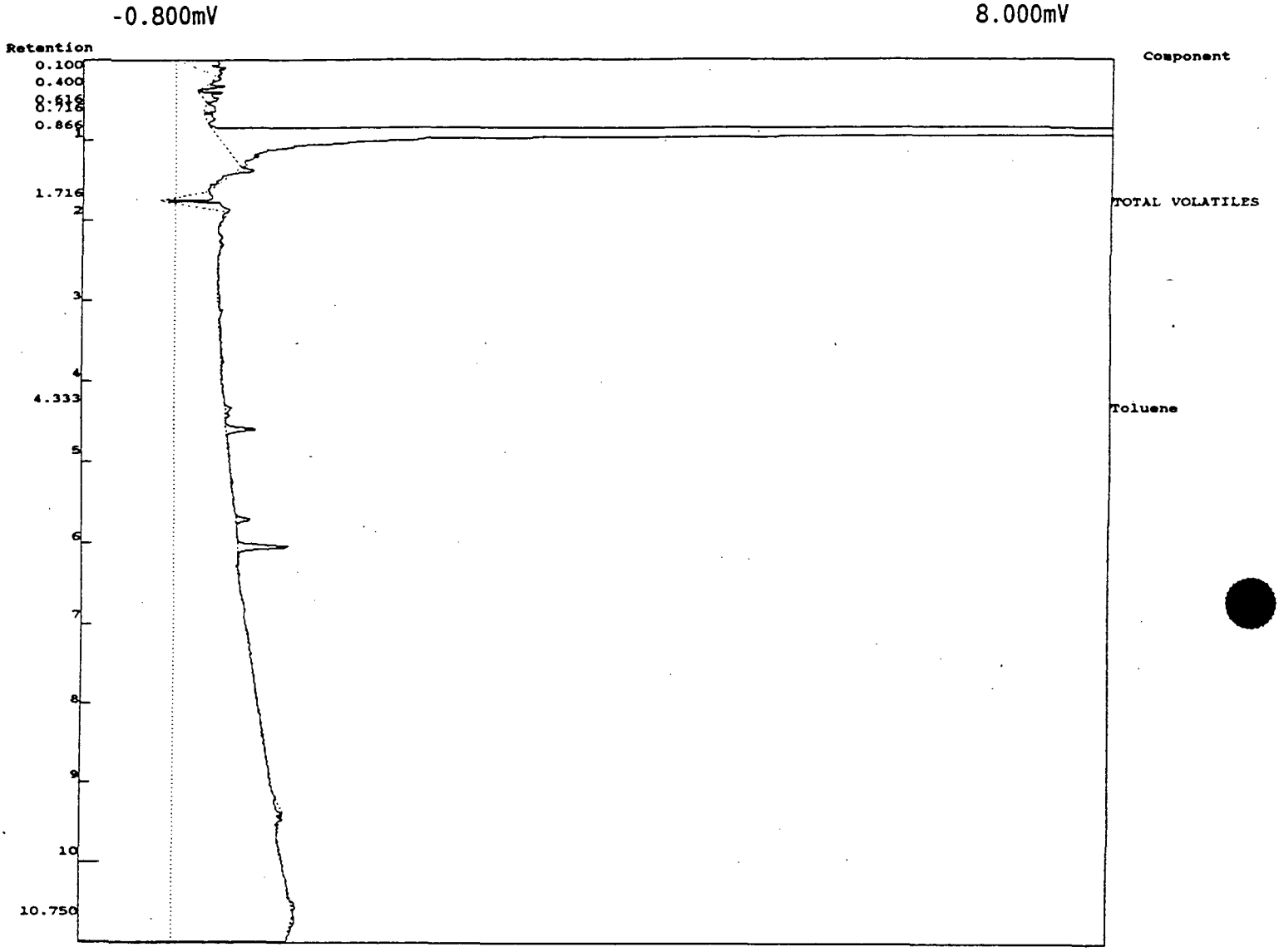
-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	7.80 M	8.21	ug/L
	1		7.80	8.21	

300518

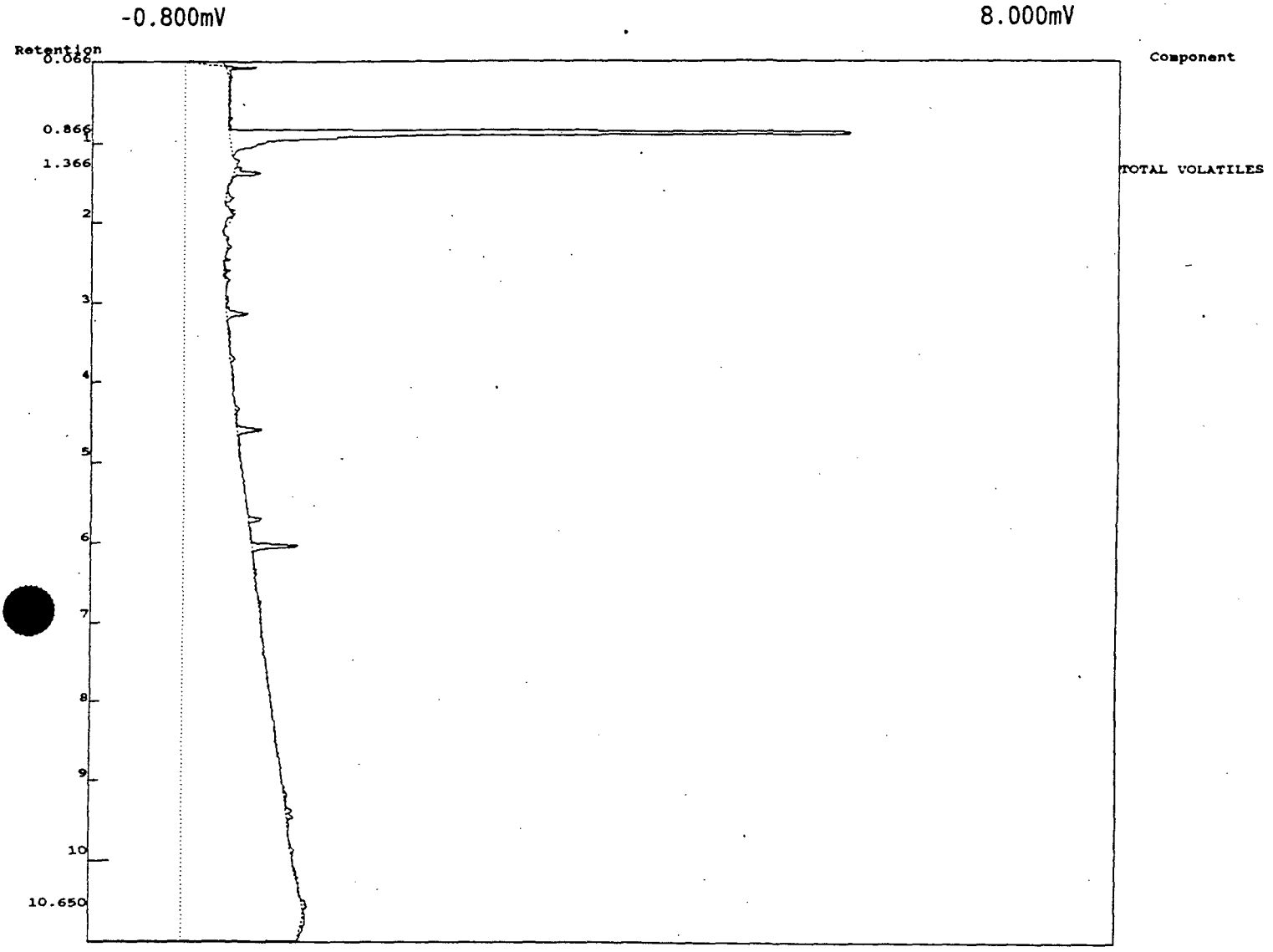
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F24.CHR (A:\)
Sample : SG-039
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.716	6.10 M	6.42	ug/L
Toluene	3	4.333	0.25 M	0.26	ug/L
	2		6.35	6.68	

300519

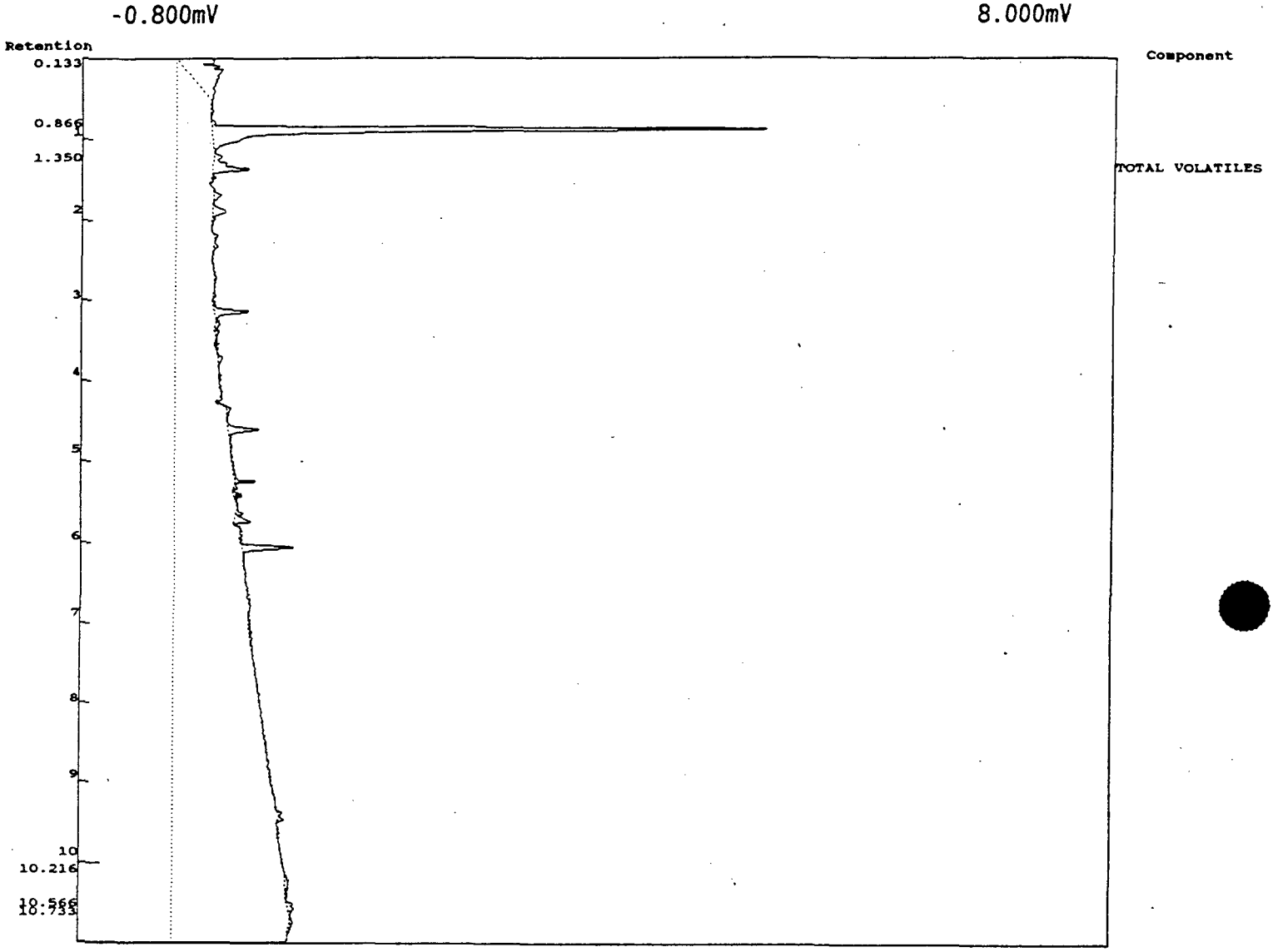
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F25.CHR (A:\)
Sample : SG-047
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.90 M	5.16	ug/L
	1		4.90	5.16	

300520

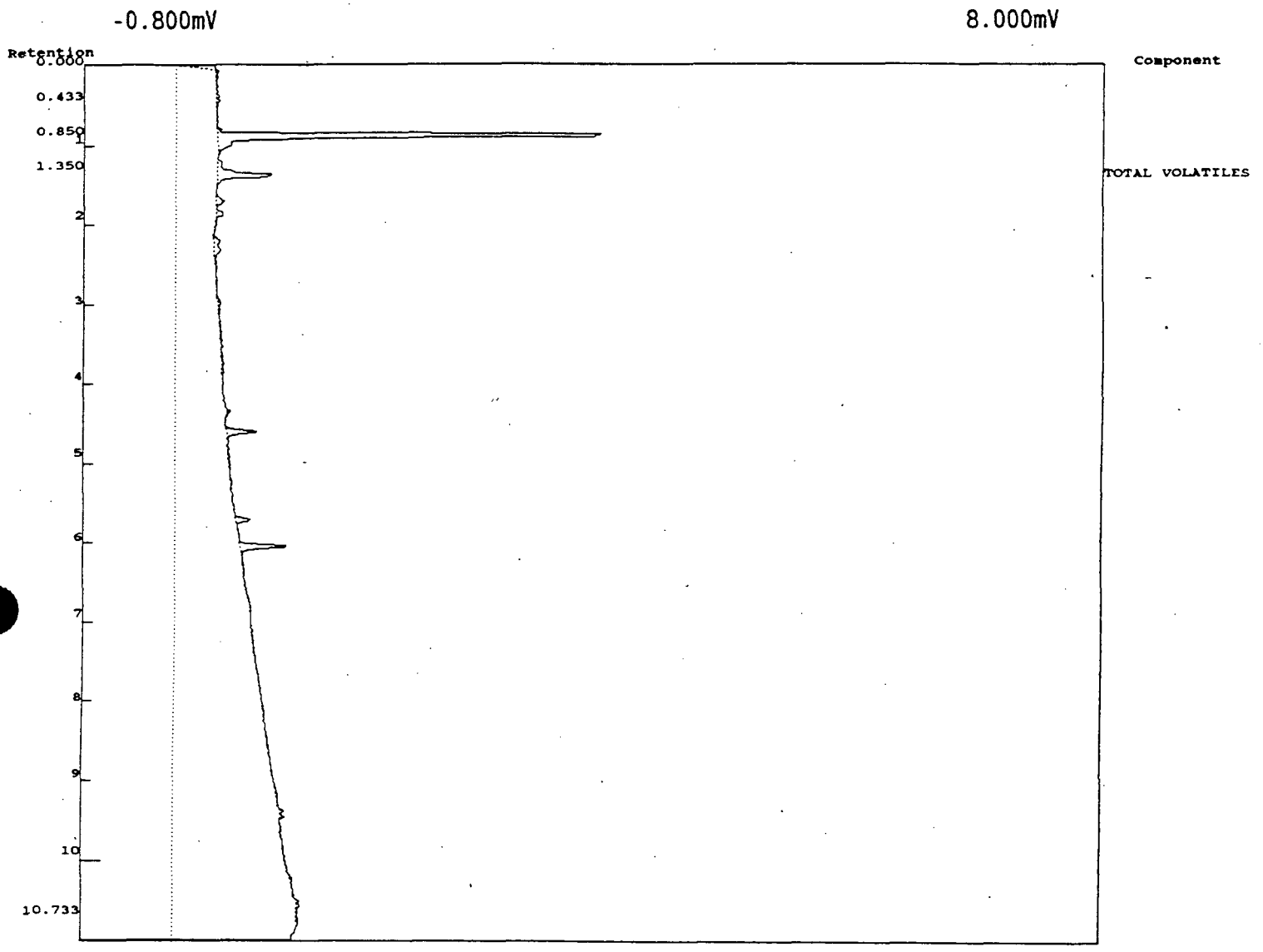
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F26.CHR (A:\)
Sample : SG-947
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	7.54 M	7.93	ug/L
	1		**7.54**	**7.93**	

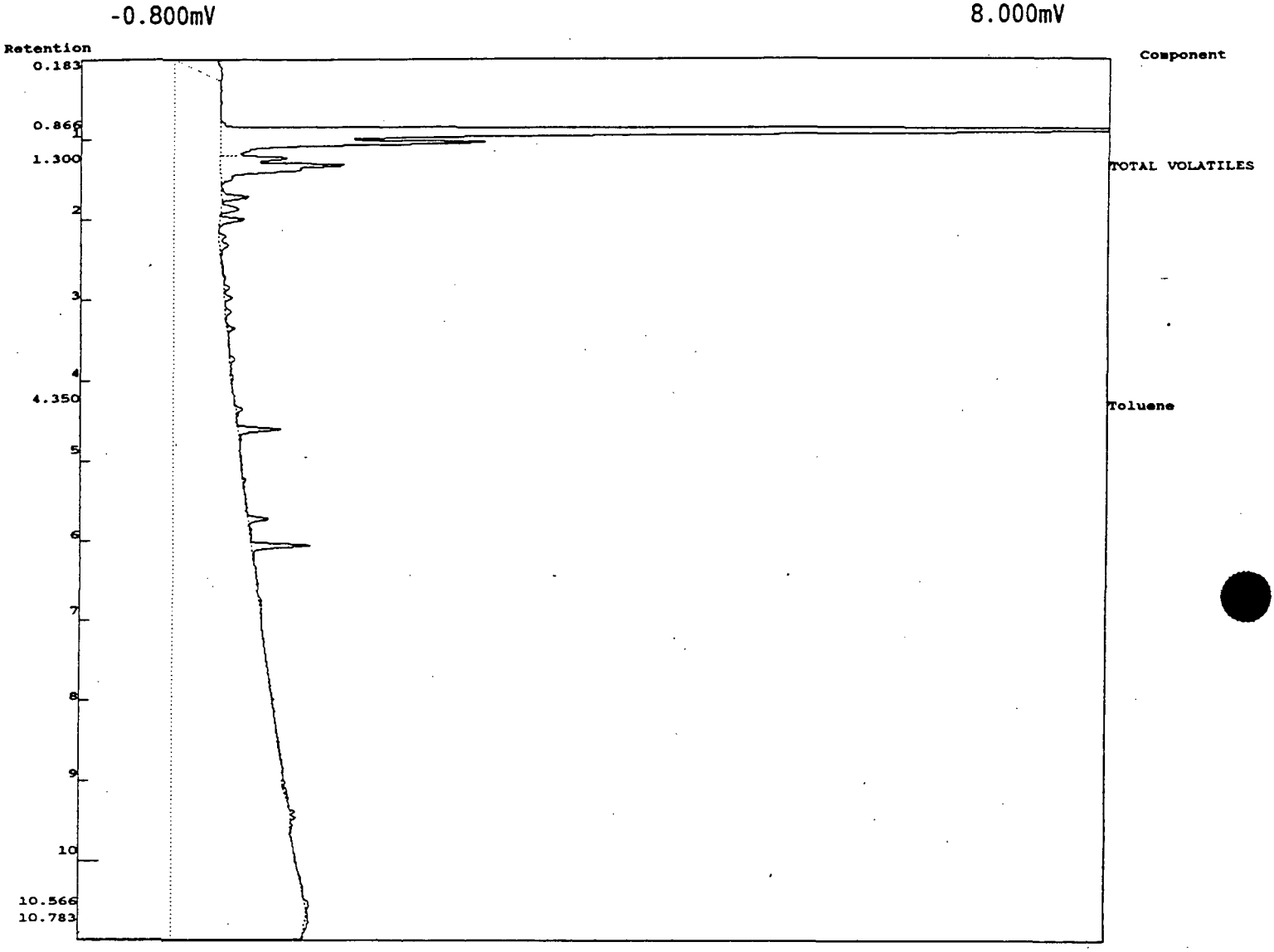
300521

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F27.CHR (A:\)
Sample : EB-03
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	6.25 M	6.58	ug/L
	1		**6.25**	**6.58**	

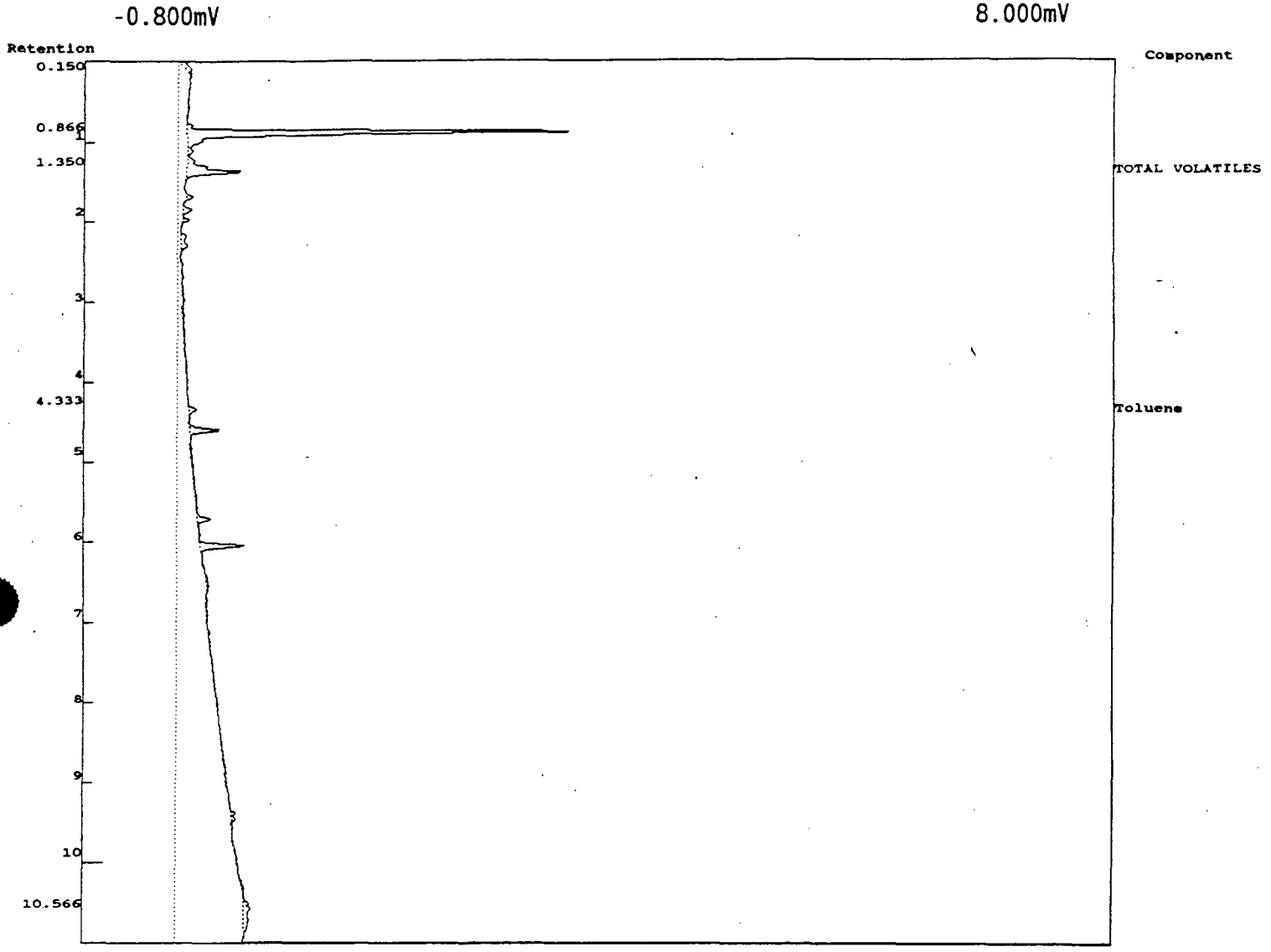
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY23F28.CHR (A:\)
Sample : SG-036-R
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.300	17.72 M	18.65	ug/L
Toluene	3	4.350	0.21 M	0.22	ug/L
	2		17.94	18.88	

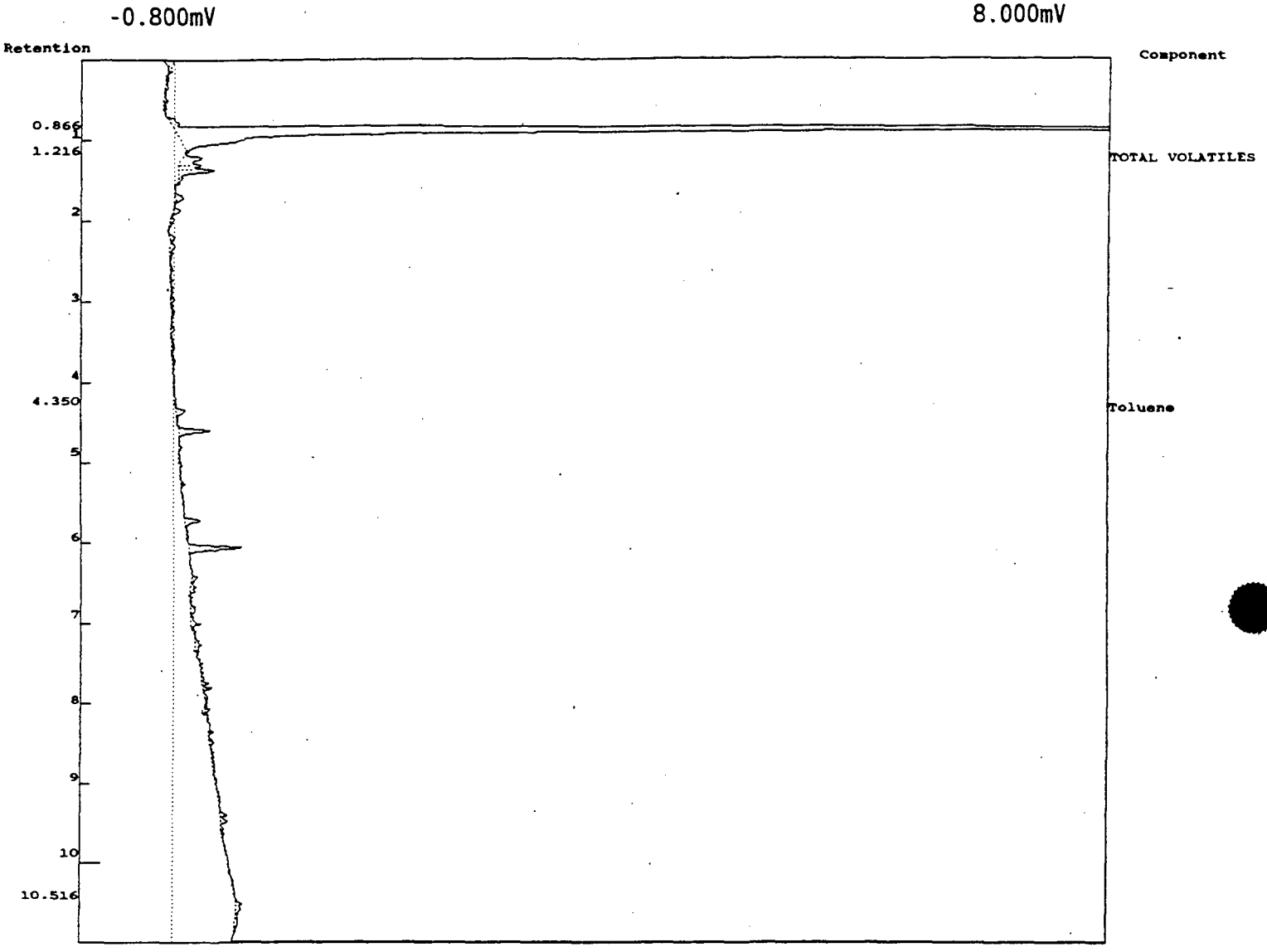
300523

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F7.CHR (A:\)
Sample : EB-04
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	6.05 M	6.36	ug/L
Toluene	3	4.333	0.23 M	0.24	ug/L
	2		6.28	6.61	

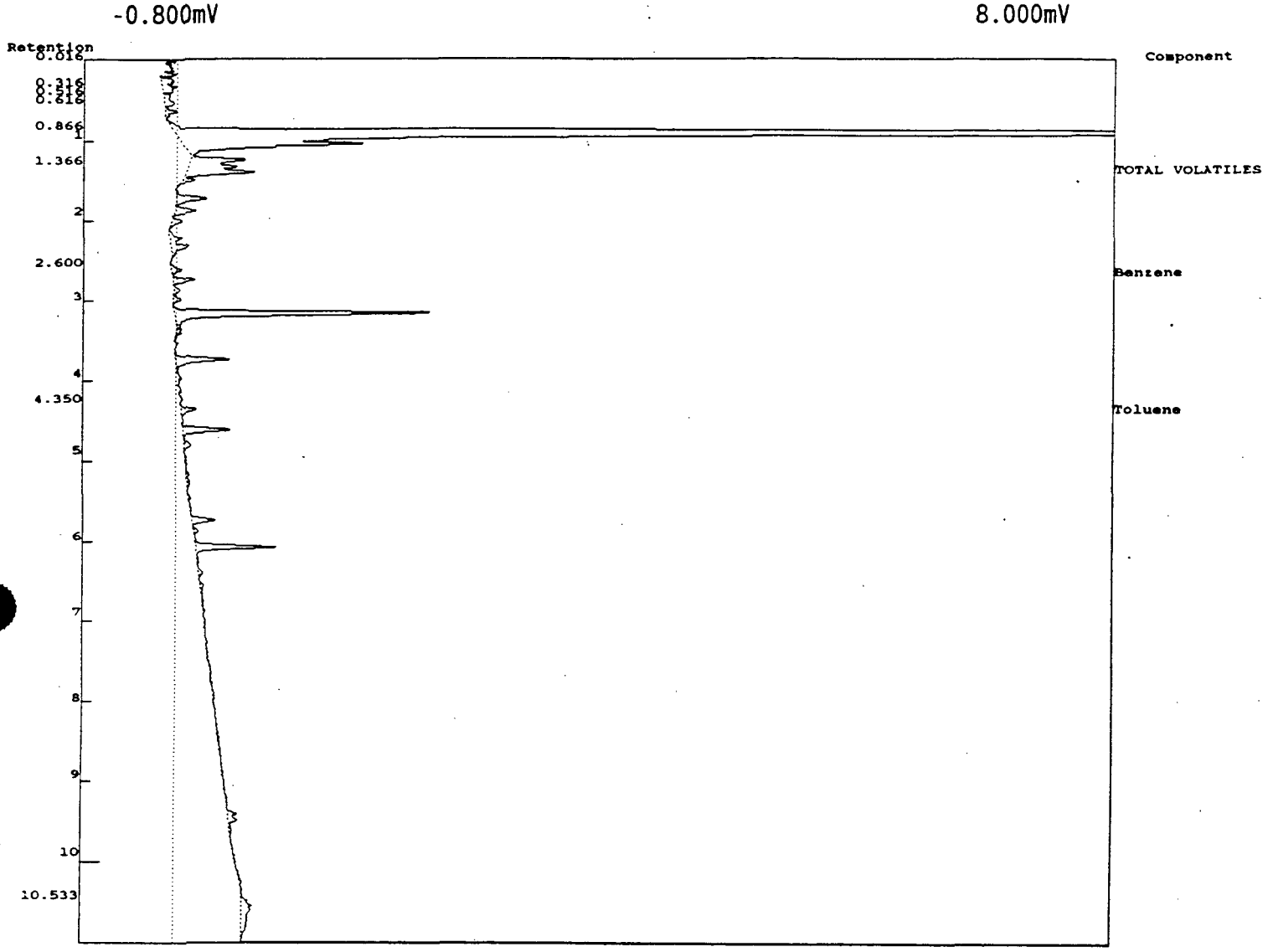
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F8.CHR (A:\)
Sample : SG-009
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	7.85 M	8.26	ug/L
Toluene	3	4.350	0.28 M	0.29	ug/L
	2		8.13	8.55	

300525

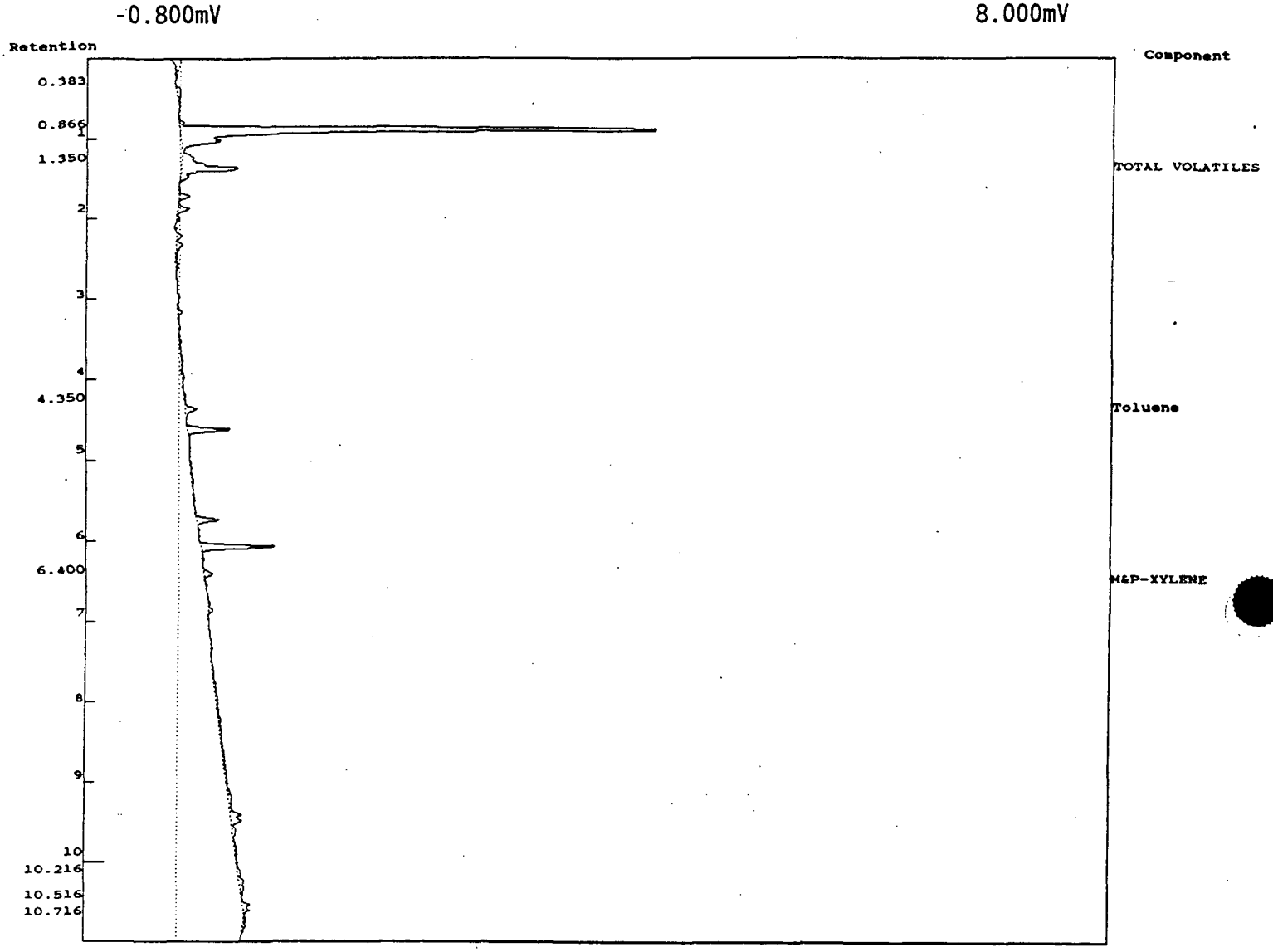
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F9.CHR (A:\)
Sample : SG-012
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	25.83 M	27.18	ug/L
Benzene	2	2.600	0.31 M	0.28	ug/L
Toluene	3	4.350	0.36 M	0.37	ug/L
	3		26.50	27.83	

300526

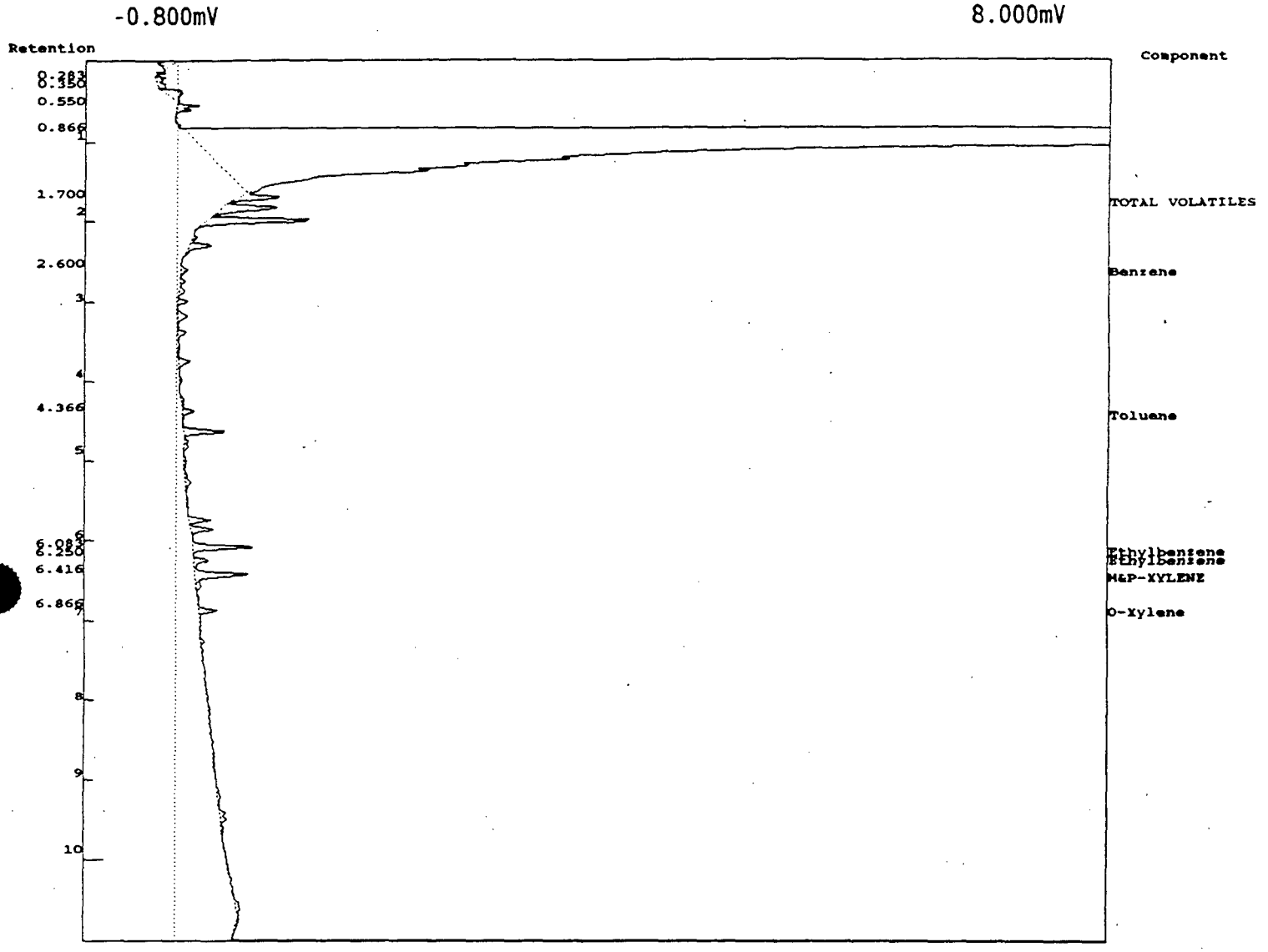
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F10.CHR (A:\)
Sample : SG-021
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	11.64 M	12.25	ug/L
Toluene	3	4.350	0.38 M	0.40	ug/L
M&P-XYLENE	5	6.400	0.30 M	0.39	ug/L
	3		12.32	13.04	

300527

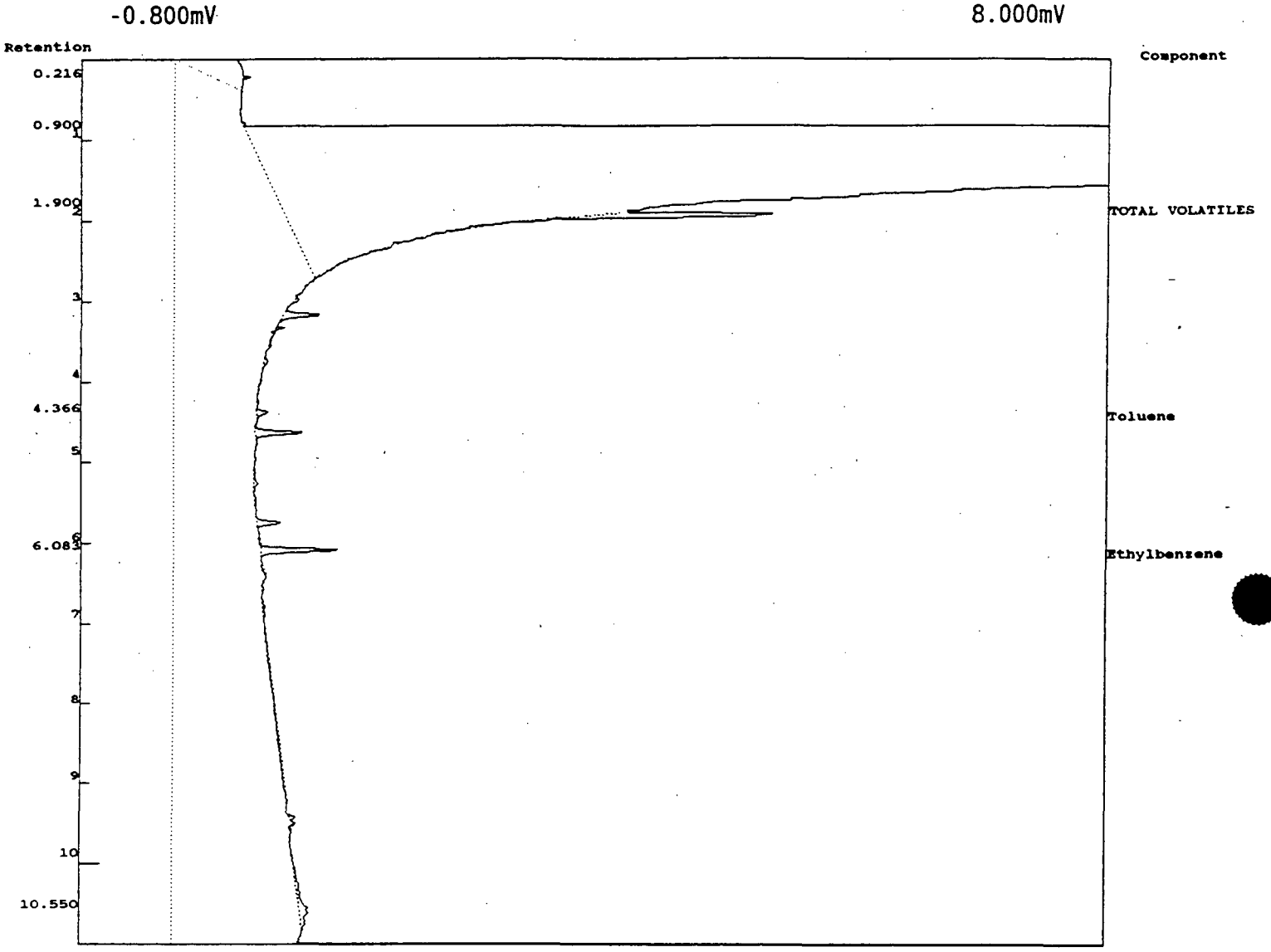
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F11.CHR (A:\)
Sample : SG-026
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.700	18.12	19.07	ug/L
Benzene	2	2.600	0.23 M	0.20	ug/L
Toluene	3	4.366	0.39 M	0.41	ug/L
~~Ethylbenzene~~	~~4~~	~~6.083~~	~~1.70 M~~	~~2.09~~	~~ug/L~~
Ethylbenzene	4	6.250	0.45 M	0.55	ug/L
M&P-XYLENE	5	6.416	1.77 M	2.32	ug/L
O-Xylene	6	6.866	0.53 M	0.74	ug/L
	7		23.18	25.38	

300528

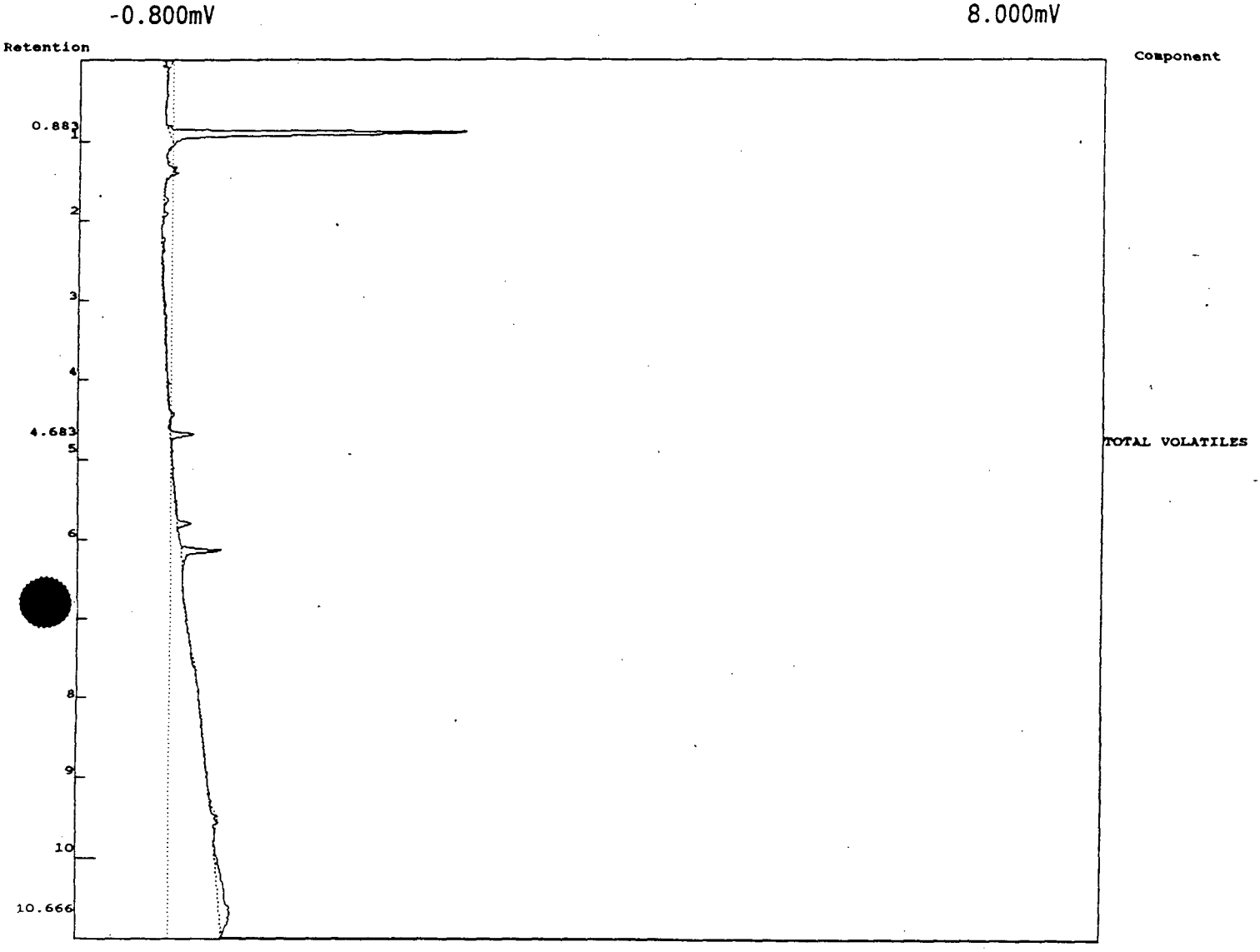
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F12.CHR (A:\)
Sample : SG-027
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.900	11.79 M	12.41	ug/L
Toluene	3	4.366	0.36 M	0.37	ug/L
~~Ethylbenzene~~	~~4~~	~~6.083~~	~~2.19 M~~	~~2.70~~	~~ug/L~~
	3		14.33	15.48	

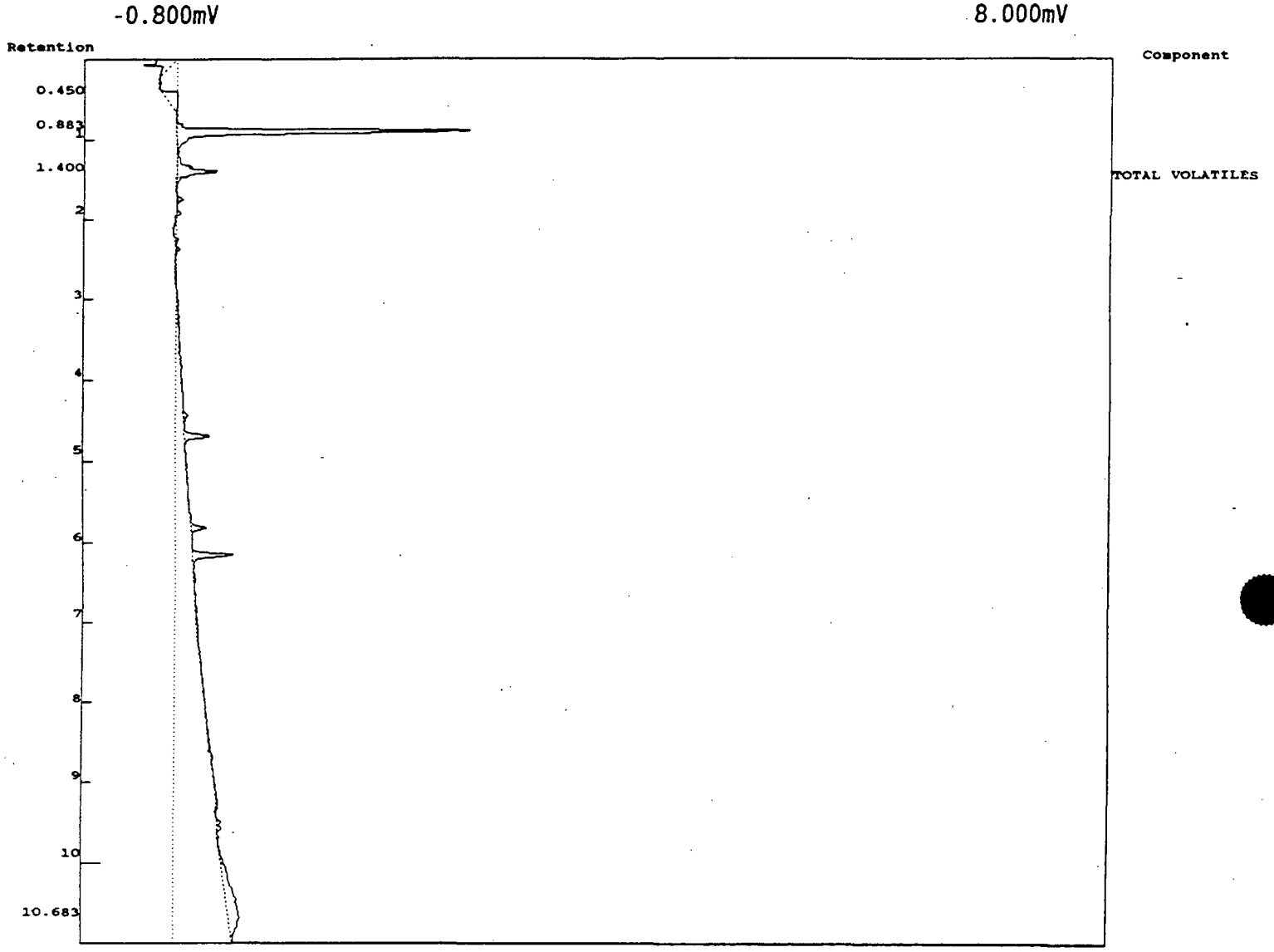
300529

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F16.CHR (A:\)
Sample : SG-003
Operator : SGN



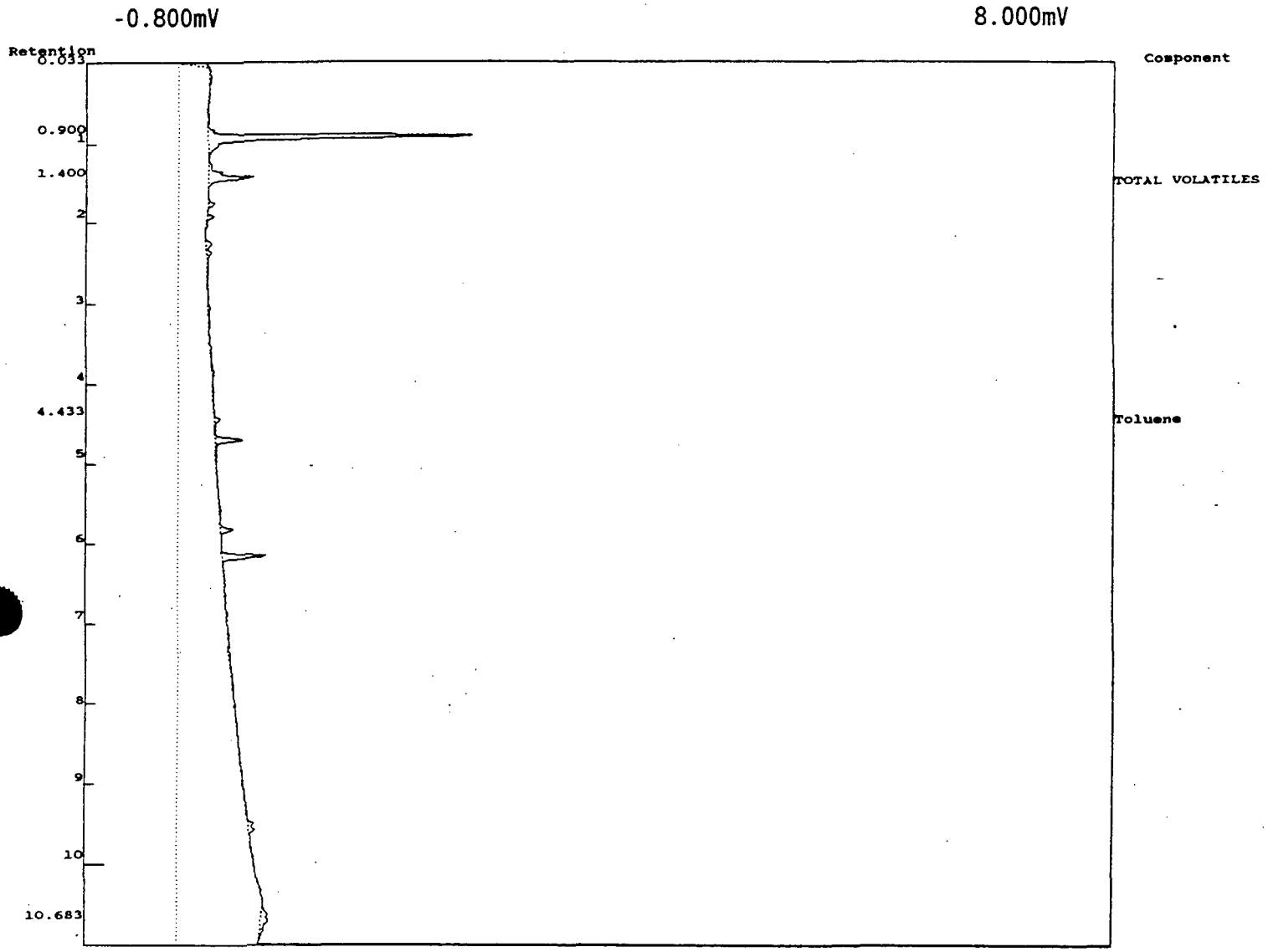
Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	4.683	2.53 M	2.66	ug/L
	1		2.53	2.66	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F17.CHR (A:\)
Sample : SG-004
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	4.91	5.17	ug/L
	1		**4.91**	**5.17**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F18.CHR (A:\)
Sample : SG-005
Operator : SGN

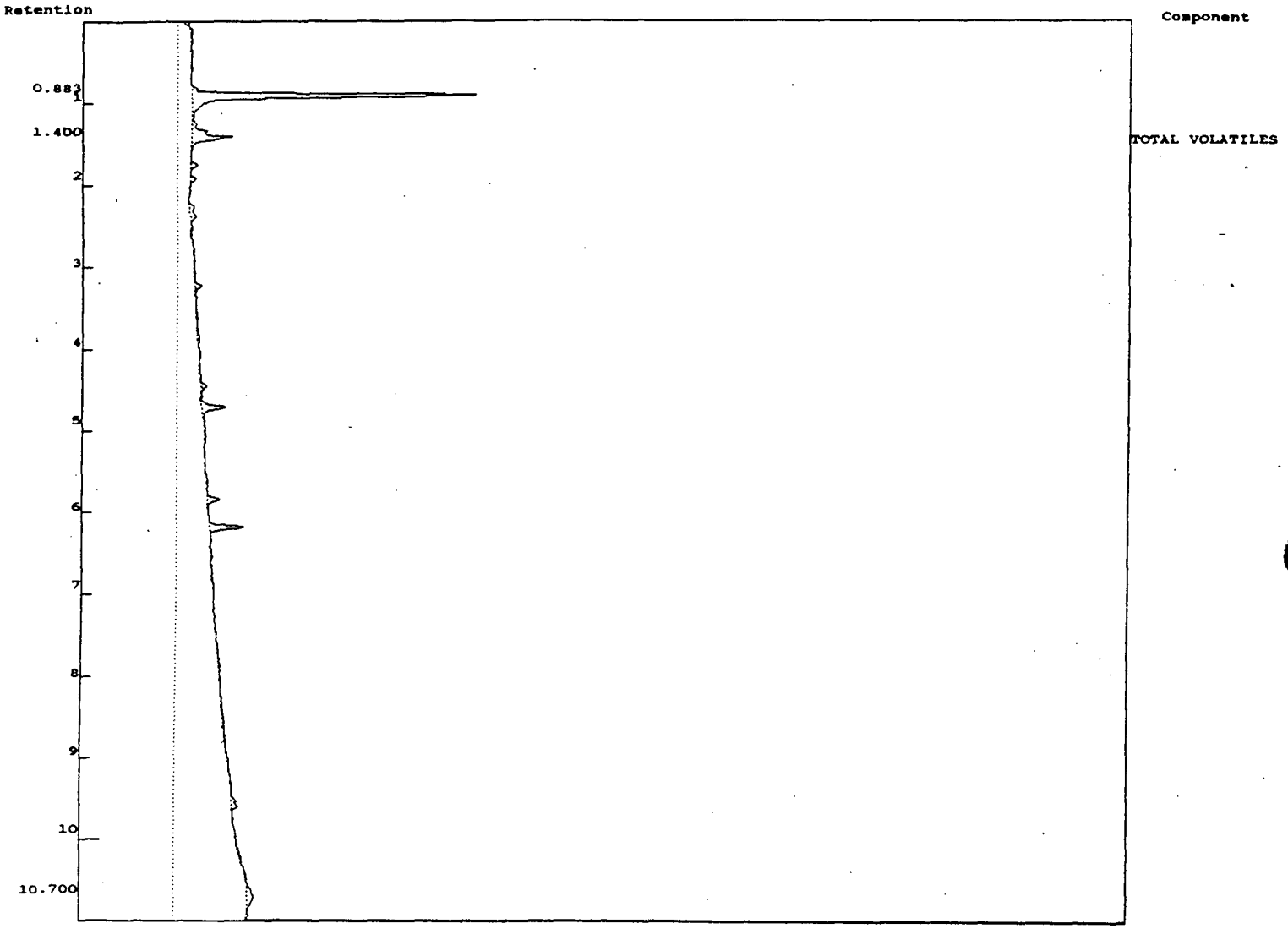


Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	5.81 M	6.11	ug/L
Toluene	3	4.433	0.22 M	0.23	ug/L
	2		6.03	6.34	

300532

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F19.CHR (A:\)
Sample : SG-006
Operator : SGN

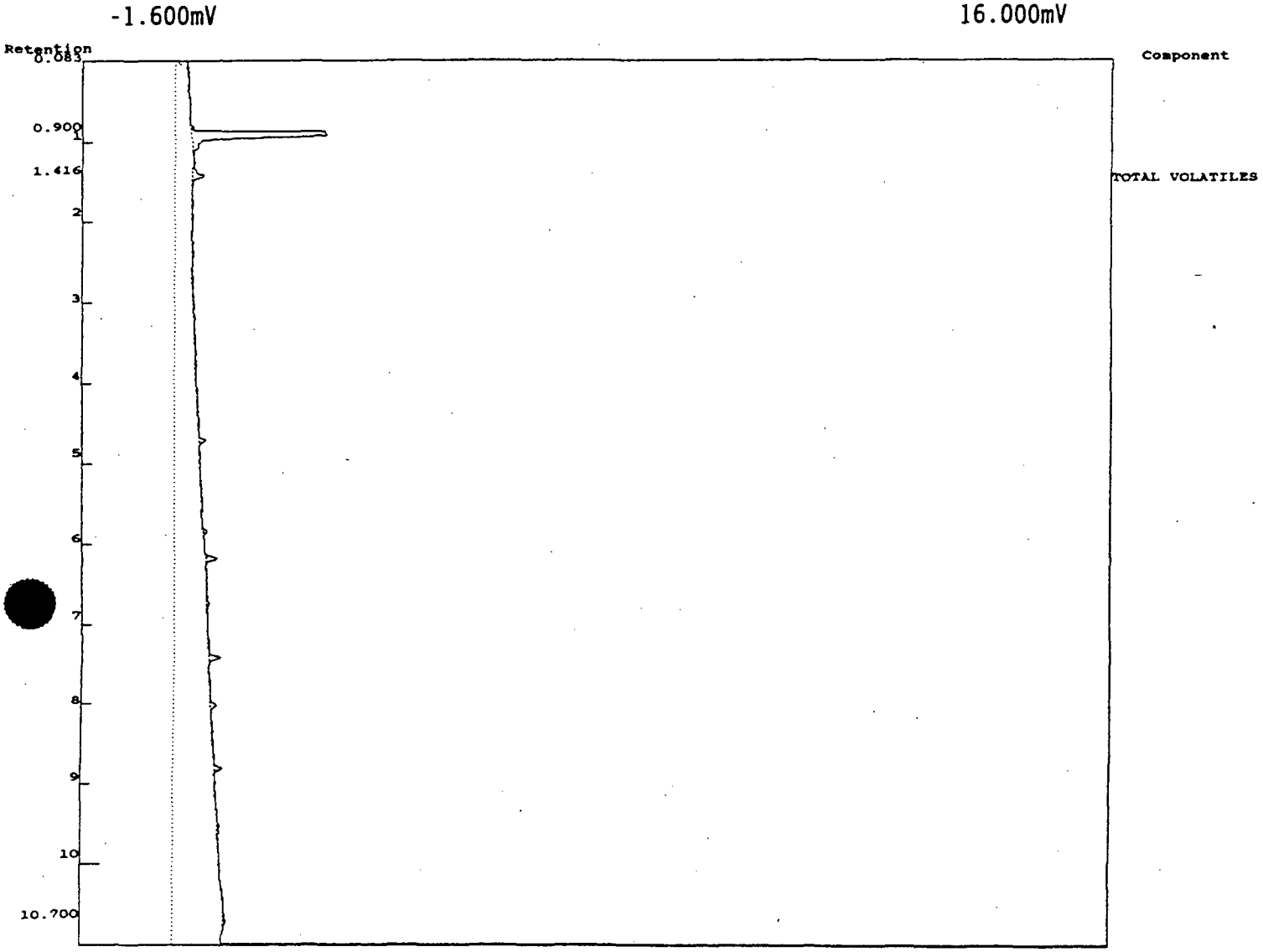
-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.400	4.97 M	5.23	ug/L
	1		4.97	5.23	

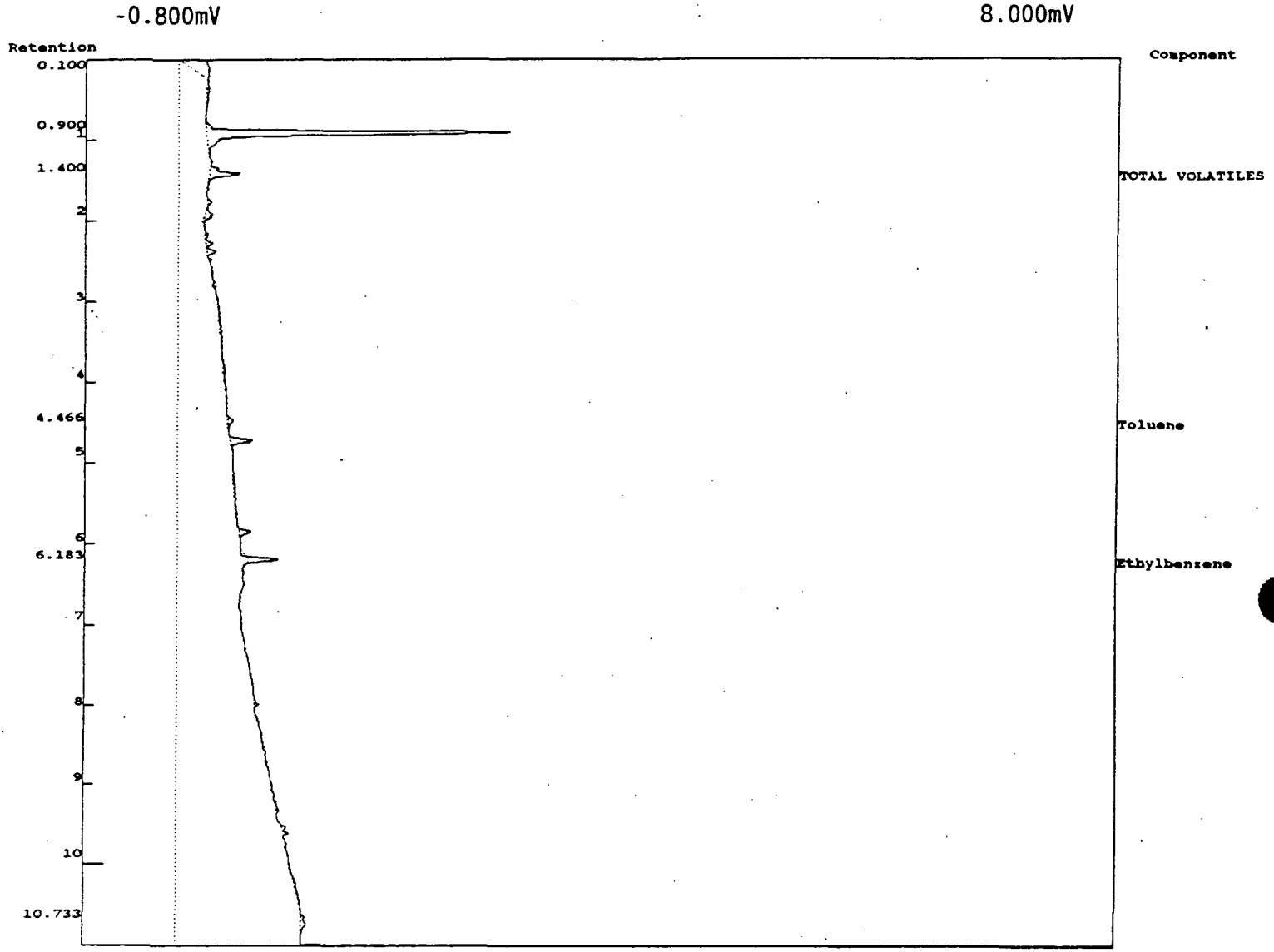
300533

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F20.CHR (A:\)
Sample : SG-007
Operator : SGN



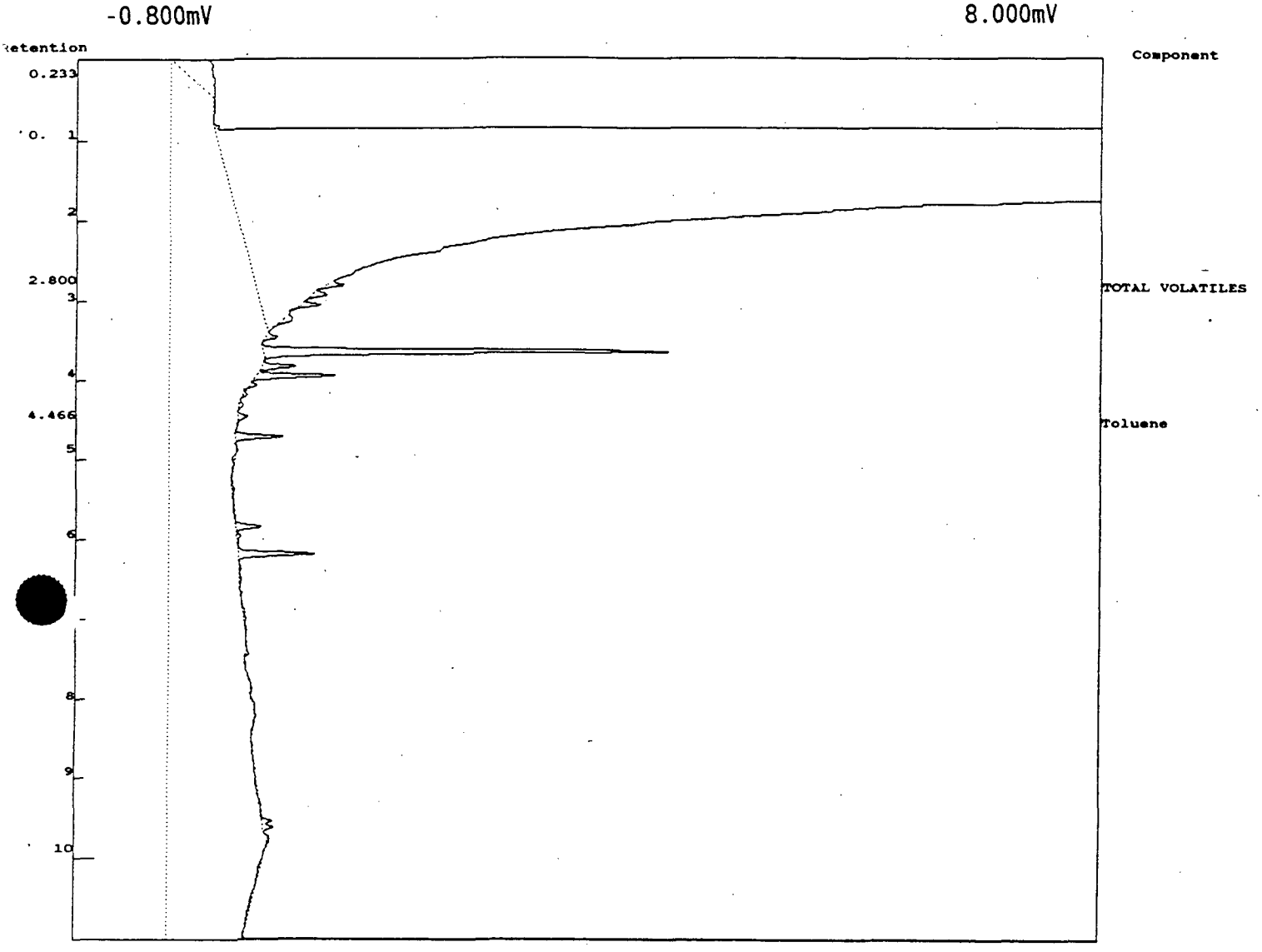
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	3.82 M	4.02	ug/L
	1		3.82	4.02	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F21.CHR (A:\)
Sample : EB-05
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	3.68 M	3.87	ug/L
Toluene	3	4.466	0.21 M	0.22	ug/L
Ethylbenzene	4	6.183	0.72 M	0.89	ug/L
	3		4.61	4.98	

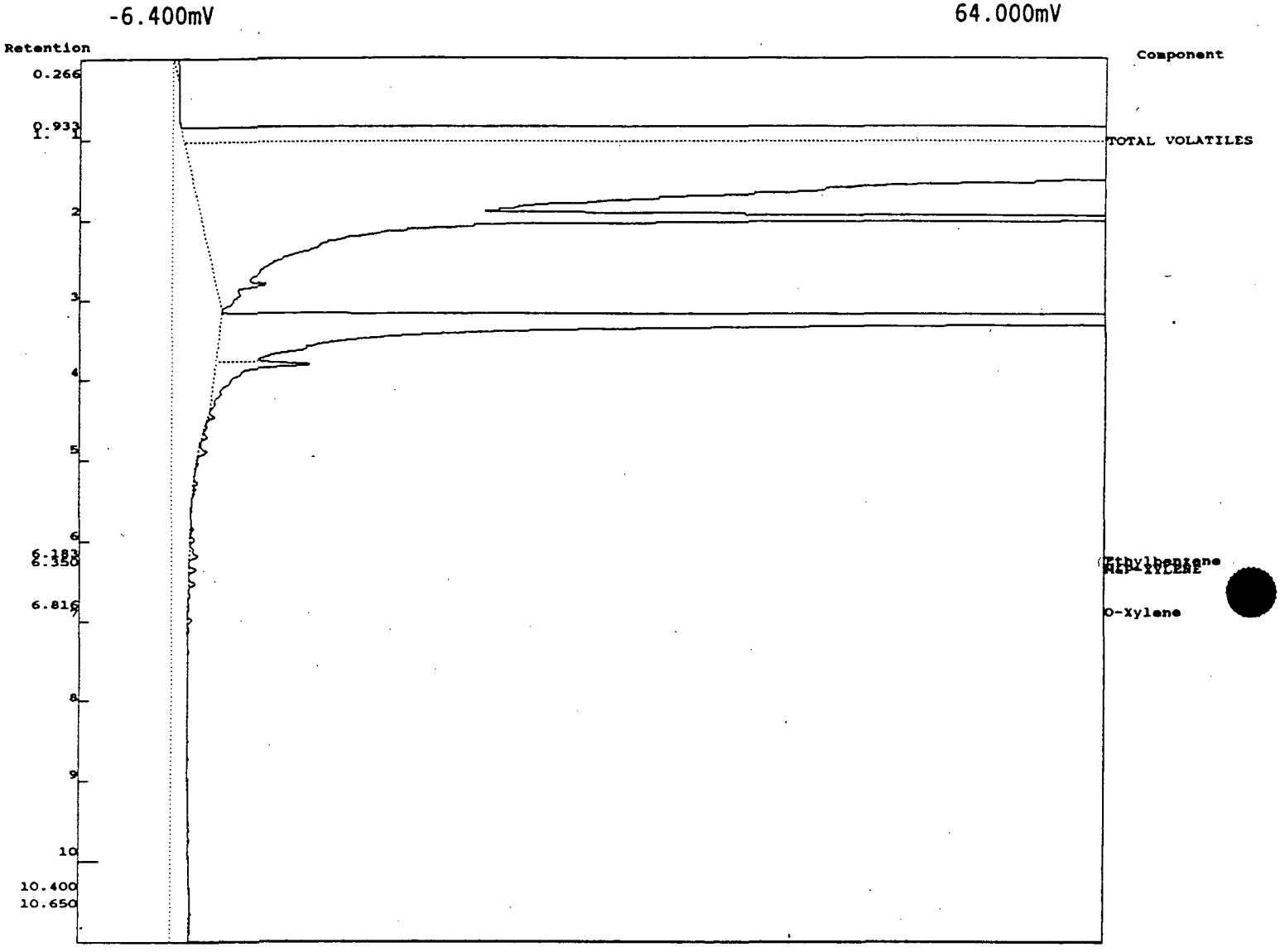
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F22.CHR (A:\)
Sample : SG-031
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	2.800	23.82 M	25.06	ug/L
oluene	3	4.466	0.35 M	0.37	ug/L
	2		24.17	25.43	

300536

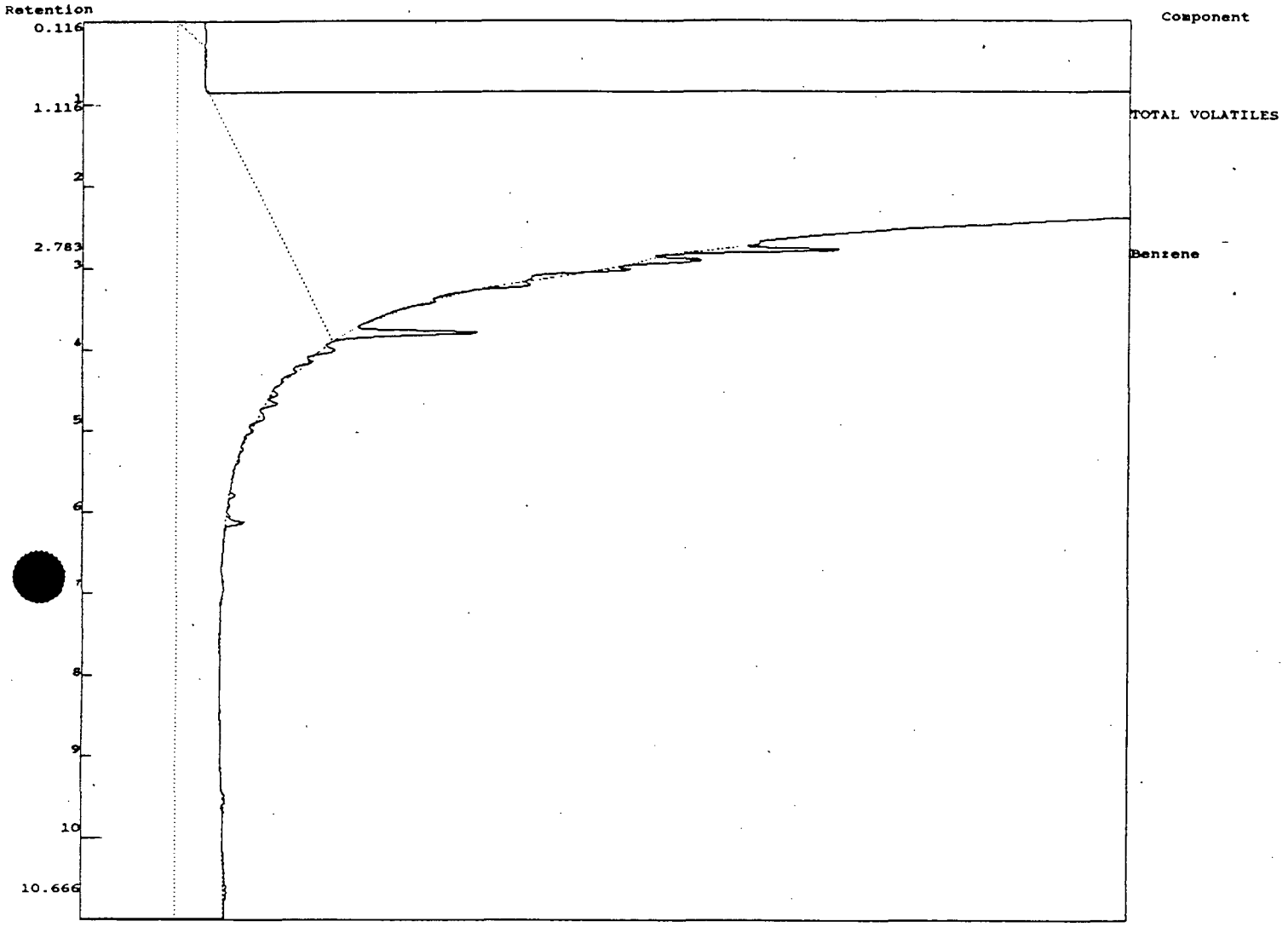
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F23.CHR (A:\MAY24)
Sample : SG-039
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	15391.47 M	16196.43	ug/L
Ethylbenzene	4	6.183	3.07	3.78	ug/L
M&P-XYLENE	5	6.350	1.71	2.24	ug/L
O-Xylene	6	6.816	0.29	0.41	ug/L
	4		15396.54	16202.86	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F29.CHR (A:\)
Sample : SG-048
Operator : SGN

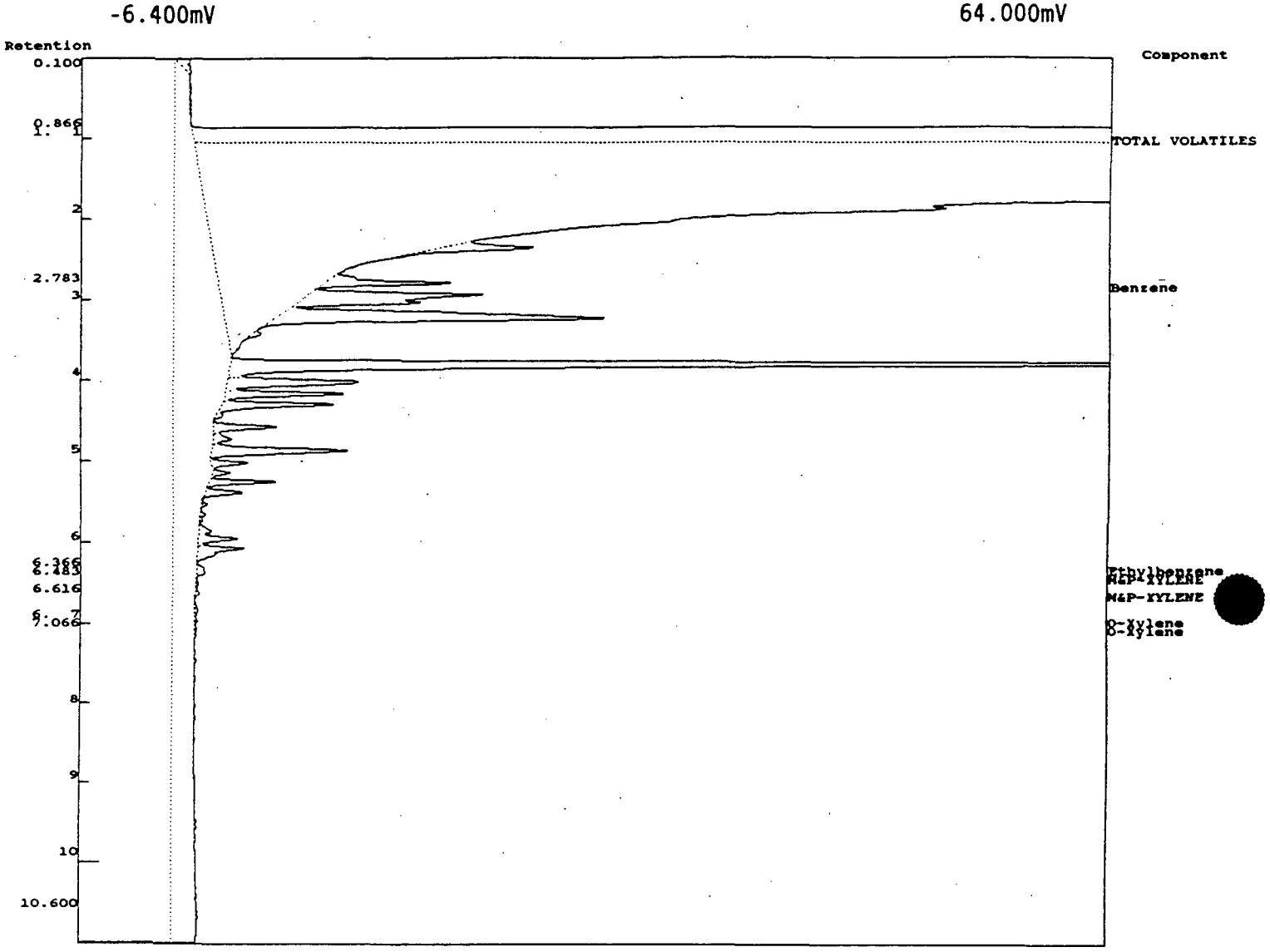
-3.200mV 32.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.116	38439.05 M	40449.39	ug/L
Benzene	2	2.783	15.10 M	13.59	ug/L
	2		38454.15	40462.98	

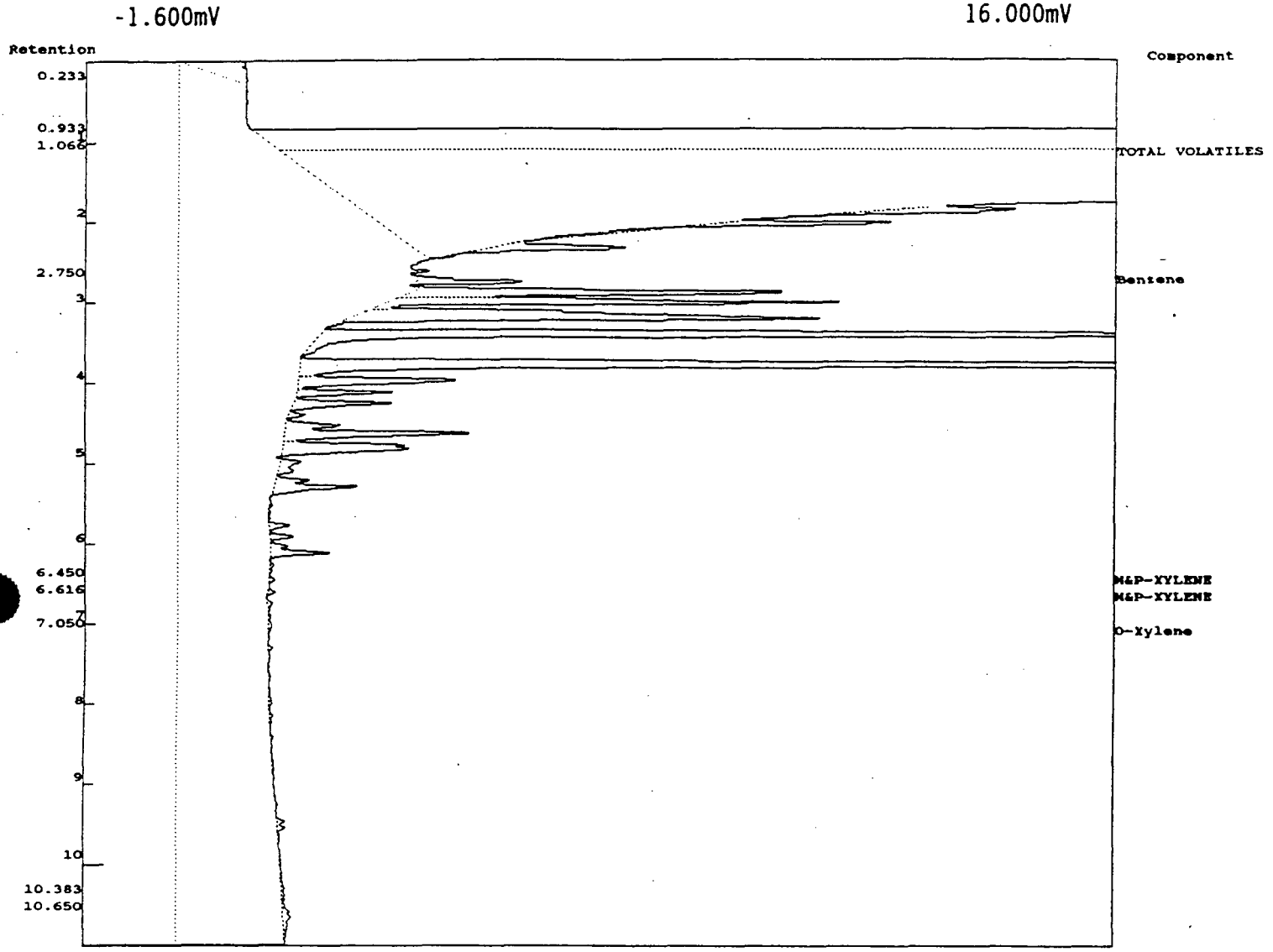
300538

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F30.CHR (A:\)
Sample : SG-049
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	16458.25 M	17319.01	ug/L
~~Benzene~~	~~2~~	~~2.783~~	~~34.79 M~~	~~31.32~~	~~ug/L~~
Ethylbenzene	4	6.366	3.91 M	4.82	ug/L
M&P-XYLENE	5	6.483	0.85 M	1.11	ug/L
~~M&P-XYLENE~~	~~5~~	~~6.616~~	~~1.04 M~~	~~1.37~~	~~ug/L~~
O-Xylene	6	6.966	0.95 M	1.32	ug/L
~~O-Xylene~~	~~6~~	~~7.066~~	~~0.75 M~~	~~1.05~~	ug/L
	7		16500.55	17359.99	

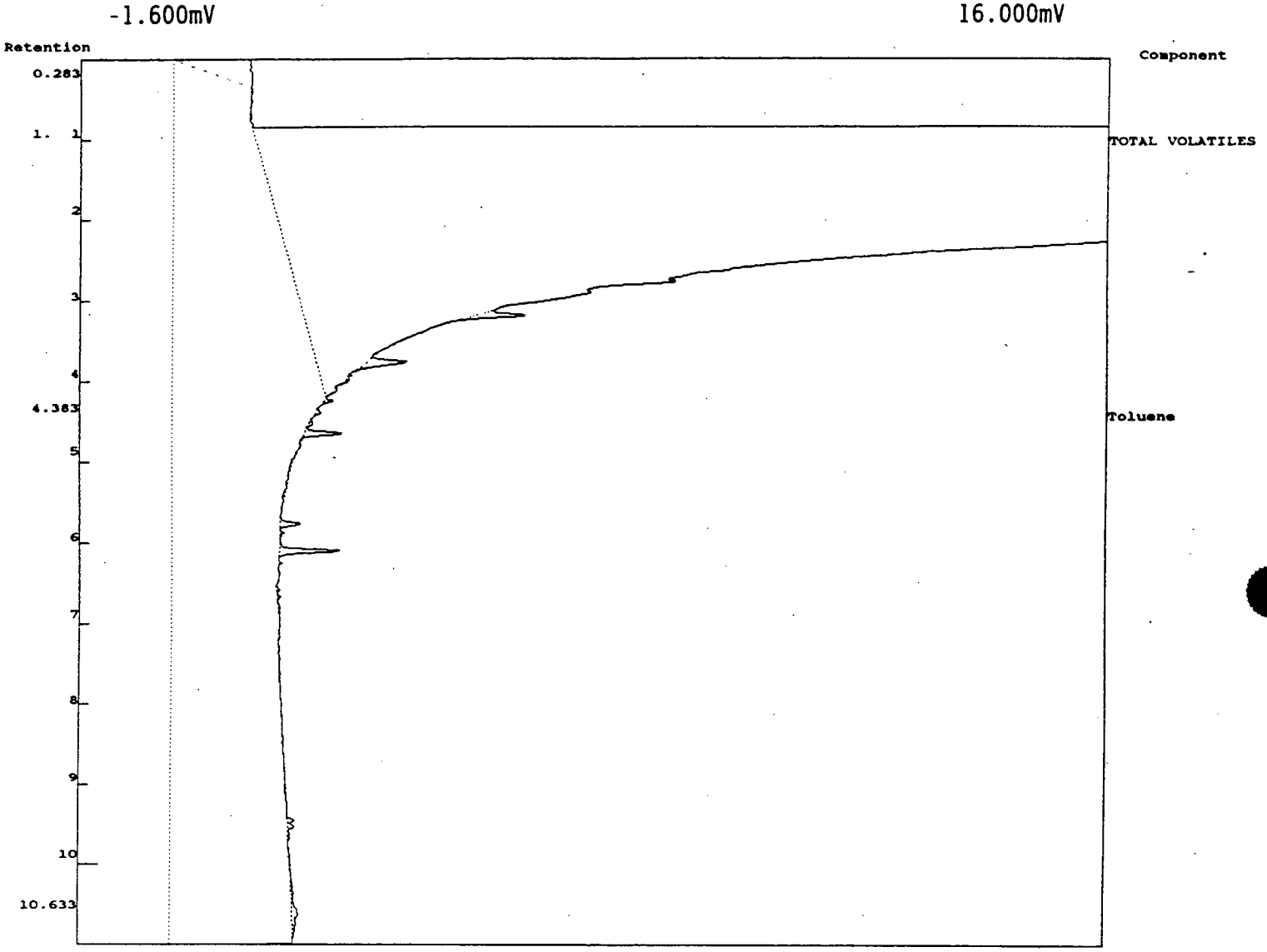
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F31.CHR (A:\)
Sample : SG-050
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.066	2927.65 M	3080.76	ug/L
Benzene	2	2.750	6.59 M	5.93	ug/L
M&P-XYLENE	5	6.450	0.33	0.43	ug/L
M&P-XYLENE	5	6.616	0.42	0.55	ug/L
O-Xylene	6	7.050	0.61	0.85	ug/L
	5		2935.60	3088.52	

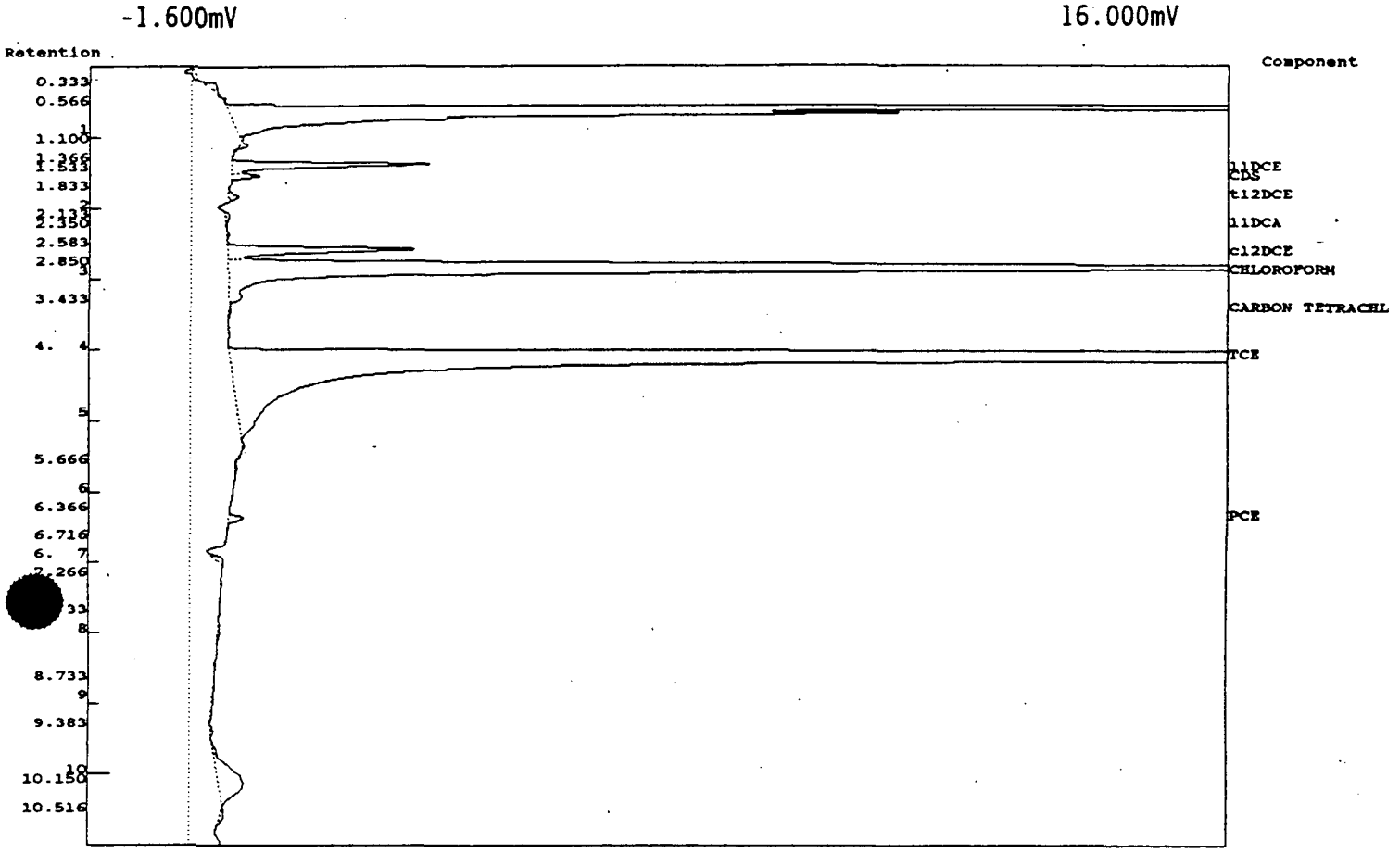
300540

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY24F32.CHR (A:\)
Sample : SG-054
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.000	23862.98 M	25111.00	ug/L
Toluene	3	4.383	0.51 M	0.53	ug/L
	2		23863.49	25111.53	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 20:09:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E32.CHR (A:\)
Sample : SG-054
Operator : SGN

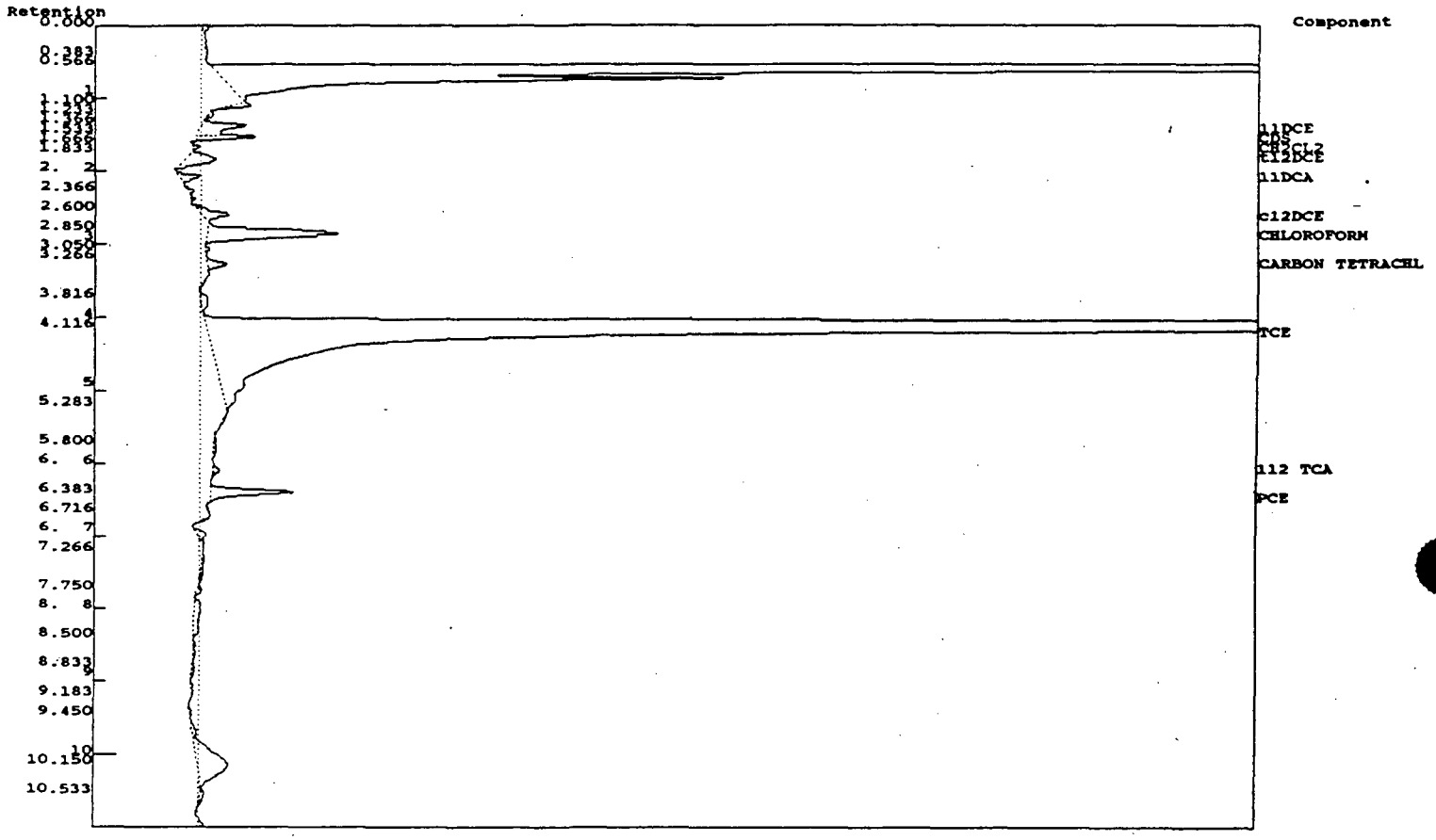


Component	Number	Retention	Area	External	Units
11DCE	1	1.366	13.33 M	1.89	ug/L
CDS	0	1.533	1.99 M	N/A	
t12DCE	3	1.833	0.83 M	1.47	ug/L
11DCA	4	2.133	0.44 M	0.38	ug/L
c12DCE	5	2.583	15.23 M	40.19	ug/L
CHLOROFORM	6	2.850	148.41 M	2.36	ug/L
CARBON TETRACHLORIDE	8	3.433	0.16 M	0.00	ug/L
TCE	9	4.100	623.21 M	8.43	ug/L
PCE	11	6.366	1.29 M	0.01	ug/L
	9		804.88	53.72	

300542

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 19:50:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E31.CHR (A:\)
Sample : SG-050
Operator : SGN

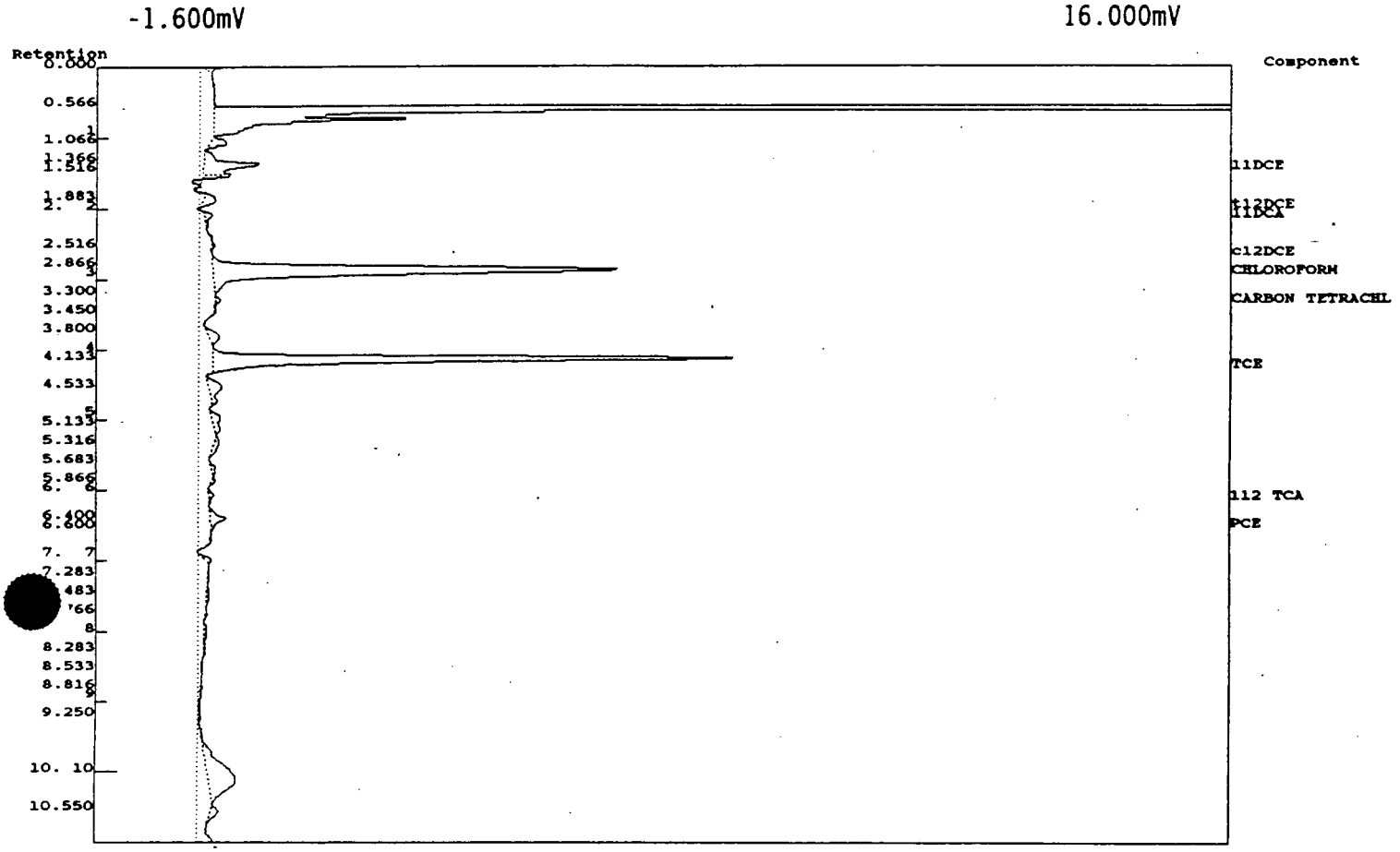
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	4.30 M	0.61	ug/L
CDS	0	1.533	3.57 M	N/A	
CH2CL2	2	1.666	0.29 M	0.22	ug/L
t12DCE	3	1.833	3.94 M	6.99	ug/L
~~11DCA~~	~~4~~	~~2.066~~	~~1.38 M~~	~~1.20~~	~~ug/L~~
c12DCE	5	2.600	2.44 M	6.43	ug/L
CHLOROFORM	6	2.850	15.01 M	0.24	ug/L
CARBON TETRACHLORIDE	8	3.266	1.58 M	0.00	ug/L
TCE	9	4.116	738.18 M	9.98	ug/L
112 TCA	10	6.083	0.54 M	0.05	ug/L
PCE	11	6.383	6.53 M	0.03	ug/L
	11		777.76	24.75	

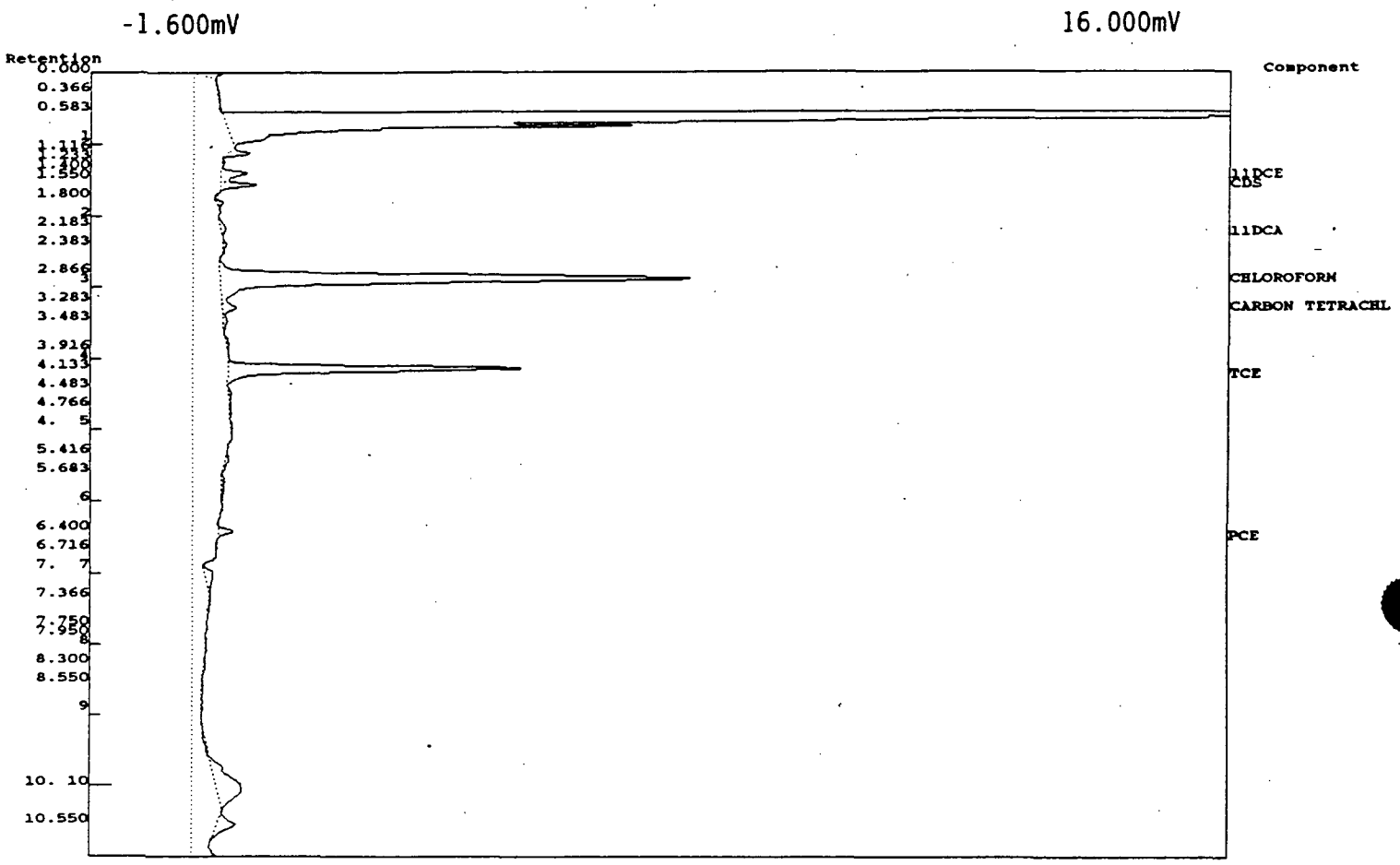
300543

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 19:30:28
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E30.CHR (A:\)
Sample : SG-049
Operator : SGN



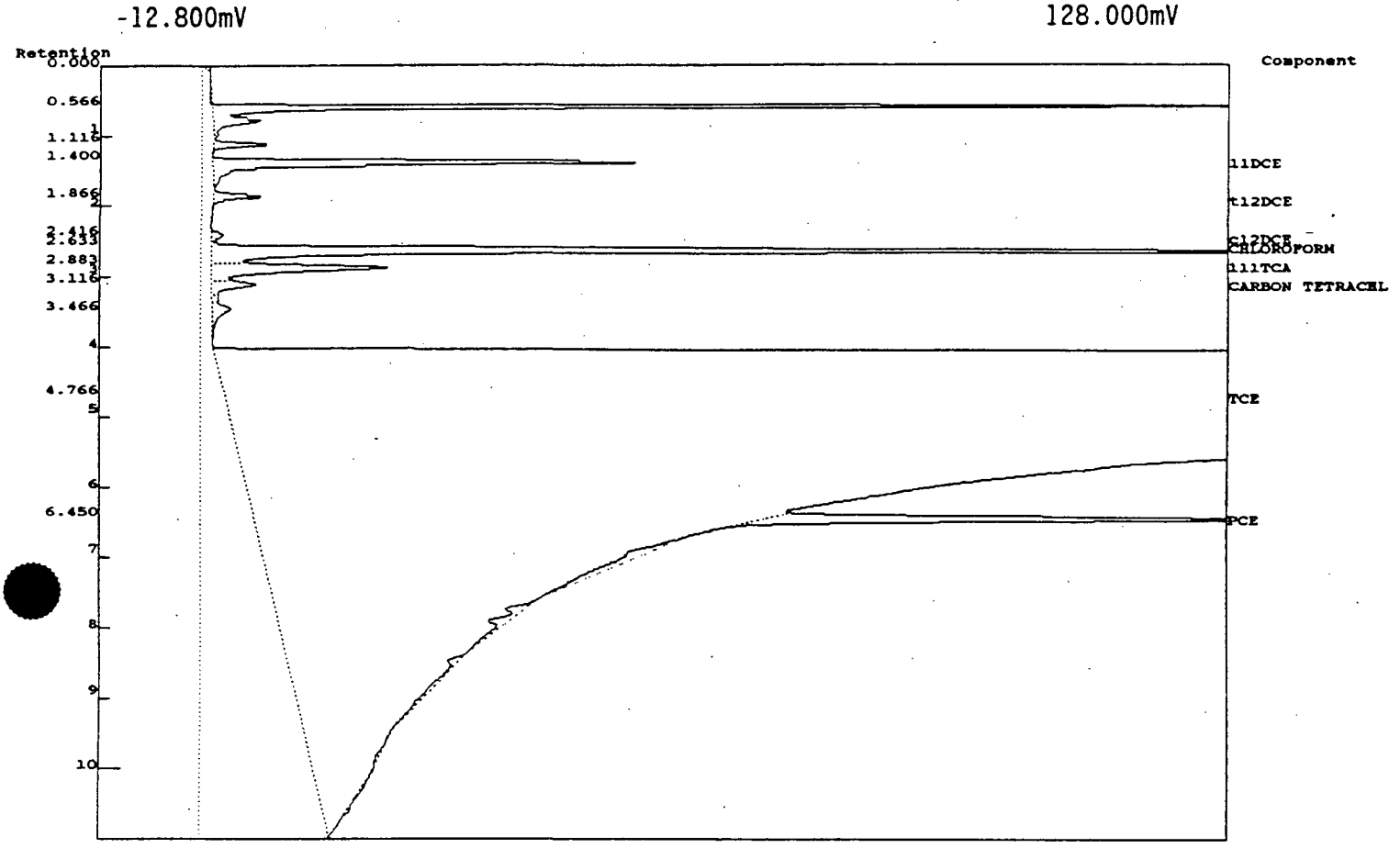
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	6.55 M	0.93	ug/L
t12DCE	3	1.883	1.47 M	2.60	ug/L
11DCA	4	2.083	0.80 M	0.70	ug/L
c12DCE	5	2.516	0.21 M	0.57	ug/L
CHLOROFORM	6	2.866	48.83 M	0.78	ug/L
CARBON TETRACHLORIDE	8	3.300	0.30 M	0.00	ug/L
TCE	9	4.133	46.25 M	0.63	ug/L
112 TCA	10	6.066	0.49 M	0.05	ug/L
PCE	11	6.400	1.87 M	0.01	ug/L
	9		106.77	6.25	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 19:10:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E29.CHR (A:\)
Sample : SG-048
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	2.20 M	0.31	ug/L
CDS	0	1.550	2.53 M	N/A	
11DCA	4	2.183	0.70 M	0.61	ug/L
CHLOROFORM	6	2.866	57.53 M	0.92	ug/L
CARBON TETRACHLORIDE	8	3.283	1.62 M	0.00	ug/L
TCE	9	4.133	25.27 M	0.34	ug/L
PCE	11	6.400	1.11 M	0.00	ug/L
	7		90.96	1.18	

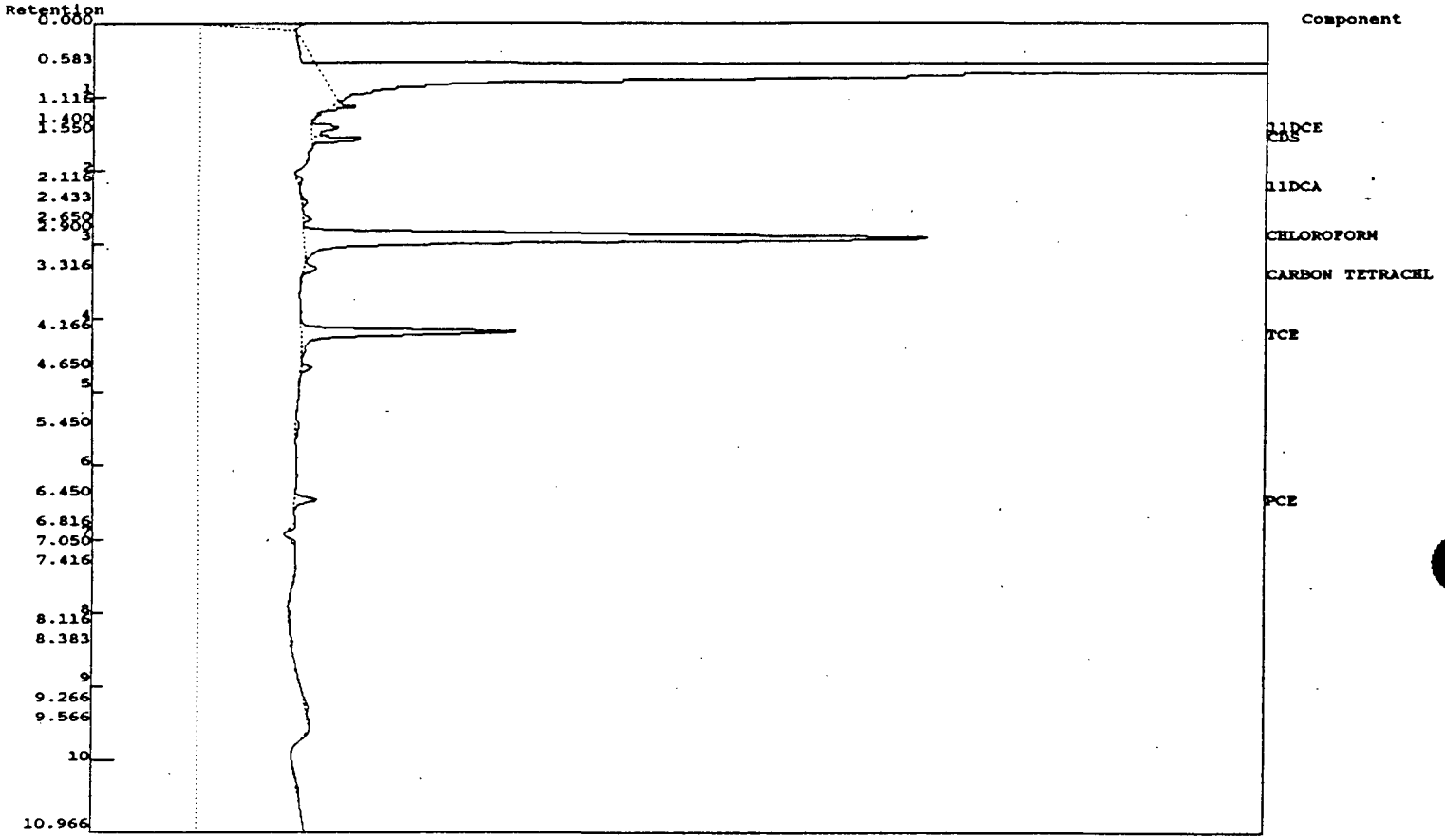
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 16:36:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E23.CHR (A:\MAY24)
Sample : SG-039
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	278.35	39.54	ug/L
t12DCE	3	1.866	28.41	50.37	ug/L
c12DCE	5	2.416	8.80 M	23.23	ug/L
CHLOROFORM	6	2.633	680.10 M	10.82	ug/L
111TCA	7	2.883	157.01 M	0.93	ug/L
CARBON TETRACHLORIDE	8	3.116	40.06 M	0.02	ug/L
TCE	9	4.766	81824.38 M	1106.24	ug/L
PCE	11	6.450	316.32 M	1.28	ug/L
	8		83333.44	1232.42	

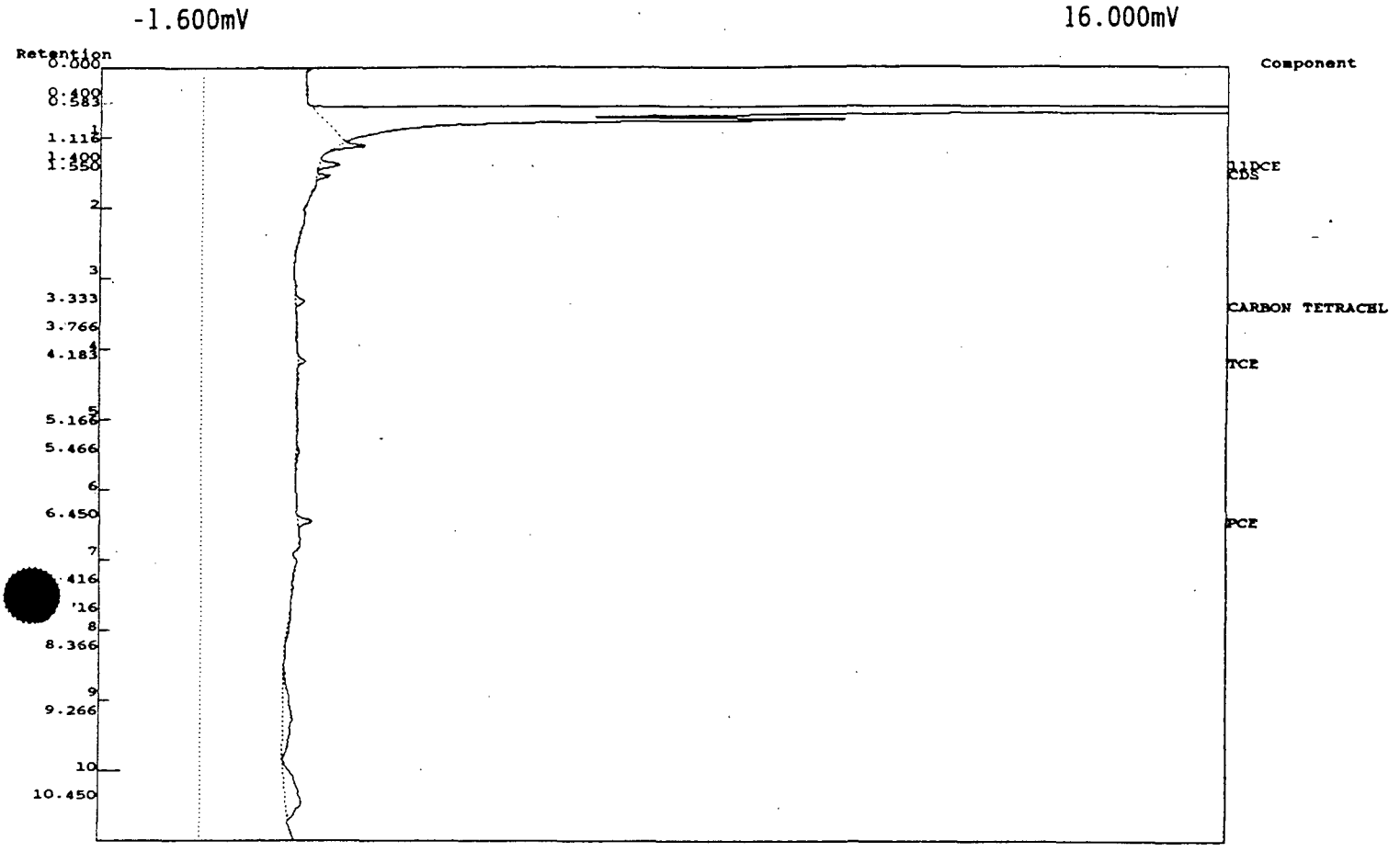
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 16:09:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E22.CHR (A:\)
Sample : SG-031
Operator : SGN

-1.600mV 16.000mV



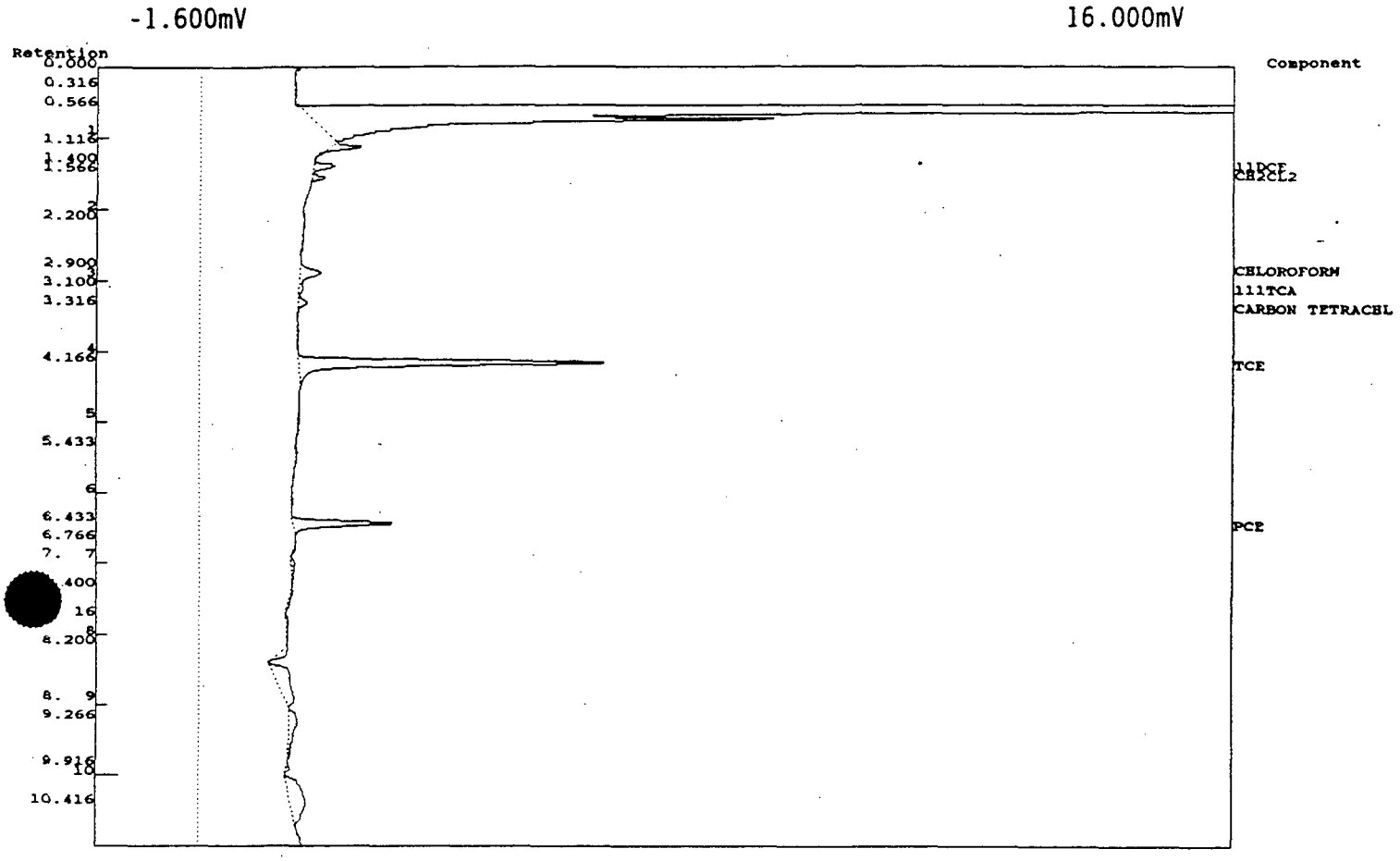
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	2.25 M	0.32	ug/L
CDS	0	1.550	3.19 M	N/A	
11DCA	4	2.116	0.47 M	0.41	ug/L
CHLOROFORM	6	2.900	72.50 M	1.15	ug/L
CARBON TETRACHLORIDE	8	3.316	1.11 M	0.00	ug/L
TCE	9	4.166	18.65 M	0.25	ug/L
PCE	11	6.450	1.86 M	0.01	ug/L
	7		100.03	1.14	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 15:41:47
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E21.CHR (A:\)
Sample : EB-05
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.57 M	0.22	ug/L
CDS	0	1.550	0.68 M	N/A	
CARBON TETRACHLORIDE	8	3.333	0.81 M	0.00	ug/L
TCE	9	4.183	0.54 M	0.01	ug/L
PCE	11	6.450	1.10 M	0.00	ug/L
	5		4.71	N/A	

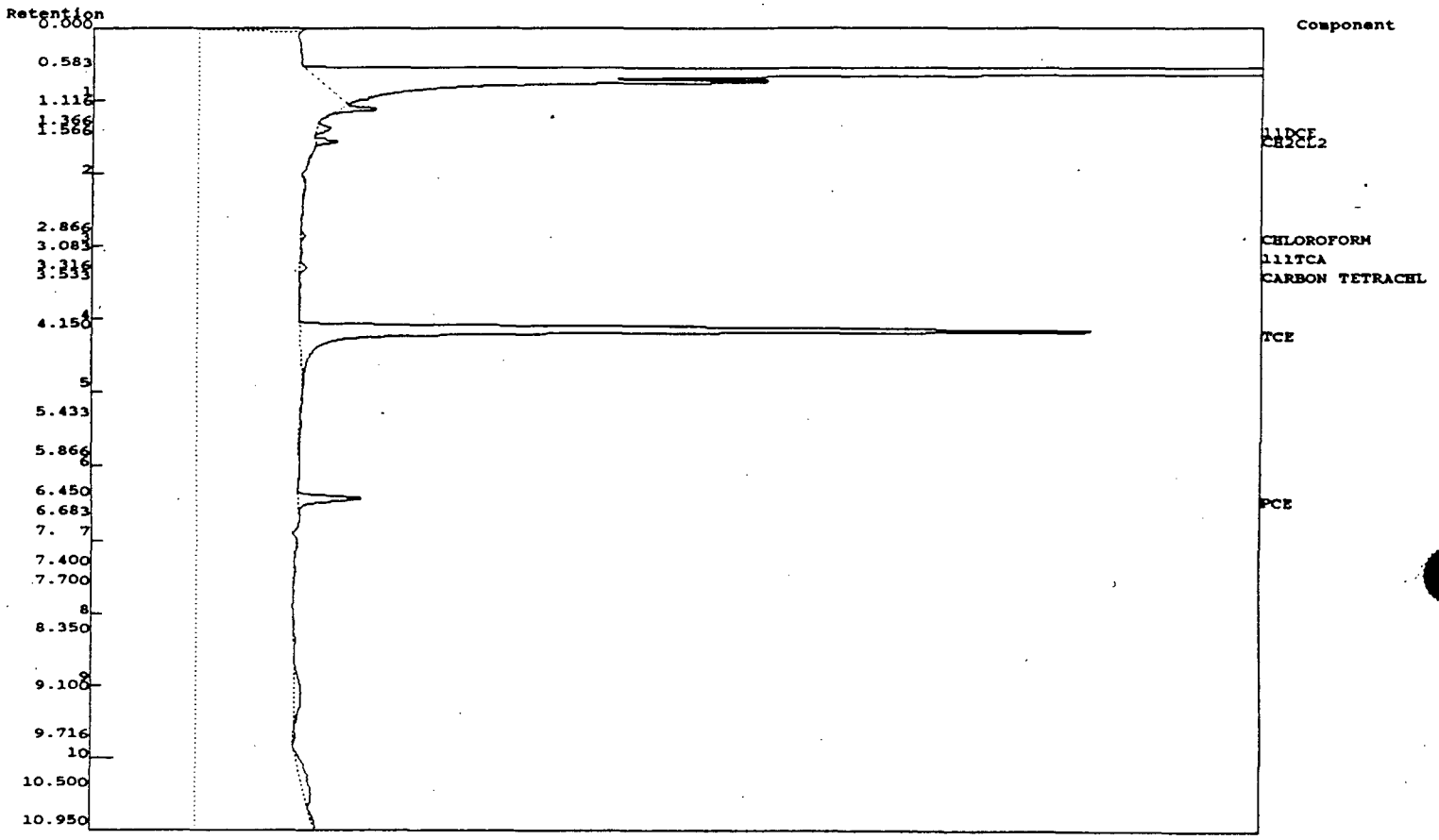
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 15:18:01
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E20.CHR (A:\)
Sample : SG-007
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.62 M	0.23	ug/L
CH2CL2	2	1.566	0.81 M	0.62	ug/L
CHLOROFORM	6	2.900	2.48 M	0.04	ug/L
111TCA	7	3.100	0.60 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.316	0.87 M	0.00	ug/L
TCE	9	4.166	26.64 M	0.36	ug/L
PCE	11	6.433	8.19 M	0.03	ug/L
	7		41.22	1.29	

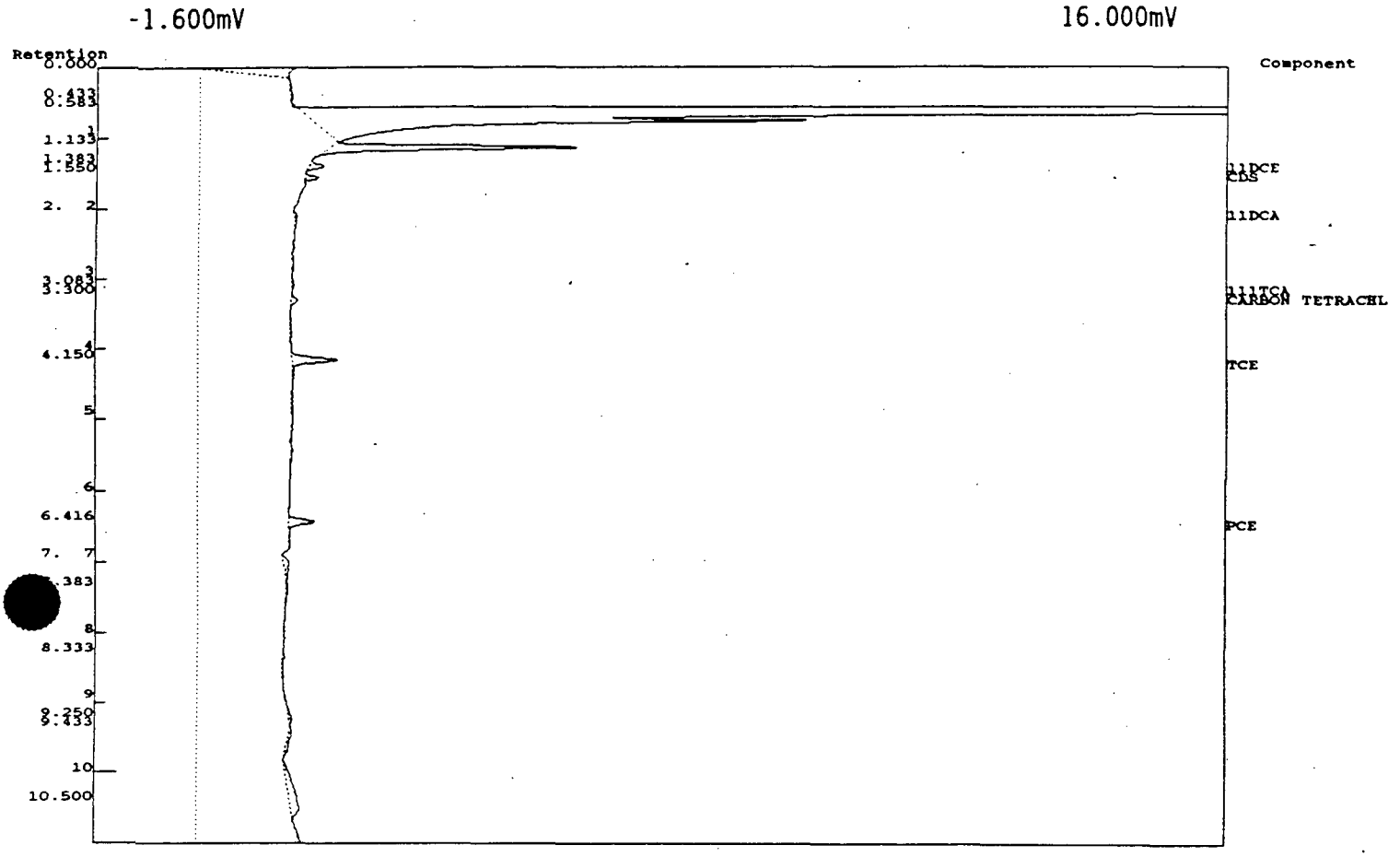
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 14:54:49
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E19.CHR (A:\)
Sample : SG-006
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.16 M	0.16	ug/L
CH2CL2	2	1.566	1.29 M	1.00	ug/L
CHLOROFORM	6	2.866	0.40 M	0.01	ug/L
111TCA	7	3.083	0.14 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.316	0.63 M	0.00	ug/L
TCE	9	4.150	73.35 M	0.99	ug/L
PCE	11	6.450	5.21 M	0.02	ug/L
	7		82.17	2.18	

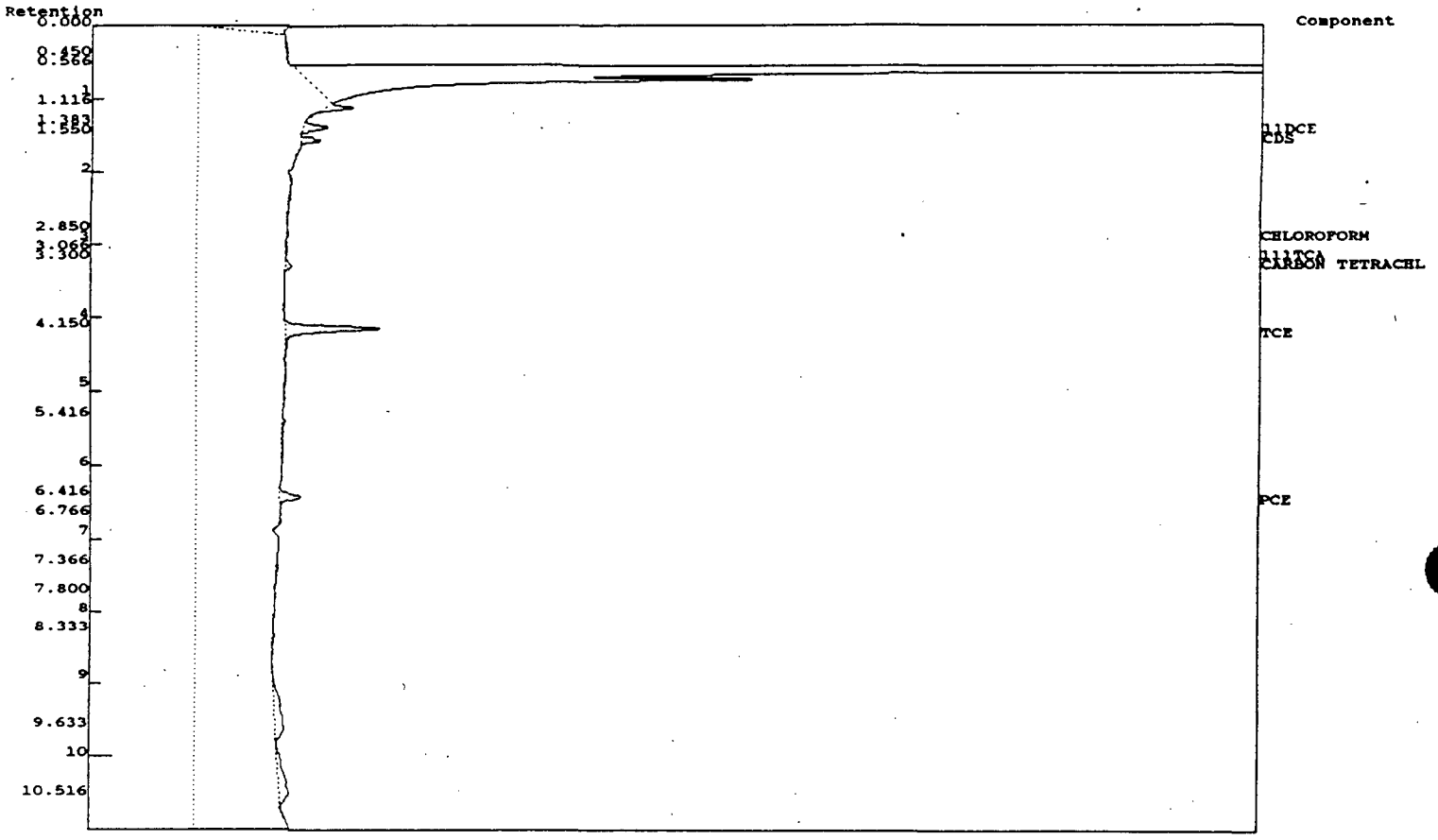
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 14:26:32
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E18.CHR (A:\)
Sample : SG-005
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	1.06 M	0.15	ug/L
CDS	0	1.550	0.76 M	N/A	
11DCA	4	2.100	0.21 M	0.18	ug/L
111TCA	7	3.083	0.18 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.300	0.52 M	0.00	ug/L
TCE	9	4.150	3.70 M	0.05	ug/L
PCE	11	6.416	2.11 M	0.01	ug/L
	7		8.55	N/A	

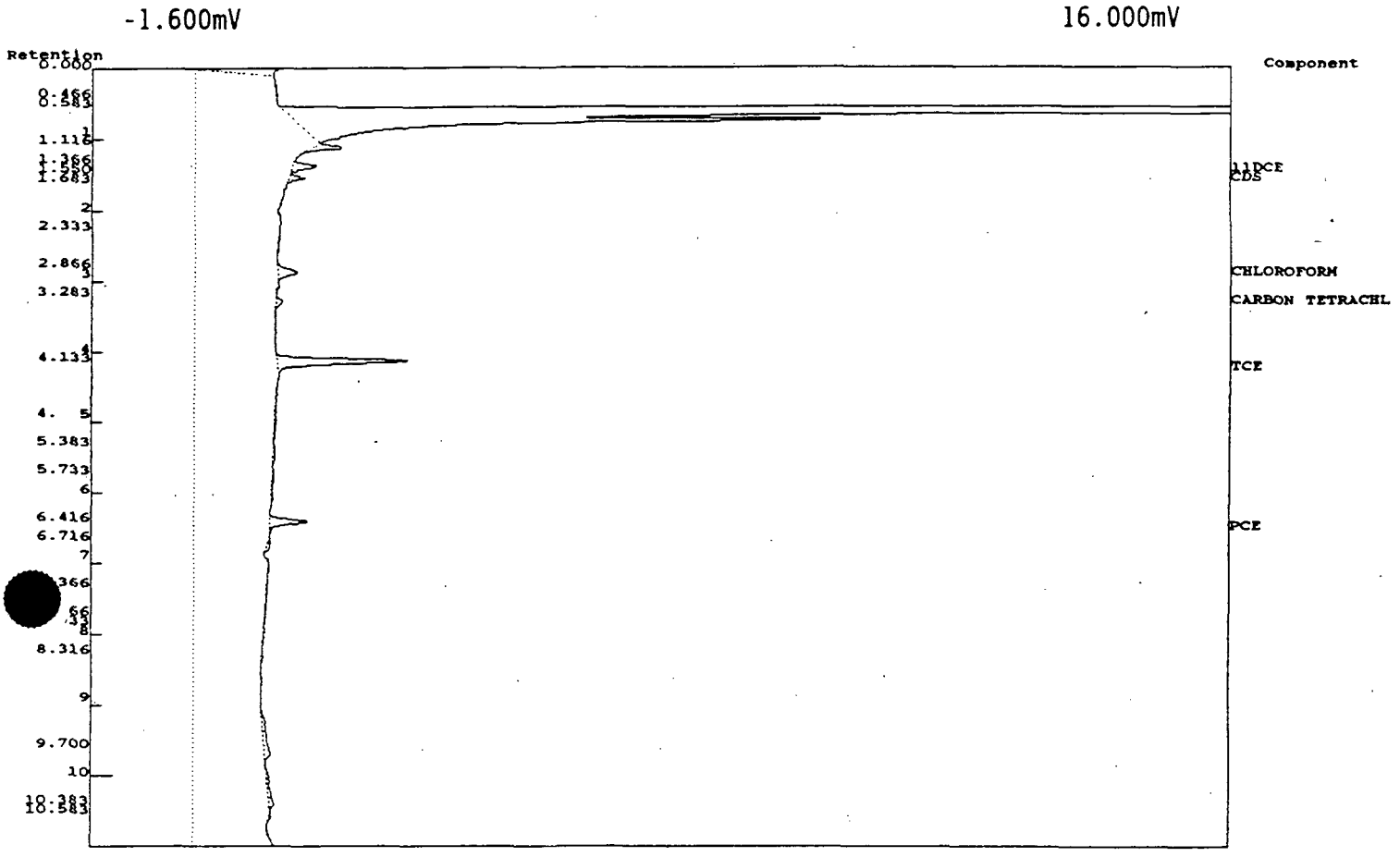
Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 14:00:58
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E17.CHR (A:\)
Sample : SG-004
Operator : SGN

-1.600mV 16.000mV



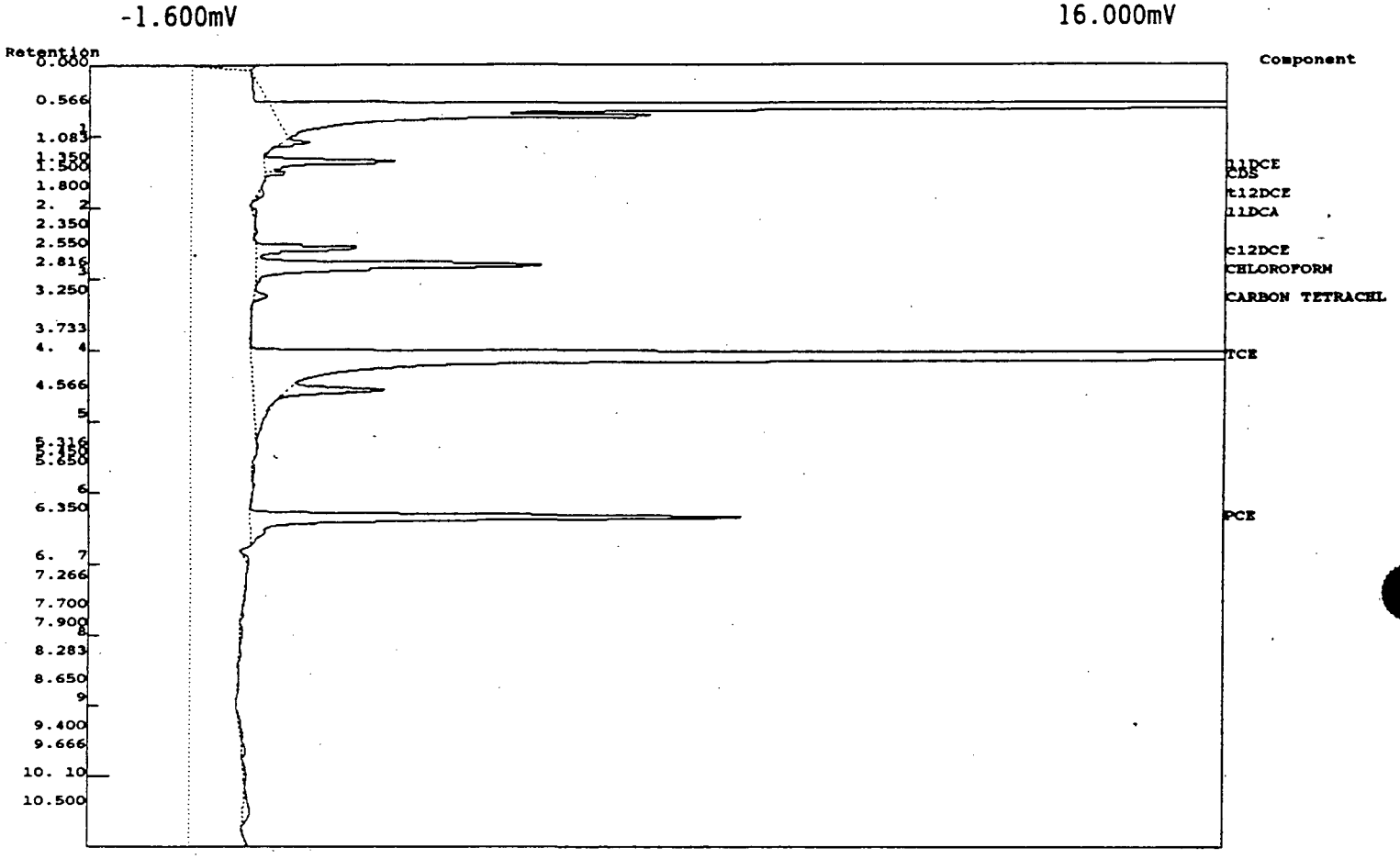
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	1.77	0.25	ug/L
CDS	0	1.550	1.26 M	N/A	
CHLOROFORM	6	2.850	0.12 M	0.00	ug/L
111TCA	7	3.066	0.11 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.300	0.52 M	0.00	ug/L
TCE	9	4.150	7.70 M	0.10	ug/L
PCE	11	6.416	1.85 M	0.01	ug/L
	7		13.32	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 13:36:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E16.CHR (A:\)
Sample : SG-003
Operator : SGN



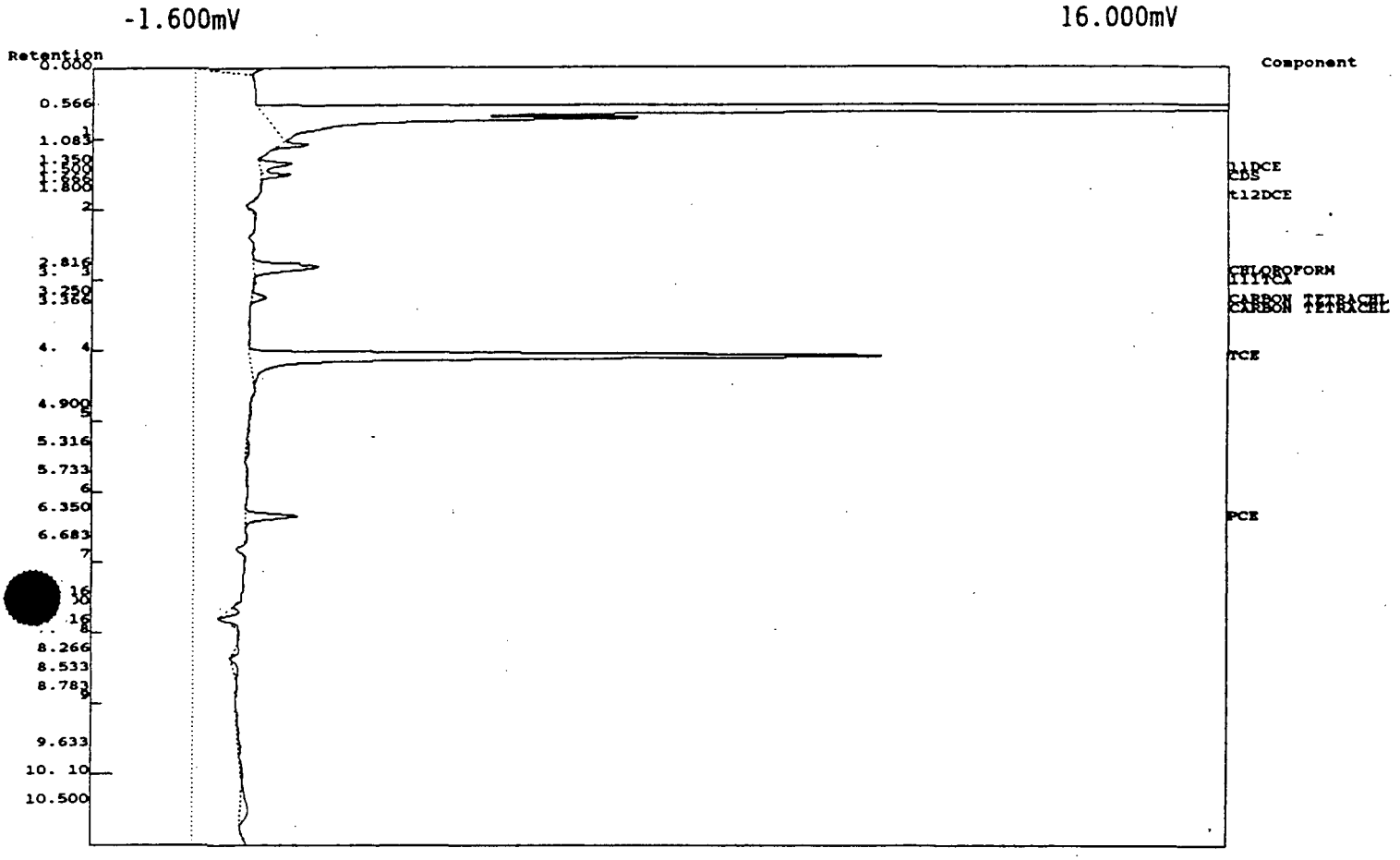
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.88 M	0.27	ug/L
CDS	0	1.550	0.94 M	N/A	
CHLOROFORM	6	2.866	1.98 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.283	0.60 M	0.00	ug/L
TCE	9	4.133	10.63 M	0.14	ug/L
PCE	11	6.416	3.20 M	0.01	ug/L
	6		19.23	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 12:05:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E12.CHR (A:\)
Sample : SG-027
Operator : SGN



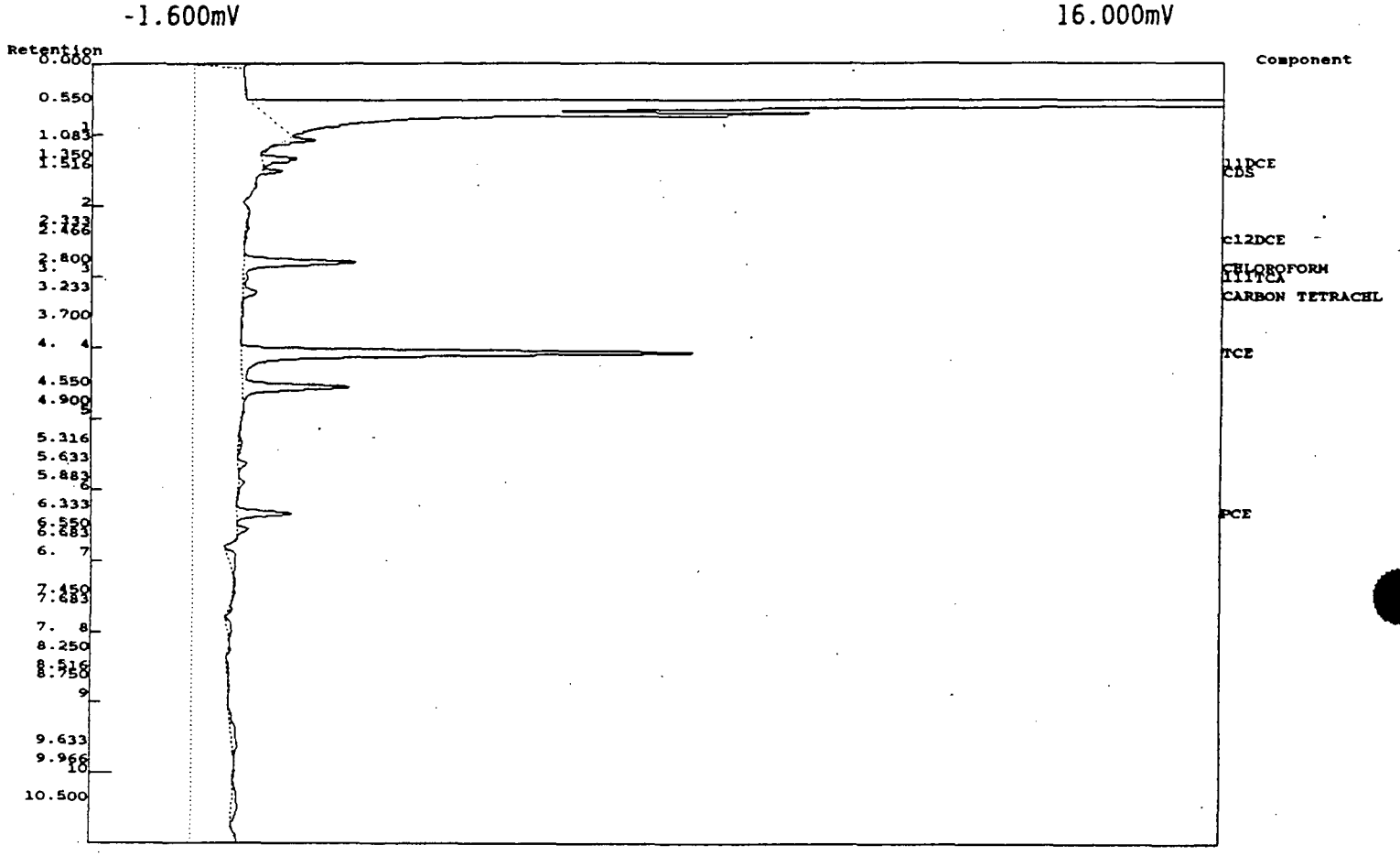
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	10.06 M	1.43	ug/L
CDS	0	1.500	1.34 M	N/A	
t12DCE	3	1.800	0.73 M	1.30	ug/L
11DCA	4	2.050	0.40 M	0.35	ug/L
c12DCE	5	2.550	8.40 M	22.16	ug/L
CHLOROFORM	6	2.816	30.82 M	0.49	ug/L
CARBON TETRACHLORIDE	8	3.250	1.16	0.00	ug/L
TCE	9	4.083	322.83 M	4.36	ug/L
PCE	11	6.350	45.16 M	0.18	ug/L
	9		420.90	29.28	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 11:44:36
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E11.CHR (A:\)
Sample : SG-026
Operator : SGN



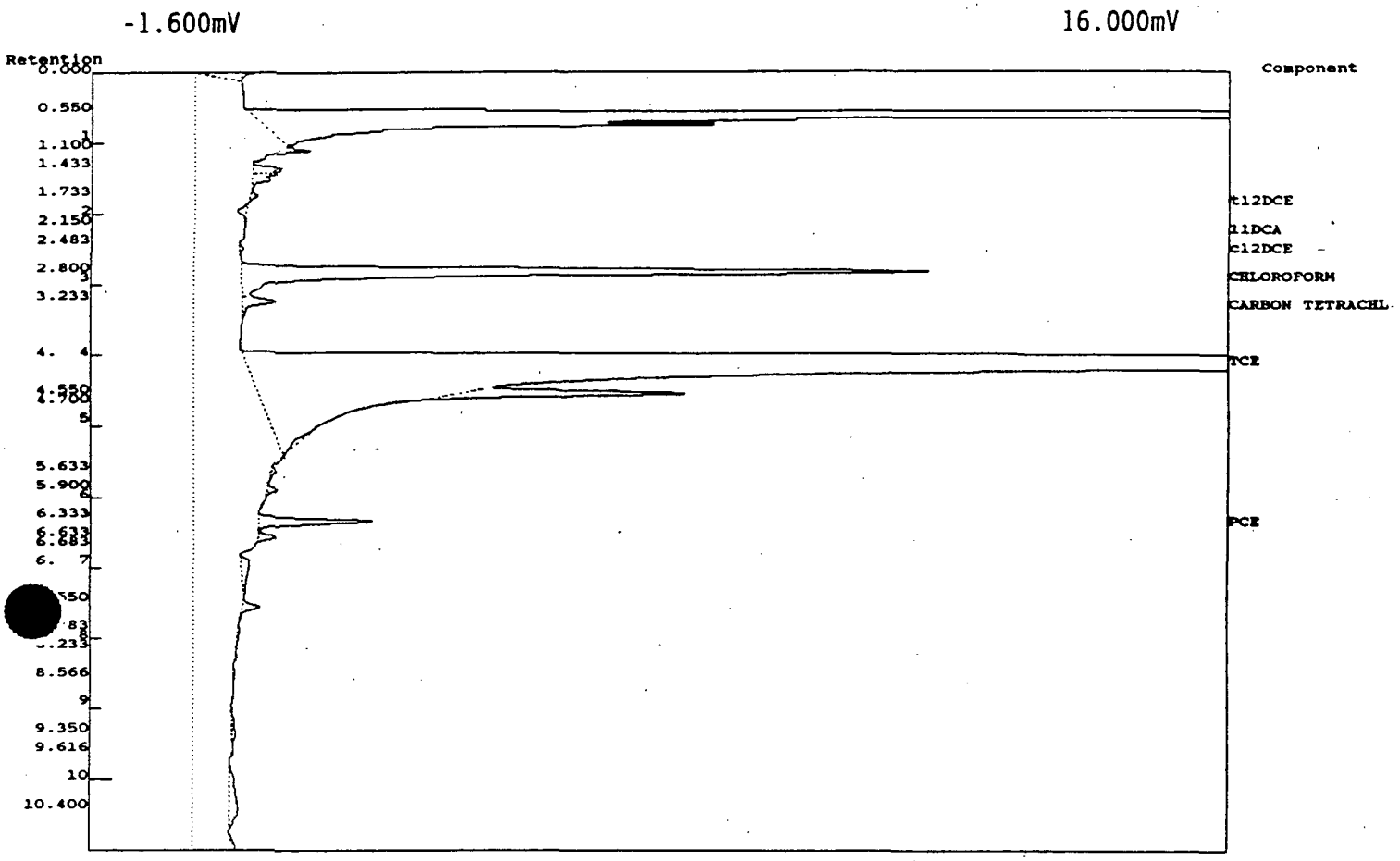
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.43 M	0.35	ug/L
CDS	0	1.500	1.92 M	N/A	
t12DCE	3	1.800	0.15 M	0.26	ug/L
CHLOROFORM	6	2.816	6.94 M	0.11	ug/L
111TCA	7	3.033	0.10 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	1.24 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.366	0.11 M	0.00	ug/L
TCE	9	4.083	57.15 M	0.77	ug/L
PCE	11	6.350	4.46 M	0.02	ug/L
	9		74.50	0.51	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 11:24:13
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E10.CHR (A:\)
Sample : SG-021
Operator : SGN



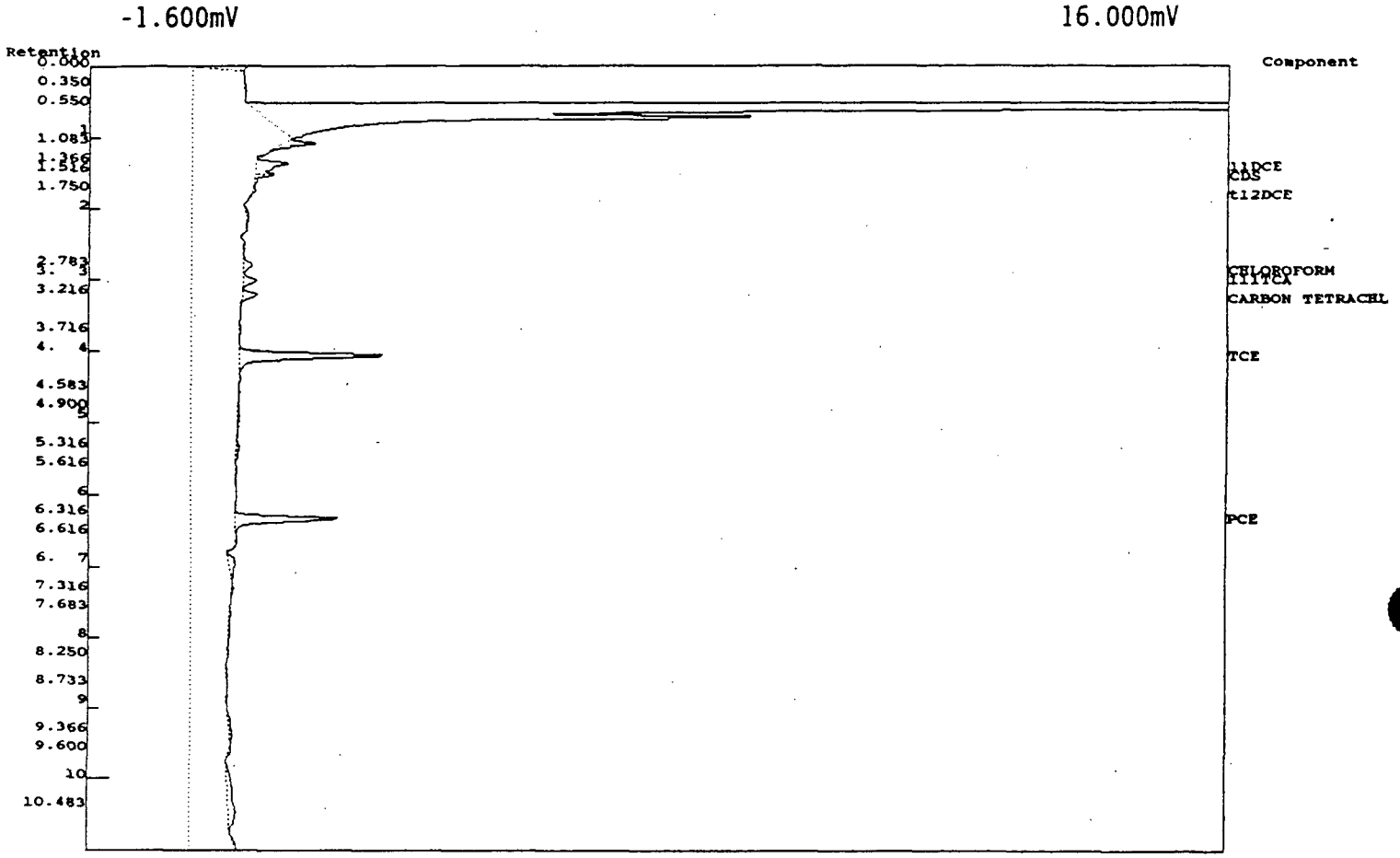
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.87 M	0.41	ug/L
CDS	0	1.516	0.99 M	N/A	
c12DCE	5	2.466	0.11 M	0.28	ug/L
CHLOROFORM	6	2.800	10.28 M	0.16	ug/L
111TCA	7	3.033	0.42 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	1.52 M	0.00	ug/L
TCE	9	4.066	40.84 M	0.55	ug/L
PCE	11	6.333	4.52	0.02	ug/L
	8		61.54	0.42	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 11:04:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E9.CHR (A:\)
Sample : SG-012
Operator : SGN



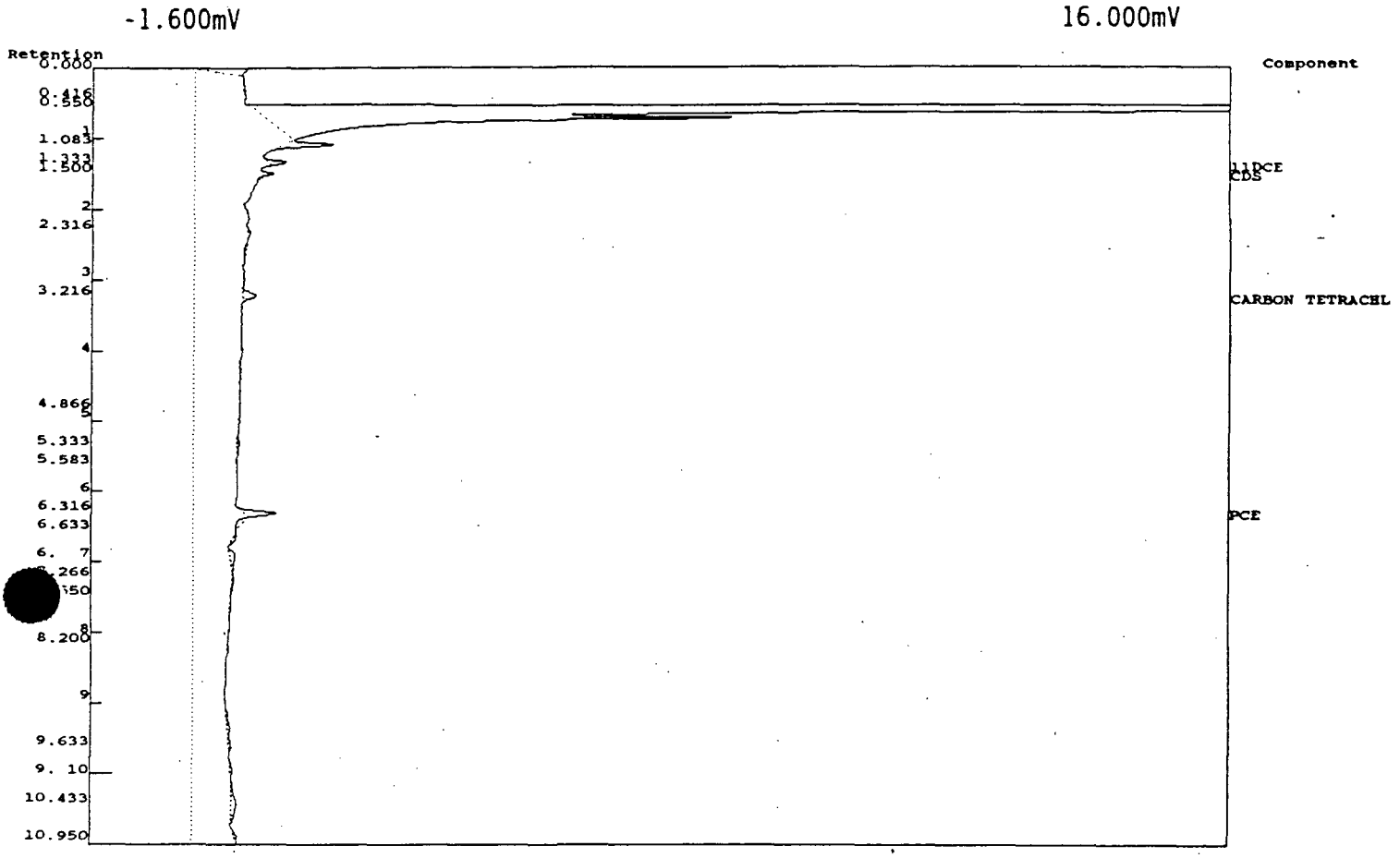
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	1.76 M	0.25	ug/L
t12DCE	3	1.733	0.54 M	0.95	ug/L
11DCA	4	2.150	0.42 M	0.36	ug/L
c12DCE	5	2.483	0.22 M	0.59	ug/L
CHLOROFORM	6	2.800	74.61 M	1.19	ug/L
CARBON TETRACHLORIDE	8	3.233	3.69 M	0.00	ug/L
TCE	9	4.083	1779.11 M	24.05	ug/L
PCE	11	6.333	9.16 M	0.04	ug/L
	8		1869.52	27.43	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 10:45:21
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E8.CHR (A:\)
Sample : SG-009
Operator : SGN



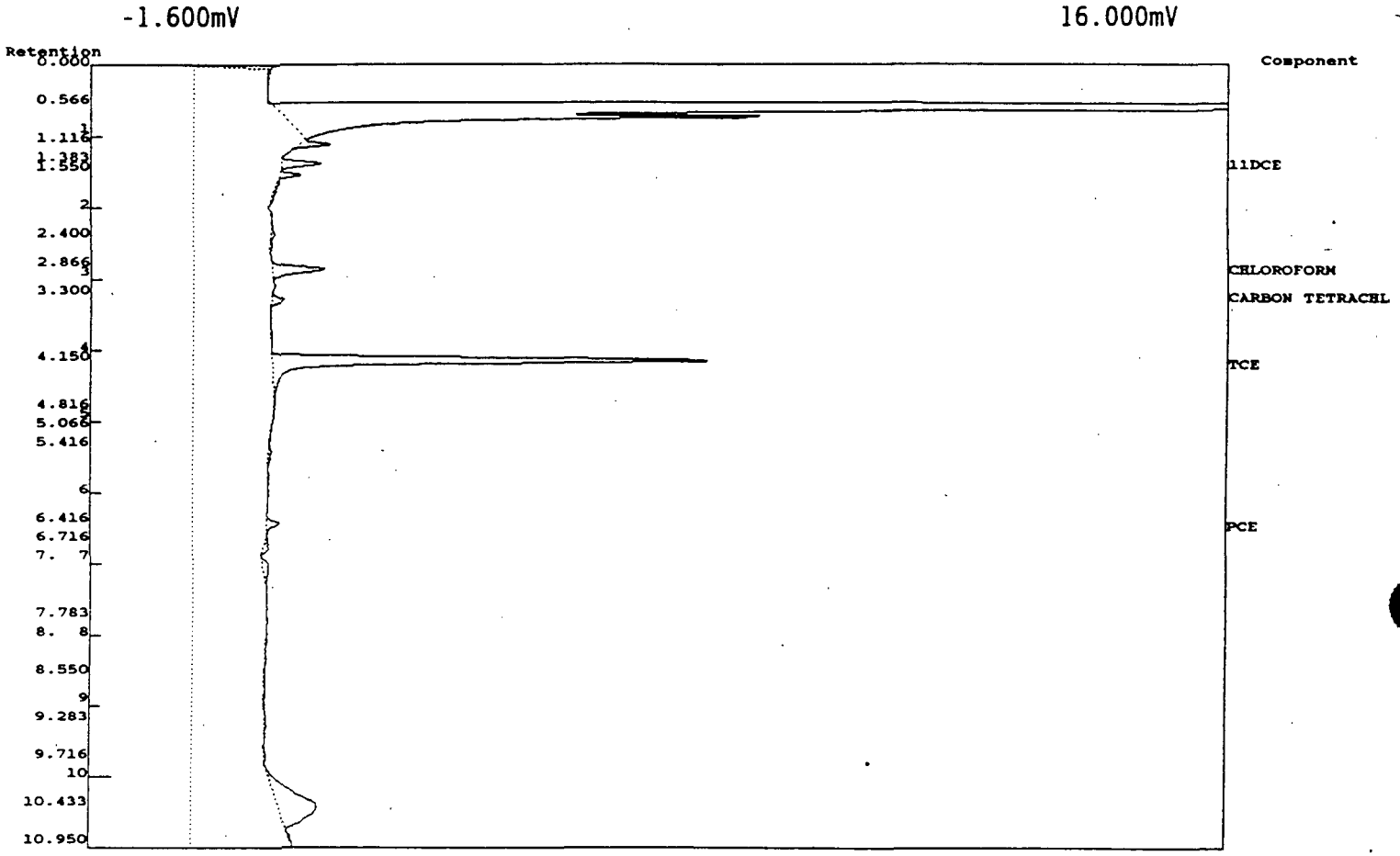
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.07 M	0.44	ug/L
CDS	0	1.516	1.25 M	N/A	
t12DCE	3	1.750	0.11 M	0.20	ug/L
CHLOROFORM	6	2.783	0.82 M	0.01	ug/L
111TCA	7	3.016	1.06 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.216	1.23 M	0.00	ug/L
TCE	9	4.050	12.61 M	0.17	ug/L
PCE	11	6.316	8.66 M	0.04	ug/L
	8		28.82	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/24/2000 10:25:29
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY24E7.CHR (A:\)
Sample : EB-04
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	0.92 M	0.13	ug/L
CDS	0	1.500	0.13 M	N/A	
CARBON TETRACHLORIDE	8	3.216	1.12 M	0.00	ug/L
PCE	11	6.316	2.02 M	0.01	ug/L
	4		4.20	N/A	

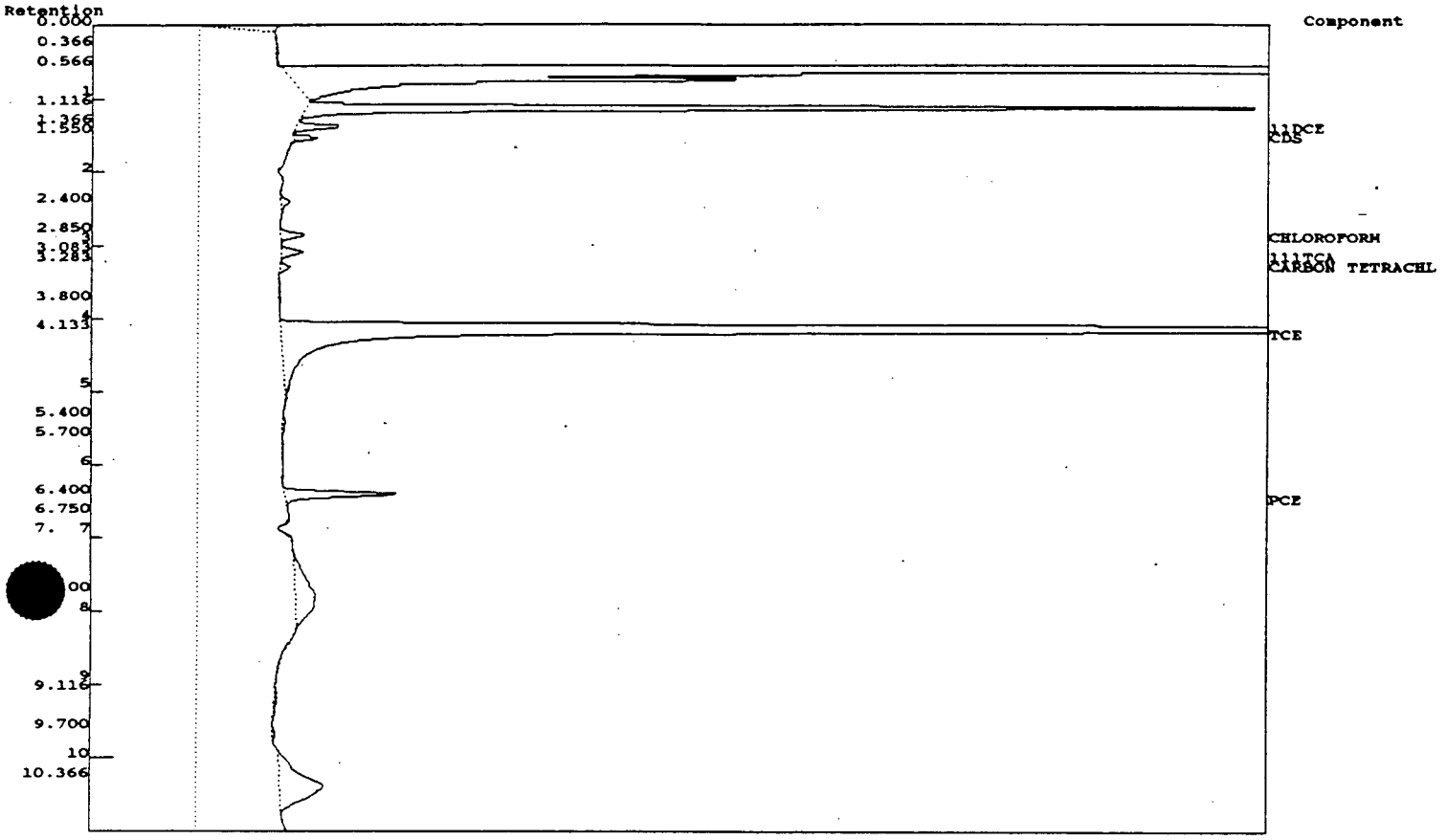
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 17:12:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E22.CHR (A:\)
Sample : SG-033
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	2.87 M	0.41	ug/L
CHLOROFORM	6	2.866	5.02 M	0.08	ug/L
CARBON TETRACHLORIDE	8	3.300	1.09	0.00	ug/L
TCE	9	4.150	39.69 M	0.54	ug/L
PCE	11	6.416	1.17	0.00	ug/L
	5		49.83	1.03	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 16:45:57
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E21.CHR (A:\)
Sample : SG-089
Operator : SGN

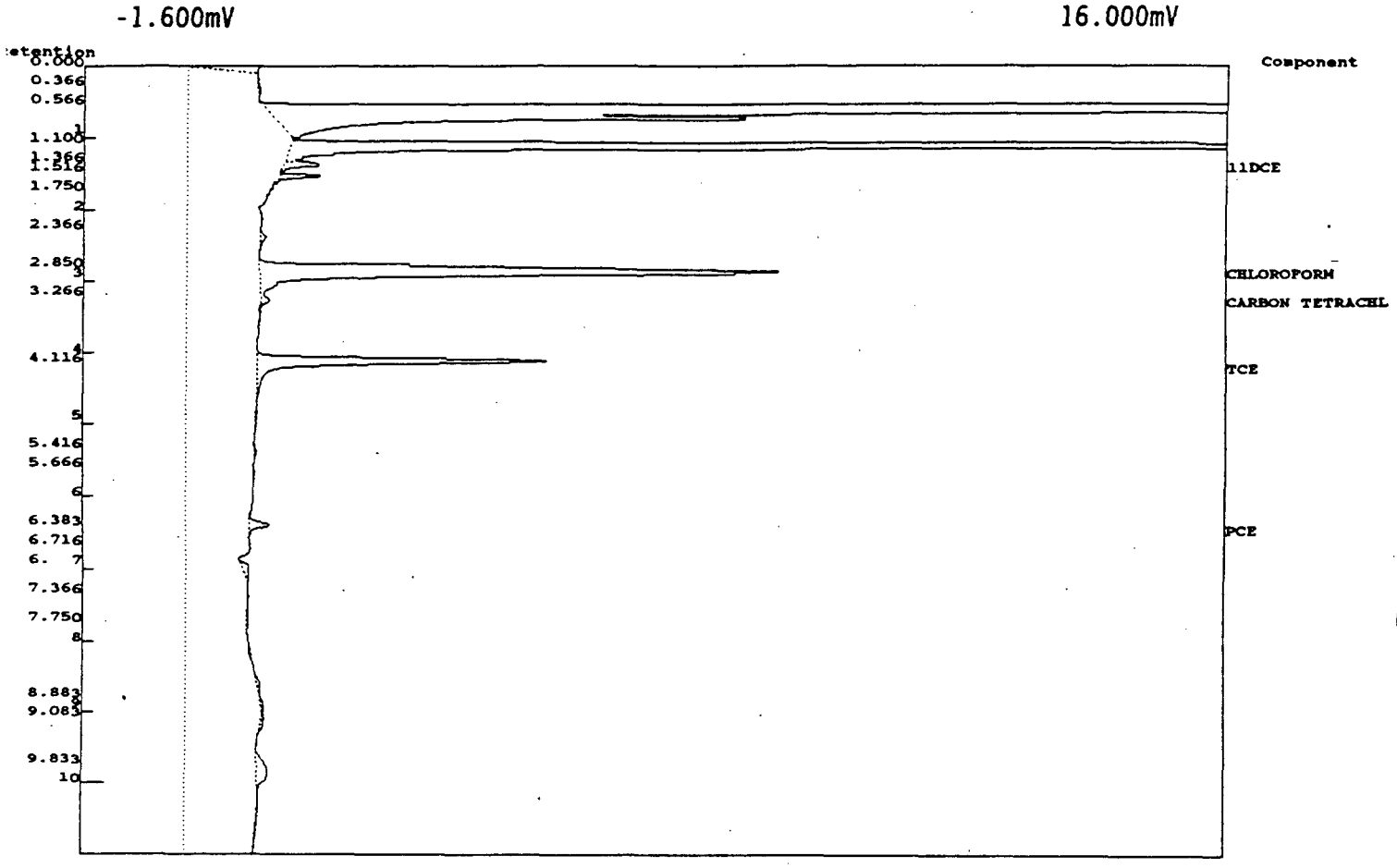
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.21 M	0.46	ug/L
CDS	0	1.550	1.27 M	N/A	
CHLOROFORM	6	2.850	1.94 M	0.03	ug/L
111TCA	7	3.083	1.76 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.283	0.79 M	0.00	ug/L
TCE	9	4.133	191.46 M	2.59	ug/L
PCE	11	6.400	8.80 M	0.04	ug/L
	7		209.23	2.12	

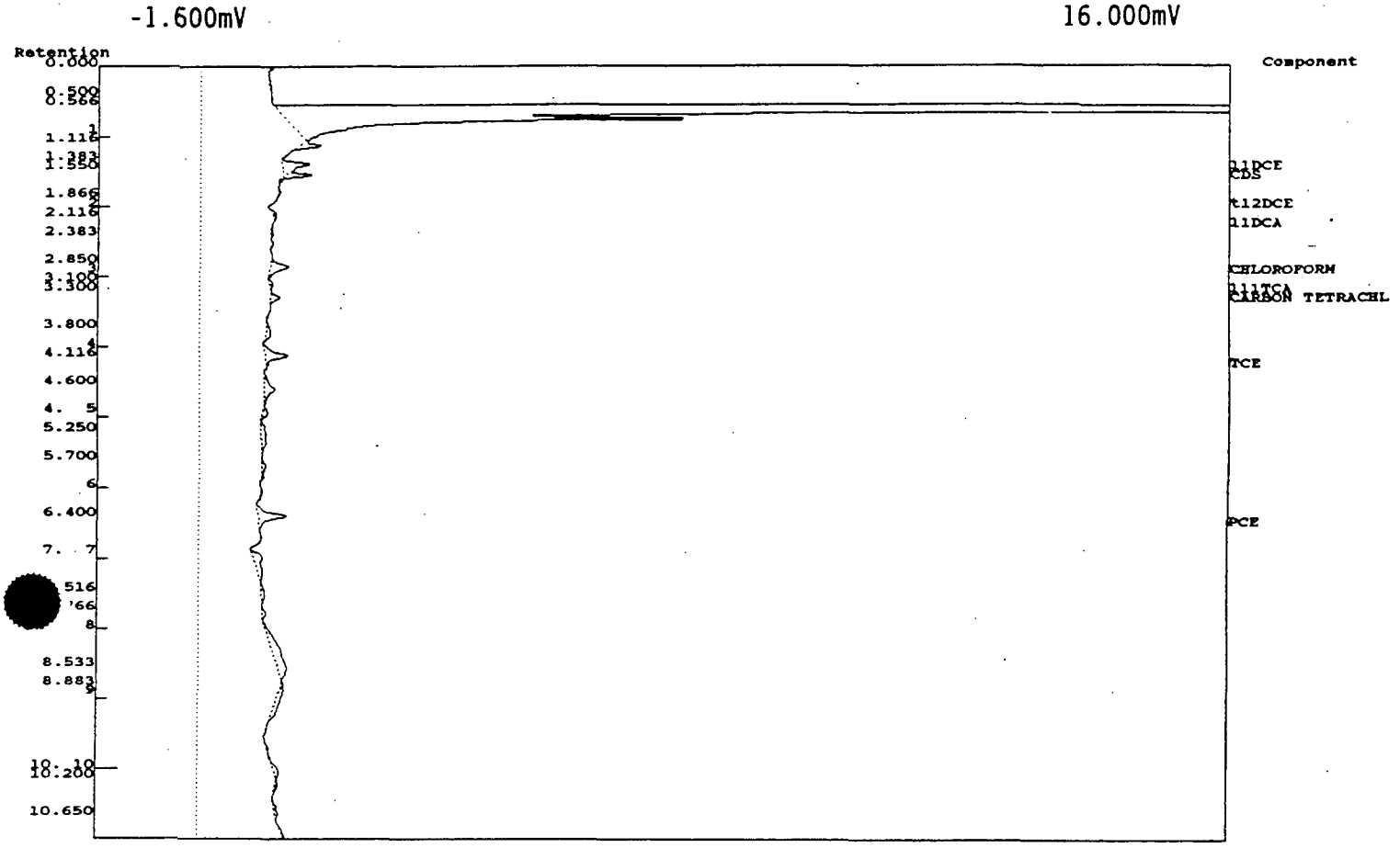
300561

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 16:21:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E20.CHR (A:\)
Sample : SG-088
Operator : SGN



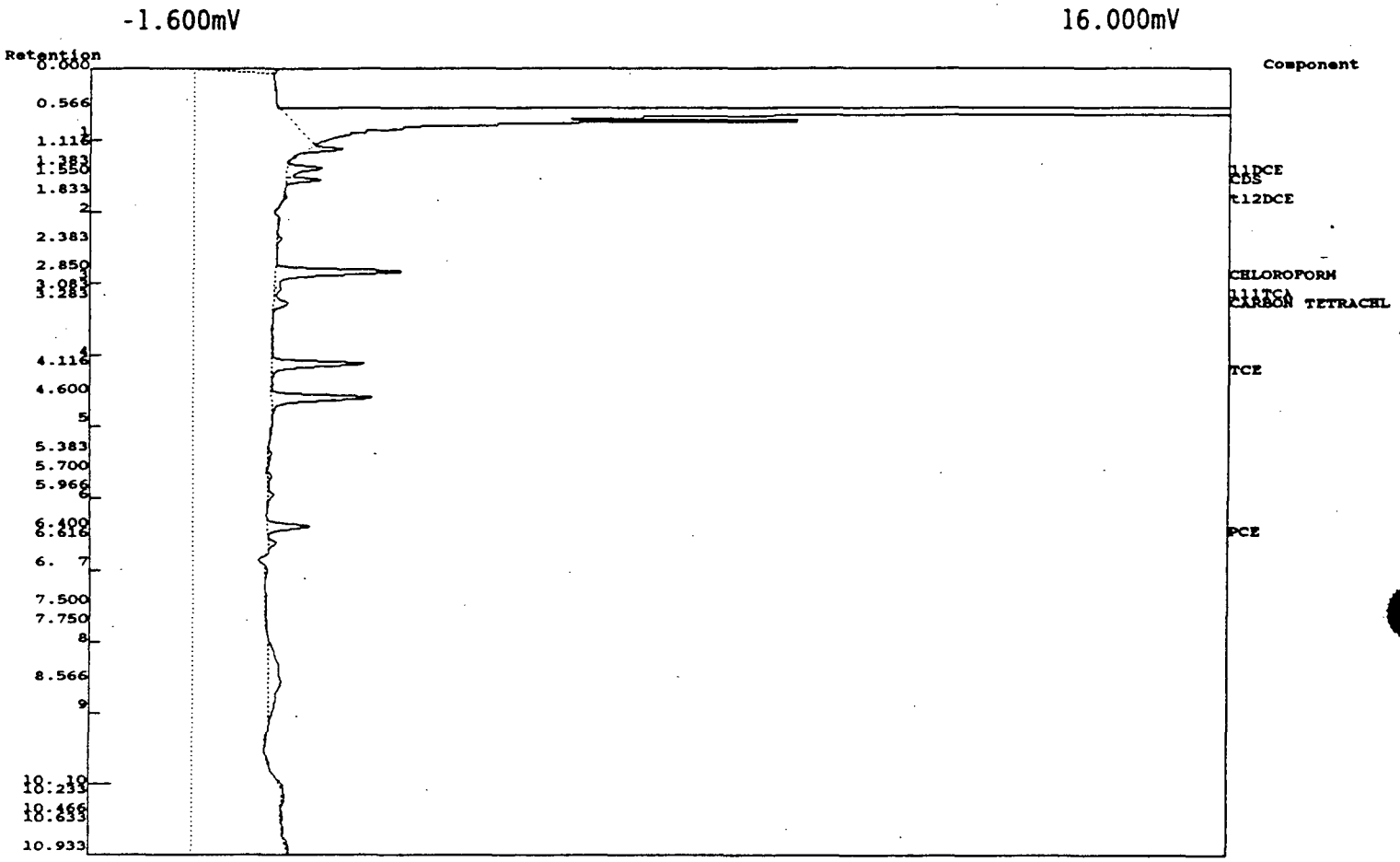
Component	Number	Retention	Area	External	Units
1DCE	1	1.366	2.84 M	0.40	ug/L
HLOROFORM	6	2.850	63.51 M	1.01	ug/L
ARBON TETRACHLORIDE	8	3.266	0.88 M	0.00	ug/L
CE	9	4.116	25.97 M	0.35	ug/L
CE	11	6.383	1.80 M	0.01	ug/L
	5		94.99	1.77	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 15:55:52
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E19.CHR (A:\)
Sample : SG-028
Operator : SGN



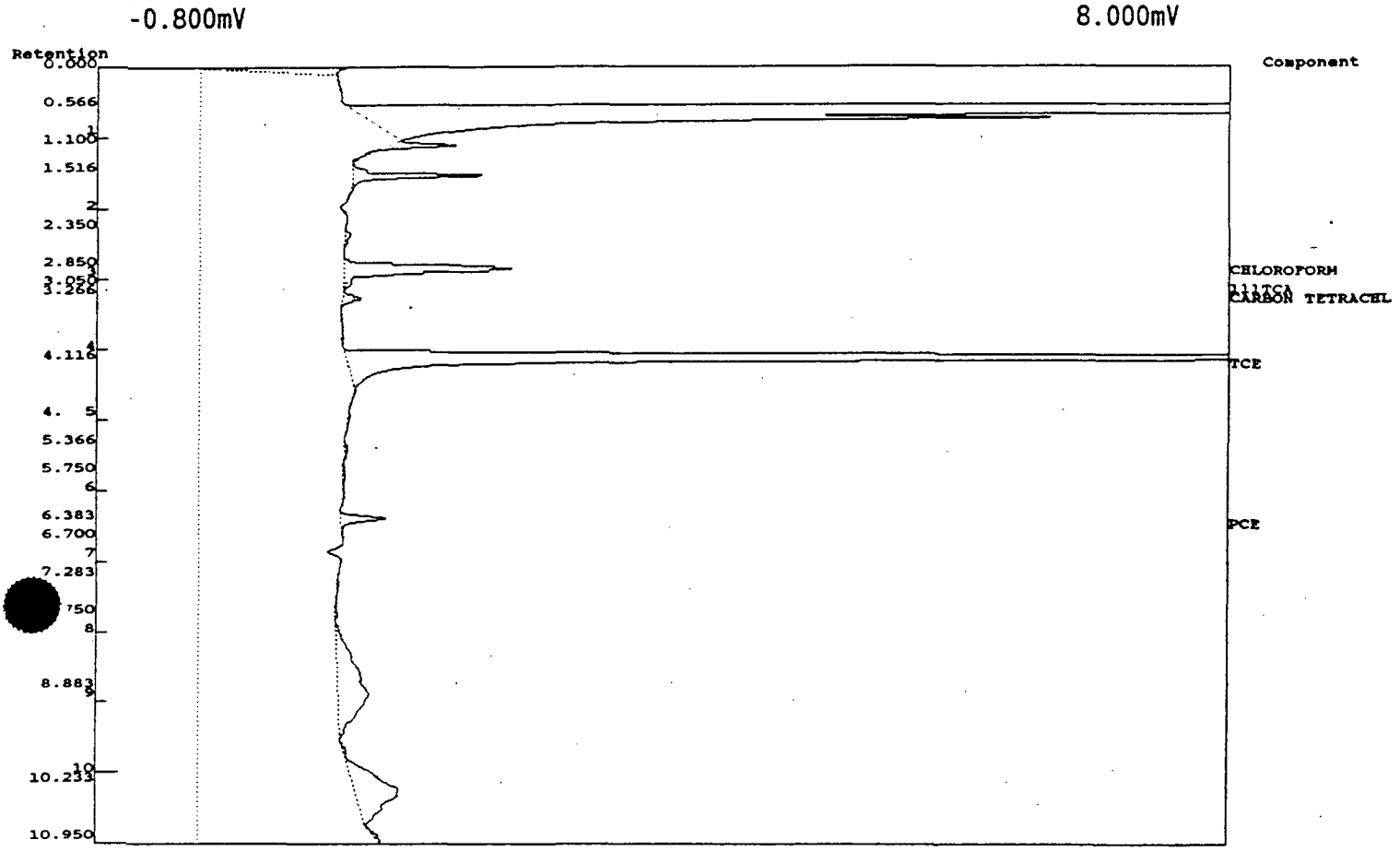
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	2.44 M	0.35	ug/L
CDS	0	1.550	1.58 M	N/A	
t12DCE	3	1.866	0.16 M	0.28	ug/L
11DCA	4	2.116	0.23 M	0.20	ug/L
CHLOROFORM	6	2.850	1.95 M	0.03	ug/L
111TCA	7	3.100	0.30 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.300	0.72 M	0.00	ug/L
TCE	9	4.116	2.31 M	0.03	ug/L
PCE	11	6.400	3.01 M	0.01	ug/L
	9		12.71	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 15:29:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E18.CHR (A:\)
Sample : SG-023
Operator : SGN



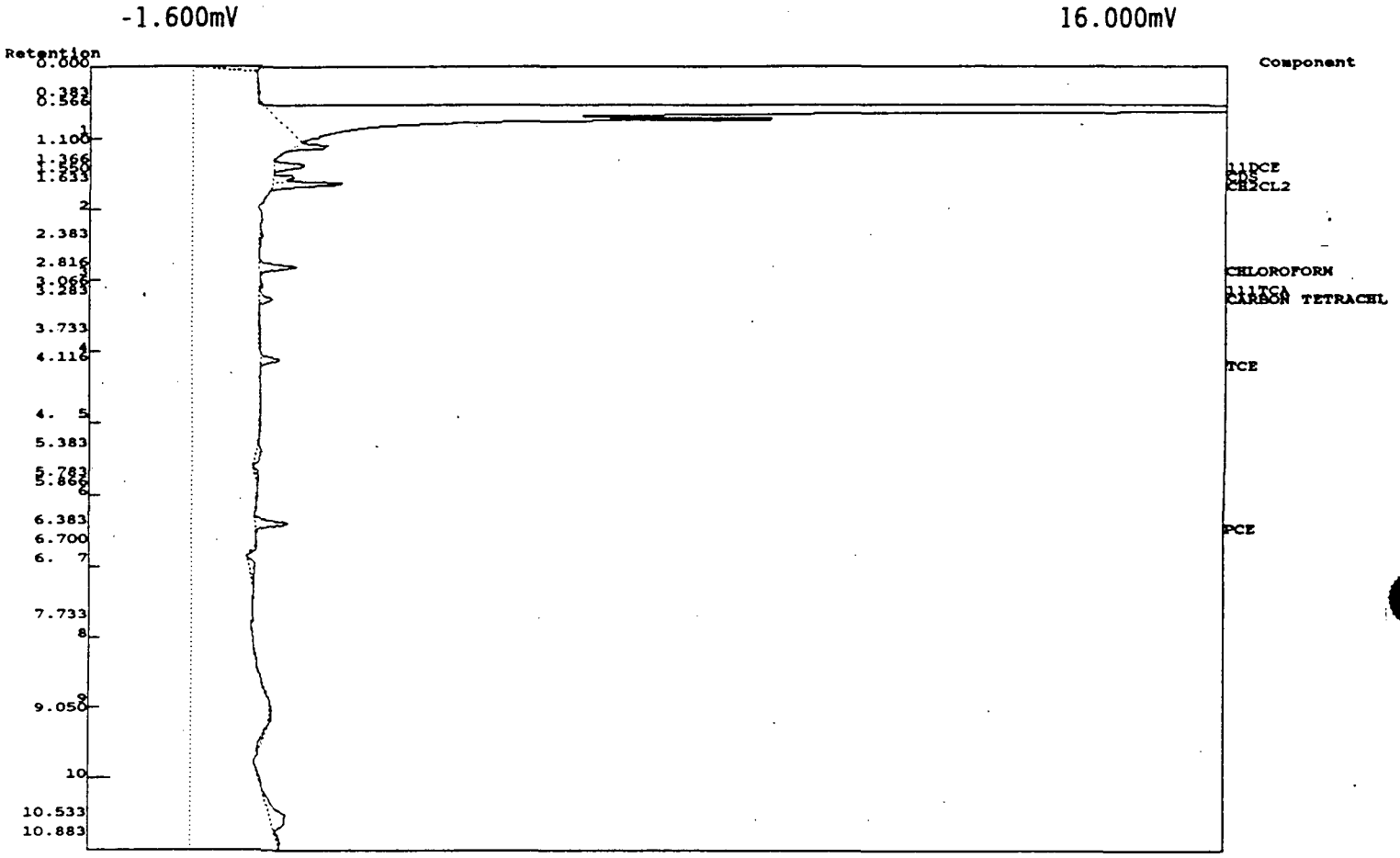
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	2.77 M	0.39	ug/L
CDS	0	1.550	2.14 M	N/A	
t12DCE	3	1.783	0.20 M	0.36	ug/L
t12DCE	3	1.833	0.10 M	0.18	ug/L
CHLOROFORM	6	2.850	11.45 M	0.18	ug/L
111TCA	7	3.083	0.71 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.283	1.52 M	0.00	ug/L
TCE	9	4.116	8.02 M	0.11	ug/L
PCE	11	6.400	3.46 M	0.01	ug/L
	9		**30.37**	**0.25**	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 15:02:18
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E17.CHR (A:\)
Sample : SG-022
Operator : SGN



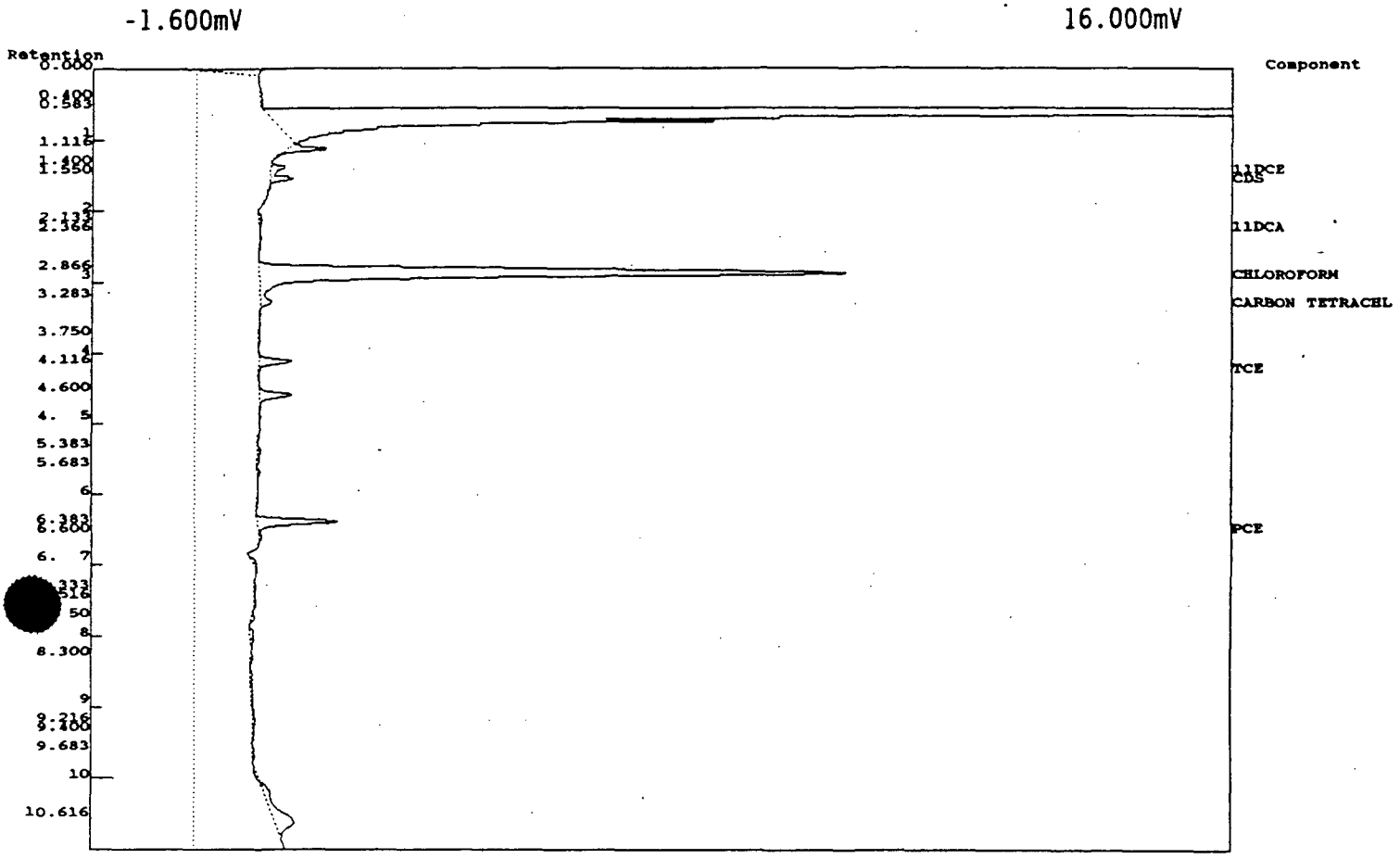
Component	Number	Retention	Area	External	Units
CHLOROFORM	6	2.850	9.93 M	0.16	ug/L
111TCA	7	3.050	0.38 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.266	0.83 M	0.00	ug/L
TCE	9	4.116	65.21 M	0.88	ug/L
PCE	11	6.383	1.94 M	0.01	ug/L
	5		78.29	1.05	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 14:36:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E16.CHR (A:\)
Sample : SG-016
Operator : SGN



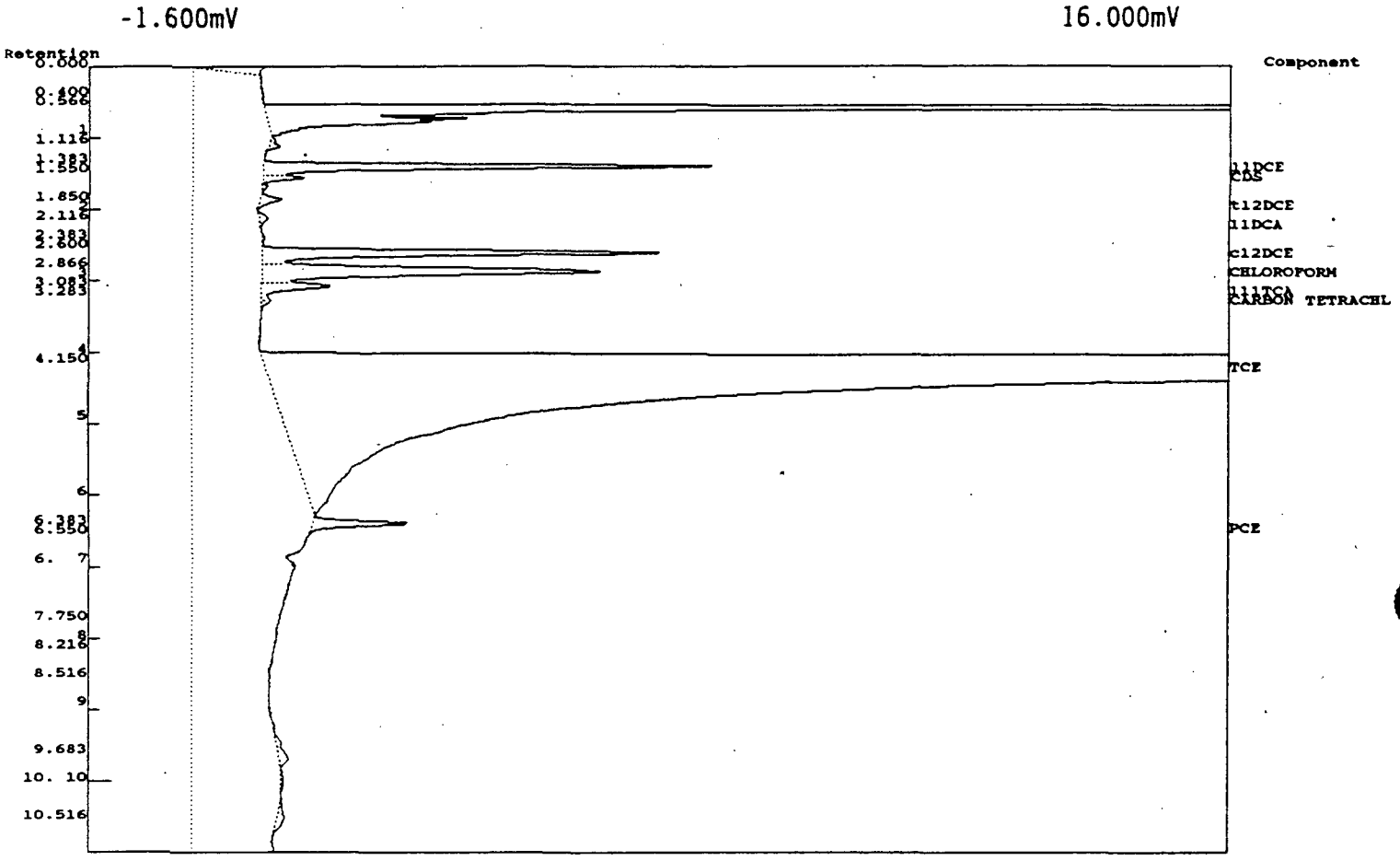
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	2.62 M	0.37	ug/L
CDS	0	1.550	1.18 M	N/A	
CH2CL2	2	1.633	4.75 M	3.67	ug/L
CHLOROFORM	6	2.816	2.76 M	0.04	ug/L
111TCA	7	3.066	0.24 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.283	1.12 M	0.00	ug/L
TCE	9	4.116	1.45 M	0.02	ug/L
PCE	11	6.383	2.69 M	0.01	ug/L
	8		16.82	3.12	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 14:10:29
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E15.CHR (A:\)
Sample : SG-013
Operator : SGN



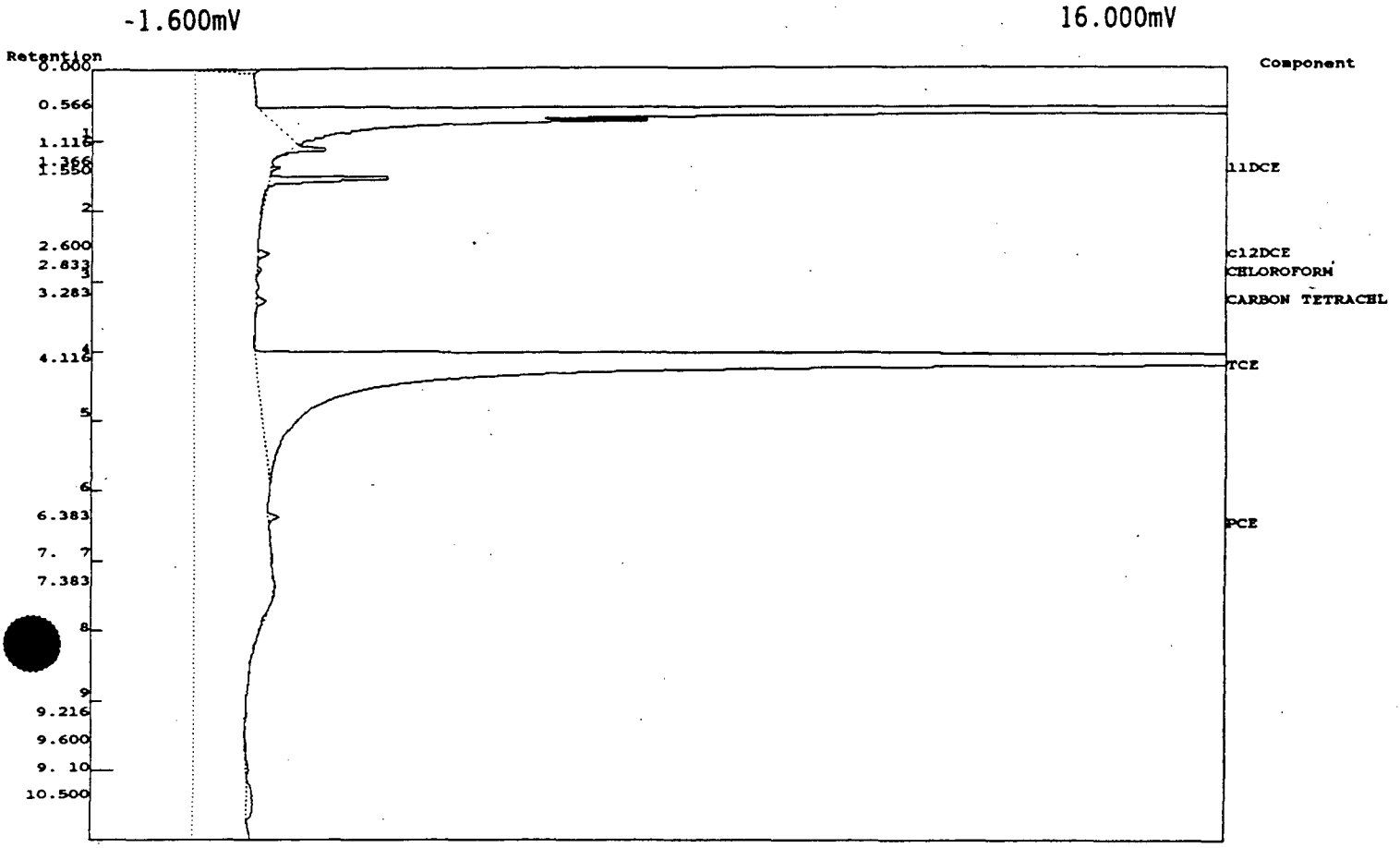
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.28 M	0.18	ug/L
CDS	0	1.550	1.47 M	N/A	
11DCA	4	2.133	0.38 M	0.33	ug/L
CHLOROFORM	6	2.866	70.37 M	1.12	ug/L
CARBON TETRACHLORIDE	8	3.283	1.07 M	0.00	ug/L
TCE	9	4.116	2.77 M	0.04	ug/L
PCE	11	6.383	6.61 M	0.03	ug/L
	7		**83.94**	**0.70**	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 12:01:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E11.CHR (A:\)
Sample : SG-965
Operator : SGN



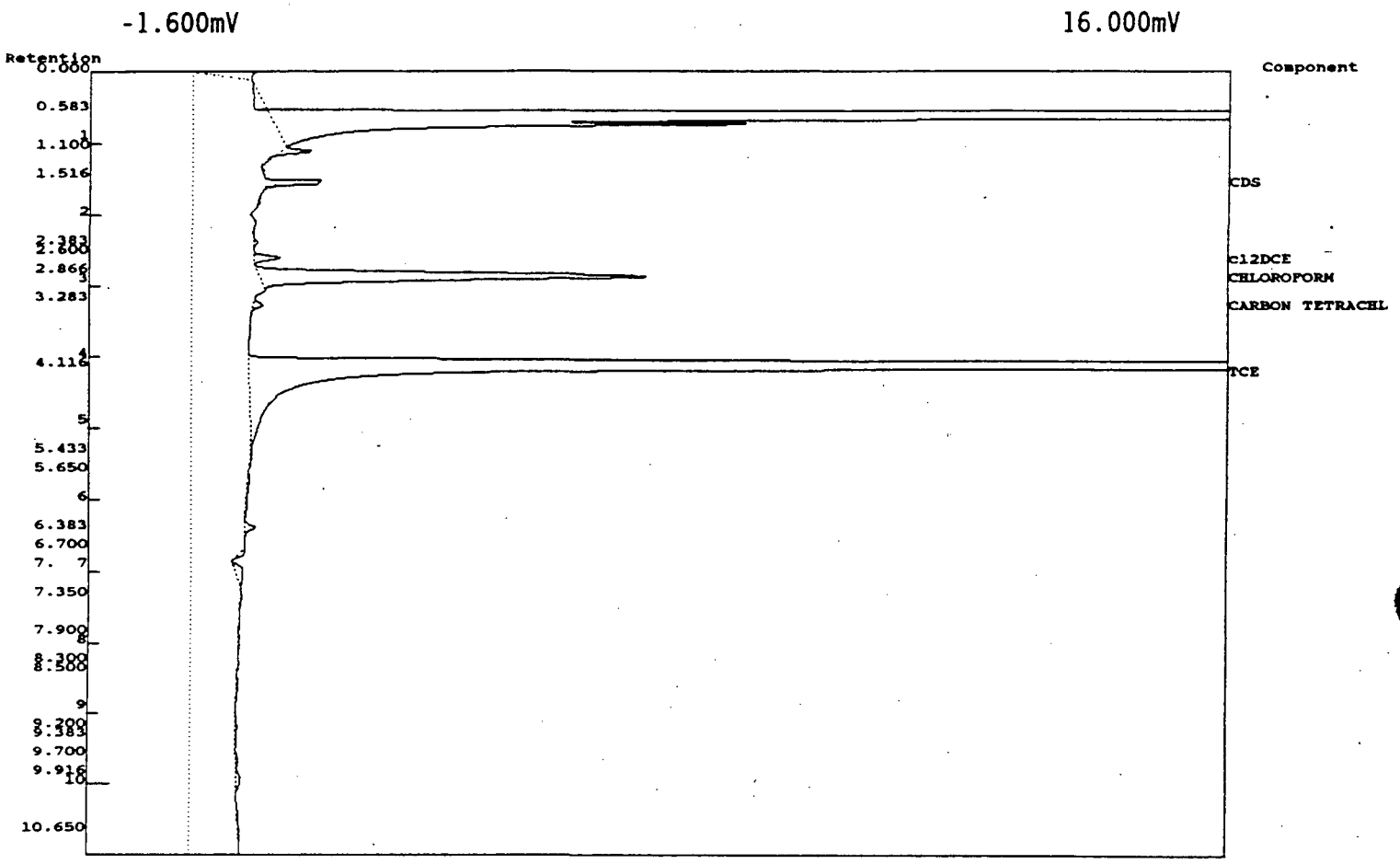
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	30.64 M	4.35	ug/L
CDS	0	1.550	3.68 M	N/A	
t12DCE	3	1.850	2.09	3.71	ug/L
11DCA	4	2.116	1.03	0.90	ug/L
c12DCE	5	2.600	32.55 M	85.89	ug/L
CHLOROFORM	6	2.866	39.58 M	0.63	ug/L
111TCA	7	3.083	7.66 M	0.05	ug/L
CARBON TETRACHLORIDE	8	3.283	0.88 M	0.00	ug/L
TCE	9	4.150	6024.80 M	81.45	ug/L
PCE	11	6.383	7.73 M	0.03	ug/L
	10		6150.65	176.02	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 11:11:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E10.CHR (A:\)
Sample : SG-039 (1000X)
Operator : SGN



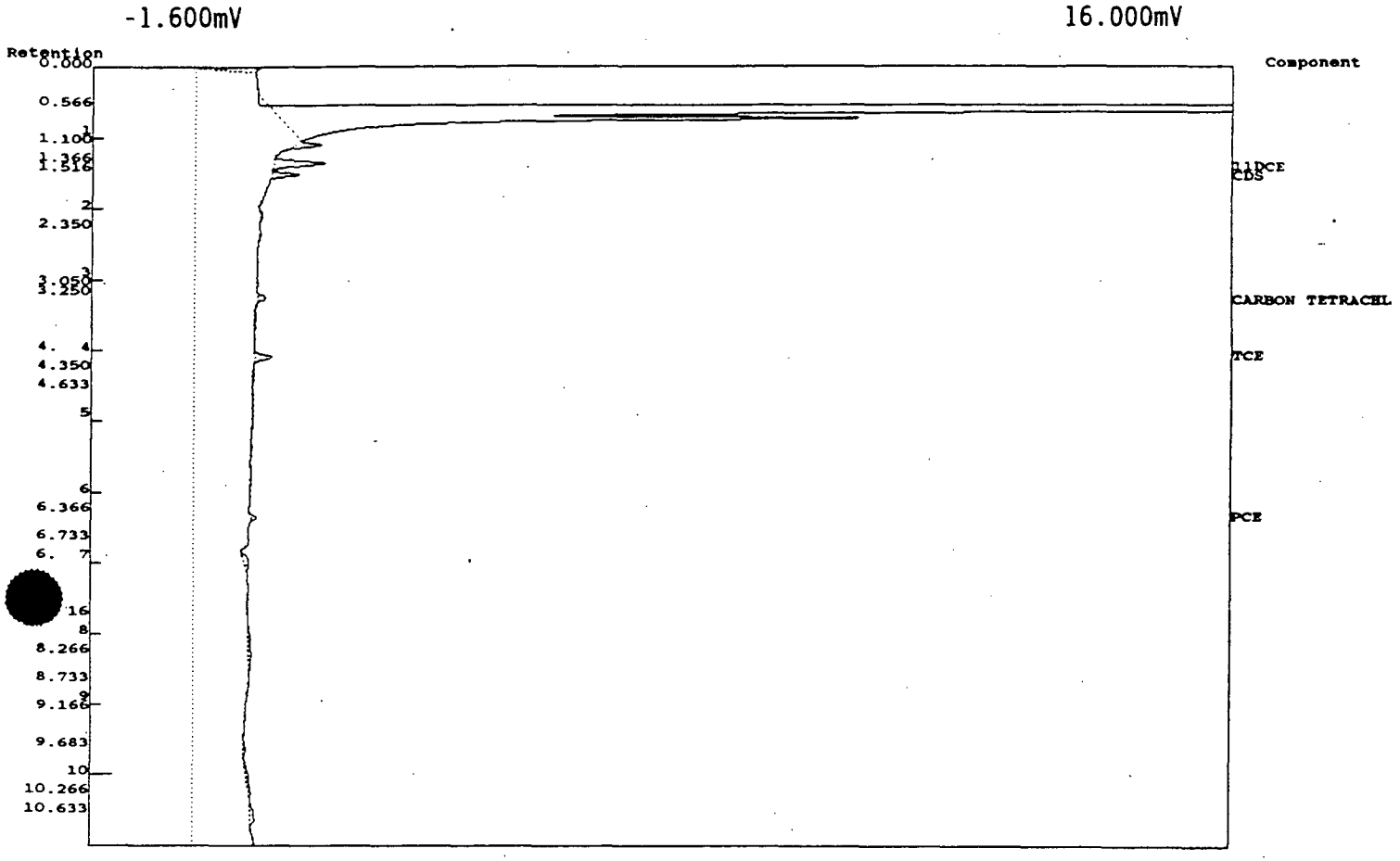
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	0.51	0.07	ug/L
c12DCE	5	2.600	0.88 M	2.32	ug/L
CHLOROFORM	6	2.833	0.34 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.283	0.89 M	0.00	ug/L
TCE	9	4.116	1045.88 M	14.14	ug/L
PCE	11	6.383	0.86	0.00	ug/L
	6		1049.36	16.54	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 10:44:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E9.CHR (A:\)
Sample : SG-080
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.516	3.14 M	N/A	
c12DCE	5	2.600	1.87 M	4.93	ug/L
CHLOROFORM	6	2.866	43.75 M	0.70	ug/L
CARBON TETRACHLORIDE	8	3.283	0.80 M	0.00	ug/L
TCE	9	4.116	269.15	3.64	ug/L
	5		318.71	8.27	

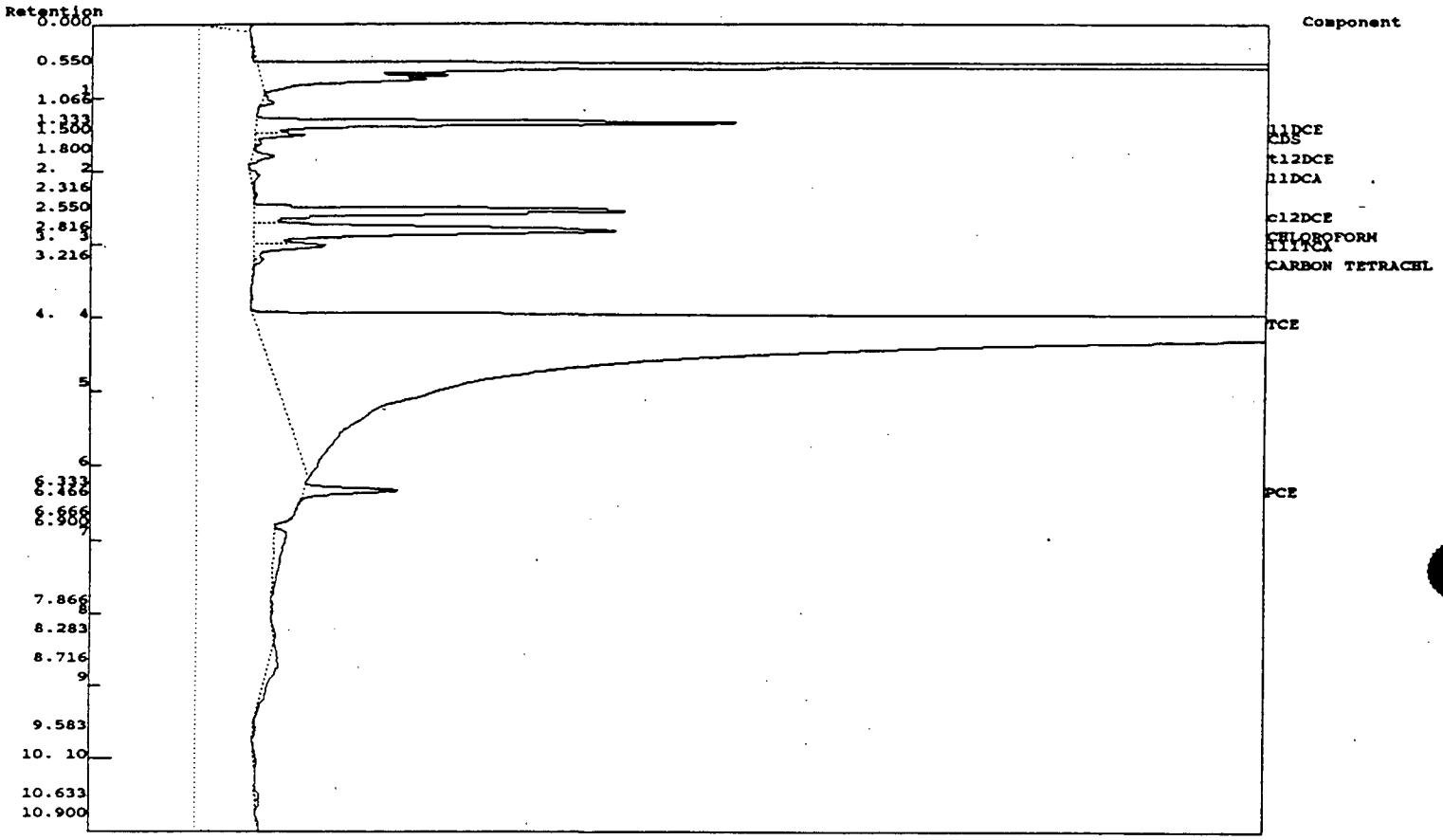
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 10:14:56
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E8.CHR (A:\)
Sample : EB-06
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.85 M	0.55	ug/L
CDS	0	1.516	1.44 M	N/A	
CARBON TETRACHLORIDE	8	3.250	0.62 M	0.00	ug/L
TCE	9	4.100	1.26 M	0.02	ug/L
PCE	11	6.366	0.32 M	0.00	ug/L
	5		7.49	N/A	

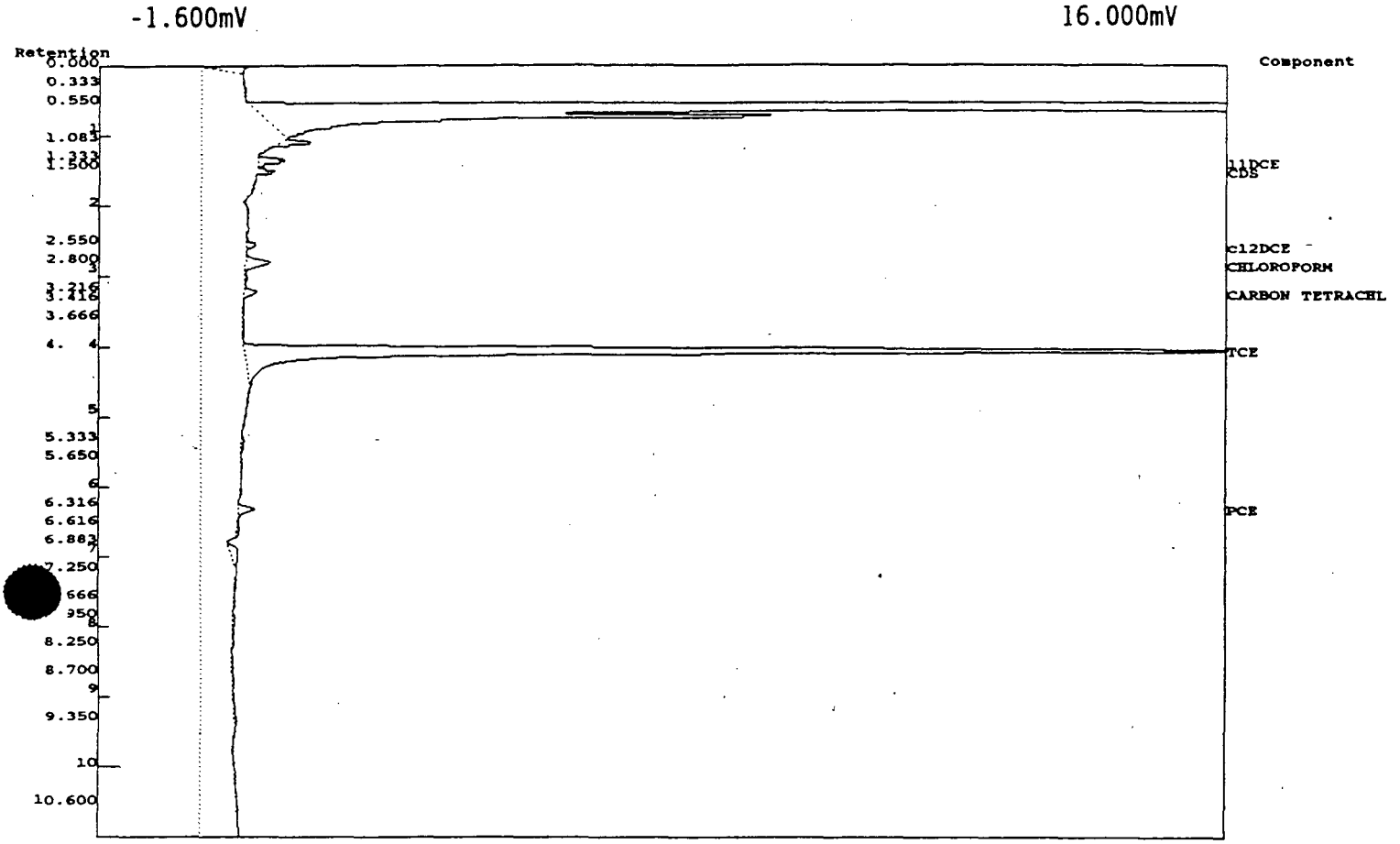
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 09:33:15
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E7.CHR (A:\)
Sample : SG-065
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	32.87 M	4.67	ug/L
CDS	0	1.500	3.57 M	N/A	
t12DCE	3	1.800	2.04	3.61	ug/L
11DCA	4	2.066	1.08	0.94	ug/L
c12DCE	5	2.550	34.20 M	90.24	ug/L
CHLOROFORM	6	2.816	42.15 M	0.67	ug/L
111TCA	7	3.016	7.07 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.216	0.83 M	0.00	ug/L
TCE	9	4.083	5852.90 M	79.13	ug/L
PCE	11	6.333	7.35 M	0.03	ug/L
	10		5984.06	178.33	

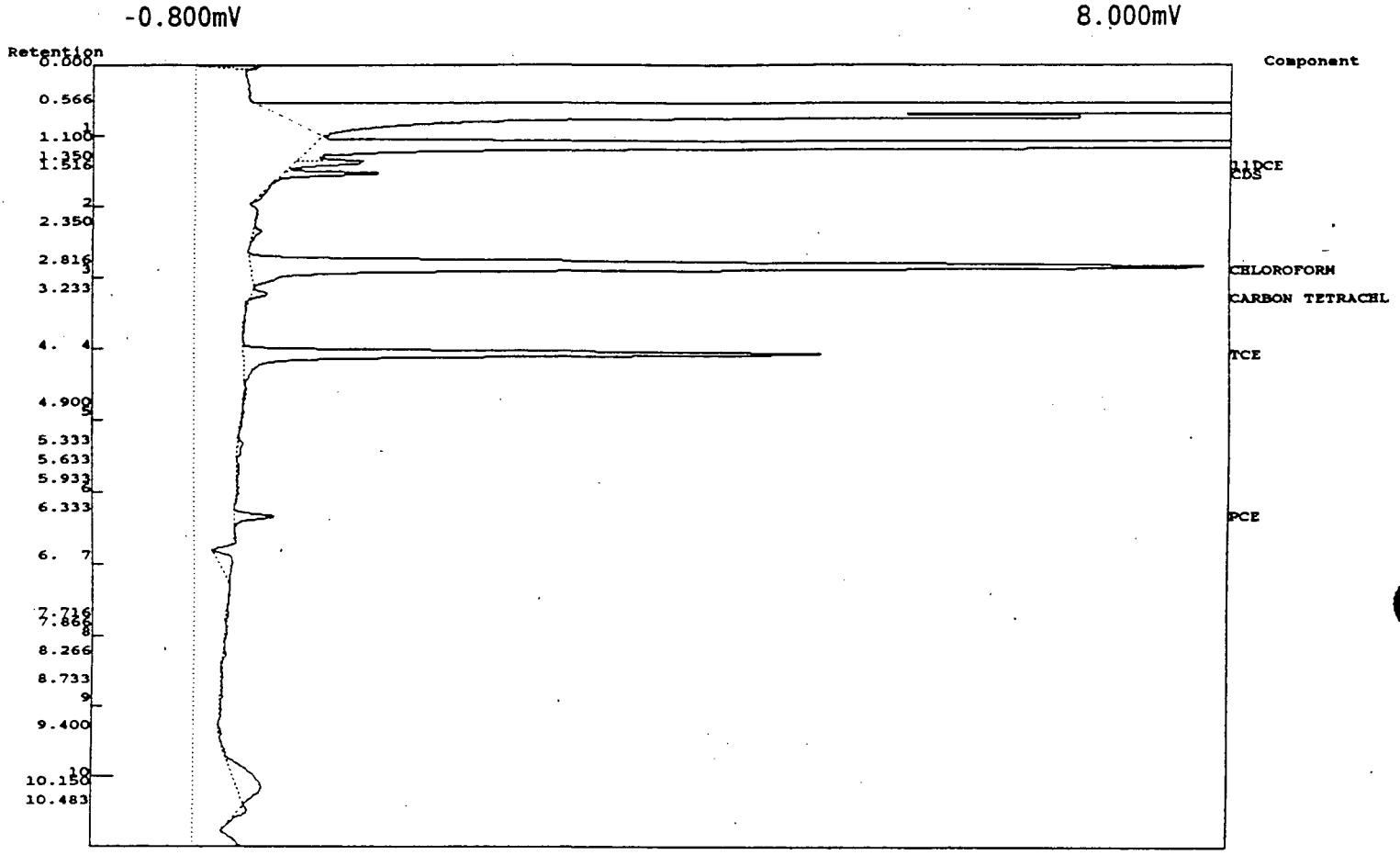
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 09:11:02
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E6.CHR (A:\)
Sample : SG-055
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	2.18 M	0.31	ug/L
CDS	0	1.500	0.17 M	N/A	
c12DCE	5	2.550	0.87	2.30	ug/L
CHLOROFORM	6	2.800	2.85	0.05	ug/L
CARBON TETRACHLORIDE	8	3.216	1.13	0.00	ug/L
TCE	9	4.050	96.81 M	1.31	ug/L
PCE	11	6.316	1.51 M	0.01	ug/L
	7		105.53	2.97	

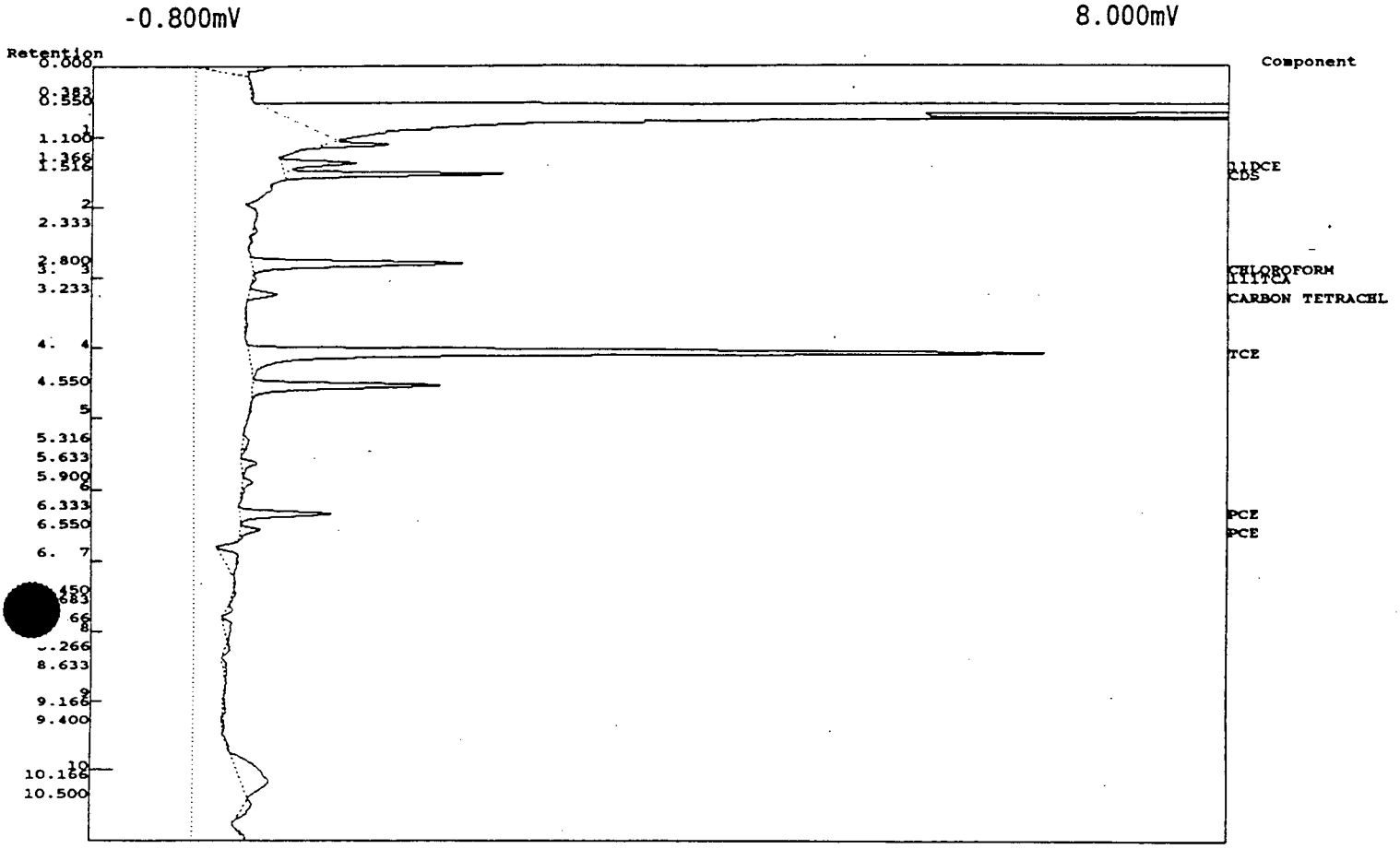
300573

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 00:39:22
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E43.CHR (A:\)
Sample : SG-088-R
Operator : SGN



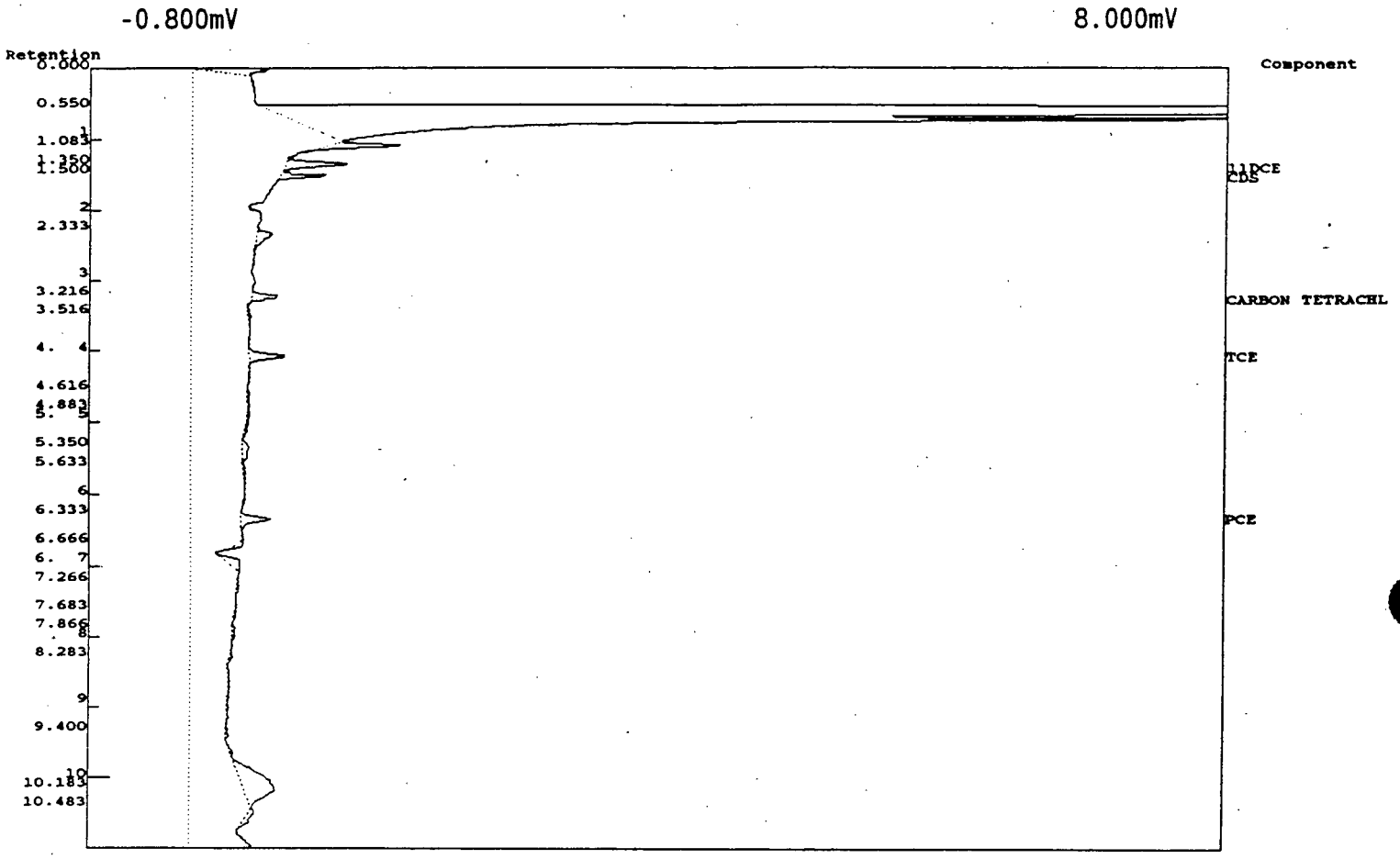
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.83 M	0.40	ug/L
CDS	0	1.516	3.42 M	N/A	
CHLOROFORM	6	2.816	57.14 M	0.91	ug/L
CARBON TETRACHLORIDE	8	3.233	0.59 M	0.00	ug/L
TCE	9	4.066	25.85 M	0.35	ug/L
PCE	11	6.333	1.73	0.01	ug/L
	6		91.56	0.67	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 00:20:22
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E42.CHR (A:\)
Sample : SG-021-R
Operator : SGN



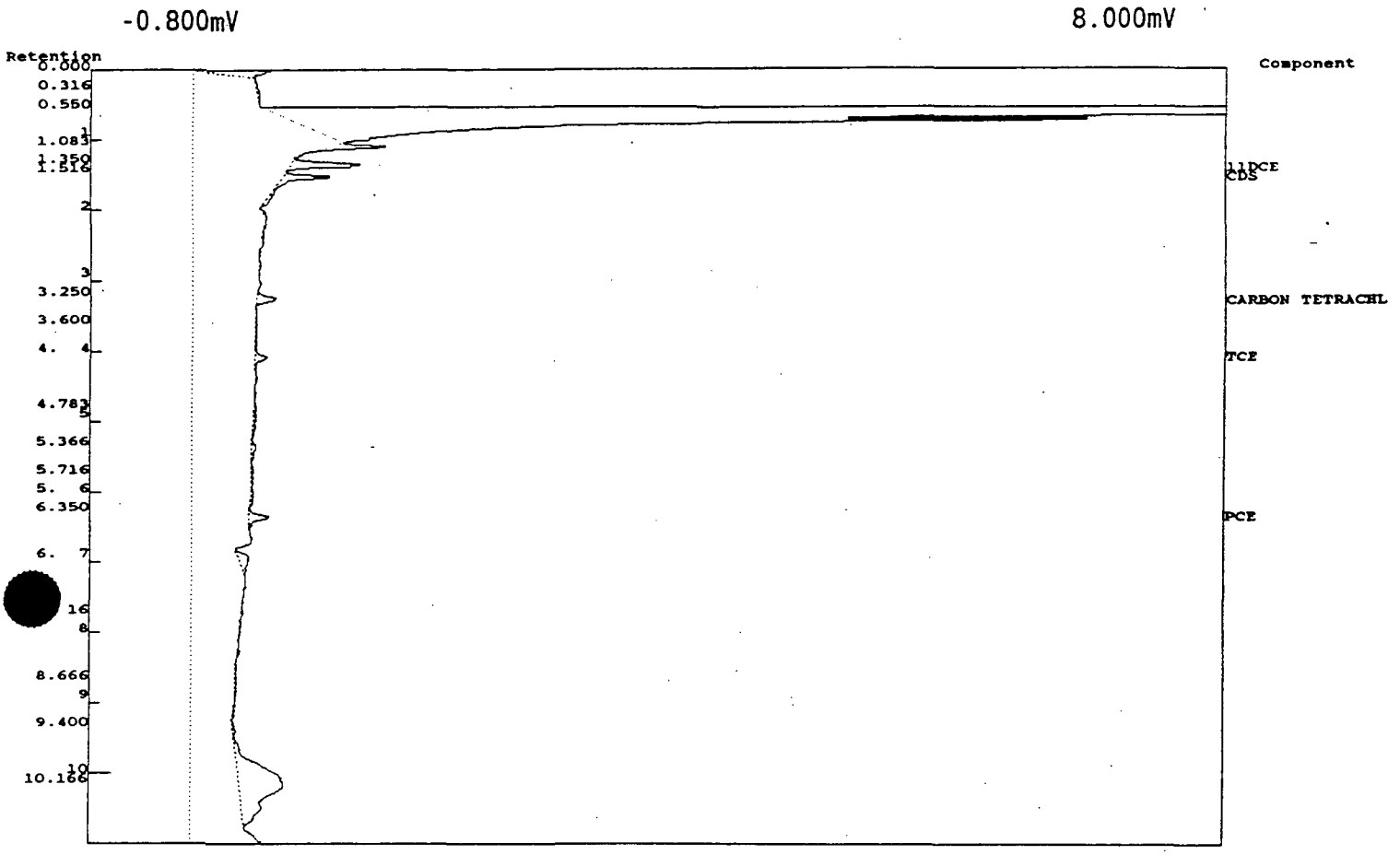
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	2.73 M	0.39	ug/L
CDS	0	1.516	6.54 M	N/A	
CHLOROFORM	6	2.800	8.84 M	0.14	ug/L
111TCA	7	3.033	0.12 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	1.18	0.00	ug/L
TCE	9	4.066	34.93 M	0.47	ug/L
PCE	11	6.333	3.68	0.01	ug/L
PCE	11	6.550	0.89 M	0.00	ug/L
	8		58.90	0.02	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 00:01:21
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E41.CHR (A:\)
Sample : EB-09
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.19	0.31	ug/L
CDS	0	1.500	1.12 M	N/A	
CARBON TETRACHLORIDE	8	3.216	0.97 M	0.00	ug/L
TCE	9	4.066	1.44 M	0.02	ug/L
PCE	11	6.333	1.22	0.00	ug/L
	5		6.93	N/A	

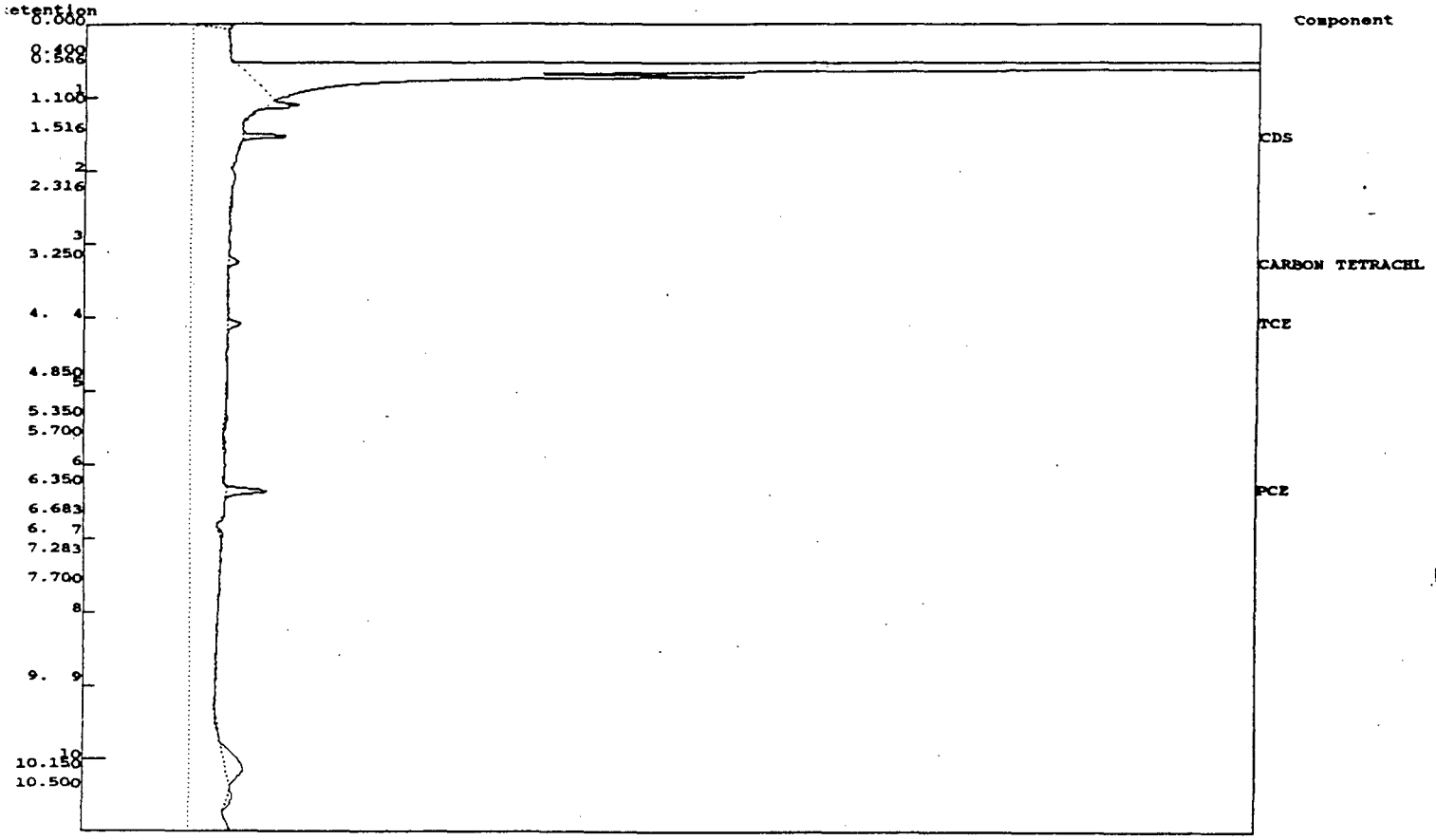
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 23:42:21
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E40.CHR (A:\)
Sample : EB-08
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.71 M	0.39	ug/L
CDS	0	1.516	2.16 M	N/A	
CARBON TETRACHLORIDE	8	3.250	0.85 M	0.00	ug/L
TCE	9	4.083	0.52 M	0.01	ug/L
PCE	11	6.350	0.92 M	0.00	ug/L
	5		7.17	N/A	

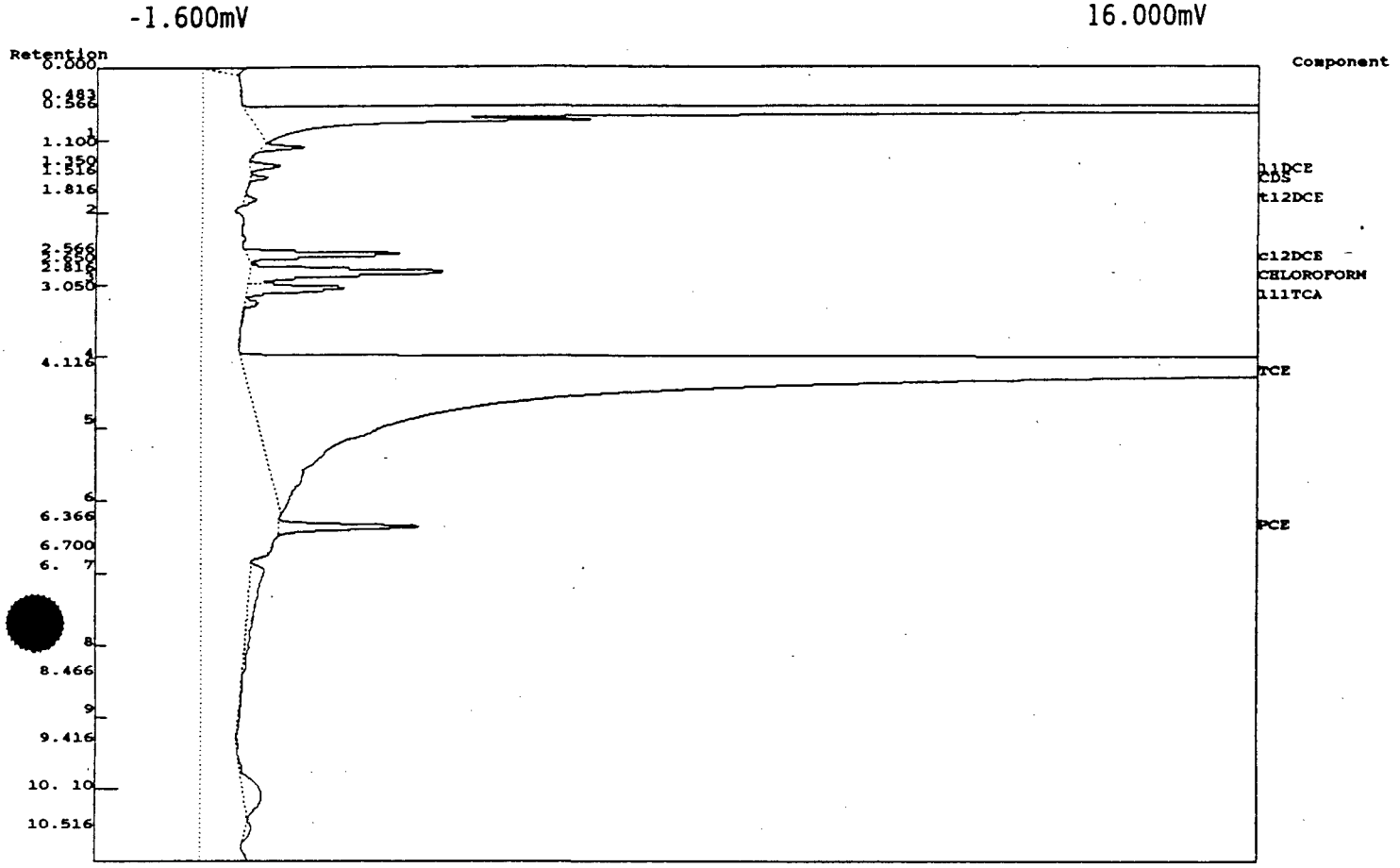
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 23:23:20
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E39.CHR (A:\)
Sample : EB-07
Operator : SGN

-1.600mV 16.000mV



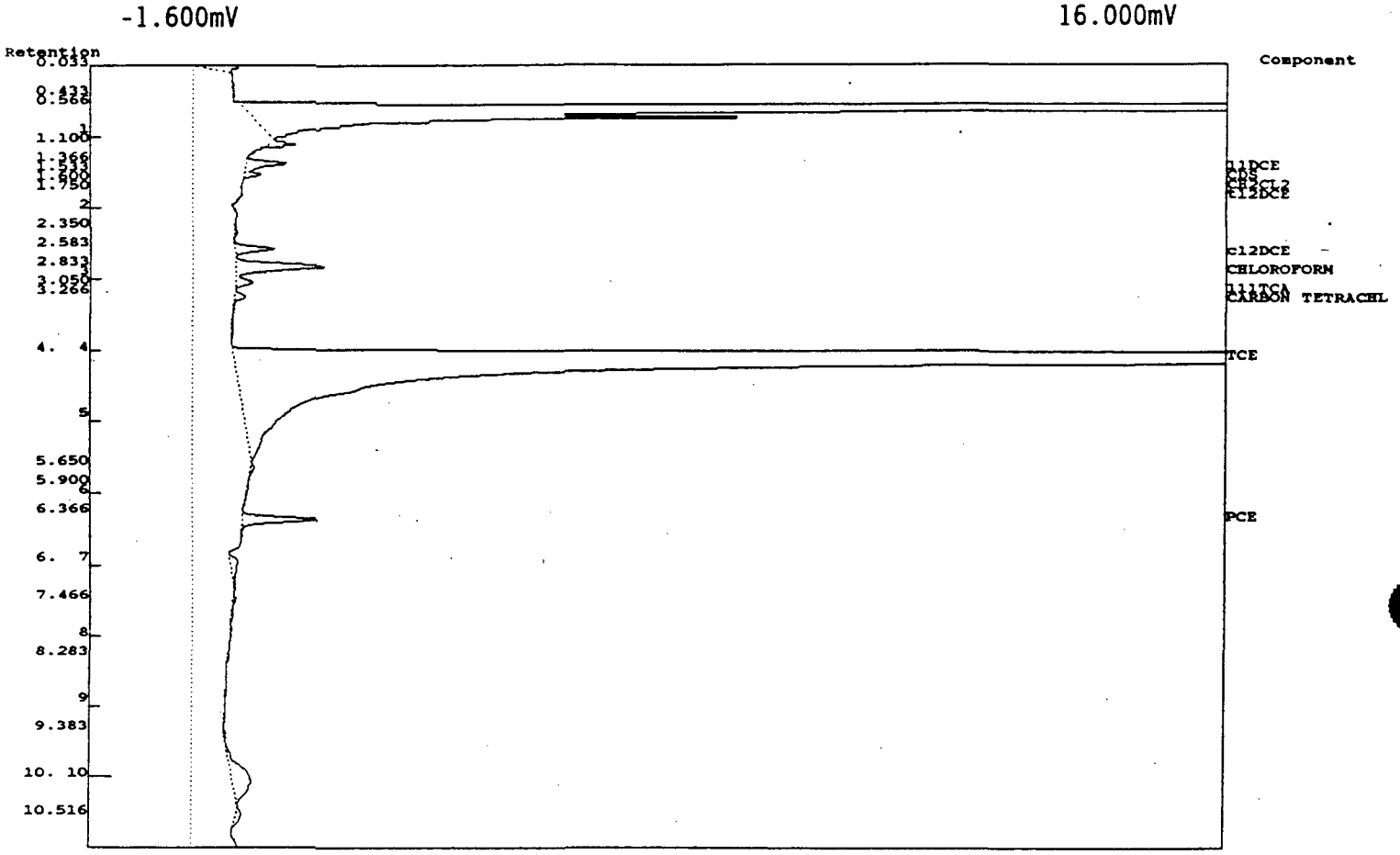
Component	Number	Retention	Area	External	Units
CDS	0	1.516	2.40 M	N/A	
CARBON TETRACHLORIDE	8	3.250	0.90 M	0.00	ug/L
TCE	9	4.083	1.02 M	0.01	ug/L
PCE	11	6.350	3.04 M	0.01	ug/L
	4		7.36	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 23:04:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E38.CHR (A:\)
Sample : SG-106
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.20 M	0.31	ug/L
CDS	0	1.516	0.94 M	N/A	
t12DCE	3	1.816	1.03 M	1.83	ug/L
c12DCE	5	2.566	11.65 M	30.73	ug/L
CHLOROFORM	6	2.816	20.64 M	0.33	ug/L
111TCA	7	3.050	10.82 M	0.06	ug/L
TCE	9	4.116	3523.55 M	47.64	ug/L
PCE	11	6.366	11.08 M	0.04	ug/L
	8		3581.92	79.95	

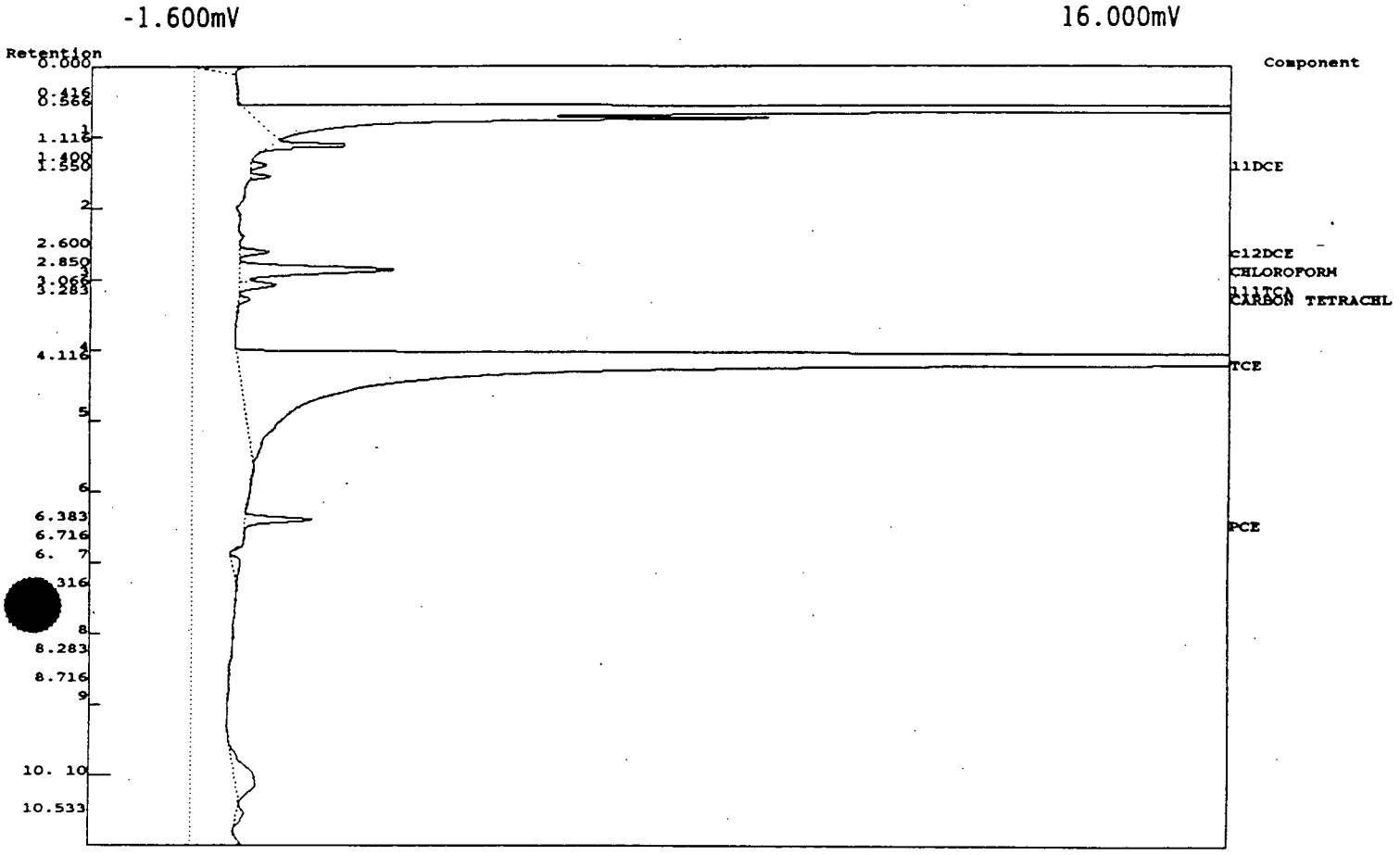
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 22:44:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E37.CHR (A:\)
Sample : SG-105
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.15 M	0.45	ug/L
CDS	0	1.533	1.16 M	N/A	
CH2CL2	2	1.600	0.81 M	0.63	ug/L
t12DCE	3	1.750	0.37 M	0.66	ug/L
c12DCE	5	2.583	2.92 M	7.72	ug/L
CHLOROFORM	6	2.833	8.95 M	0.14	ug/L
111TCA	7	3.050	1.58 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.266	0.85	0.00	ug/L
TCE	9	4.100	1087.27 M	14.70	ug/L
PCE	11	6.366	6.18 M	0.03	ug/L
	10		1113.25	23.32	

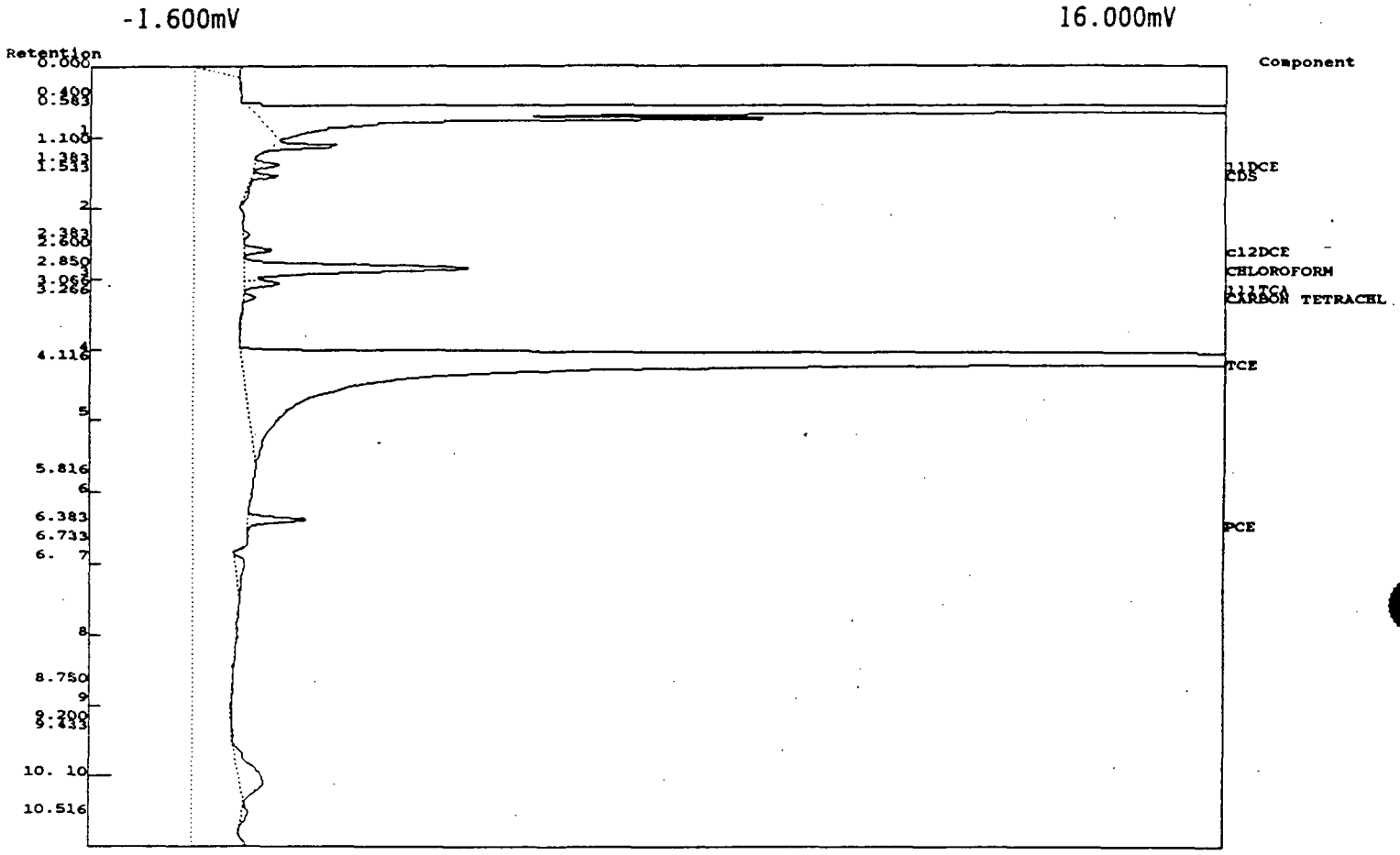
300580

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 22:25:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E36.CHR (A:\)
Sample : SG-804
Operator : SGN



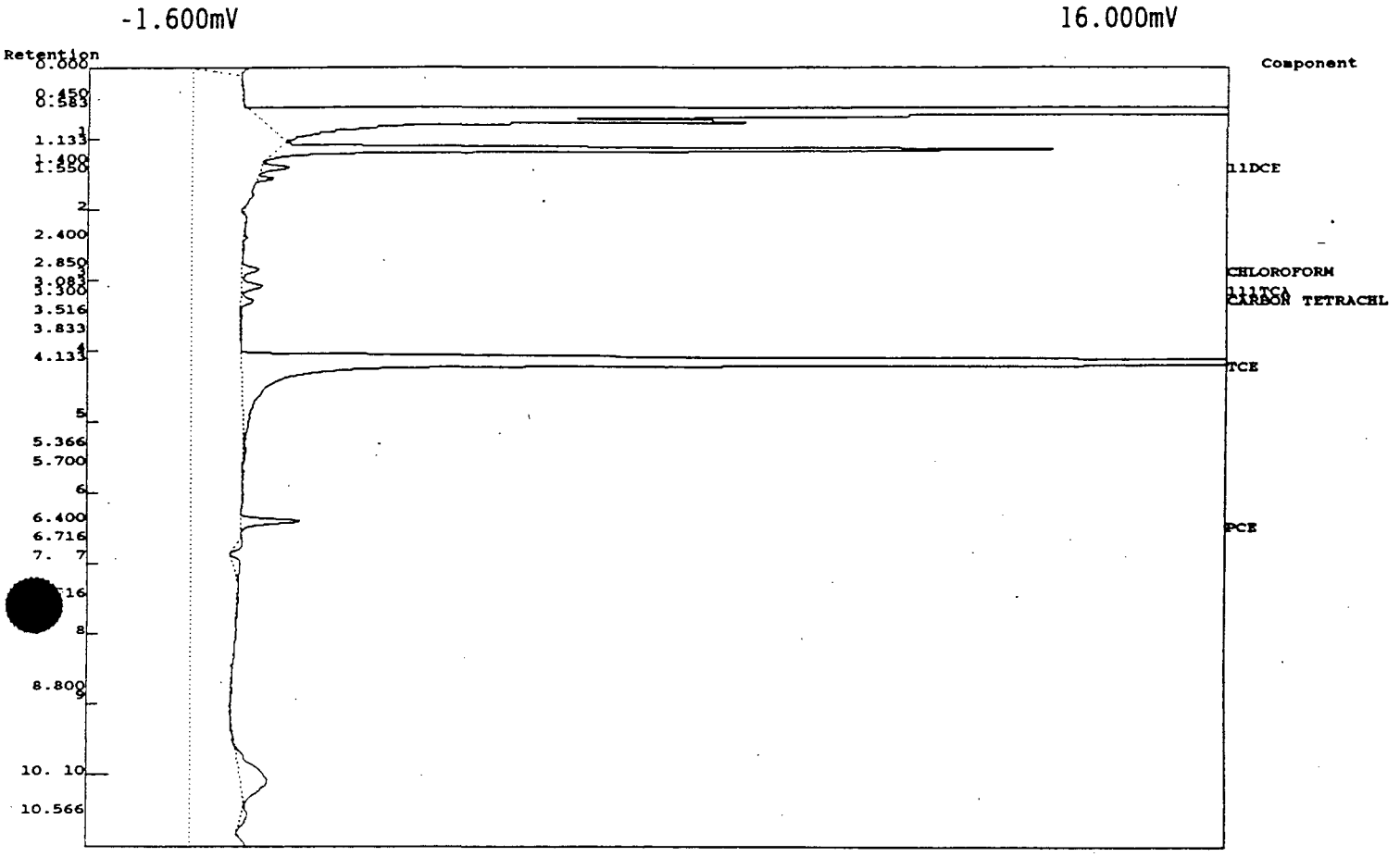
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.07 M	0.15	ug/L
c12DCE	5	2.600	2.16 M	5.71	ug/L
CHLOROFORM	6	2.850	17.30 M	0.28	ug/L
111TCA	7	3.066	3.45 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.283	0.93	0.00	ug/L
TCE	9	4.116	1044.58 M	14.12	ug/L
PCE	11	6.383	5.45 M	0.02	ug/L
	7		1074.94	20.30	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 22:05:25
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E35.CHR (A:\)
Sample : SG-104
Operator : SGN



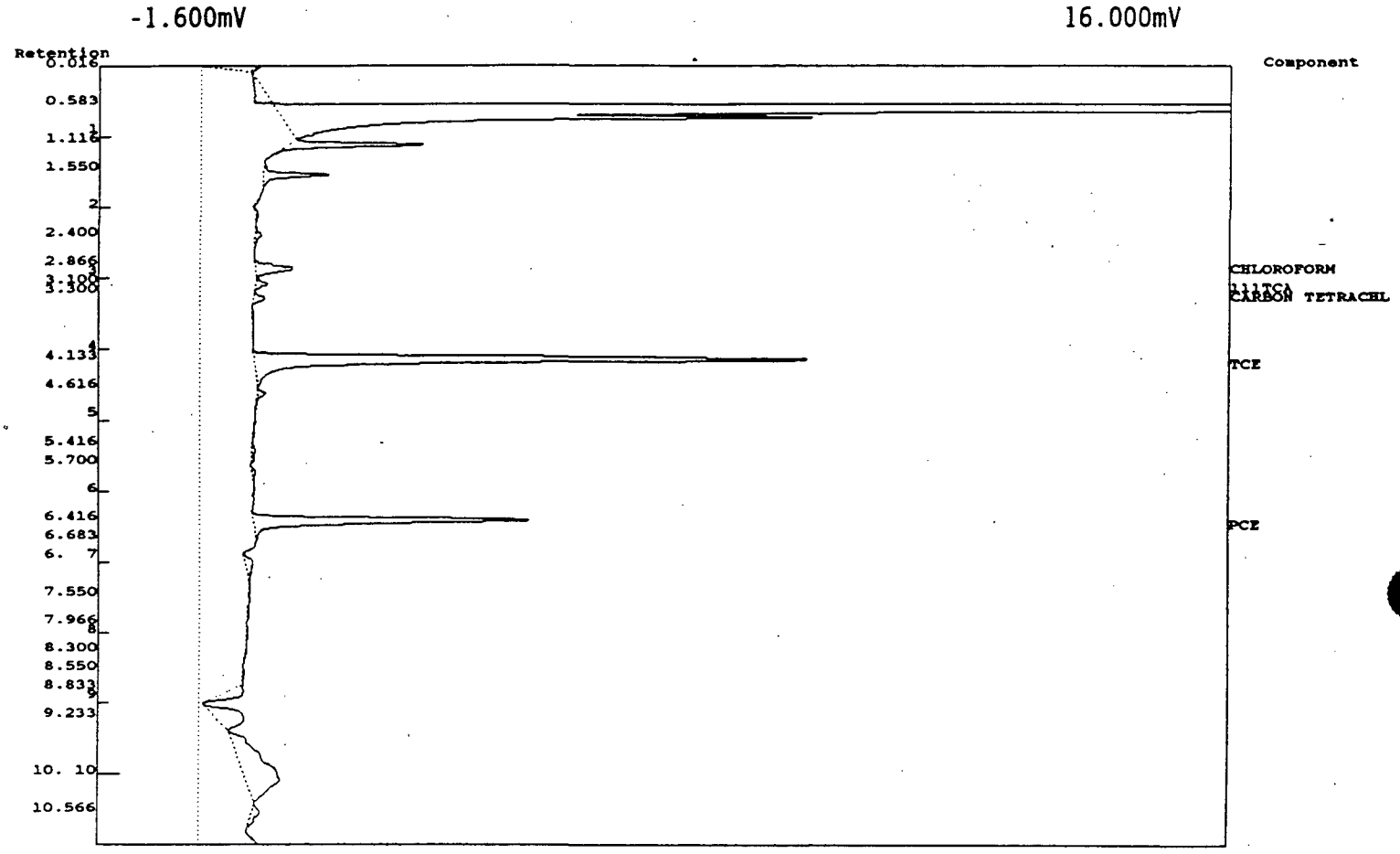
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	1.83	0.26	ug/L
CDS	0	1.533	2.39	N/A	
c12DCE	5	2.600	1.98	5.23	ug/L
CHLOROFORM	6	2.850	25.42 M	0.40	ug/L
111TCA	7	3.066	3.26 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.266	0.83	0.00	ug/L
TCE	9	4.116	958.31 M	12.96	ug/L
PCE	11	6.383	4.89 M	0.02	ug/L
	8		998.92	17.89	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 21:45:10
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E34.CHR (A:\)
Sample : SG-103
Operator : SGN



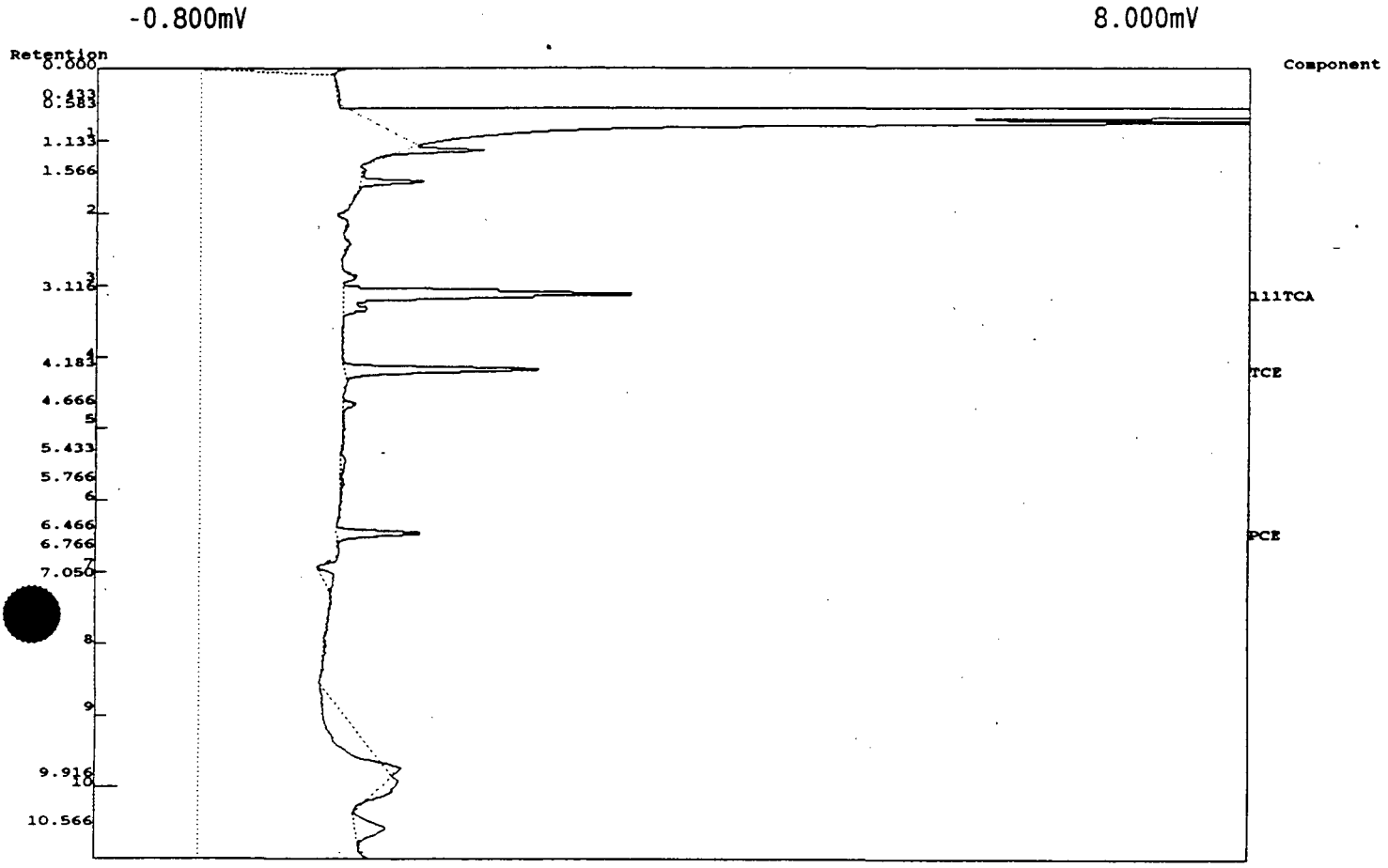
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	2.02	0.29	ug/L
CHLOROFORM	6	2.850	1.66 M	0.03	ug/L
111TCA	7	3.083	2.16 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.300	1.23 M	0.00	ug/L
TCE	9	4.133	207.82 M	2.81	ug/L
PCE	11	6.400	4.95 M	0.02	ug/L
	6		219.84	3.16	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 21:24:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E33.CHR (A:\)
Sample : SG-078
Operator : SGN



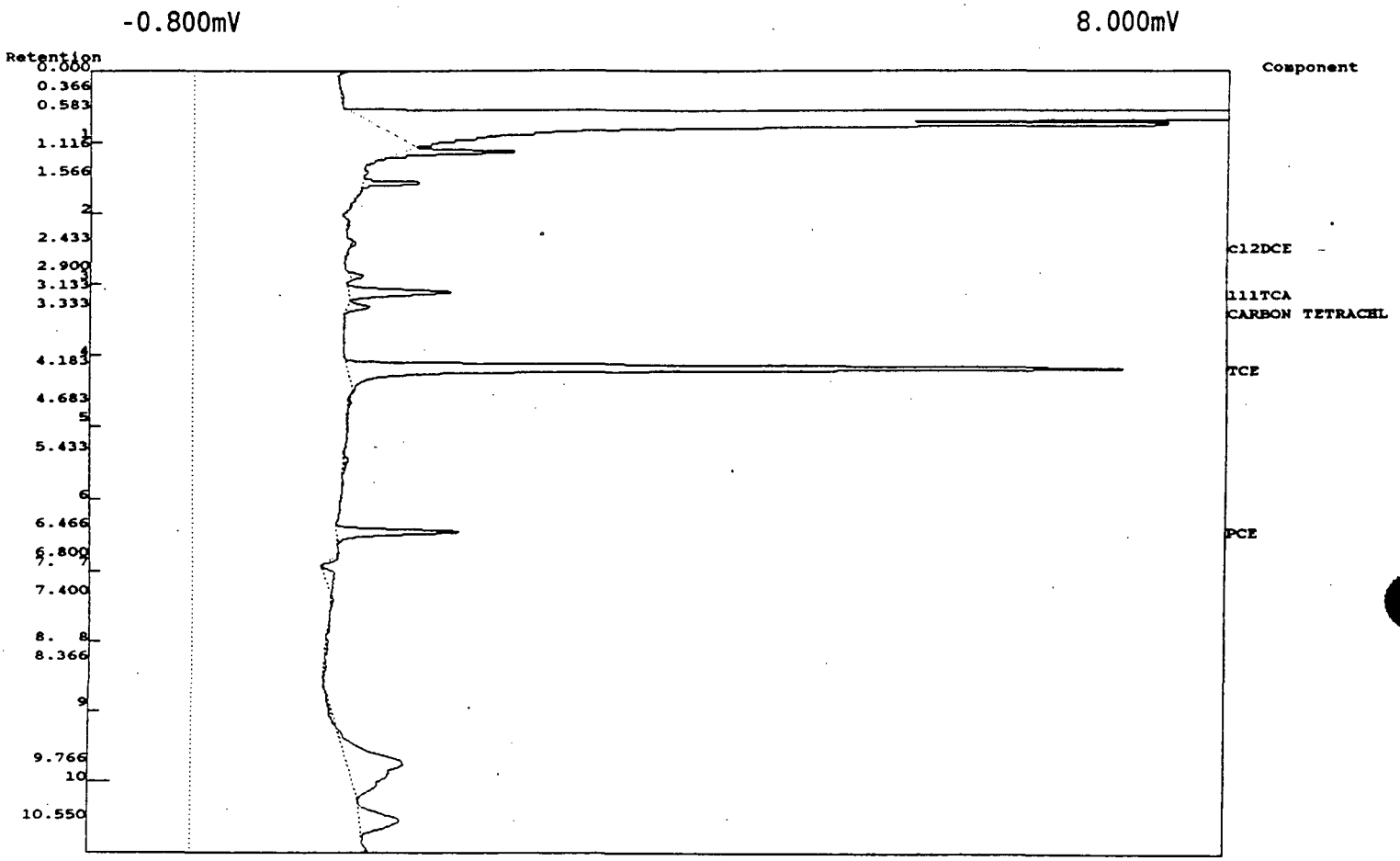
Component	Number	Retention	Area	External	Units
CHLOROFORM	6	2.866	3.94 M	0.06	ug/L
111TCA	7	3.100	0.93 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.300	1.03 M	0.00	ug/L
TCE	9	4.133	50.93 M	0.69	ug/L
PCE	11	6.416	23.66 M	0.10	ug/L
	5		80.49	0.85	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 19:59:33
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E29.CHR (A:\)
Sample : SG-077
Operator : SGN



Component	Number	Retention	Area	External	Units
111TCA	7	3.116	15.61 M	0.09	ug/L
TCE	9	4.183	7.91 M	0.11	ug/L
PCE	11	6.466	3.46 M	0.01	ug/L
	3		26.98	0.21	

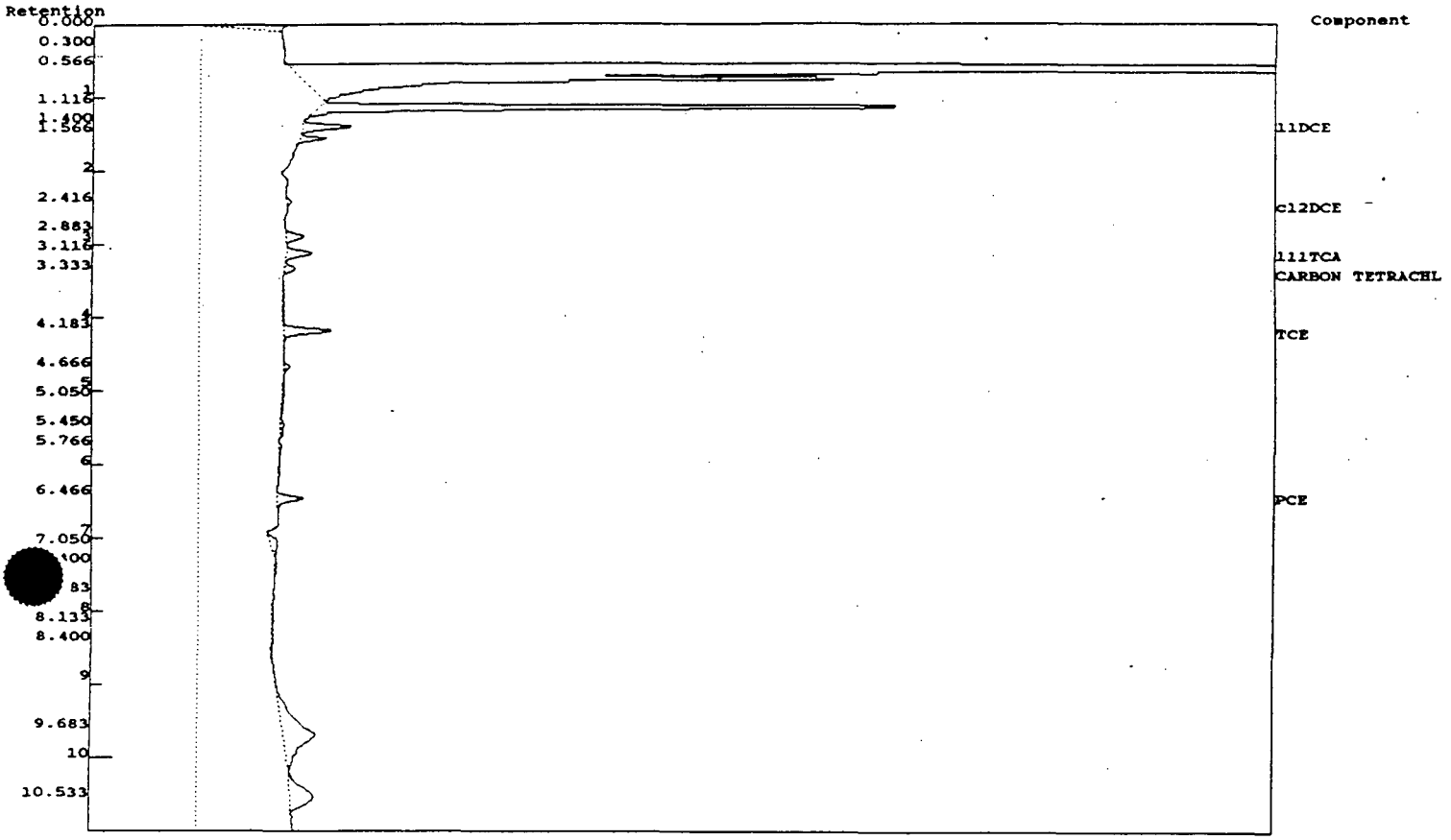
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 19:36:57
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E28.CHR (A:\)
Sample : SG-076
Operator : SGN



Component	Number	Retention	Area	External	Units
c12DCE	5	2.433	0.12 M	0.32	ug/L
111TCA	7	3.133	4.74 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.333	0.93 M	0.00	ug/L
TCE	9	4.183	33.77 M	0.46	ug/L
PCE	11	6.466	5.09 M	0.02	ug/L
	5		44.64	0.82	

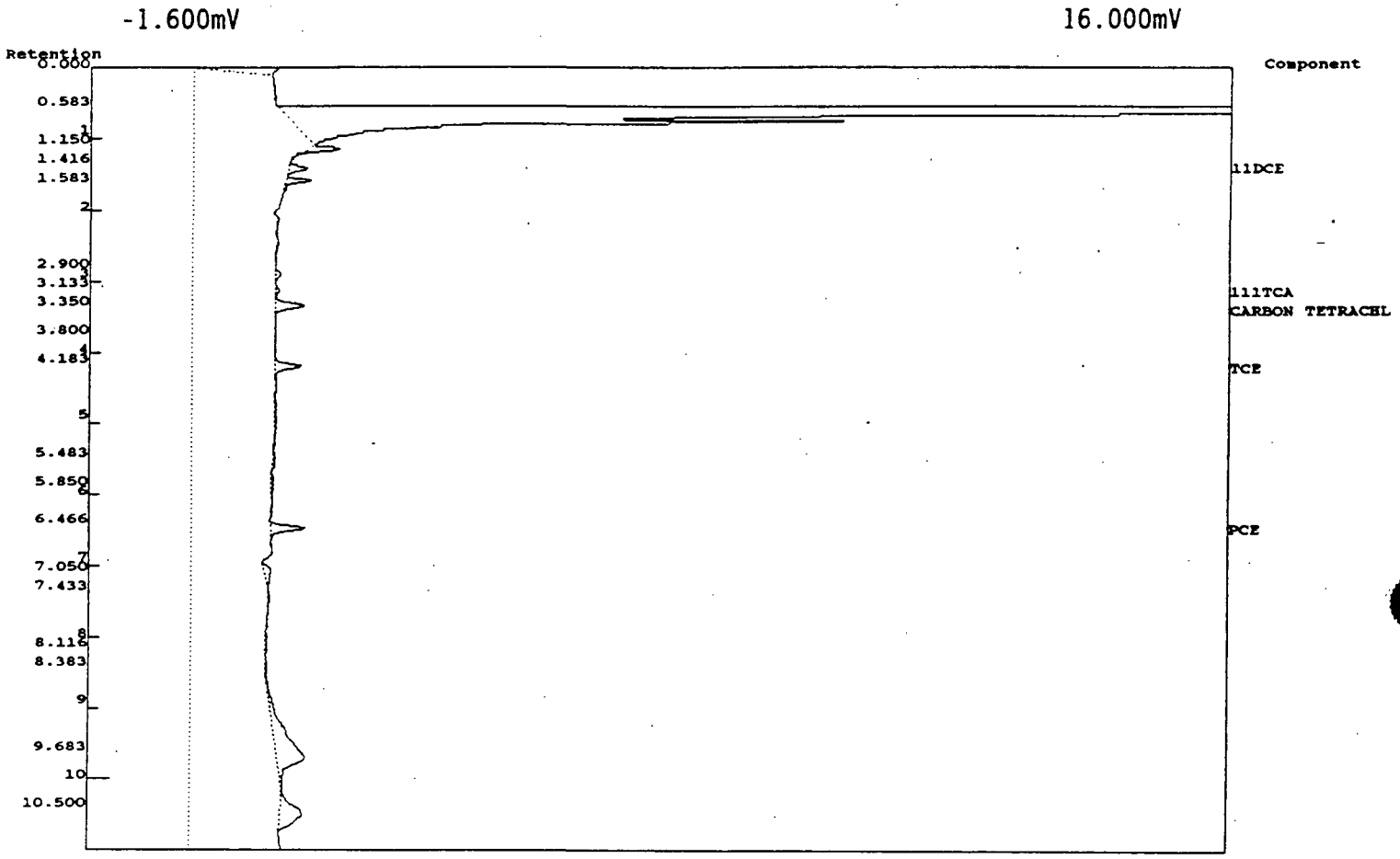
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 19:13:36
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E27.CHR (A:\)
Sample : SG-062
Operator : SGN

-1.600mV 16.000mV



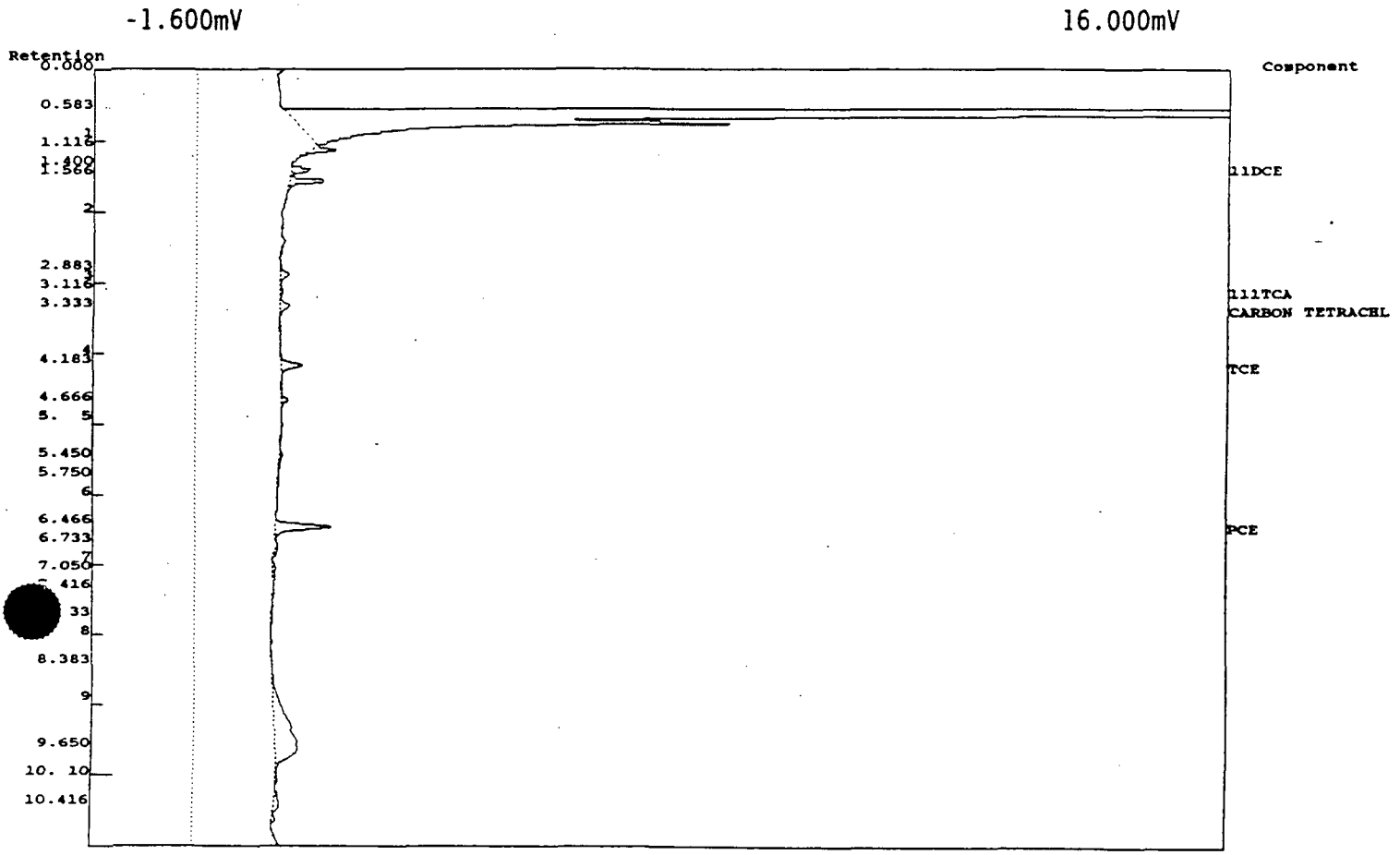
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	3.54	0.50	ug/L
c12DCE	5	2.416	0.30 M	0.79	ug/L
111TCA	7	3.116	2.13 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.333	0.92 M	0.00	ug/L
TCE	9	4.183	3.70 M	0.05	ug/L
PCE	11	6.466	2.13	0.01	ug/L
	6		12.71	1.36	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 18:49:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E26.CHR (A:\)
Sample : SG-044
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.416	1.43	0.20	ug/L
111TCA	7	3.133	0.27 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.350	2.57 M	0.00	ug/L
TCE	9	4.183	2.17 M	0.03	ug/L
PCE	11	6.466	2.92 M	0.01	ug/L
	5		9.36	0.25	

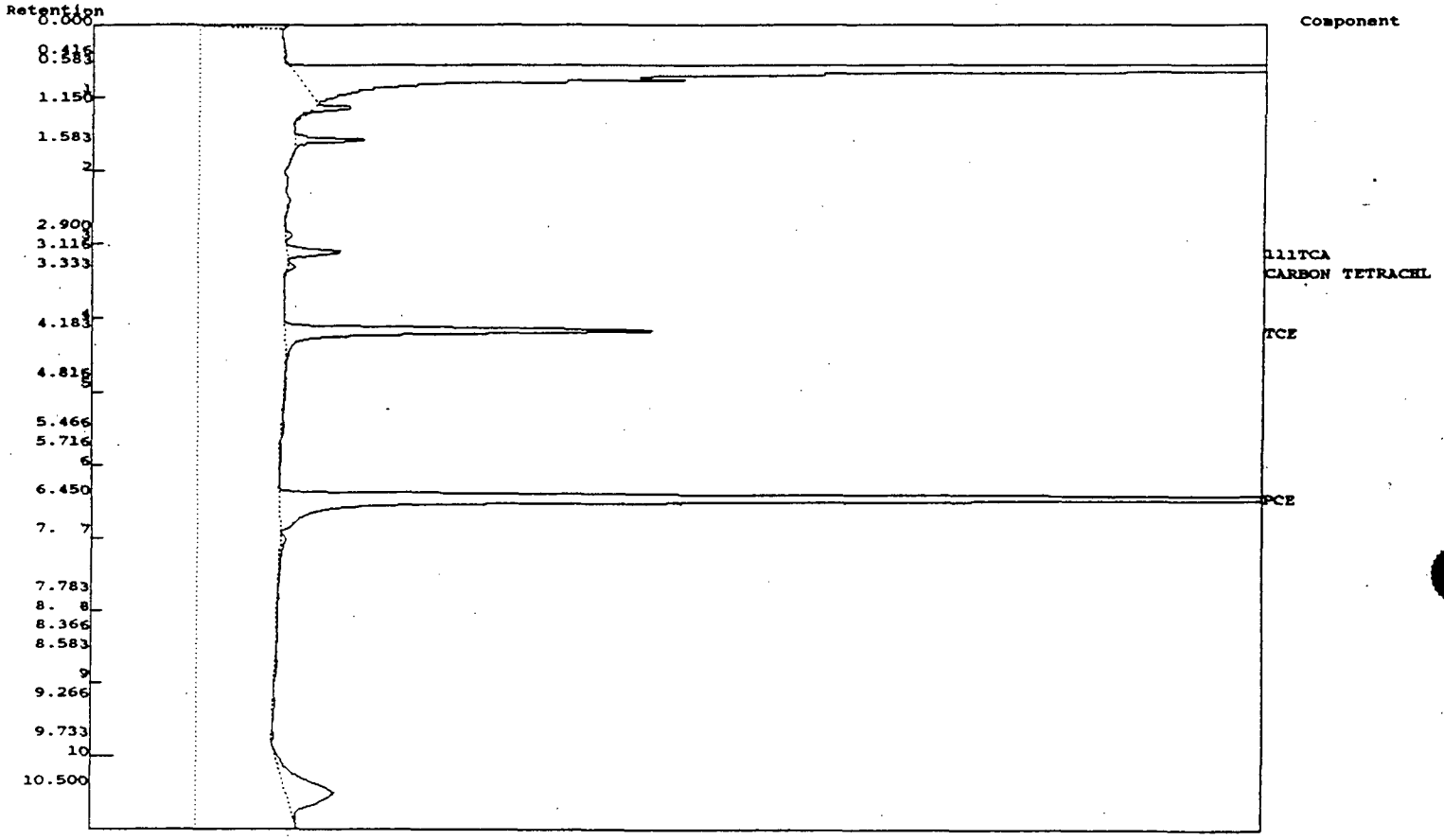
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 18:25:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E25.CHR (A:\)
Sample : SG-041
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.43 M	0.20	ug/L
111TCA	7	3.116	0.22 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.333	0.85	0.00	ug/L
TCE	9	4.183	1.75 M	0.02	ug/L
PCE	11	6.466	4.71	0.02	ug/L
	5		8.96	0.25	

Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 18:01:00
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E24.CHR (A:\)
Sample : SG-040
Operator : SGN

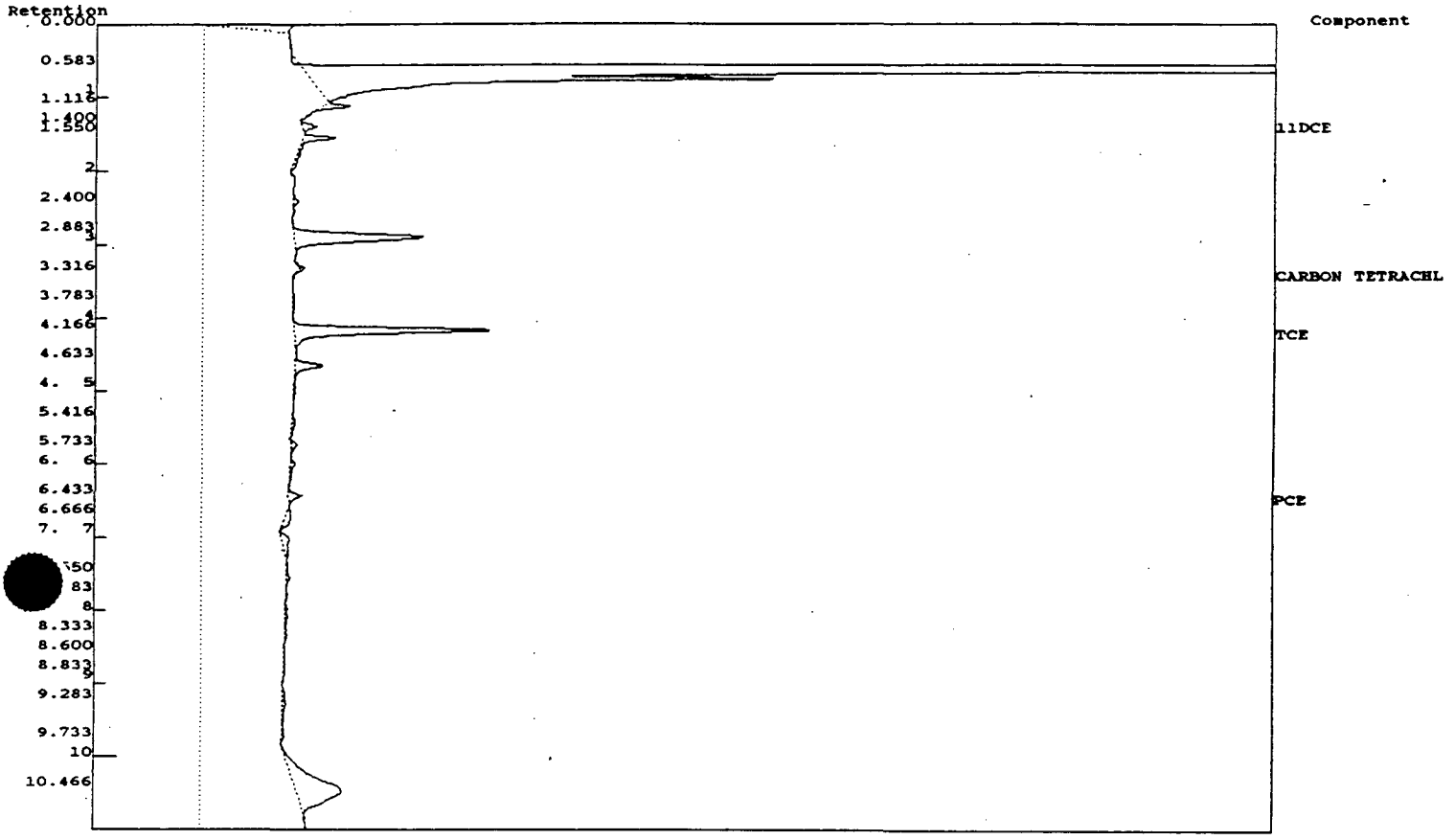
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
111TCA	7	3.116	4.78 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.333	0.59 M	0.00	ug/L
TCE	9	4.183	32.17 M	0.43	ug/L
PCE	11	6.450	125.24 M	0.51	ug/L
	4		162.80	0.97	

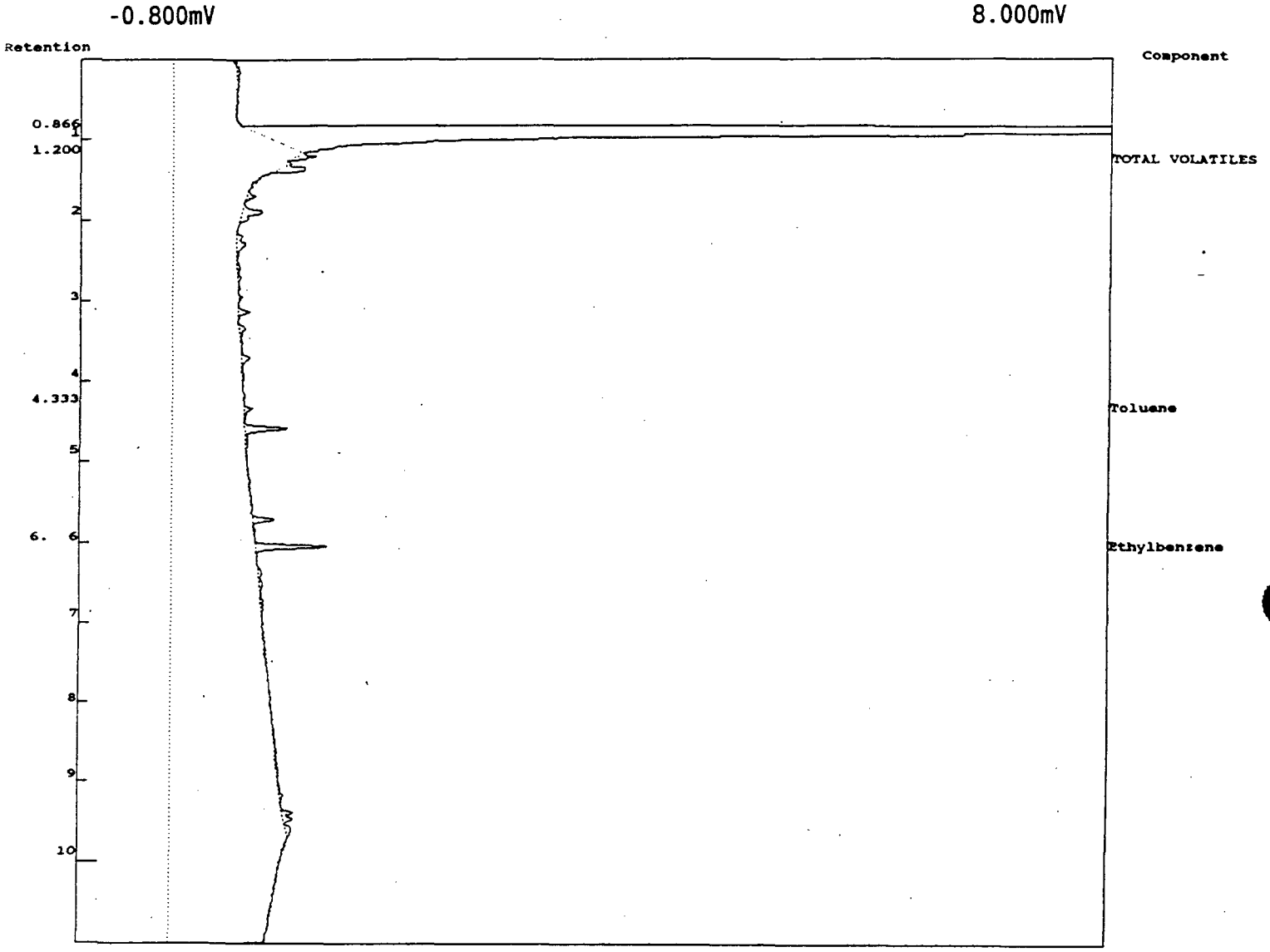
Lab name : COLUMBIA TECH
Analysis date : 05/25/2000 17:36:35
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY25E23.CHR (A:\)
Sample : SG-034
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.00	0.14	ug/L
CARBON TETRACHLORIDE	8	3.316	0.30 M	0.00	ug/L
TCE	9	4.166	16.64 M	0.22	ug/L
PCE	11	6.433	1.04	0.00	ug/L
	4		18.98	0.37	

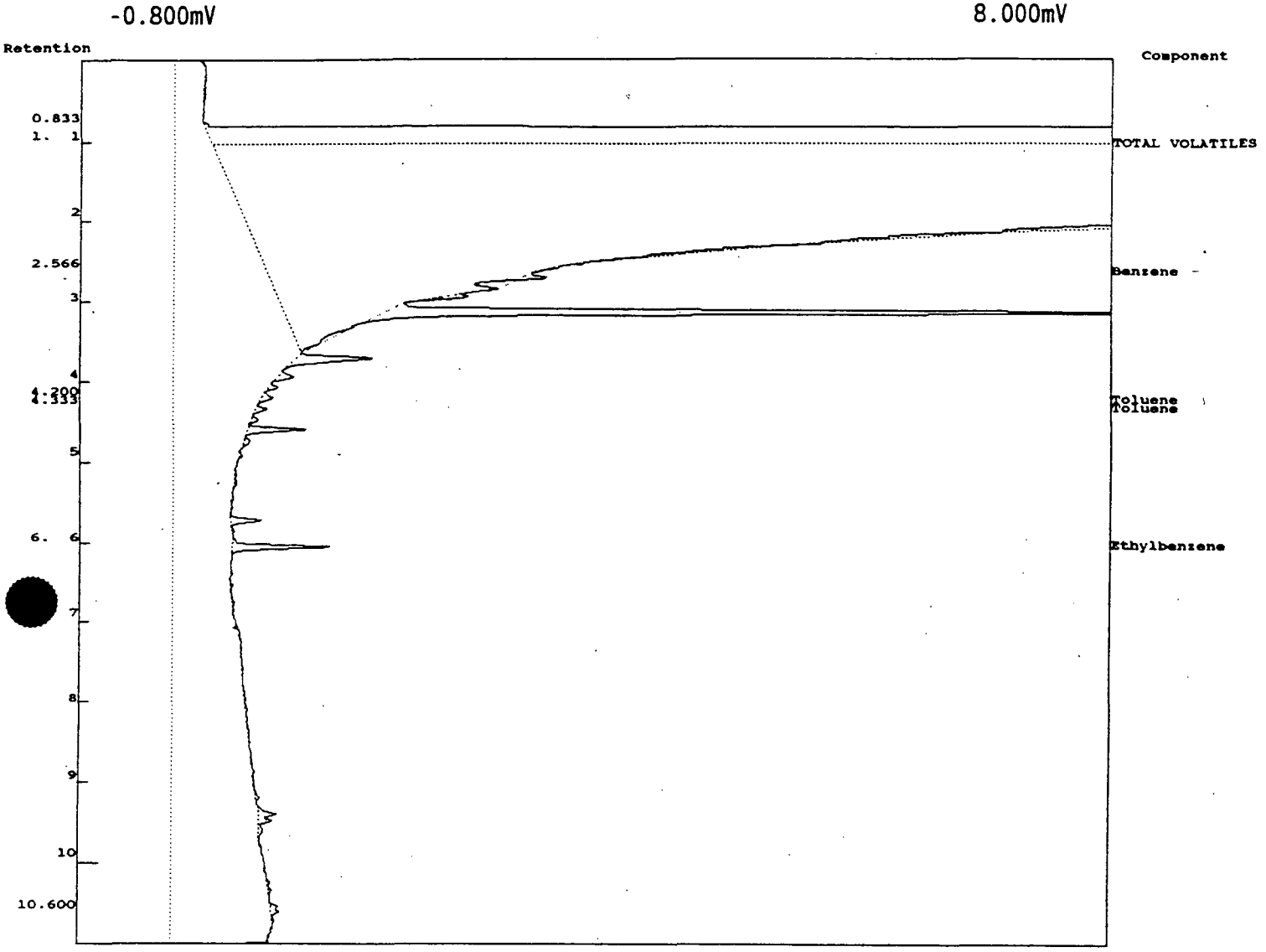
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F6.CHR (A:\)
Sample : SG-055
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.200	10.82 M	11.39	ug/L
Toluene	3	4.333	0.31 M	0.33	ug/L
~~Ethyl~~benzene	~~4~~	~~6.050~~	~~2.10 M~~	~~2.59~~	~~ug/L~~
	3		13.23	14.30	

300592

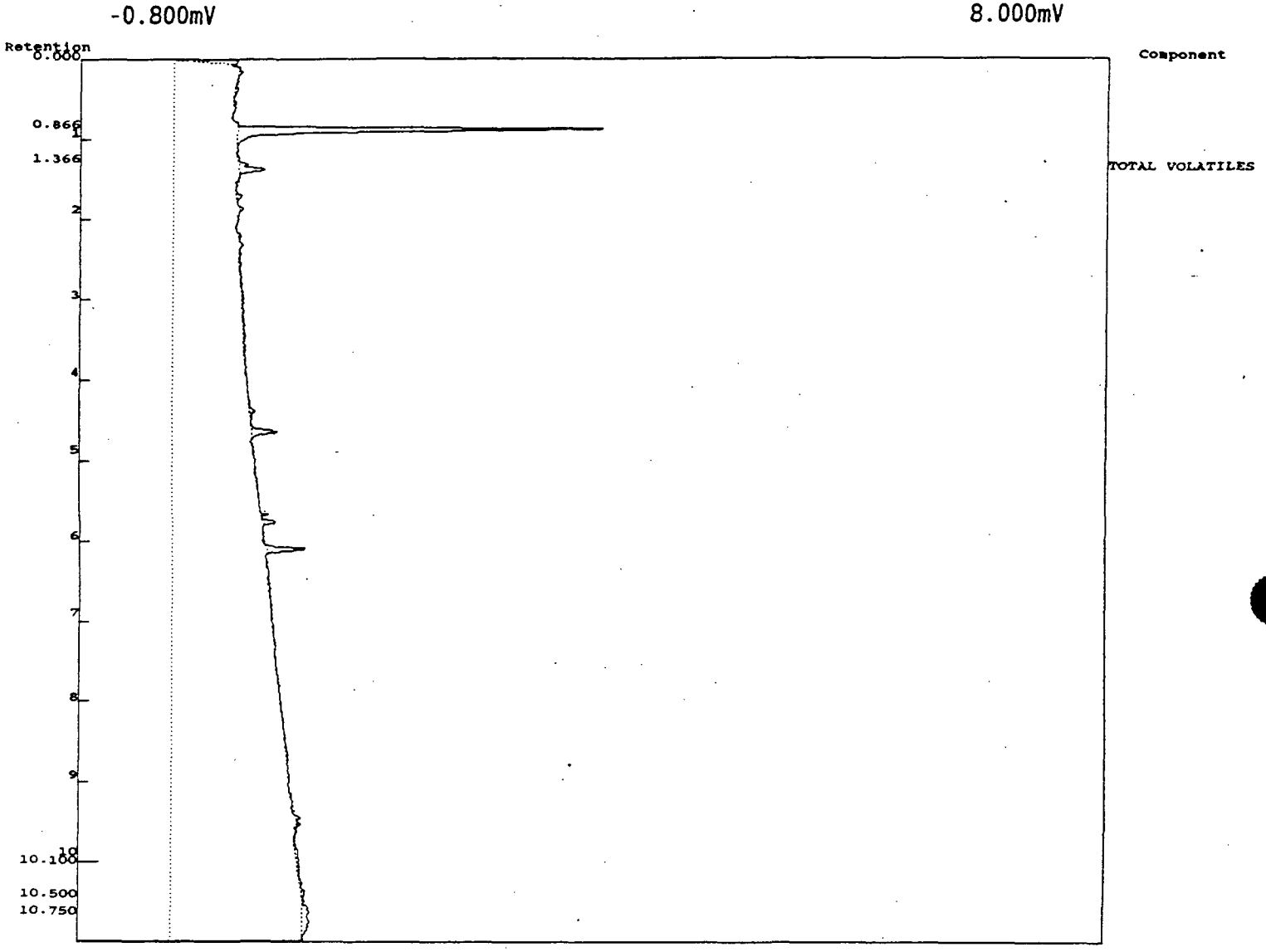
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F7.CHR (A:\)
Sample : SG-065
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.000	4047.03 M	4258.69	ug/L
Benzene	2	2.566	0.23 M	0.21	ug/L
Toluene	3	4.200	0.44	0.46	ug/L
Toluene	3	4.333	0.57	~~0.60~~	ug/L
~~Ethylbenzene~~	~~4~~	~~6.050~~	~~2.93 M~~	~~3.60~~	ug/L
	5		4051.20	4263.56	

300593

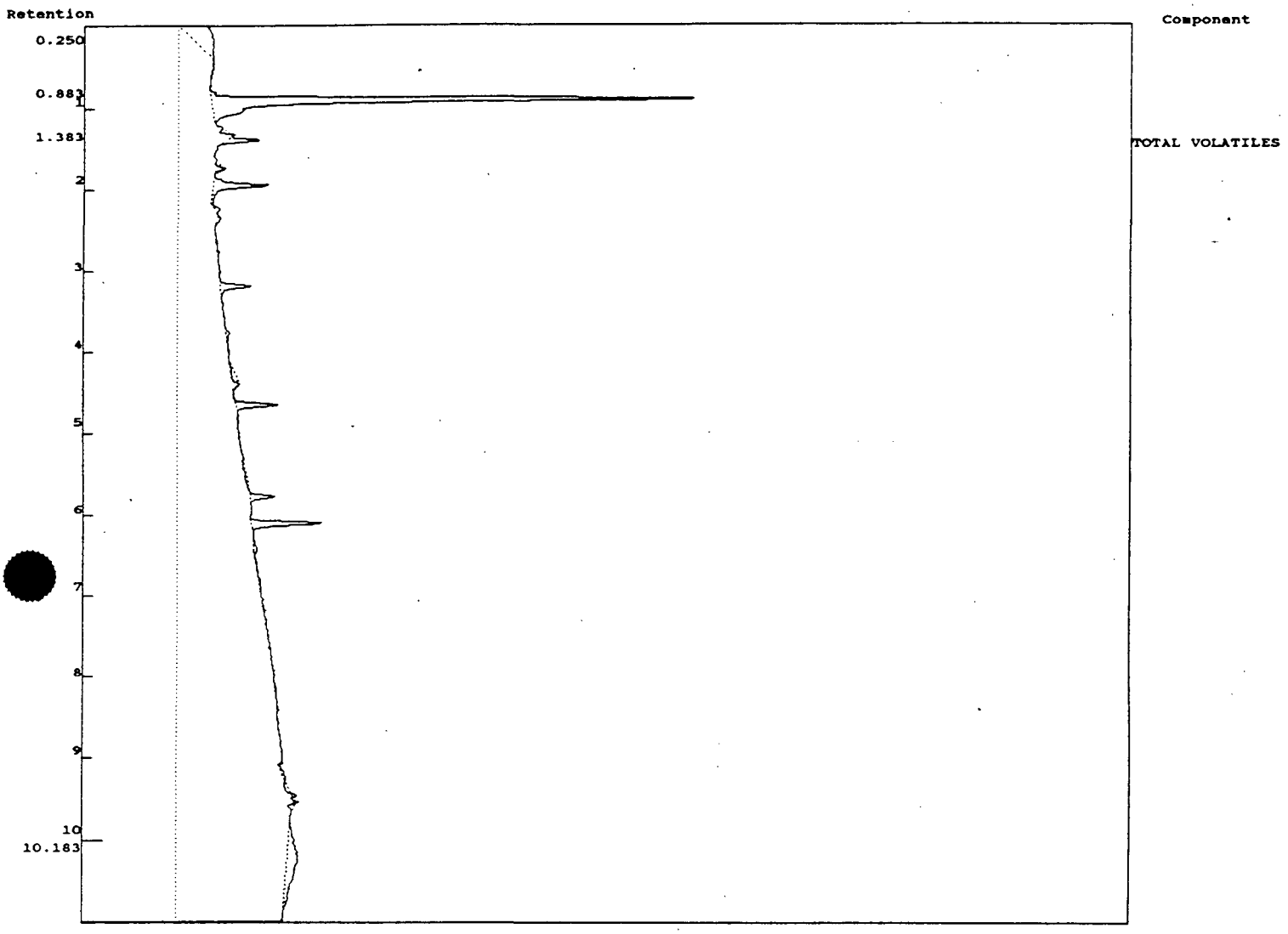
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F8.CHR (A:\)
Sample : EB-06
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	3.06 M	3.22	ug/L
	1		3.06	3.22	

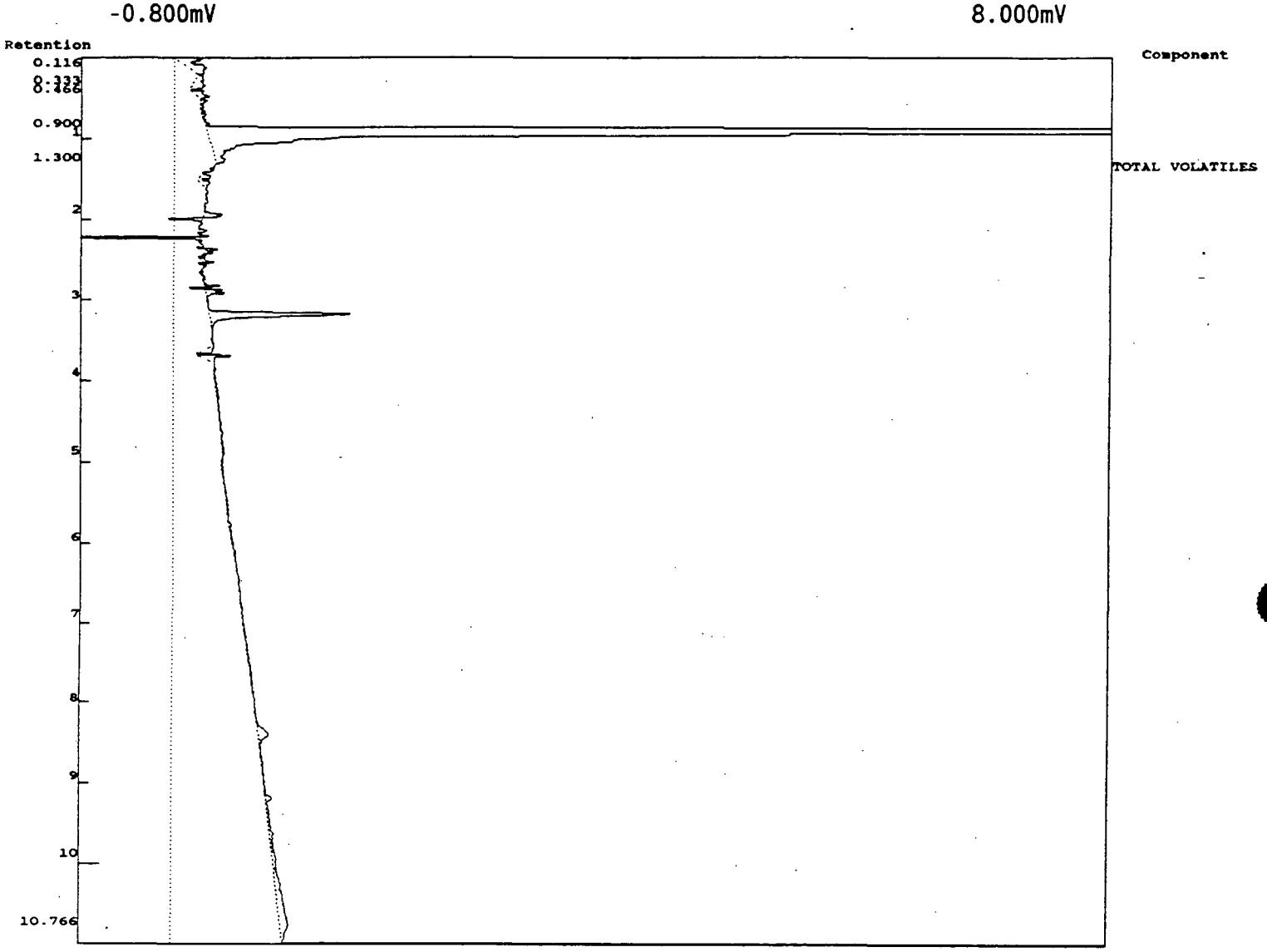
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F9.CHR (A:\)
Sample : SG-080
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	7.71 M	8.12	ug/L
	1		7.71	8.12	

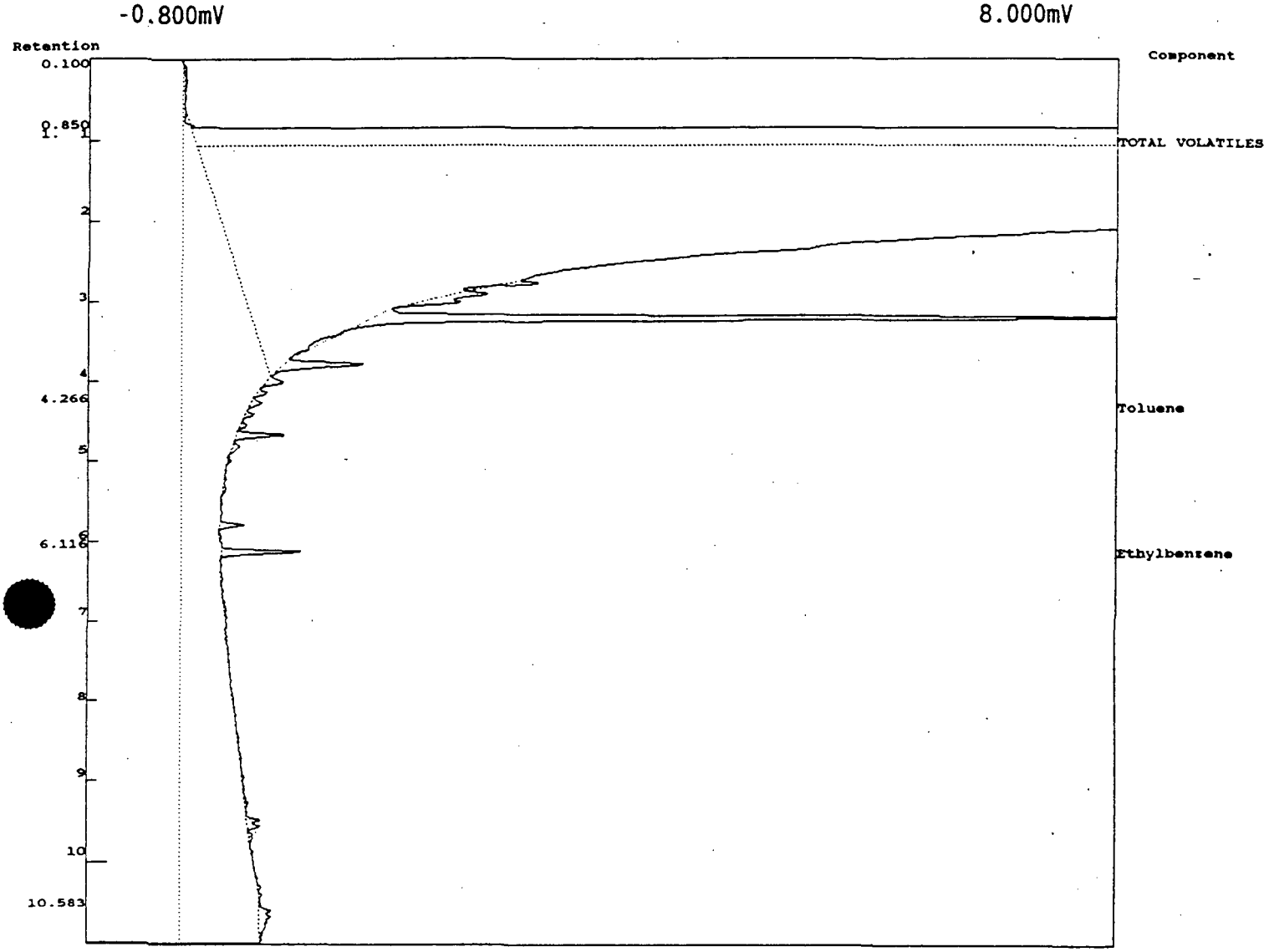
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F10.CHR (A:\)
Sample : SG-039 (1000X)
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.300	7.56 M	7.95	ug/L
	1		7.56	7.95	

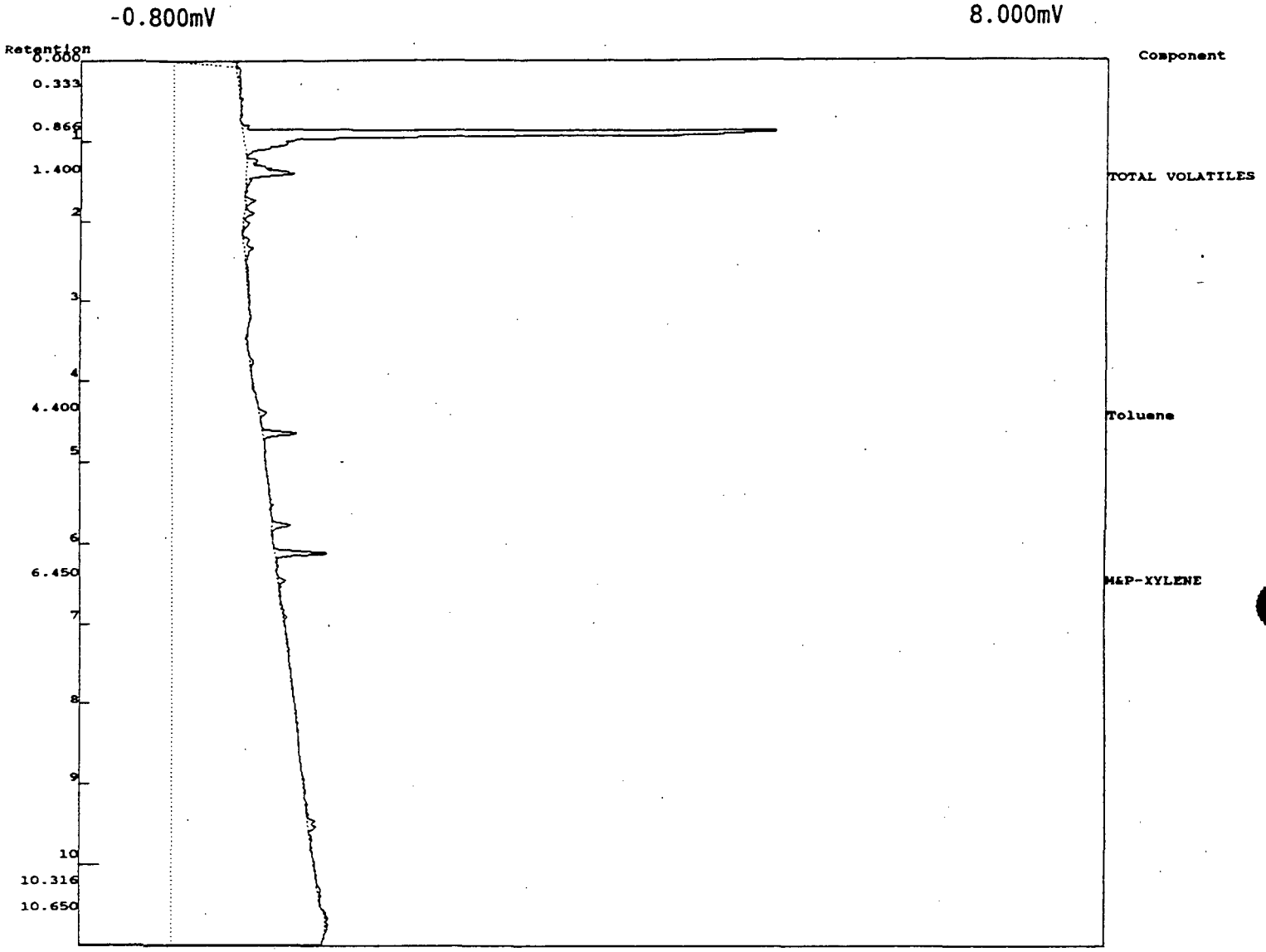
300596

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F11.CHR (A:\)
Sample : SG-965
Operator : SGN



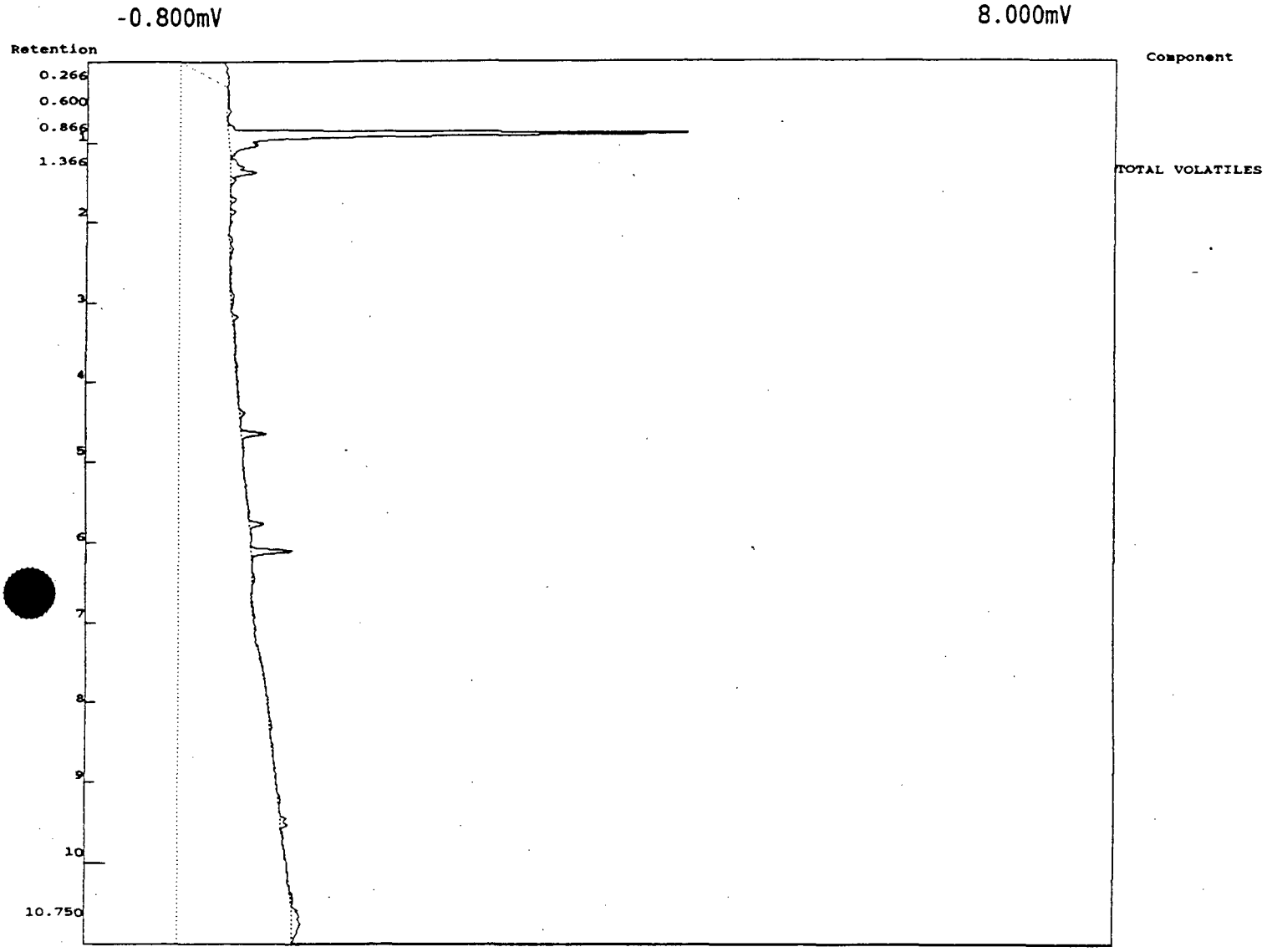
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.033	4360.00 M	4588.02	ug/L
Toluene	3	4.266	0.41	0.43	ug/L
Ethylbenzene	4	6.116	2.23 M	2.75	ug/L
	3		4362.64	4591.21	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F15.CHR (A:\)
Sample : SG-013
Operator : SGN



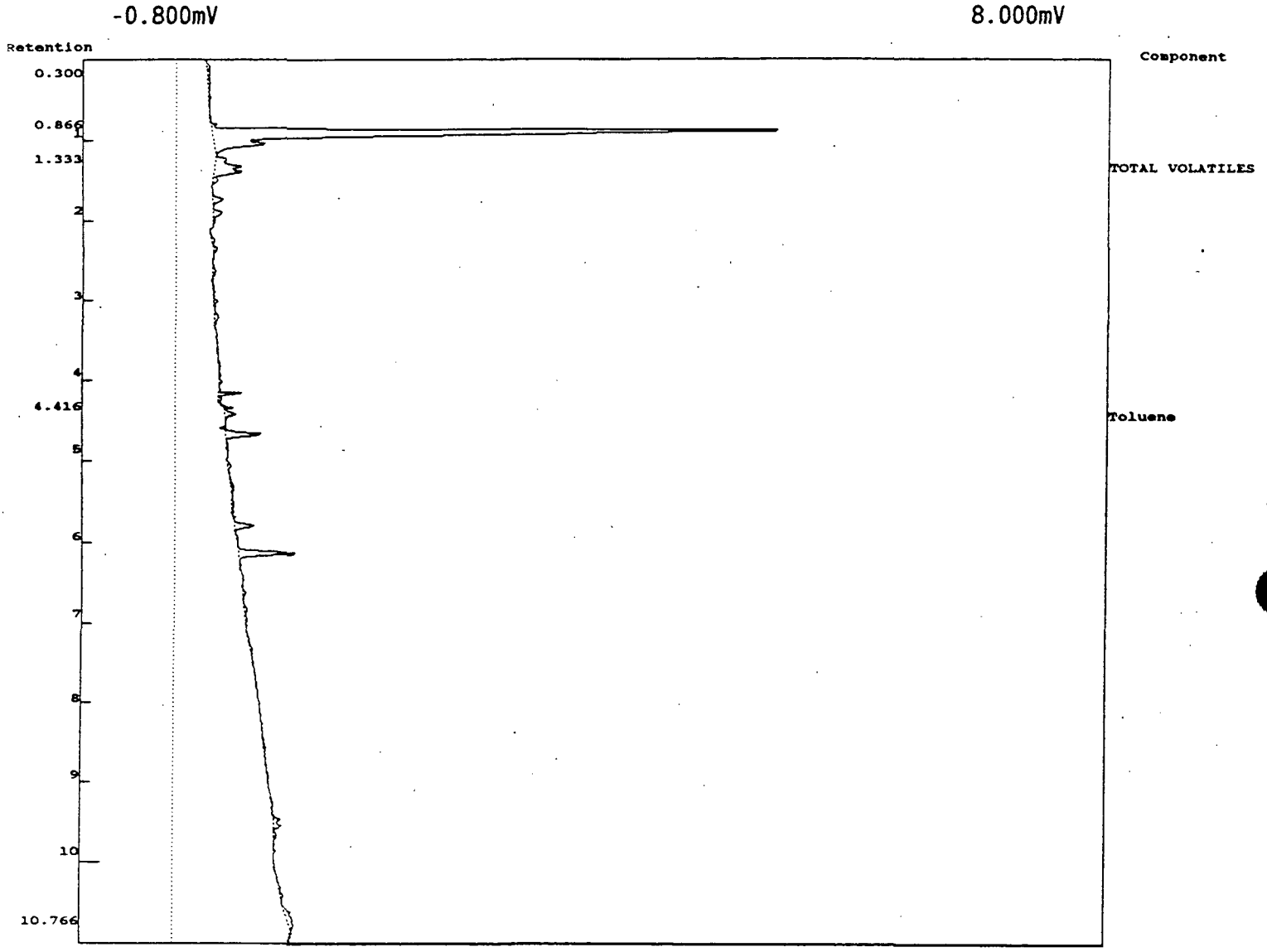
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	8.73	9.19	ug/L
Toluene	3	4.400	0.25 M	0.26	ug/L
M&P-XYLENE	5	6.450	0.23	0.31	ug/L
	3		9.21	9.76	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F17.CHR (A:\)
Sample : SG-022
Operator : SGN



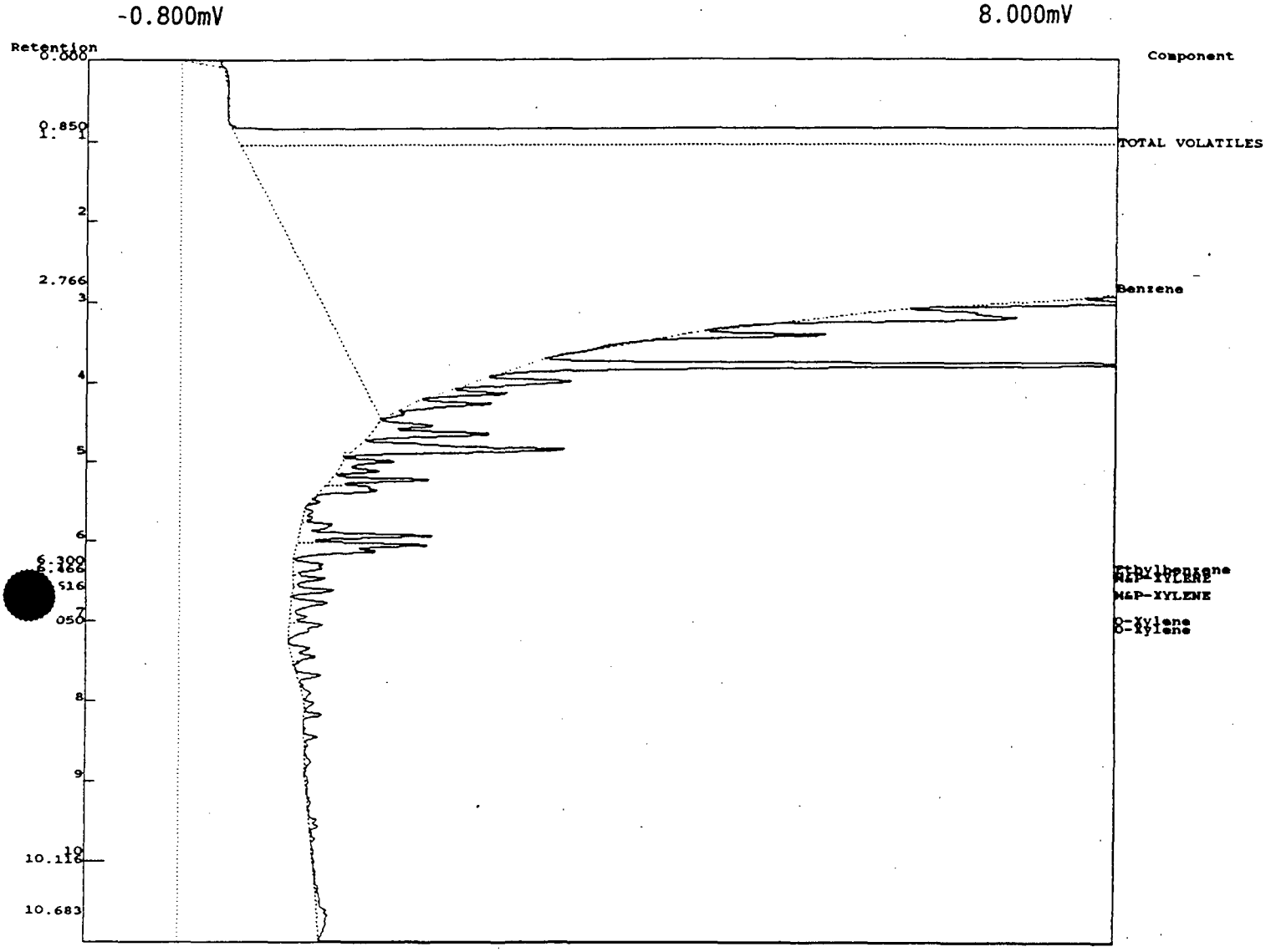
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.84 M	5.09	ug/L
	1		**4.84**	**5.09**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F18.CHR (A:\)
Sample : SG-023
Operator : SGN



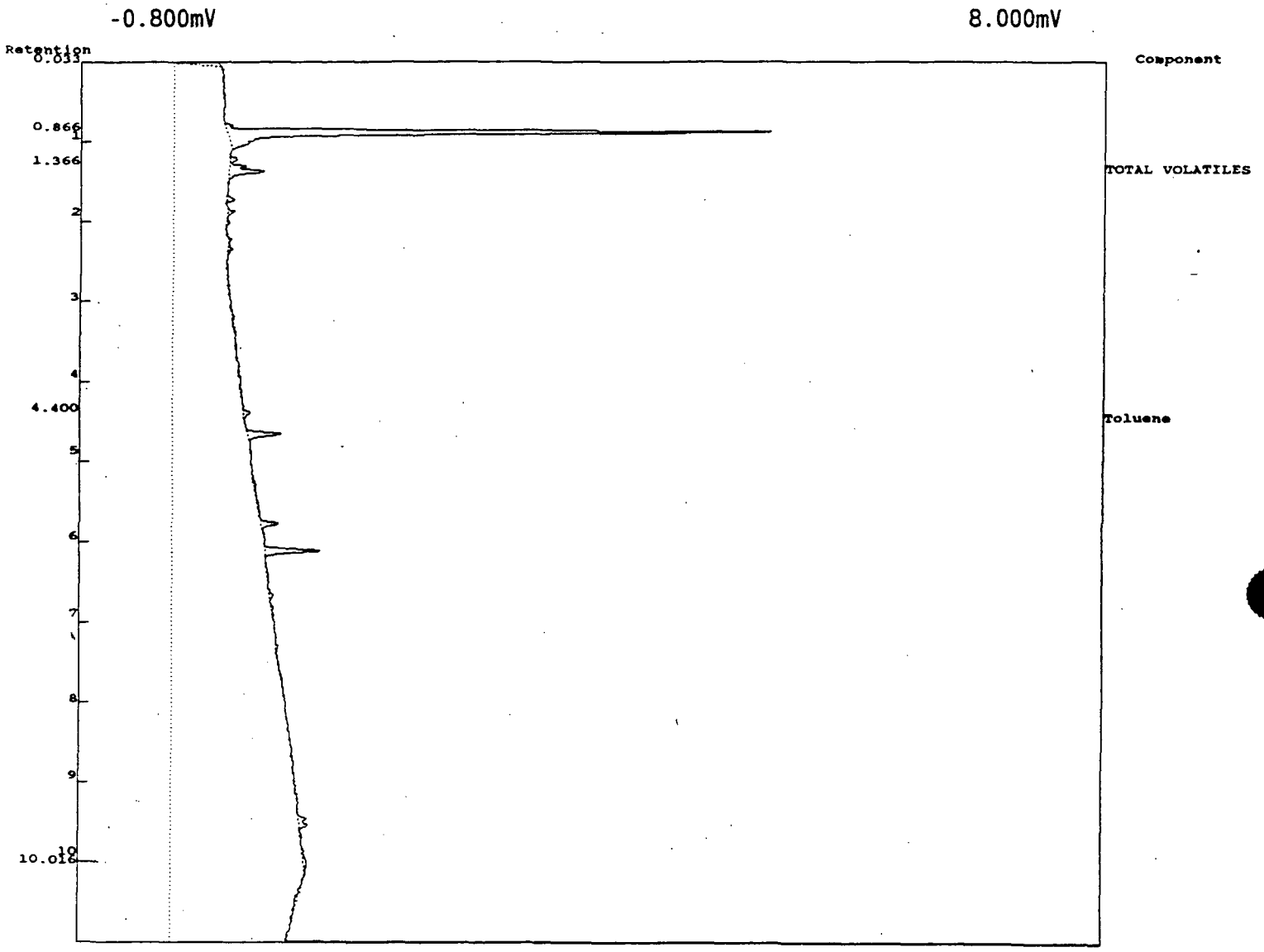
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	7.47 M	7.86	ug/L
Toluene	3	4.416	0.33 M	0.35	ug/L
	2		7.80	8.20	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F19.CHR (A:\)
Sample : SG-028
Operator : SGN



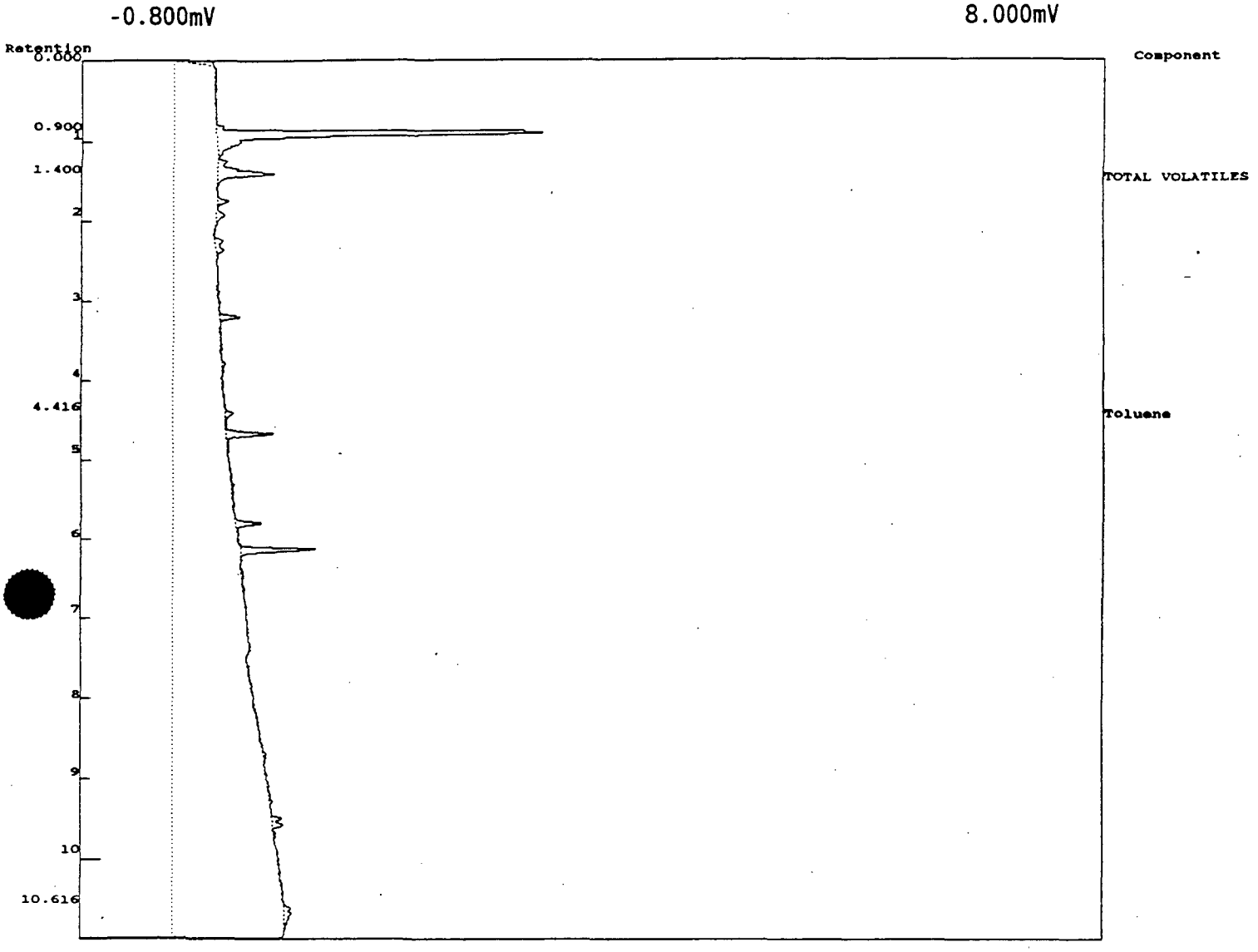
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	15224.73 M	16020.98	ug/L
Benzene	2	2.766	10.48 M	9.43	ug/L
Ethylbenzene	4	6.300	1.66 M	2.04	ug/L
M&P-XYLENE	5	6.466	1.11 M	1.45	ug/L
M&P-XYLENE	5	6.616	1.45 M	1.90	ug/L
O-Xylene	6	6.950	0.61 M	0.85	ug/L
O-Xylene	6	7.050	2.06 M	2.87	ug/L
	7		15242.11	16039.54	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F20.CHR (A:\)
Sample : SG-088
Operator : SGN



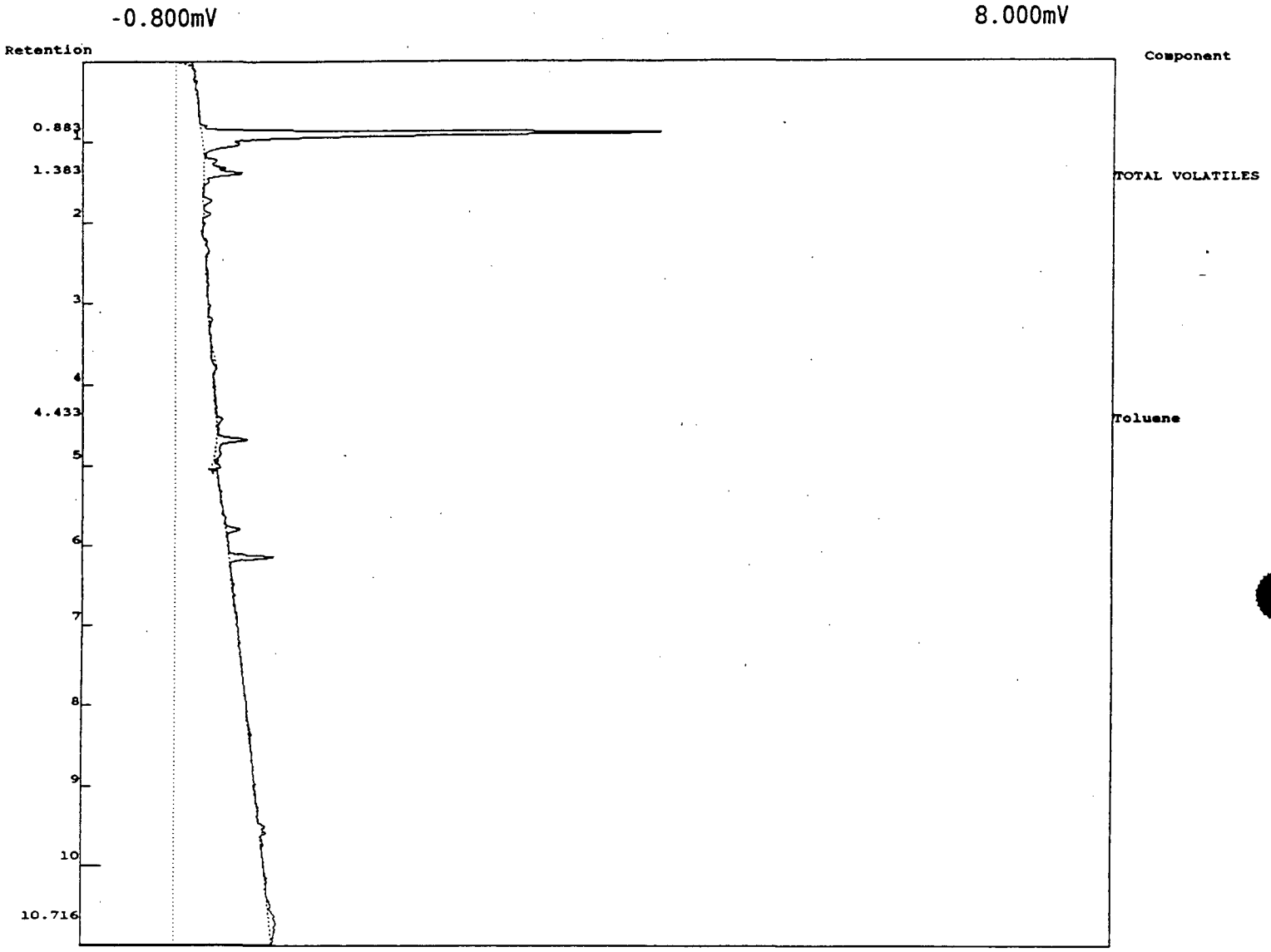
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.92 M	6.23	ug/L
Toluene	3	4.400	0.22 M	0.23	ug/L
	2		6.14	6.46	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F21.CHR (A:\)
Sample : SG-089
Operator : SGN



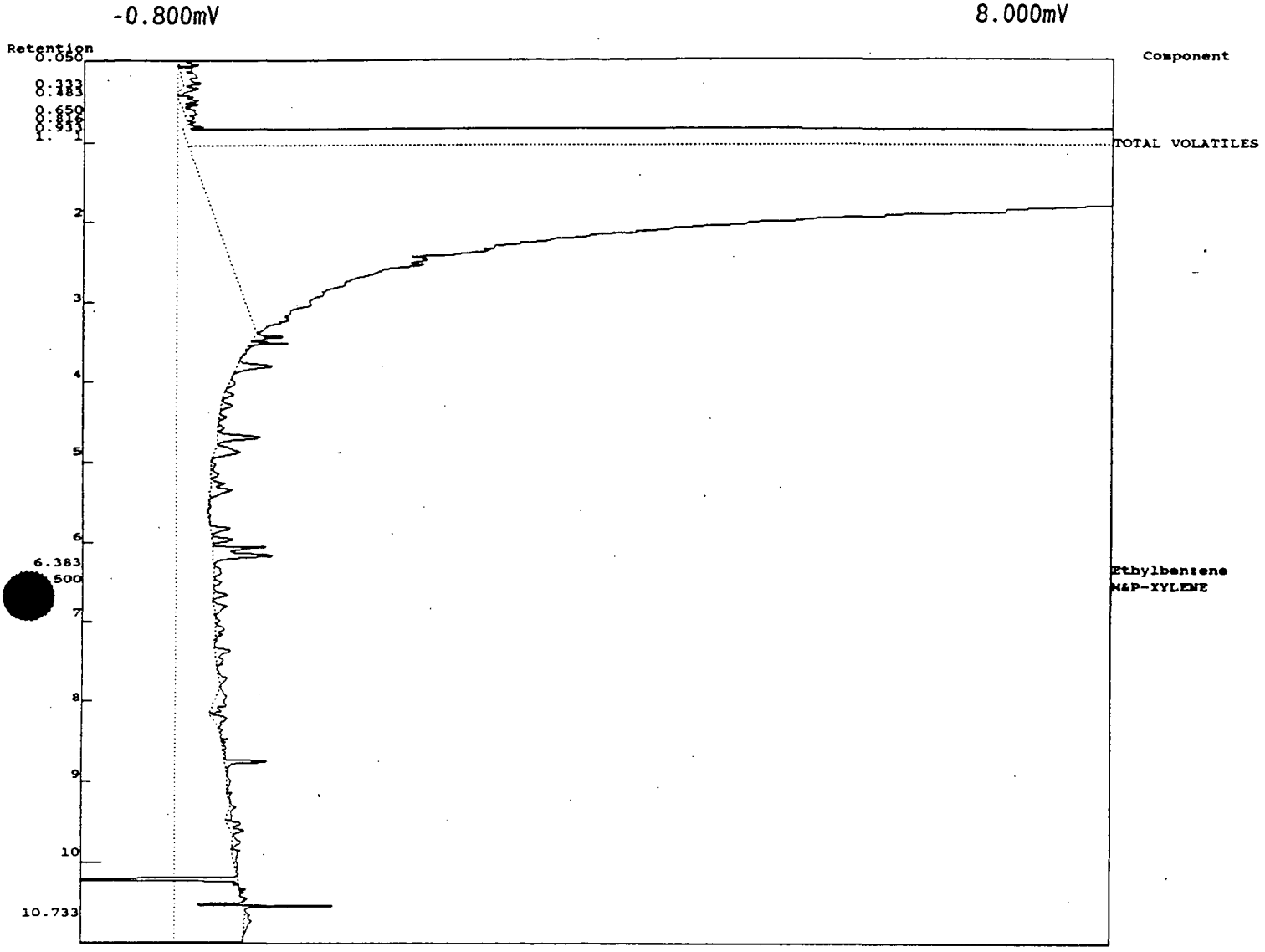
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	9.91 M	10.43	ug/L
Toluene	3	4.416	0.32 M	0.34	ug/L
	2		10.23	10.76	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F22.CHR (A:\)
Sample : SG-033
Operator : SGN



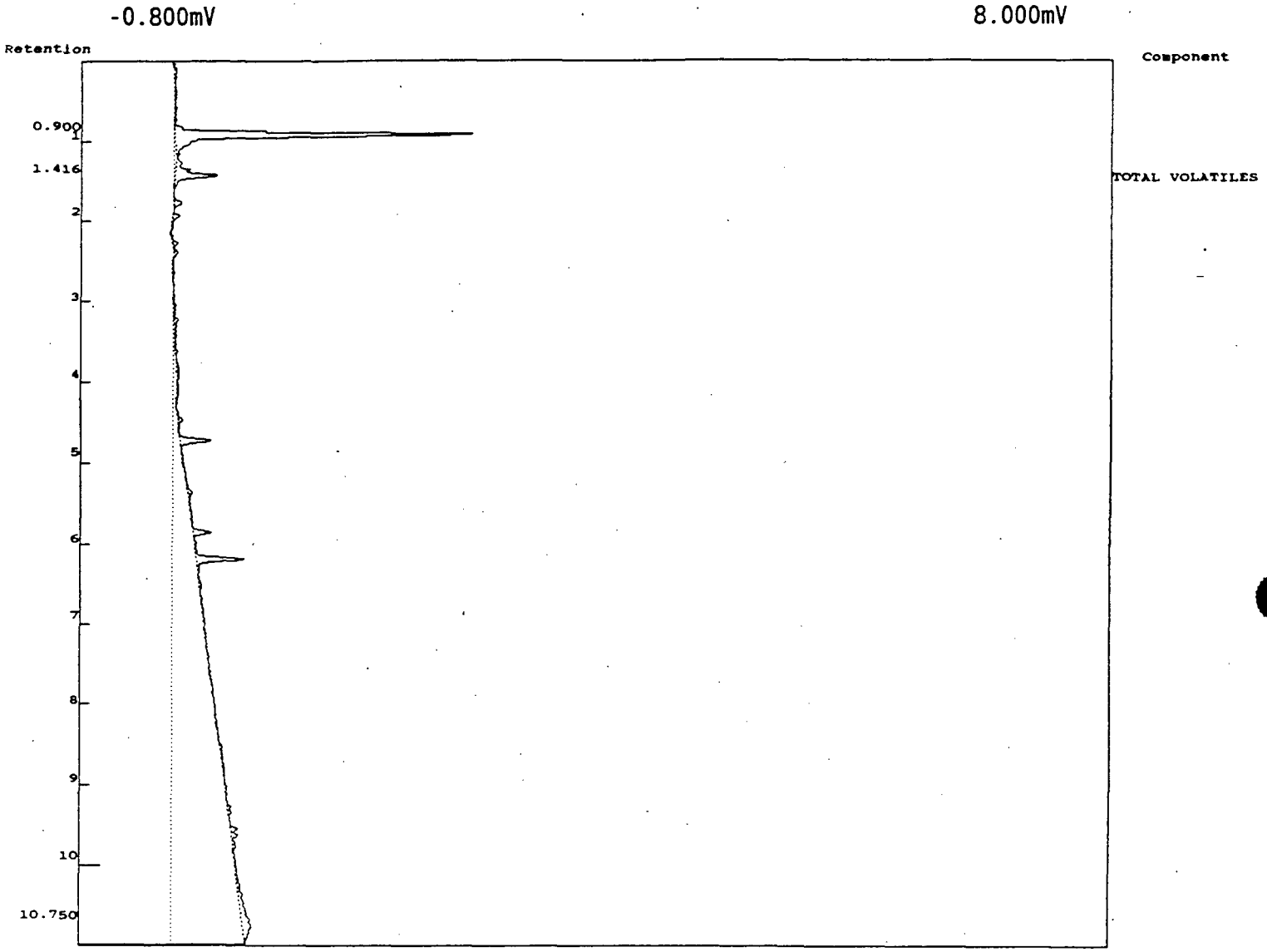
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	7.15 M	7.52	ug/L
Toluene	3	4.433	0.42	0.44	ug/L
	2		7.57	7.96	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F23.CHR (A:\)
Sample : SG-034
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	2346.68 M	2469.41	ug/L
Ethylbenzene	4	6.383	0.37	0.46	ug/L
M&P-XYLENE	5	6.500	0.22	0.28	ug/L
	3		2347.27	2470.15	

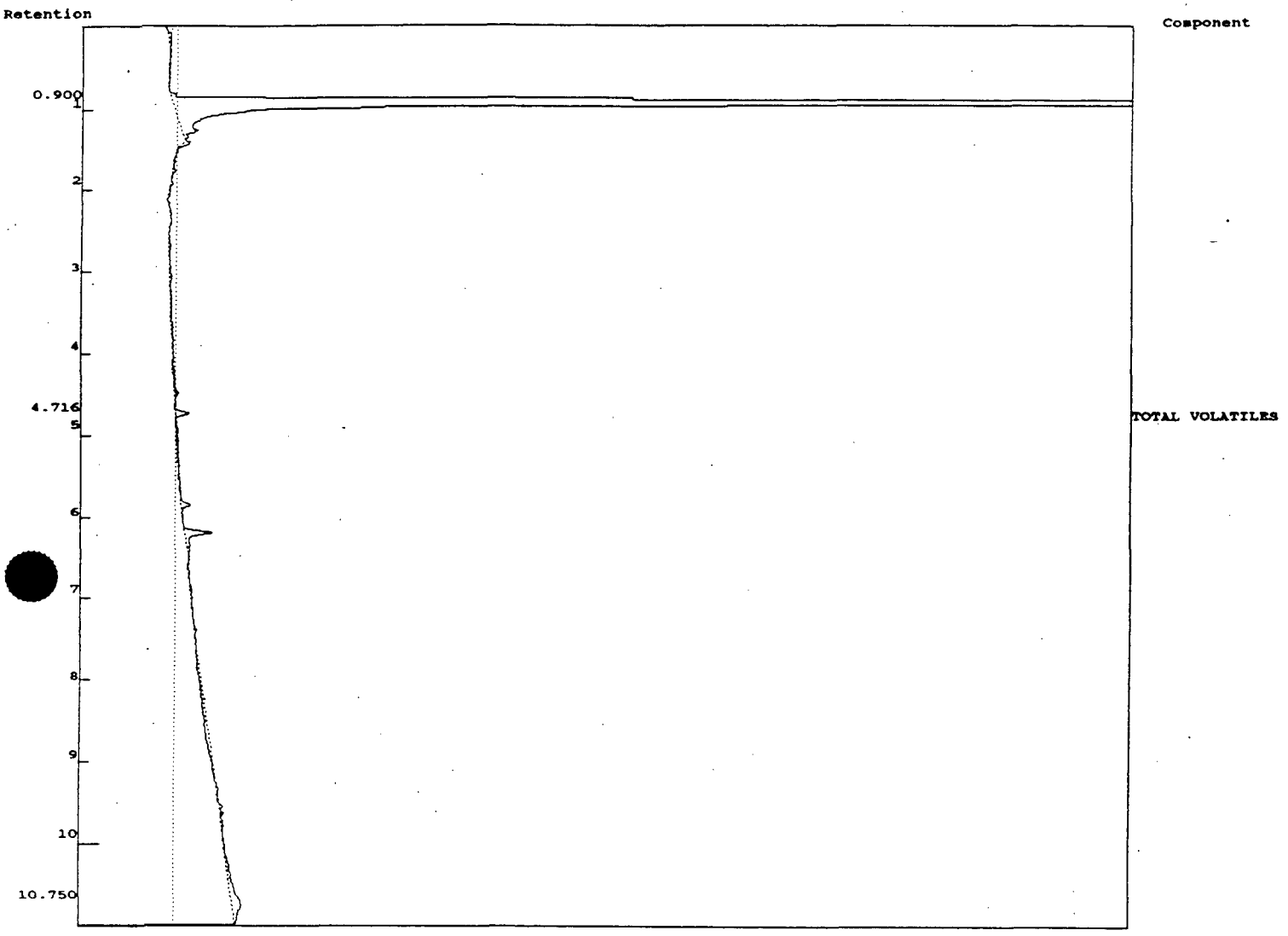
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F24.CHR (A:\)
Sample : SG-040
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	6.61 M	6.96	ug/L
	1		6.61	6.96	

300606

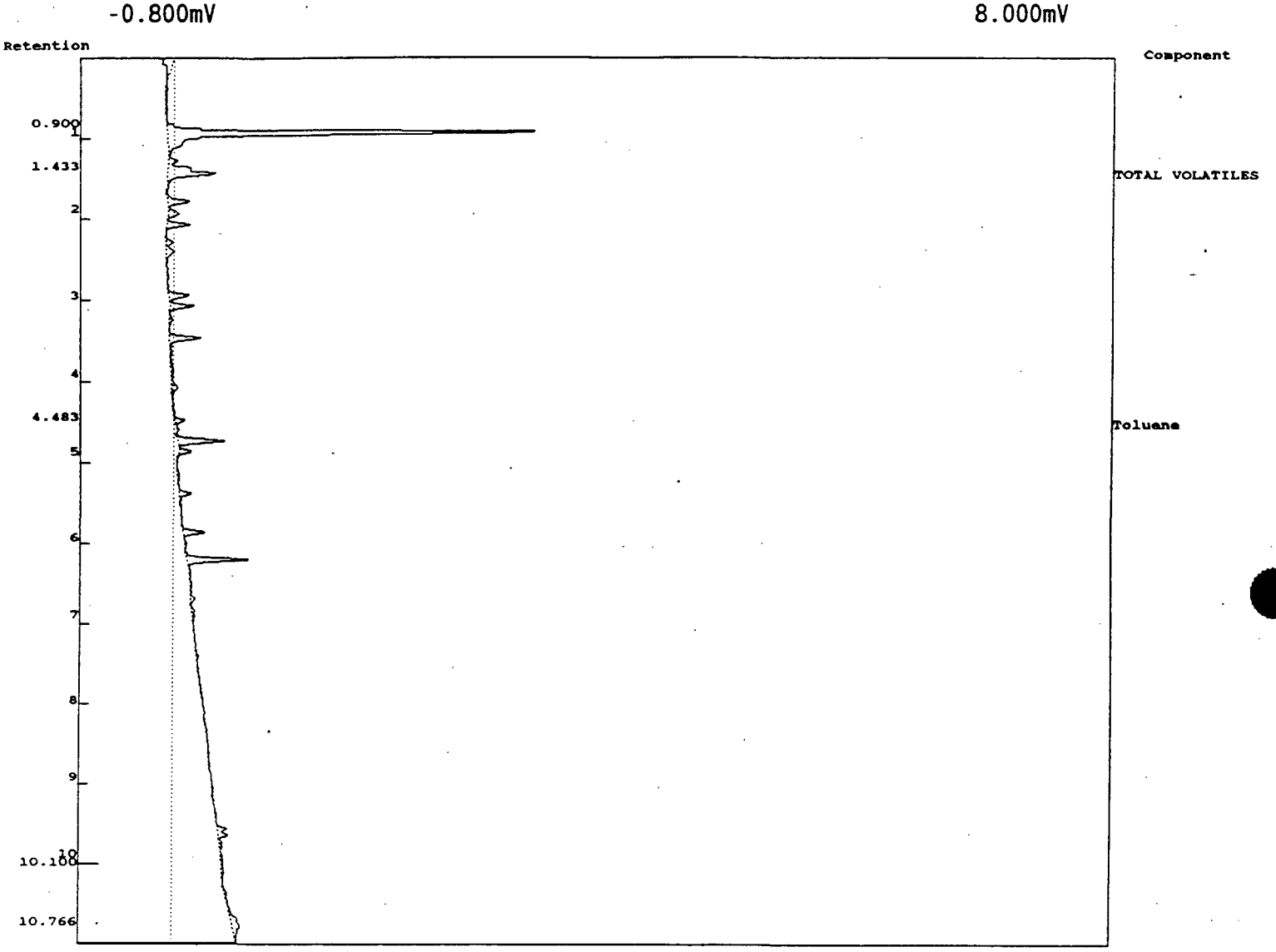
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F25.CHR (A:\)
Sample : SG-041
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	4.716	1.84	1.93	ug/L
1			1.84	1.93	

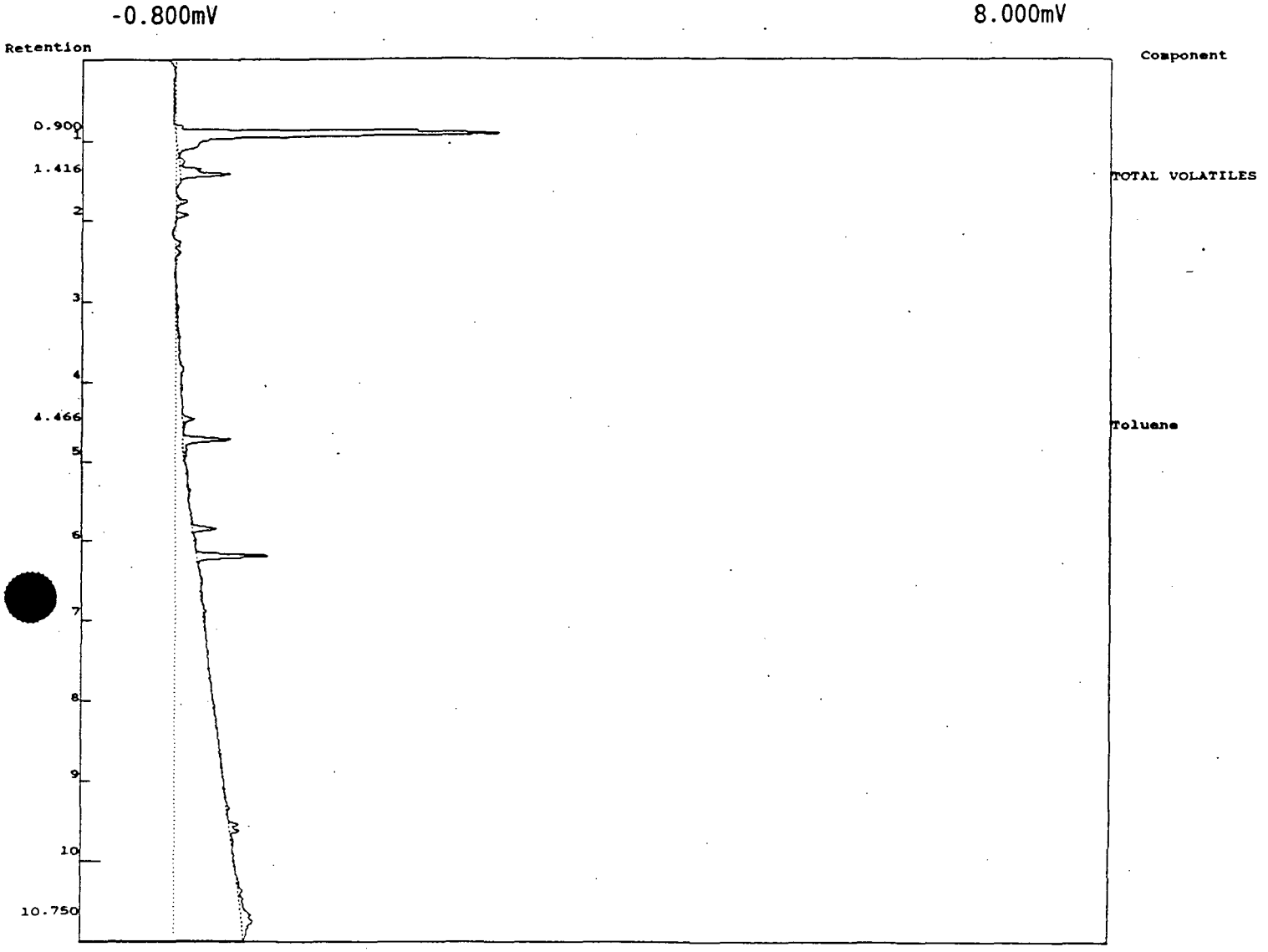
300607

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F26.CHR (A:\)
Sample : SG-044
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.433	12.60 M	13.26	ug/L
Toluene	3	4.483	0.25 M	0.26	ug/L
	2		12.85	13.52	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F27.CHR (A:\)
Sample : SG-062
Operator : SGN

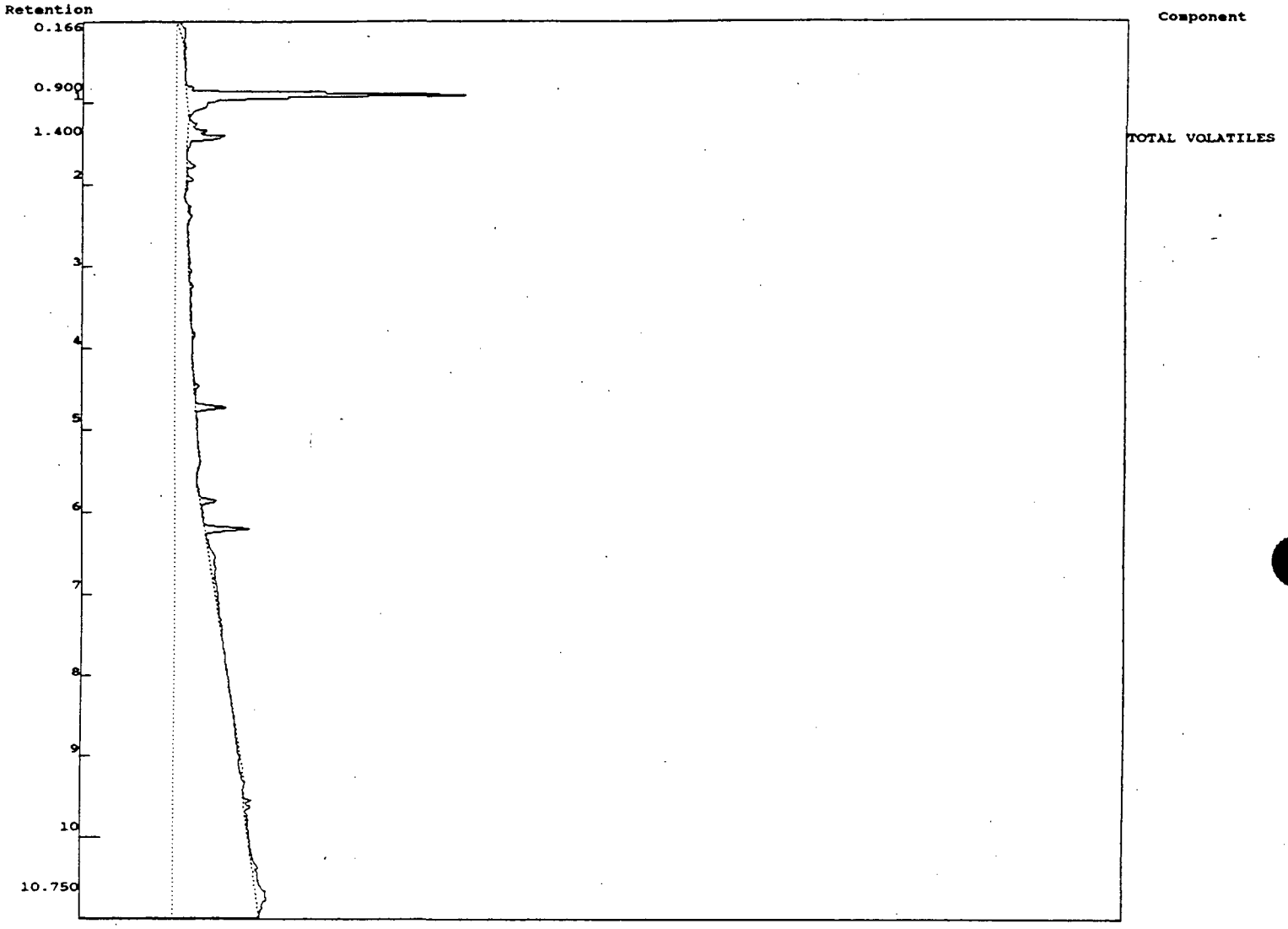


Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	7.82 M	8.23	ug/L
Toluene	3	4.466	0.39 M	0.41	ug/L
	2		8.21	8.64	

300609

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F28.CHR (A:\)
Sample : SG-076
Operator : SGN

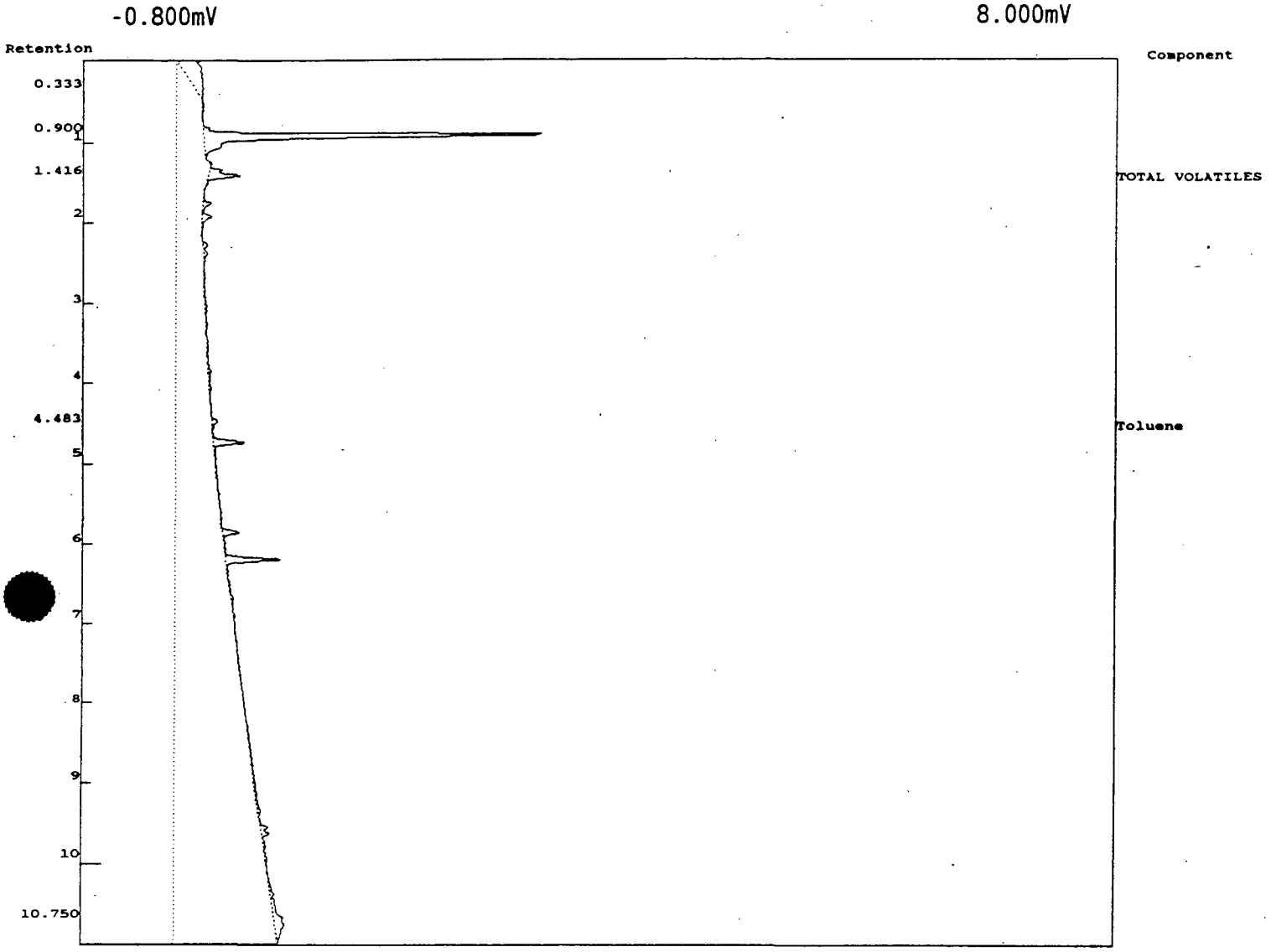
-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	5.95 M	6.26	ug/L
	1		5.95	6.26	

300610

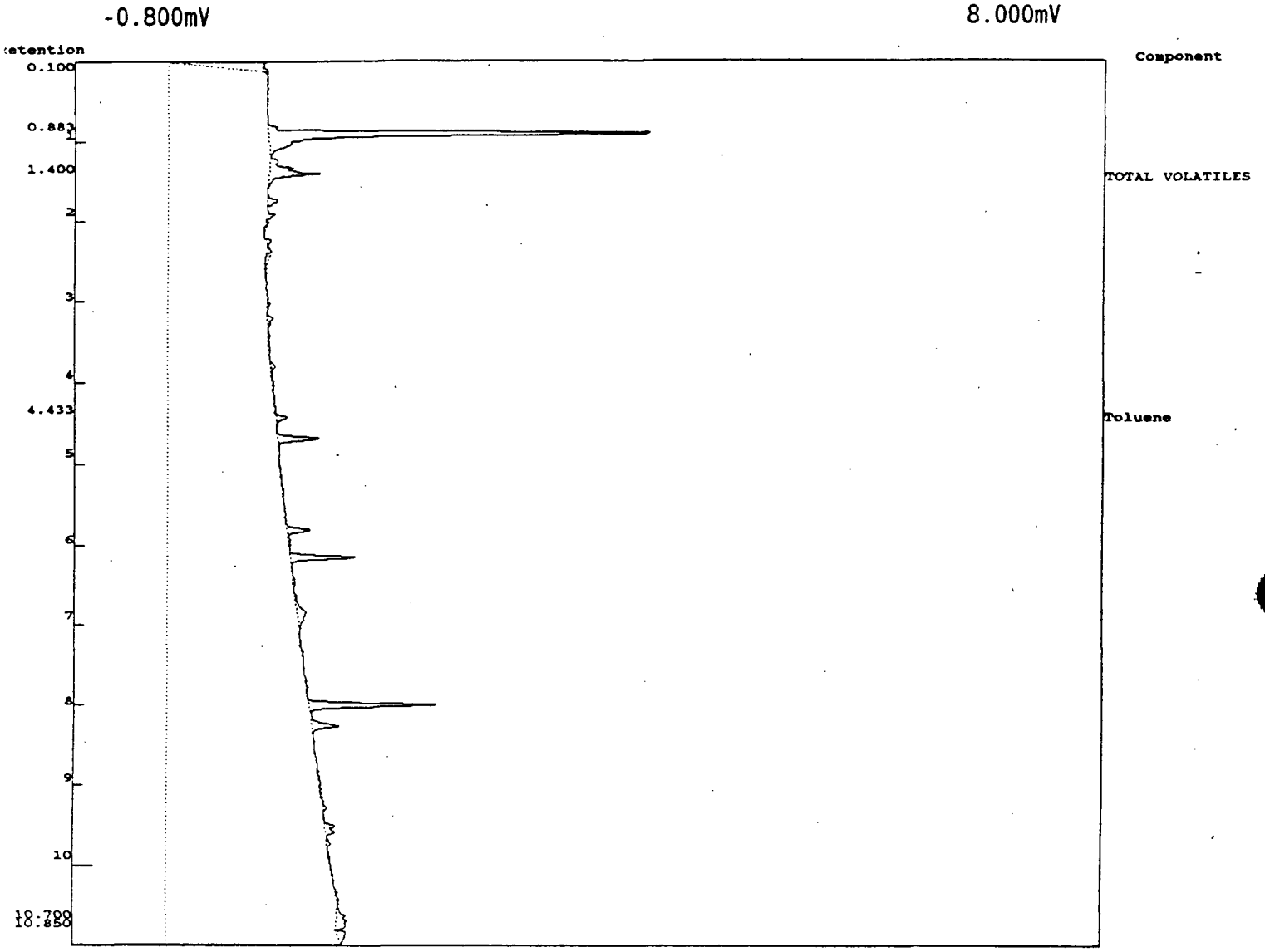
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F29.CHR (A:\)
Sample : SG-077
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	5.75 M	6.05	ug/L
Toluene	3	4.483	0.22 M	0.23	ug/L
	2		5.97	6.28	

300611

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F33.CHR (A:\)
Sample : SG-078
Operator : SGN

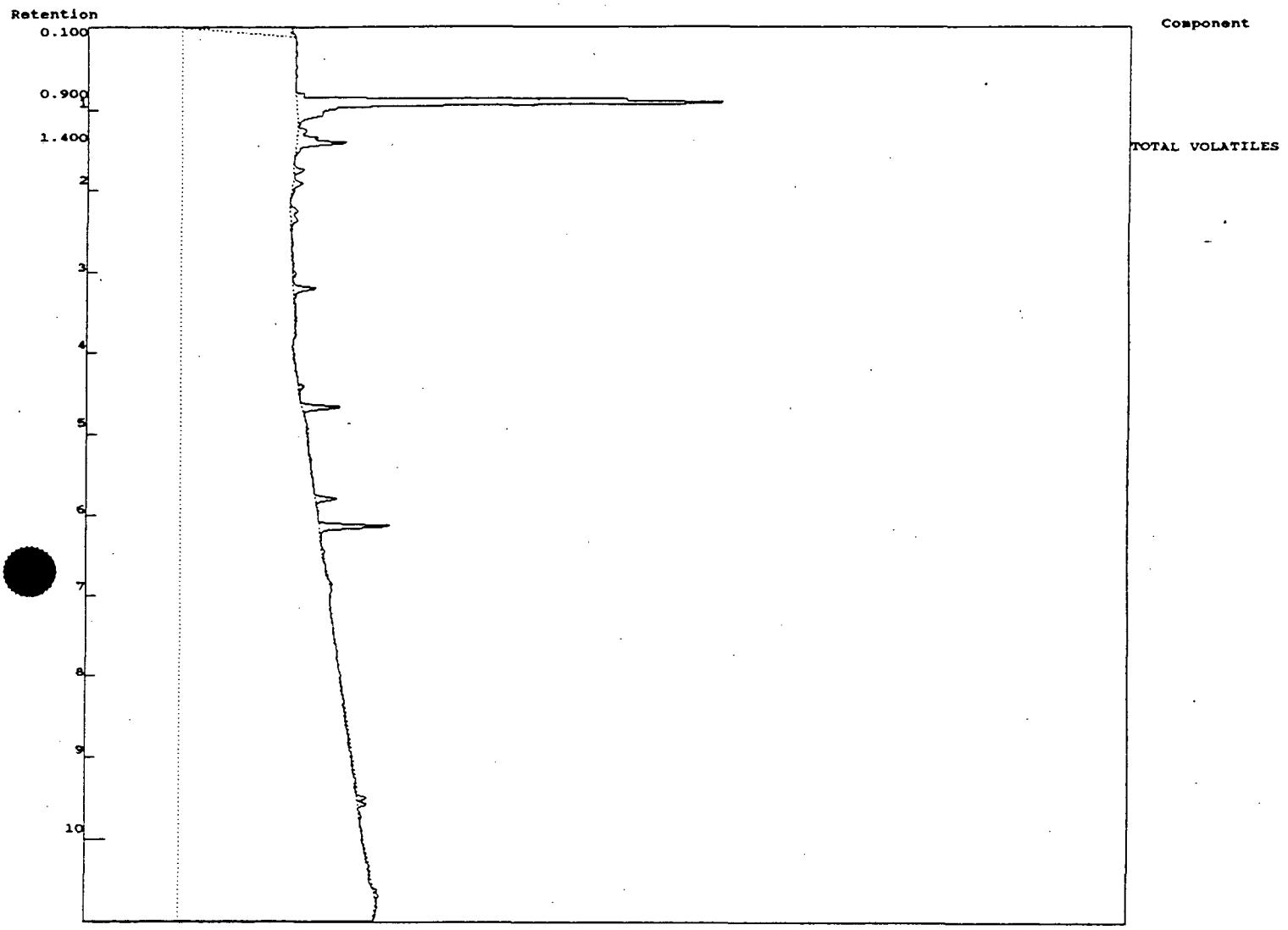


Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.400	13.27 M	13.97	ug/L
oluene	3	4.433	0.34 M	0.36	ug/L
	2		13.61	14.32	

300612

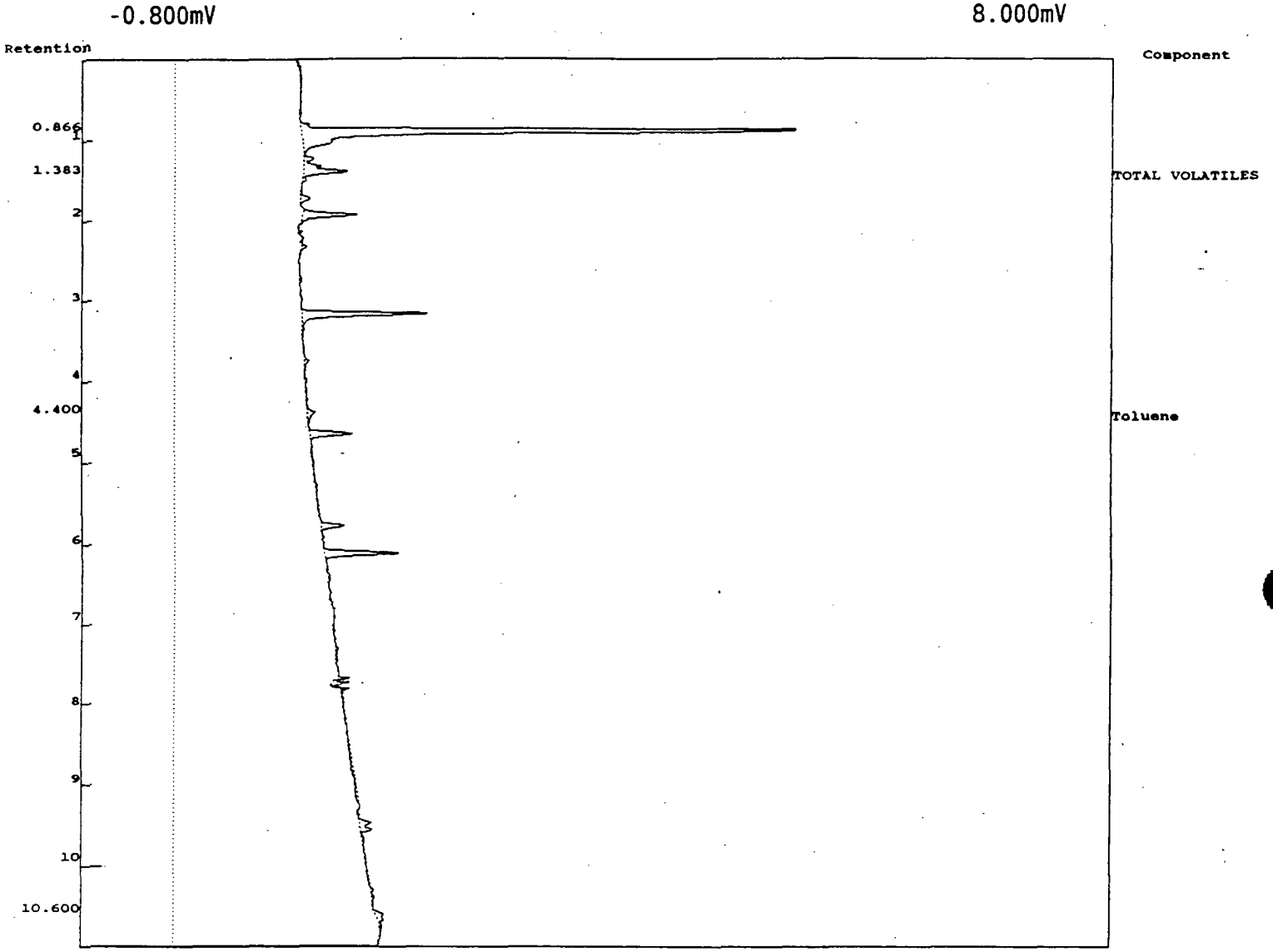
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F34.CHR (A:\)
Sample : SG-103
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	8.82 M	9.28	ug/L
1			8.82	9.28	

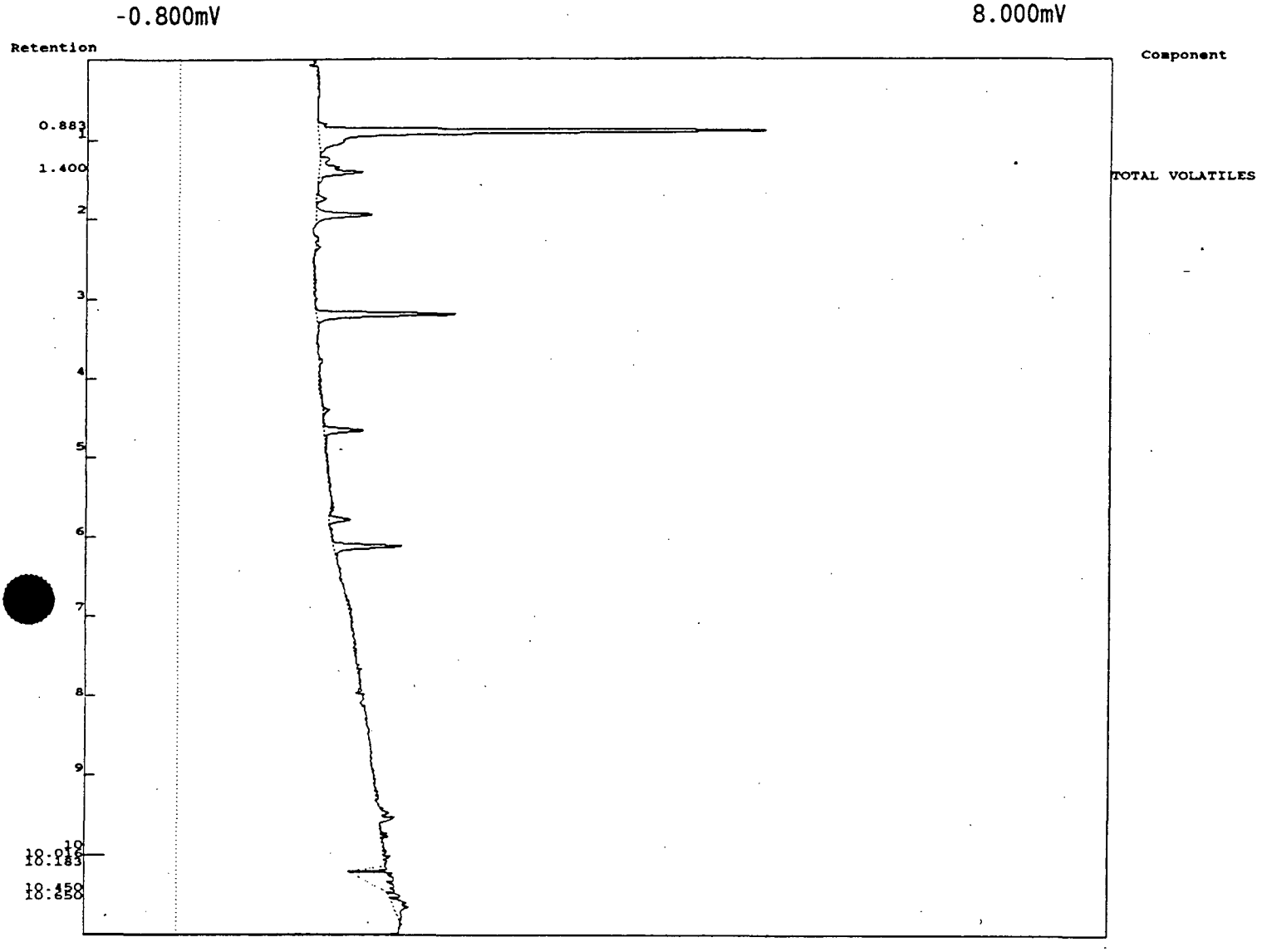
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F35.CHR (A:\)
Sample : SG-104
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.383	13.75 M	14.47	ug/L
oluene	3	4.400	0.34 M	0.35	ug/L
	2		14.09	14.82	

300614

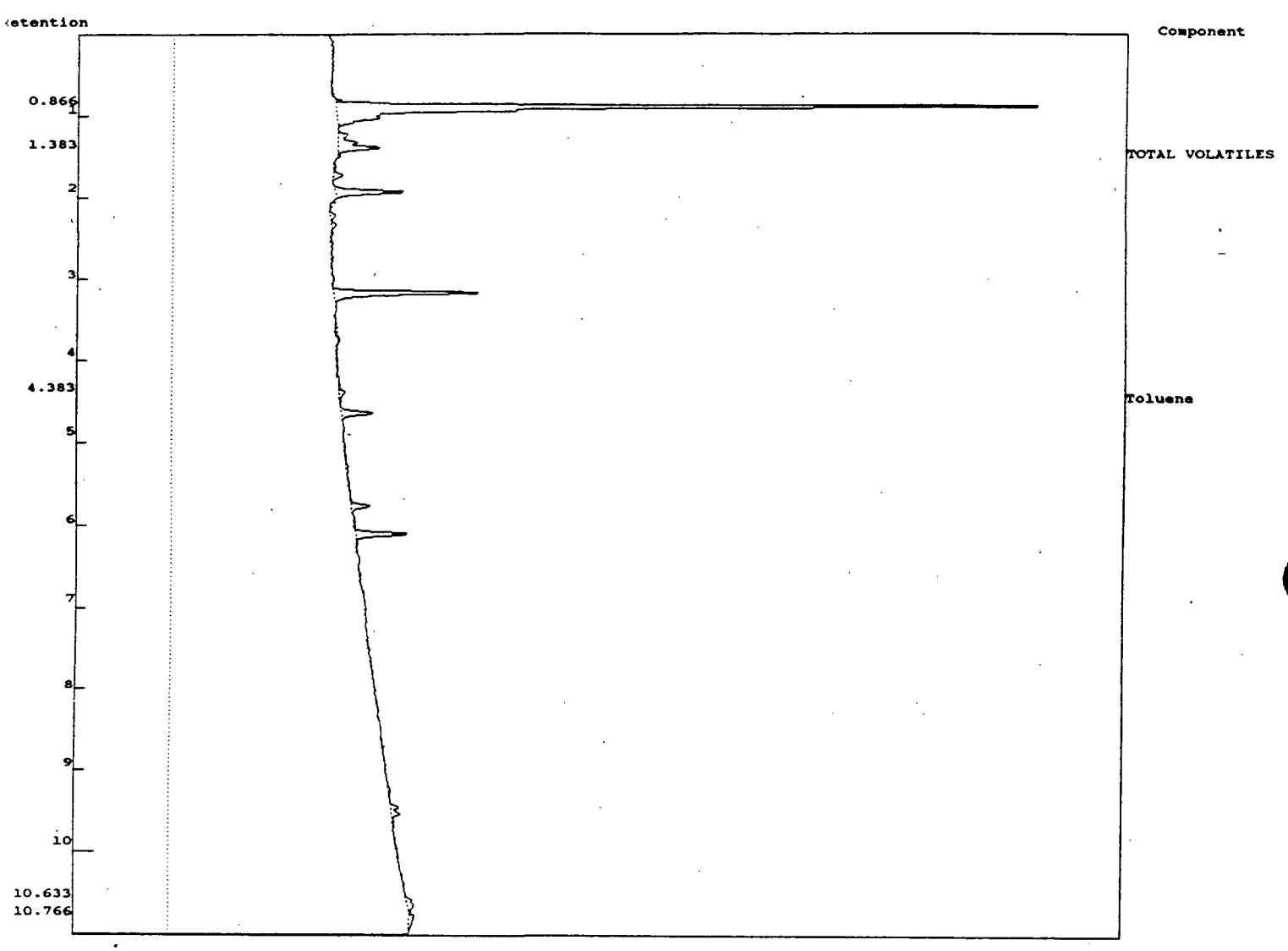
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F36.CHR (A:\)
Sample : SG-804
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	12.61 M	13.27	ug/L
	1		12.61	13.27	

300615

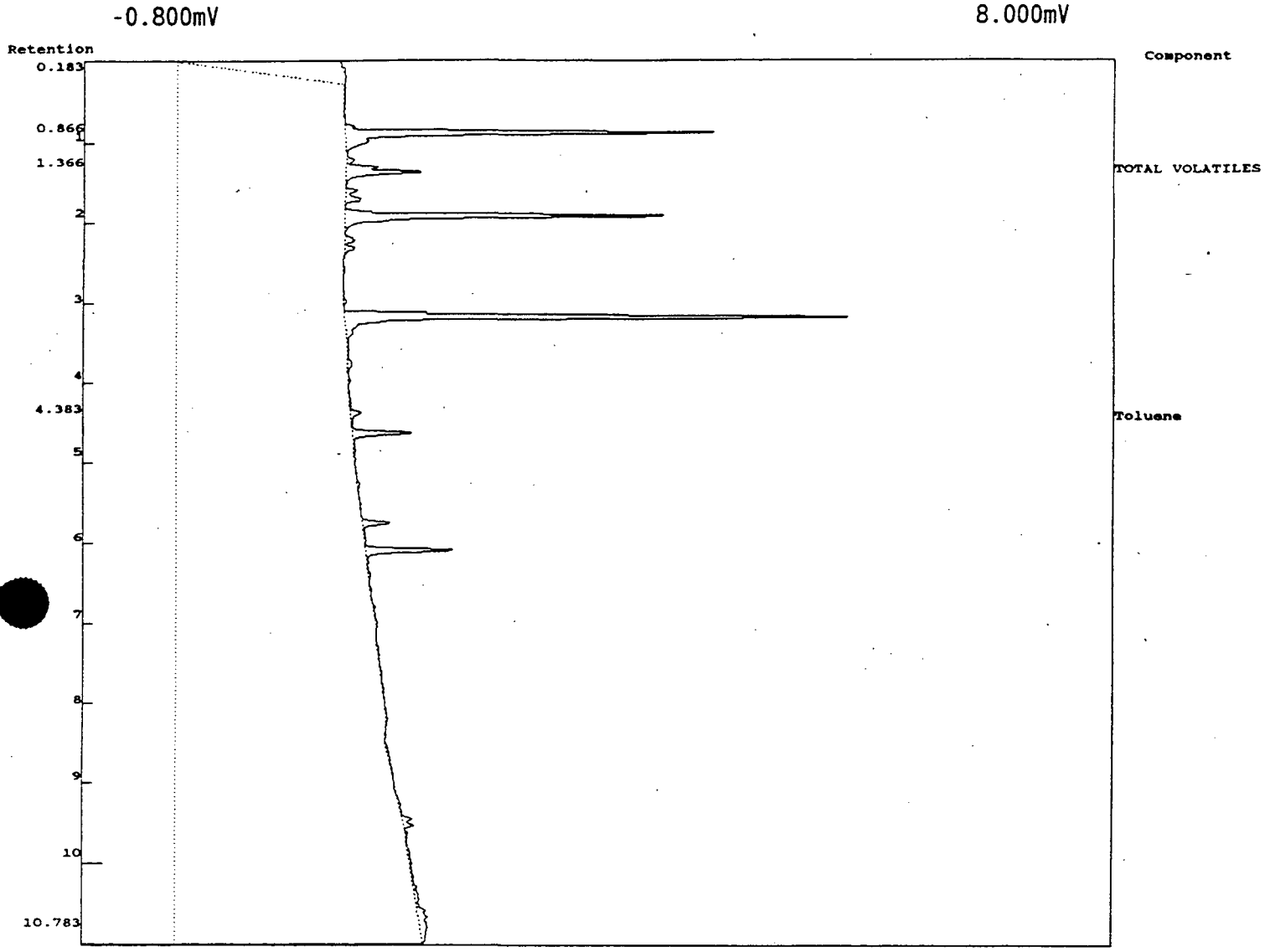
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F37.CHR (A:\)
Sample : SG-105
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	12.69 M	13.35	ug/L
Toluene	3	4.383	0.22 M	0.23	ug/L
	2		12.90	13.58	

300616

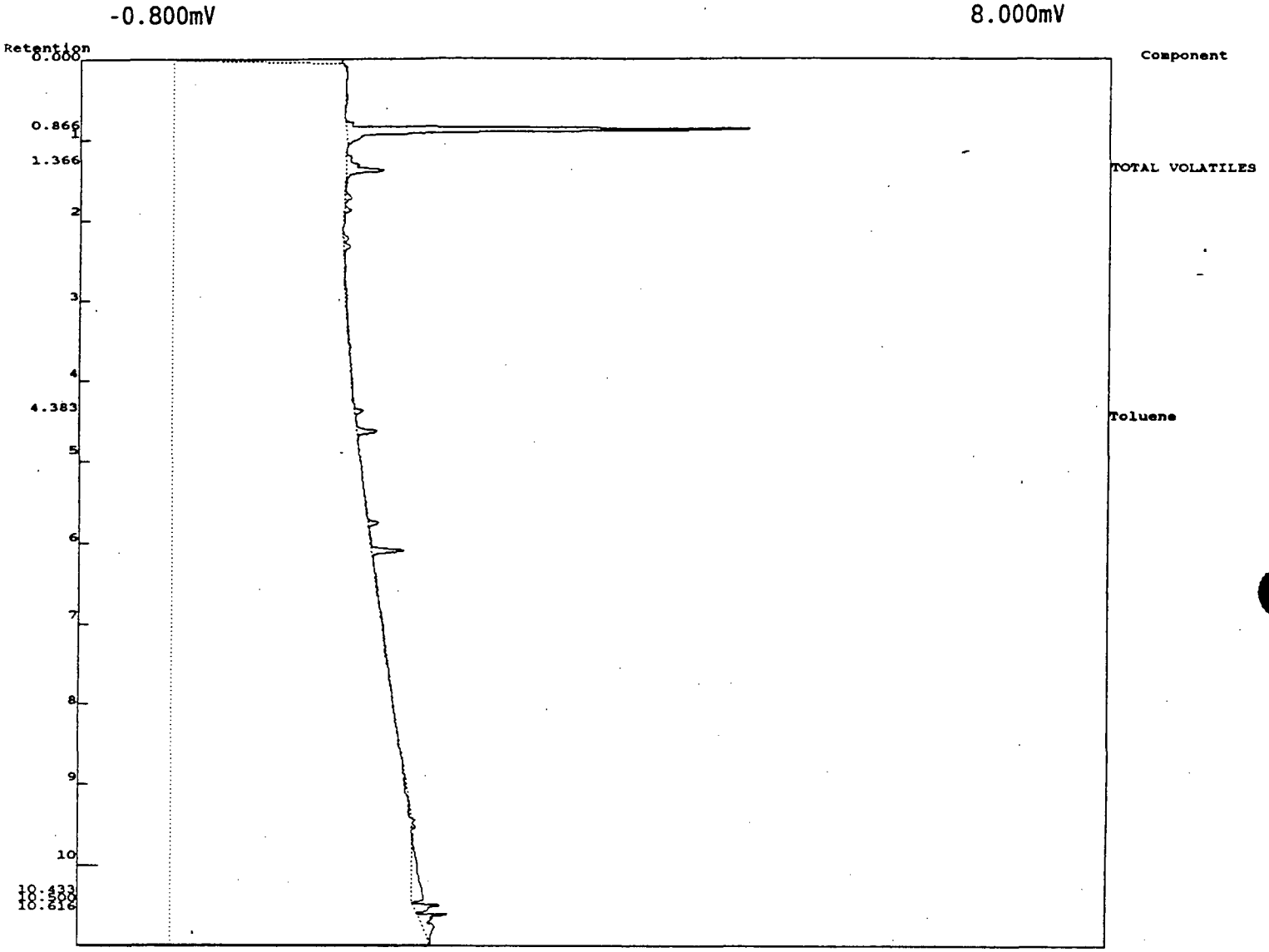
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F38.CHR (A:\)
Sample : SG-106
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	38.06	40.05	ug/L
Toluene	3	4.383	0.50	0.53	ug/L
	2		38.56	40.58	

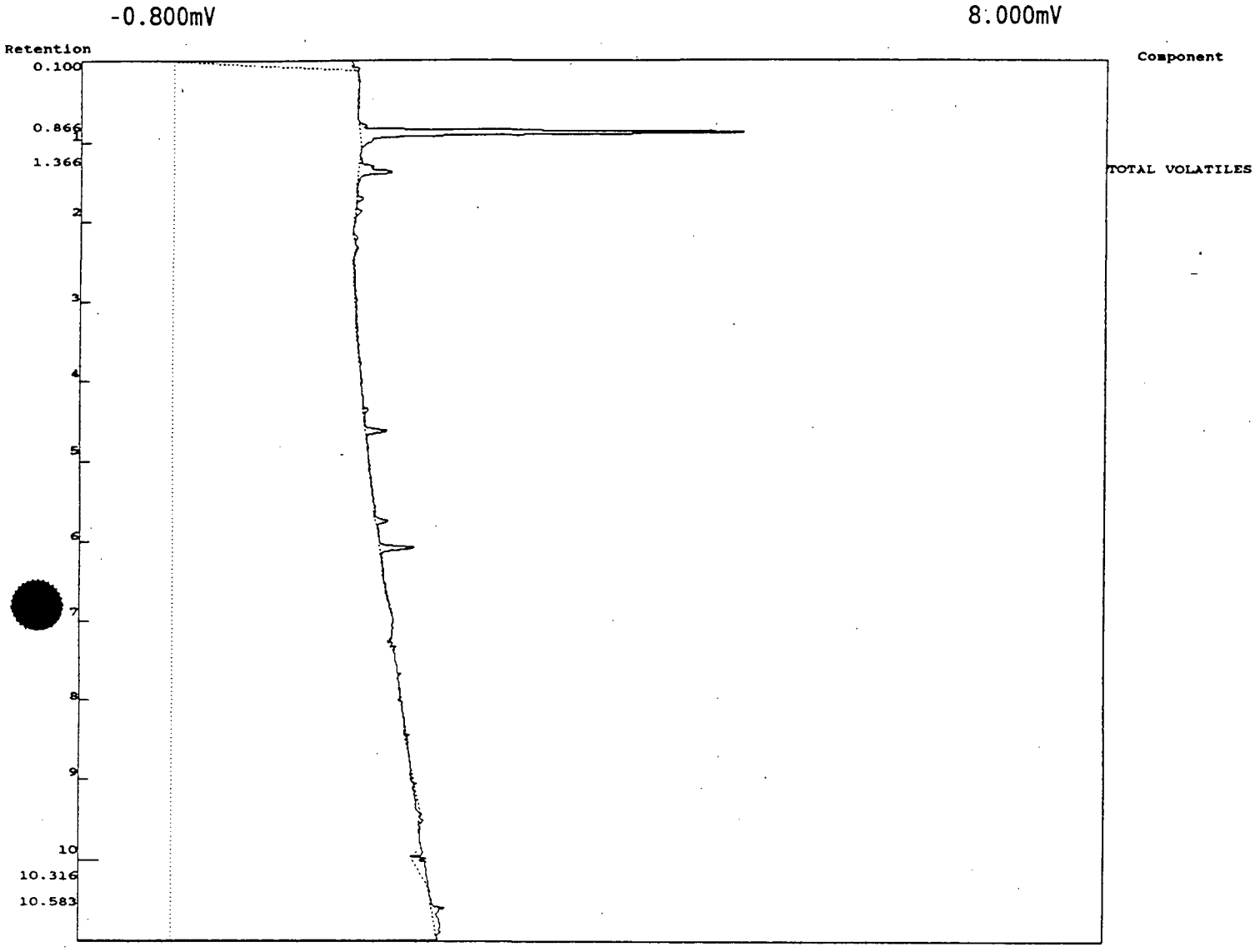
300617

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F39.CHR (A:\)
Sample : EB-07
Operator : SGN



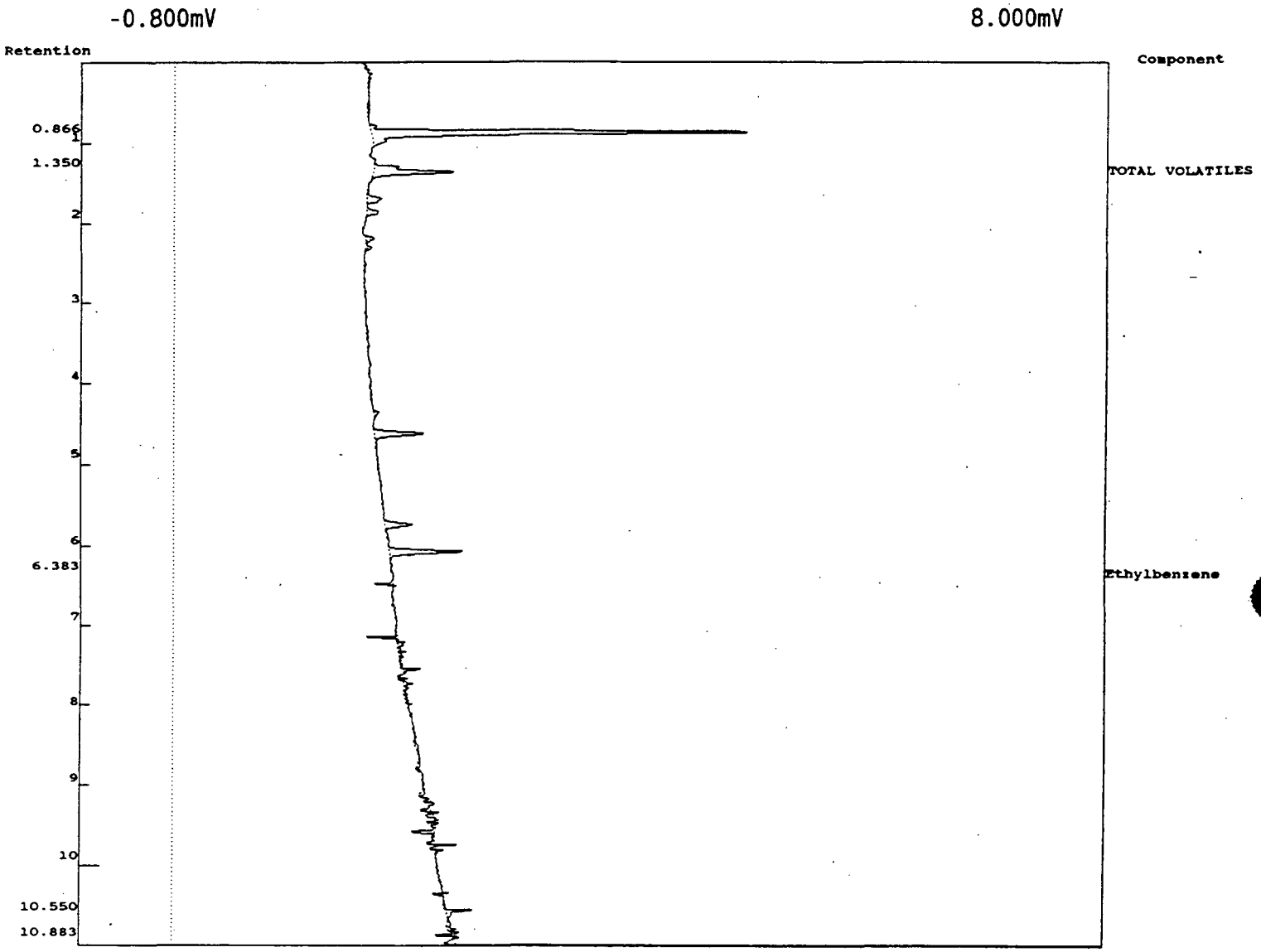
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.98 M	5.24	ug/L
Toluene	3	4.383	0.23 M	0.25	ug/L
	2		5.21	5.49	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F40.CHR (A:\)
Sample : EB-08
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.68	4.92	ug/L
	1		4.68	4.92	

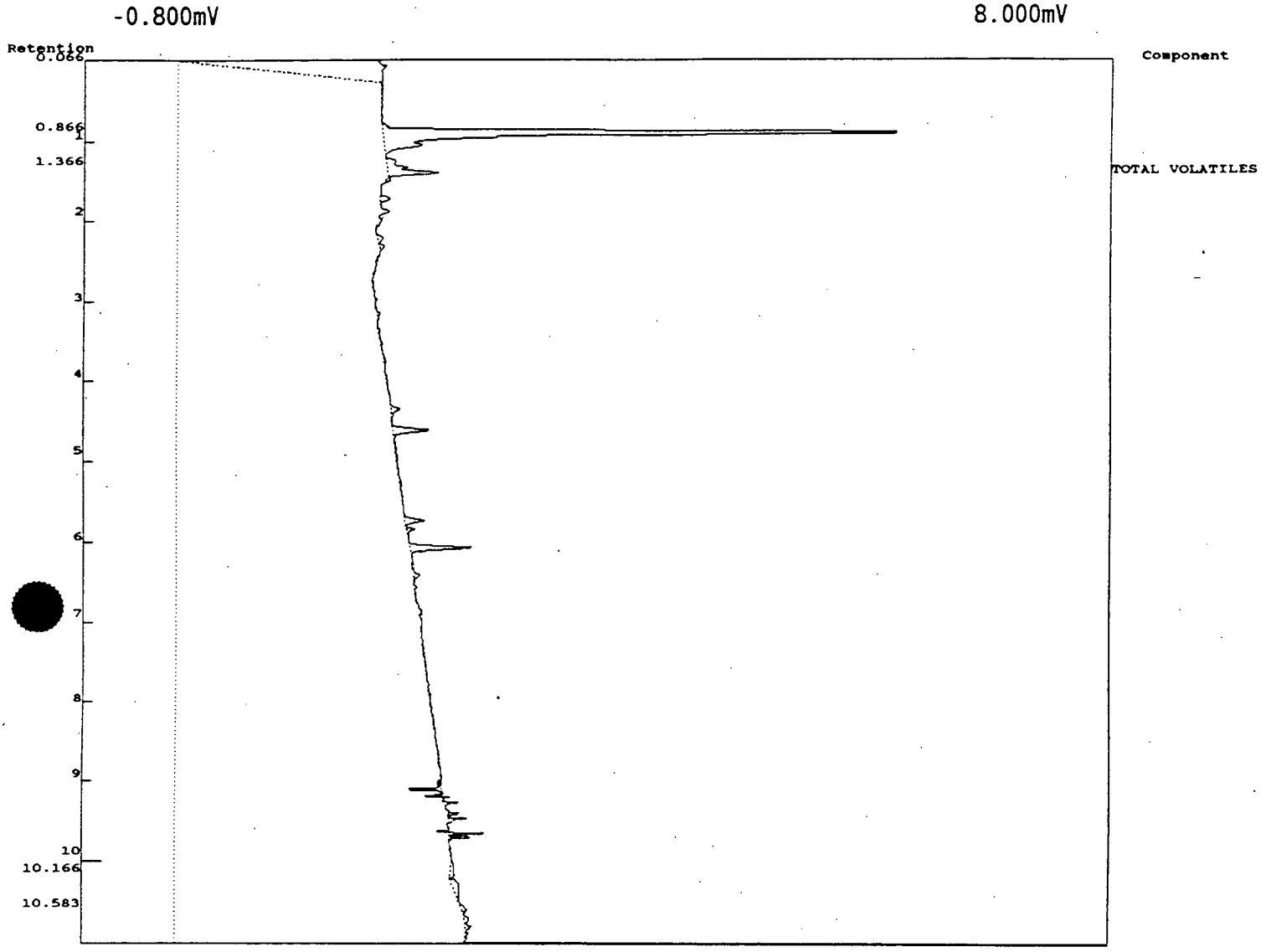
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F41.CHR (A:\)
Sample : EB-09
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	9.15 M	9.63	ug/L
Ethylbenzene	4	6.383	0.54 M	0.67	ug/L
	2		9.69	10.30	

300620

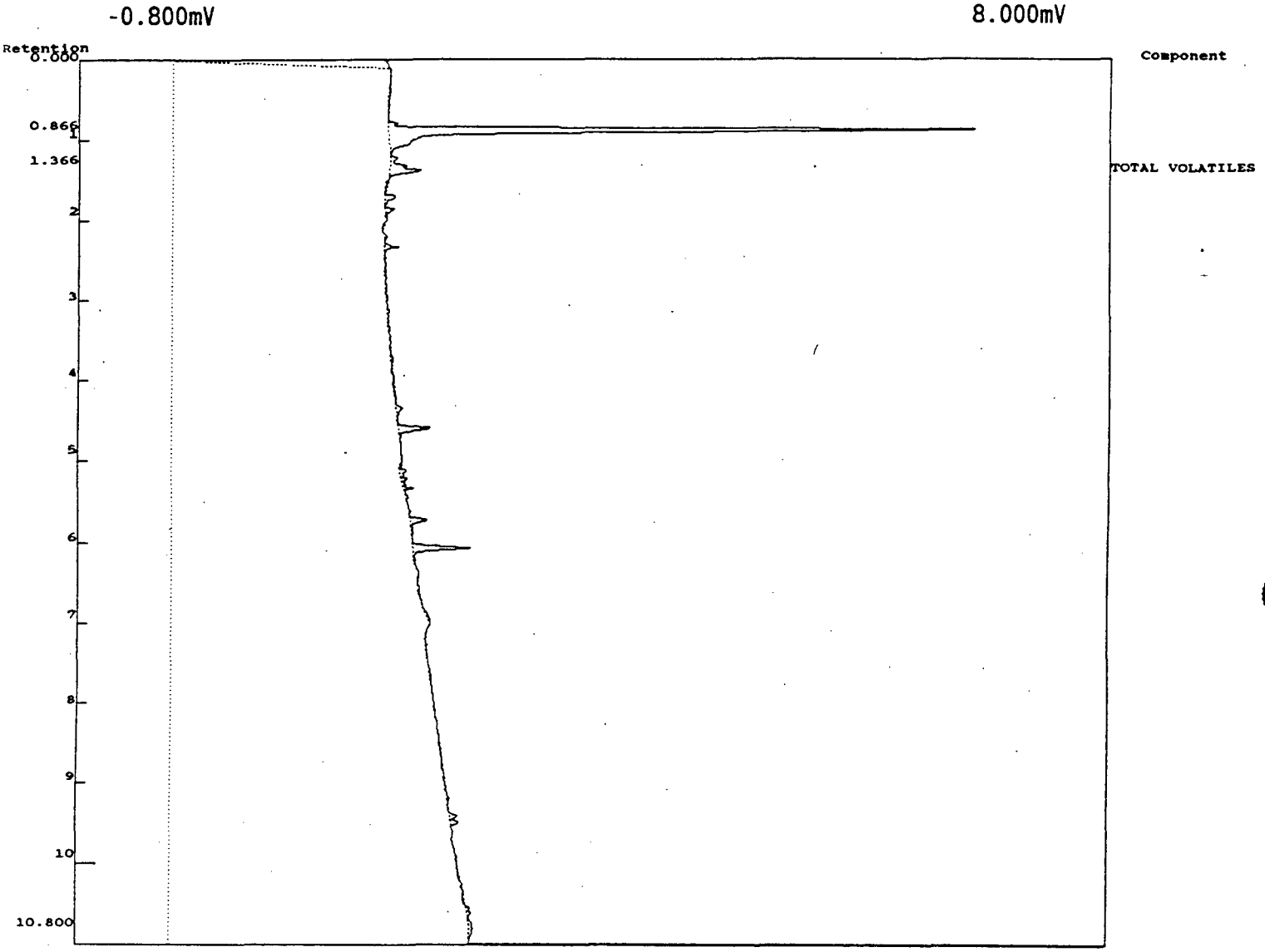
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F42.CHR (A:\)
Sample : SG-021-R
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	6.75 M	7.10	ug/L
	1		6.75	7.10	

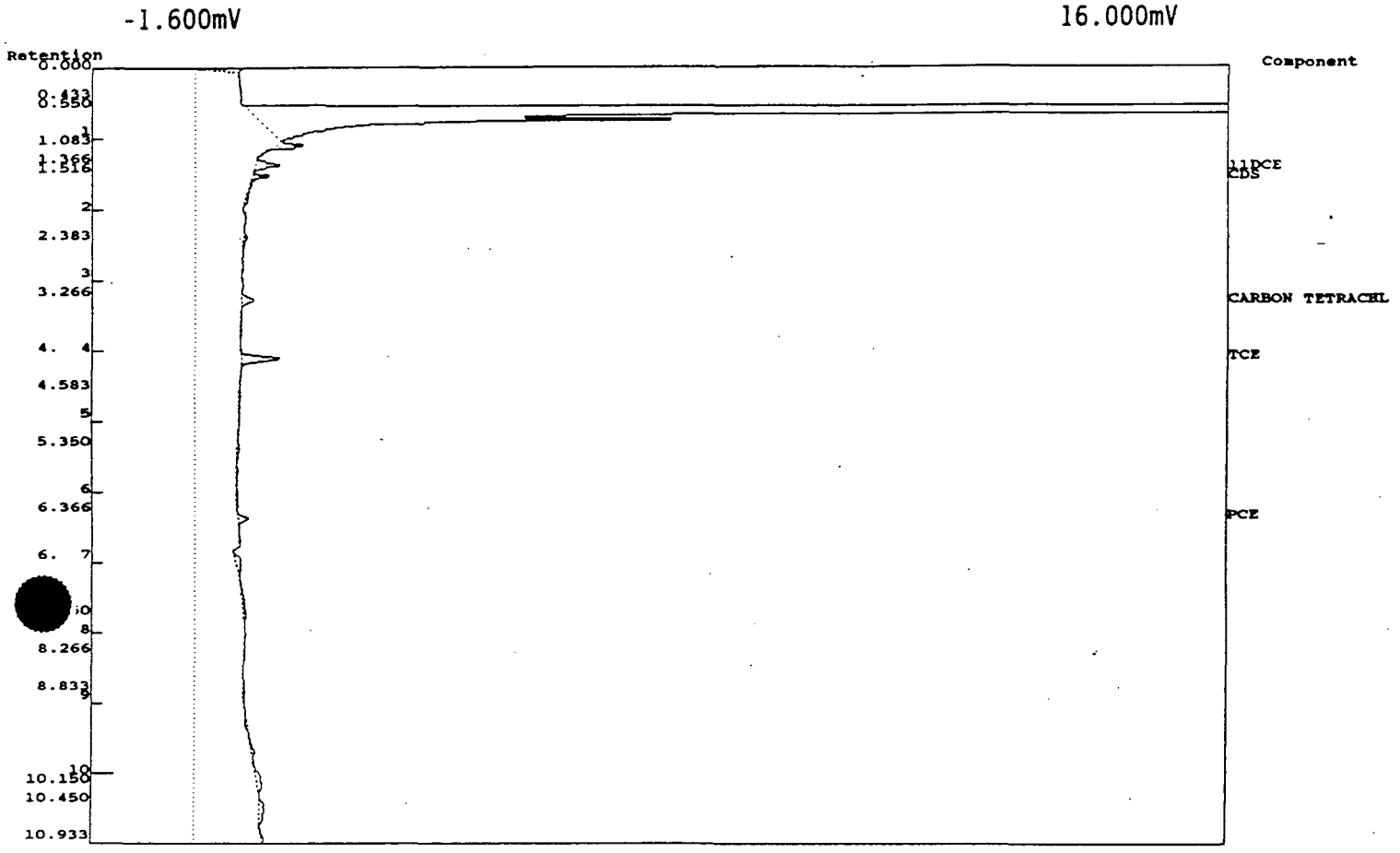
300621

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY25F43.CHR (A:\)
Sample : SG-088-R
Operator : SGN



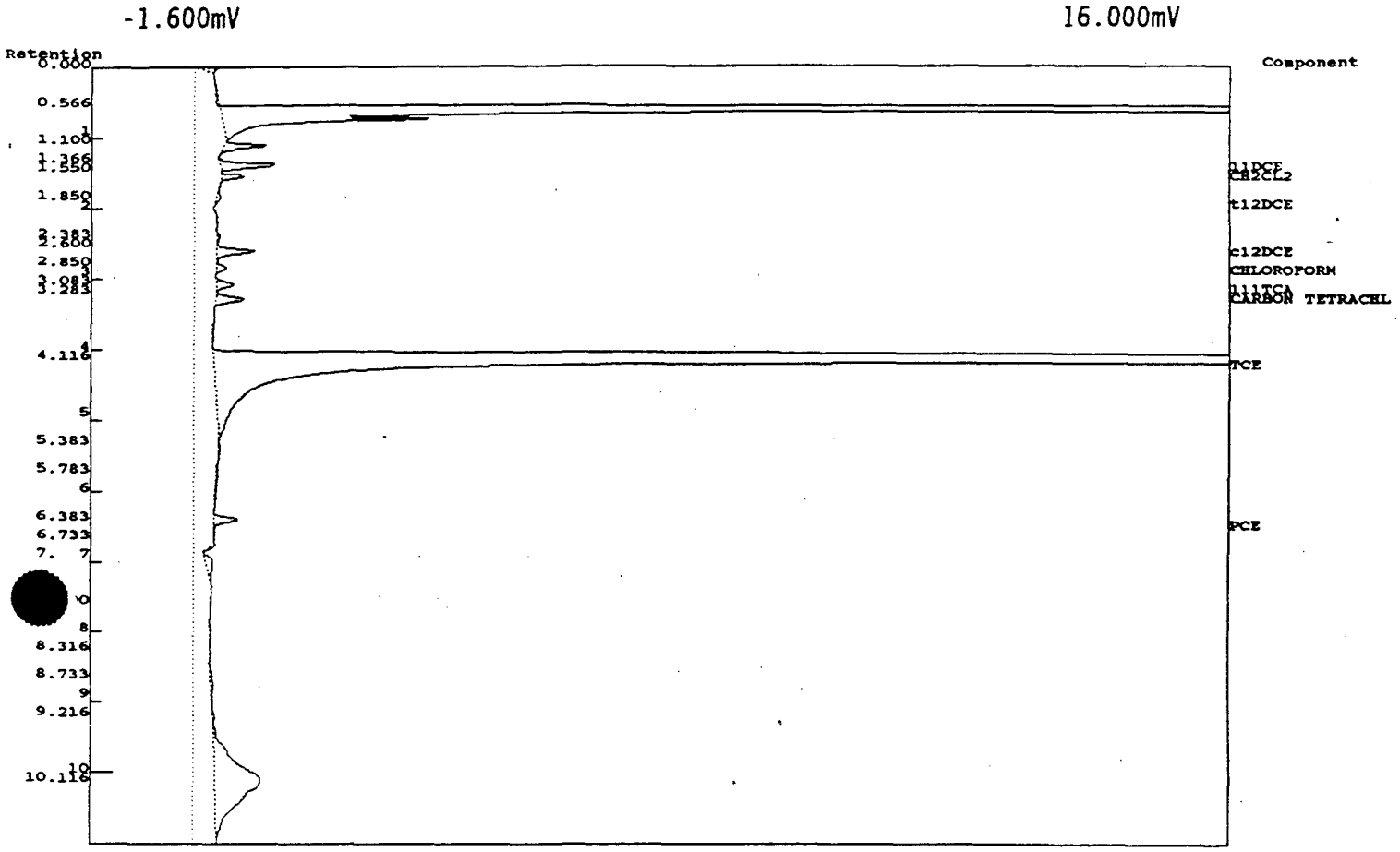
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	6.47 M	6.81	ug/L
1			6.47	6.81	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 10:26:59
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E6.CHR (A:\)
Sample : EB-10
Operator : SGN



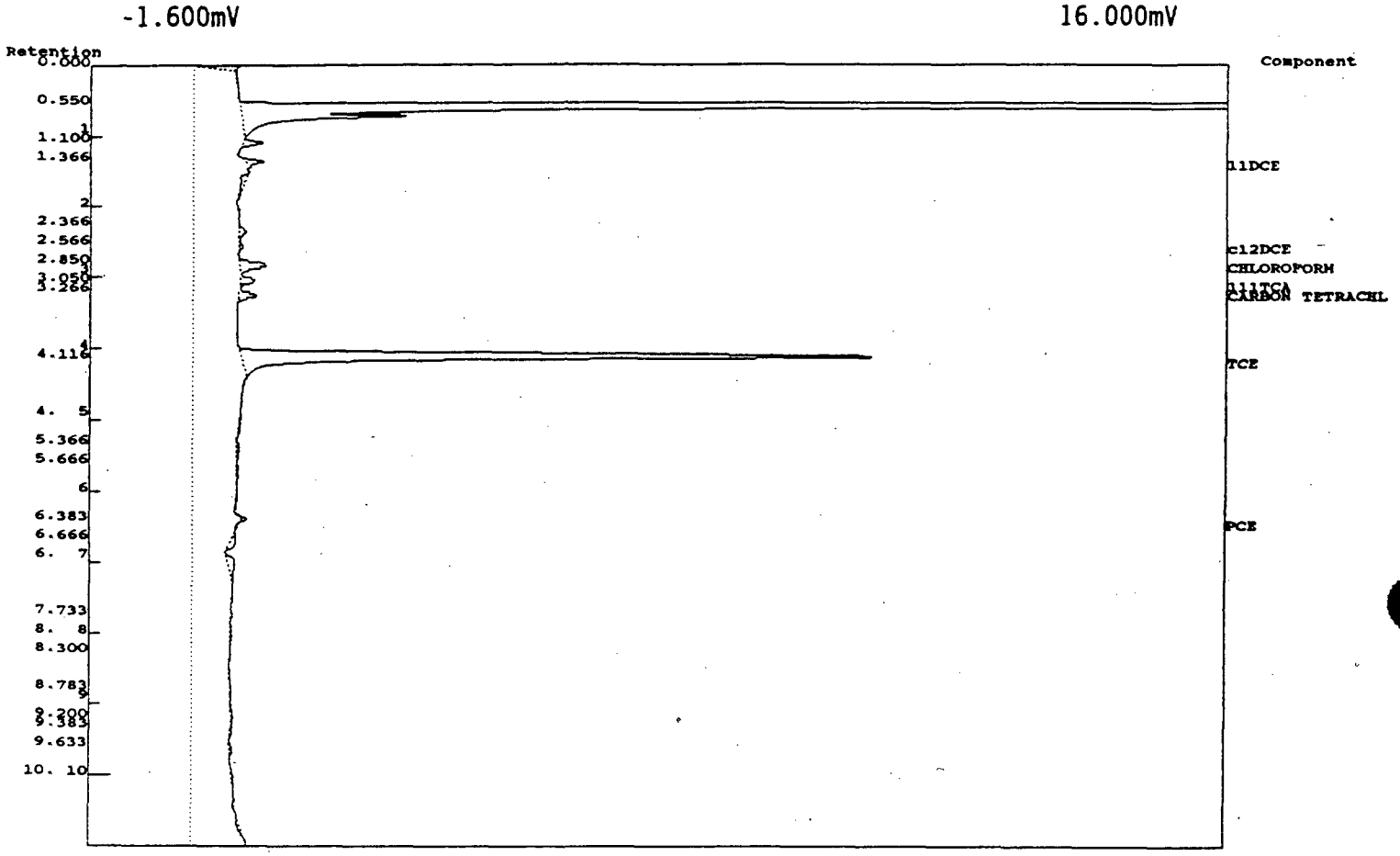
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.84	0.26	ug/L
CDS	0	1.516	1.42 M	N/A	
CARBON TETRACHLORIDE	8	3.266	1.09 M	0.00	ug/L
TCE	9	4.100	3.02 M	0.04	ug/L
PCE	11	6.366	0.74 M	0.00	ug/L
	5		8.11	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 11:36:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E8.CHR (A:\)
Sample : SG-087
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	4.12 M	0.59	ug/L
CH2CL2	2	1.550	1.45 M	1.12	ug/L
t12DCE	3	1.850	0.48 M	0.86	ug/L
c12DCE	5	2.600	2.82 M	7.43	ug/L
CHLOROFORM	6	2.850	0.73 M	0.01	ug/L
111TCA	7	3.083	1.48 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.283	2.44 M	0.00	ug/L
TCE	9	4.116	403.55 M	5.46	ug/L
PCE	11	6.383	1.98 M	0.01	ug/L
	9		419.05	15.48	

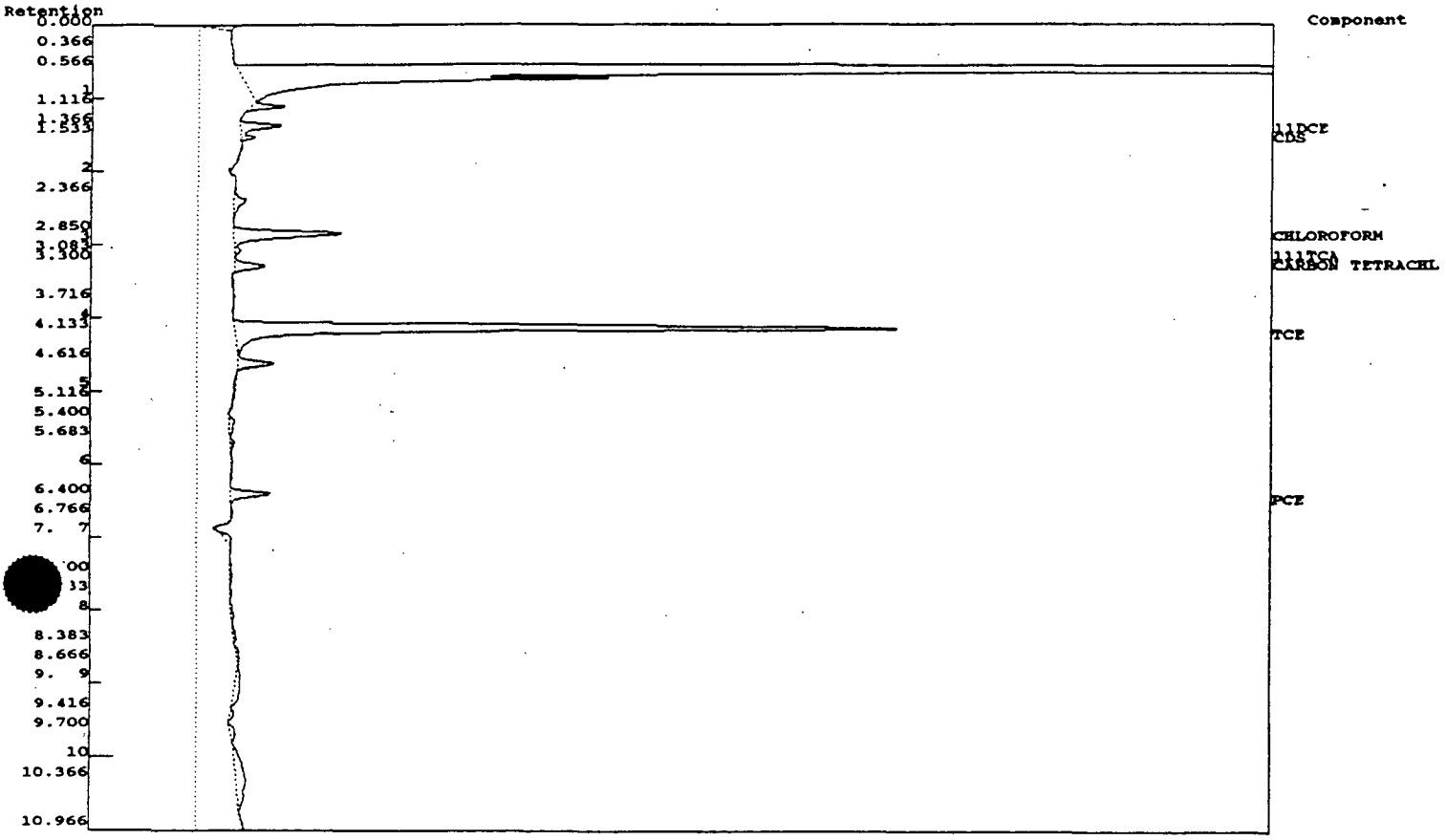
Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 10:51:54
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E7.CHR (A:\)
Sample : SG-086
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.01 M	0.14	ug/L
c12DCE	5	2.566	0.28 M	0.74	ug/L
CHLOROFORM	6	2.850	2.74 M	0.04	ug/L
111TCA	7	3.050	1.19	0.01	ug/L
CARBON TETRACHLORIDE	8	3.266	1.53	0.00	ug/L
TCE	9	4.116	56.35 M	0.76	ug/L
PCE	11	6.383	0.14 M	0.00	ug/L
	7		63.24	1.70	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 12:28:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E10.CHR (A:\)
Sample : SG-091
Operator : SGN

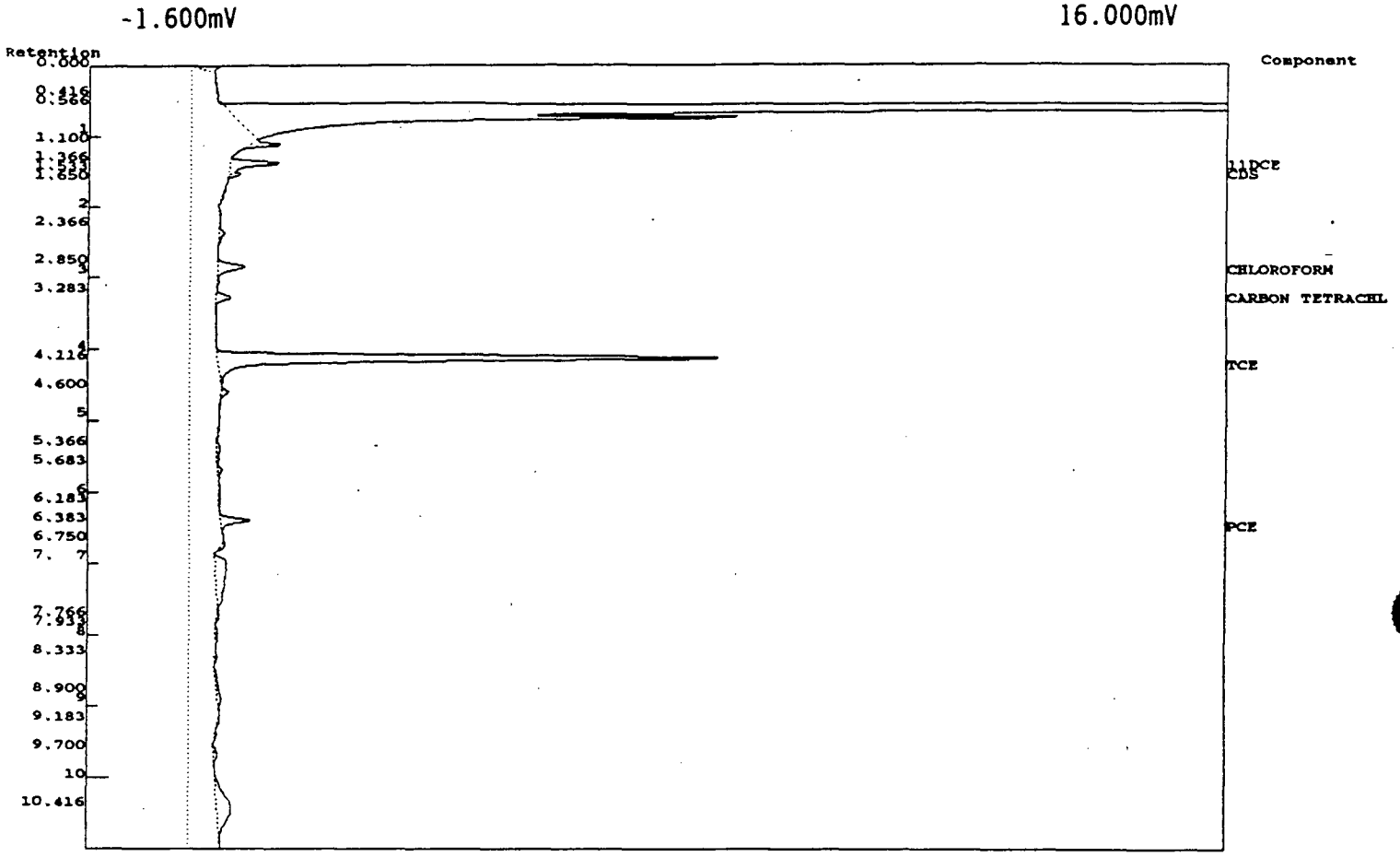
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.12 M	0.44	ug/L
CDS	0	1.533	0.77 M	N/A	
CHLOROFORM	6	2.850	10.09 M	0.16	ug/L
111TCA	7	3.083	0.43 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.300	2.51 M	0.00	ug/L
TCE	9	4.133	56.08 M	0.76	ug/L
PCE	11	6.400	3.30 M	0.01	ug/L
	7		76.31	0.38	

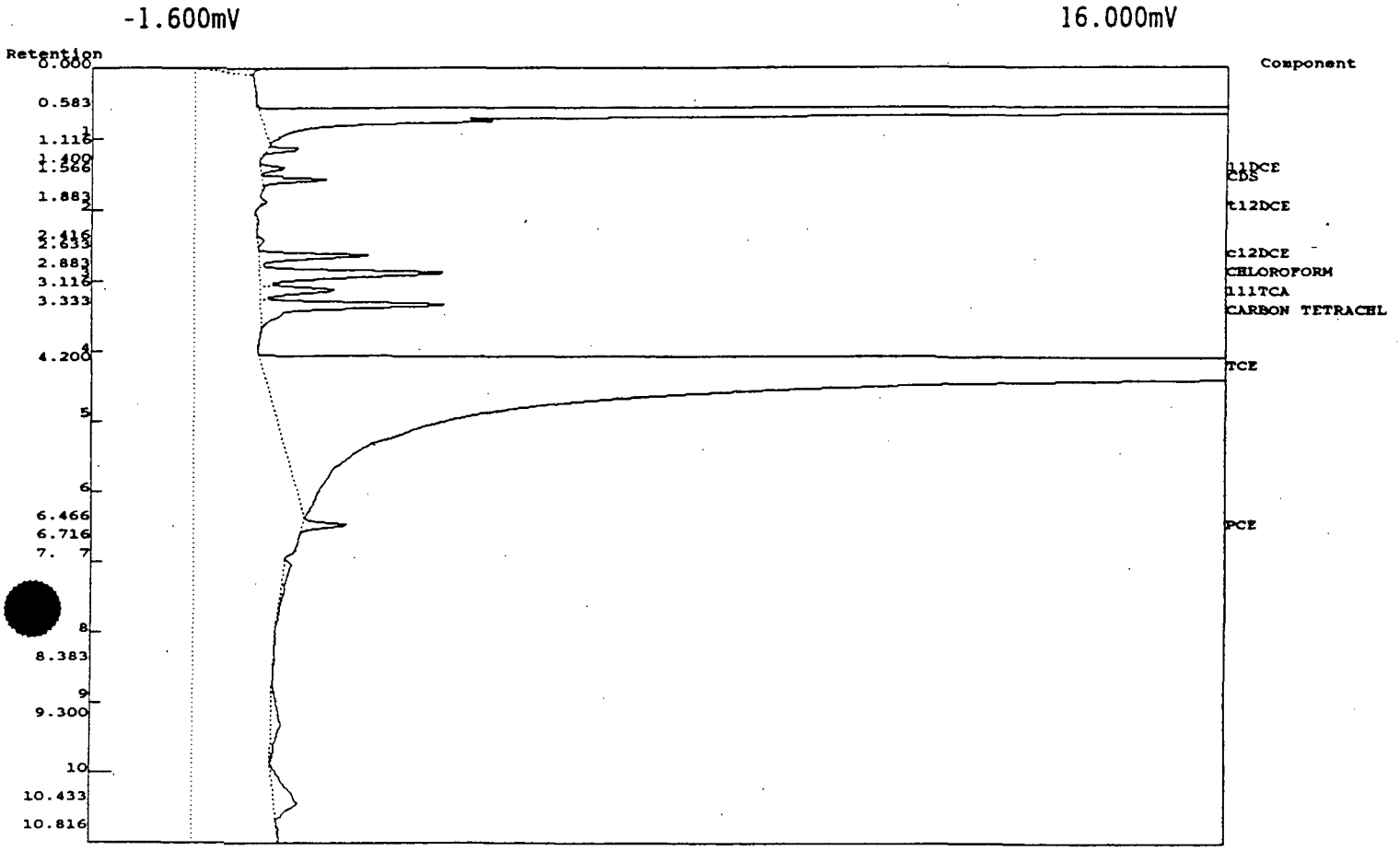
300626

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 12:00:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E9.CHR (A:\)
Sample : SG-085
Operator : SGN



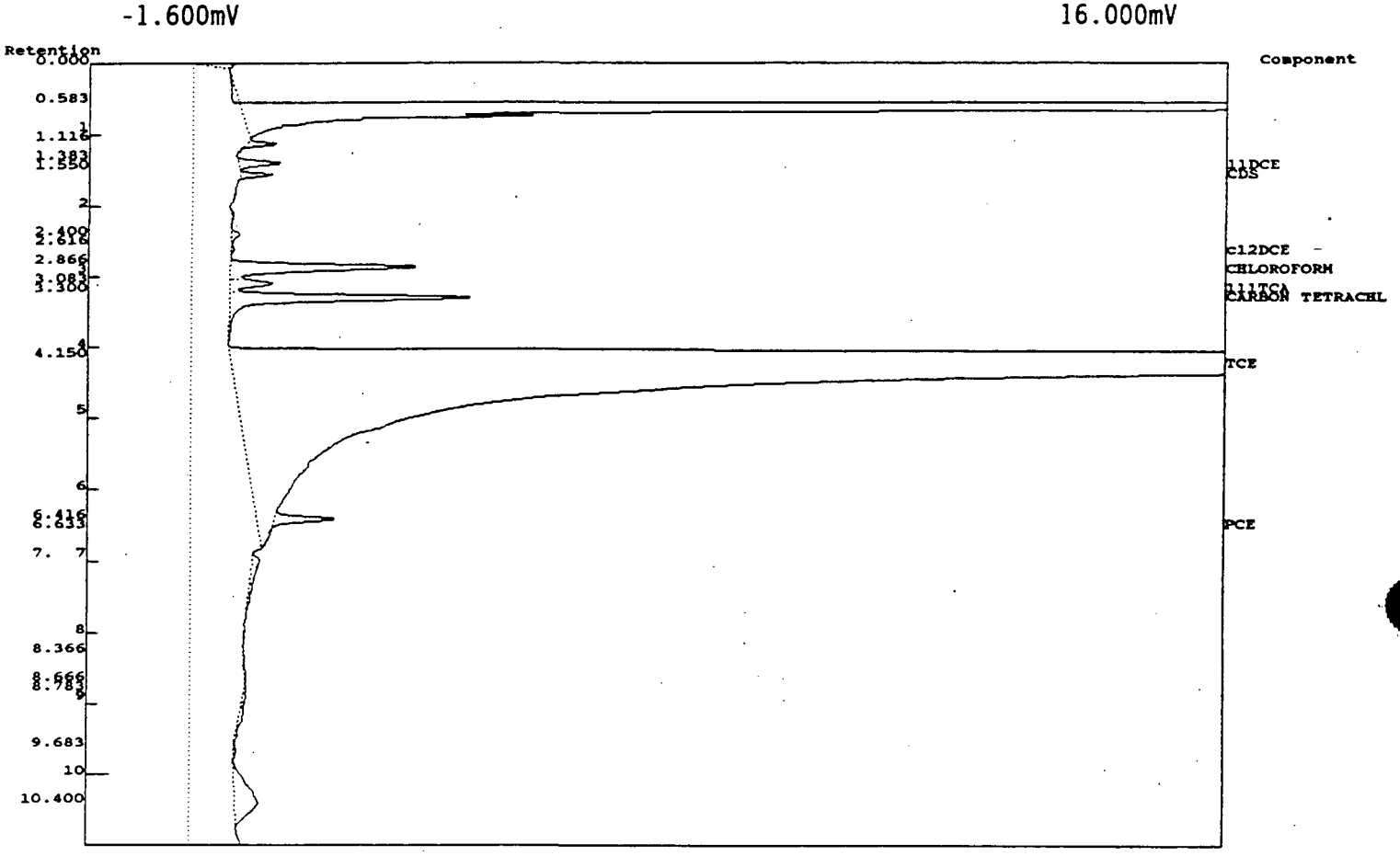
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	4.06 M	0.58	ug/L
CDS	0	1.533	0.71 M	N/A	
CHLOROFORM	6	2.850	2.66 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.283	1.27 M	0.00	ug/L
TCE	9	4.116	44.27 M	0.60	ug/L
PCE	11	6.383	2.43 M	0.01	ug/L
	6		55.39	0.23	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 14:37:33
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E15.CHR (A:\)
Sample : SG-093
Operator : SGN



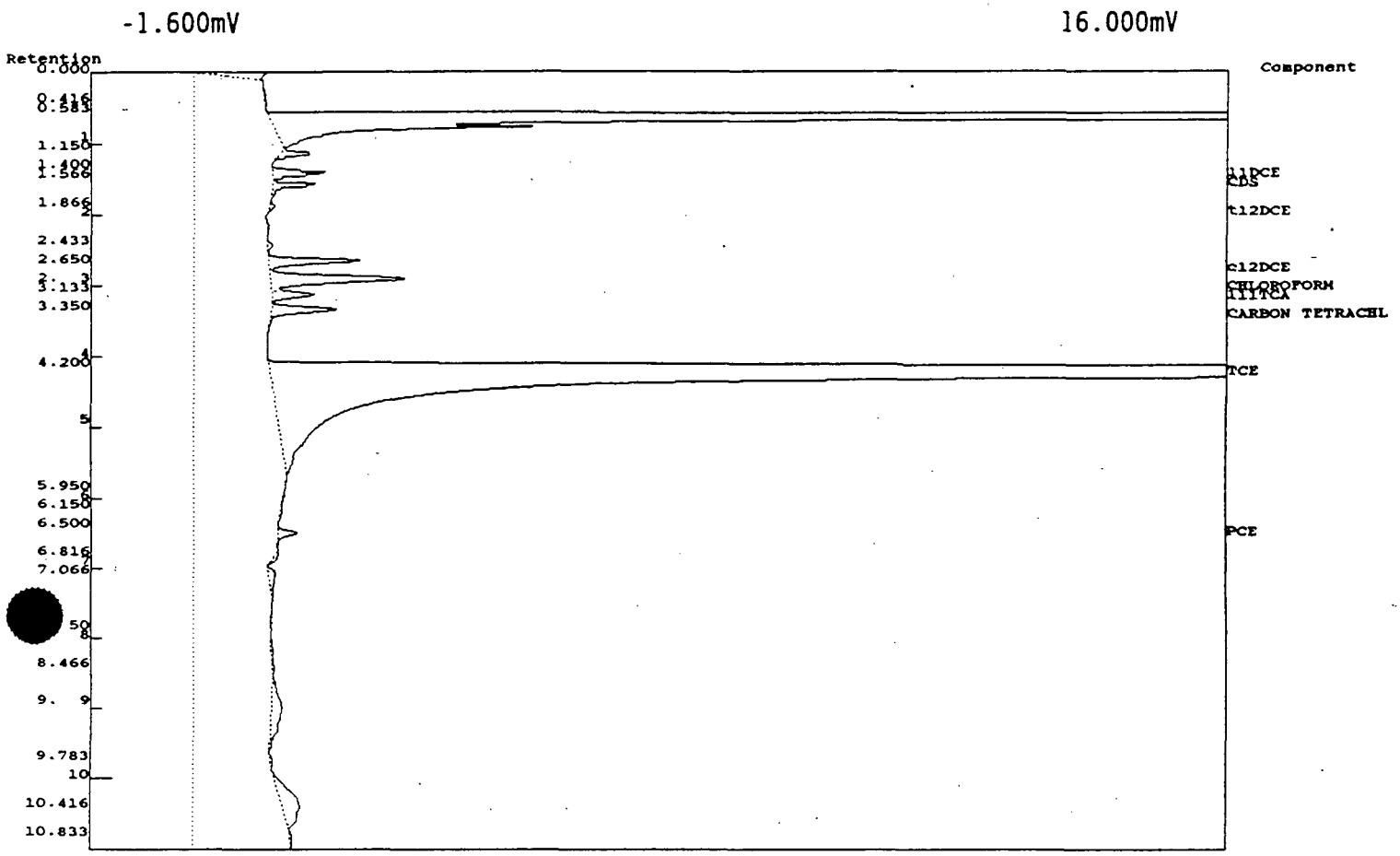
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.72 M	0.24	ug/L
CDS	0	1.566	4.14 M	N/A	
t12DCE	3	1.883	0.23 M	0.41	ug/L
c12DCE	5	2.633	8.93 M	23.56	ug/L
CHLOROFORM	6	2.883	19.80 M	0.31	ug/L
111TCA	7	3.116	7.26 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.333	19.78 M	0.01	ug/L
TCE	9	4.200	4771.93	64.52	ug/L
PCE	11	6.466	3.62 M	0.01	ug/L
	9		4837.42	88.11	

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 12:51:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E11.CHR (A:\)
Sample : SG-092
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	3.08 M	0.44	ug/L
CDS	0	1.550	1.71 M	N/A	
c12DCE	5	2.616	0.20	0.53	ug/L
CHLOROFORM	6	2.866	18.80 M	0.30	ug/L
111TCA	7	3.083	4.32 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.300	24.89 M	0.01	ug/L
TCE	9	4.150	5113.54 M	69.13	ug/L
PCE	11	6.416	4.92 M	0.02	ug/L
	8		**5171.46**	**69.46**	

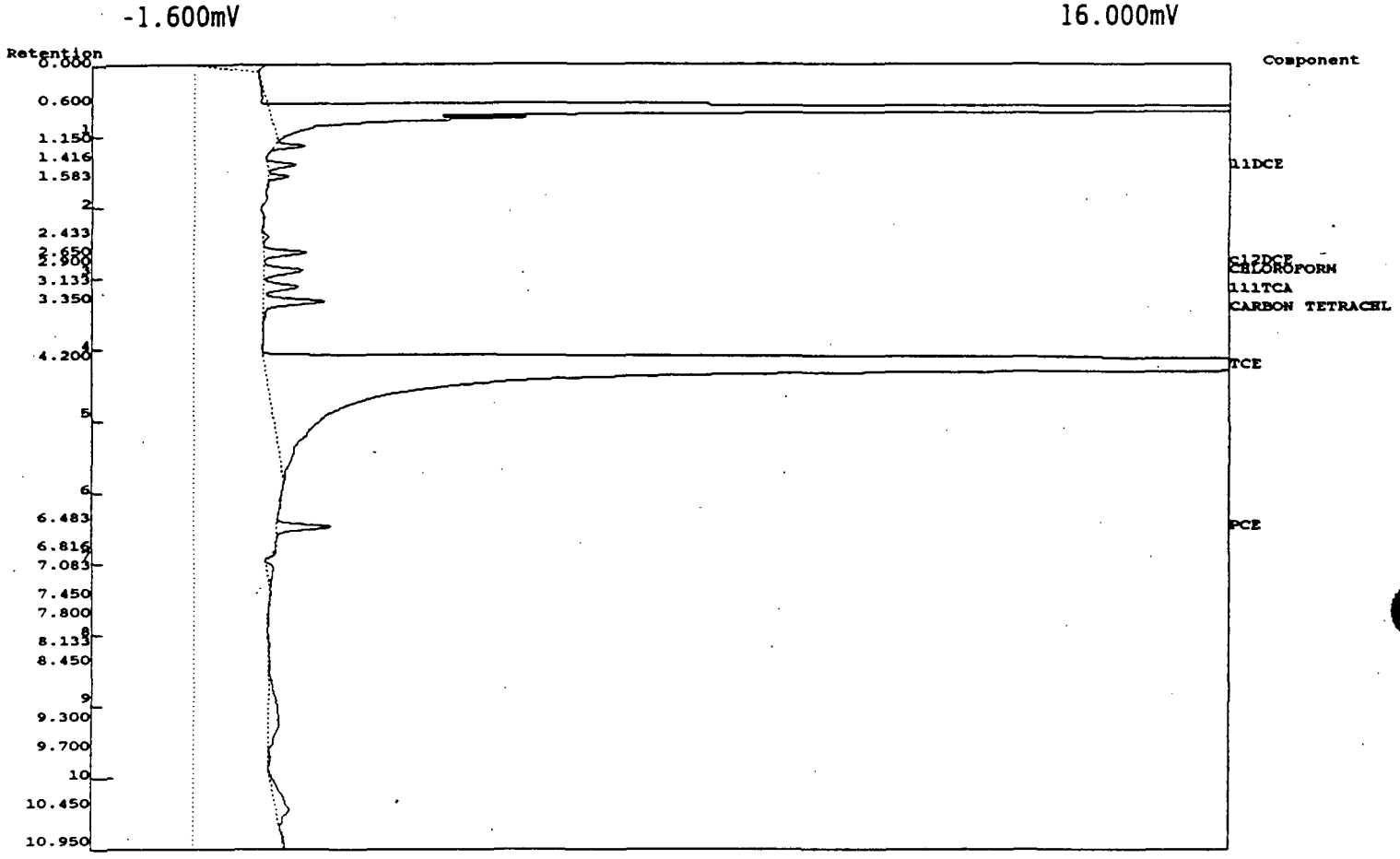
Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 15:43:21
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E17.CHR (A:\)
Sample : SG-098
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	3.93 M	0.56	ug/L
CDS	0	1.566	2.83 M	N/A	
t12DCE	3	1.866	0.43 M	0.77	ug/L
c12DCE	5	2.650	7.27 M	19.18	ug/L
CHLOROFORM	6	2.916	15.10 M	0.24	ug/L
111TCA	7	3.133	3.78 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.350	5.82 M	0.00	ug/L
TCE	9	4.200	1050.89 M	14.21	ug/L
PCE	11	6.500	1.74	0.01	ug/L
	9		1091.79	33.99	

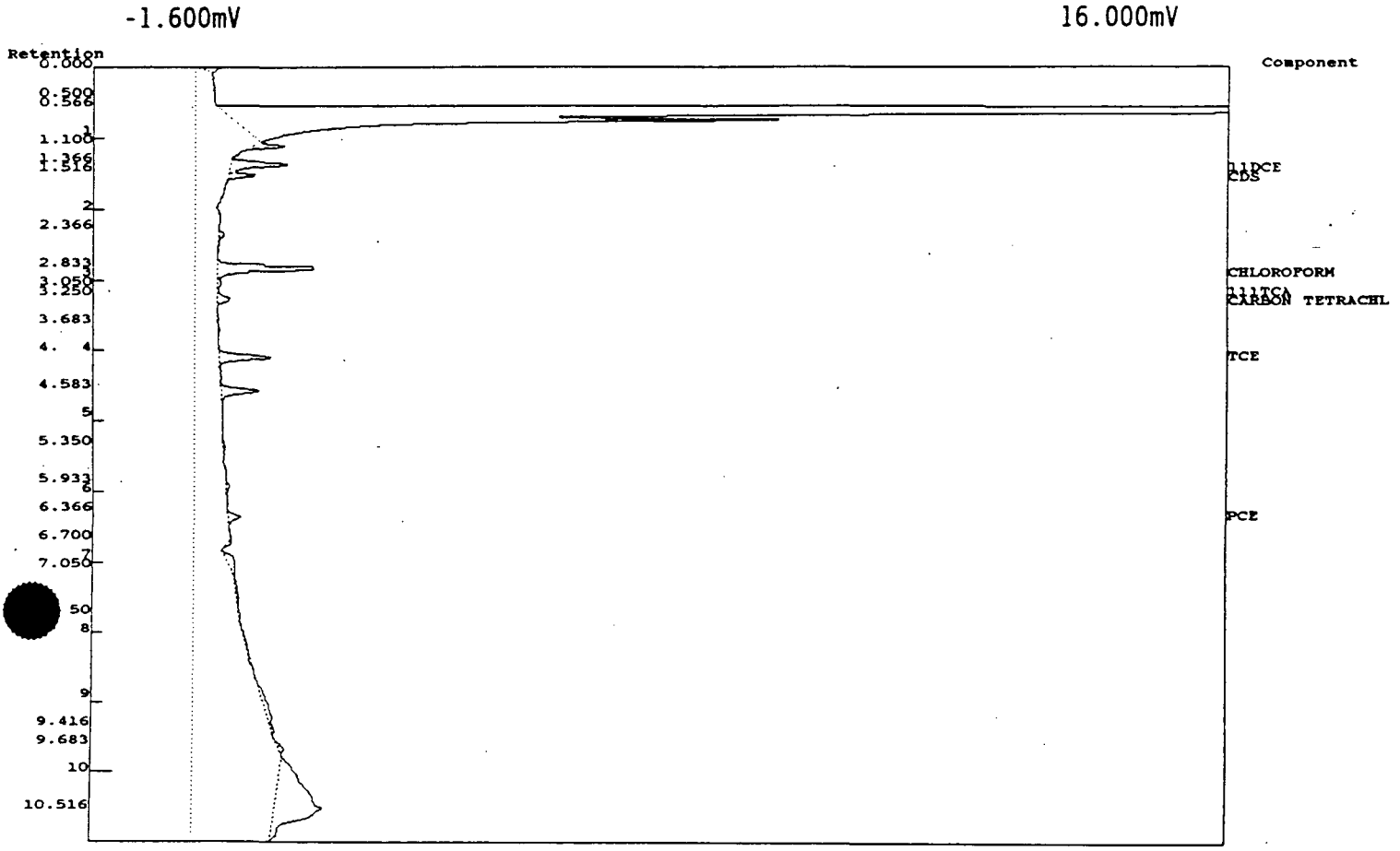
300630

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 15:09:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E16.CHR (A:\)
Sample : SG-097
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.416	2.02	0.29	ug/L
c12DCE	5	2.650	3.37 M	8.88	ug/L
CHLOROFORM	6	2.900	3.94 M	0.06	ug/L
111TCA	7	3.133	3.36 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.350	6.14 M	0.00	ug/L
TCE	9	4.200	1154.42 M	15.61	ug/L
PCE	11	6.483	4.63 M	0.02	ug/L
	7		1177.88	24.88	

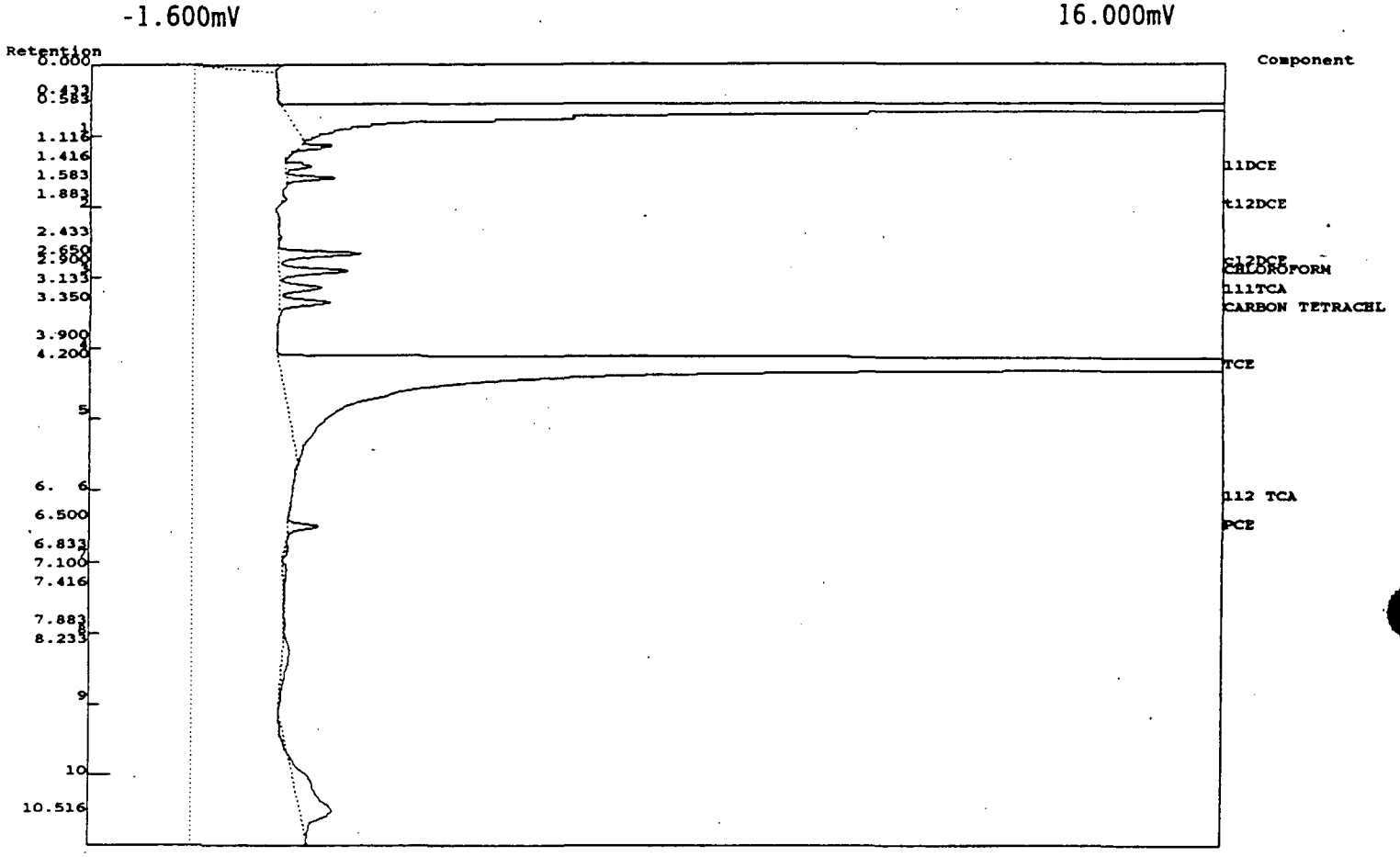
Lab name : COLUMBIA TECH
Analysis date : 05/27/2000 16:21:30
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E19.CHR (A:\)
Sample : SG-079
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	4.46 M	0.63	ug/L
CDS	0	1.516	1.68 M	N/A	
CHLOROFORM	6	2.833	9.08 M	0.14	ug/L
111TCA	7	3.050	0.42 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	1.35 M	0.00	ug/L
TCE	9	4.100	4.30 M	0.06	ug/L
PCE	11	6.366	1.09 M	0.00	ug/L
	7		22.38	N/A	

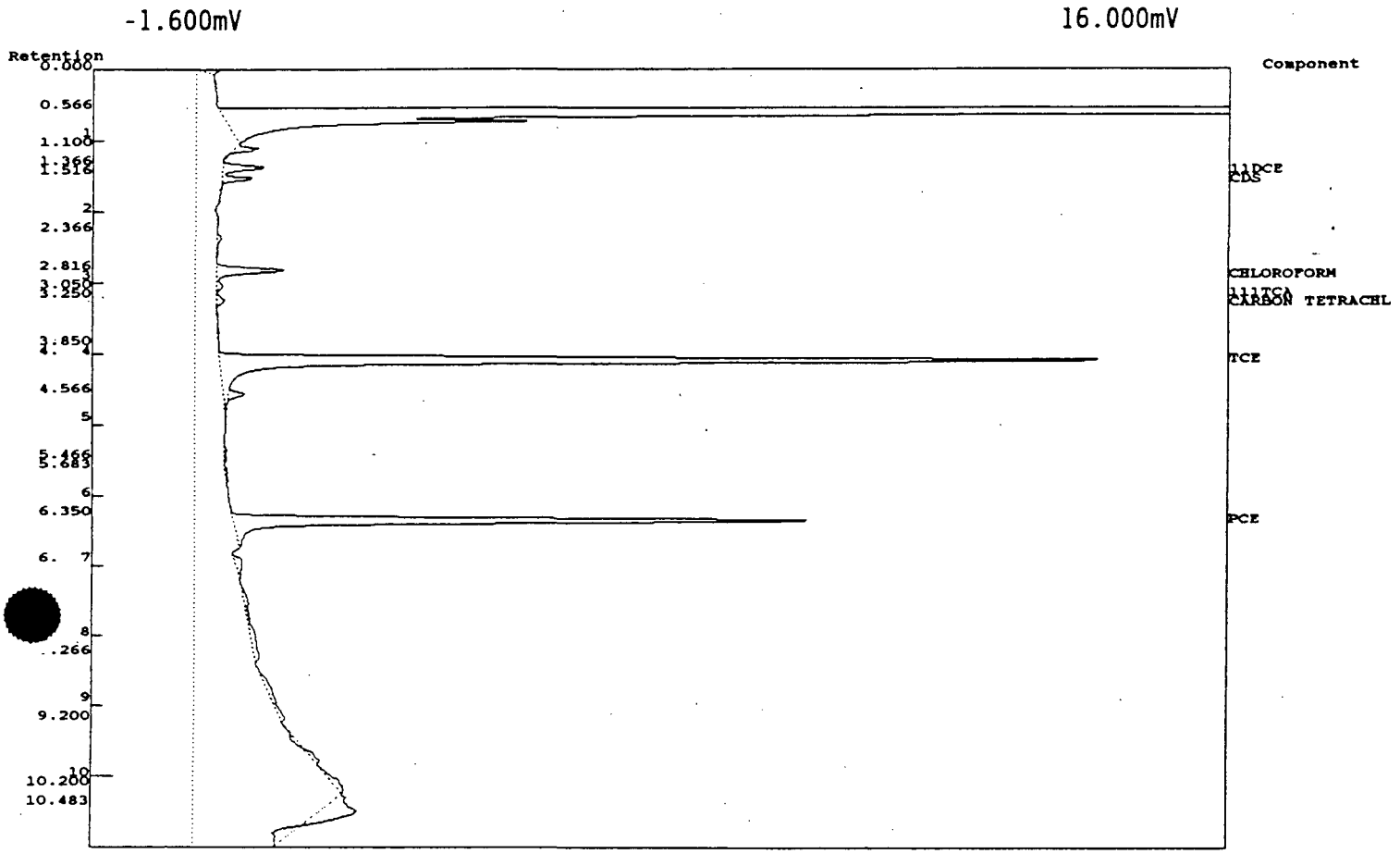
300632

Lab name : COLUMBIA TECH
Analysis date : 05/26/2000 16:35:04
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E18.CHR (A:\)
Sample : SG-099
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.416	2.01 M	0.29	ug/L
t12DCE	3	1.883	0.17 M	0.30	ug/L
c12DCE	5	2.650	6.76 M	17.84	ug/L
CHLOROFORM	6	2.900	6.30 M	0.10	ug/L
111TCA	7	3.133	4.07 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.350	4.67 M	0.00	ug/L
TCE	9	4.200	1121.98 M	15.17	ug/L
112 TCA	10	6.050	0.15 M	0.01	ug/L
PCE	11	6.500	2.63	0.01	ug/L
	9		1148.74	33.75	

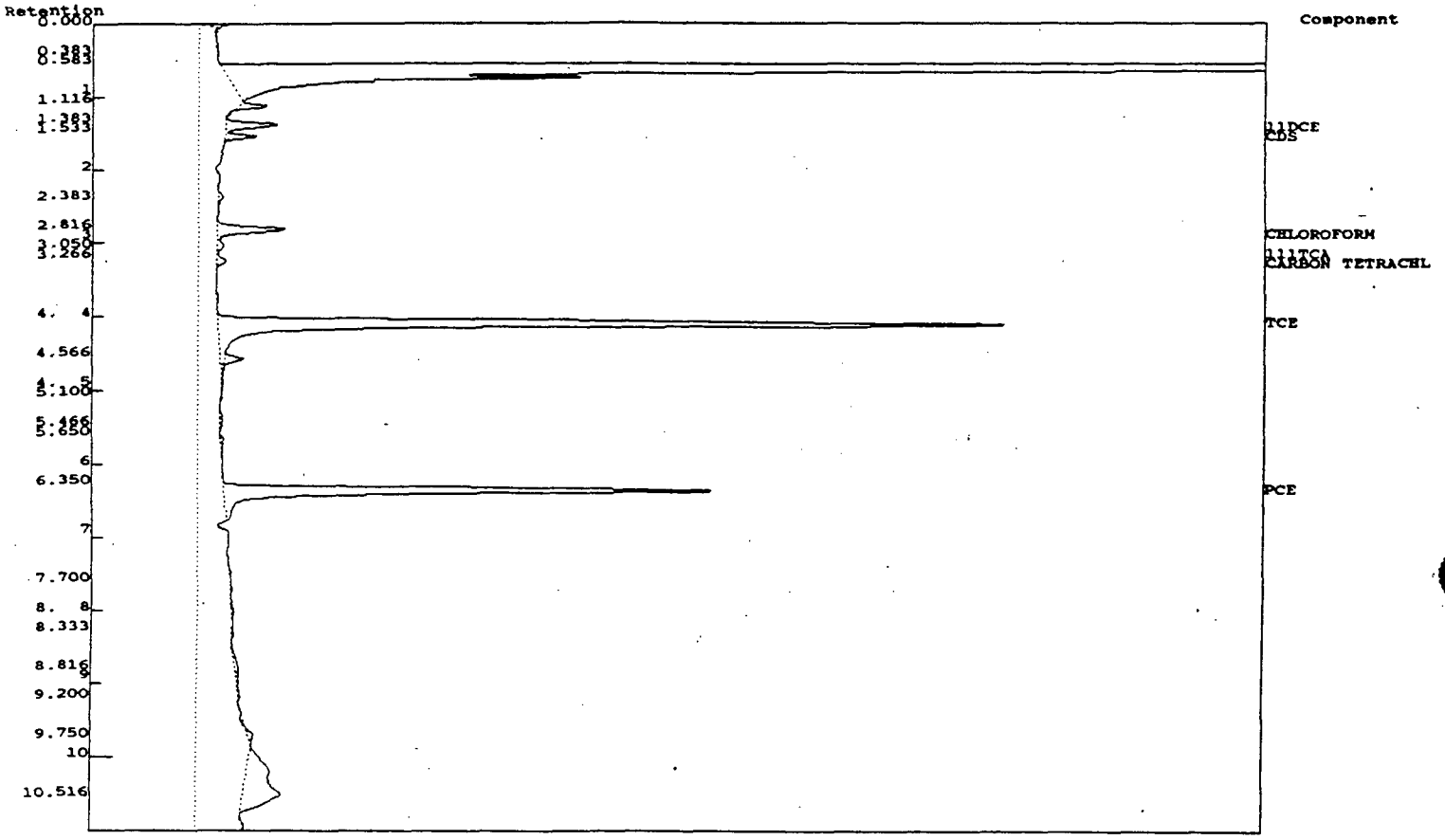
Lab name : COLUMBIA TECH
Analysis date : 05/27/2000 16:41:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E20.CHR (A:\)
Sample : SG-090
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.23 M	0.46	ug/L
CDS	0	1.516	1.89 M	N/A	
CHLOROFORM	6	2.816	5.86 M	0.09	ug/L
111TCA	7	3.050	0.69 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	0.76 M	0.00	ug/L
TCE	9	4.083	82.39 M	1.11	ug/L
PCE	11	6.350	50.71 M	0.21	ug/L
	7		145.53	0.88	

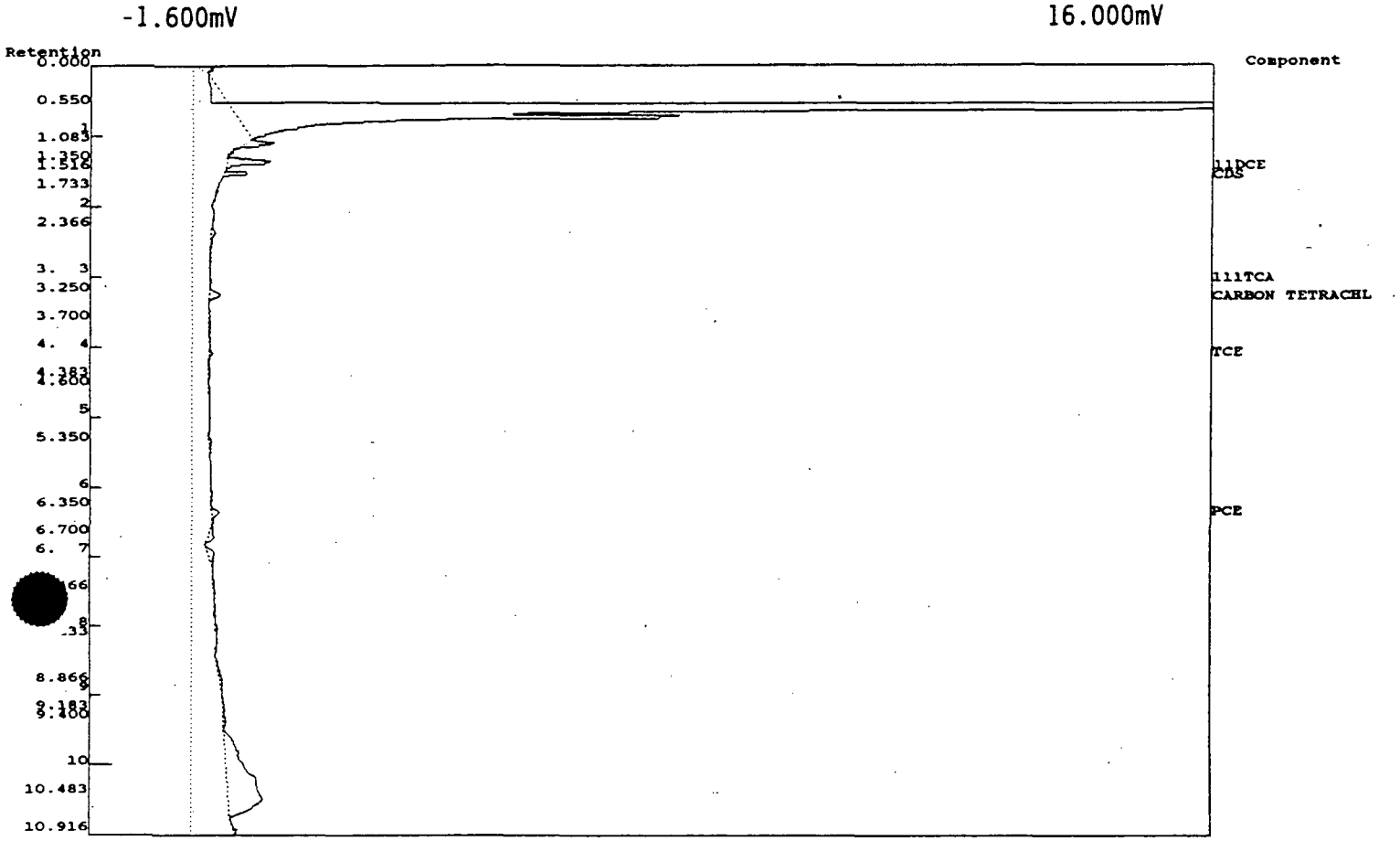
Lab name : COLUMBIA TECH
Analysis date : 05/27/2000 17:00:52
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E21.CHR (A:\)
Sample : SG-990
Operator : SGN

-1.600mV 16.000mV



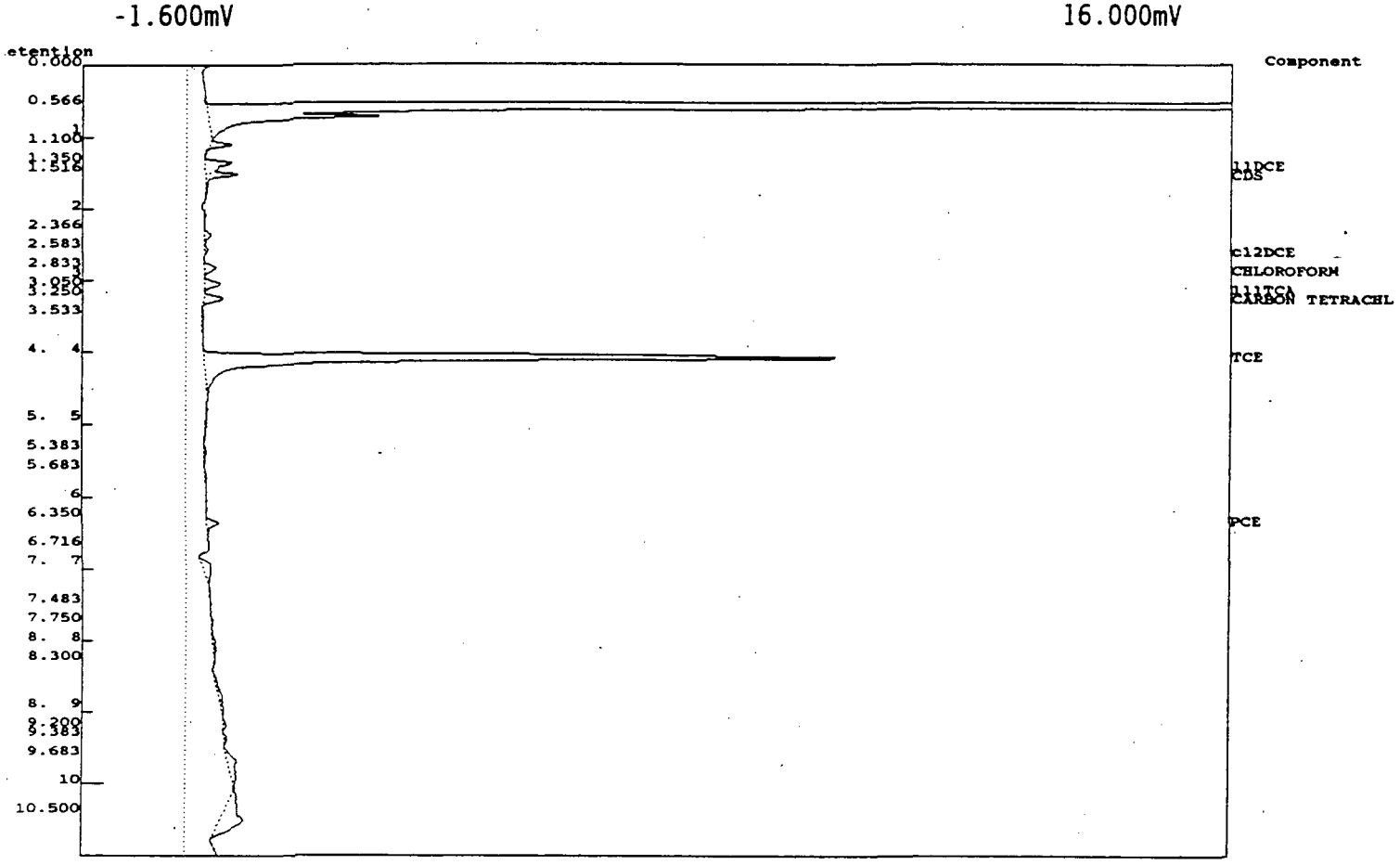
Component	Number	Retention	Area	External	Units
1DCE	1	1.383	3.81 M	0.54	ug/L
DS	0	1.533	1.84 M	N/A	
HLOROFORM	6	2.816	5.75 M	0.09	ug/L
11TCA	7	3.050	0.72 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.266	0.85 M	0.00	ug/L
CE	9	4.100	71.06 M	0.96	ug/L
CE	11	6.350	42.99 M	0.17	ug/L
	7		**127.02**	**0.77**	

Lab name : COLUMBIA TECH
Analysis date : 05/27/2000 17:20:36
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E22.CHR (A:\)
Sample : EB-11
Operator : SGN



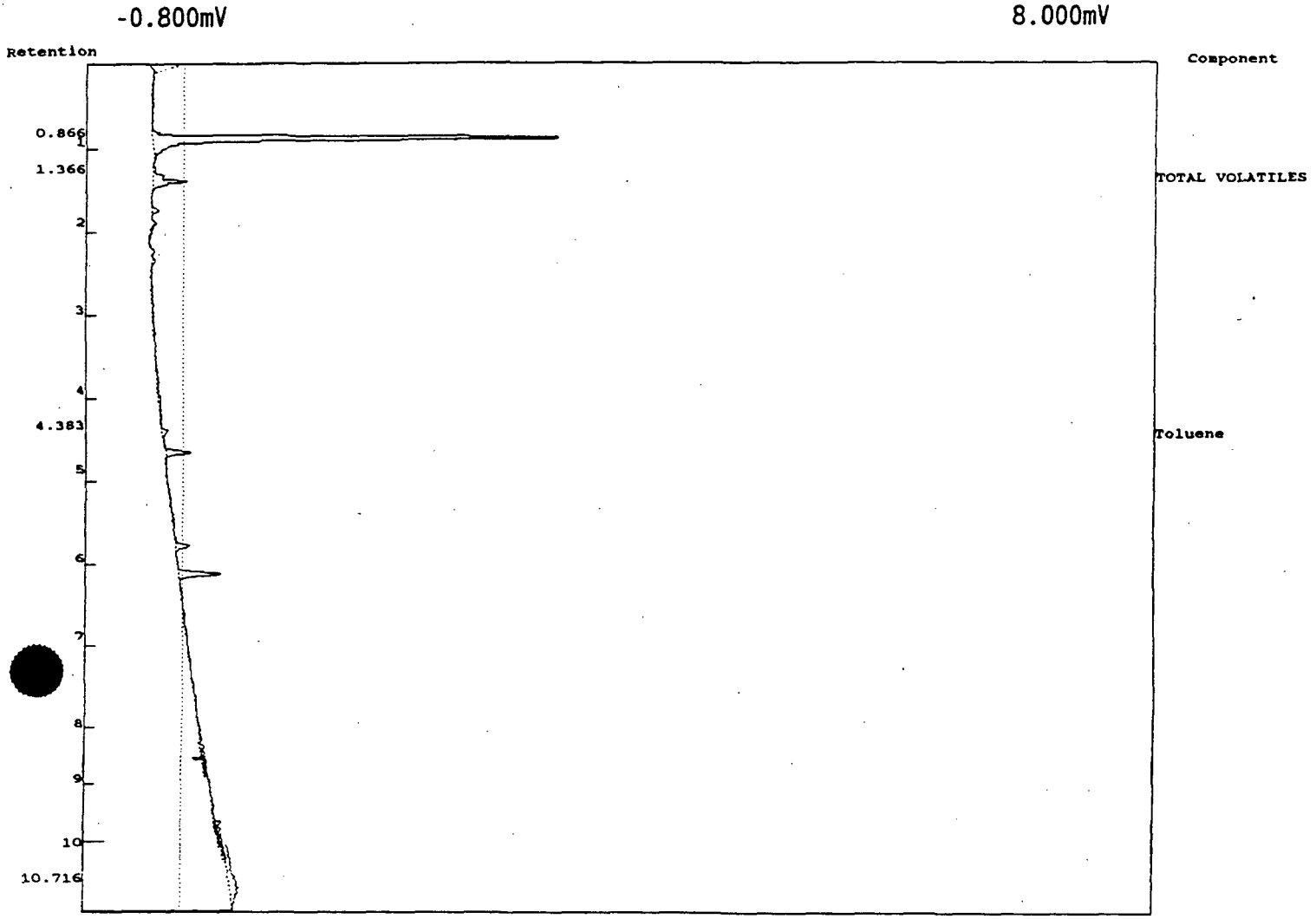
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	3.35	0.48	ug/L
CDS	0	1.516	1.14 M	N/A	
111TCA	7	3.033	0.15 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	0.96	0.00	ug/L
TCE	9	4.083	0.24 M	0.00	ug/L
PCE	11	6.350	0.70 M	0.00	ug/L
	6		6.54	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/27/2000 17:40:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY26E23.CHR (A:\)
Sample : SG-086-R
Operator : SGN



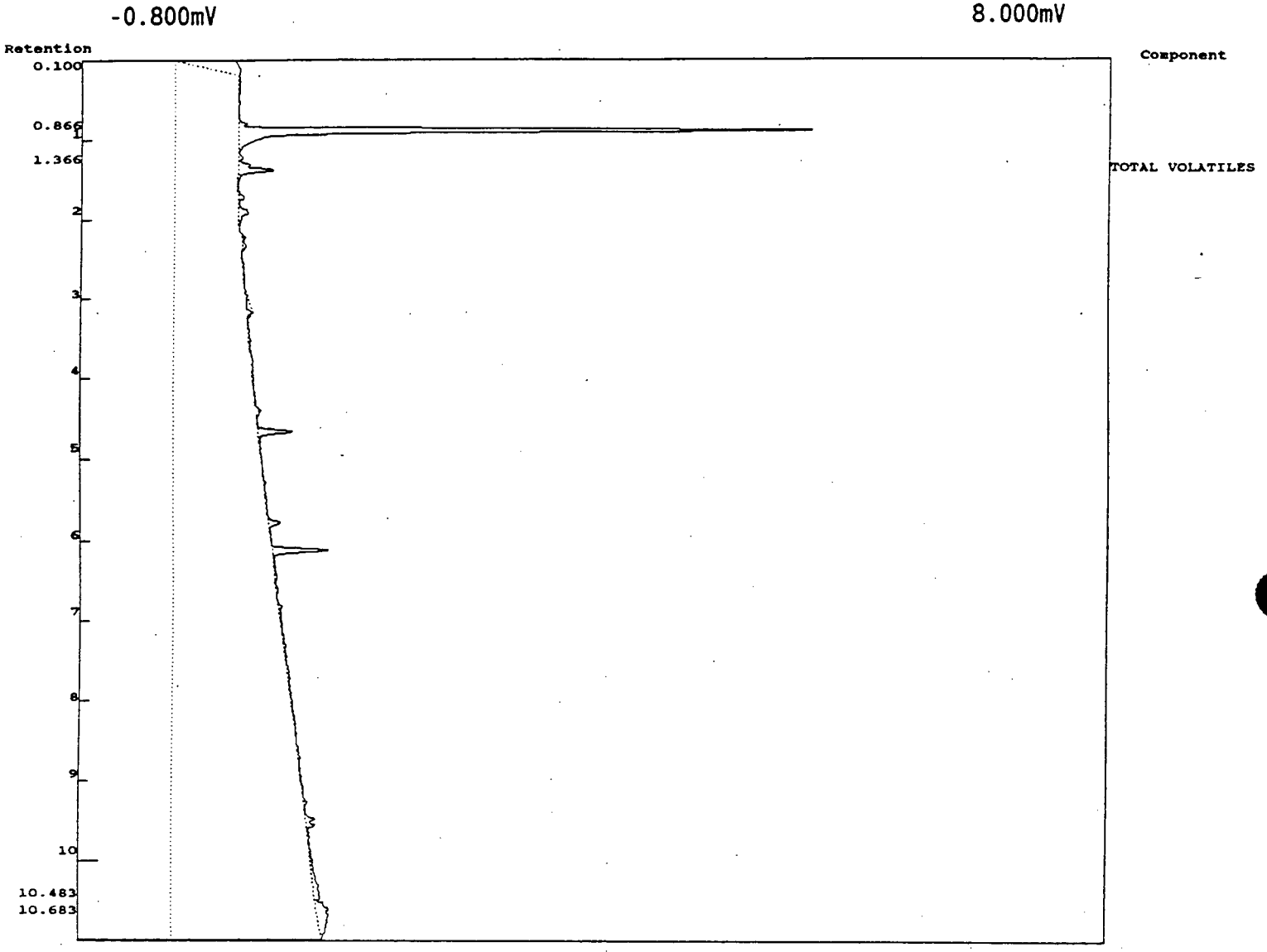
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	2.46 M	0.35	ug/L
DS	0	1.516	2.21 M	N/A	
12DCE	5	2.583	0.25 M	0.65	ug/L
HLOROFORM	6	2.833	1.04 M	0.02	ug/L
11TCA	7	3.050	1.32 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.250	1.71 M	0.00	ug/L
CE	9	4.083	57.84 M	0.78	ug/L
CE	11	6.350	1.07 M	0.00	ug/L
	8		**67.90**	**0.81**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F6.CHR (A:\)
Sample : EB-10
Operator : SGN



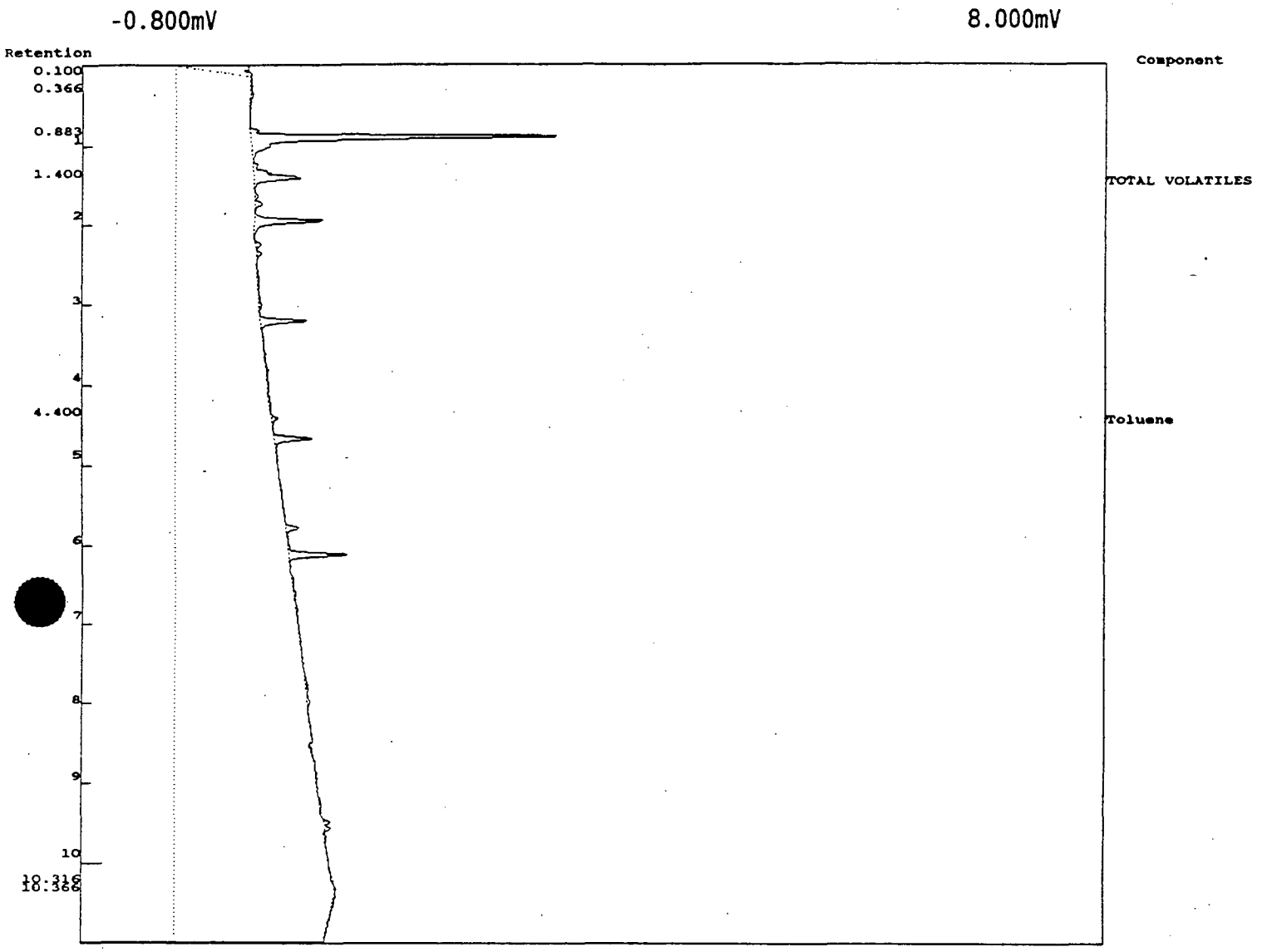
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.72 M	4.96	ug/L
Toluene	3	4.383	0.20 M	0.21	ug/L
	2		4.92	5.18	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F7.CHR (A:\)
Sample : SG-086
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	6.73	7.08	ug/L
	1		**6.73**	**7.08**	

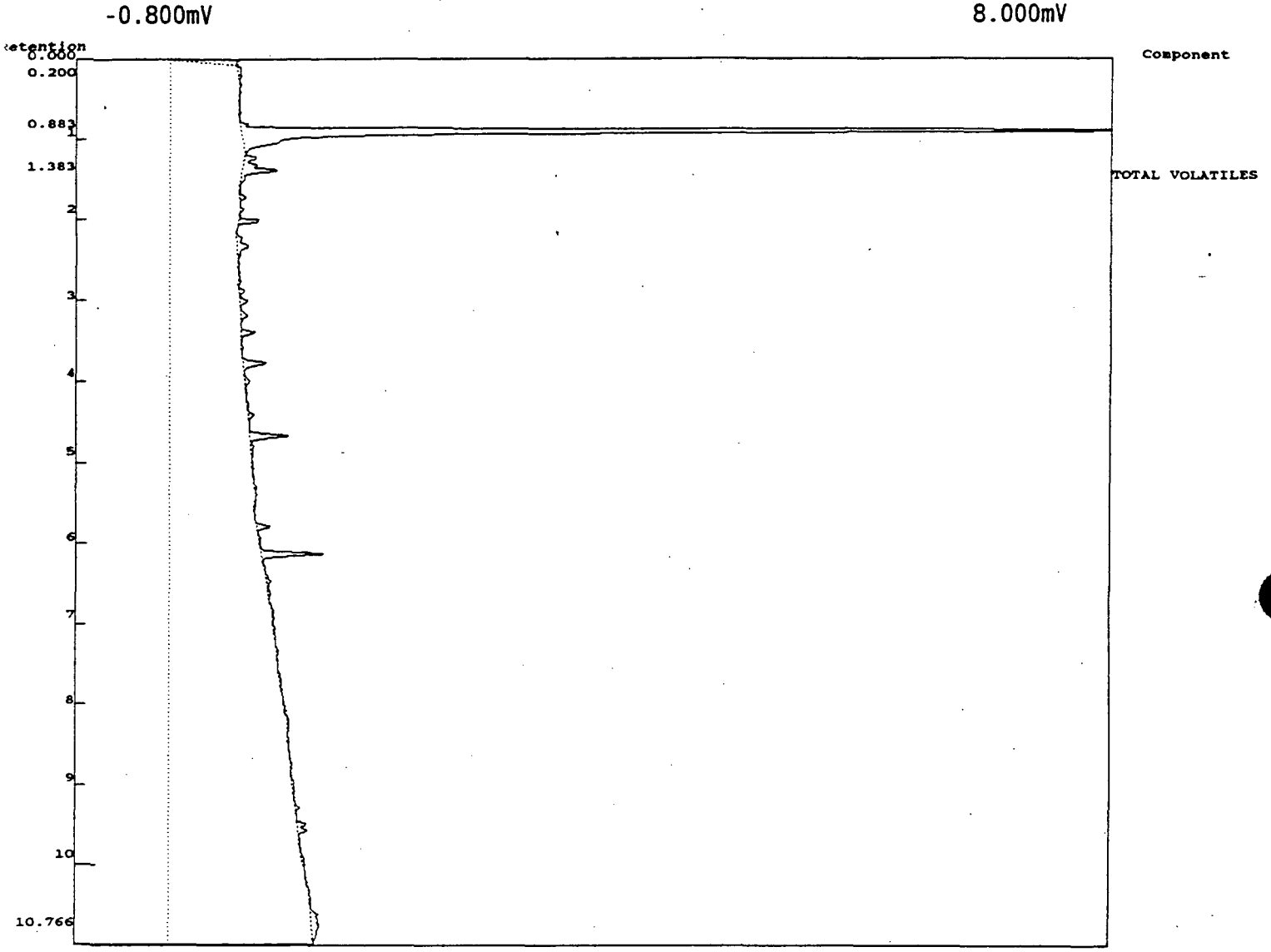
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F8.CHR (A:\)
Sample : SG-087
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	10.14 M	10.67	ug/L
Toluene	3	4.400	0.21 M	0.22	ug/L
	2		10.35	10.89	

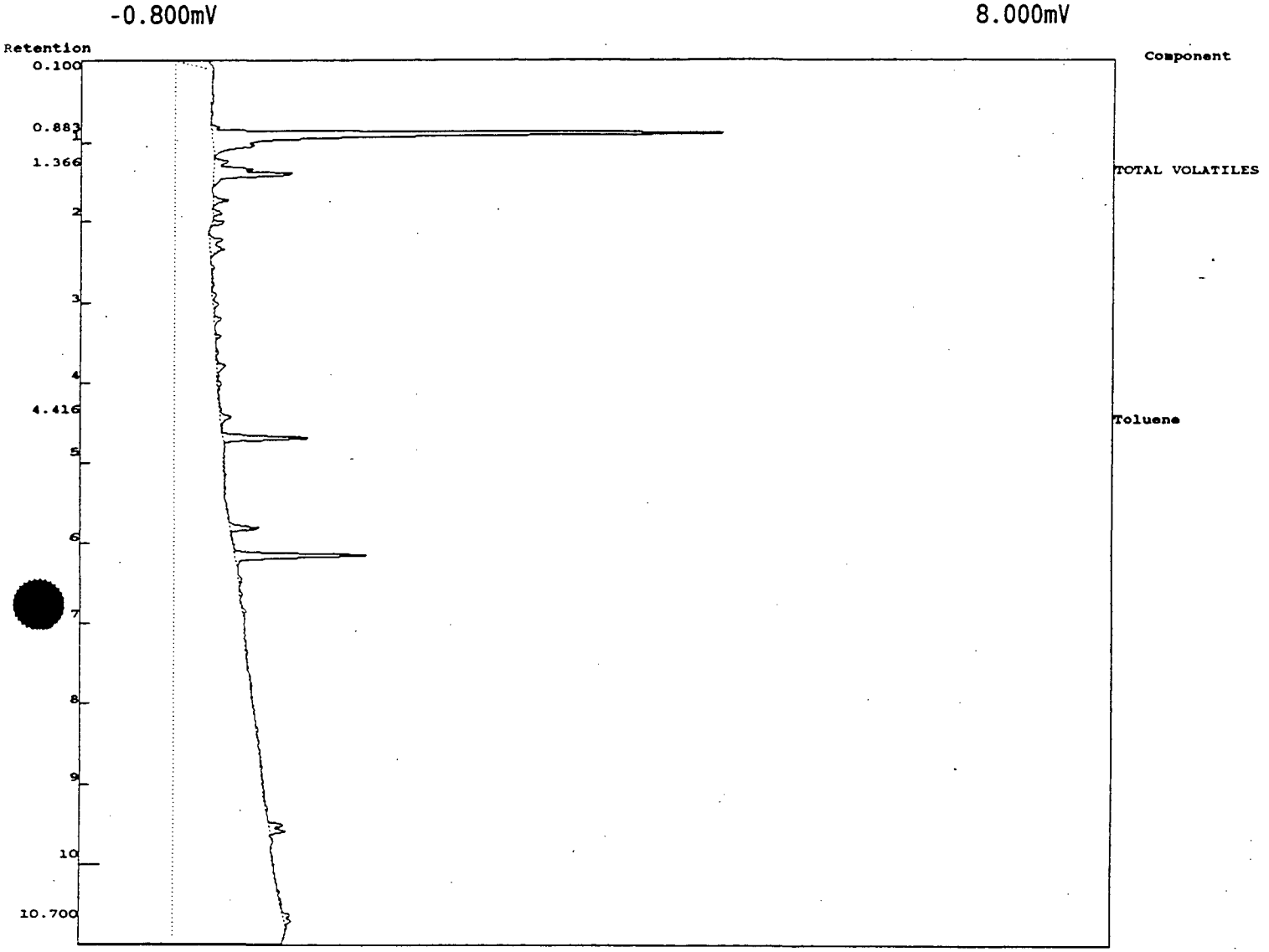
300640

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F9.CHR (A:\)
Sample : SG-085
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	9.16 M	9.64	ug/L
	1		**9.16**	**9.64**	

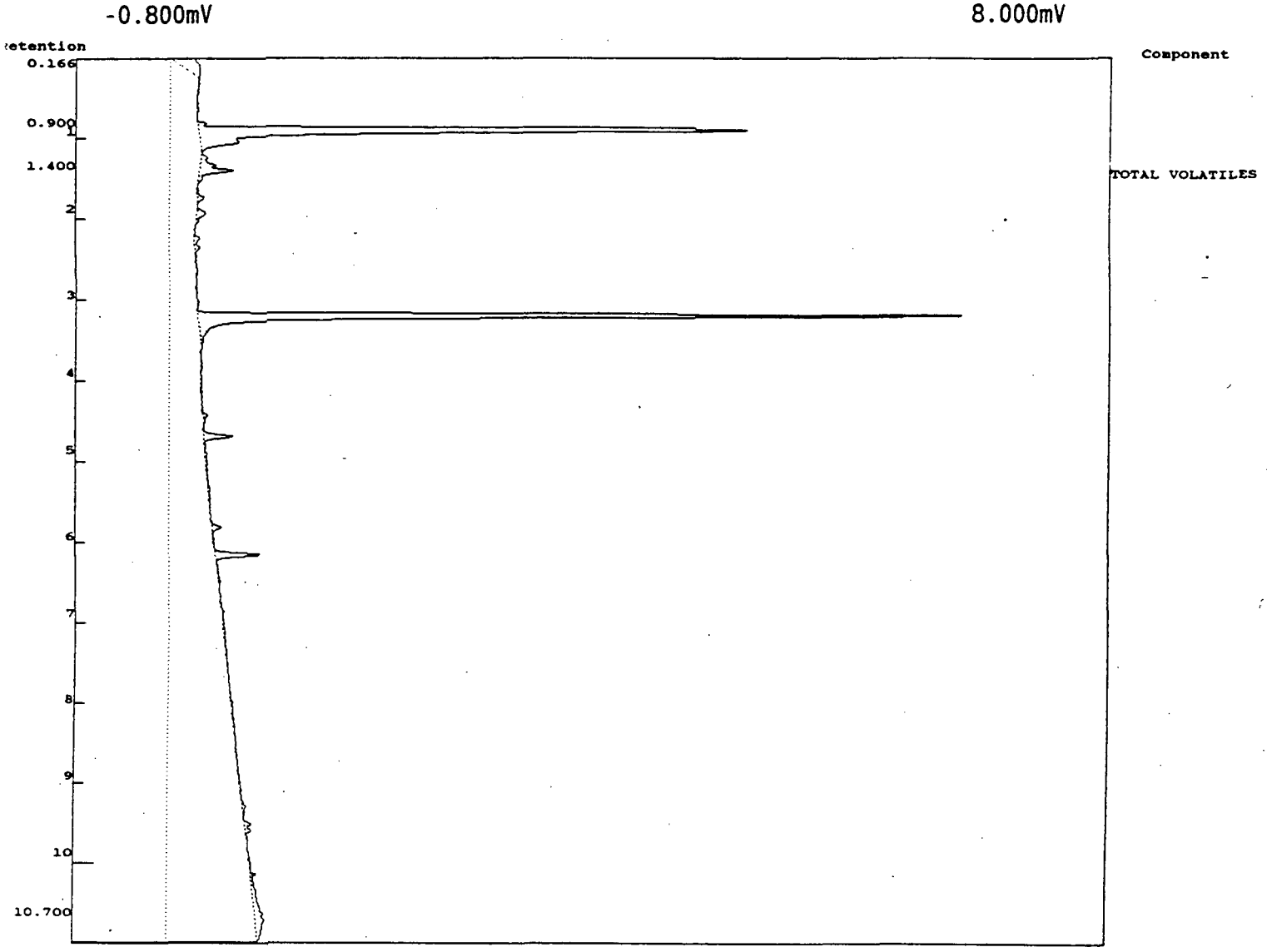
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F10.CHR (A:\)
Sample : SG-091
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	15.63 M	16.44	ug/L
Toluene	3	4.416	0.45 M	0.47	ug/L
	2		16.08	16.92	

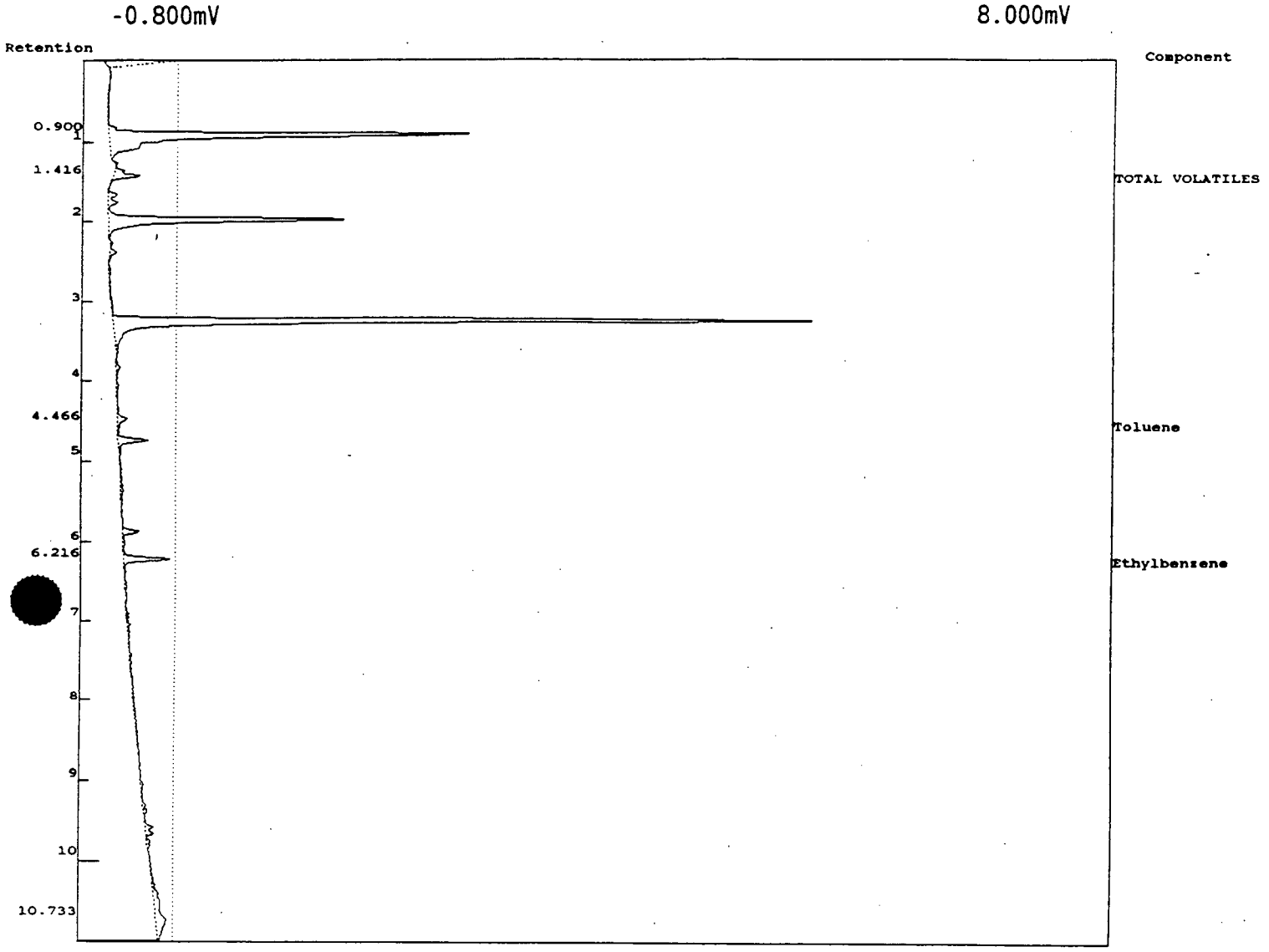
300642

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F11.CHR (A:\)
Sample : SG-092
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.400	29.14	30.66	ug/L
	1		**29.14**	**30.66**	

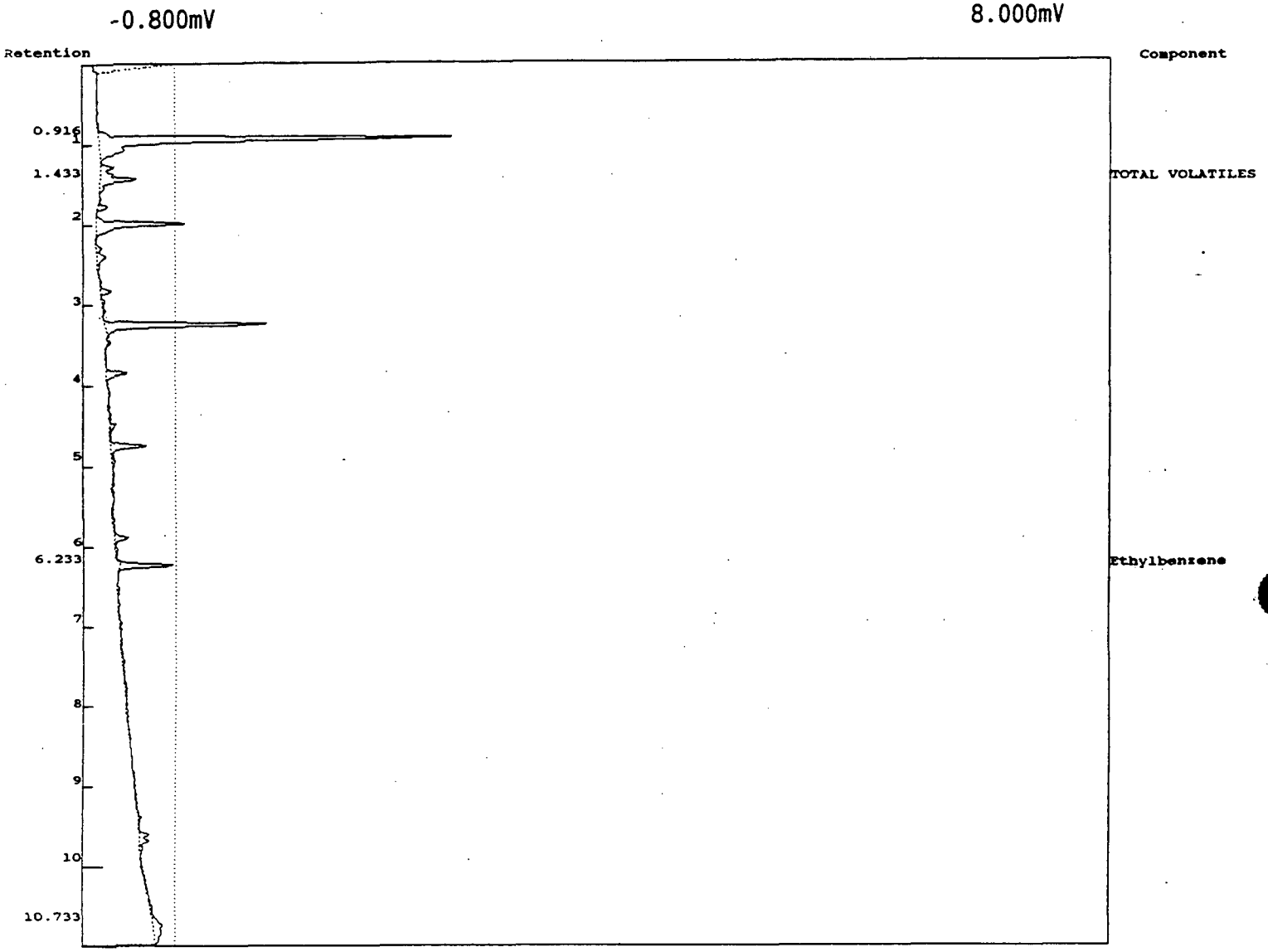
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F15.CHR (A:\)
Sample : SG-093
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	36.29 M	38.19	ug/L
Toluene	3	4.466	0.43 M	0.46	ug/L
~~Ethylbenzene~~	~~4~~	~~6.216~~	~~1.38 M~~	~~1.70~~	~~ug/L~~ ☆
	3		38.10	40.34	

300644

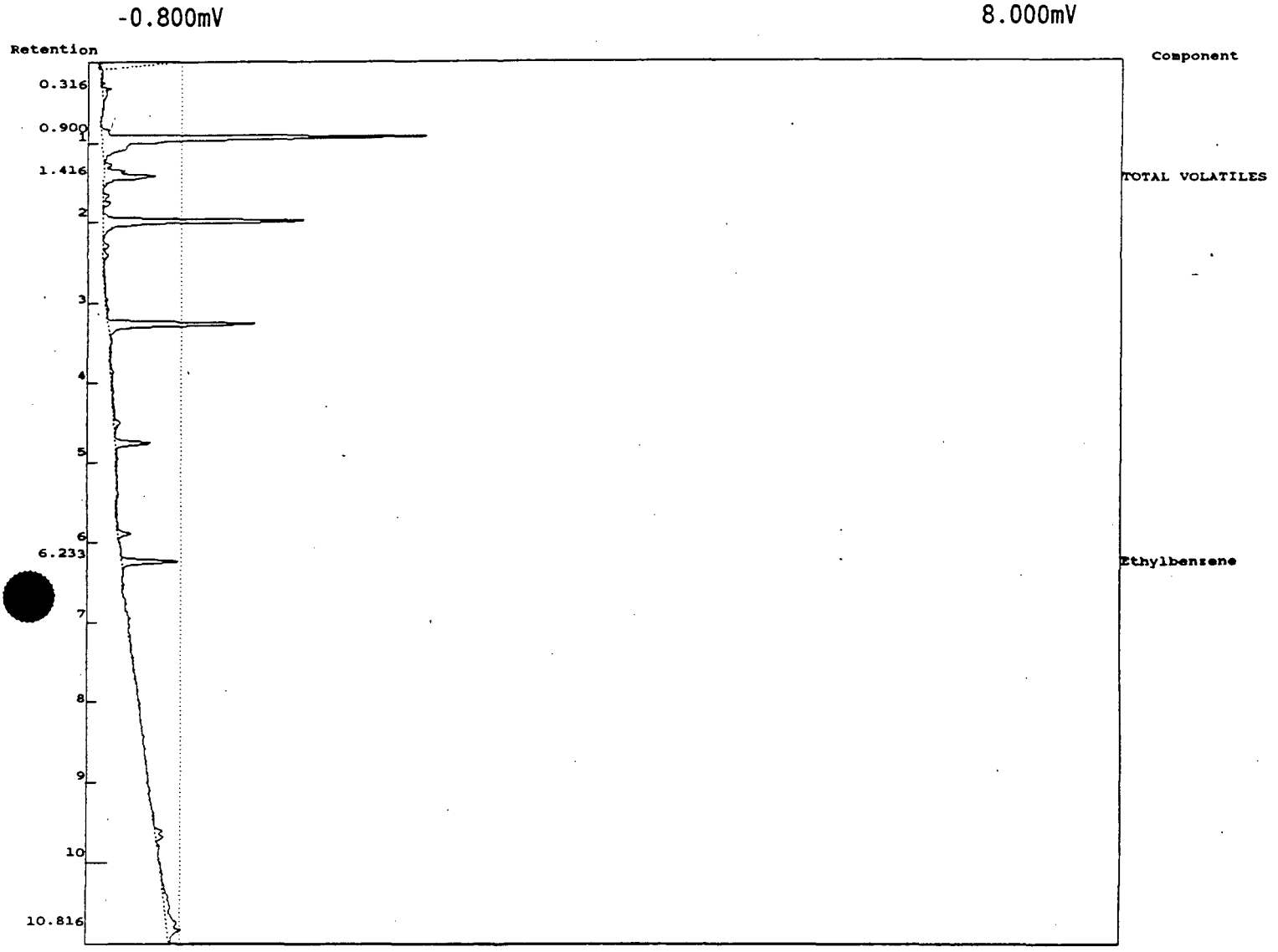
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F16.CHR (A:\)
Sample : SG-097
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.433	16.10 M	16.94	ug/L
Ethylbenzene	4	6.233	1.45 M	1.79	ug/L
	2		17.55	18.73	

300645

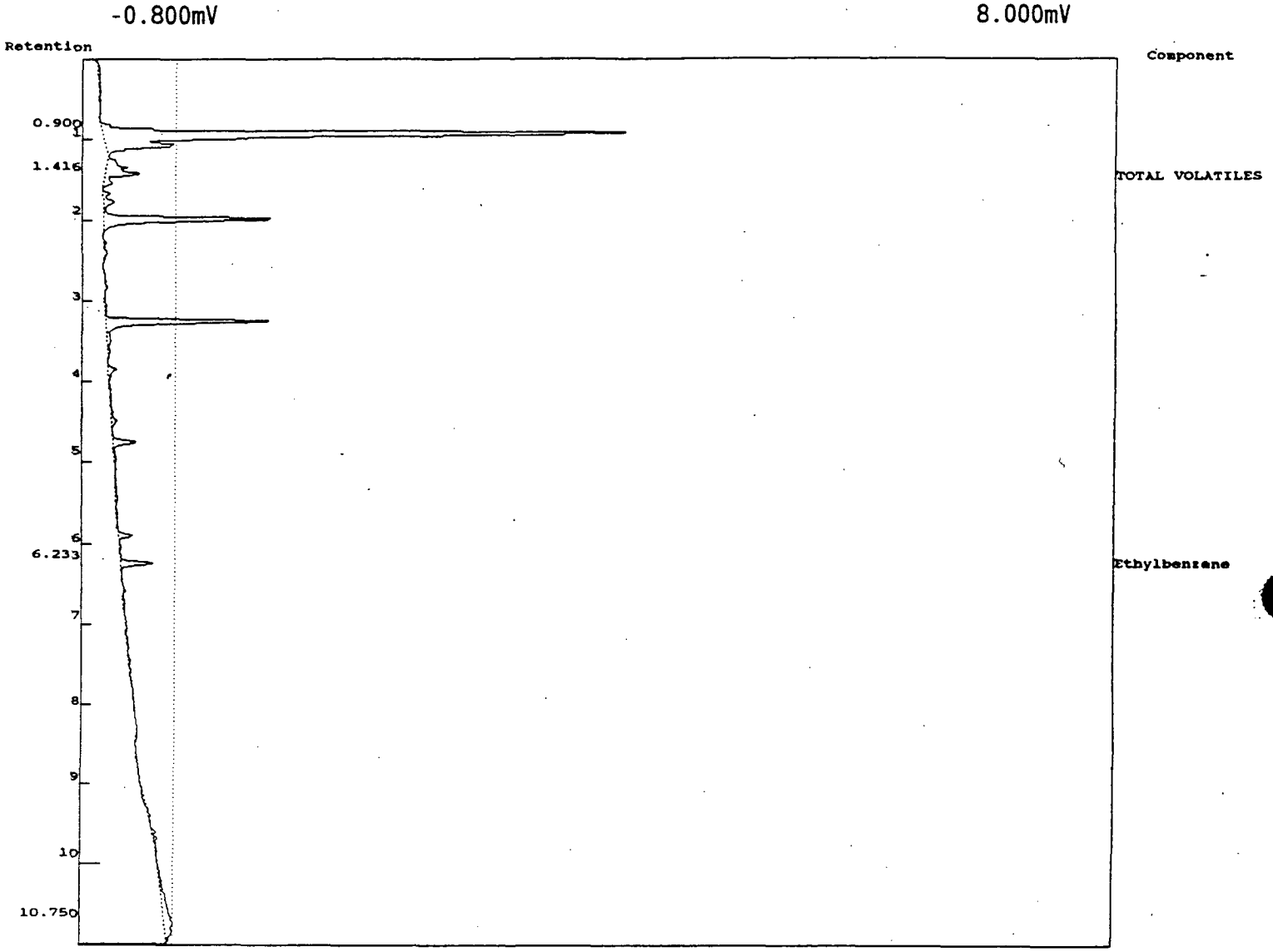
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F17.CHR (A:\)
Sample : SG-098
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	18.14 M	19.09	ug/L
Ethylbenzene	4	6.233	1.61 M	1.98	ug/L
	2		19.75	21.07	

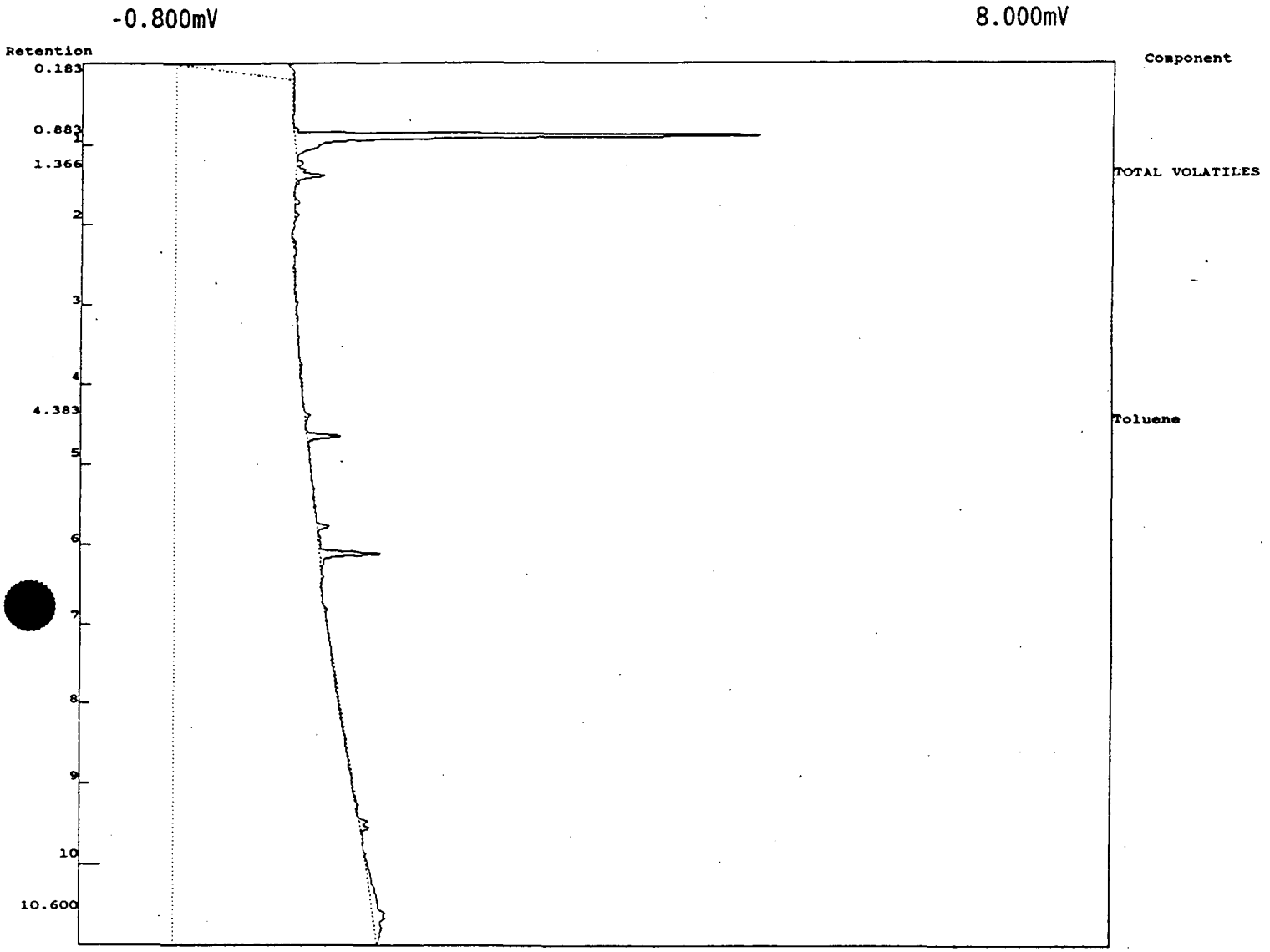
300646

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F18.CHR (A:\)
Sample : SG-099
Operator : SGN



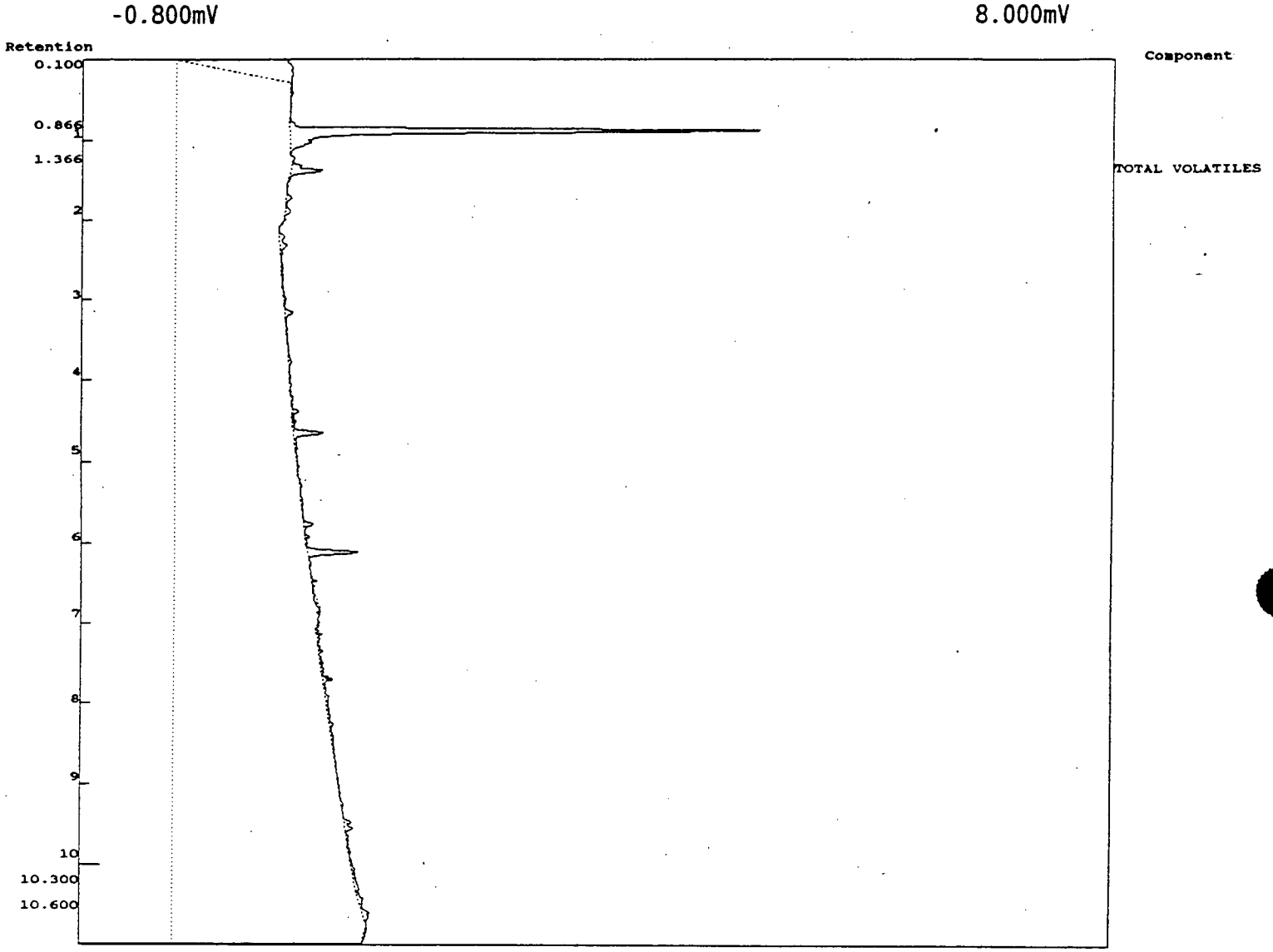
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	16.78 M	17.66	ug/L
Ethylbenzene	4	6.233	0.92 M	1.13	ug/L
	2		17.70	18.79	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F19.CHR (A:\)
Sample : SG-079
Operator : SGN



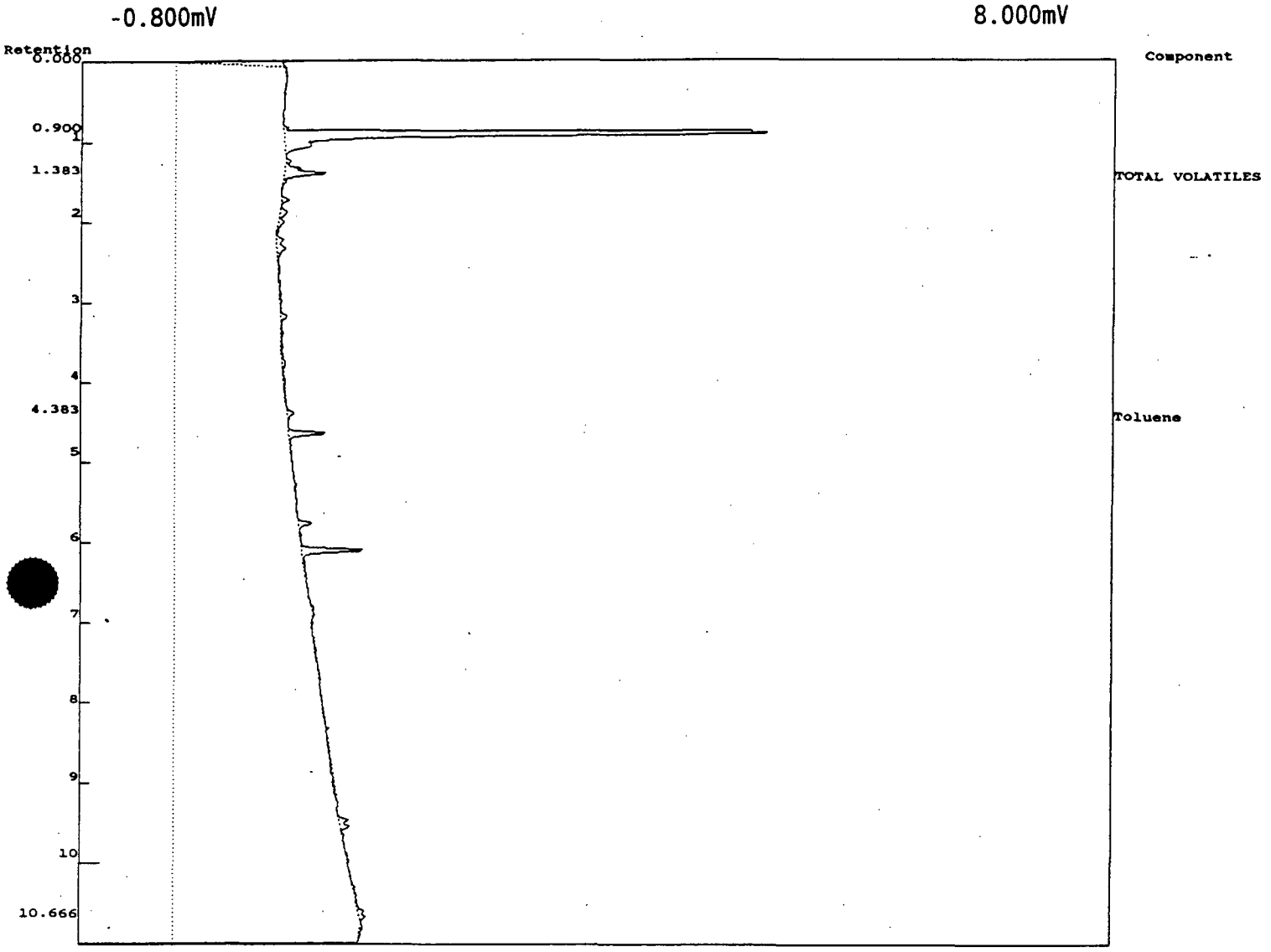
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.81 M	5.06	ug/L
Toluene	3	4.383	0.21 M	0.22	ug/L
	2		5.02	5.28	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F20.CHR (A:\)
Sample : SG-090
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	7.04 M	7.41	ug/L
	1		**7.04**	**7.41**	

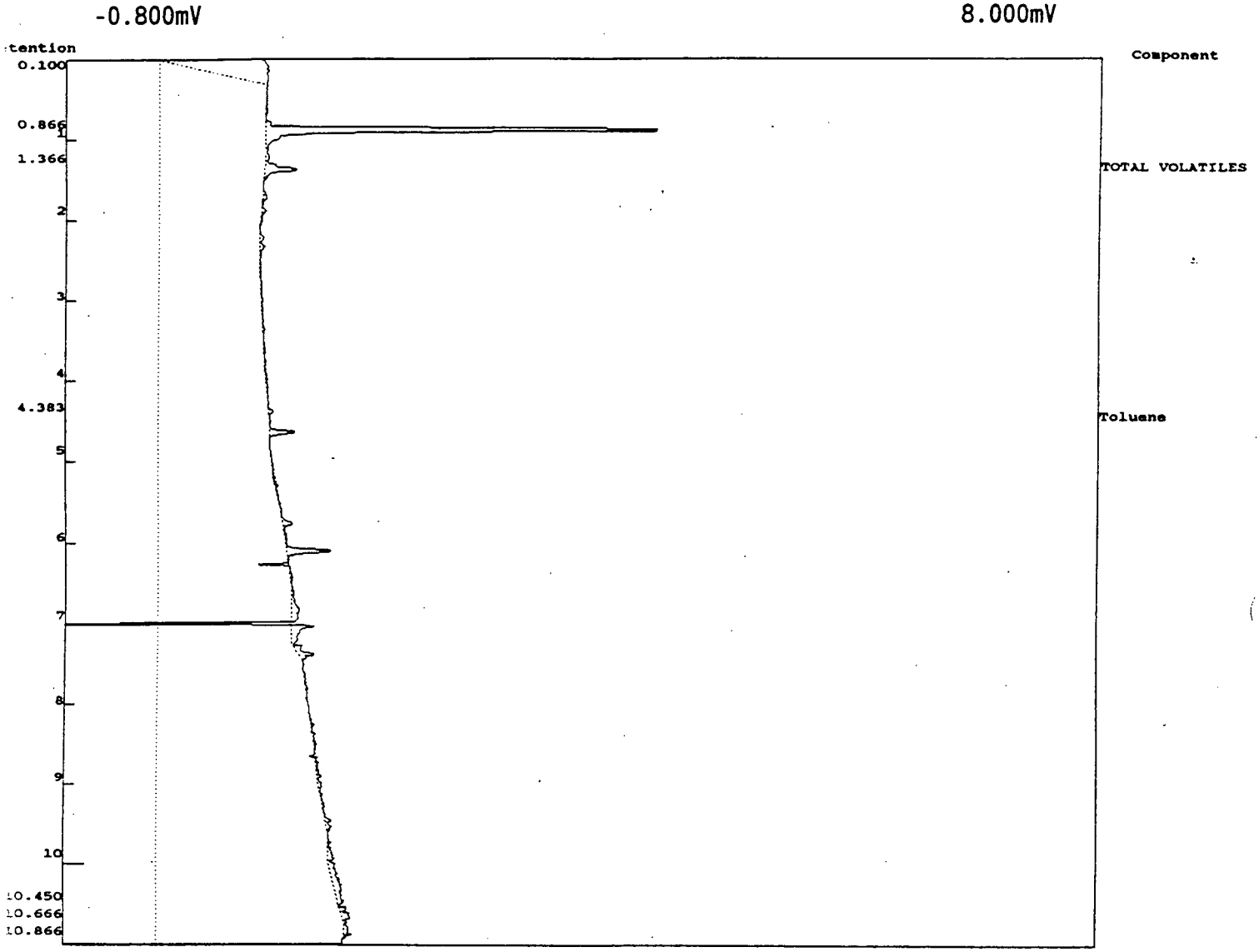
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F21.CHR (A:\)
Sample : SG-990
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	8.13 M	8.56	ug/L
Toluene	3	4.383	0.23 M	0.25	ug/L
	2		8.37	8.80	

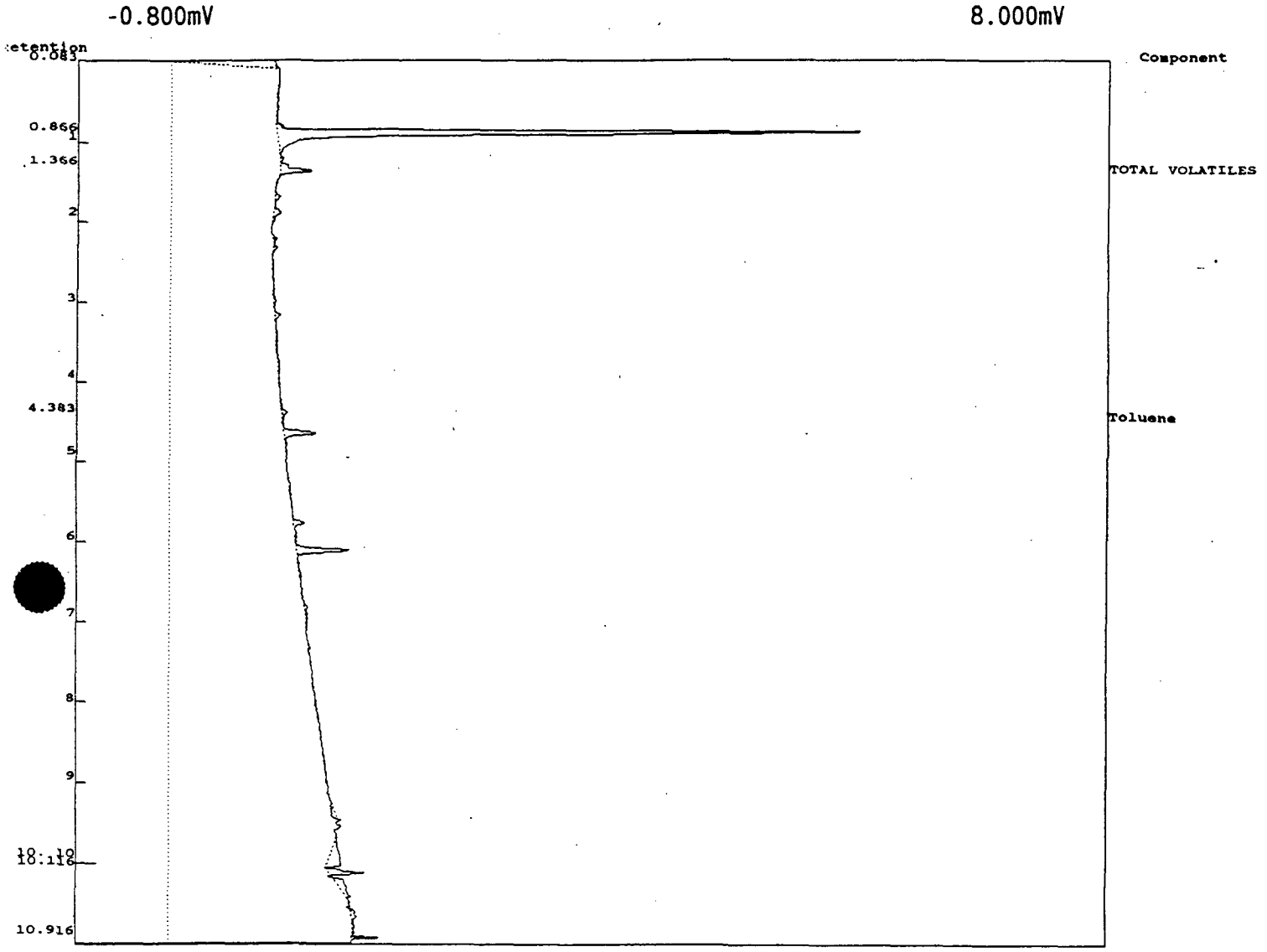
300650

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F22.CHR (A:\)
Sample : EB-11
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.366	6.48	6.82	ug/L
luene	3	4.383	0.25	0.26	ug/L
	2		6.73	7.08	

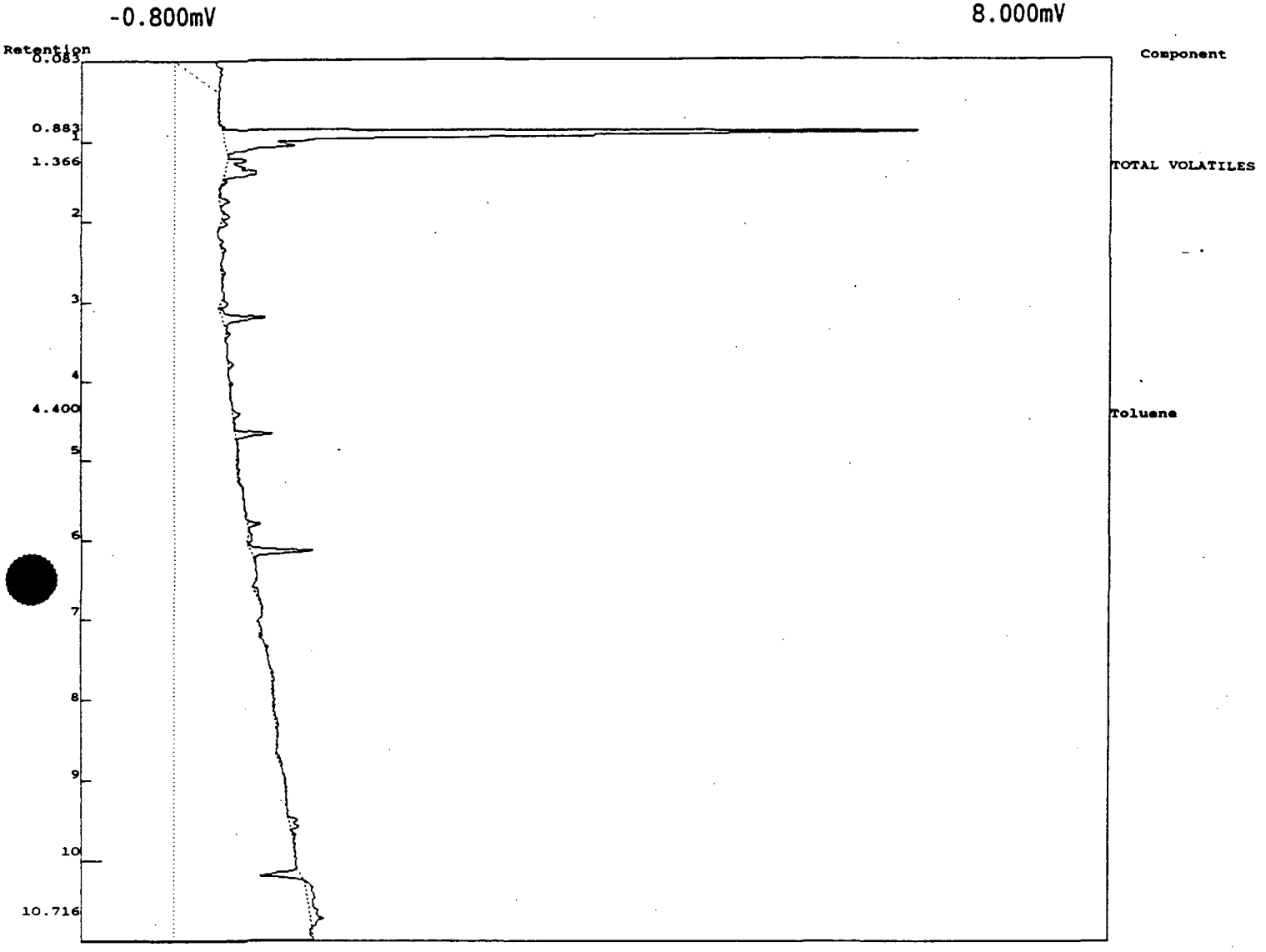
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY26F23.CHR (A:\)
Sample : SG-086-R
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.59 M	4.83	ug/L
Toluene	3	4.383	0.20 M	0.21	ug/L
	2		4.80	5.05	

300652

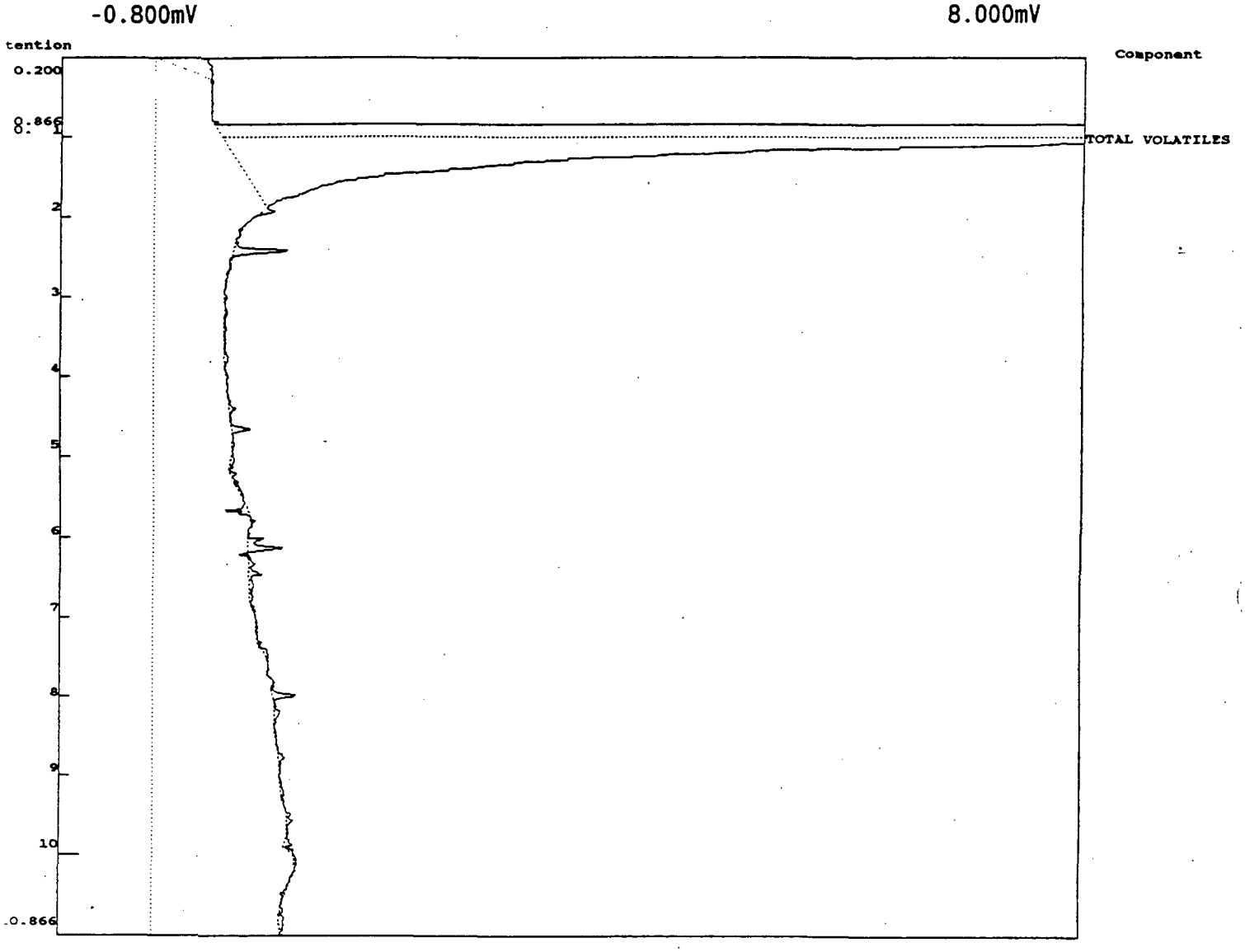
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F8.CHR (A:\)
Sample : SG-011
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	9.25 M	9.25	ug/L
Toluene	3	4.400	0.23 M	0.23	ug/L
	2		9.48	9.48	

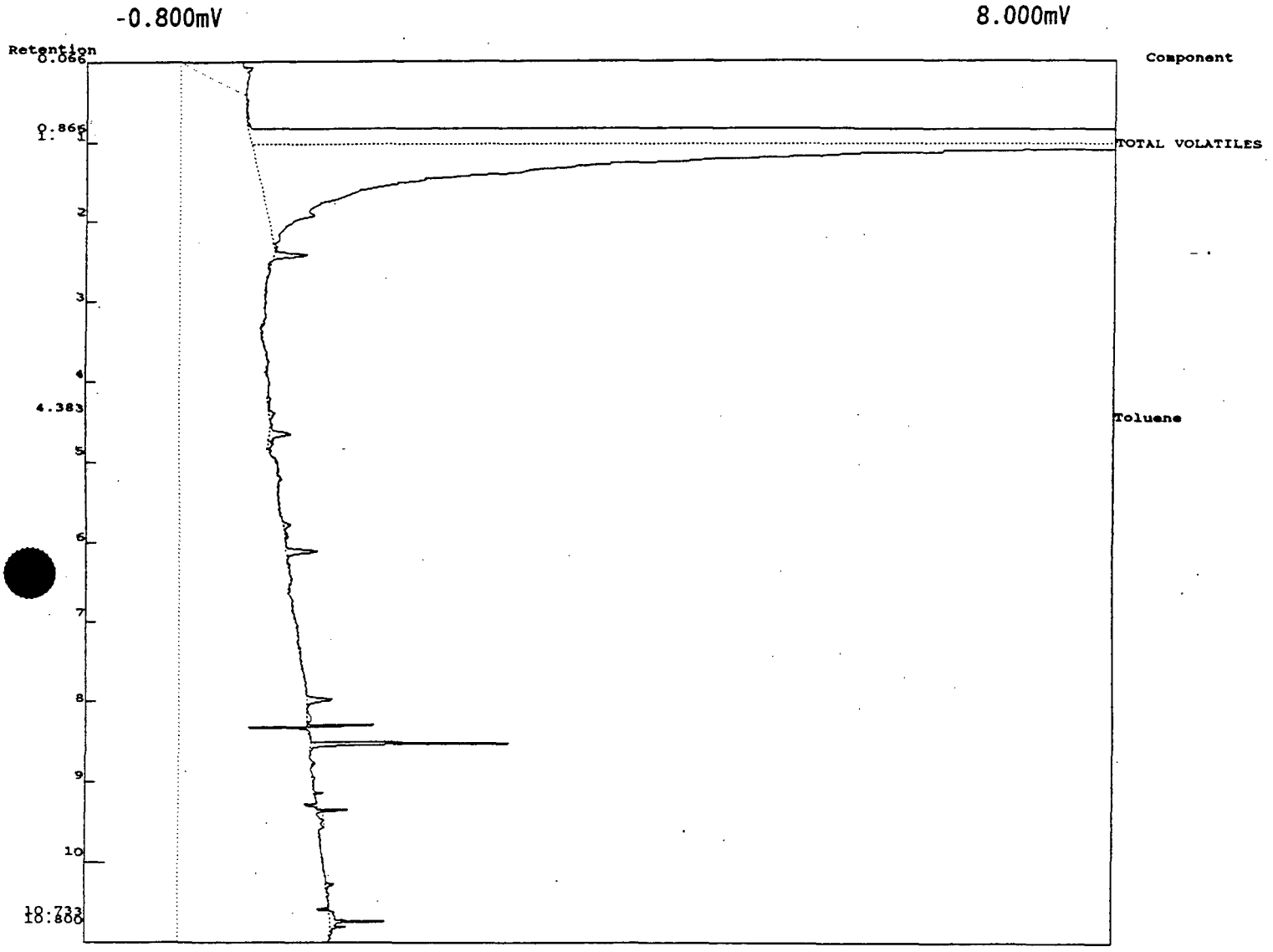
300653

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F9.CHR (A:\)
Sample : SG-024
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	0.983	183.65 M	183.65	ug/L
1			183.65	183.65	

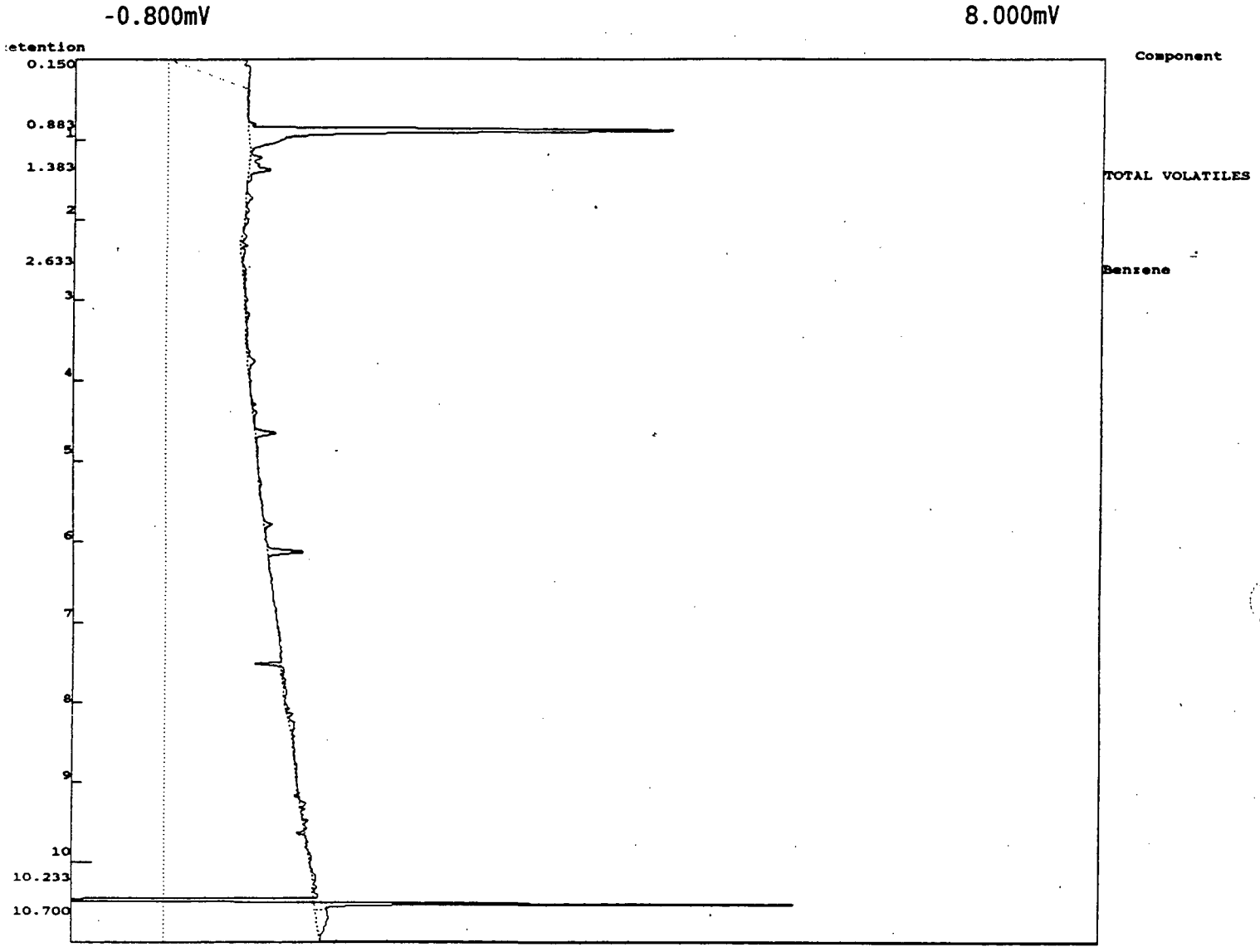
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F10.CHR (A:\)
Sample : SG-924
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.000	174.39 M	174.39	ug/L
Toluene	3	4.383	0.21 M	0.21	ug/L
	2		174.60	174.60	

300655

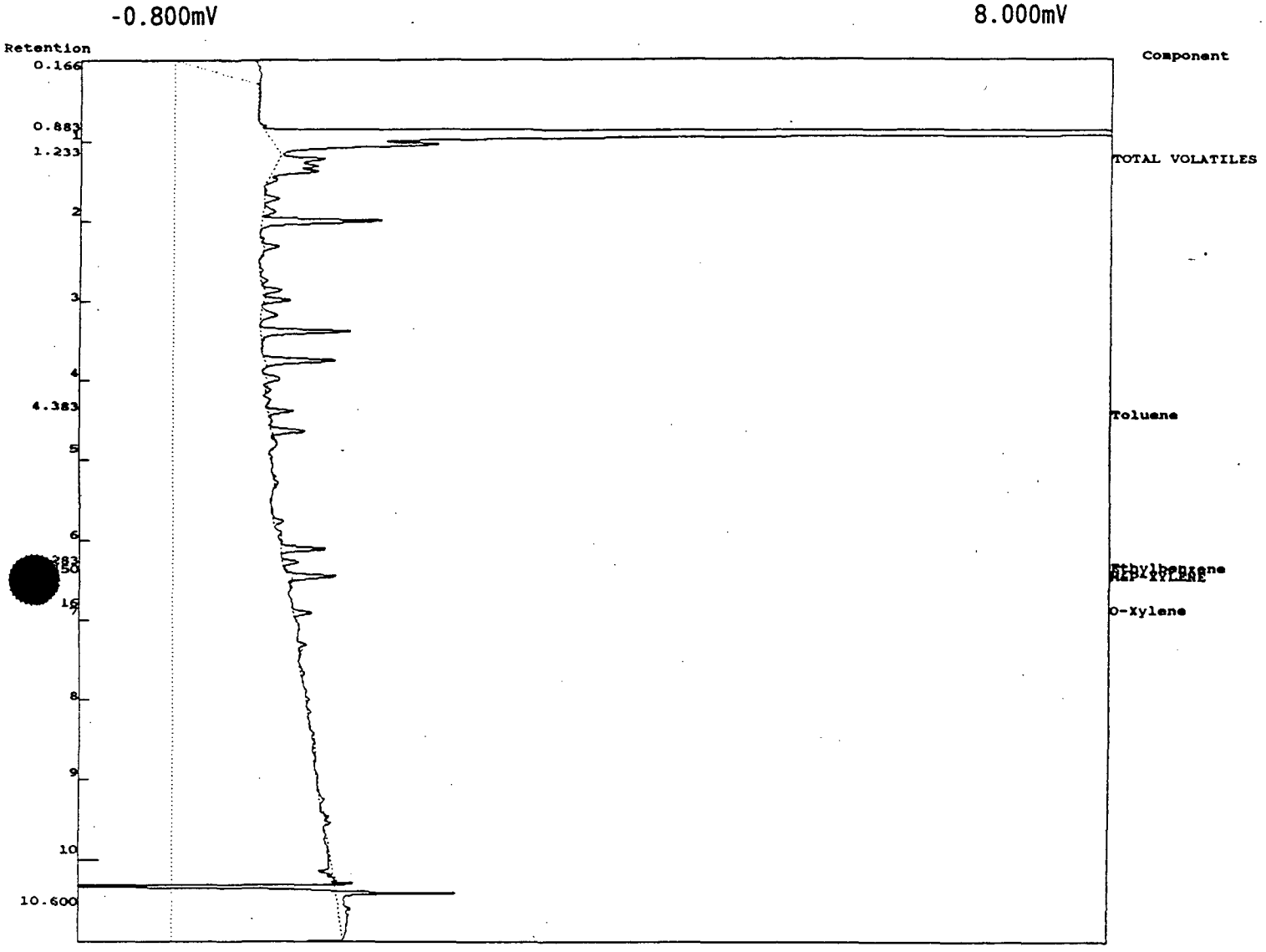
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F11.CHR (A:\)
Sample : SG-042
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.383	5.98	5.98	ug/L
enzene	2	2.633	0.23	0.20	ug/L
	2		6.21	6.17	

300656

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F12.CHR (A:\)
Sample : SG-045
Operator : SGN

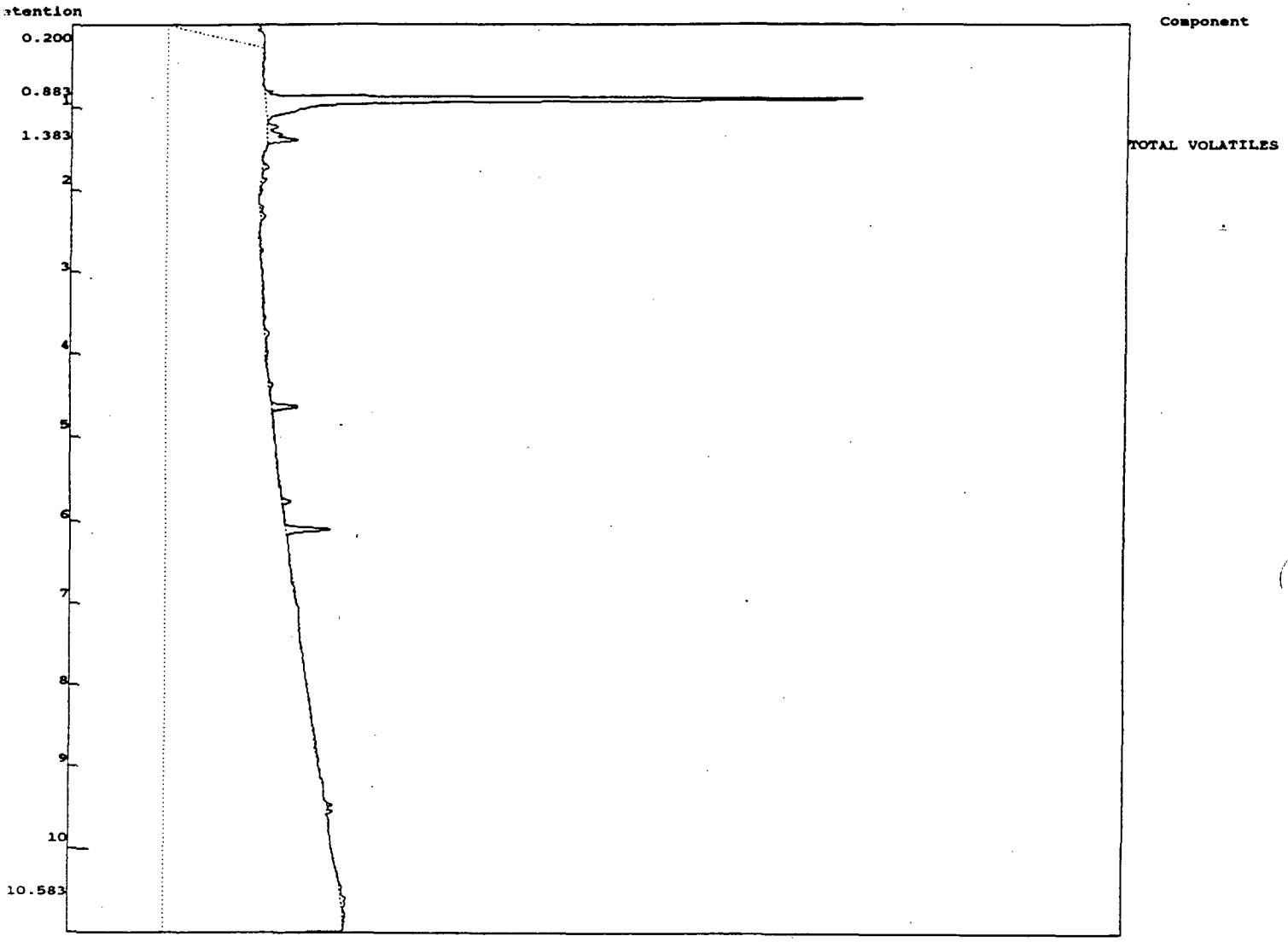


Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.233	22.33 M	22.33	ug/L
Toluene	3	4.383	0.59 M	0.59	ug/L
Ethylbenzene	4	6.283	0.44 M	0.52	ug/L
M&P-XYLENE	5	6.450	1.20 M	1.49	ug/L
O-Xylene	6	6.916	0.49 M	0.59	ug/L
	5		25.04	25.53	

300657

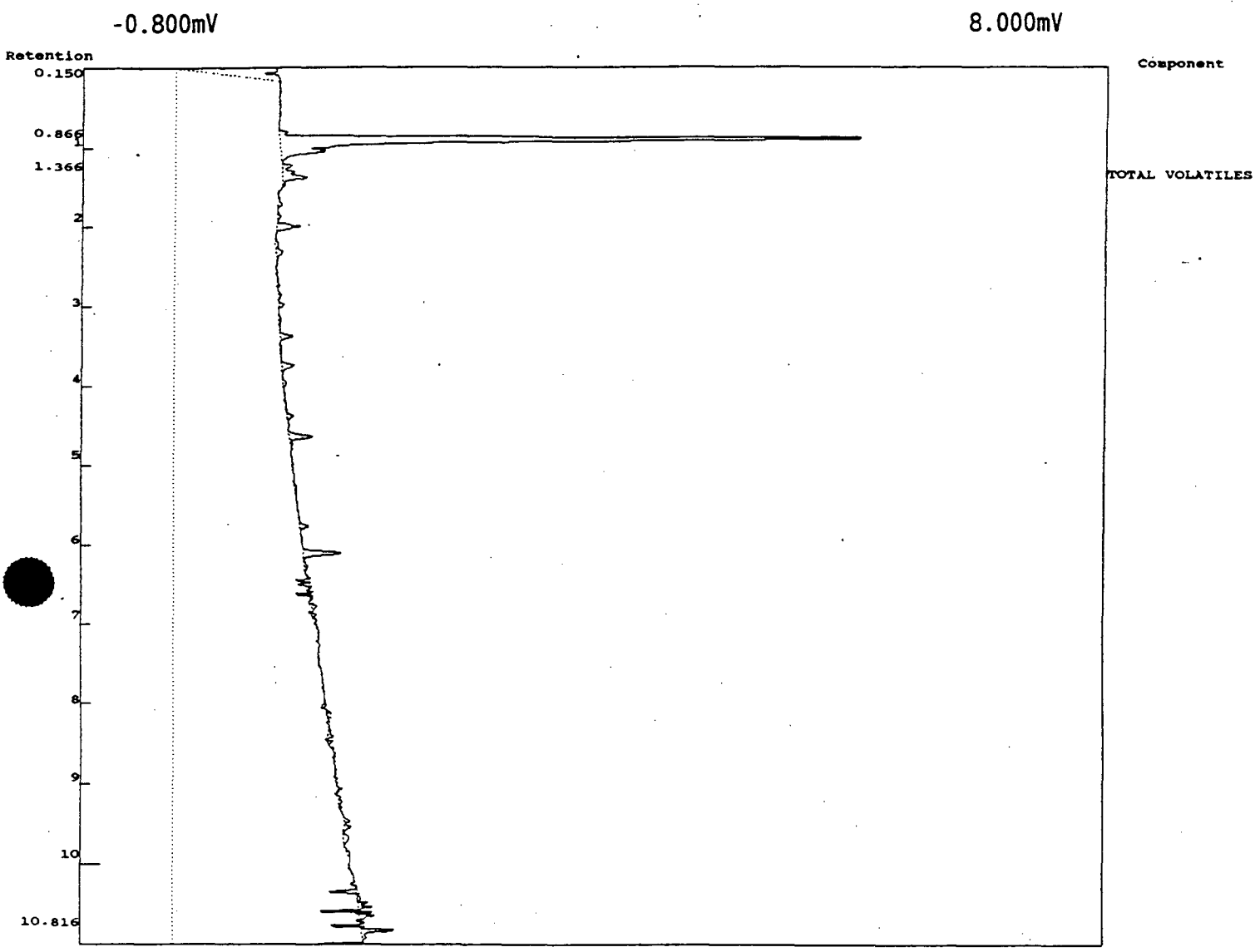
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F13.CHR (A:\)
Sample : SG-046
Operator : SGN

-0.800mV 8.000mV



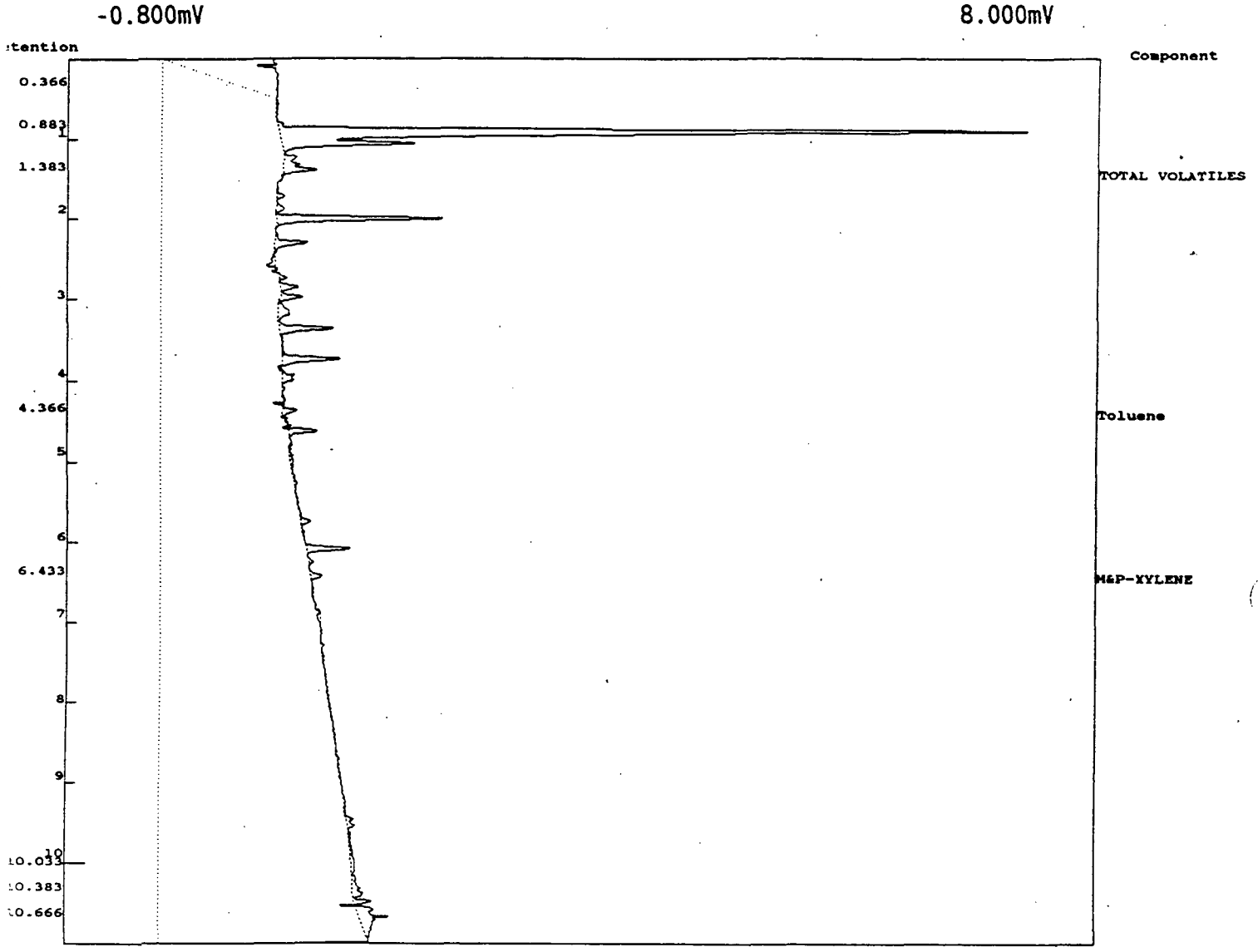
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	4.56 M	4.56	ug/L
1			4.56	4.56	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F14.CHR (A:\)
Sample : SG-063
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.40 M	5.40	ug/L
	1		5.40	5.40	

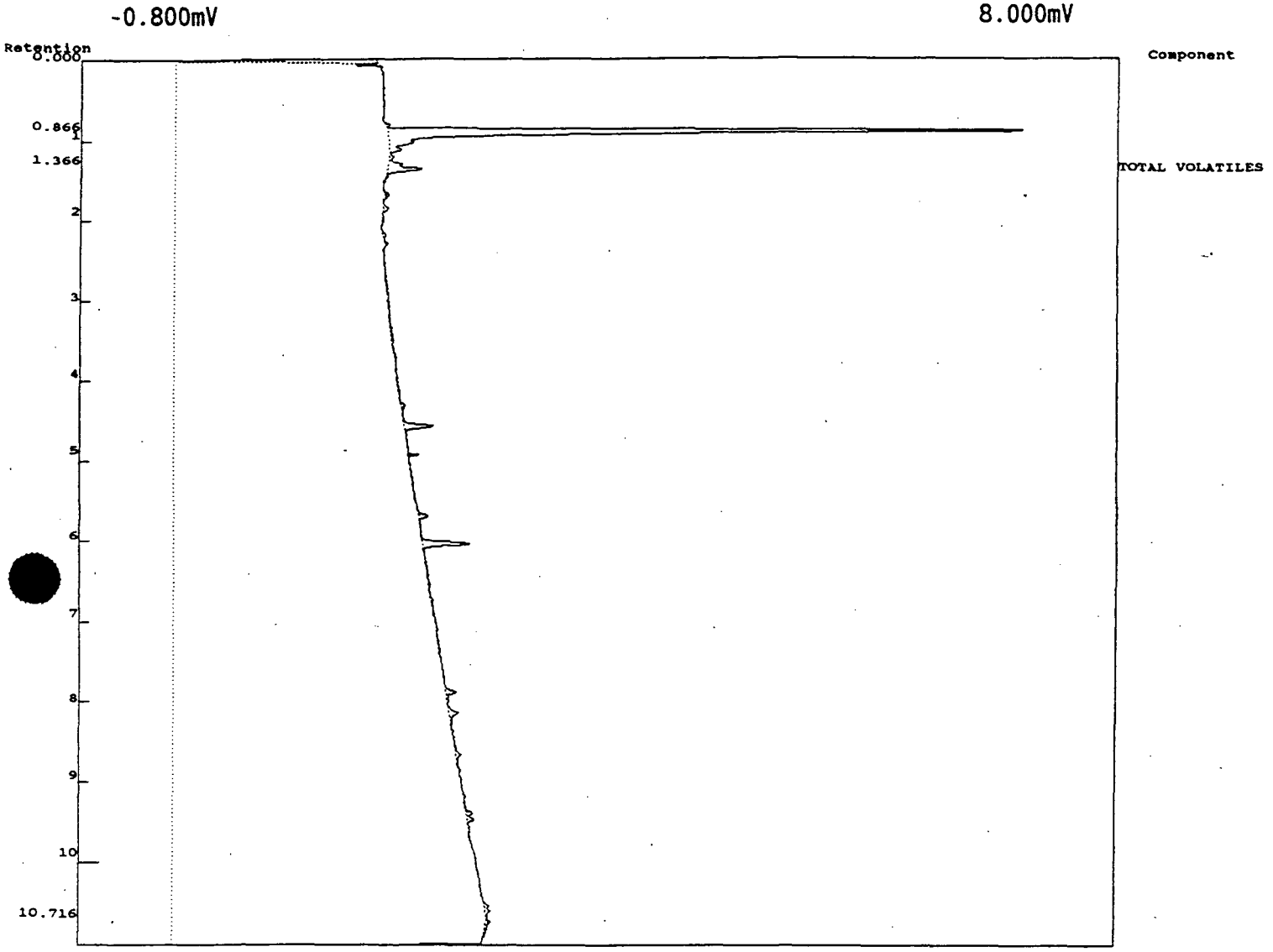
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F15.CHR (A:\)
Sample : SG-064
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.383	18.00 M	18.00	ug/L
luene	3	4.366	0.47 M	0.47	ug/L
P-XYLENE	5	6.433	0.35	0.43	ug/L
	3		18.82	18.90	

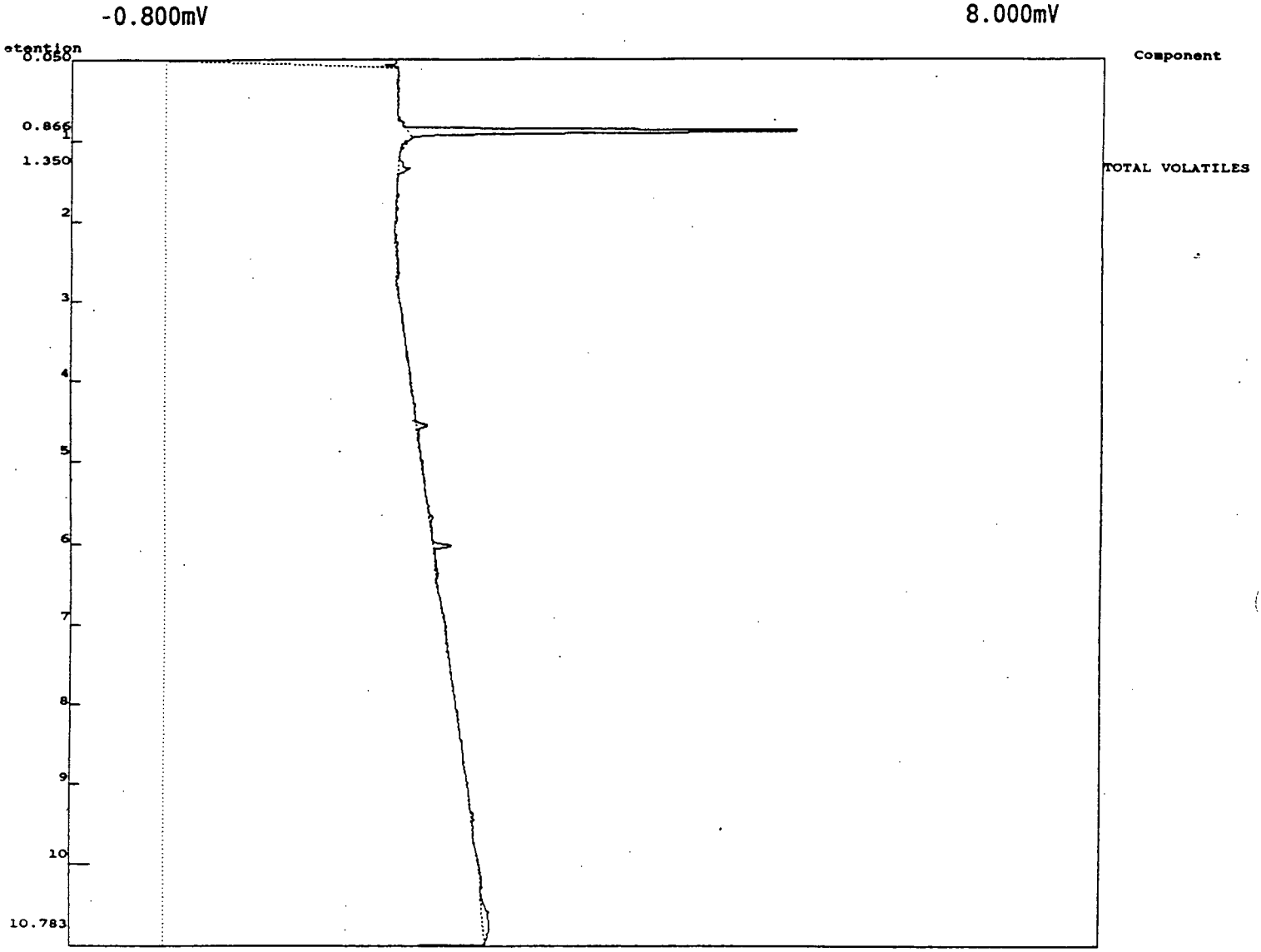
300660

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F19.CHR (A:\)
Sample : SG-053
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.01 M	5.01	ug/L
	1		5.01	5.01	

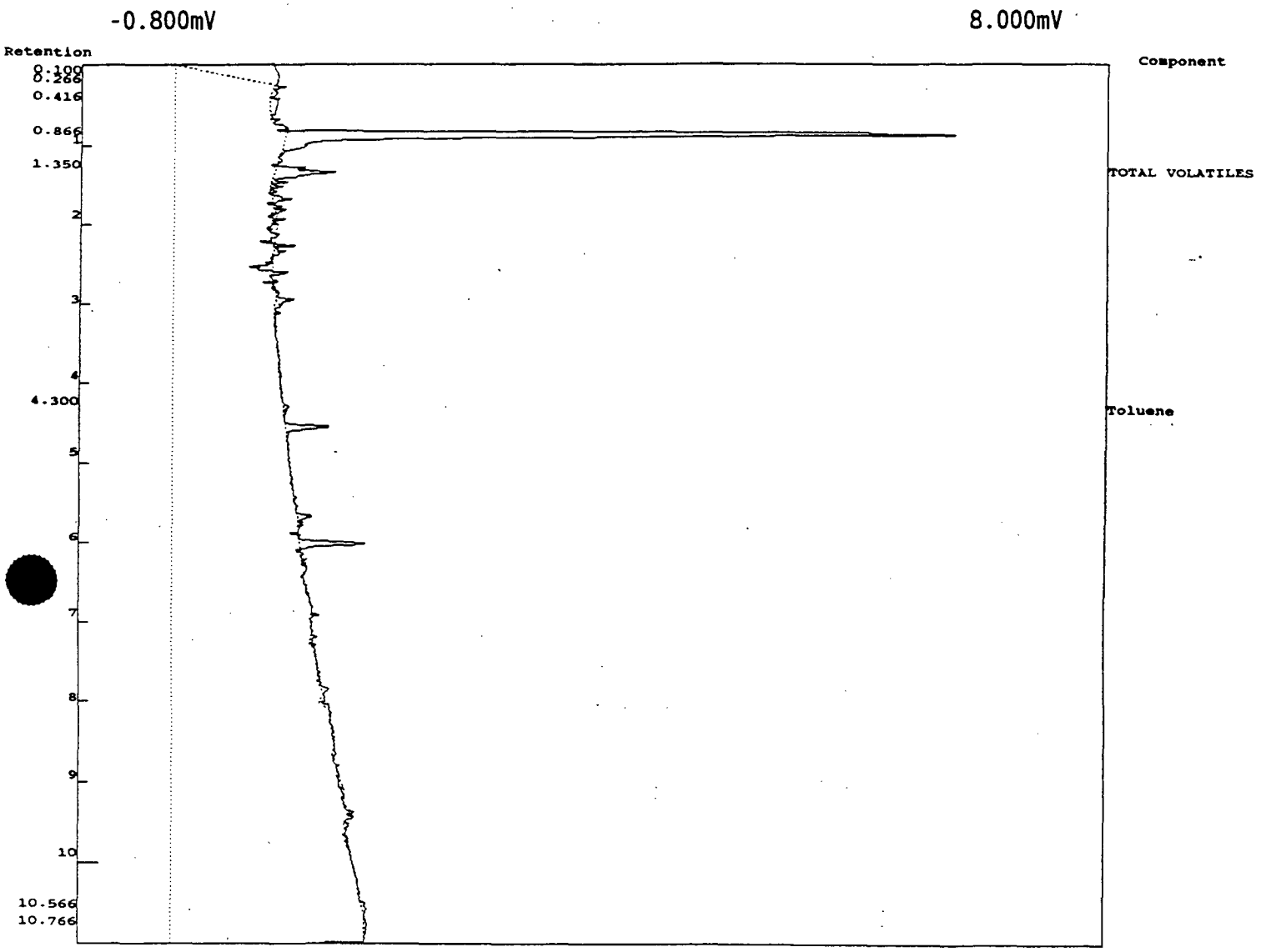
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F20.CHR (A:\)
Sample : EB-12
Operator : SGN



Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	1.350	1.48 M	1.48	ug/L
1			1.48	1.48	

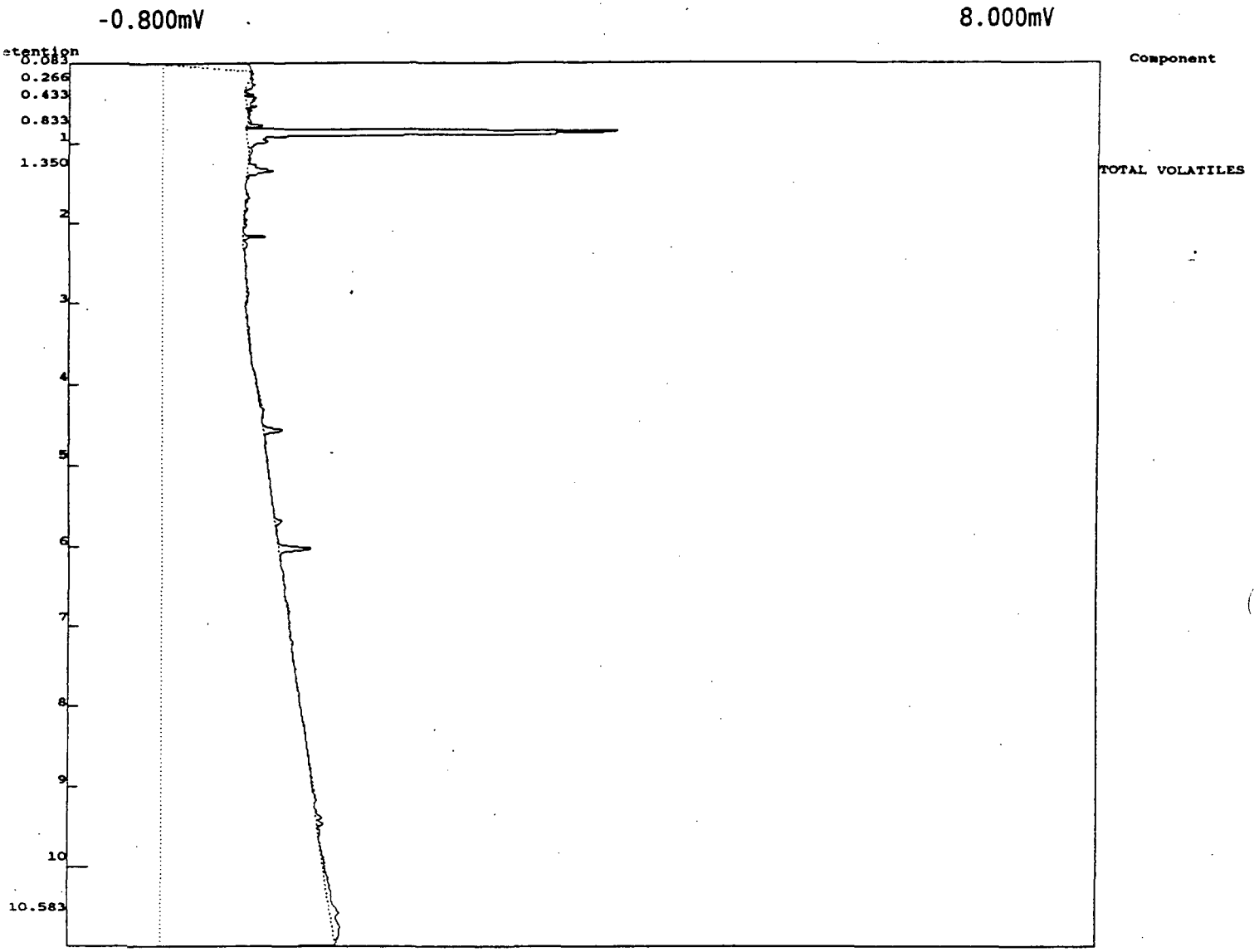
300662

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F21.CHR (A:\)
Sample : SG-084
Operator : SGN



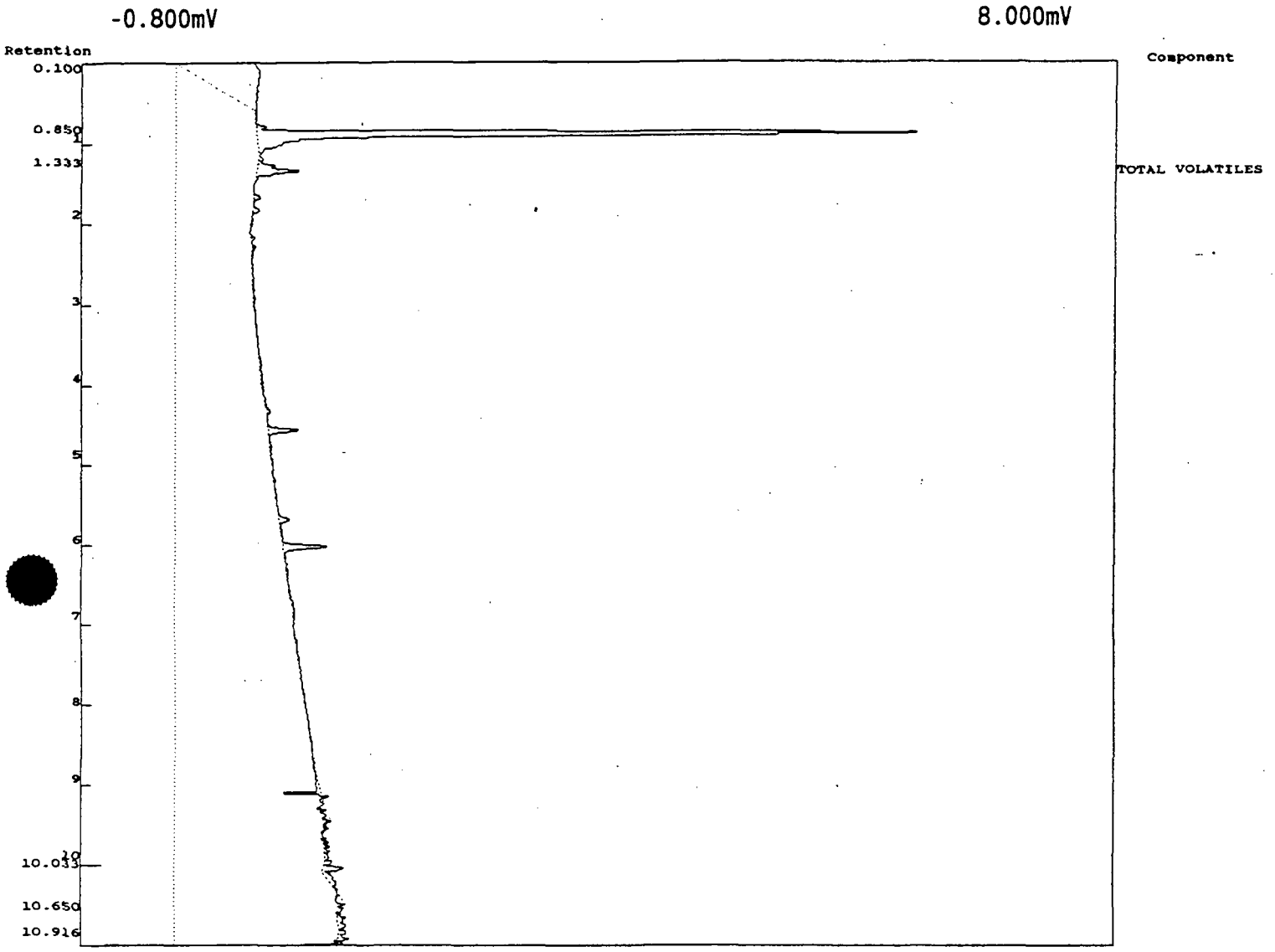
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	8.48 M	8.48	ug/L
Toluene	3	4.300	0.23 M	0.23	ug/L
	2		8.71	8.71	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F22.CHR (A:\)
Sample : EB-13
Operator : SGN



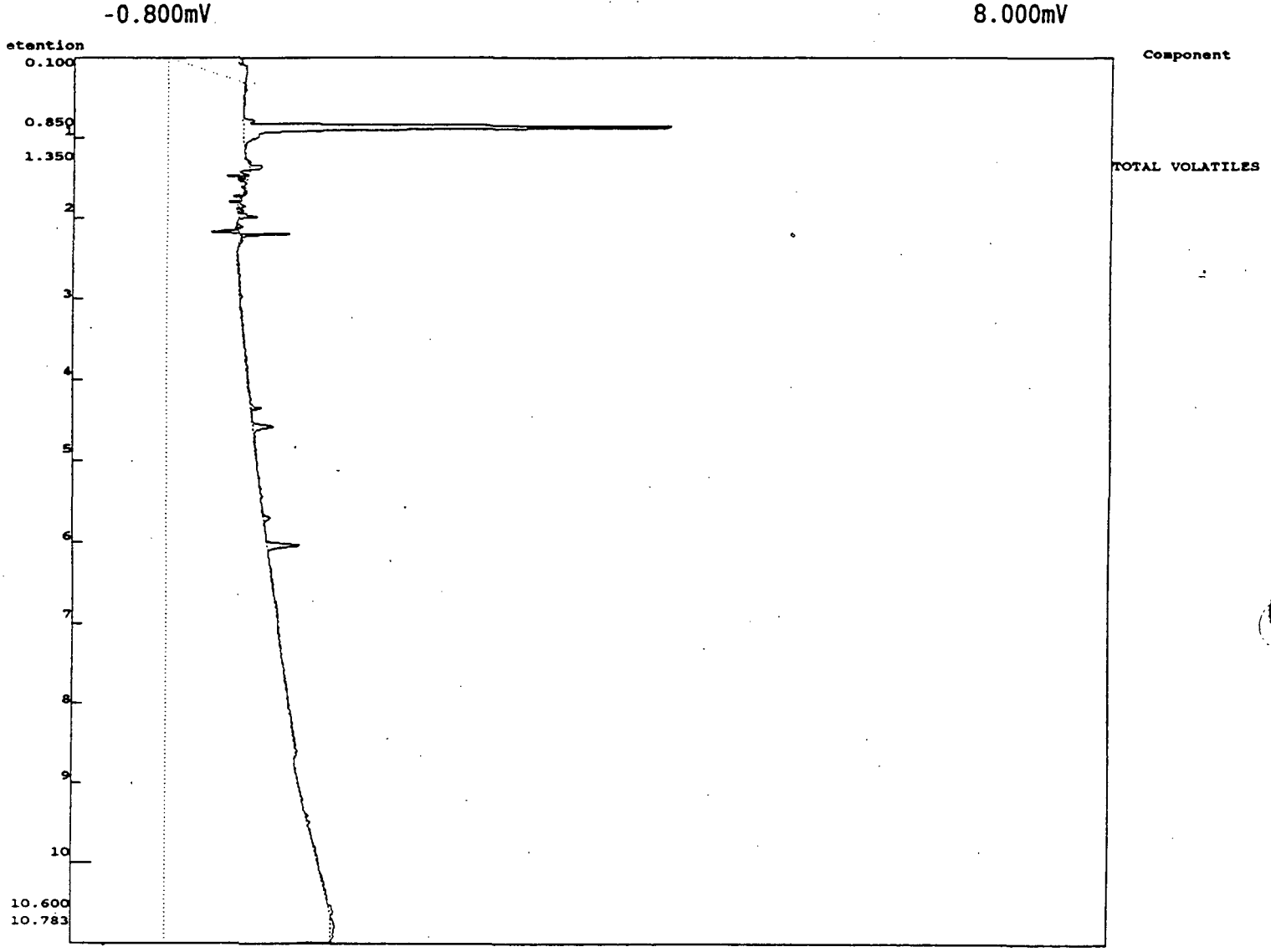
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.350	3.72 M	3.72	ug/L
	1		3.72	3.72	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F23.CHR (A:\)
Sample : SG-115
Operator : SGN



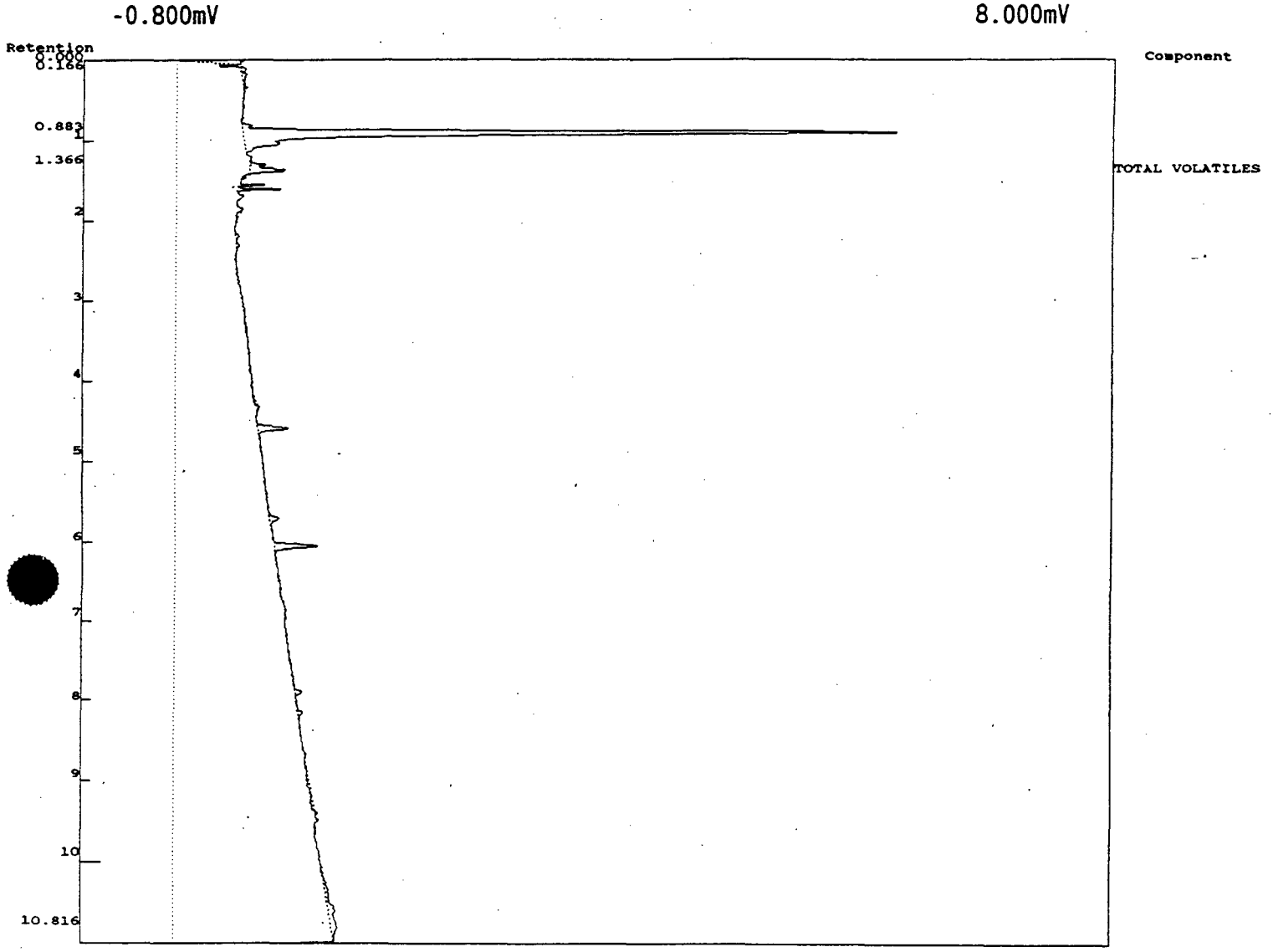
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	4.83 M	4.83	ug/L
	1		**4.83**	**4.83**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F24.CHR (A:\)
Sample : EB-14
Operator : SGN



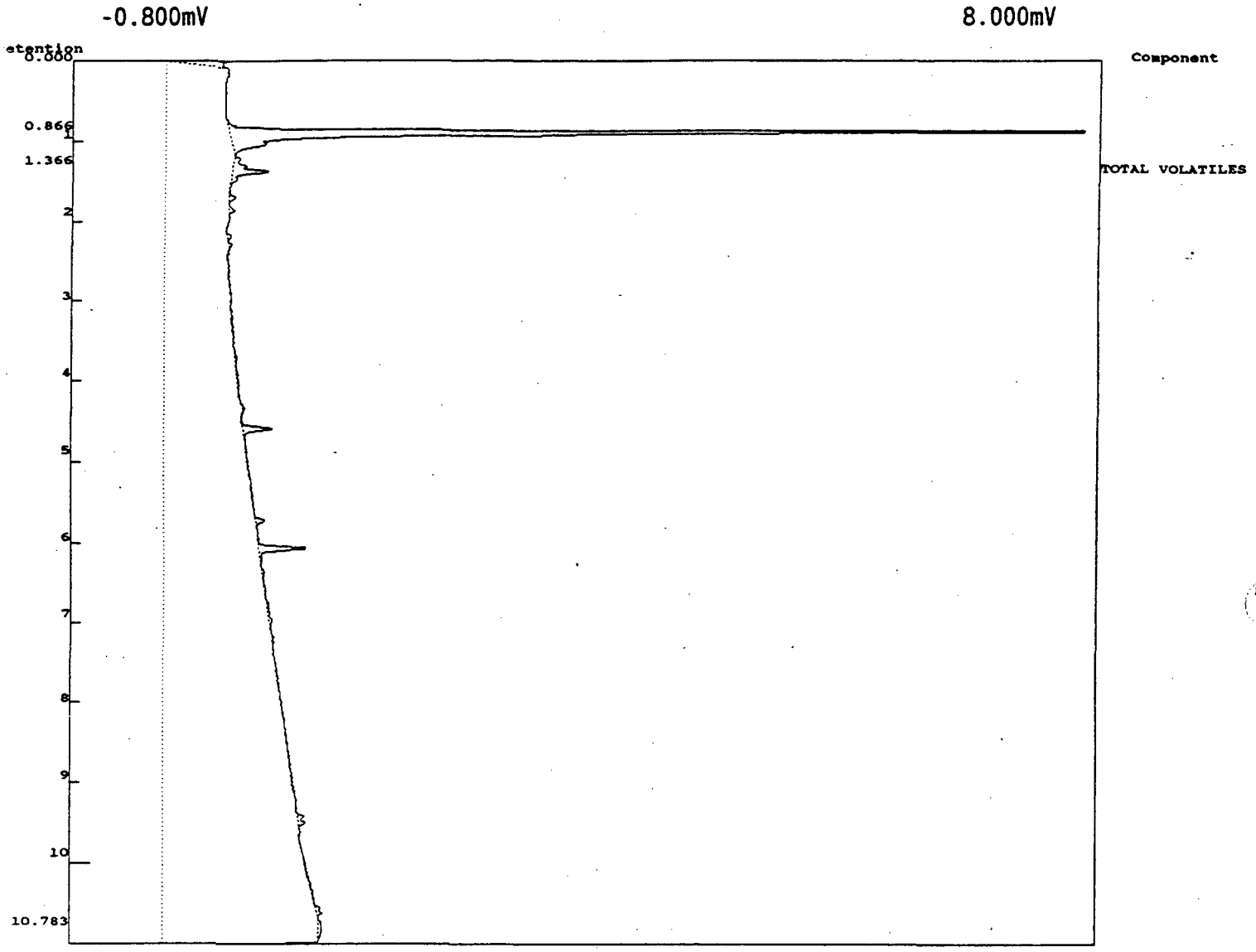
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.350	2.40 M	2.40	ug/L
	1		2.40	2.40	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F25.CHR (A:\)
Sample : SG-142
Operator : SGN



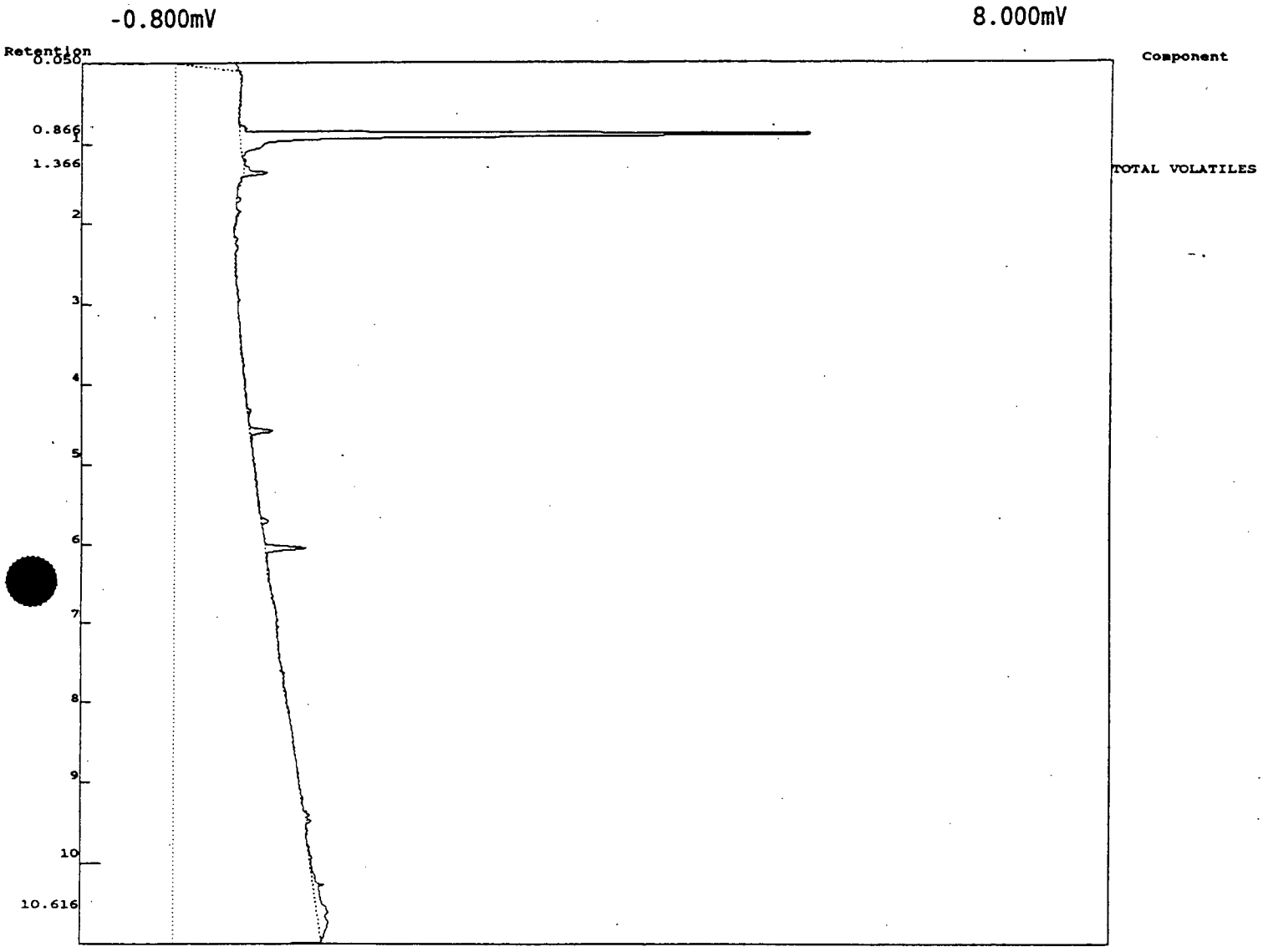
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	4.51 M	4.51	ug/L
	1		4.51	4.51	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F26.CHR (A:\)
Sample : SG-173
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.366	5.08 M	5.08	ug/L
	1		5.08	5.08	

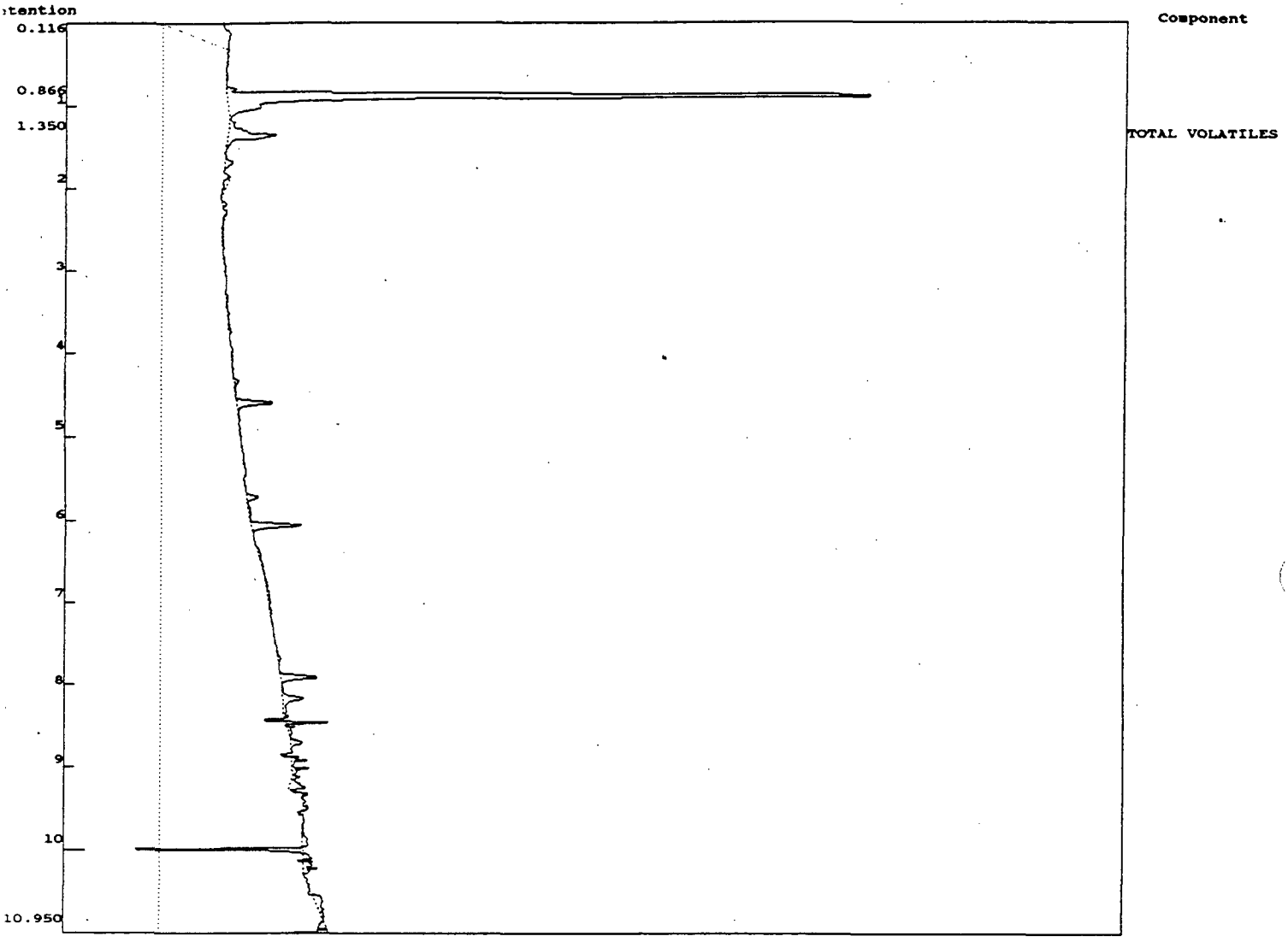
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F27.CHR (A:\)
Sample : SG-174
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	2.93 M	2.93	ug/L
	1		2.93	2.93	

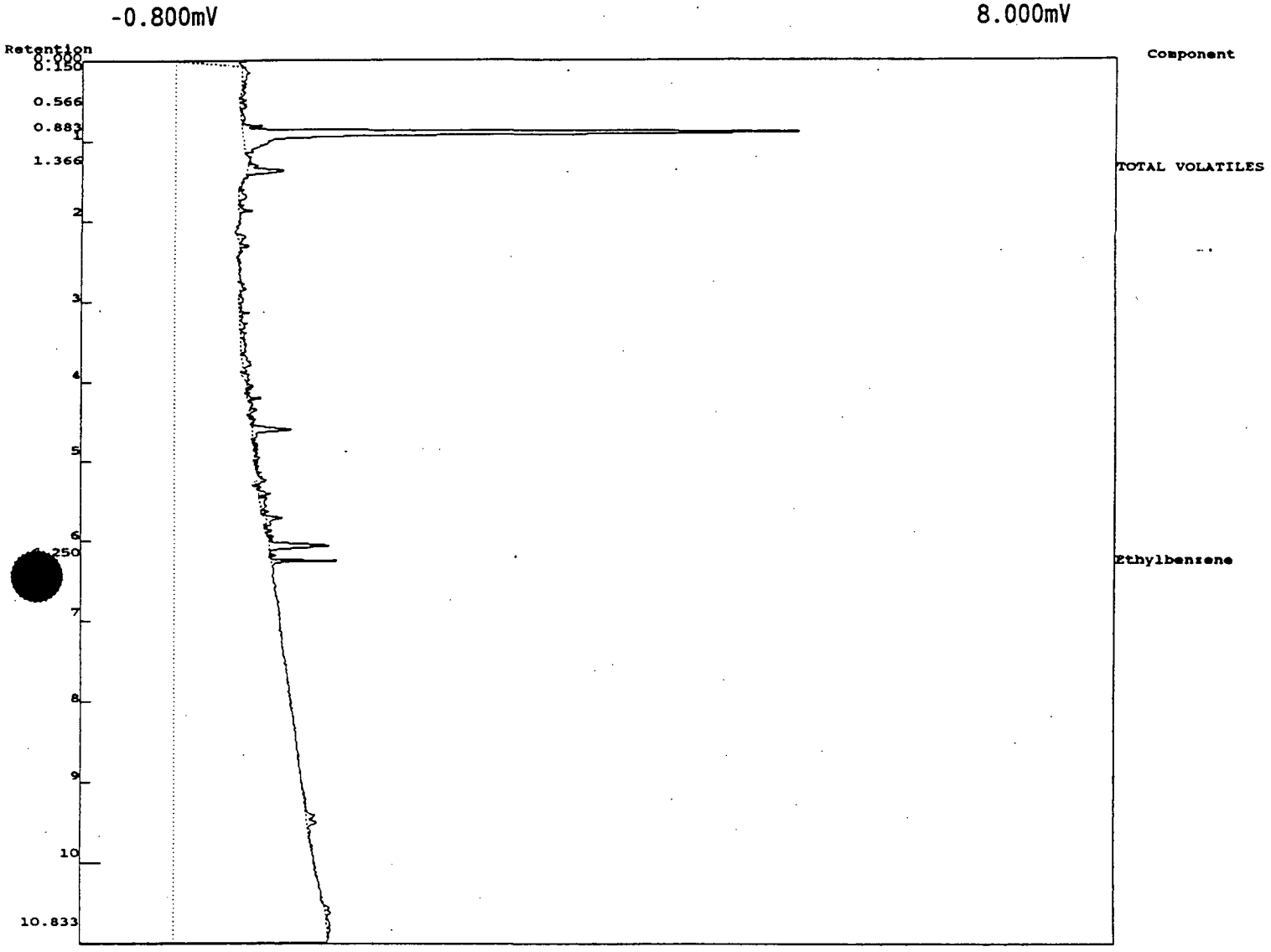
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F28.CHR (A:\)
Sample : SG-175
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.350	9.36	9.36	ug/L
	1		**9.36**	**9.36**	

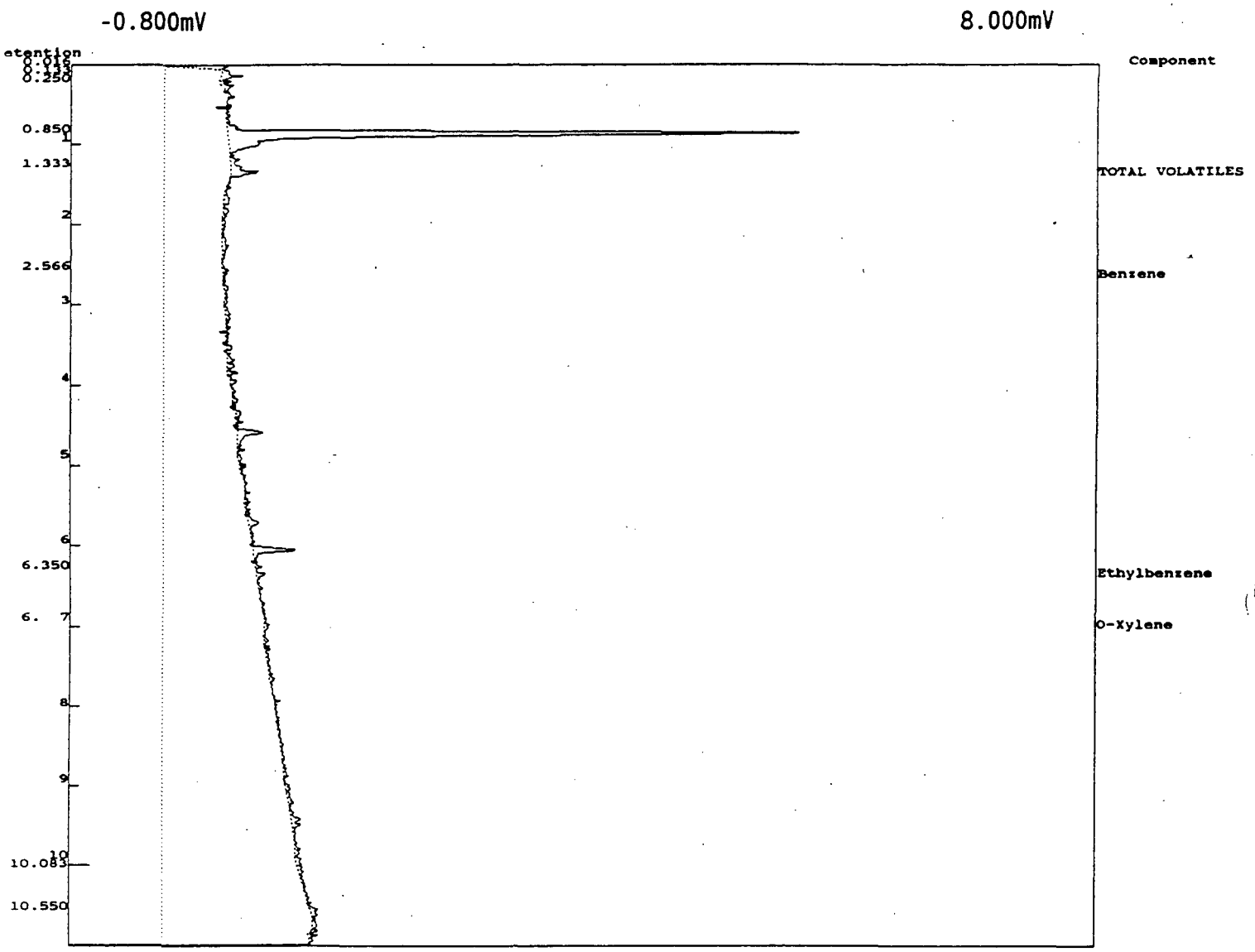
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F29.CHR (A:\)
Sample : SG-192
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	10.19 M	10.19	ug/L
Ethylbenzene	4	6.250	0.84 M	0.98	ug/L
	2		11.03	11.17	

300671

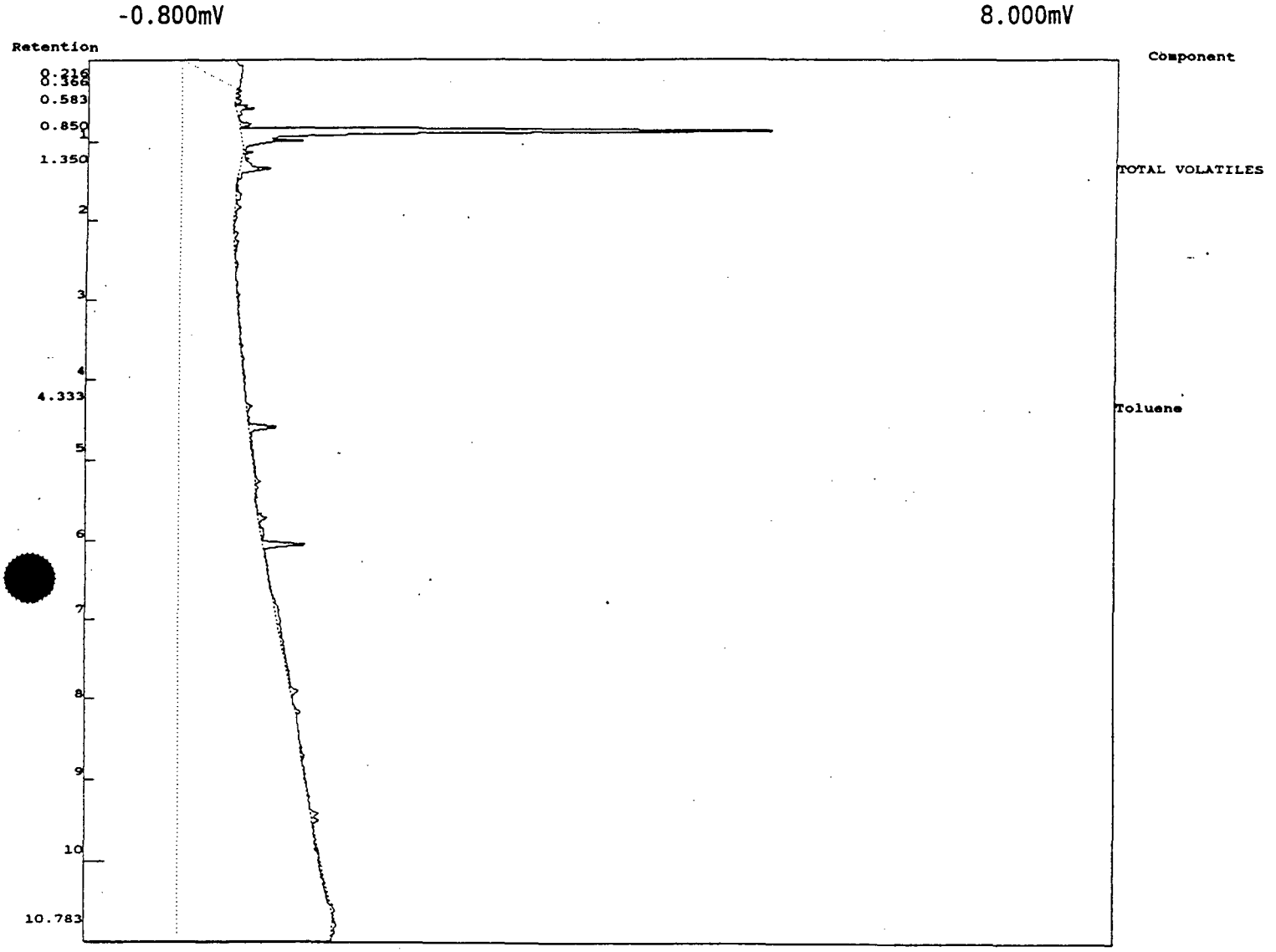
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F30.CHR (A:\)
Sample : SG-201
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.333	10.40 M	10.40	ug/L
enzene	2	2.566	0.20 M	0.17	ug/L
thylbenzene	4	6.350	0.23 M	0.27	ug/L
-Xylene	6	6.983	0.30 M	0.37	ug/L
	4		11.15	11.22	

300672

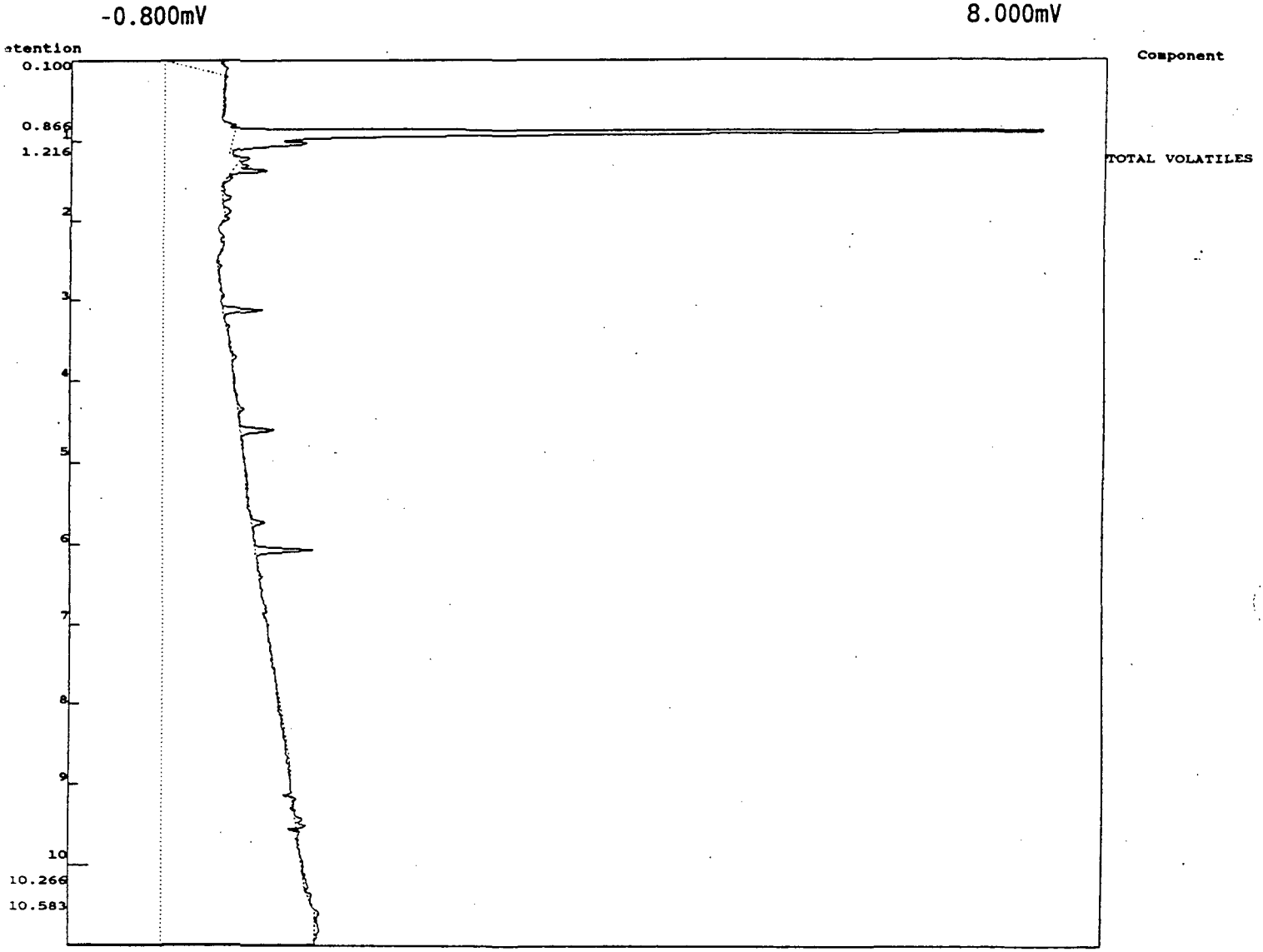
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F31.CHR (A:\)
Sample : SG-202
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	7.94	7.94	ug/L
Toluene	3	4.333	0.35	0.35	ug/L
	2		8.29	8.29	

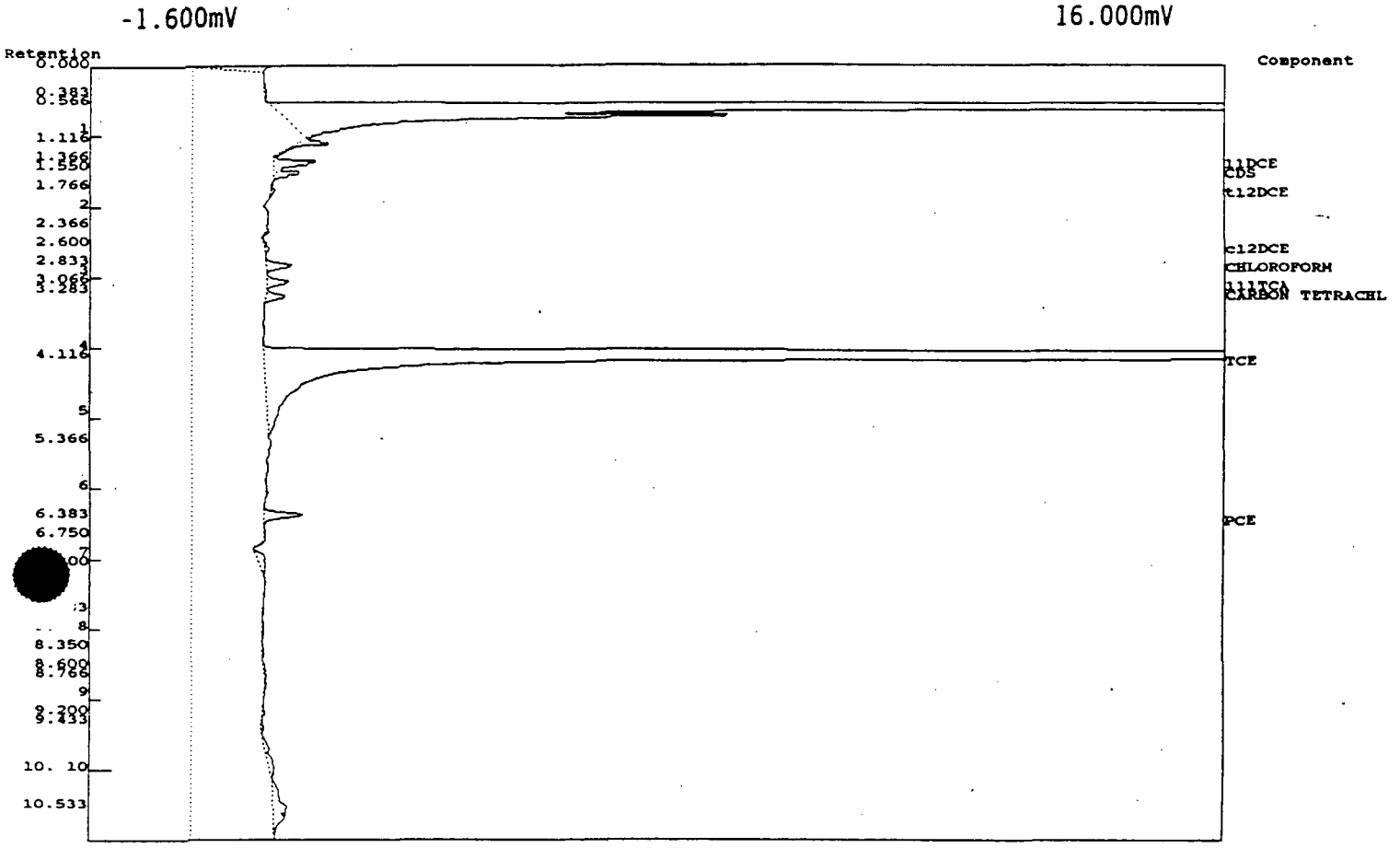
300673

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY30F32.CHR (A:\)
Sample : SG-011-R
Operator : SGN



Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	1.216	6.56 M	6.56	ug/L
	1		6.56	6.56	

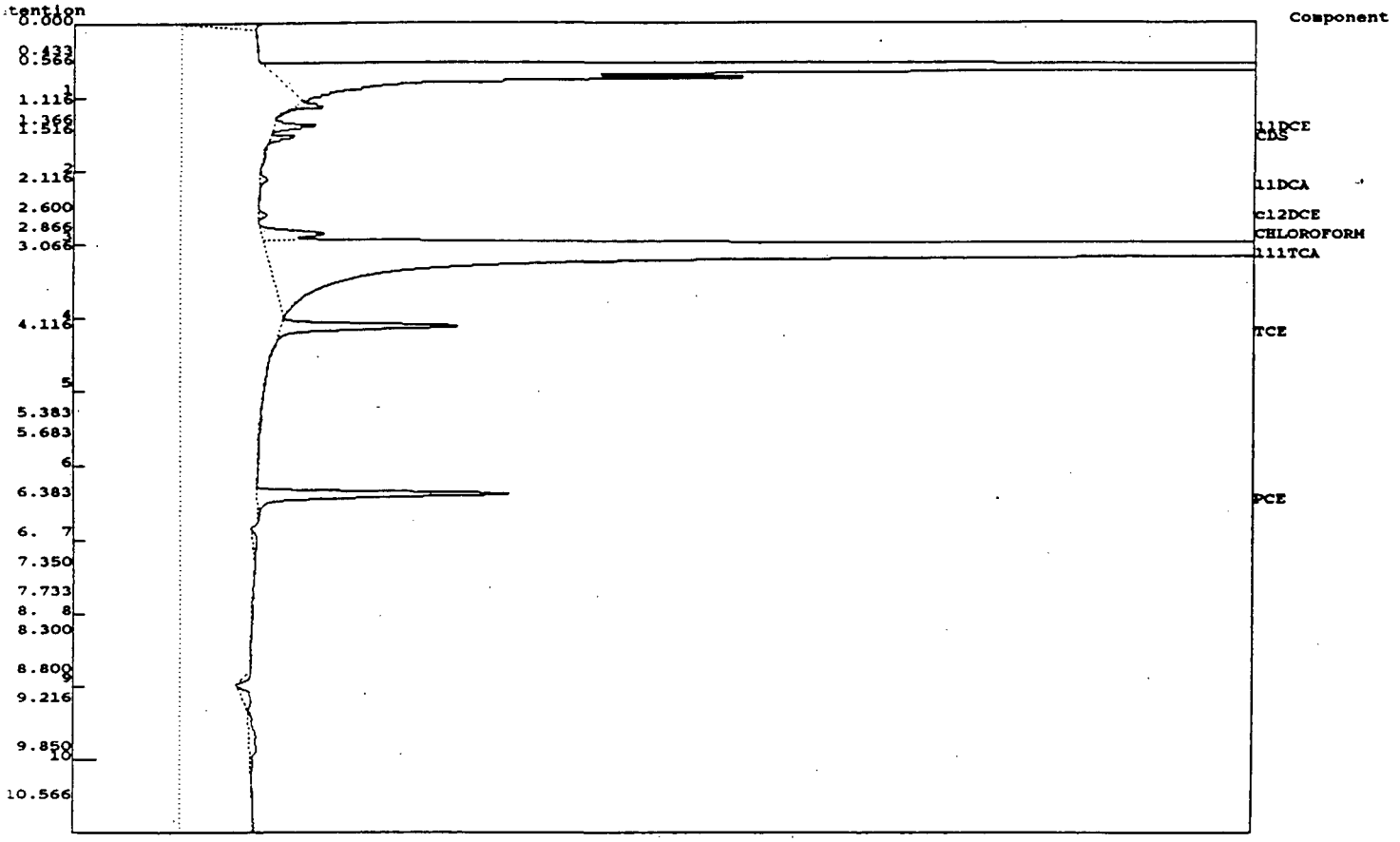
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 16:20:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E8.CHR (A:\)
Sample : SG-011
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.62 M	0.49	ug/L
CDS	0	1.550	1.88 M	N/A	
t12DCE	3	1.766	0.32 M	0.54	ug/L
c12DCE	5	2.600	0.31 M	0.71	ug/L
CHLOROFORM	6	2.833	2.19 M	0.03	ug/L
111TCA	7	3.066	1.79 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.283	1.64 M	0.00	ug/L
TCE	9	4.116	353.03	4.35	ug/L
PCE	11	6.383	3.36 M	0.01	ug/L
	9		368.15	5.15	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 16:44:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E9.CHR (A:\)
Sample : SG-024
Operator : SGN

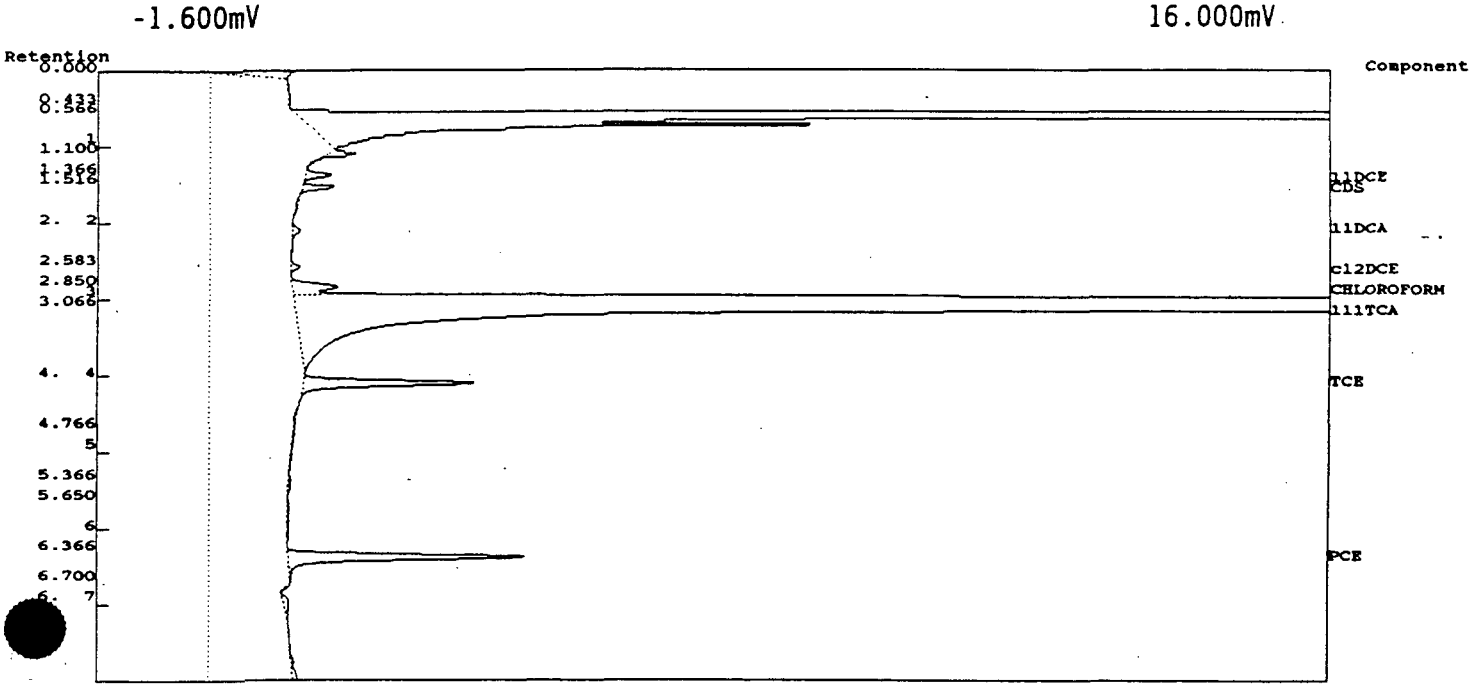
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
DCE	1	1.366	2.92	0.39	ug/L
S	0	1.516	1.43 M	N/A	
DCA	4	2.116	0.73 M	0.67	ug/L
2DCE	5	2.600	0.65	1.48	ug/L
LOROFORM	6	2.866	5.47 M	0.08	ug/L
1TCA	7	3.066	1050.03 M	6.30	ug/L
E	9	4.116	14.35 M	0.18	ug/L
E	11	6.383	20.98 M	0.08	ug/L
	8		1096.55	8.19	

300676

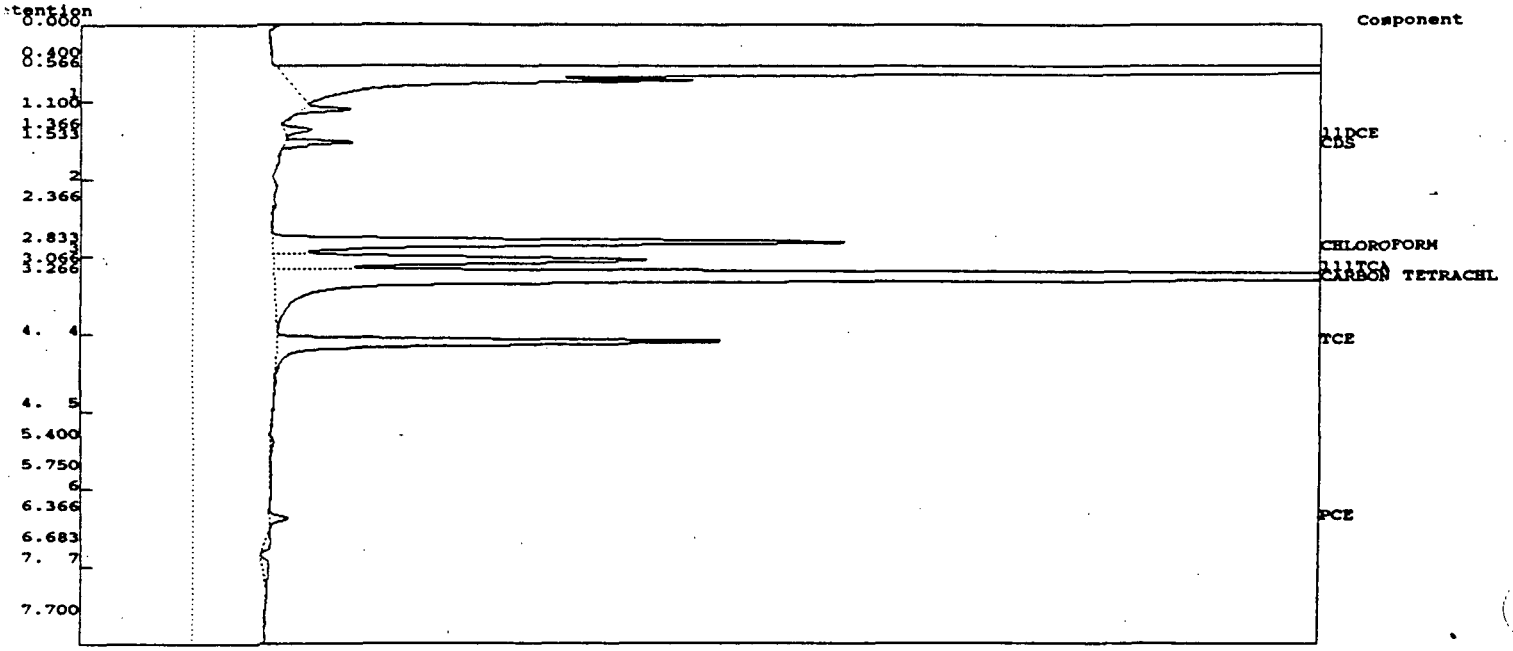
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 17:06:32
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E10.CHR (A:\)
Sample : SG-924
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.73	0.23	ug/L
CDS	0	1.516	1.65 M	N/A	
11DCA	4	2.100	0.72 M	0.67	ug/L
c12DCE	5	2.583	0.67 M	1.52	ug/L
CHLOROFORM	6	2.850	4.11 M	0.06	ug/L
111TCA	7	3.066	722.94 M	4.34	ug/L
TCE	9	4.100	13.04 M	0.16	ug/L
PCE	11	6.366	18.79 M	0.07	ug/L
	8		763.65	6.05	

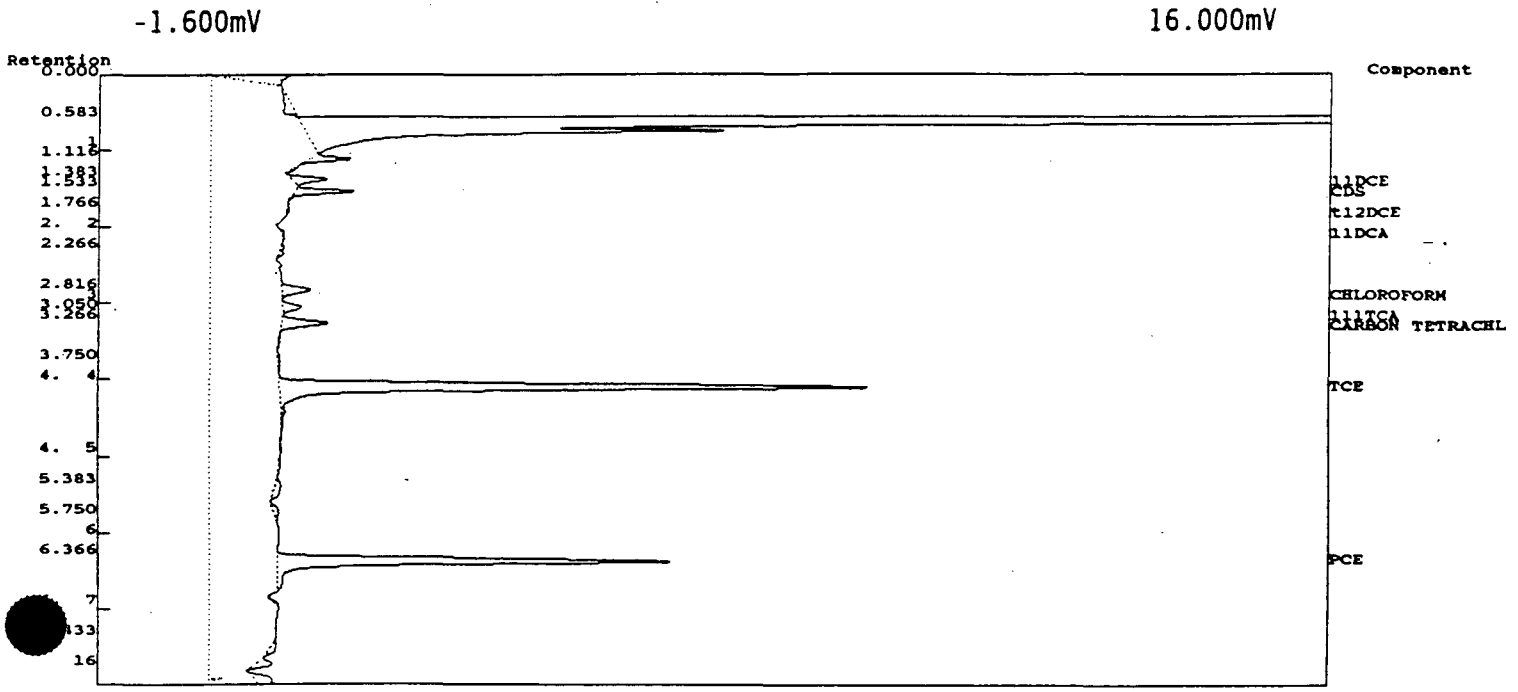
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 17:25:38
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E11.CHR (A:\)
Sample : SG-042
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	1.81	0.24	ug/L
)S	0	1.533	3.89 M	N/A	
HLOROFORM	6	2.833	46.17 M	0.69	ug/L
1TCA	7	3.066	34.01 M	0.20	ug/L
RBON TETRACHLORIDE	8	3.266	222.01 M	0.09	ug/L
E	9	4.100	36.66 M	0.45	ug/L
E	11	6.366	1.52 M	0.01	ug/L
	7		346.07	0.69	

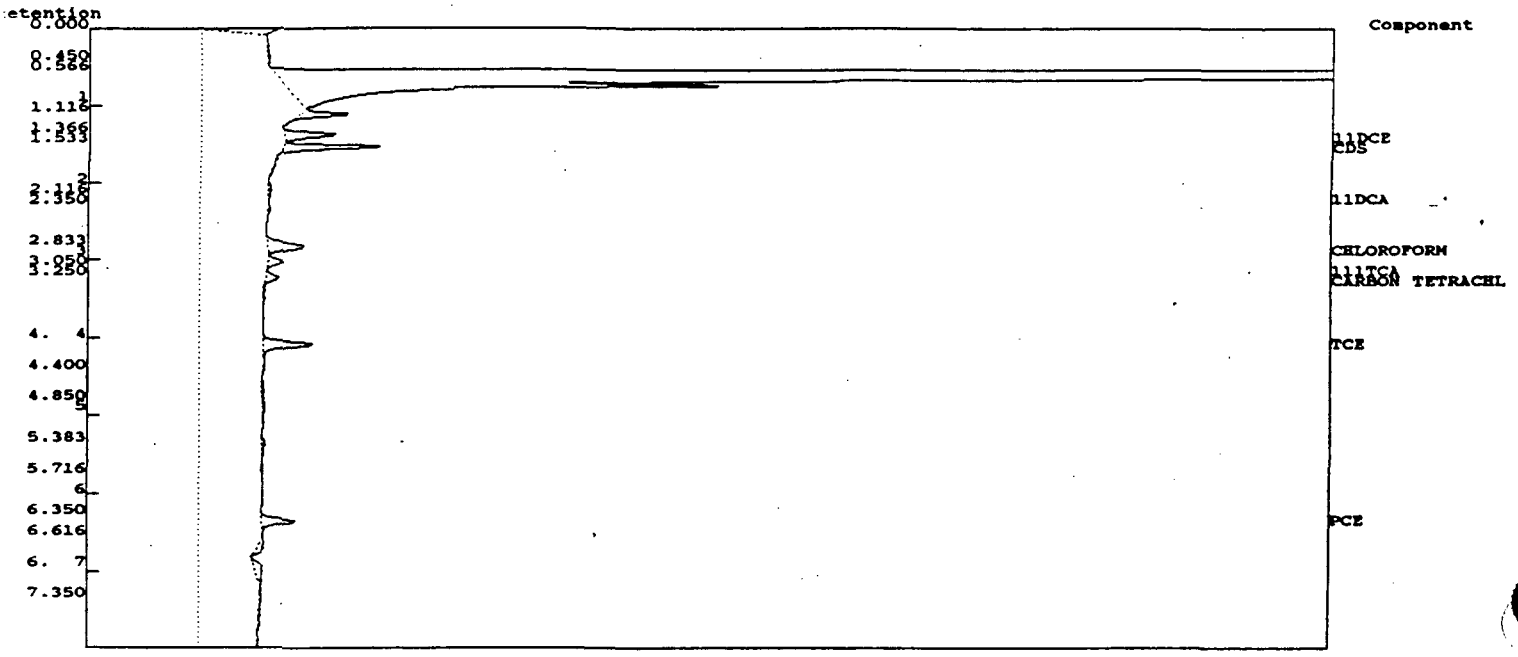
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 17:44:39
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E12.CHR (A:\)
Sample : SG-045
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	2.30	0.31	ug/L
CDS	0	1.533	3.00	N/A	
t12DCE	3	1.766	0.14 M	0.24	ug/L
11DCA	4	2.066	0.20 M	0.18	ug/L
CHLOROFORM	6	2.816	2.44 M	0.04	ug/L
111TCA	7	3.050	1.44	0.01	ug/L
CARBON TETRACHLORIDE	8	3.266	3.90	0.00	ug/L
TCE	9	4.100	48.29 M	0.59	ug/L
PCE	11	6.366	32.29 M	0.12	ug/L
	9		**94.01**	**0.49**	

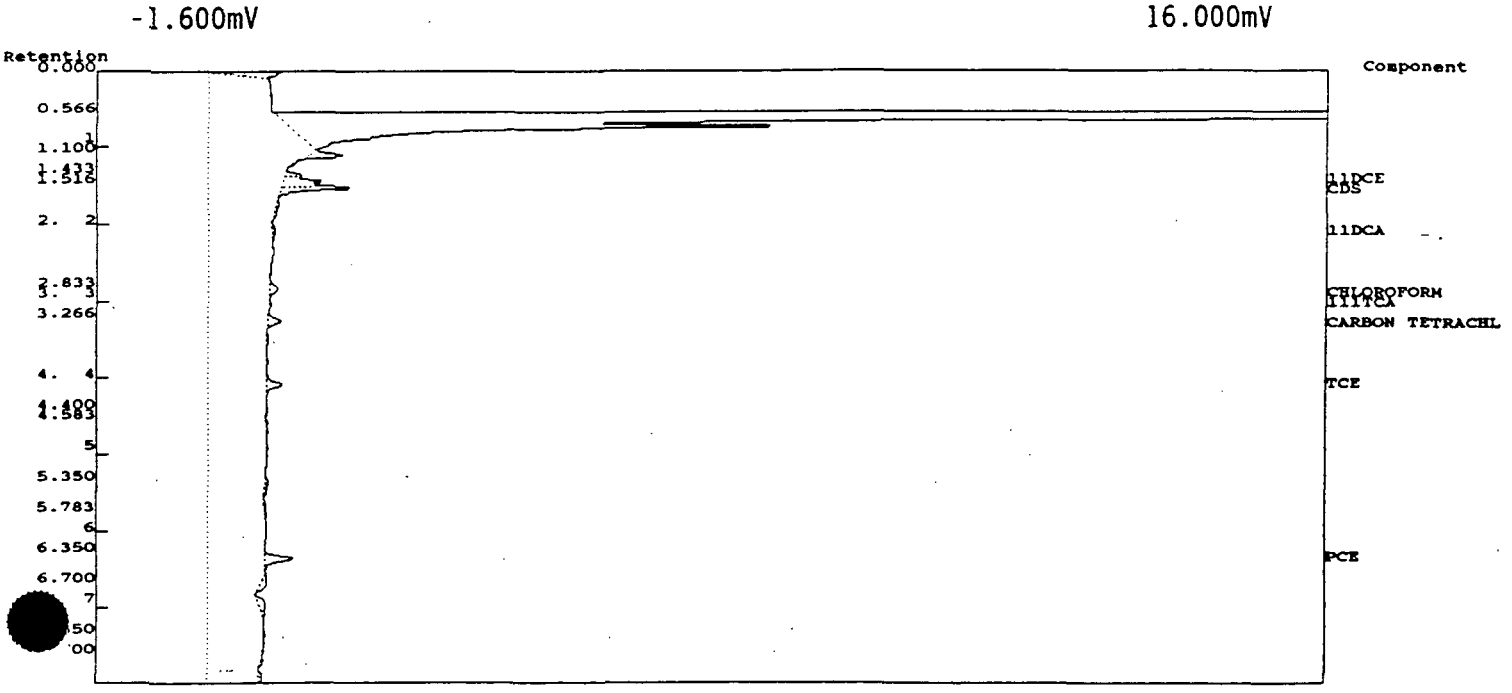
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 18:03:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E13.CHR (A:\)
Sample : SG-046
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	3.41	0.46	ug/L
DS	0	1.533	5.20	N/A	
1DCA	4	2.116	0.41	0.38	ug/L
HLOROFORM	6	2.833	3.40	0.05	ug/L
11TCA	7	3.050	1.16	0.01	ug/L
ARBON TETRACHLORIDE	8	3.250	1.00	0.00	ug/L
CE	9	4.083	3.79	0.05	ug/L
CE	11	6.350	2.51	0.01	ug/L
	8		20.88	N/A	

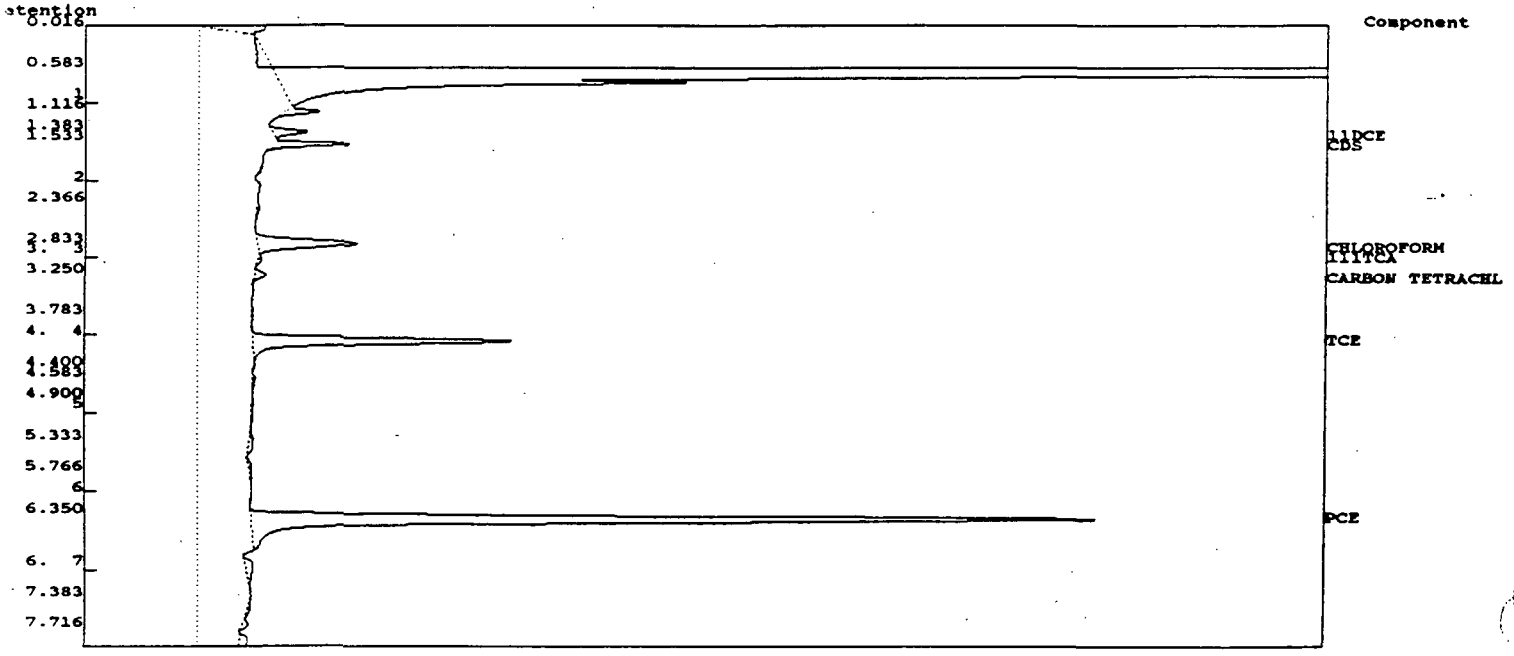
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 18:22:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E14.CHR (A:\)
Sample : SG-063
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	0.18 M	0.02	ug/L
11DCE	1	1.433	2.83 M	0.38	ug/L
CDS	0	1.516	4.88 M	N/A	
11DCA	4	2.066	0.43	0.39	ug/L
CHLOROFORM	6	2.833	0.76	0.01	ug/L
111TCA	7	3.033	0.13	0.00	ug/L
CARBON TETRACHLORIDE	8	3.266	1.04	0.00	ug/L
TCE	9	4.083	1.34	0.02	ug/L
PCE	11	6.350	2.25	0.01	ug/L
	9		13.85	N/A	

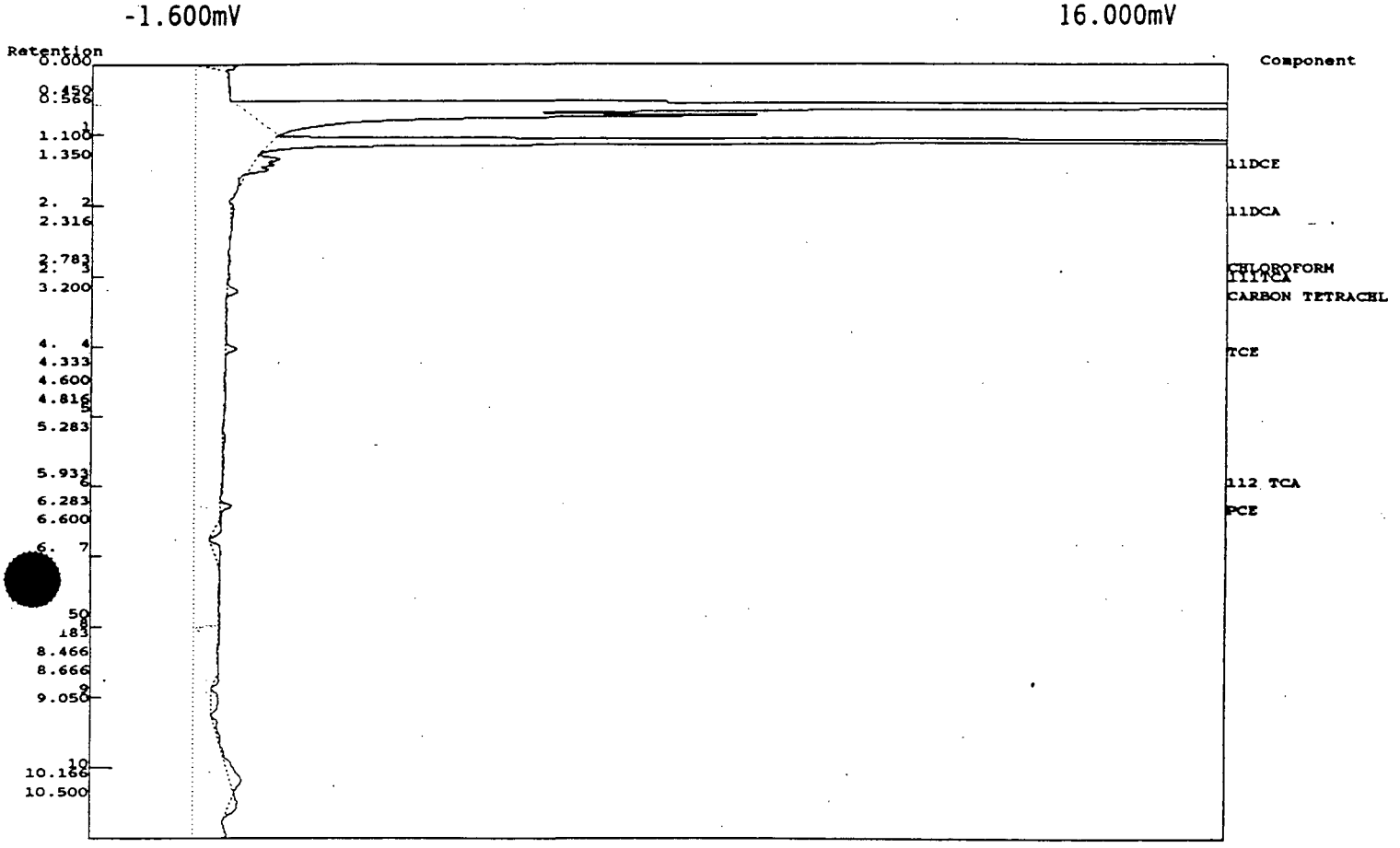
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 18:41:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E15.CHR (A:\)
Sample : SG-064
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	2.20	0.30	ug/L
DS	0	1.533	3.20 M	N/A	
HLOROFORM	6	2.833	9.97 M	0.15	ug/L
11TCA	7	3.033	0.31 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.250	0.86 M	0.00	ug/L
CE	9	4.083	20.60 M	0.25	ug/L
CE	11	6.350	70.31 M	0.26	ug/L
	7		107.46	N/A	

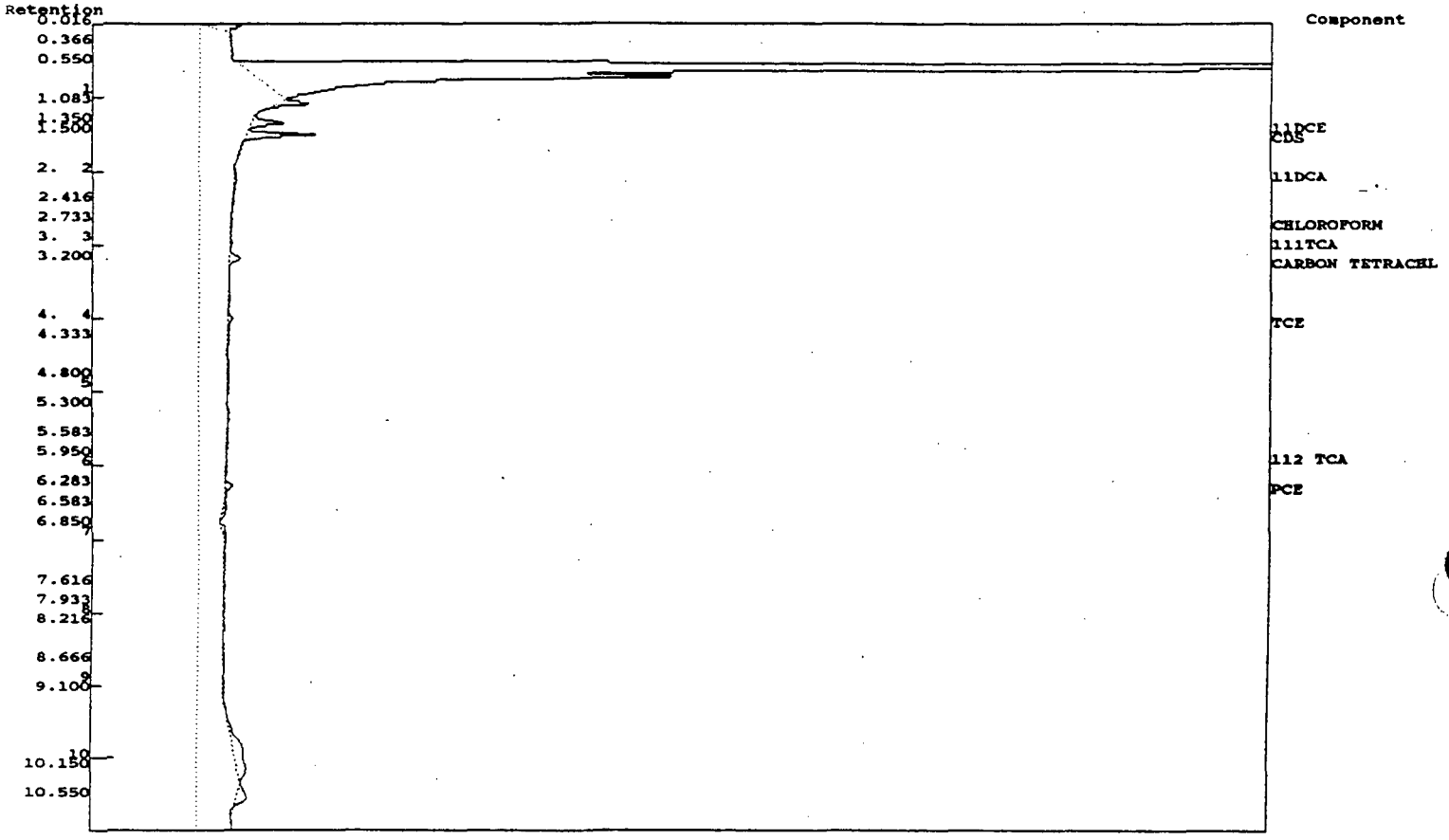
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 19:57:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E19.CHR (A:\)
Sample : SG-053
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	3.52	0.48	ug/L
11DCA	4	2.050	0.56	0.51	ug/L
CHLOROFORM	6	2.783	0.22	0.00	ug/L
111TCA	7	2.983	0.16	0.00	ug/L
CARBON TETRACHLORIDE	8	3.200	1.01	0.00	ug/L
TCE	9	4.033	1.00	0.01	ug/L
112 TCA	10	5.933	0.18	0.02	ug/L
PCE	11	6.283	1.00	0.00	ug/L
	8		7.65	1.02	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 20:16:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E20.CHR (A:\)
Sample : EB-12
Operator : SGN

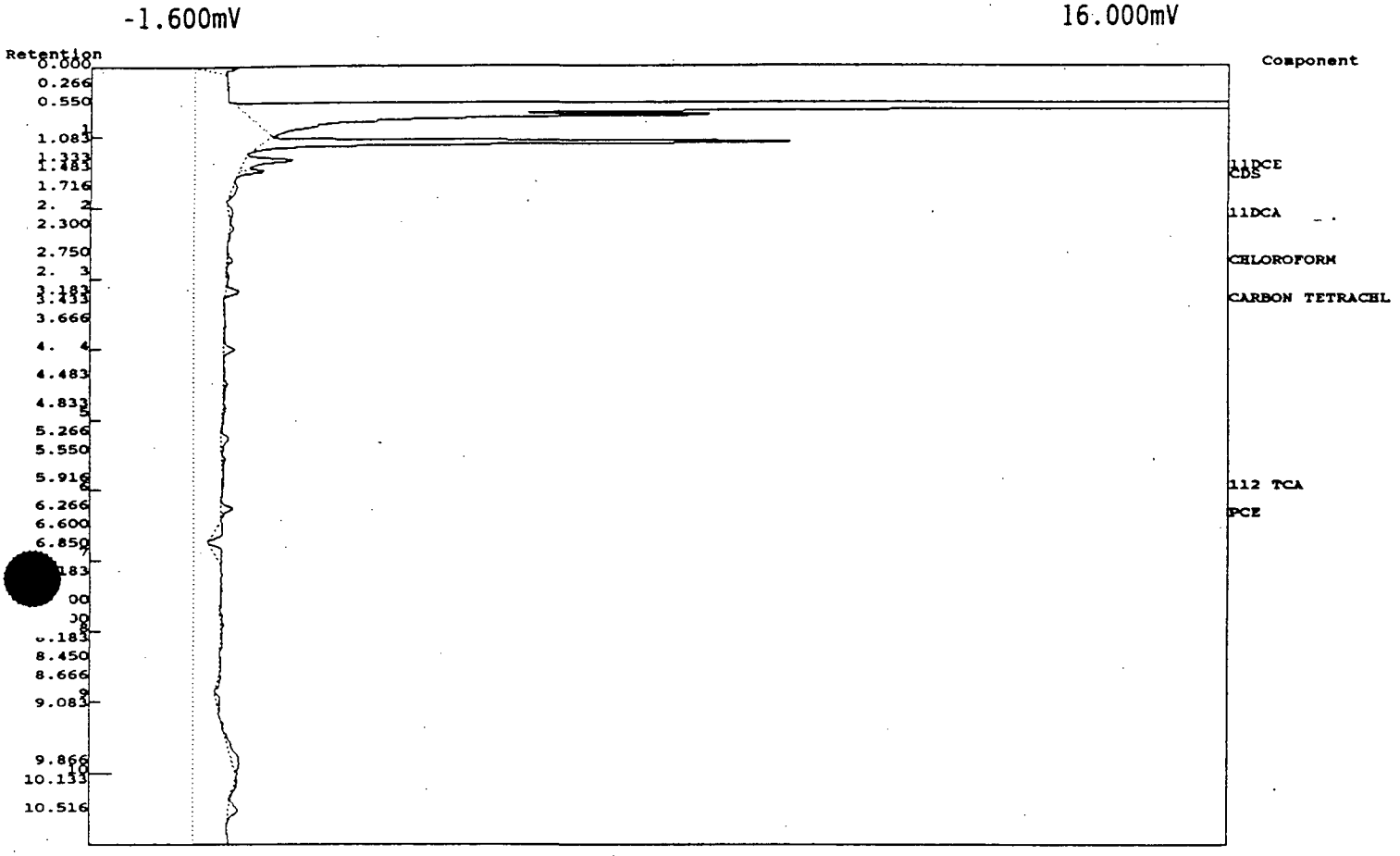
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	2.11	0.29	ug/L
DS	0	1.500	3.29	N/A	
1DCA	4	2.100	0.44	0.41	ug/L
HLOROFORM	6	2.733	0.10	0.00	ug/L
11TCA	7	3.000	0.14	0.00	ug/L
ARBON TETRACHLORIDE	8	3.200	0.93	0.00	ug/L
CE	9	4.016	0.33	0.00	ug/L
12 TCA	10	5.950	0.17	0.01	ug/L
CE	11	6.283	0.70	0.00	ug/L
9			8.21	N/A	

300684

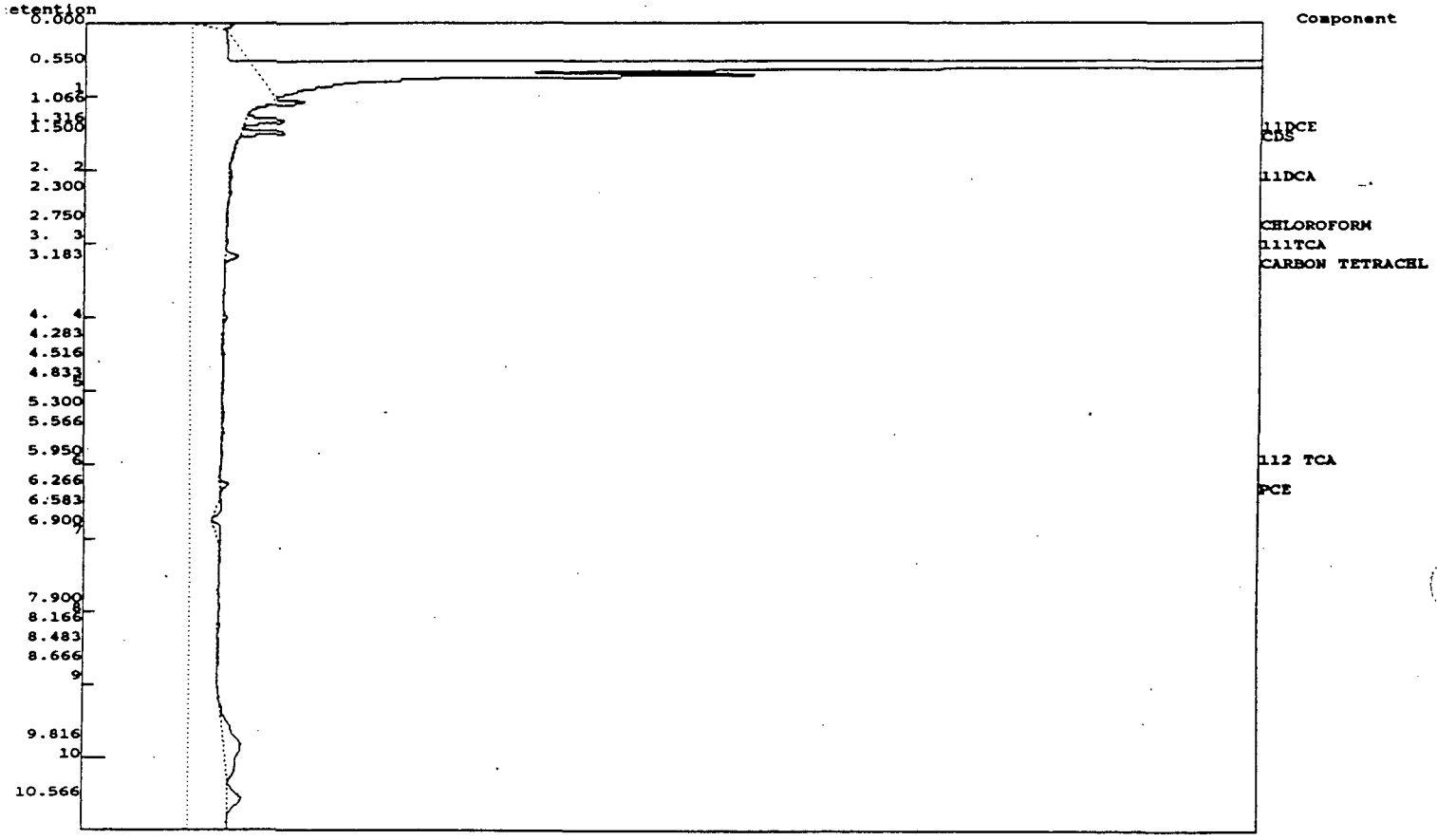
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 20:35:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E21.CHR (A:\)
Sample : SG-084
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	4.04 M	0.55	ug/L
CDS	0	1.483	1.56 M	N/A	
11DCA	4	2.083	0.64	0.58	ug/L
CHLOROFORM	6	2.750	0.53	0.01	ug/L
CARBON TETRACHLORIDE	8	3.183	1.20	0.00	ug/L
112 TCA	10	5.916	0.12	0.01	ug/L
PCE	11	6.266	1.03	0.00	ug/L
	7		9.13	0.15	

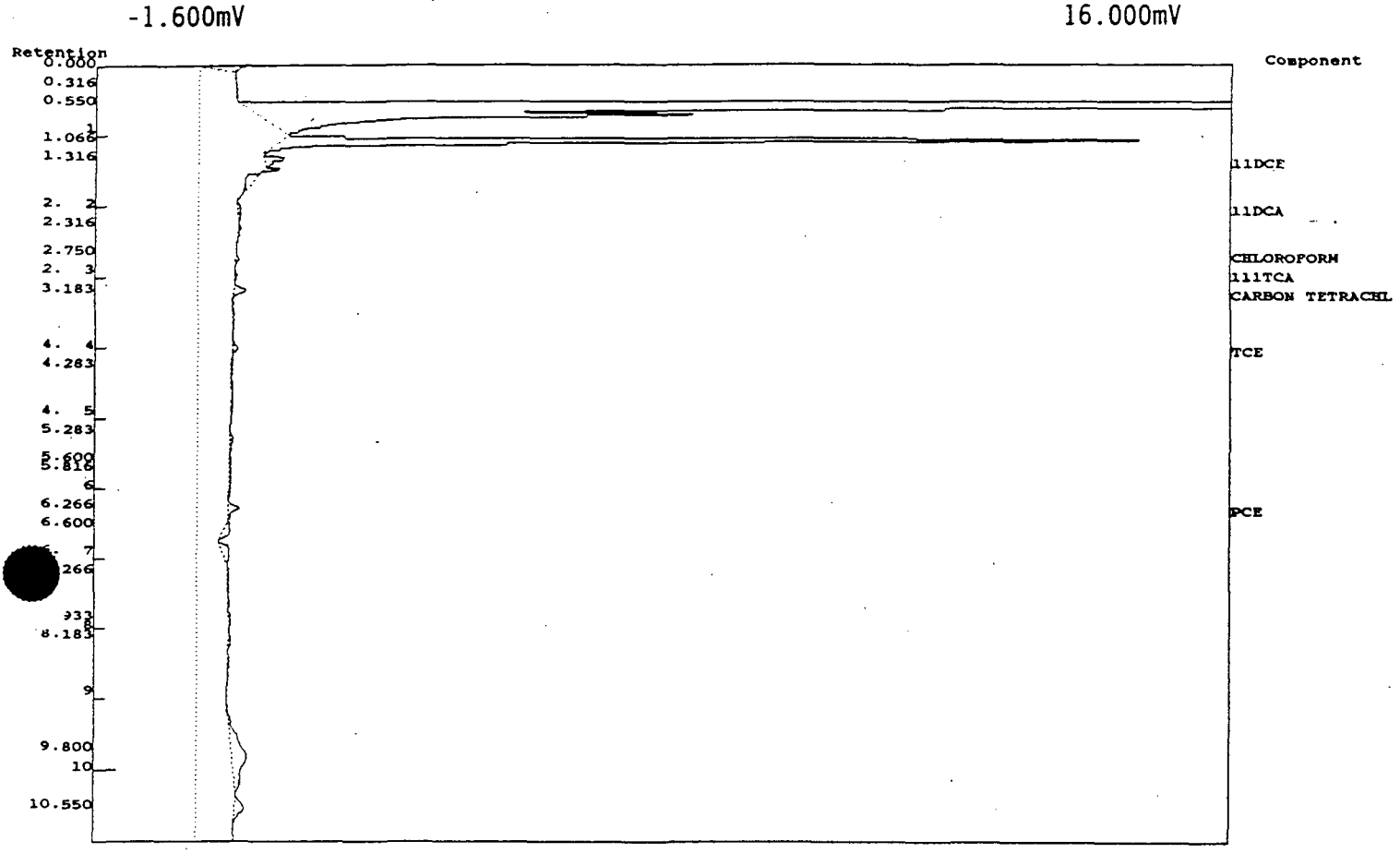
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 20:54:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E22.CHR (A:\)
Sample : EB-13
Operator : SGN

-1.600mV 16.000mV



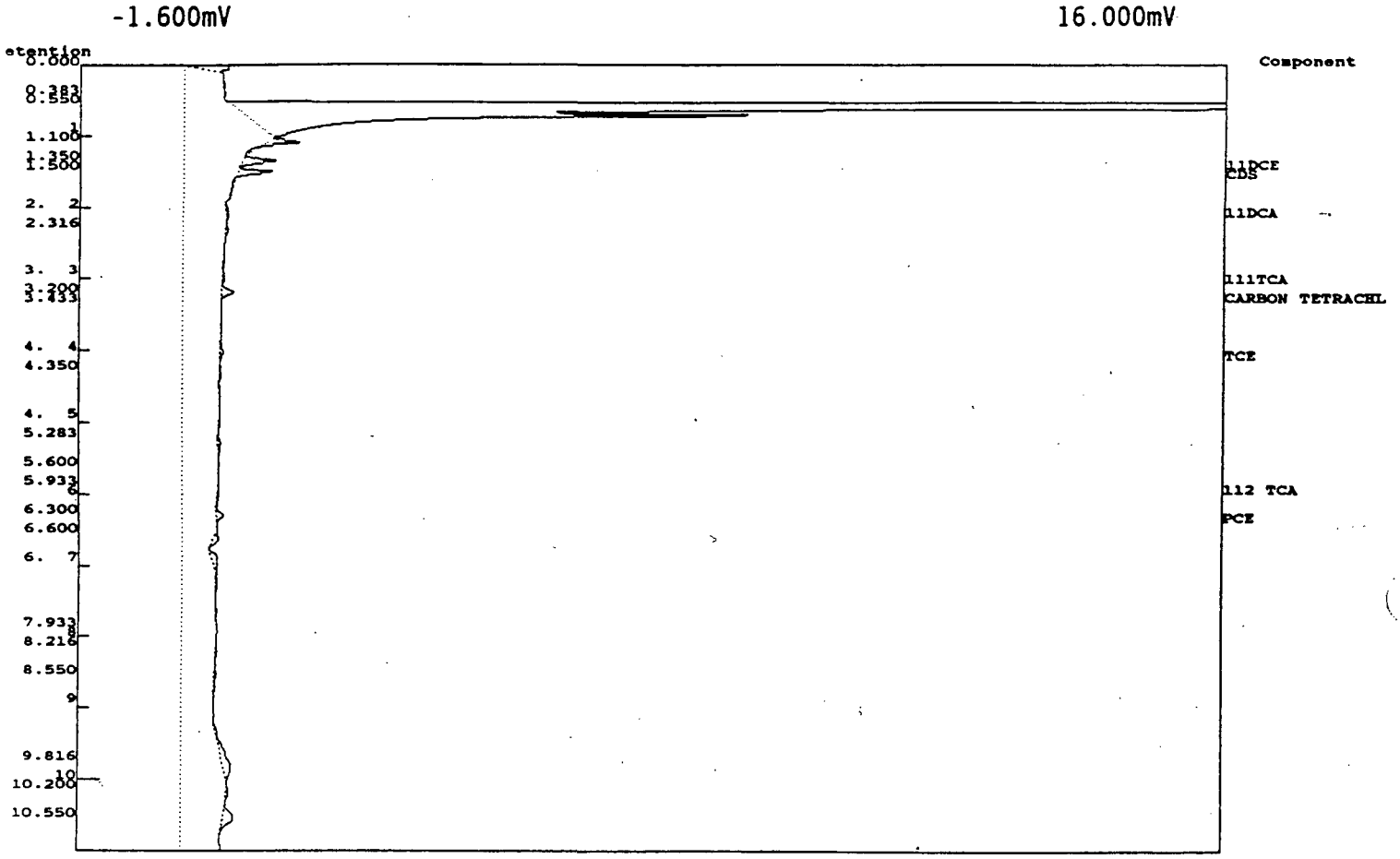
Component	Number	Retention	Area	External	Units
1DCE	1	1.316	2.88	0.39	ug/L
DS	0	1.500	2.40	N/A	
1DCA	4	2.083	0.29	0.26	ug/L
HLOROFORM	6	2.750	0.12	0.00	ug/L
11TCA	7	3.000	0.14	0.00	ug/L
ARBON TETRACHLORIDE	8	3.183	1.08	0.00	ug/L
12 TCA	10	5.950	0.11	0.01	ug/L
CE	11	6.266	0.73	0.00	ug/L
	8		7.77	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 21:13:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E23.CHR (A:\)
Sample : SG-115
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	1.54	0.21	ug/L
11DCA	4	2.050	0.48	0.44	ug/L
CHLOROFORM	6	2.750	0.20	0.00	ug/L
111TCA	7	2.983	0.16	0.00	ug/L
CARBON TETRACHLORIDE	8	3.183	1.03	0.00	ug/L
TCE	9	4.016	0.49	0.01	ug/L
PCE	11	6.266	0.95	0.00	ug/L
	7		4.86	0.67	

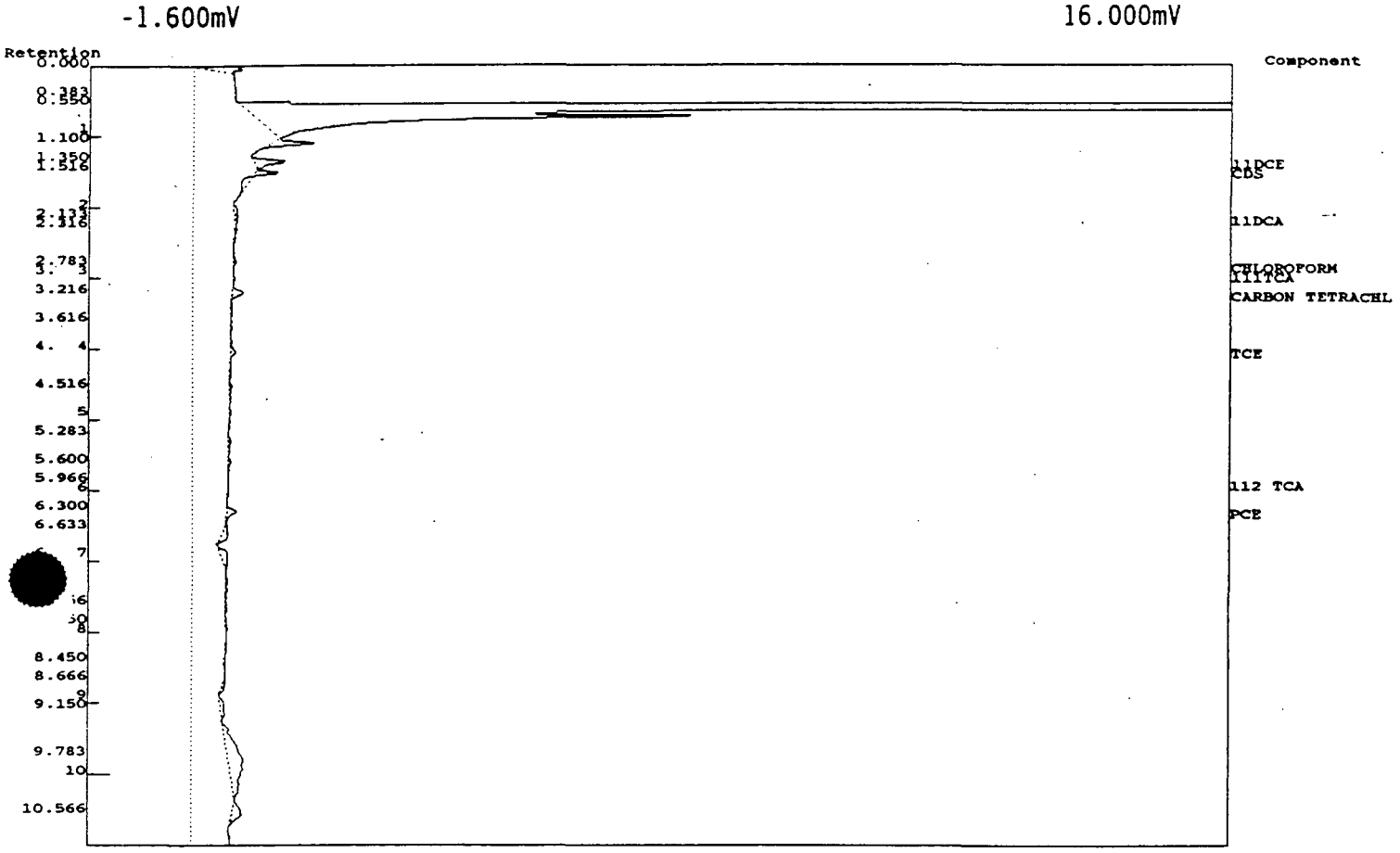
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 21:32:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E24.CHR (A:\)
Sample : EB-14
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	2.18	0.30	ug/L
)S	0	1.500	1.75	N/A	
1DCA	4	2.050	0.27	0.25	ug/L
11TCA	7	3.000	0.17	0.00	ug/L
ARBON TETRACHLORIDE	8	3.200	1.08	0.00	ug/L
:E	9	4.016	0.34	0.00	ug/L
12 TCA	10	5.933	0.18	0.02	ug/L
:E	11	6.300	0.66	0.00	ug/L
	8		6.63	N/A	

300688

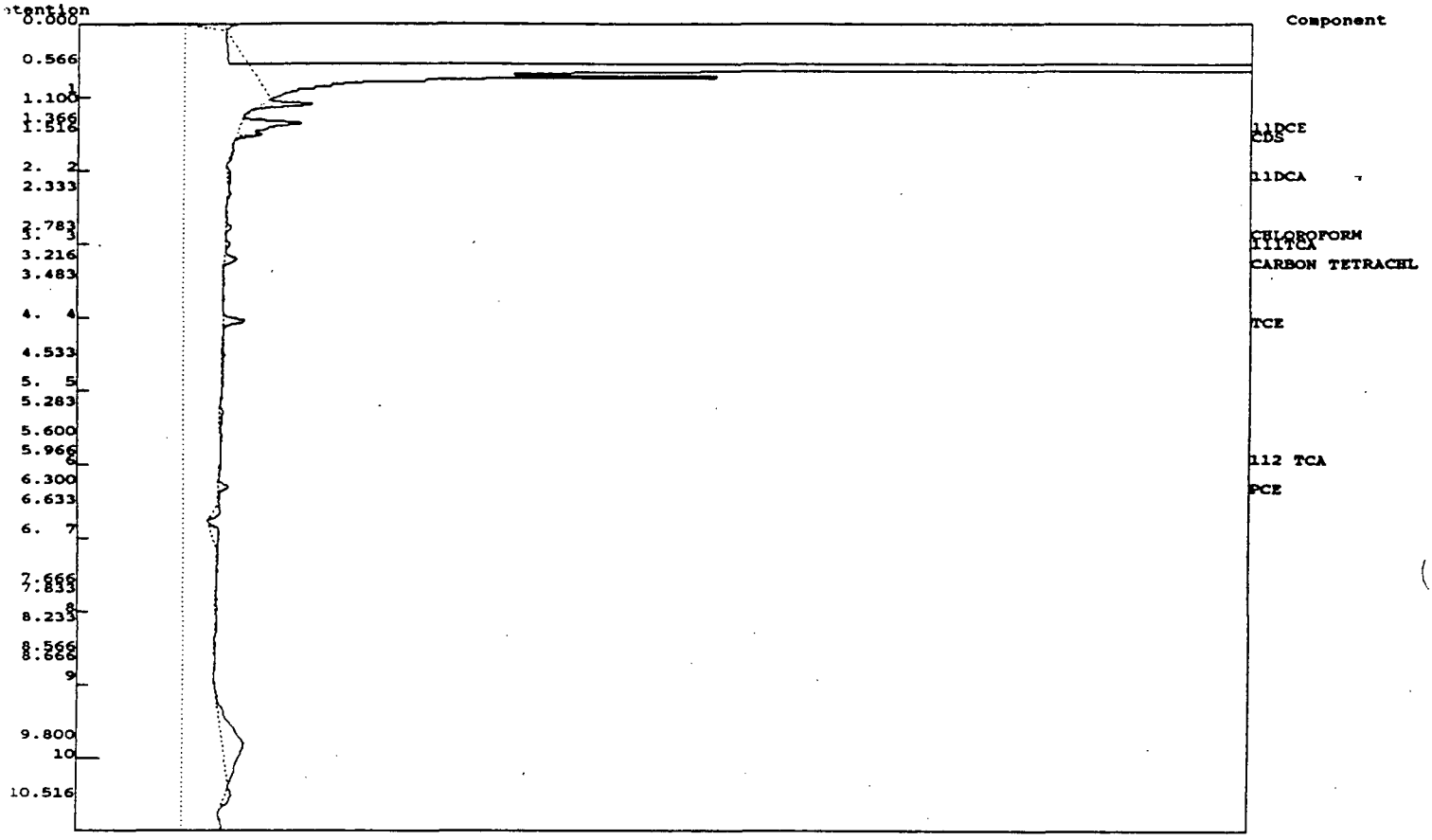
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 21:51:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E25.CHR (A:\)
Sample : SG-142
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	2.25	0.30	ug/L
CDS	0	1.516	0.14	N/A	
11DCA	4	2.133	0.56	0.52	ug/L
CHLOROFORM	6	2.783	0.31	0.00	ug/L
111TCA	7	3.016	0.15	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	1.02	0.00	ug/L
TCE	9	4.033	0.49	0.01	ug/L
112 TCA	10	5.966	0.10	0.01	ug/L
PCE	11	6.300	0.92	0.00	ug/L
	9		5.96	N/A	

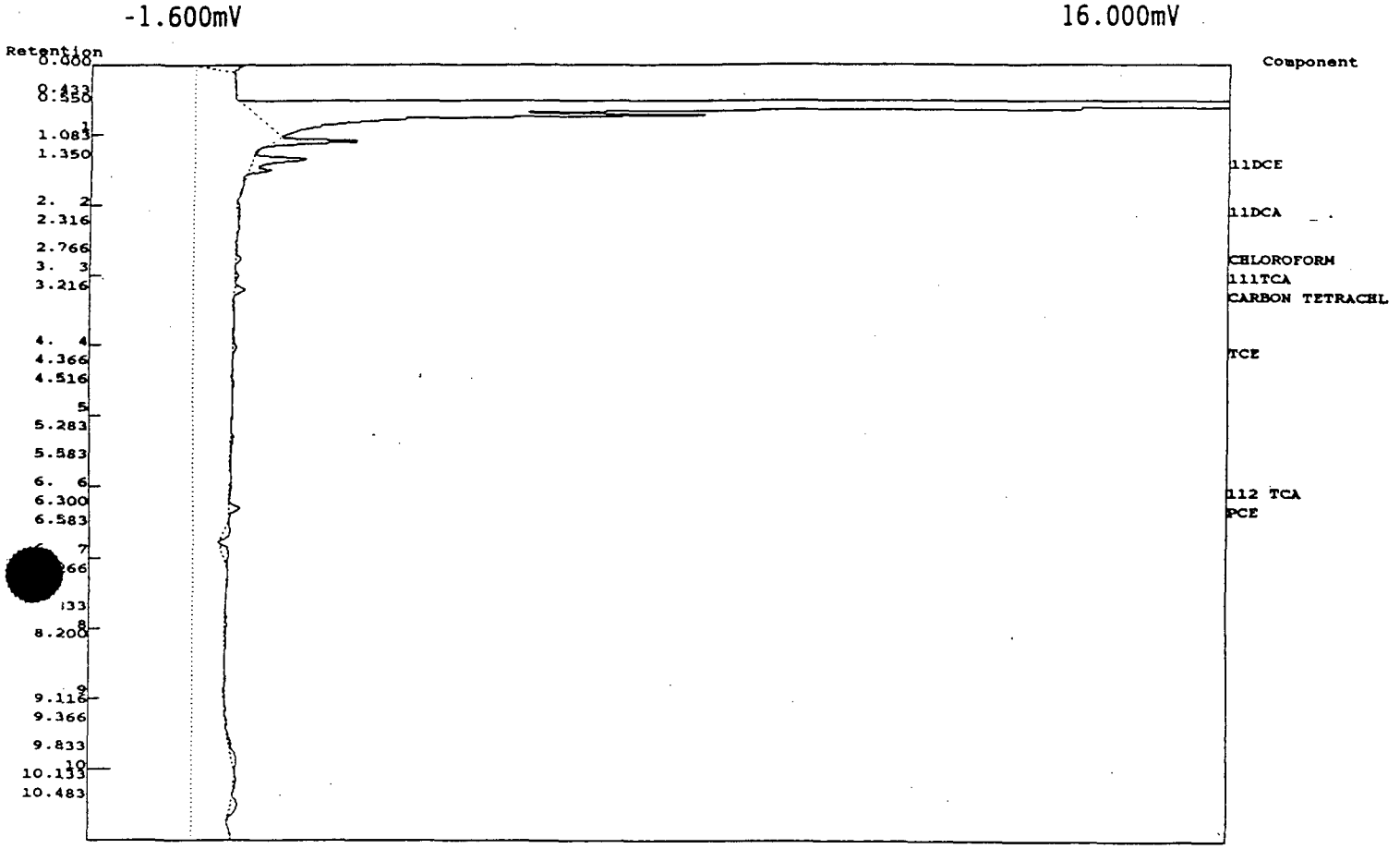
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 22:10:48
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E26.CHR (A:\)
Sample : SG-173
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
DCE	1	1.366	5.95 M	0.80	ug/L
S	0	1.516	1.56 M	N/A	
DCA	4	2.100	0.45	0.41	ug/L
LOROFORM	6	2.783	0.54	0.01	ug/L
1TCA	7	3.016	0.33	0.00	ug/L
RBON TETRACHLORIDE	8	3.216	1.08	0.00	ug/L
E	9	4.050	1.78	0.02	ug/L
2 TCA	10	5.966	0.14	0.01	ug/L
E	11	6.300	0.86	0.00	ug/L
	9		12.69	0.27	

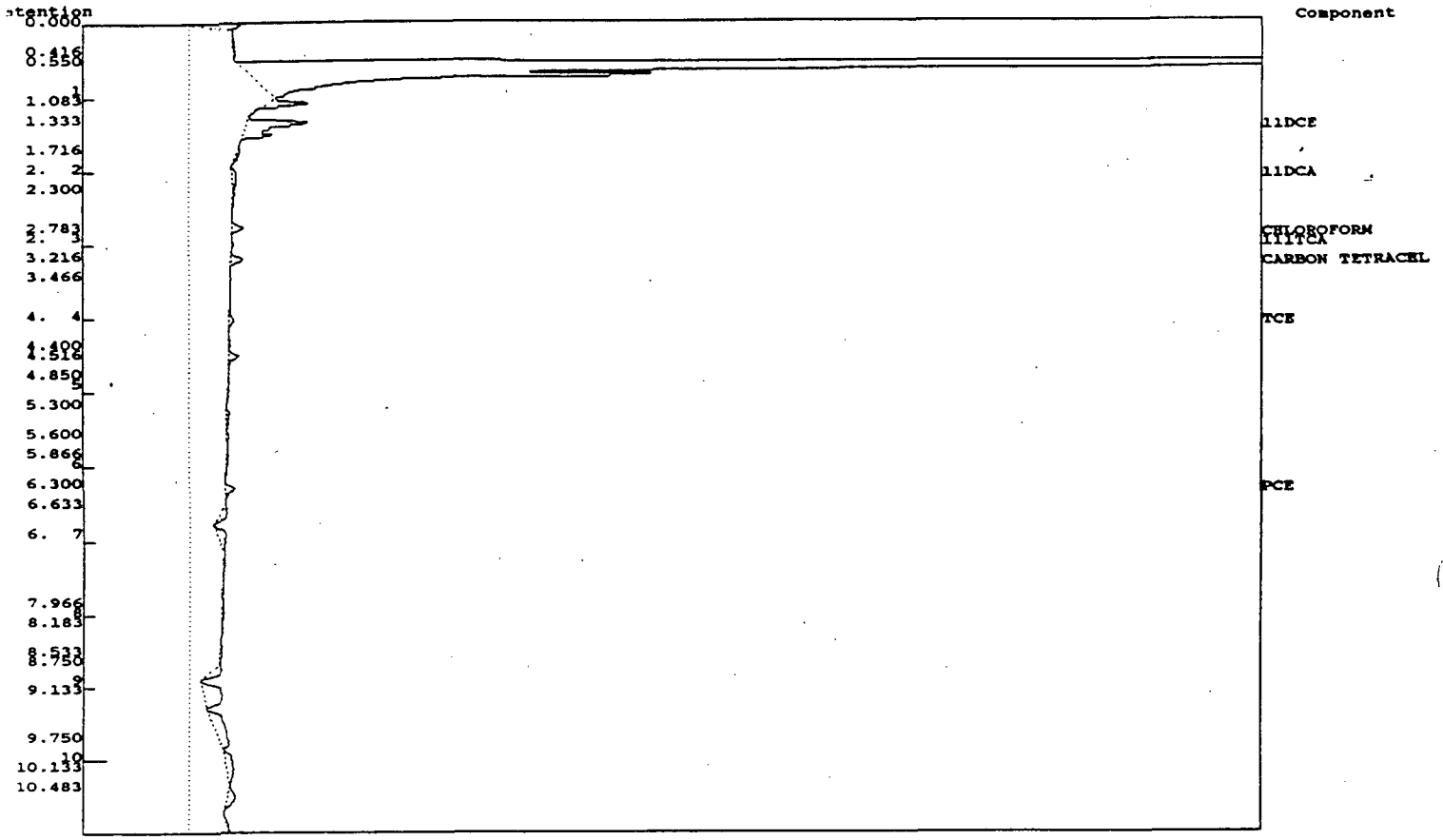
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 22:29:48
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E27.CHR (A:\)
Sample : SG-174
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	5.72	0.77	ug/L
11DCA	4	2.083	0.34	0.32	ug/L
CHLOROFORM	6	2.766	0.46	0.01	ug/L
111TCA	7	3.000	0.27	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	0.91	0.00	ug/L
TCE	9	4.016	0.43	0.01	ug/L
112 TCA	10	6.000	0.14	0.01	ug/L
PCE	11	6.300	1.01	0.00	ug/L
	8		9.29	1.12	

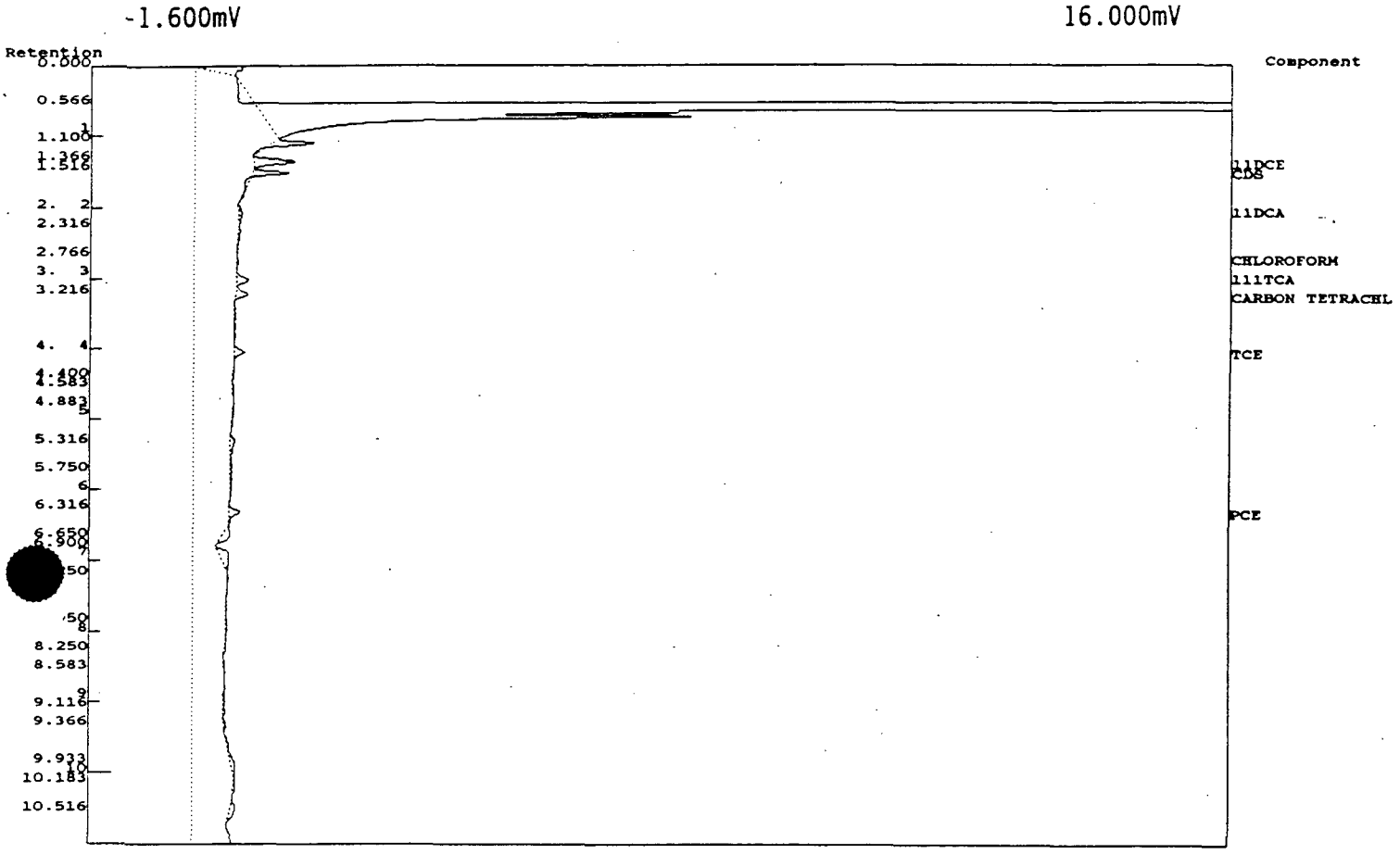
Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 22:48:49
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E28.CHR (A:\)
Sample : SG-175
Operator : SGN

-1.600mV 16.000mV



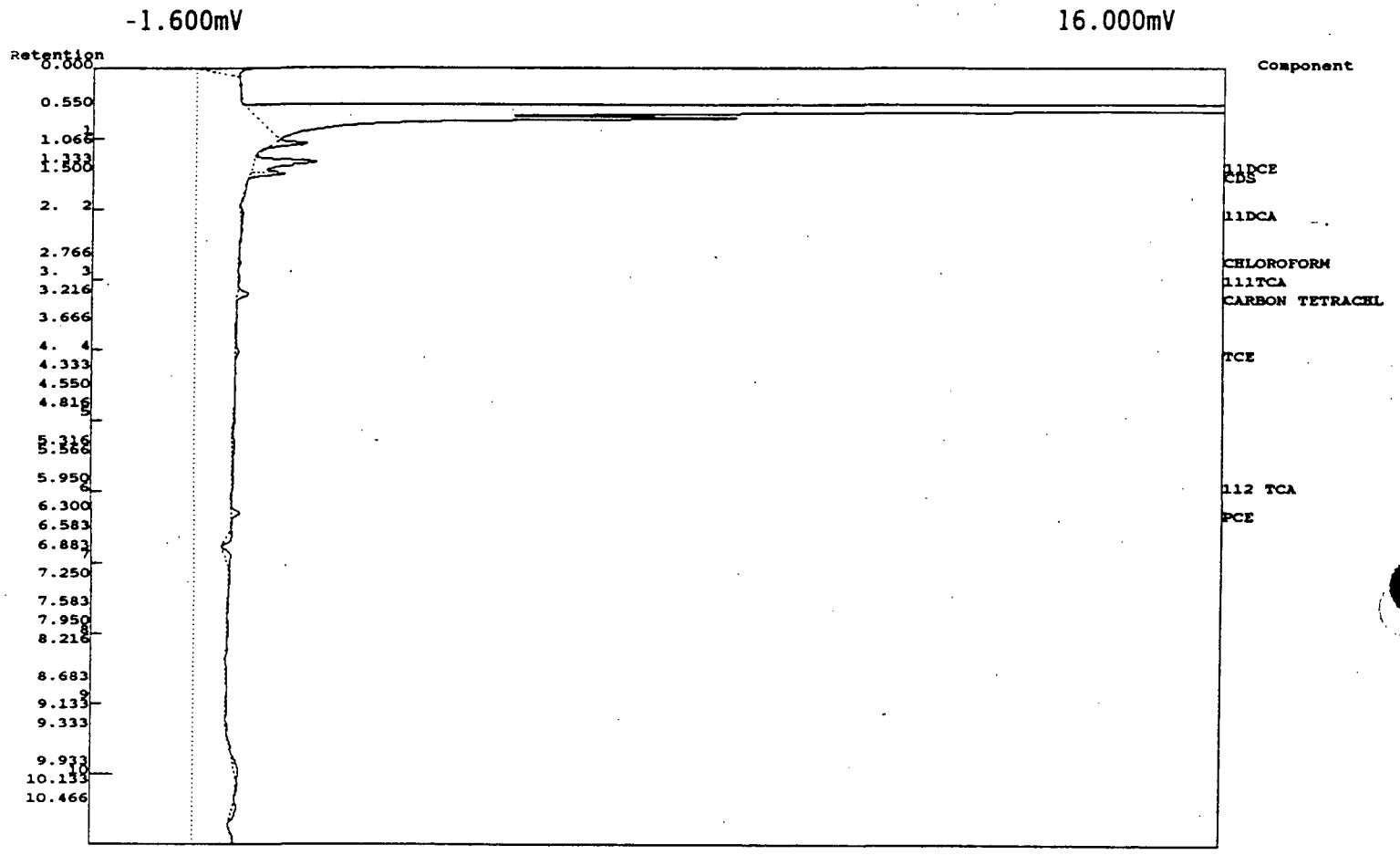
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	7.35	0.99	ug/L
1DCA	4	2.050	0.76	0.70	ug/L
HLOROFORM	6	2.783	0.98	0.01	ug/L
11TCA	7	2.983	0.16	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	0.98	0.00	ug/L
CE	9	4.050	0.53	0.01	ug/L
CE	11	6.300	0.83	0.00	ug/L
	7		11.59	1.72	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 23:07:48
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E29.CHR (A:\)
Sample : SG-192
Operator : SGN



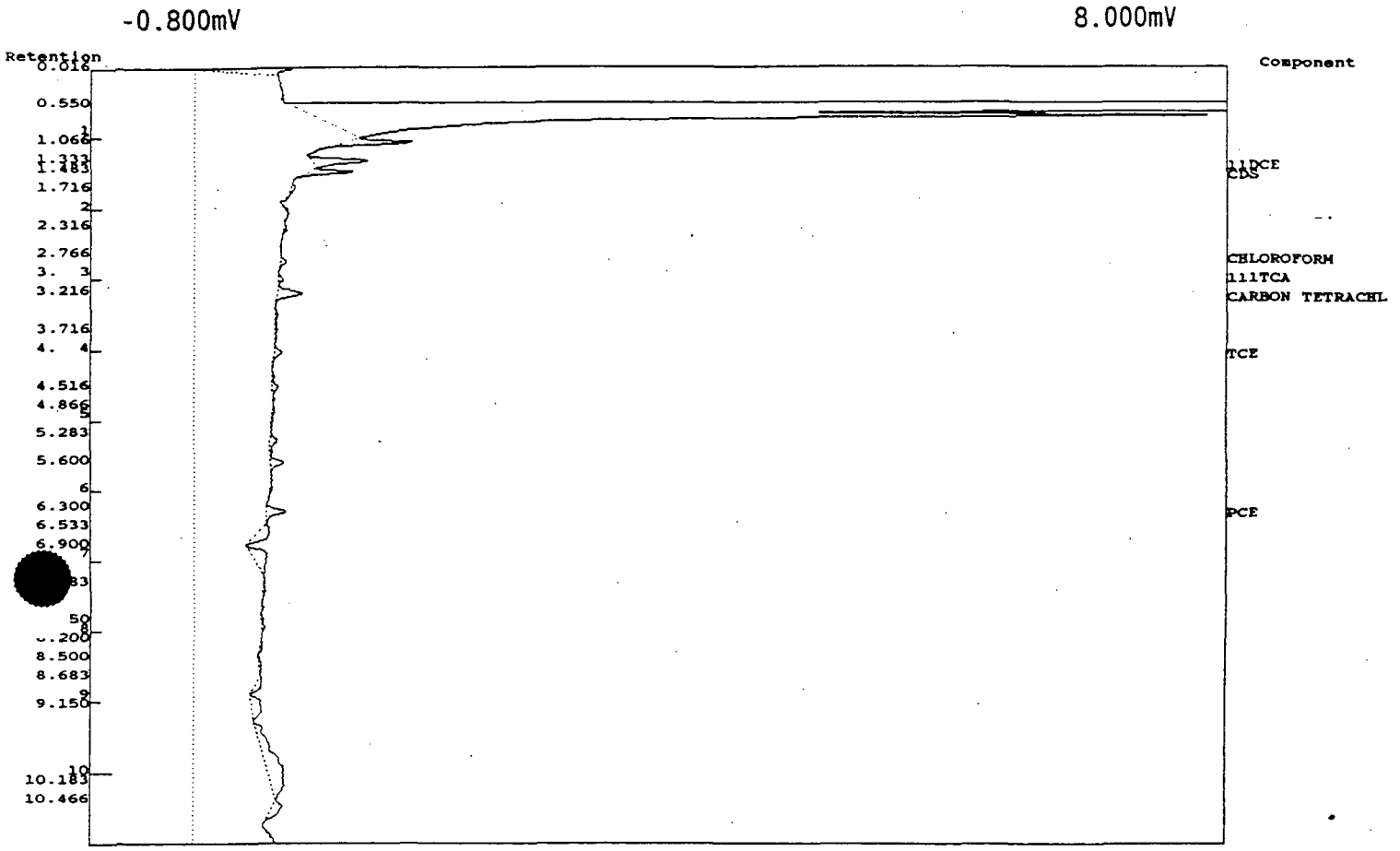
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	2.98	0.40	ug/L
CDS	0	1.516	1.68	N/A	
11DCA	4	2.083	0.57	0.52	ug/L
CHLOROFORM	6	2.766	0.18	0.00	ug/L
111TCA	7	3.016	1.06	0.01	ug/L
CARBON TETRACHLORIDE	8	3.216	1.03	0.00	ug/L
TCE	9	4.050	0.85	0.01	ug/L
PCE	11	6.316	0.96	0.00	ug/L
	8		9.30	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 23:26:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E30.CHR (A:\)
Sample : SG-201
Operator : SGN



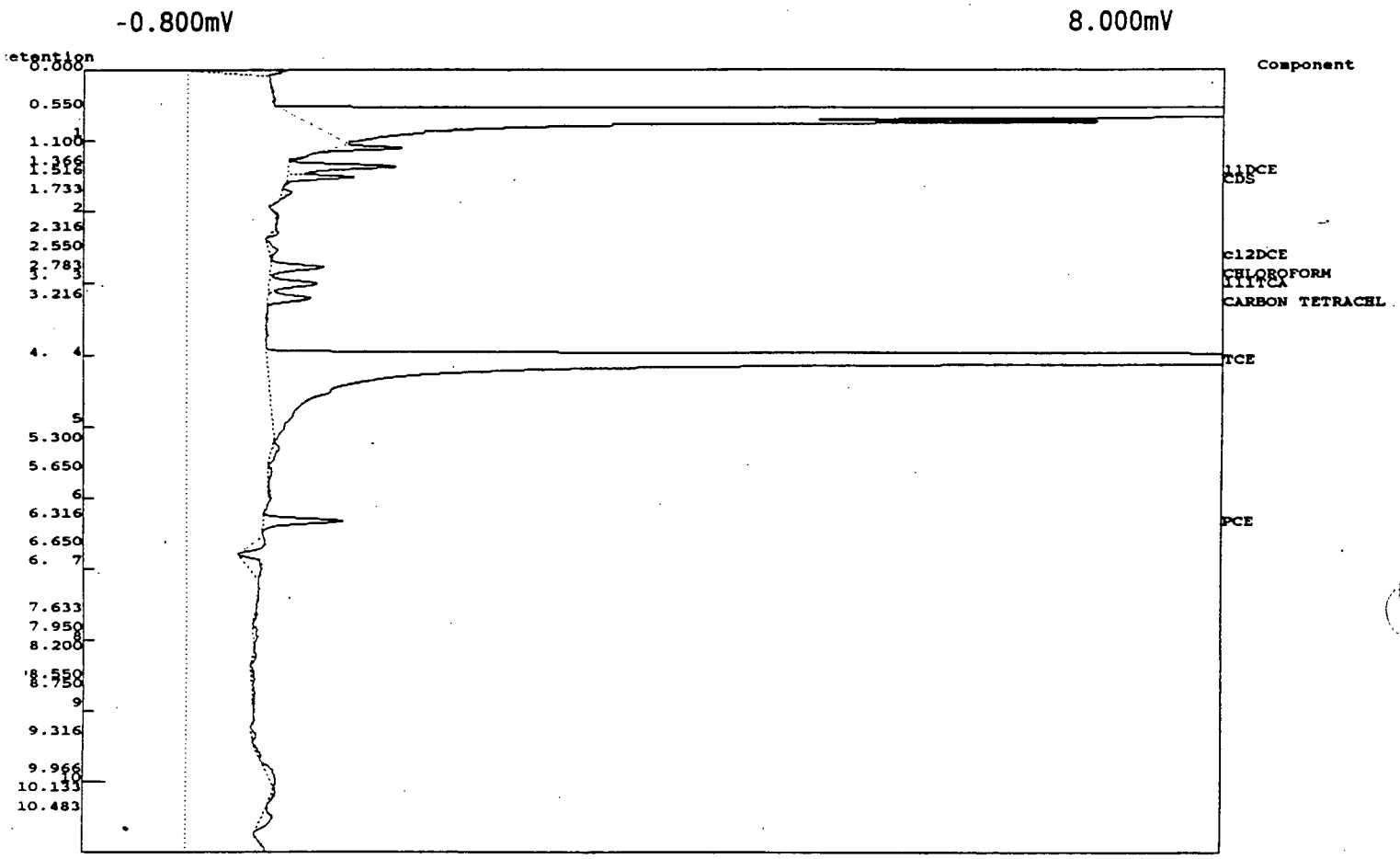
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	5.80 M	0.78	ug/L
DS	0	1.500	2.33 M	N/A	
1DCA	4	2.050	0.39	0.36	ug/L
HLOROFORM	6	2.766	0.18	0.00	ug/L
11TCA	7	3.000	0.14	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	1.02	0.00	ug/L
CE	9	4.033	0.47	0.01	ug/L
12 TCA	10	5.950	0.31	0.03	ug/L
CE	11	6.300	0.86	0.00	ug/L
	9		11.51	0.18	

Lab name : COLUMBIA TECH
Analysis date : 05/30/2000 23:45:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E31.CHR (A:\)
Sample : SG-202
Operator : SGN



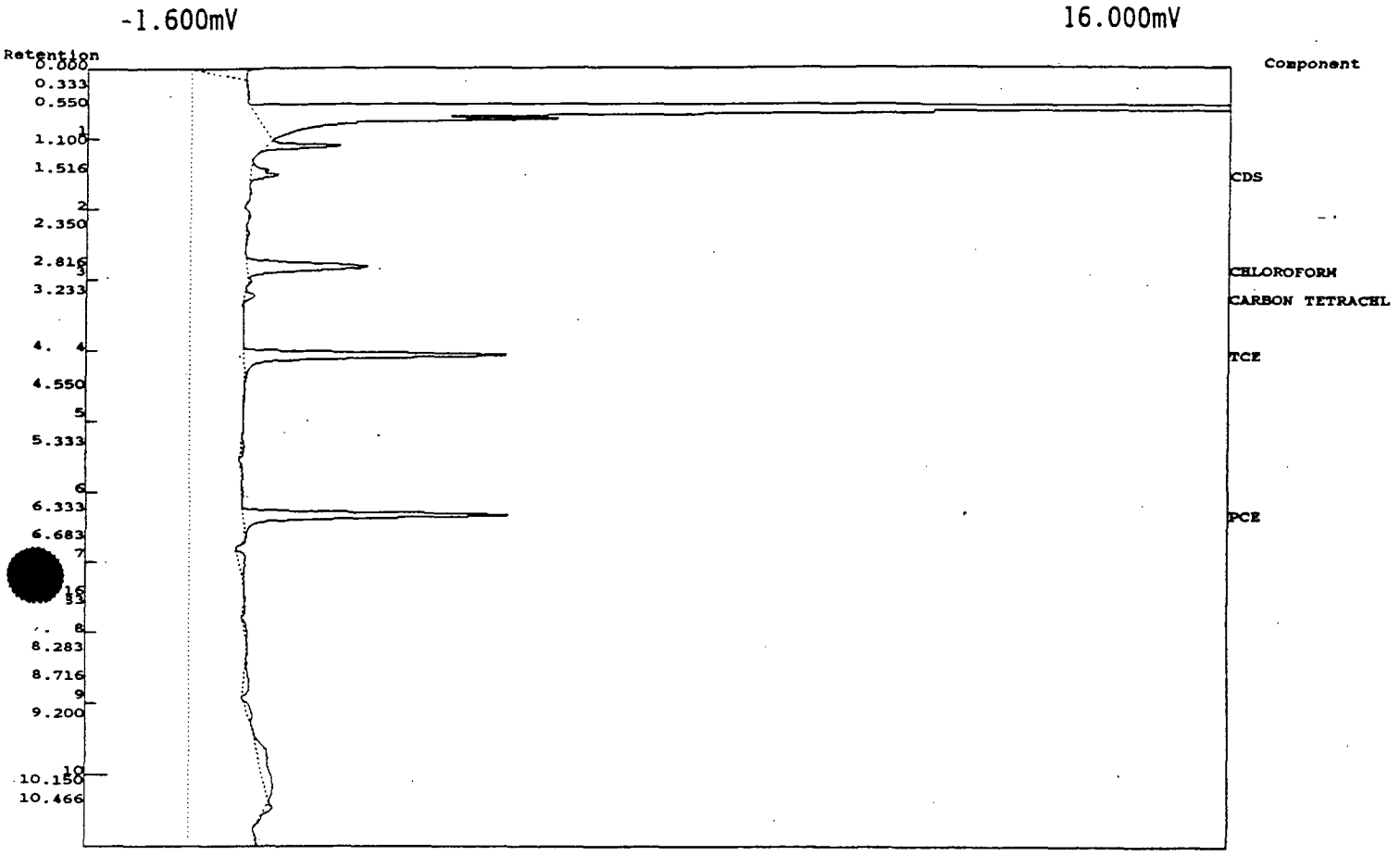
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	2.08	0.28	ug/L
CDS	0	1.483	1.01 M	N/A	
CHLOROFORM	6	2.766	0.23 M	0.00	ug/L
111TCA	7	3.016	0.19 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	1.13 M	0.00	ug/L
TCE	9	4.033	0.40	0.00	ug/L
PCE	11	6.300	0.86	0.00	ug/L
	7		5.90	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 00:04:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY30E32.CHR (A:\)
Sample : SG-011-R
Operator : SGN



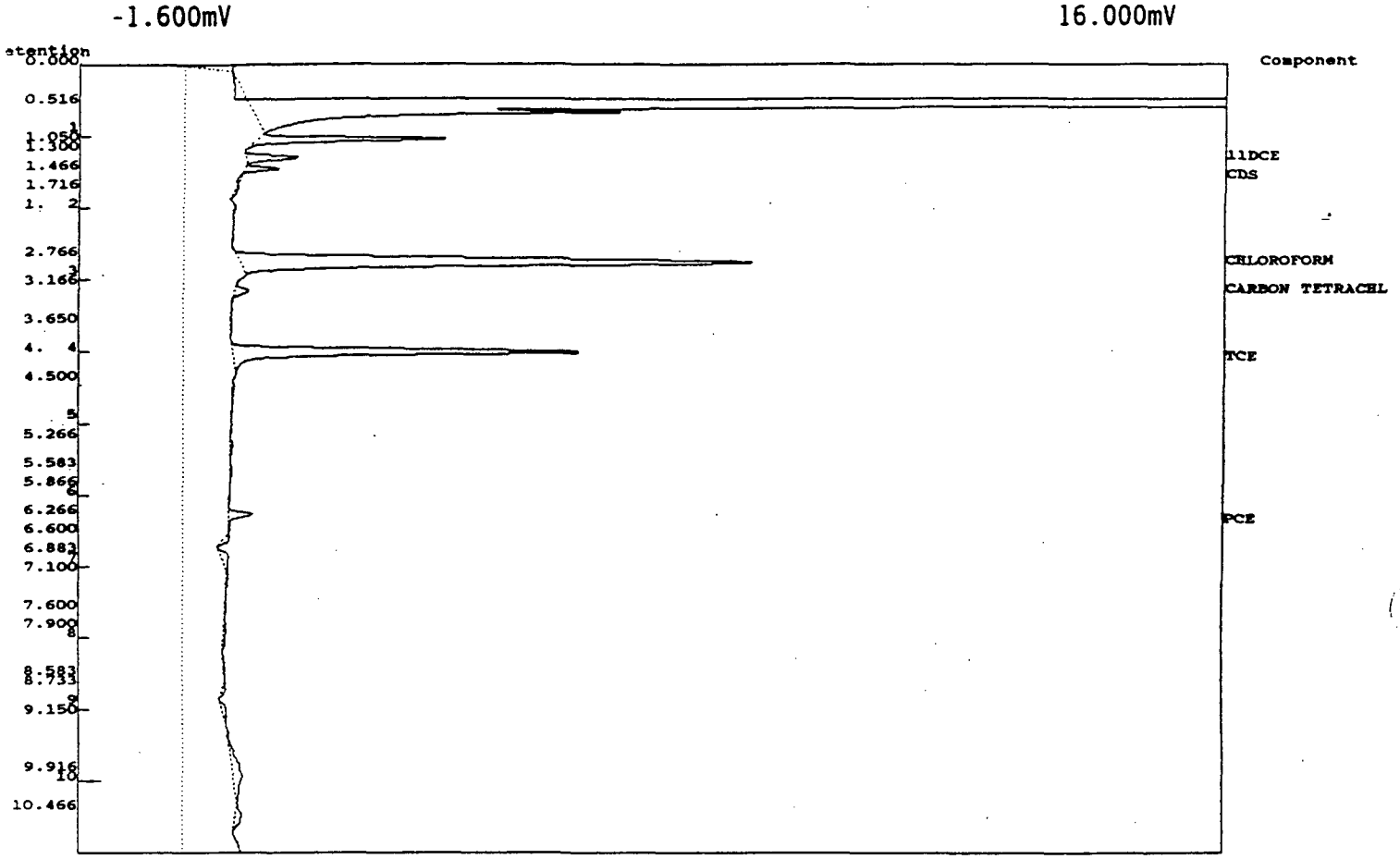
Component	Number	Retention	Area	External	Units
1DCE	1	1.366	4.25 M	0.58	ug/L
DS	0	1.516	2.34 M	N/A	
12DCE	5	2.550	0.51 M	1.17	ug/L
HLOROFORM	6	2.783	2.37 M	0.04	ug/L
11TCA	7	3.016	2.31 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.216	2.06 M	0.00	ug/L
CE	9	4.050	350.91 M	4.32	ug/L
CE	11	6.316	3.41 M	0.01	ug/L
	8		368.16	5.13	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 10:53:38
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E6.CHR (A:\)
Sample : SG-112
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.516	3.04 M	N/A	
CHLOROFORM	6	2.816	13.41 M	0.20	ug/L
CARBON TETRACHLORIDE	8	3.233	0.93	0.00	ug/L
TCE	9	4.066	22.71 M	0.28	ug/L
PCE	11	6.333	22.53 M	0.08	ug/L
	5		62.62	N/A	

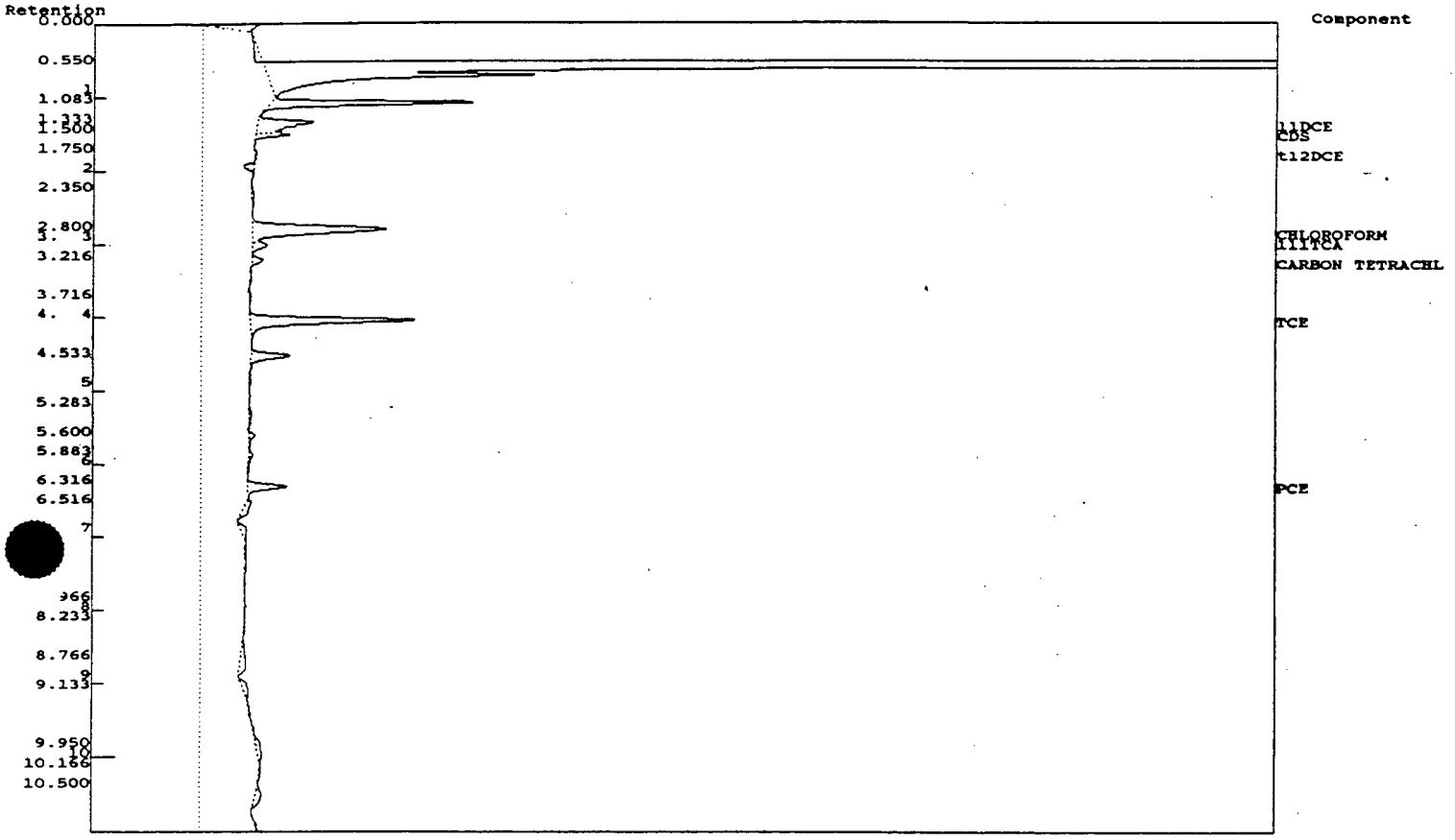
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 11:12:41
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E7.CHR (A:\)
Sample : SG-113
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.300	3.79	0.51	ug/L
DS	0	1.466	1.59 M	N/A	
HLOROFORM	6	2.766	58.65 M	0.88	ug/L
ARBON TETRACHLORIDE	8	3.166	1.17 M	0.00	ug/L
CE	9	4.000	30.54 M	0.38	ug/L
CE	11	6.266	1.88 M	0.01	ug/L
	6		**97.62**	**0.77**	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 11:31:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E8.CHR (A:\)
Sample : SG-116
Operator : SGN

-1.600mV 16.000mV

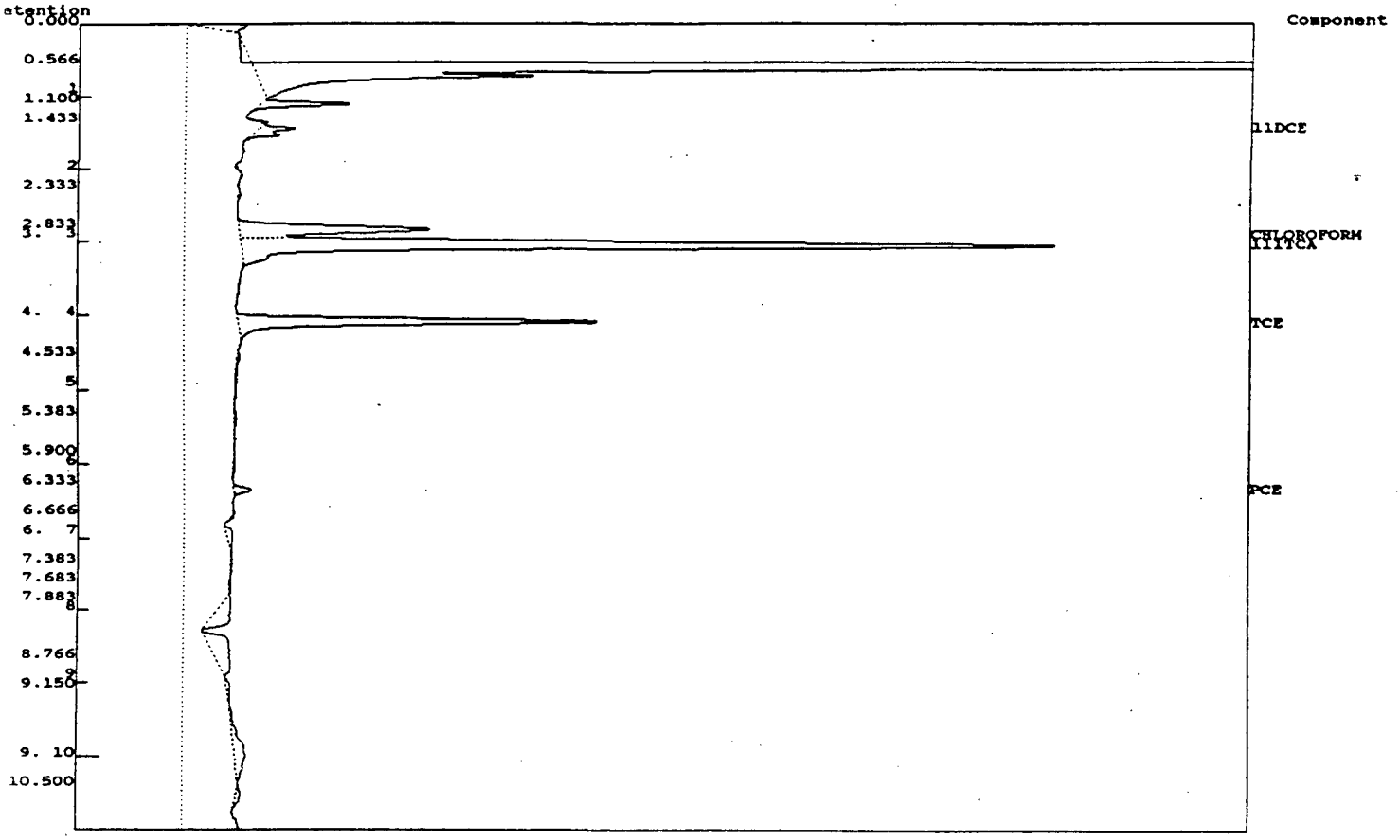


Component	Number	Retention	Area	External	Units
11DCE	1	1.333	5.32 M	0.72	ug/L
CDS	0	1.500	2.15 M	N/A	
t12DCE	3	1.750	0.11 M	0.18	ug/L
CHLOROFORM	6	2.800	14.06 M	0.21	ug/L
111TCA	7	3.016	1.31 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.216	0.79 M	0.00	ug/L
TCE	9	4.050	13.49 M	0.17	ug/L
PCE	11	6.316	2.94 M	0.01	ug/L
	8		40.19	0.30	

300699

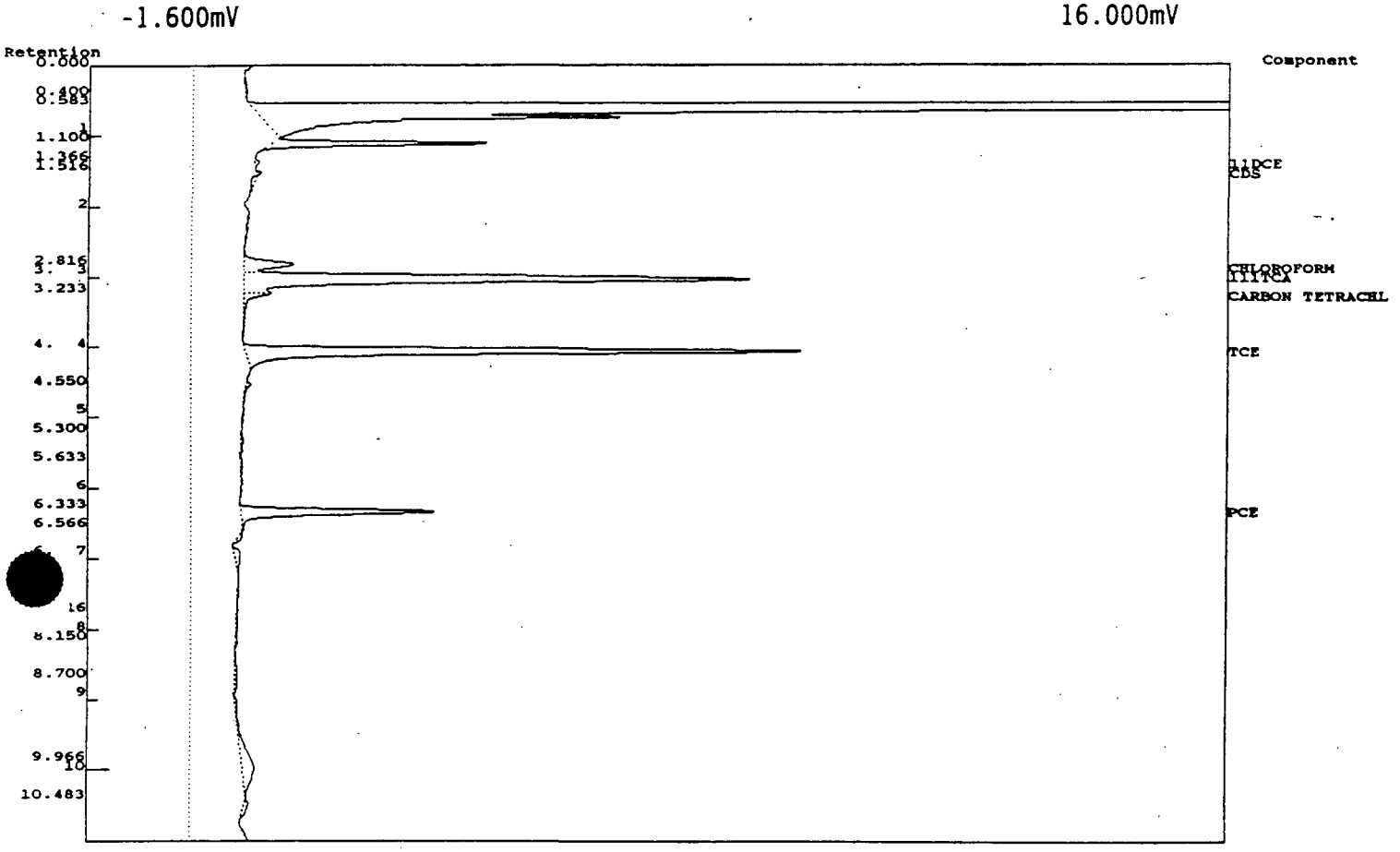
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 11:50:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E9.CHR (A:\)
Sample : SG-117
Operator : SGN

-1.600mV 16.000mV



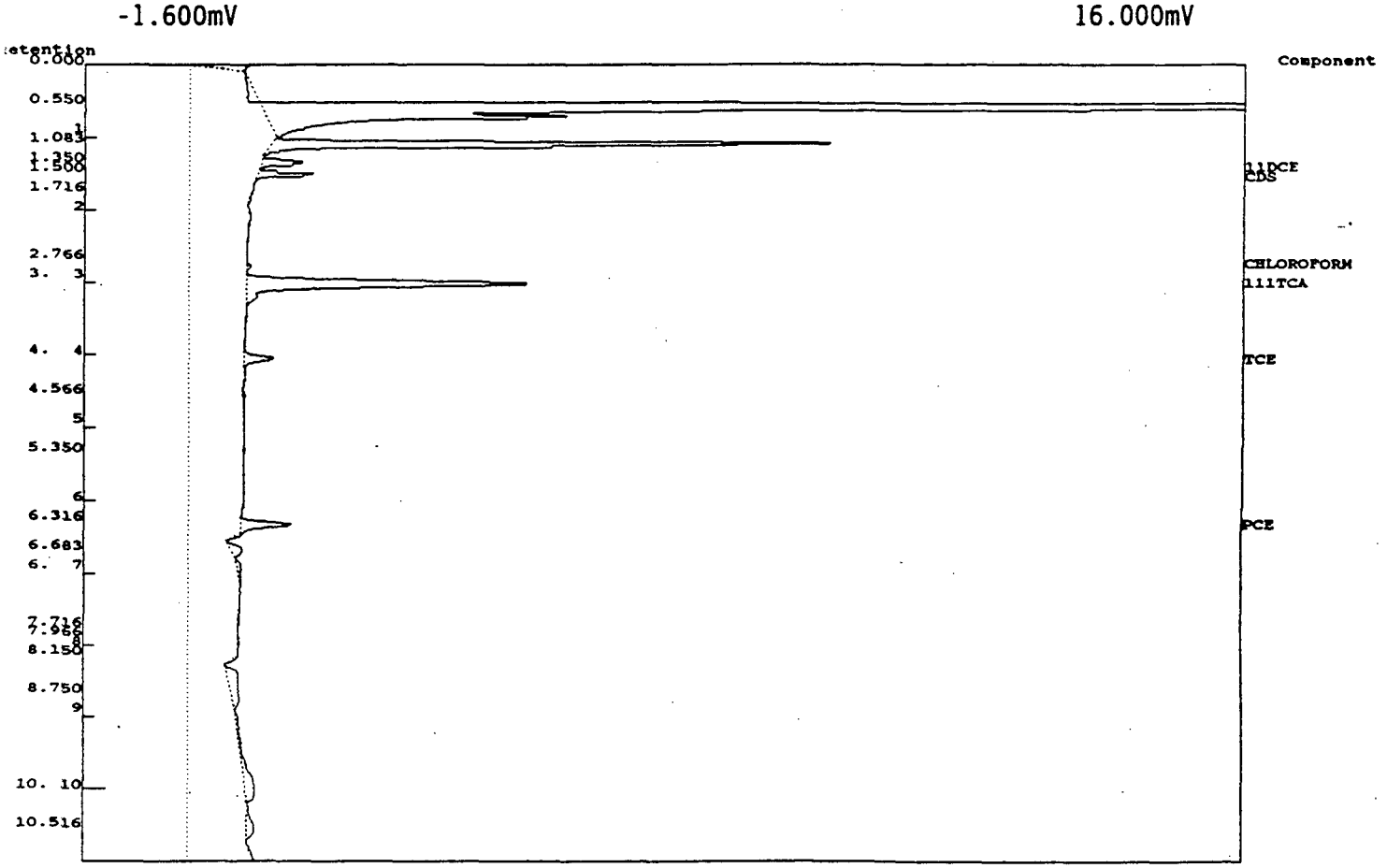
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	0.12	0.02	ug/L
1DCE	1	1.433	3.35 M	0.45	ug/L
HLOROFORM	6	2.833	19.81 M	0.30	ug/L
11TCA	7	3.033	83.94 M	0.50	ug/L
CE	9	4.066	30.58 M	0.38	ug/L
CE	11	6.333	1.27 M	0.00	ug/L
	6		139.08	1.65	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 12:09:41
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E10.CHR (A:\)
Sample : SG-128
Operator : SGN



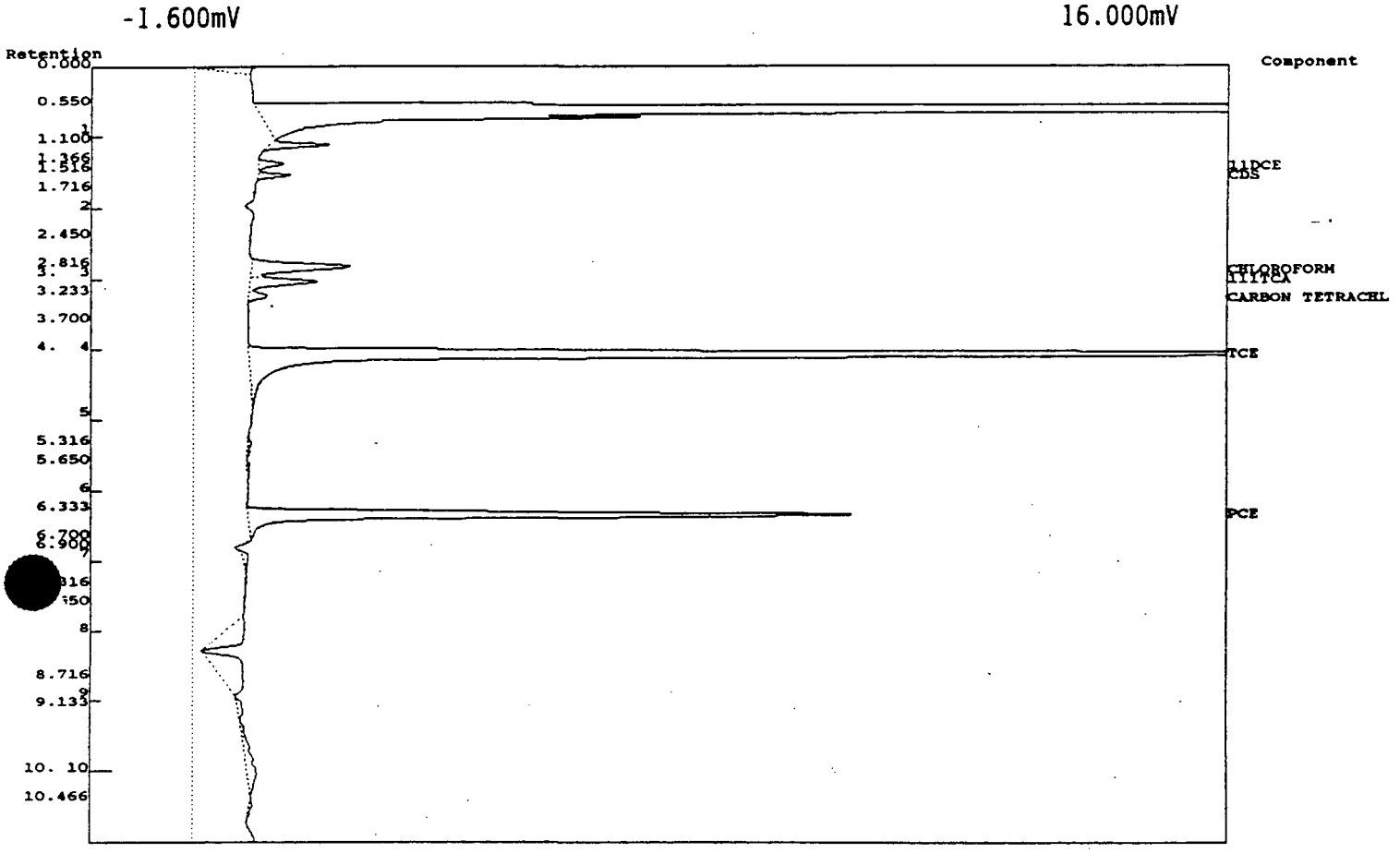
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	0.24 M	0.03	ug/L
CDS	0	1.516	0.17 M	N/A	
CHLOROFORM	6	2.816	5.18 M	0.08	ug/L
111TCA	7	3.033	52.61 M	0.32	ug/L
CARBON TETRACHLORIDE	8	3.233	2.76 M	0.00	ug/L
TCE	9	4.066	48.23 M	0.59	ug/L
PCE	11	6.333	16.32 M	0.06	ug/L
	7		125.51	0.08	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 12:28:42
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E11.CHR (A:\)
Sample : SG-129
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	3.12	0.42	ug/L
CDS	0	1.500	3.03 M	N/A	
CHLOROFORM	6	2.766	0.27 M	0.00	ug/L
111TCA	7	3.016	29.17 M	0.18	ug/L
TCE	9	4.066	2.41 M	0.03	ug/L
PCE	11	6.316	4.16 M	0.02	ug/L
	6		42.15	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 12:48:03
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E12.CHR (A:\)
Sample : SG-139
Operator : SGN

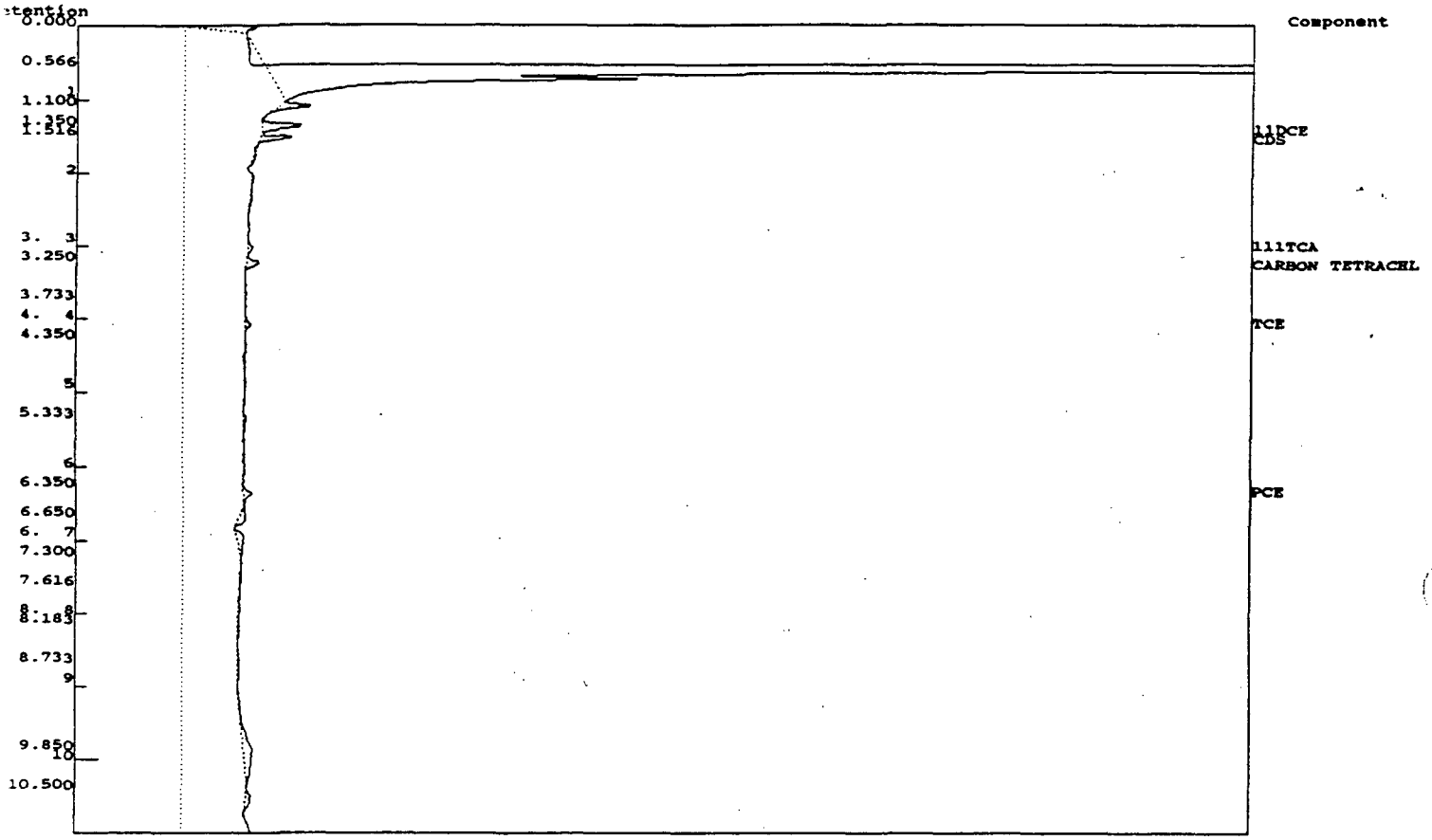


Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.76 M	0.24	ug/L
CDS	0	1.516	1.85 M	N/A	
CHLOROFORM	6	2.816	10.63 M	0.16	ug/L
111TCA	7	3.033	6.70 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.233	1.86 M	0.00	ug/L
TCE	9	4.066	126.81 M	1.56	ug/L
PCE	11	6.333	53.05 M	0.19	ug/L
	7		202.65	1.19	

300703

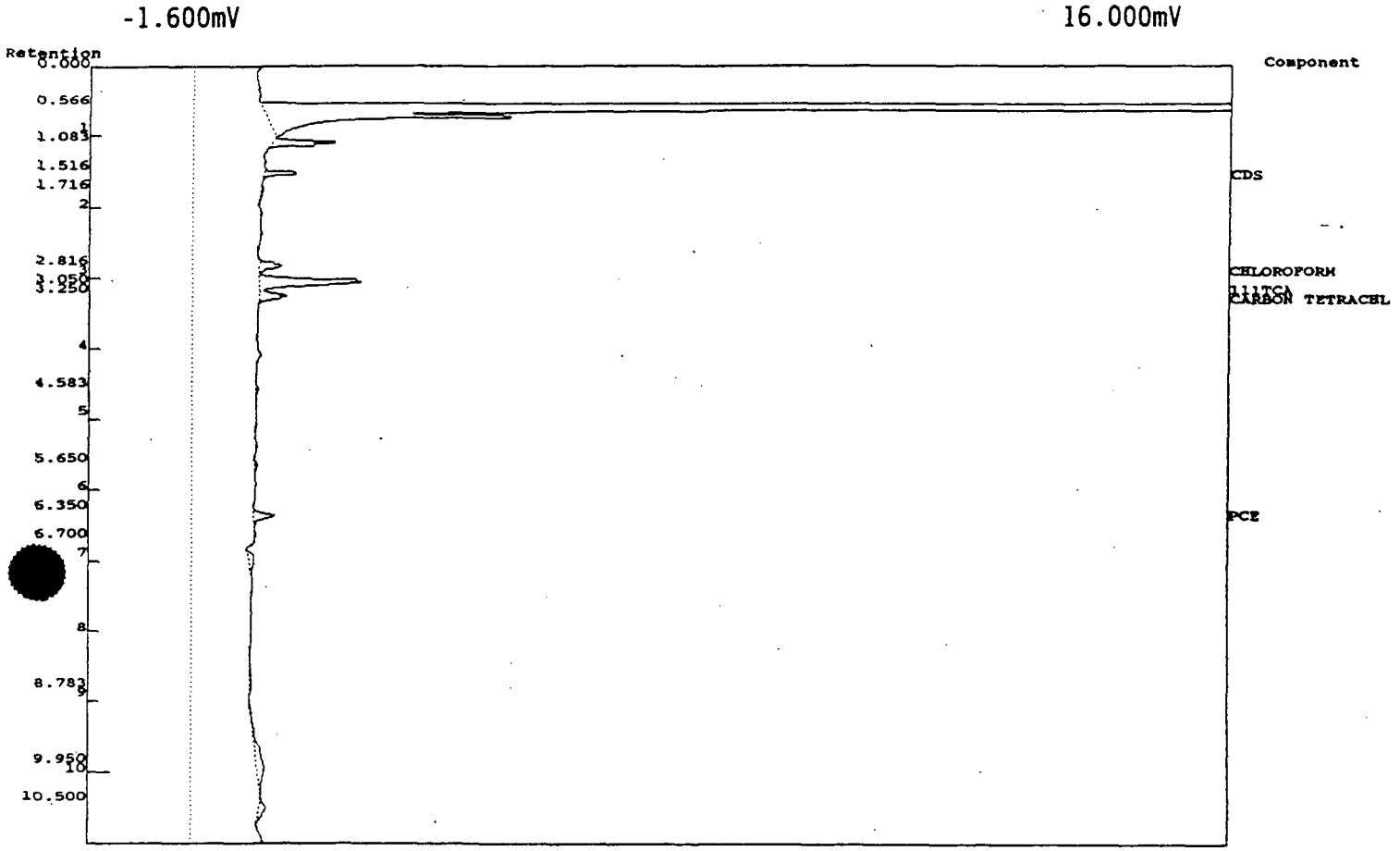
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 13:07:45
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E13.CHR (A:\)
Sample : SG-141
Operator : SGN

-1.600mV 16.000mV



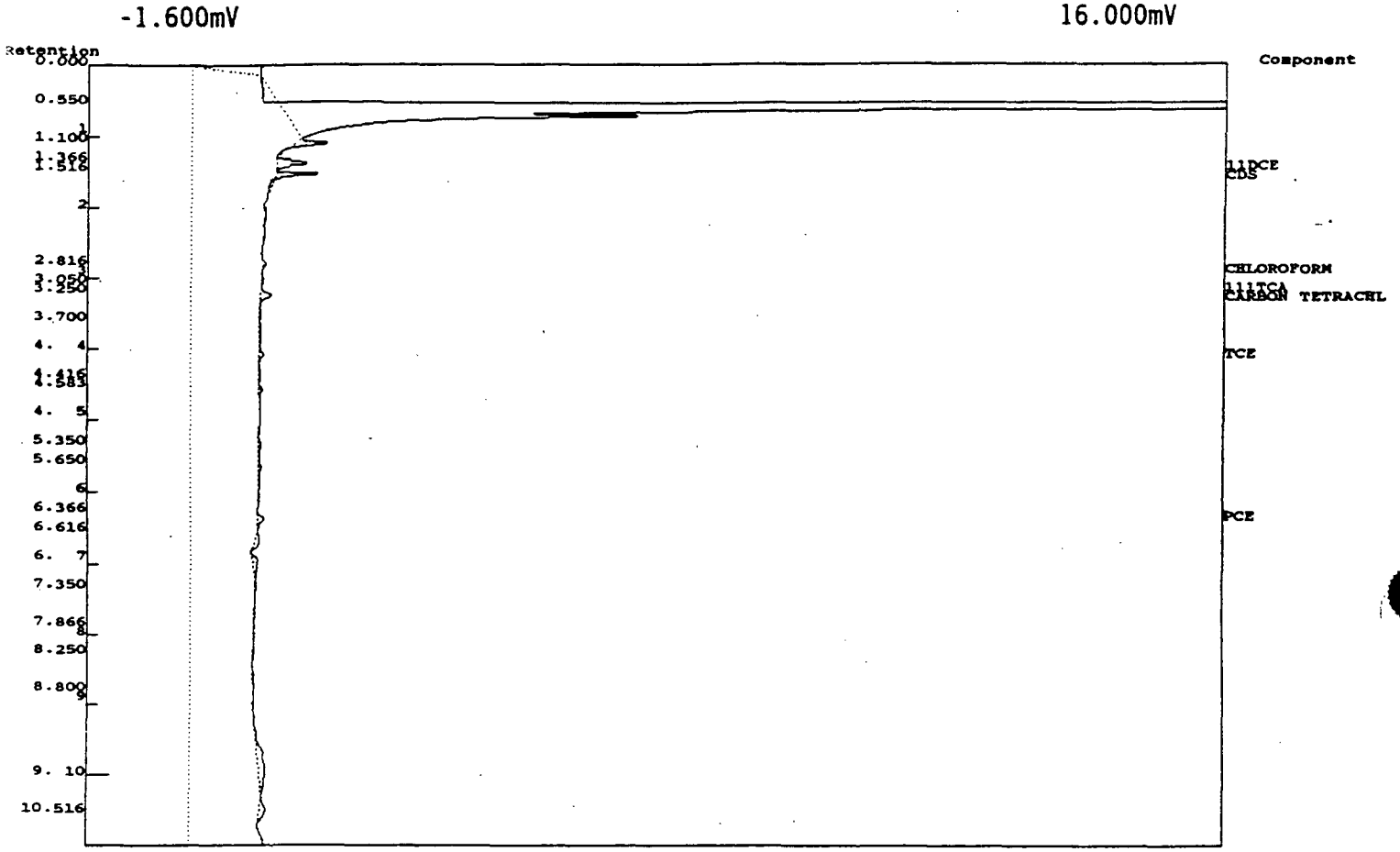
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	2.79 M	0.38	ug/L
)S	0	1.516	1.70 M	N/A	
11TCA	7	3.016	0.45	0.00	ug/L
ARBON TETRACHLORIDE	8	3.250	1.07	0.00	ug/L
CE	9	4.083	0.59	0.01	ug/L
CE	11	6.350	0.78	0.00	ug/L
	6		7.38	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 13:27:50
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E14.CHR (A:\)
Sample : SG-151
Operator : SGN



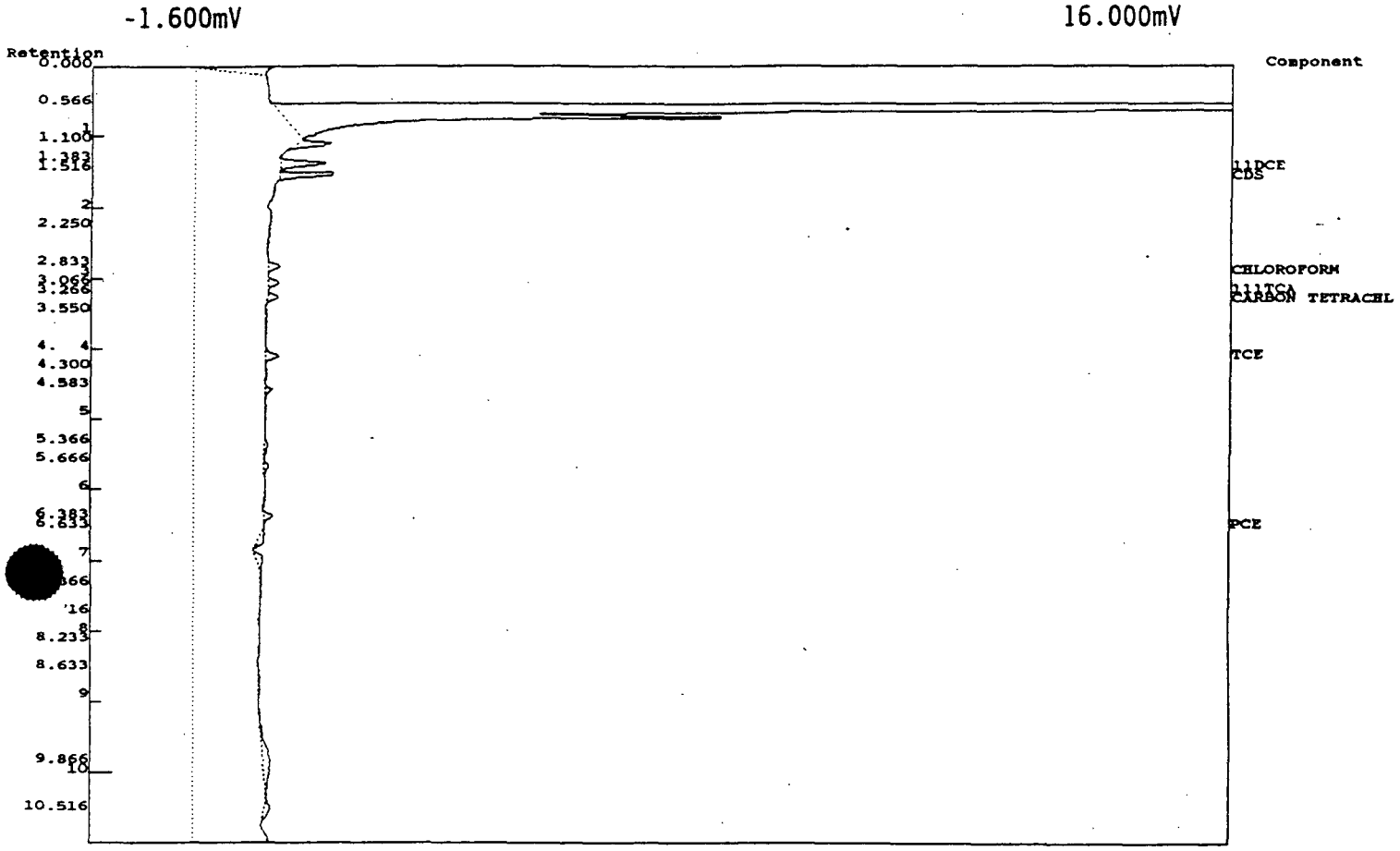
Component	Number	Retention	Area	External	Units
CDS	0	1.516	1.82 M	N/A	
CHLOROFORM	6	2.816	1.88 M	0.03	ug/L
111TCA	7	3.050	10.18 M	0.06	ug/L
CARBON TETRACHLORIDE	8	3.250	2.56 M	0.00	ug/L
PCE	11	6.350	1.77 M	0.01	ug/L
	5		18.21	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 13:48:19
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E15.CHR (A:\)
Sample : SG-152
Operator : SGN



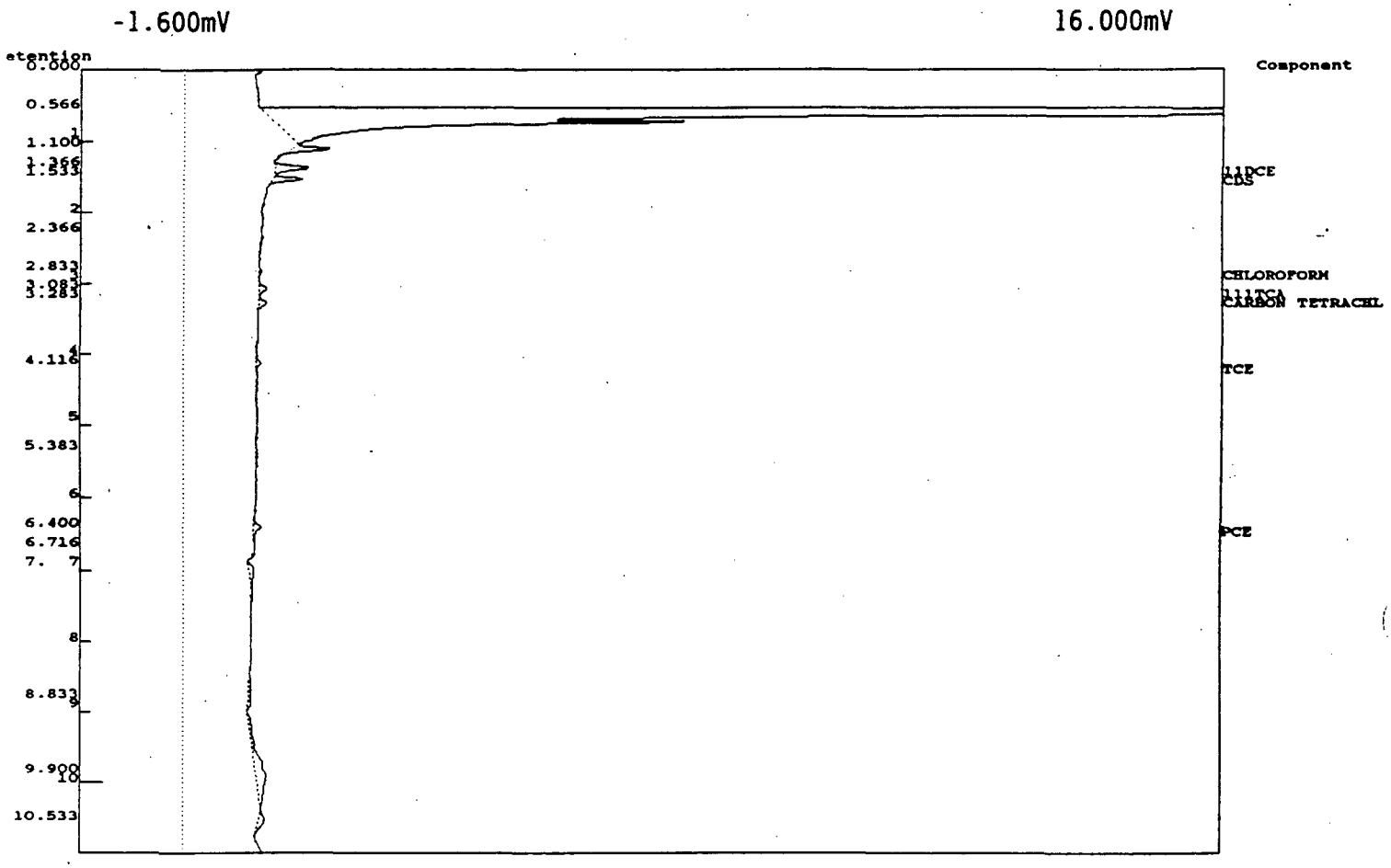
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	2.24	0.30	ug/L
CDS	0	1.516	1.65	N/A	
CHLOROFORM	6	2.816	0.11 M	0.00	ug/L
111TCA	7	3.050	0.15	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	0.94	0.00	ug/L
TCE	9	4.083	0.43	0.01	ug/L
PCE	11	6.366	0.61	0.00	ug/L
	7		6.14	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 14:08:30
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E16.CHR (A:\)
Sample : SG-161
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	3.31 M	0.45	ug/L
CDS	0	1.516	3.53 M	N/A	
CHLOROFORM	6	2.833	1.00 M	0.02	ug/L
111TCA	7	3.066	0.89 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.266	0.88 M	0.00	ug/L
TCE	9	4.100	1.21	0.01	ug/L
PCE	11	6.383	0.75 M	0.00	ug/L
	7		11.58	N/A	

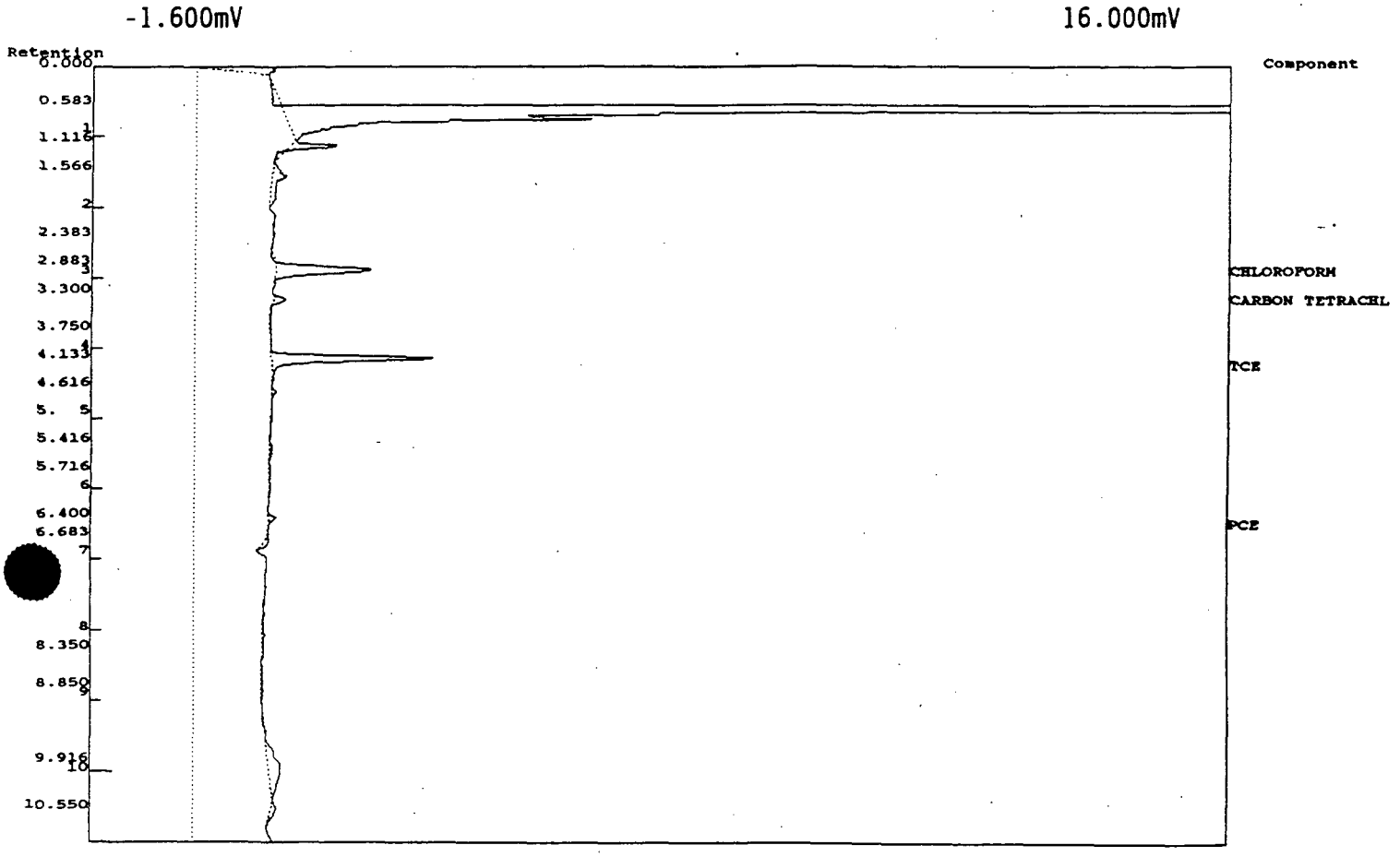
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 14:28:38
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E17.CHR (A:\)
Sample : SG-162
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	2.39	0.32	ug/L
DS	0	1.533	1.62 M	N/A	
HLOROFORM	6	2.833	0.15 M	0.00	ug/L
11TCA	7	3.083	0.64 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.283	0.71 M	0.00	ug/L
CE	9	4.116	0.38 M	0.00	ug/L
CE	11	6.400	0.76 M	0.00	ug/L
	7		6.65	N/A	

300708

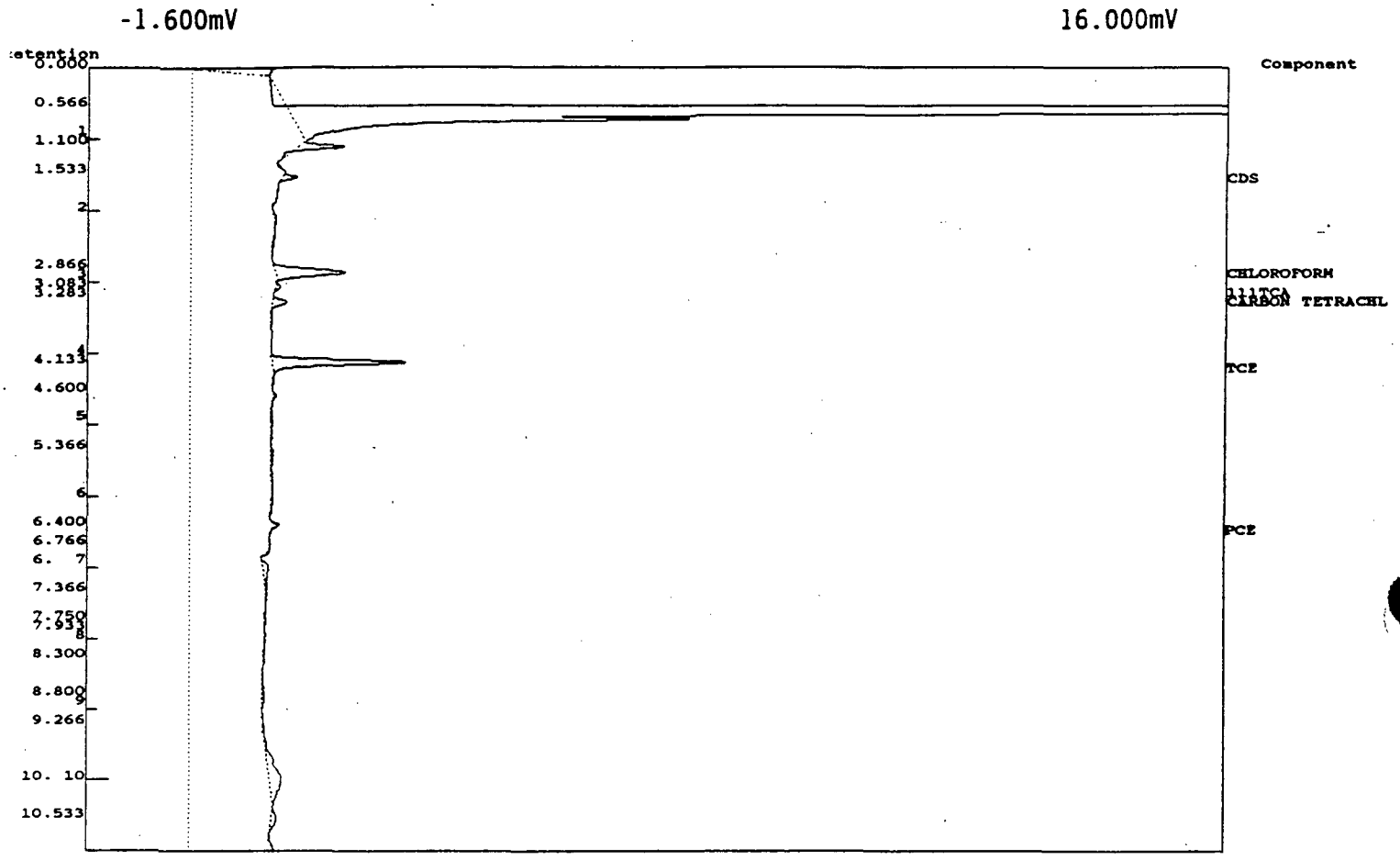
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 14:48:55
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E18.CHR (A:\)
Sample : SG-074
Operator : SGN



Component	Number	Retention	Area	External	Units
CHLOROFORM	6	2.883	10.28 M	0.15	ug/L
CARBON TETRACHLORIDE	8	3.300	0.95 M	0.00	ug/L
TCE	9	4.133	13.62 M	0.17	ug/L
PCE	11	6.400	0.58 M	0.00	ug/L
	4		25.43	0.32	

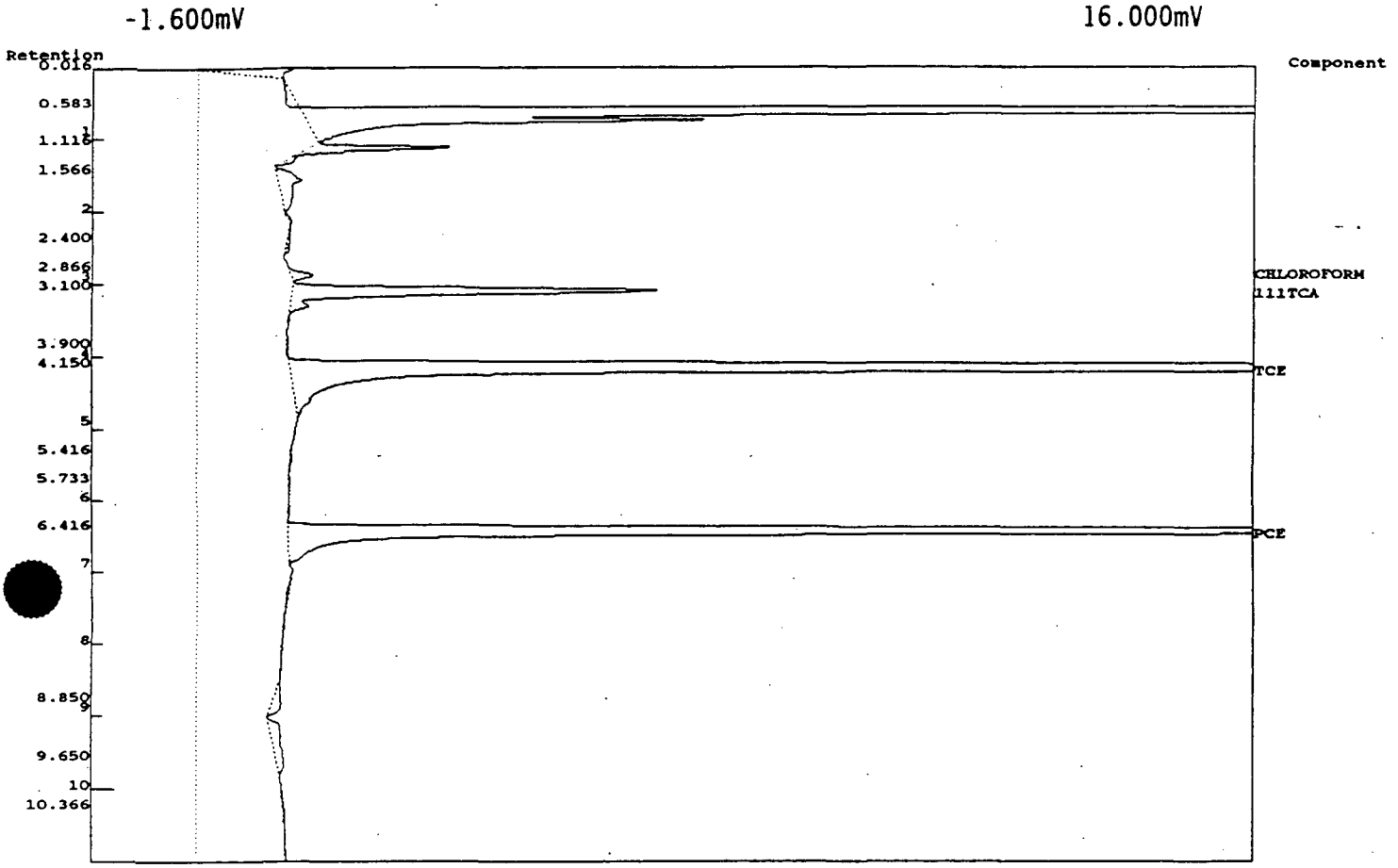
300709

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 15:09:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E19.CHR (A:\)
Sample : SG-075
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.533	0.86 M	N/A	
CHLOROFORM	6	2.866	7.28 M	0.11	ug/L
111TCA	7	3.083	0.33 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.283	1.26 M	0.00	ug/L
TCE	9	4.133	11.26 M	0.14	ug/L
PCE	11	6.400	0.32 M	0.00	ug/L
	6		21.30	N/A	

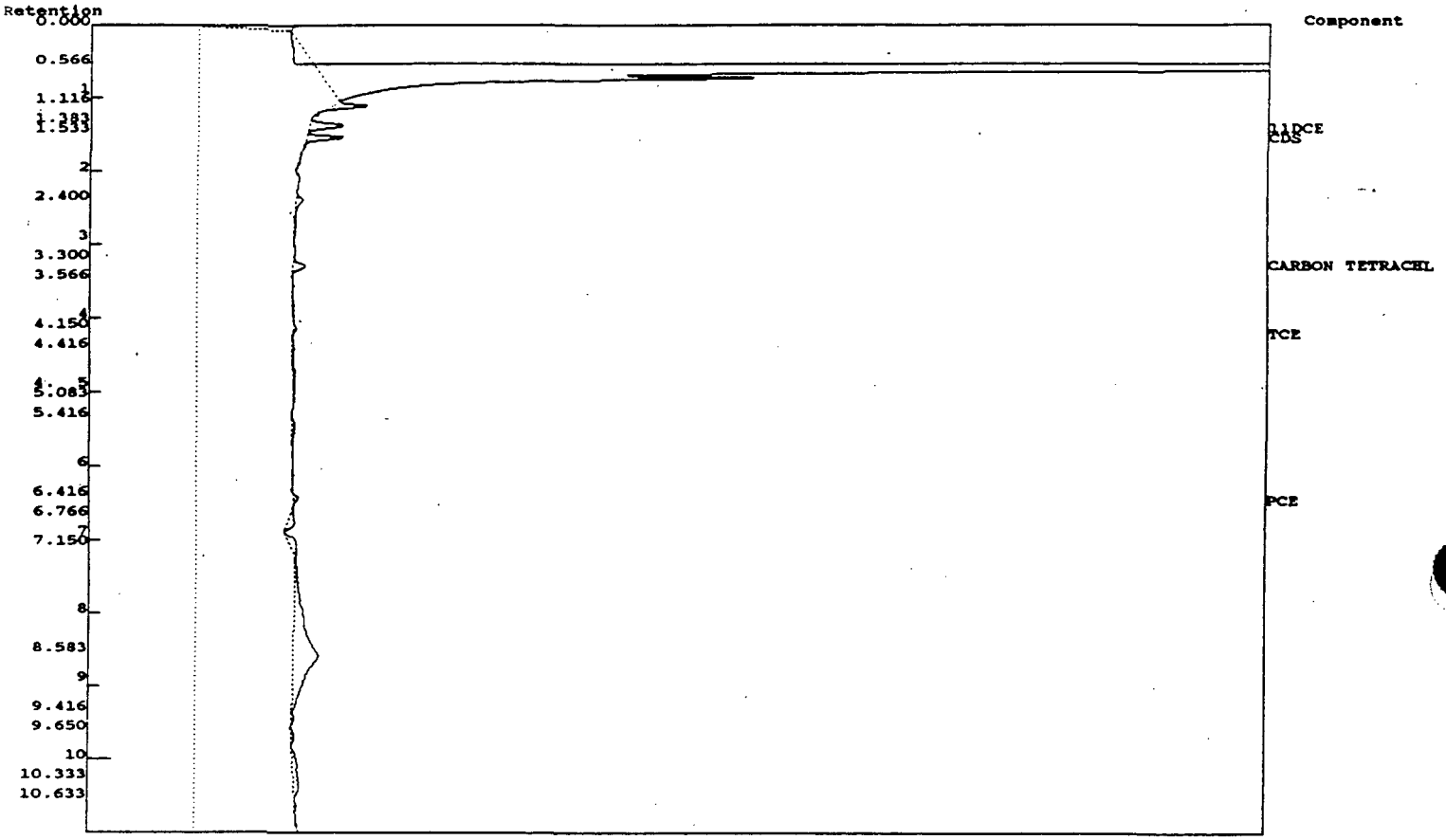
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 15:30:13
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E20.CHR (A:\)
Sample : SG-127
Operator : SGN



Component	Number	Retention	Area	External	Units
CHLOROFORM	6	2.866	1.92 M	0.03	ug/L
111TCA	7	3.100	36.97 M	0.22	ug/L
TCE	9	4.150	229.98 M	2.83	ug/L
PCE	11	6.416	168.78 M	0.61	ug/L
	4		437.64	3.70	

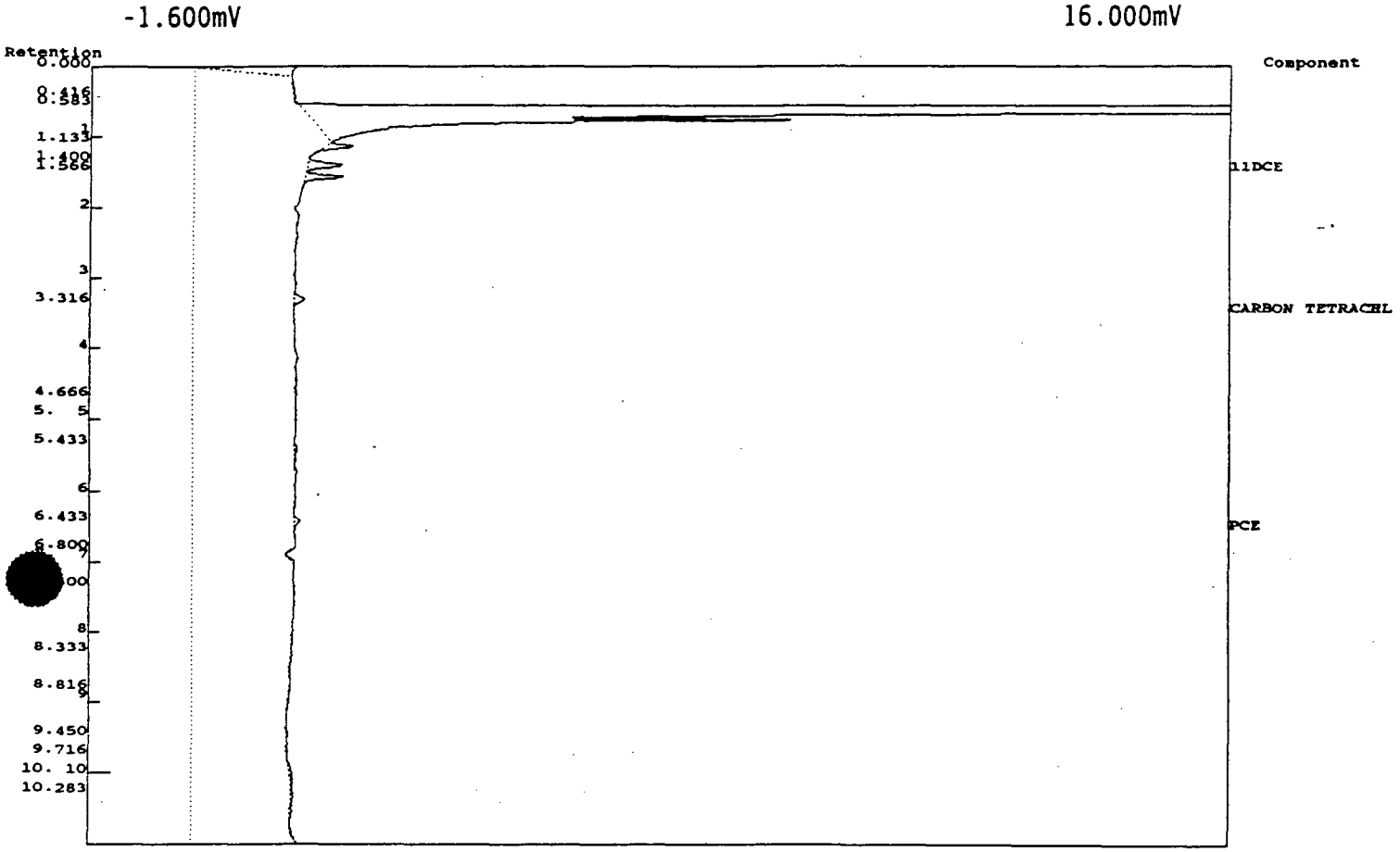
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 15:54:22
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E21.CHR (A:\)
Sample : EB-15
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	2.35	0.32	ug/L
DS	0	1.533	2.39 M	N/A	
ARBON TETRACHLORIDE	8	3.300	1.10	0.00	ug/L
CE	9	4.150	0.19 M	0.00	ug/L
CE	11	6.416	0.35 M	0.00	ug/L
	5		6.38	N/A	

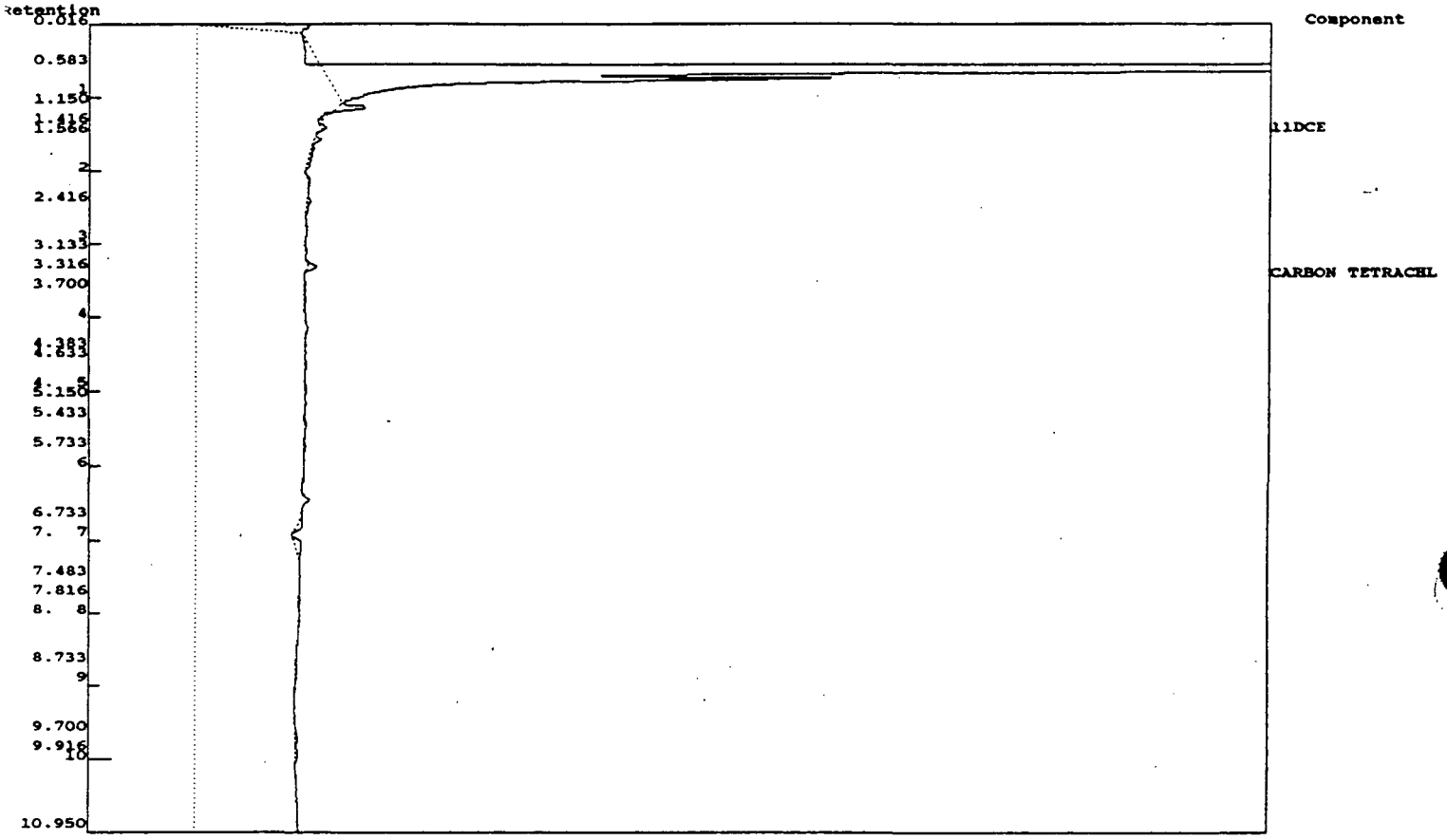
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 16:15:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E22.CHR (A:\)
Sample : EB-16
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	2.60 M	0.35	ug/L
CARBON TETRACHLORIDE	8	3.316	0.92 M	0.00	ug/L
PCE	11	6.433	0.59 M	0.00	ug/L
	3		4.11	0.35	

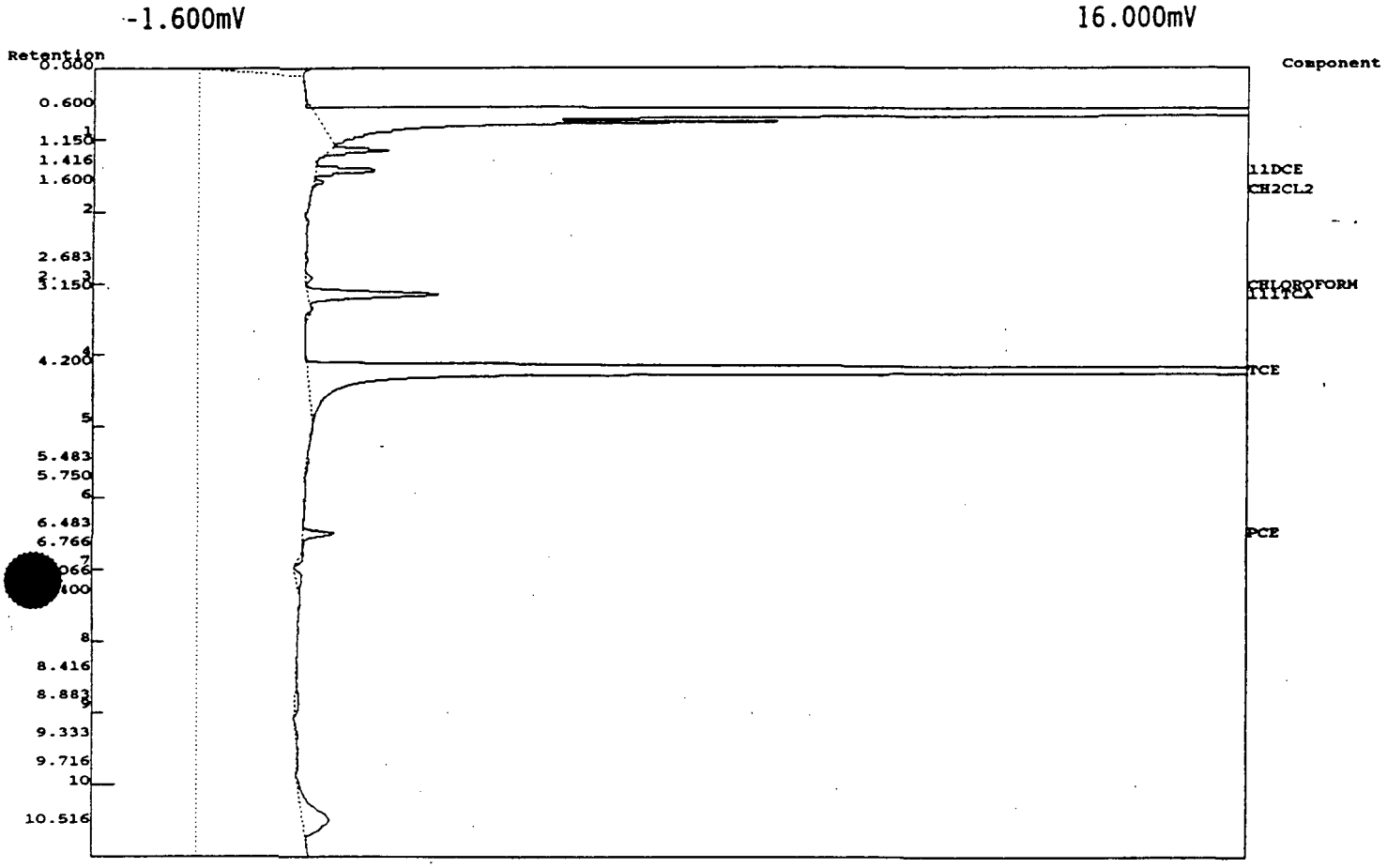
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 16:37:02
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E23.CHR (A:\)
Sample : EB-17
Operator : SGN

-1.600mV 16.000mV



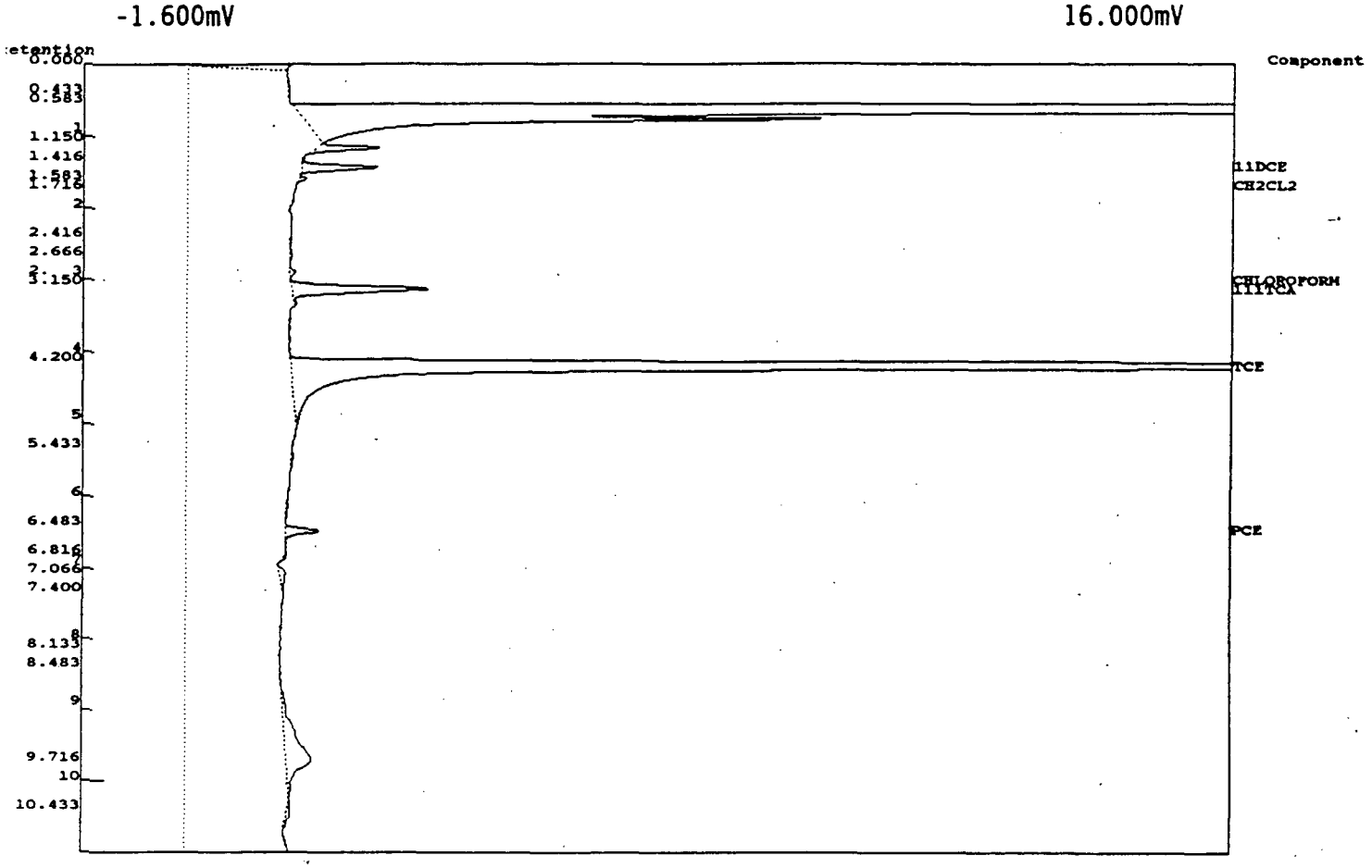
Component	Number	Retention	Area	External	Units
1DCE	1	1.416	0.30 M	0.04	ug/L
ARBON TETRACHLORIDE	8	3.316	0.70 M	0.00	ug/L
	2		1.00	0.04	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 18:27:53
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E27.CHR (A:\)
Sample : SG-182
Operator : SGN



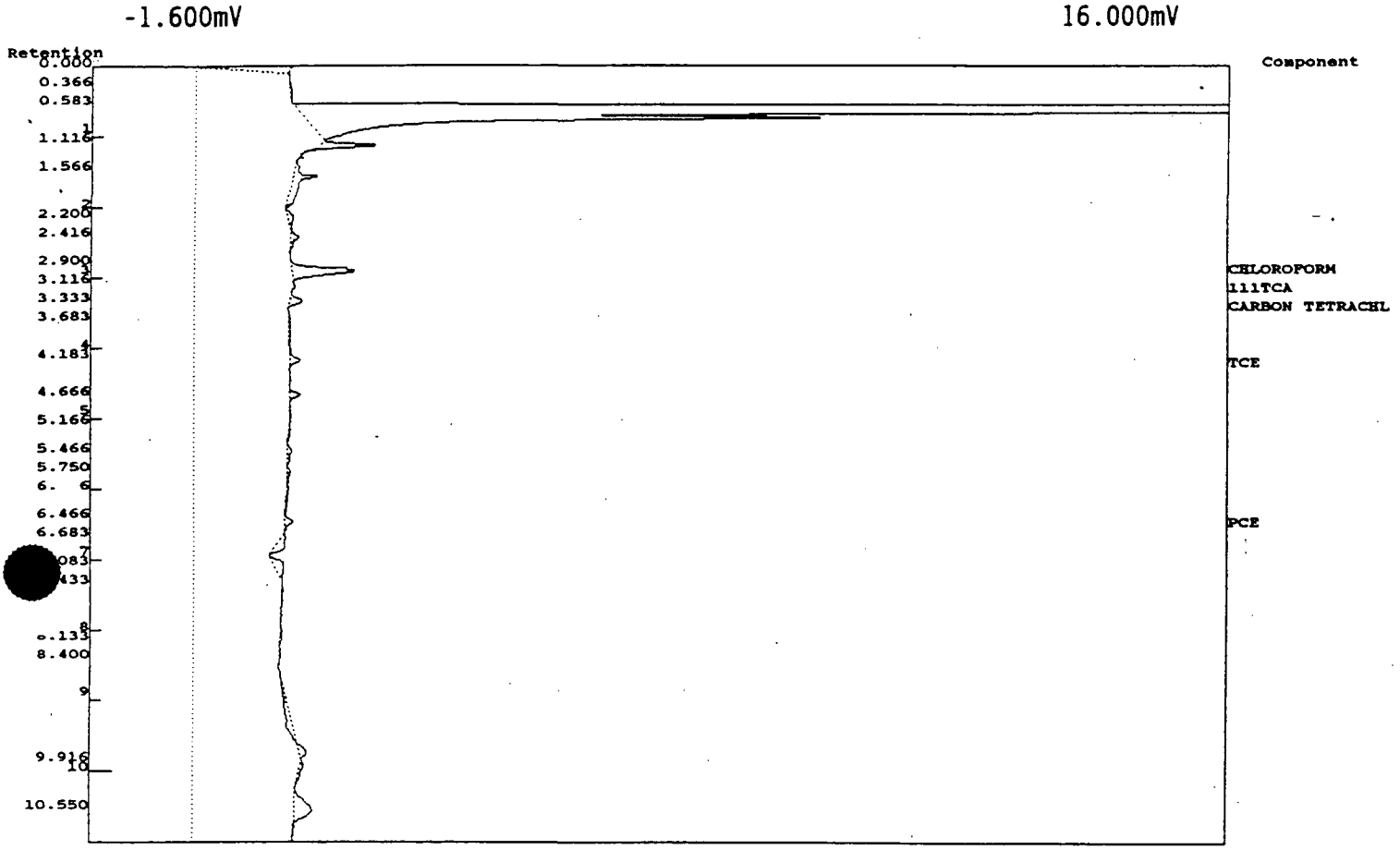
Component	Number	Retention	Area	External	Units
11DCE	1	1.416	4.71 M	0.64	ug/L
CH2CL2	2	1.600	0.58 M	0.39	ug/L
CHLOROFORM	6	2.916	0.55 M	0.01	ug/L
111TCA	7	3.150	12.46 M	0.07	ug/L
TCE	9	4.200	184.66 M	2.27	ug/L
PCE	11	6.483	2.60	0.01	ug/L
	6		205.55	3.39	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 18:51:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E28.CHR (A:\)
Sample : SG-882
Operator : SGN



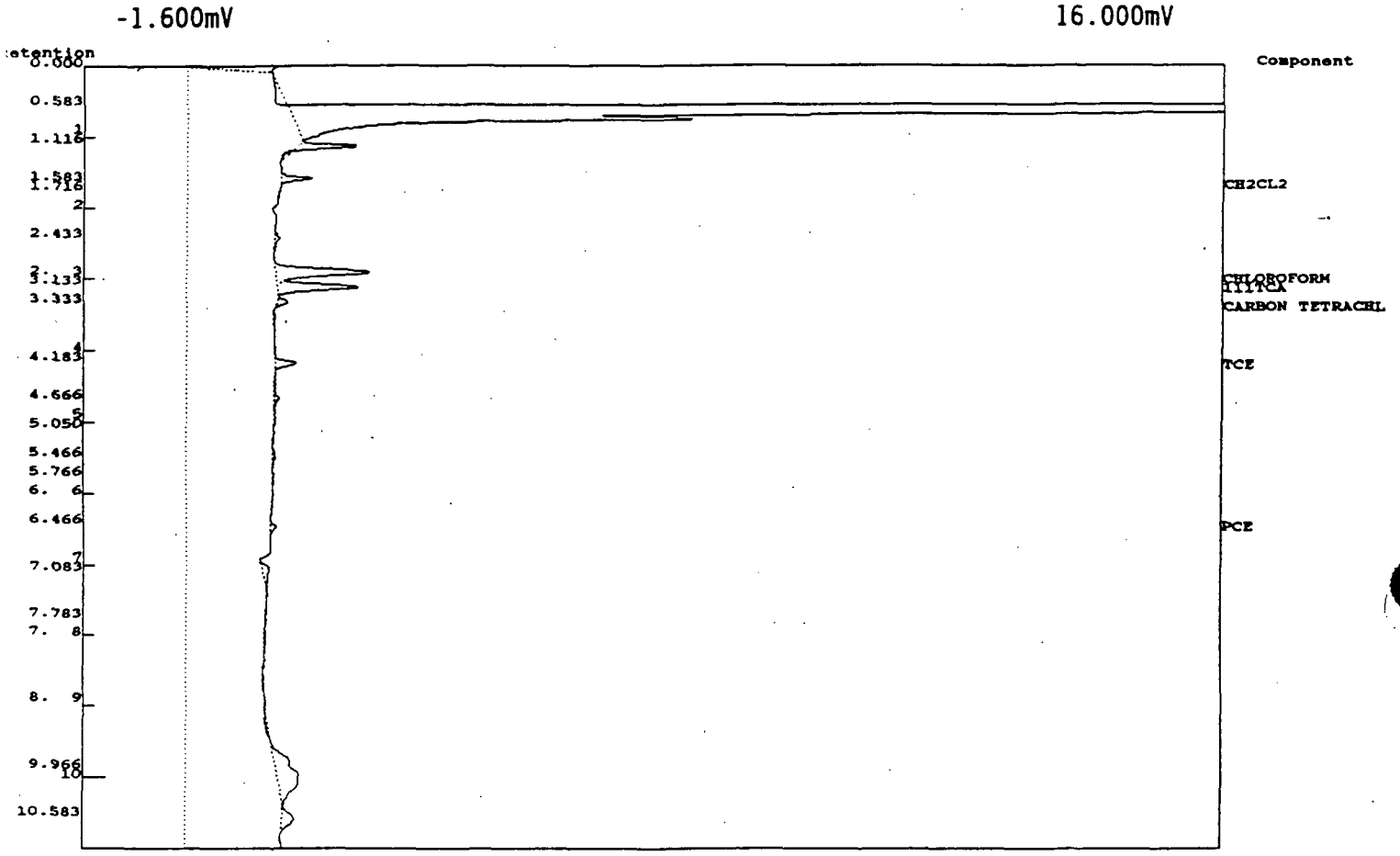
Component	Number	Retention	Area	External	Units
1DCE	1	1.416	5.77 M	0.78	ug/L
H2CL2	2	1.583	0.28 M	0.19	ug/L
HLOROFORM	6	2.916	0.41 M	0.01	ug/L
11TCA	7	3.150	13.09 M	0.08	ug/L
CE	9	4.200	201.93 M	2.49	ug/L
CE	11	6.483	2.76 M	0.01	ug/L
	6		224.24	3.55	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 19:14:37
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E29.CHR (A:\)
Sample : SG-183
Operator : SGN



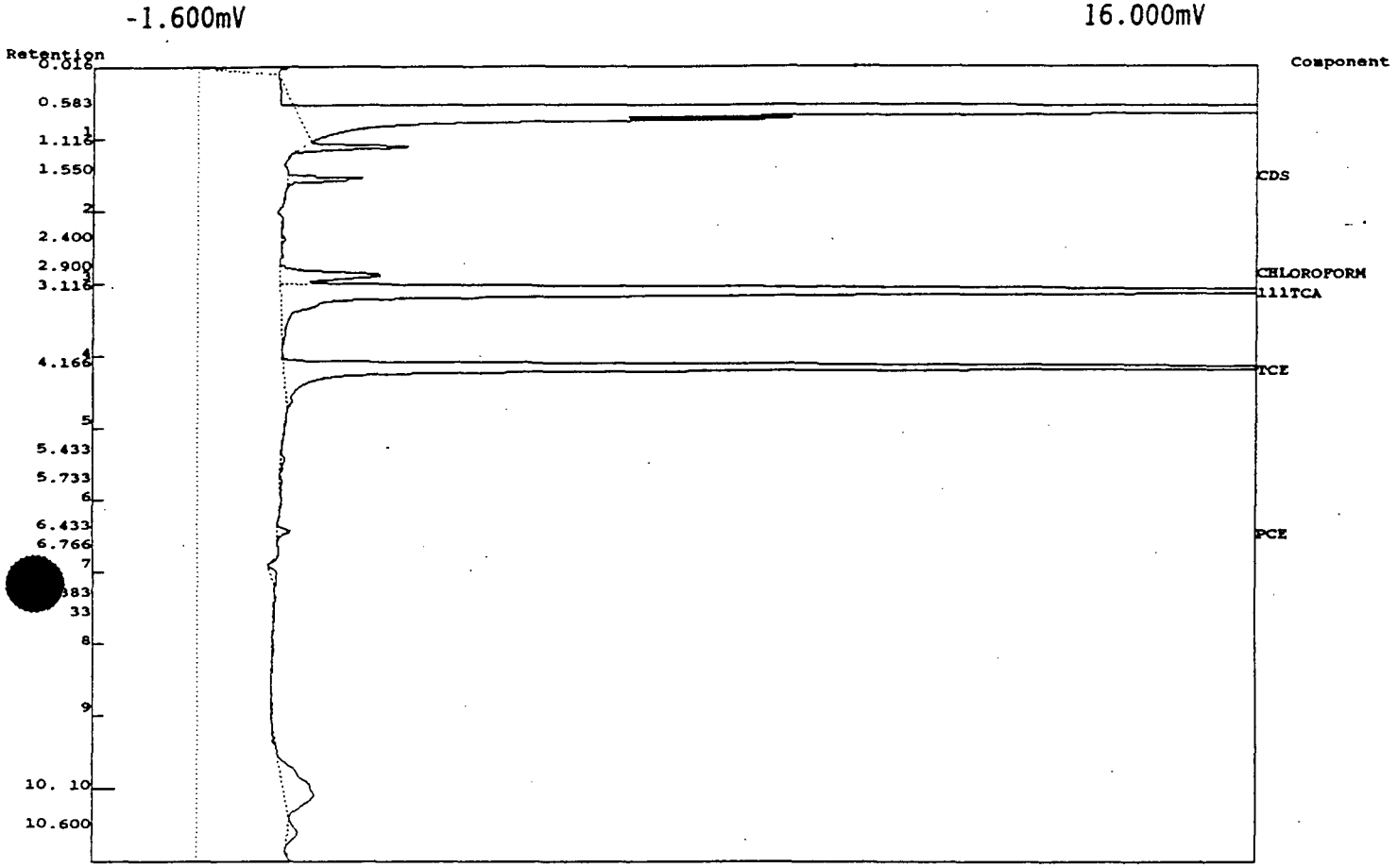
Component	Number	Retention	Area	External	Units
CHLOROFORM	6	2.900	6.90 M	0.10	ug/L
111TCA	7	3.116	0.14 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.333	1.13 M	0.00	ug/L
TCE	9	4.183	0.88 M	0.01	ug/L
PCE	11	6.466	0.79	0.00	ug/L
	5		9.85	0.12	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 19:36:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E30.CHR (A:\)
Sample : SG-184
Operator : SGN



Component	Number	Retention	Area	External	Units
CH2CL2	2	1.583	1.86 M	1.25	ug/L
CHLOROFORM	6	2.916	10.34 M	0.15	ug/L
11TCA	7	3.133	7.72 M	0.05	ug/L
CARBON TETRACHLORIDE	8	3.333	0.86 M	0.00	ug/L
TCE	9	4.183	1.82 M	0.02	ug/L
PCE	11	6.466	0.57 M	0.00	ug/L
	6		23.17	1.48	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 19:57:56
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E31.CHR (A:\)
Sample : SG-185
Operator : SGN

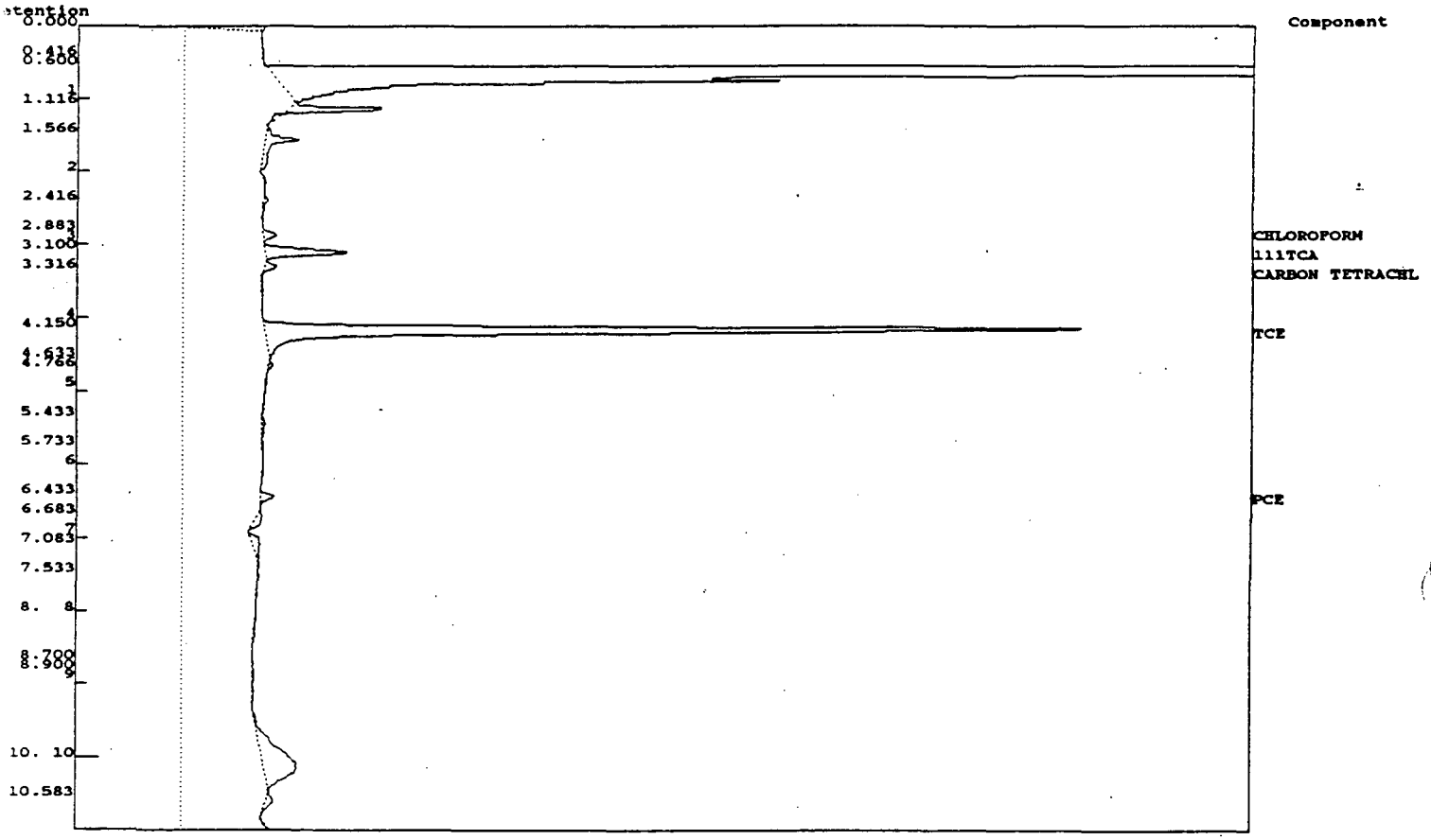


Component	Number	Retention	Area	External	Units
CDS	0	1.550	4.59 M	N/A	
CHLOROFORM	6	2.900	10.54 M	0.16	ug/L
111TCA	7	3.116	137.70 M	0.83	ug/L
TCE	9	4.166	107.17 M	1.32	ug/L
PCE	11	6.433	1.08 M	0.00	ug/L
	5		261.08	1.31	

300719

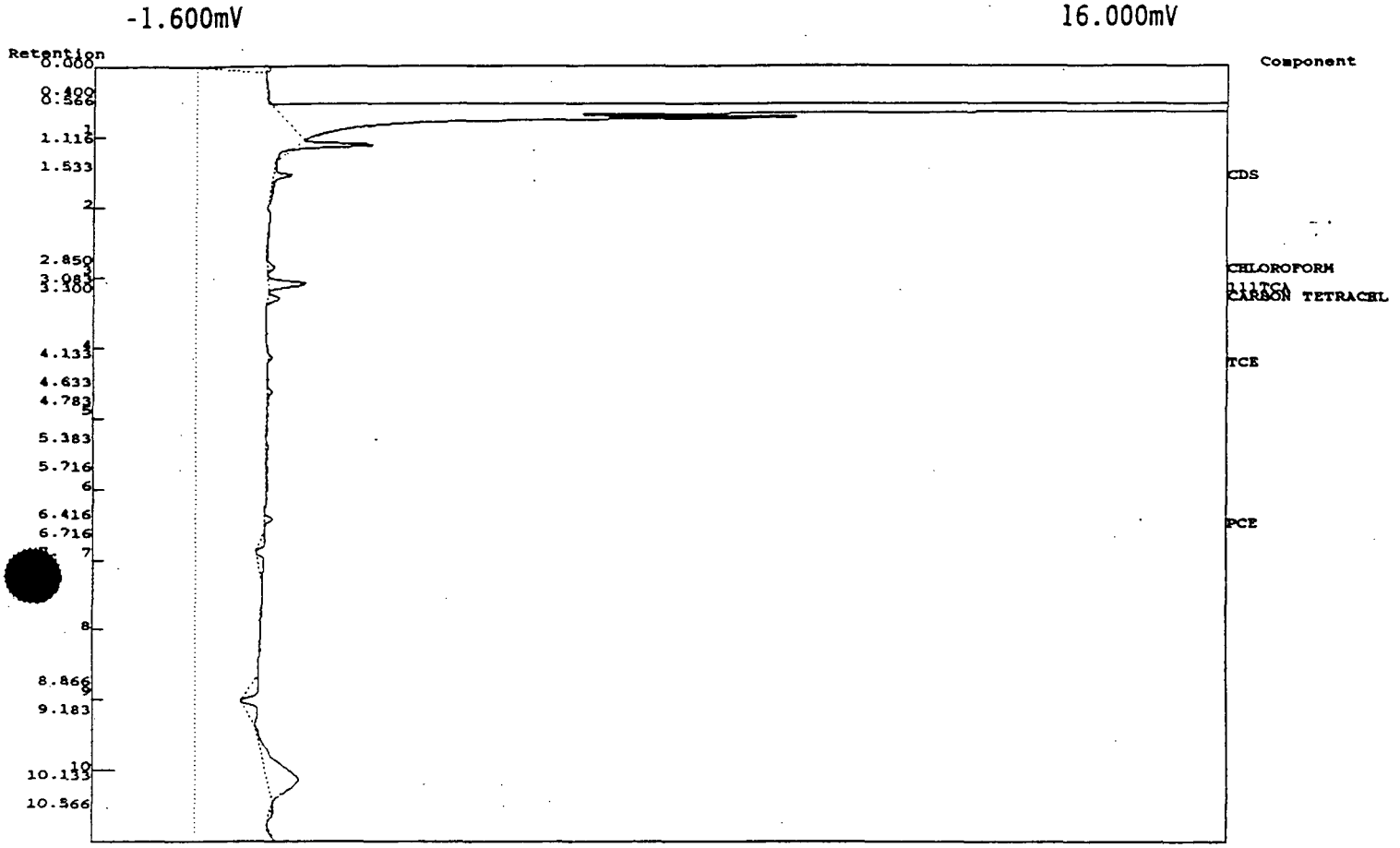
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 20:18:35
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E32.CHR (A:\)
Sample : SG-186
Operator : SGN

-1.600mV 16.000mV



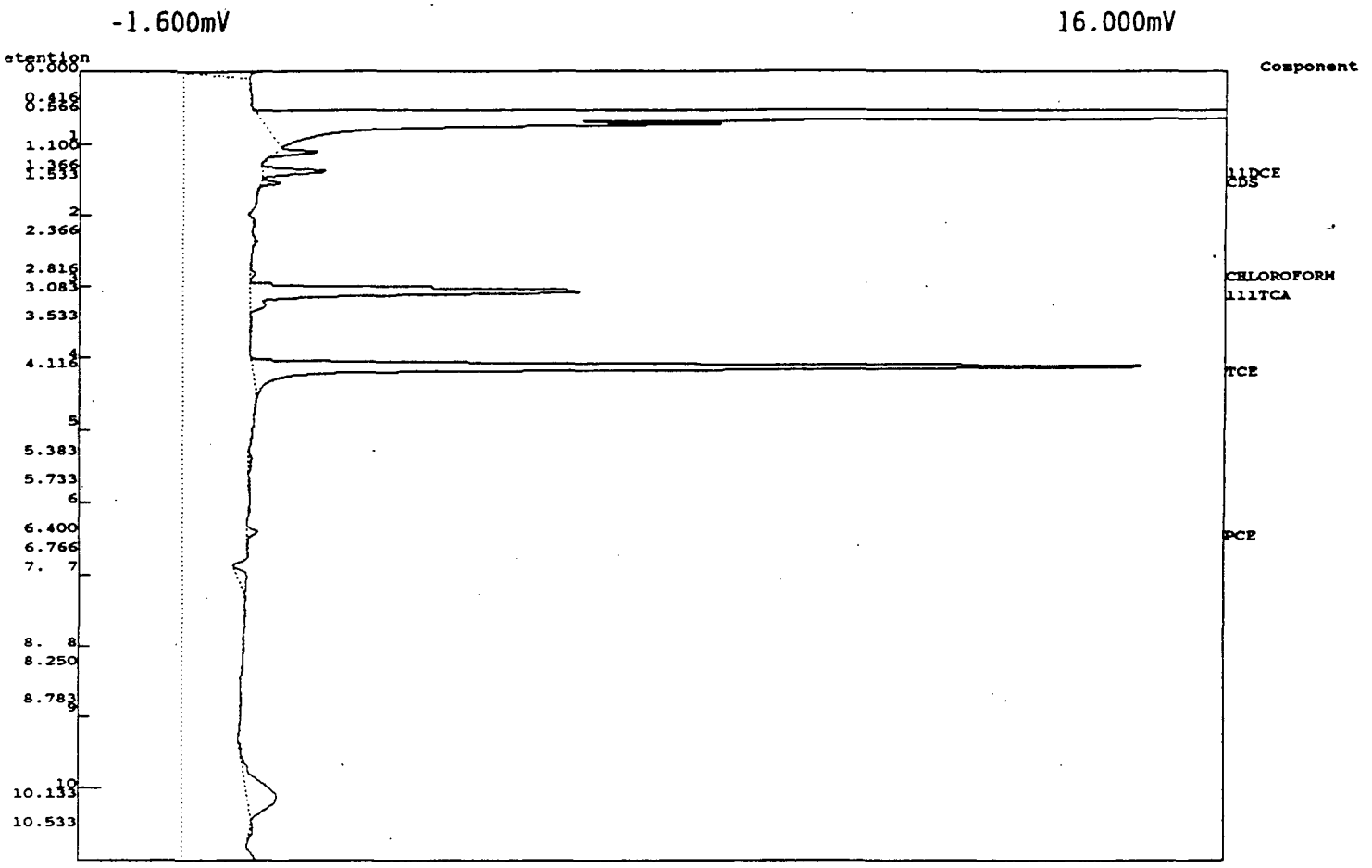
Component	Number	Retention	Area	External	Units
HLOROFORM	6	2.883	1.03	0.02	ug/L
11TCA	7	3.100	7.38 M	0.04	ug/L
ARBON TETRACHLORIDE	8	3.316	0.88 M	0.00	ug/L
CE	9	4.150	71.05 M	0.87	ug/L
CE	11	6.433	1.10	0.00	ug/L
	5		81.45	0.94	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 20:38:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E33.CHR (A:\)
Sample : SG-187
Operator : SGN



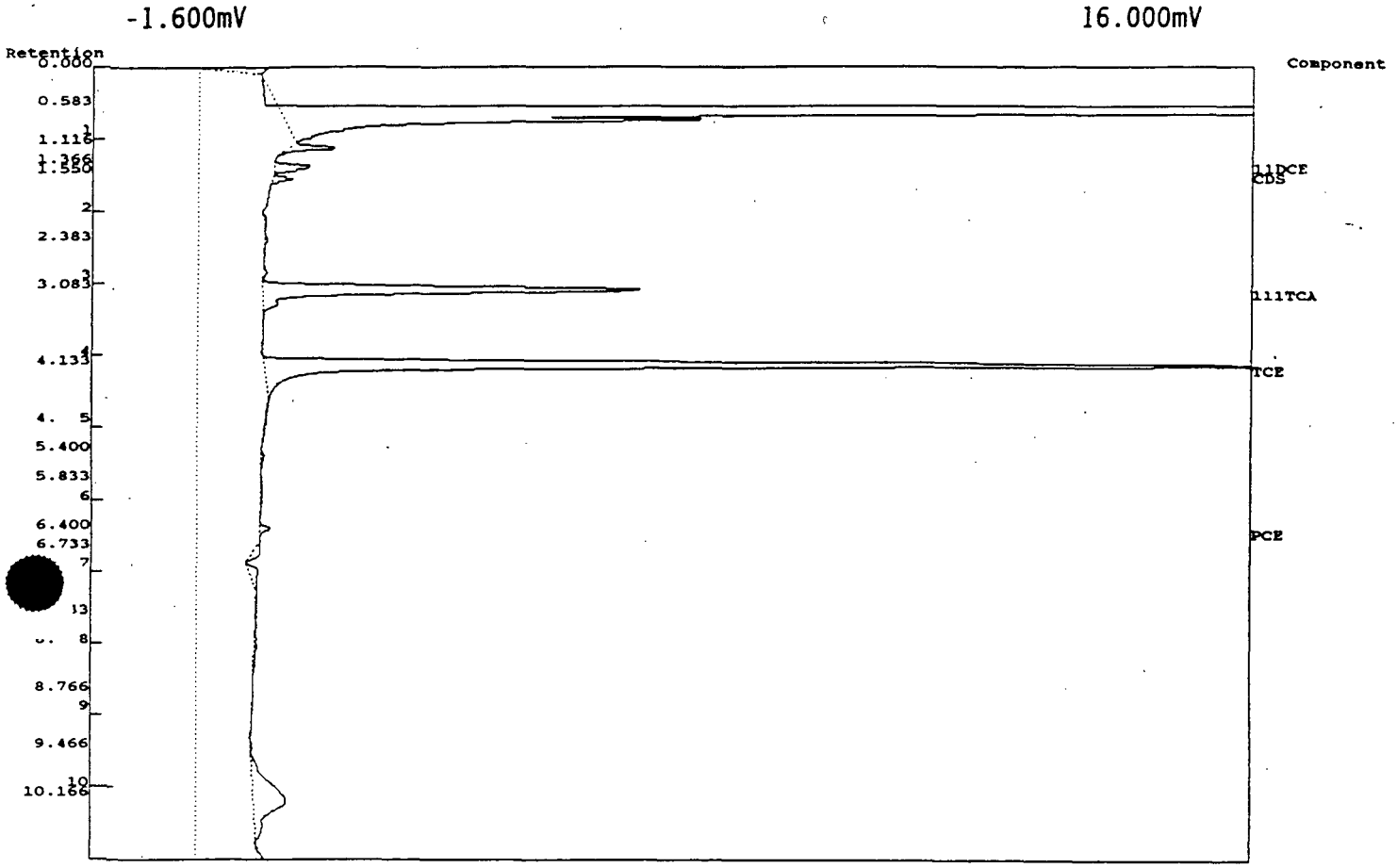
Component	Number	Retention	Area	External	Units
CDS	0	1.533	2.05	N/A	
CHLOROFORM	6	2.850	0.70	0.01	ug/L
111TCA	7	3.083	3.42	0.02	ug/L
CARBON TETRACHLORIDE	8	3.300	0.93	0.00	ug/L
TCE	9	4.133	0.18 M	0.00	ug/L
PCE	11	6.416	0.70	0.00	ug/L
	6		7.98	N/A	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 20:58:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E34.CHR (A:\)
Sample : SG-188
Operator : SGN



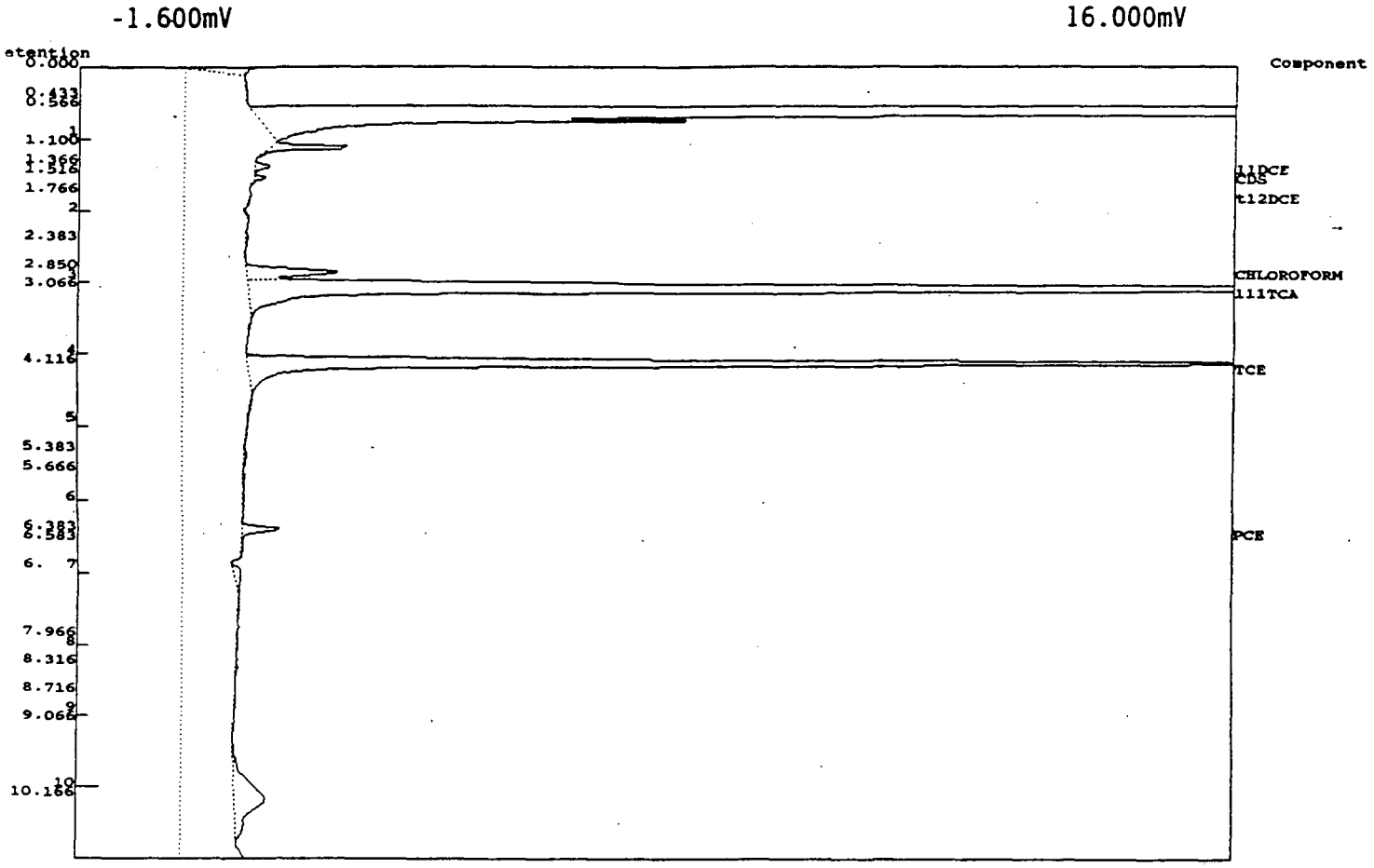
Component	Number	Retention	Area	External	Units
1DCE	1	1.366	4.84 M	0.65	ug/L
DS	0	1.533	1.01 M	N/A	
HLOROFORM	6	2.816	0.36 M	0.01	ug/L
11TCA	7	3.083	36.77 M	0.22	ug/L
CE	9	4.116	80.13 M	0.99	ug/L
CE	11	6.400	1.00 M	0.00	ug/L
	6		124.12	0.87	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 21:18:23
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E35.CHR (A:\)
Sample : SG-888
Operator : SGN



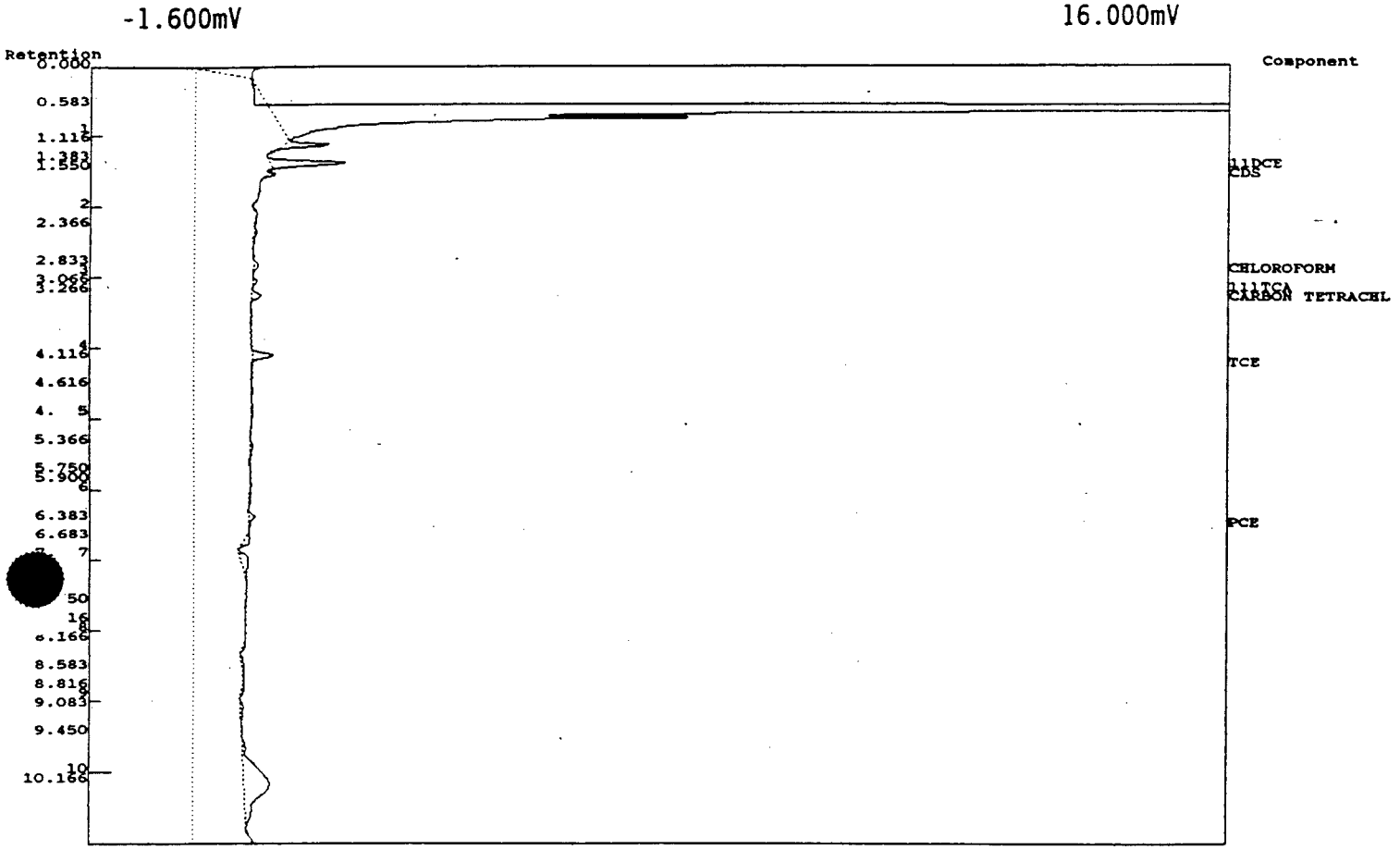
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	2.91 M	0.39	ug/L
CDS	0	1.550	1.14 M	N/A	
111TCA	7	3.083	39.00 M	0.23	ug/L
TCE	9	4.133	91.26 M	1.12	ug/L
PCE	11	6.400	0.82 M	0.00	ug/L
	5		135.13	0.75	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 21:37:48
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E36.CHR (A:\)
Sample : SG-189
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	1.05	0.14	ug/L
DS	0	1.516	0.59 M	N/A	
12DCE	3	1.766	0.24 M	0.41	ug/L
HLOROFORM	6	2.850	9.09 M	0.14	ug/L
11TCA	7	3.066	159.21 M	0.96	ug/L
CE	9	4.116	94.64 M	1.16	ug/L
CE	11	6.383	3.04 M	0.01	ug/L
	7		267.88	1.82	

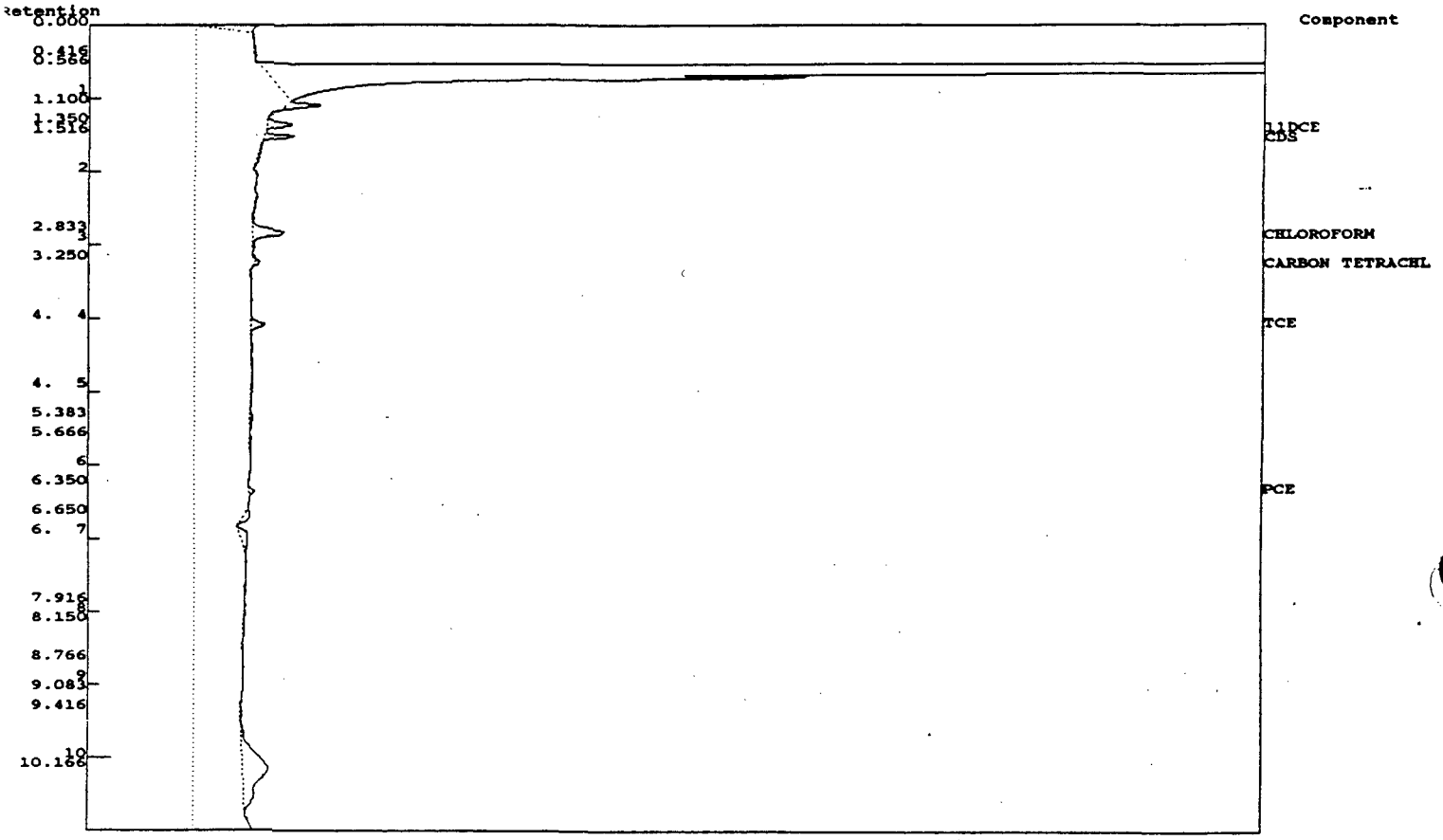
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 21:57:04
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E37.CHR (A:\)
Sample : SG-194
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	5.35 M	0.72	ug/L
CDS	0	1.550	0.37 M	N/A	
CHLOROFORM	6	2.833	0.37 M	0.01	ug/L
111TCA	7	3.066	0.33	0.00	ug/L
CARBON TETRACHLORIDE	8	3.266	0.77	0.00	ug/L
TCE	9	4.116	1.68 M	0.02	ug/L
PCE	11	6.383	0.66	0.00	ug/L
	7		9.54	N/A	

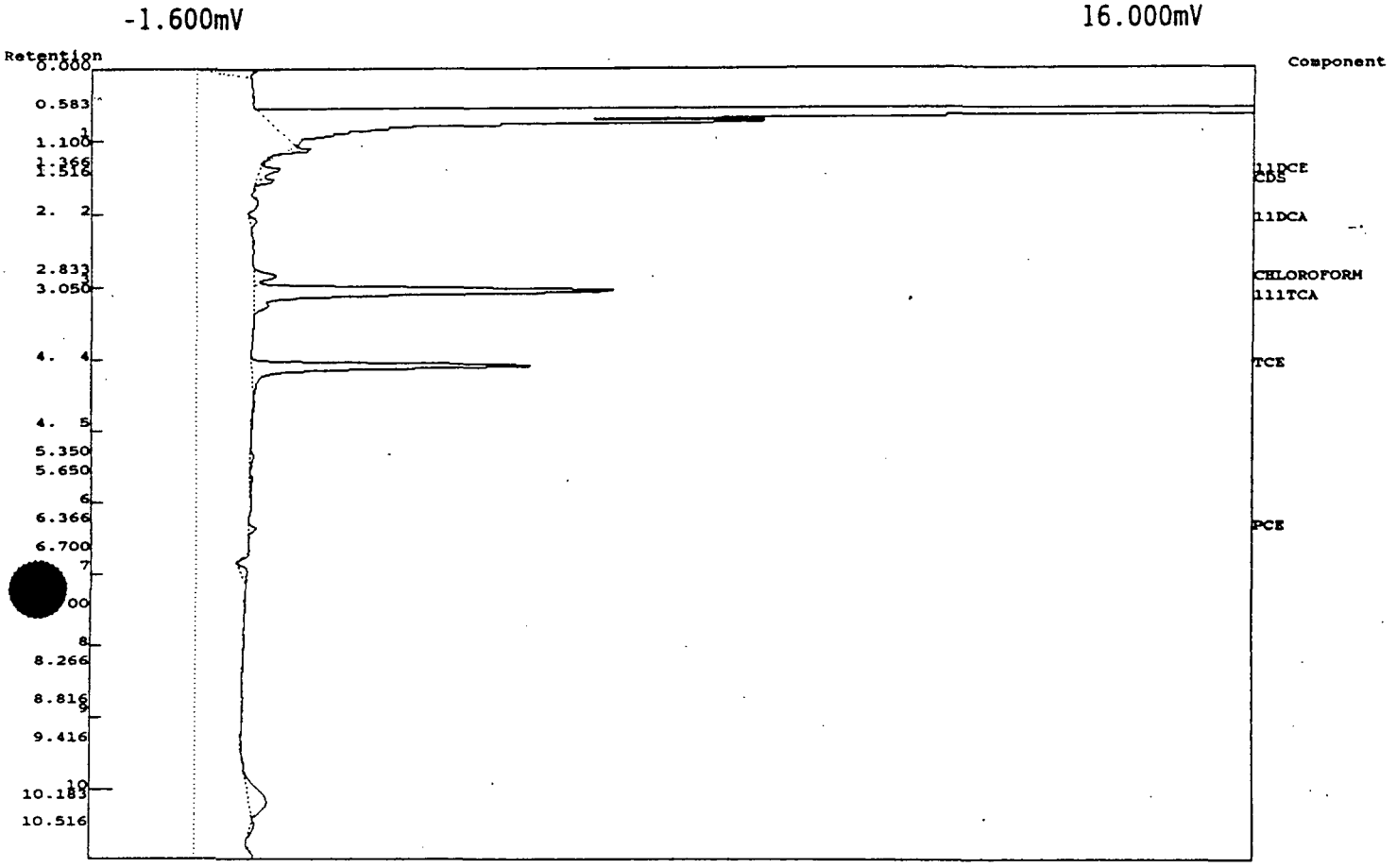
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 22:16:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E38.CHR (A:\)
Sample : SG-195
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	1.73	0.23	ug/L
DS	0	1.516	1.93	N/A	
HLOROFORM	6	2.833	3.55	0.05	ug/L
ARBON TETRACHLORIDE	8	3.250	0.30 M	0.00	ug/L
CE	9	4.083	1.21	0.01	ug/L
CE	11	6.350	0.39 M	0.00	ug/L
	6		9.11	N/A	

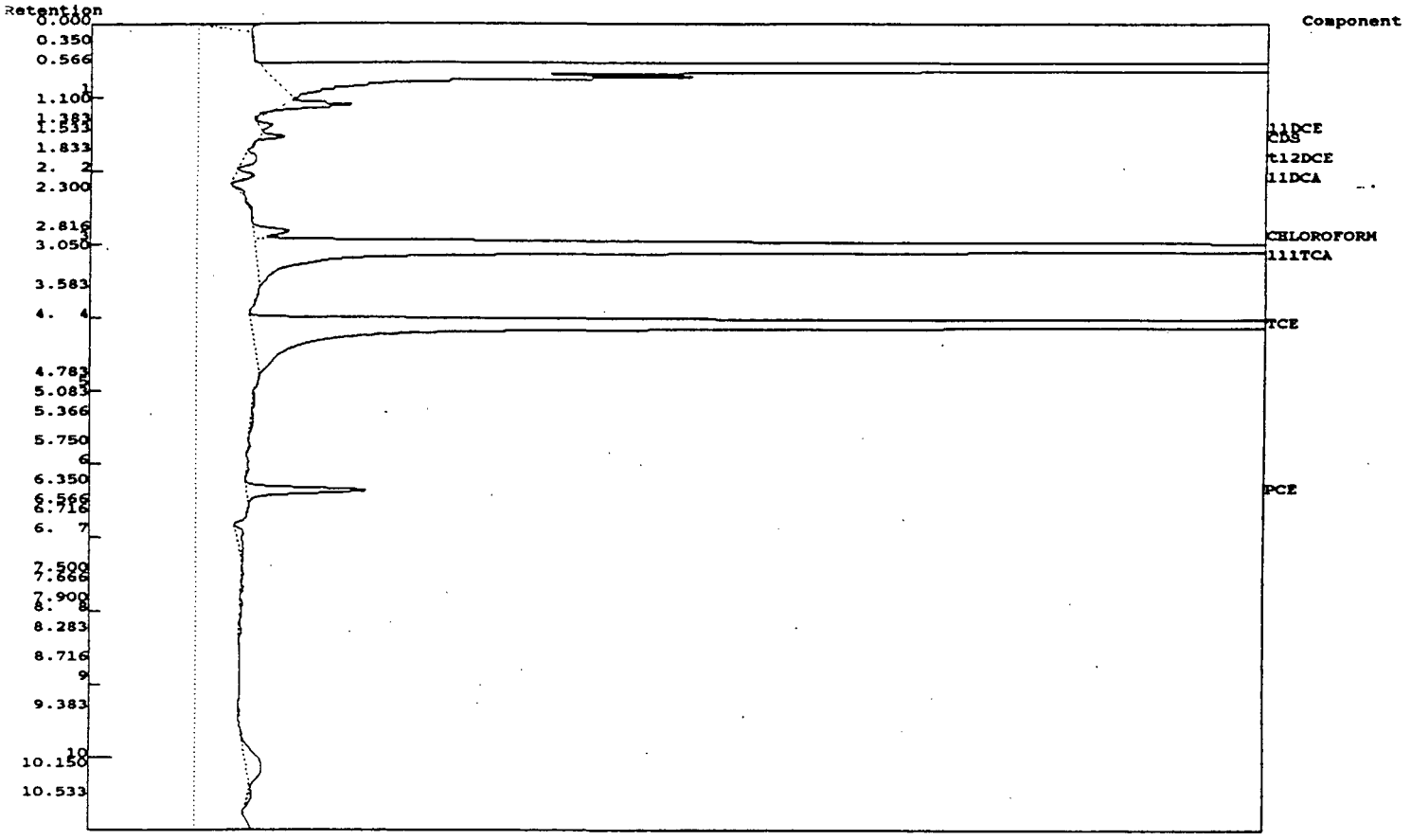
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 22:35:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E39.CHR (A:\)
Sample : SG-196
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.74 M	0.24	ug/L
CDS	0	1.516	1.44 M	N/A	
11DCA	4	2.083	0.60 M	0.55	ug/L
CHLOROFORM	6	2.833	2.26 M	0.03	ug/L
111TCA	7	3.050	37.21 M	0.22	ug/L
TCE	9	4.100	24.41 M	0.30	ug/L
PCE	11	6.366	0.70 M	0.00	ug/L
	7		68.35	0.35	

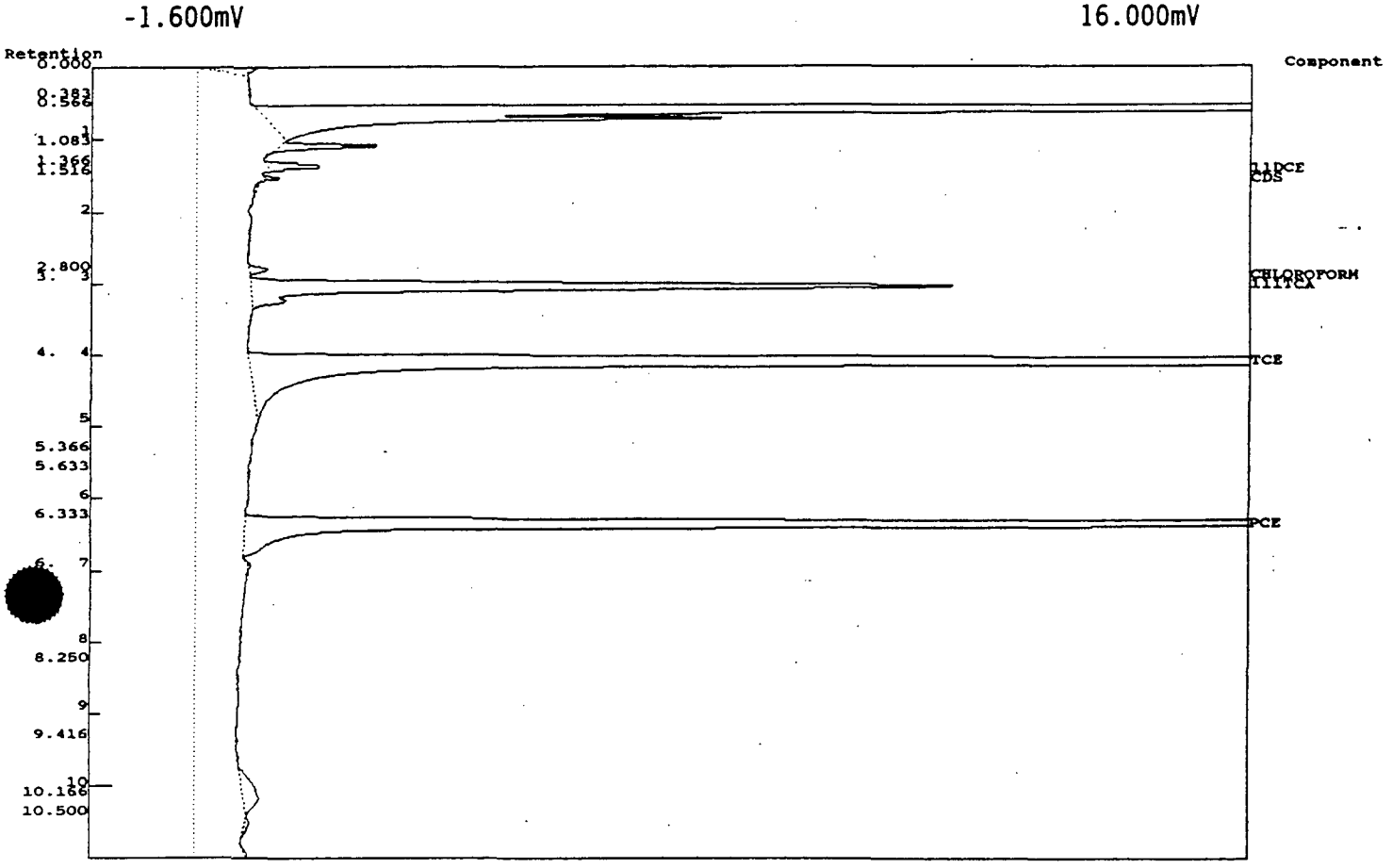
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 22:54:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E40.CHR (A:\)
Sample : SG-197
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	0.92	0.12	ug/L
CDS	0	1.533	1.30 M	N/A	
t12DCE	3	1.833	1.97 M	3.35	ug/L
11DCA	4	2.066	1.87 M	1.72	ug/L
CHLOROFORM	6	2.816	3.20 M	0.05	ug/L
111TCA	7	3.050	269.88 M	1.62	ug/L
TCE	9	4.083	270.99 M	3.34	ug/L
PCE	11	6.350	9.71 M	0.04	ug/L
	8		559.83	9.23	

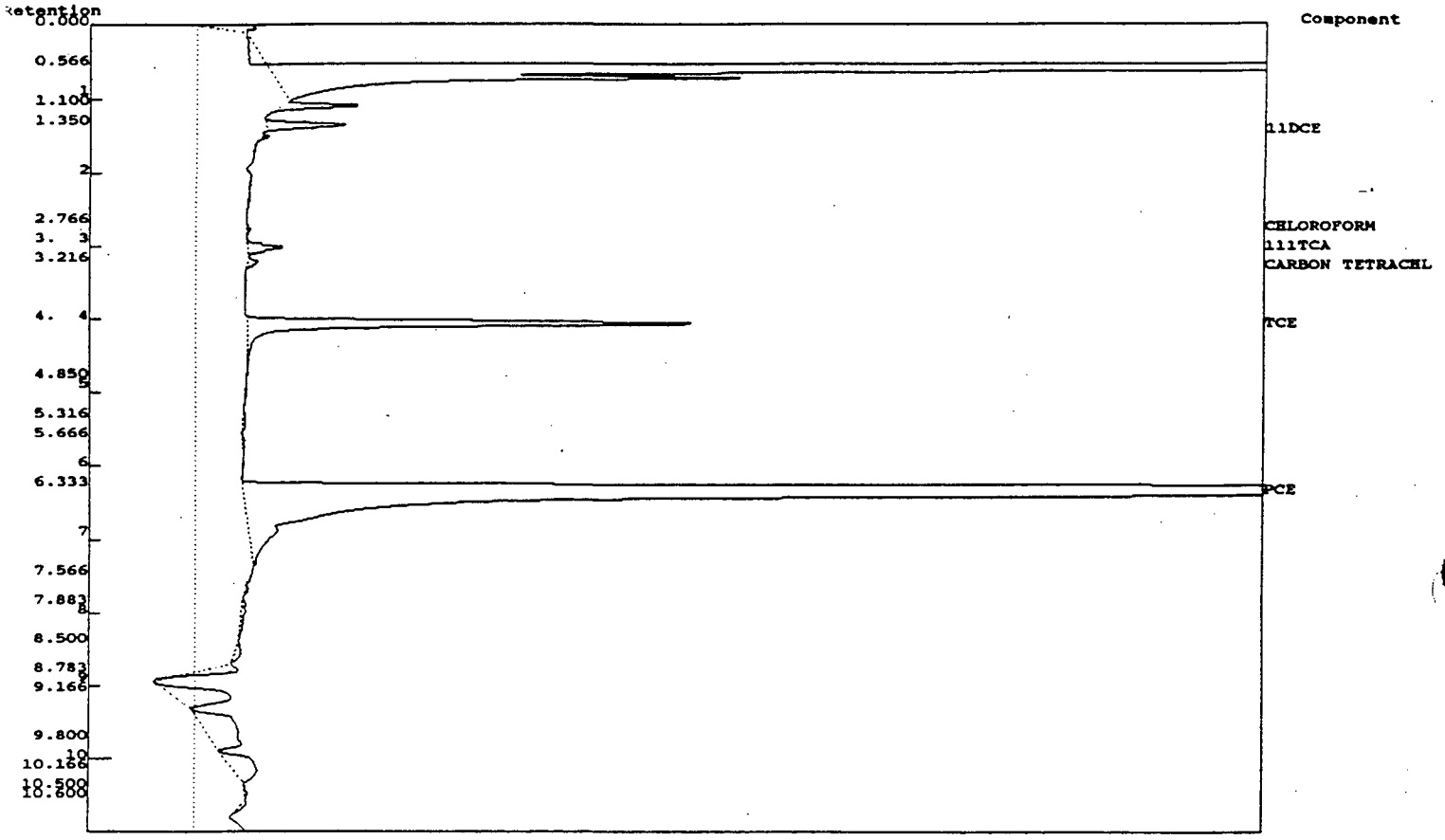
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 23:13:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E41.CHR (A:\)
Sample : SG-198
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.87 M	0.52	ug/L
CDS	0	1.516	0.42 M	N/A	
CHLOROFORM	6	2.800	1.36 M	0.02	ug/L
111TCA	7	3.033	73.74 M	0.44	ug/L
TCE	9	4.083	300.02 M	3.69	ug/L
PCE	11	6.333	159.70 M	0.58	ug/L
	6		539.12	4.26	

Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 23:32:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E42.CHR (A:\)
Sample : SG-199
Operator : SGN

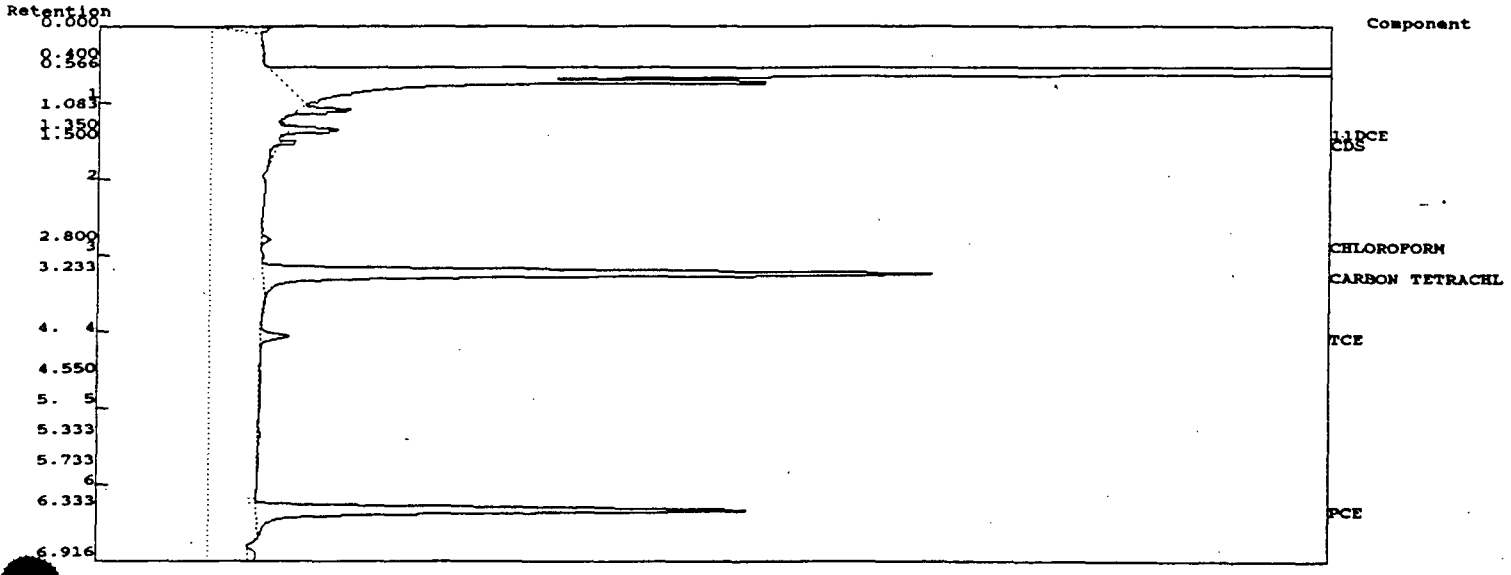
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	5.55 M	0.75	ug/L
HLOROFORM	6	2.766	0.22 M	0.00	ug/L
11TCA	7	3.016	3.00 M	0.02	ug/L
ARBON TETRACHLORIDE	8	3.216	0.75 M	0.00	ug/L
CE	9	4.066	38.97 M	0.48	ug/L
CE	11	6.333	587.74 M	2.14	ug/L
	6		636.24	3.39	

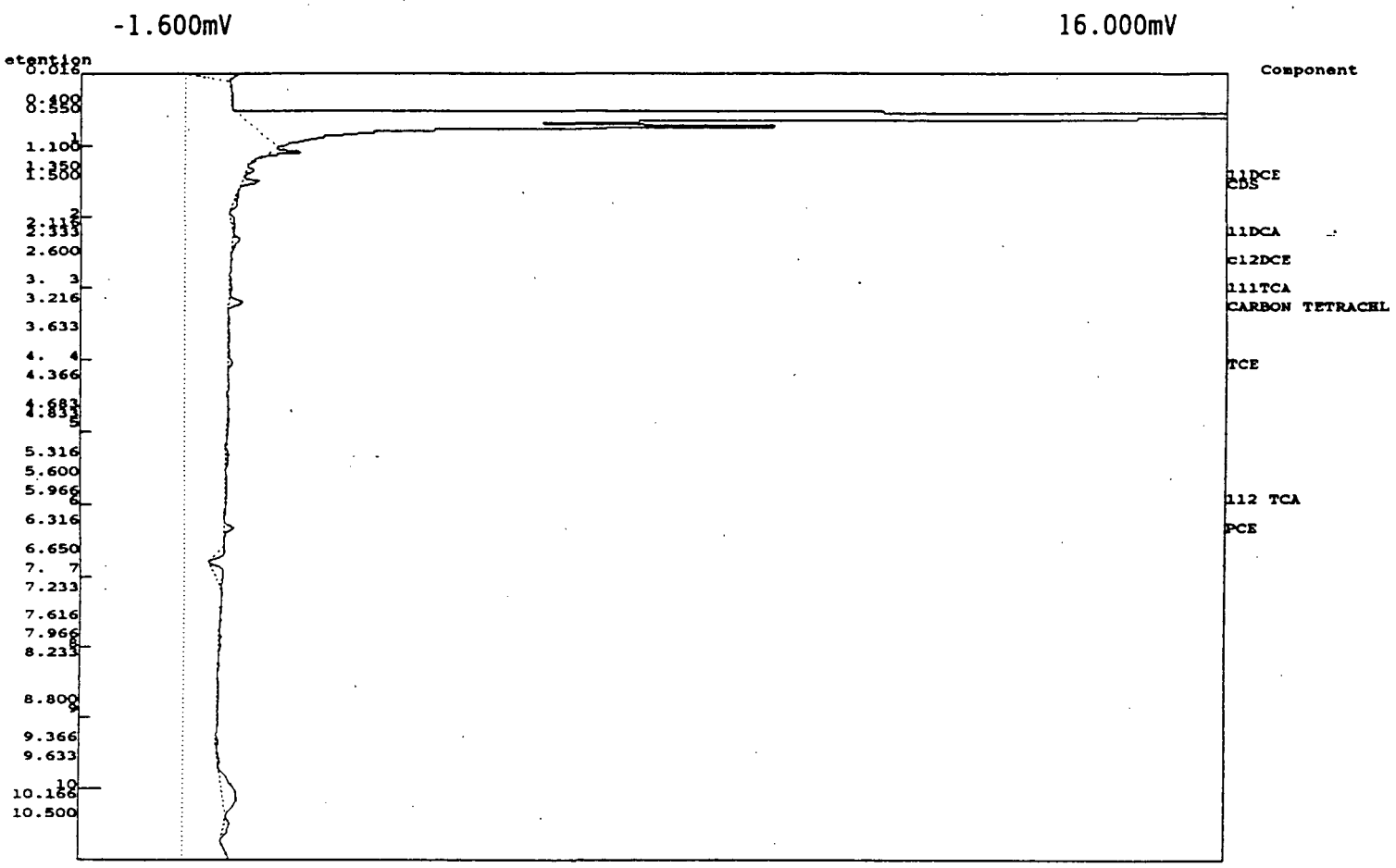
Lab name : COLUMBIA TECH
Analysis date : 05/31/2000 23:51:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E43.CHR (A:\)
Sample : SG-200
Operator : SGN

-1.600mV 16.000mV



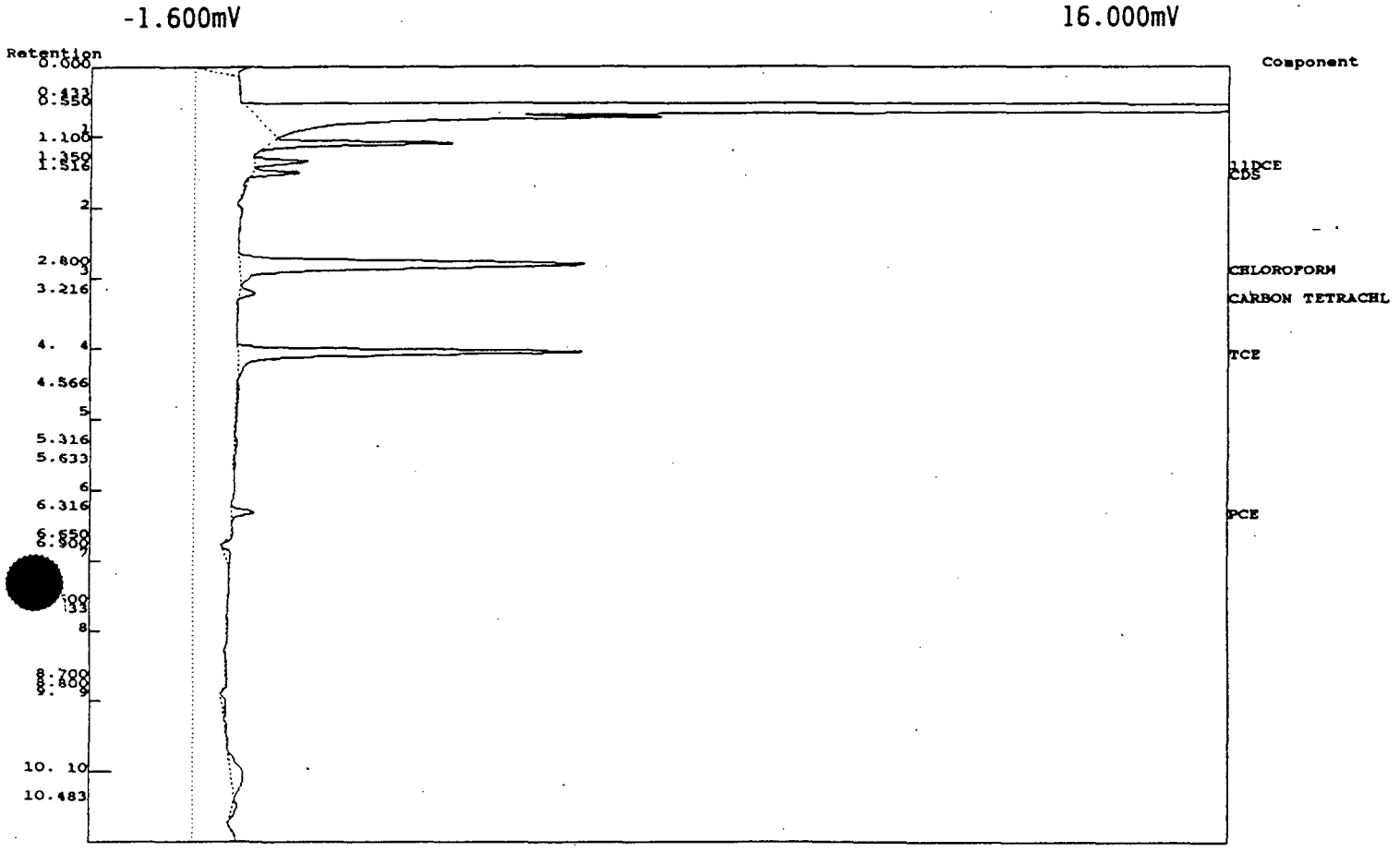
omponent	Number	Retention	Area	External	Units
11DCE	1	1.350	2.87 M	0.39	ug/L
CDS	0	1.500	0.49 M	N/A	
CHLOROFORM	6	2.800	0.67	0.01	ug/L
CARBON TETRACHLORIDE	8	3.233	60.03 M	0.02	ug/L
TCE	9	4.066	2.16 M	0.03	ug/L
PCE	11	6.333	40.17 M	0.15	ug/L
	6		106.40	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 00:10:10
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E44.CHR (A:\)
Sample : EB-18
Operator : SGN



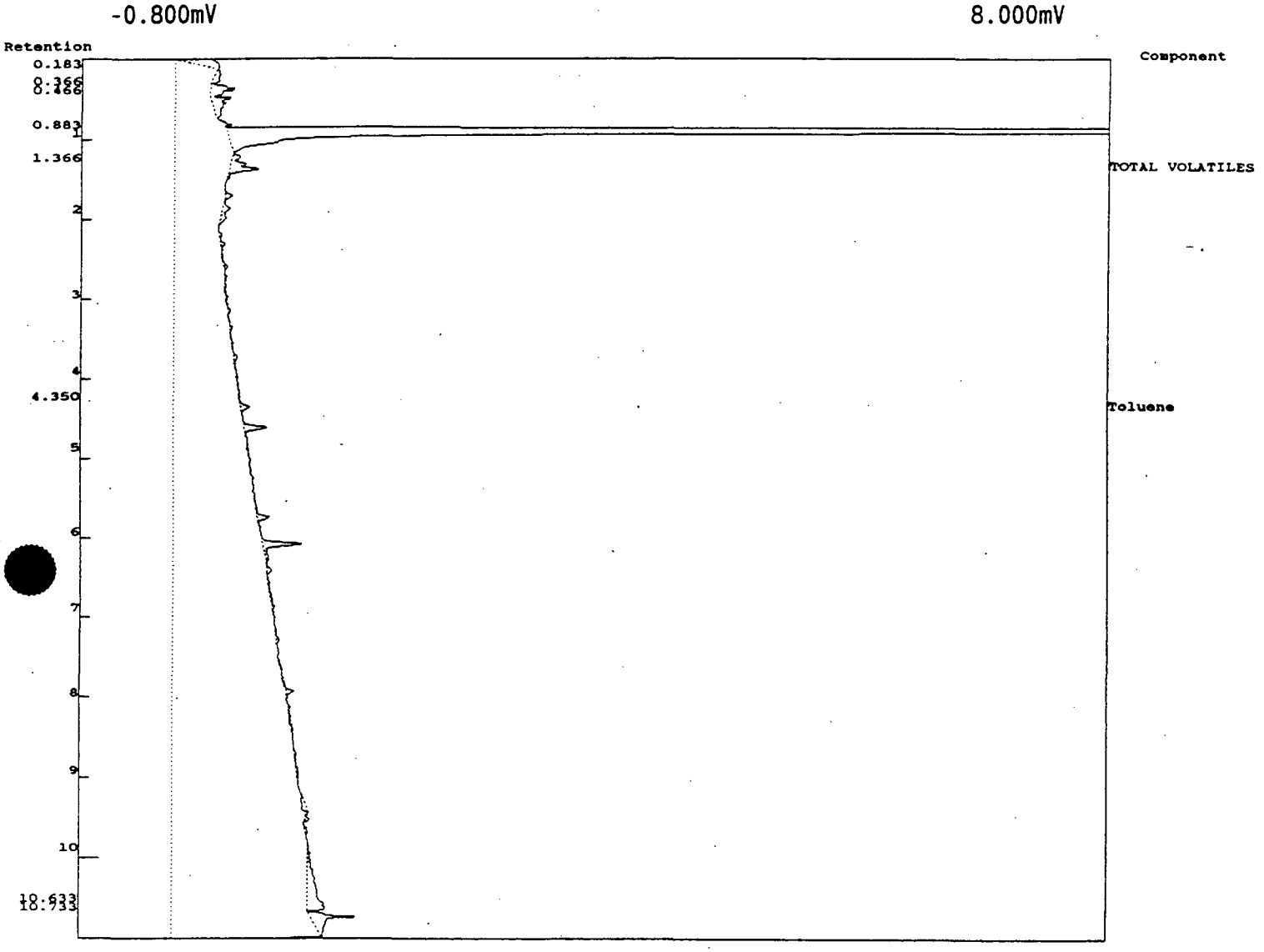
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	0.52	0.07	ug/L
DS	0	1.500	1.82	N/A	
1DCA	4	2.116	0.57	0.52	ug/L
12DCE	5	2.600	0.15	0.34	ug/L
11TCA	7	3.000	0.17	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	1.21	0.00	ug/L
CE	9	4.050	0.45	0.01	ug/L
12 TCA	10	5.966	0.12	0.01	ug/L
CE	11	6.316	0.89	0.00	ug/L
	9		5.90	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 00:29:10
Method : 8010
Description : ECD - CHANNEL 2
Data file : MAY31E45.CHR (A:\)
Sample : SG-113-R
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	3.80	0.51	ug/L
CDS	0	1.516	2.58	N/A	
CHLOROFORM	6	2.800	41.11 M	0.62	ug/L
CARBON TETRACHLORIDE	8	3.216	1.39 M	0.00	ug/L
TCE	9	4.050	30.43 M	0.37	ug/L
PCE	11	6.316	1.99 M	0.01	ug/L
	6		81.30	0.51	

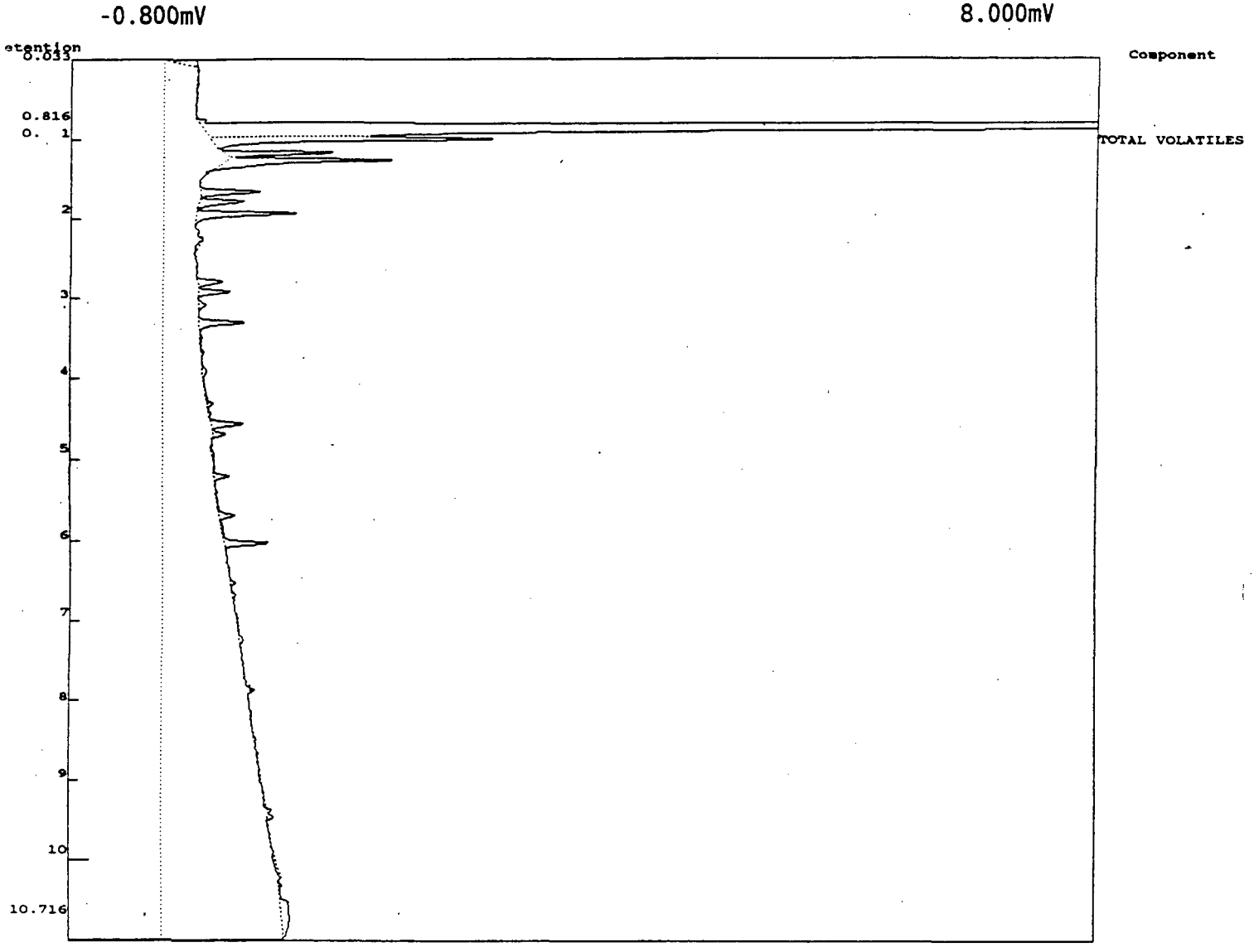
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F6.CHR (A:\)
Sample : SG-112
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.18 M	5.18	ug/L
Toluene	3	4.350	0.28 M	0.28	ug/L
	2		5.45	5.45	

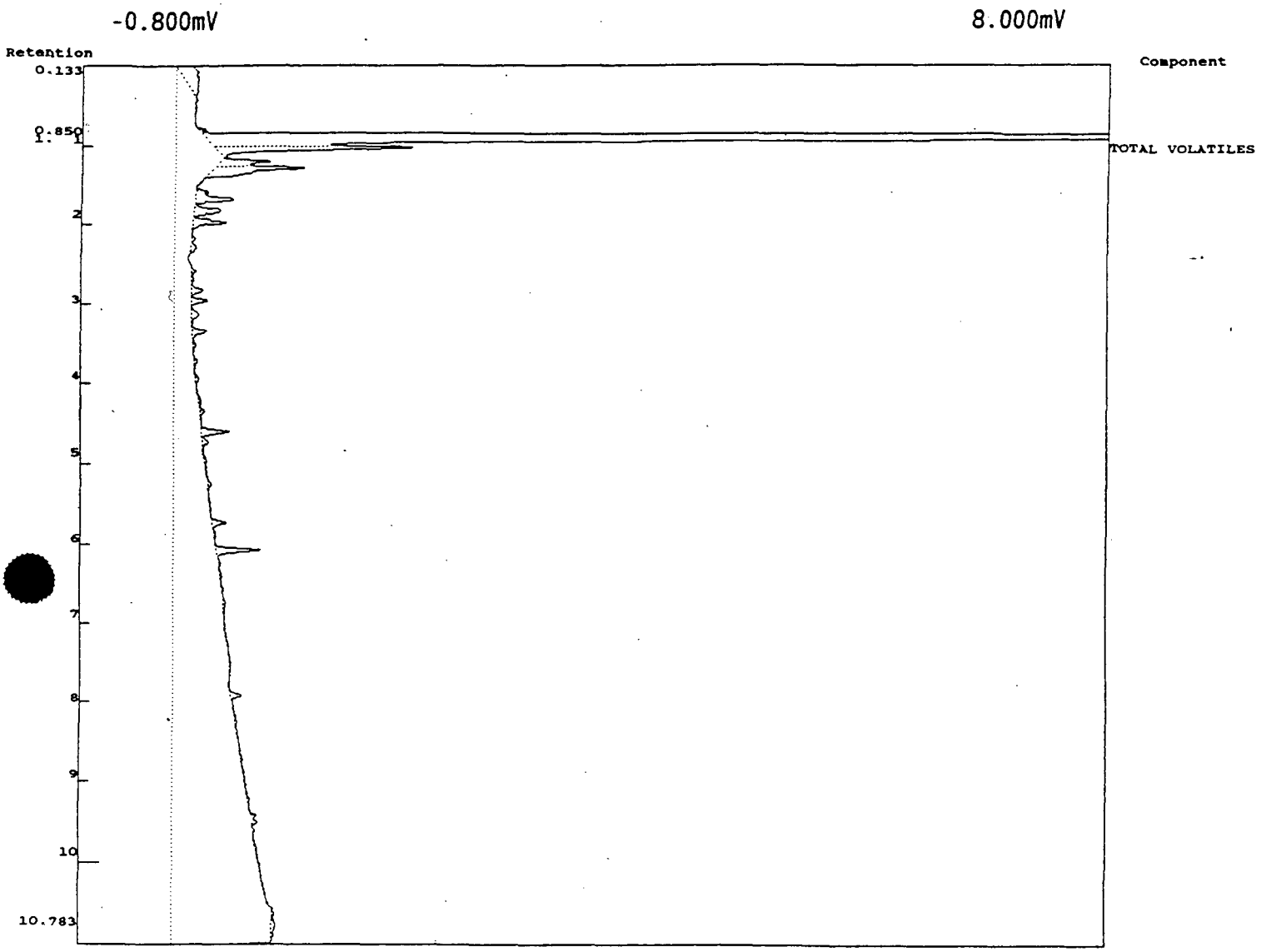
300734

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F7.CHR (A:\)
Sample : SG-113
Operator : SGN



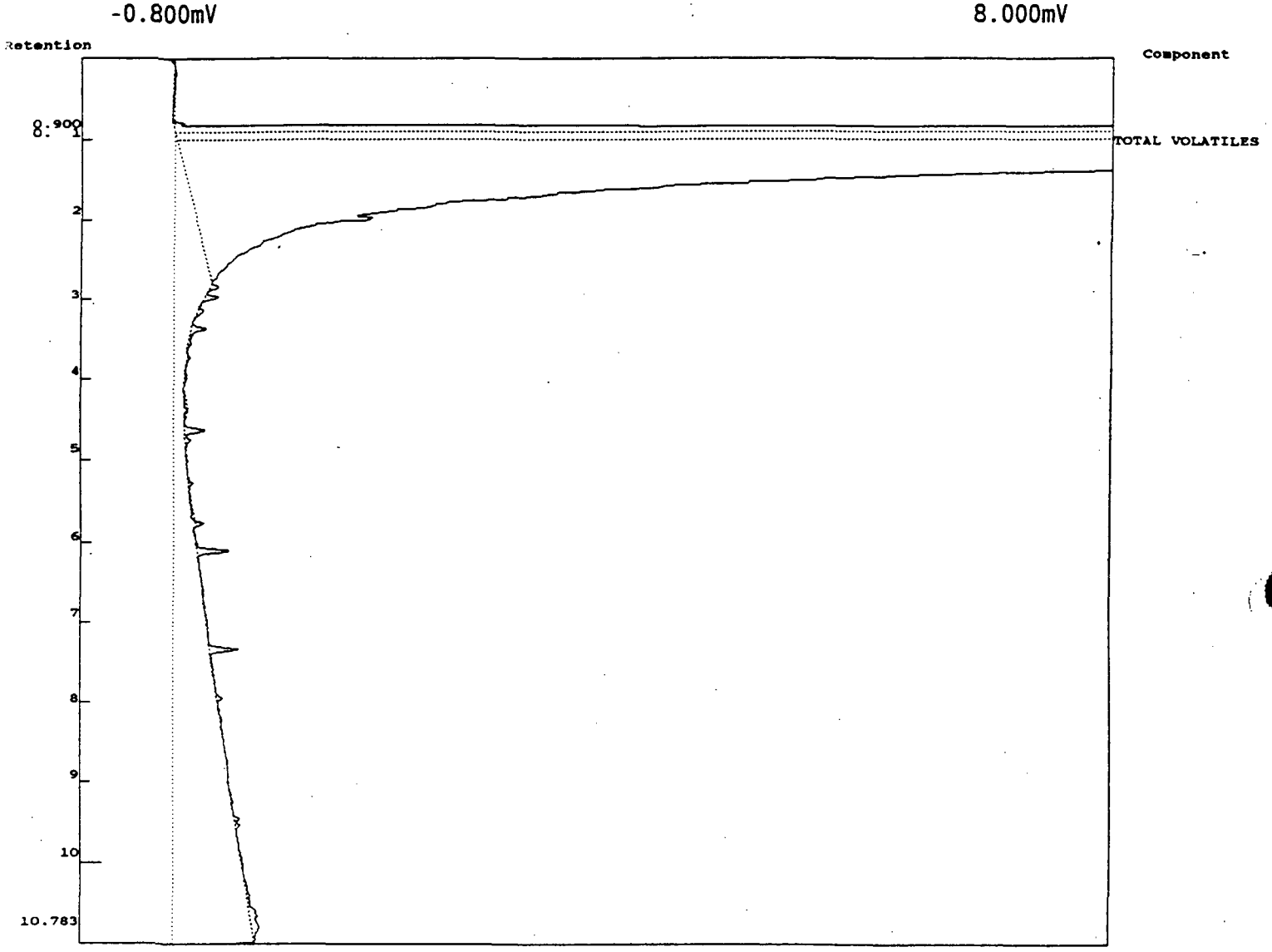
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	33.41 M	33.41	ug/L
	1		33.41	33.41	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F8.CHR (A:\)
Sample : SG-116
Operator : SGN



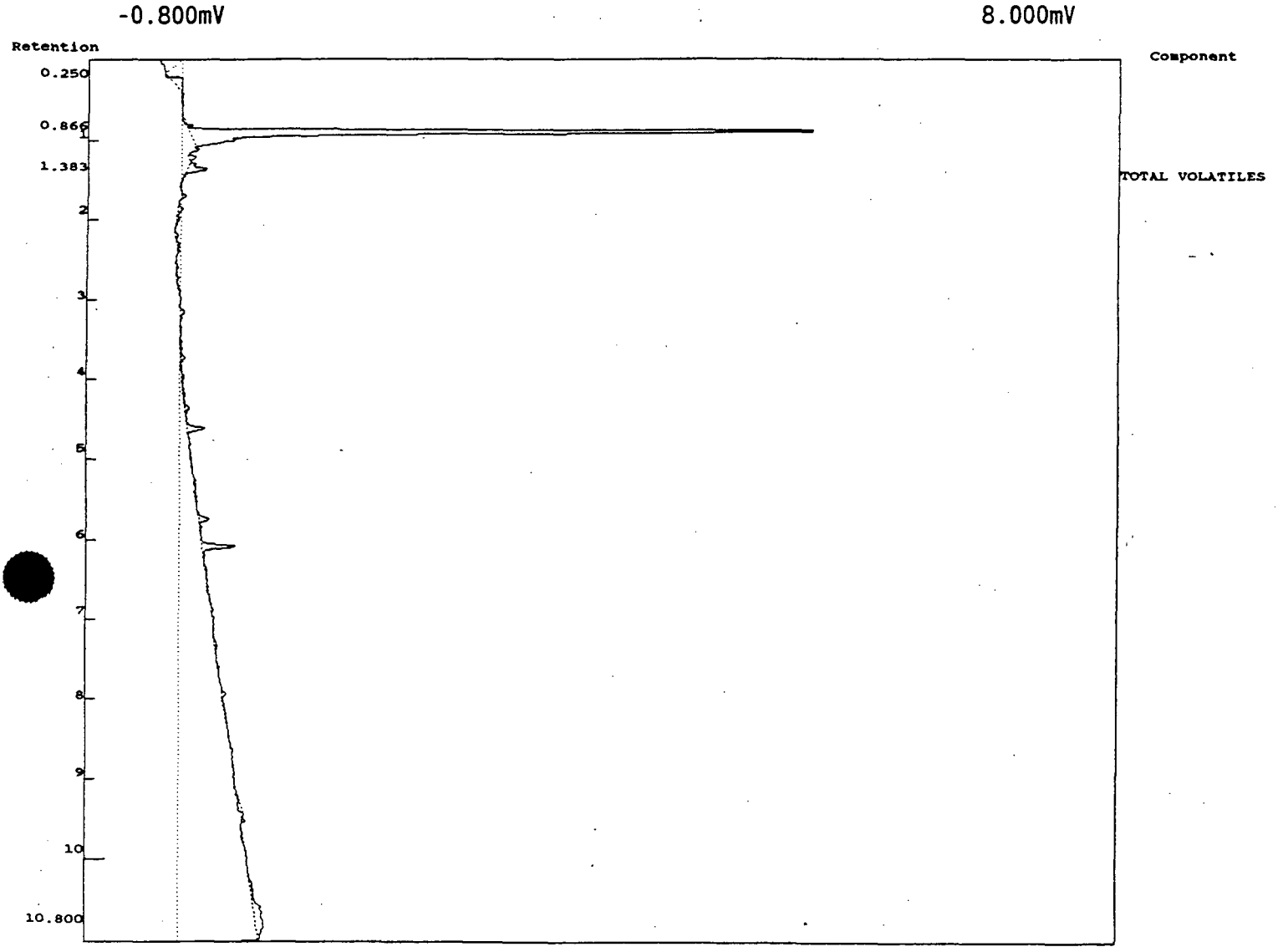
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	21.42 M	21.42	ug/L
	1		21.42	21.42	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F9.CHR (A:\)
Sample : SG-117
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	713.50 M	713.50	ug/L
	1		713.50	713.50	

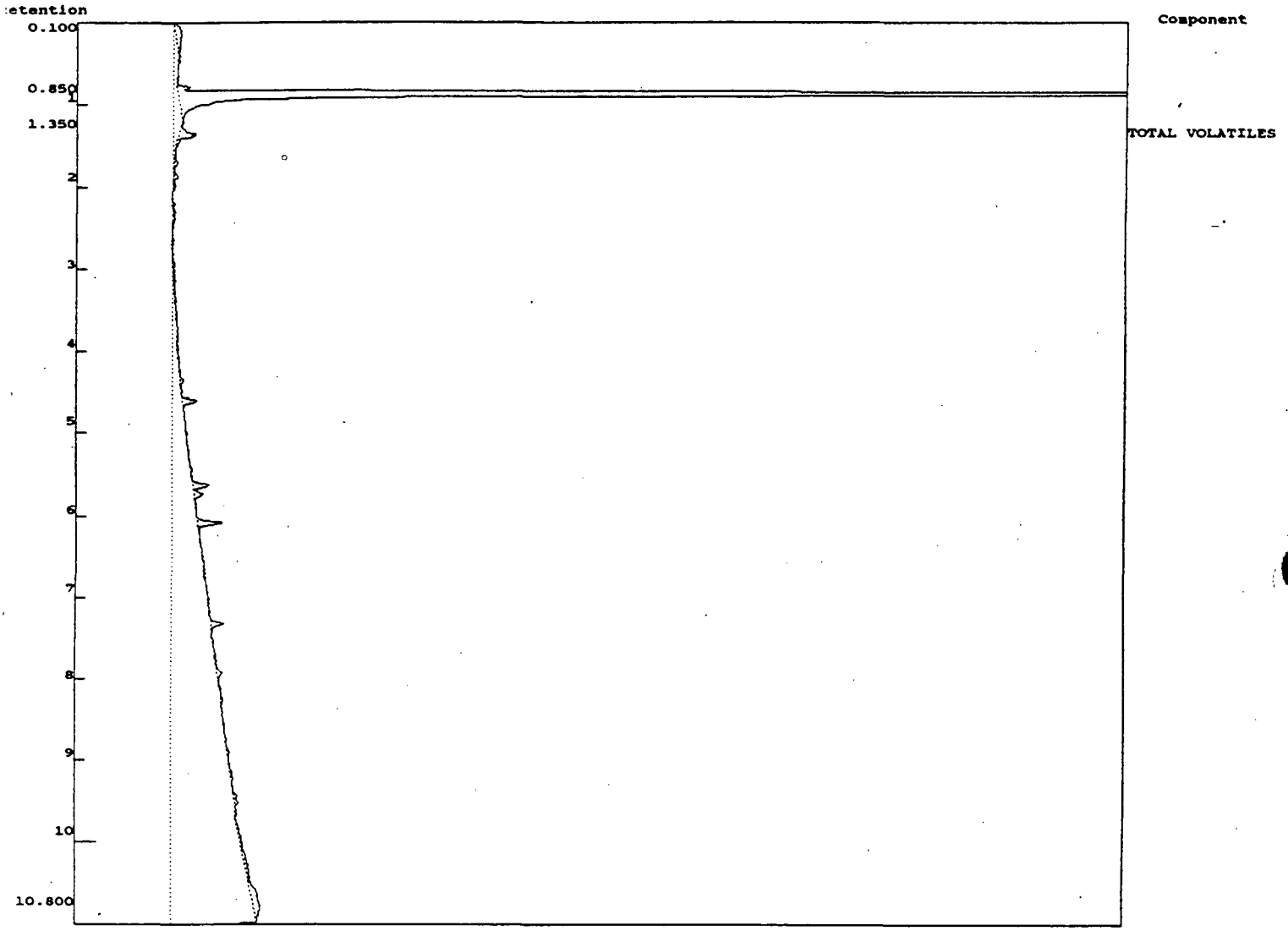
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F10.CHR (A:\)
Sample : SG-128
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	2.57 M	2.57	ug/L
	1		2.57	2.57	

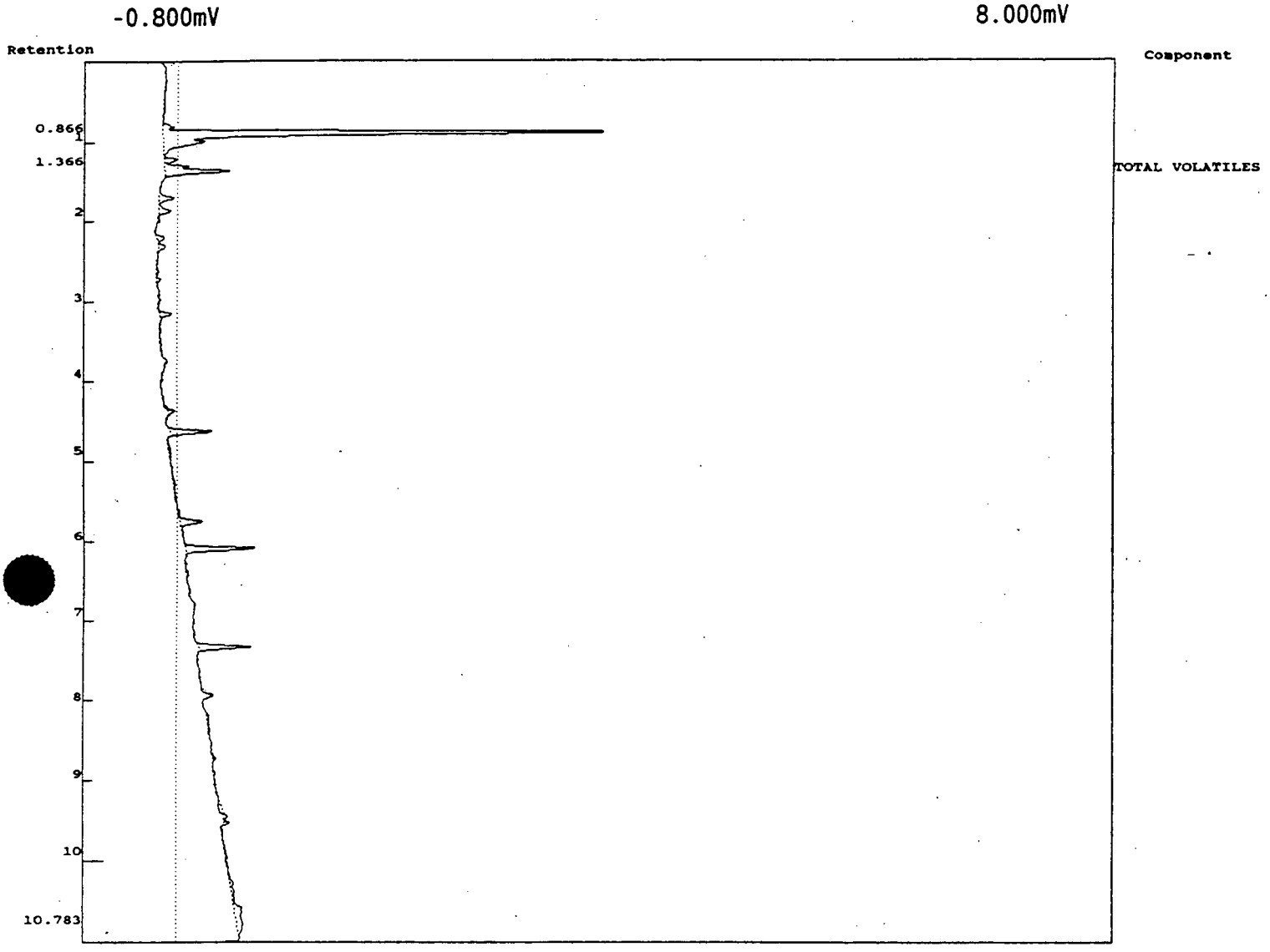
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F11.CHR (A:\)
Sample : SG-129
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.350	2.87 M	2.87	ug/L
1			2.87	2.87	

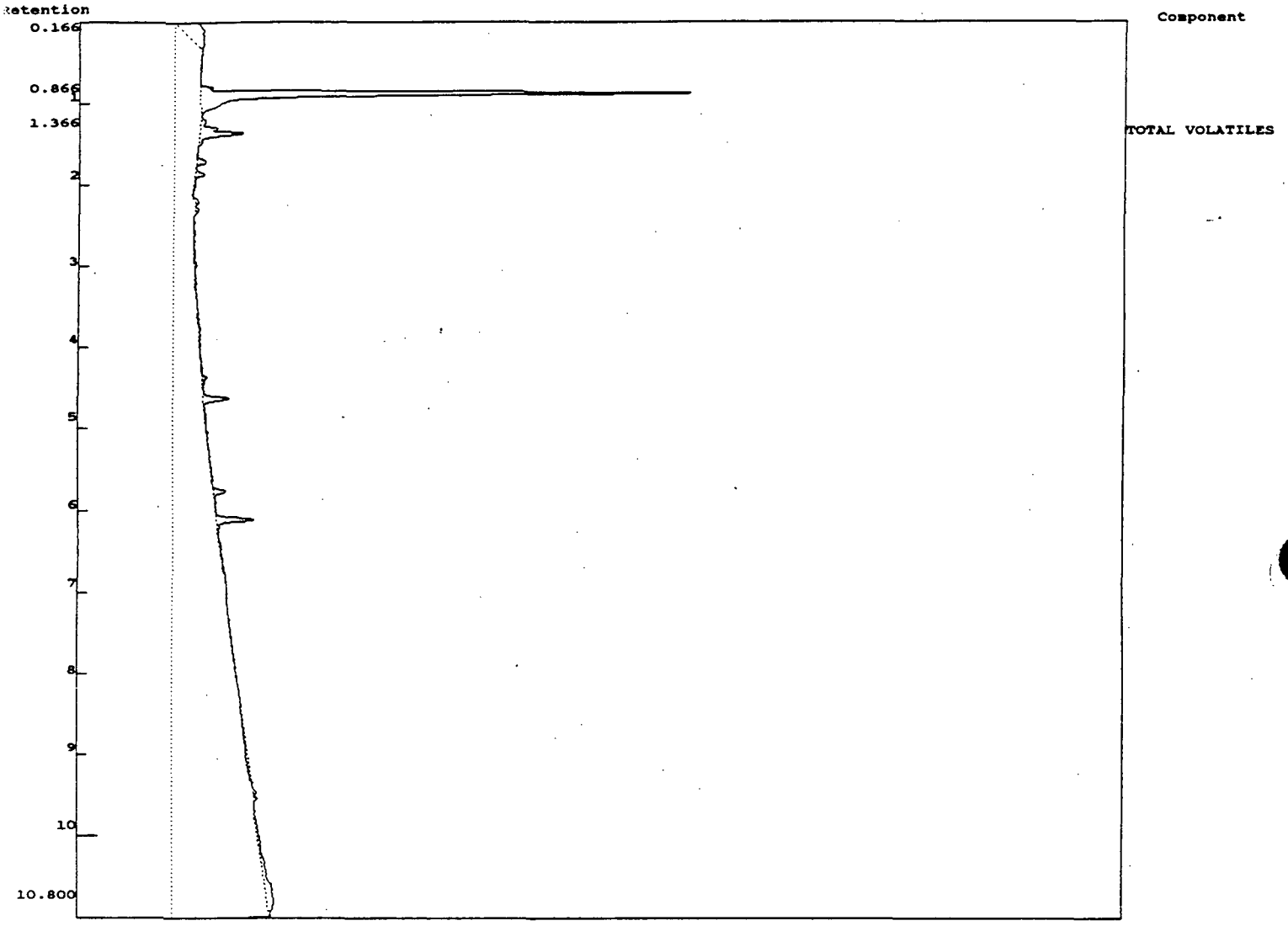
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F12.CHR (A:\)
Sample : SG-139
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	9.42 M	9.42	ug/L
	1		9.42	9.42	

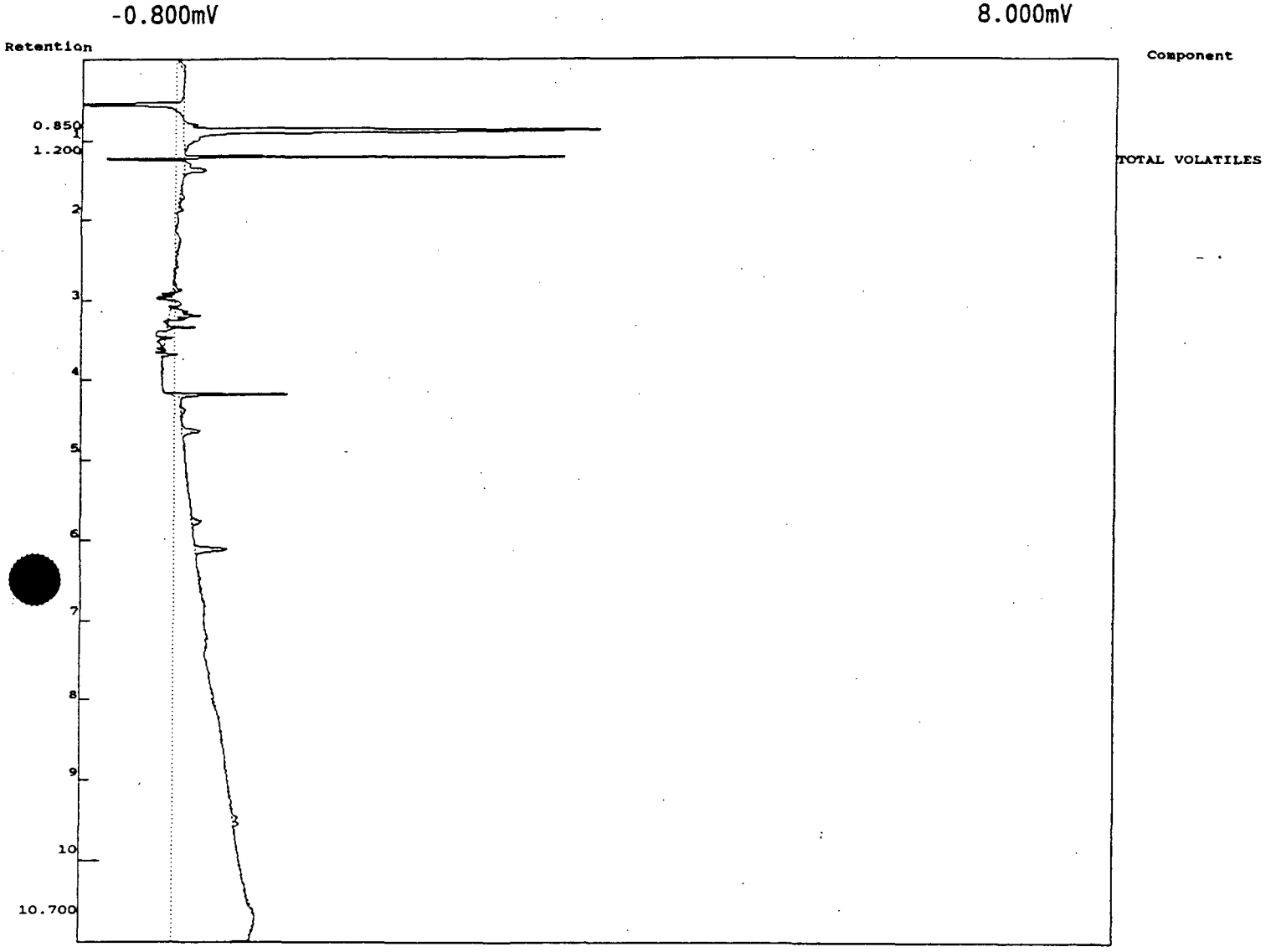
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F13.CHR (A:\)
Sample : SG-141
Operator : SGN

-0.800mV 8.000mV



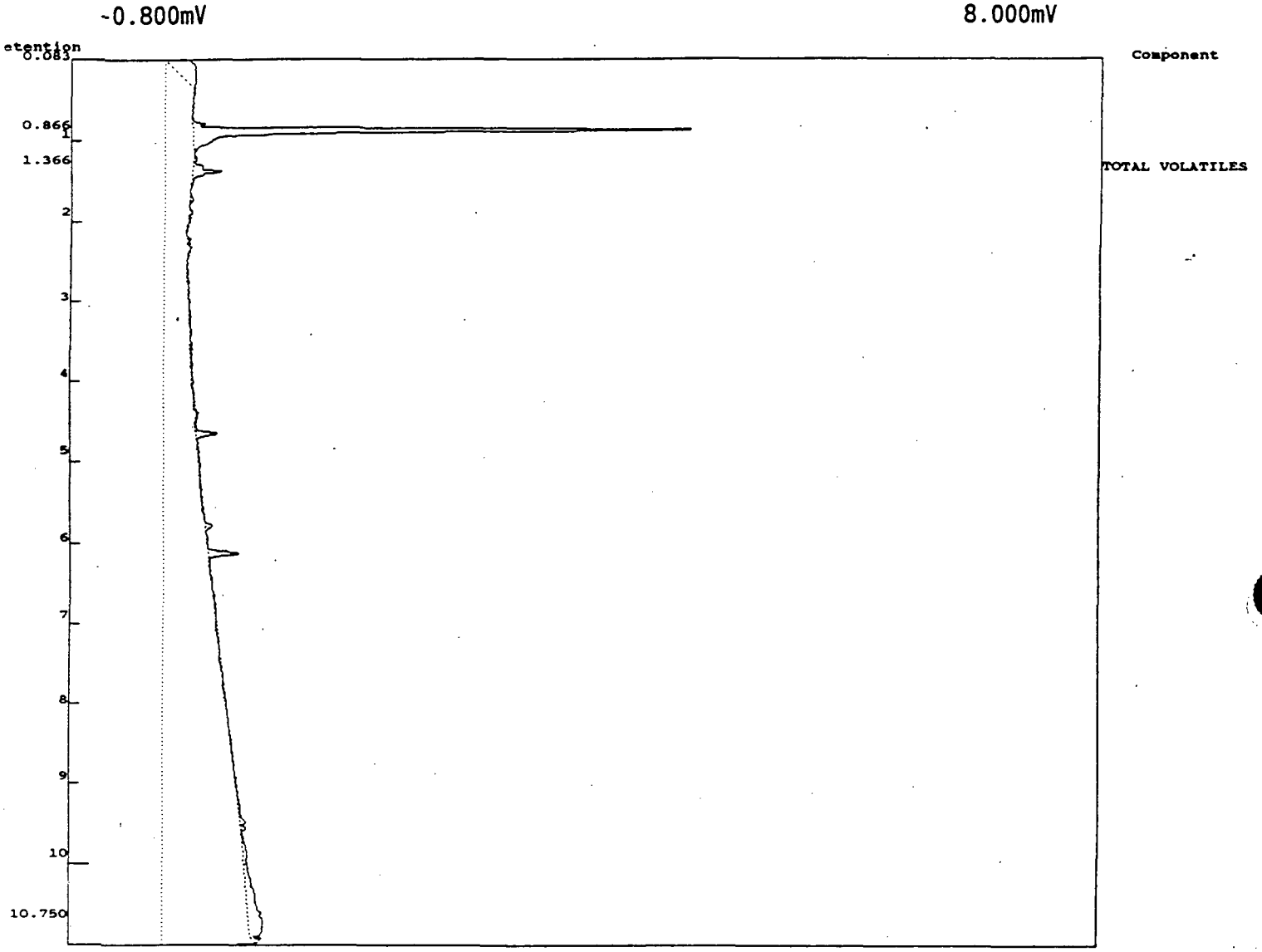
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.29 M	5.29	ug/L
	1		5.29	5.29	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F14.CHR (A:\)
Sample : SG-151
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.200	7.70 M	7.70	ug/L
	1		**7.70**	**7.70**	

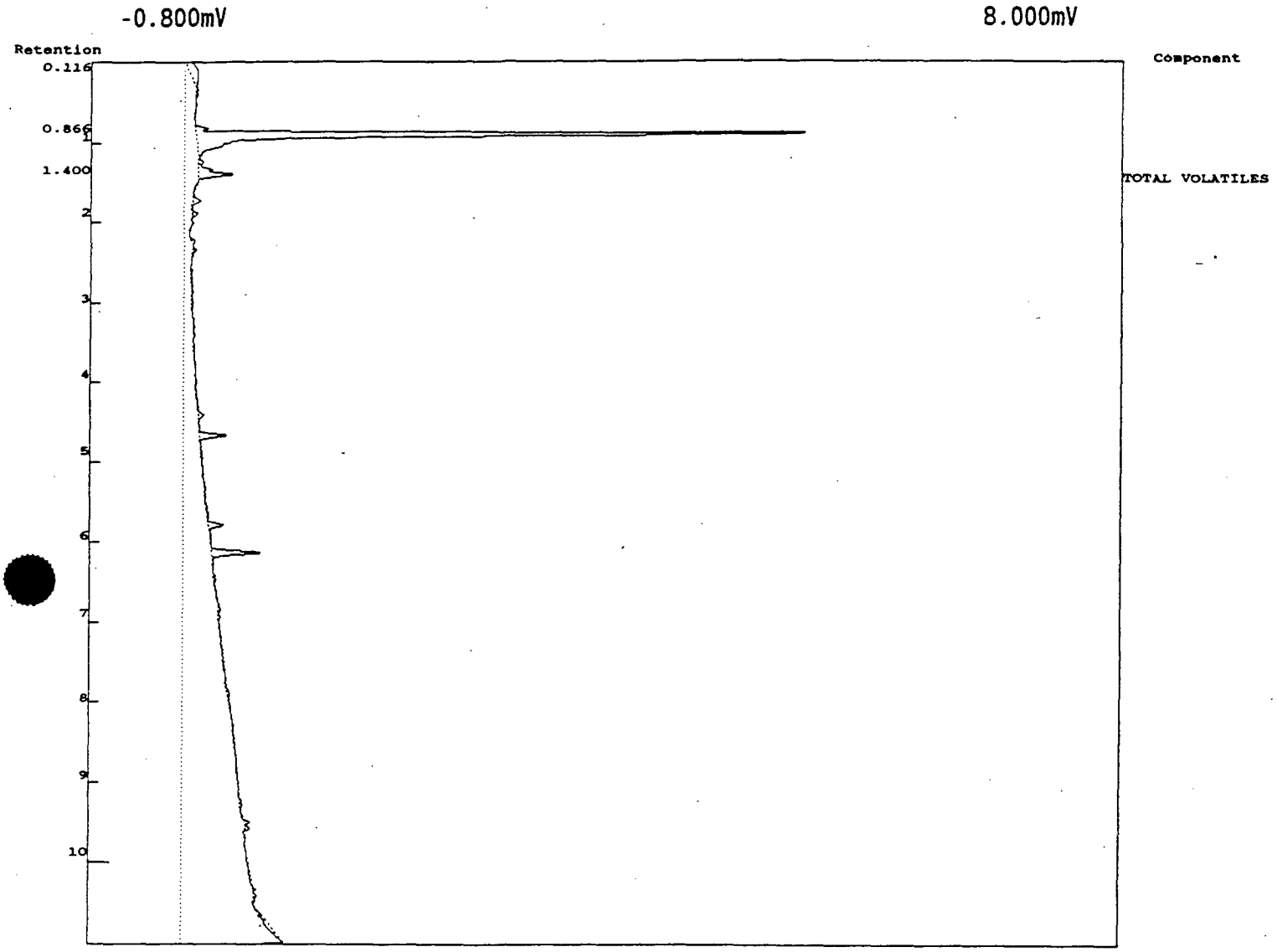
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F15.CHR (A:\)
Sample : SG-152
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.366	3.15	3.15	ug/L
	1		3.15	3.15	

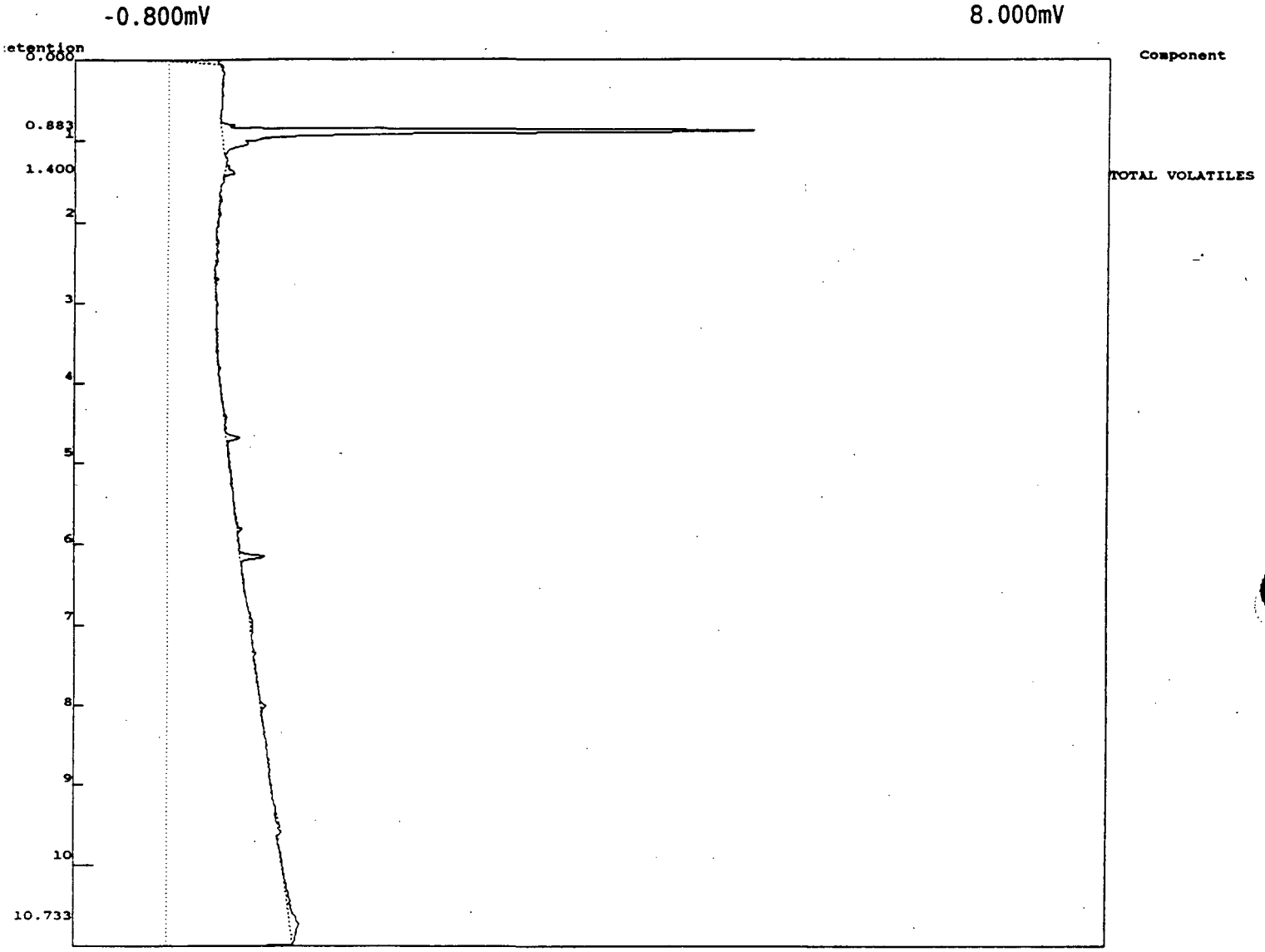
300743

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F16.CHR (A:\)
Sample : SG-161
Operator : SGN



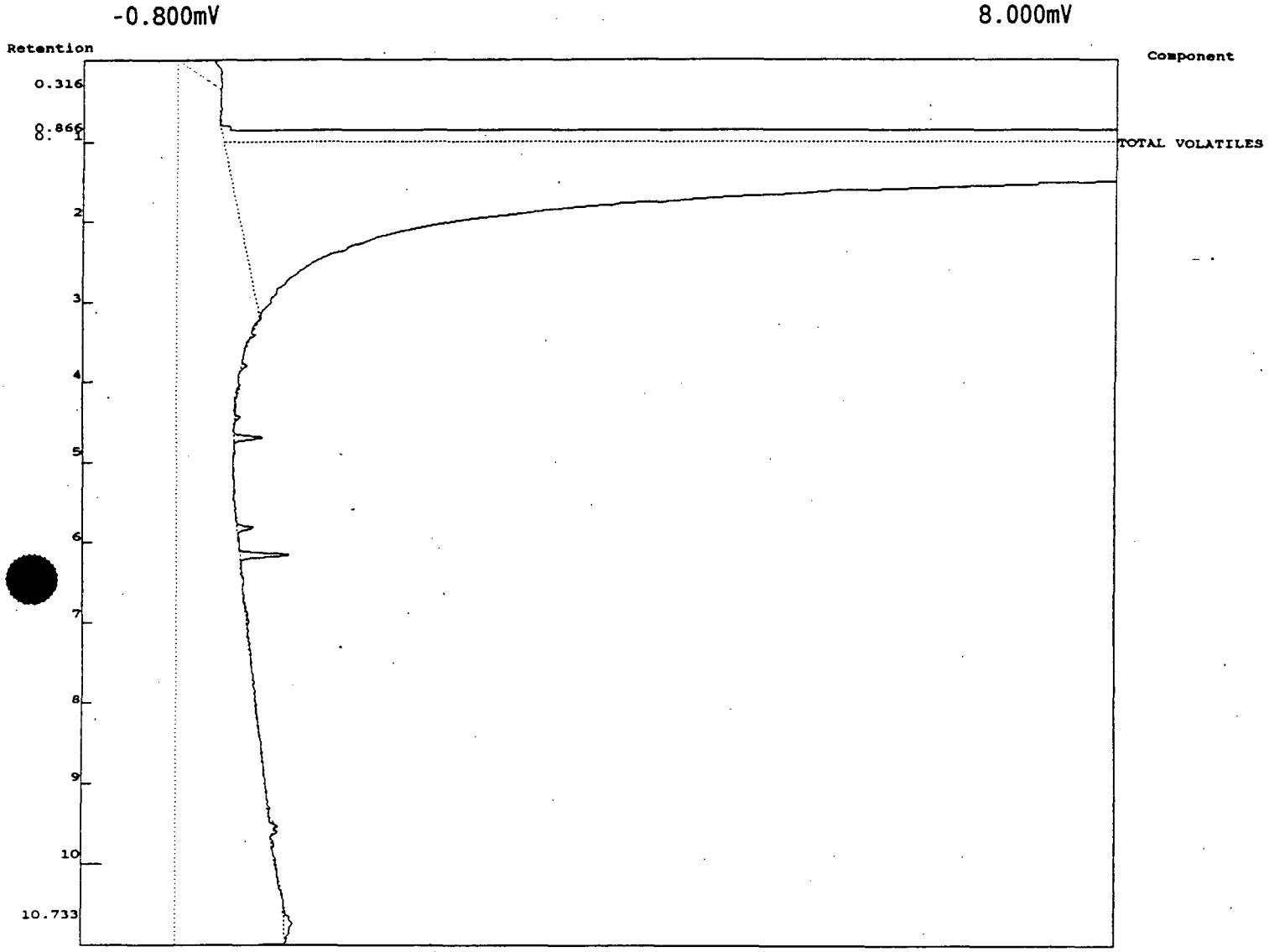
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	4.46 M	4.46	ug/L
	1		4.46	4.46	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F17.CHR (A:\)
Sample : SG-162
Operator : SGN



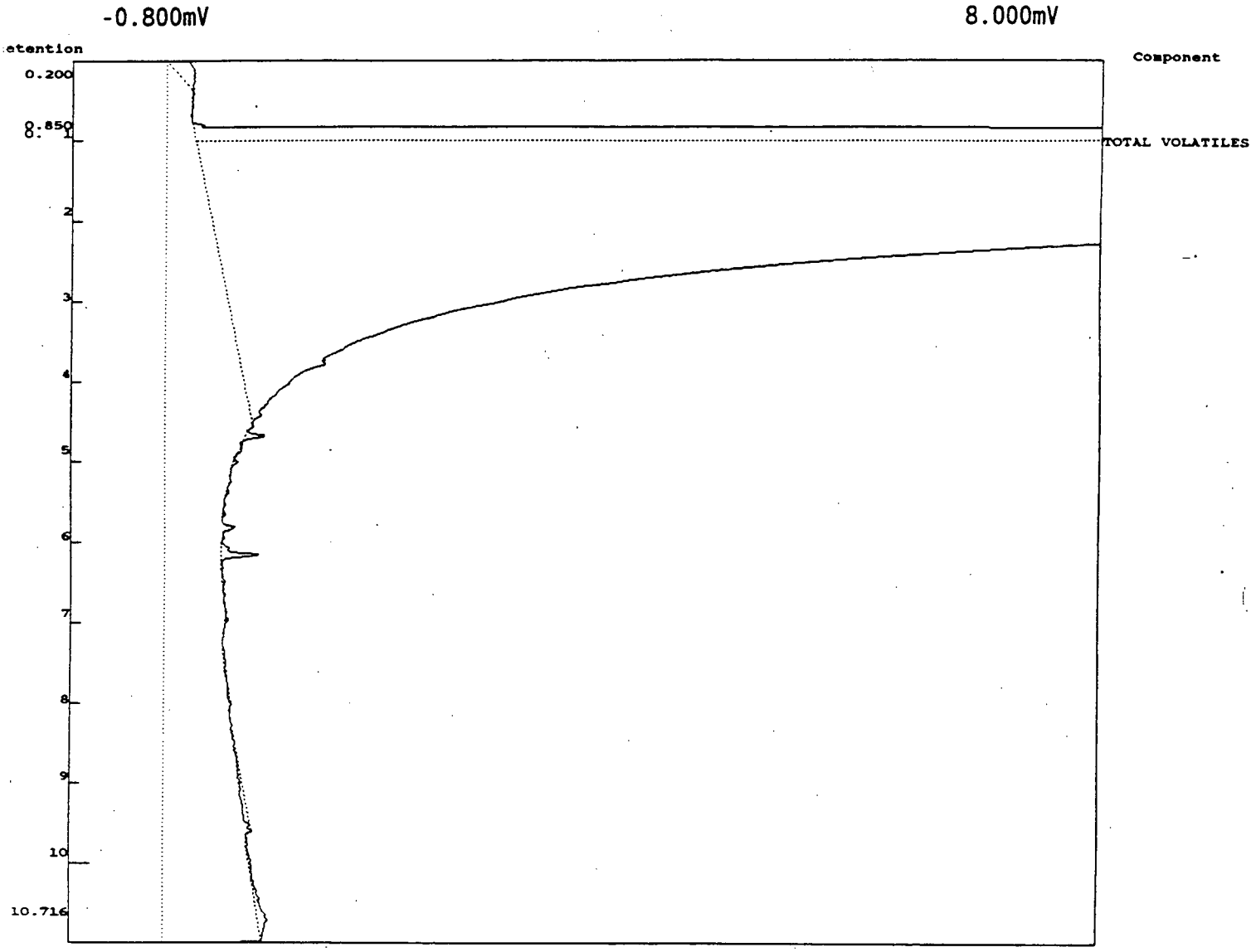
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.400	1.87 M	1.87	ug/L
	1		1.87	1.87	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F18.CHR (A:\)
Sample : SG-074
Operator : SGN



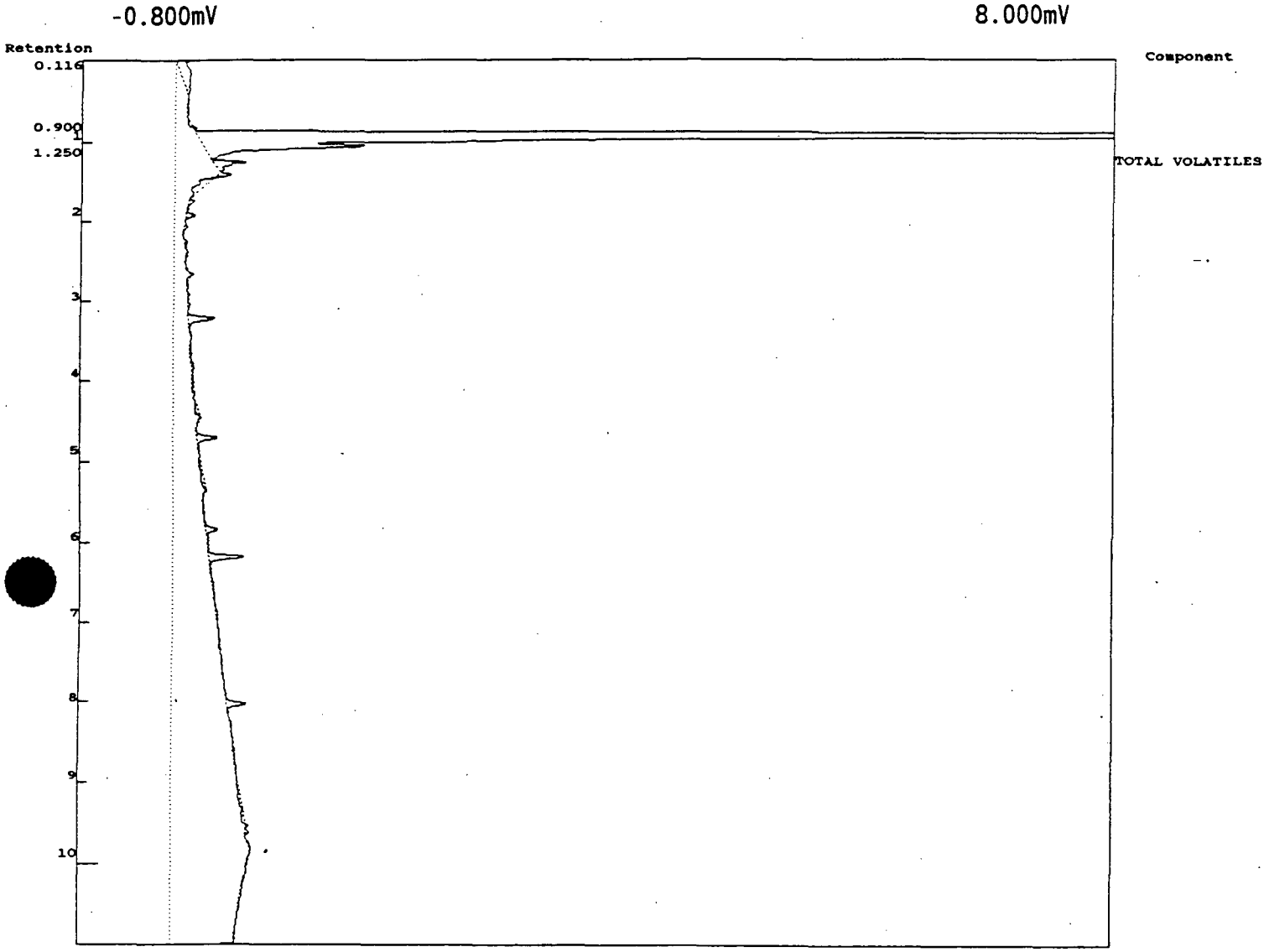
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	1302.63 M	1302.63	ug/L
	1		1302.63	1302.63	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F19.CHR (A:\)
Sample : SG-075
Operator : SGN



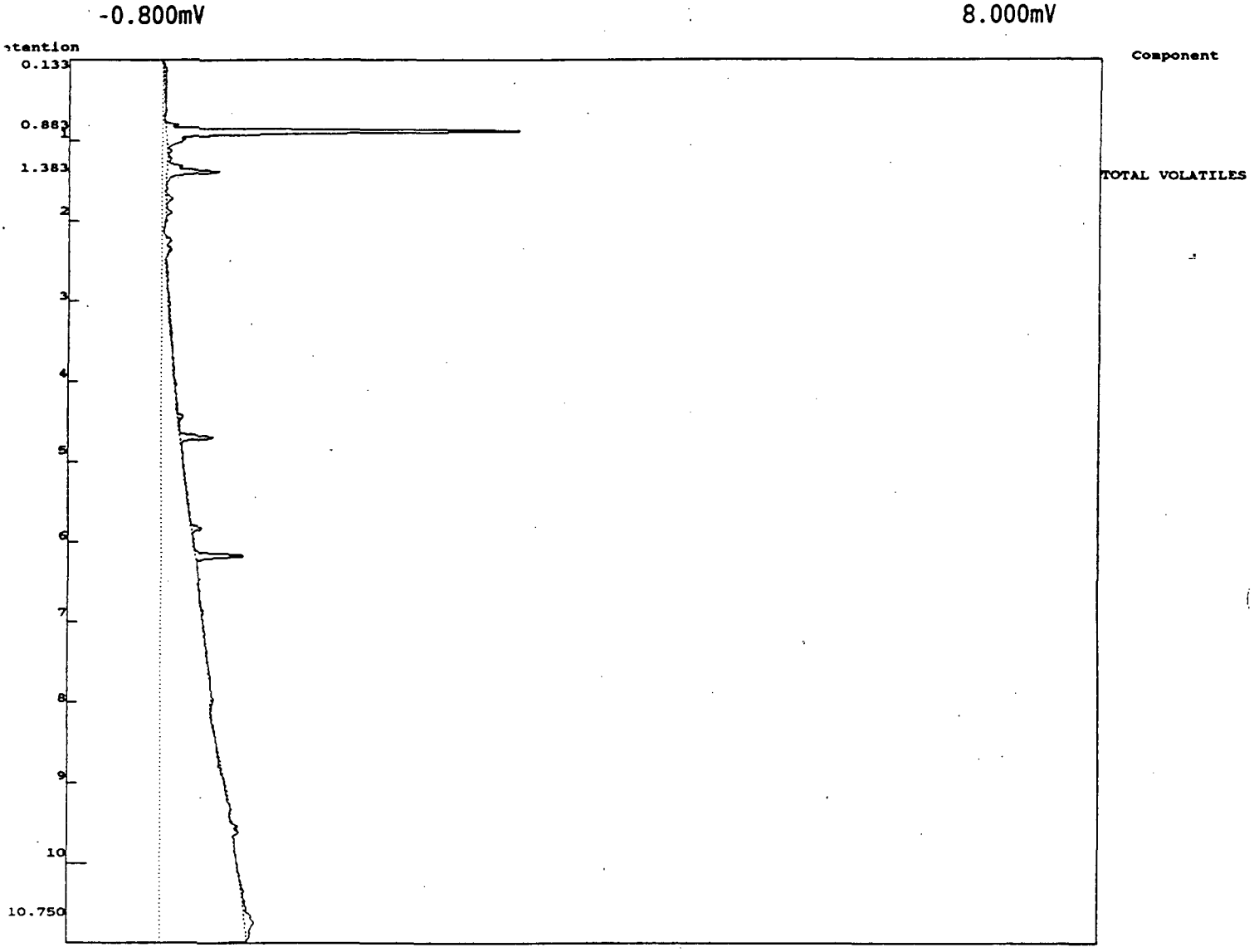
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	7350.12 M	7350.12	ug/L
	1		7350.12	7350.12	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F20.CHR (A:\)
Sample : SG-127
Operator : SGN



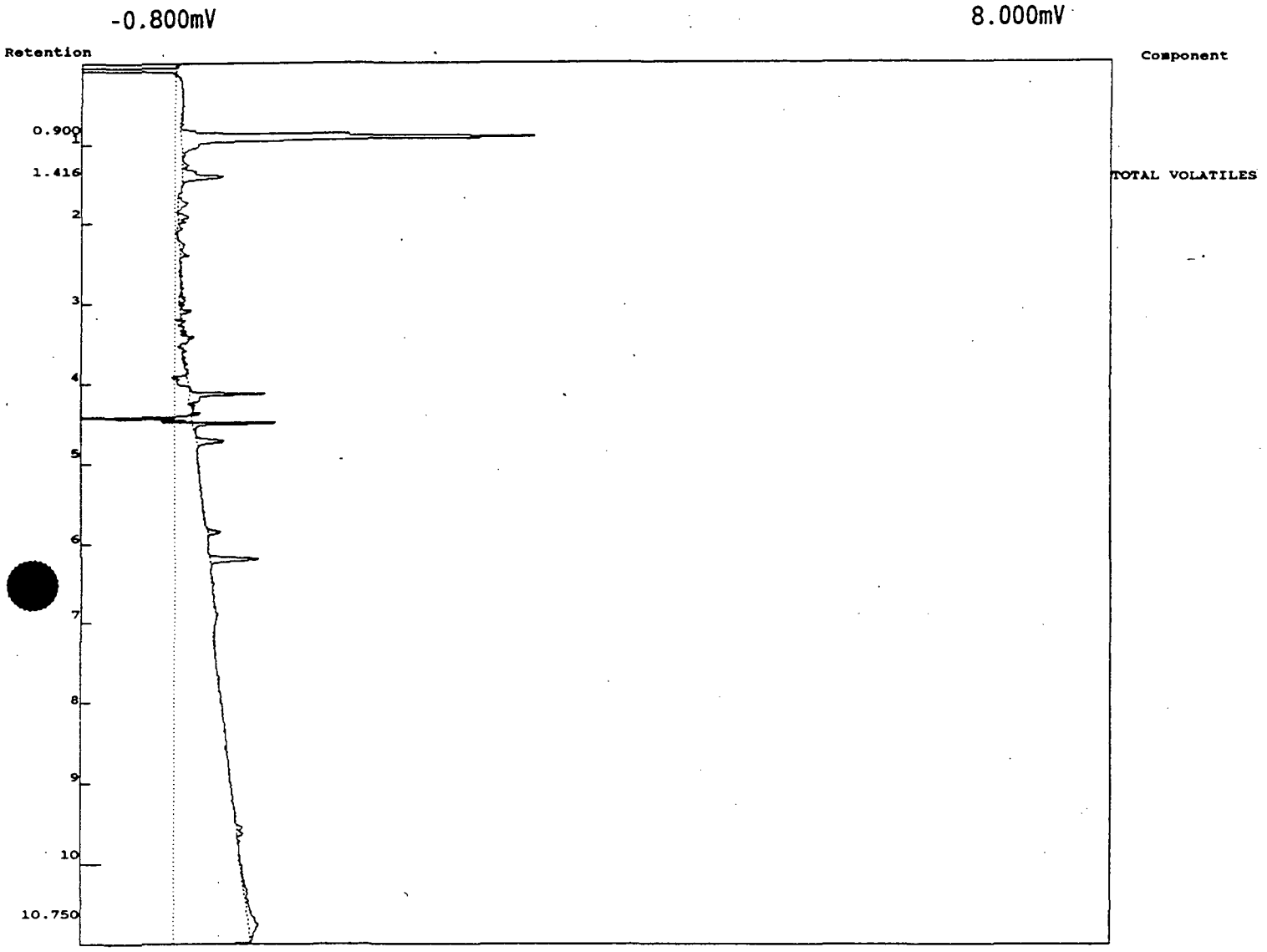
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.250	5.11	5.11	ug/L
	1		5.11	5.11	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F21.CHR (A:\)
Sample : EB-15
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.383	5.07	5.07	ug/L
	1		5.07	5.07	

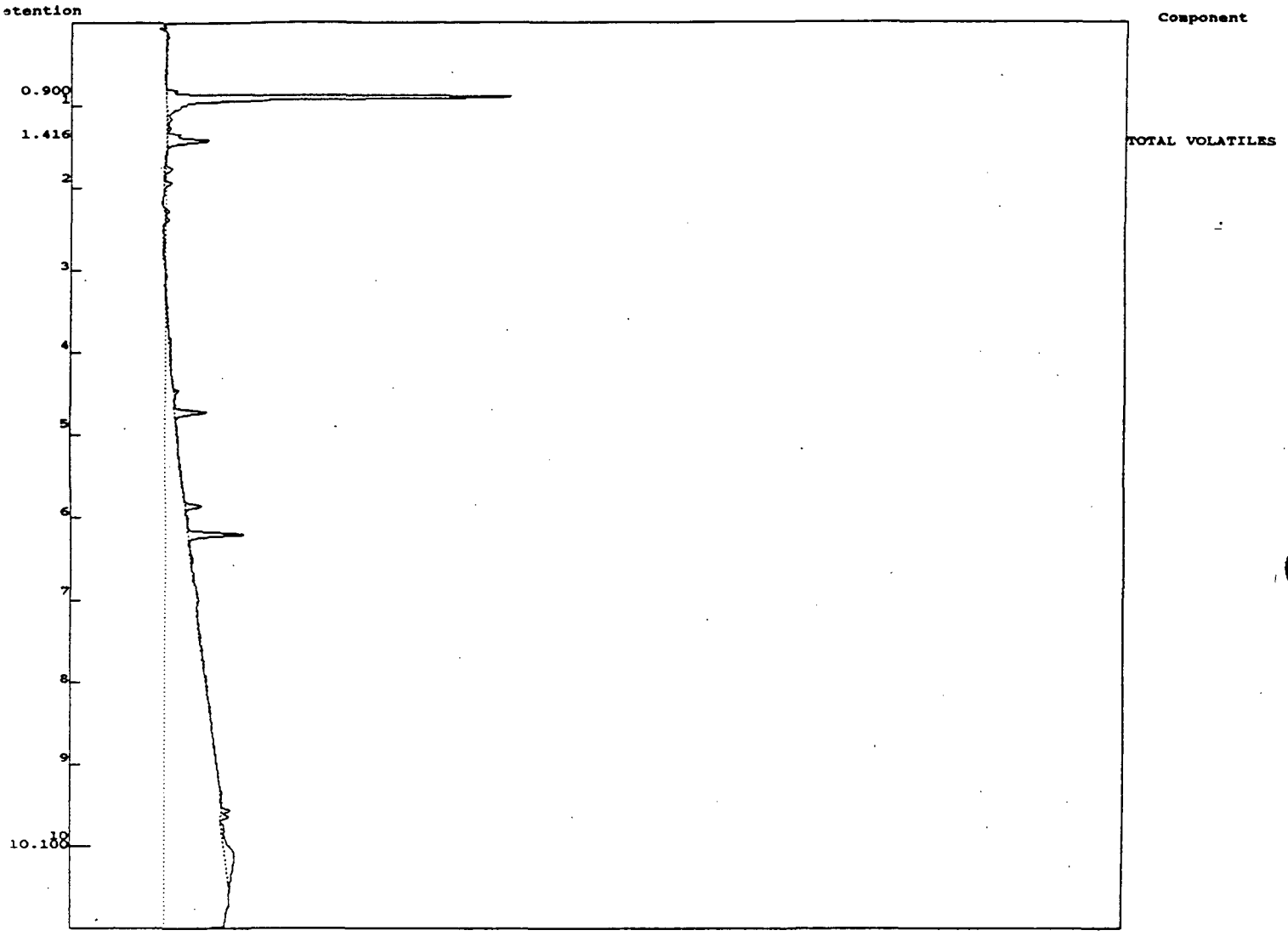
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F22.CHR (A:\)
Sample : EB-16
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	8.37 M	8.37	ug/L
	1		8.37	8.37	

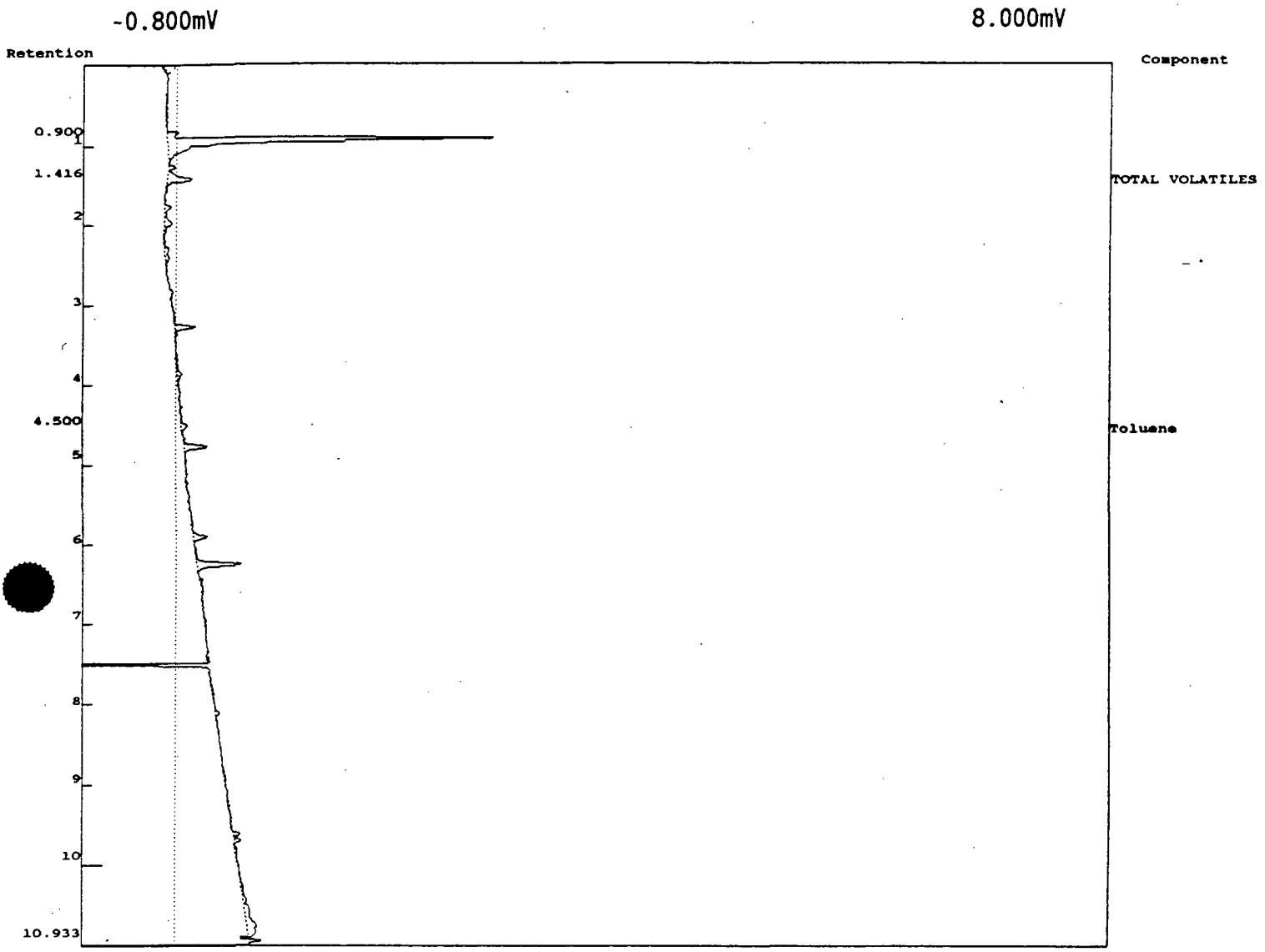
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F23.CHR (A:\)
Sample : EB-17
Operator : SGN

-0.800mV 8.000mV



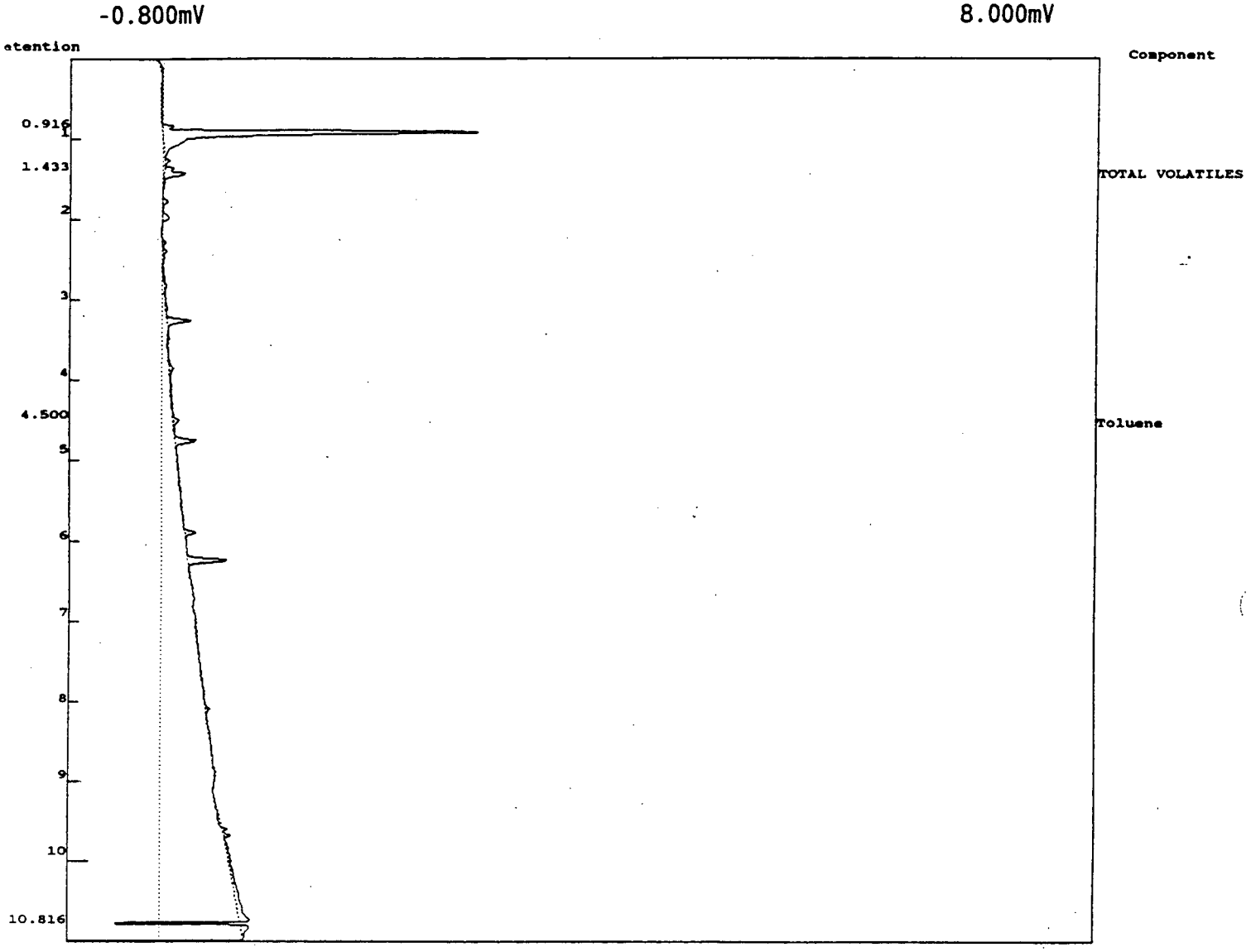
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.416	5.45 M	5.45	ug/L
	1		5.45	5.45	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F27.CHR (A:\MAY31)
Sample : SG-182
Operator : SGN



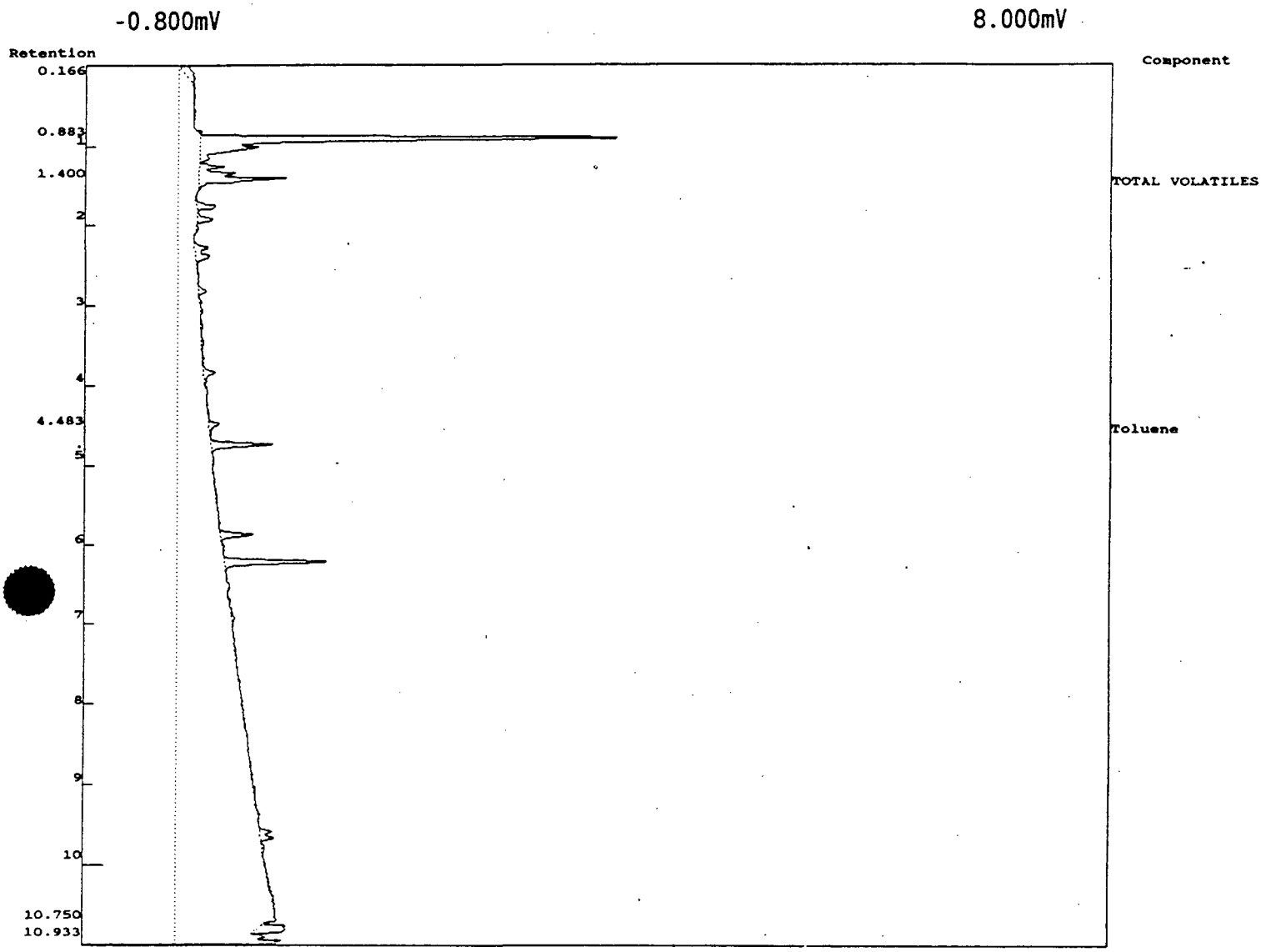
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.416	5.37 M	5.37	ug/L
Toluene	3	4.500	0.23 M	0.23	ug/L
	2		5.60	5.60	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F28.CHR (A:\MAY31)
Sample : SG-882
Operator : SGN



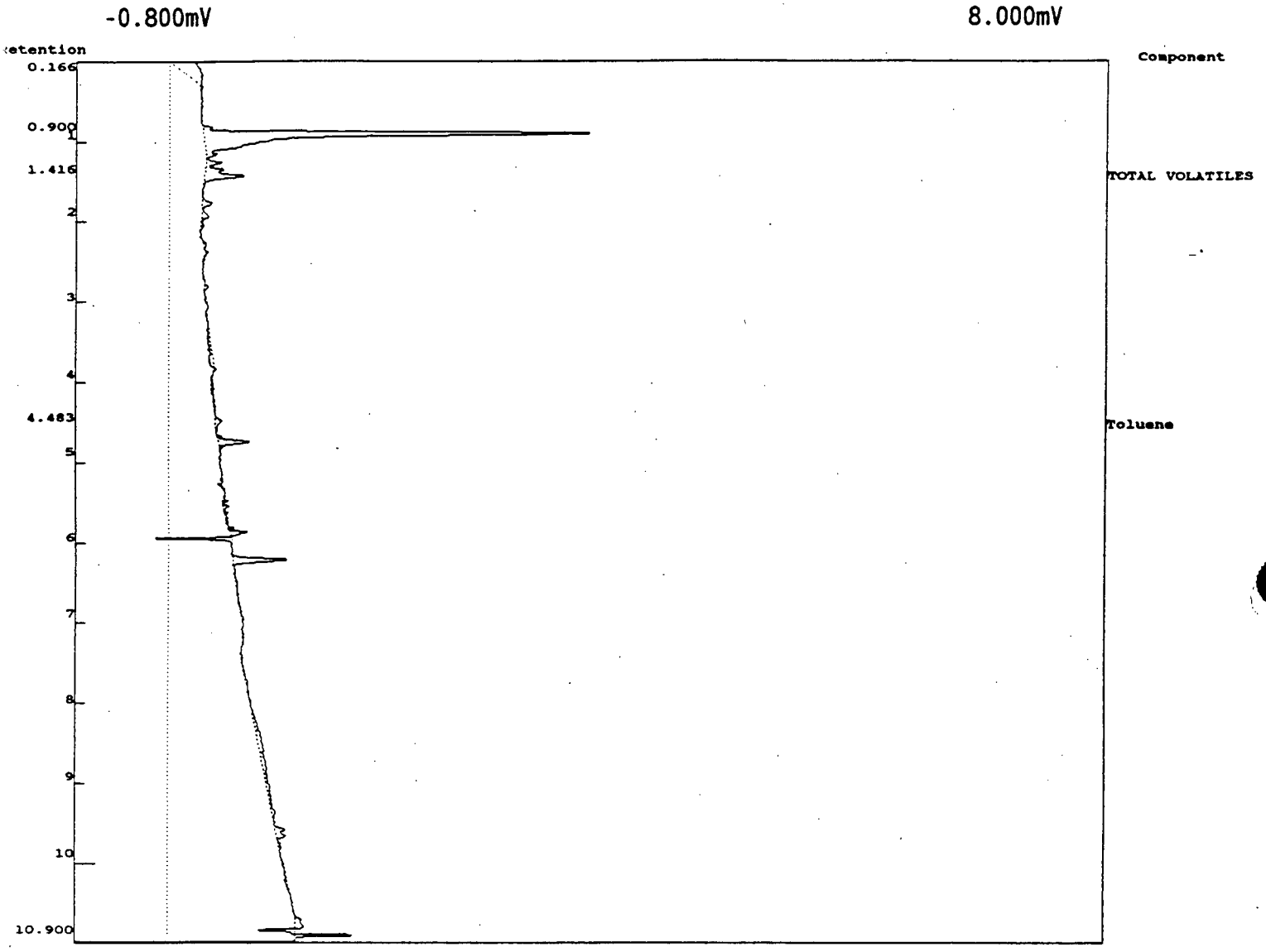
Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	1.433	4.90 M	4.90	ug/L
)luene	3	4.500	0.30 M	0.30	ug/L
	2		5.20	5.20	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F29.CHR (A:\MAY31)
Sample : SG-183
Operator : SGN



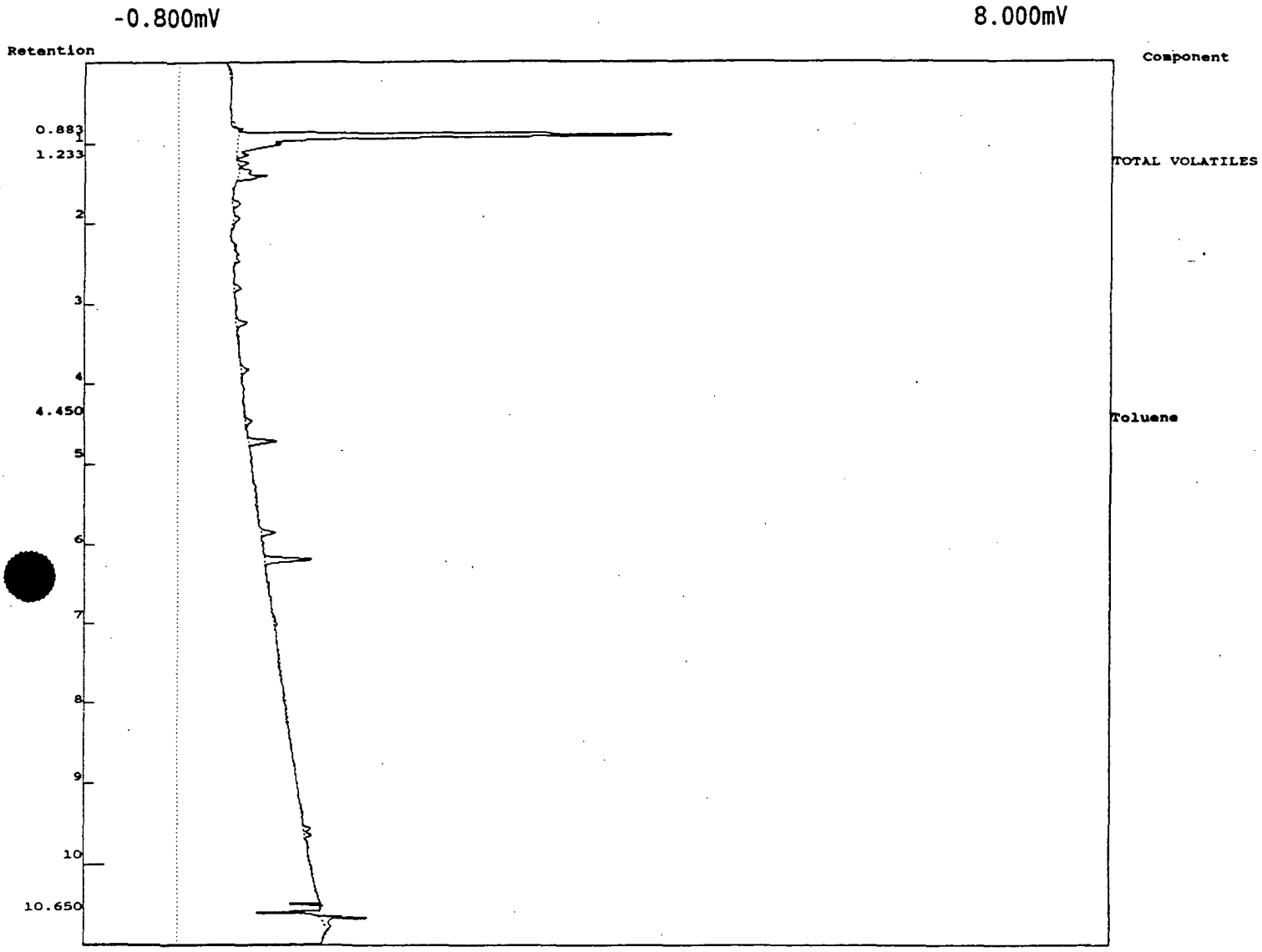
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	13.92 M	13.92	ug/L
Toluene	3	4.483	0.36 M	0.36	ug/L
	2		14.28	14.28	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F30.CHR (A:\MAY31)
Sample : SG-184
Operator : SGN



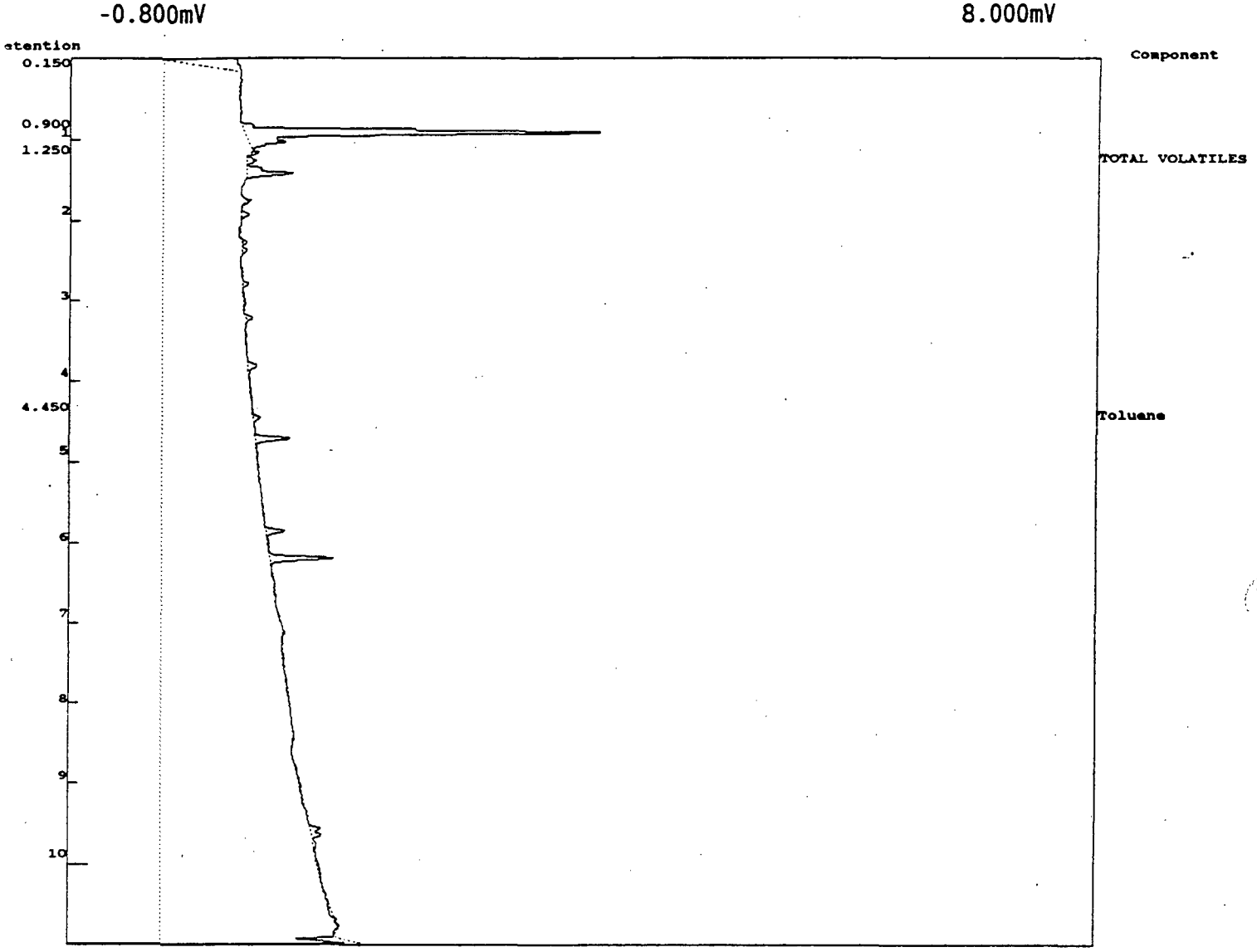
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.416	8.44 M	8.44	ug/L
oluene	3	4.483	0.26 M	0.26	ug/L
	2		8.70	8.70	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F31.CHR (A:\MAY31)
Sample : SG-185
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.233	6.03 M	6.03	ug/L
Toluene	3	4.450	0.26 M	0.26	ug/L
	2		6.28	6.28	

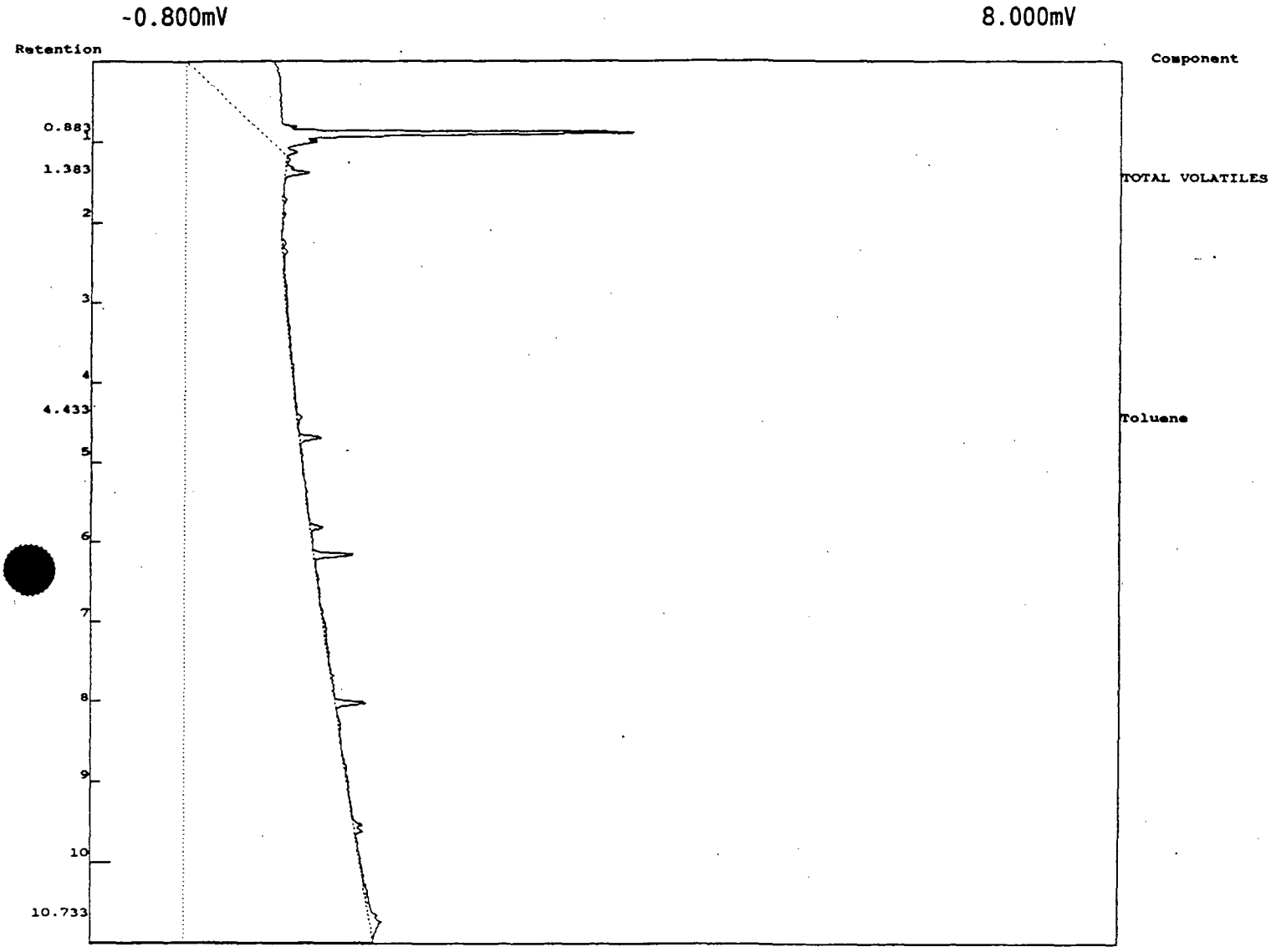
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F32.CHR (A:\MAY31)
Sample : SG-186
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.250	6.76	6.76	ug/L
luene	3	4.450	0.22 M	0.22	ug/L
	2		6.98	6.98	

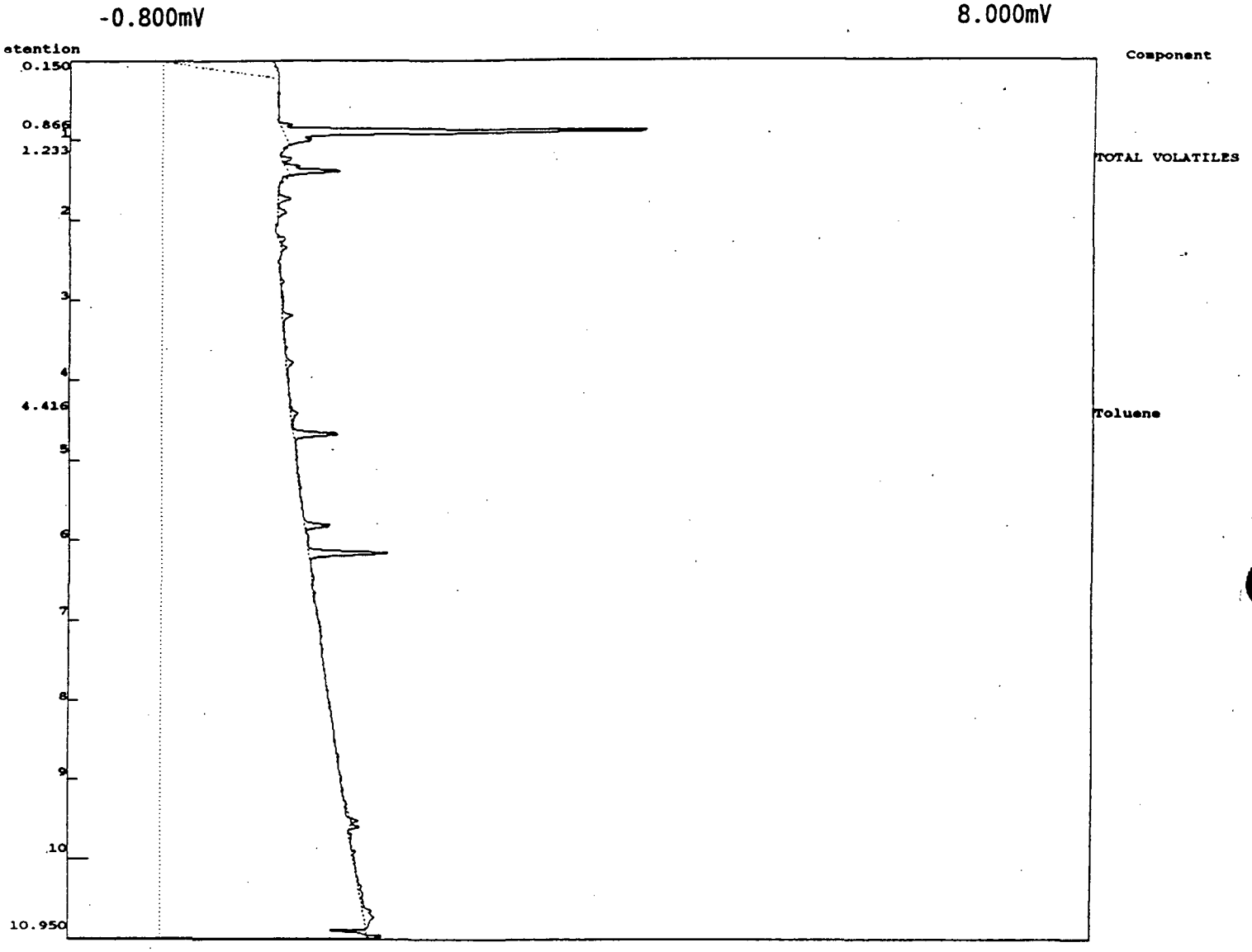
300757

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F33.CHR (A:\MAY31)
Sample : SG-187
Operator : SGN



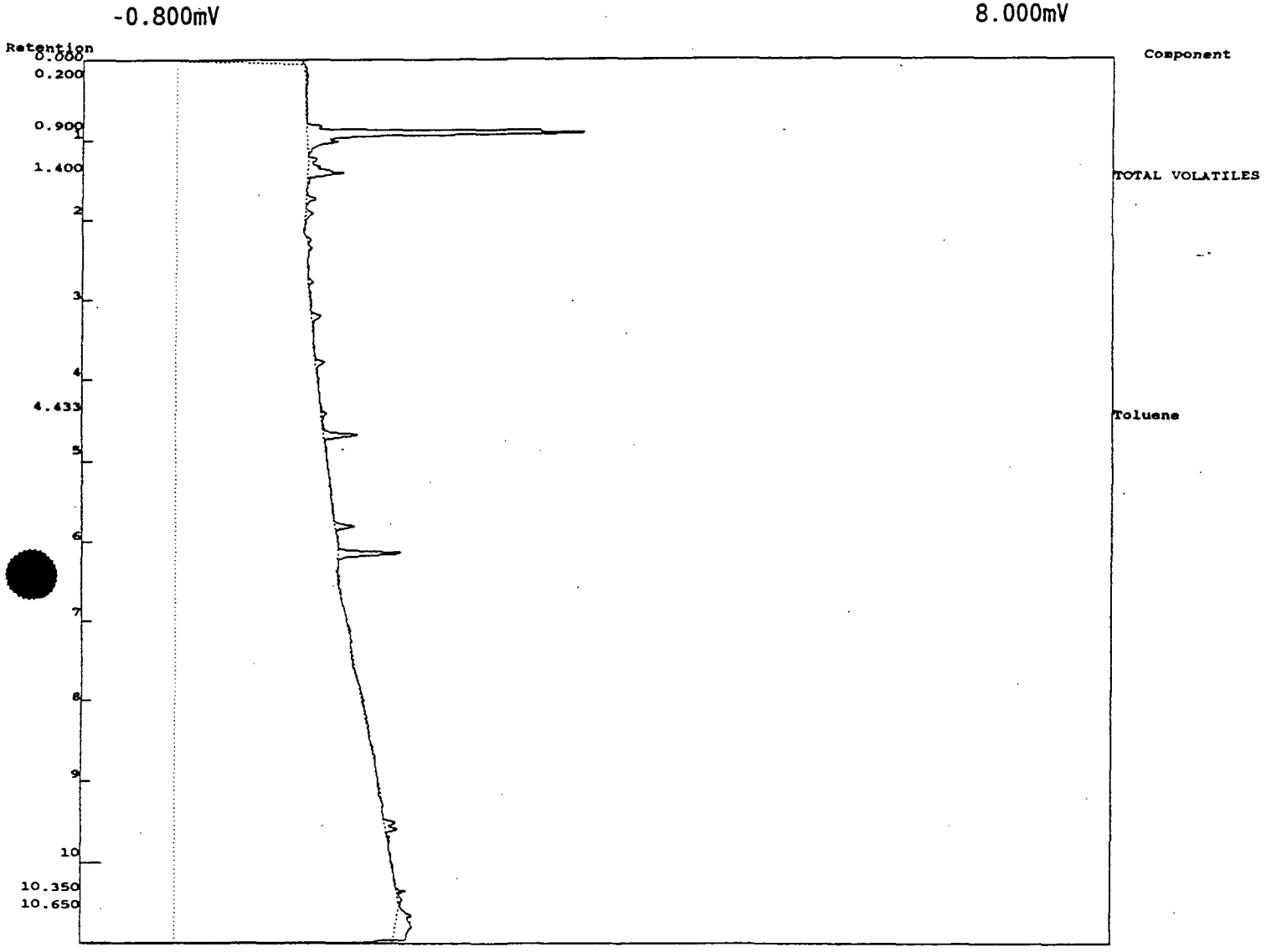
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	7.06	7.06	ug/L
Toluene	3	4.433	0.50	0.50	ug/L
	2		7.56	7.56	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F34.CHR (A:\MAY31)
Sample : SG-188
Operator : SGN



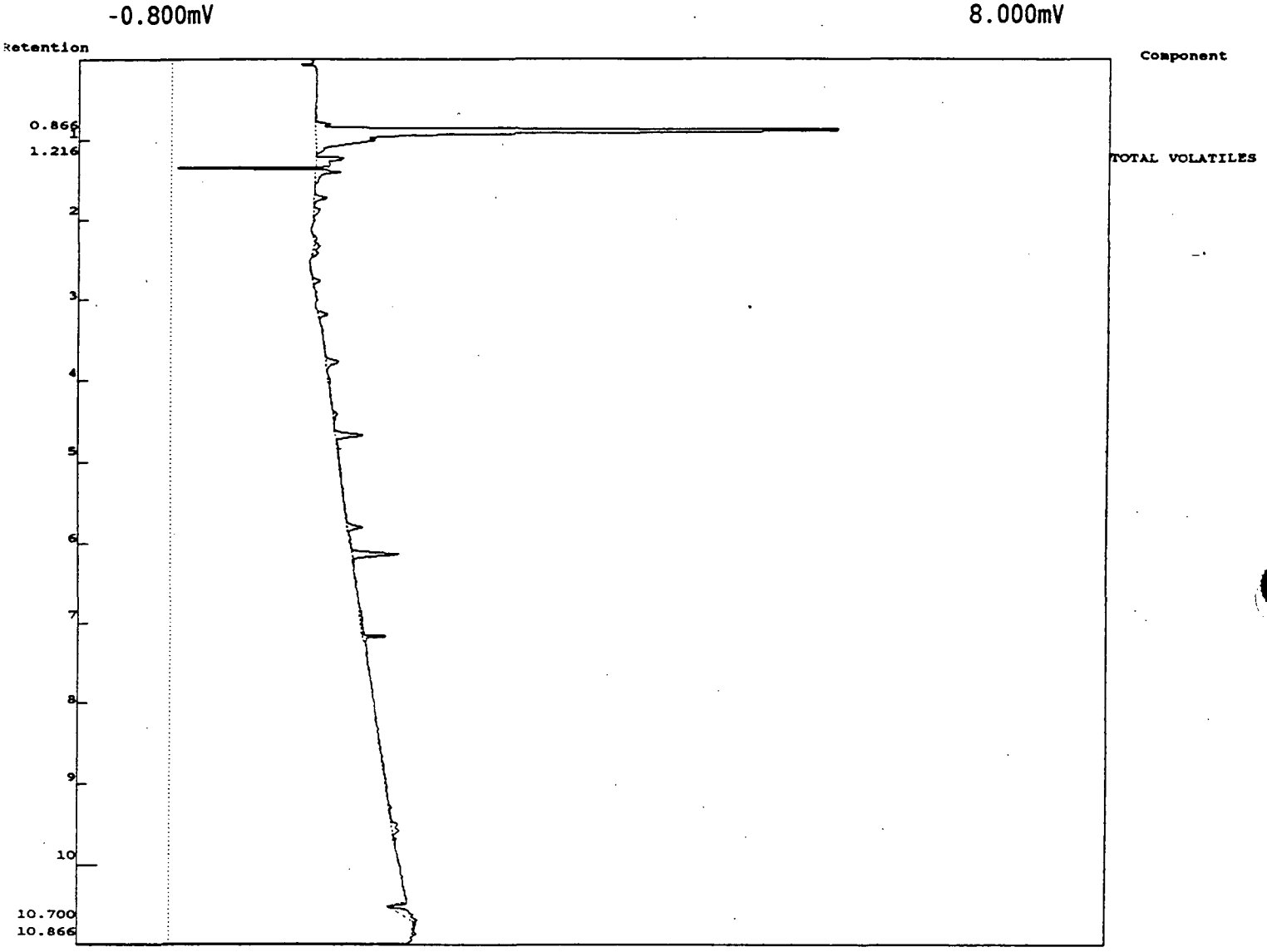
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.233	8.69 M	8.69	ug/L
oluene	3	4.416	0.37 M	0.37	ug/L
	2		9.06	9.06	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F35.CHR (A:\MAY31)
Sample : SG-888
Operator : SGN



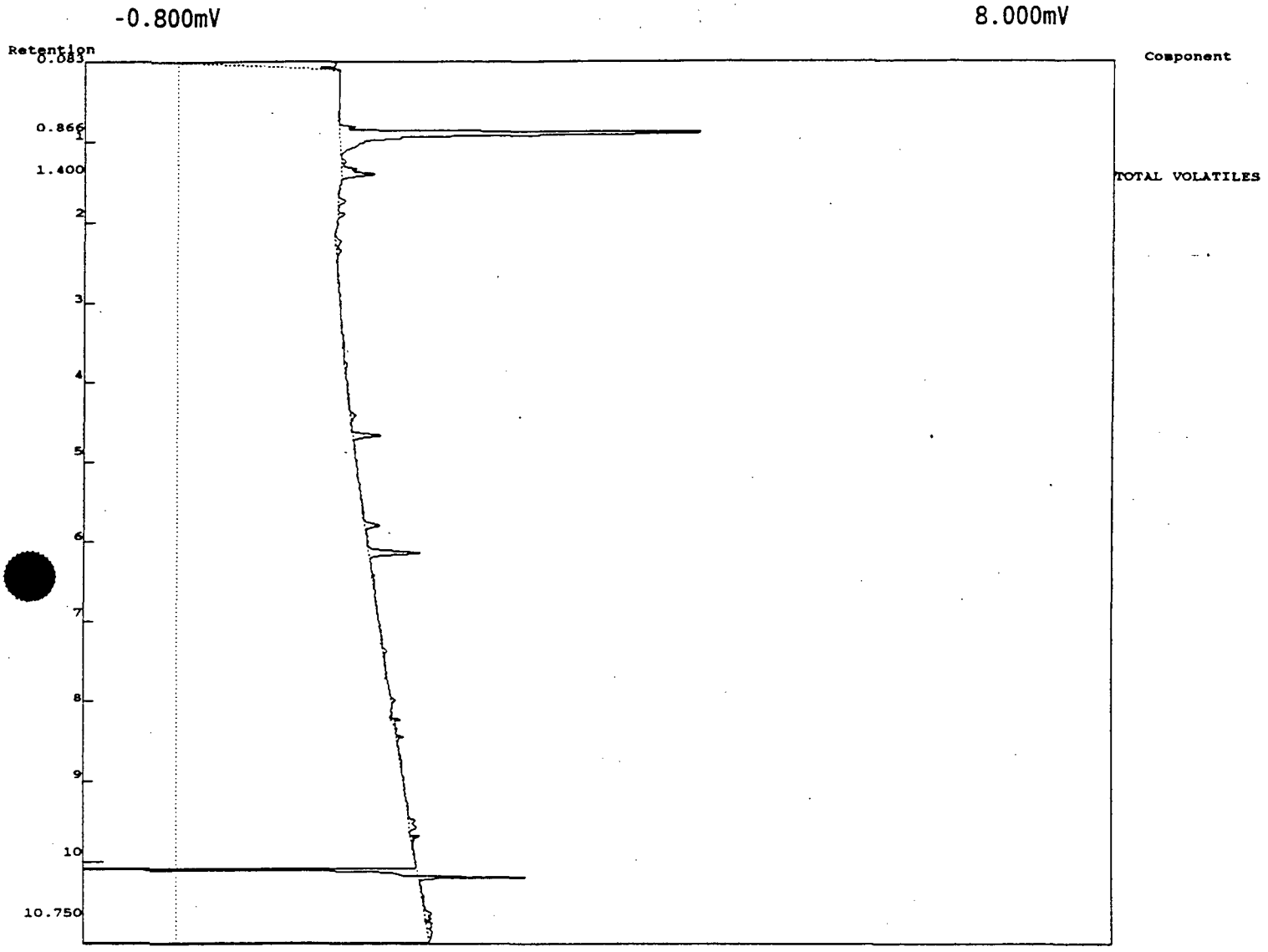
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	7.56	7.56	ug/L
Toluene	3	4.433	0.21 M	0.21	ug/L
	2		7.77	7.77	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F36.CHR (A:\MAY31)
Sample : SG-189
Operator : SGN



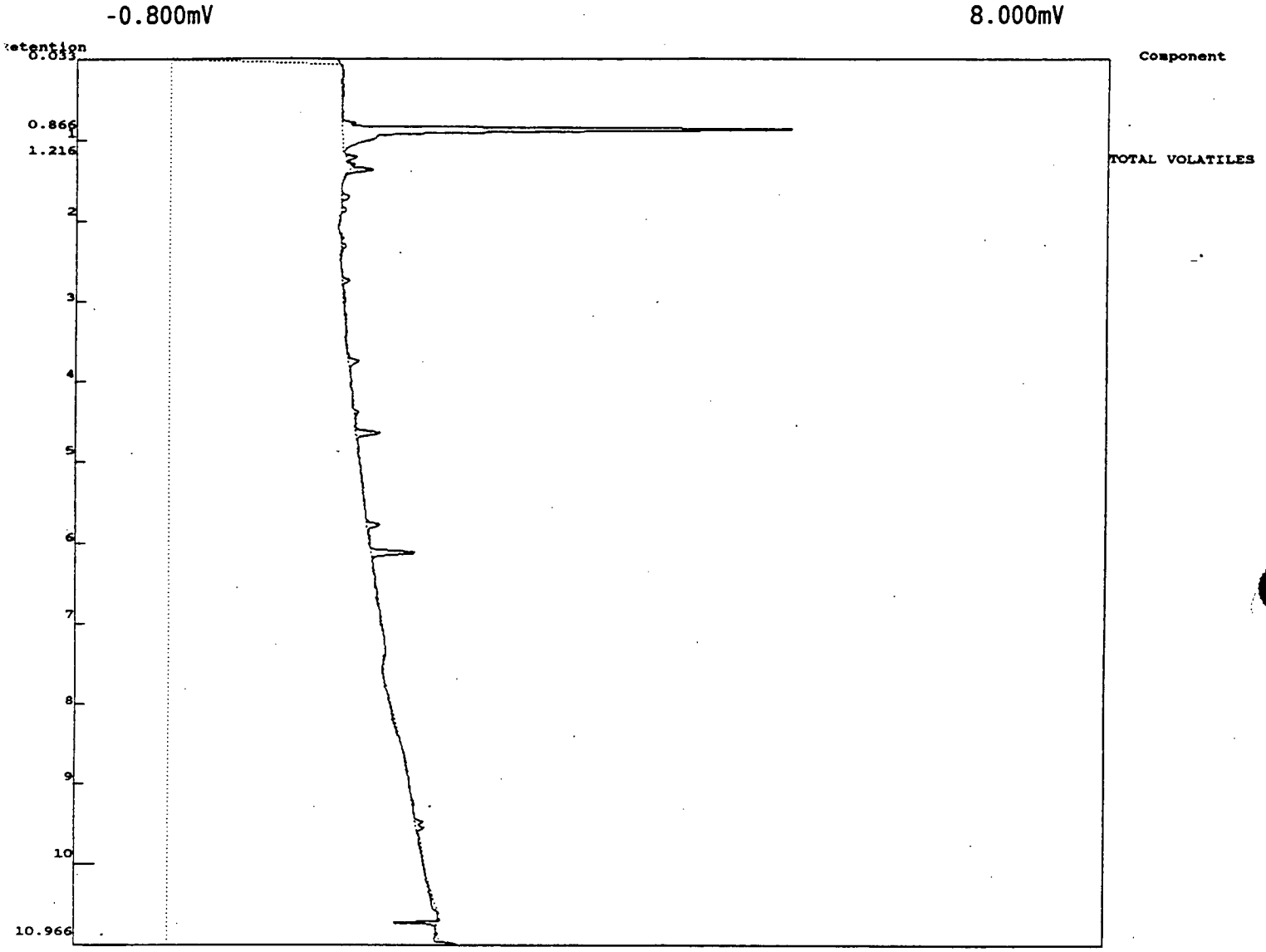
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	6.28 M	6.28	ug/L
	1		6.28	6.28	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F37.CHR (A:\MAY31)
Sample : SG-194
Operator : SGN



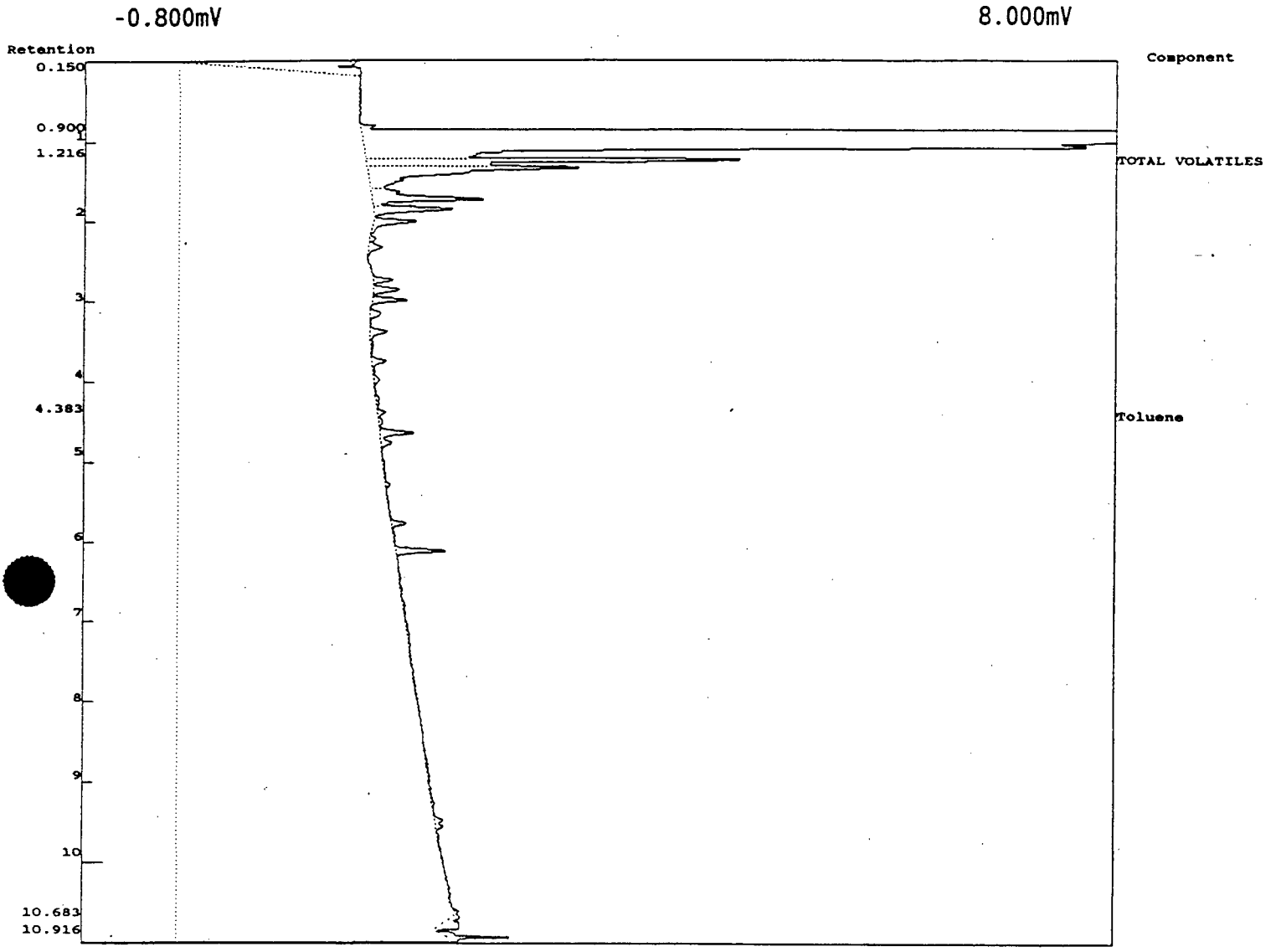
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	5.72 M	5.72	ug/L
	1		5.72	5.72	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F38.CHR (A:\MAY31)
Sample : SG-195
Operator : SGN



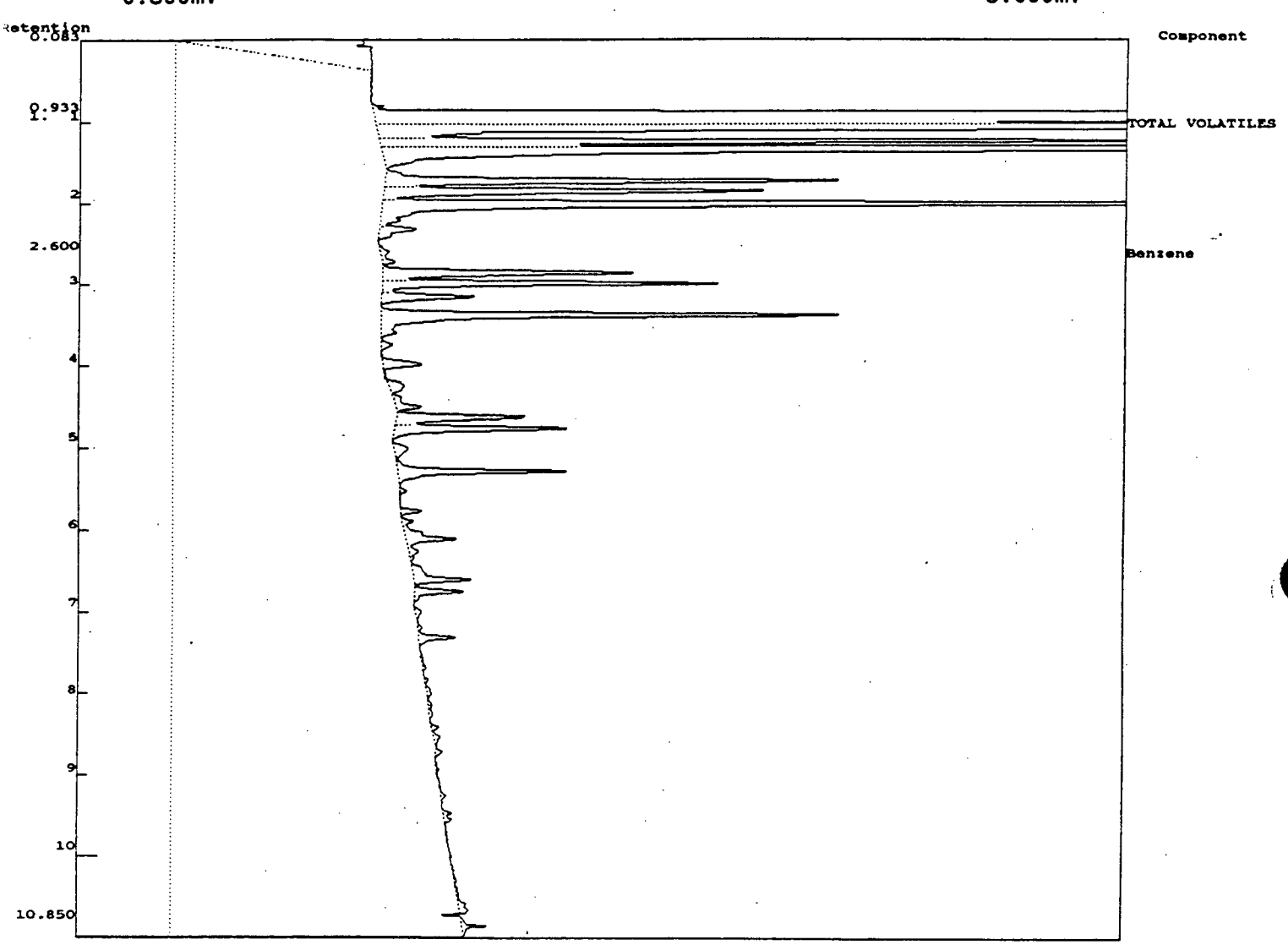
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	4.97 M	4.97	ug/L
	1		**4.97**	**4.97**	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F39.CHR (A:\MAY31)
Sample : SG-196
Operator : SGN



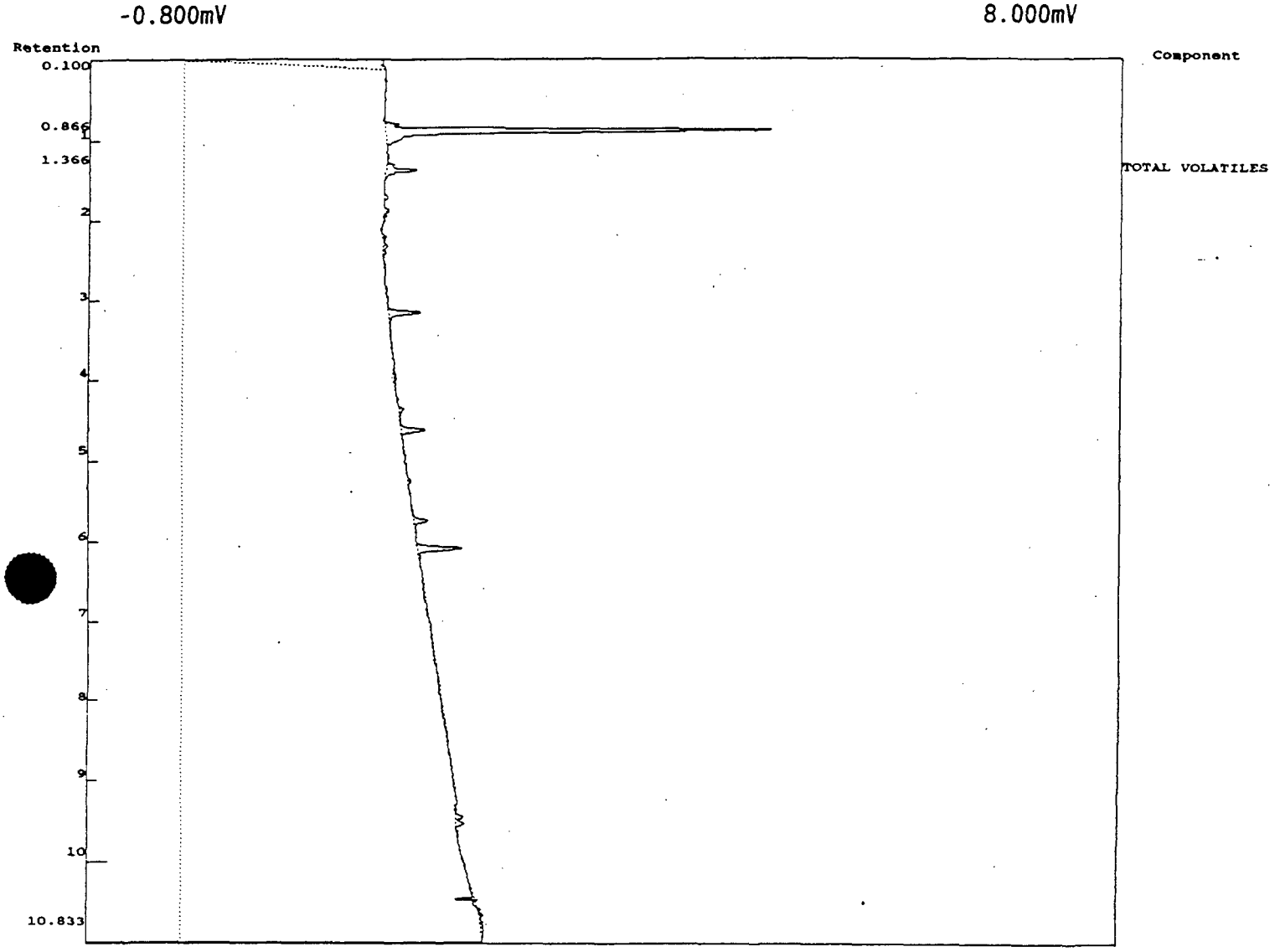
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	42.99 M	42.99	ug/L
Toluene	3	4.383	0.62	0.62	ug/L
	2		43.61	43.61	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F40.CHR (A:\MAY31)
Sample : SG-197
Operator : SGN



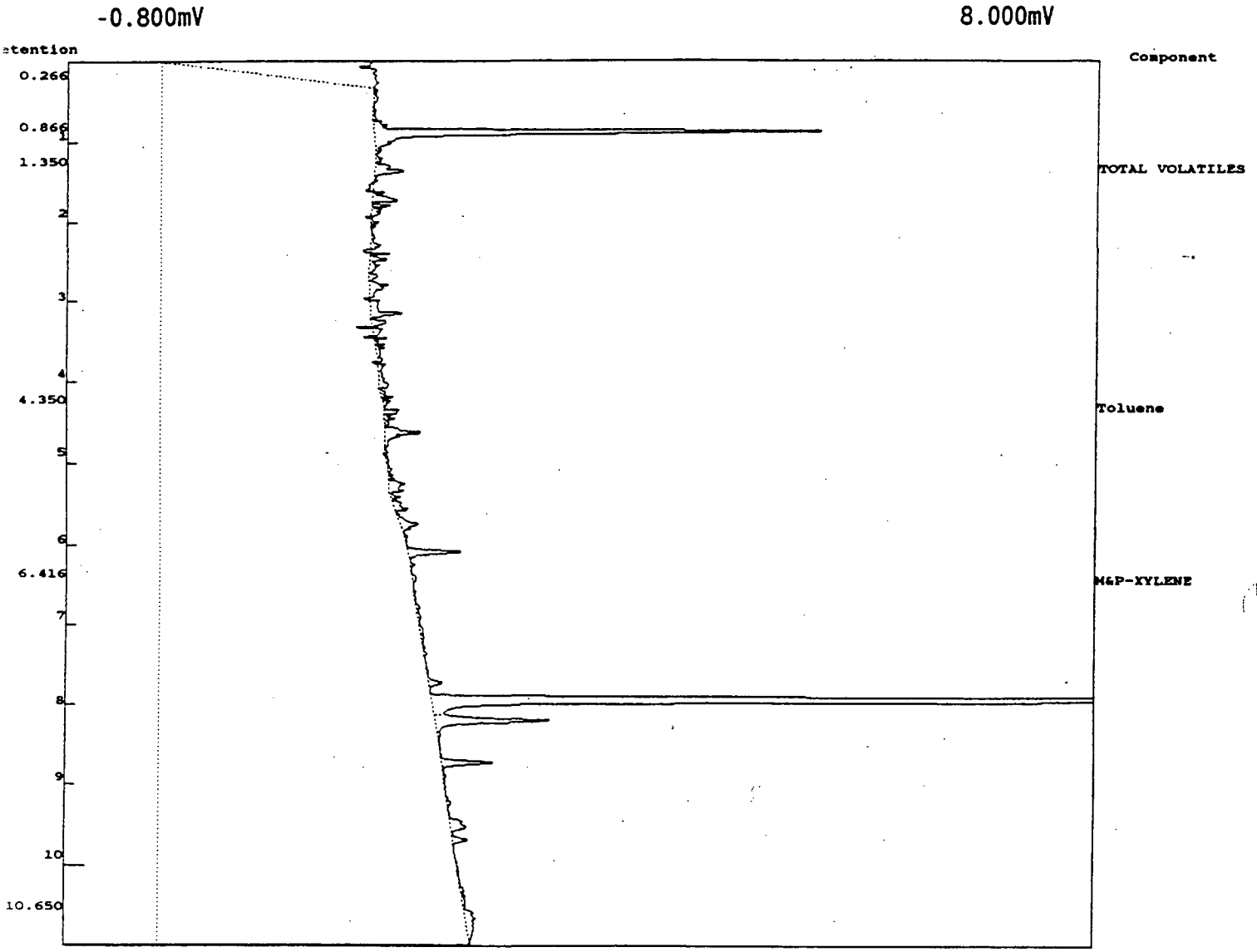
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.050	282.01 M	282.01	ug/L
enzene	2	2.600	0.35 M	0.30	ug/L
	2		282.36	282.31	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F41.CHR (A:\MAY31)
Sample : SG-198
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.02 M	5.02	ug/L
	1		5.02	5.02	

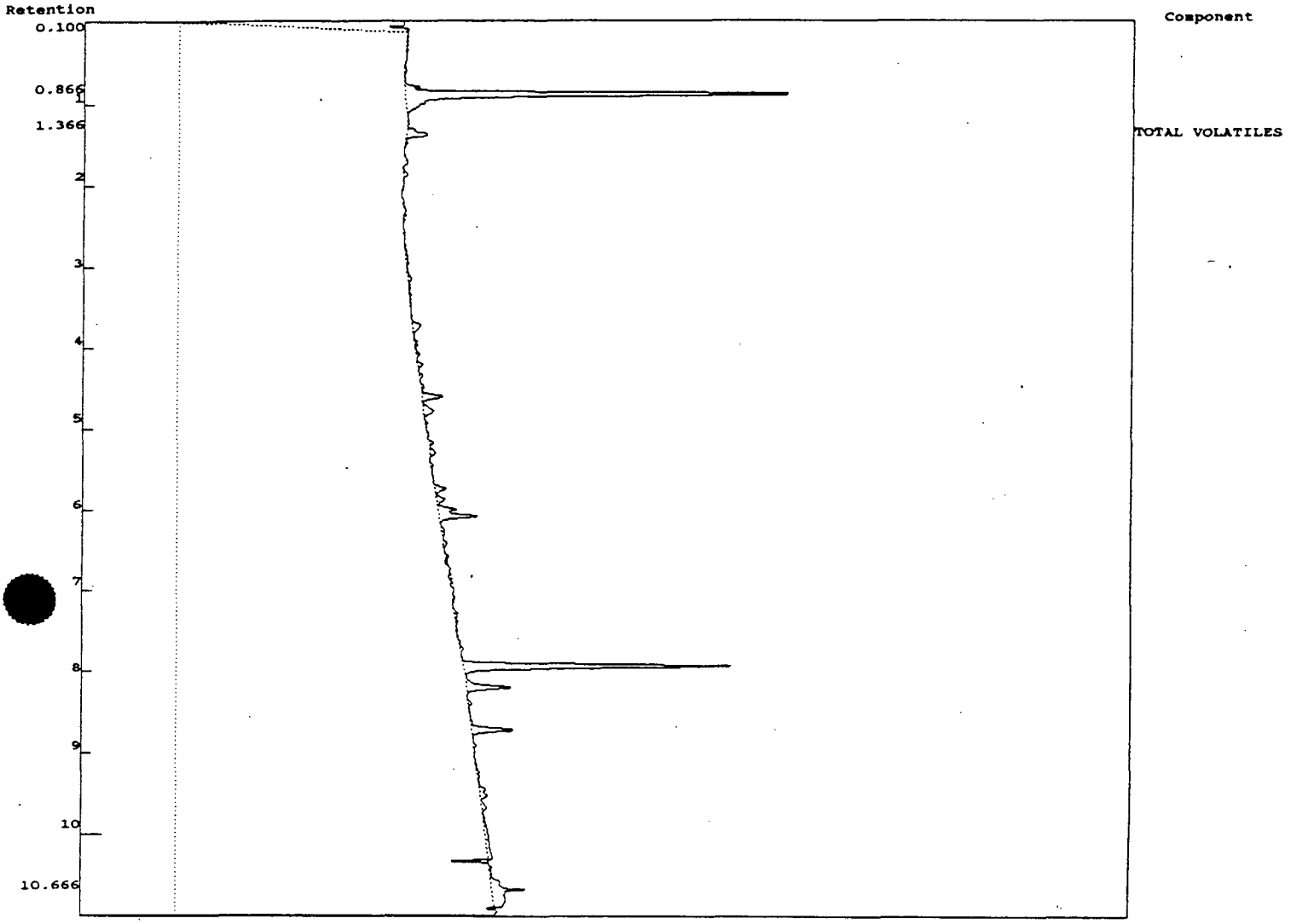
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F42.CHR (A:\MAY31)
Sample : SG-199
Operator : SGN



Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	1.350	65.82 M	65.82	ug/L
)luene	3	4.350	0.49 M	0.49	ug/L
:P-XYLENE	5	6.416	0.20	0.25	ug/L
	3		66.51	66.56	

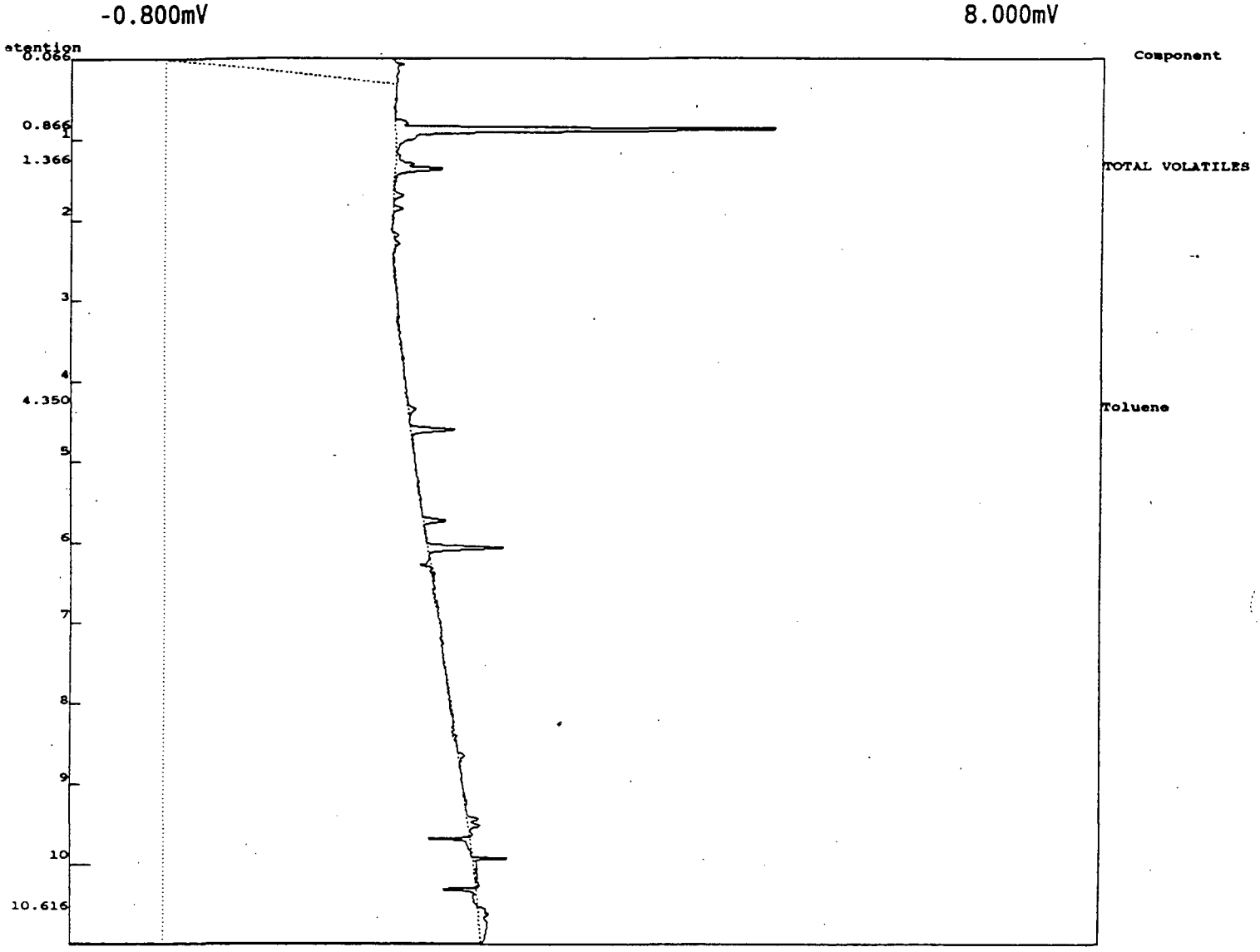
Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F43.CHR (A:\MAY31)
Sample : SG-200
Operator : SGN

-0.800mV 8.000mV



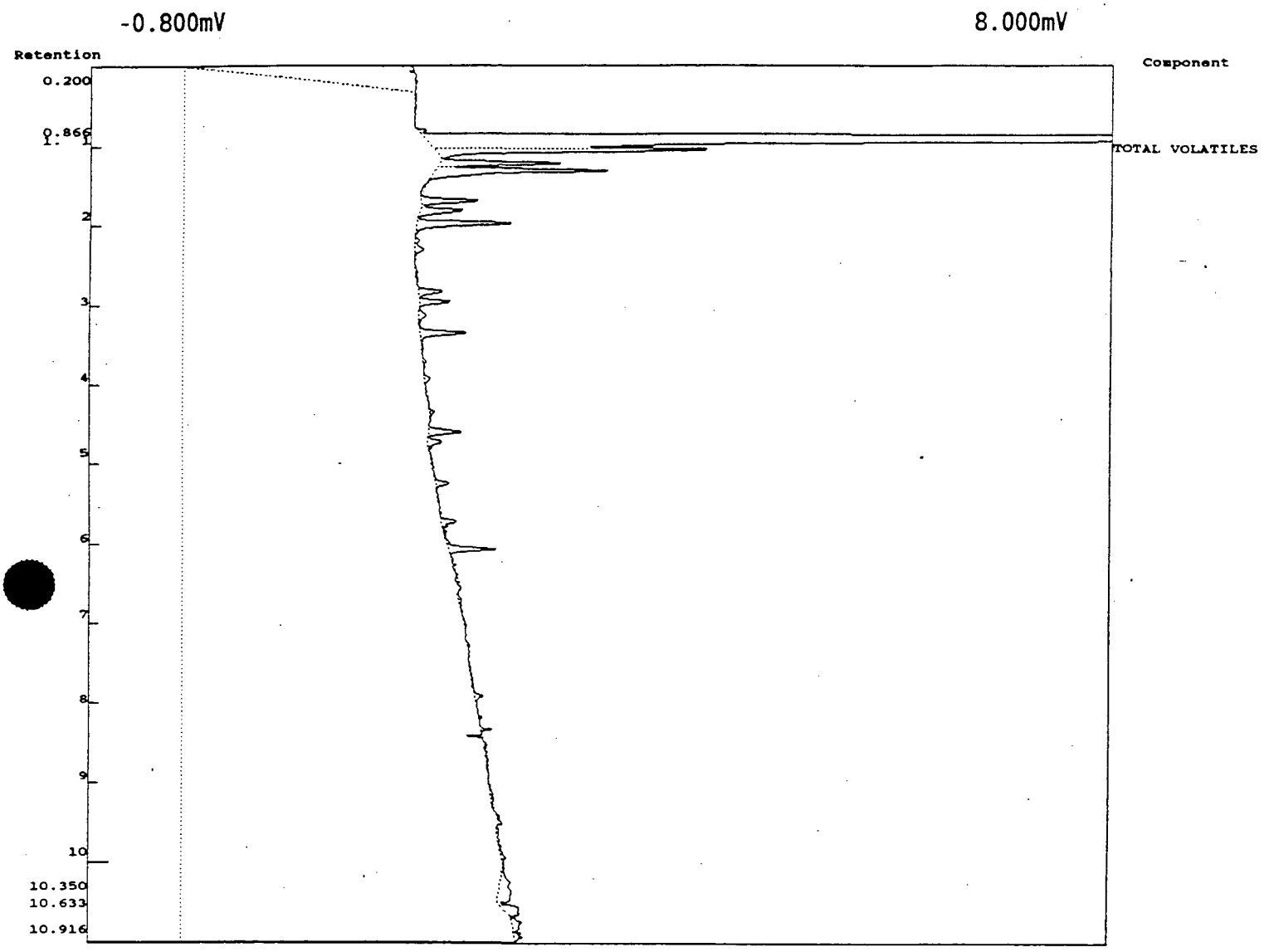
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	15.41 M	15.41	ug/L
	1		15.41	15.41	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F44.CHR (A:\MAY31)
Sample : EB-18
Operator : SGN



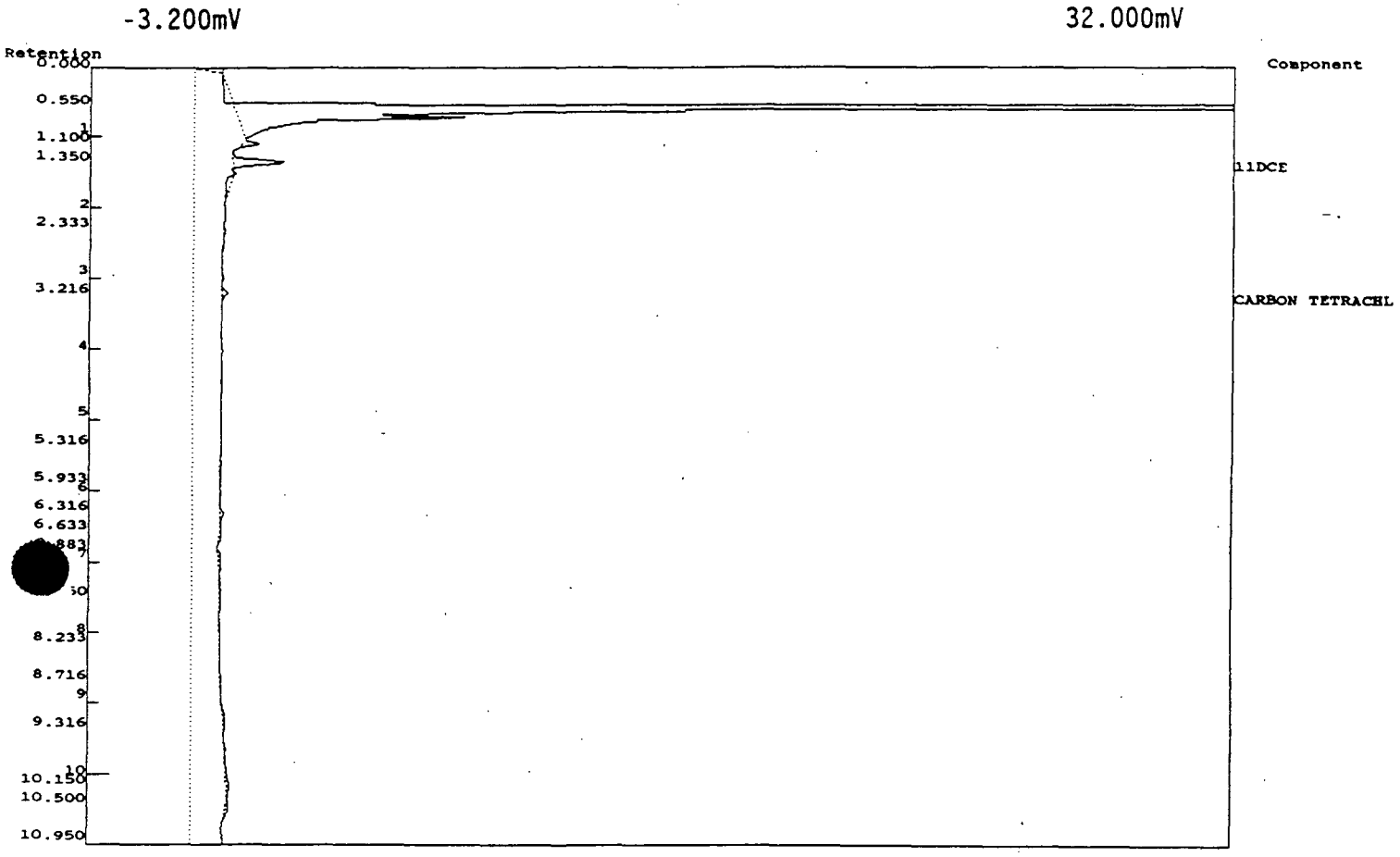
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.366	7.82	7.82	ug/L
oluene	3	4.350	0.30 M	0.30	ug/L
	2		8.13	8.13	

Lab name : WINNIE
Description : FID - Channel 1
Data file : MAY31F45.CHR (A:\MAY31)
Sample : SG-113-R
Operator : SGN



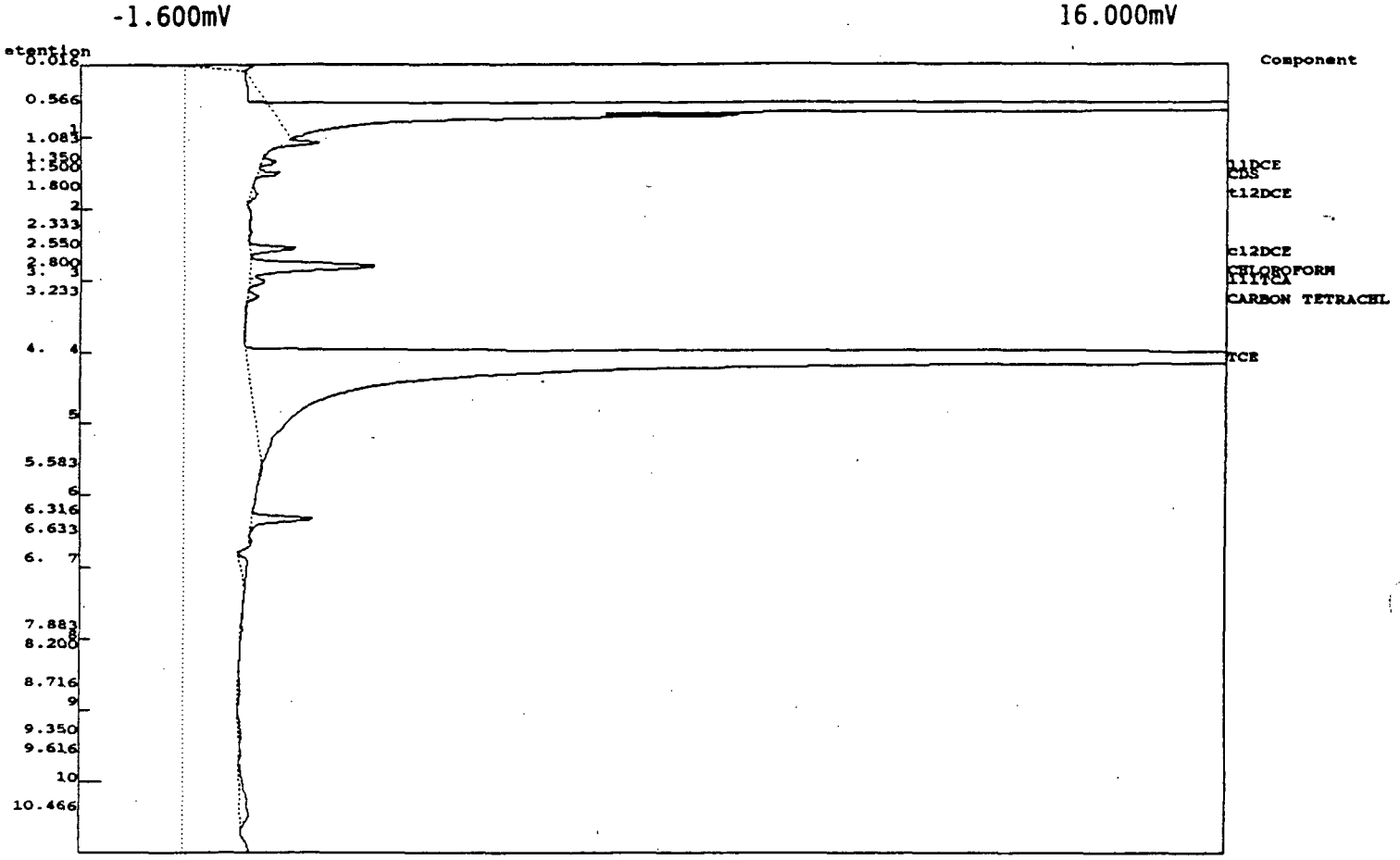
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.033	33.80 M	33.80	ug/L
	1		33.80	33.80	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 08:56:56
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E6.CHR (A:\)
Sample : EB-19
Operator : SGN



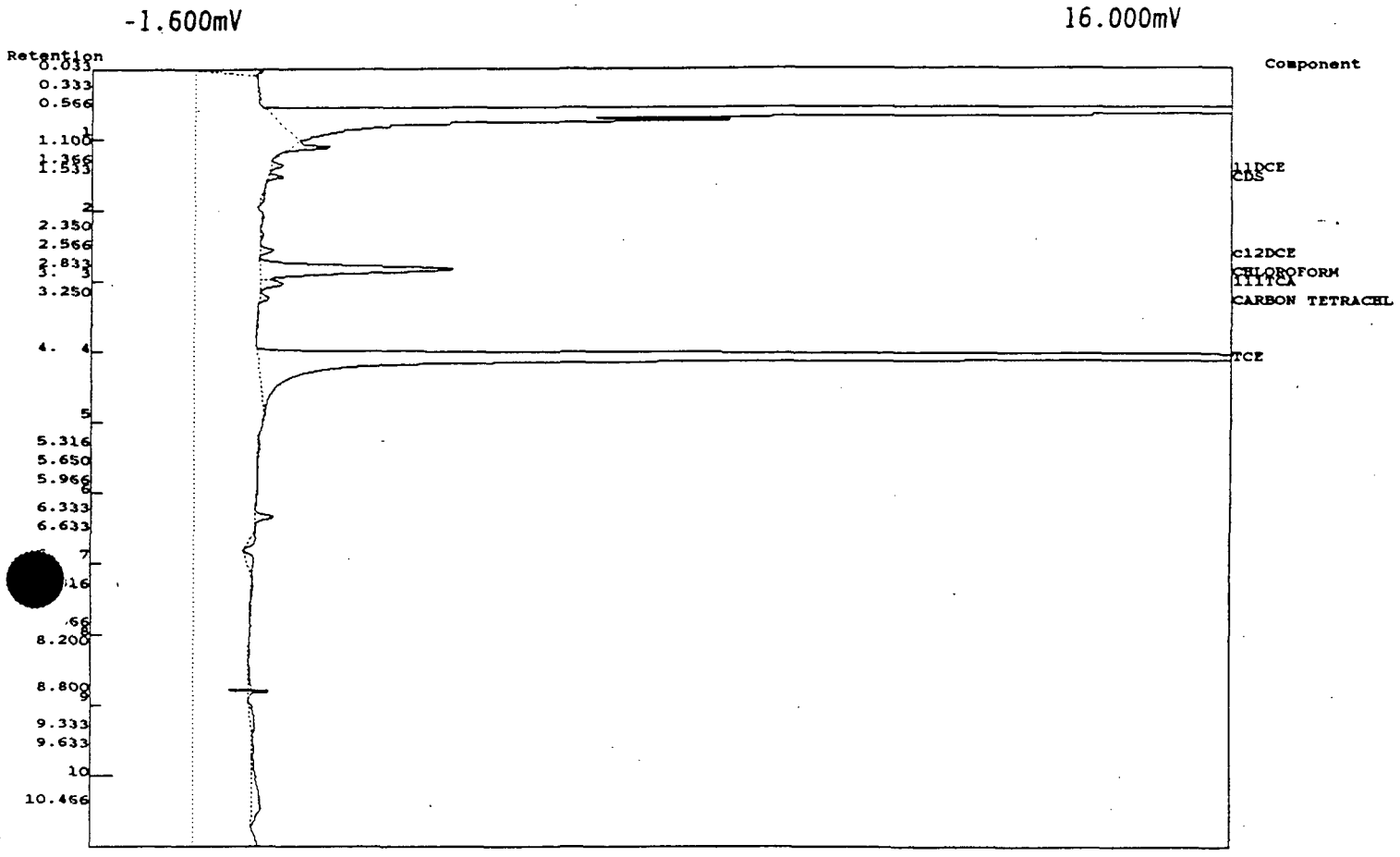
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	7.19 M	0.97	ug/L
CARBON TETRACHLORIDE	8	3.216	1.04	0.00	ug/L
	2		8.24	0.97	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 09:16:16
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E7.CHR (A:\JUNE01)
Sample : SG-163
Operator : SGN



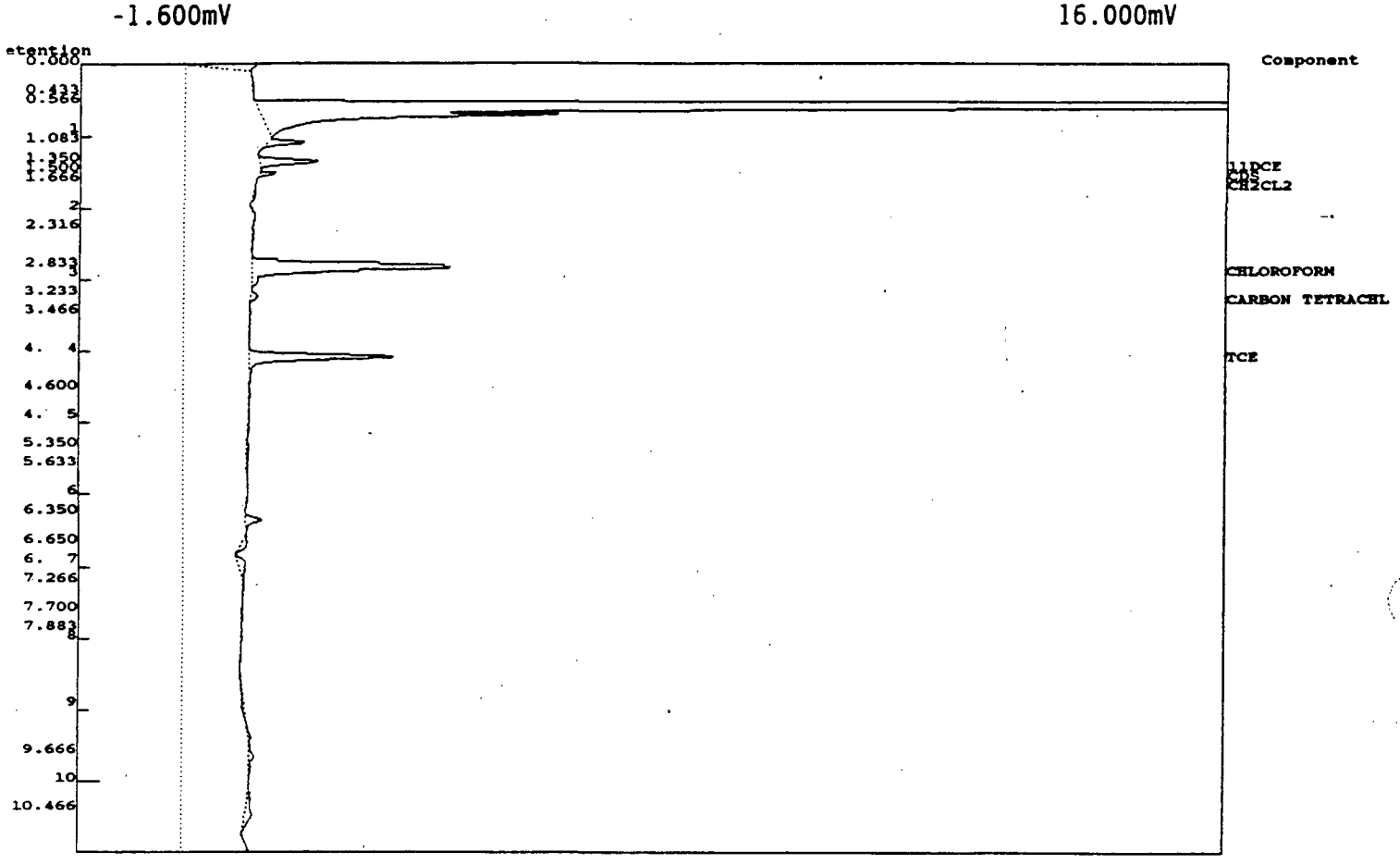
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	1.04	0.14	ug/L
DS	0	1.500	1.25 M	N/A	
12DCE	3	1.800	0.91 M	1.54	ug/L
12DCE	5	2.550	3.34 M	7.63	ug/L
HLOROFORM	6	2.800	13.55 M	0.20	ug/L
11TCA	7	3.016	1.43 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.233	0.86	0.00	ug/L
CE	9	4.066	1131.18 M	13.92	ug/L
	8		1153.57	22.45	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 09:35:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E8.CHR (A:\JUNE01)
Sample : SG-164
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	0.82	0.11	ug/L
CDS	0	1.533	1.49	N/A	
c12DCE	5	2.566	0.97 M	2.21	ug/L
CHLOROFORM	6	2.833	21.73 M	0.33	ug/L
111TCA	7	3.033	2.42 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.250	0.73 M	0.00	ug/L
TCE	9	4.083	196.92 M	2.42	ug/L
	7		225.08	4.09	

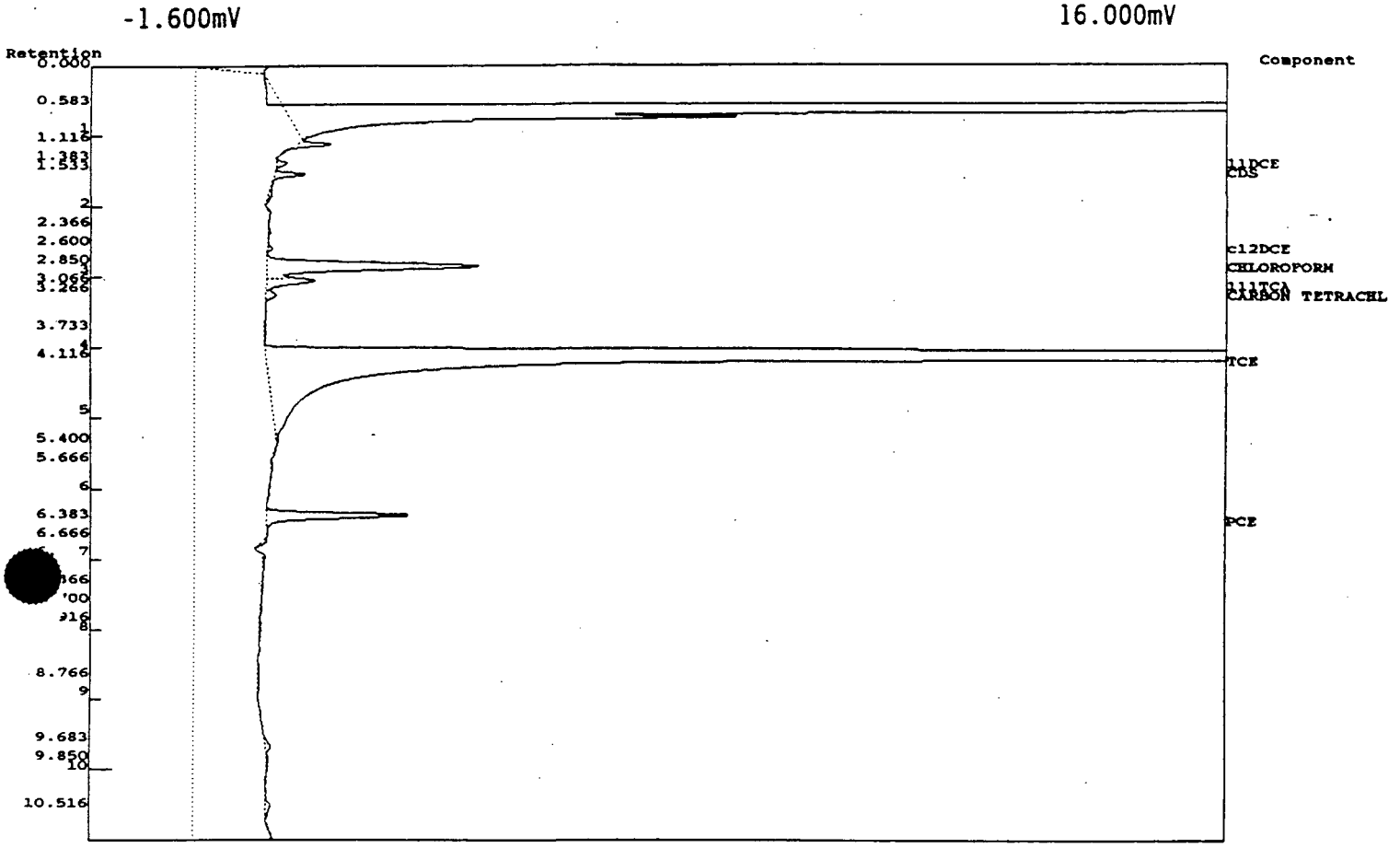
Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 09:55:29
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E9.CHR (A:\JUNE01)
Sample : SG-165
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	4.22 M	0.57	ug/L
DS	0	1.500	0.67 M	N/A	
H2CL2	2	1.666	0.34 M	0.23	ug/L
HLOROFORM	6	2.833	23.49 M	0.35	ug/L
ARBON TETRACHLORIDE	8	3.233	0.66 M	0.00	ug/L
CE	9	4.083	12.12 M	0.15	ug/L
	6		41.50	0.30	

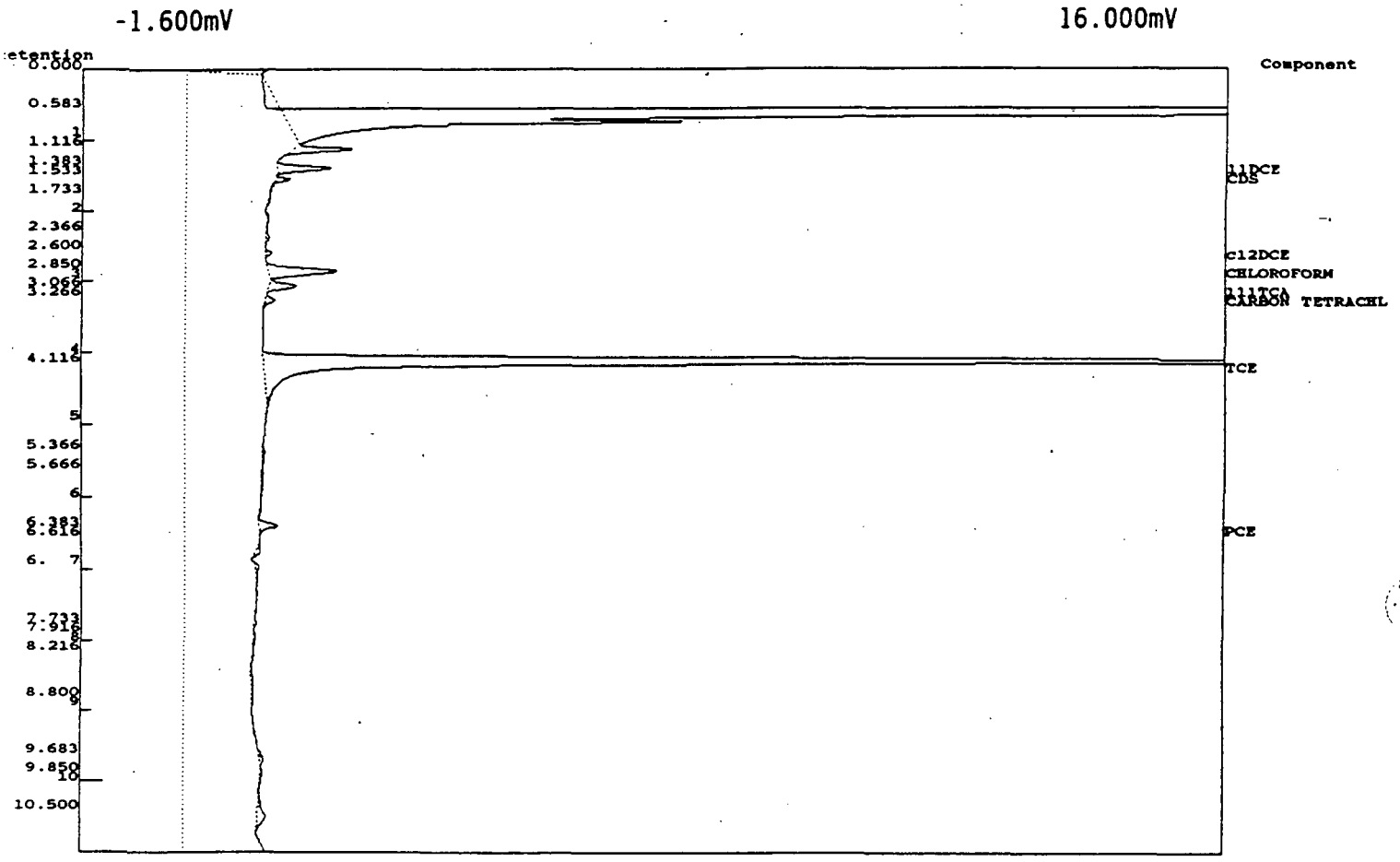
300774

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 10:40:20
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E10.CHR (A:\)
Sample : SG-166
Operator : SGN



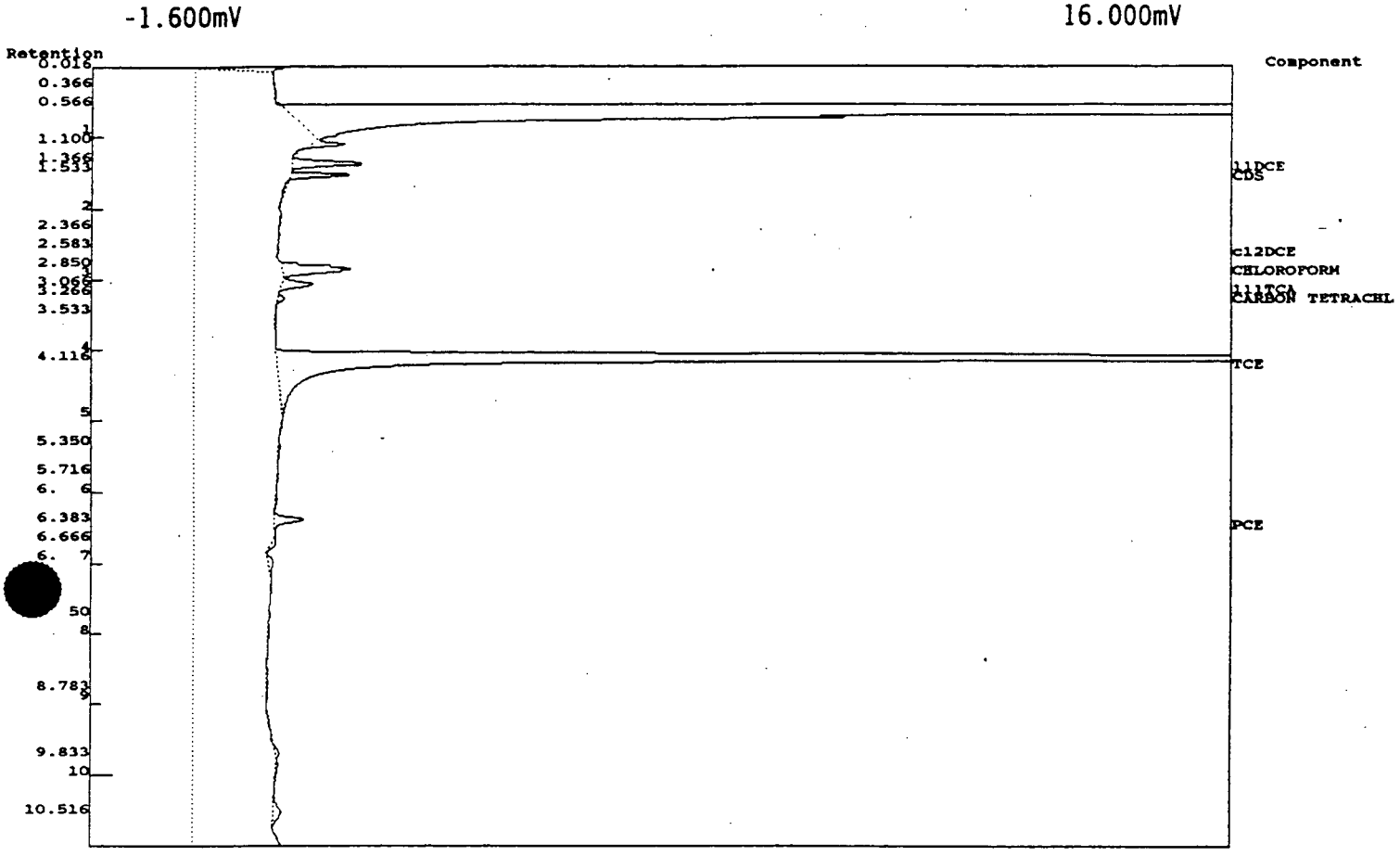
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	0.74	0.10	ug/L
CDS	0	1.533	2.64	N/A	
c12DCE	5	2.600	0.32	0.74	ug/L
CHLOROFORM	6	2.850	24.45 M	0.37	ug/L
111TCA	7	3.066	4.70 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.266	1.09 M	0.00	ug/L
TCE	9	4.116	622.03 M	7.66	ug/L
PCE	11	6.383	12.09 M	0.04	ug/L
	8		668.08	7.94	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 11:00:52
Method : 8010
Description : ECD - CHANNEL 2
Data File : JUN01E11.CHR (A:\JUNE01)
Sample : SG-167
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	3.82 M	0.52	ug/L
DS	0	1.533	0.54 M	N/A	
12DCE	5	2.600	0.43 M	0.99	ug/L
HLOROFORM	6	2.850	7.05 M	0.11	ug/L
11TCA	7	3.066	2.33 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.266	0.72 M	0.00	ug/L
CE	9	4.116	112.75 M	1.39	ug/L
CE	11	6.383	1.58	0.01	ug/L
	8		**129.24**	**2.02**	

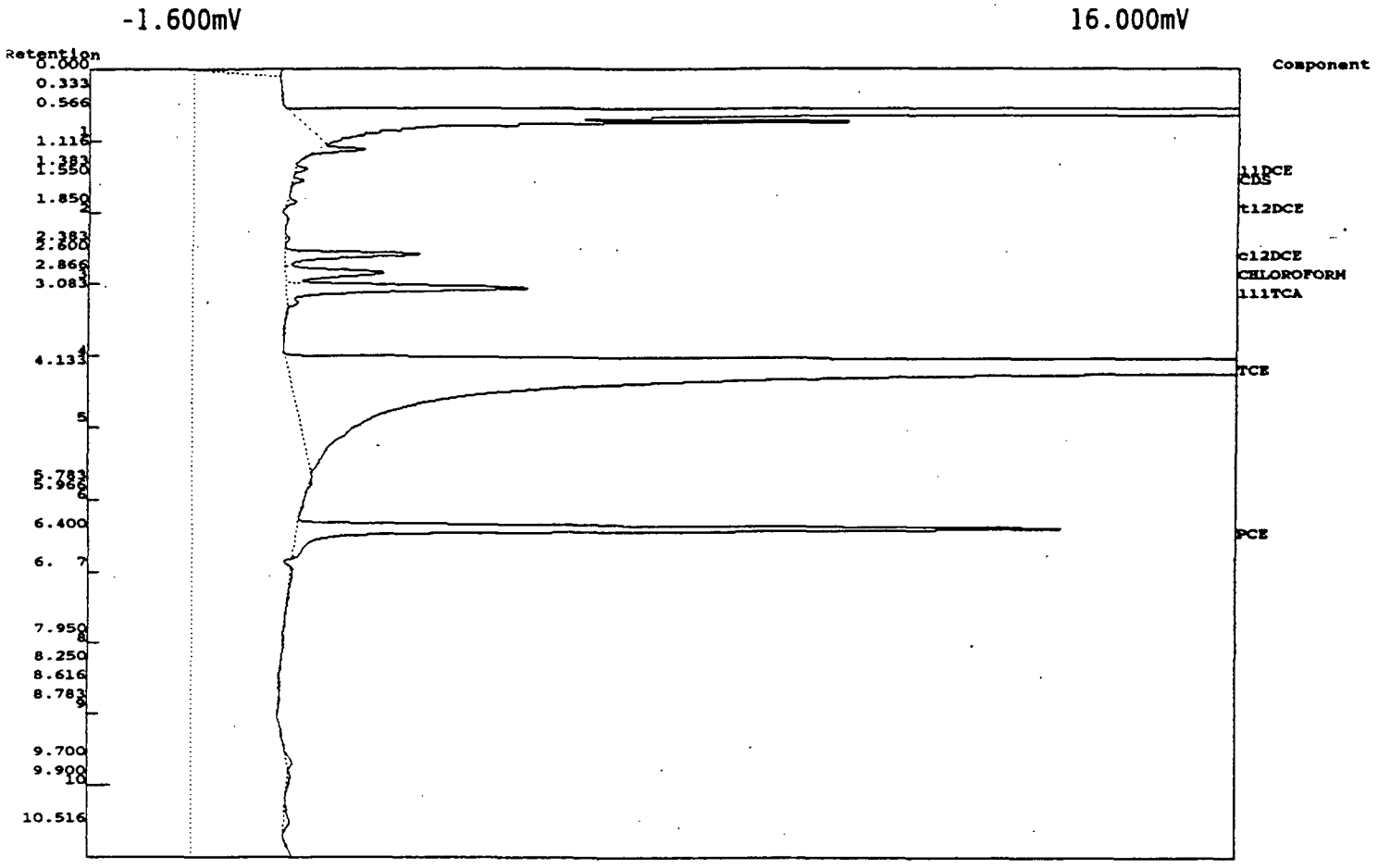
Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 11:21:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E12.CHR (A:\JUNE01)
Sample : SG-168
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	5.30	0.72	ug/L
CDS	0	1.533	2.85	N/A	
c12DCE	5	2.583	0.11 M	0.26	ug/L
CHLOROFORM	6	2.850	7.28 M	0.11	ug/L
111TCA	7	3.066	2.64 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.266	0.61	0.00	ug/L
TCE	9	4.116	176.54 M	2.17	ug/L
PCE	11	6.383	2.47 M	0.01	ug/L
	8		197.81	2.28	

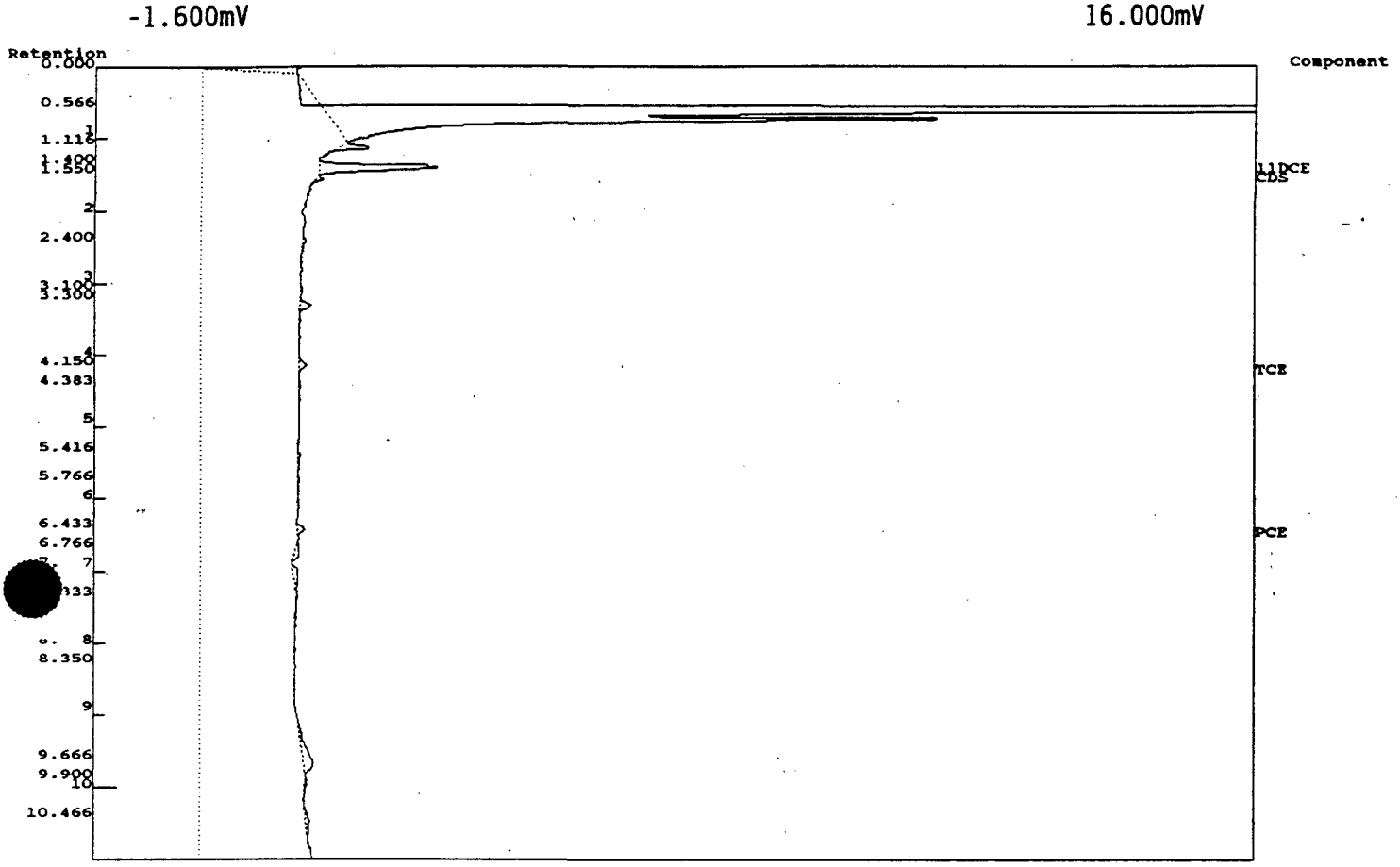
300777

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 11:43:28
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E13.CHR (A:\JUNE01)
Sample : SG-148
Operator : SGN



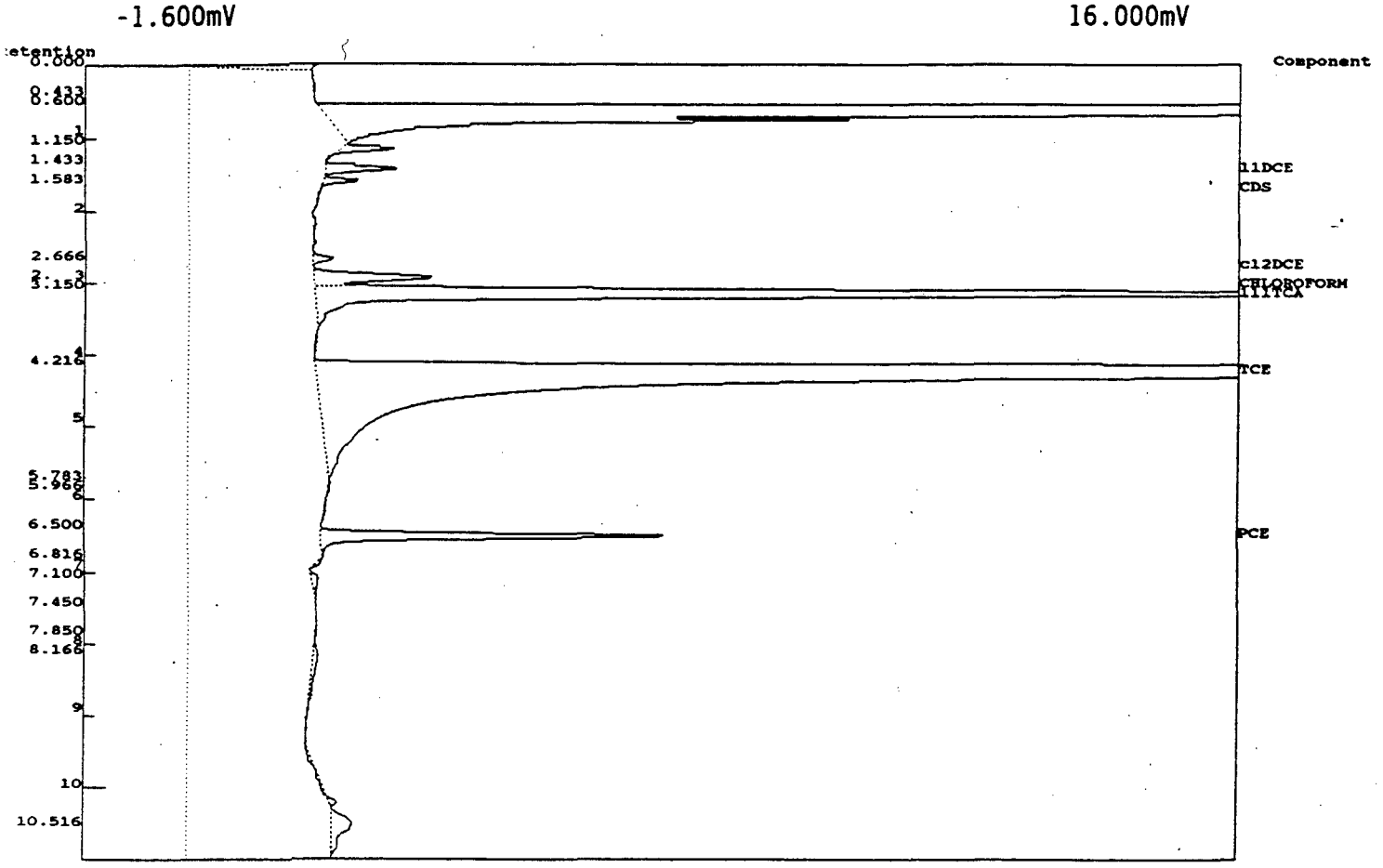
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	0.80	0.11	ug/L
CDS	0	1.550	0.62 M	N/A	
t12DCE	3	1.850	0.77 M	1.31	ug/L
c12DCE	5	2.600	10.89 M	24.87	ug/L
CHLOROFORM	6	2.866	10.89 M	0.16	ug/L
111TCA	7	3.083	25.54 M	0.15	ug/L
TCE	9	4.133	1744.60 M	21.47	ug/L
PCE	11	6.400	67.91 M	0.25	ug/L
	8		1862.02	47.32	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 12:12:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E14.CHR (A:\JUNE01)
Sample : EB-20
Operator : SGN



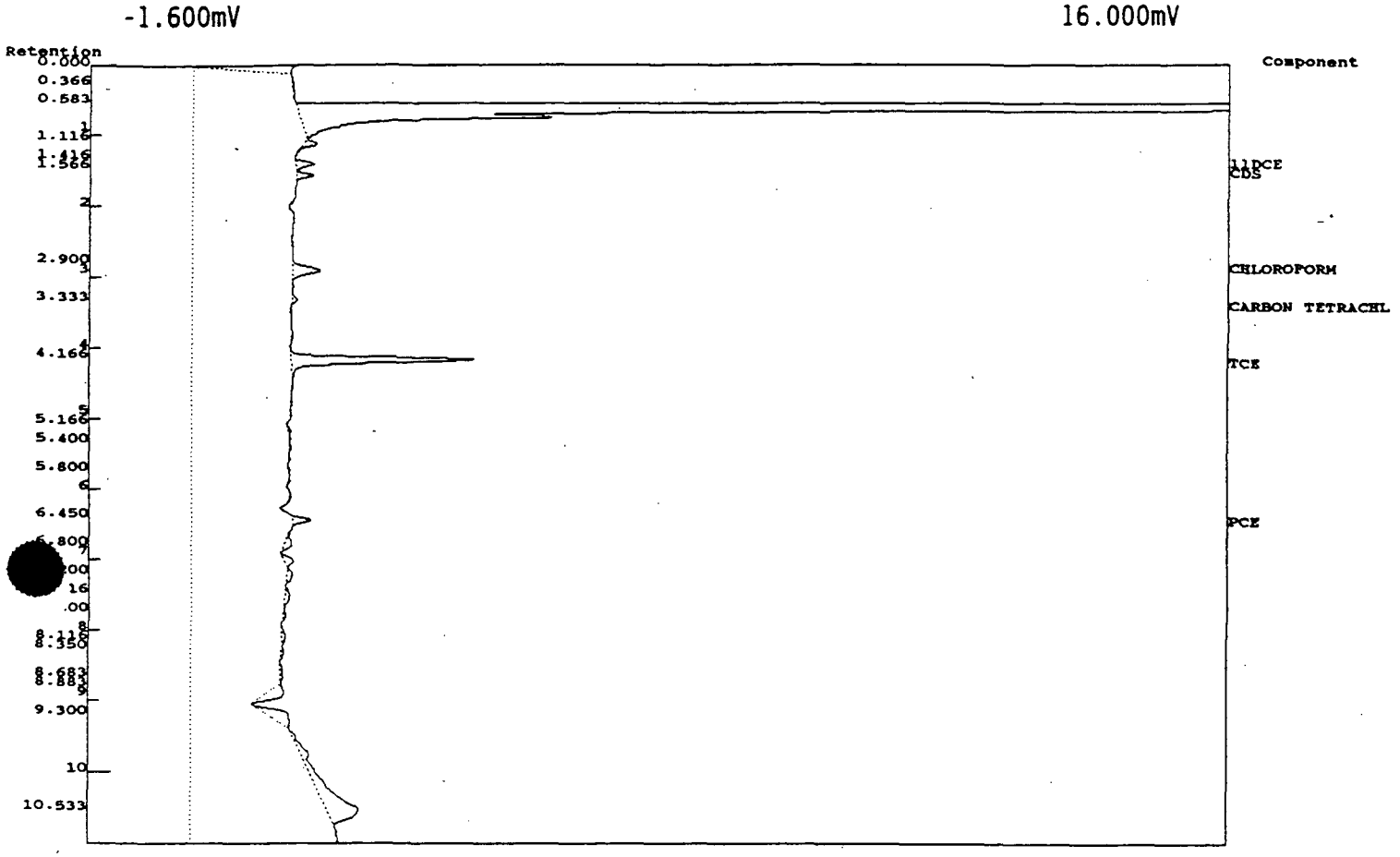
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	9.48 M	1.28	ug/L
CDS	0	1.550	0.34 M	N/A	
TCE	9	4.150	0.62 M	0.01	ug/L
PCE	11	6.433	0.59 M	0.00	ug/L
	4		11.03	0.29	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 14:31:45
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E18.CHR (A:\JUNE01)
Sample : SG-149
Operator : SGN



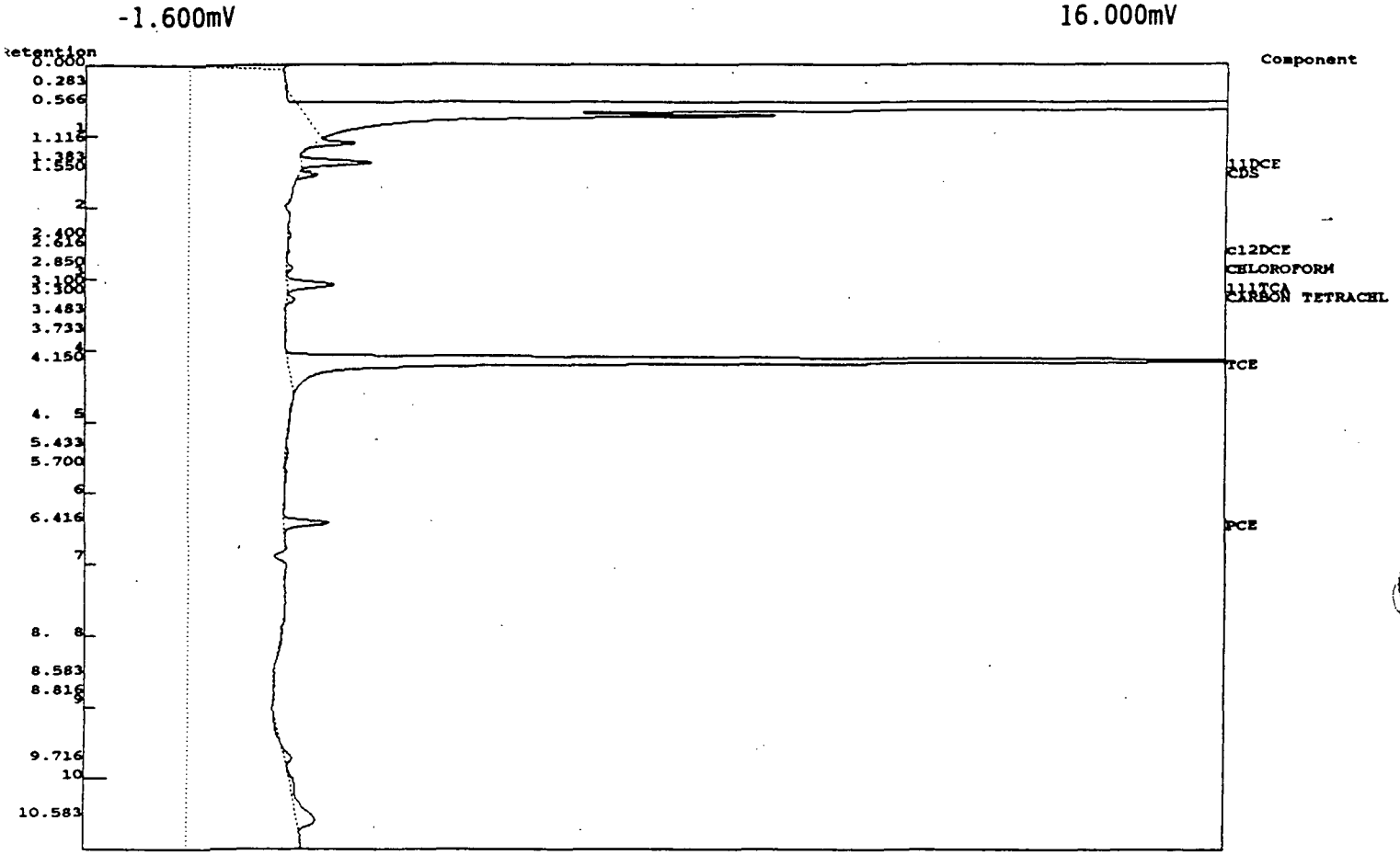
Component	Number	Retention	Area	External	Units
1DCE	1	1.433	5.69	0.77	ug/L
DS	0	1.583	2.01 M	N/A	
12DCE	5	2.666	1.55 M	3.54	ug/L
HLOROFORM	6	2.933	12.48 M	0.19	ug/L
11TCA	7	3.150	128.83 M	0.77	ug/L
CE	9	4.216	1402.12 M	17.26	ug/L
CE	11	6.500	28.74 M	0.10	ug/L
	7		1581.42	21.63	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 15:28:59
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E19.CHR (A:\JUNE01)
Sample : SG-156
Operator : SGN



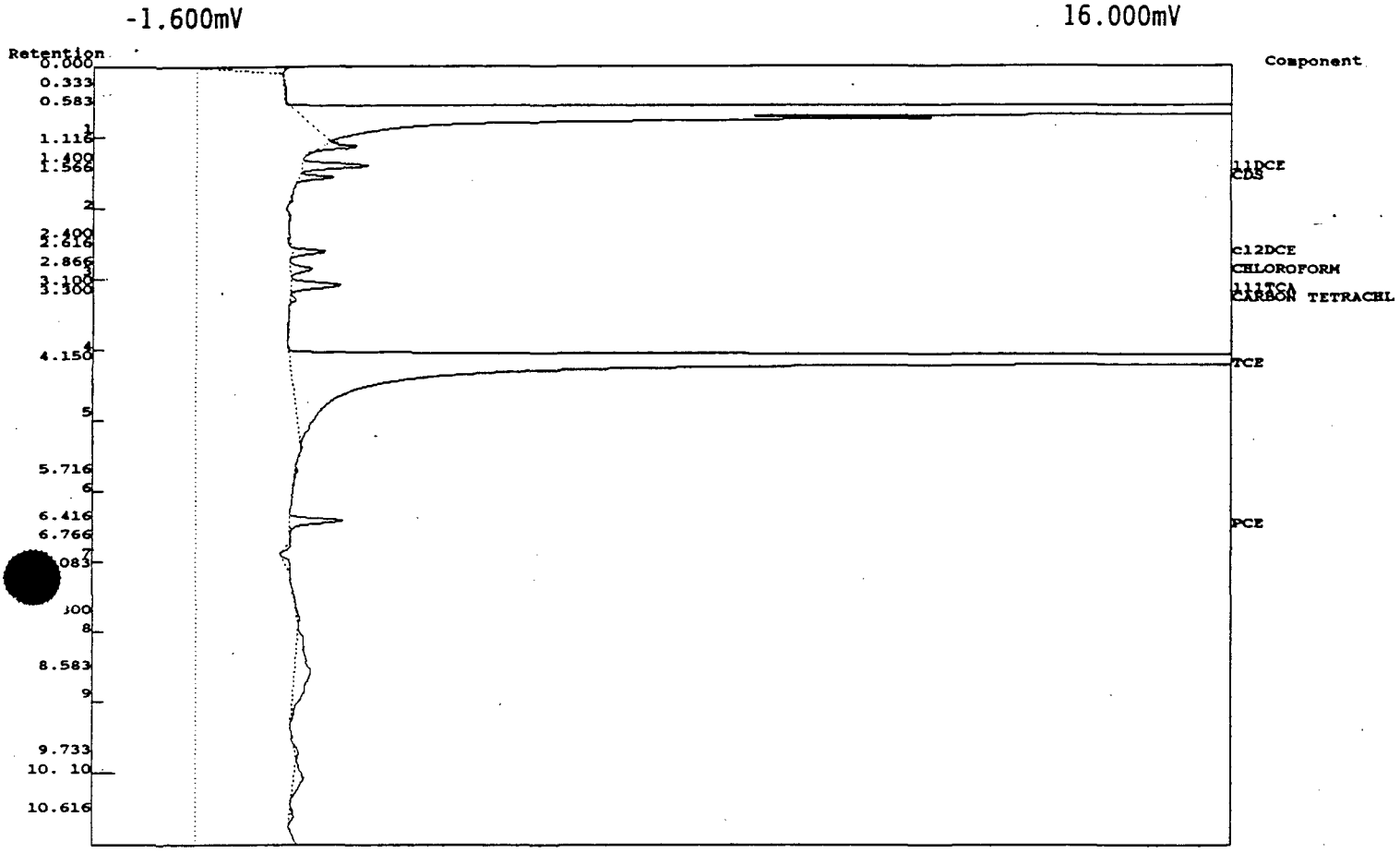
Component	Number	Retention	Area	External	Units
11DCE	1	1.416	1.34	0.18	ug/L
CDS	0	1.566	1.02	N/A	
CHLOROFORM	6	2.900	2.98 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.333	0.38 M	0.00	ug/L
TCE	9	4.166	15.33 M	0.19	ug/L
PCE	11	6.450	1.24 M	0.00	ug/L
	6		22.30	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 15:50:36
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E20.CHR (A:\JUNE01)
Sample : SG-157
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	5.32 M	0.72	ug/L
DS	0	1.550	1.18 M	N/A	
12DCE	5	2.616	0.10 M	0.24	ug/L
HLOROFORM	6	2.850	0.52 M	0.01	ug/L
11TCA	7	3.100	4.38 M	0.03	ug/L
ARBON TETRACHLORIDE	8	3.300	0.66 M	0.00	ug/L
CE	9	4.150	97.34 M	1.20	ug/L
CE	11	6.416	3.77 M	0.01	ug/L
	8		113.27	1.20	

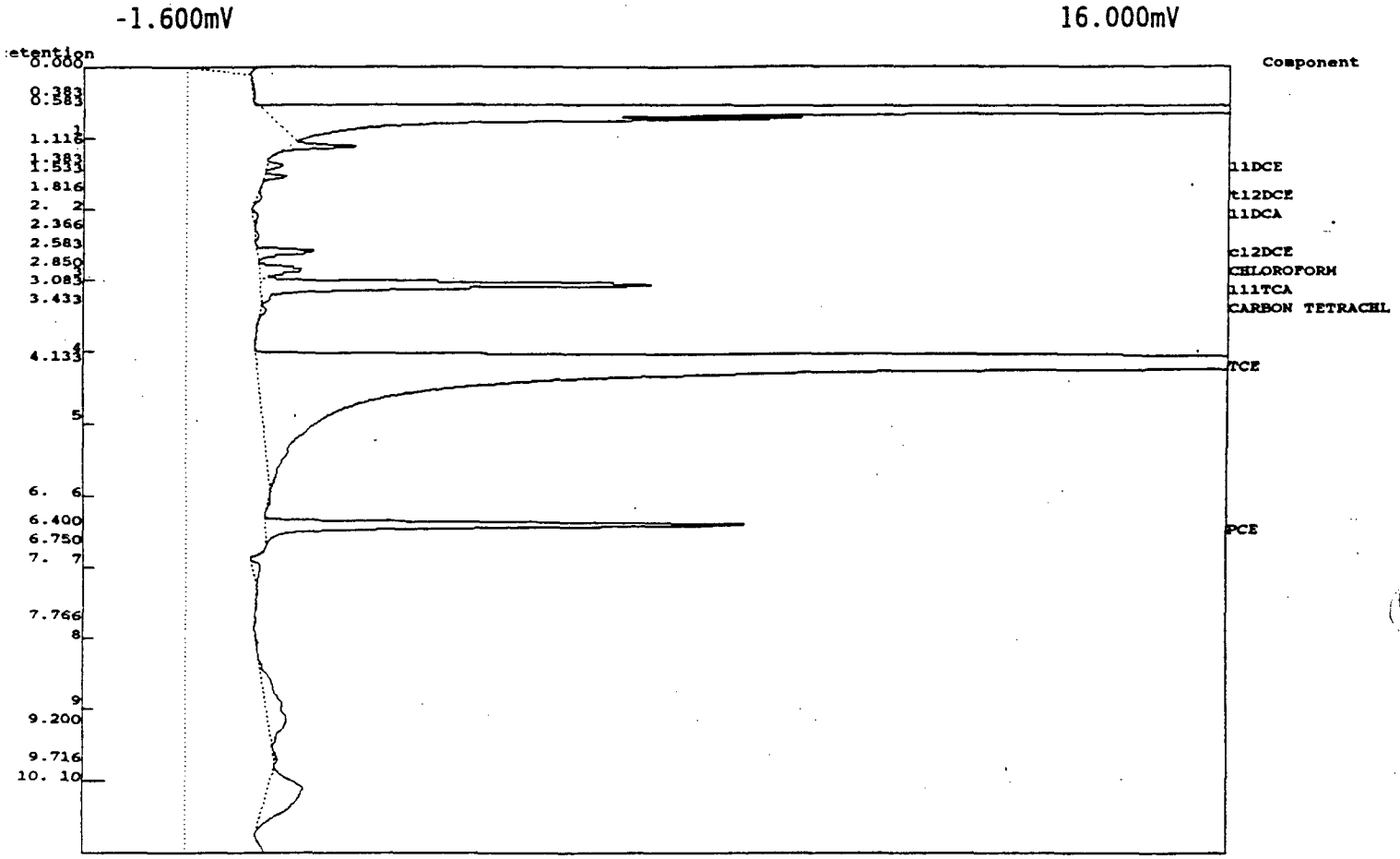
Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 16:15:34
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E21.CHR (A:\JUNE01)
Sample : SG-158
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	5.07	0.69	ug/L
CDS	0	1.566	2.31	N/A	
c12DCE	5	2.616	2.28 M	5.20	ug/L
CHLOROFORM	6	2.866	1.92 M	0.03	ug/L
111TCA	7	3.100	4.56 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.300	0.42 M	0.00	ug/L
TCE	9	4.150	592.39 M	7.29	ug/L
PCE	11	6.416	4.39 M	0.02	ug/L
	8		613.33	12.25	

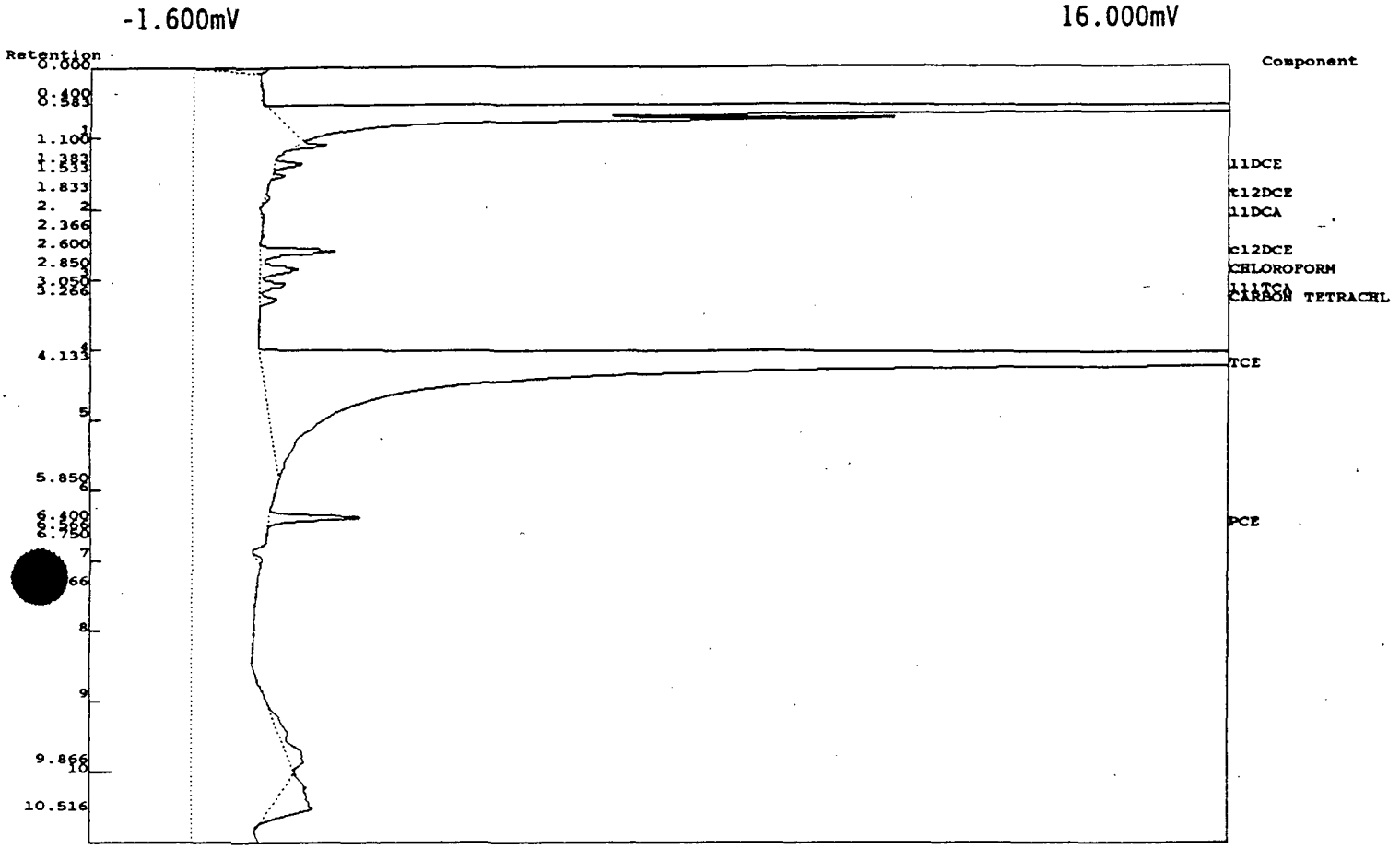
300783

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 16:40:36
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E22.CHR (A:\JUNE01)
Sample : SG-159
Operator : SGN



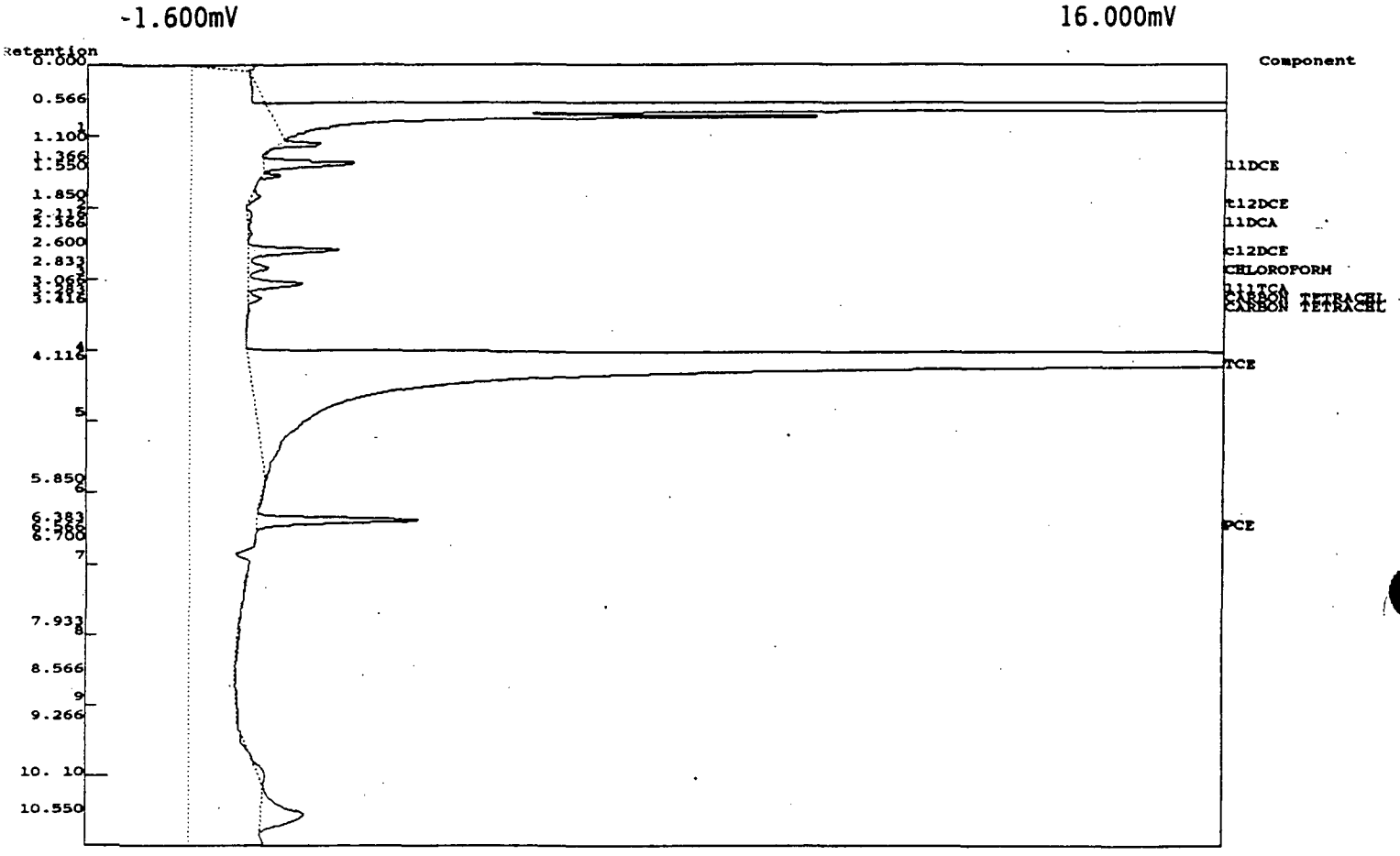
Component	Number	Retention	Area	External	Units
1DCE	1	1.383	1.18 M	0.16	ug/L
12DCE	3	1.816	0.54 M	0.92	ug/L
1DCA	4	2.100	0.57 M	0.52	ug/L
12DCE	5	2.583	4.90 M	11.18	ug/L
HLOROFORM	6	2.850	4.42 M	0.07	ug/L
11TCA	7	3.083	40.57 M	0.24	ug/L
ARBON TETRACHLORIDE	8	3.433	0.57 M	0.00	ug/L
CE	9	4.133	1408.25 M	17.33	ug/L
CE	11	6.400	40.68 M	0.15	ug/L
	9		1501.67	30.57	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 17:00:55
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E23.CHR (A:\JUNE01)
Sample : SG-108
Operator : SGN



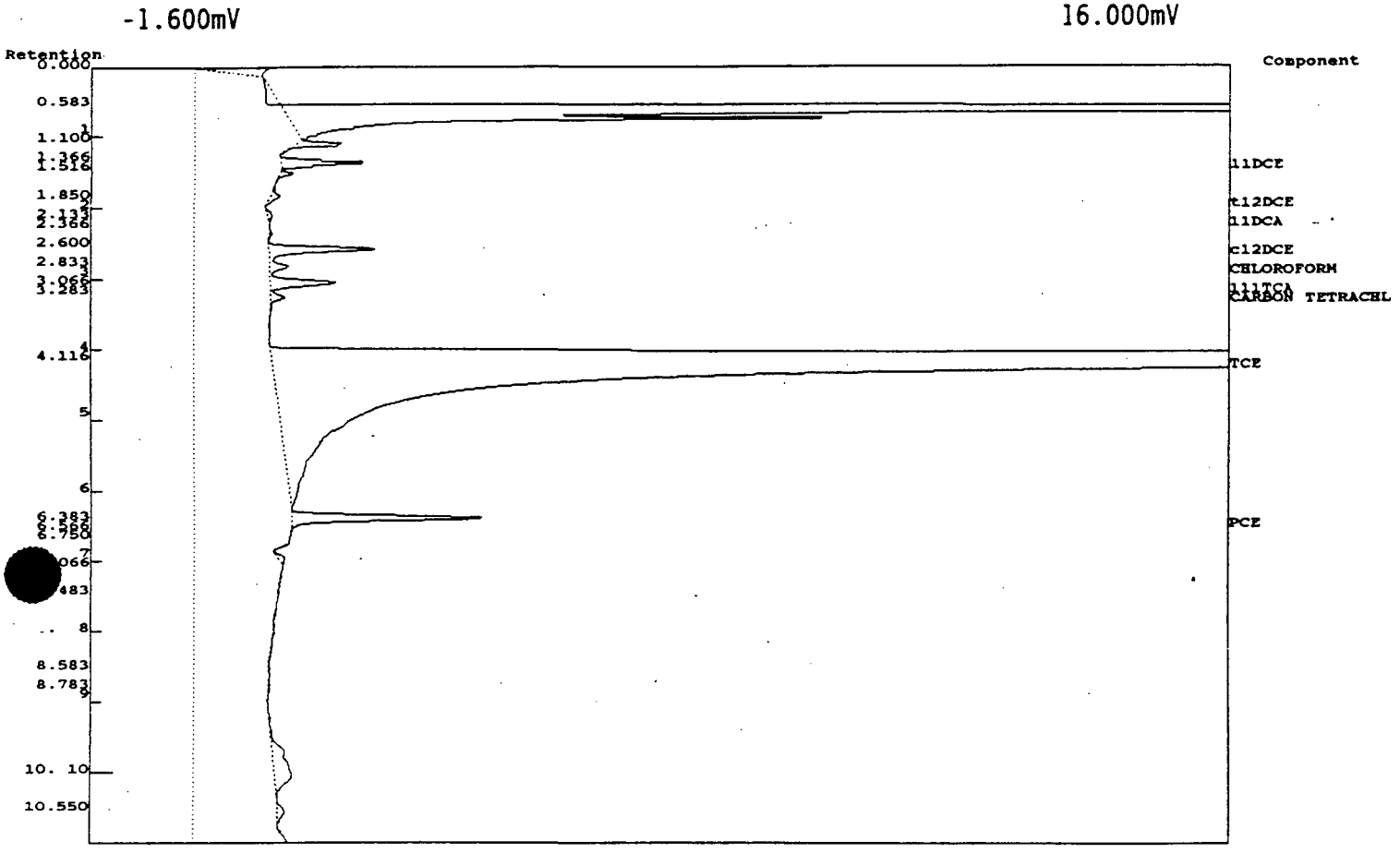
Component	Number	Retention	Area	External	Units
11DCE	1	1.383	1.97 M	0.27	ug/L
t12DCE	3	1.833	0.53 M	0.90	ug/L
11DCA	4	2.100	0.20 M	0.18	ug/L
c12DCE	5	2.600	6.39 M	14.58	ug/L
CHLOROFORM	6	2.850	4.11 M	0.06	ug/L
111TCA	7	3.050	2.51 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.266	1.56 M	0.00	ug/L
TCE	9	4.133	1689.72 M	20.80	ug/L
PCE	11	6.400	7.62 M	0.03	ug/L
	9		1714.61	36.84	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 17:20:37
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E24.CHR (A:\JUNE01)
Sample : SG-109
Operator : SGN



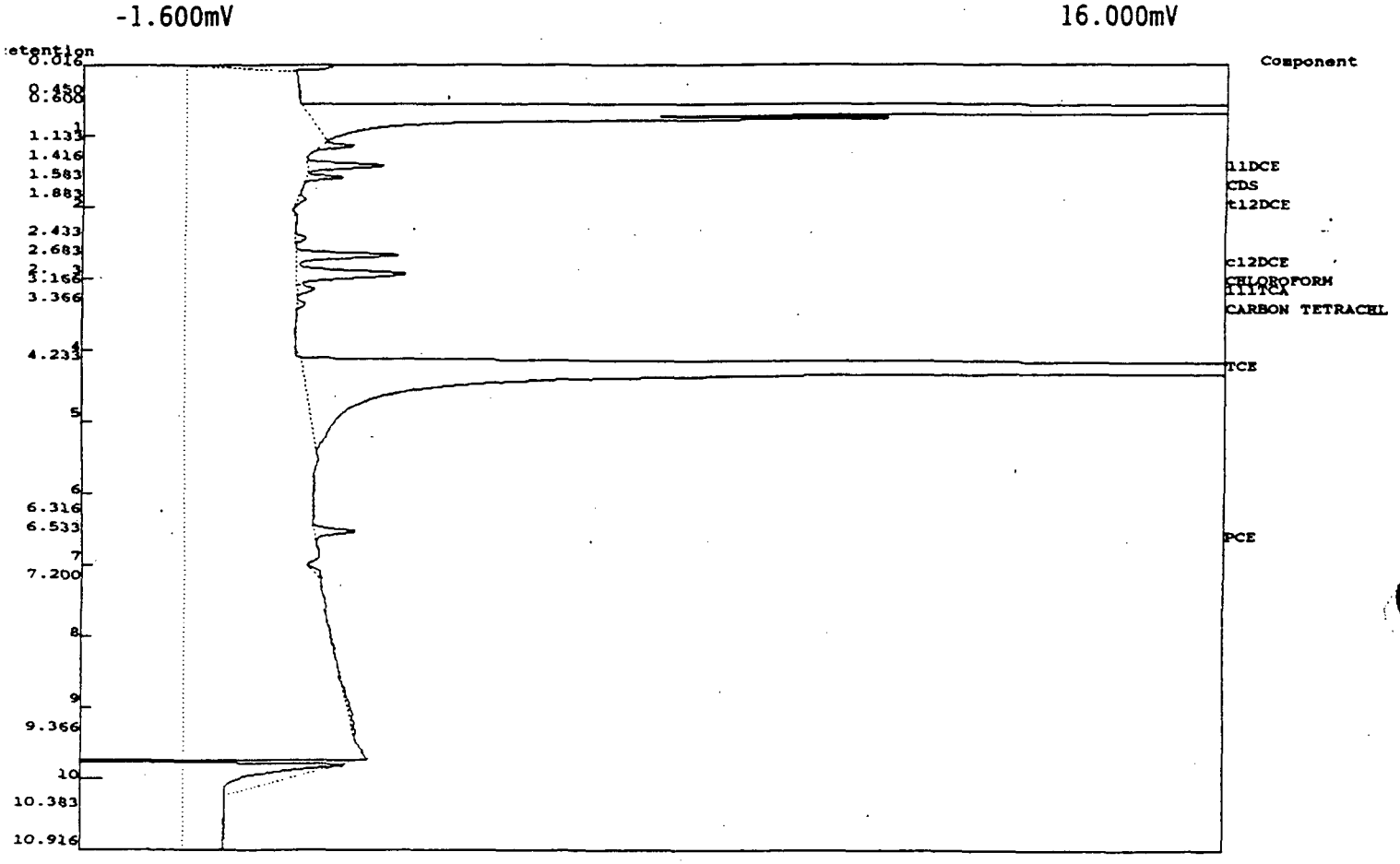
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	7.75 M	1.05	ug/L
12DCE	3	1.850	1.04 M	1.76	ug/L
11DCA	4	2.116	0.62 M	0.57	ug/L
12DCE	5	2.600	7.36 M	16.81	ug/L
CHLOROFORM	6	2.833	1.94 M	0.03	ug/L
111TCA	7	3.066	5.22 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.283	1.14 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.416	0.10 M	0.00	ug/L
TCE	9	4.116	1866.59 M	22.98	ug/L
PCE	11	6.383	13.44 M	0.05	ug/L
	10		1905.19	43.26	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 17:42:53
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E25.CHR (A:\JUNE01)
Sample : SG-909
Operator : SGN



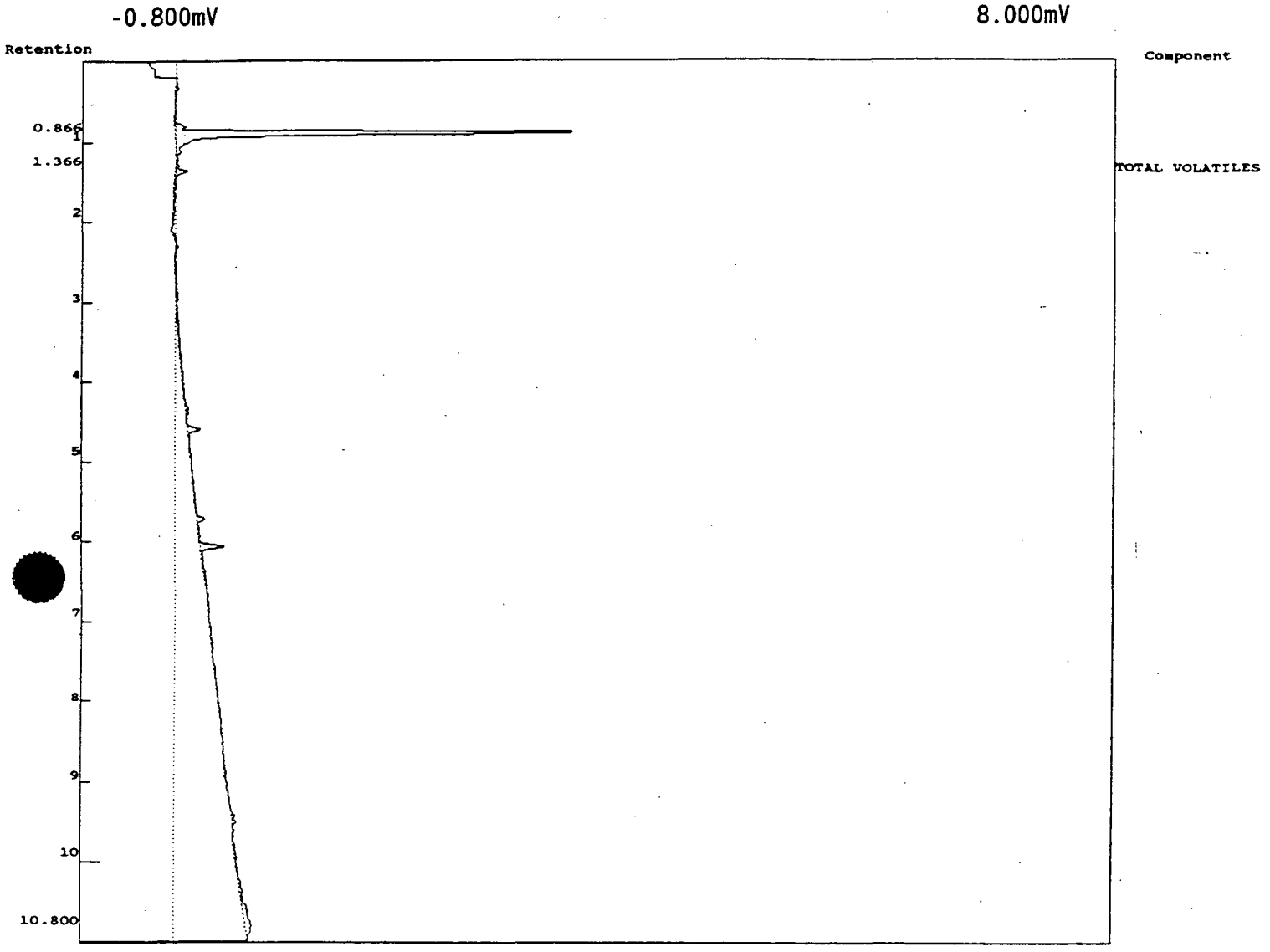
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	6.13 M	0.83	ug/L
t12DCE	3	1.850	1.07 M	1.82	ug/L
11DCA	4	2.133	0.56 M	0.52	ug/L
c12DCE	5	2.600	8.73 M	19.94	ug/L
CHLOROFORM	6	2.833	1.82 M	0.03	ug/L
111TCA	7	3.066	6.23 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.283	1.27 M	0.00	ug/L
TCE	9	4.116	2275.17 M	28.00	ug/L
PCE	11	6.383	15.64 M	0.06	ug/L
	9		2316.63	51.23	

Lab name : COLUMBIA TECH
Analysis date : 06/01/2000 20:10:00
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN01E26.CHR (A:\JUNE01)
Sample : SG-130
Operator : SGN



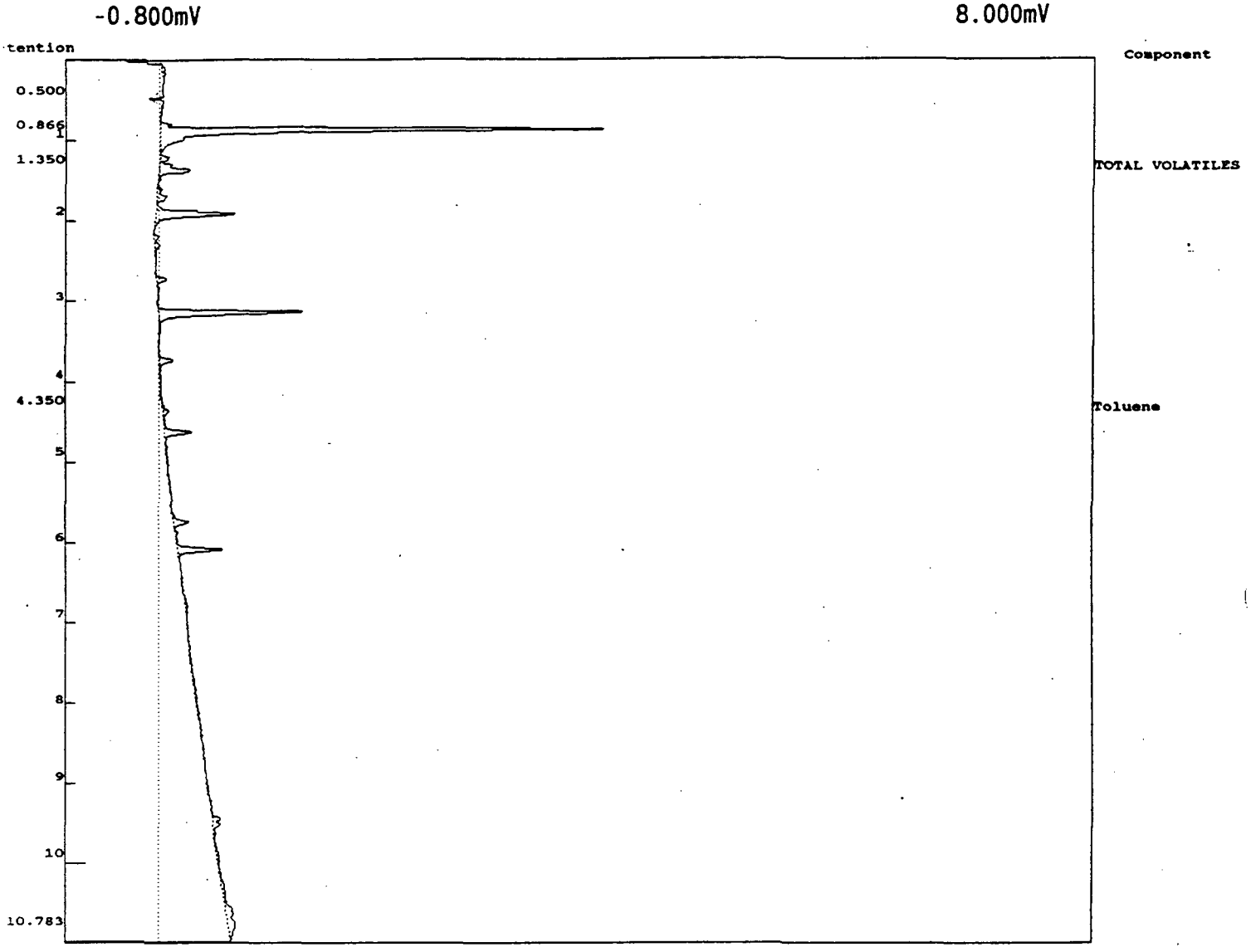
Component	Number	Retention	Area	External	Units
1DCE	1	1.416	5.85 M	0.79	ug/L
DS	0	1.583	2.11 M	N/A	
12DCE	3	1.883	0.78 M	1.32	ug/L
12DCE	5	2.683	8.22 M	18.78	ug/L
HLOROFORM	6	2.933	12.15 M	0.18	ug/L
11TCA	7	3.166	1.74 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.366	0.62 M	0.00	ug/L
CE	9	4.233	971.27 M	11.96	ug/L
CE	11	6.533	3.40 M	0.01	ug/L
	9		1006.14	32.04	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F6.CHR (A:\)
Sample : EB-19
Operator : SGN



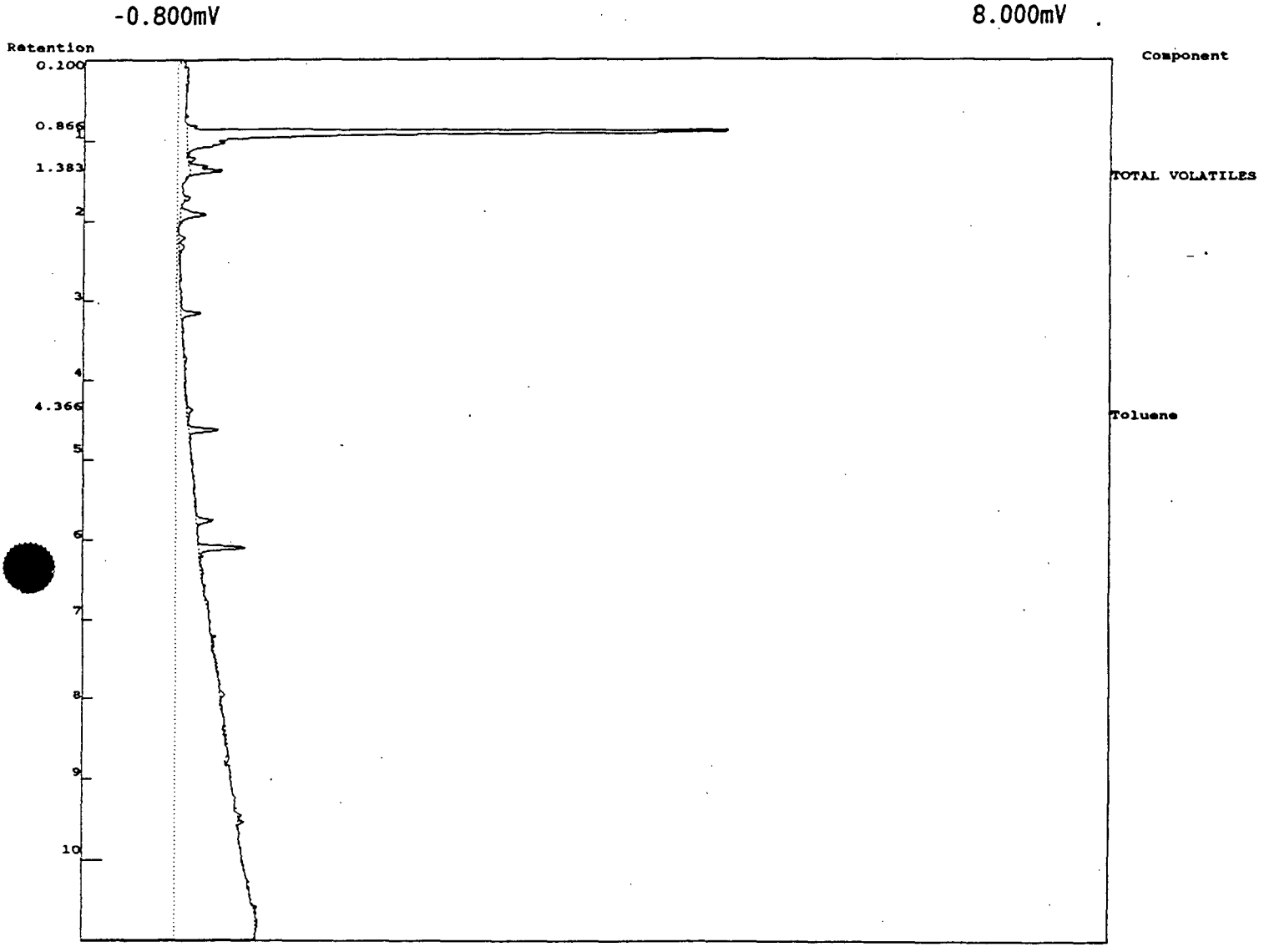
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	2.15	2.15	ug/L
	1		2.15	2.15	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F7.CHR (A:\JUNE01)
Sample : SG-163
Operator : SGN



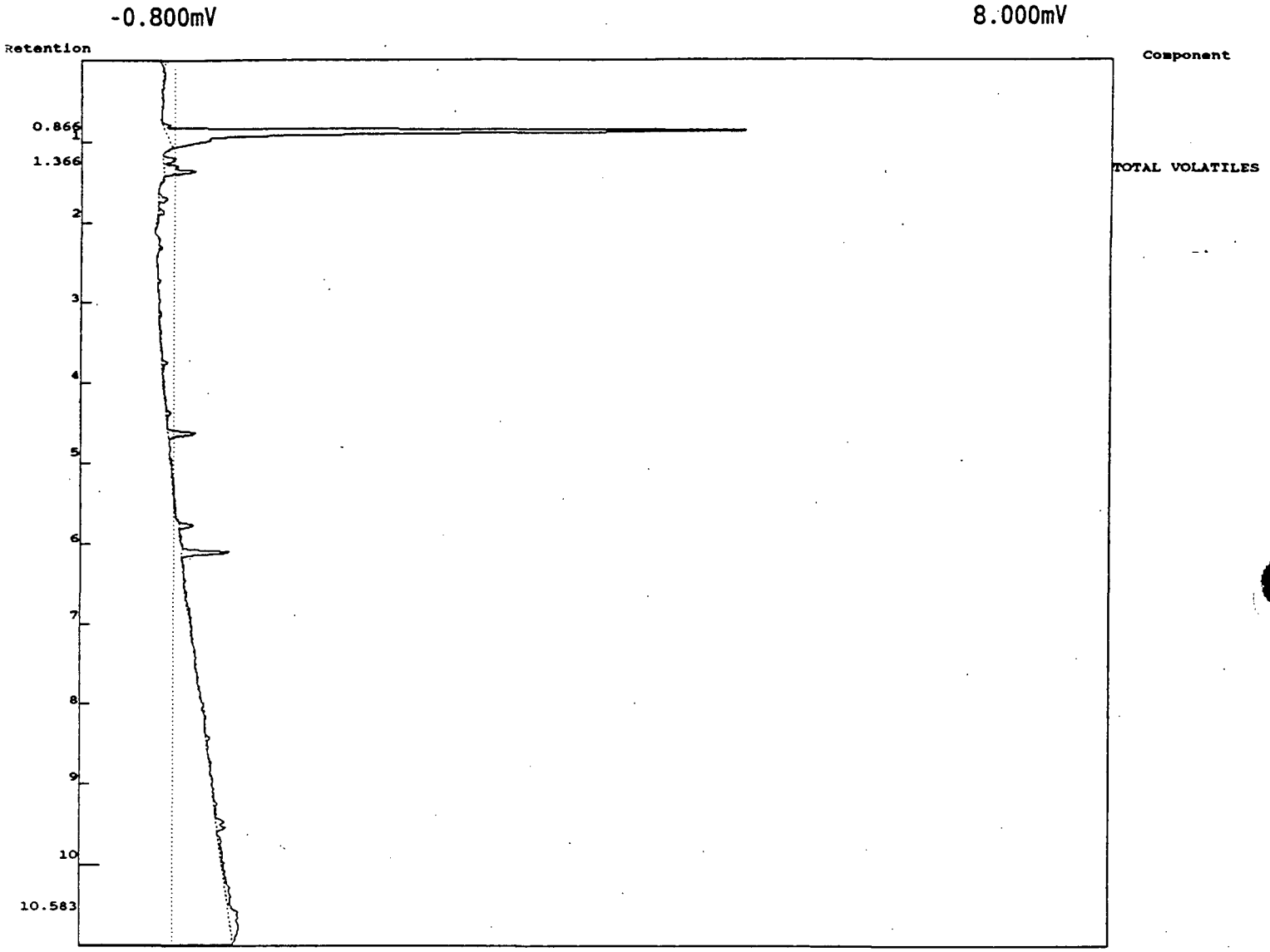
Component	Number	Retention	Area	External	Units
)TAL VOLATILES	1	1.350	14.59 M	14.59	ug/L
)luene	3	4.350	0.24 M	0.24	ug/L
	2		14.83	14.83	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F8.CHR (A:\JUNE01)
Sample : SG-164
Operator : SGN



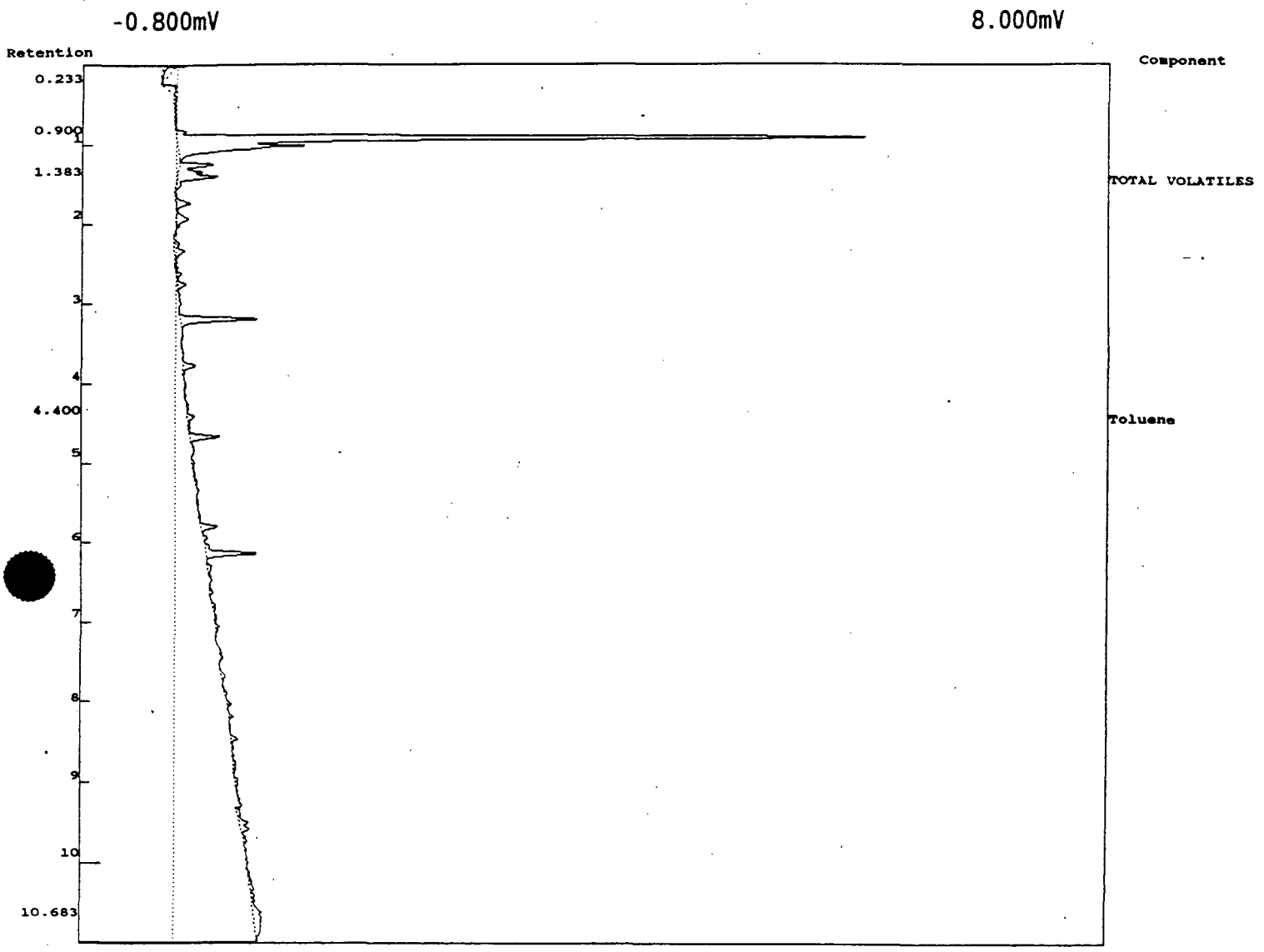
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	7.05 M	7.05	ug/L
Toluene	3	4.366	0.33 M	0.33	ug/L
	2		7.38	7.38	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F9.CHR (A:\JUNE01)
Sample : SG-165
Operator : SGN



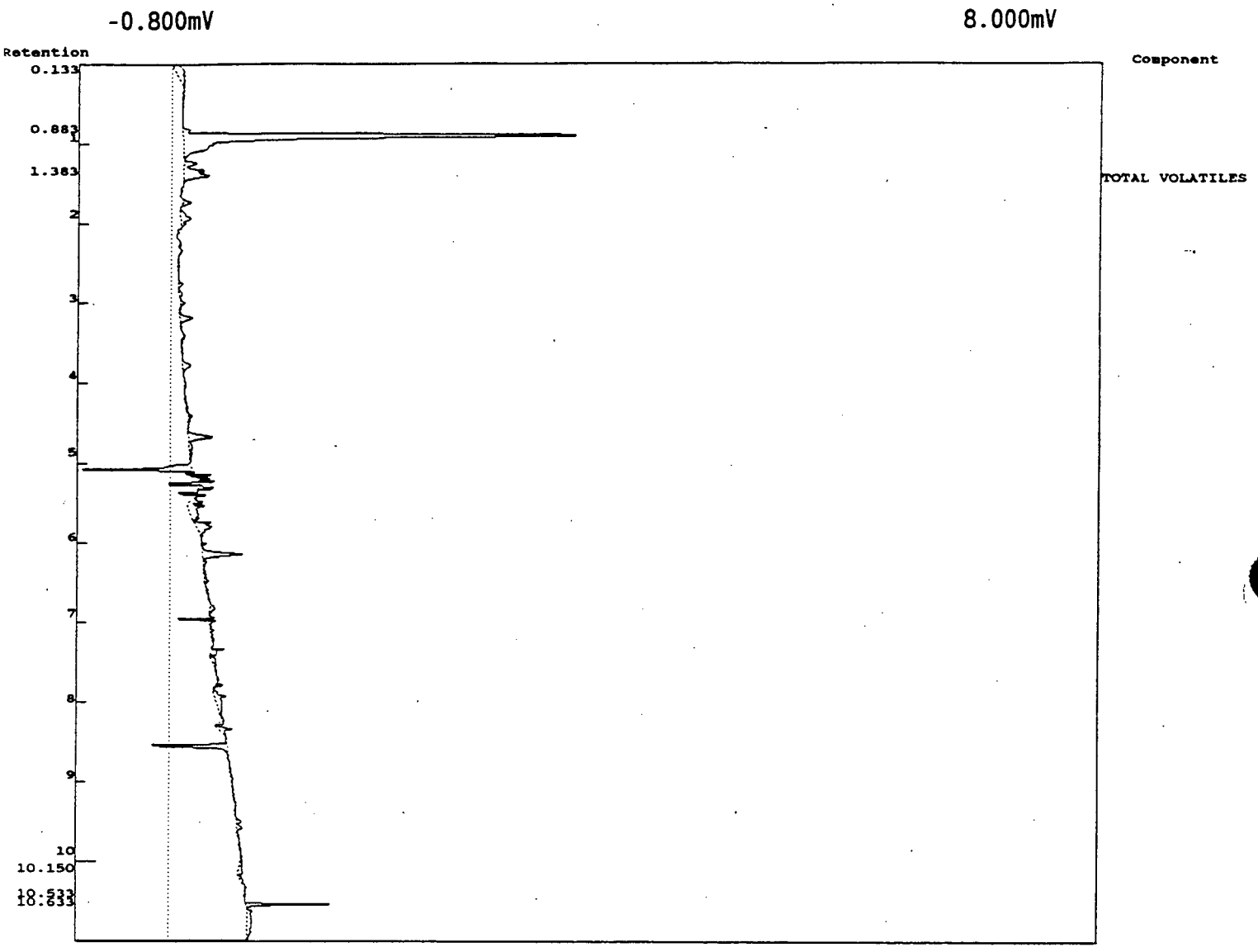
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	5.27 M	5.27	ug/L
	1		5.27	5.27	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F10.CHR (A:\)
Sample : SG-166
Operator : SGN



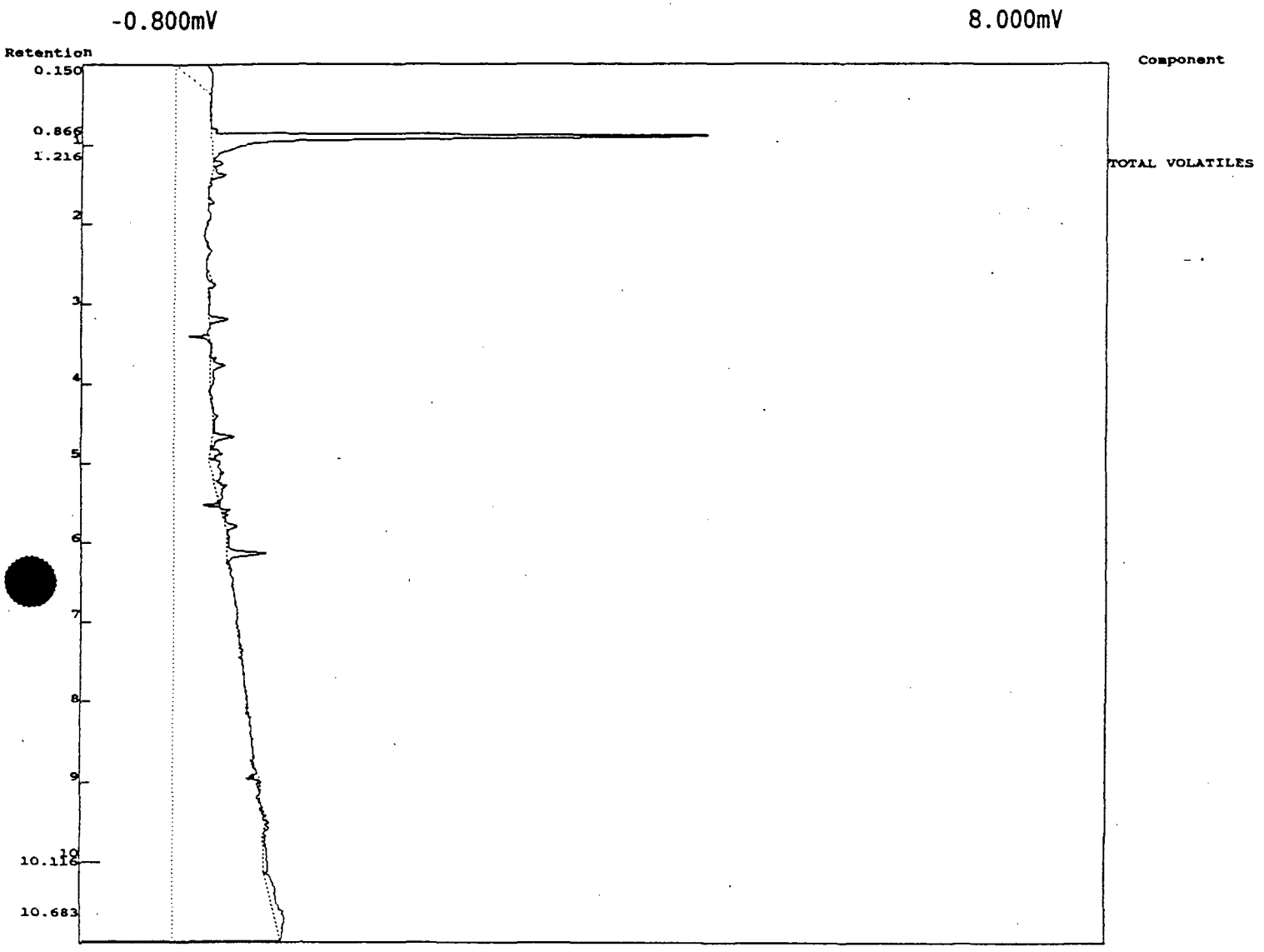
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	11.82 M	11.82	ug/L
Toluene	3	4.400	0.31 M	0.31	ug/L
	2		12.13	12.13	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F11.CHR (A:\JUNE01)
Sample : SG-167
Operator : SGN



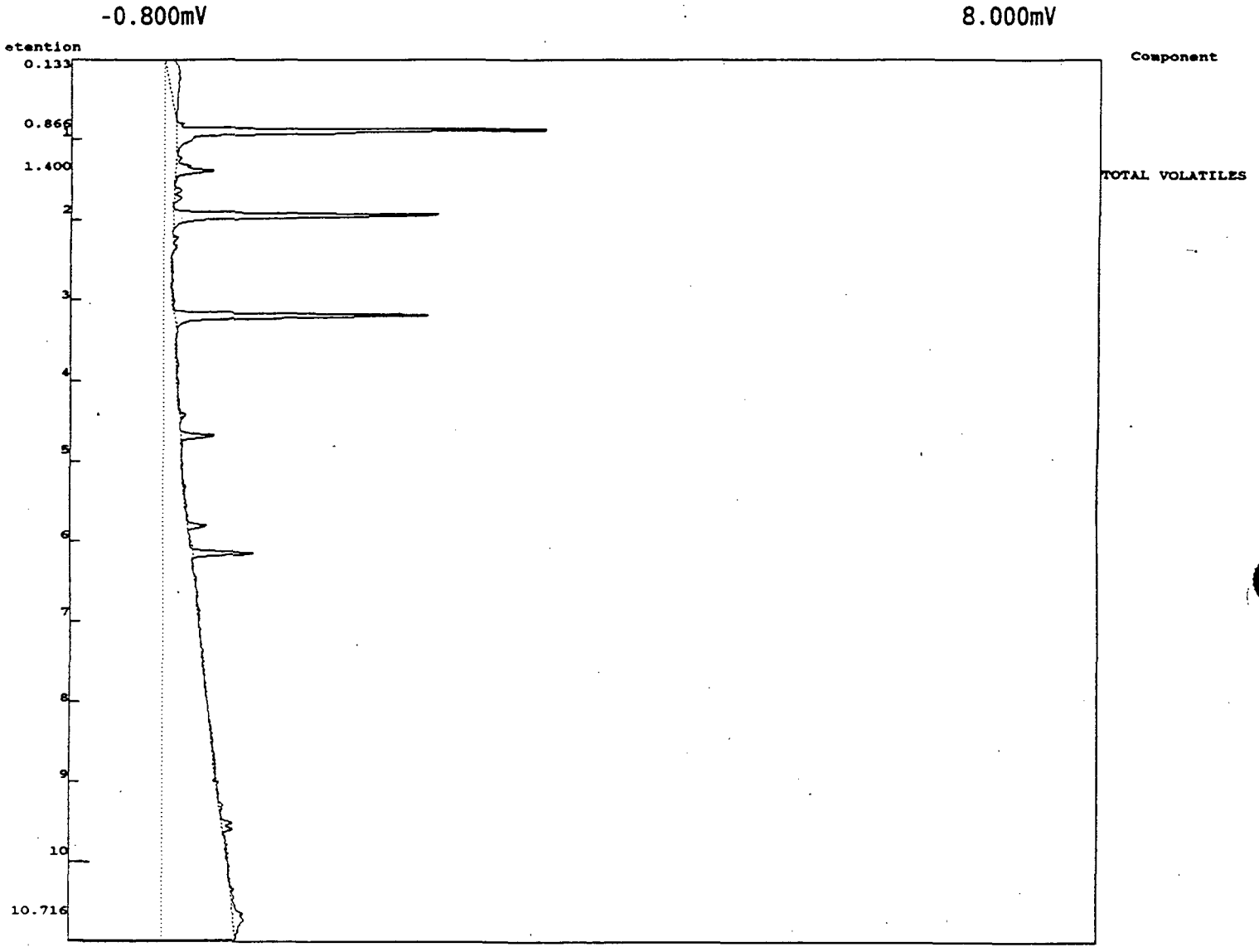
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	8.36 M	8.36	ug/L
	1		8.36	8.36	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F12.CHR (A:\JUNE01)
Sample : SG-168
Operator : SGN



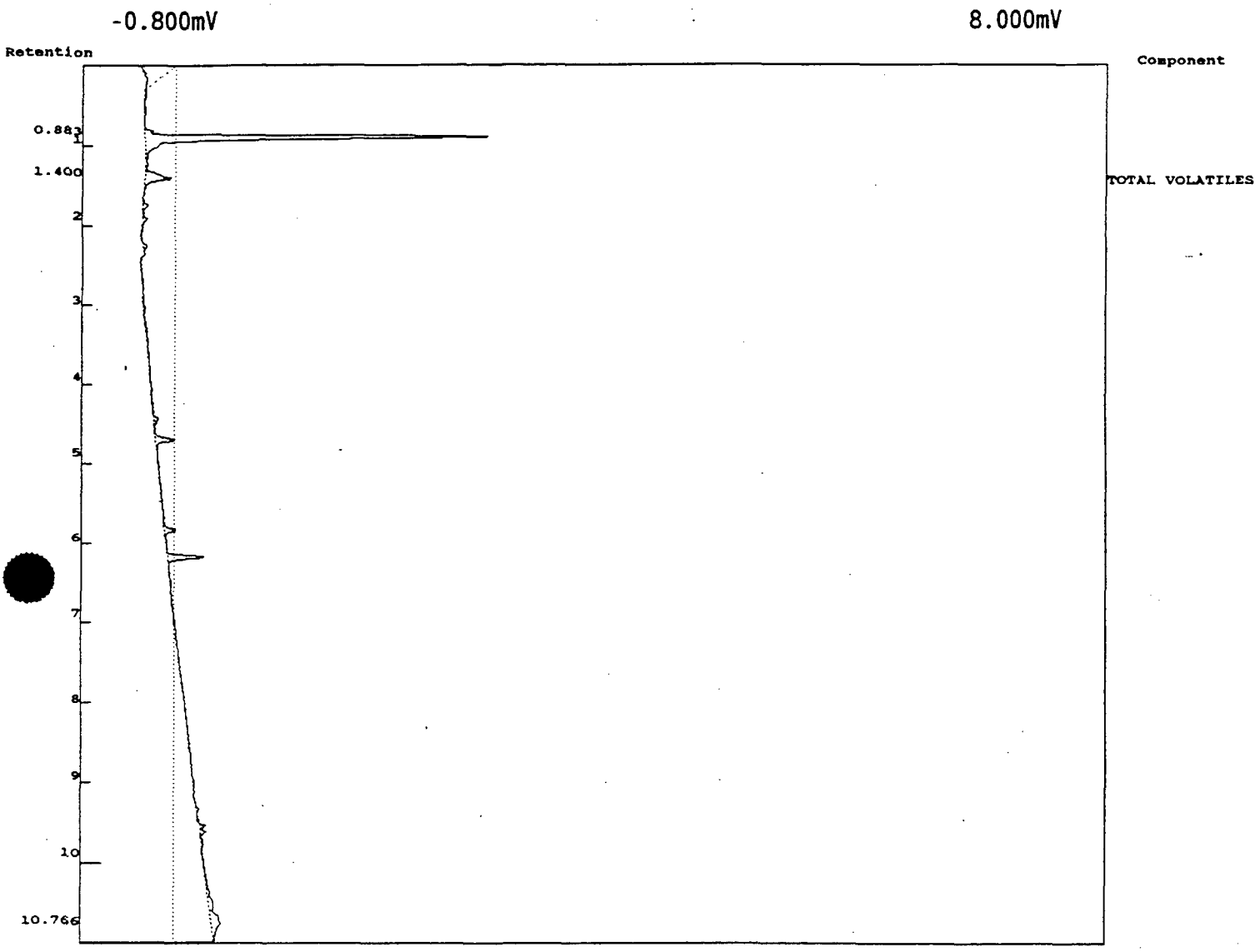
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	7.49	7.49	ug/L
	1		7.49	7.49	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F13.CHR (A:\JUNE01)
Sample : SG-148
Operator : SGN



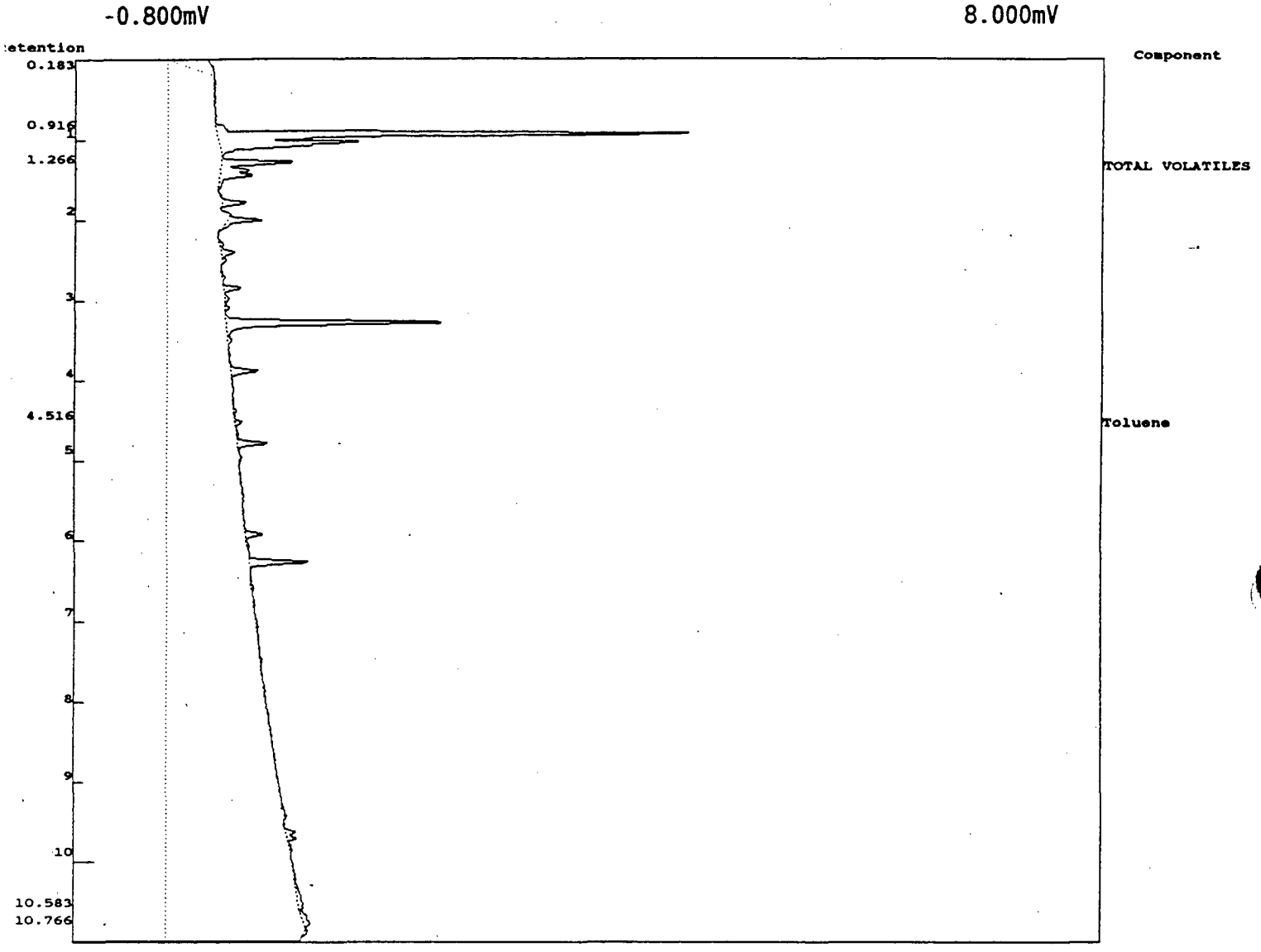
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.400	22.08	22.08	ug/L
	1		22.08	22.08	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F14.CHR (A:\JUNE01)
Sample : EB-20
Operator : SGN



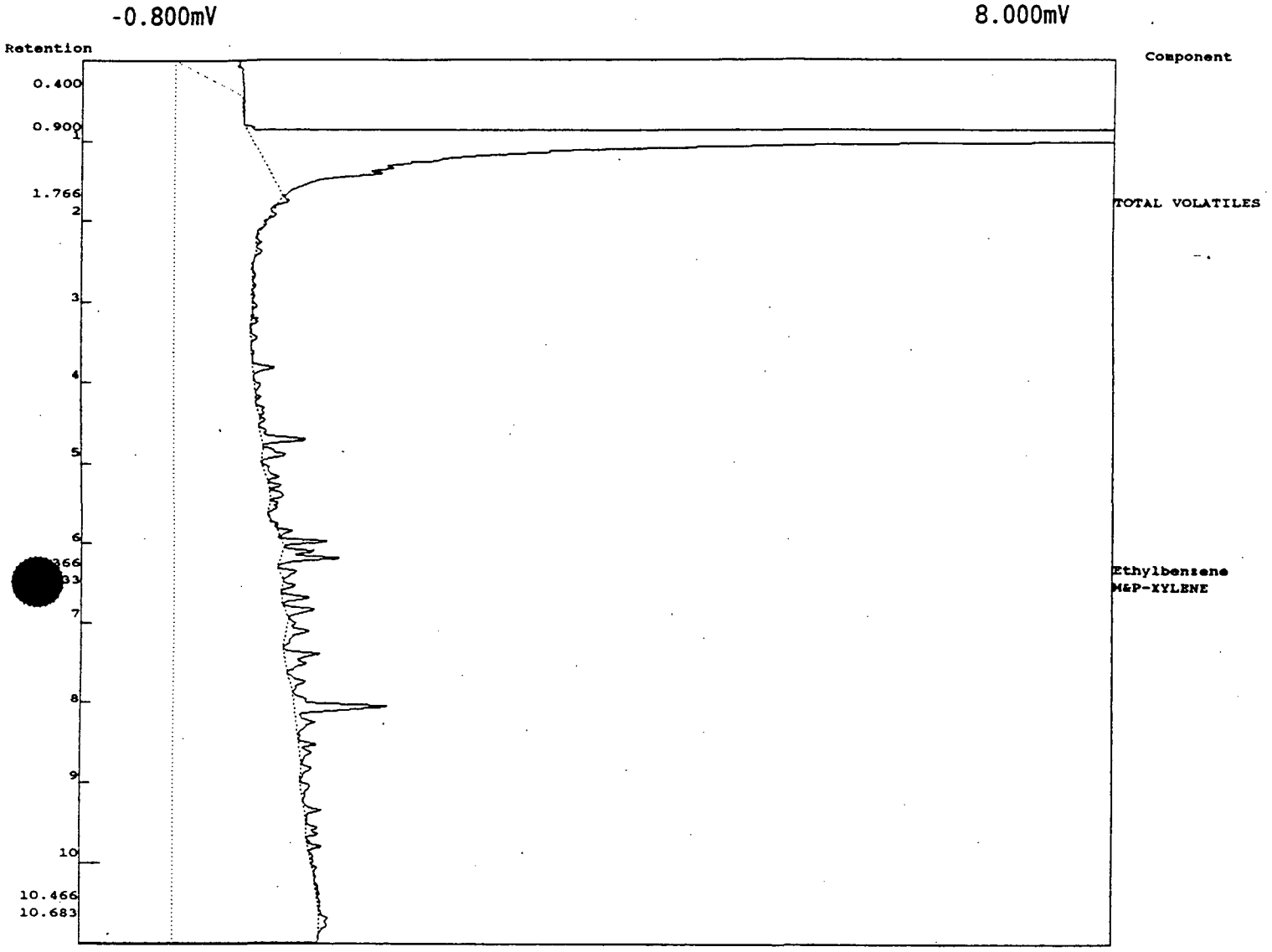
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.400	3.38	3.38	ug/L
	1		3.38	3.38	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F18.CHR (A:\JUNE01)
Sample : SG-149
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.266	19.14 M	19.14	ug/L
Toluene	3	4.516	0.21	0.21	ug/L
	2		19.35	19.35	

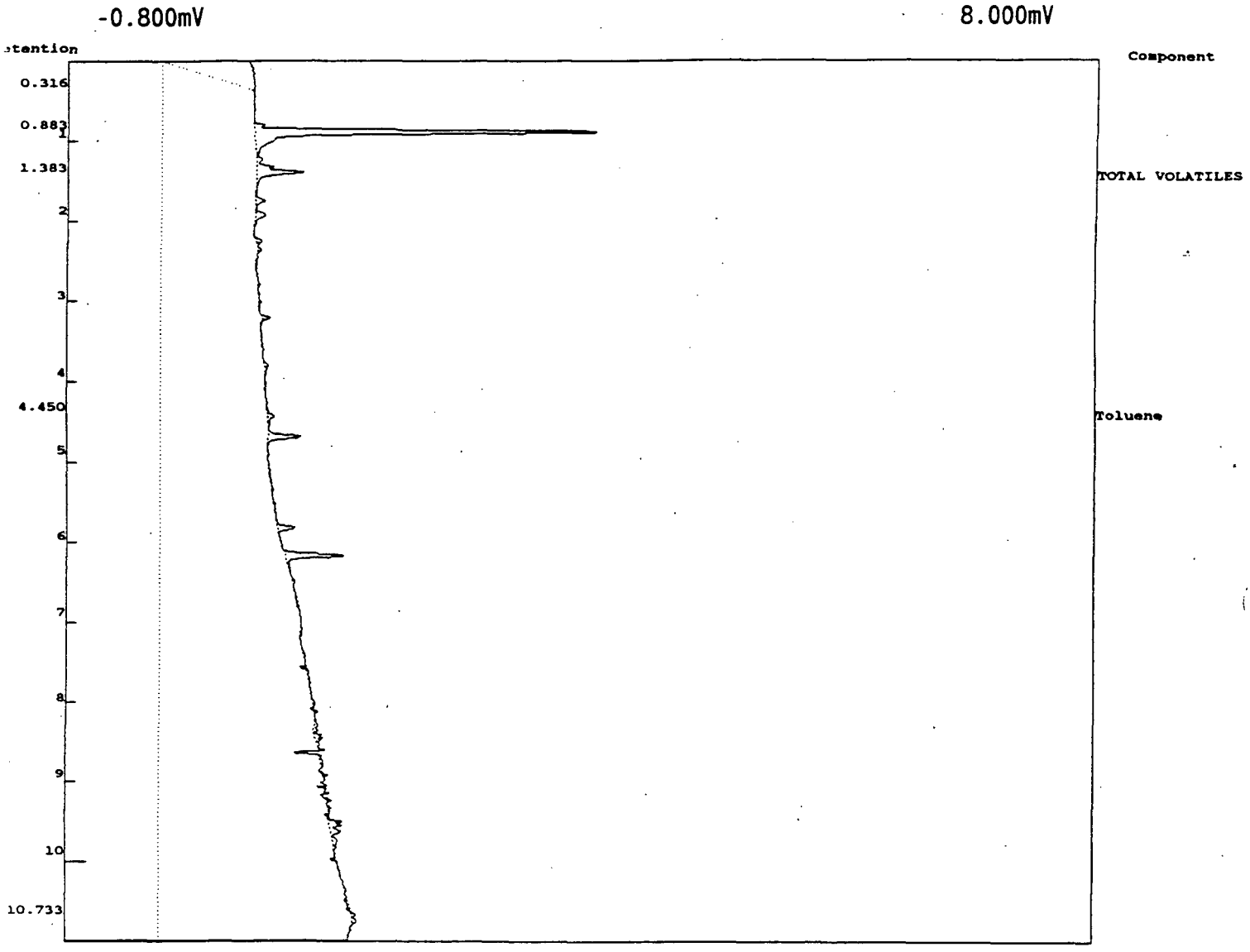
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F19.CHR (A:\JUNE01)
Sample : SG-156
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.766	28.08	28.08	ug/L
Ethylbenzene	4	6.366	0.66	0.77	ug/L
M&P-XYLENE	5	6.533	0.38	0.48	ug/L
	3		29.12	29.32	

300799

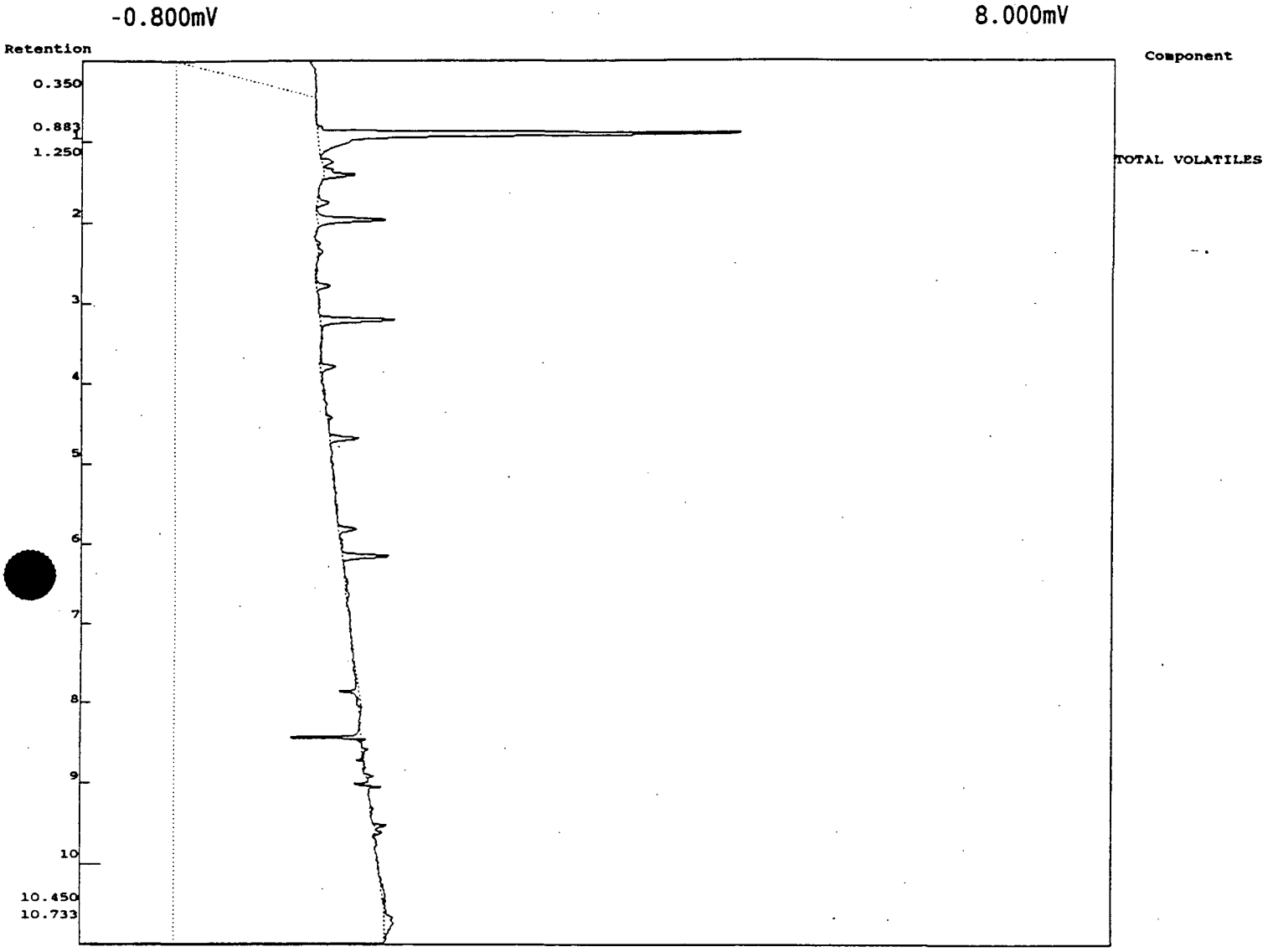
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F20.CHR (A:\JUNE01)
Sample : SG-157
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.383	8.16	8.16	ug/L
luene	3	4.450	0.27 M	0.27	ug/L
	2		8.44	8.44	

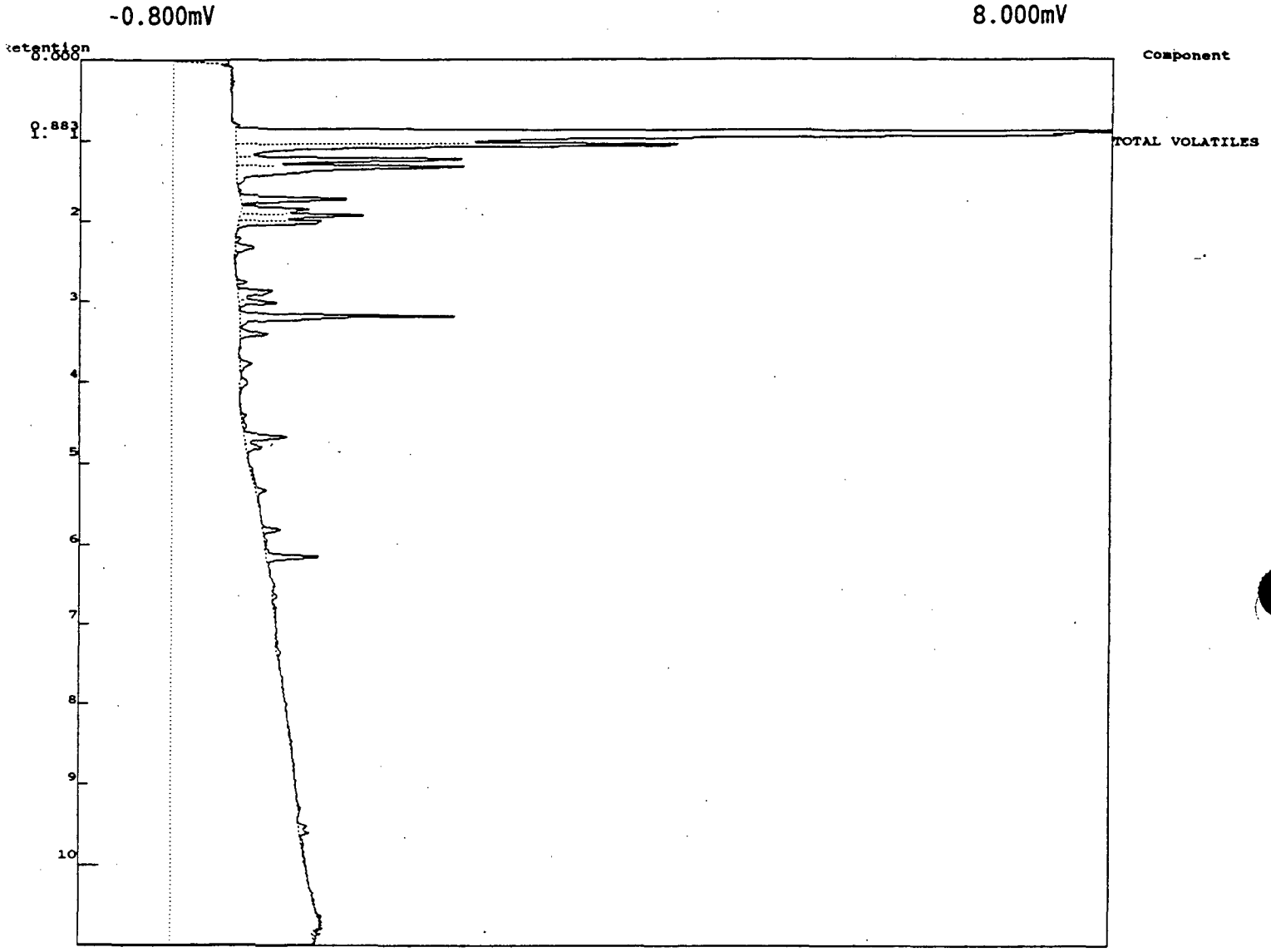
300800

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F21.CHR (A:\JUNE01)
Sample : SG-158
Operator : SGN



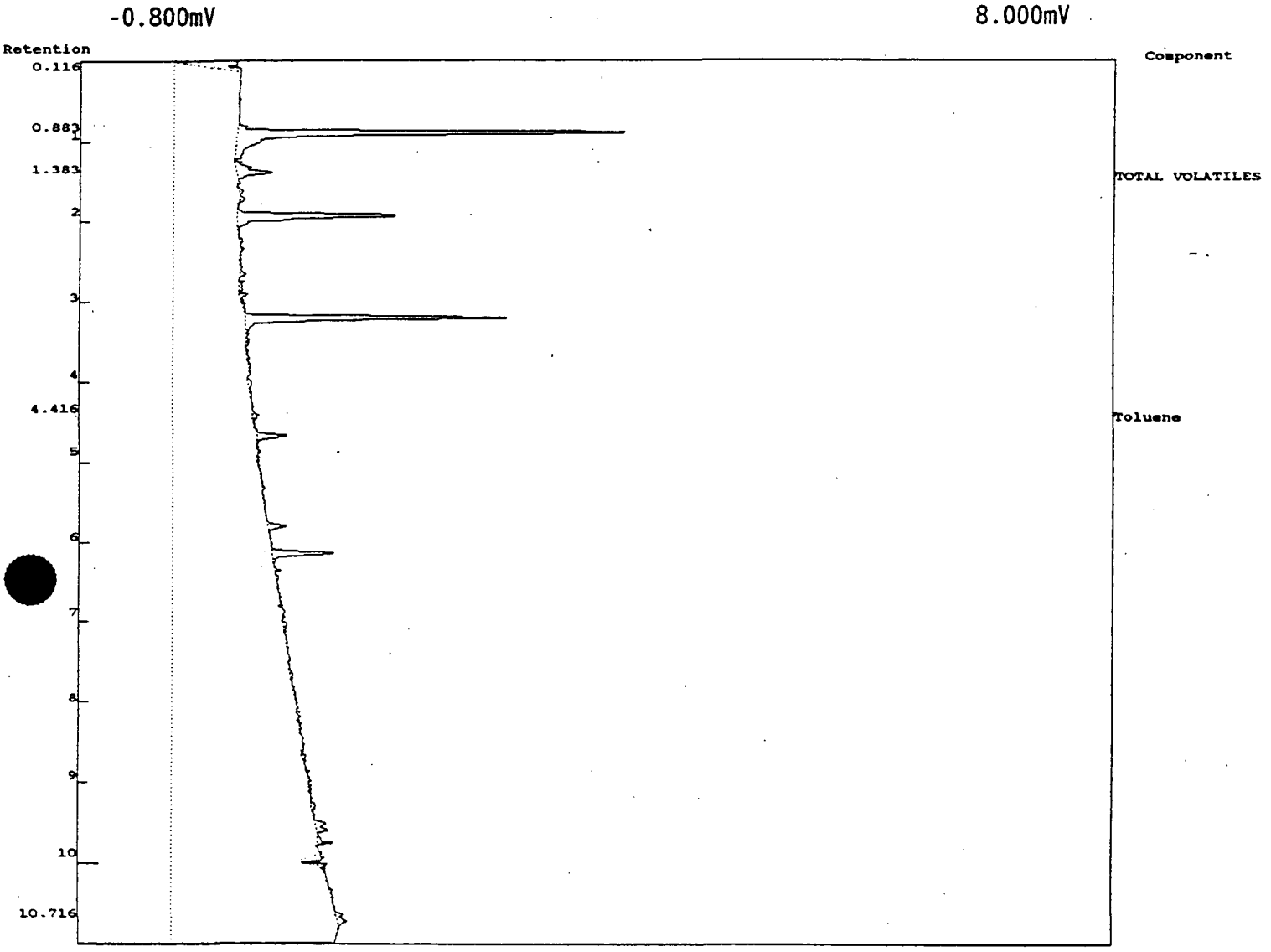
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.250	10.18 M	10.18	ug/L
	1		10.18	10.18	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F22.CHR (A:\JUNE01)
Sample : SG-159
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.050	58.66 M	58.66	ug/L
	1		58.66	58.66	

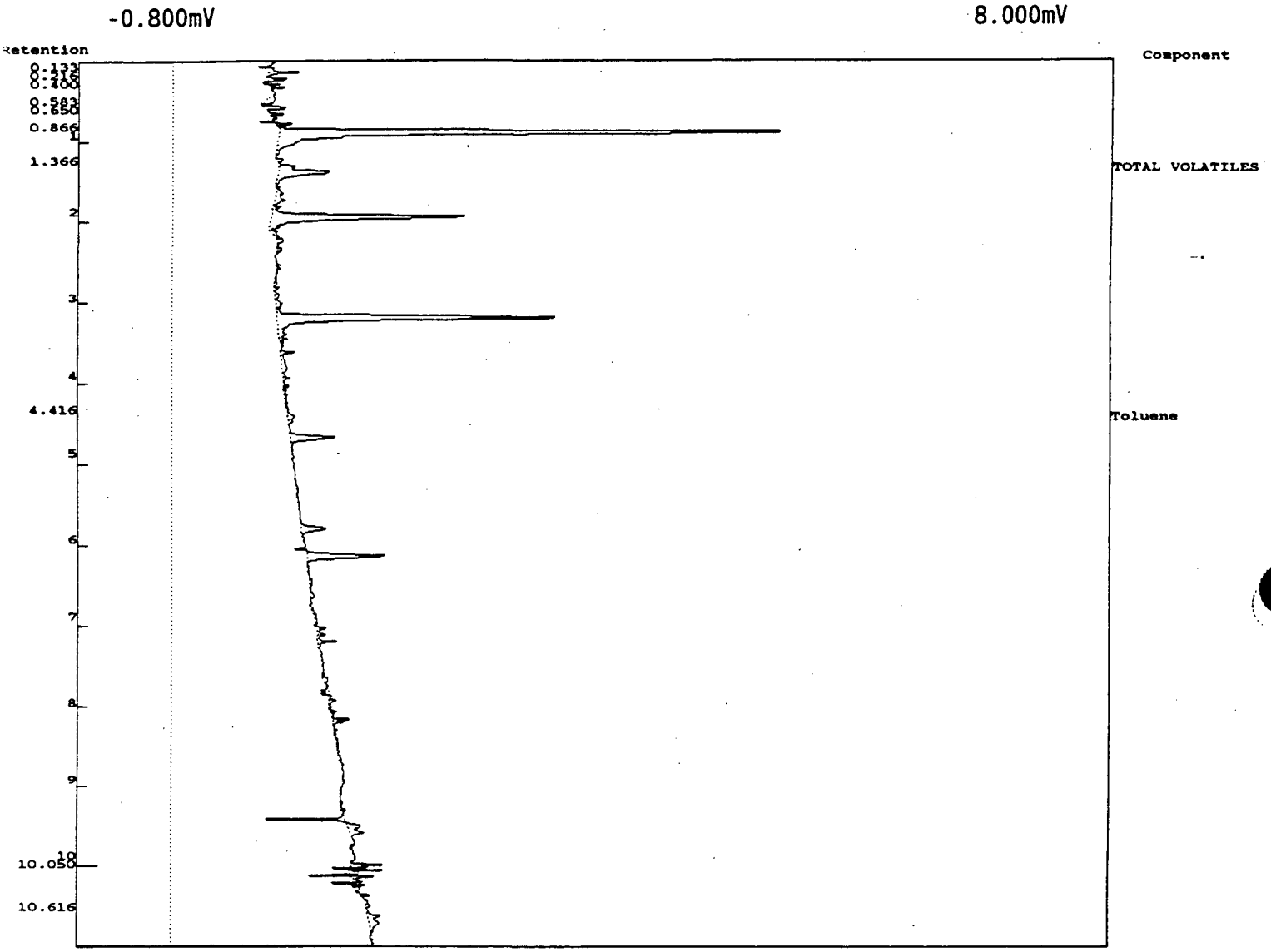
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F23.CHR (A:\JUNE01)
Sample : SG-108
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	20.24 M	20.24	ug/L
Toluene	3	4.416	0.21 M	0.21	ug/L
	2		20.44	20.44	

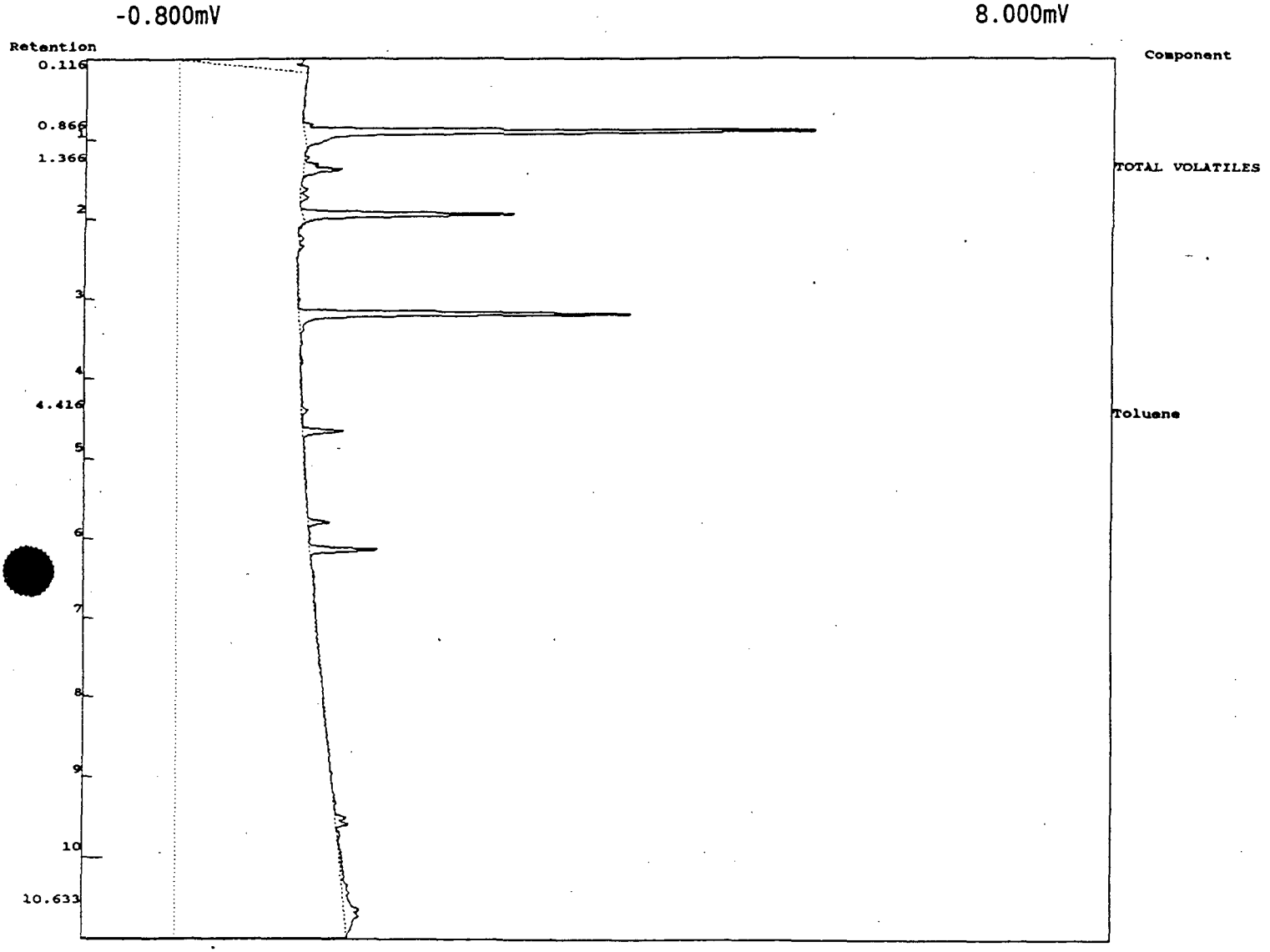
300803

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F24.CHR (A:\JUNE01)
Sample : SG-109
Operator : SGN



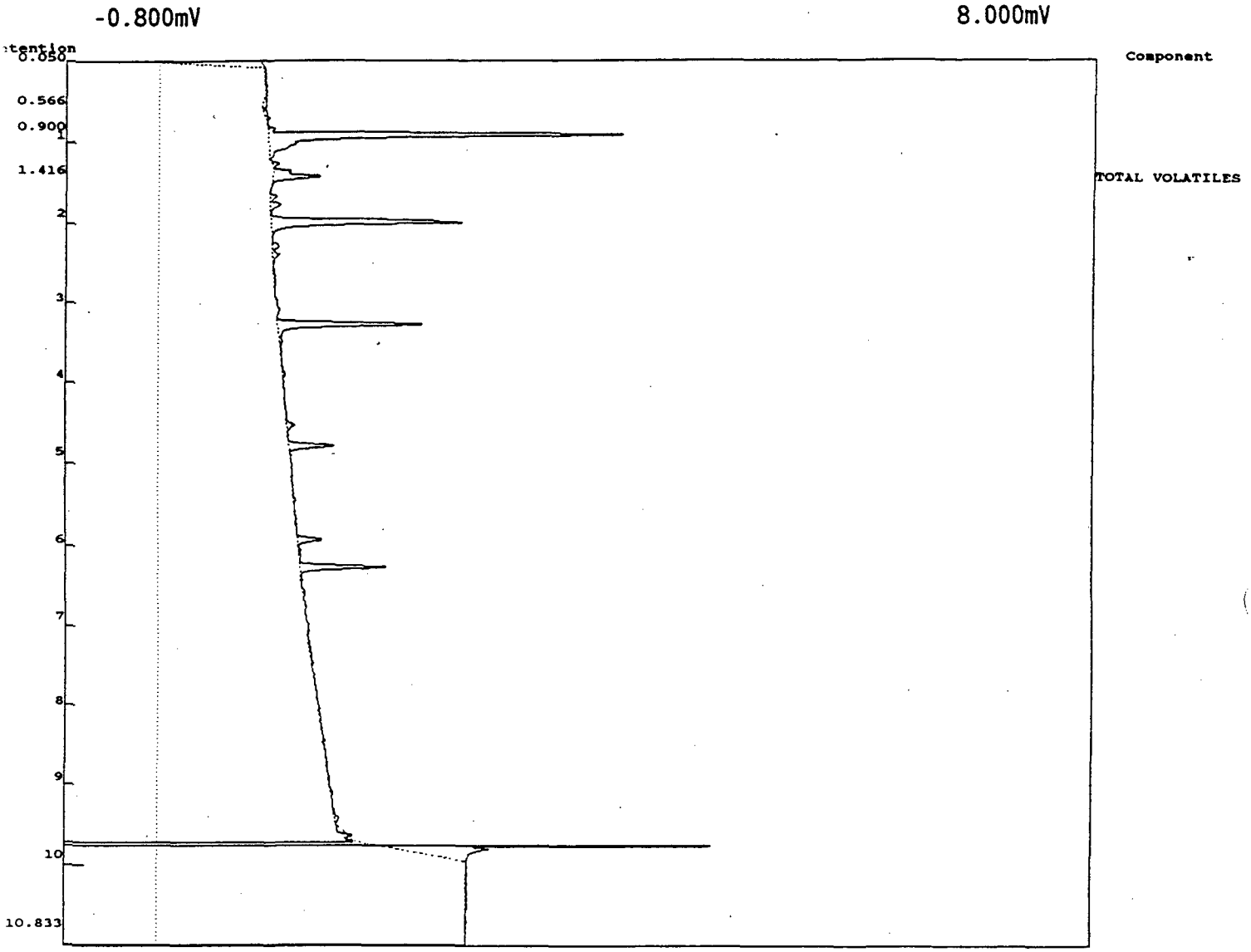
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	25.49 M	25.49	ug/L
Toluene	3	4.416	0.28 M	0.28	ug/L
	2		25.77	25.77	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F25.CHR (A:\JUNE01)
Sample : SG-909
Operator : SGN



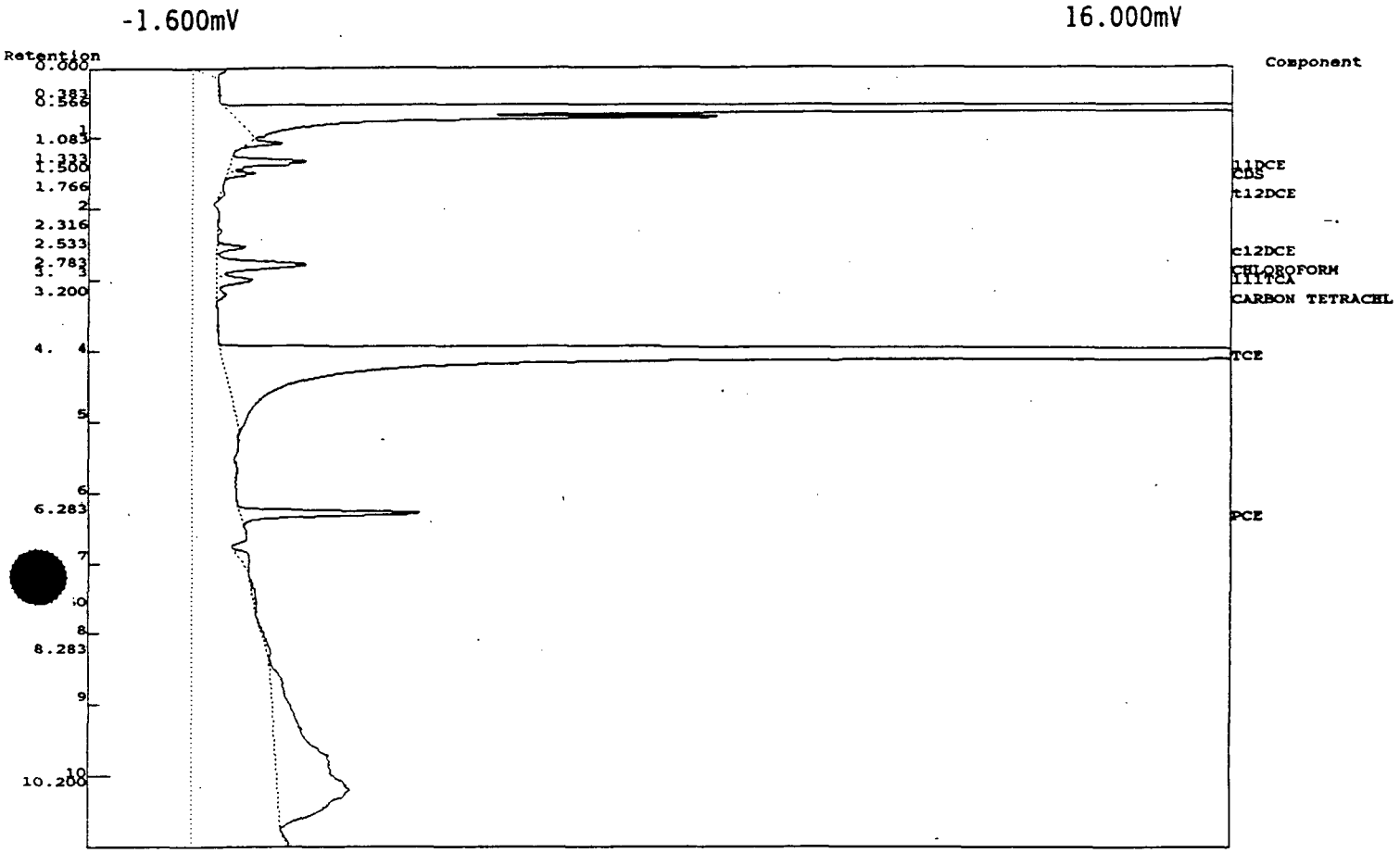
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	23.59 M	23.59	ug/L
Toluene	3	4.416	0.27 M	0.27	ug/L
	2		23.86	23.86	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN01F26.CHR (A:\JUNE01)
Sample : SG-130
Operator : SGN



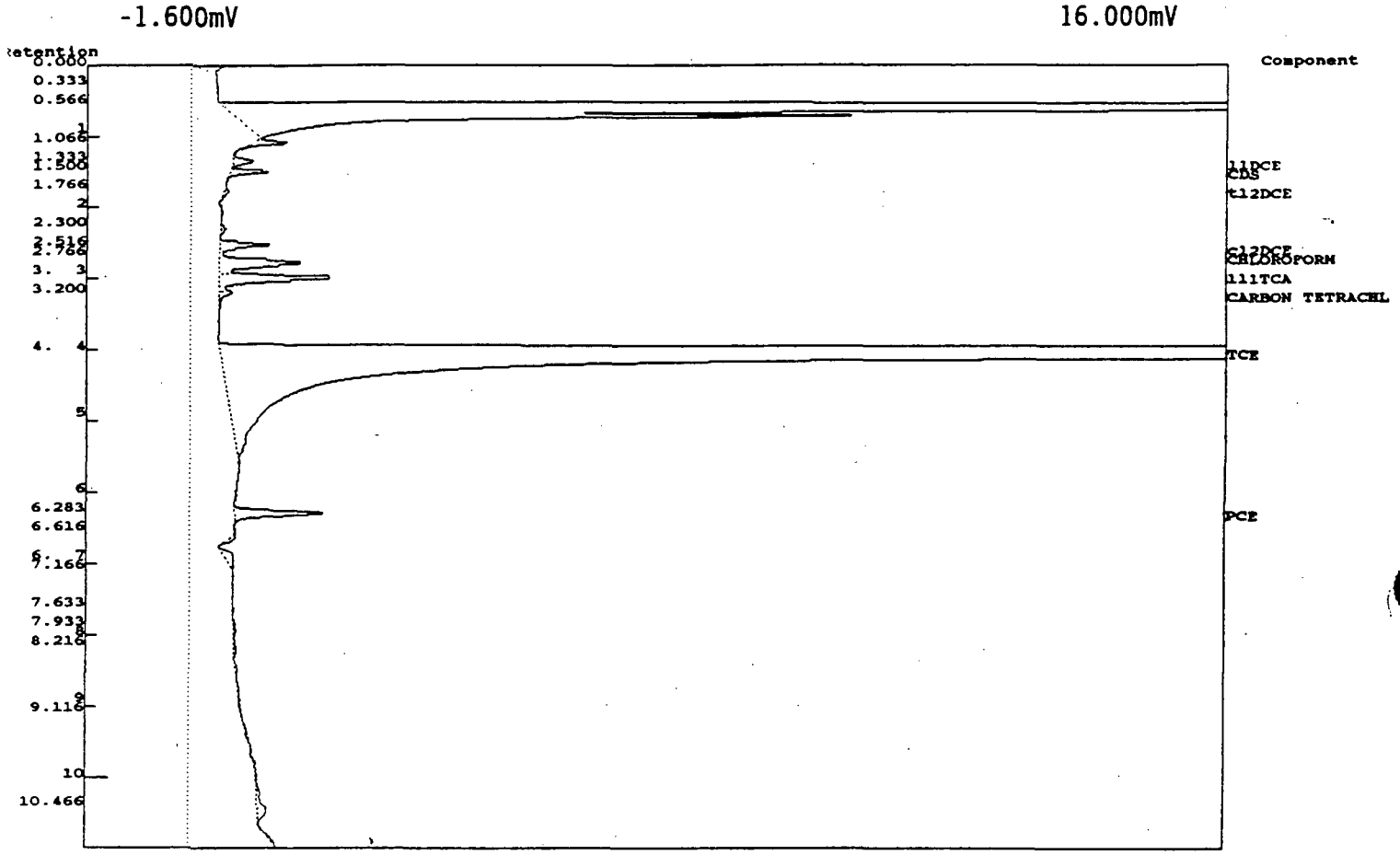
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.416	18.95 M	18.95	ug/L
1			18.95	18.95	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 08:46:01
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E6.CHR (A:\JUNE01)
Sample : SG-131
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	6.71 M	0.91	ug/L
CDS	0	1.500	1.74 M	N/A	
t12DCE	3	1.766	0.49 M	0.83	ug/L
c12DCE	5	2.533	2.19 M	5.01	ug/L
CHLOROFORM	6	2.783	9.76 M	0.15	ug/L
111TCA	7	3.000	3.53 M	0.02	ug/L
CARBON TETRACHLORIDE	8	3.200	1.01 M	0.00	ug/L
TCE	9	4.033	770.39 M	9.48	ug/L
PCE	11	6.283	14.70 M	0.05	ug/L
	9		810.53	15.45	

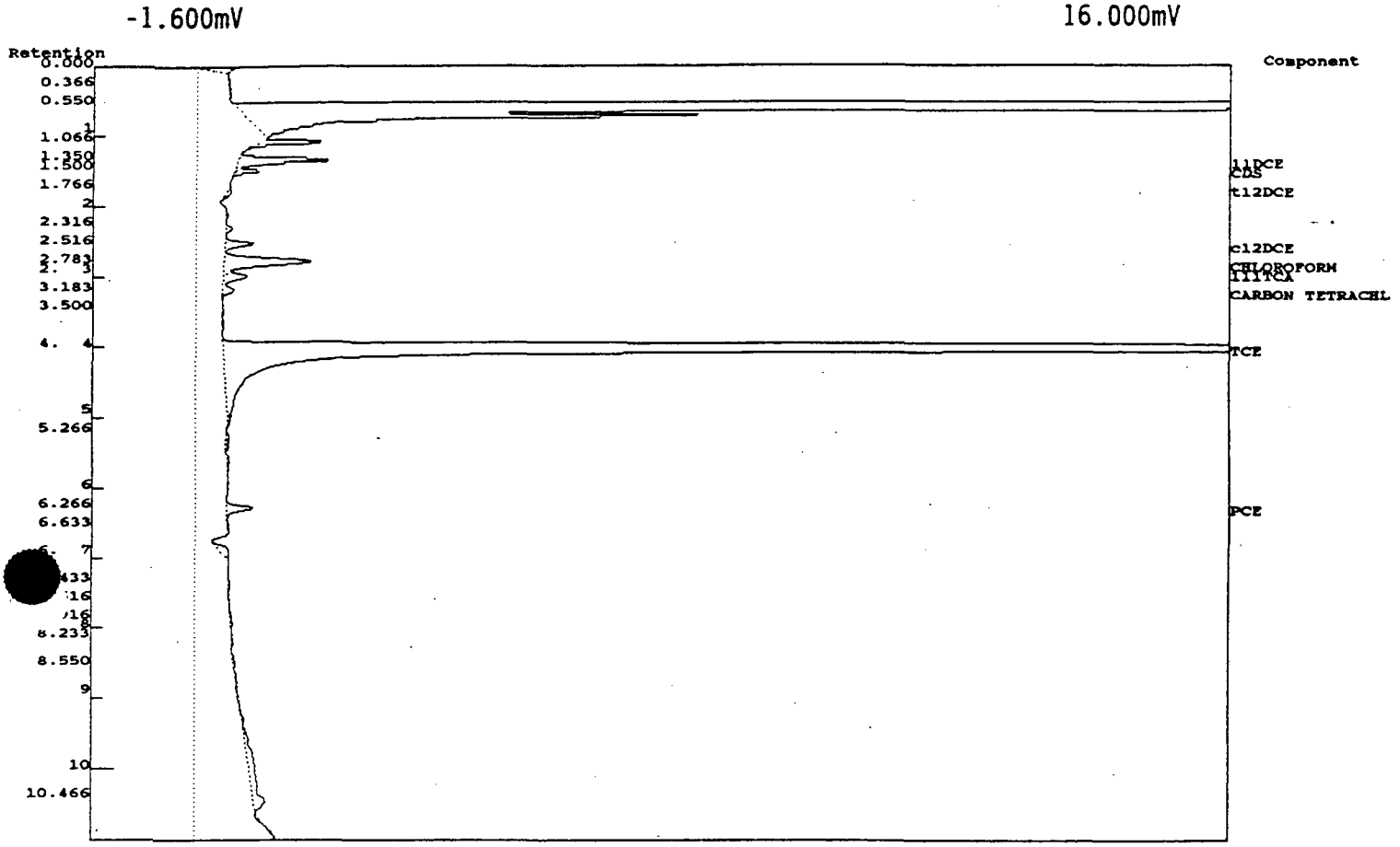
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 09:05:02
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E7.CHR (A:\JUNE01)
Sample : SG-132
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	1.51 M	0.20	ug/L
CDS	0	1.500	2.30 M	N/A	
t12DCE	3	1.766	0.35 M	0.60	ug/L
c12DCE	5	2.516	3.58 M	8.18	ug/L
CHLOROFORM	6	2.766	8.78 M	0.13	ug/L
111TCA	7	3.000	10.99 M	0.07	ug/L
CARBON TETRACHLORIDE	8	3.200	1.15 M	0.00	ug/L
TCE	9	4.033	1081.53	13.31	ug/L
PCE	11	6.283	7.22 M	0.03	ug/L
	9		1117.44	21.52	

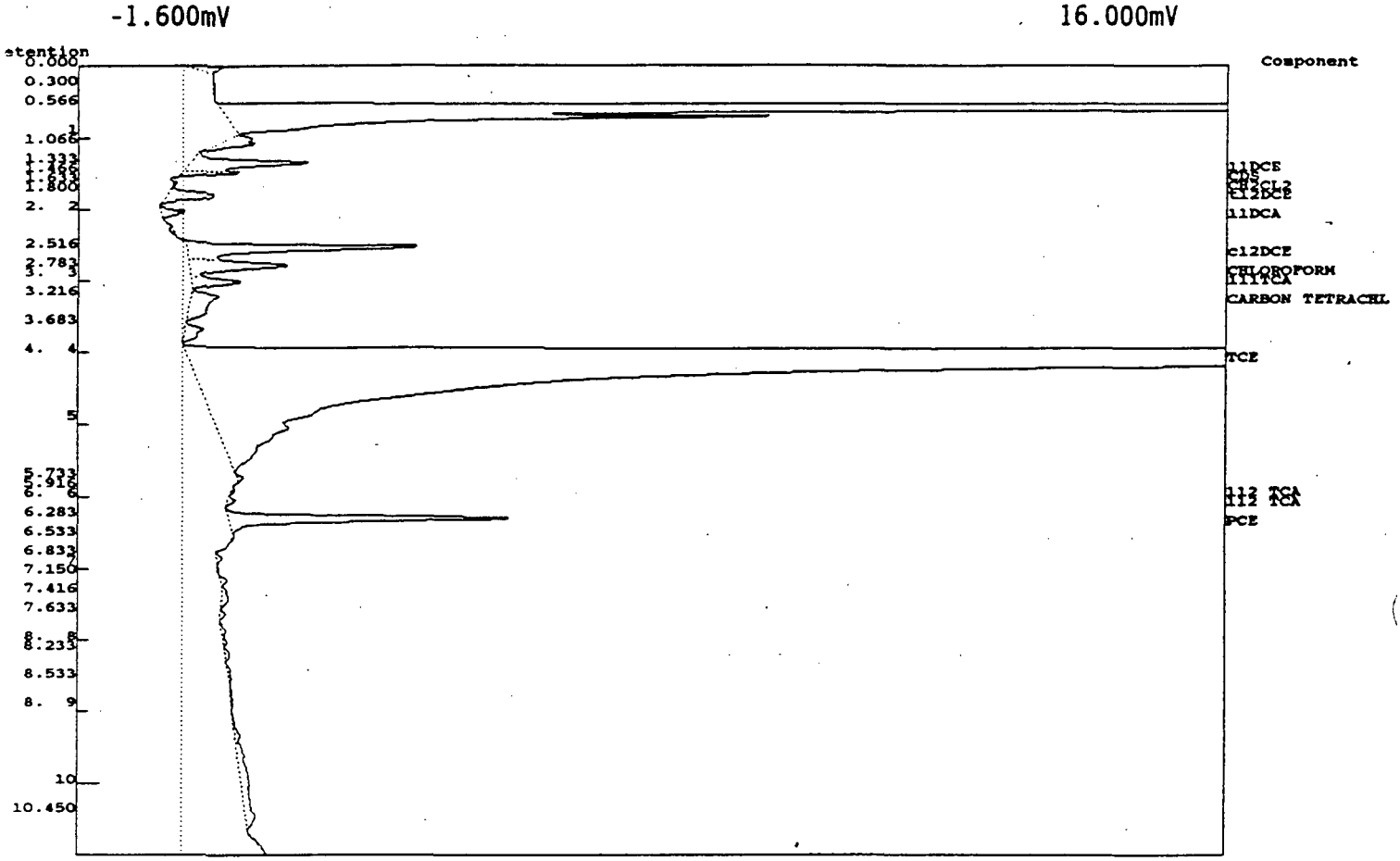
300808

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 09:24:03
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E8.CHR (A:\JUNE01)
Sample : SG-143
Operator : SGN



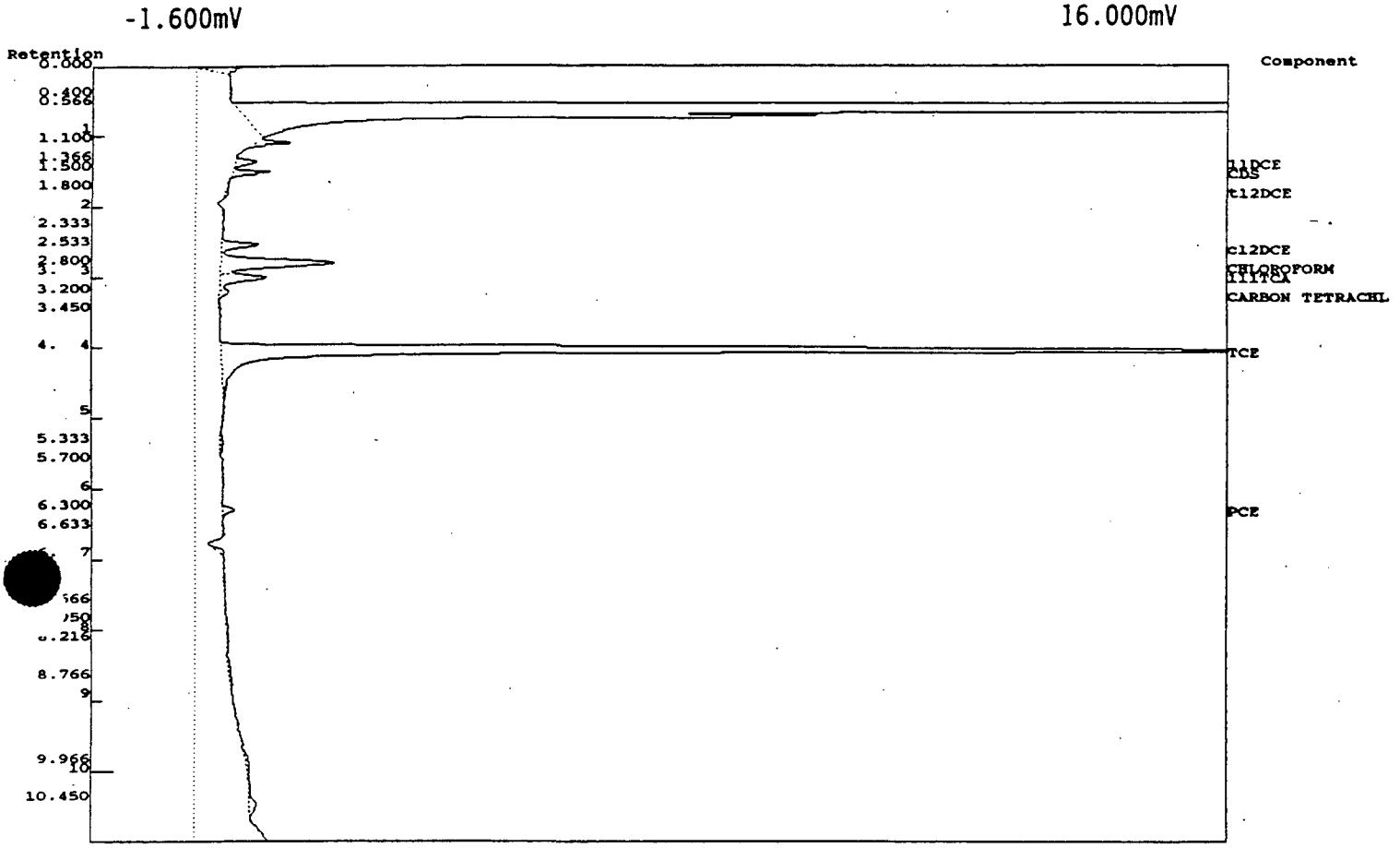
Component	Number	Retention	Area	External	Units
11DCE	1	1.350	7.48 M	1.01	ug/L
CDS	0	1.500	1.41 M	N/A	
t12DCE	3	1.766	0.54 M	0.92	ug/L
c12DCE	5	2.516	2.17 M	4.95	ug/L
CHLOROFORM	6	2.783	9.77 M	0.15	ug/L
111TCA	7	2.983	2.42 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.183	1.16 M	0.00	ug/L
TCE	9	4.016	276.87 M	3.41	ug/L
PCE	11	6.266	2.26 M	0.01	ug/L
	9		**304.07**	**9.45**	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 09:43:03
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E9.CHR (A:\JUNE01)
Sample : SG-144
Operator : SGN



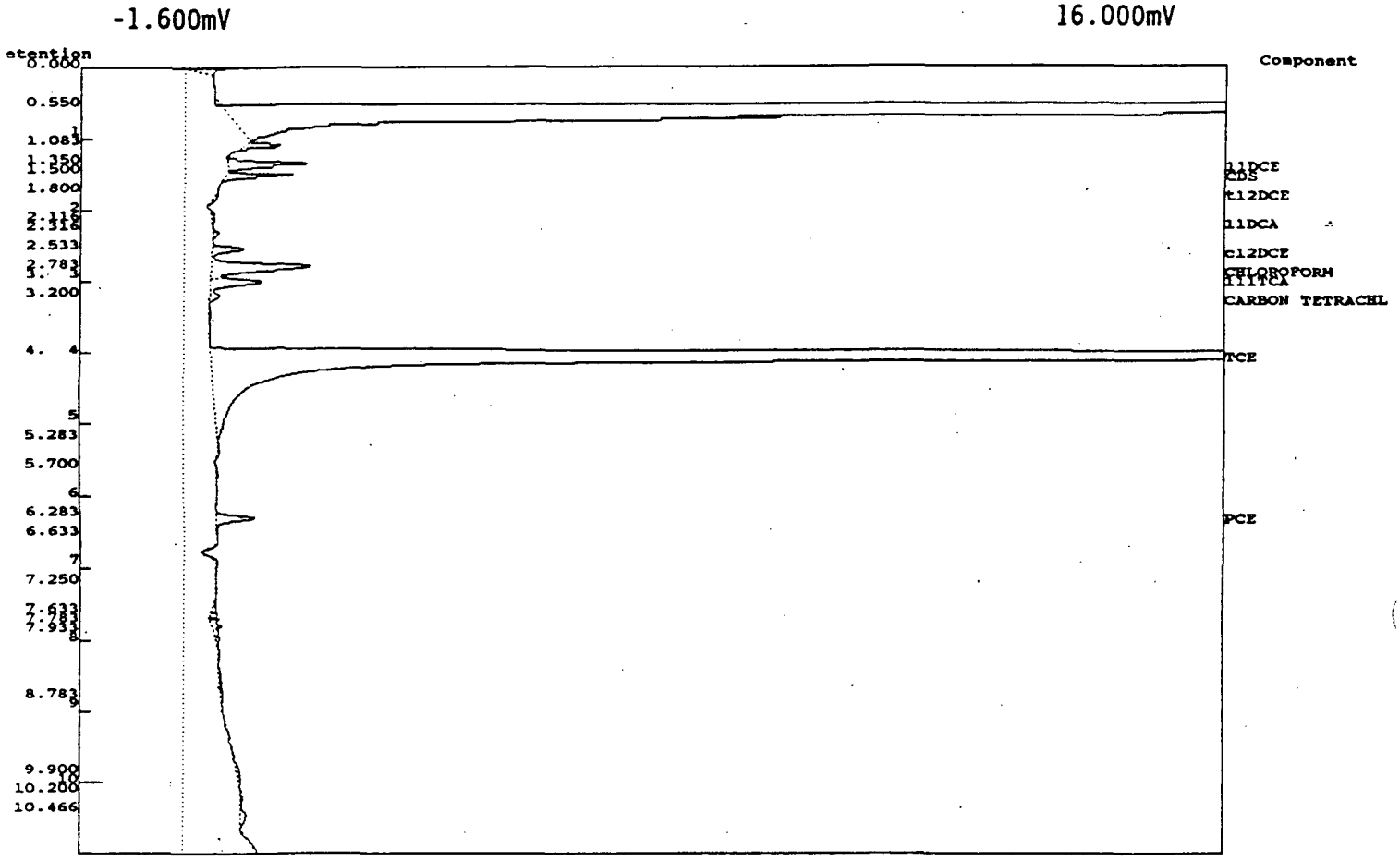
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	10.78 M	1.46	ug/L
DS	0	1.466	3.74 M	N/A	
H2CL2	2	1.633	0.17 M	0.11	ug/L
12DCE	3	1.800	5.22 M	8.87	ug/L
1DCA	4	2.016	1.73 M	1.59	ug/L
12DCE	5	2.516	20.10 M	45.89	ug/L
HLOROFORM	6	2.783	11.56 M	0.17	ug/L
11TCA	7	3.000	4.72 M	0.03	ug/L
ARBON TETRACHLORIDE	8	3.216	6.54	0.00	ug/L
CE	9	4.050	2834.43 M	34.89	ug/L
12 TCA	10	5.916	0.23 M	0.02	ug/L
12 TCA	10	6.033	0.53 M	0.05	ug/L
CE	11	6.283	23.53 M	0.09	ug/L
	13		2923.29	92.17	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 10:02:03
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E10.CHR (A:\JUNE01)
Sample : SG-146
Operator : SGN



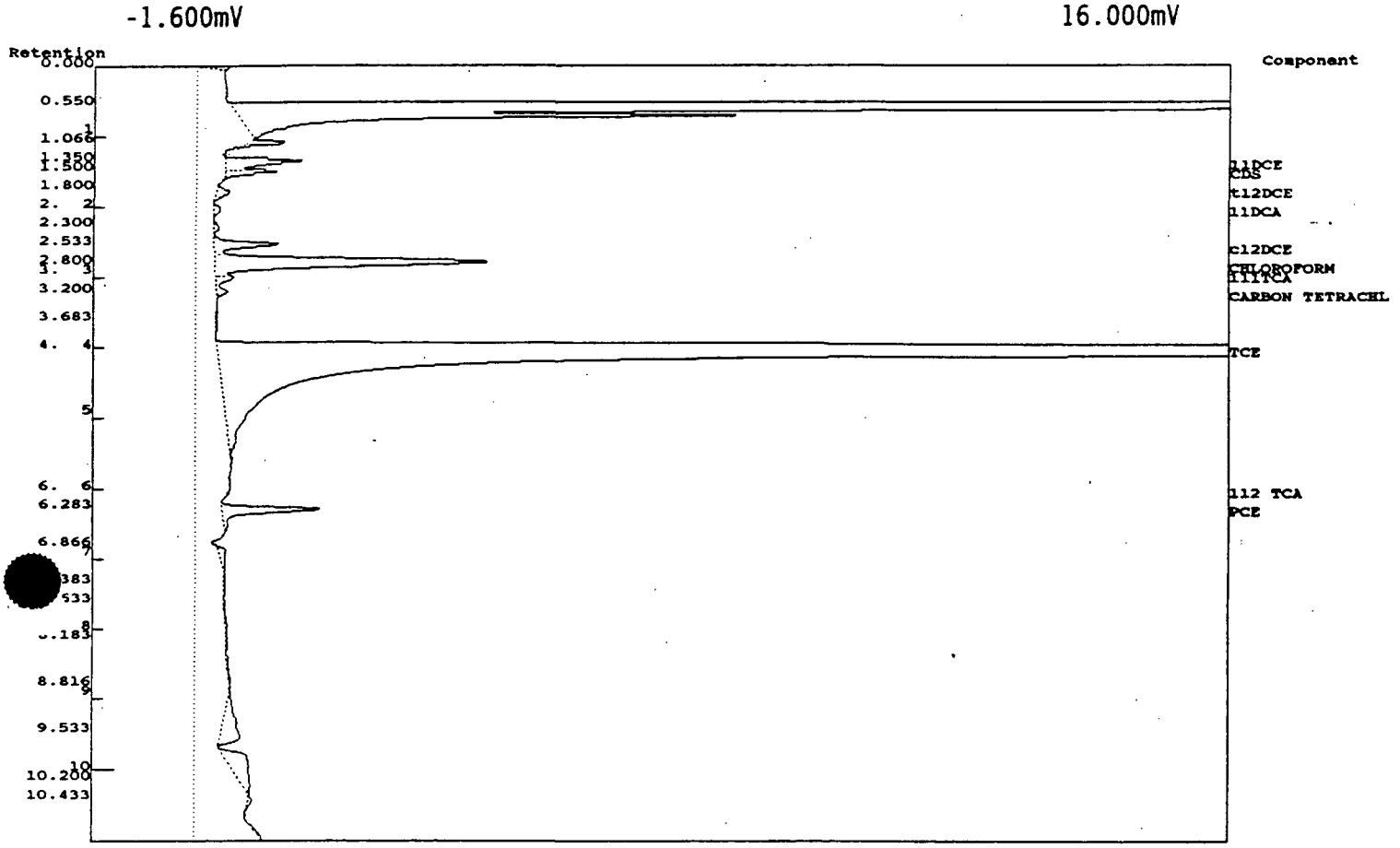
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	1.58	0.21	ug/L
CDS	0	1.500	1.86	N/A	
t12DCE	3	1.800	0.25 M	0.43	ug/L
c12DCE	5	2.533	2.94 M	6.71	ug/L
CHLOROFORM	6	2.800	12.66 M	0.19	ug/L
111TCA	7	3.000	4.89 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.200	0.88 M	0.00	ug/L
TCE	9	4.033	101.46 M	1.25	ug/L
PCE	11	6.300	1.04	0.00	ug/L
	9		127.56	7.82	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 10:21:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E11.CHR (A:\JUNE01)
Sample : SG-147
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	5.79	0.78	ug/L
DS	0	1.500	3.33 M	N/A	
12DCE	3	1.800	0.47 M	0.79	ug/L
1DCA	4	2.116	0.39 M	0.36	ug/L
12DCE	5	2.533	2.40 M	5.47	ug/L
HLOROFORM	6	2.783	11.15 M	0.17	ug/L
11TCA	7	3.000	5.10 M	0.03	ug/L
ARBON TETRACHLORIDE	8	3.200	0.99 M	0.00	ug/L
CE	9	4.033	453.70 M	5.58	ug/L
CE	11	6.283	3.10 M	0.01	ug/L
	10		486.41	12.20	

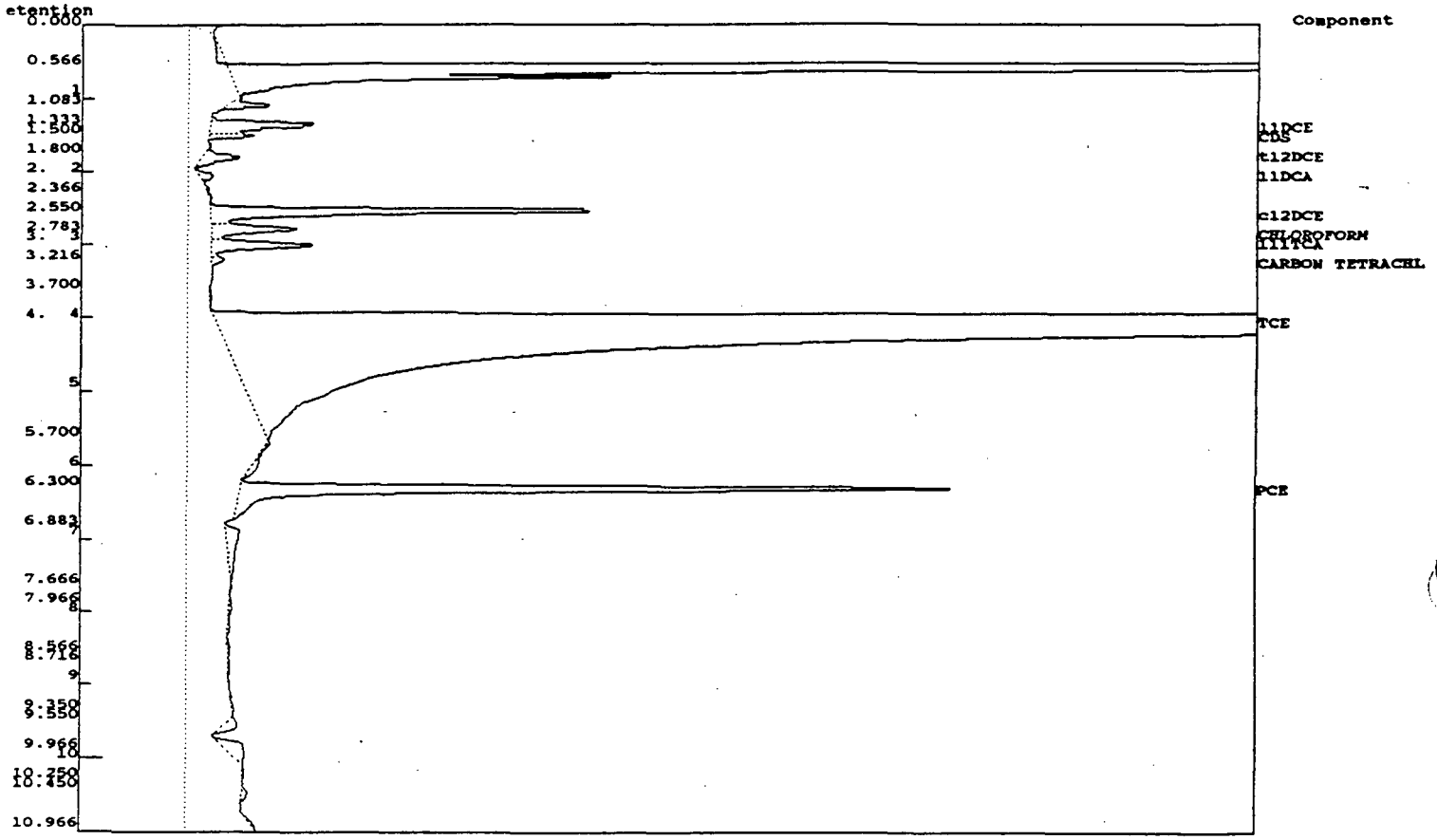
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 10:40:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E12.CHR (A:\JUNE01)
Sample : SG-153
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	6.60 M	0.89	ug/L
CDS	0	1.500	3.52 M	N/A	
t12DCE	3	1.800	1.35	2.29	ug/L
11DCA	4	2.016	0.81	0.74	ug/L
c12DCE	5	2.533	5.49 M	12.53	ug/L
CHLOROFORM	6	2.800	31.90 M	0.48	ug/L
111TCA	7	3.000	1.82 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.200	1.03 M	0.00	ug/L
TCE	9	4.033	1102.29 M	13.57	ug/L
112 TCA	10	6.000	0.20 M	0.02	ug/L
PCE	11	6.283	8.71 M	0.03	ug/L
	11		1163.73	29.56	

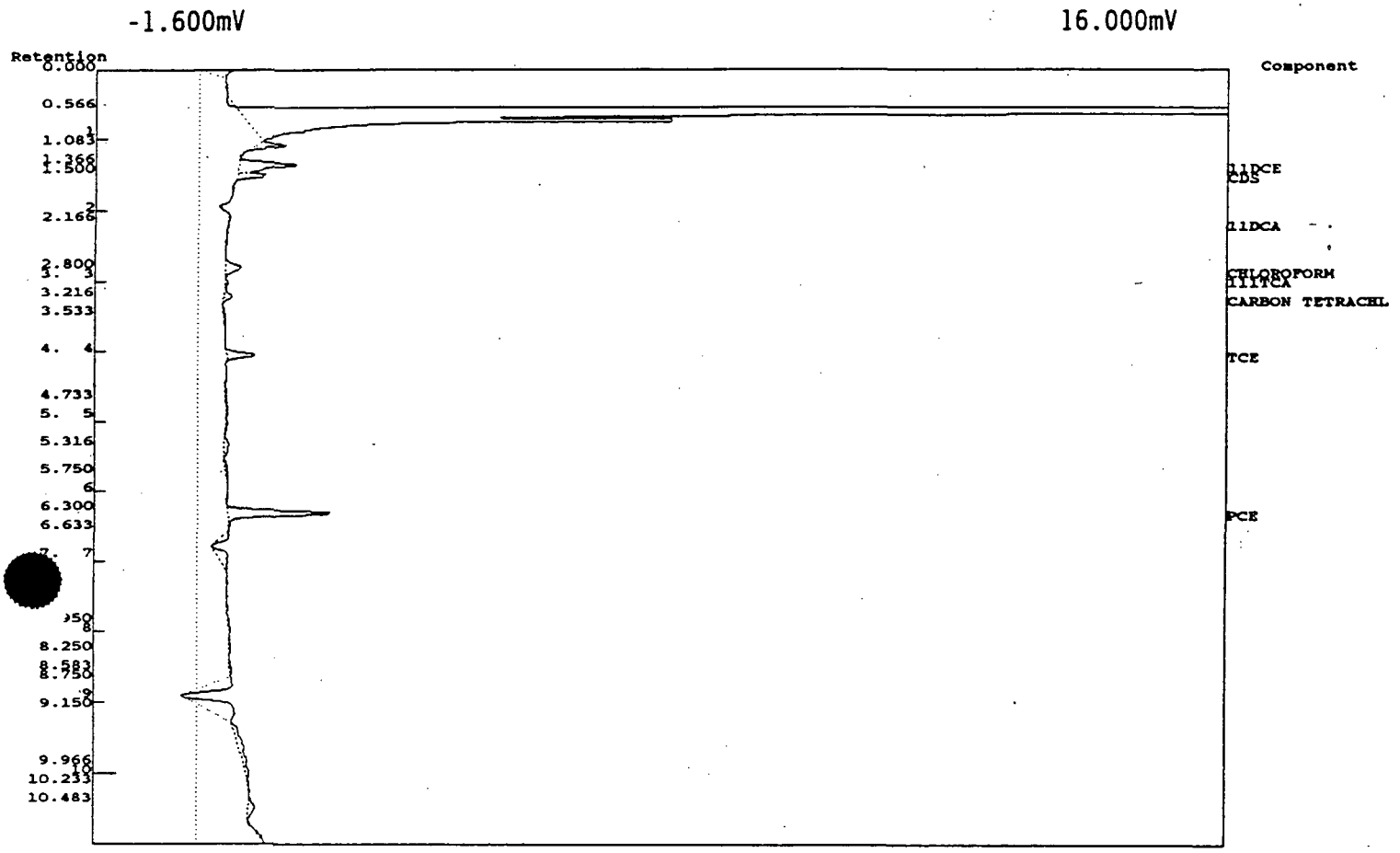
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 10:59:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E13.CHR (A:\JUNE01)
Sample : SG-154
Operator : SGN

-1.600mV 16.000mV



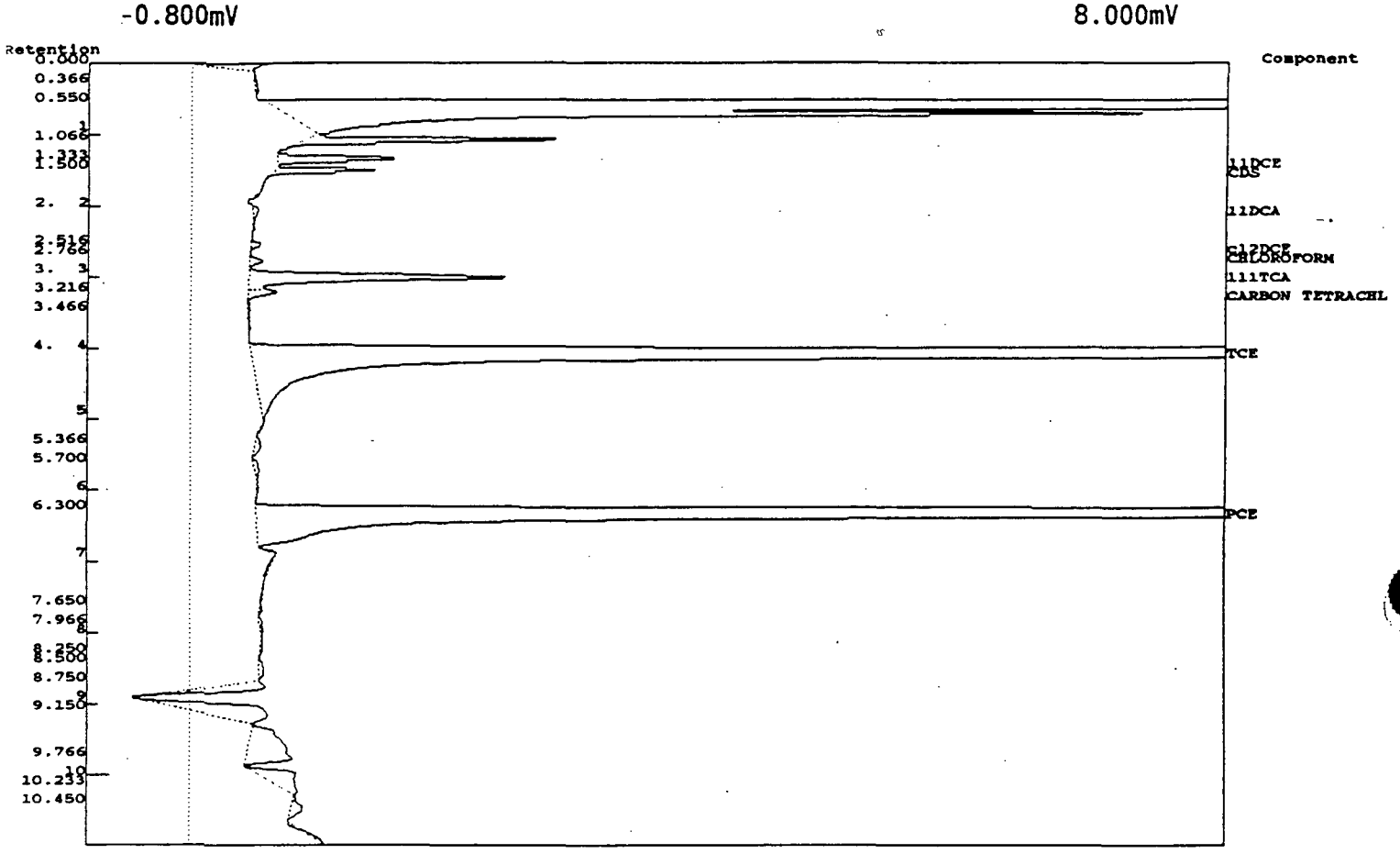
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	9.89 M	1.34	ug/L
DS	0	1.500	3.29 M	N/A	
12DCE	3	1.800	4.01 M	6.81	ug/L
1DCA	4	2.066	1.25 M	1.15	ug/L
12DCE	5	2.550	32.48 M	74.15	ug/L
HLOROFORM	6	2.783	8.70 M	0.13	ug/L
11TCA	7	3.016	10.03 M	0.06	ug/L
ARBON TETRACHLORIDE	8	3.216	1.19 M	0.00	ug/L
CE	9	4.066	4852.59	59.73	ug/L
CE	11	6.300	61.29 M	0.22	ug/L
	10		4984.72	142.60	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 11:18:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E14.CHR (A:\JUNE01)
Sample : SG-203
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.366	4.96 M	0.67	ug/L
CDS	0	1.500	2.27 M	N/A	
11DCA	4	2.166	0.14 M	0.12	ug/L
CHLOROFORM	6	2.800	1.59 M	0.02	ug/L
111TCA	7	3.016	0.13 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	0.79 M	0.00	ug/L
TCE	9	4.050	2.12 M	0.03	ug/L
PCE	11	6.300	8.55 M	0.03	ug/L
	8		20.55	N/A	

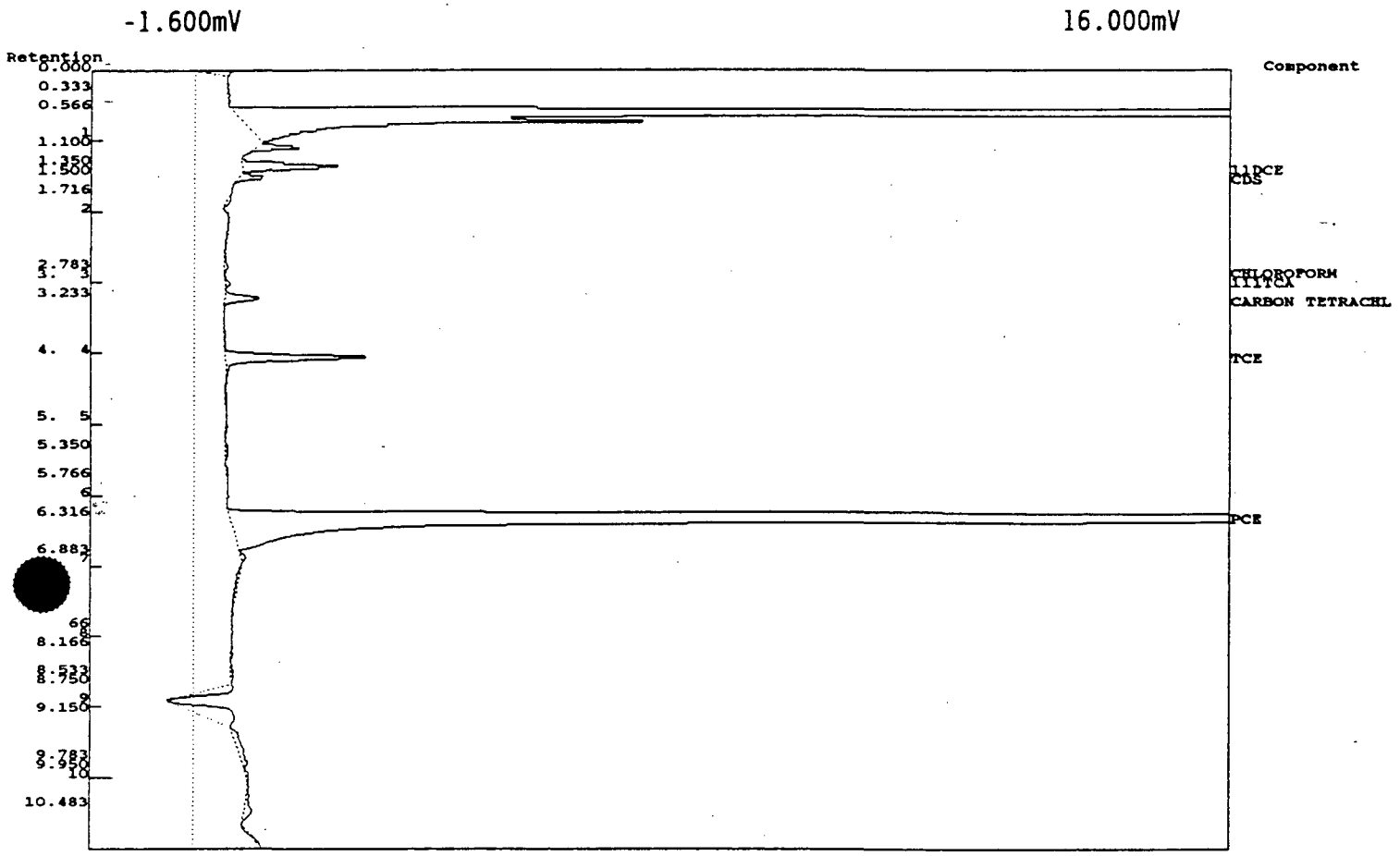
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 11:37:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E15.CHR (A:\JUNE01)
Sample : SG-204
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	4.49 M	0.61	ug/L
CDS	10	1.500	2.89 M	N/A	
11DCA	4	2.050	0.33 M	0.31	ug/L
112DCE	5	2.516	0.41 M	0.93	ug/L
CHLOROFORM	6	2.766	0.55 M	0.01	ug/L
111TCA	7	3.000	12.85 M	0.08	ug/L
CARBON TETRACHLORIDE	8	3.216	1.37 M	0.00	ug/L
TCE	9	4.050	245.04 M	3.02	ug/L
PCE	11	6.300	223.03 M	0.81	ug/L
	9		490.96	4.76	

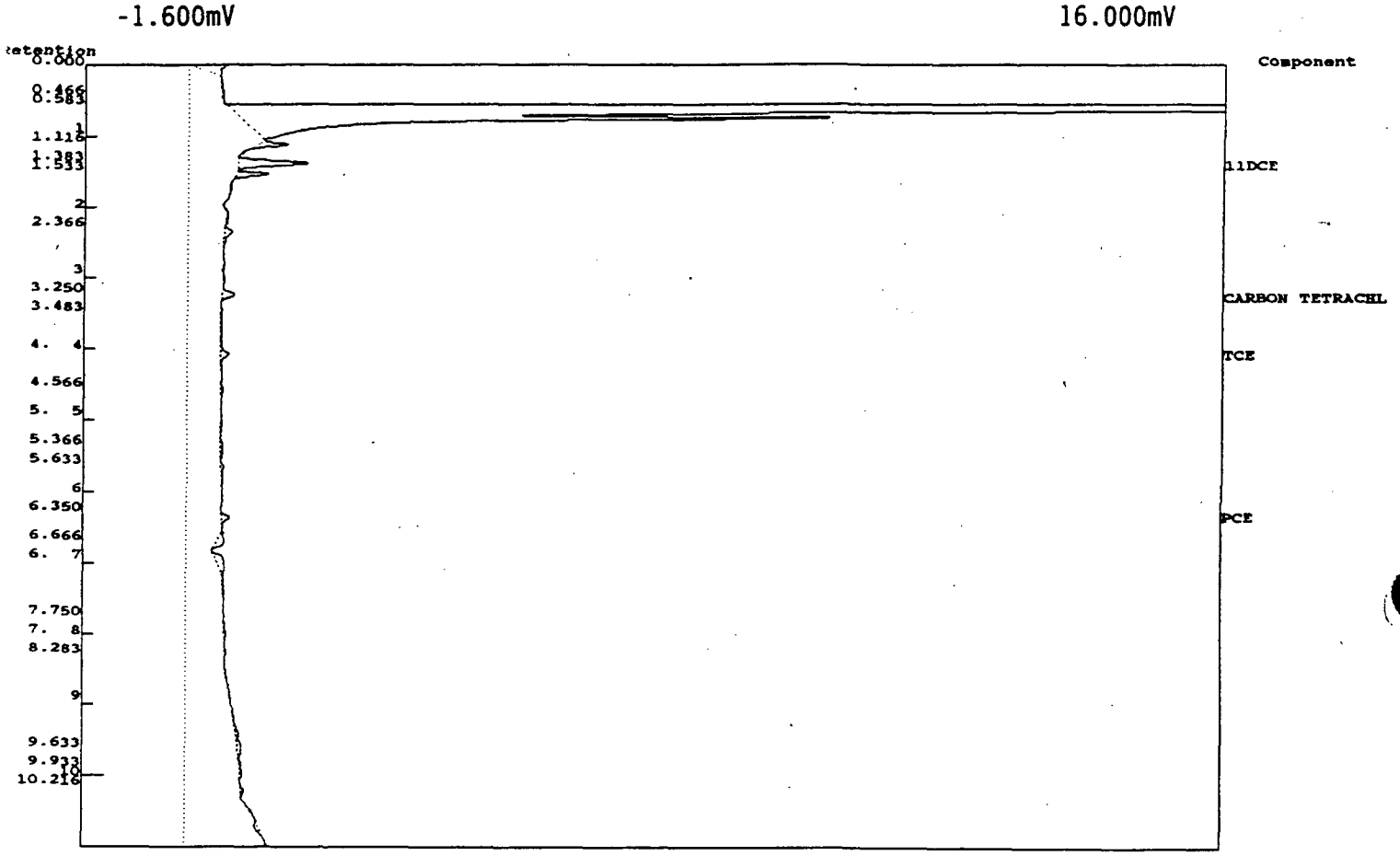
300816

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 11:56:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E16.CHR (A:\JUNE01)
Sample : SG-205
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	7.59 M	1.03	ug/L
CDS	0	1.500	1.62 M	N/A	
CHLOROFORM	6	2.783	0.37 M	0.01	ug/L
111TCA	7	3.016	0.38 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.233	2.98 M	0.00	ug/L
TCE	9	4.066	11.91 M	0.15	ug/L
PCE	11	6.316	373.47	1.36	ug/L
	7		398.31	1.54	

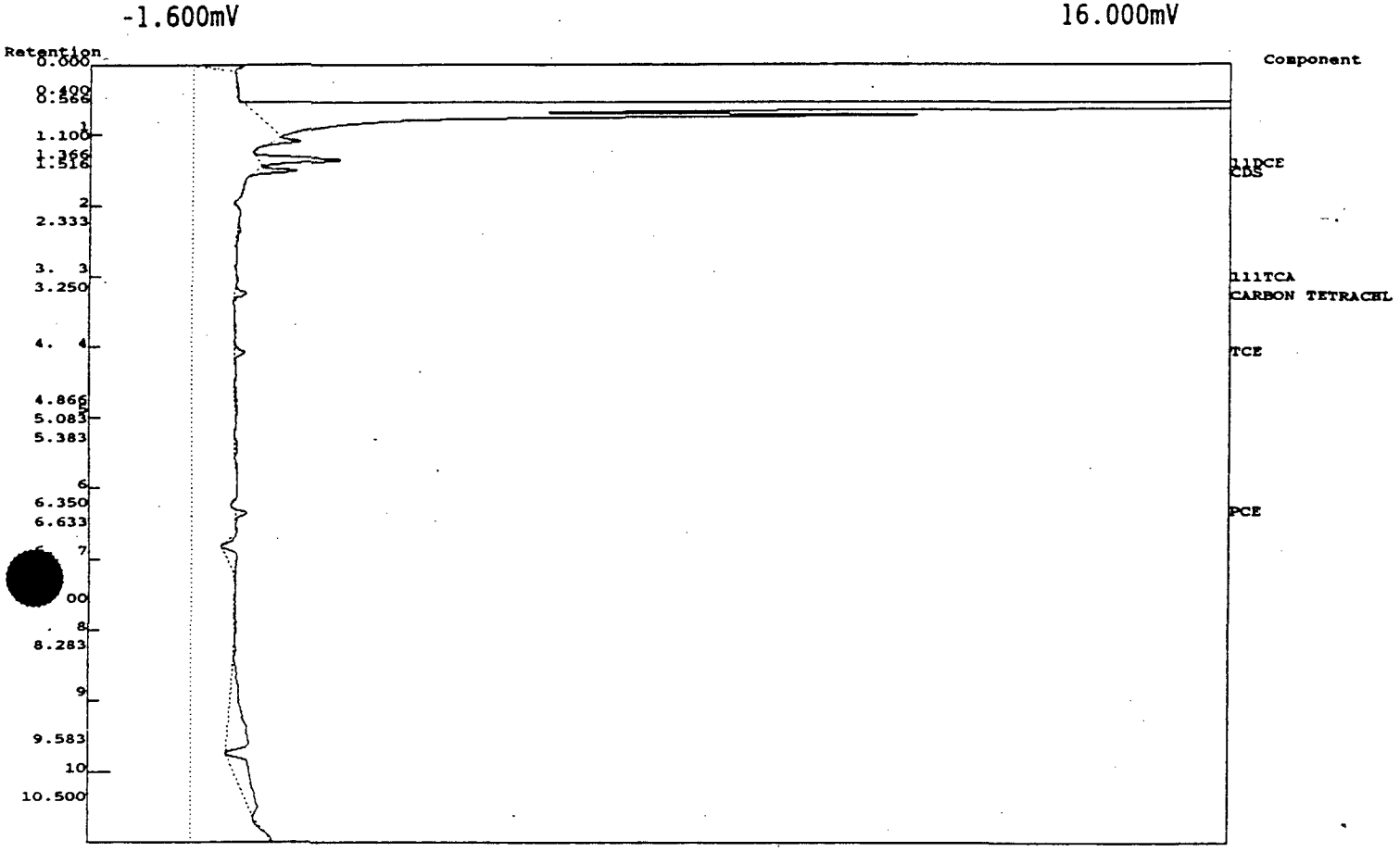
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 12:32:46
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E17.CHR (A:\)
Sample : EB-21
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	5.17 M	0.70	ug/L
ARBON TETRACHLORIDE	8	3.250	1.09	0.00	ug/L
CE	9	4.083	0.83	0.01	ug/L
CE	11	6.350	0.71	0.00	ug/L
	4		7.79	0.71	

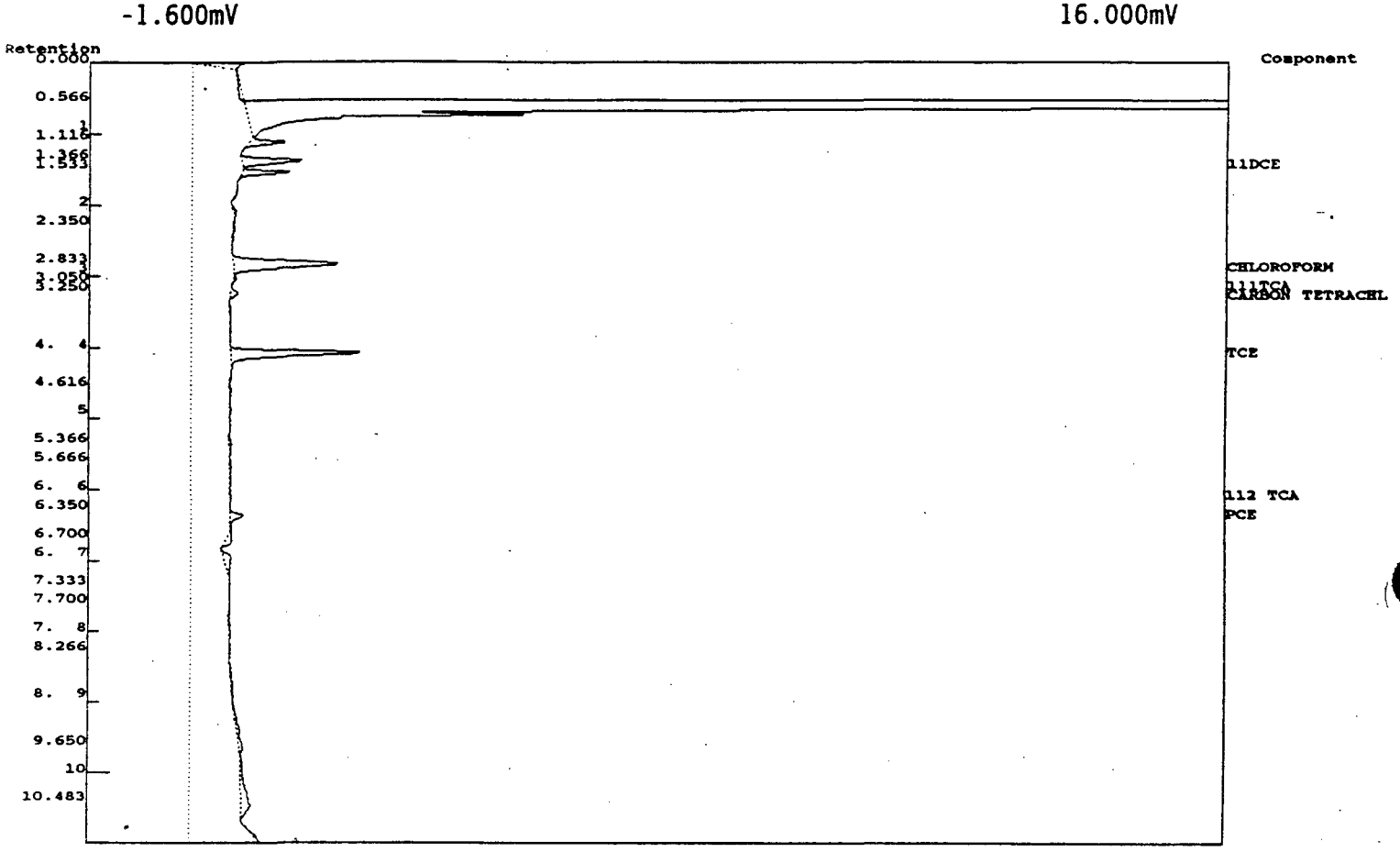
300818

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 12:52:23
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E18.CHR (A:\)
Sample : EB-22
Operator : SGN



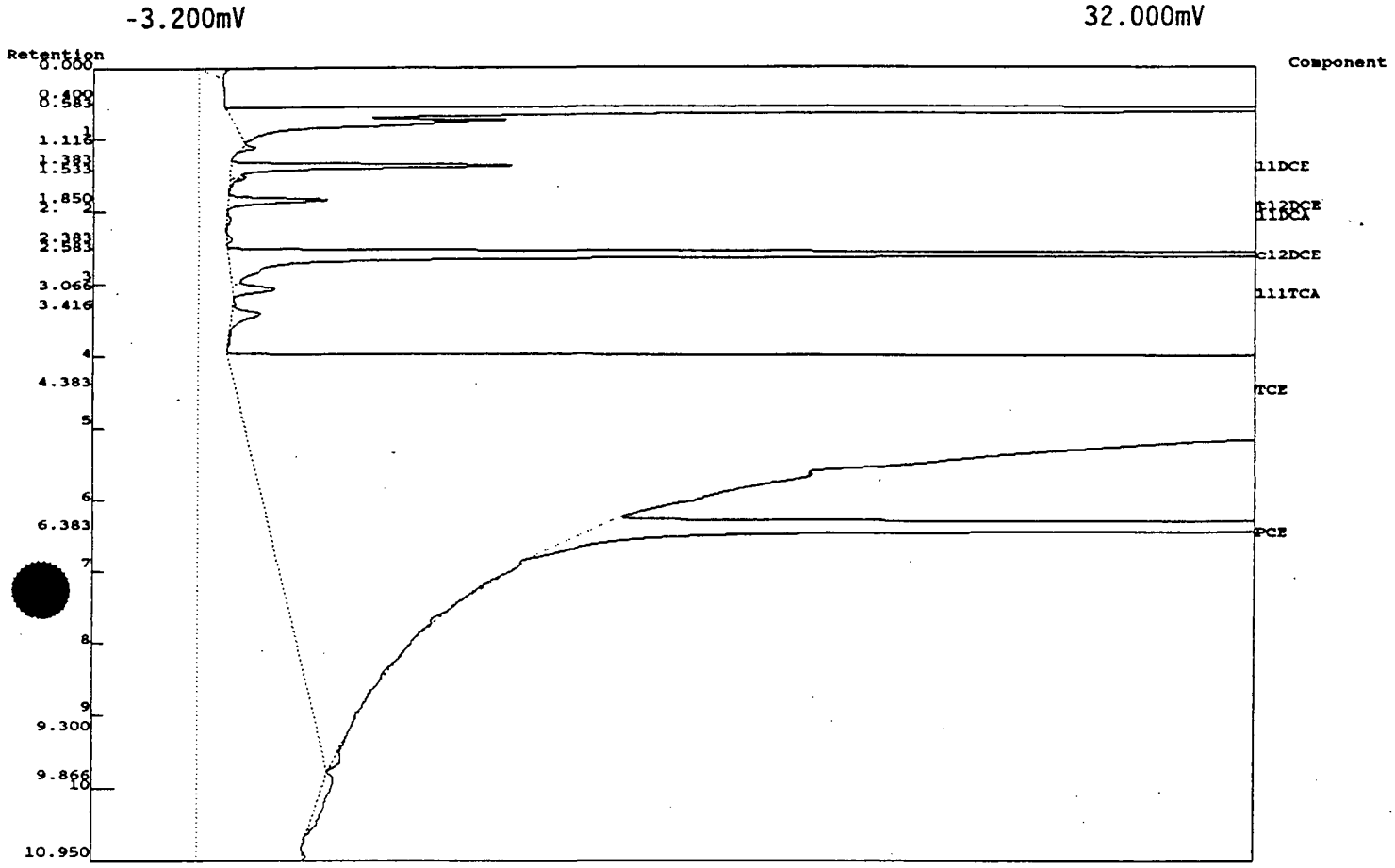
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	6.43 M	0.87	ug/L
CDS	0	1.516	2.29 M	N/A	
111TCA	7	3.016	0.10 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.250	0.99 M	0.00	ug/L
TCE	9	4.083	0.94	0.01	ug/L
PCE	11	6.350	0.80 M	0.00	ug/L
	6		11.54	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 13:12:12
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E19.CHR (A:\)
Sample : SG-165-R
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	4.50 M	0.61	ug/L
HLOROFORM	6	2.833	11.22 M	0.17	ug/L
11TCA	7	3.050	0.12 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.250	0.63 M	0.00	ug/L
CE	9	4.083	10.44 M	0.13	ug/L
12 TCA	10	6.050	0.10	0.01	ug/L
CE	11	6.350	1.18	0.00	ug/L
	7		28.19	0.92	

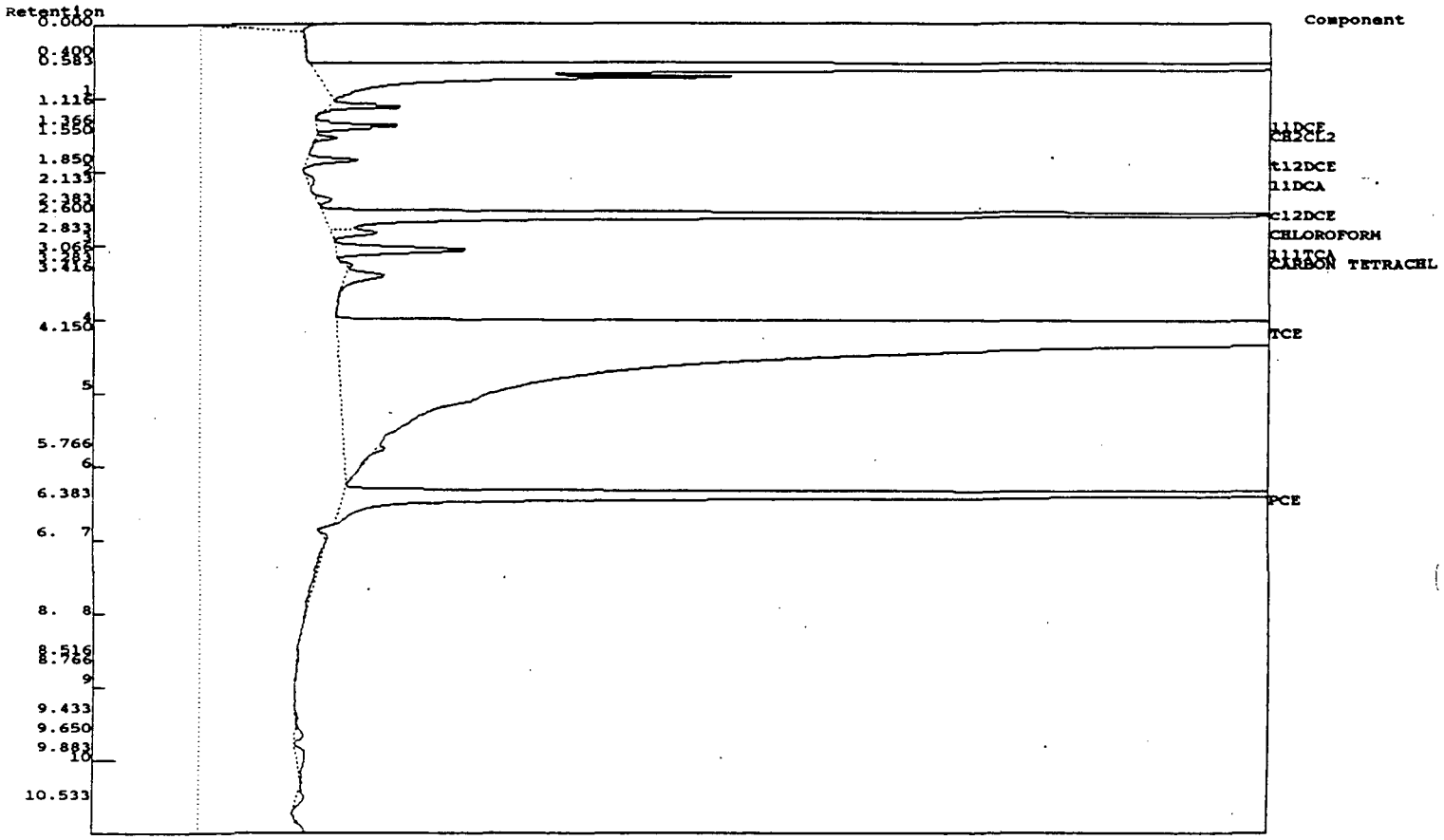
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 14:33:59
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E23.CHR (A:\)
Sample : SG-082
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	37.71 M	5.10	ug/L
t12DCE	3	1.850	13.74	23.33	ug/L
11DCA	4	2.100	0.85	0.78	ug/L
c12DCE	5	2.583	229.10 M	523.05	ug/L
111TCA	7	3.066	8.64 M	0.05	ug/L
TCE	9	4.383	35023.39 M	431.09	ug/L
PCE	11	6.383	785.89 M	2.86	ug/L
	7		36099.33	986.26	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 14:54:42
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E24.CHR (A:\)
Sample : SG-110
Operator : SGN

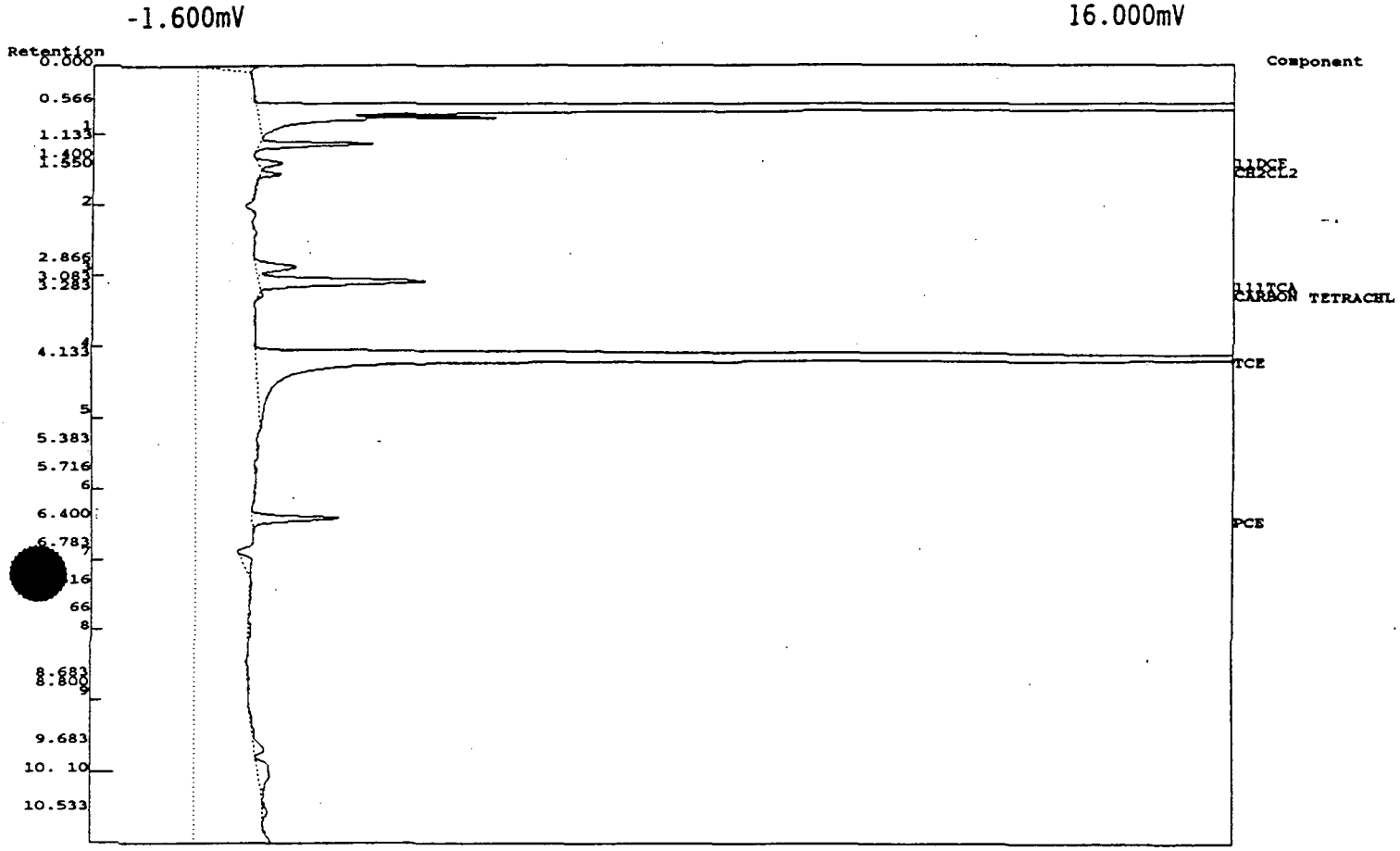
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.366	5.84 M	0.79	ug/L
H2CL2	2	1.550	1.10 M	0.74	ug/L
12DCE	3	1.850	3.61 M	6.13	ug/L
1DCA	4	2.133	0.78 M	0.71	ug/L
12DCE	5	2.600	88.69 M	202.48	ug/L
HLOROFORM	6	2.833	4.39 M	0.07	ug/L
11TCA	7	3.066	11.73 M	0.07	ug/L
ARBON TETRACHLORIDE	8	3.283	0.34 M	0.00	ug/L
CE	9	4.150	5993.55 M	73.77	ug/L
CE	11	6.383	148.45 M	0.54	ug/L
	10		6258.48	285.31	

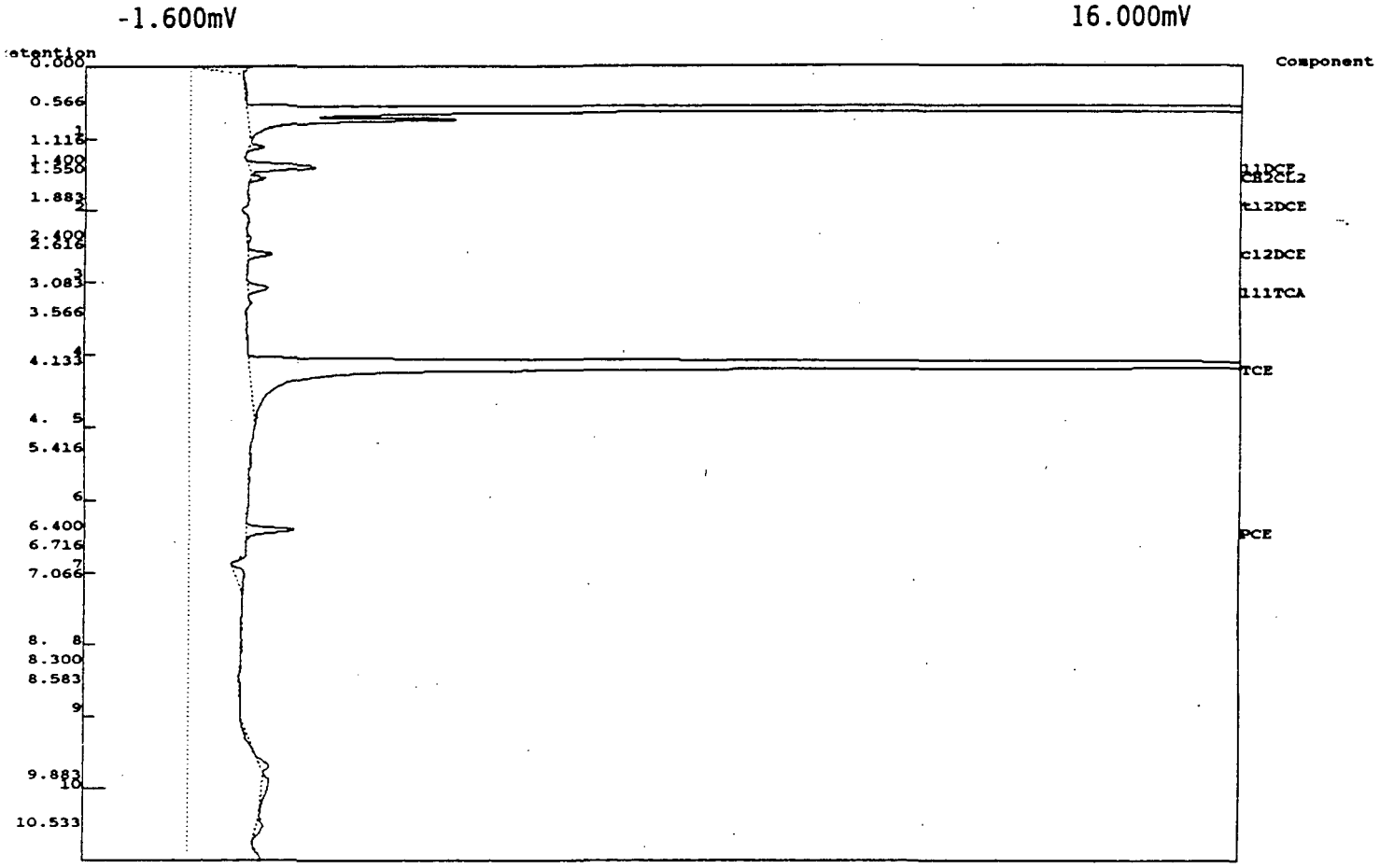
300822

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 16:39:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E29.CHR (A:\)
Sample : SG-122
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.400	1.76	0.24	ug/L
CH2CL2	2	1.550	1.11 M	0.75	ug/L
111TCA	7	3.083	15.94 M	0.10	ug/L
CARBON TETRACHLORIDE	8	3.283	0.30 M	0.00	ug/L
TCE	9	4.133	204.79 M	2.52	ug/L
PCE	11	6.400	7.17 M	0.03	ug/L
	6		231.07	3.63	

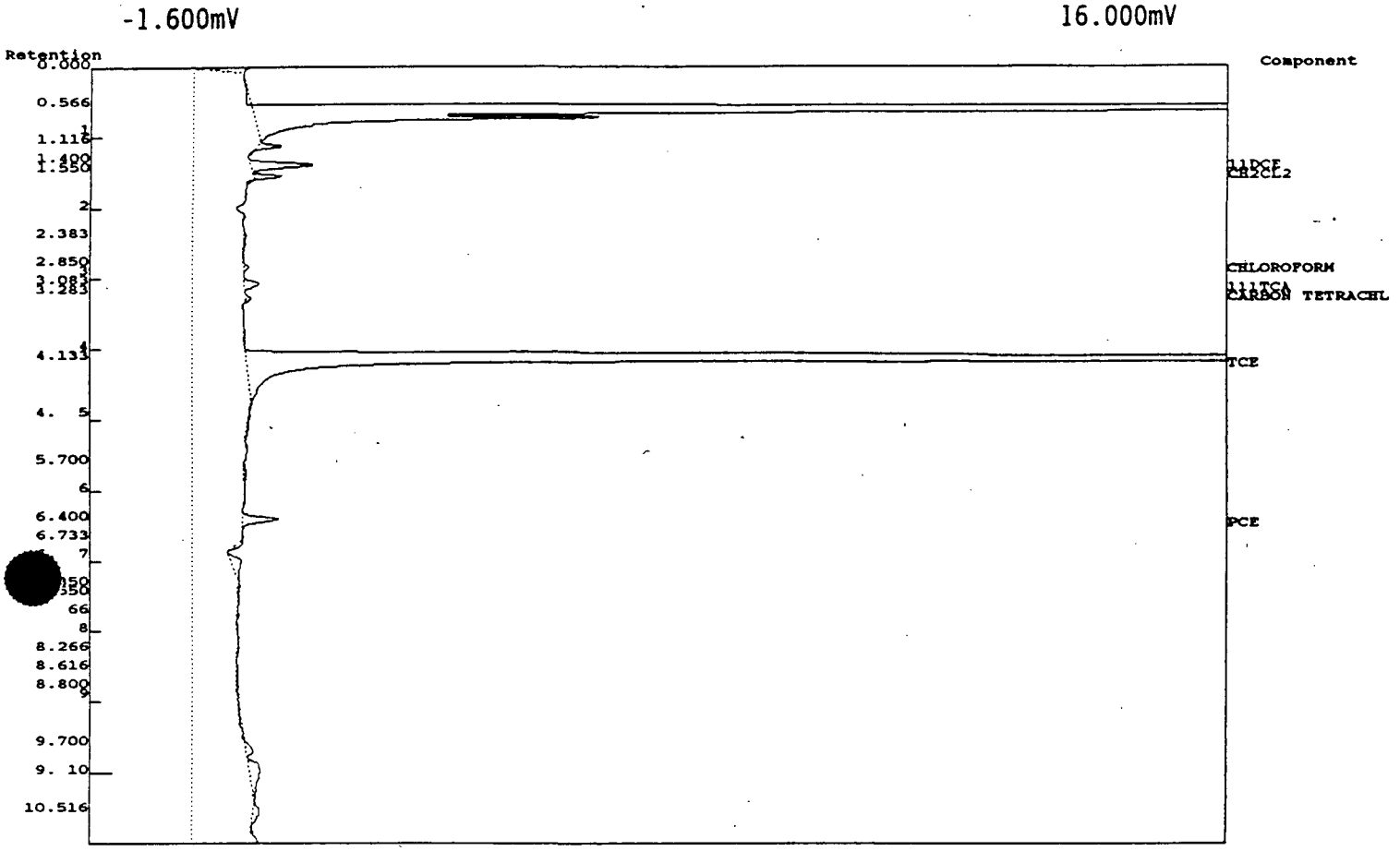
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 17:00:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E30.CHR (A:\)
Sample : SG-123
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.400	5.86 M	0.79	ug/L
H2CL2	2	1.550	0.89 M	0.60	ug/L
12DCE	3	1.883	0.10 M	0.18	ug/L
12DCE	5	2.616	1.82 M	4.15	ug/L
11TCA	7	3.083	1.74 M	0.01	ug/L
CE	9	4.133	217.13 M	2.67	ug/L
CE	11	6.400	3.88 M	0.01	ug/L
	7		231.42	8.42	

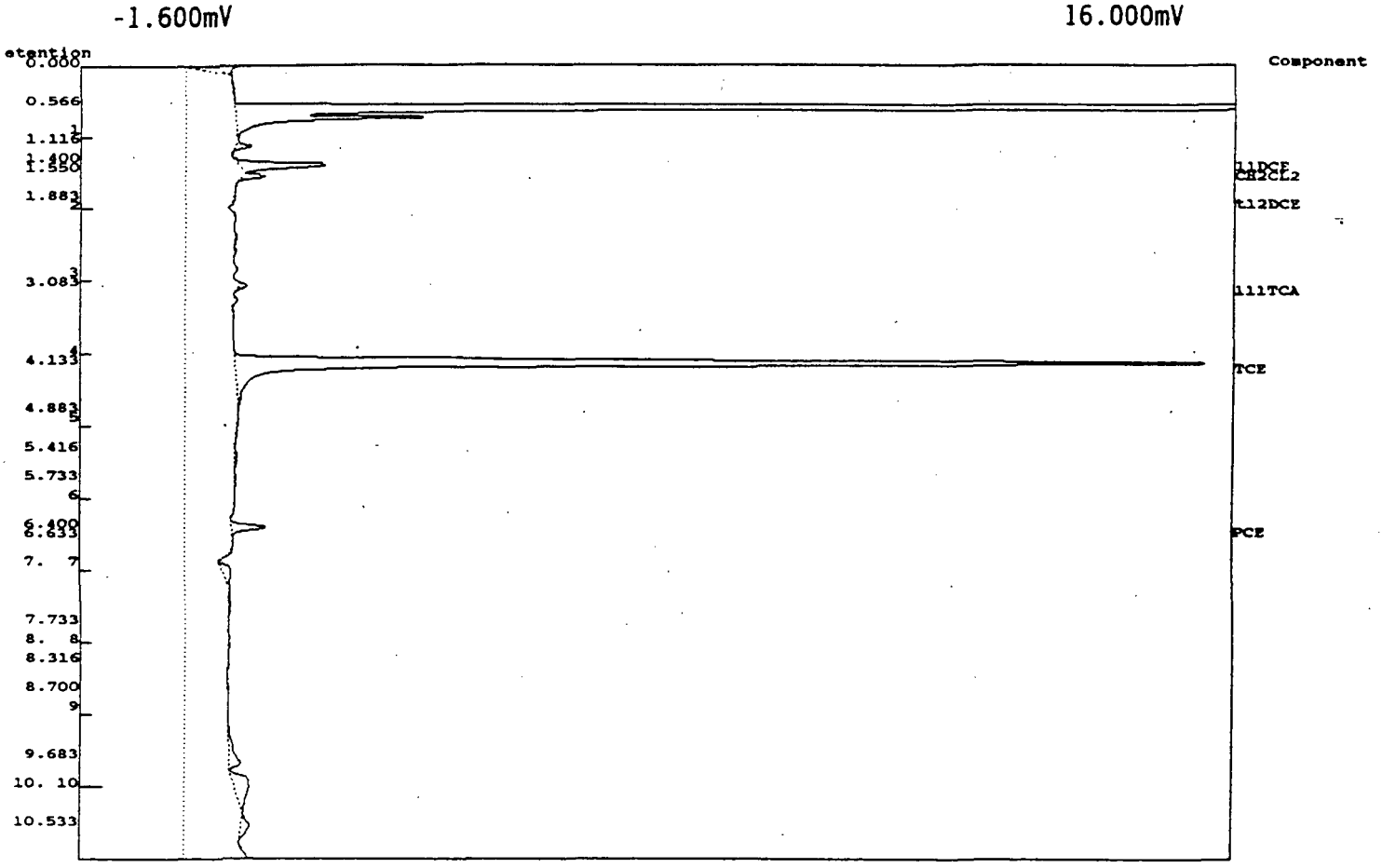
300824

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 17:21:38
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E31.CHR (A:\)
Sample : SG-124
Operator : SGN



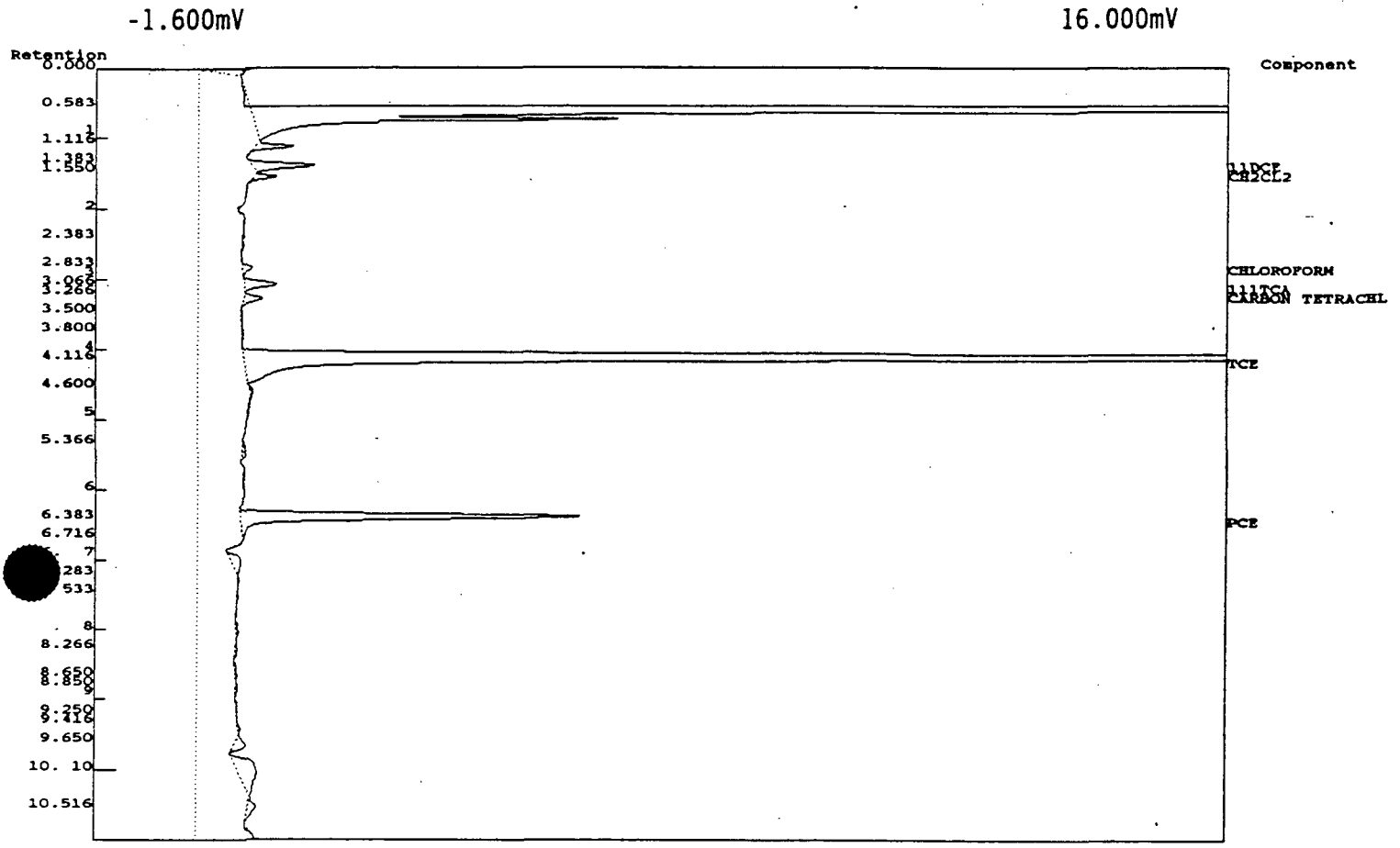
Component	Number	Retention	Area	External	Units
11DCE	1	1.400	4.79 M	0.65	ug/L
CH2CL2	2	1.550	1.36 M	0.91	ug/L
CHLOROFORM	6	2.850	0.48 M	0.01	ug/L
111TCA	7	3.083	1.35 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.283	0.35 M	0.00	ug/L
TCE	9	4.133	168.46 M	2.07	ug/L
PCE	11	6.400	2.94 M	0.01	ug/L
	7		179.72	3.66	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 17:42:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E32.CHR (A:\)
Sample : SG-125
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.400	7.07 M	0.96	ug/L
H2CL2	2	1.550	1.37 M	0.92	ug/L
12DCE	3	1.883	0.12 M	0.21	ug/L
11TCA	7	3.083	0.56 M	0.00	ug/L
CE	9	4.133	87.76 M	1.08	ug/L
CE	11	6.400	2.81 M	0.01	ug/L
	6		99.68	3.18	

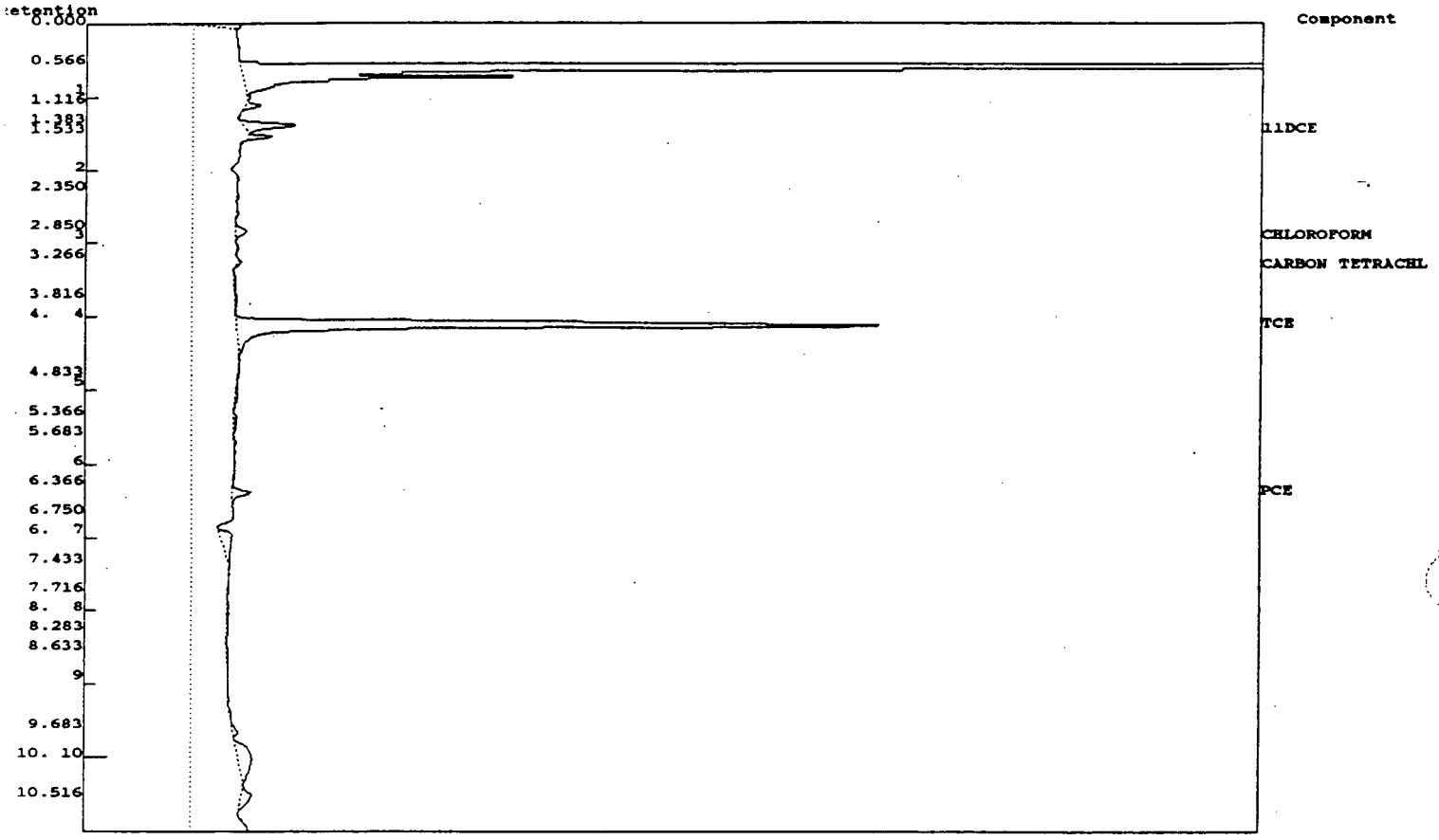
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 18:02:25
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E33.CHR (A:\)
Sample : SG-126
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.383	4.72 M	0.64	ug/L
CH2CL2	2	1.550	1.16 M	0.78	ug/L
CHLOROFORM	6	2.833	0.85	0.01	ug/L
111TCA	7	3.066	2.89	0.02	ug/L
CARBON TETRACHLORIDE	8	3.266	1.62	0.00	ug/L
TCE	9	4.116	146.69 M	1.81	ug/L
PCE	11	6.383	28.91 M	0.11	ug/L
	7		186.85	3.36	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 18:22:25
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E34.CHR (A:\)
Sample : SG-135
Operator : SGN

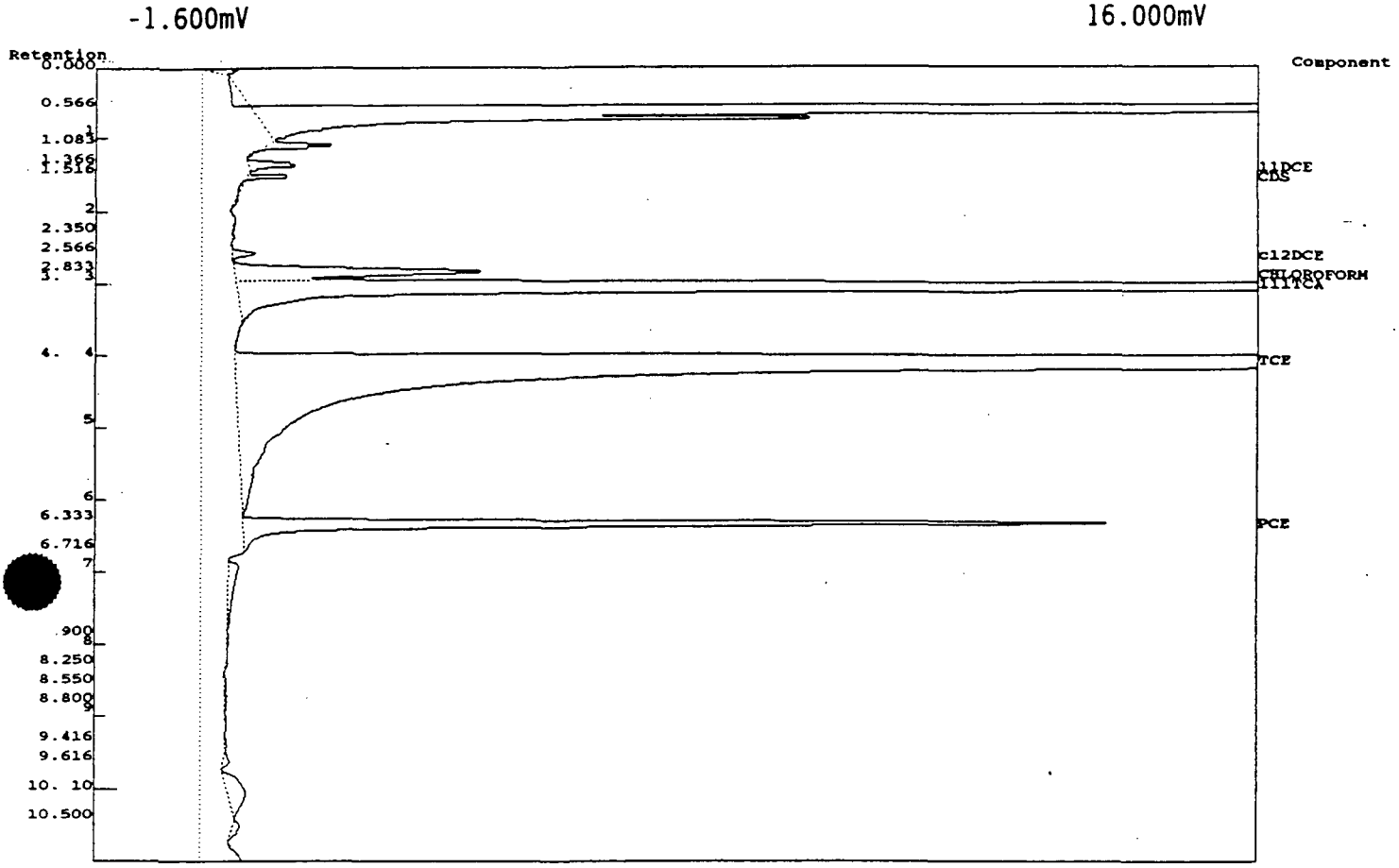
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.383	3.78 M	0.51	ug/L
HLOROFORM	6	2.850	1.06 M	0.02	ug/L
ARBON TETRACHLORIDE	8	3.266	0.20 M	0.00	ug/L
CE	9	4.100	55.12 M	0.68	ug/L
CE	11	6.366	1.46	0.01	ug/L
	5		61.63	1.21	

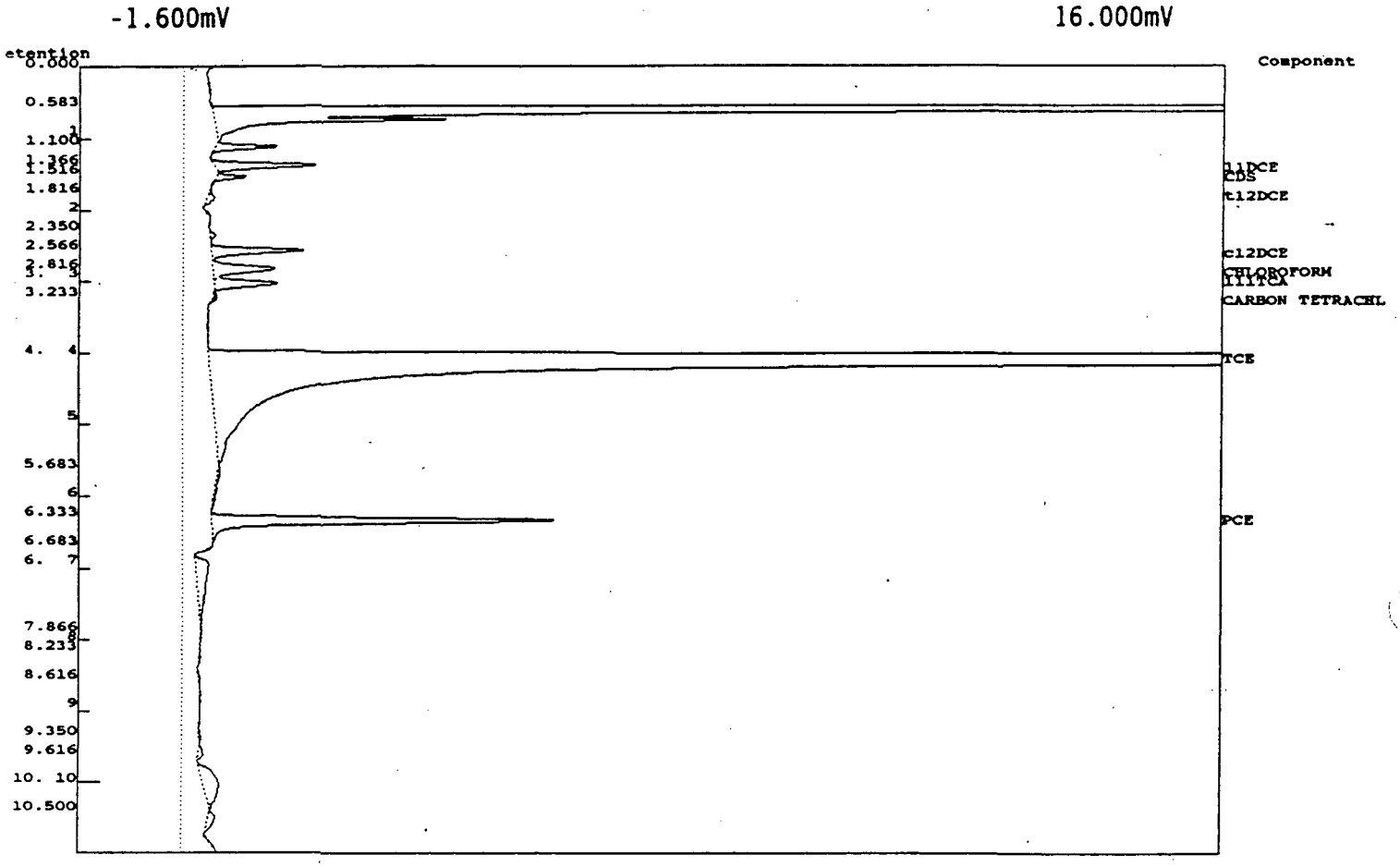
300828

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 19:39:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E38.CHR (A:\)
Sample : SG-133
Operator : SGN



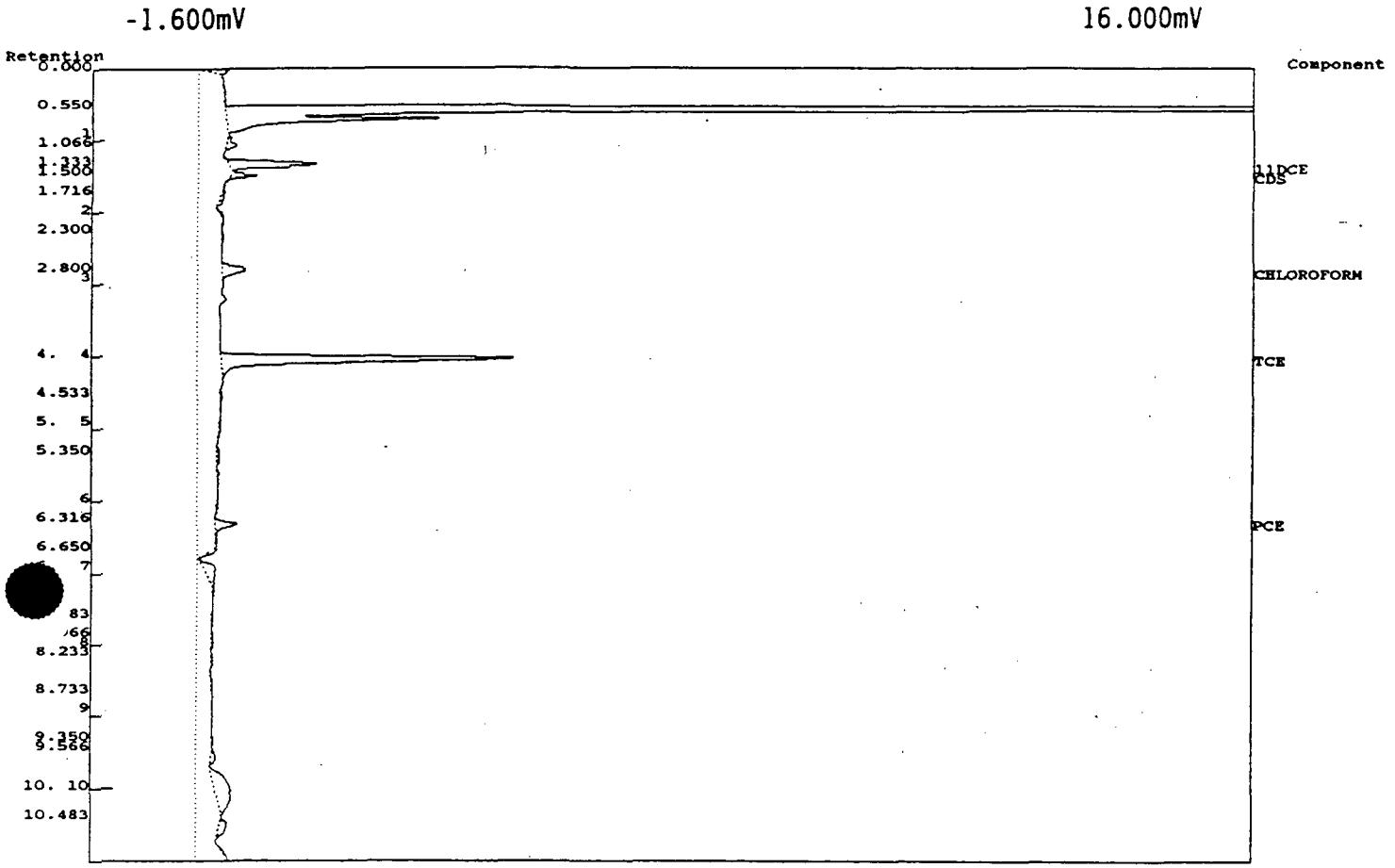
Component	Number	Retention	Area	External	Units
11DCE	1	1.366	3.65	0.49	ug/L
CDS	0	1.516	2.02	N/A	
c12DCE	5	2.566	1.69	3.85	ug/L
CHLOROFORM	6	2.833	26.10 M	0.39	ug/L
111TCA	7	3.033	230.79 M	1.39	ug/L
TCE	9	4.083	1521.43	18.73	ug/L
PCE	11	6.333	73.19 M	0.27	ug/L
	7		1858.87	24.11	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 19:58:18
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E39.CHR (A:\)
Sample : SG-134
Operator : SGN



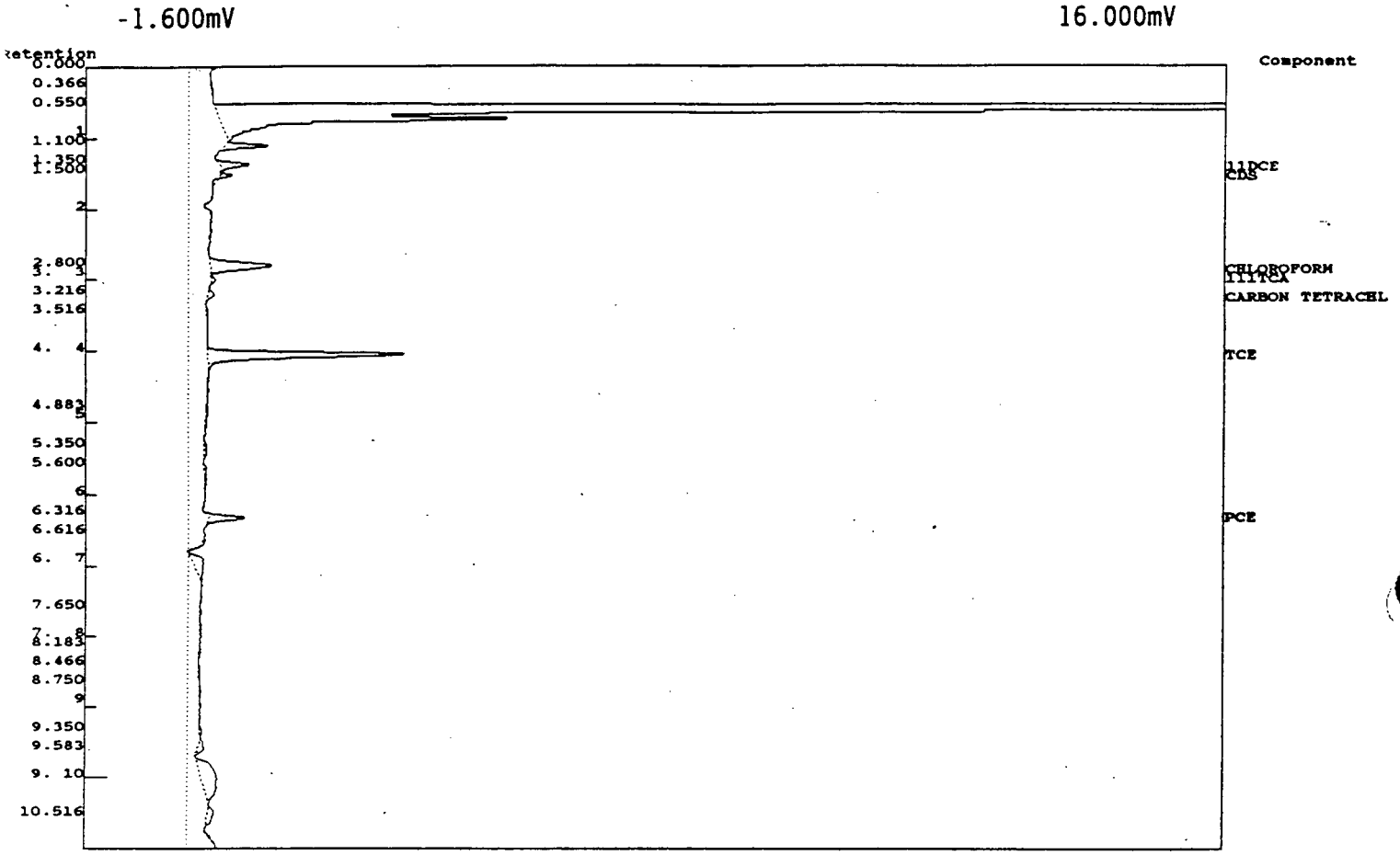
Component	Number	Retention	Area	External	Units
1DCE	1	1.366	7.45 M	1.01	ug/L
DS	0	1.516	1.55 M	N/A	
12DCE	3	1.816	0.92 M	1.56	ug/L
12DCE	5	2.566	7.23 M	16.50	ug/L
HLOROFORM	6	2.816	6.59 M	0.10	ug/L
11TCA	7	3.033	5.72 M	0.03	ug/L
ARBON TETRACHLORIDE	8	3.233	0.19 M	0.00	ug/L
CE	9	4.066	885.00	10.89	ug/L
CE	11	6.333	29.41 M	0.11	ug/L
	9		944.05	29.20	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 20:17:18
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E40.CHR (A:\)
Sample : SG-136
Operator : SGN



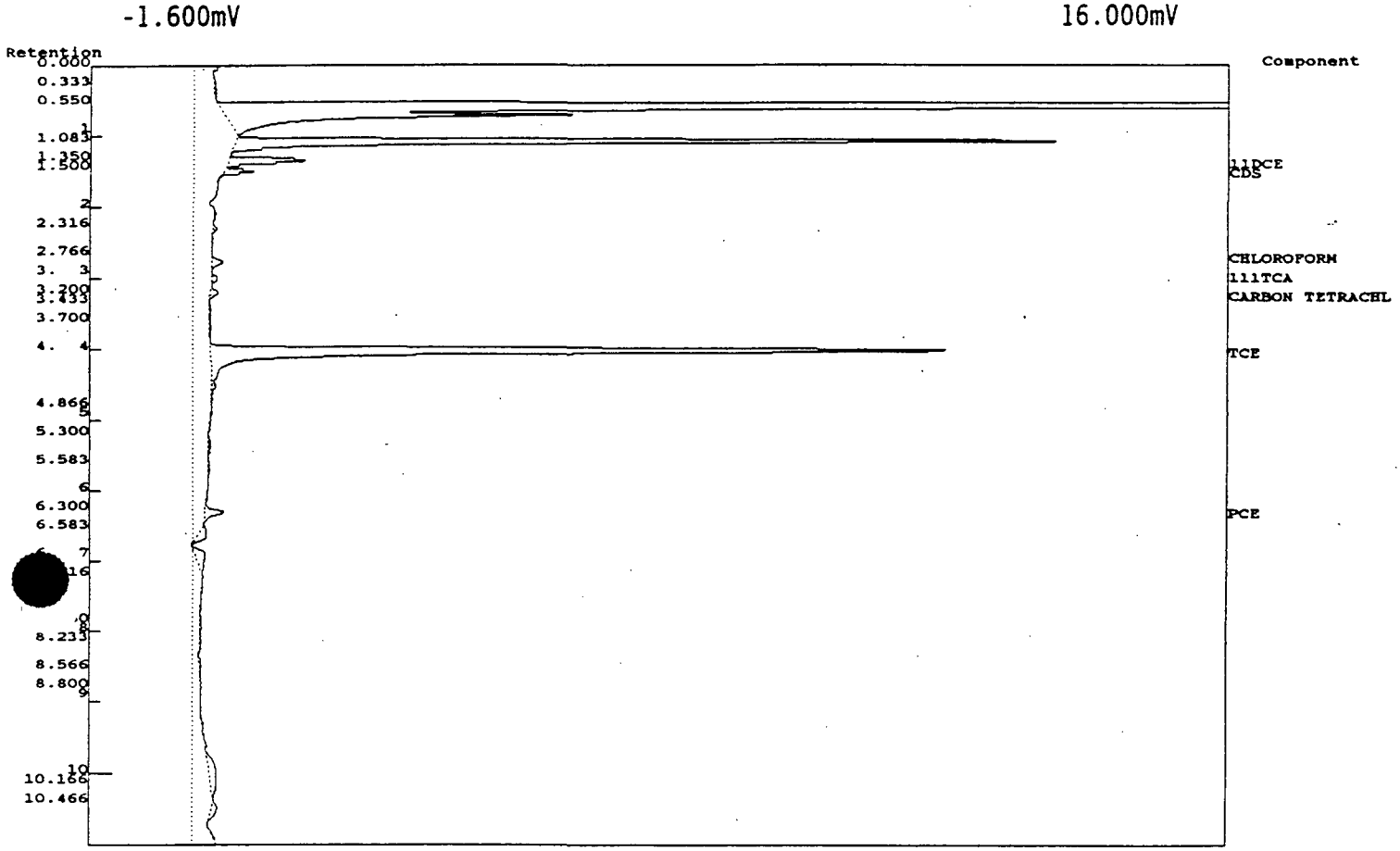
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	6.70 M	0.91	ug/L
CDS	0	1.500	1.07 M	N/A	
CHLOROFORM	6	2.800	2.44 M	0.04	ug/L
TCE	9	4.050	24.18 M	0.30	ug/L
PCE	11	6.316	1.86 M	0.01	ug/L
	5		36.26	0.25	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 20:36:19
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E41.CHR (A:\)
Sample : SG-137
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	1.88 M	0.25	ug/L
DS	0	1.500	0.36 M	N/A	
HLOROFORM	6	2.800	6.46 M	0.10	ug/L
11TCA	7	3.016	0.23 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	0.58	0.00	ug/L
CE	9	4.050	16.35 M	0.20	ug/L
CE	11	6.316	2.51 M	0.01	ug/L
	7		28.38	N/A	

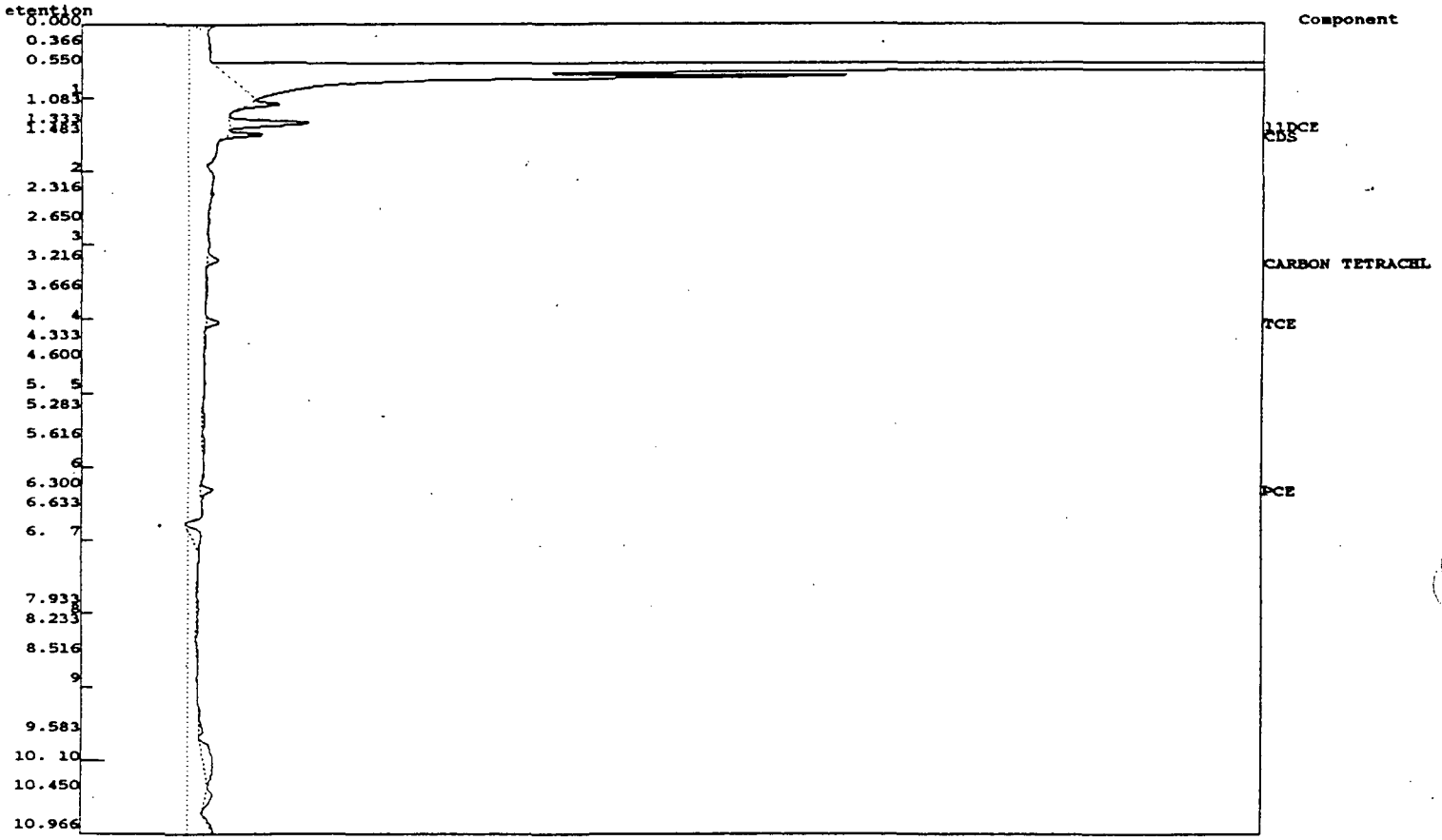
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 22:11:22
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E46.CHR (A:\)
Sample : SG-169
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	5.74 M	0.78	ug/L
CDS	0	1.500	1.54 M	N/A	
CHLOROFORM	6	2.766	0.95 M	0.01	ug/L
111TCA	7	3.000	0.45	0.00	ug/L
CARBON TETRACHLORIDE	8	3.200	0.70	0.00	ug/L
TCE	9	4.033	66.81 M	0.82	ug/L
PCE	11	6.300	1.81 M	0.01	ug/L
	7		78.02	0.62	

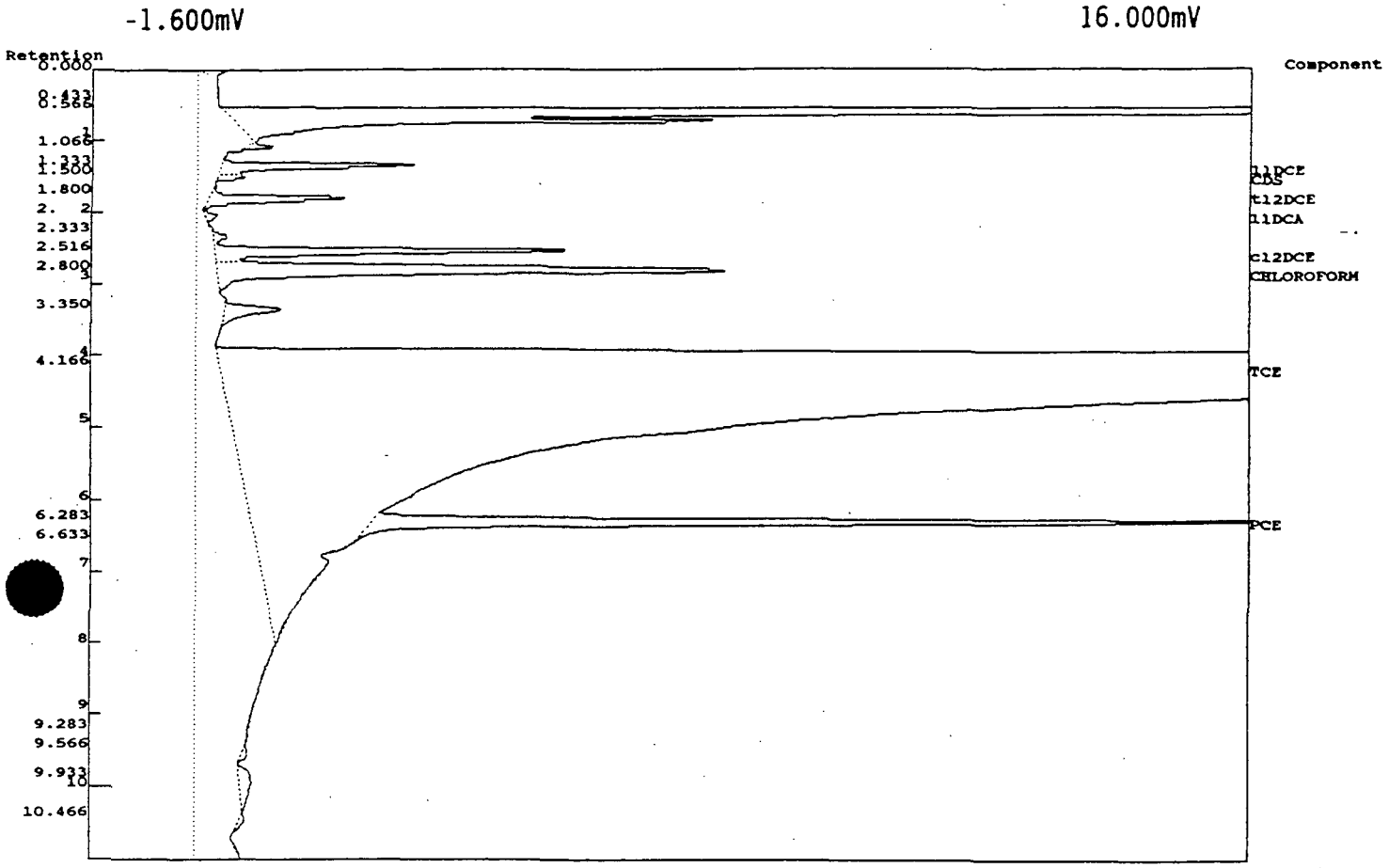
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 22:30:23
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E47.CHR (A:\)
Sample : EB-24
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.333	5.69 M	0.77	ug/L
DS	0	1.483	1.73 M	N/A	
ARBON TETRACHLORIDE	8	3.216	1.01 M	0.00	ug/L
CE	9	4.033	1.00 M	0.01	ug/L
CE	11	6.300	1.06 M	0.00	ug/L
	5		10.50	N/A	

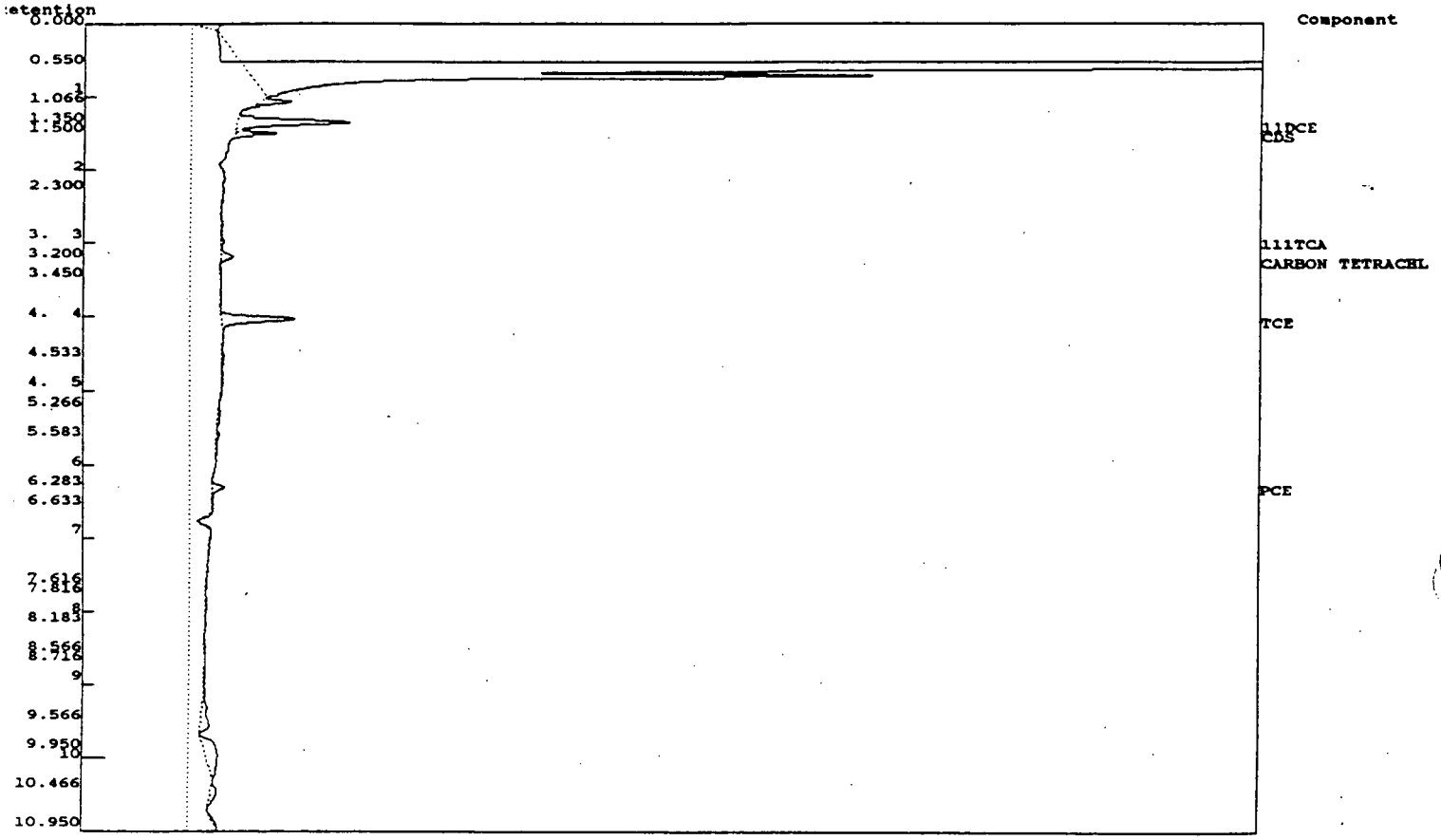
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 22:49:23
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E48.CHR (A:\)
Sample : SG-190
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	14.60 M	1.97	ug/L
CDS	0	1.500	2.27 M	N/A	
t12DCE	3	1.800	12.16 M	20.65	ug/L
11DCA	4	2.016	1.01 M	0.93	ug/L
c12DCE	5	2.516	28.65 M	65.40	ug/L
CHLOROFORM	6	2.800	61.47 M	0.92	ug/L
TCE	9	4.166	19496.04 M	239.97	ug/L
PCE	11	6.283	78.58 M	0.29	ug/L
	8		19694.77	329.14	

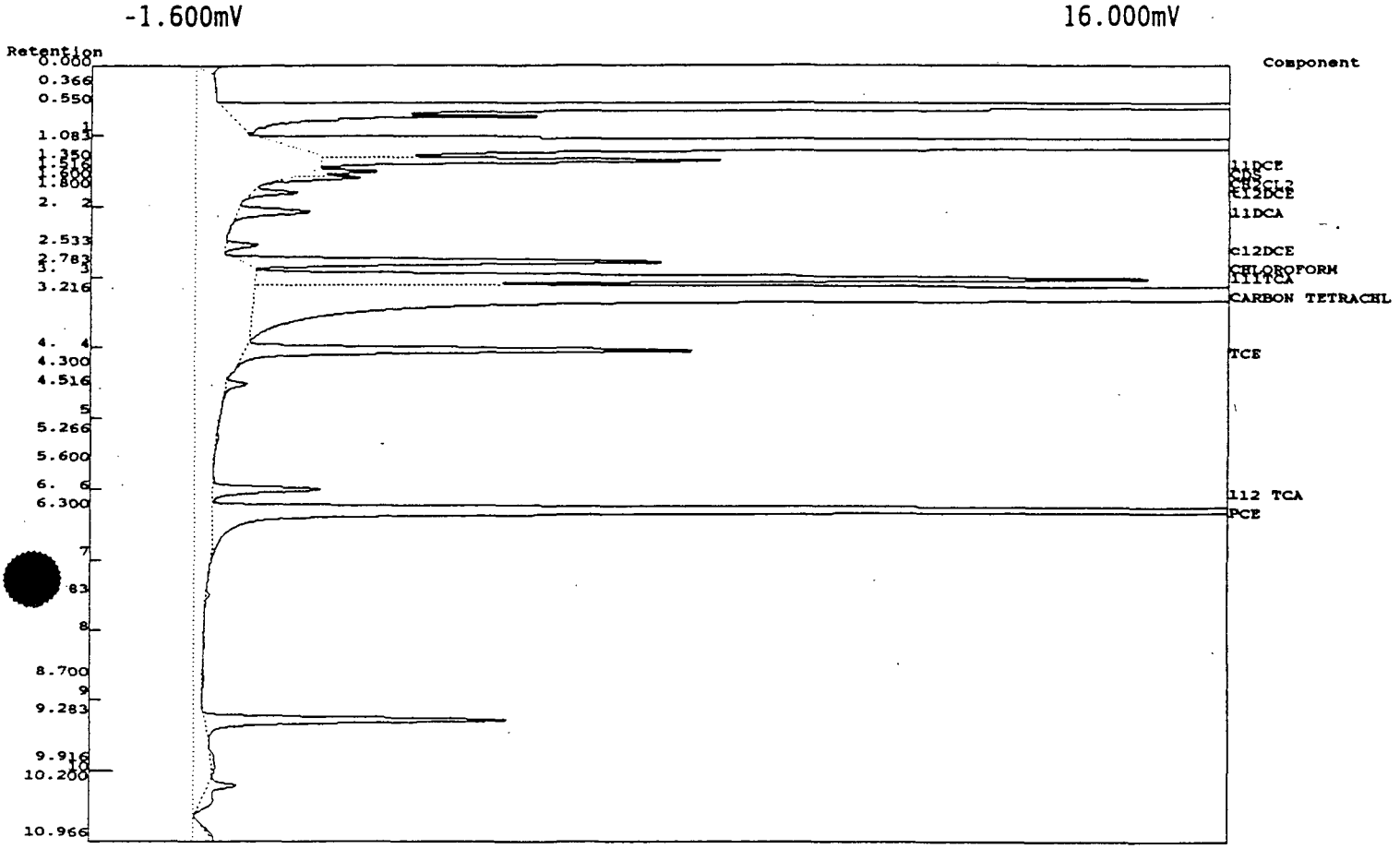
Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 23:08:24
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E49.CHR (A:\)
Sample : EB-25
Operator : SGN

-1.600mV 16.000mV



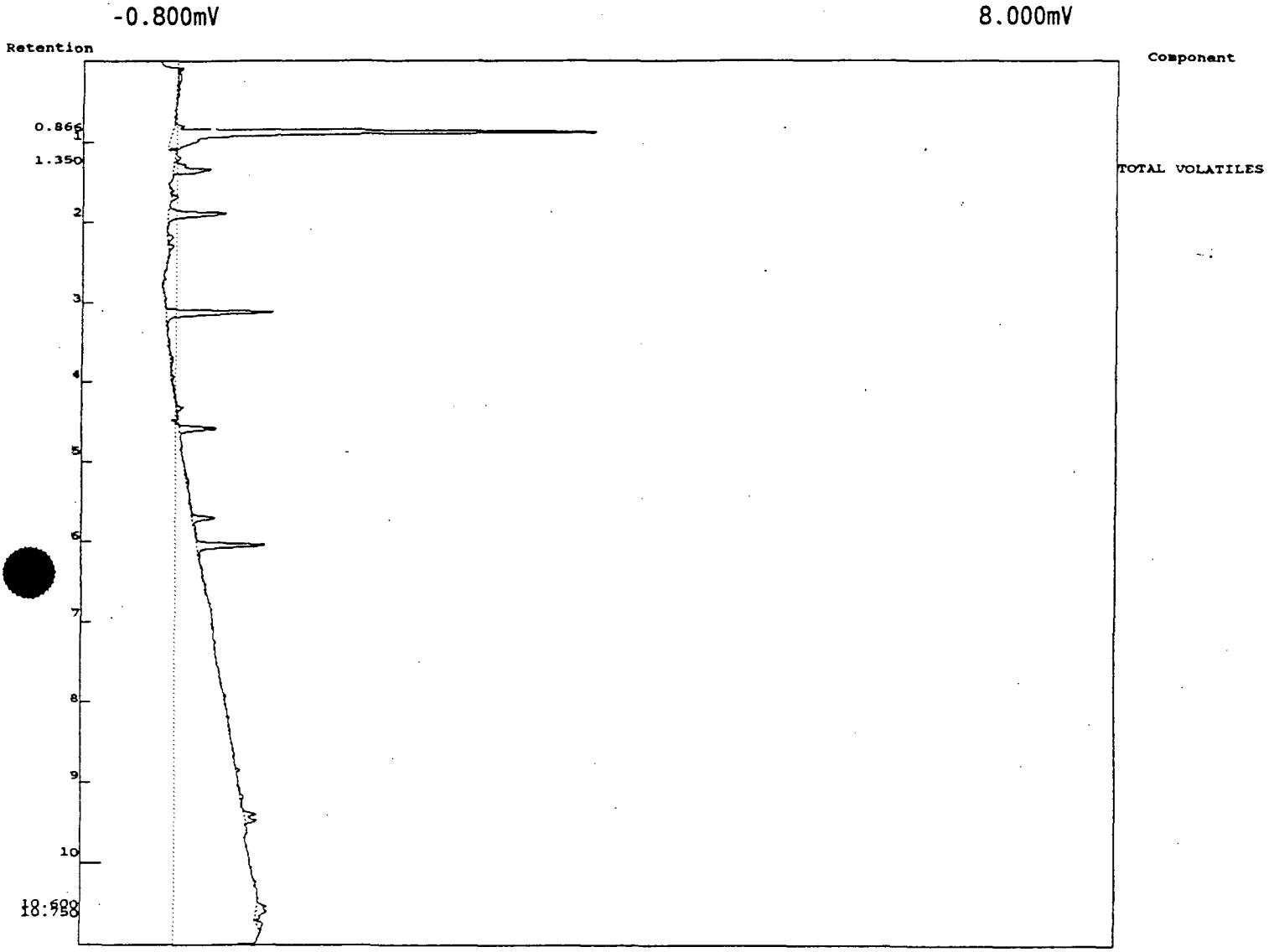
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	8.74 M	1.18	ug/L
DS	0	1.500	2.02 M	N/A	
11TCA	7	3.000	0.18 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.200	1.03 M	0.00	ug/L
CE	9	4.033	5.72 M	0.07	ug/L
CE	11	6.283	1.06	0.00	ug/L
	6		18.76	0.26	

Lab name : COLUMBIA TECH
Analysis date : 06/02/2000 23:46:25
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN02E51.CHR (A:\)
Sample : CC-060200E-4
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	29.24 M	3.96	ug/L
CDS	0	1.516	3.23 M	N/A	
CH2CL2	2	1.600	4.74 M	3.18	ug/L
t12DCE	3	1.800	3.03 M	5.14	ug/L
11DCA	4	2.066	6.58 M	6.04	ug/L
c12DCE	5	2.533	2.43 M	5.55	ug/L
CHLOROFORM	6	2.783	34.65 M	0.52	ug/L
111TCA	7	3.016	82.77 M	0.50	ug/L
CARBON TETRACHLORIDE	8	3.216	1482.82 M	0.62	ug/L
TCE	9	4.050	38.65 M	0.48	ug/L
112 TCA	10	6.000	9.55 M	0.85	ug/L
PCE	11	6.300	154.30 M	0.56	ug/L
	12		1851.99	26.39	

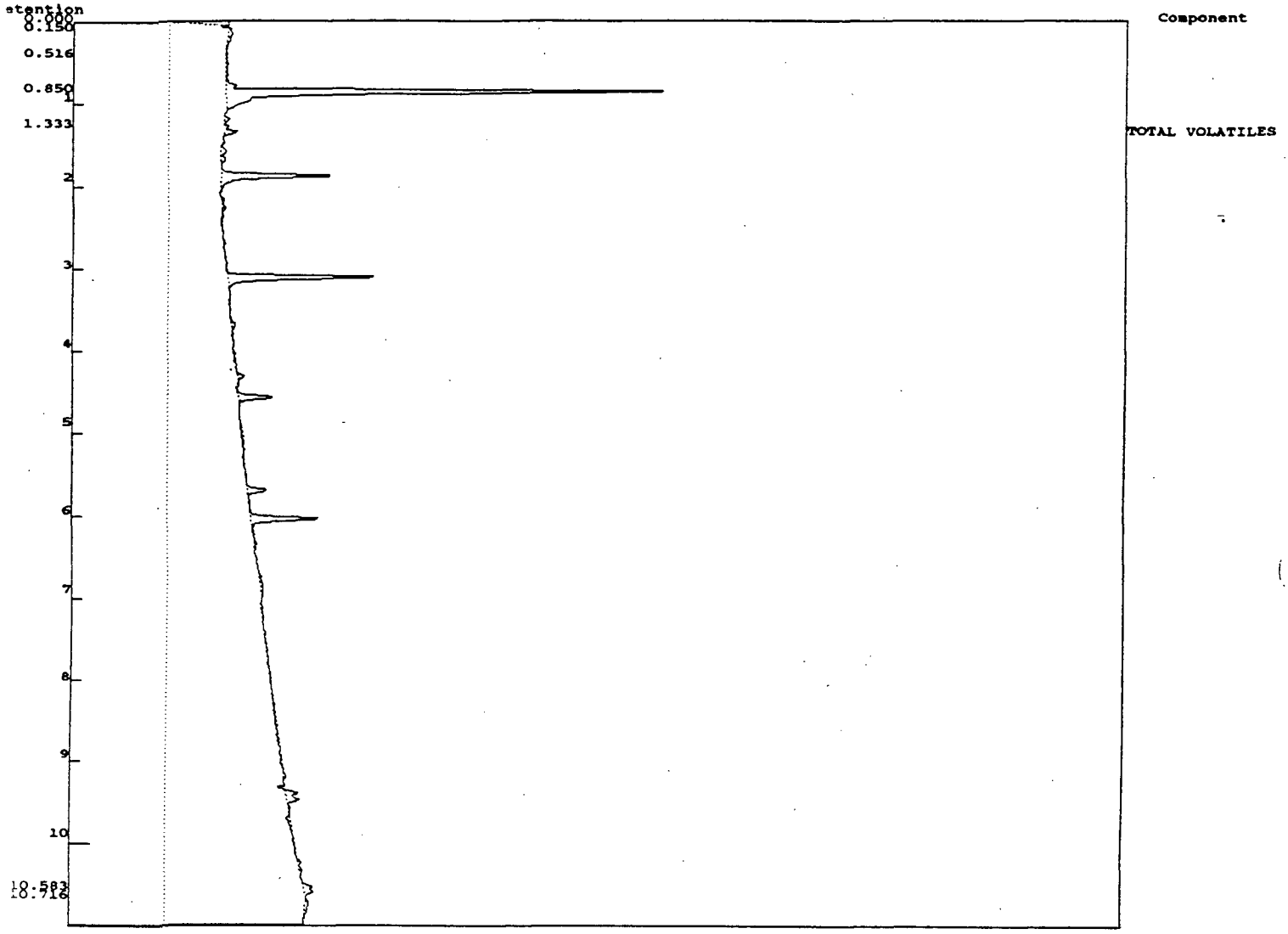
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F6.CHR (A:\JUNE01)
Sample : SG-131
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	11.17 M	11.17	ug/L
	1		11.17	11.17	

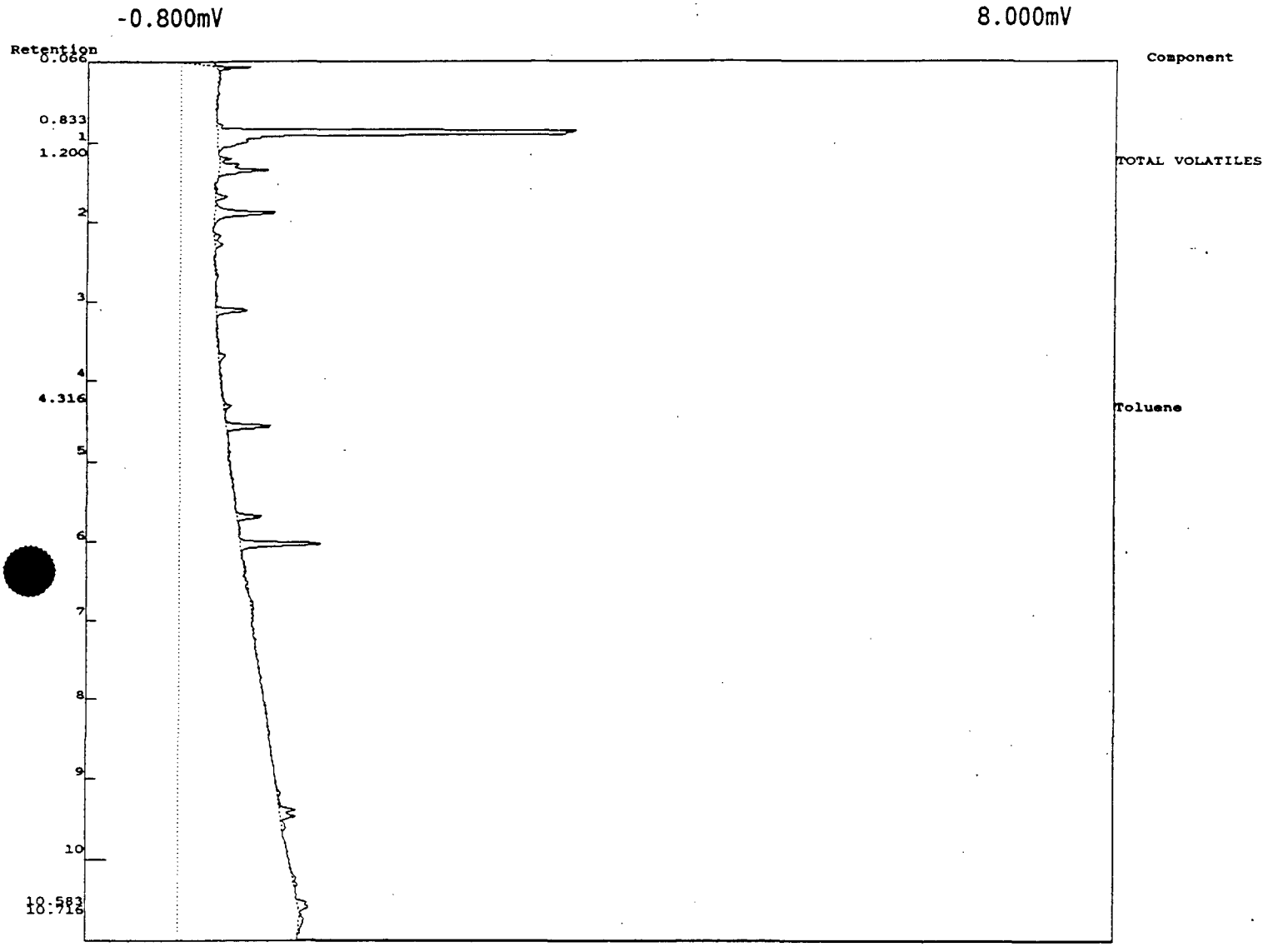
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F7.CHR (A:\JUNE01)
Sample : SG-132
Operator : SGN

-0.800mV 8.000mV



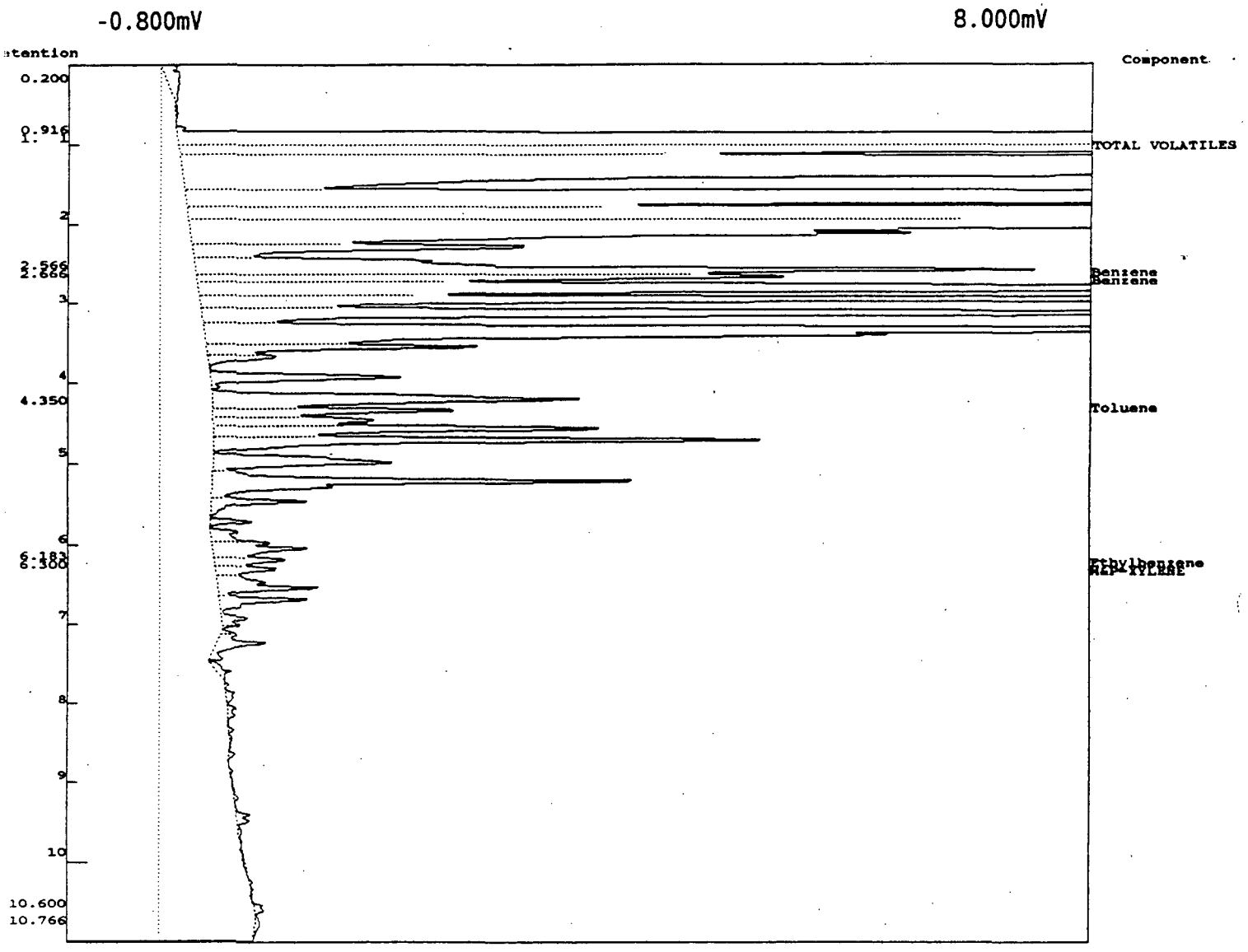
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.333	12.80 M	12.80	ug/L
1			12.80	12.80	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F8.CHR (A:\JUNE01)
Sample : SG-143
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.200	12.42 M	12.42	ug/L
Toluene	3	4.316	0.23 M	0.23	ug/L
	2		12.66	12.66	

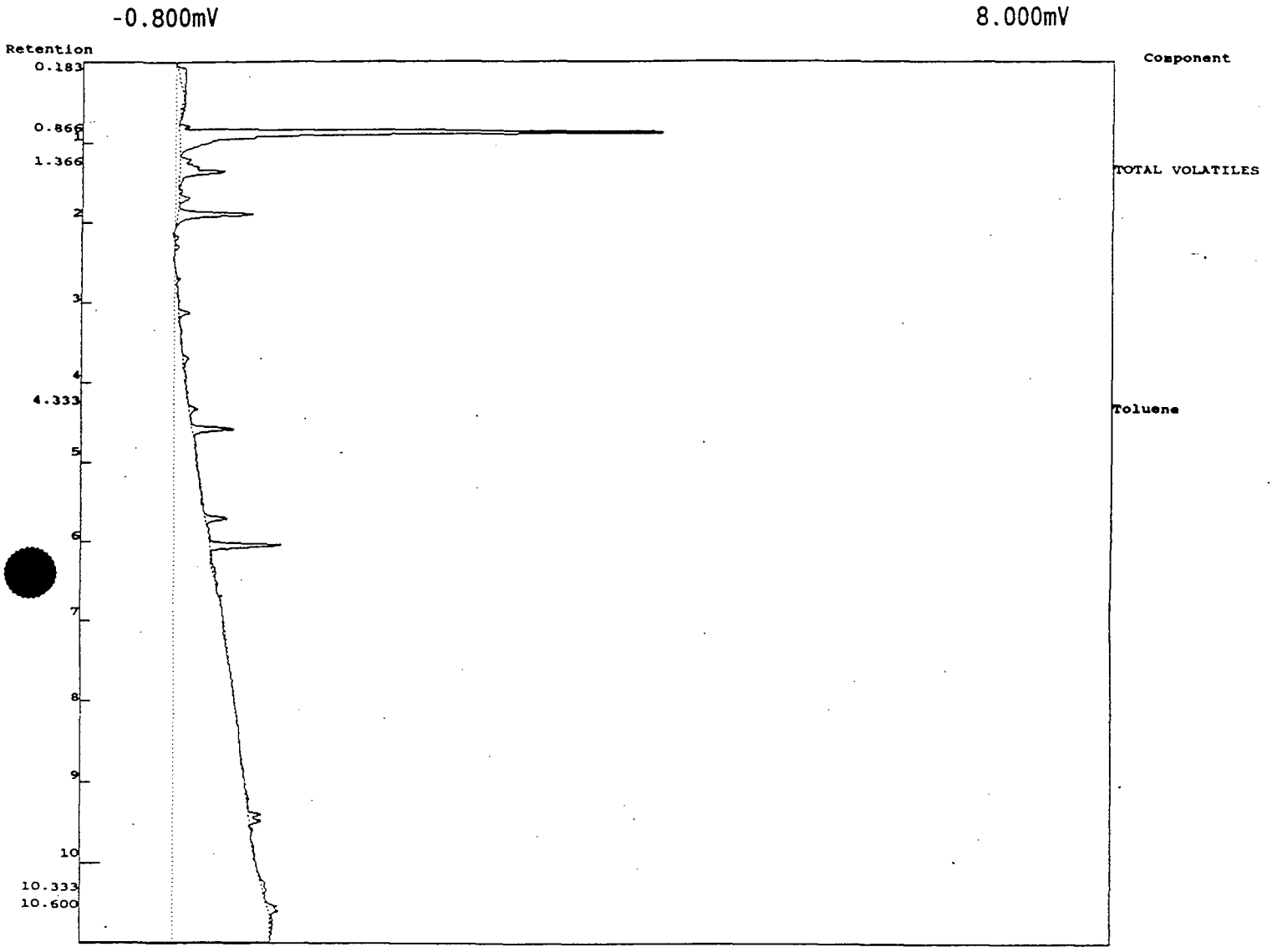
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F9.CHR (A:\JUNE01)
Sample : SG-144
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	2294.84 M	2294.84	ug/L
Benzene	2	2.566	39.68 M	33.29	ug/L
~~Benzene~~	~~2~~	~~2.666~~	~~26.20 M~~	~~21.98~~	ug/L
Toluene	3	4.350	8.79 M	8.79	ug/L
Ethylbenzene	4	6.183	3.08 M	3.60	ug/L
M,P-XYLENE	5	6.300	2.60 M	3.25	ug/L
	6		2375.19	2365.75	

300841

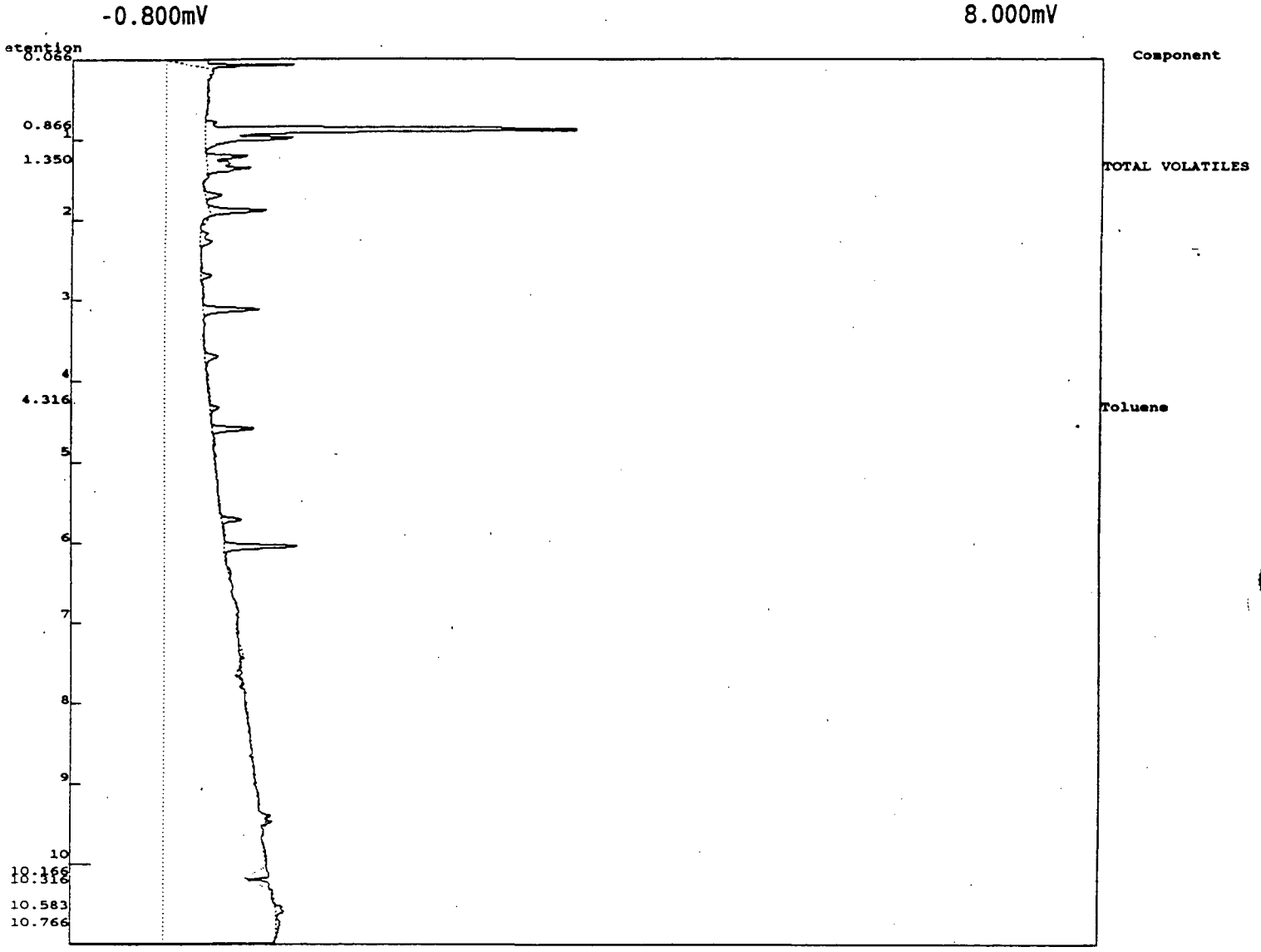
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F10.CHR (A:\JUNE01)
Sample : SG-146
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	11.09 M	11.09	ug/L
Toluene	3	4.333	0.27 M	0.27	ug/L
	2		11.37	11.37	

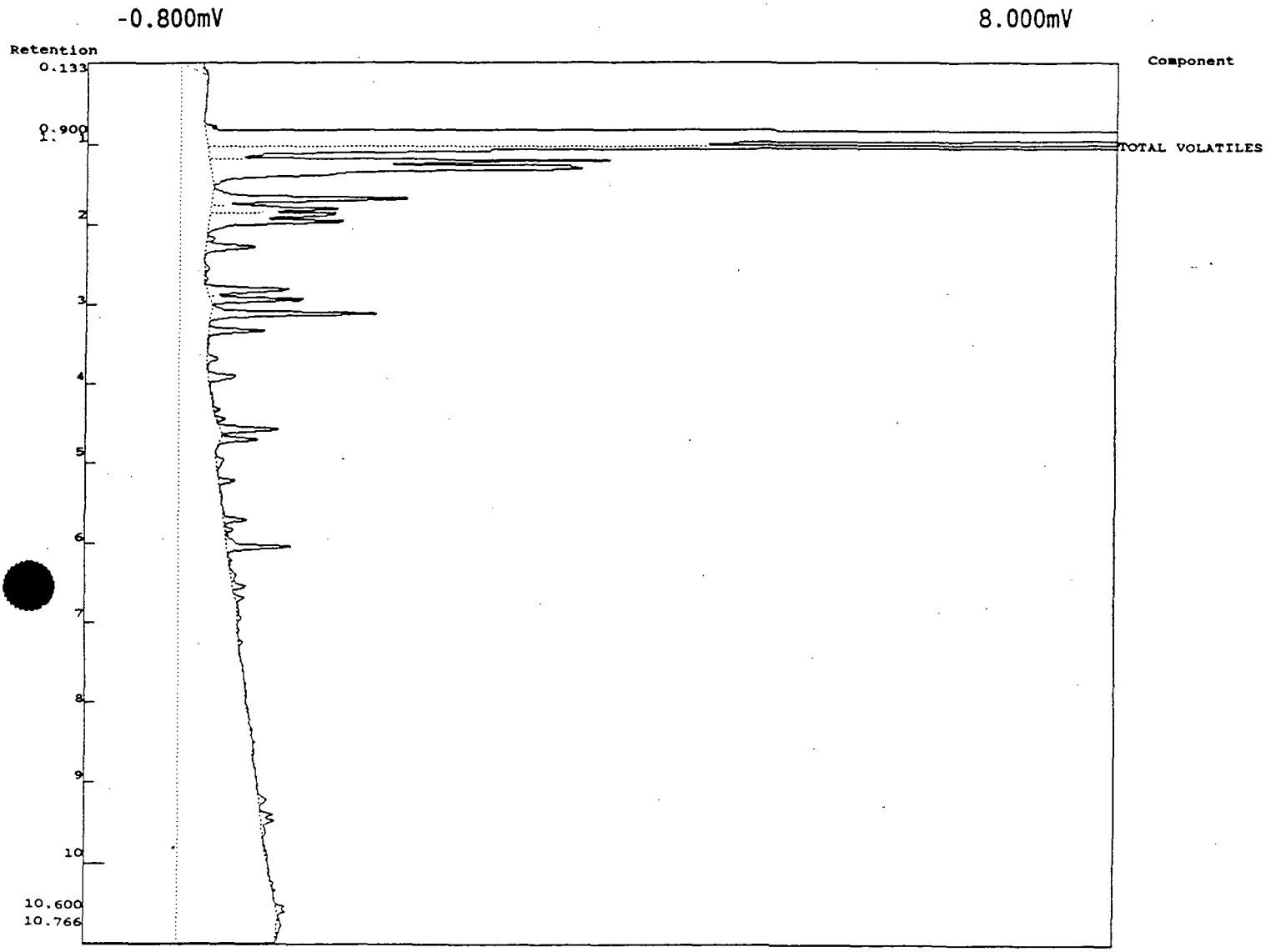
300842

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F11.CHR (A:\JUNE01)
Sample : SG-147
Operator : SGN



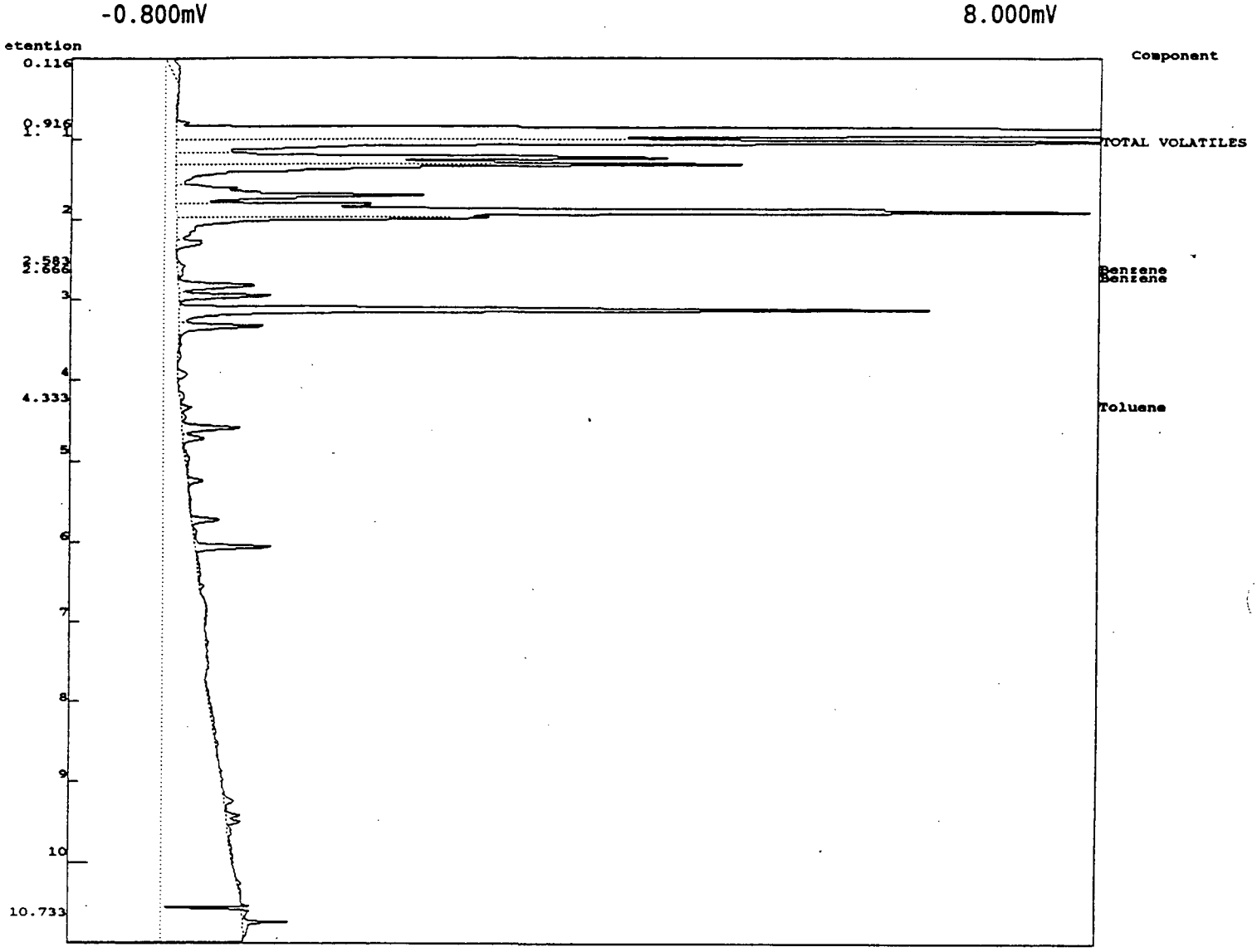
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.350	12.70 M	12.70	ug/L
luene	3	4.316	0.27 M	0.27	ug/L
	2		12.97	12.97	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F12.CHR (A:\JUNE01)
Sample : SG-153
Operator : SGN



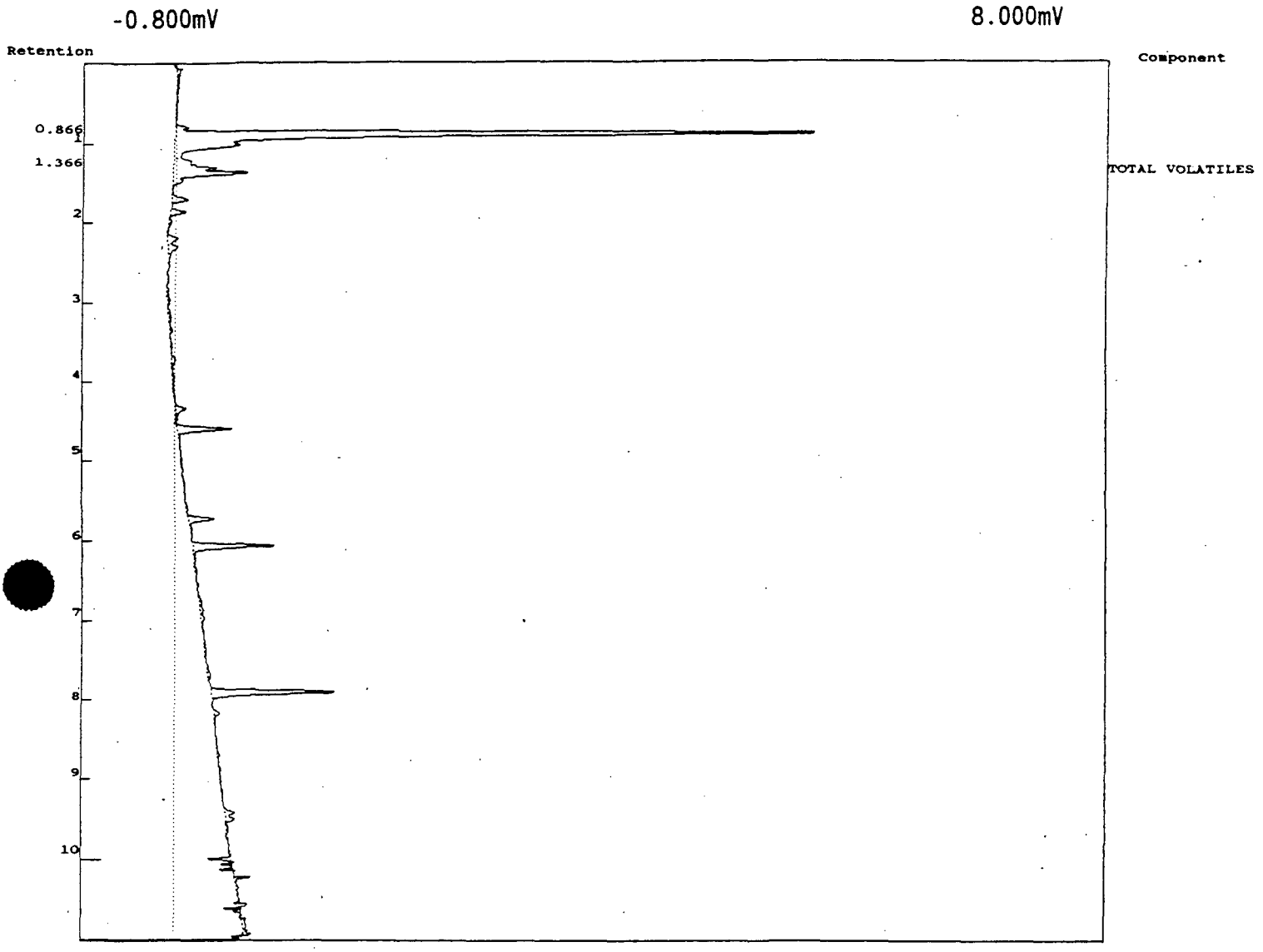
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	116.84 M	116.84	ug/L
	1		116.84	116.84	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F13.CHR (A:\JUNE01)
Sample : SG-154
Operator : SGN



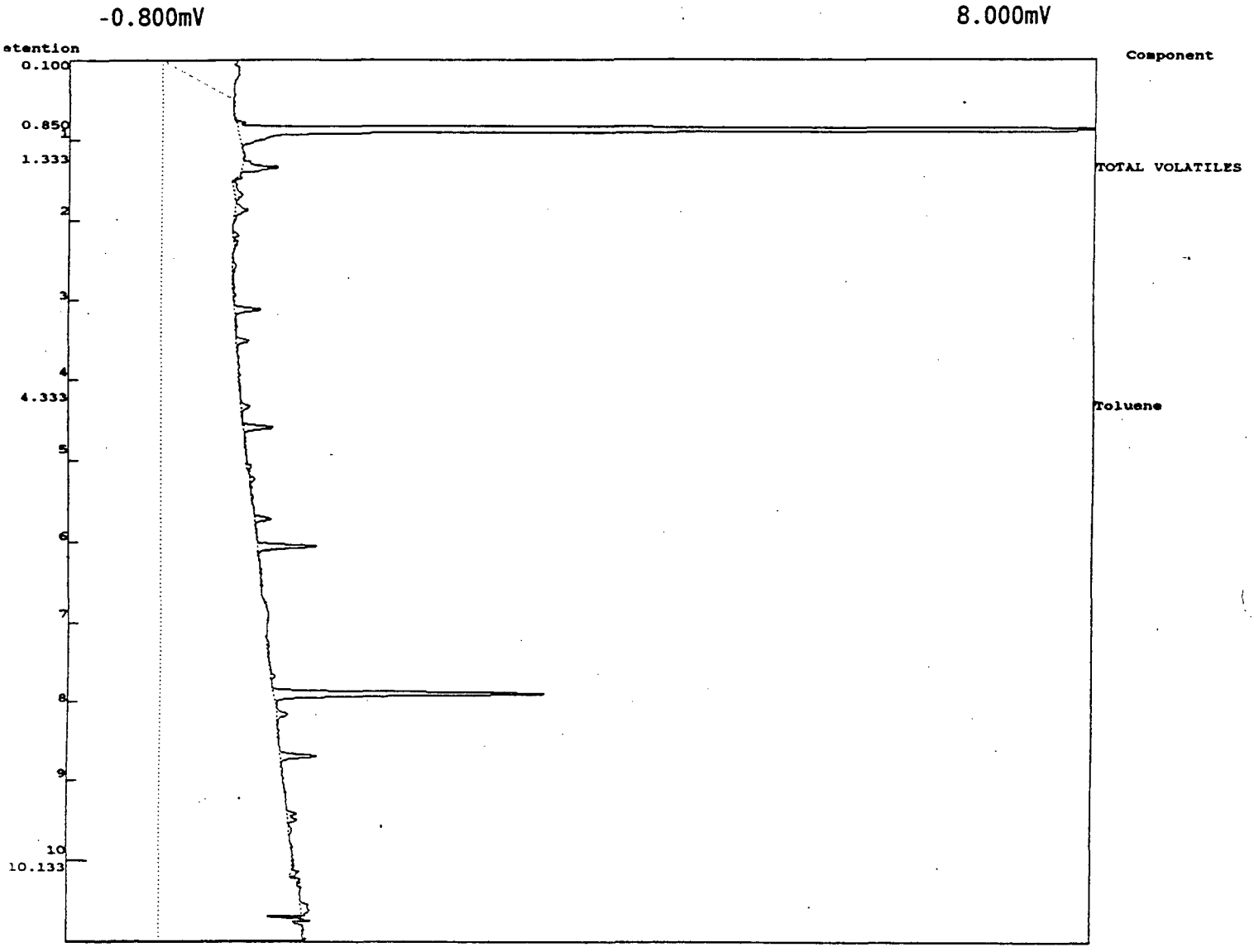
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.016	177.29 M	177.29	ug/L
enzene	2	2.583	0.33 M	0.27	ug/L
enzene	2	2.666	0.20 M	0.17	ug/L
oluene	3	4.333	0.28 M	0.28	ug/L
	4		178.10	178.01	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F14.CHR (A:\JUNE01)
Sample : SG-203
Operator : SGN



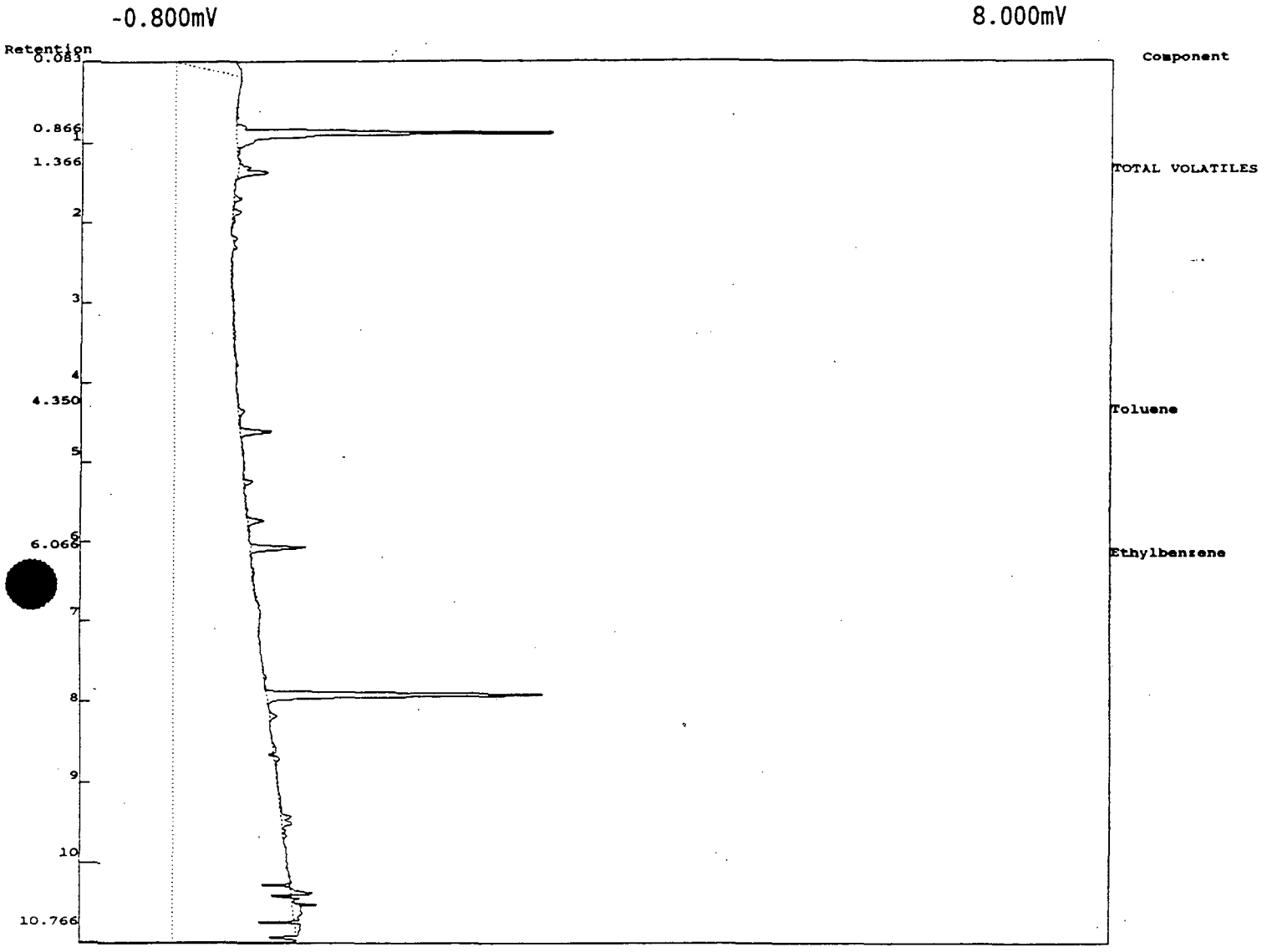
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	16.15 M	16.15	ug/L
	1		16.15	16.15	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F15.CHR (A:\JUNE01)
Sample : SG-204
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.333	17.67 M	17.67	ug/L
luene	3	4.333	0.35 M	0.35	ug/L
	2		18.02	18.02	

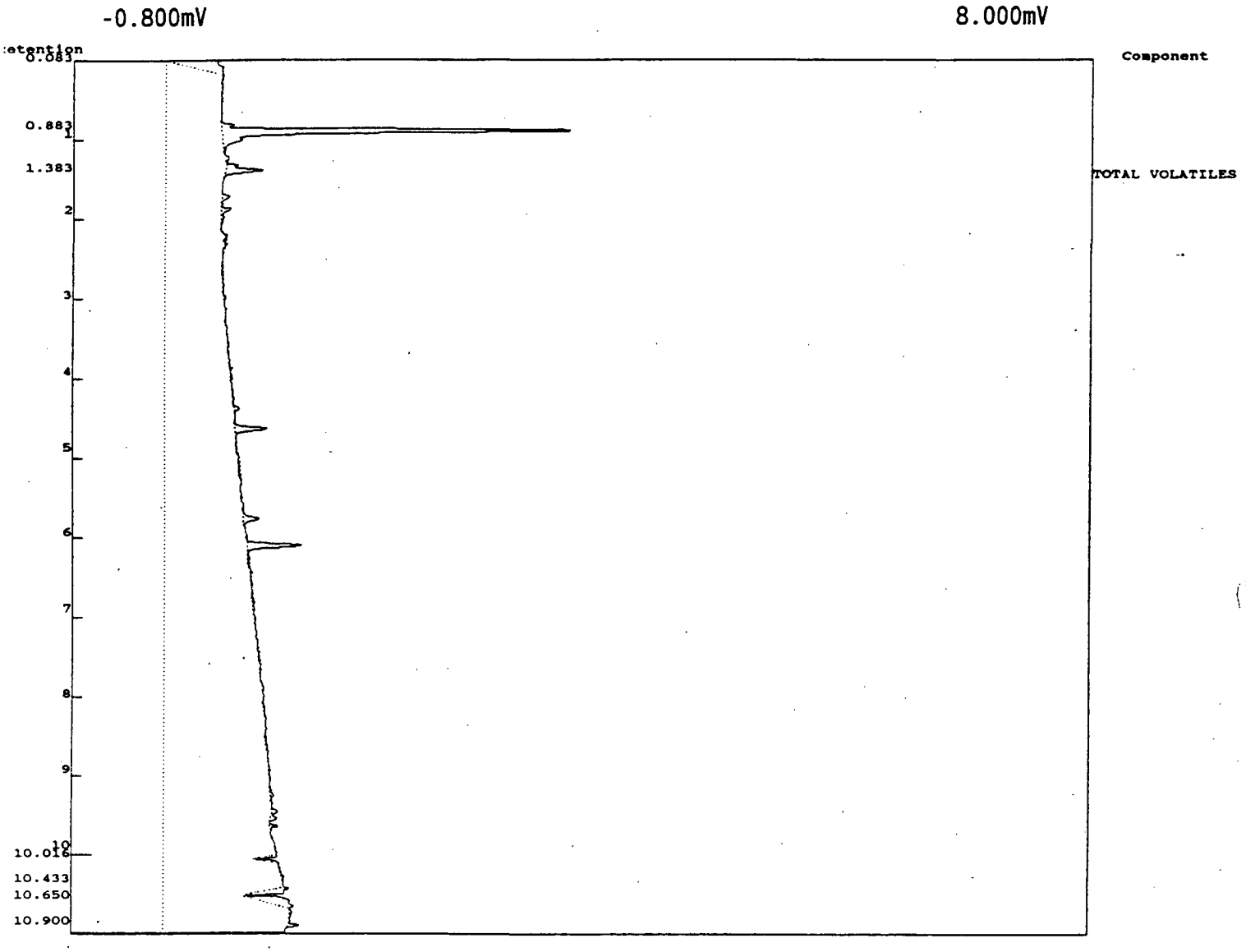
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F16.CHR (A:\JUNE01)
Sample : SG-205
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	14.72 M	14.72	ug/L
Toluene	3	4.350	0.26 M	0.26	ug/L
Ethylbenzene	4	6.066	1.49 M	1.74	ug/L
	3		16.47	16.72	

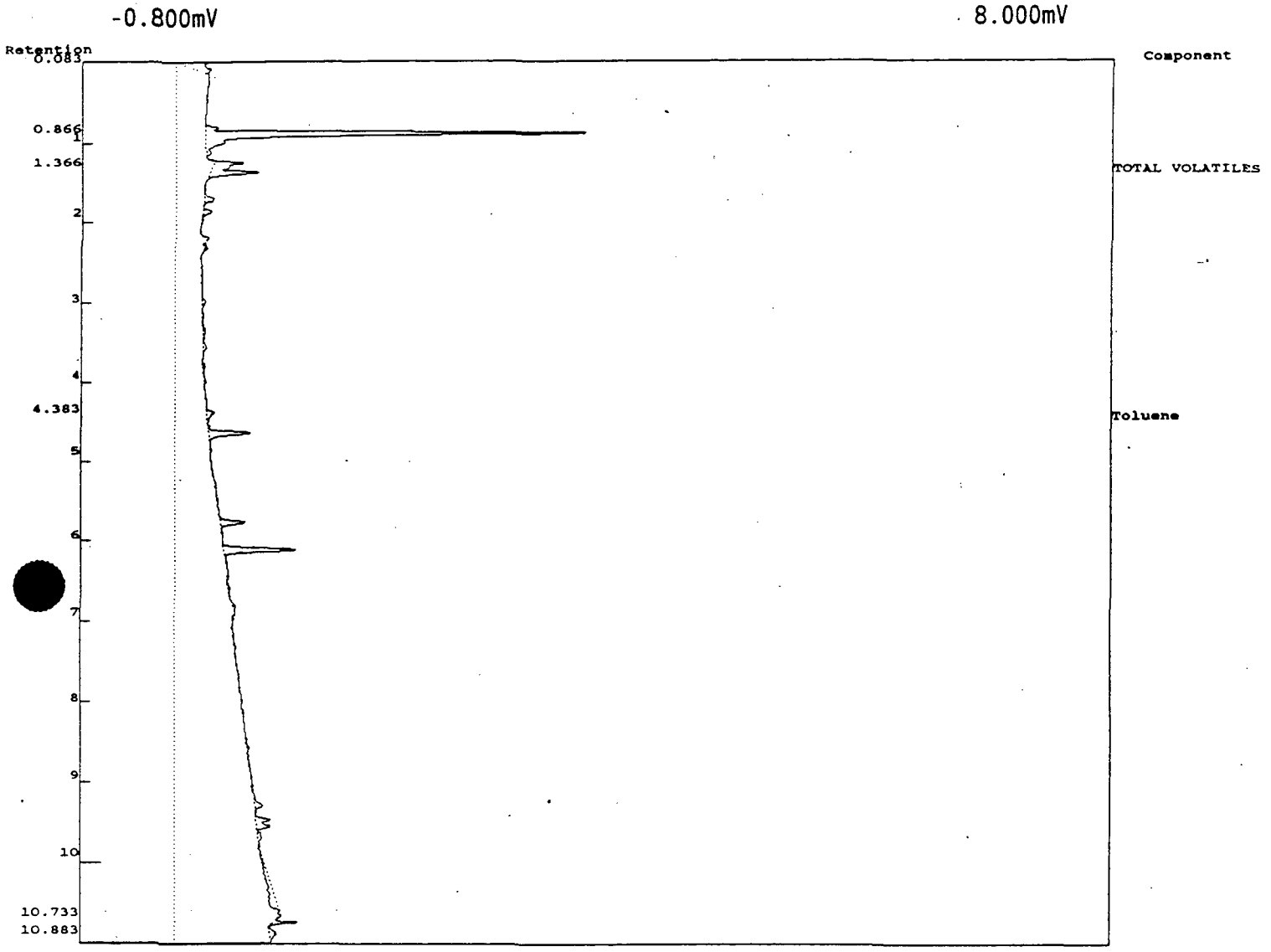
300848

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F17.CHR (A:\)
Sample : EB-21
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	5.06 M	5.06	ug/L
	1		5.06	5.06	

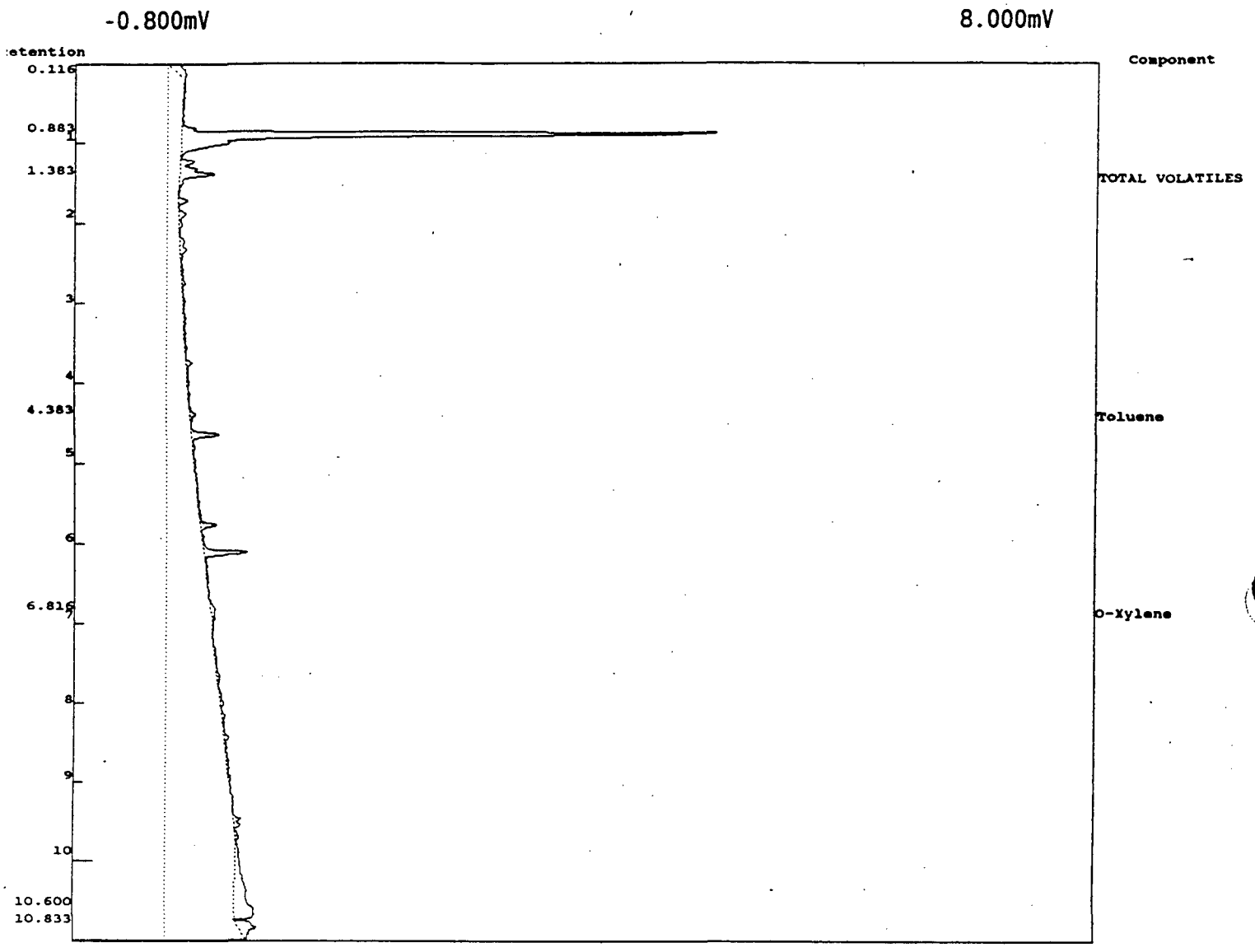
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F18.CHR (A:\)
Sample : EB-22
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.366	8.82 M	8.82	ug/L
Toluene	3	4.383	0.32 M	0.32	ug/L
	2		9.14	9.14	

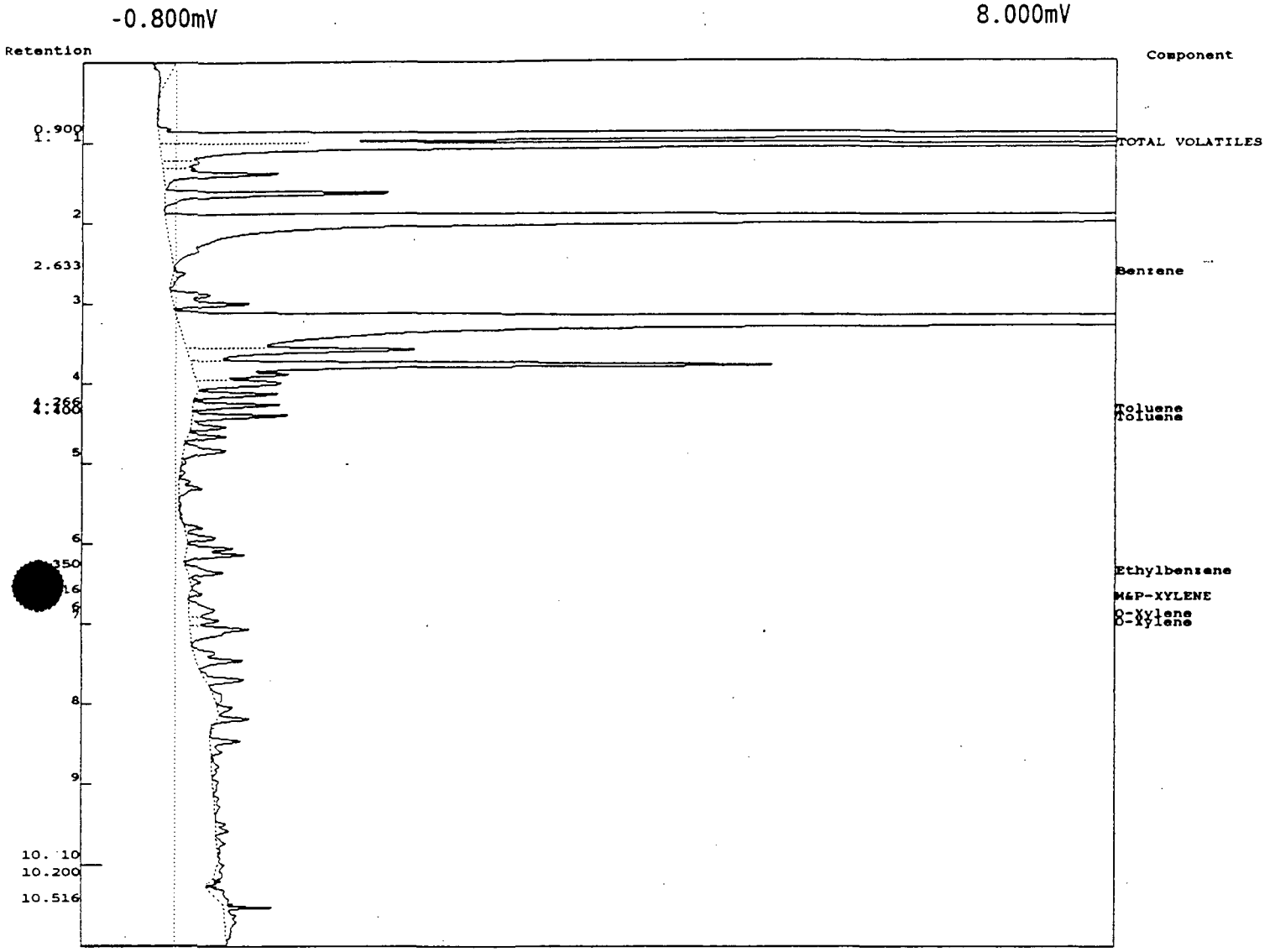
300850

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F19.CHR (A:\)
Sample : SG-165-R
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.383	9.36	9.36	ug/L
oluene	3	4.383	0.27	0.27	ug/L
-Xylene	6	6.816	0.32	0.39	ug/L
	3		9.95	10.02	

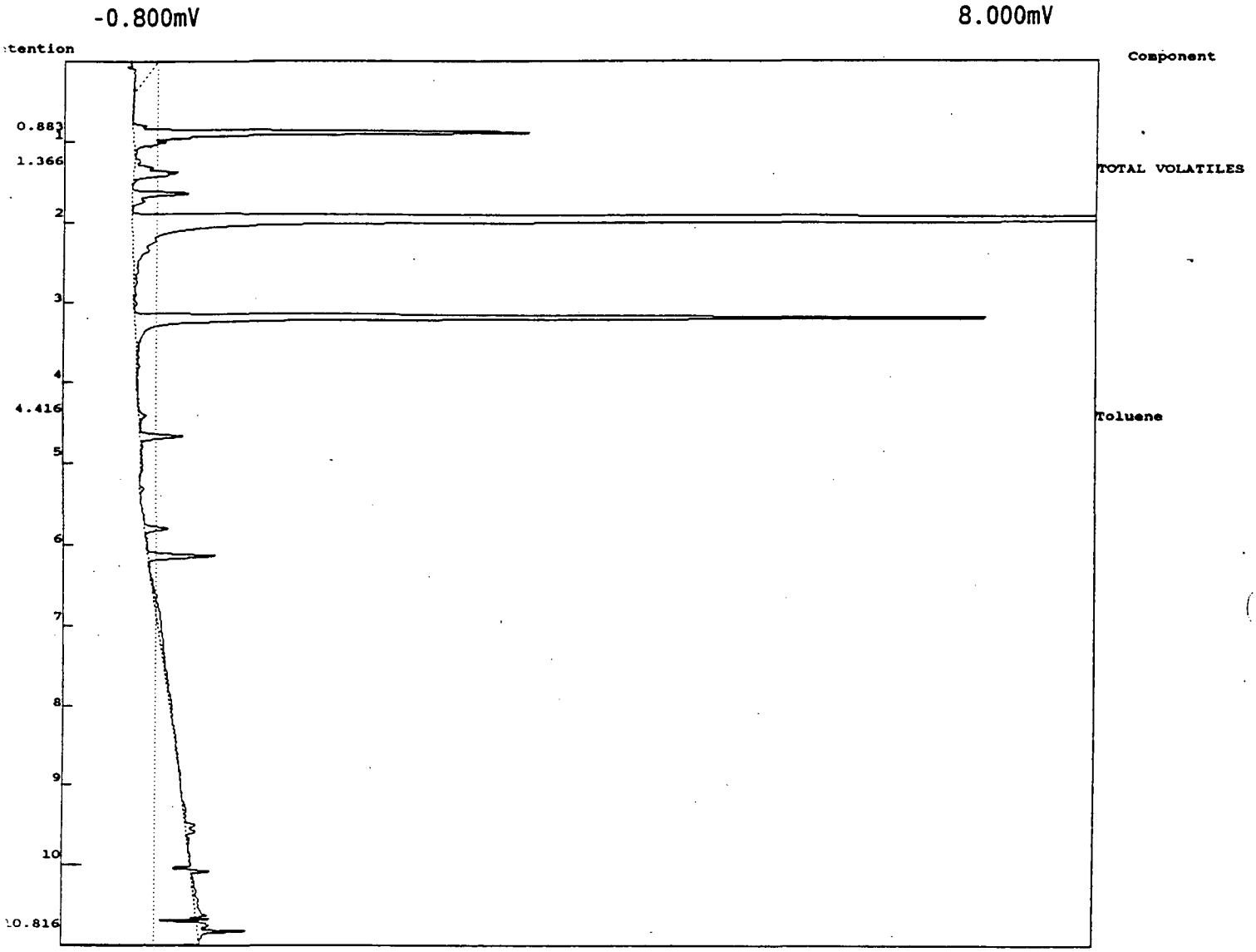
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F23.CHR (A:\)
Sample : SG-082
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	1203.76 M	1203.76	ug/L
Benzene	2	2.633	0.66	0.56	ug/L
~~Toluene~~	~~3~~	~~4.266~~	~~2.48~~	~~2.48~~	~~ug/L~~
Toluene	3	4.400	3.67	3.67	ug/L
~~Ethylbenzene~~	~~4~~	~~6.350~~	~~1.76~~	~~2.06~~	~~ug/L~~
M&P-XYLENE	5	6.616	0.37	0.46	ug/L
O-Xylene	6	6.816	1.50 M	1.83	ug/L
O-Xylene	6	6.950	1.06 M	1.30	ug/L
	8		1215.26	1216.12	

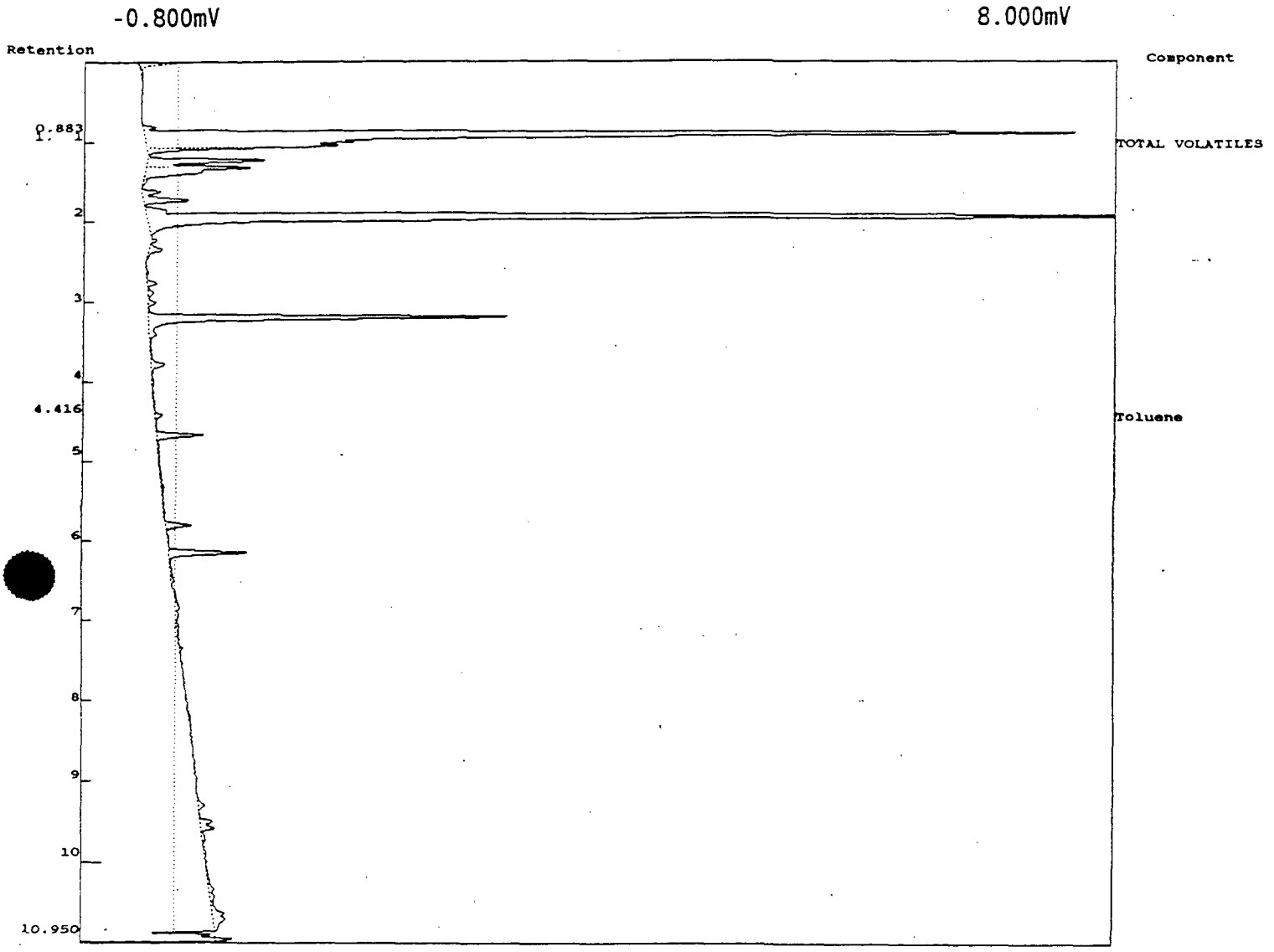
300852

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F24.CHR (A:\)
Sample : SG-110
Operator : SGN



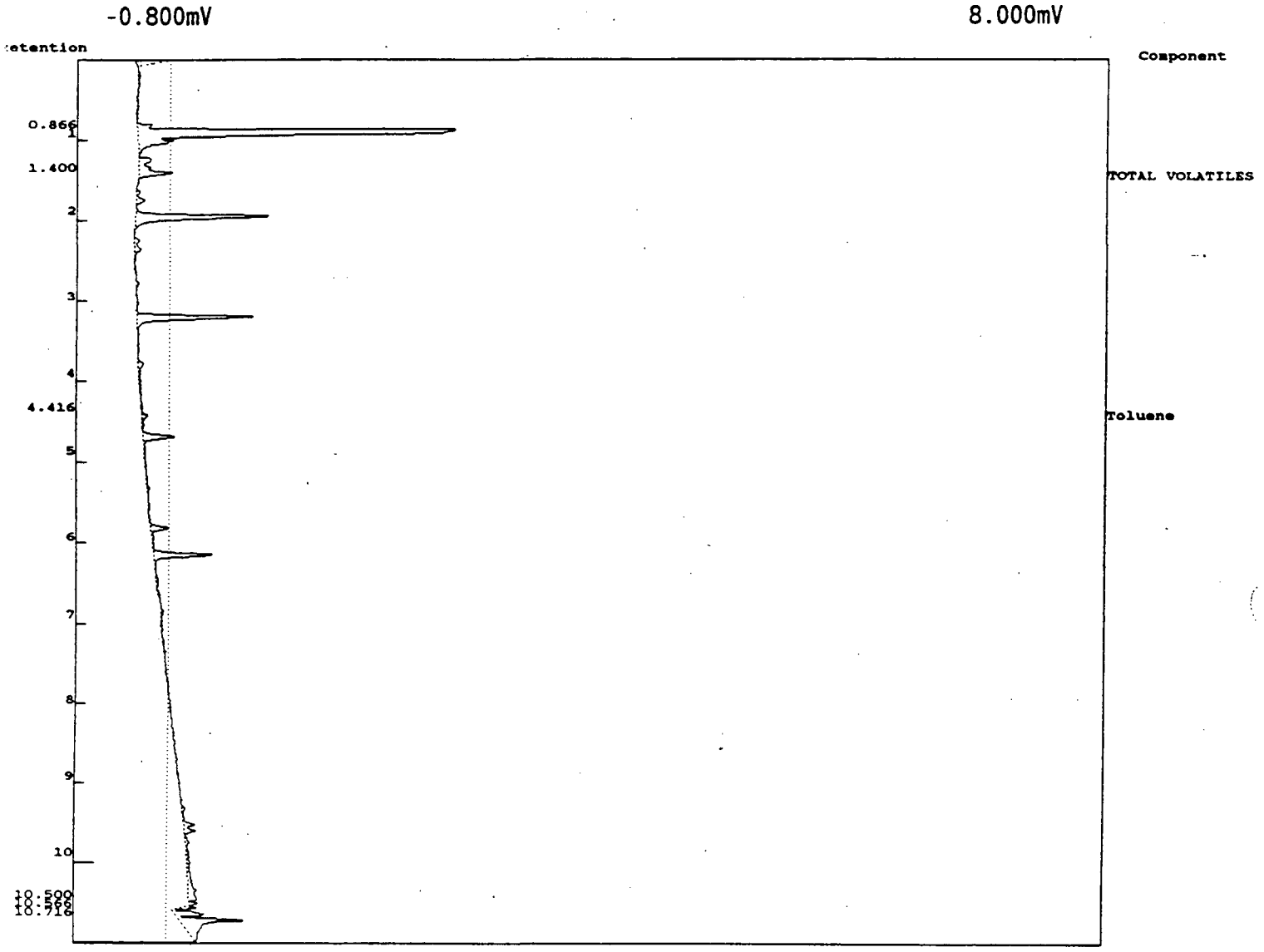
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.366	149.97	149.97	ug/L
luene	3	4.416	0.29	0.29	ug/L
	2		150.26	150.26	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F25.CHR (A:\)
Sample : SG-111
Operator : SGN



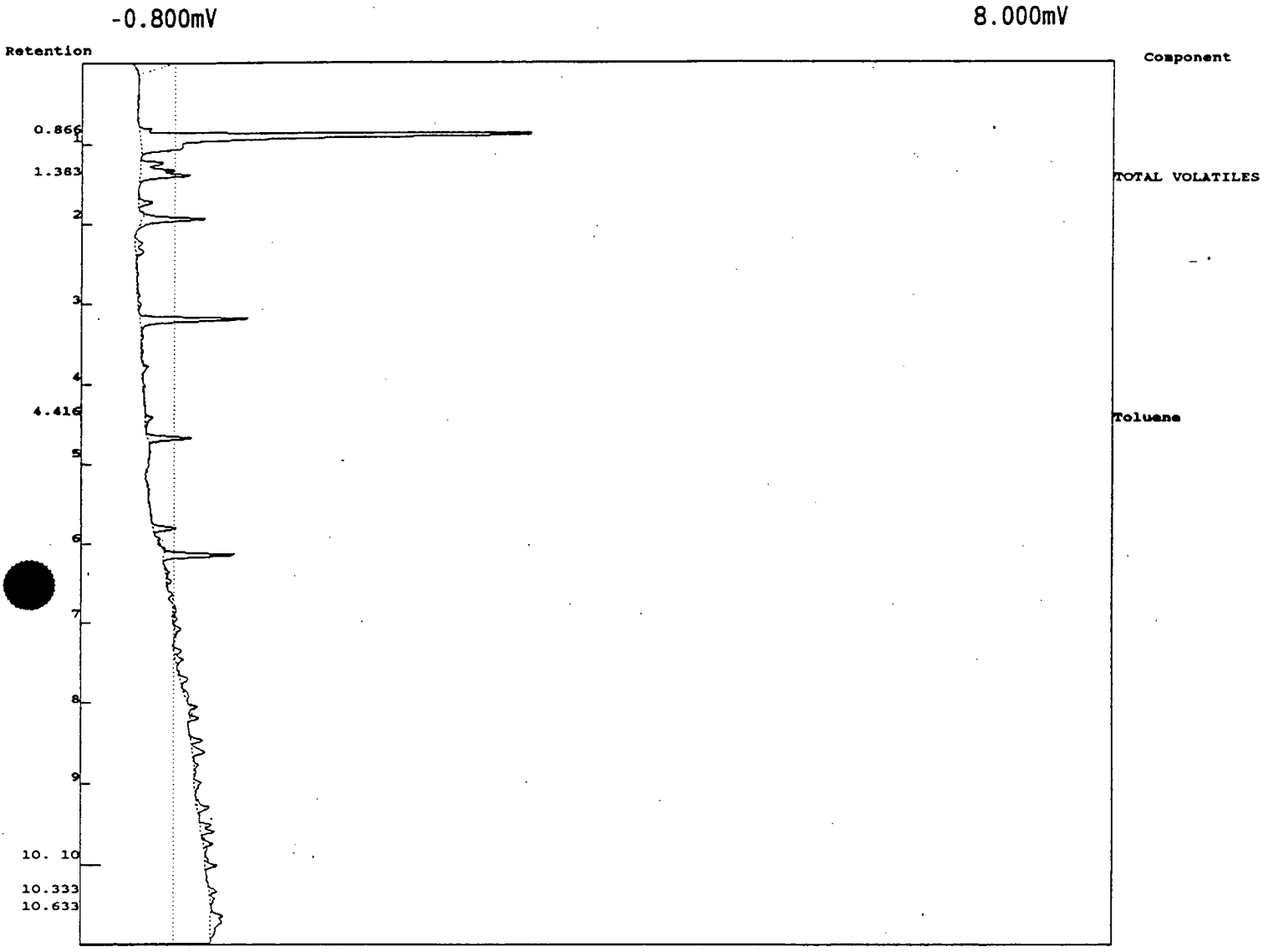
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.050	71.95 M	71.95	ug/L
Toluene	3	4.416	0.23	0.23	ug/L
	2		72.18	72.18	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F26.CHR (A:\)
Sample : SG-119
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.400	14.64 M	14.64	ug/L
luene	3	4.416	0.21	0.21	ug/L
	2		14.85	14.85	

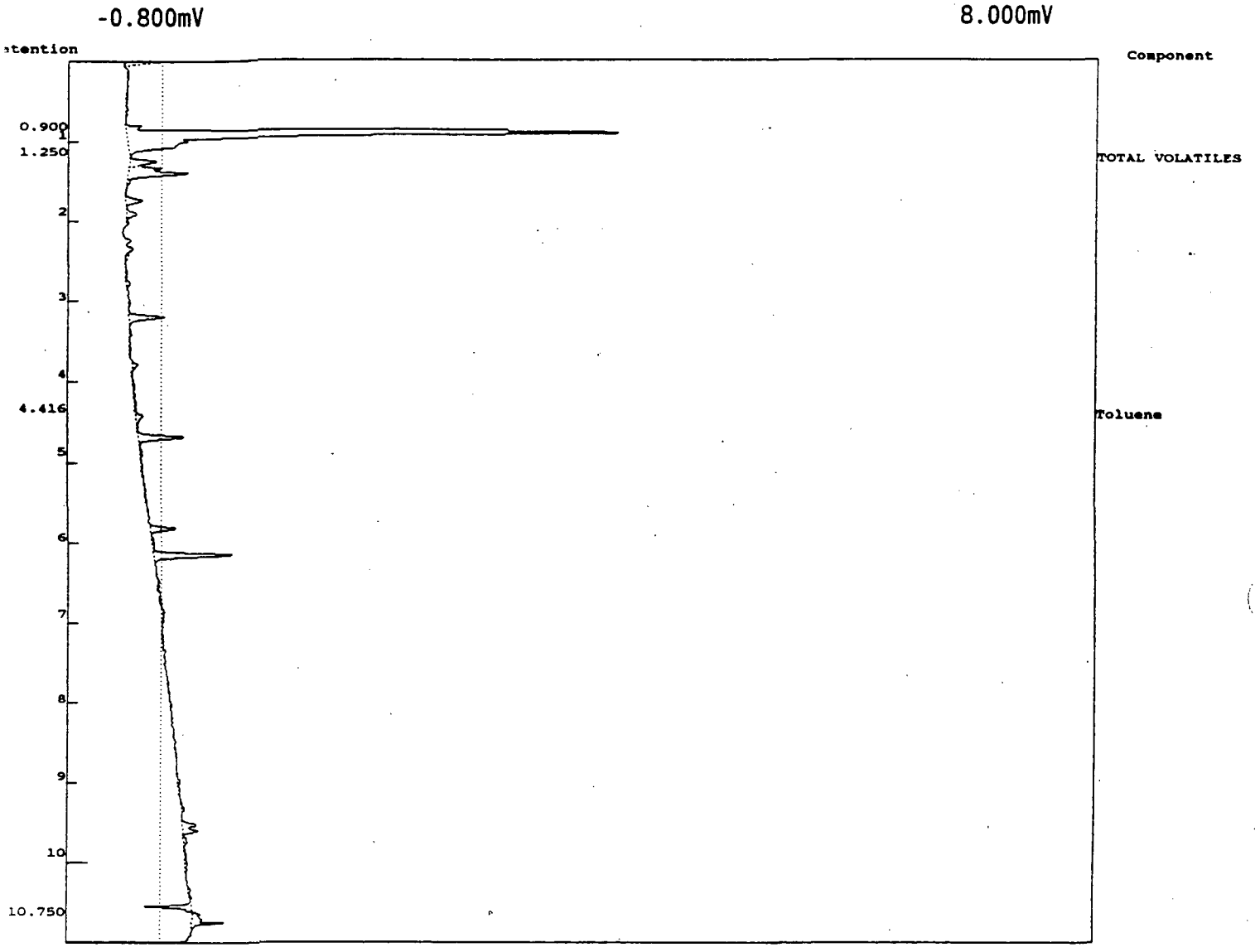
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F27.CHR (A:\)
Sample : SG-120
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.383	17.23 M	17.23	ug/L
Toluene	3	4.416	0.28 M	0.28	ug/L
	2		17.51	17.51	

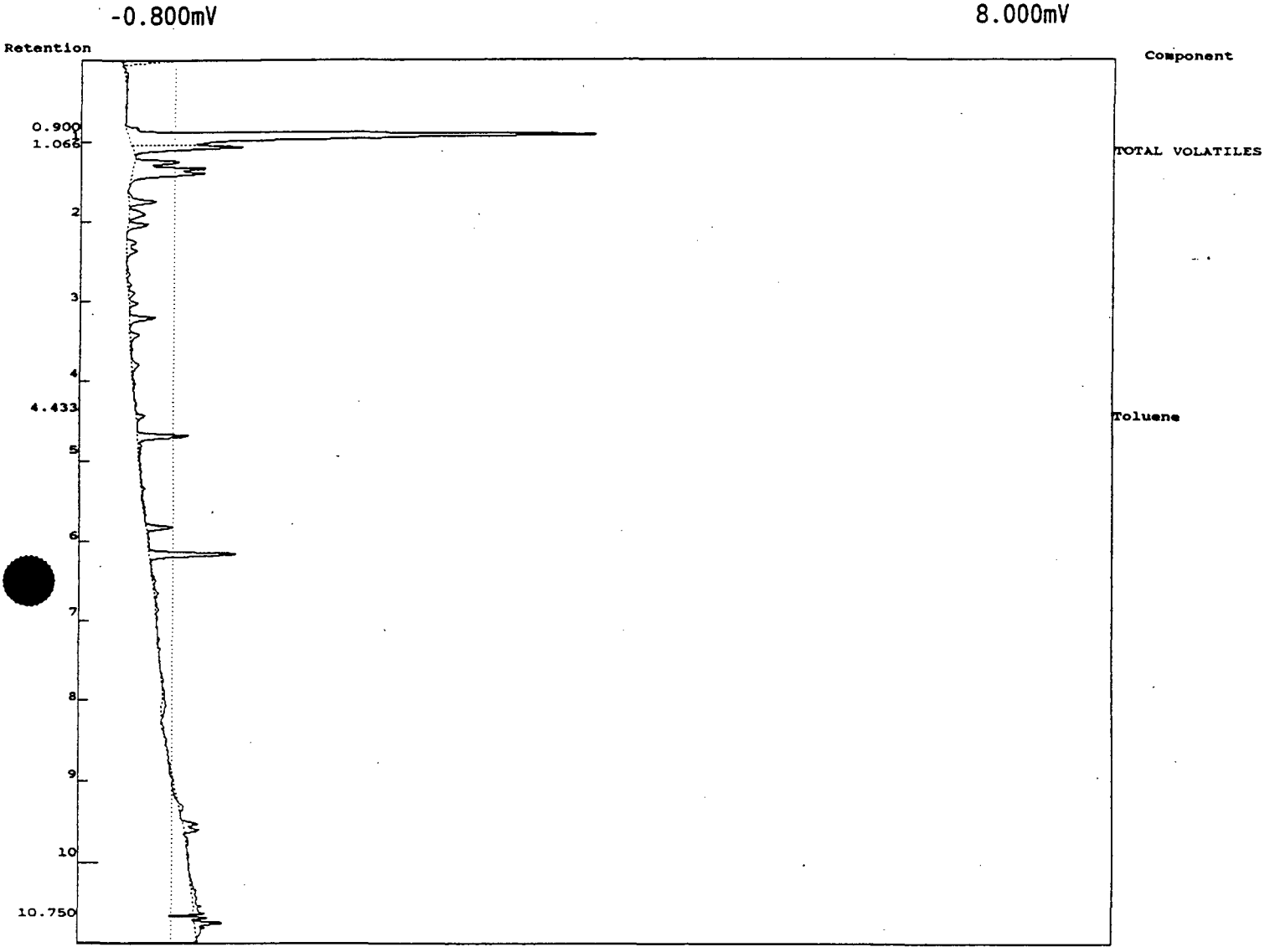
300856

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F28.CHR (A:\)
Sample : SG-121
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.250	11.05 M	11.05	ug/L
luene	3	4.416	0.38 M	0.38	ug/L
	2		11.43	11.43	

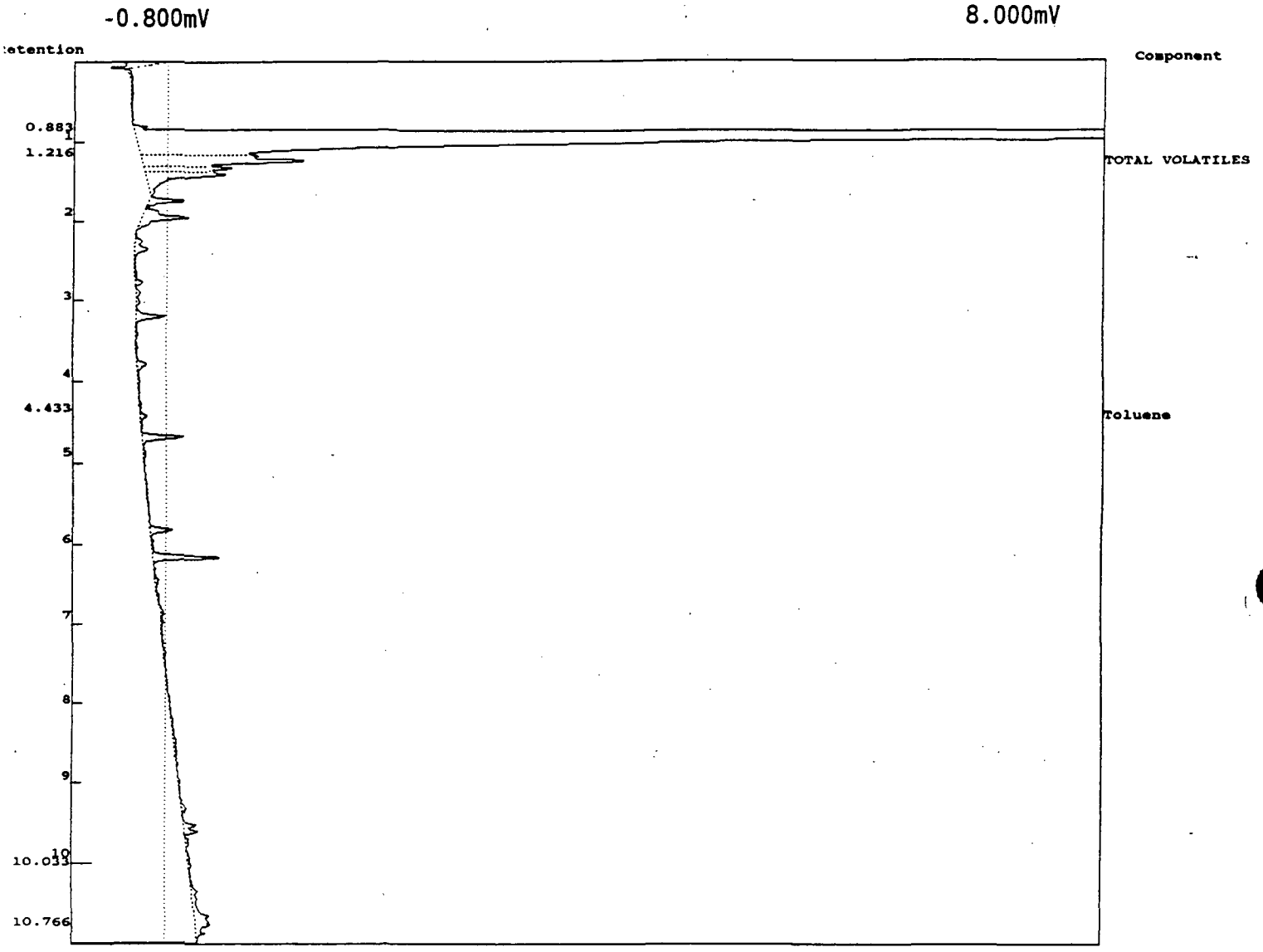
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F29.CHR (A:\)
Sample : SG-122
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.066	21.71 M	21.71	ug/L
Toluene	3	4.433	0.34	0.34	ug/L
	2		22.05	22.05	

300858

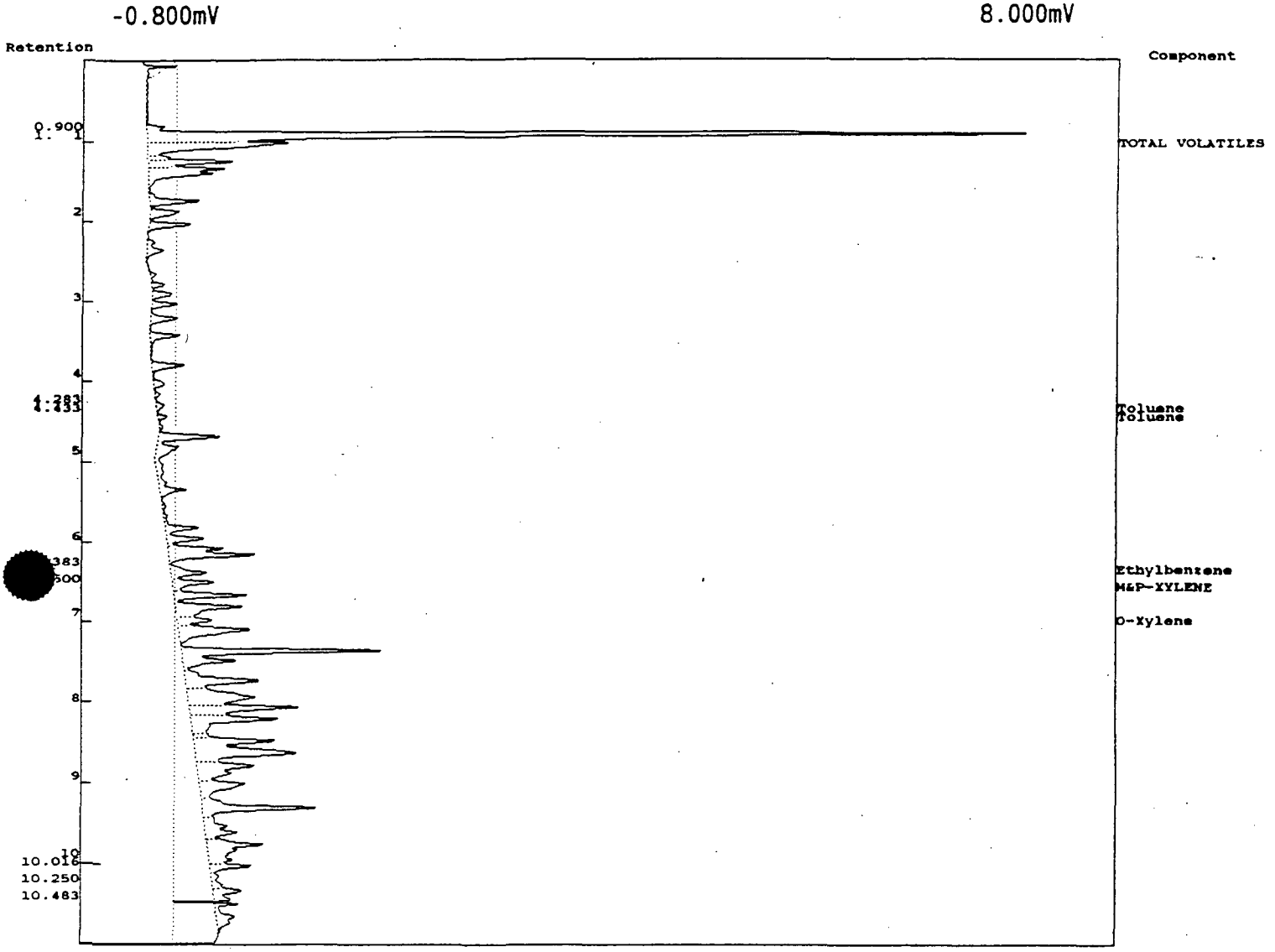
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F30.CHR (A:\)
Sample : SG-123
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.216	28.90 M	28.90	ug/L
oluene	3	4.433	0.31	0.31	ug/L
	2		29.21	29.21	

300859

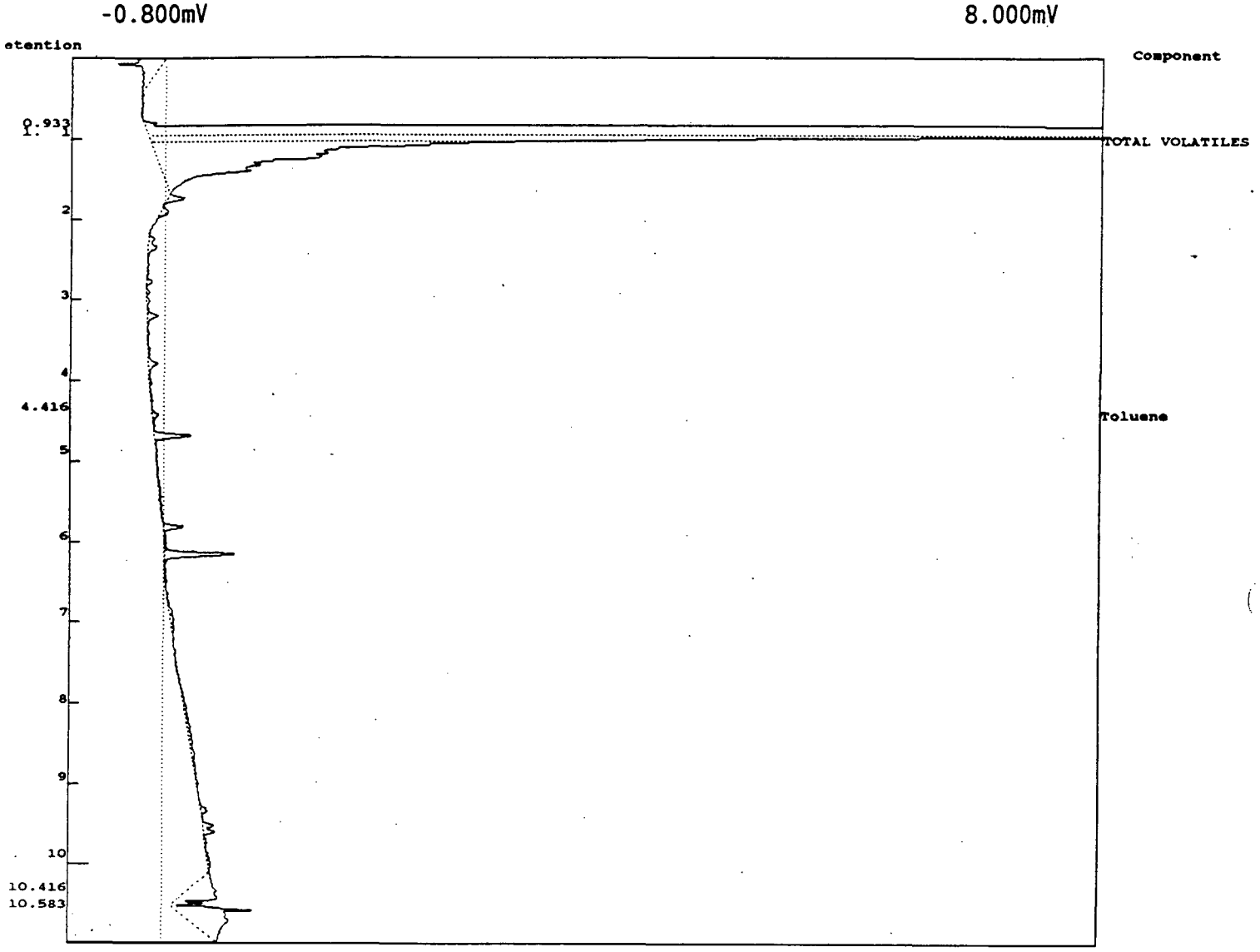
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F31.CHR (A:\)
Sample : SG-124
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.016	101.39 M	101.39	ug/L
Toluene	3	4.283	0.28	0.28	ug/L
Toluene	3	4.433	0.24	0.24	ug/L
~~Ethylbenzene~~	~~4~~	~~6.383~~	~~1.38 M~~	~~1.61~~	~~ug/L~~
M&P-XYLENE	5	6.500	1.51 M	1.89	ug/L
~~O-Xylene~~	~~6~~	~~6.966~~	~~1.25 M~~	~~1.52~~	~~ug/L~~
	6		106.04	106.93	

300860

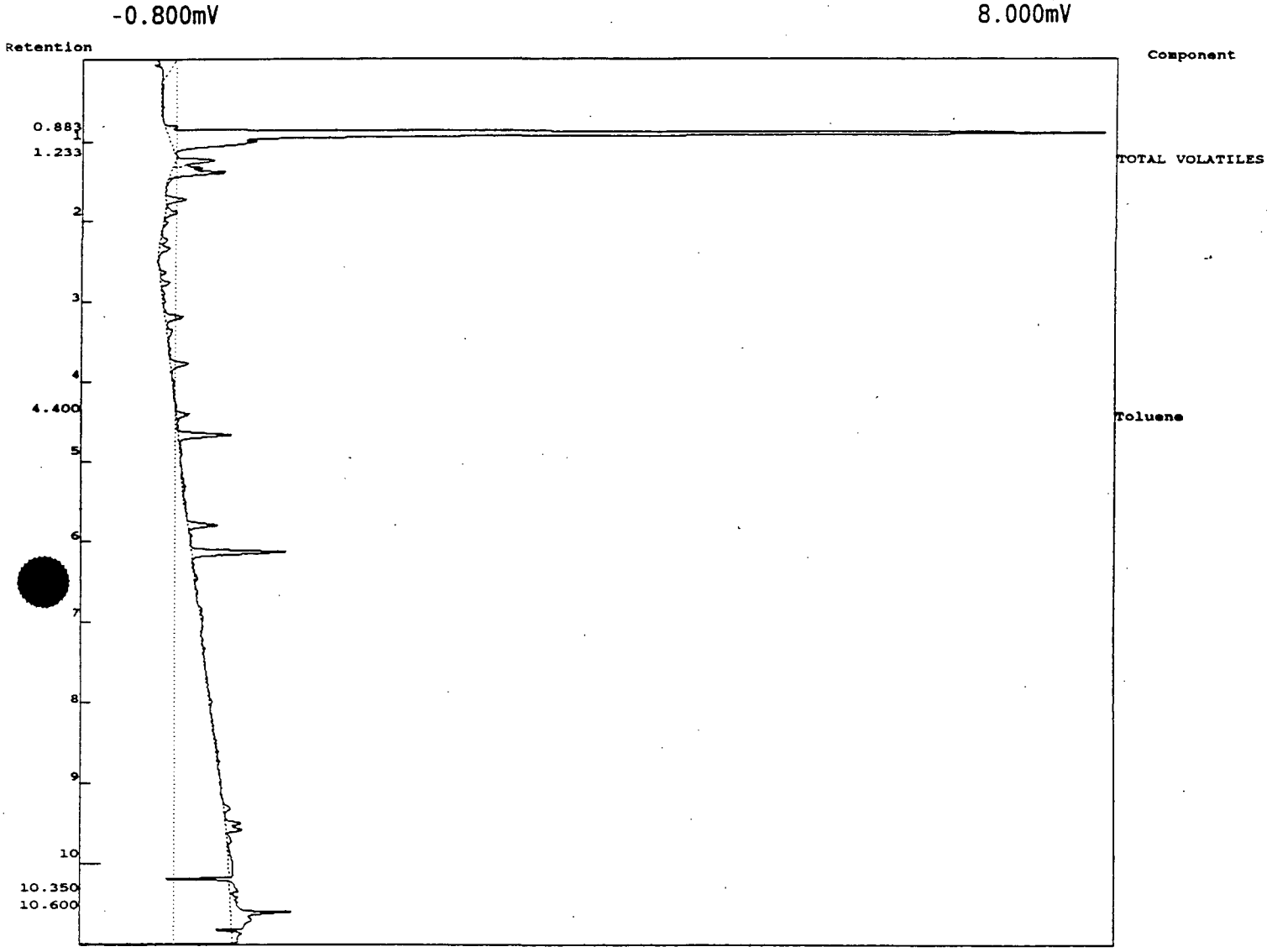
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F32.CHR (A:\)
Sample : SG-125
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.016	49.16 M	49.16	ug/L
oluene	3	4.416	0.28	0.28	ug/L
	2		49.45	49.45	

300861

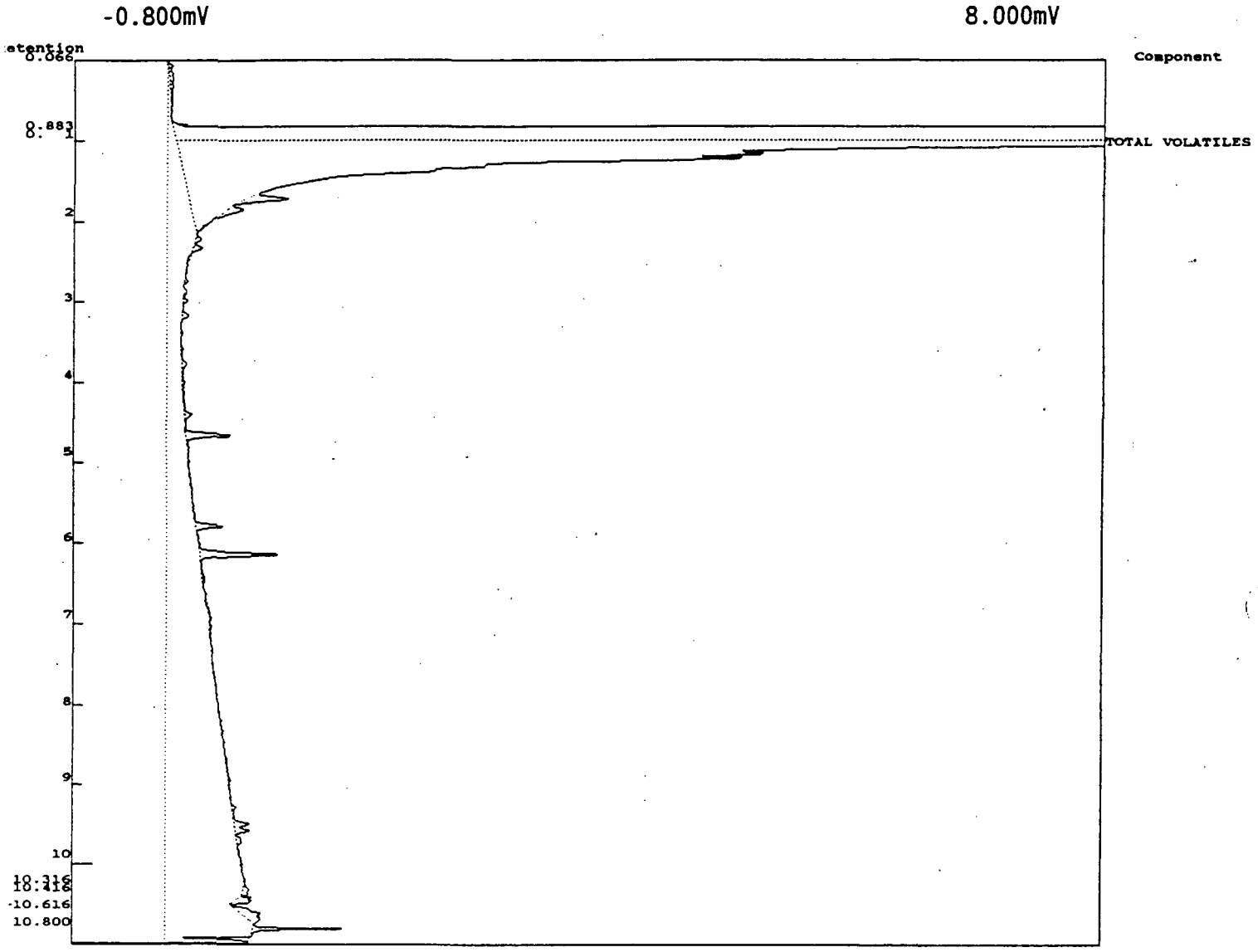
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F33.CHR (A:\)
Sample : SG-126
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.233	15.38 M	15.38	ug/L
Toluene	3	4.400	0.44	0.44	ug/L
	2		15.82	15.82	

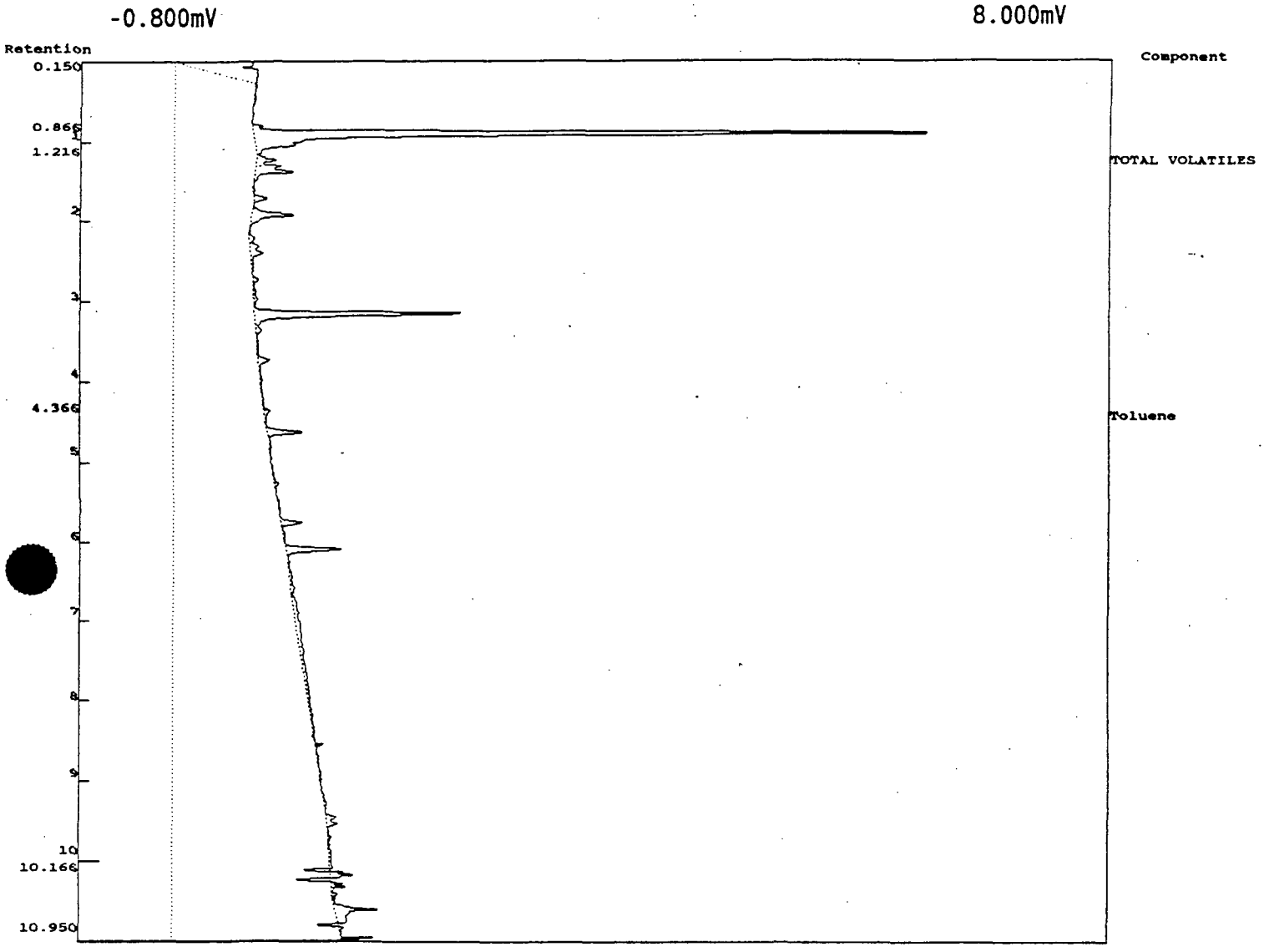
300862

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F34.CHR (A:\)
Sample : SG-135
Operator : SGN



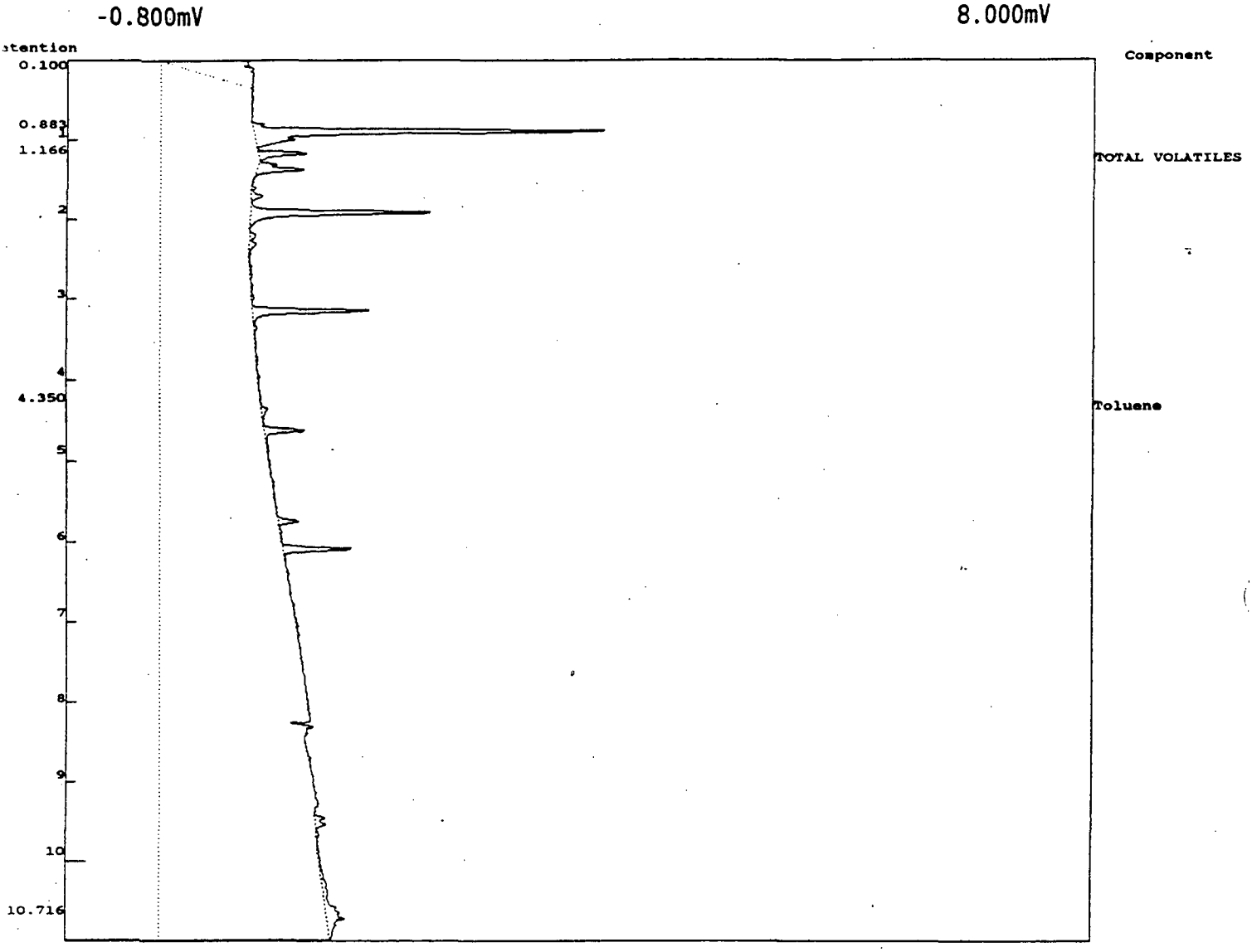
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	189.12 M	189.12	ug/L
	1		189.12	189.12	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F38.CHR (A:\)
Sample : SG-133
Operator : SGN



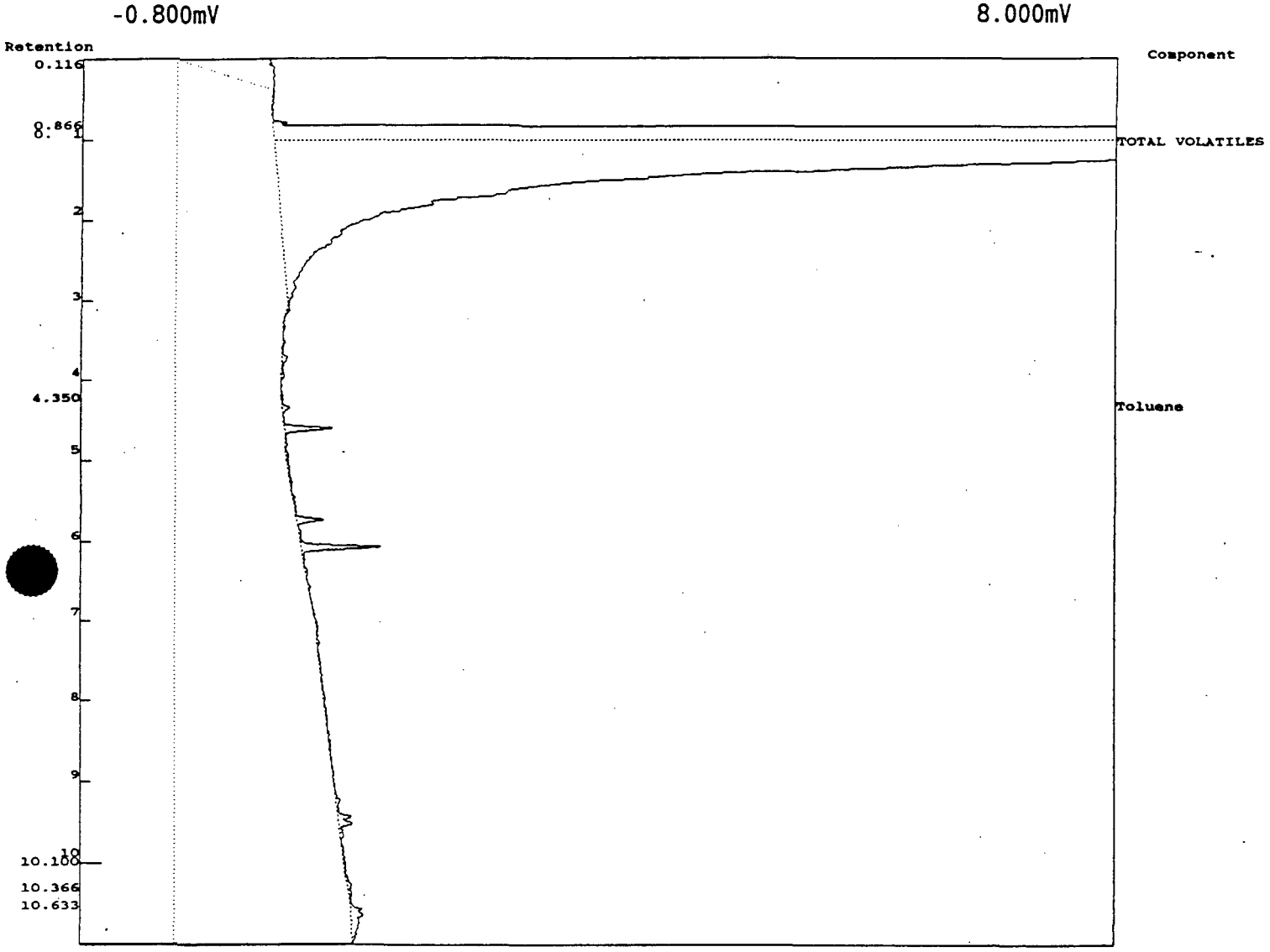
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.216	19.91 M	19.91	ug/L
Toluene	3	4.366	0.24	0.24	ug/L
	2		20.14	20.14	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F39.CHR (A:\)
Sample : SG-134
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.166	18.99	18.99	ug/L
luene	3	4.350	0.36	0.36	ug/L
	2		19.34	19.34	

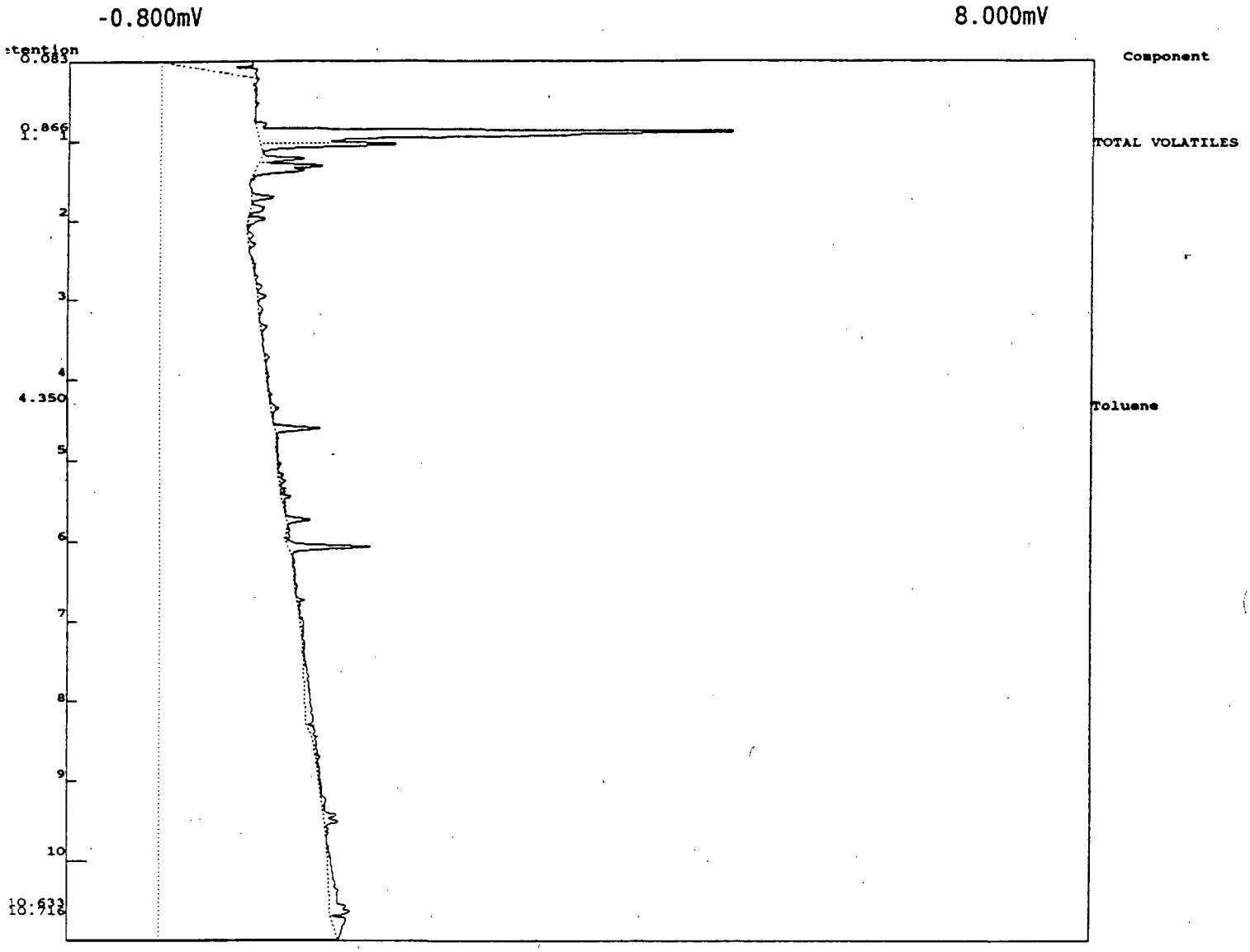
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F40.CHR (A:\)
Sample : SG-136
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	404.97 M	404.97	ug/L
Toluene	3	4.350	0.21	0.21	ug/L
	2		405.18	405.18	

300866

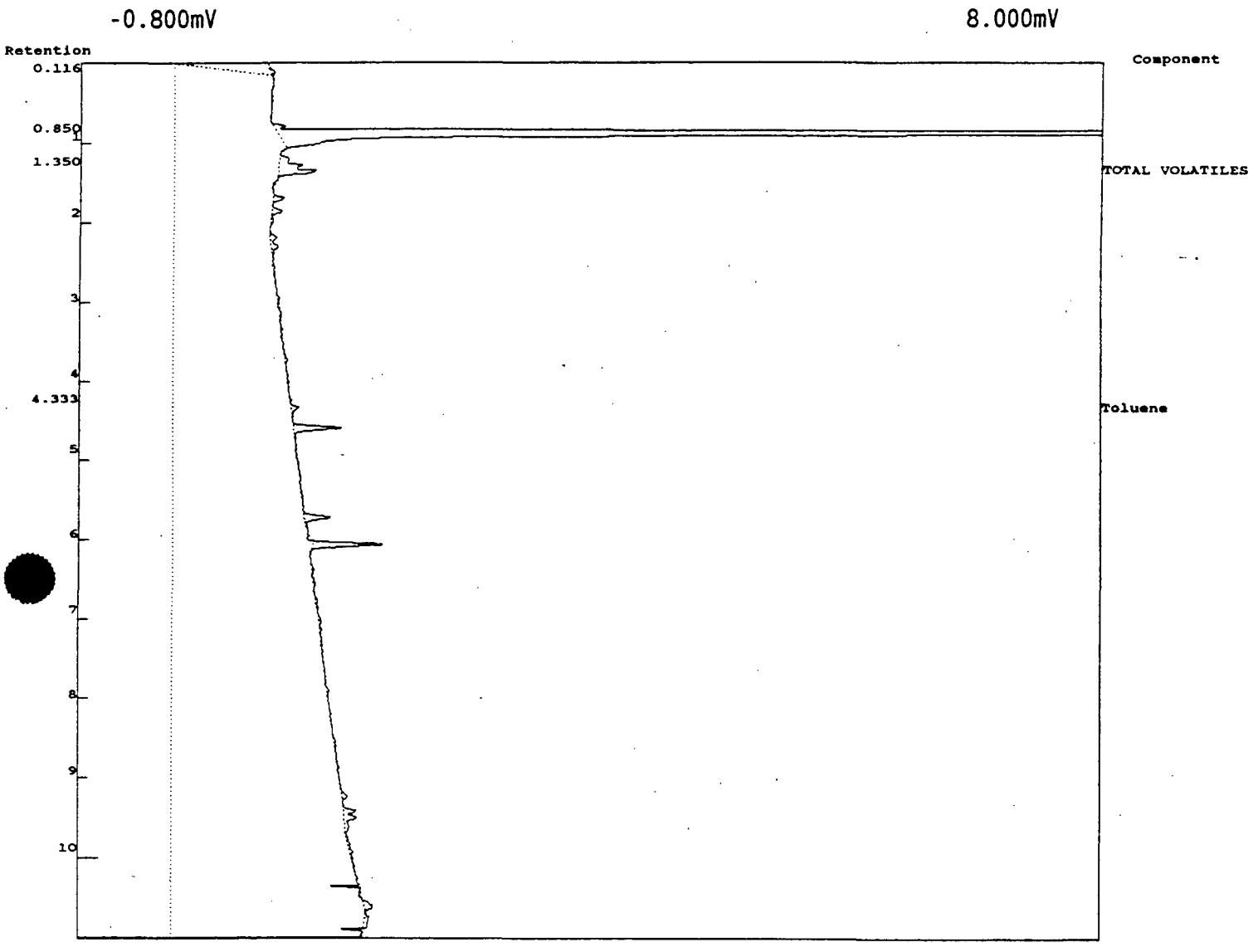
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F41.CHR (A:\)
Sample : SG-137
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.033	23.06 M	23.06	ug/L
luene	3	4.350	0.44	0.44	ug/L
	2		23.50	23.50	

300867

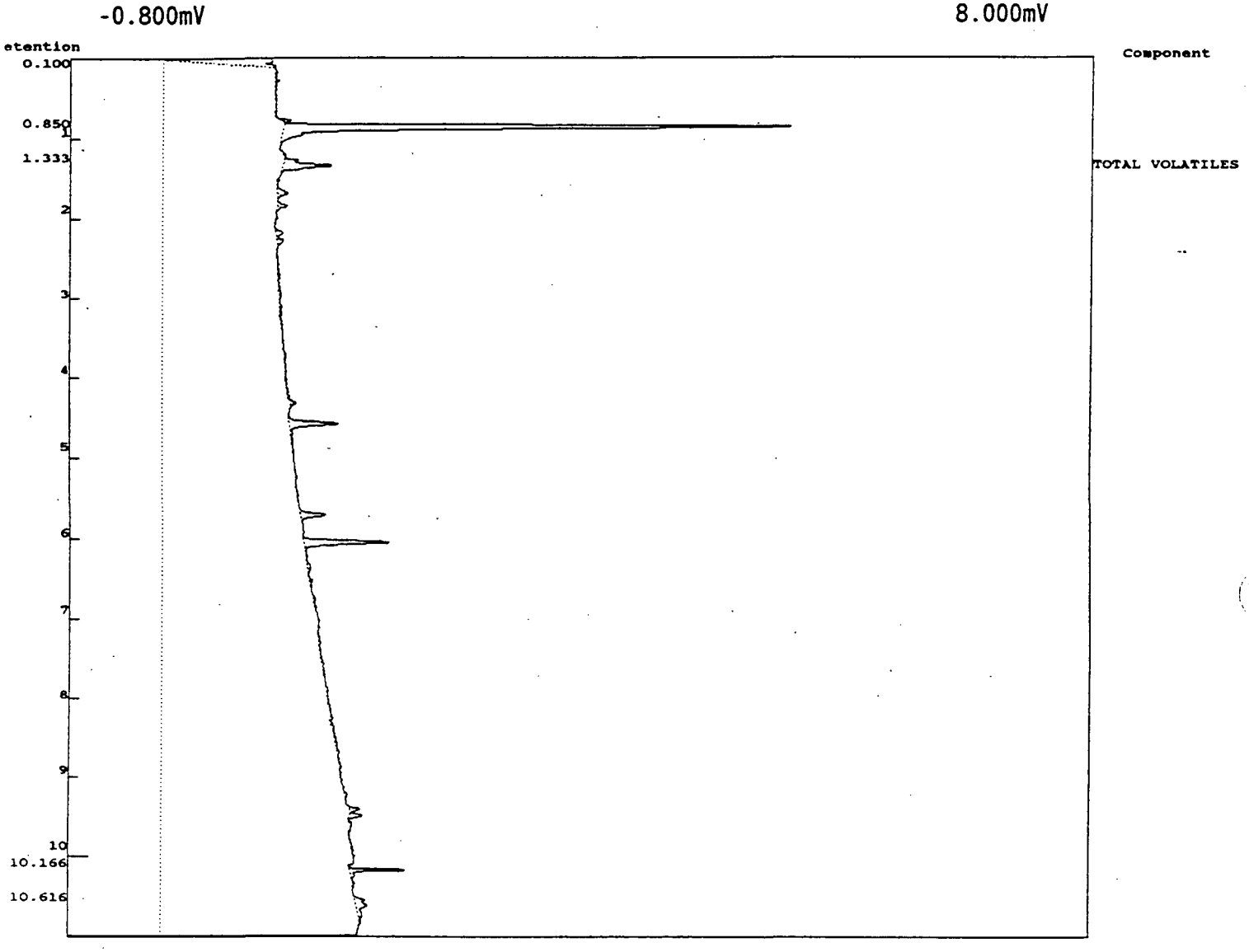
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F42.CHR (A:\)
Sample : SG-138
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	8.87 M	8.87	ug/L
Toluene	3	4.333	0.22 M	0.22	ug/L
	2		9.09	9.09	

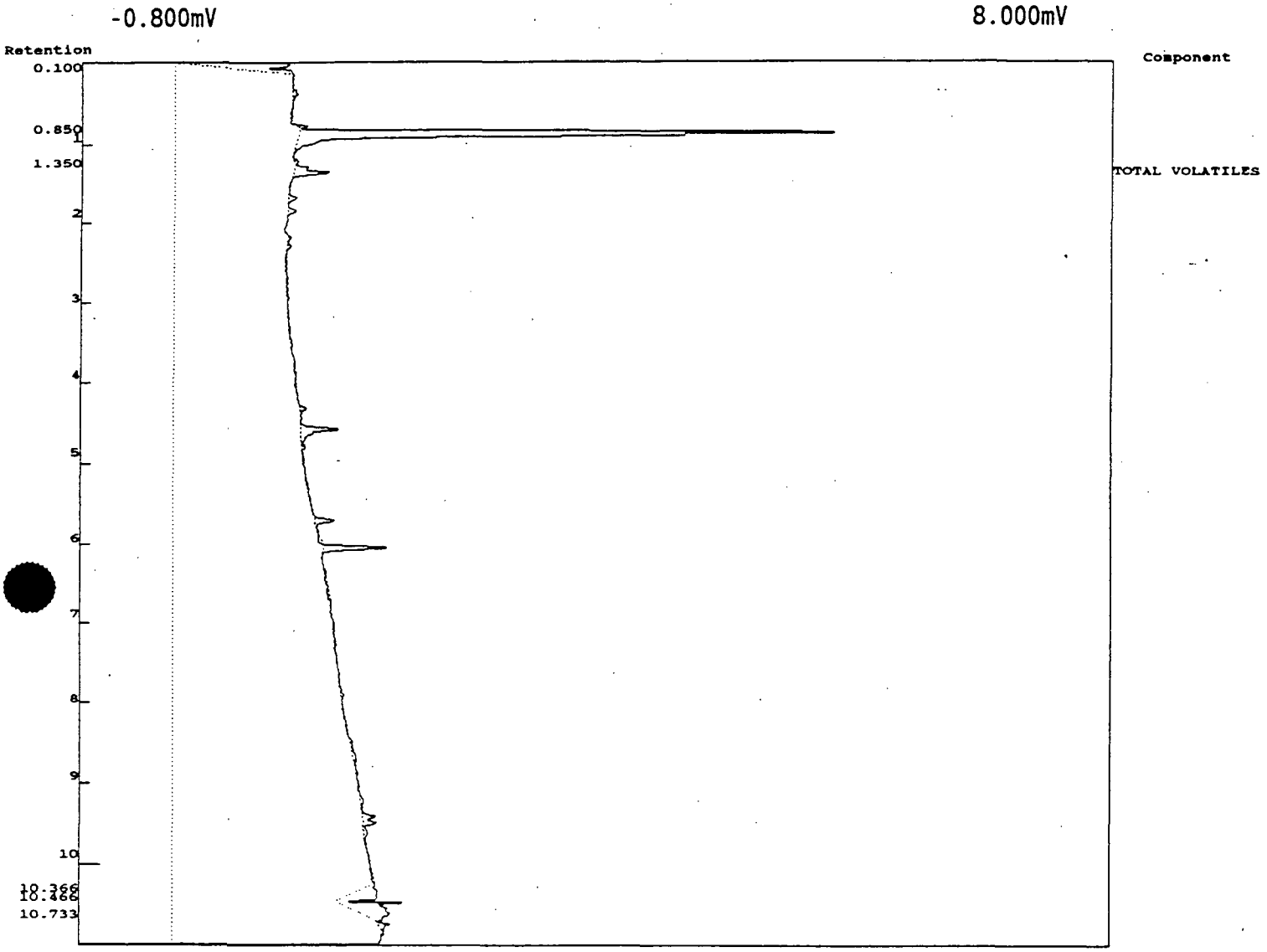
300868

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F43.CHR (A:\)
Sample : SG-150
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.333	8.04 M	8.04	ug/L
1			8.04	8.04	

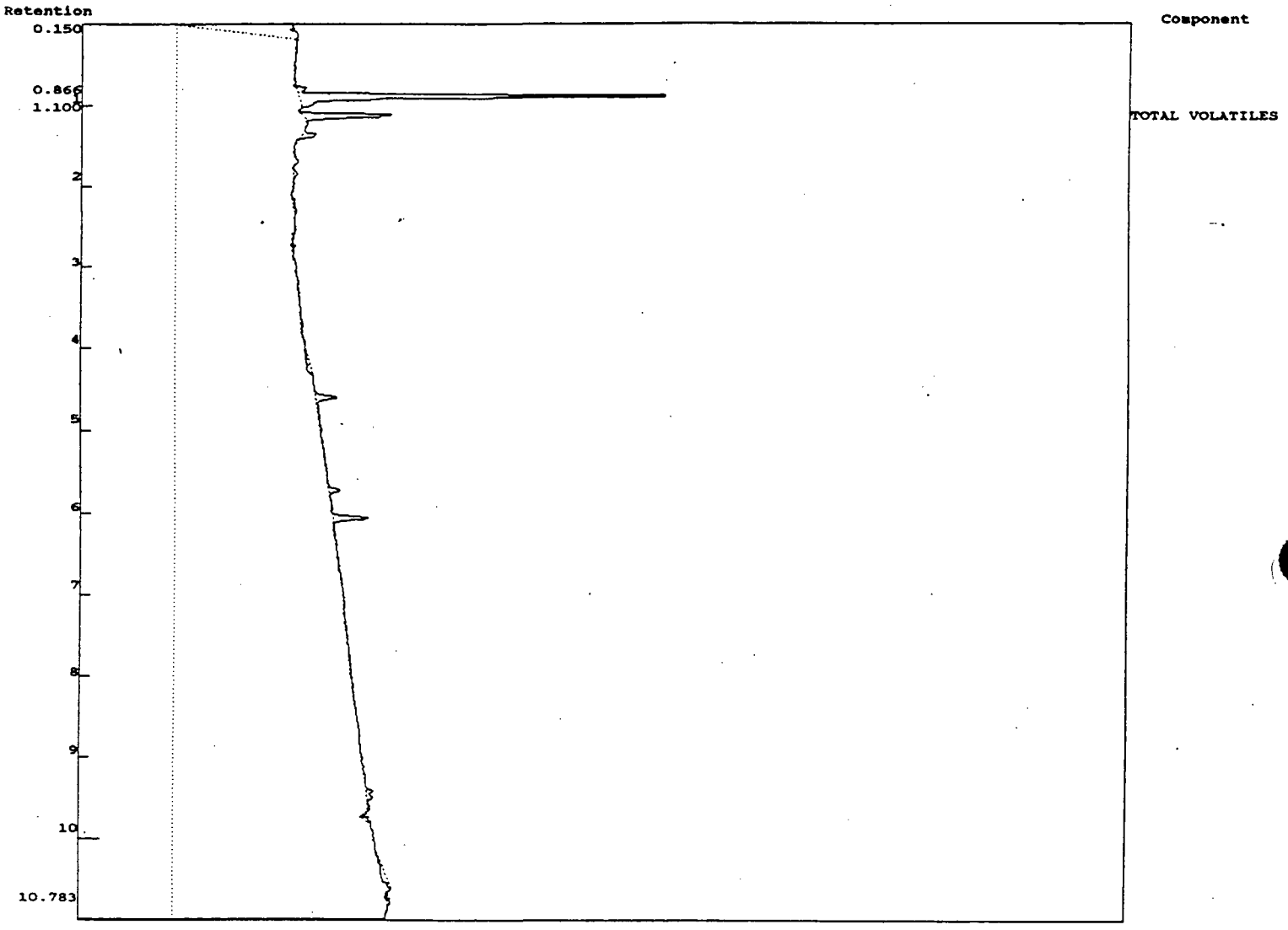
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F44.CHR (A:\)
Sample : SG-850
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	6.75 M	6.75	ug/L
	1		6.75	6.75	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F45.CHR (A:\)
Sample : EB-23
Operator : SGN

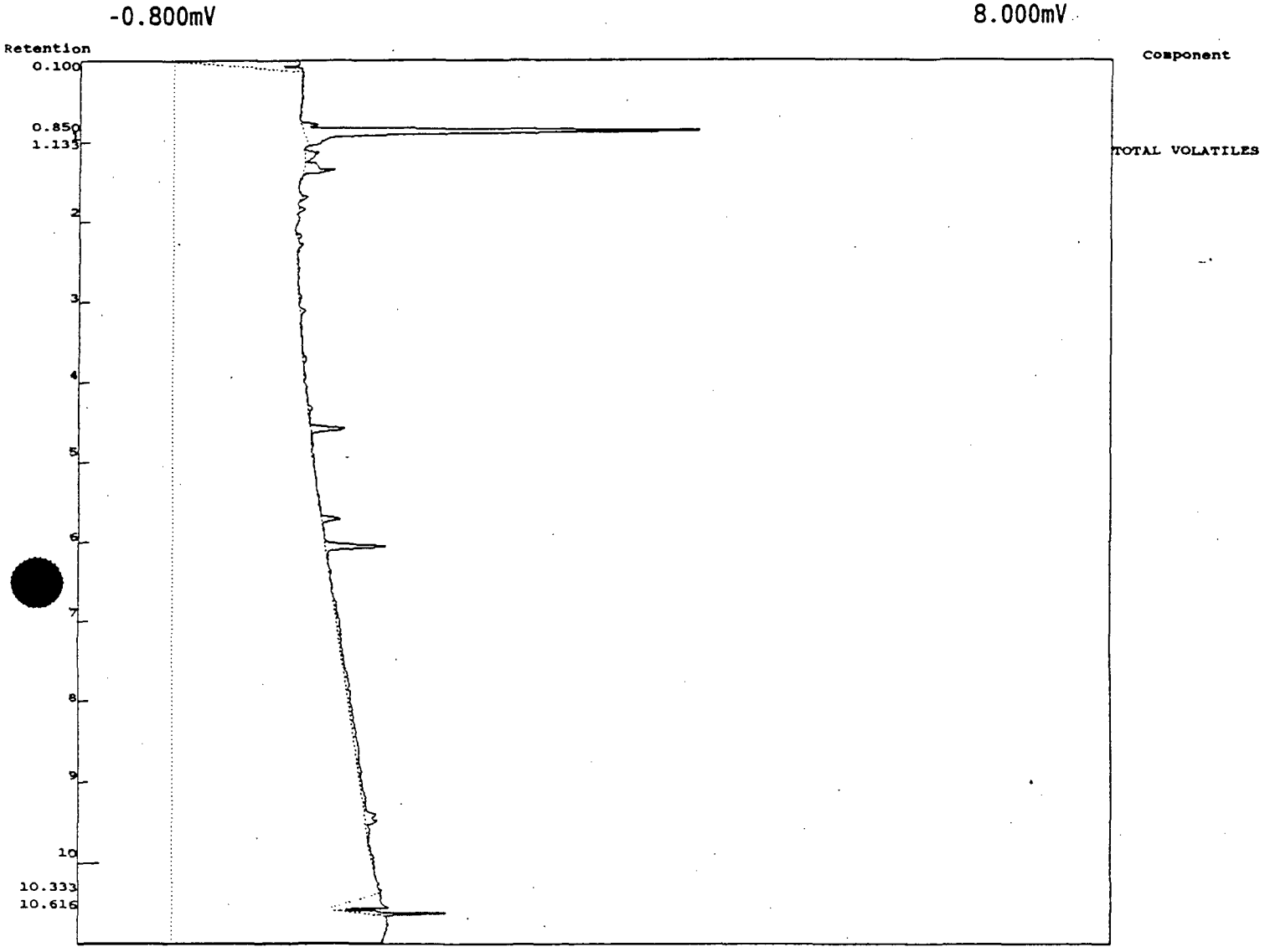
-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.100	5.20 M	5.20	ug/L
	1		**5.20**	**5.20**	

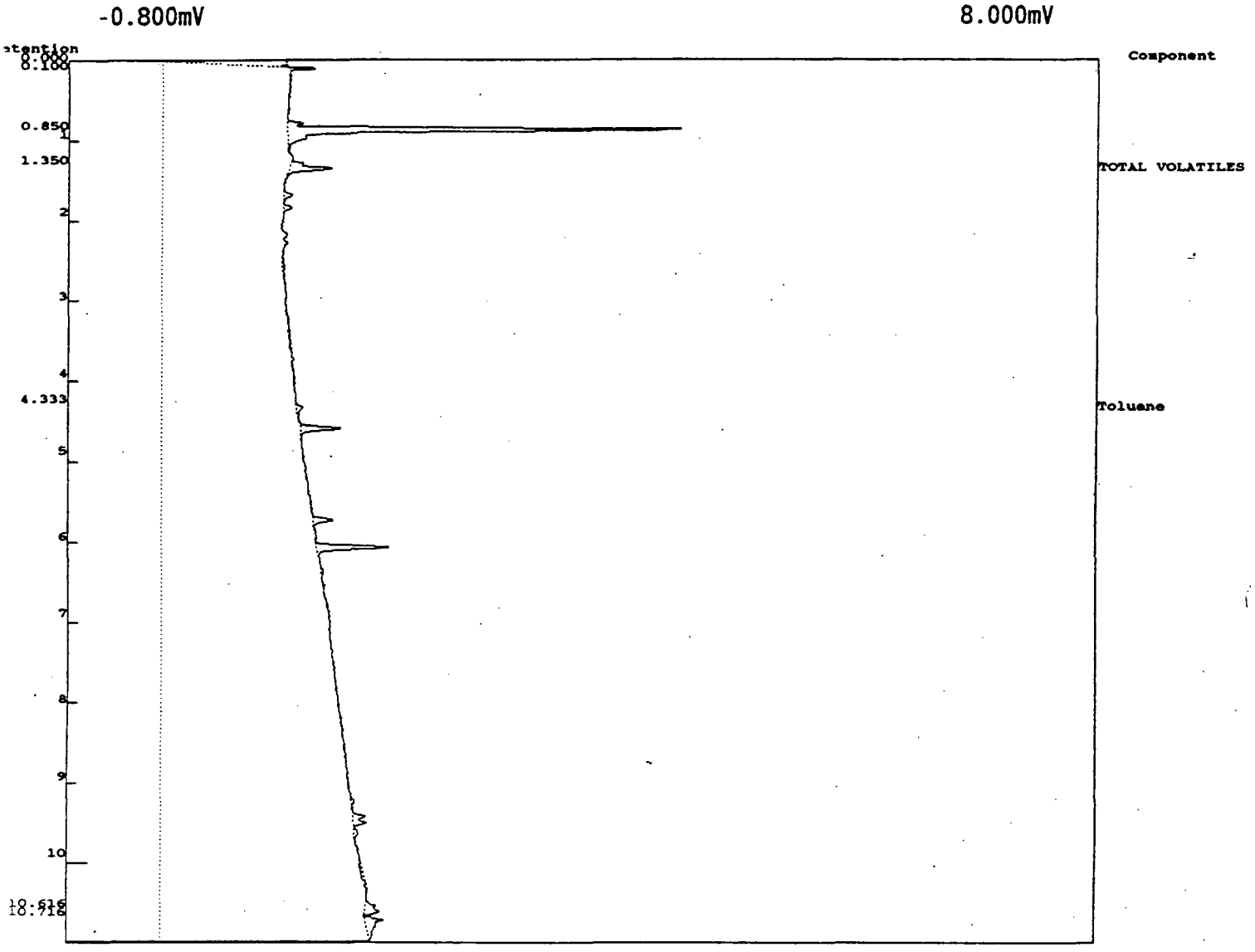
300871

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F46.CHR (A:\)
Sample : SG-169
Operator : SGN



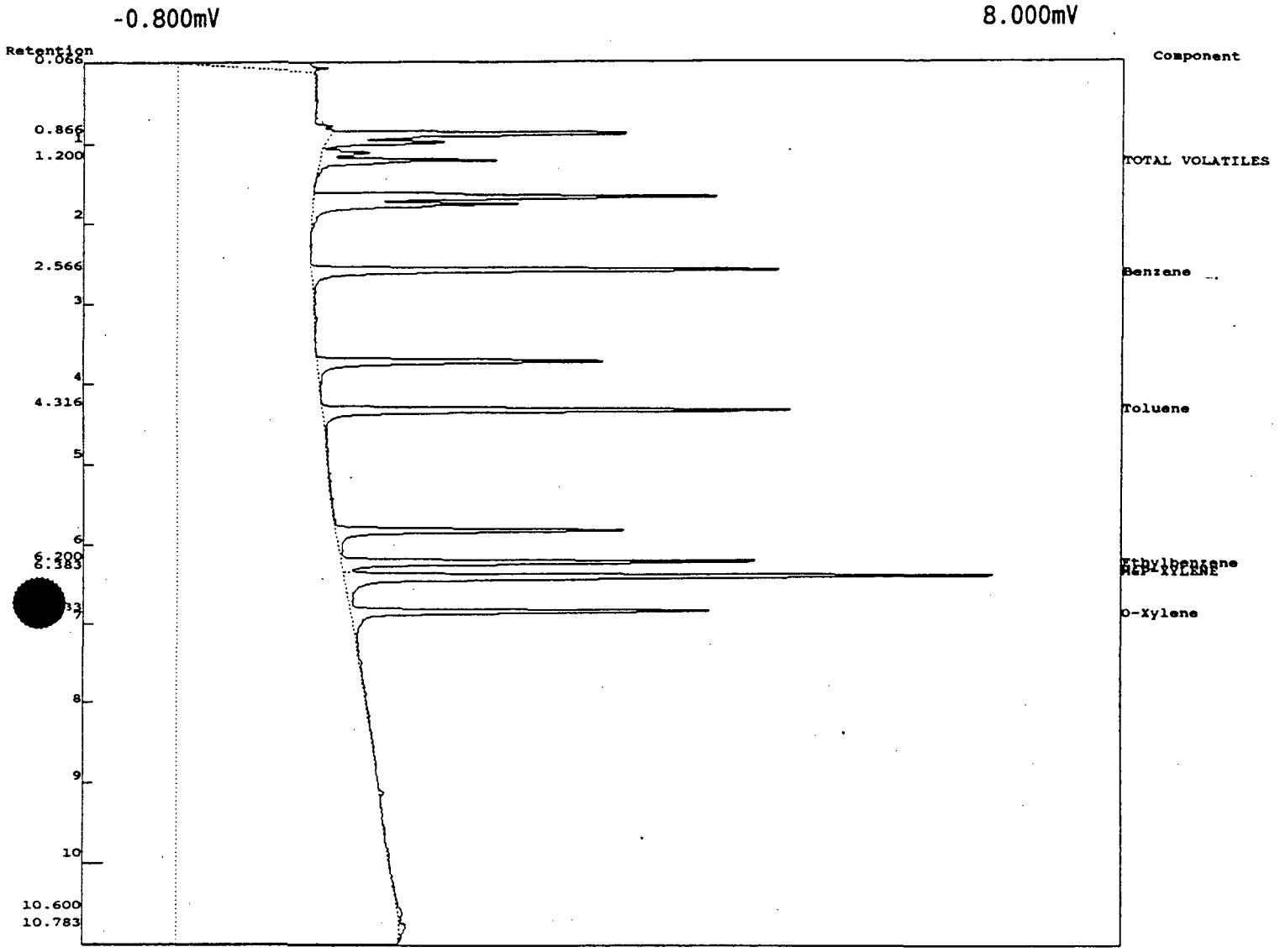
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.133	9.53 M	9.53	ug/L
	1		9.53	9.53	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F47.CHR (A:\)
Sample : EB-24
Operator : SGN



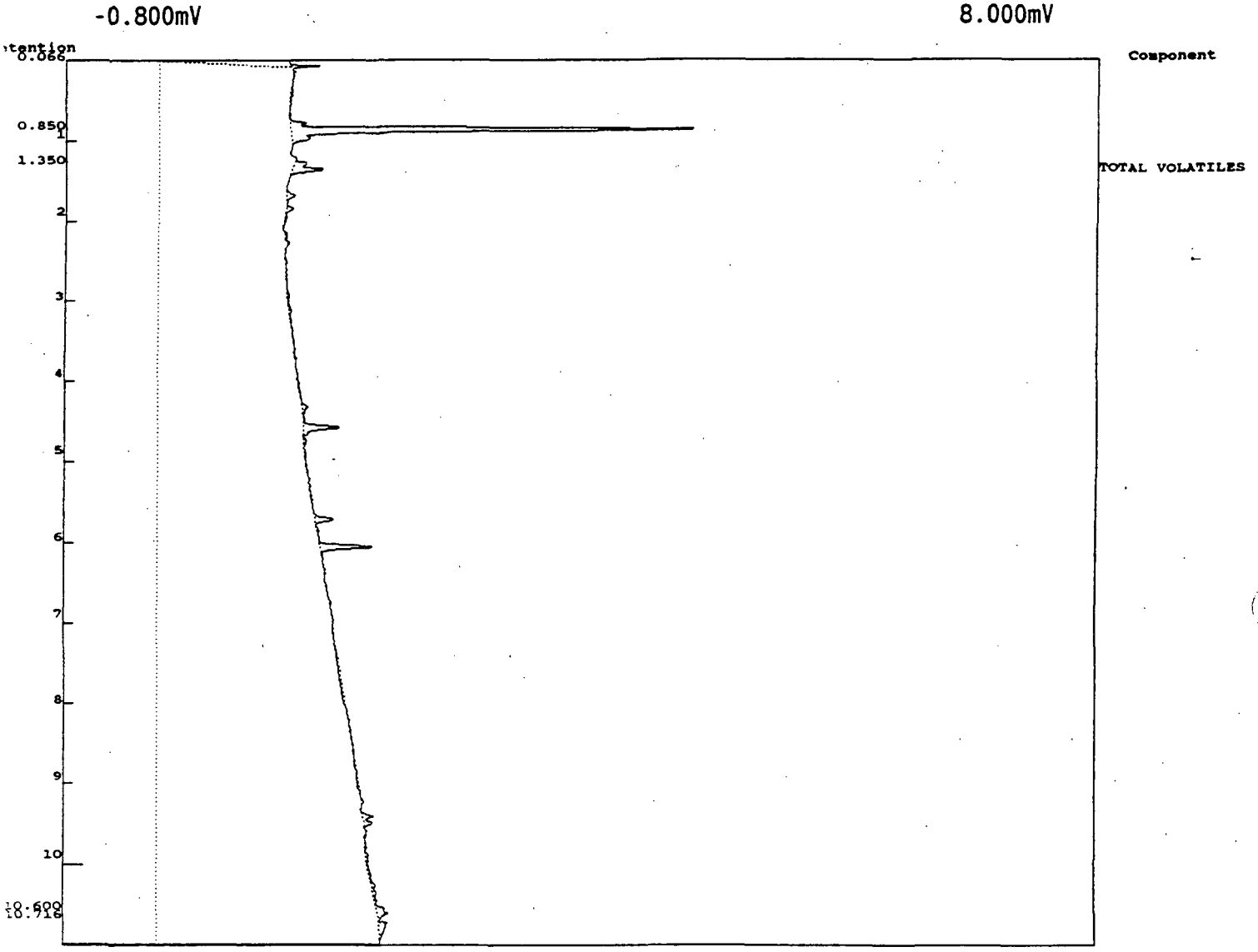
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.350	7.06 M	7.06	ug/L
luene	3	4.333	0.28 M	0.28	ug/L
	2		7.34	7.34	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F50.CHR (A:\)
Sample : CC-060200F-4
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.200	118.52	118.52	ug/L
Benzene	2	2.566	14.68	12.31	ug/L
Toluene	3	4.316	13.68 M	13.68	ug/L
Ethylbenzene	4	6.200	11.98 M	14.01	ug/L
M&P-XYLENE	5	6.383	22.20 M	27.75	ug/L
O-Xylene	6	6.833	11.18 M	13.66	ug/L
	6		192.24	199.93	

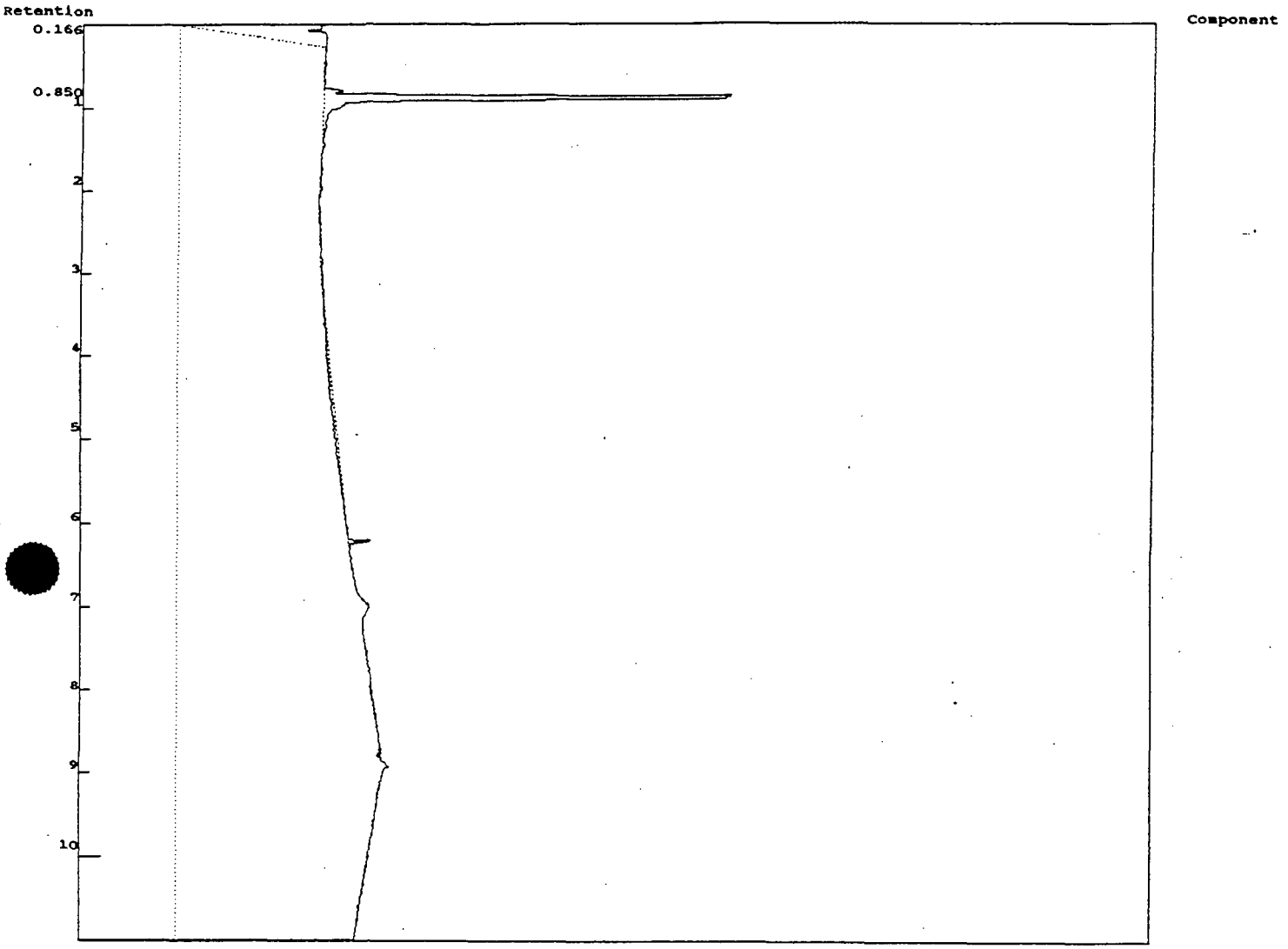
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F49.CHR (A:\)
Sample : EB-25
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.350	5.63 M	5.63	ug/L
	1		5.63	5.63	

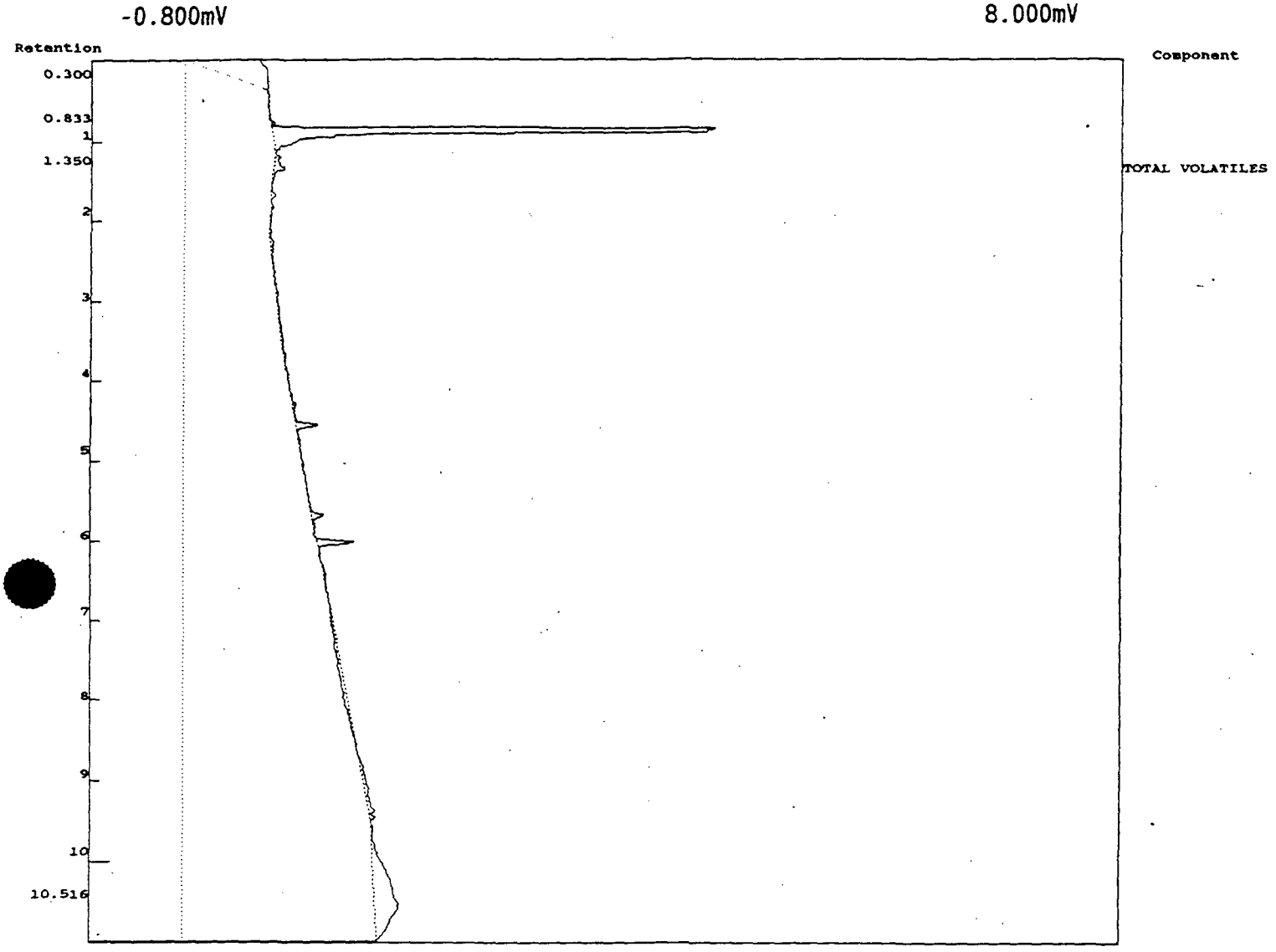
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN02F52.CHR (A:\)
Sample : MB-060200-4
Operator : SGN

-0.800mV 8.000mV



Component	Number Retention	Area	External	Units
	0	0.00	0.00	

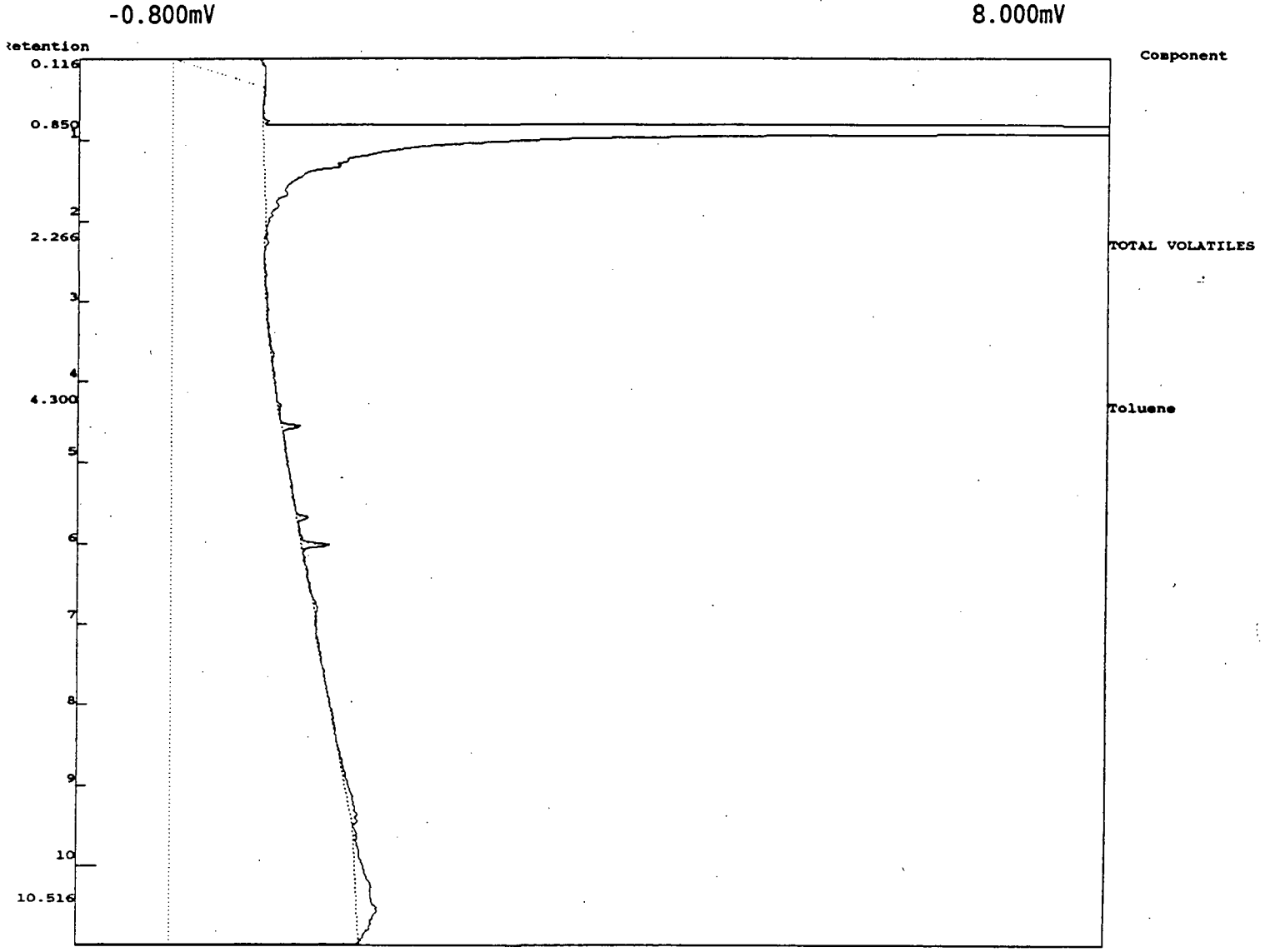
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F6.CHR (A:\)
Sample : SG-160
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	3.72	3.72	ug/L
1			3.72	3.72	

300877

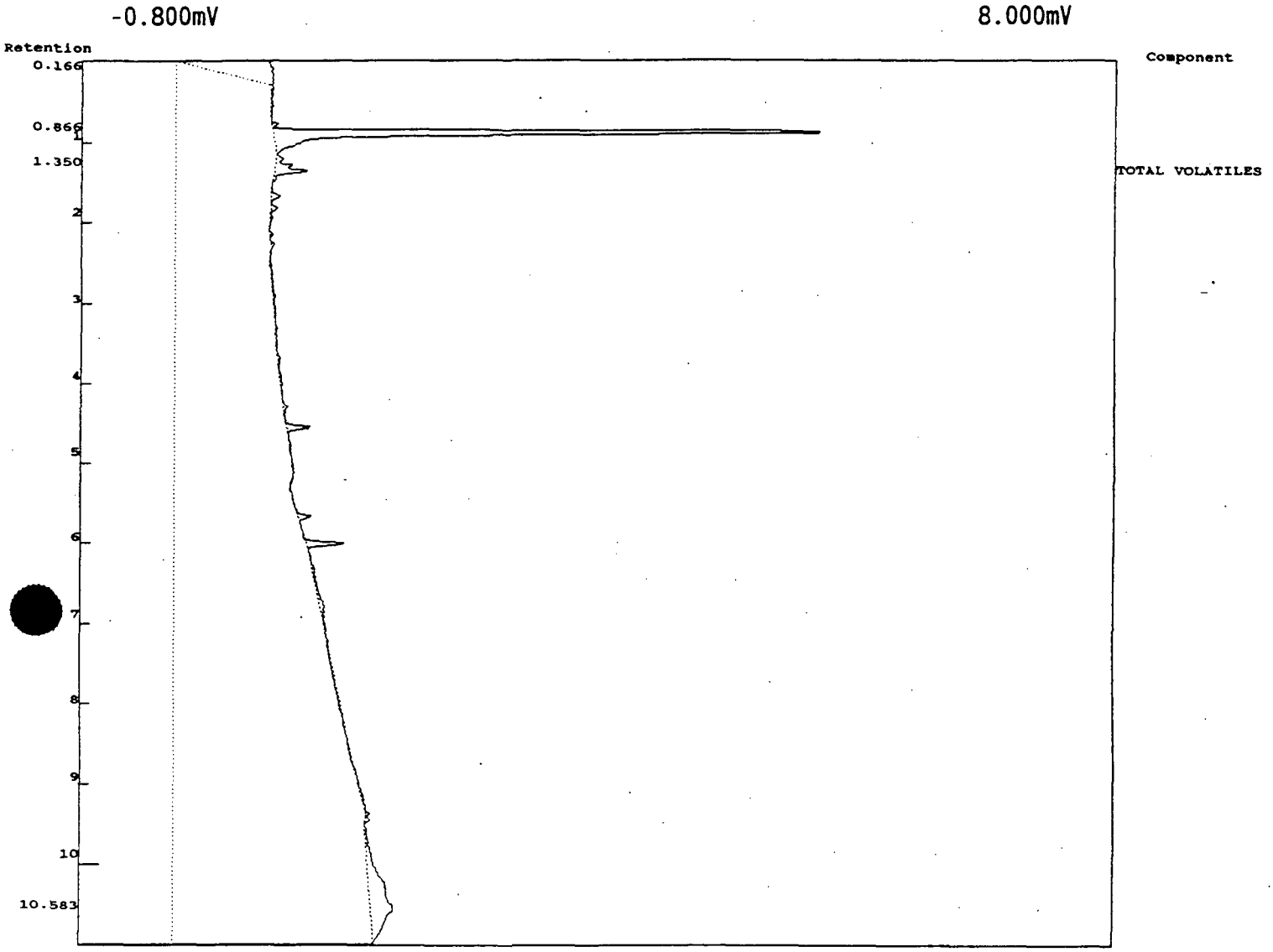
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F7.CHR (A:\)
Sample : SG-170
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	2.266	4.19	4.19	ug/L
oluene	3	4.300	0.22	0.22	ug/L
	2		4.41	4.41	

300878

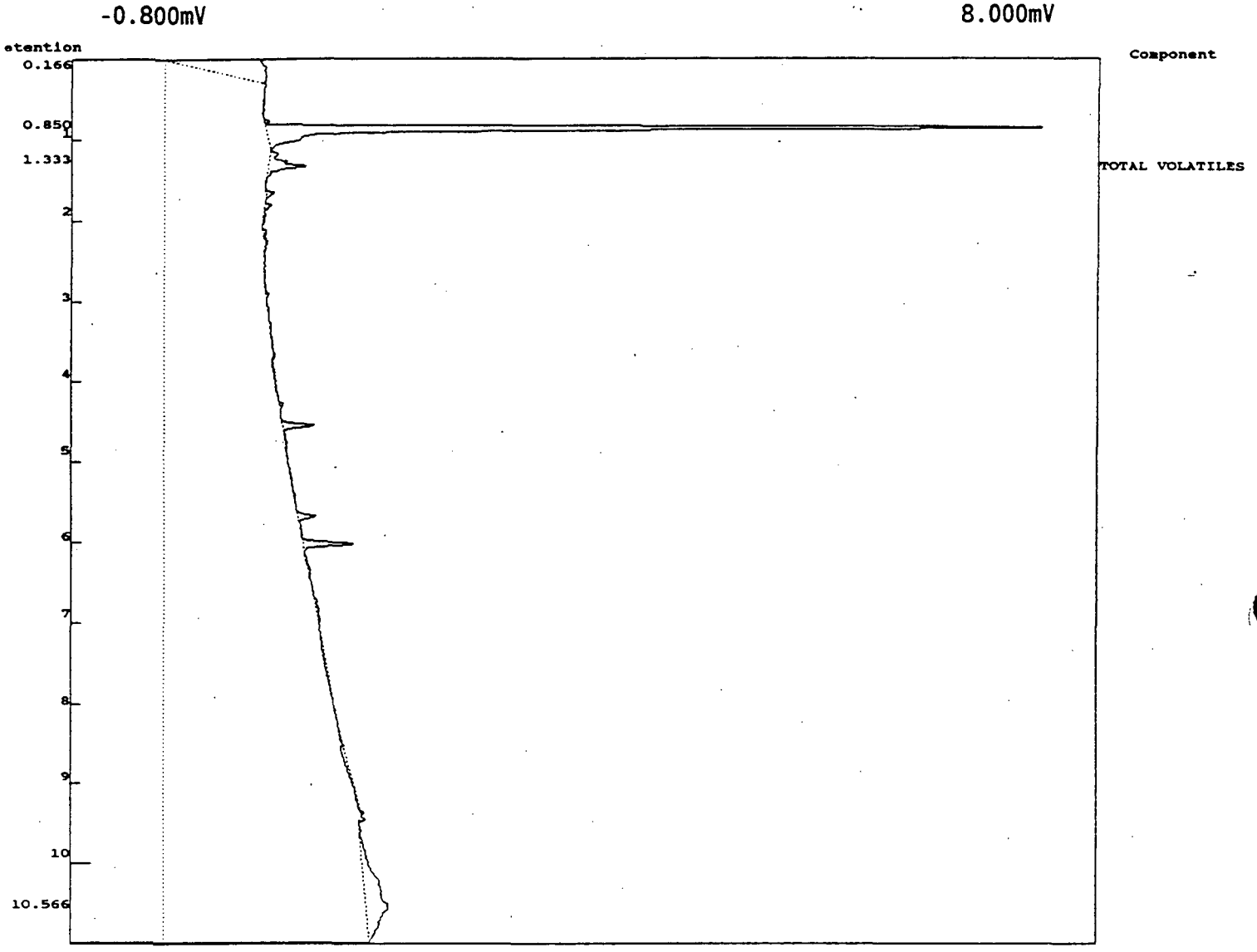
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F8.CHR (A:\)
Sample : SG-171
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	4.57	4.57	ug/L
1			4.57	4.57	

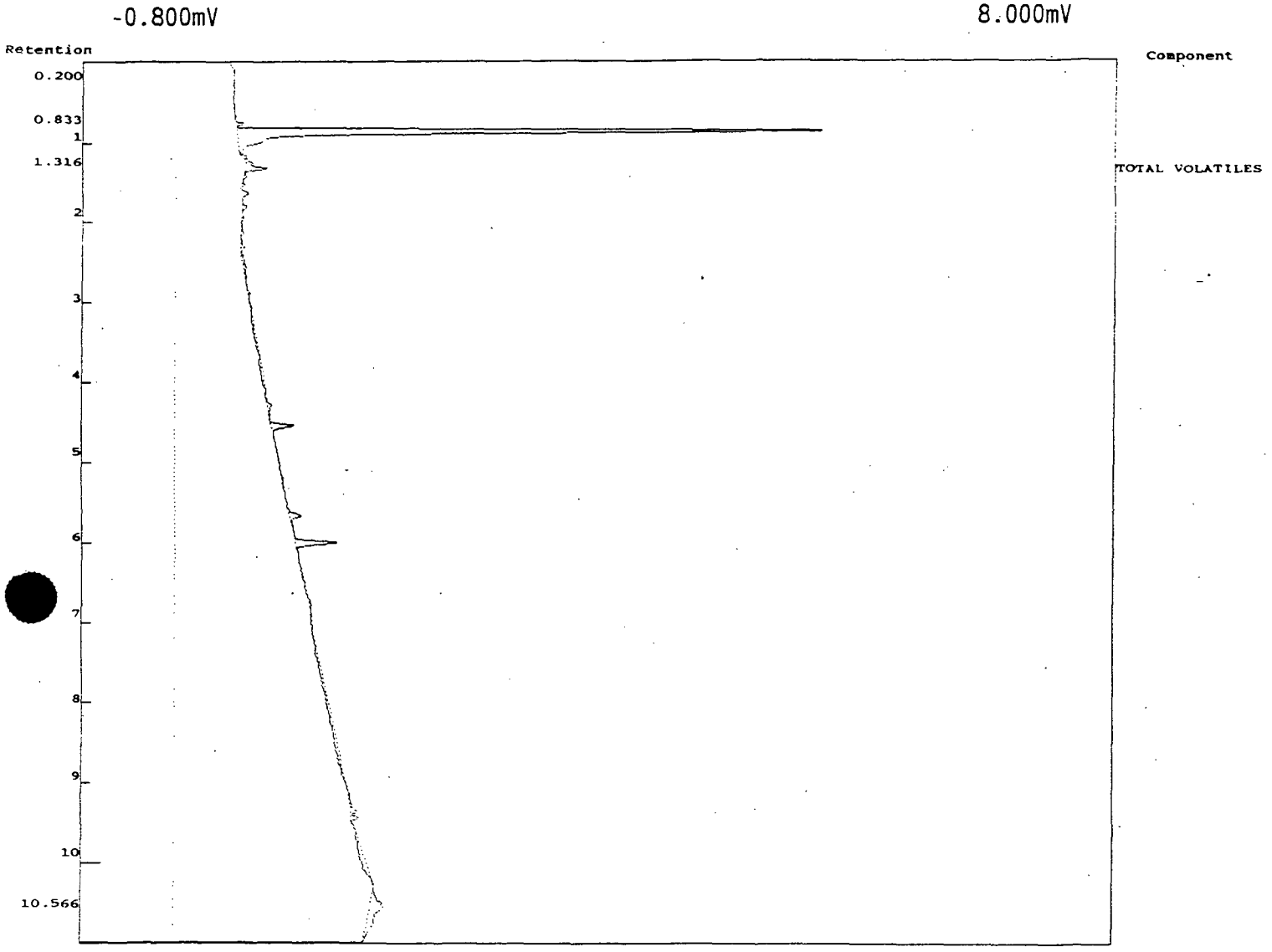
300879

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F9.CHR (A:\)
Sample : SG-172
Operator : SGN



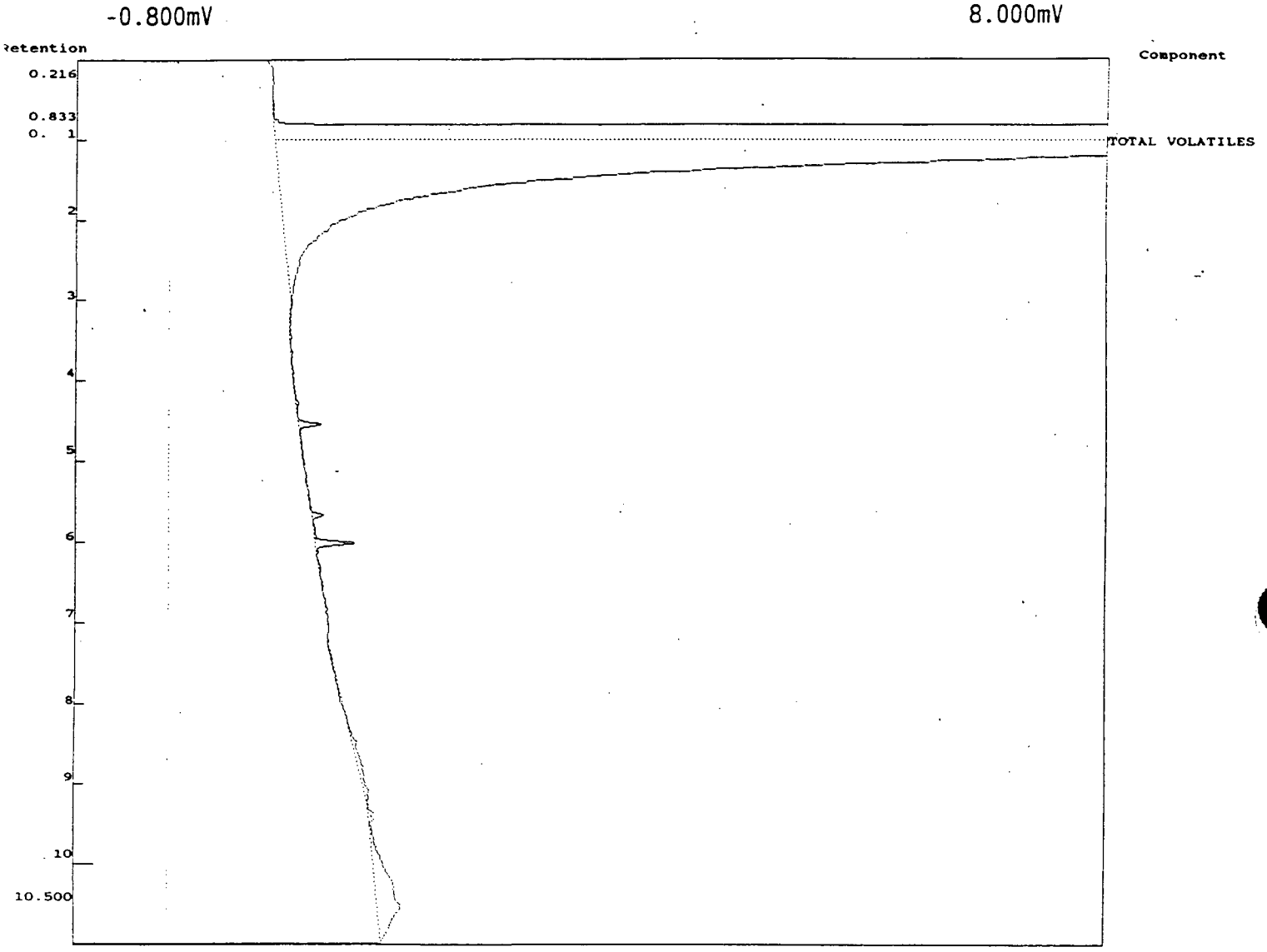
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.333	5.26	5.26	ug/L
	1		5.26	5.26	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F11.CHR (A:\JUNE05)
Sample : SG-177
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	3.40 M	3.40	ug/L
	1		3.40	3.40	

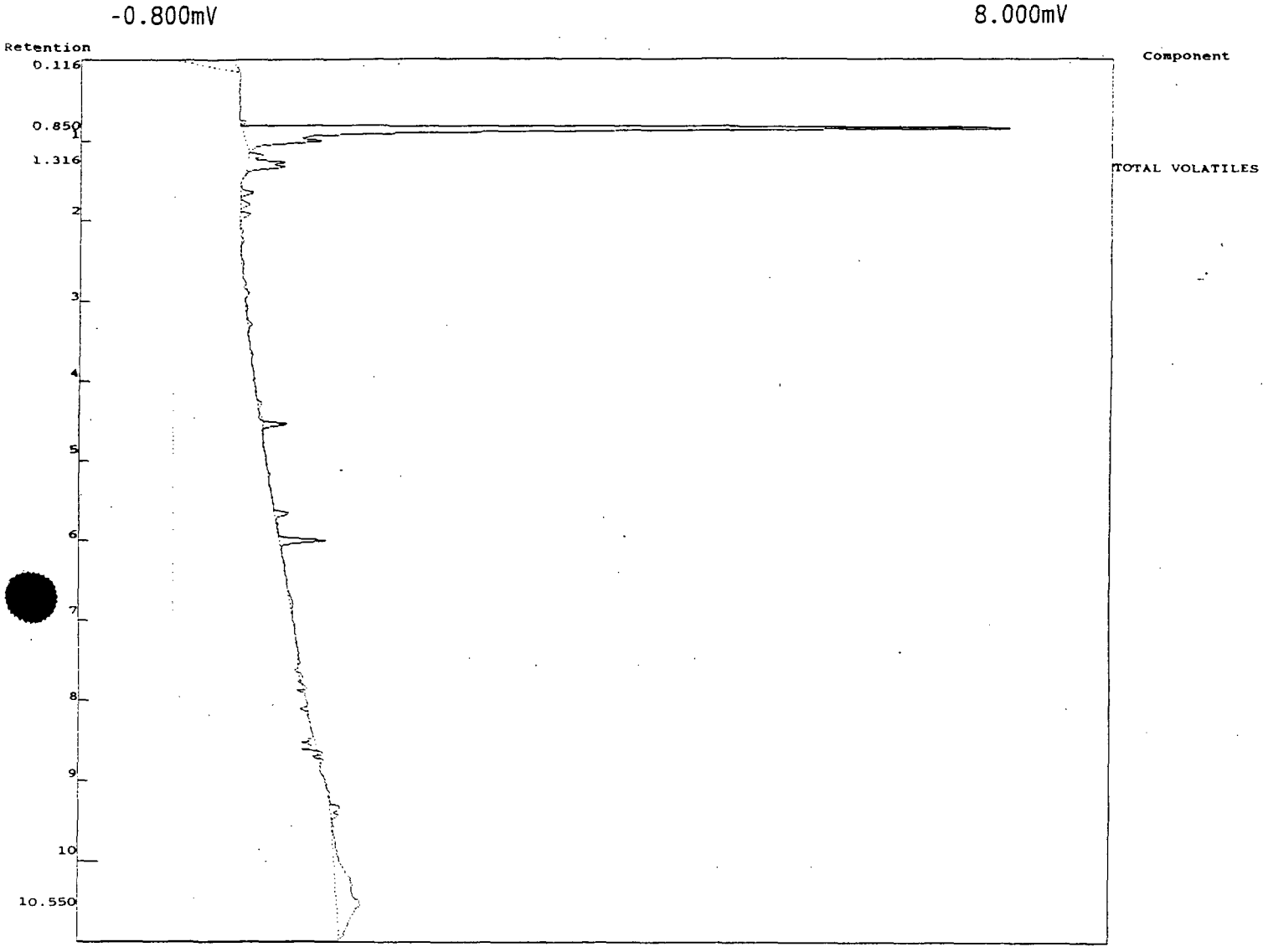
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F10.CHR (A:\JUNE05)
Sample : SG-176
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	289.42 M	289.42	ug/L
1			289.42	289.42	

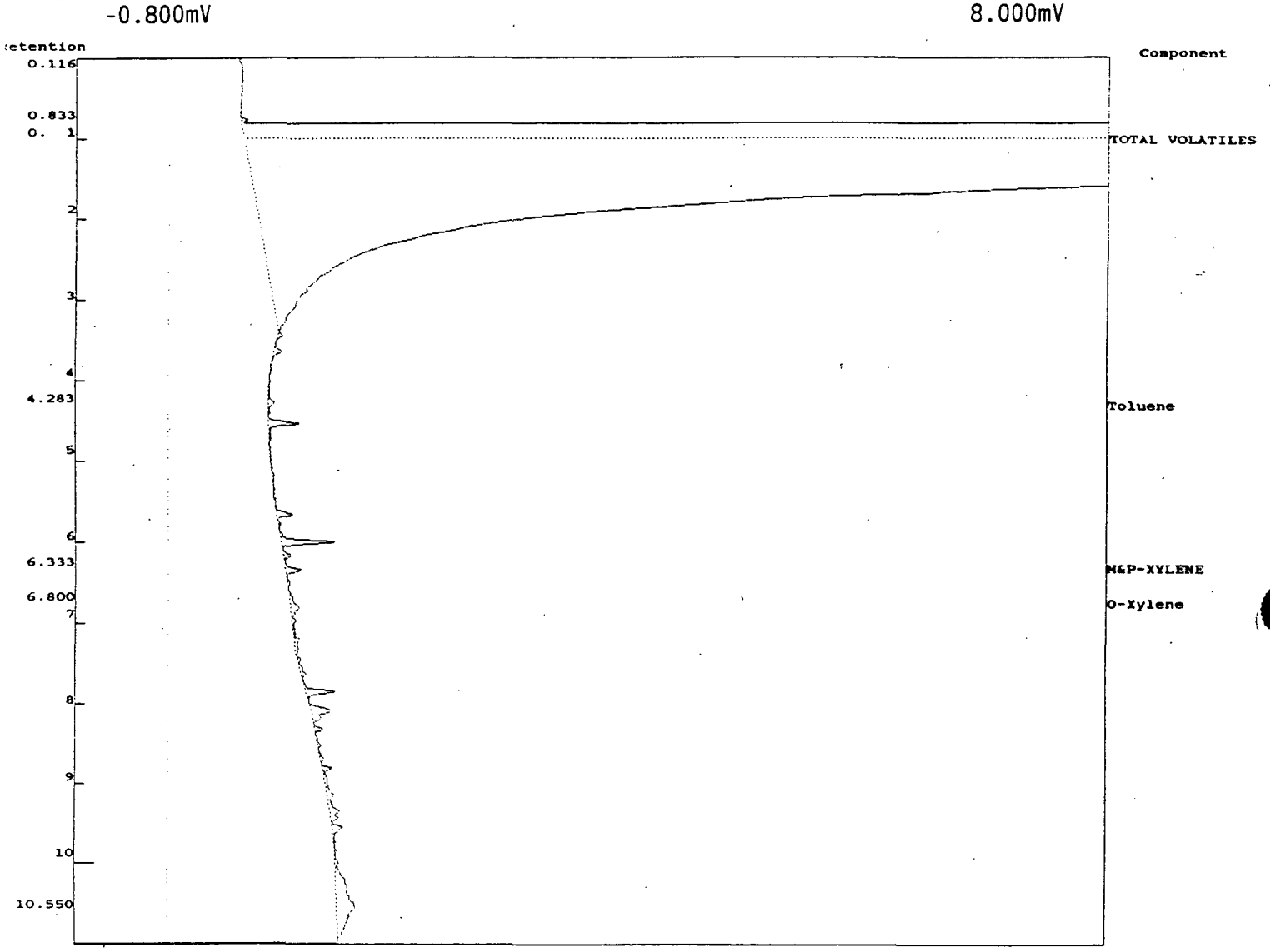
300882

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F12.CHR (A:\JUNE05)
Sample : SG-178
Operator : SGN



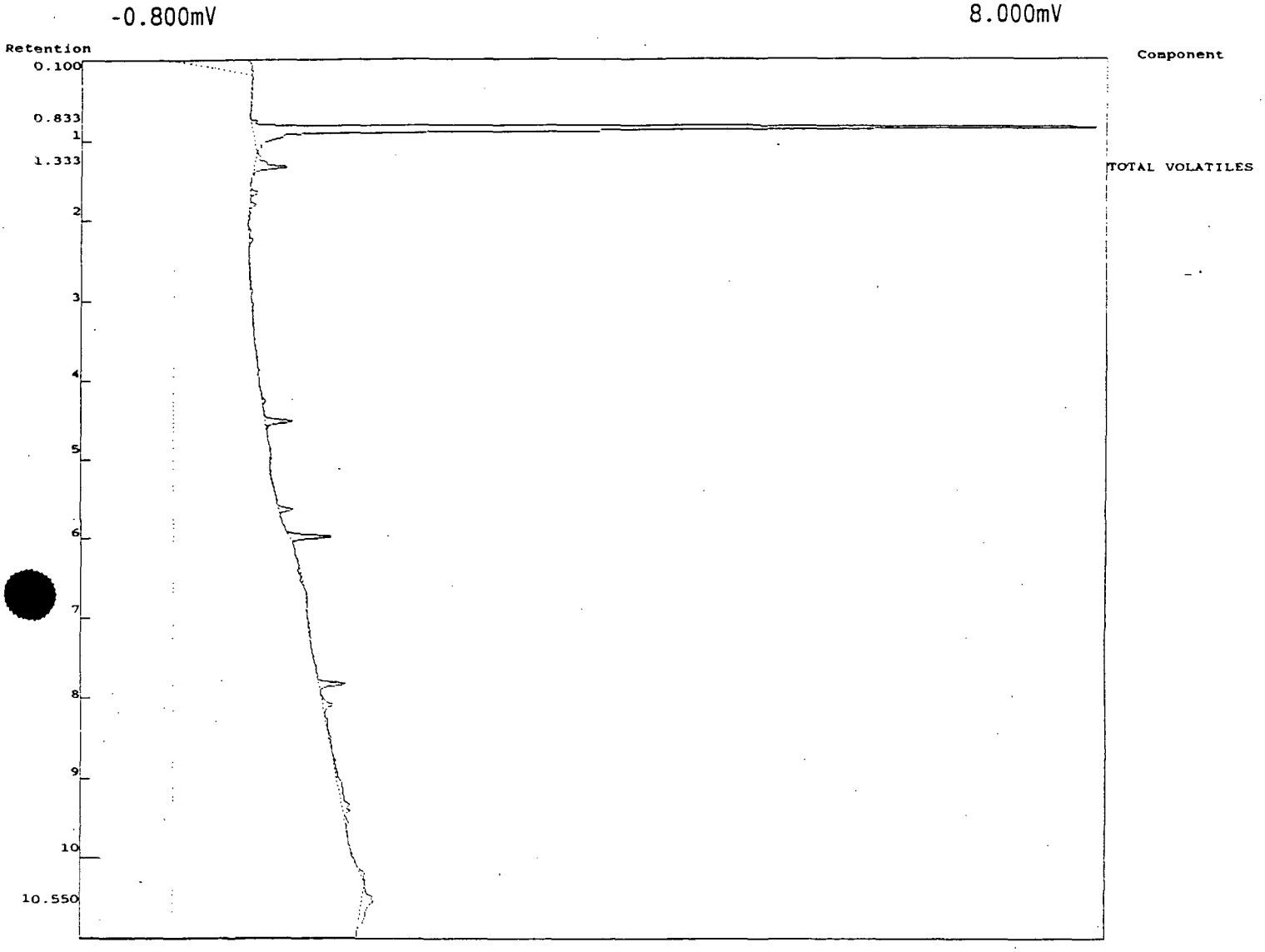
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	6.98 M	6.98	ug/L
	1		6.98	6.98	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F13.CHR (A:\JUNE05)
Sample : SG-179
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	1228.76 M	1228.76	ug/L
Toluene	3	4.283	0.35	0.35	ug/L
M&P-XYLENE	5	6.333	0.46	0.58	ug/L
O-Xylene	6	6.800	0.70	0.86	ug/L
	4		1230.28	1230.55	

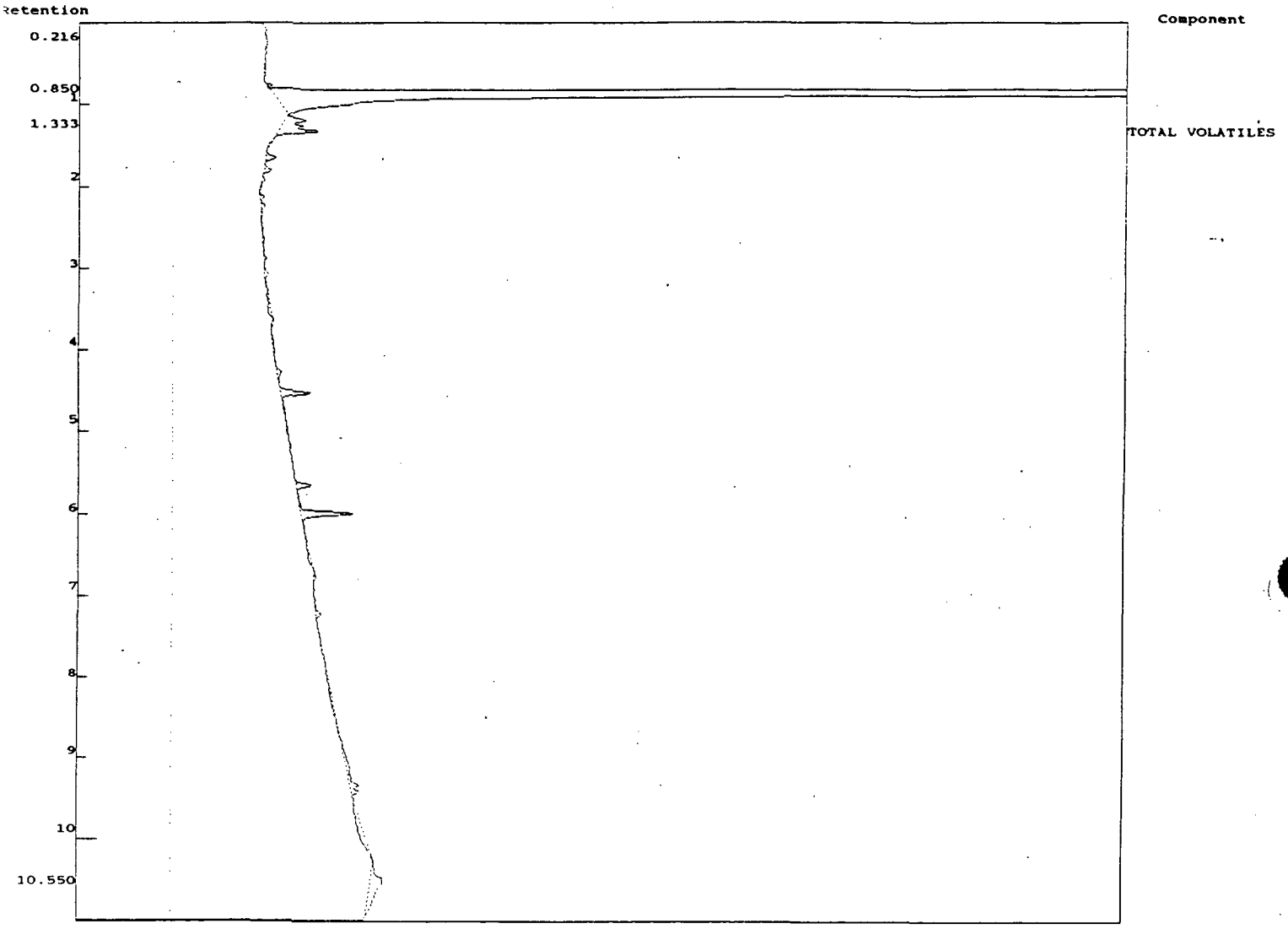
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F14.CHR (A:\JUNE05)
Sample : SG-180
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	6.98	6.98	ug/L
1			6.98	6.98	

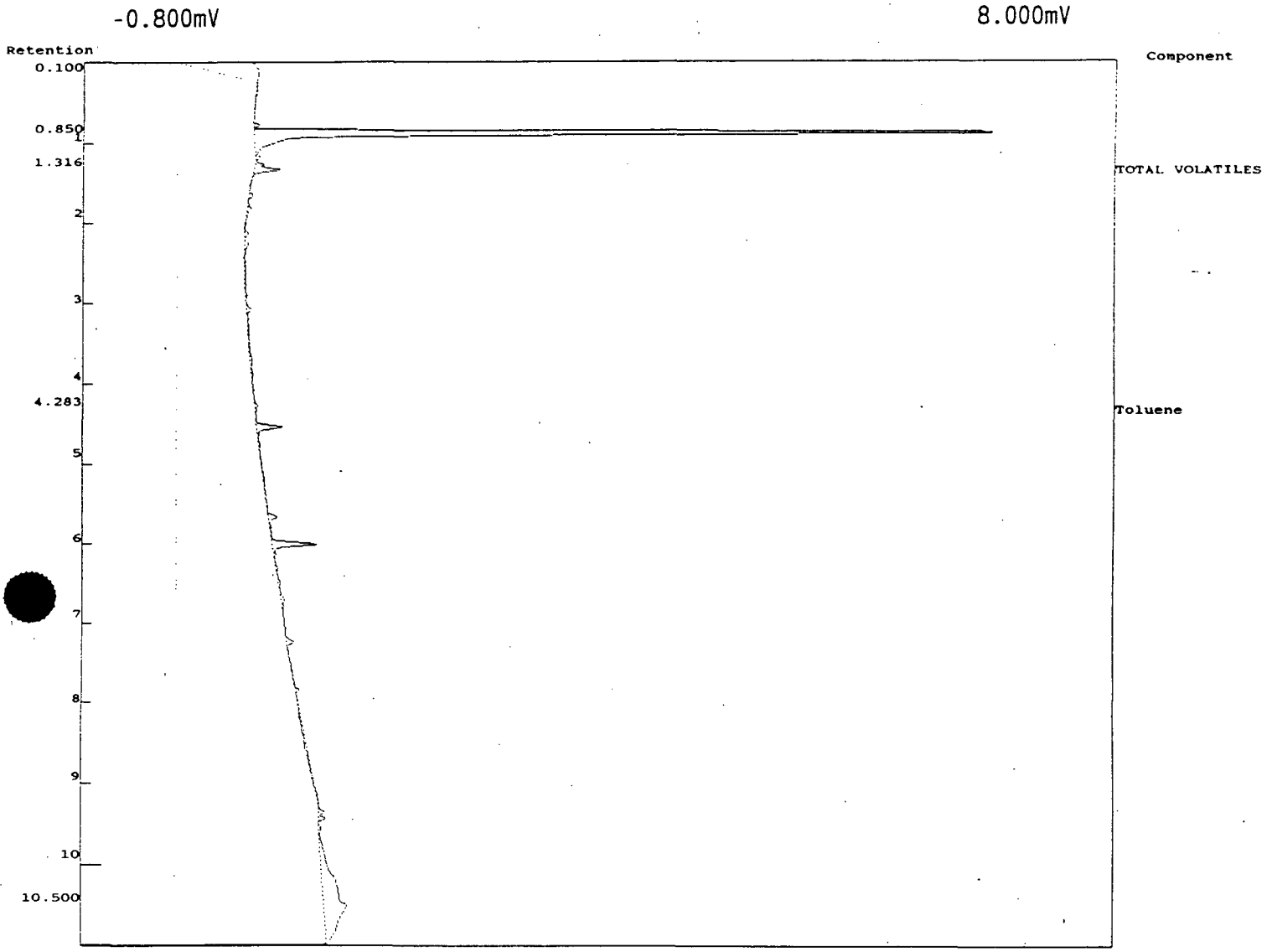
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F15.CHR (A:\JUNE05)
Sample : SG-181
Operator : SGN

-0.800mV 8.000mV



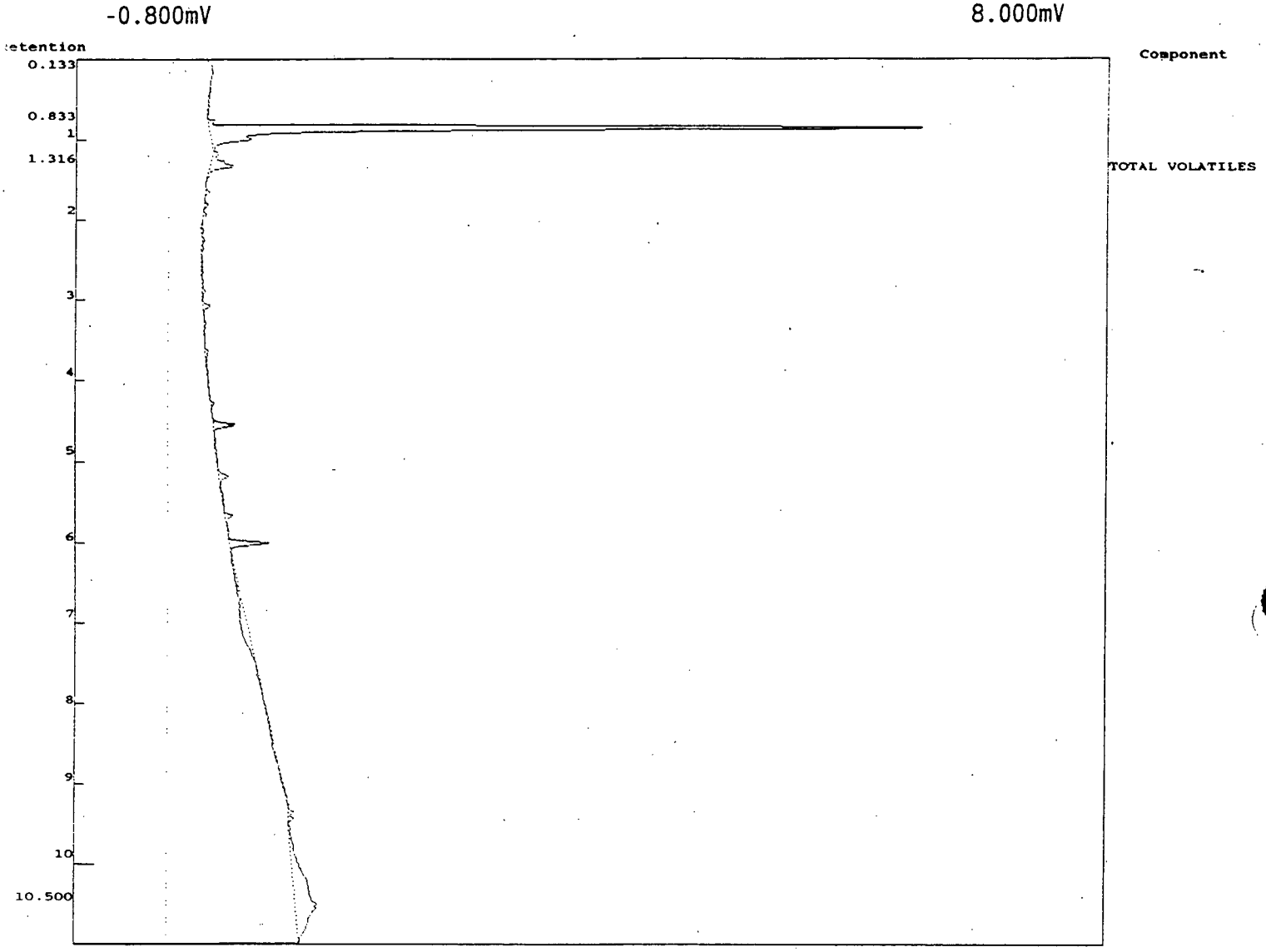
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	6.30	6.30	ug/L
	1		6.30	6.30	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F16.CHR (A:\JUNE05)
Sample : SG-191
Operator : SGN



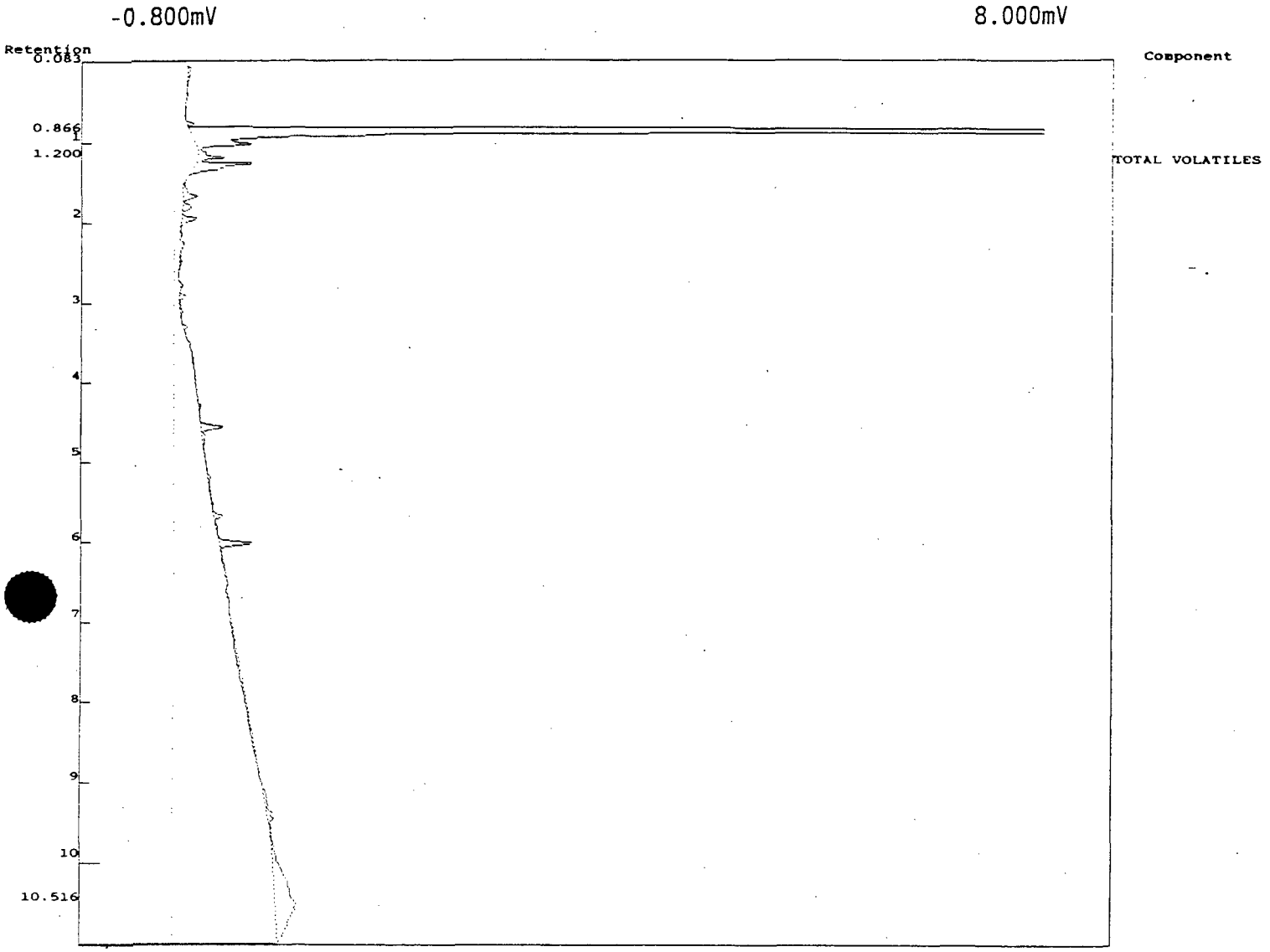
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	5.84	5.84	ug/L
Toluene	3	4.283	0.36	0.36	ug/L
	2		6.20	6.20	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F17.CHR (A:\JUNE05)
Sample : SG-210
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.316	4.82	4.82	ug/L
	1		4.82	4.82	

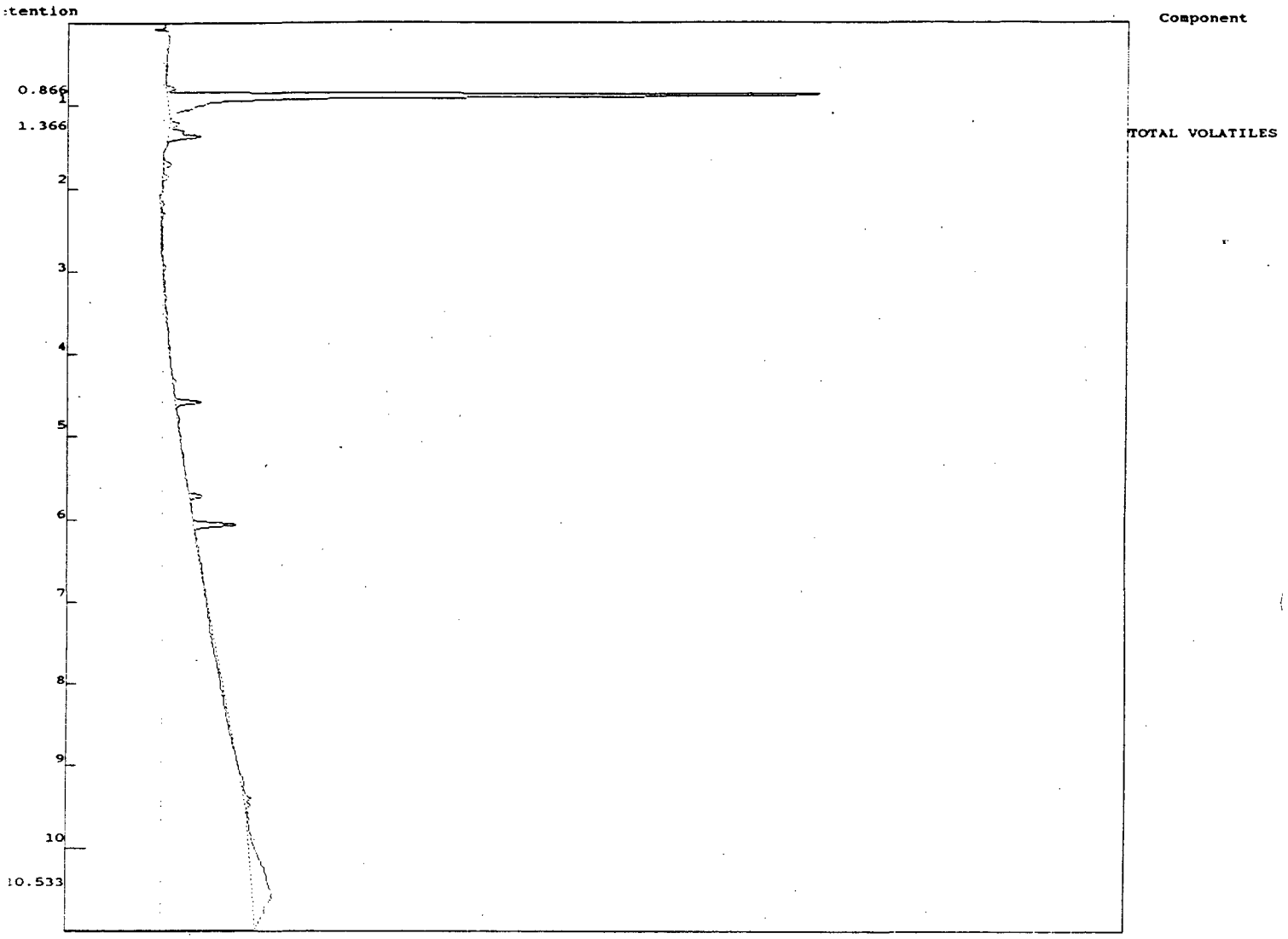
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F18.CHR (A:\JUNE05)
Sample : SG-211
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.200	6.45 M	6.45	ug/L
	1		6.45	6.45	

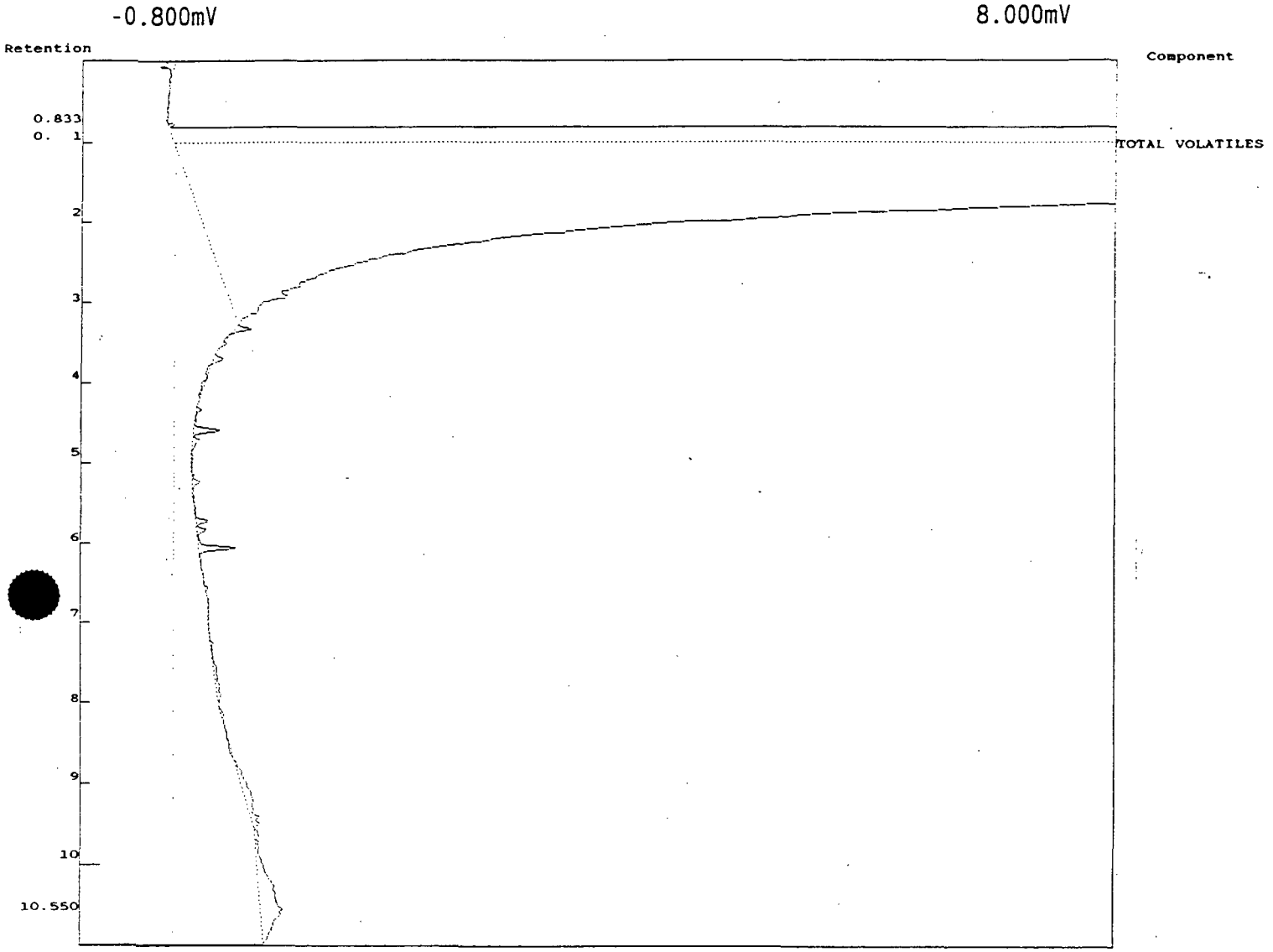
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F19.CHR (A:\JUNE05)
Sample : SG-212
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.366	4.59 M	4.59	ug/L
	1		4.59	4.59	

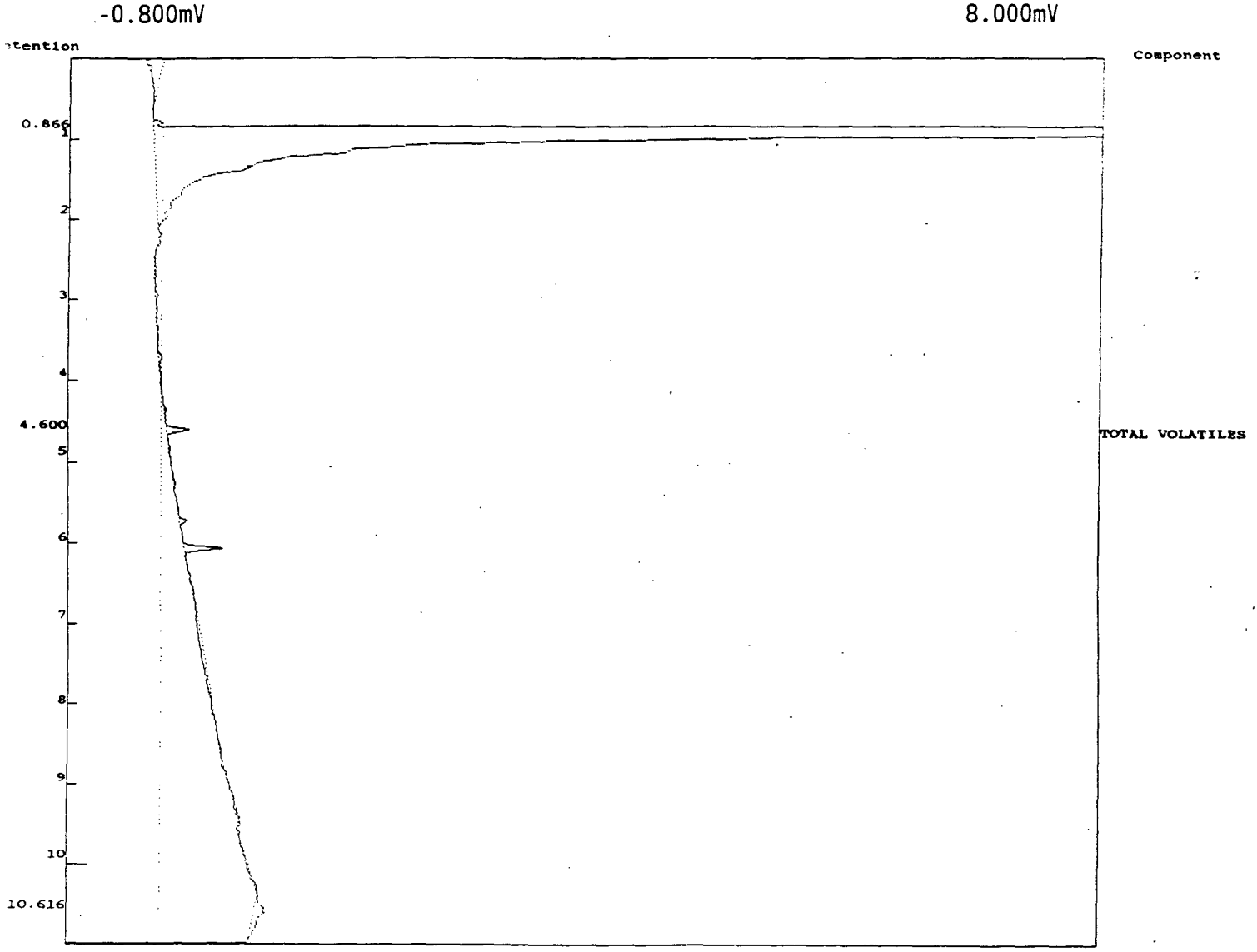
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F20.CHR (A:\JUNE05)
Sample : SG-213
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	2317.52 M	2317.52	ug/L
	1		2317.52	2317.52	

300891

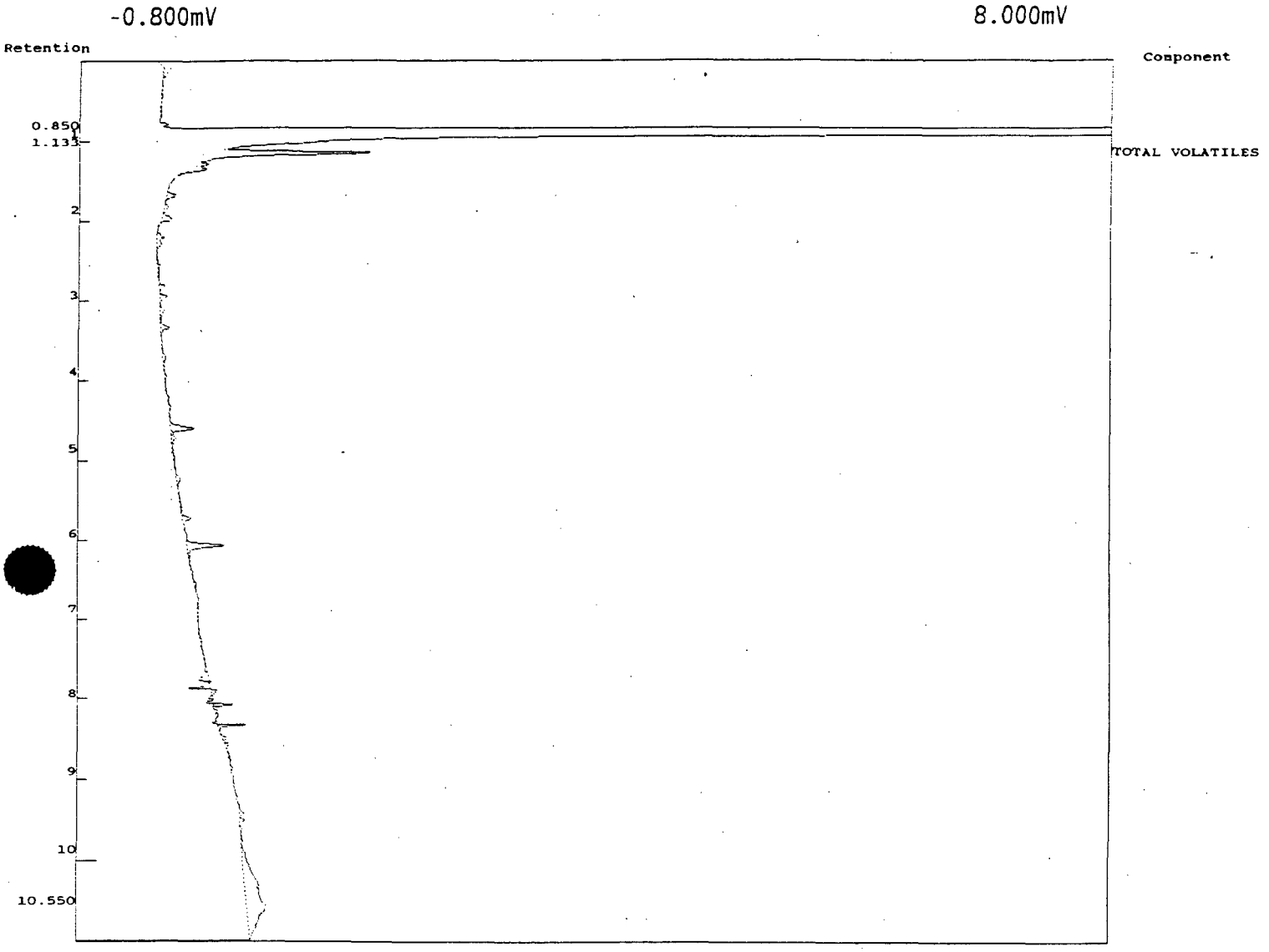
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F21.CHR (A:\JUNE05)
Sample : SG-215
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	4.600	1.89 M	1.89	ug/L
	1		1.89	1.89	

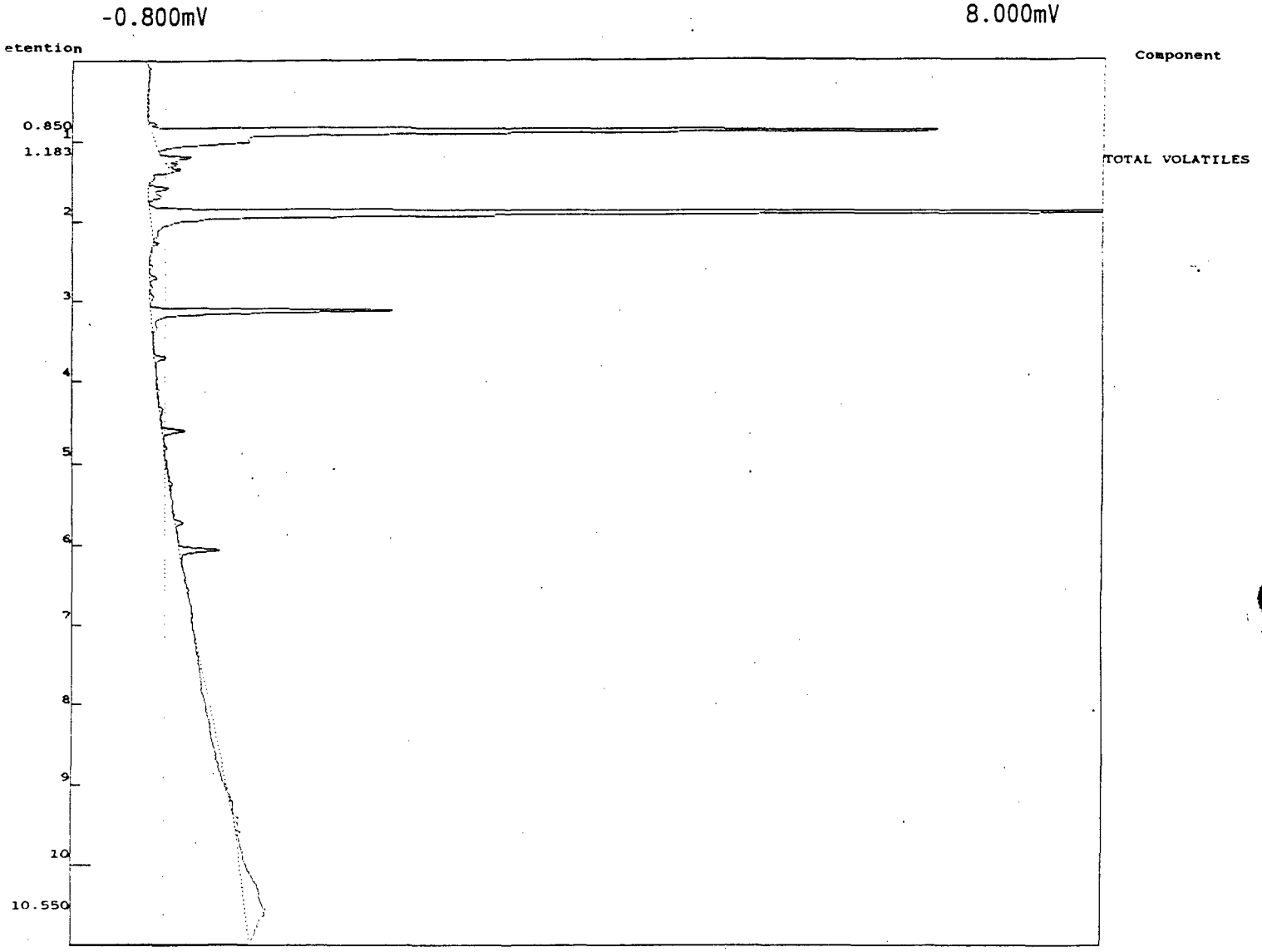
300892

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F22.CHR (A:\JUNE05)
Sample : SG-216
Operator : SGN



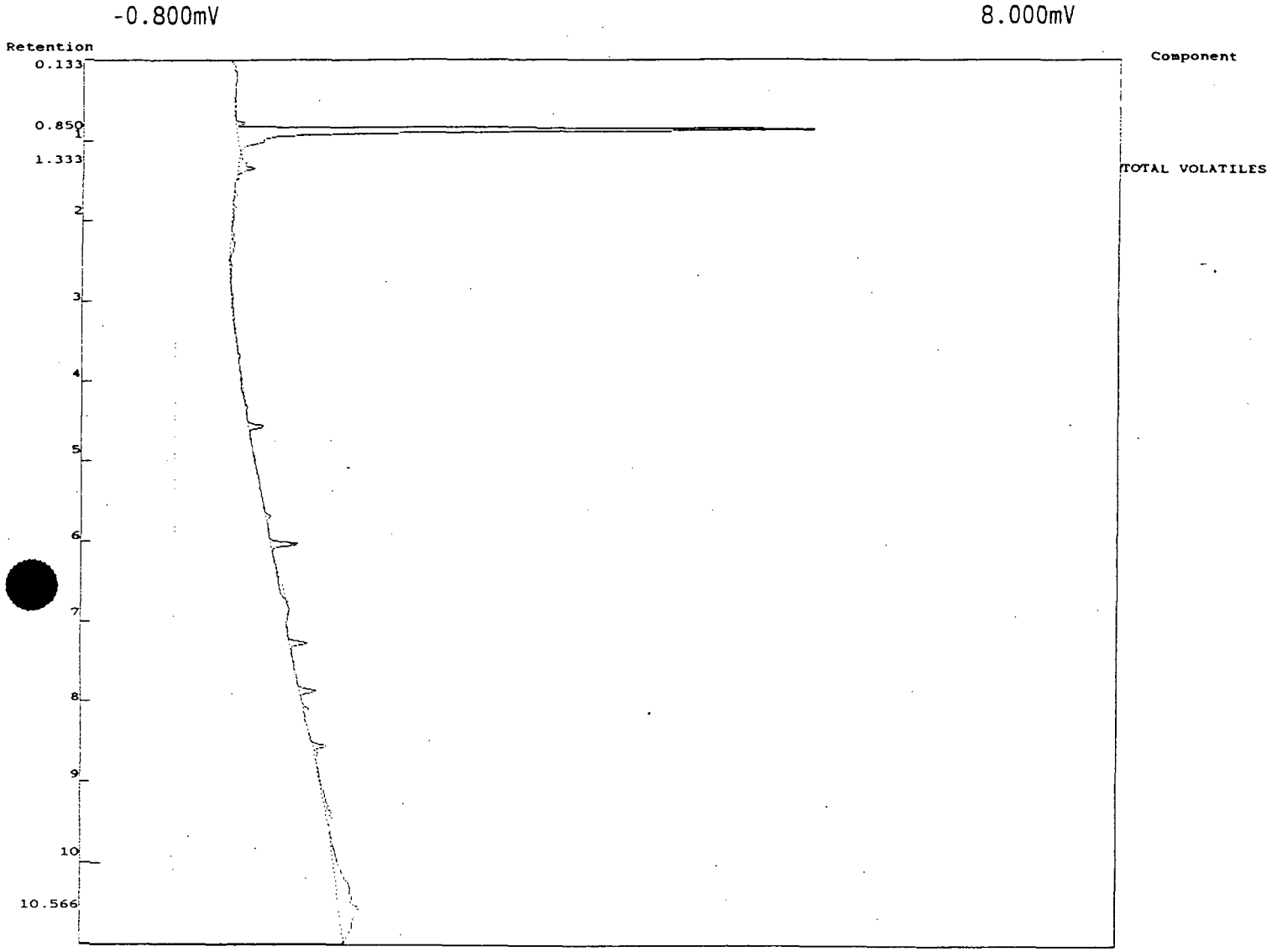
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.133	9.06 M	9.06	ug/L
	1		9.06	9.06	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F23.CHR (A:\JUNE05)
Sample : SG-217
Operator : SGN



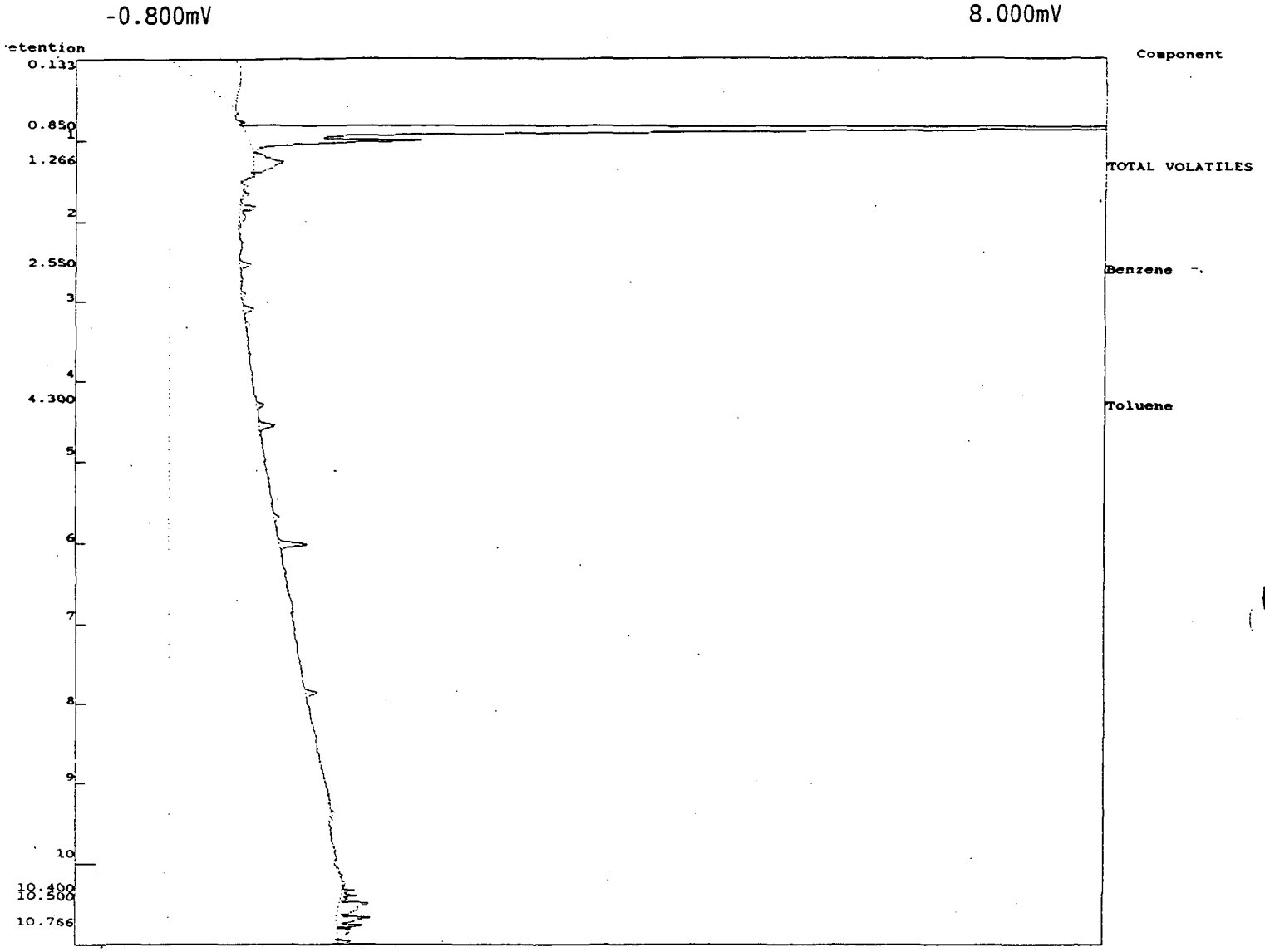
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.183	47.74	47.74	ug/L
	1		47.74	47.74	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F27.CHR (A:\JUNE05)
Sample : SG-094
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	5.03	5.03	ug/L
	1		5.03	5.03	

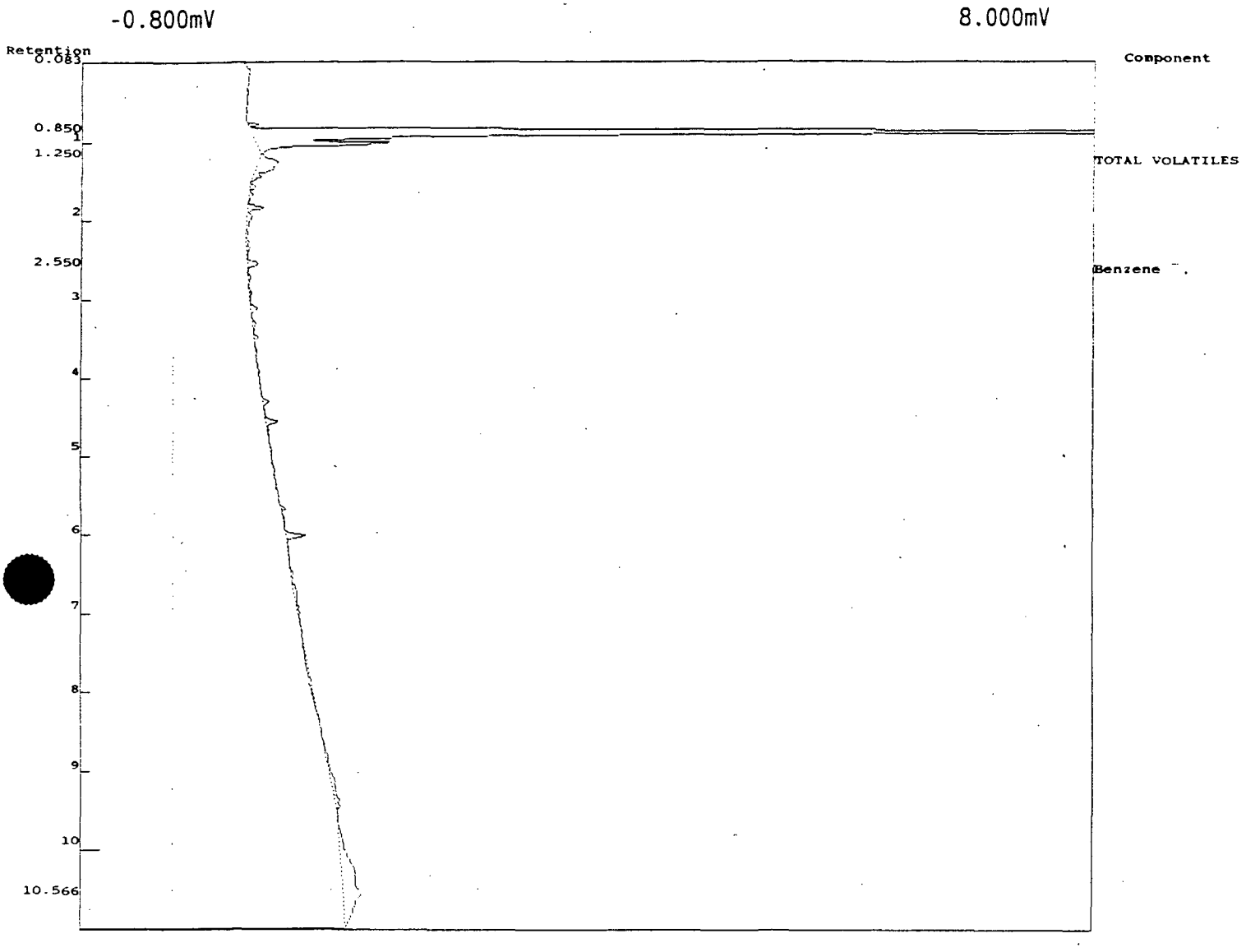
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F28.CHR (A:\JUNE05)
Sample : SG-095
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.266	5.90 M	5.90	ug/L
enzene	2	2.550	0.36	0.30	ug/L
oluene	3	4.300	0.24 M	0.24	ug/L
	3		6.50	6.44	

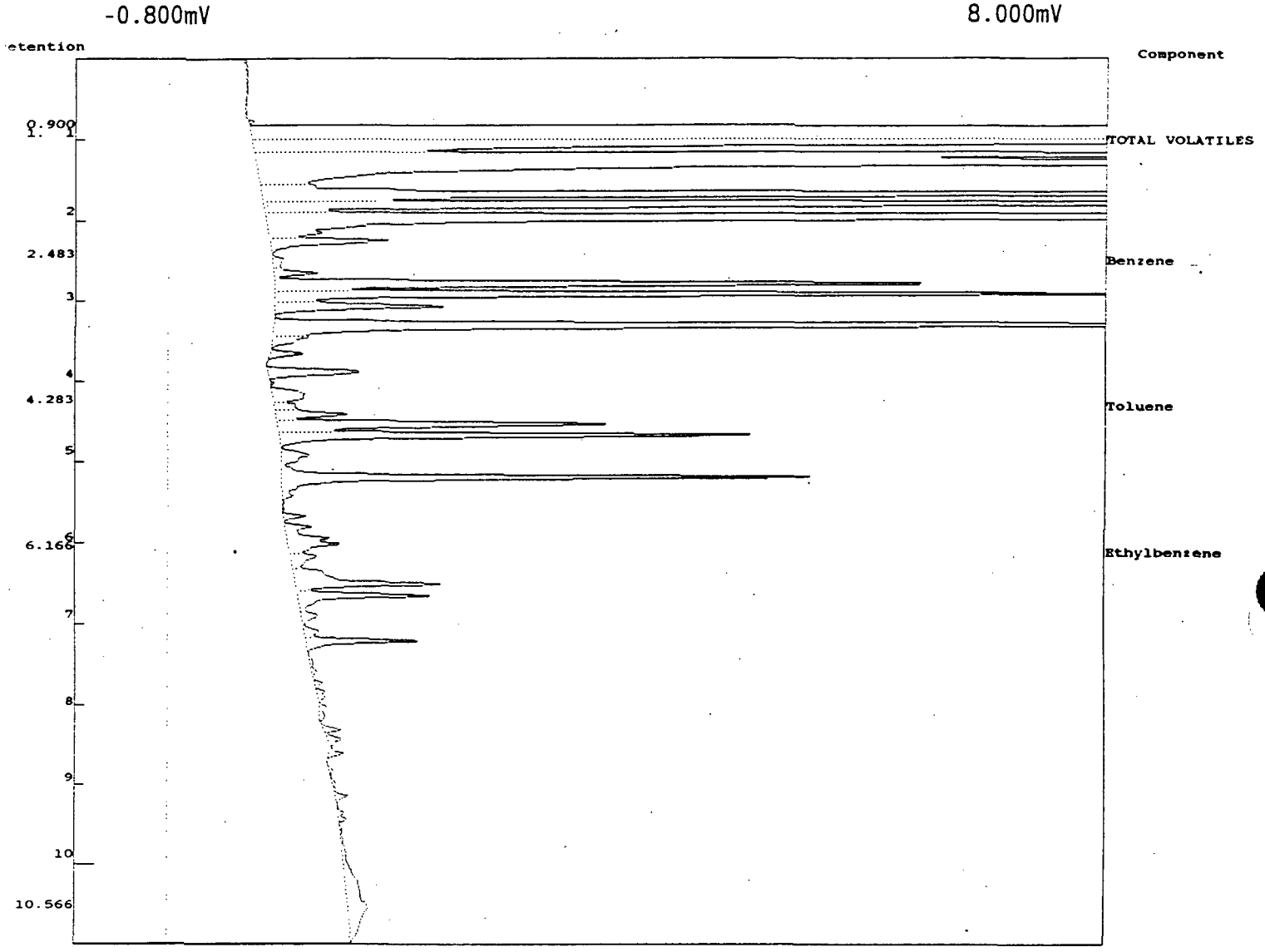
300896

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F29.CHR (A:\JUNE05)
Sample : SG-101
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.250	5.74	5.74	ug/L
Benzene	2	2.550	0.41	0.34	ug/L
	2		6.15	6.08	

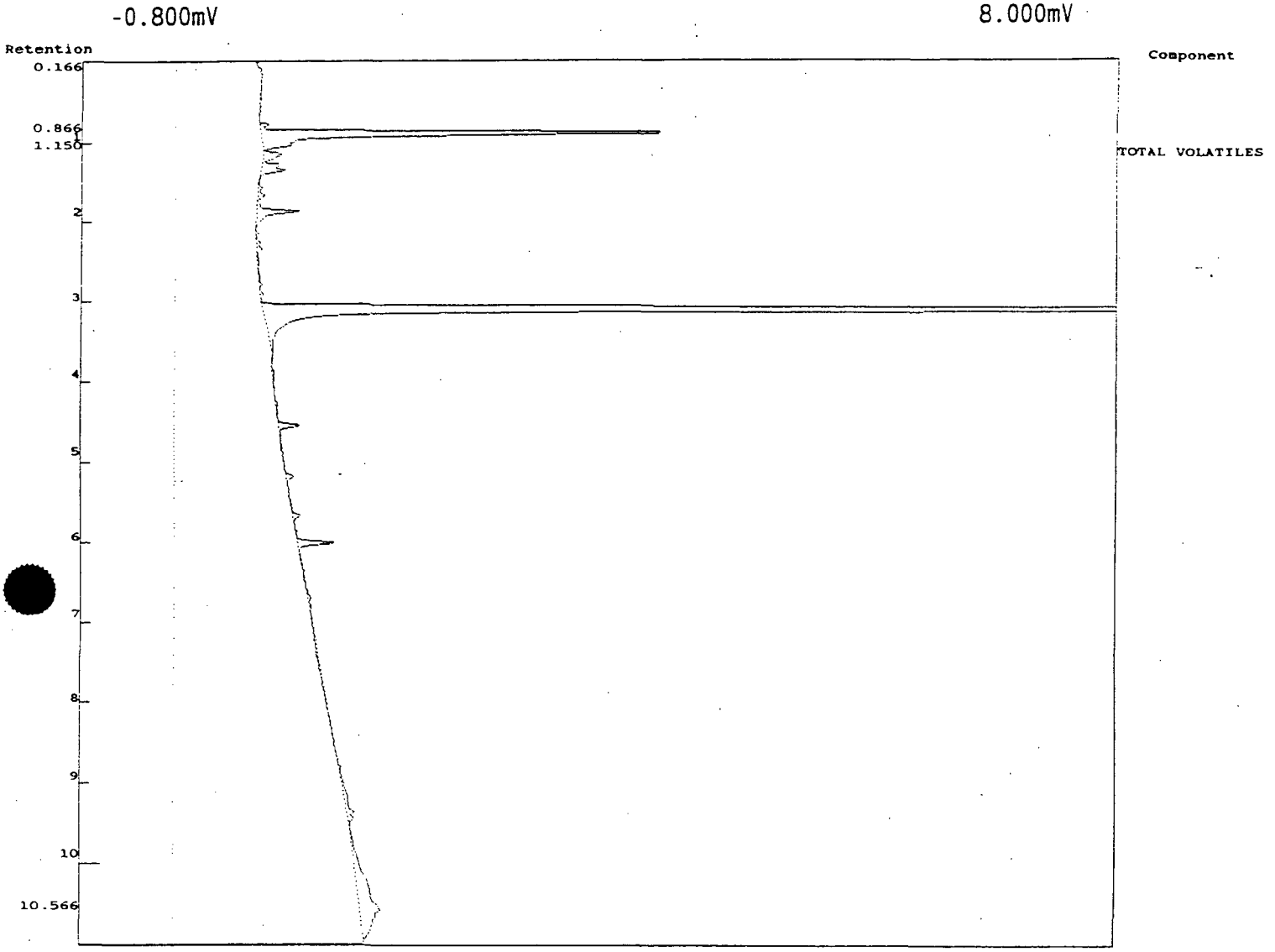
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F30.CHR (A:\JUNE05)
Sample : SG-206
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.016	708.60 M	708.60	ug/L
enzene	2	2.483	0.52 M	0.43	ug/L
oluene	3	4.283	0.77 M	0.77	ug/L
thylbenzene	4	6.166	1.59 M	1.86	ug/L
	4		711.48	711.67	

300898

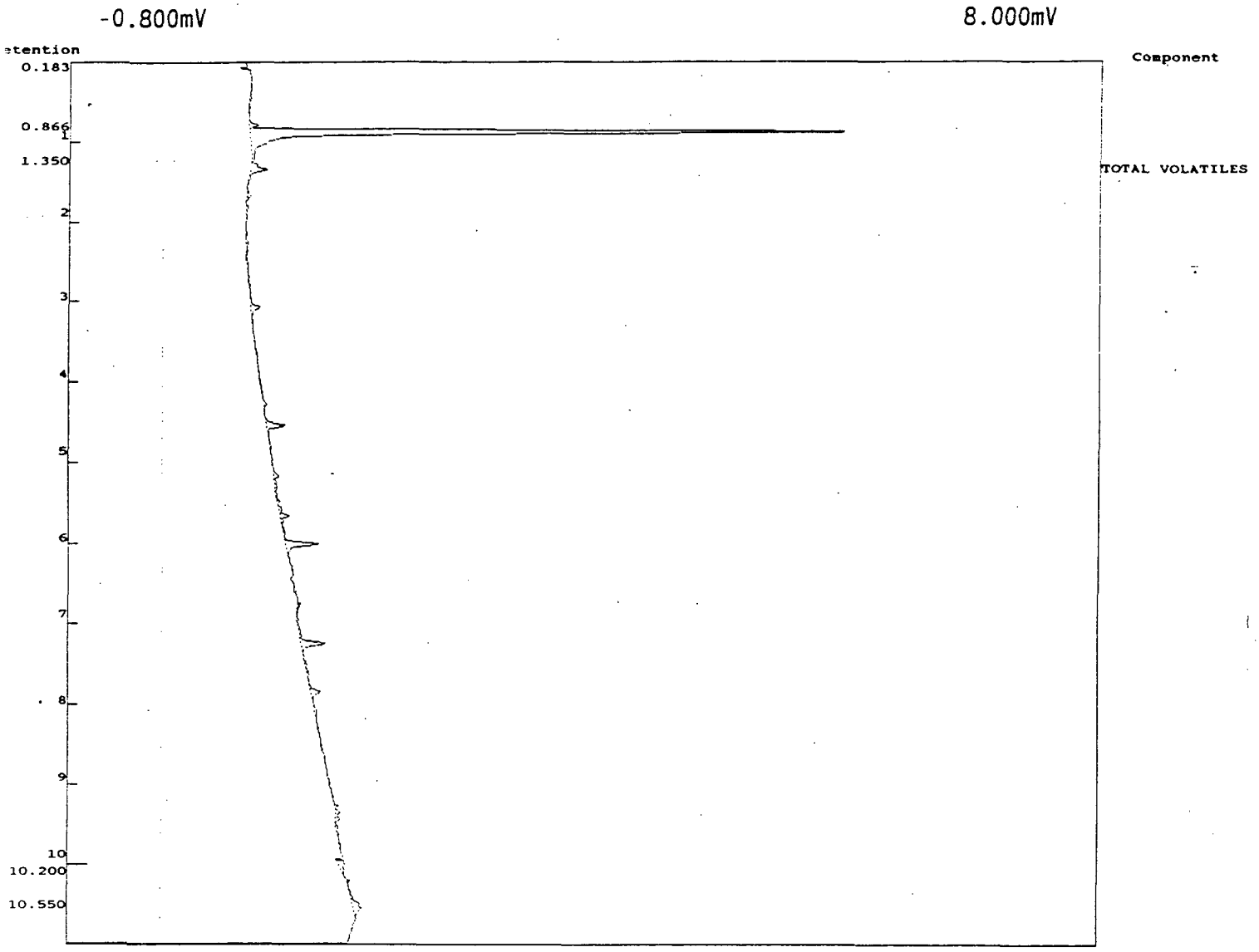
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F31.CHR (A:\JUNE05)
Sample : SG-207
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.150	58.55	58.55	ug/L
	1		58.55	58.55	

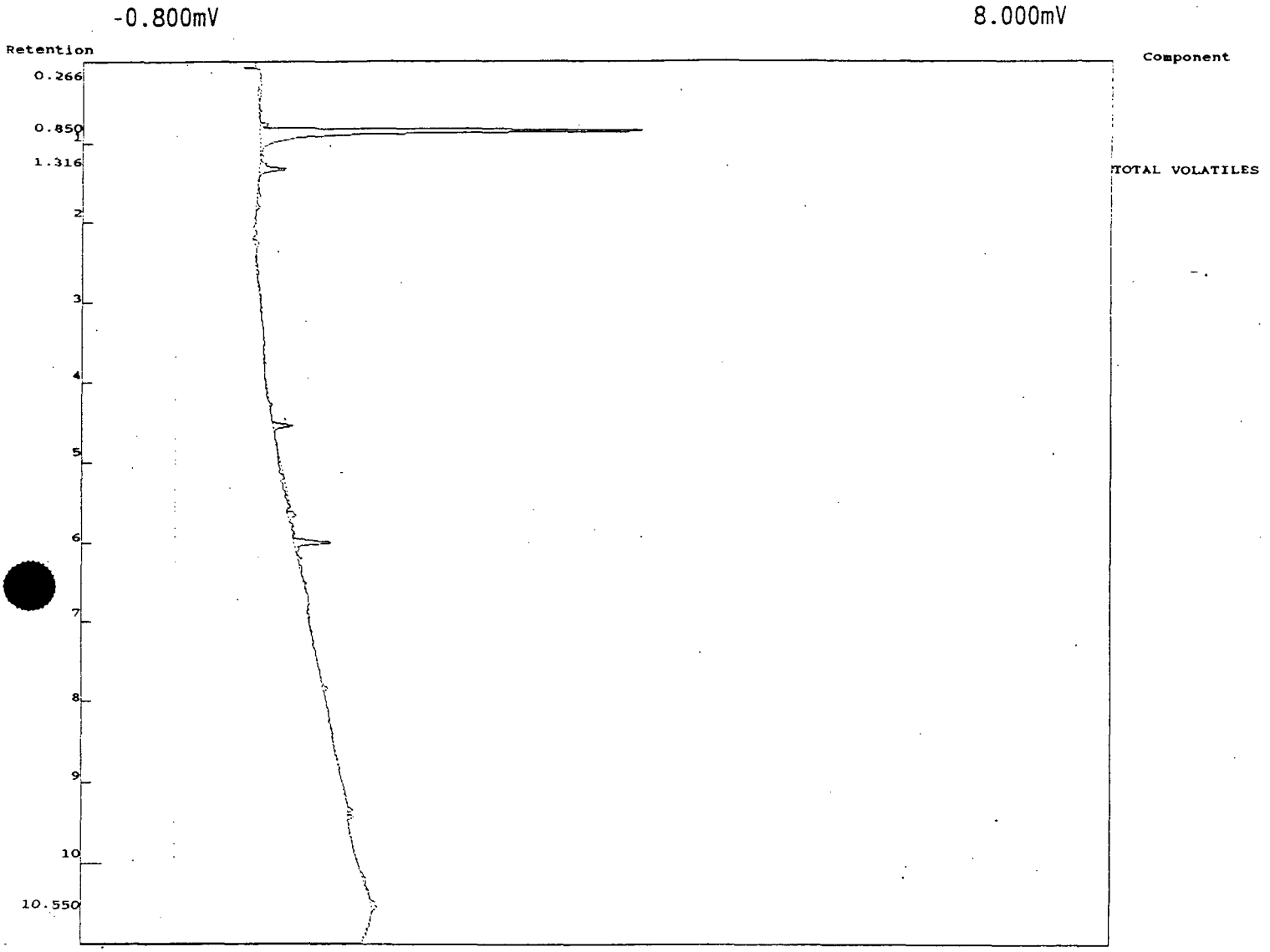
300899

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F32.CHR (A:\JUNE05)
Sample : SG-208
Operator : SGN



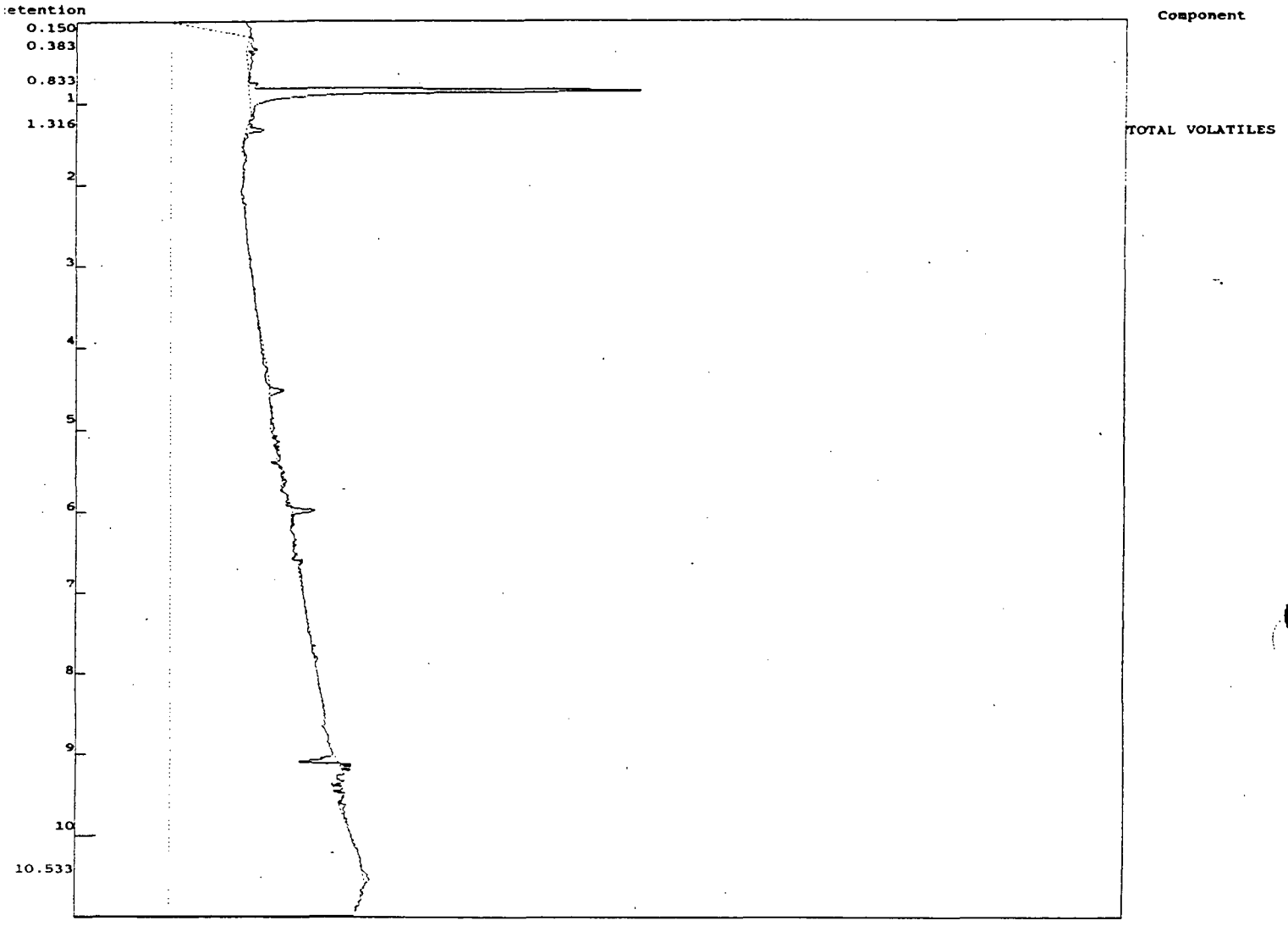
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.350	5.03	5.03	ug/L
1			5.03	5.03	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F33.CHR (A:\JUNE05)
Sample : SG-209
Operator : SGN



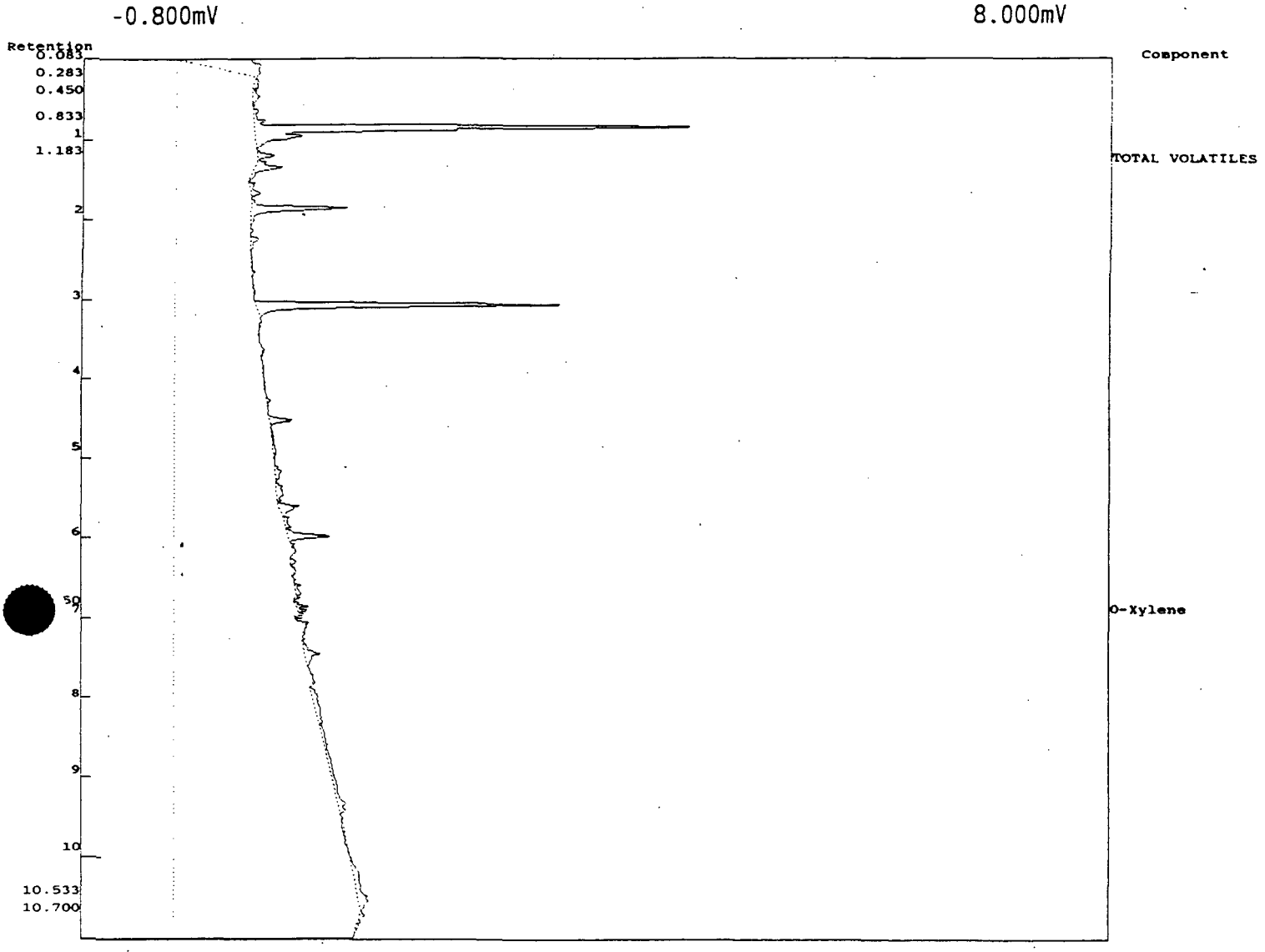
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	3.46	3.46	ug/L
	1		3.46	3.46	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F34.CHR (A:\JUNE05)
Sample : SG-809
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.316	1.53 M	1.53	ug/L
	1		1.53	1.53	

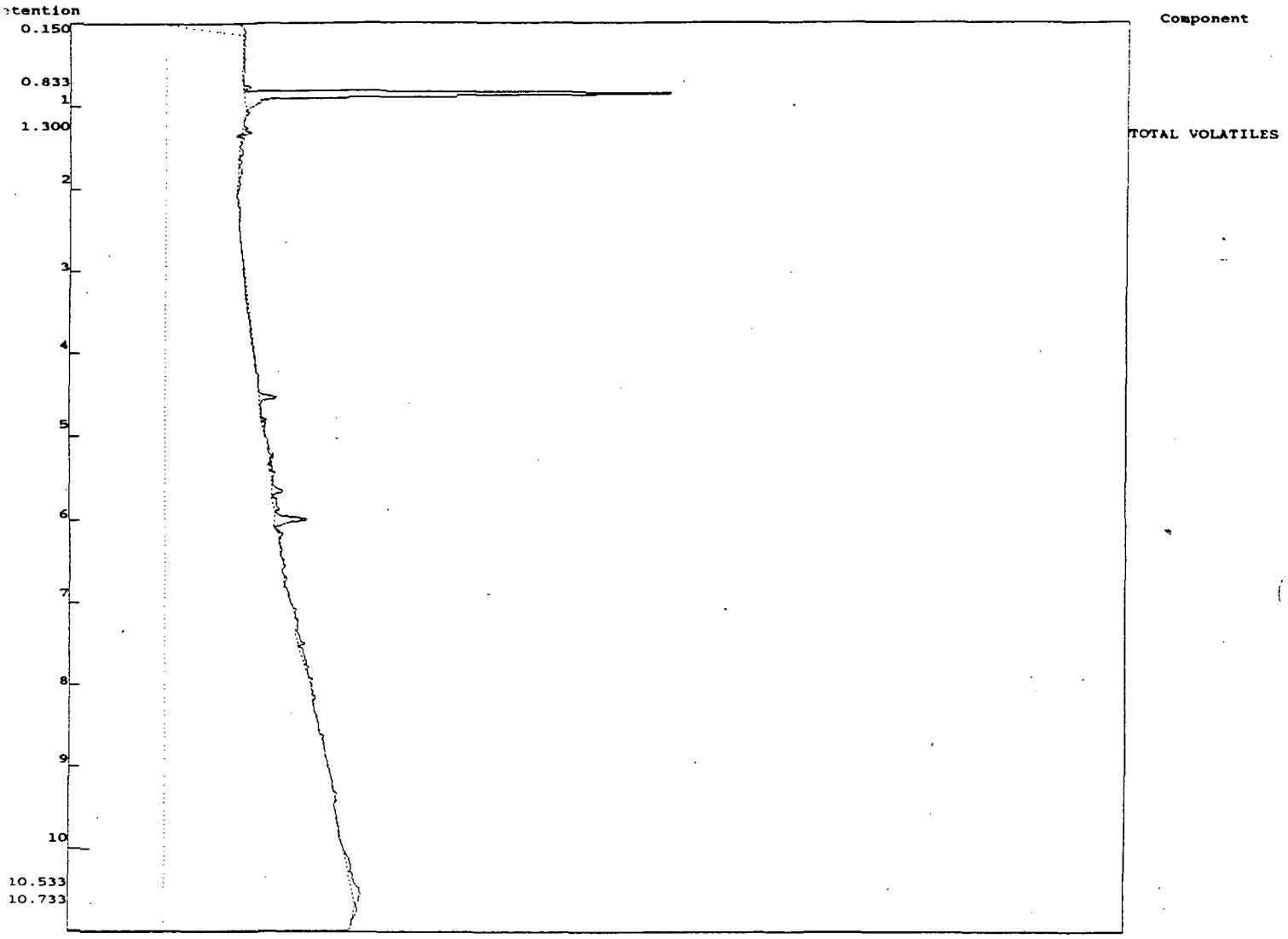
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F35.CHR (A:\JUNE05)
Sample : SG-214
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.183	22.54	22.54	ug/L
O-Xylene	6	6.850	0.30 M	0.37	ug/L
	2		22.84	22.91	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F36.CHR (A:\JUNE05)
Sample : EB-26
Operator : SGN

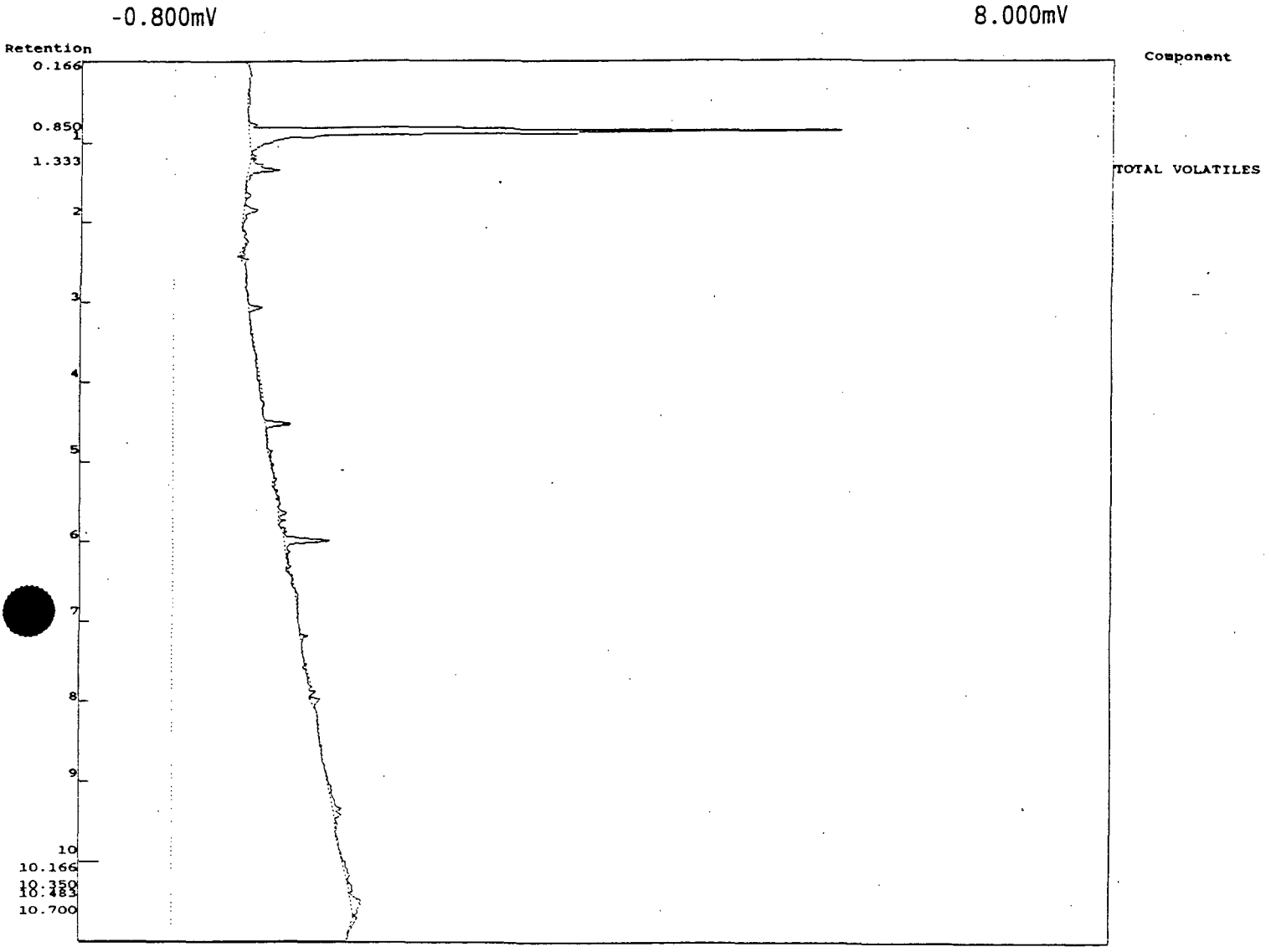
-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.300	3.85 M	3.85	ug/L
1			3.85	3.85	

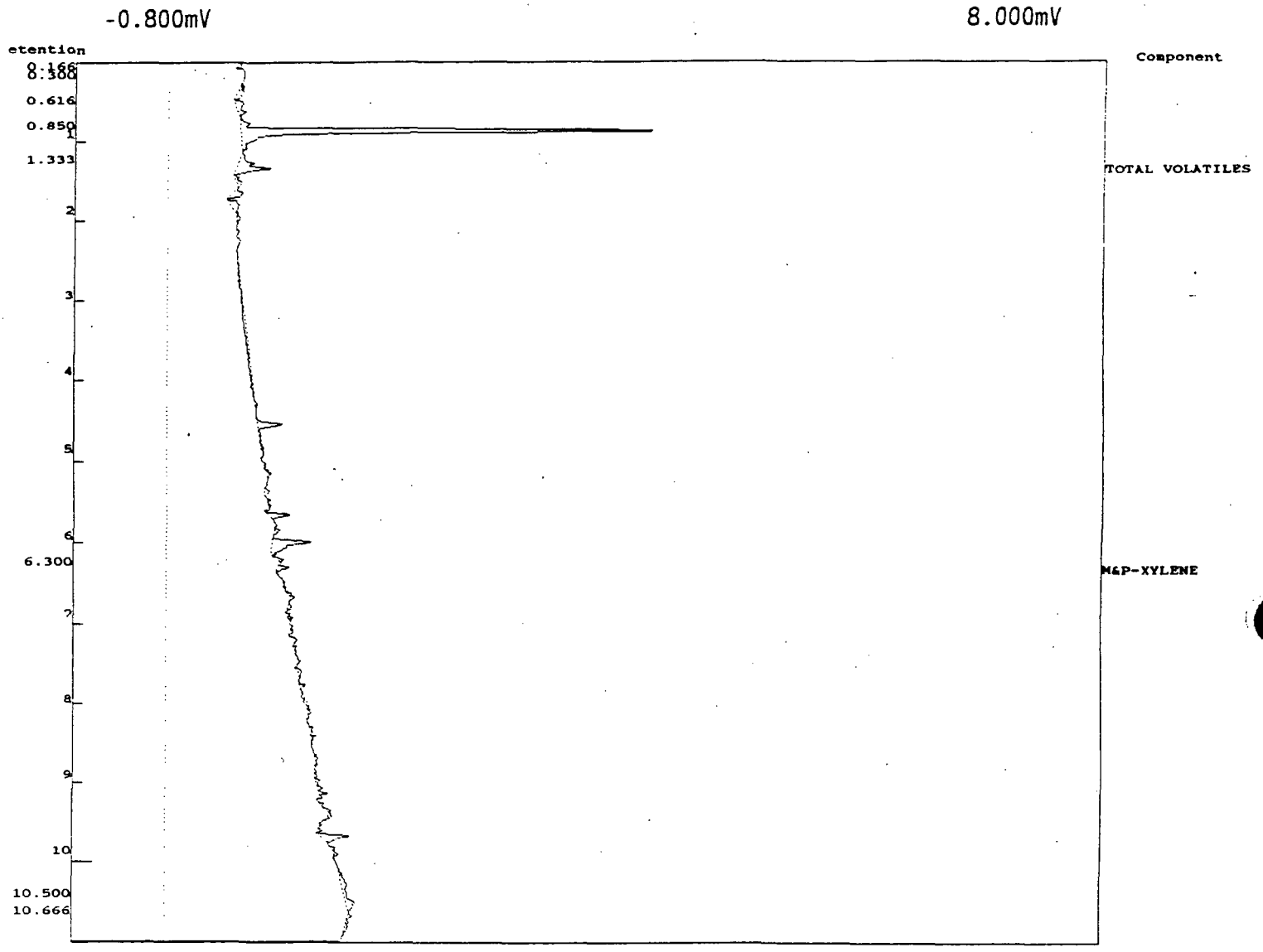
300904

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F37.CHR (A:\JUNE05)
Sample : SG-218
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	6.65	6.65	ug/L
	1		6.65	6.65	

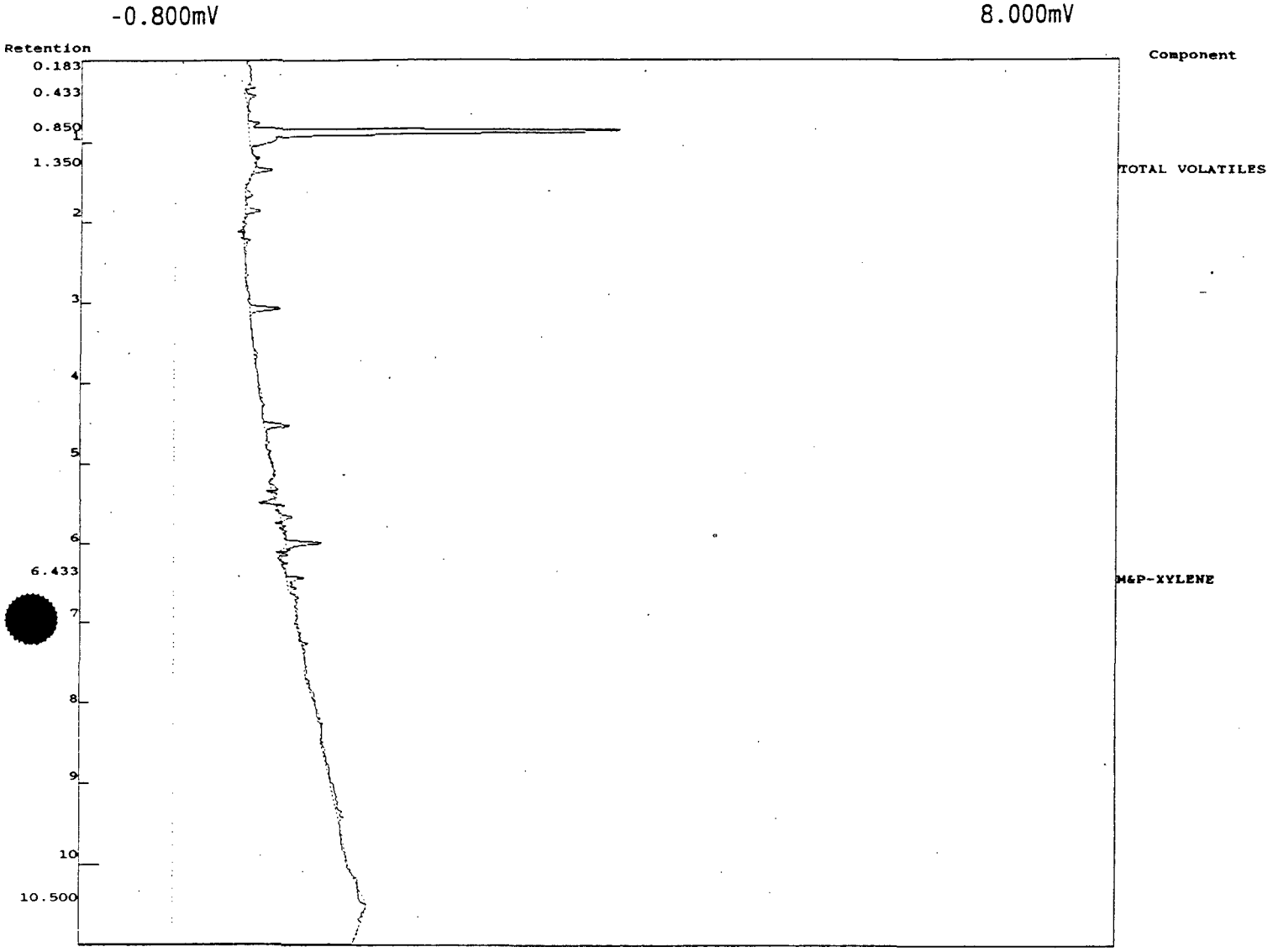
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F38.CHR (A:\JUNE05)
Sample : EB-27
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	6.75 M	6.75	ug/L
M&P-XYLENE	5	6.300	0.29 M	0.37	ug/L
	2		7.04	7.11	

300906

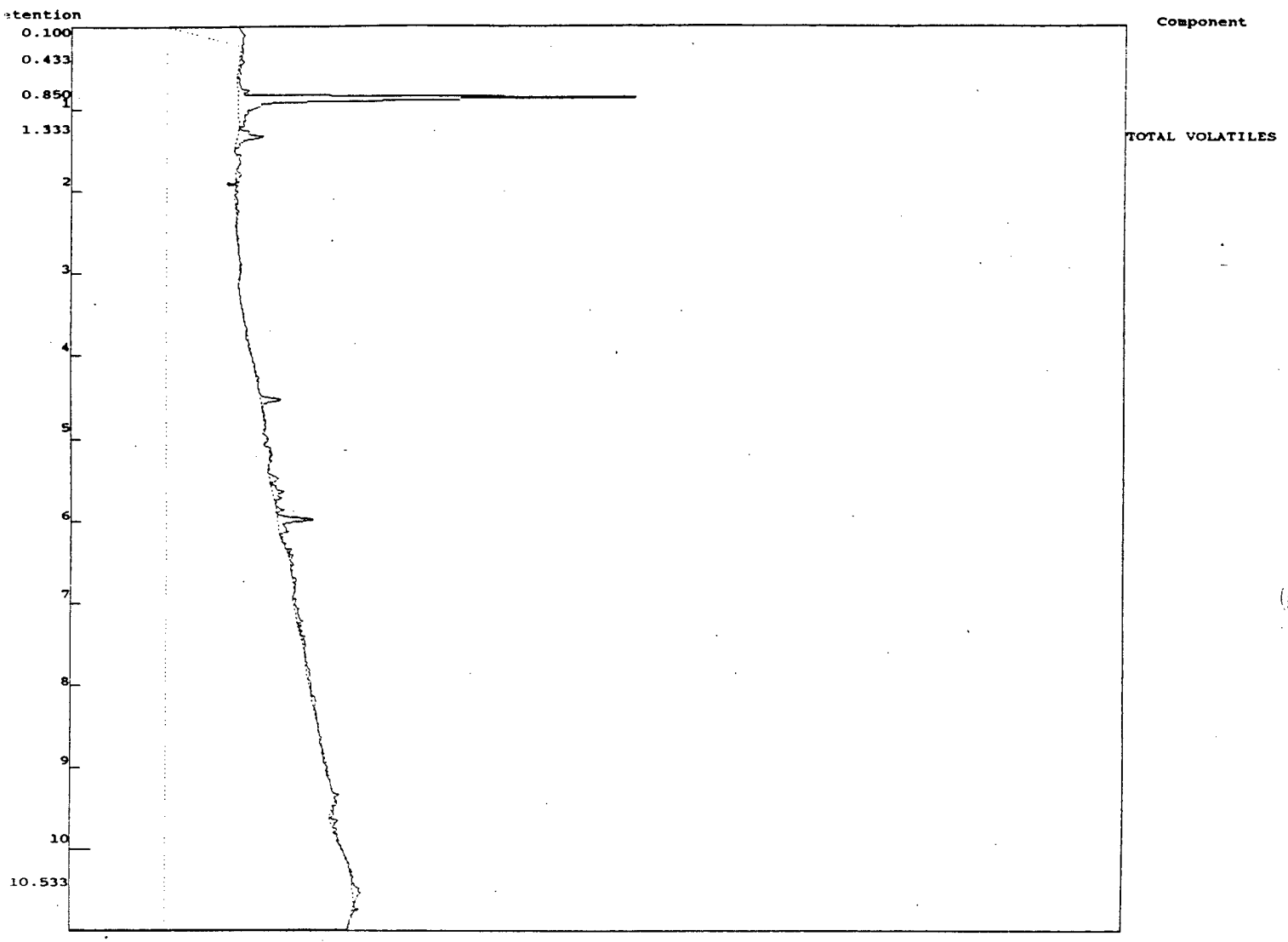
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F39.CHR (A:\JUNE05)
Sample : SG-220
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	5.70 M	5.70	ug/L
M&P-XYLENE	5	6.433	0.73 M	0.91	ug/L
	2		6.43	6.61	

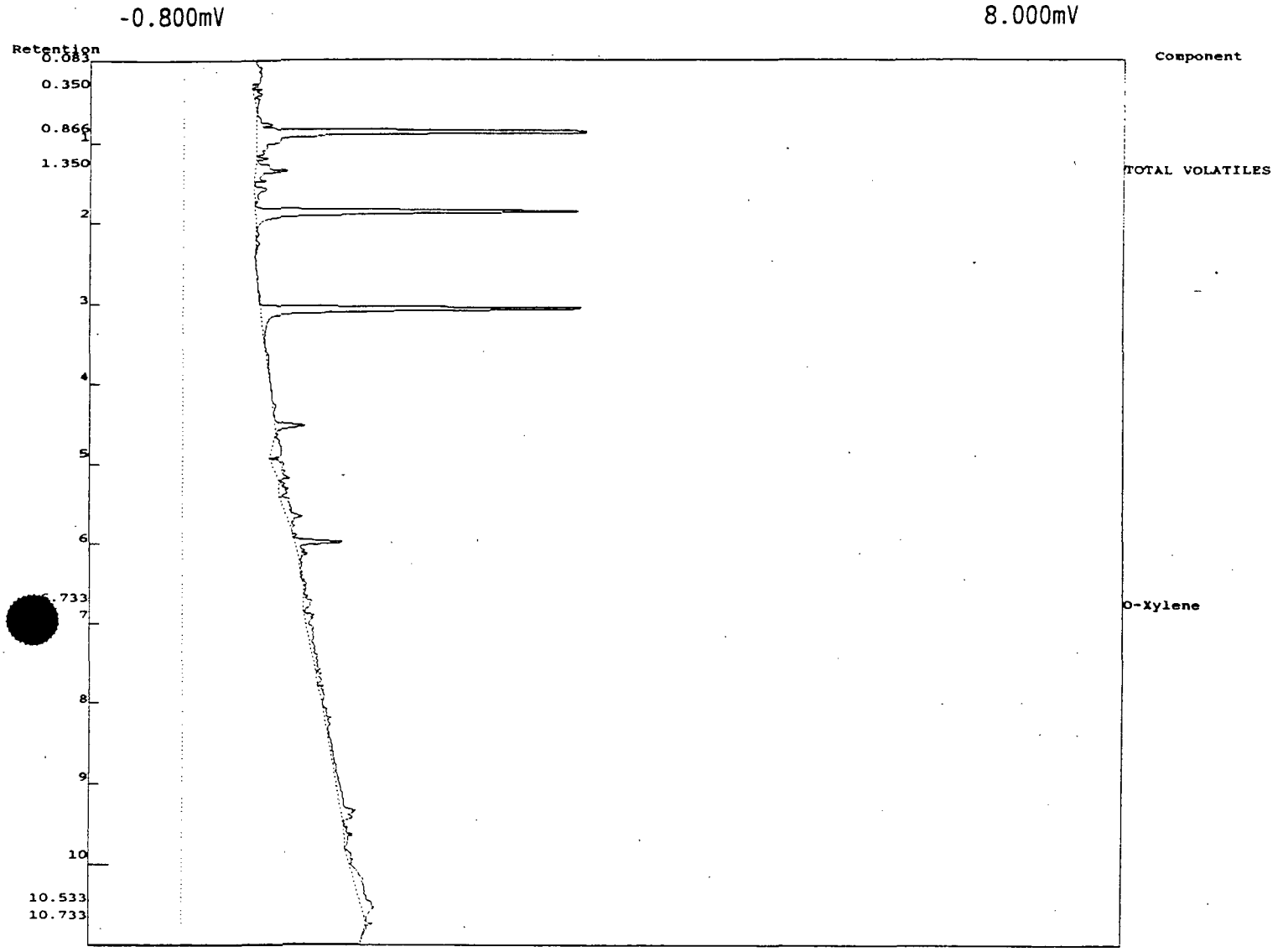
300907

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F40.CHR (A:\JUNE05)
Sample : EB-28
Operator : SGN



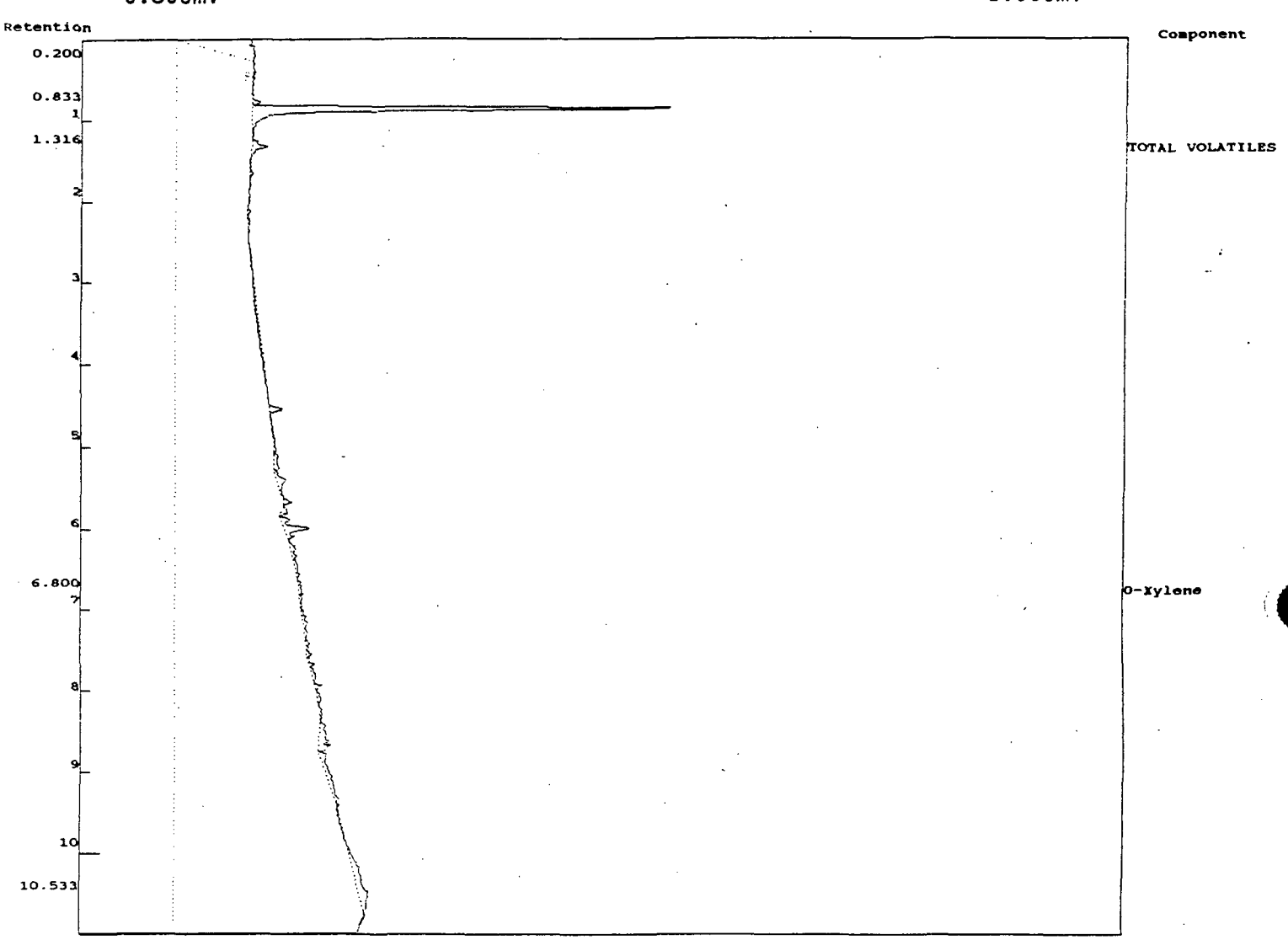
Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.333	5.81	5.81	ug/L
1			5.81	5.81	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F41.CHR (A:\JUNE05)
Sample : SG-221
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	34.37	34.37	ug/L
O-Xylene	6	6.733	0.42	0.52	ug/L
	2		34.79	34.89	

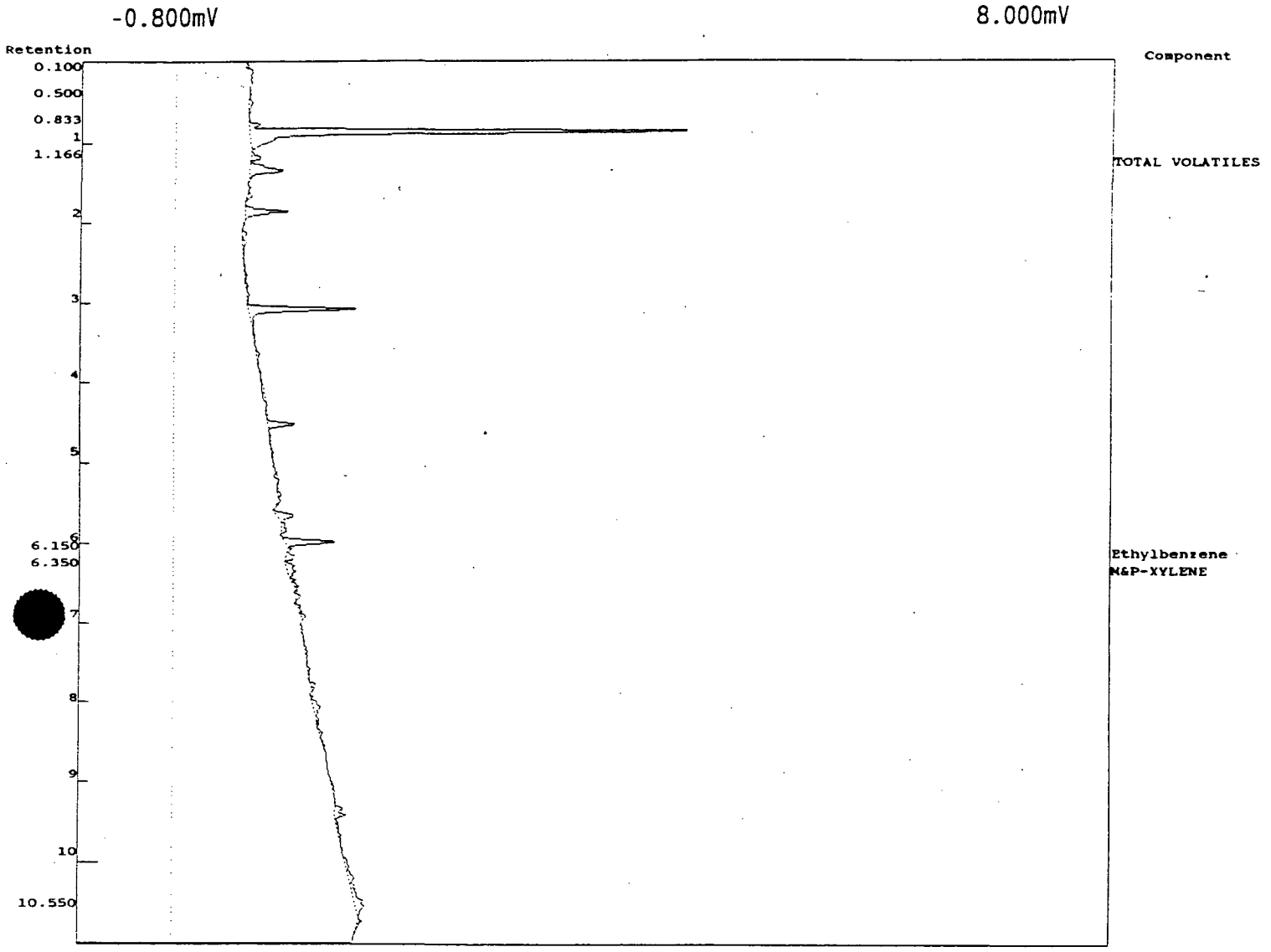
Lab name : WINNIE
Description : FID - Channel I
Data file : JUN05F42.CHR (A:\JUNE05)
Sample : EB-29
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	7.25	7.25	ug/L
O-Xylene	6	6.800	0.26	0.32	ug/L
	2		7.51	7.57	

300910

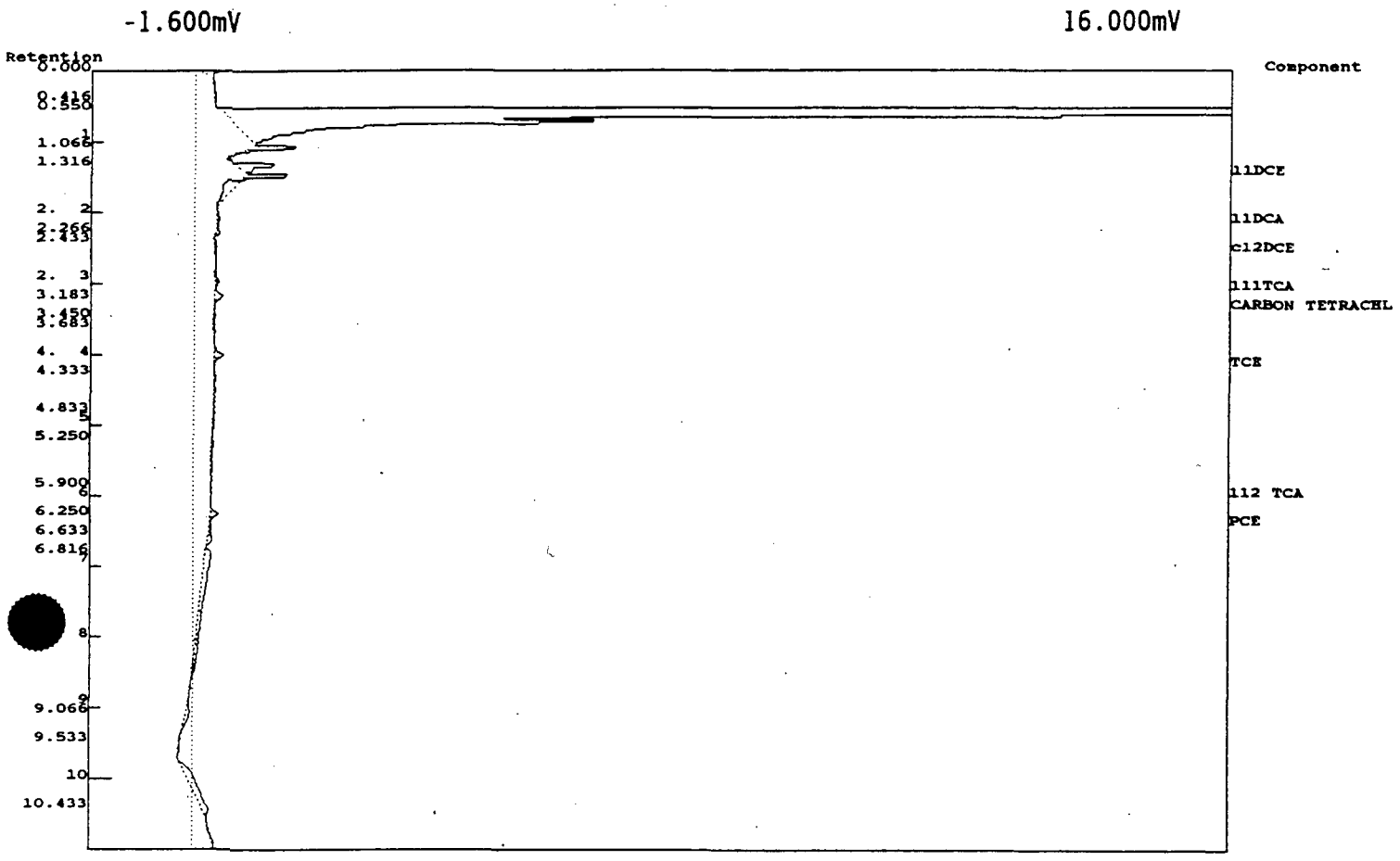
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN05F43.CHR (A:\JUNE05)
Sample : SG-222
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.166	11.30	11.30	ug/L
Ethylbenzene	4	6.150	0.40	0.47	ug/L
M&P-XYLENE	5	6.350	0.52	0.65	ug/L
	3		12.23	12.42	

300911

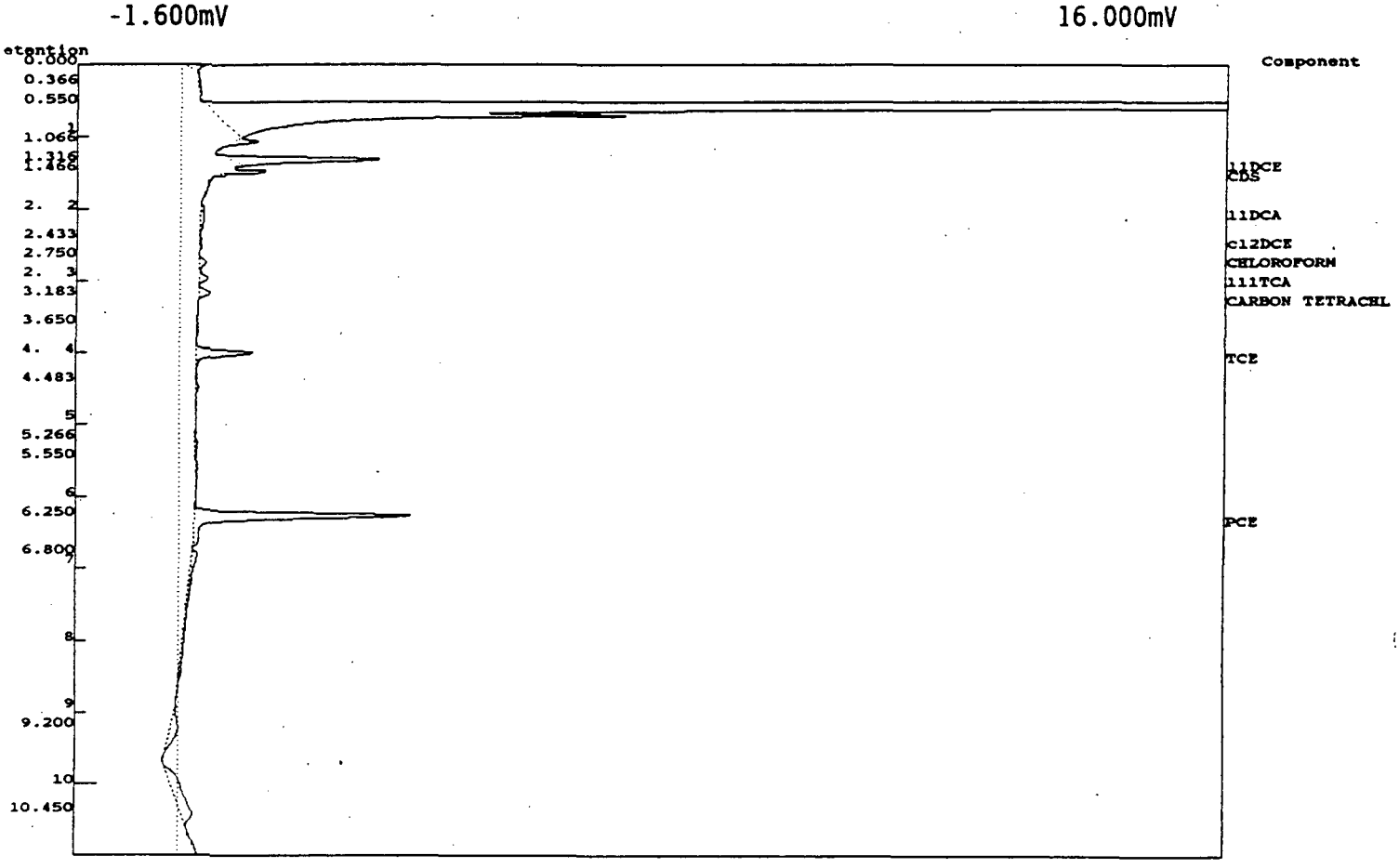
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 14:52:38
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E6.CHR (A:\)
Sample : SG-160
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	2.92	0.39	ug/L
11DCA	4	2.100	0.37	0.34	ug/L
c12DCE	5	2.433	0.26	0.60	ug/L
111TCA	7	2.983	0.34	0.00	ug/L
CARBON TETRACHLORIDE	8	3.183	0.77	0.00	ug/L
TCE	9	4.000	1.00	0.01	ug/L
112 TCA	10	5.900	0.11	0.01	ug/L
PCE	11	6.250	0.66	0.00	ug/L
	8		6.43	1.36	

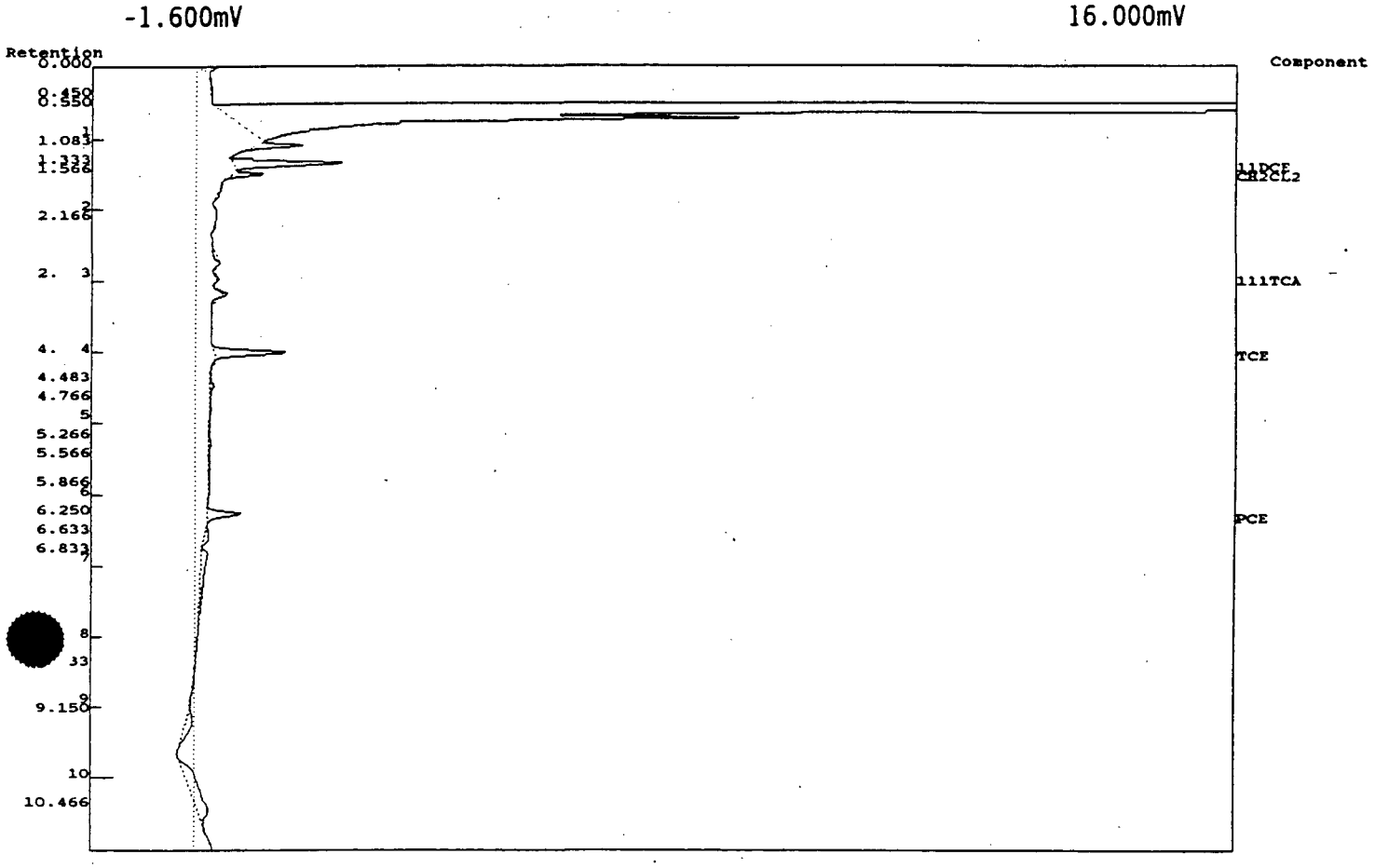
300912

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 15:11:39
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E7.CHR (A:\)
Sample : SG-170
Operator : SGN



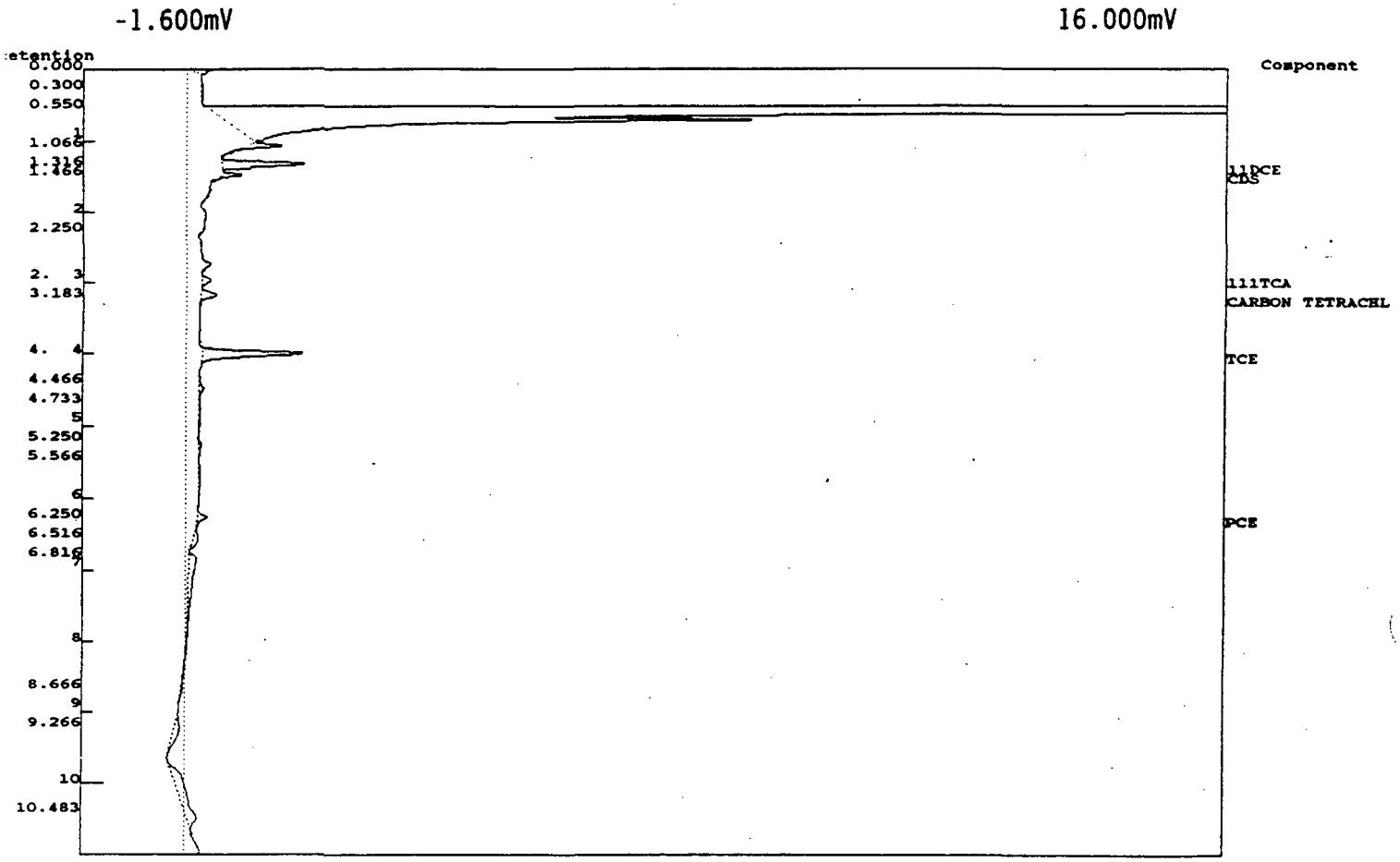
Component	Number	Retention	Area	External	Units
1DCE	1	1.316	10.02 M	1.35	ug/L
DS	0	1.466	2.06 M	N/A	
1DCA	4	2.100	0.95	0.88	ug/L
12DCE	5	2.433	0.26	0.58	ug/L
HLOROFORM	6	2.750	0.68	0.01	ug/L
11TCA	7	2.966	0.67	0.00	ug/L
ARBON TETRACHLORIDE	8	3.183	0.96	0.00	ug/L
CE	9	4.000	4.89	0.06	ug/L
CE	11	6.250	19.72	0.07	ug/L
	9		40.20	1.96	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 15:30:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E8.CHR (A:\)
Sample : SG-171
Operator : SGN



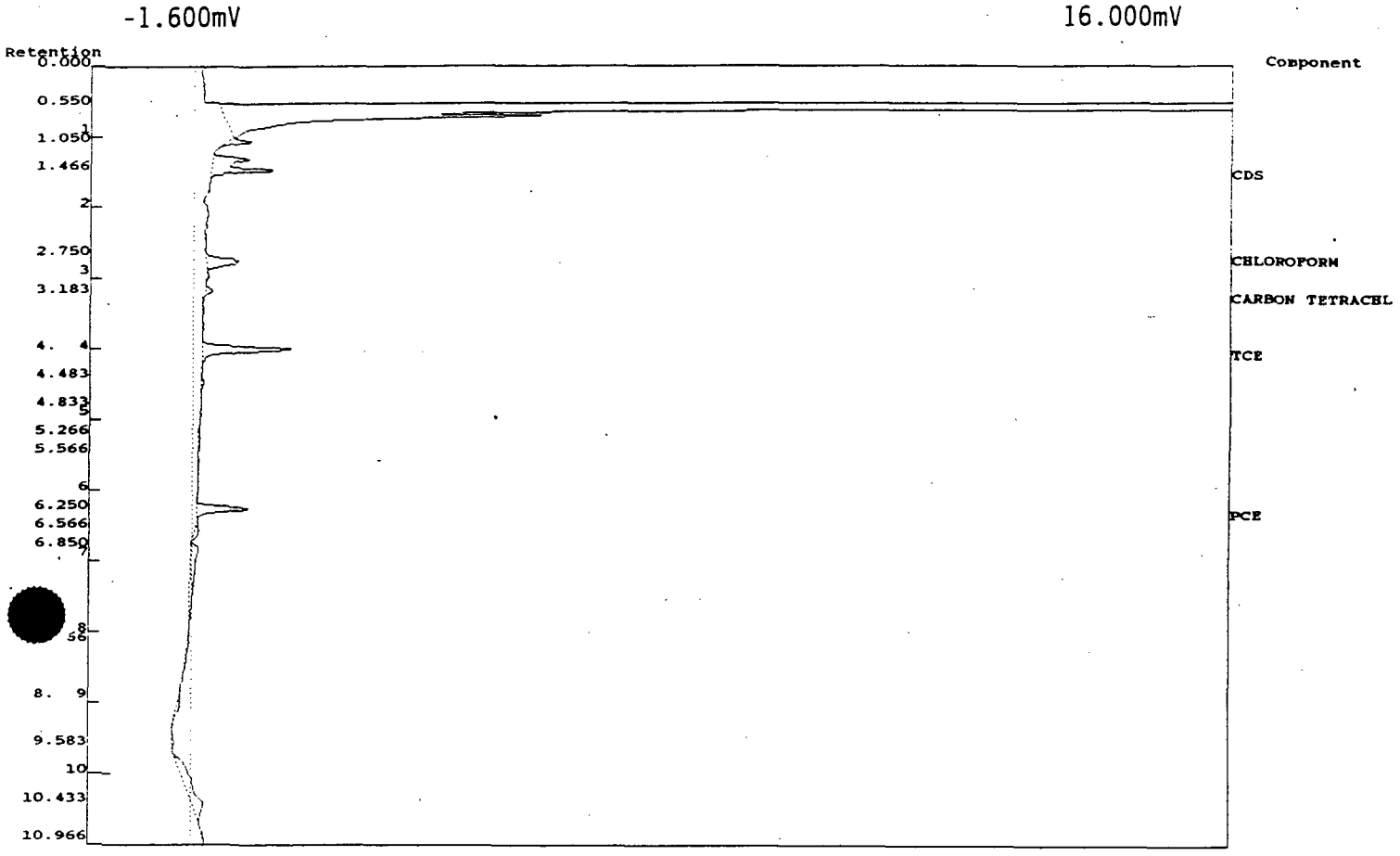
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	8.15 M	1.10	ug/L
CDS	0	1.483	1.65 M	N/A	
CH2CL2	2	1.566	0.25 M	0.17	ug/L
111TCA	7	2.966	0.16 M	0.00	ug/L
TCE	9	4.000	5.38 M	0.07	ug/L
PCE	11	6.250	2.81 M	0.01	ug/L
	6		18.40	0.35	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 15:49:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E9.CHR (A:\)
Sample : SG-172
Operator : SGN



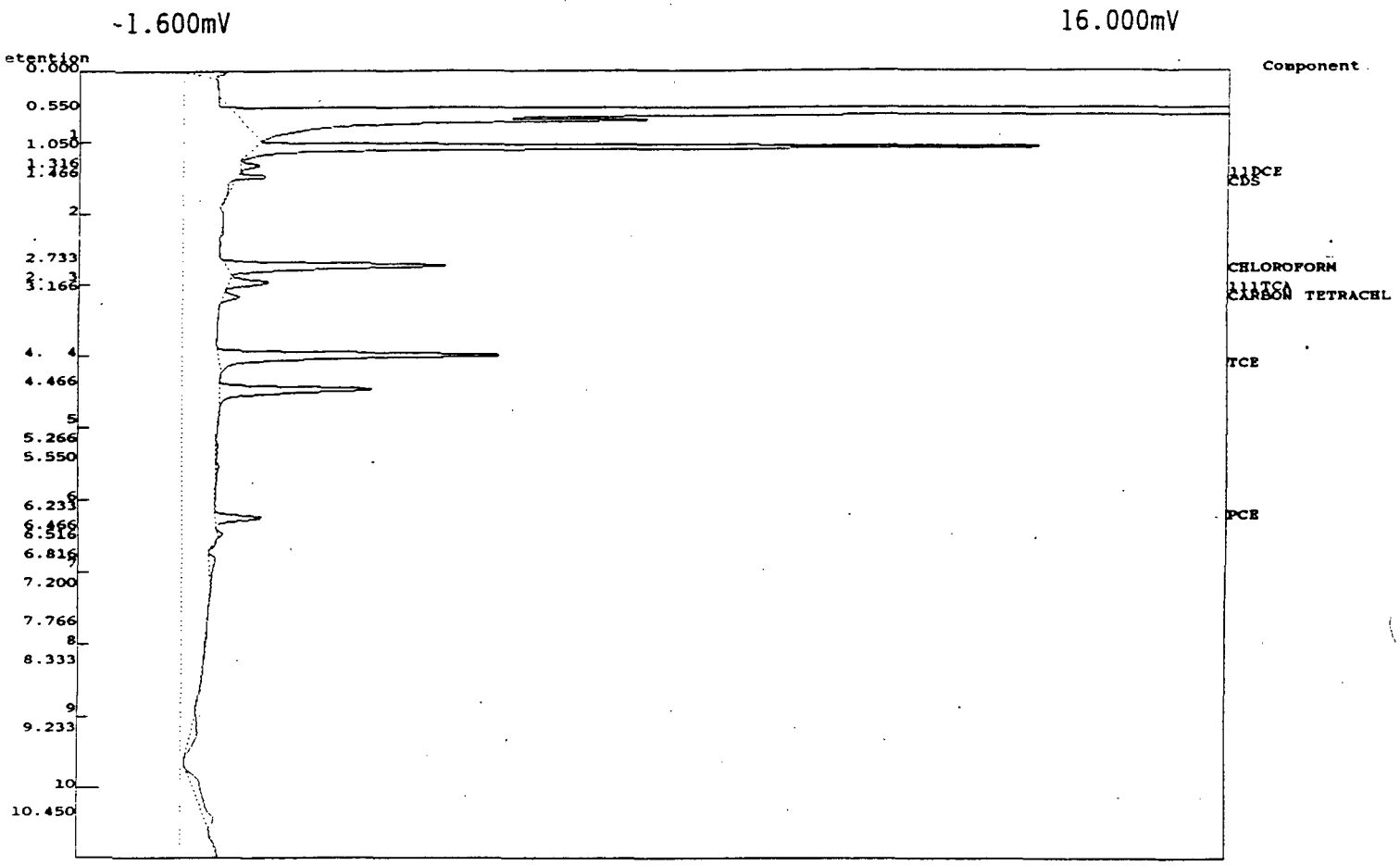
Component	Number	Retention	Area	External	Units
1DCE	1	1.316	6.00 M	0.81	ug/L
DS	0	1.466	0.90 M	N/A	
11TCA	7	2.966	0.76	0.00	ug/L
ARBON TETRACHLORIDE	8	3.183	1.27	0.00	ug/L
CE	9	4.000	7.99 M	0.10	ug/L
CE	11	6.250	0.83 M	0.00	ug/L
	6		17.75	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 16:13:41
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E10.CHR (A:\JUNE05)
Sample : SG-176
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.466	7.79 M	N/A	
CHLOROFORM	6	2.750	3.68 M	0.06	ug/L
CARBON TETRACHLORIDE	8	3.183	0.47 M	0.00	ug/L
TCE	9	4.000	7.30 M	0.09	ug/L
PCE	11	6.250	4.18 M	0.02	ug/L
	5		23.43	N/A	

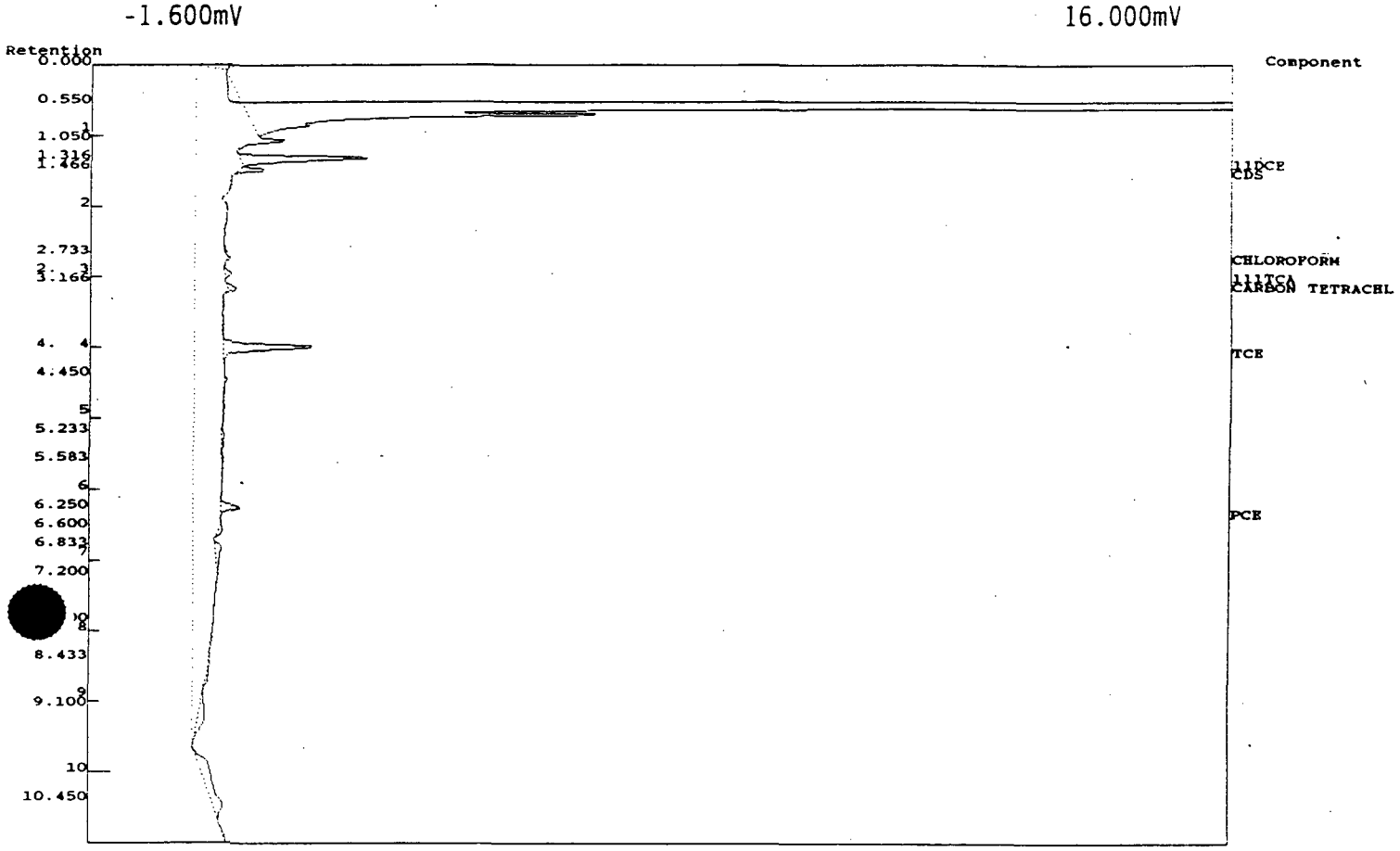
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 16:32:42
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E11.CHR (A:\JUNE05)
Sample : SG-177
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.316	1.29	0.17	ug/L
DS	0	1.466	1.12	N/A	
HLOROFORM	6	2.733	18.17 M	0.27	ug/L
11TCA	7	2.966	3.40 M	0.02	ug/L
ARBON TETRACHLORIDE	8	3.166	1.30 M	0.00	ug/L
CE	9	4.000	24.65 M	0.30	ug/L
CE	11	6.233	3.75	0.01	ug/L
	7		53.67	N/A	

300917

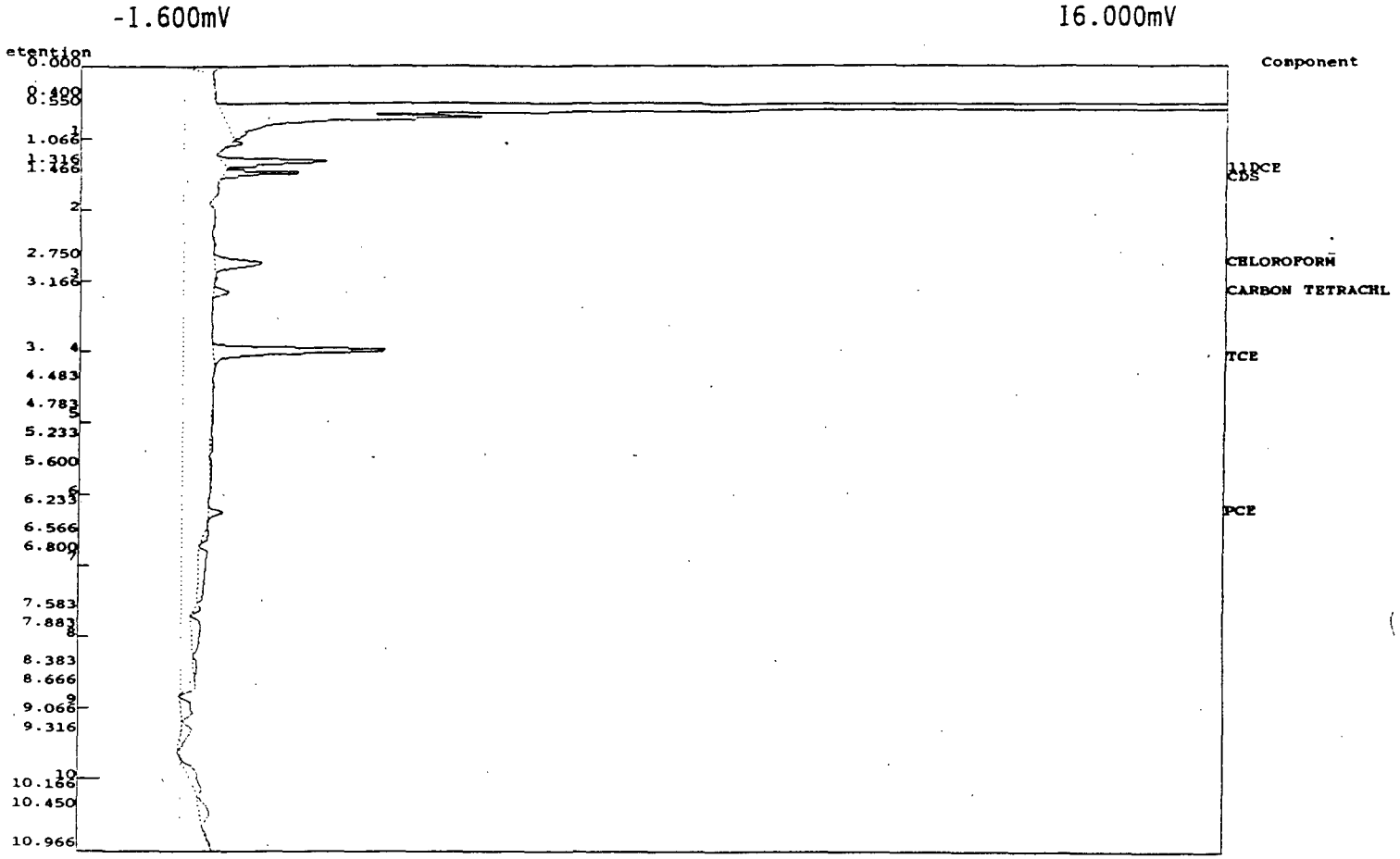
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 16:51:43
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E12.CHR (A:\JUNE05)
Sample : SG-178
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	9.54 M	1.29	ug/L
CDS	0	1.466	1.36 M	N/A	
CHLOROFORM	6	2.733	0.15 M	0.00	ug/L
111TCA	7	2.966	0.58 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.166	0.57 M	0.00	ug/L
TCE	9	4.000	7.69 M	0.09	ug/L
PCE	11	6.250	1.65	0.01	ug/L
	7		21.54	0.40	

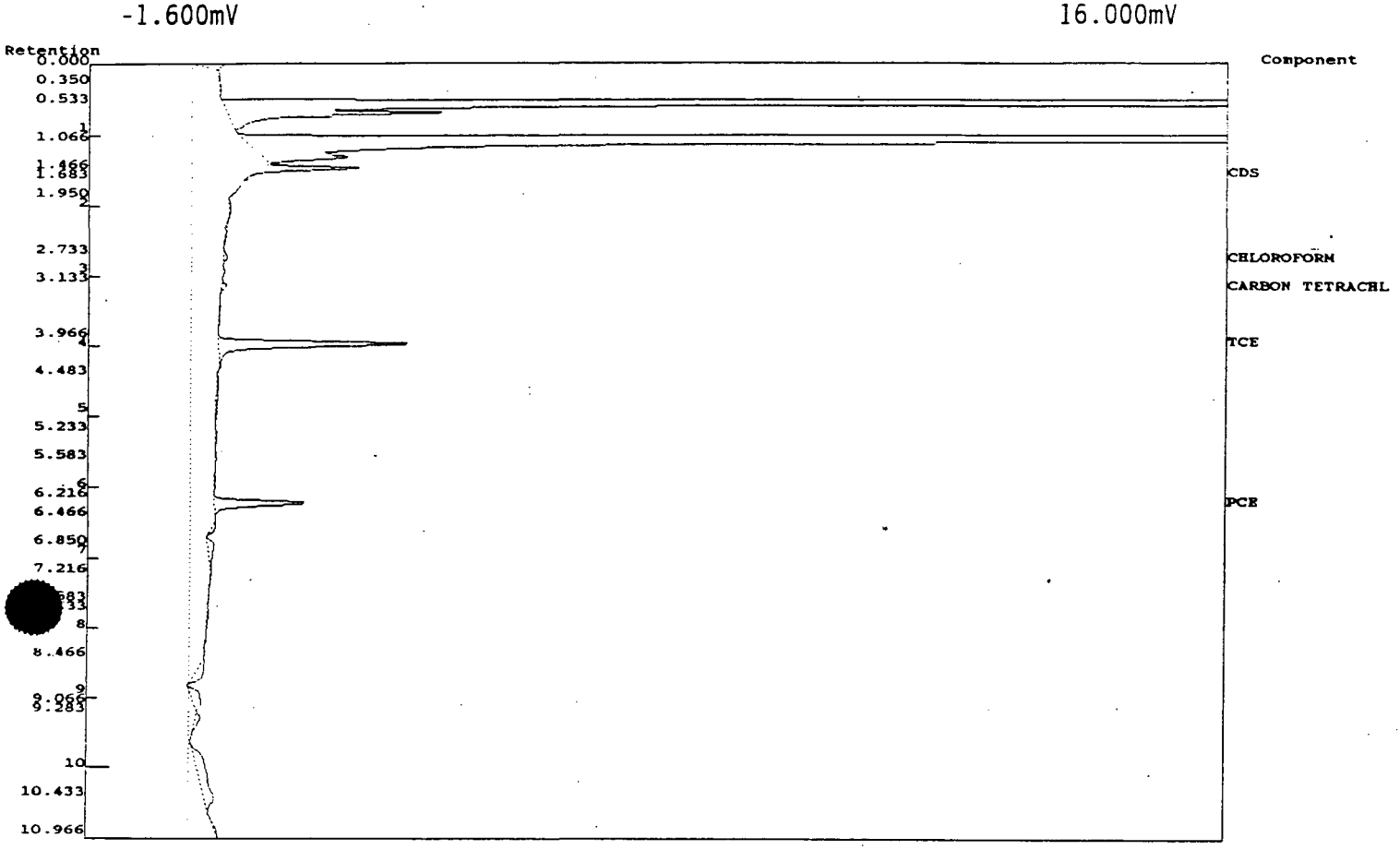
300918

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 17:10:42
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E13.CHR (A:\JUNE05)
Sample : SG-179
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.316	7.71	1.04	ug/L
DS	0	1.466	3.90	N/A	
HLOROFORM	6	2.750	5.26 M	0.08	ug/L
ARBON TETRACHLORIDE	8	3.166	1.45 M	0.00	ug/L
CE	9	3.983	14.99 M	0.18	ug/L
CE	11	6.233	1.28 M	0.00	ug/L
	6		34.59	0.31	

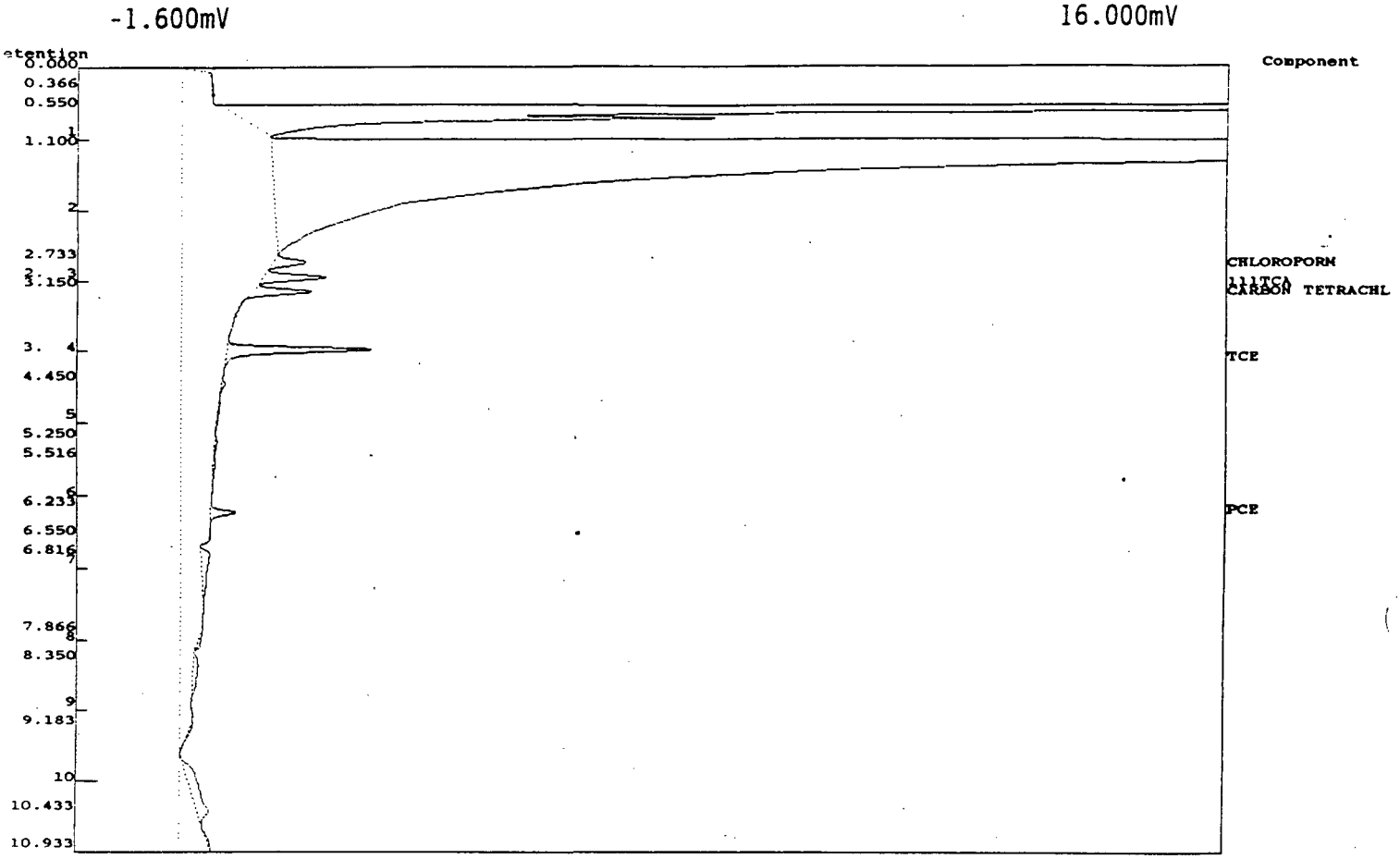
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 17:29:44
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E14.CHR (A:\JUNE05)
Sample : SG-180
Operator : SGN



Component	Number	Retention	Area	External	Units
CDS	0	1.466	5.19 M	N/A	
CHLOROFORM	6	2.733	0.45 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.133	0.39 M	0.00	ug/L
TCE	9	3.966	16.64 M	0.20	ug/L
PCE	11	6.216	7.55 M	0.03	ug/L
	5		30.23	N/A	

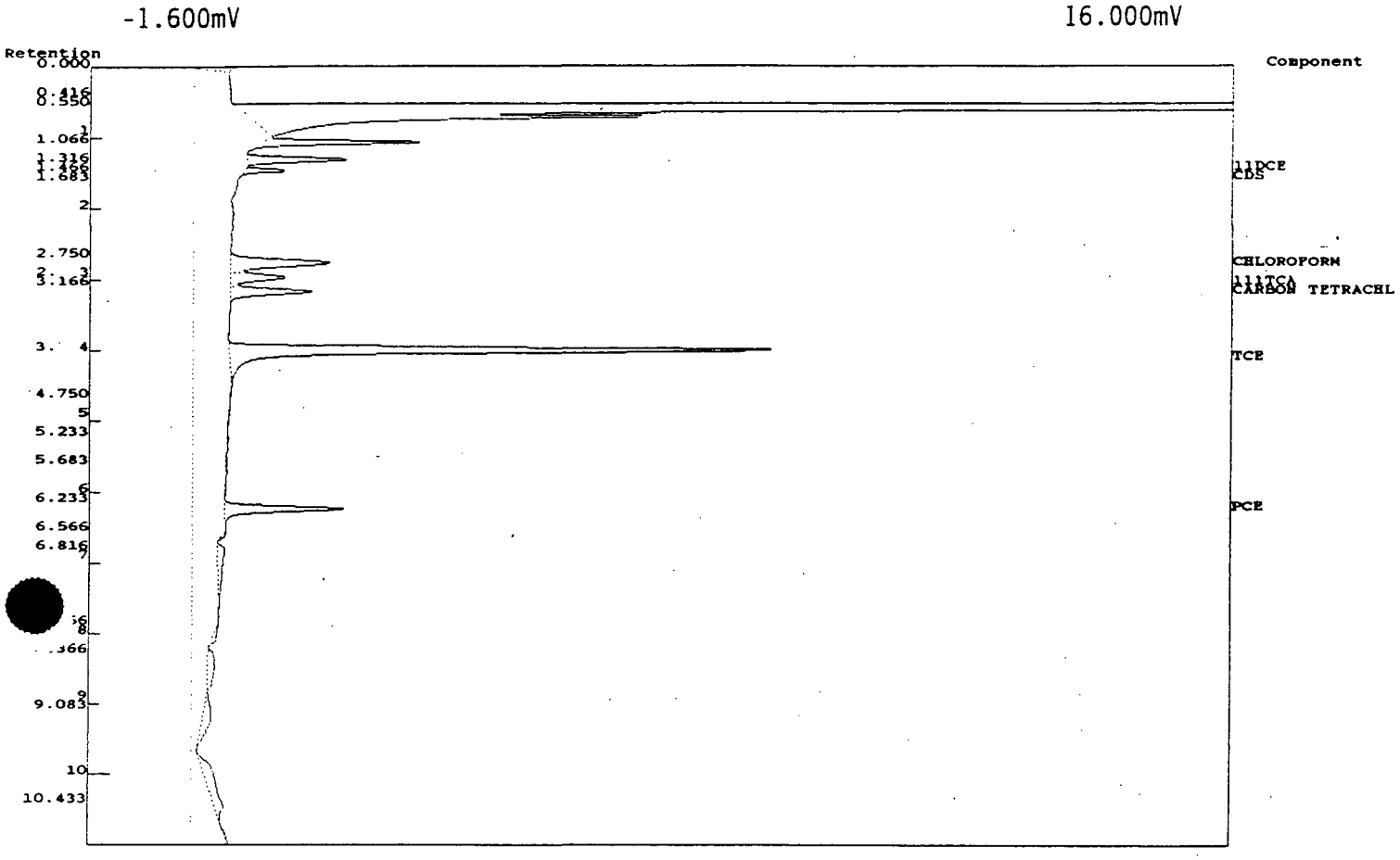
300920

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 17:48:45
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E15.CHR (A:\JUNE05)
Sample : SG-181
Operator : SGN



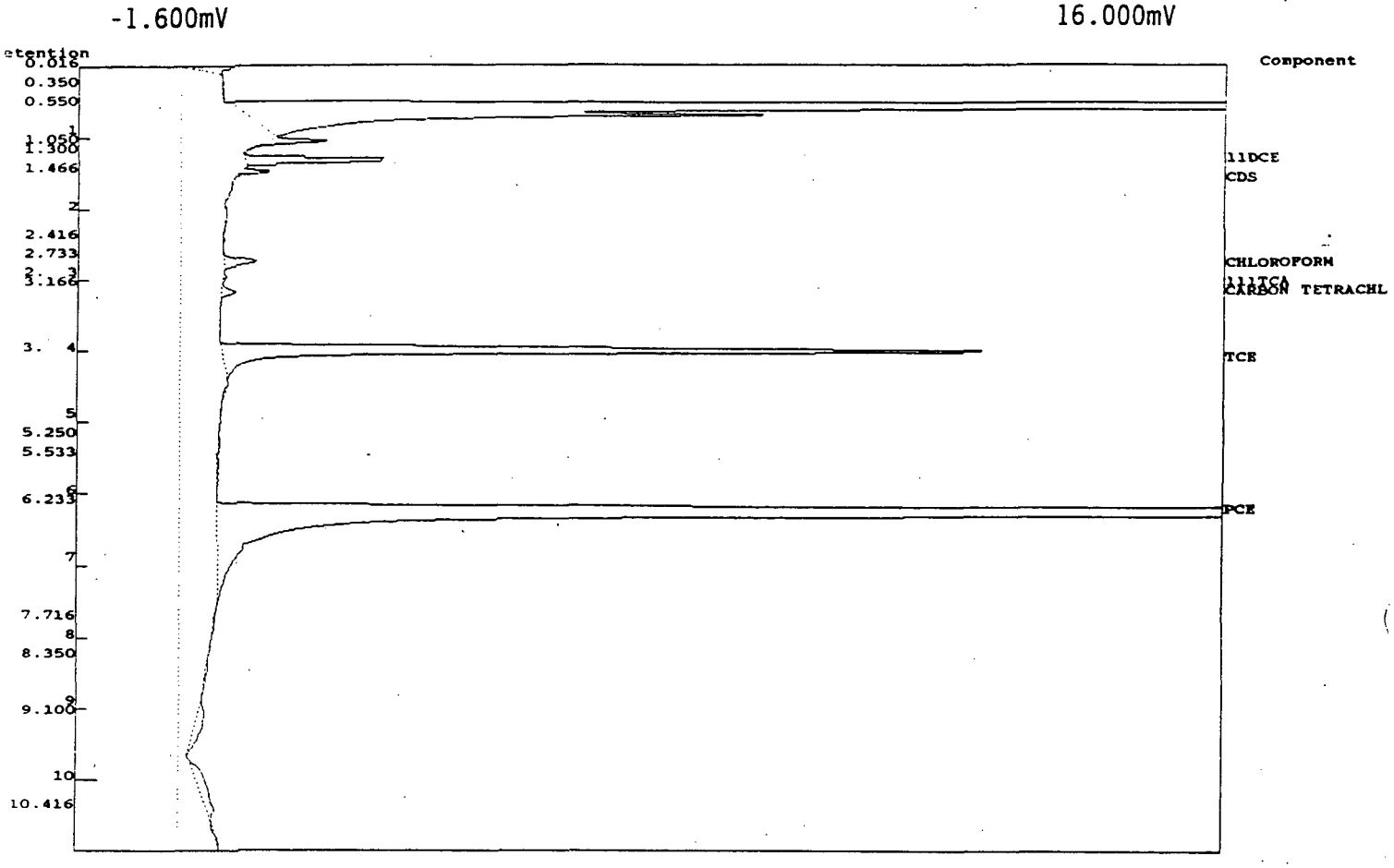
Component	Number	Retention	Area	External	Units
HLOROFORM	6	2.733	3.22 M	0.05	ug/L
11TCA	7	2.950	5.33 M	0.03	ug/L
ARBON TETRACHLORIDE	8	3.150	4.97 M	0.00	ug/L
CE	9	3.983	12.31 M	0.15	ug/L
CE	11	6.233	2.12	0.01	ug/L
	5		27.94	0.24	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 18:07:45
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E16.CHR (A:\JUNE05)
Sample : SG-191
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	7.22 M	0.98	ug/L
CDS	0	1.466	2.20 M	N/A	
CHLOROFORM	6	2.750	11.13 M	0.17	ug/L
111TCA	7	2.966	5.62 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.166	7.79 M	0.00	ug/L
TCE	9	3.983	49.42 M	0.61	ug/L
PCE	11	6.233	10.19 M	0.04	ug/L
	7		93.57	0.83	

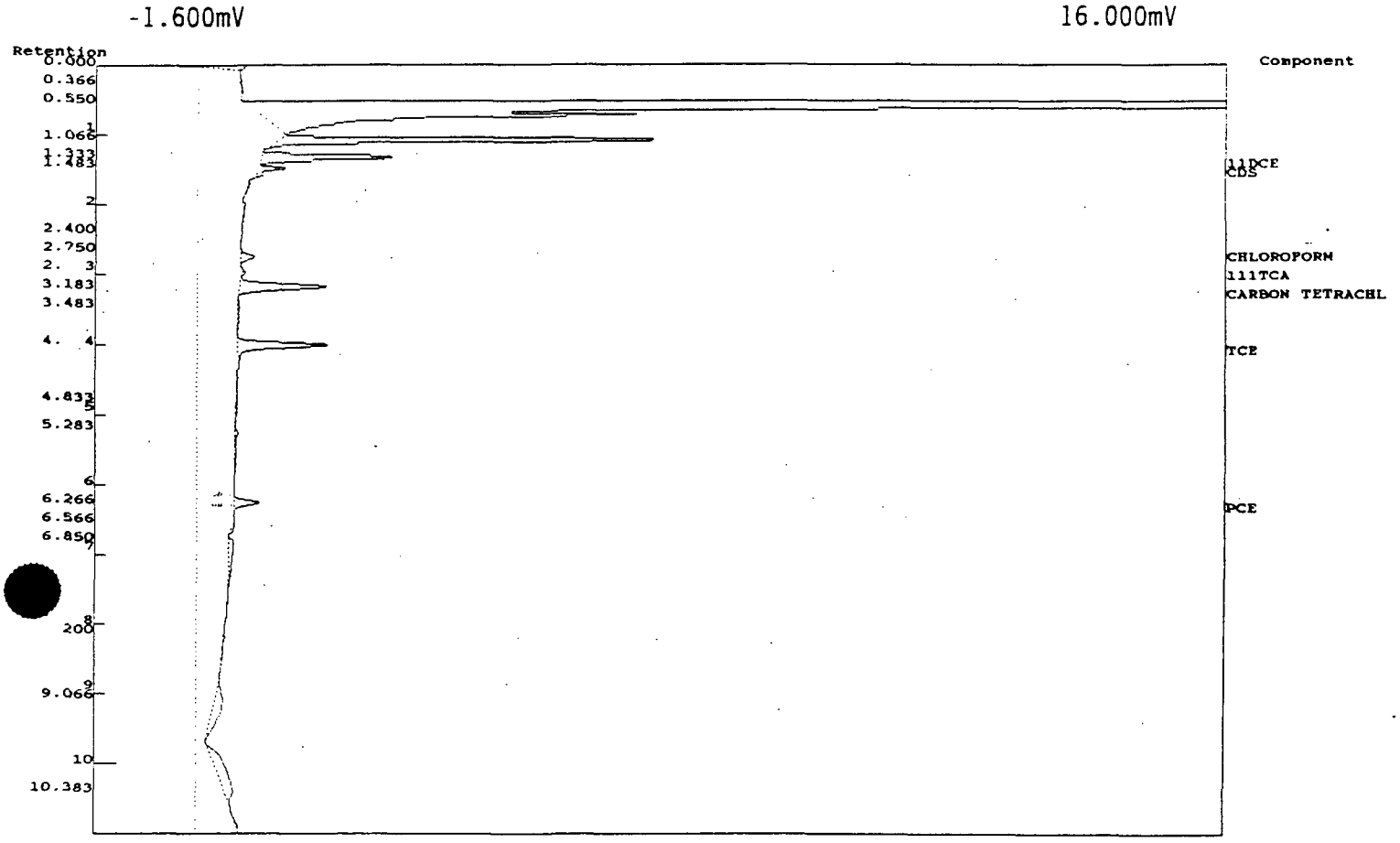
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 18:26:51
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E17.CHR (A:\JUNE05)
Sample : SG-210
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.300	10.67 M	1.44	ug/L
)S	0	1.466	1.58 M	N/A	
HLOROFORM	6	2.733	2.92 M	0.04	ug/L
11TCA	7	2.966	0.15 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.166	1.20 M	0.00	ug/L
CE	9	3.983	68.67 M	0.85	ug/L
CE	11	6.233	396.22 M	1.44	ug/L
	7		481.41	2.78	

300923

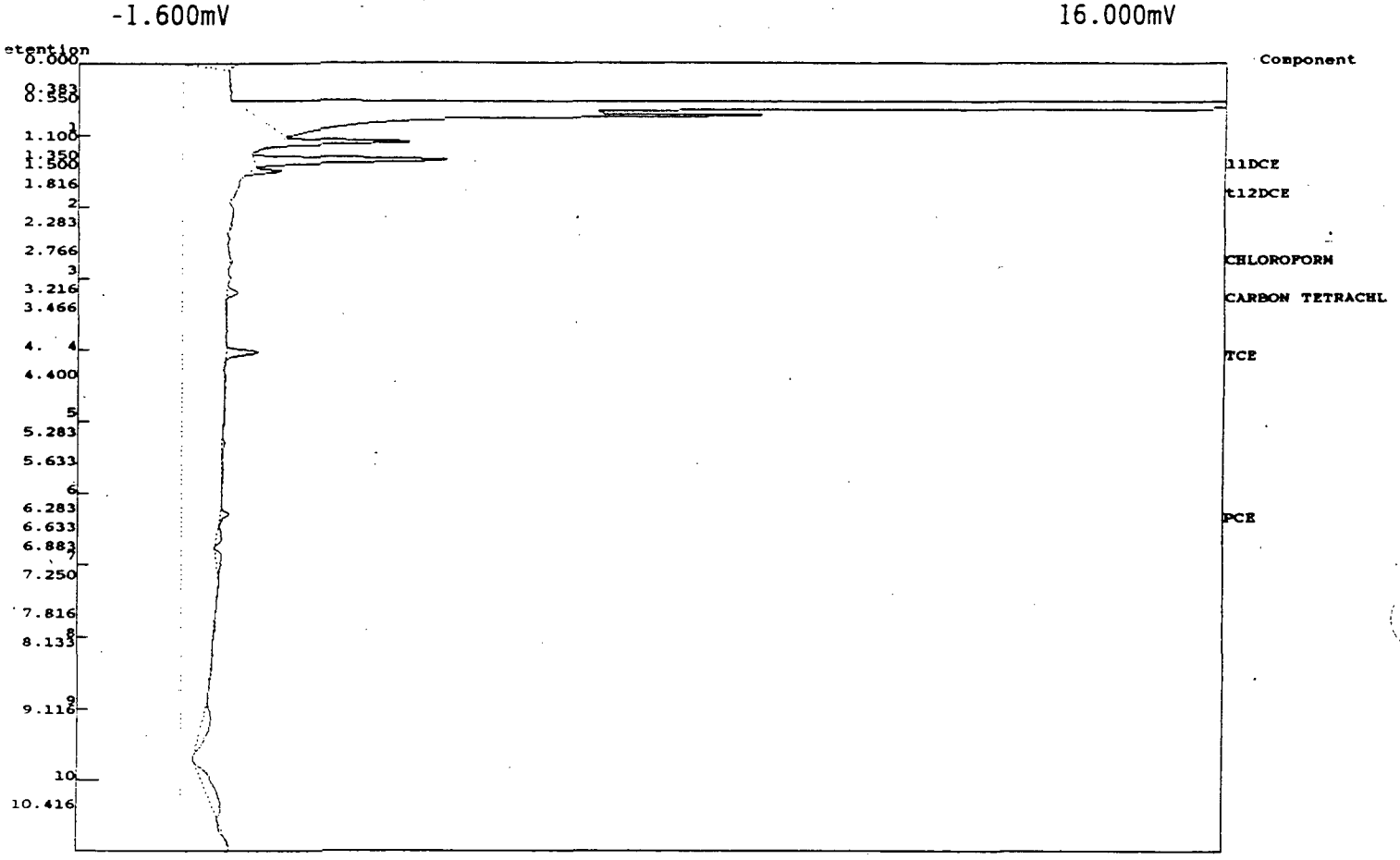
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 18:46:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E18.CHR (A:\JUNE05)
Sample : SG-211
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	10.28 M	1.39	ug/L
CDS	0	1.483	1.78 M	N/A	
CHLOROFORM	6	2.750	1.19 M	0.02	ug/L
111TCA	7	2.983	0.18 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.183	7.91 M	0.00	ug/L
TCE	9	4.016	7.74 M	0.10	ug/L
PCE	11	6.266	2.05 M	0.01	ug/L
	7		31.13	0.51	

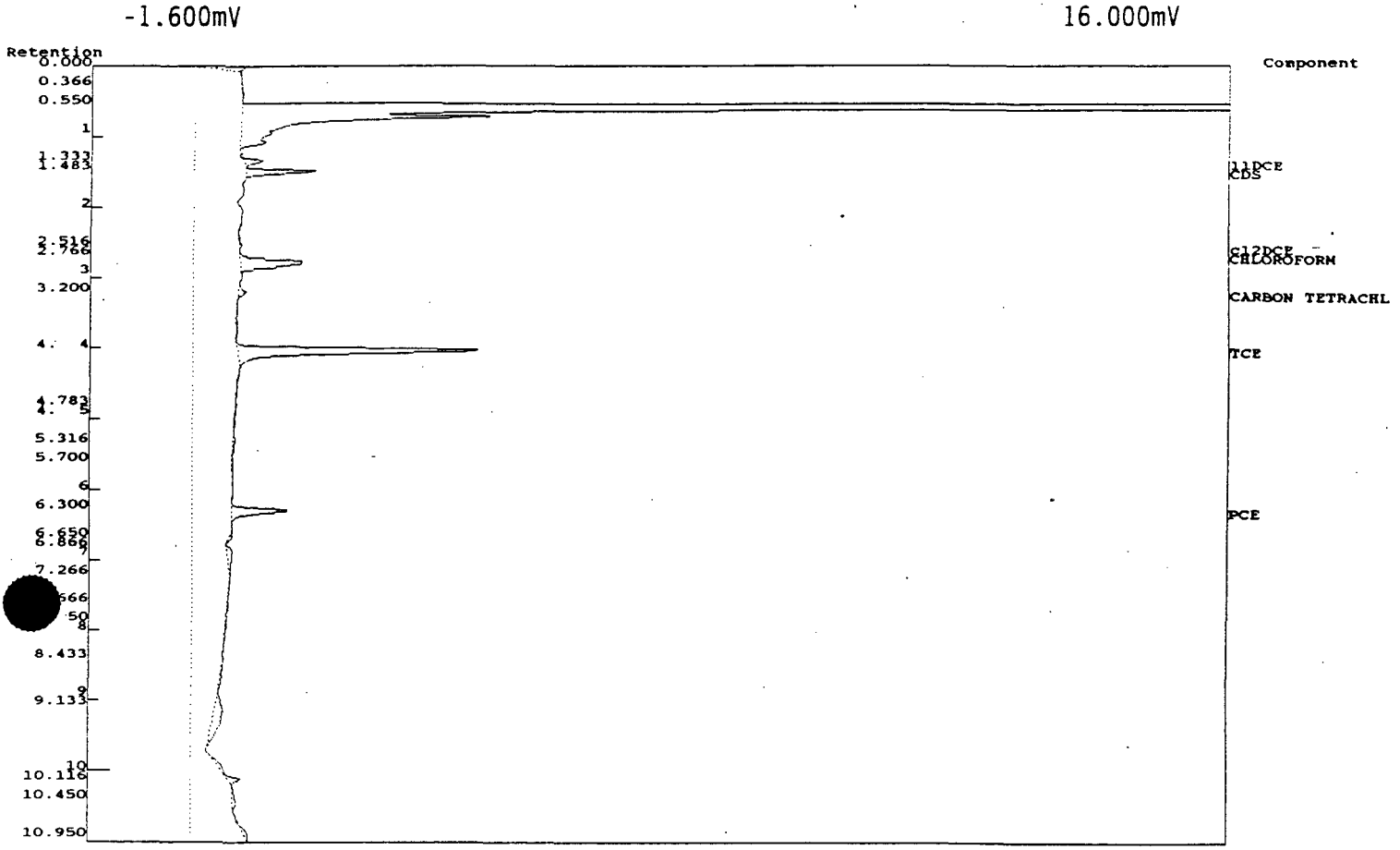
300924

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 19:05:56
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E19.CHR (A:\JUNE05)
Sample : SG-212
Operator : SGN



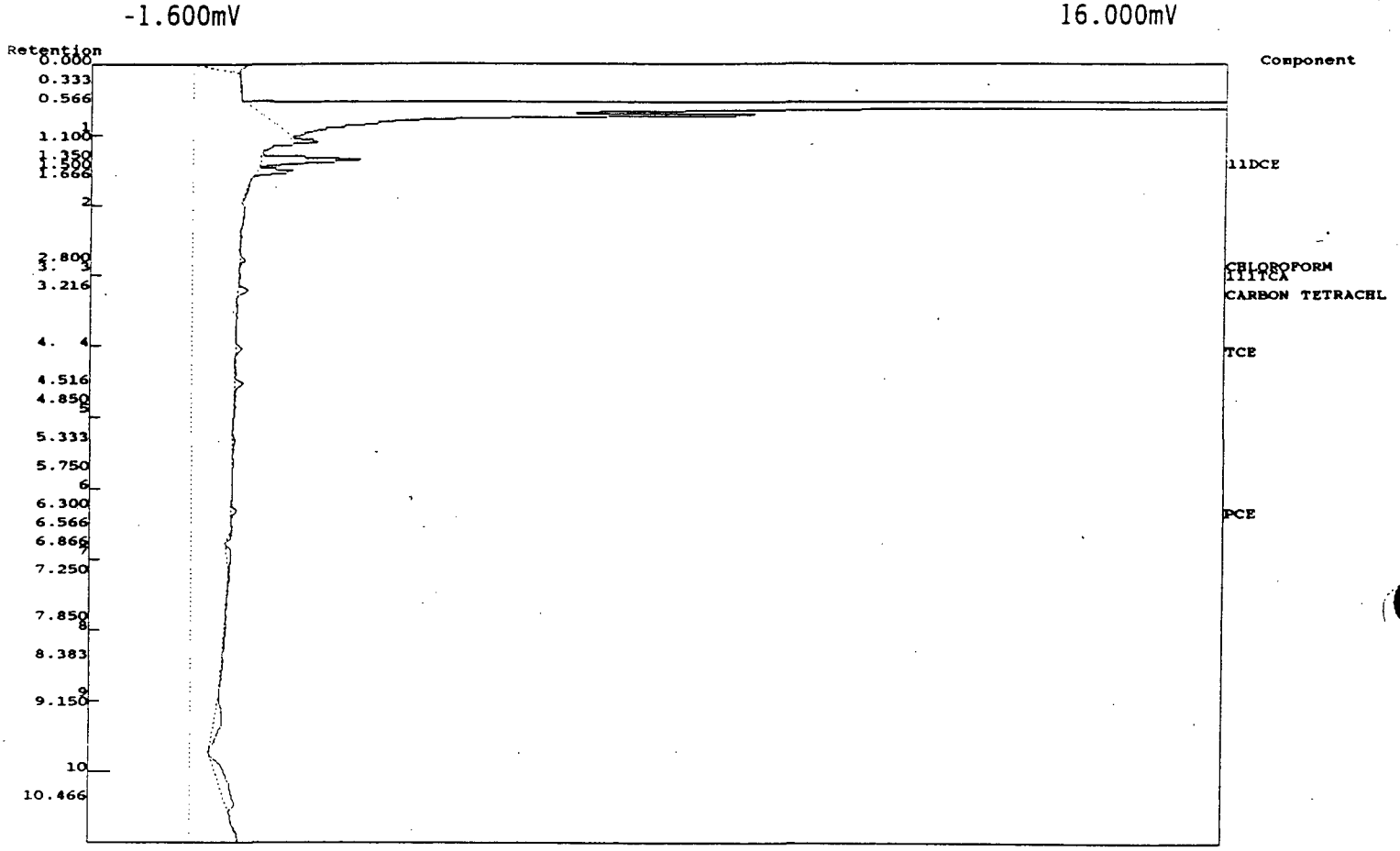
Component	Number	Retention	Area	External	Units
1DCE	1	1.350	14.23 M	1.92	ug/L
12DCE	3	1.816	0.11 M	0.19	ug/L
HLOROFORM	6	2.766	0.17 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	1.02	0.00	ug/L
CE	9	4.033	2.60 M	0.03	ug/L
CE	11	6.283	0.85	0.00	ug/L
	6		18.98	2.15	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 19:25:40
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E20.CHR (A:\JUNE05)
Sample : SG-213
Operator : SGN



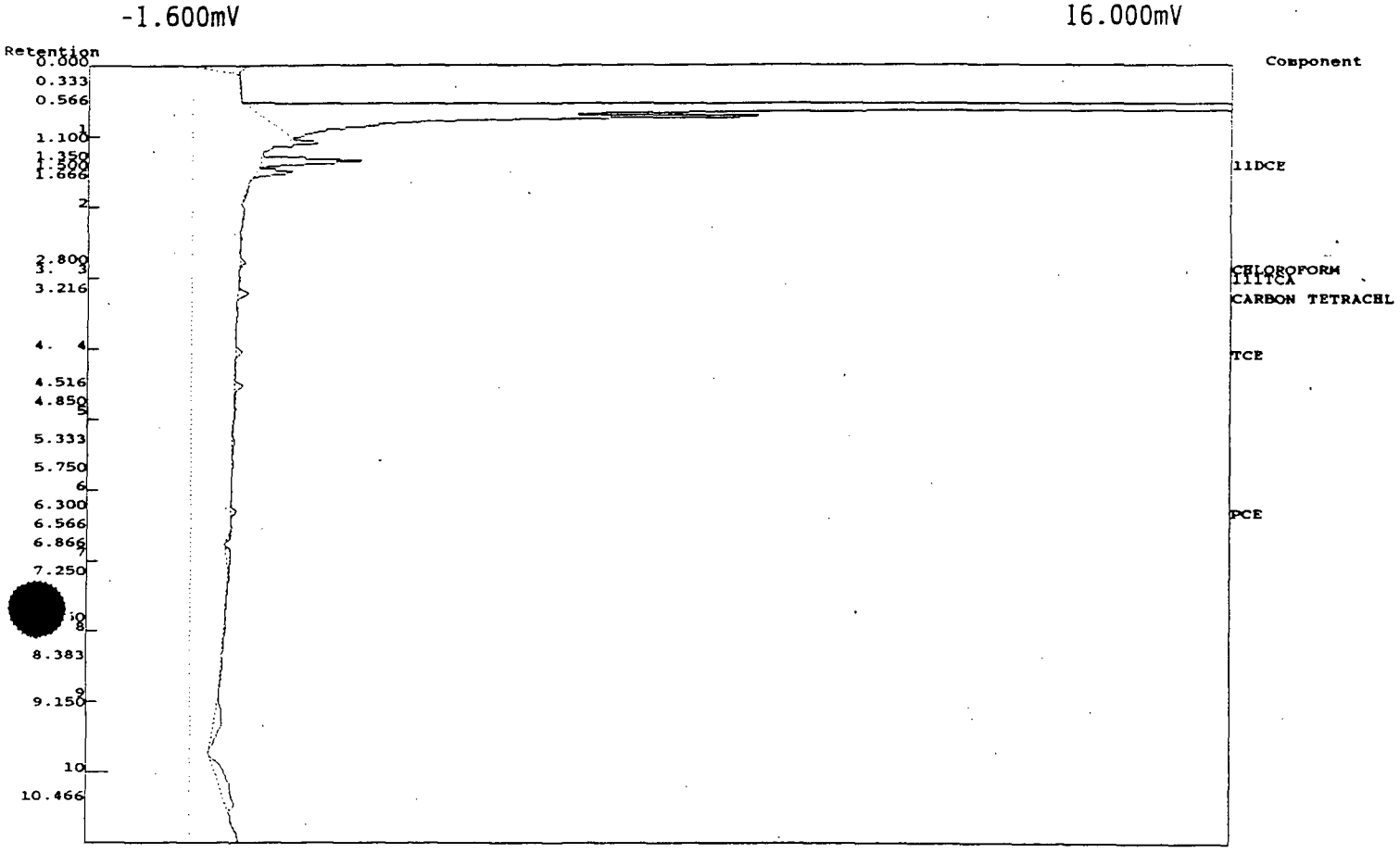
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	1.01 M	0.14	ug/L
CDS	0	1.483	4.04 M	N/A	
c12DCE	5	2.516	0.16 M	0.36	ug/L
CHLOROFORM	6	2.766	7.07 M	0.11	ug/L
CARBON TETRACHLORIDE	8	3.200	0.65 M	0.00	ug/L
TCE	9	4.033	20.62 M	0.25	ug/L
PCE	11	6.300	4.78 M	0.02	ug/L
	7		38.33	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 19:45:26
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E21.CHR (A:\JUNE05)
Sample : SG-215
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.350	7.63 M	1.03	ug/L
HLOROFORM	6	2.800	0.41 M	0.01	ug/L
11TCA	7	3.033	0.10 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.216	0.88 M	0.00	ug/L
CE	9	4.050	0.58 M	0.01	ug/L
CE	11	6.300	0.59	0.00	ug/L
	6		10.19	1.05	

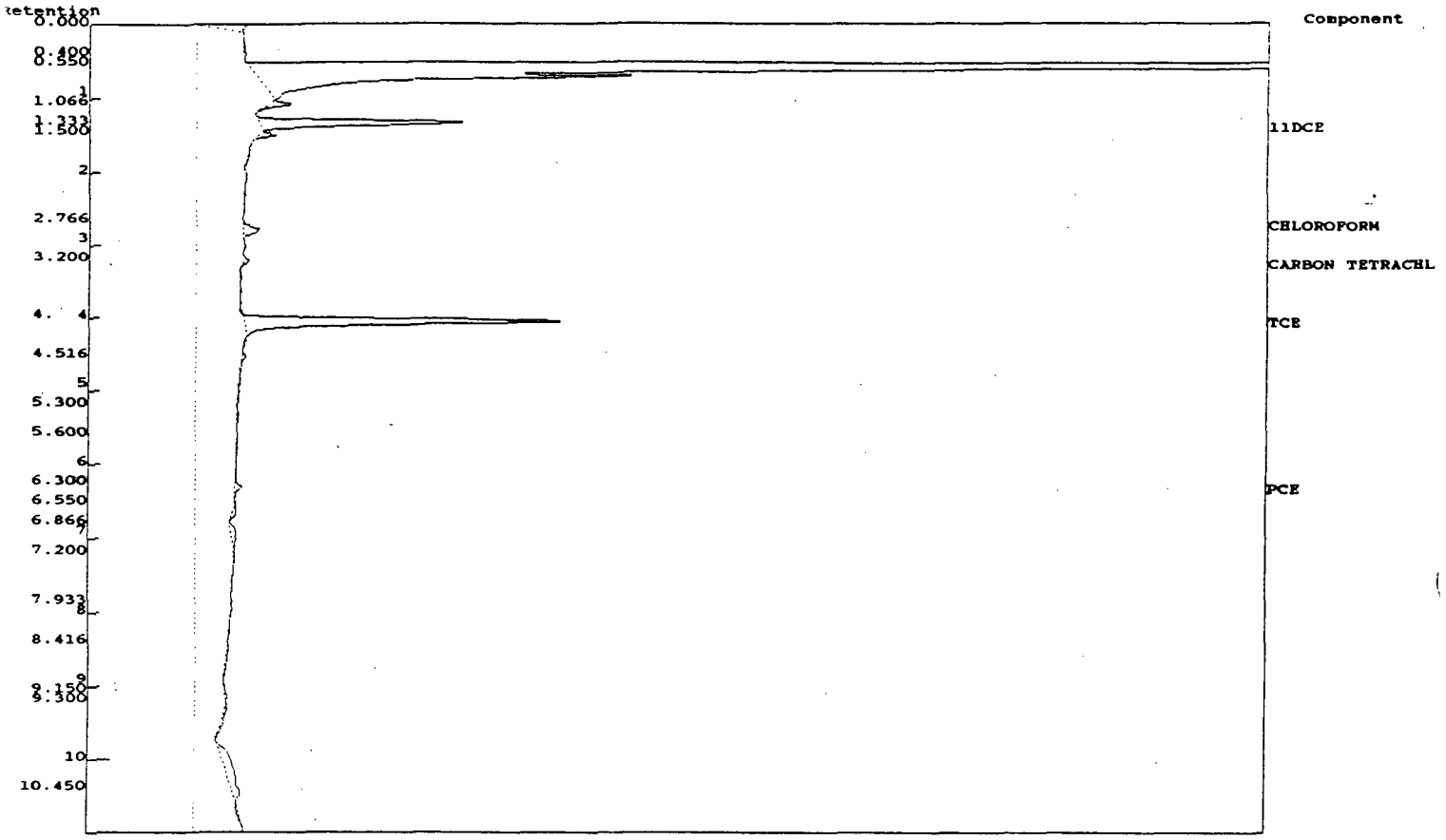
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 19:45:26
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E21.CHR (A:\JUNE05)
Sample : SG-215
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.350	7.63 M	1.03	ug/L
CHLOROFORM	6	2.800	0.41 M	0.01	ug/L
111TCA	7	3.033	0.10 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.216	0.88 M	0.00	ug/L
TCE	9	4.050	0.58 M	0.01	ug/L
PCE	11	6.300	0.59	0.00	ug/L
	6		10.19	1.05	

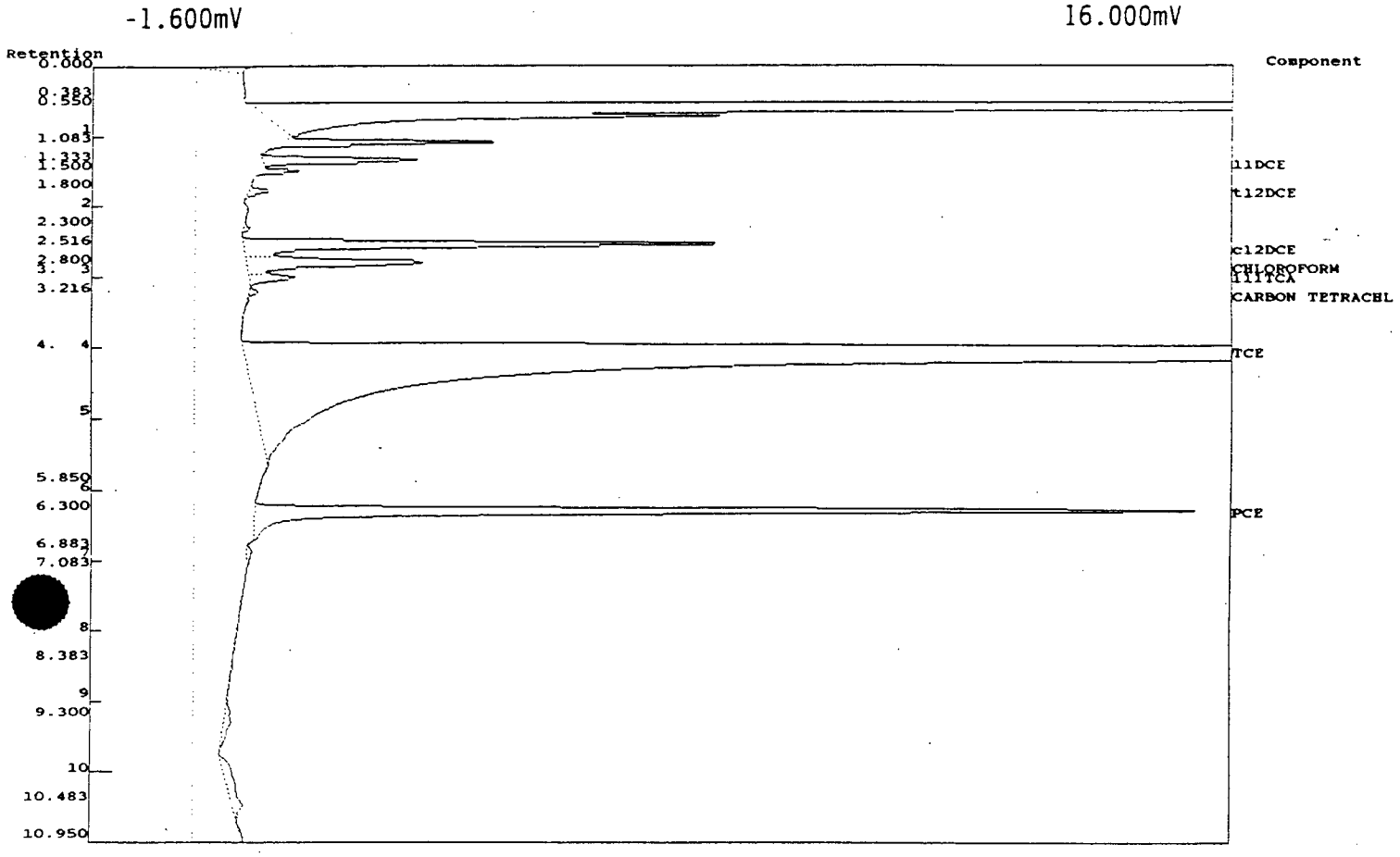
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 20:05:15
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E22.CHR (A:\JUNE05)
Sample : SG-216
Operator : SGN

-1.600mV 16.000mV



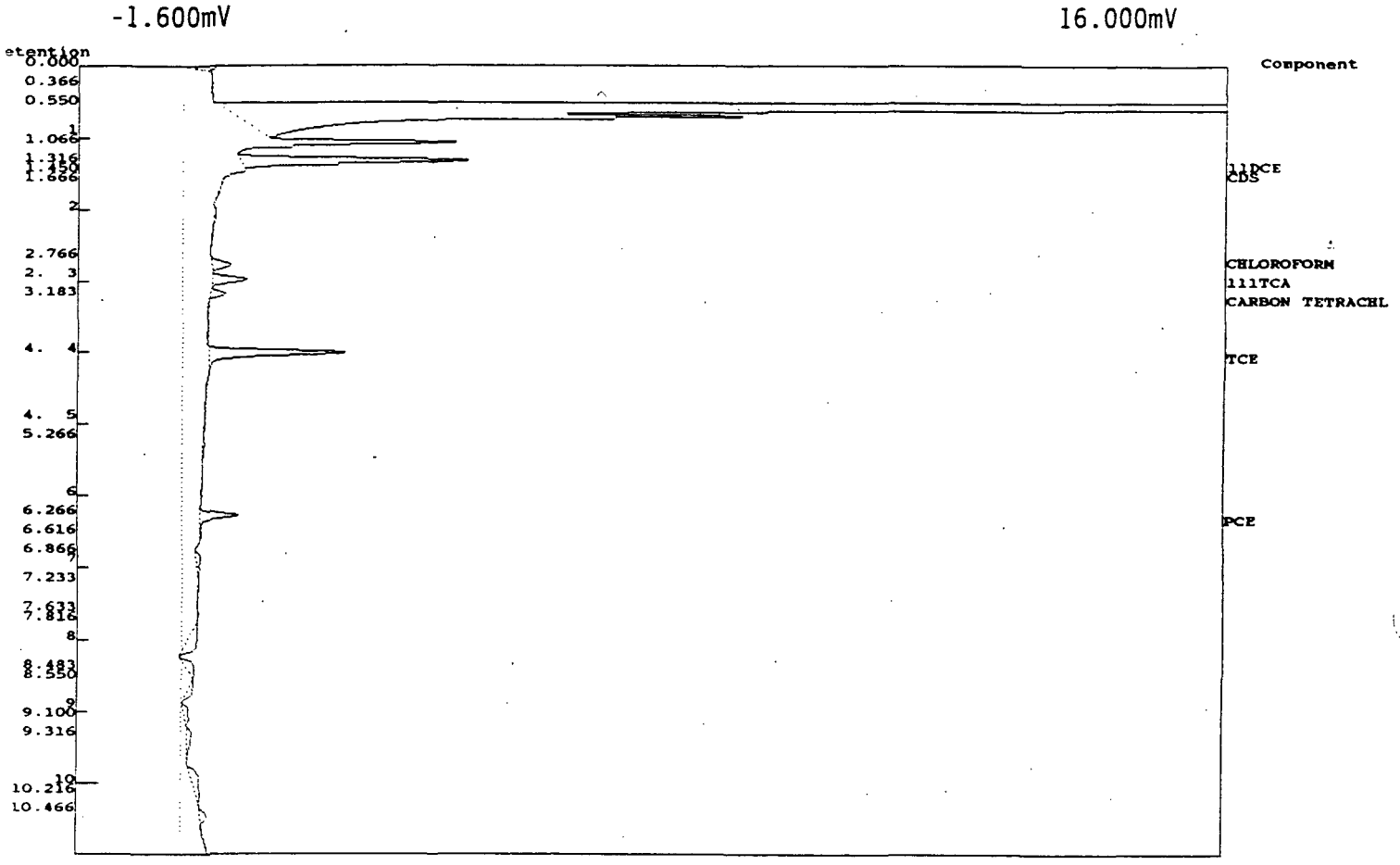
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	14.78 M	2.00	ug/L
HLOROFORM	6	2.766	1.49 M	0.02	ug/L
ARBON TETRACHLORIDE	8	3.200	0.32 M	0.00	ug/L
CE	9	4.050	25.64 M	0.32	ug/L
CE	11	6.300	0.57 M	0.00	ug/L
	5		42.80	2.34	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 20:25:05
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E23.CHR (A:\JUNE05)
Sample : SG-217
Operator : SGN



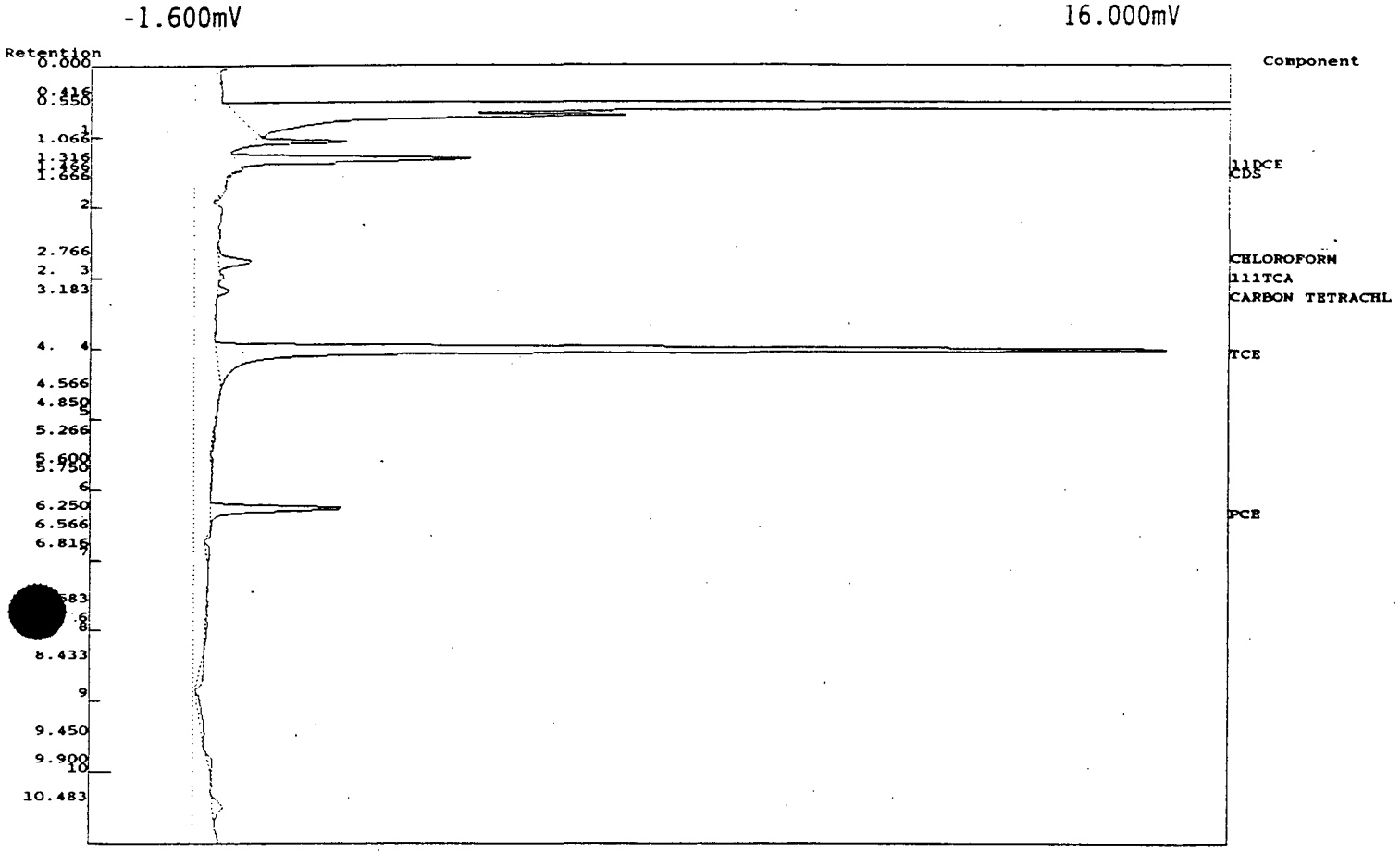
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	12.16 M	1.65	ug/L
t12DCE	3	1.800	1.62 M	2.75	ug/L
c12DCE	5	2.516	40.69 M	92.89	ug/L
CHLOROFORM	6	2.800	21.05 M	0.32	ug/L
111TCA	7	3.000	4.61 M	0.03	ug/L
CARBON TETRACHLORIDE	8	3.216	0.79 M	0.00	ug/L
TCE	9	4.050	1757.07 M	21.63	ug/L
PCE	11	6.300	83.64 M	0.30	ug/L
	8		1921.62	119.57	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 21:41:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E27.CHR (A:\JUNE05)
Sample : SG-094
Operator : SGN



Component	Number	Retention	Area	External	Units
IDCE	1	1.316	18.27 M	2.47	ug/L
)S	0	1.450	0.31 M	N/A	
HLOROFORM	6	2.766	1.80 M	0.03	ug/L
11TCA	7	2.983	2.96 M	0.02	ug/L
ARBON TETRACHLORIDE	8	3.183	1.25 M	0.00	ug/L
CE	9	4.016	11.10 M	0.14	ug/L
CE	11	6.266	3.12 M	0.01	ug/L
	7		38.80	1.66	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 22:00:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E28.CHR (A:\JUNE05)
Sample : SG-095
Operator : SGN

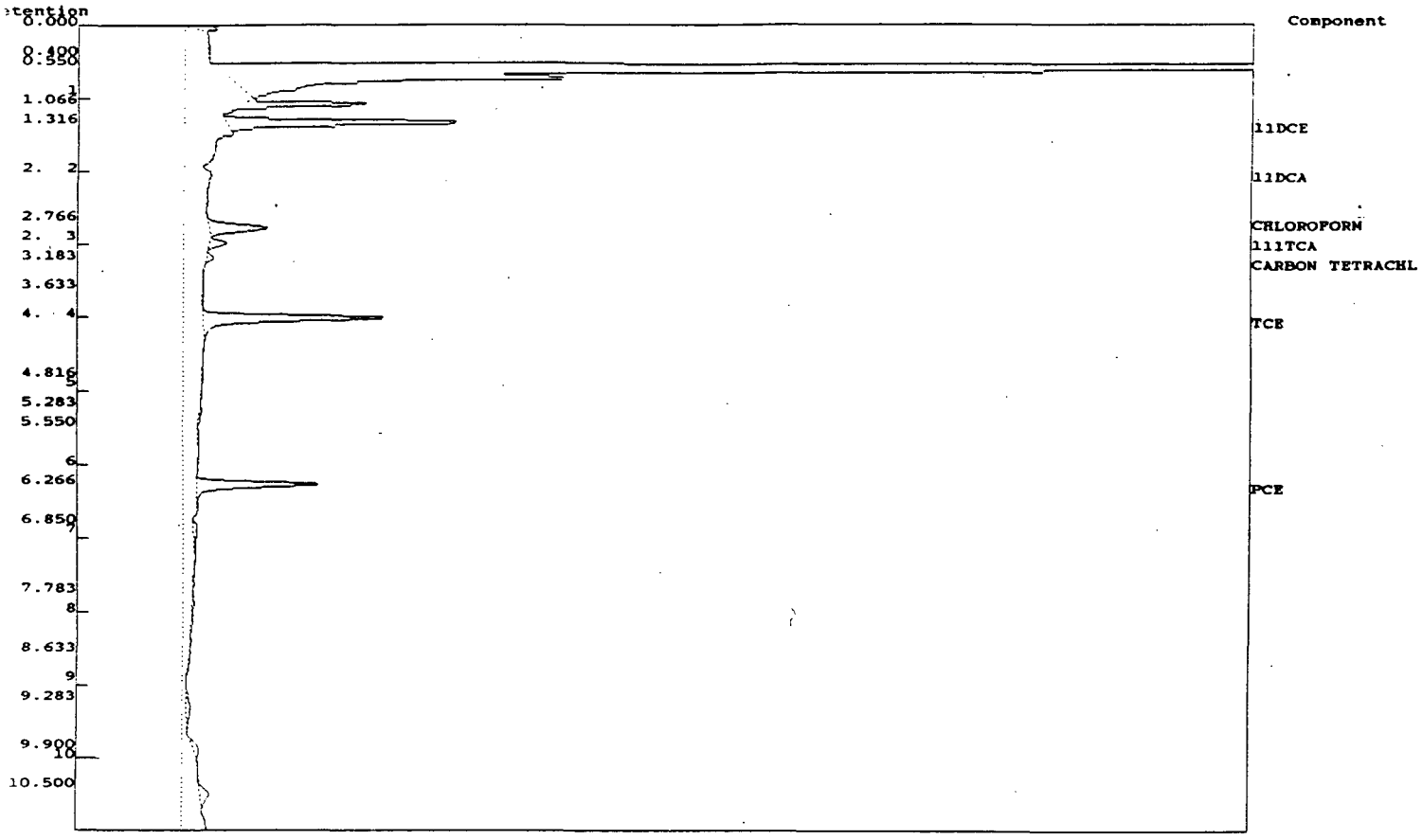


Component	Number	Retention	Area	External	Units
11DCE	1	1.316	19.23 M	2.60	ug/L
CDS	0	1.466	0.19 M	N/A	
CHLOROFORM	6	2.766	3.66 M	0.05	ug/L
111TCA	7	2.983	0.33 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.183	1.04 M	0.00	ug/L
TCE	9	4.016	89.42 M	1.10	ug/L
PCE	11	6.250	11.31 M	0.04	ug/L
	7		125.18	2.80	

300932

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 22:19:08
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E29.CHR (A:\JUNE05)
Sample : SG-101
Operator : SGN

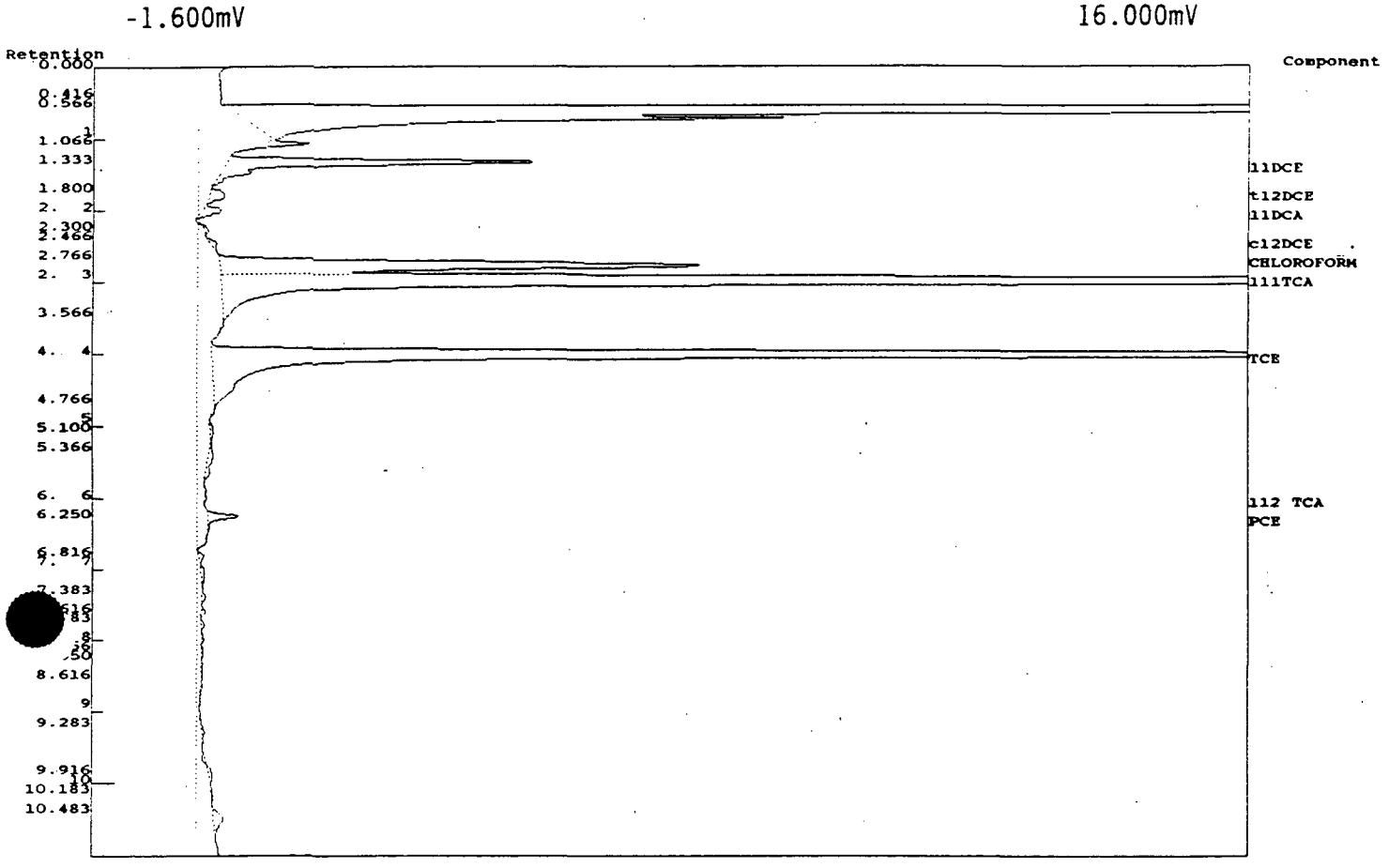
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.316	18.64 M	2.52	ug/L
1DCA	4	2.050	0.16 M	0.15	ug/L
HLOROFORM	6	2.766	5.96 M	0.09	ug/L
11TCA	7	2.983	1.39 M	0.01	ug/L
ARBON TETRACHLORIDE	8	3.183	0.53 M	0.00	ug/L
CE	9	4.016	15.72 M	0.19	ug/L
CE	11	6.266	10.37 M	0.04	ug/L
	7		52.77	3.00	

300933

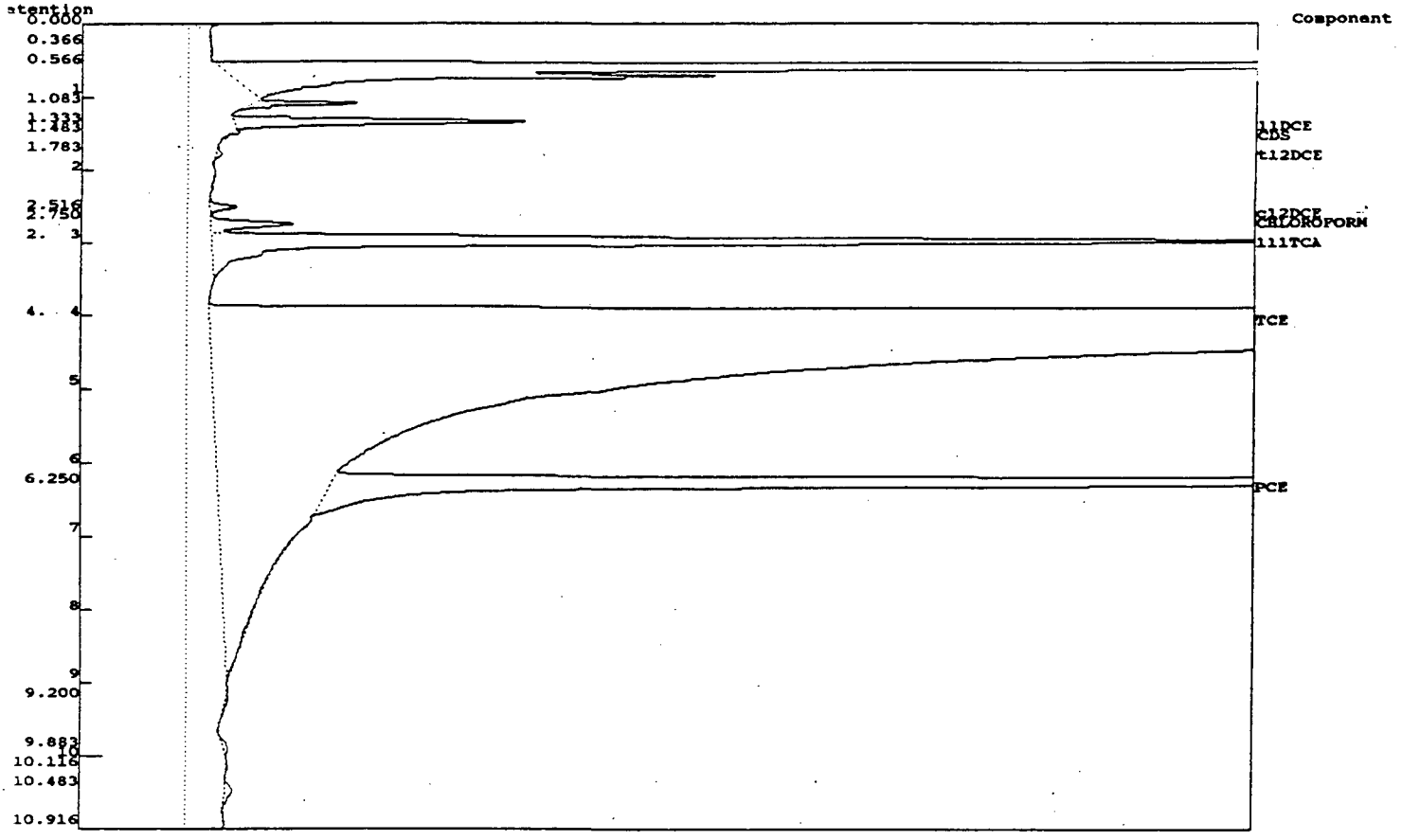
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 22:38:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E30.CHR (A:\JUNE05)
Sample : SG-206
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.333	27.86 M	3.77	ug/L
t12DCE	3	1.800	2.03 M	3.45	ug/L
11DCA	4	2.000	1.94 M	1.78	ug/L
c12DCE	5	2.466	0.44 M	1.00	ug/L
CHLOROFORM	6	2.766	52.88 M	0.79	ug/L
111TCA	7	2.983	194.93 M	1.17	ug/L
TCE	9	4.000	168.04 M	2.07	ug/L
112 TCA	10	6.000	0.17 M	0.01	ug/L
PCE	11	6.250	2.41 M	0.01	ug/L
	9		450.69	14.05	

Lab name : COLUMBIA TECH
Analysis date : [illegible]
Method : 8010
Description : ECD - CHAN[illegible]
Data file : [illegible] (A:\JUNE05)
Sample : SG-207
Operator : SGN

-1.600mV 16.000mV

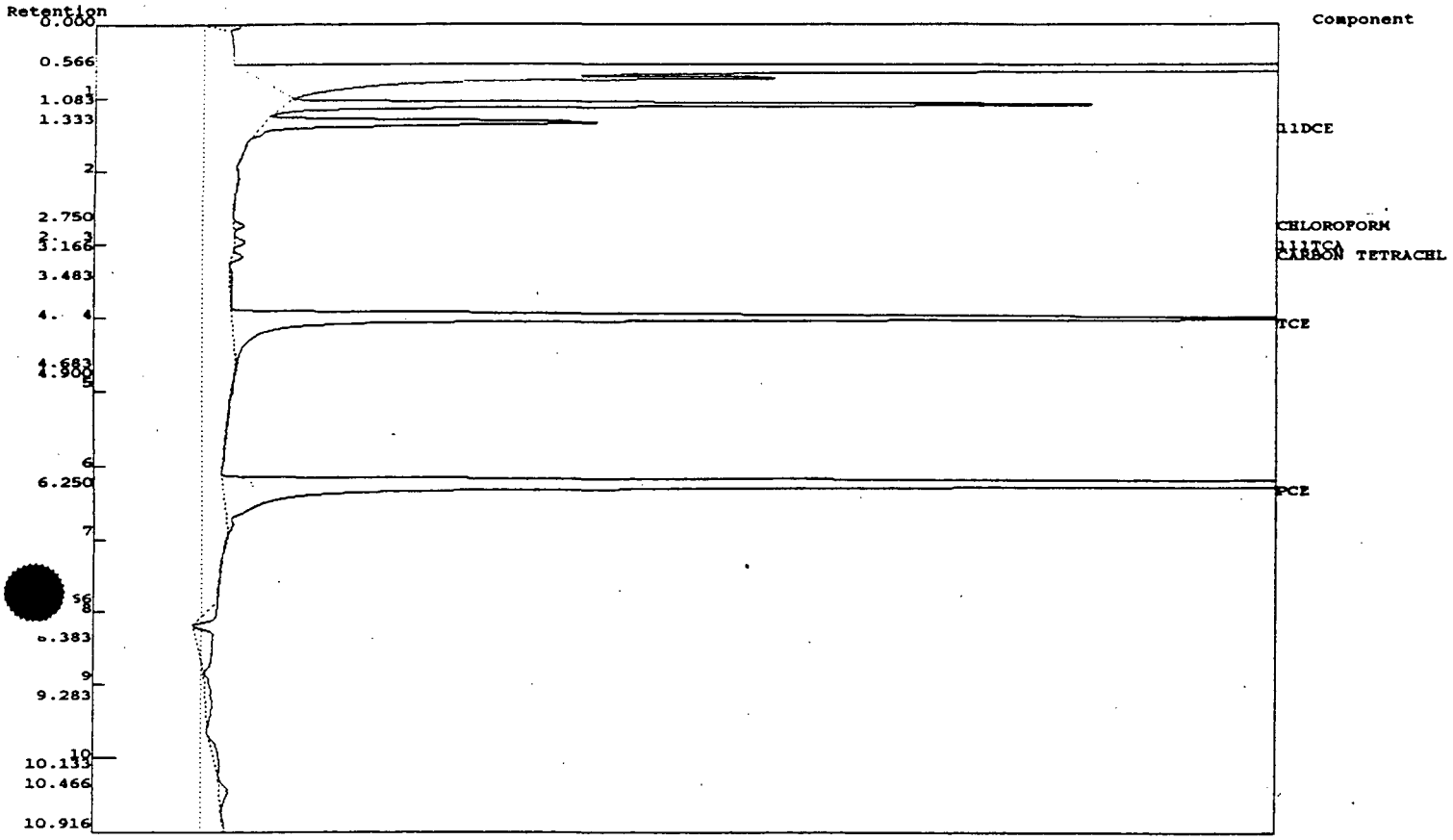


Component	Number	Retention	Area	External	Units
1DCE	1	1.333	22.47 M	3.04	ug/L
DS	0	1.483	0.19 M	N/A	
12DCE	3	1.783	0.58	0.98	ug/L
12DCE	5	2.516	2.02 M	4.61	ug/L
HLOROFORM	6	2.750	6.95 M	0.10	ug/L
1TCA	7	2.966	114.91 M	0.69	ug/L
E	9	4.083	14254.44 M	175.45	ug/L
E	11	6.250	319.29 M	1.16	ug/L
	8		14720.84	185.04	

300935

Lab name : COLUMBIA TECH
Analysis date : [illegible]
Method : 8010
Description : ECD - CHANNEL 2
Data file : [illegible]
Sample : SG-208
Operator : SGN

-1.600mV 16.000mV

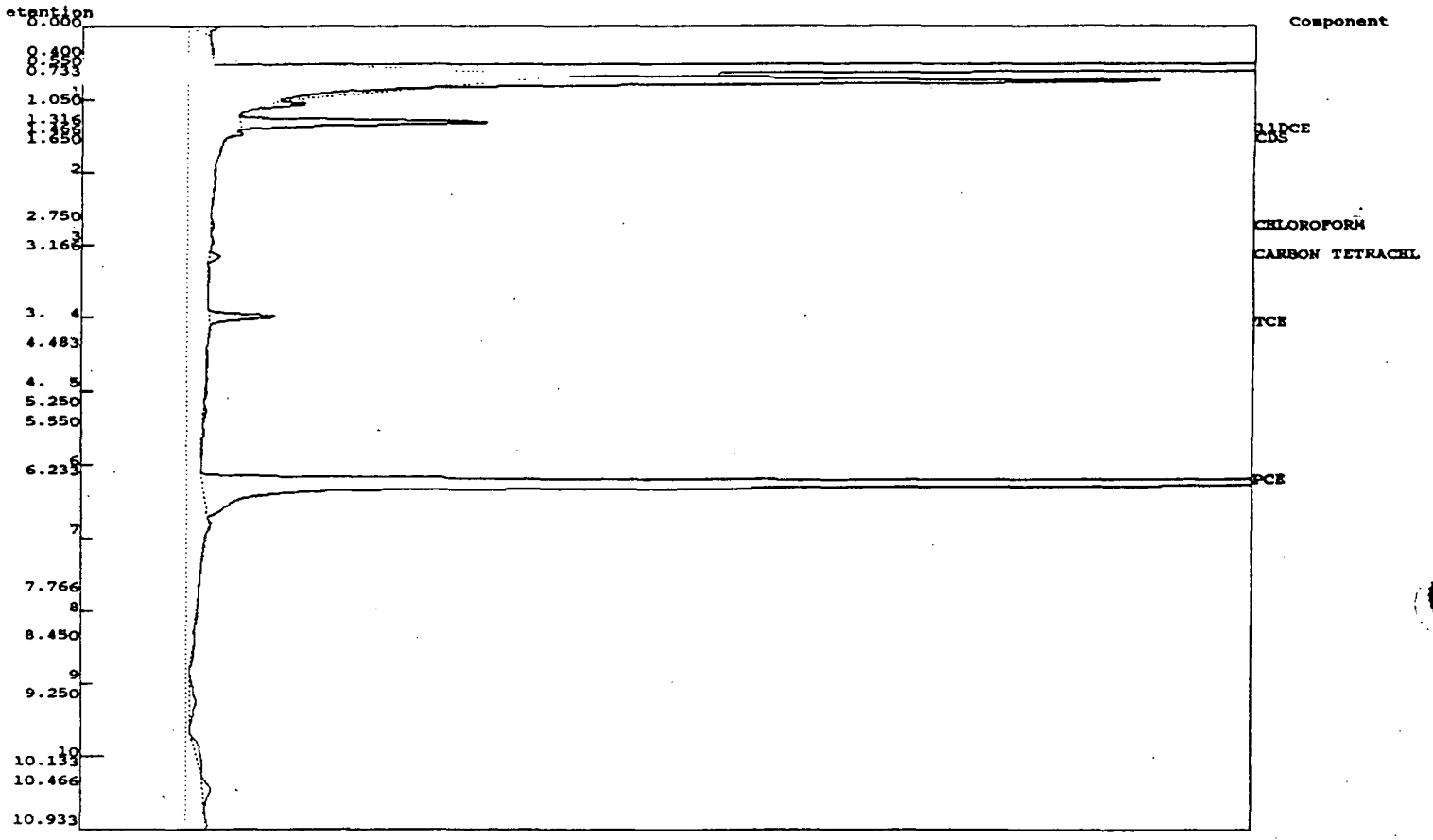


Component	Number	Retention	Area	External	Units
11DCE	1	1.333	26.05 M	3.52	ug/L
CHLOROFORM	6	2.750	0.79	0.01	ug/L
111TCA	7	2.966	0.91	0.01	ug/L
CARBON TETRACHLORIDE	8	3.166	0.87 M	0.00	ug/L
TCE	9	4.000	103.63 M	1.28	ug/L
PCE	11	6.250	210.94 M	0.77	ug/L
	6		343.29	5.58	

300936

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 [illegible]
Method : 8010
Description : ECD - CHANNEL [illegible]
DATA FILE : [illegible].CHR (A:\JUNE05)
Sample : SG-209
Operator : SGN

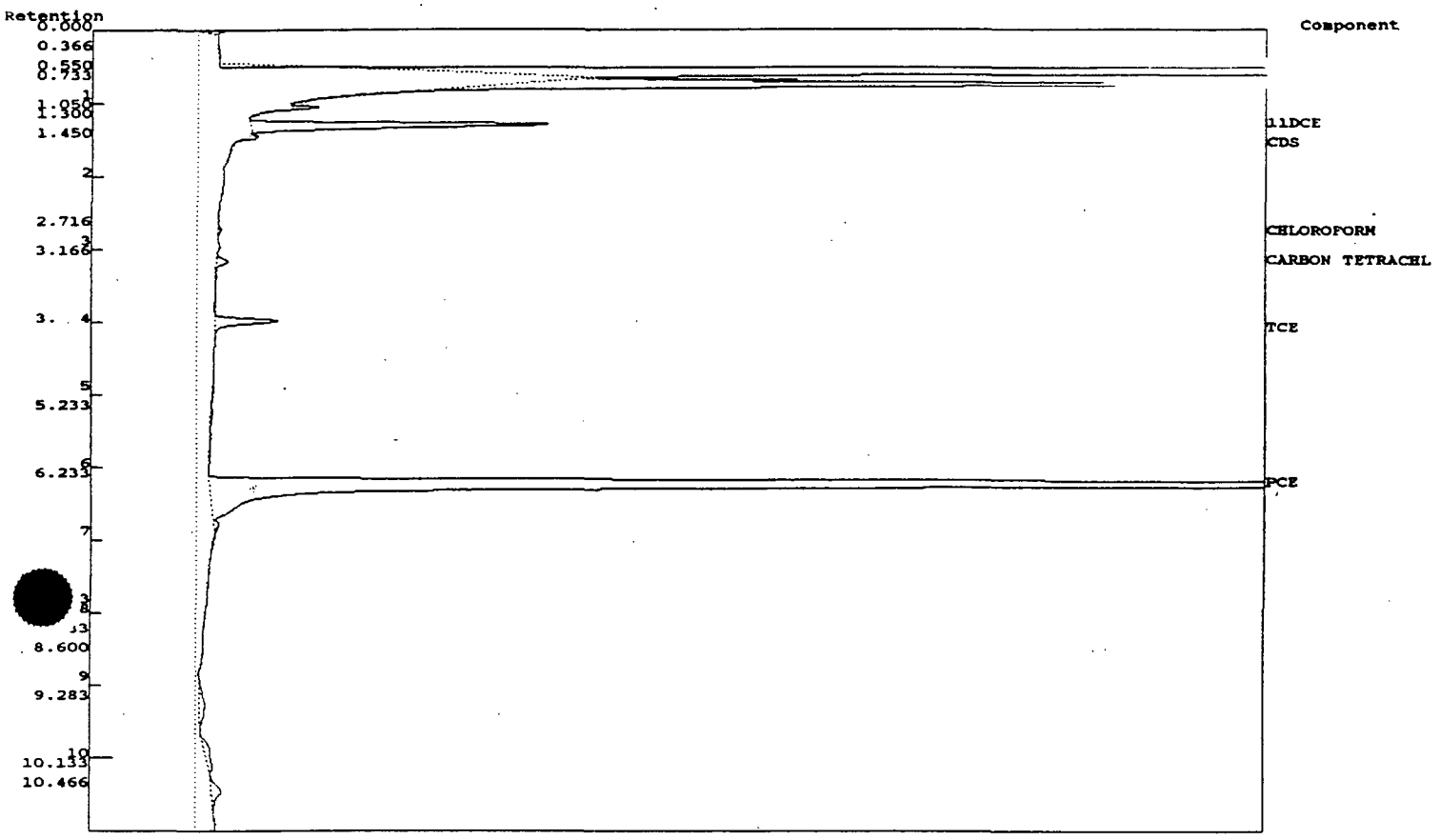
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.316	18.47 M	2.50	ug/L
DS	0	1.466	0.44 M	N/A	
HLOROFORM	6	2.750	0.31	0.00	ug/L
ARBON TETRACHLORIDE	8	3.166	0.99	0.00	ug/L
CE	9	3.983	5.05 M	0.06	ug/L
CE	11	6.233	174.75 M	0.64	ug/L
6			200.01	2.20	

300937

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 [illegible]
Method : 8010
Description : ECD - CHANN[illegible]
DATA FILE : [illegible].CHR (A:\JUNE05)
Sample : SG-80[illegible]
Operator : SGN

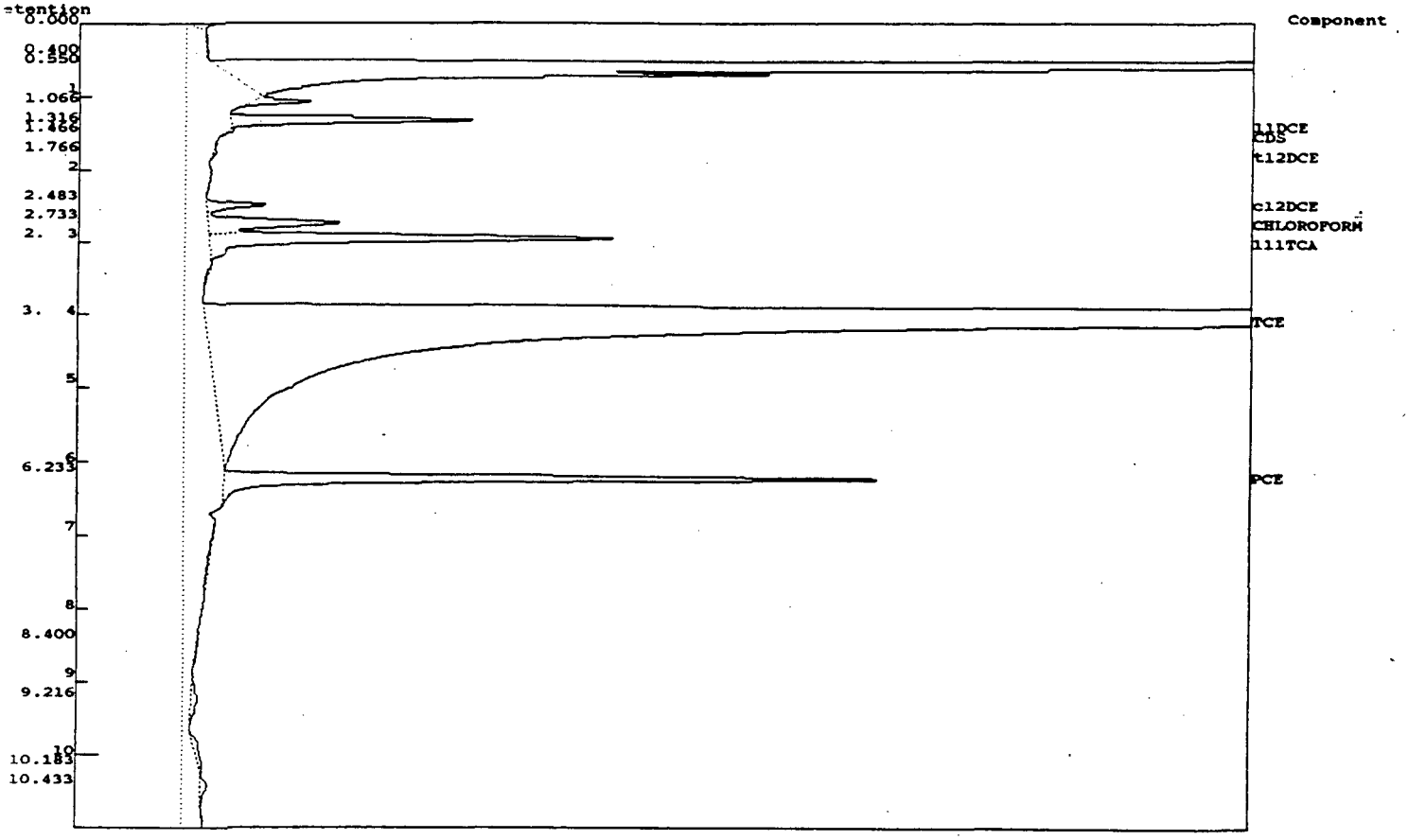


Component	Number	Retention	Area	External	Units
11DCE	1	1.300	22.32 M	3.02	ug/L
CDS	0	1.450	0.57 M	N/A	
CHLOROFORM	6	2.716	0.24 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.166	0.98 M	0.00	ug/L
TCE	9	3.983	5.09 M	0.06	ug/L
PCE	11	6.233	174.22 M	0.63	ug/L
	6		203.42	2.72	

300938

Lab name : COLUMBIA TECH
Analysis date : 06/[illegible]/2005 [illegible]
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUNE05[illegible].CHR (A:\JUNE05)
Sample : SG-214
Operator : SGN

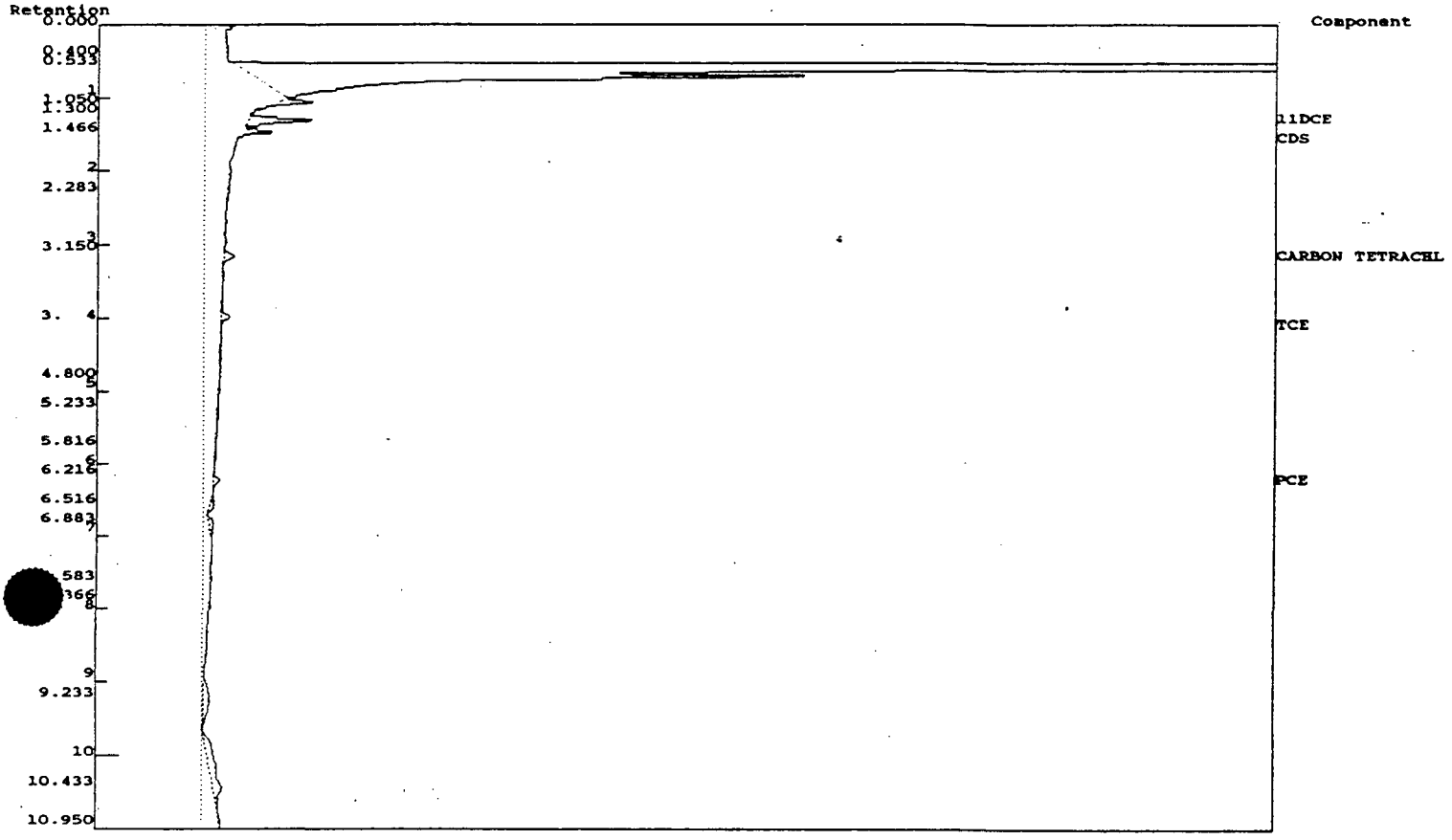
-1.600mV 16.000mV



Component	Number	Retention	Area	External Units
1DCE	1	1.316	19.13 M	2.59 ug/L
)S	0	1.466	0.34 M	N/A
12DCE	3	1.766	0.32	0.54 ug/L
.2DCE	5	2.483	4.49 M	10.25 ug/L
LOROFORM	6	2.733	14.10 M	0.21 ug/L
.1TCA	7	2.950	41.53 M	0.25 ug/L
E	9	3.983	2223.43 M	27.37 ug/L
E	11	6.233	57.23 M	0.21 ug/L
	8		2360.58	40.42

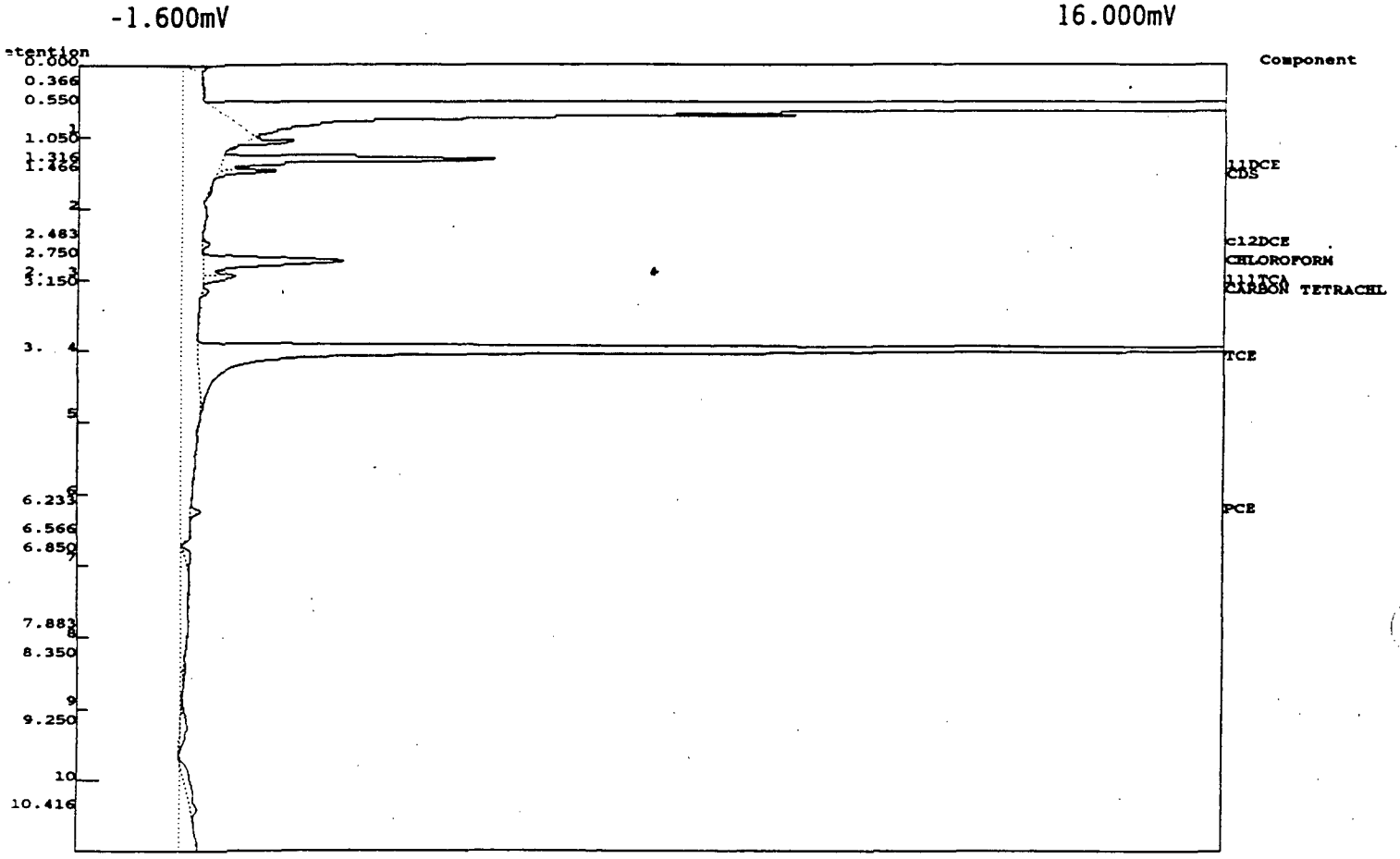
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 08:32:14
Method : 8010
Description : ECD - CHANNEL 2
Data File : JUNE05B36.CHR (A:\JUNE05)
Sample : EB-26
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
11DCE	1	1.300	4.34 M	0.59	ug/L
CDS	0	1.466	0.92 M	N/A	
CARBON TETRACHLORIDE	8	3.150	0.92	0.00	ug/L
TCE	9	3.983	0.74	0.01	ug/L
PCE	11	6.216	0.53 M	0.00	ug/L
	5		7.44	N/A	

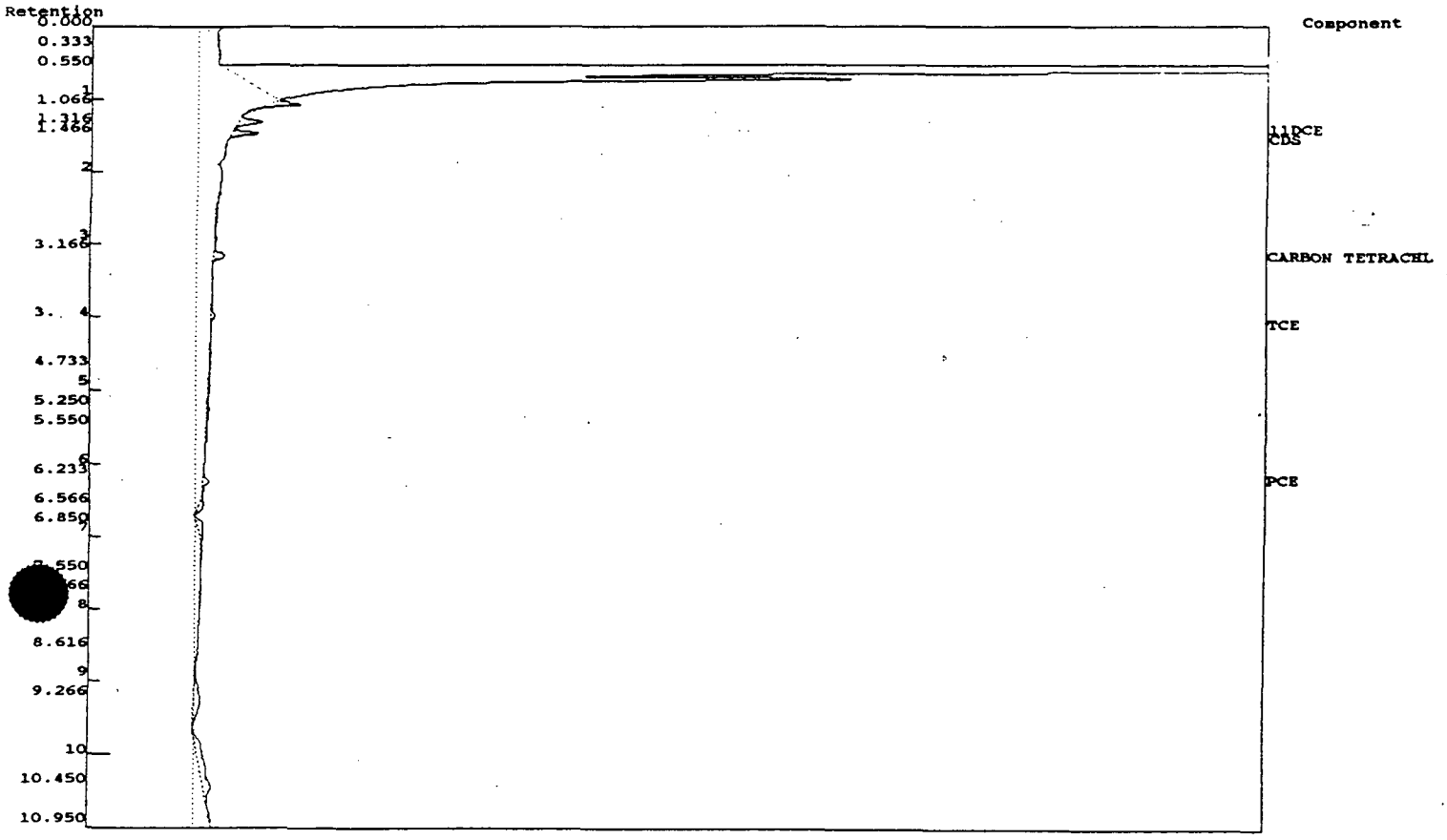
Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 08:31:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E37.CHR (A:\JUNE00)
Sample : SG-218
Operator : SGN



Component	Number	Retention	Area	External	Units
.DCE	1	1.316	21.80 M	2.95	ug/L
)S	0	1.466	4.14 M	N/A	
.2DCE	5	2.483	0.57	1.31	ug/L
ILOROFORM	6	2.750	15.93 M	0.24	ug/L
1TCA	7	2.950	2.86 M	0.02	ug/L
-BON TETRACHLORIDE	8	3.150	0.55 M	0.00	ug/L
:E	9	3.983	142.41 M	1.75	ug/L
:E	11	6.233	0.90 M	0.00	ug/L
	8		189.17	5.27	

Lab name : COLUMBIA TECH
Analysis date : 06/05/2000 01:10:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E3B.CHR (A:\JUN05)
Sample : EB-27
Operator : SGN

-1.600mV 16.000mV

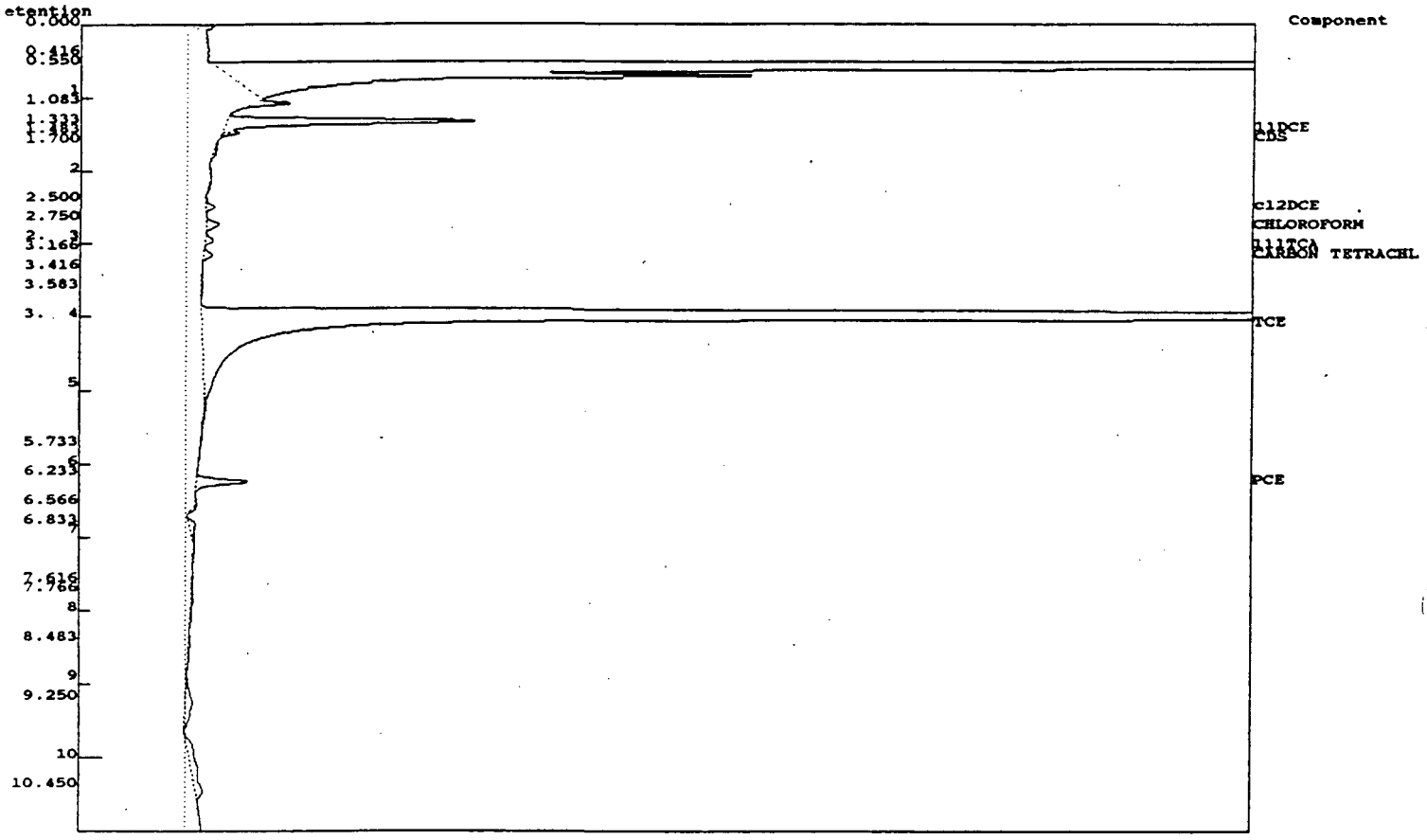


Component	Number	Retention	Area	External	Units
11DCE	1	1.316	1.59	0.21	ug/L
CDS	0	1.466	1.43 M	N/A	
CARBON TETRACHLORIDE	8	3.166	0.98	0.00	ug/L
TCE	9	3.983	0.36	0.00	ug/L
PCE	11	6.233	0.52 M	0.00	ug/L
	5		4.88	N/A	

300942

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 01:25:14
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUNE05E39.CHR (A:\JUNE05)
Sample : SG-220
Operator : SGN

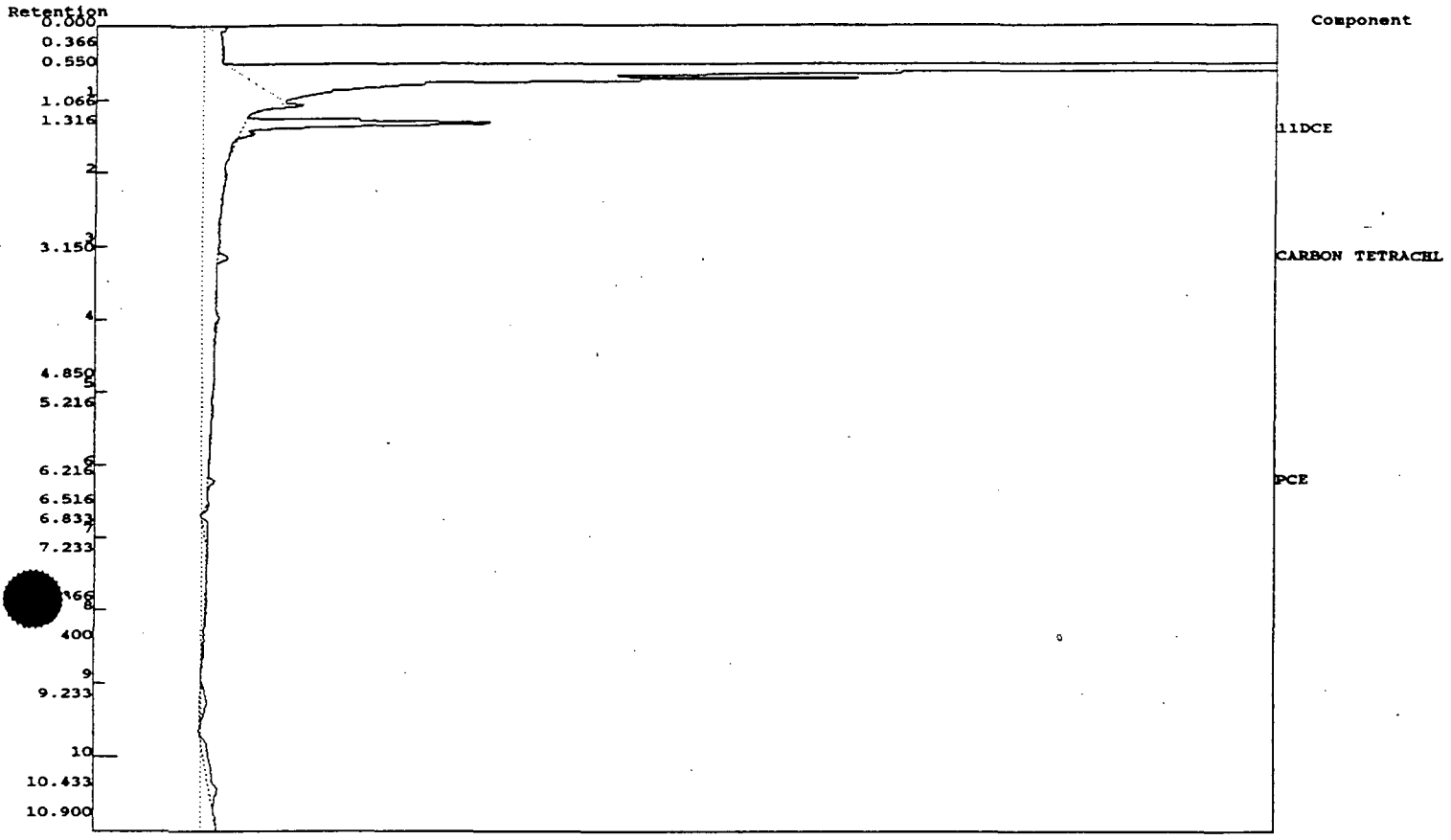
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.333	18.89 M	2.55	ug/L
DS	0	1.483	1.03 M	N/A	
12DCE	5	2.500	0.68	1.55	ug/L
HLOROFORM	6	2.750	1.20	0.02	ug/L
11TCA	7	2.966	0.62	0.00	ug/L
ARBON TETRACHLORIDE	8	3.166	0.71	0.00	ug/L
CE	9	3.983	305.65 M	3.76	ug/L
CE	11	6.233	4.17	0.02	ug/L
	8		332.94	6.91	

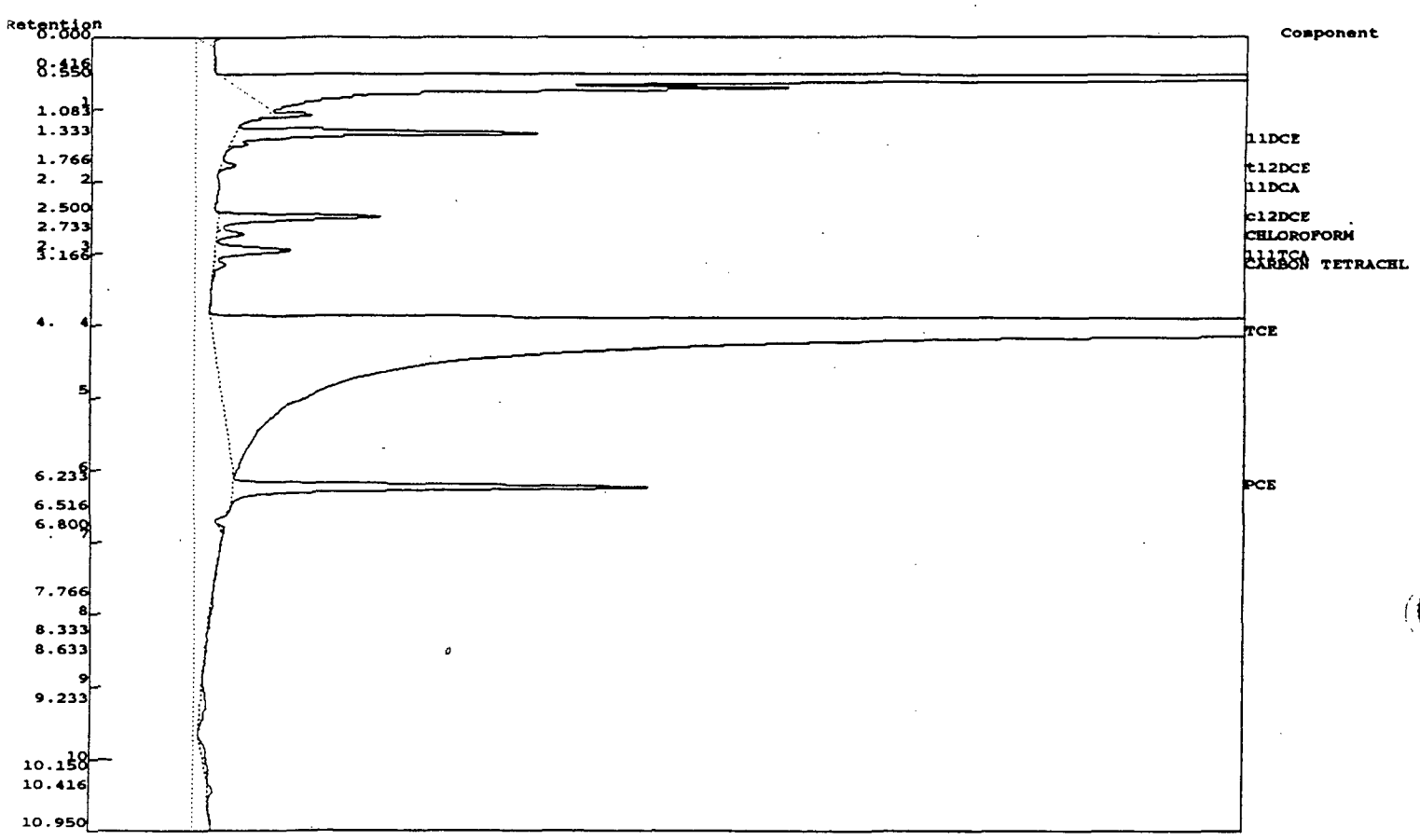
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 01:48:15
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E40.CHR (A:\JUNE05)
Sample : EB-28
Operator : SGN

-1.600mV 16.000mV



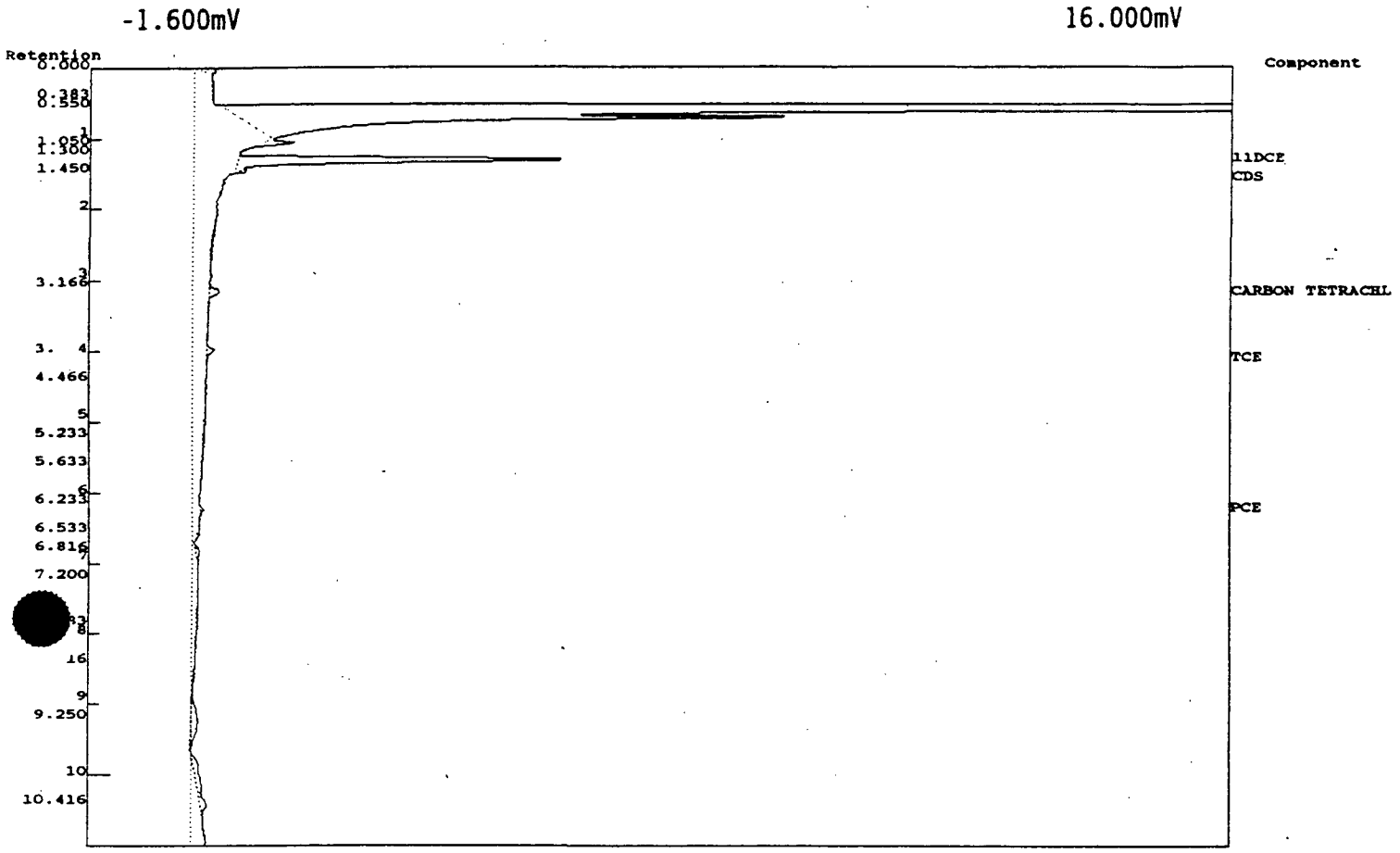
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	20.71	2.80	ug/L
CARBON TETRACHLORIDE	8	3.150	0.98	0.00	ug/L
PCE	11	6.216	0.58 M	0.00	ug/L
	3		22.27	2.80	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 02:07:16
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E41.CHR (A:\JUNE05)
Sample : SG-221
Operator : SGN



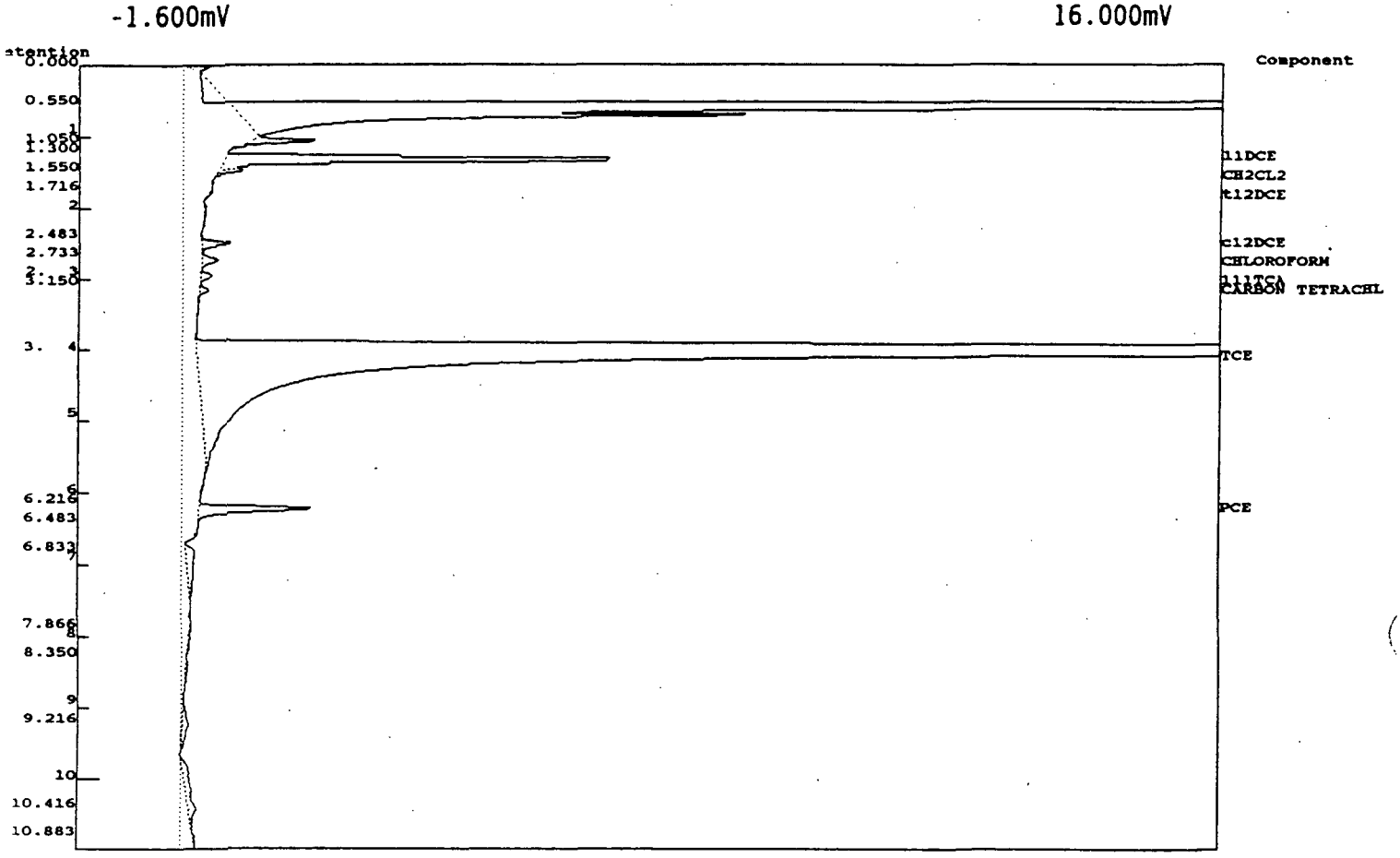
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	24.30 M	3.29	ug/L
12DCE	3	1.766	1.09 M	1.86	ug/L
1DCA	4	2.016	0.23 M	0.21	ug/L
12DCE	5	2.500	12.89 M	29.43	ug/L
HLOROFORM	6	2.733	2.36 M	0.04	ug/L
11TCA	7	2.966	7.35 M	0.04	ug/L
ARBON TETRACHLORIDE	8	3.166	1.36 M	0.00	ug/L
CE	9	4.000	2469.62 M	30.40	ug/L
CE	11	6.233	35.07 M	0.13	ug/L
	9		**2554.27**	**65.39**	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 02:26:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E42.CHR (A:\JUNE05)
Sample : EB-29
Operator : SGN



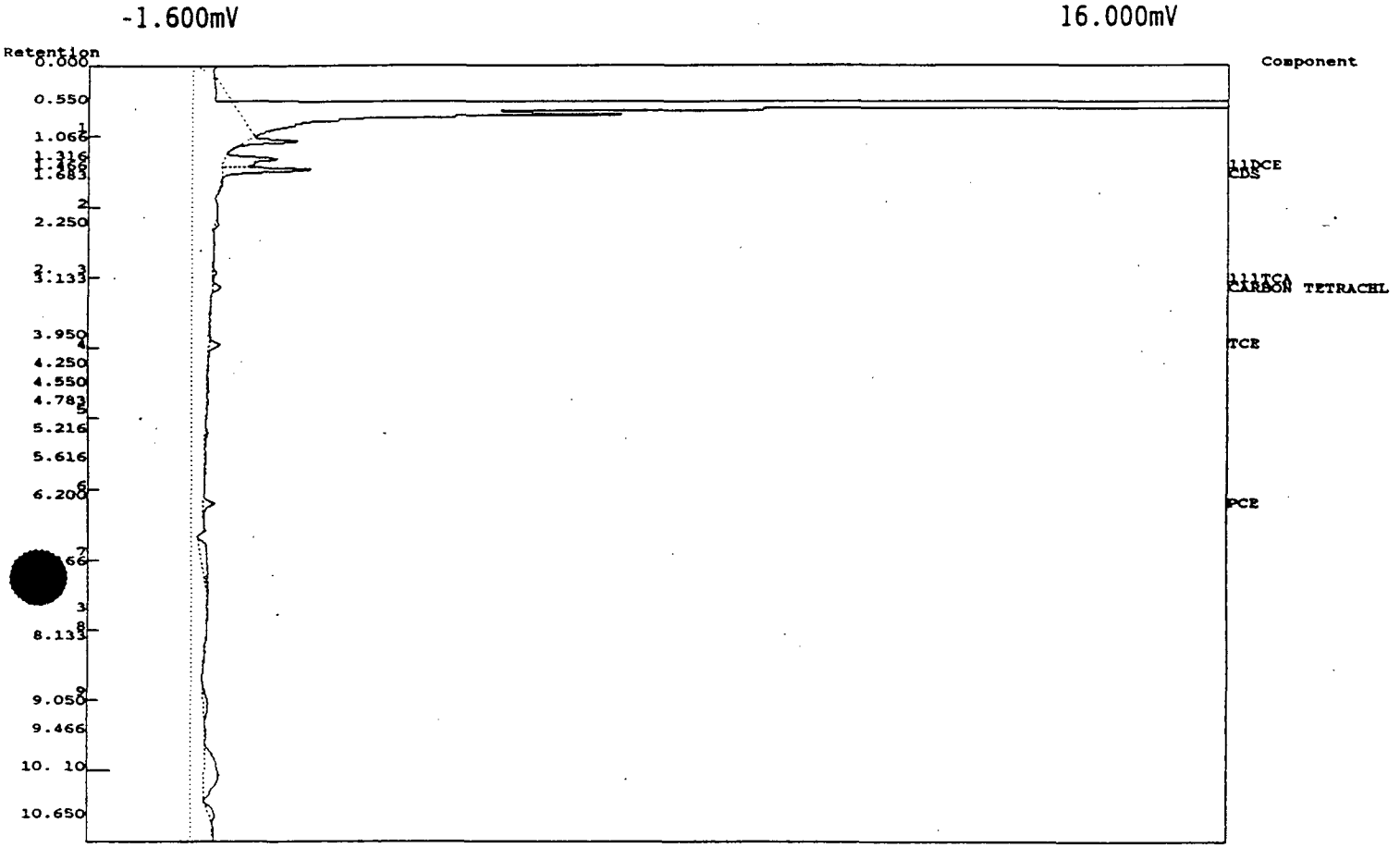
Component	Number	Retention	Area	External	Units
11DCE	1	1.300	25.87 M	3.50	ug/L
CDS	0	1.450	0.61 M	N/A	
CARBON TETRACHLORIDE	8	3.166	0.92 M	0.00	ug/L
TCE	9	3.983	0.71	0.01	ug/L
PCE	11	6.233	0.12 M	0.00	ug/L
	5		28.23	2.51	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 02:45:17
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN05E43.CHR (A:\JUNE05)
Sample : SG-222
Operator : SGN



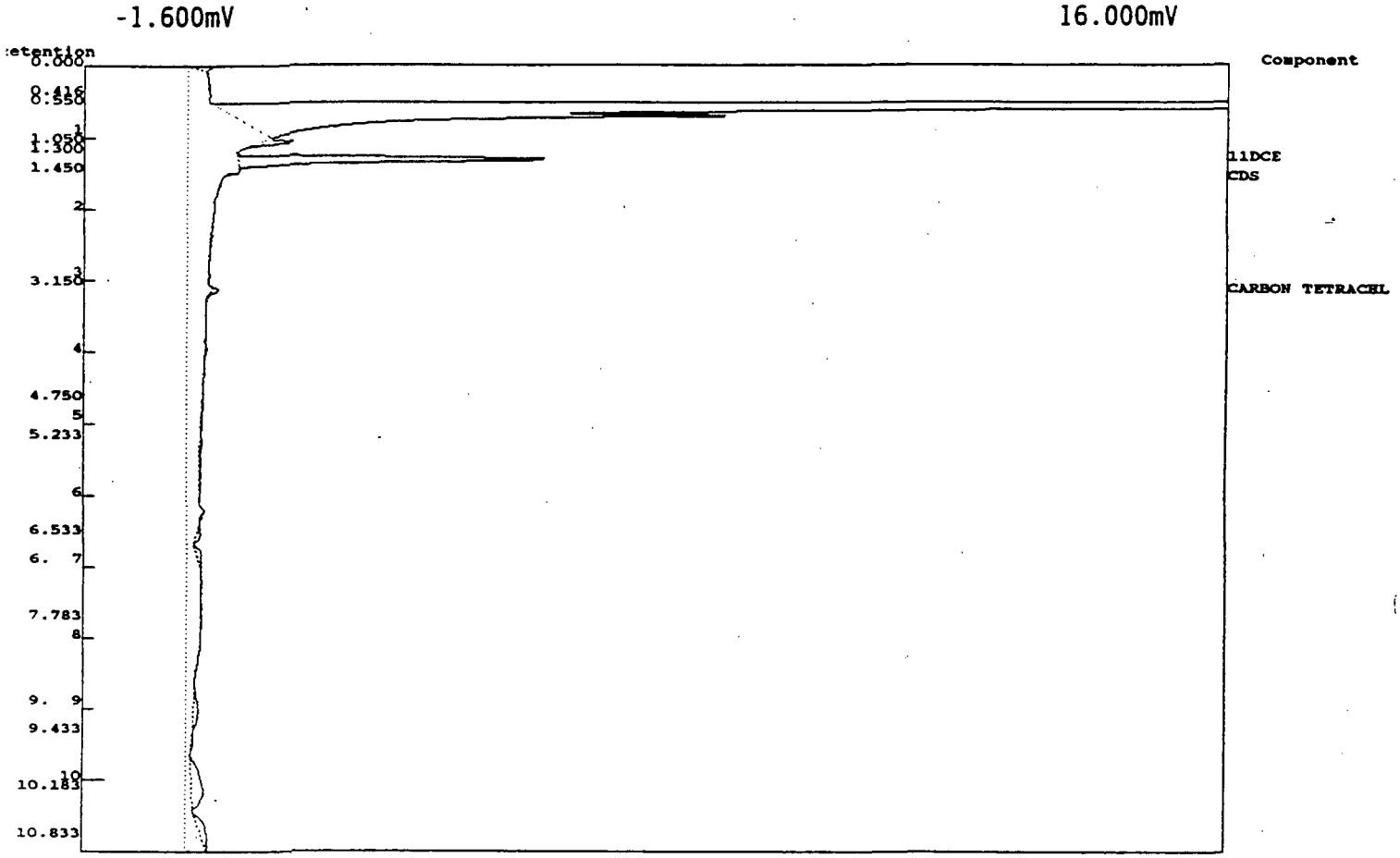
Component	Number	Retention	Area	External	Units
1DCE	1	1.300	33.14 M	4.48	ug/L
)S	0	1.466	1.66 M	N/A	
12CL2	2	1.550	0.42 M	0.28	ug/L
2DCE	3	1.716	0.23 M	0.39	ug/L
2DCE	5	2.483	2.08	4.75	ug/L
LOROFORM	6	2.733	1.39	0.02	ug/L
1TCA	7	2.950	0.92	0.01	ug/L
RBON TETRACHLORIDE	8	3.150	0.66 M	0.00	ug/L
E	9	3.983	892.87 M	10.99	ug/L
E	11	6.216	9.43 M	0.03	ug/L
	10		942.81	19.96	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 07:02:30
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E6.CHR (A:\)
Sample : SG-160-R
Operator : SGN



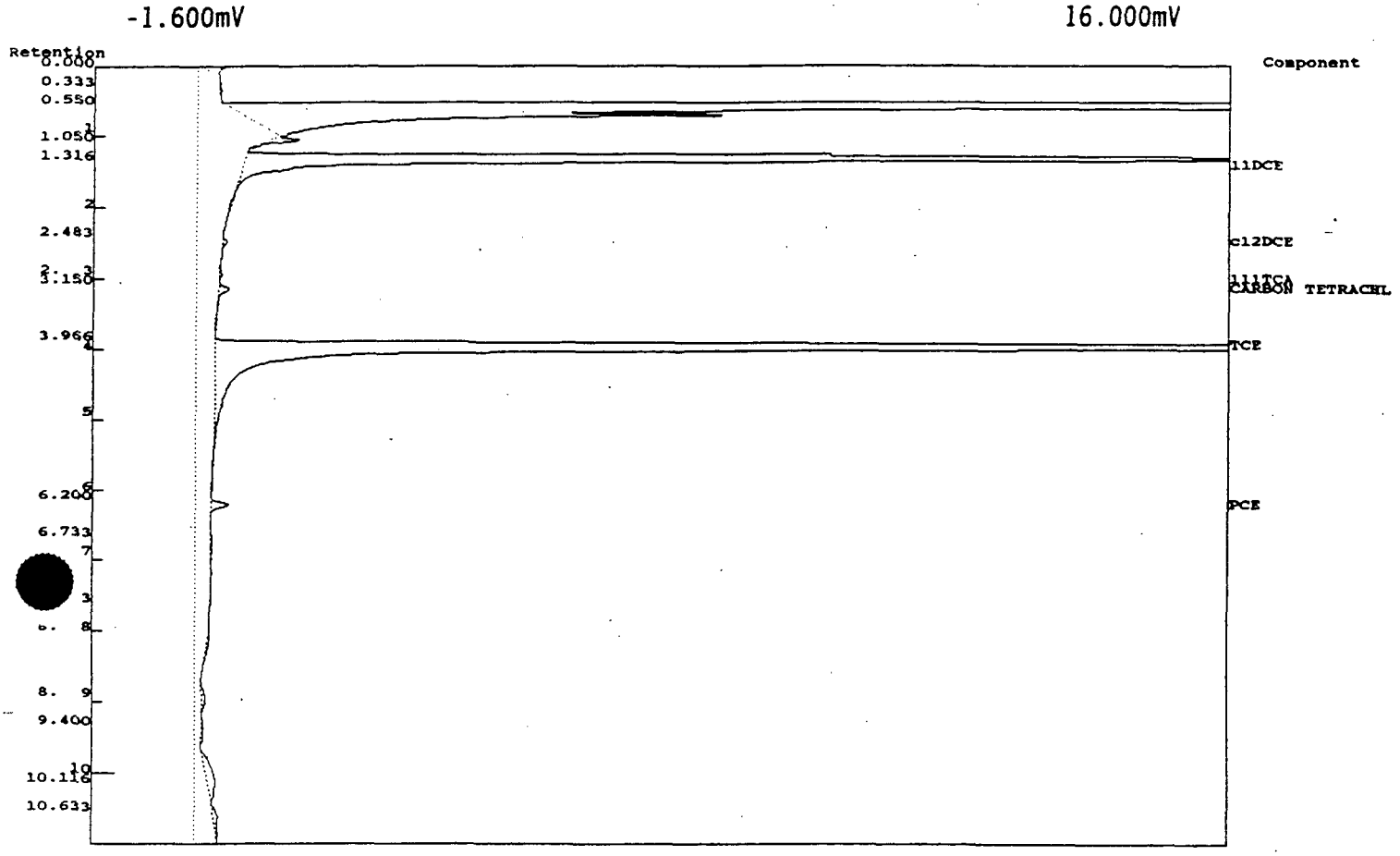
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	4.56 M	0.62	ug/L
CDS	0	1.466	6.34 M	N/A	
111TCA	7	2.933	0.31 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.133	0.65 M	0.00	ug/L
TCE	9	3.950	1.04 M	0.01	ug/L
PCE	11	6.200	0.94 M	0.00	ug/L
	6		13.84	N/A	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 07:24:19
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E7.CHR (A:\)
Sample : EB-30
Operator : SGN



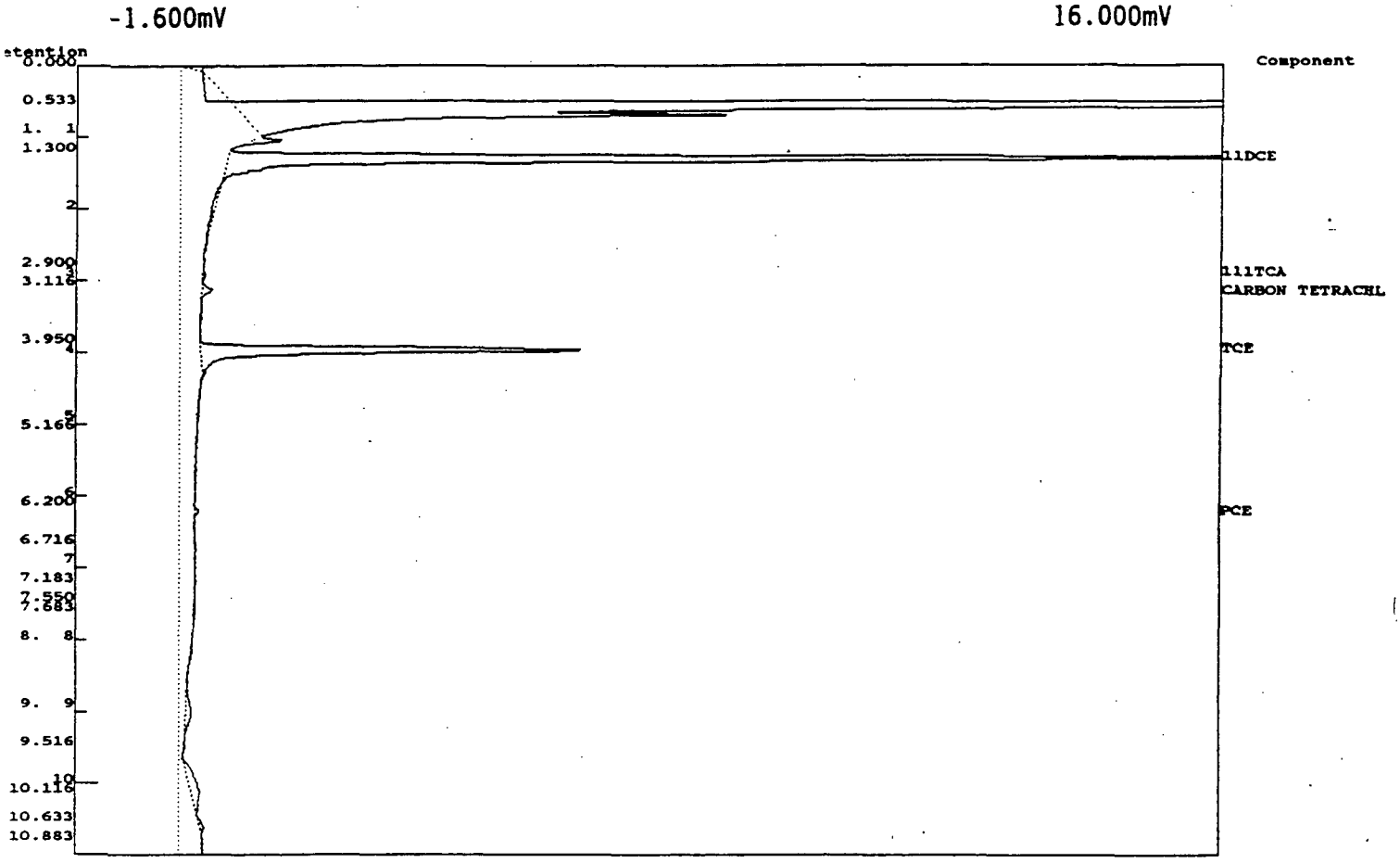
Component	Number	Retention	Area	External	Units
1DCE	1	1.300	23.72 M	3.21	ug/L
DS	0	1.450	0.10 M	N/A	
ARBON TETRACHLORIDE	8	3.150	0.38 M	0.00	ug/L
	3		24.21	2.21	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 07:49:04
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E8.CHR (A:\)
Sample : SG-082 (1000X)
Operator : SGN



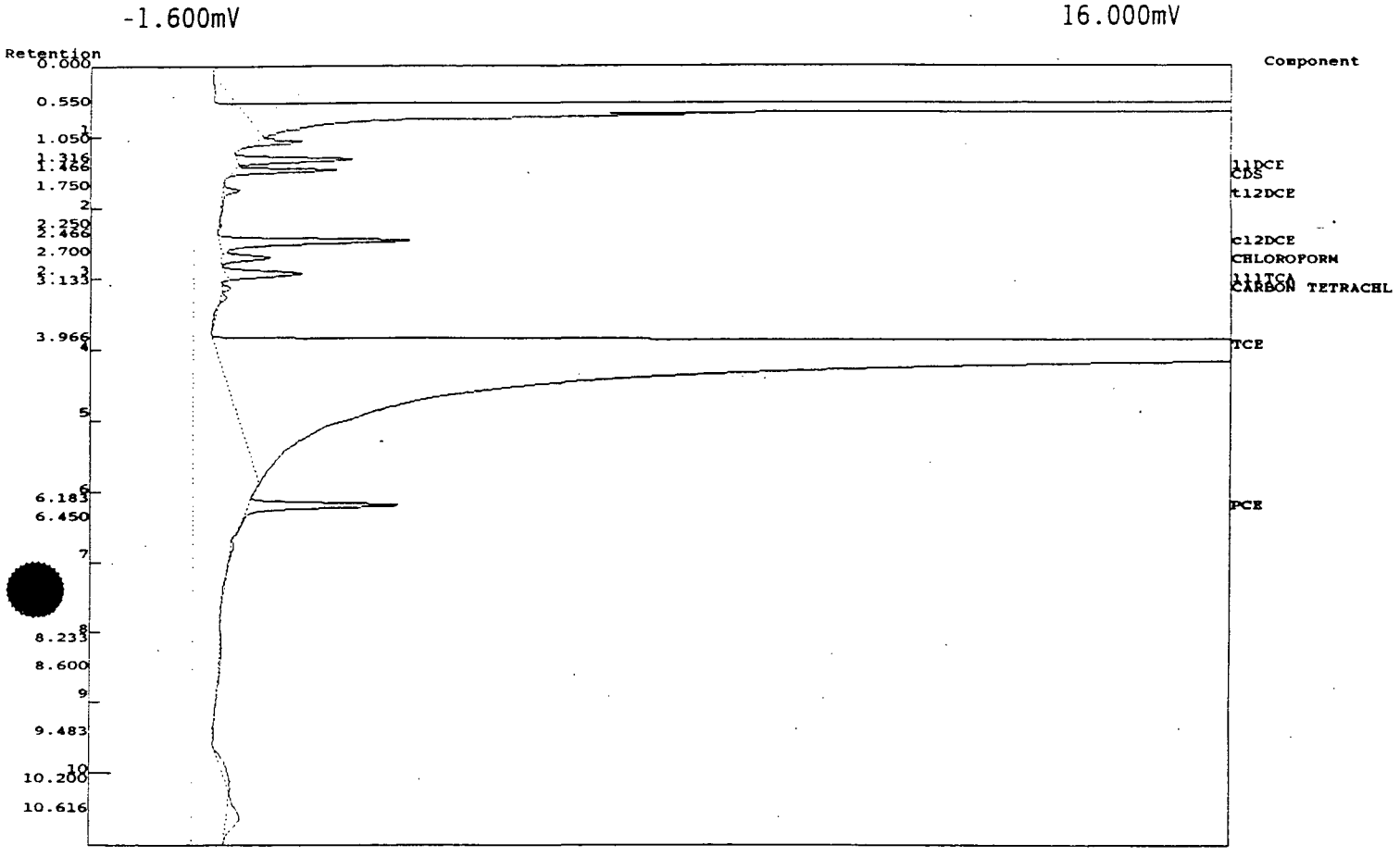
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	106.83 M	14.45	ug/L
c12DCE	5	2.483	0.33 M	0.74	ug/L
111TCA	7	2.933	0.18	0.00	ug/L
CARBON TETRACHLORIDE	8	3.150	0.91 M	0.00	ug/L
TCE	9	3.966	177.00 M	2.18	ug/L
PCE	11	6.200	1.43	0.01	ug/L
	6		286.67	17.38	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 08:10:54
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E9.CHR (A:\)
Sample : SG-190 (1000X)
Operator : SGN



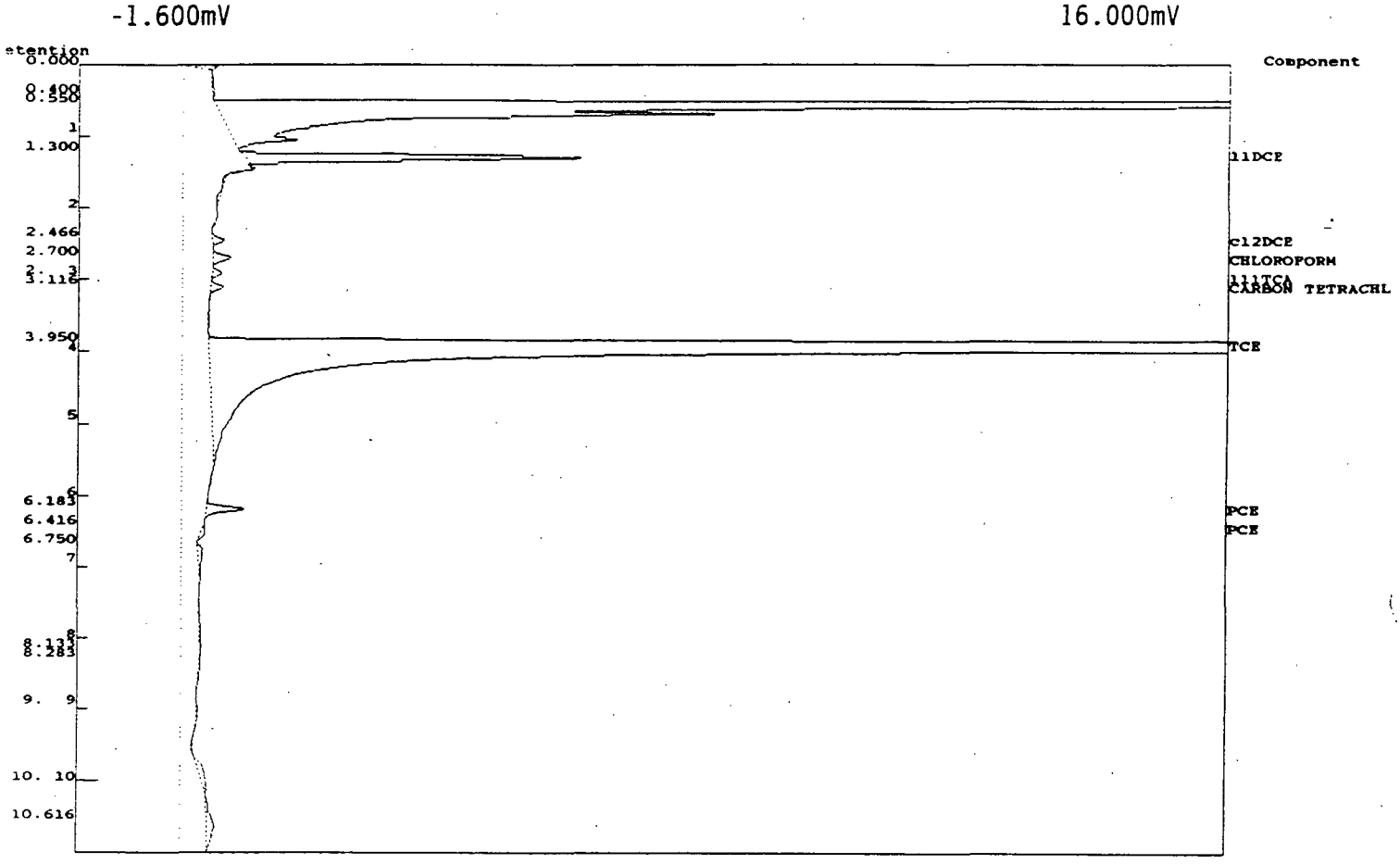
Component	Number	Retention	Area	External	Units
1DCE	1	1.300	85.93	11.62	ug/L
11TCA	7	2.900	0.20 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.116	0.94 M	0.00	ug/L
CE	9	3.950	34.41 M	0.42	ug/L
CE	11	6.200	0.35 M	0.00	ug/L
	5		121.83	12.05	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 10:11:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E10.CHR (A:\)
Sample : SG-219
Operator : SGN



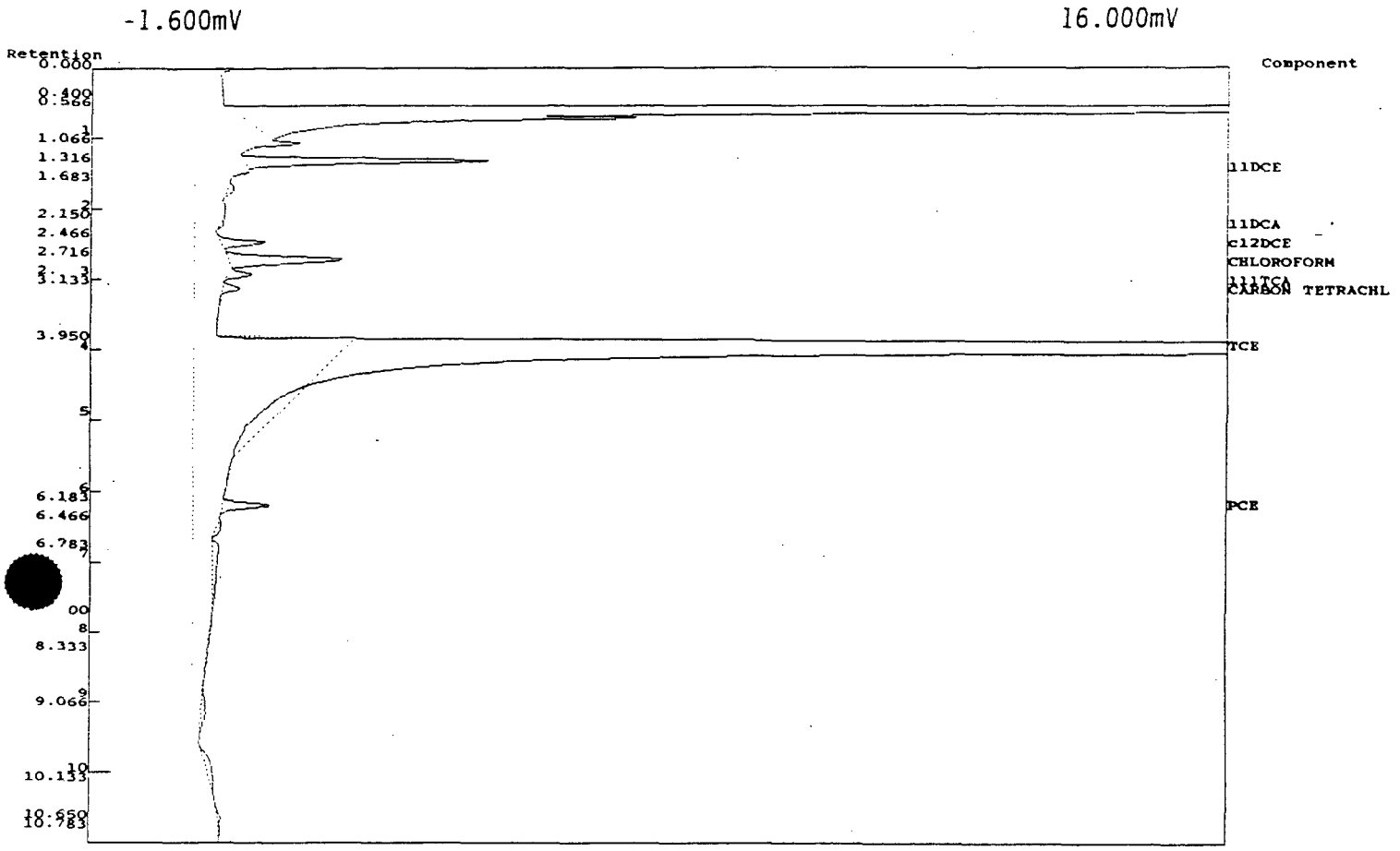
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	8.35	1.13	ug/L
CDS	0	1.466	5.81	N/A	
t12DCE	3	1.750	1.63	2.77	ug/L
c12DCE	5	2.466	15.40 M	35.15	ug/L
CHLOROFORM	6	2.700	4.12 M	0.06	ug/L
111TCA	7	2.933	6.59 M	0.04	ug/L
CARBON TETRACHLORIDE	8	3.133	0.56 M	0.00	ug/L
TCE	9	3.966	4045.59 M	49.80	ug/L
PCE	11	6.183	12.61 M	0.05	ug/L
	9		4100.66	87.99	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 10:30:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E11.CHR (A:\)
Sample : SG-223
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.300	25.95 M	3.51	ug/L
12DCE	5	2.466	0.93	2.12	ug/L
HLOROFORM	6	2.700	1.63	0.02	ug/L
11TCA	7	2.916	0.75	0.00	ug/L
ARBON TETRACHLORIDE	8	3.116	1.00	0.00	ug/L
CE	9	3.950	598.35 M	7.36	ug/L
CE	11	6.183	3.08 M	0.01	ug/L
CE	11	6.416	0.63 M	0.00	ug/L
	8		632.33	13.04	

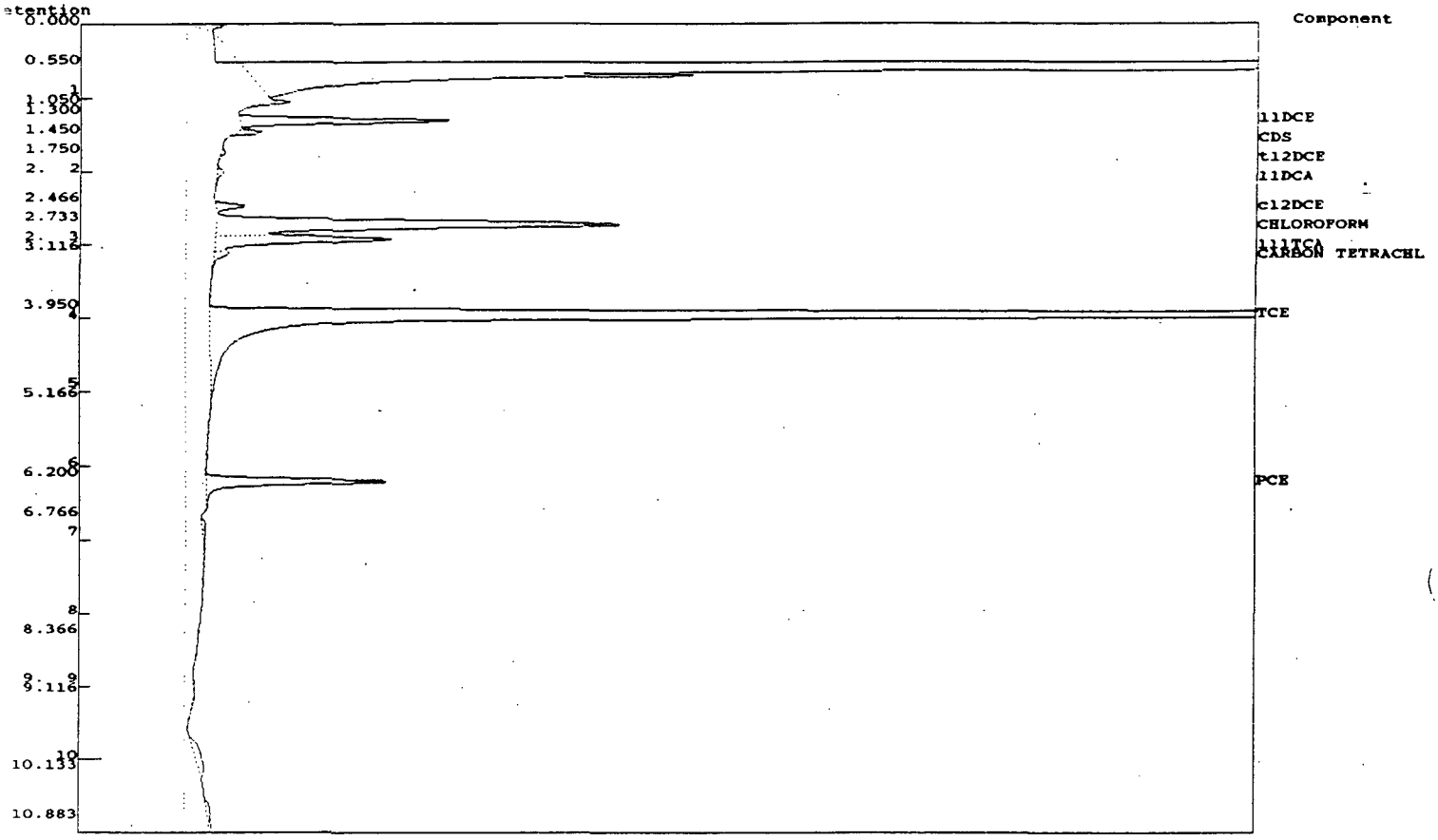
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 10:49:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E12.CHR (A:\)
Sample : SG-224
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	18.54 M	2.51	ug/L
11DCA	4	2.150	0.34 M	0.31	ug/L
c12DCE	5	2.466	3.40 M	7.76	ug/L
CHLOROFORM	6	2.716	12.01 M	0.18	ug/L
111TCA	7	2.933	1.88 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.133	1.31 M	0.00	ug/L
TCE	9	3.950	918.10 M	11.30	ug/L
PCE	11	6.183	4.01	0.01	ug/L
	8		959.58	22.08	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 11:08:07
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E13.CHR (A:\)
Sample : SG-225
Operator : SGN

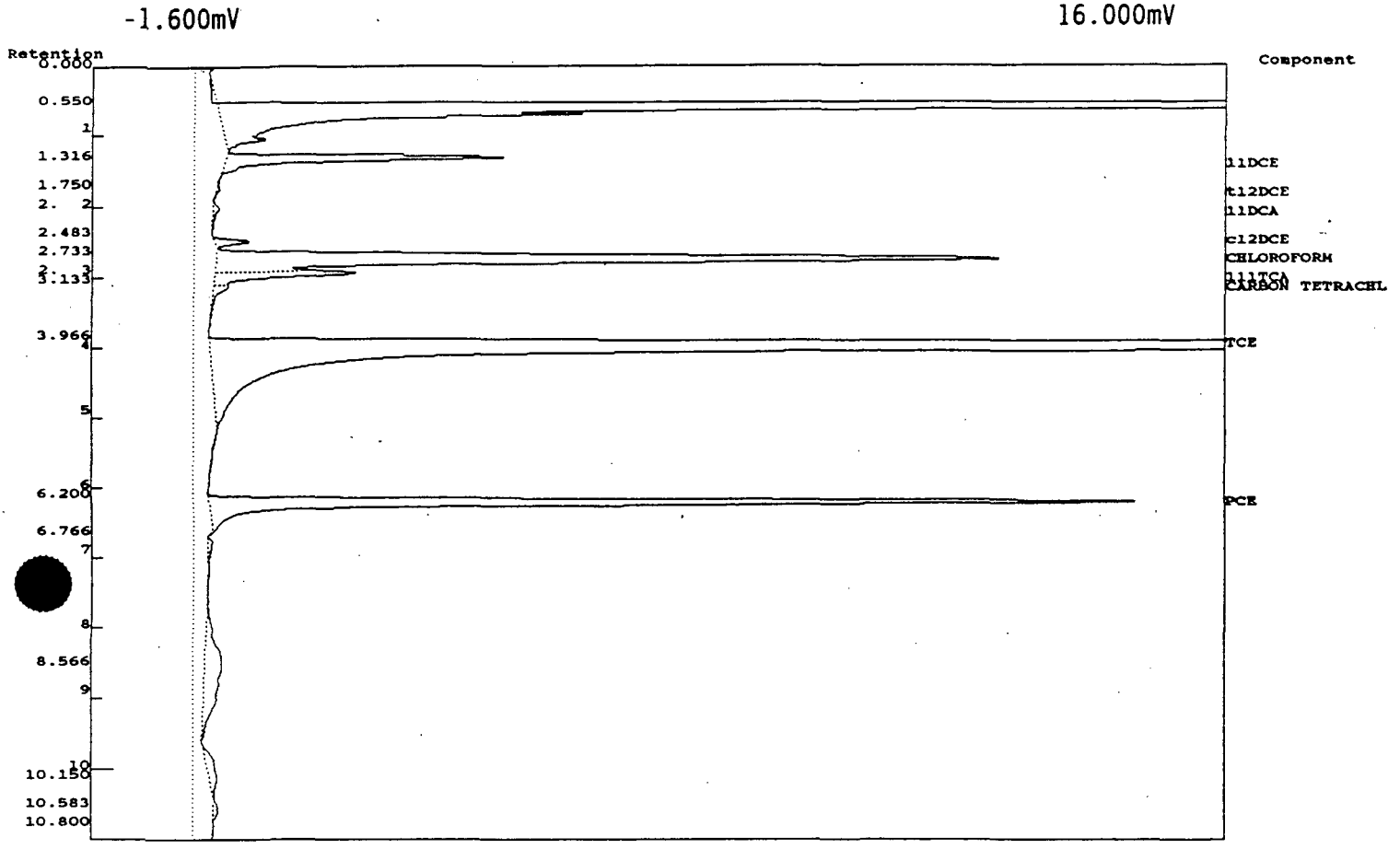
-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
1DCE	1	1.300	15.01 M	2.03	ug/L
DS	0	1.450	1.39 M	N/A	
12DCE	3	1.750	0.32 M	0.54	ug/L
1DCA	4	2.000	0.83 M	0.76	ug/L
12DCE	5	2.466	2.08	4.74	ug/L
HLOROFORM	6	2.733	45.36 M	0.68	ug/L
11TCA	7	2.933	17.95 M	0.11	ug/L
ARBON TETRACHLORIDE	8	3.116	1.62 M	0.00	ug/L
CE	9	3.950	172.98	2.13	ug/L
CE	11	6.200	15.78 M	0.06	ug/L
	10		273.31	10.05	

300955

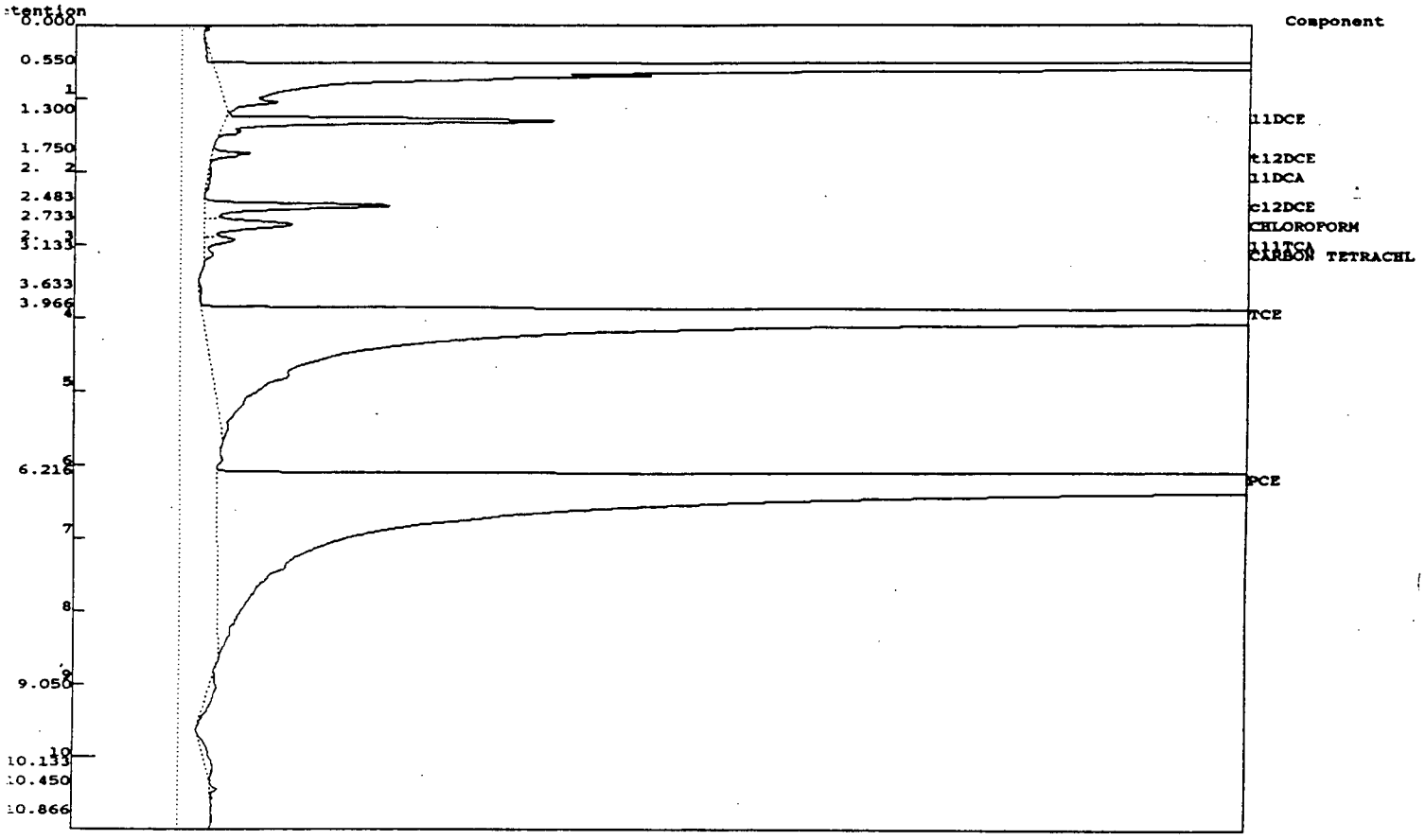
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 11:49:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E14.CHR (A:\)
Sample : SG-226
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.316	24.86	3.36	ug/L
t12DCE	3	1.750	0.24	0.41	ug/L
11DCA	4	2.000	1.06	0.98	ug/L
c12DCE	5	2.483	2.46	5.63	ug/L
CHLOROFORM	6	2.733	93.72 M	1.40	ug/L
111TCA	7	2.933	14.37 M	0.09	ug/L
CARBON TETRACHLORIDE	8	3.133	2.45 M	0.00	ug/L
TCE	9	3.966	461.56 M	5.68	ug/L
PCE	11	6.200	85.04 M	0.31	ug/L
	9		685.77	17.86	

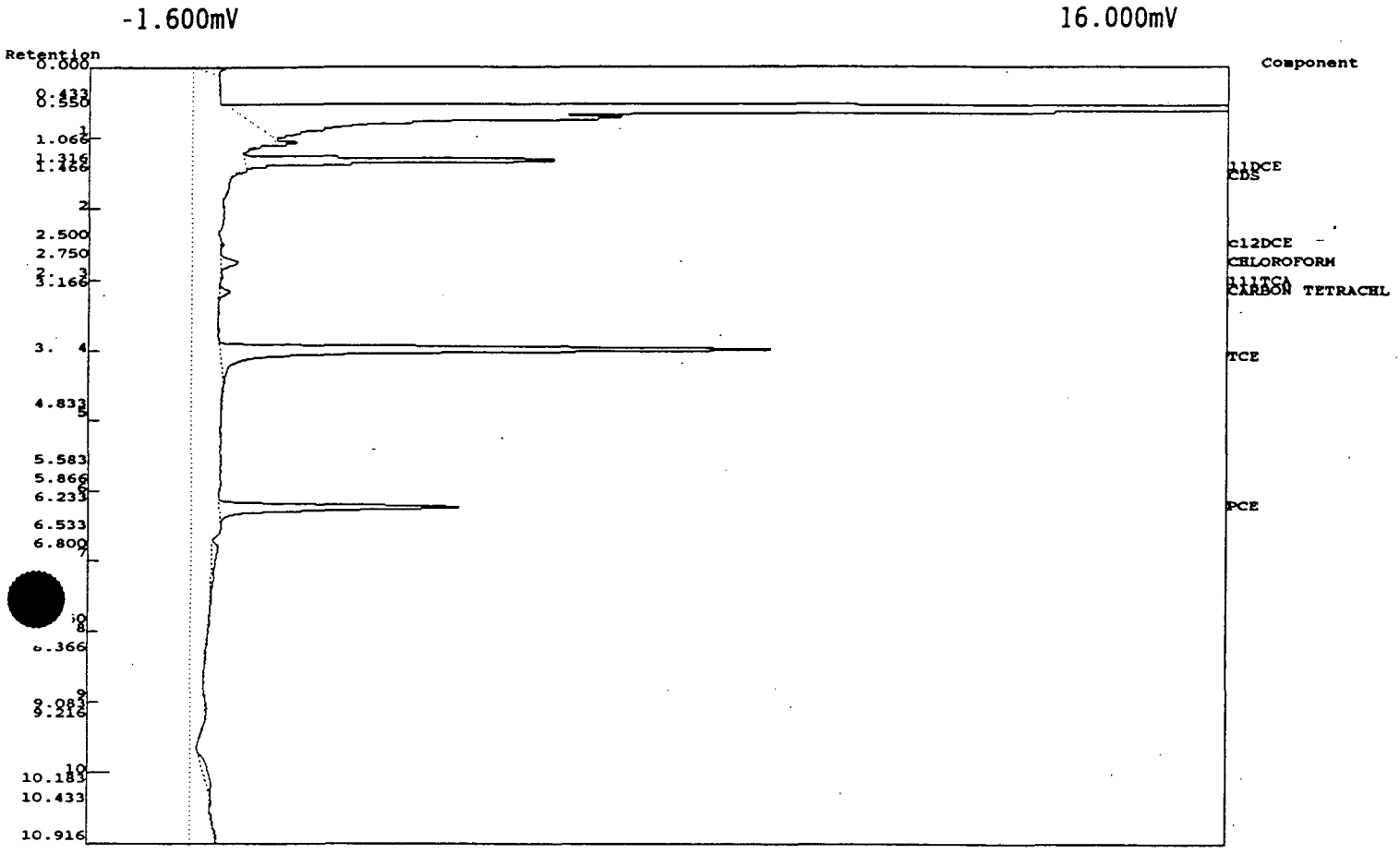
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 12:08:27
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E15.CHR (A:\)
Sample : SG-227
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
DCE	1	1.300	26.17	3.54	ug/L
2DCE	3	1.750	2.61	4.43	ug/L
DCA	4	2.000	0.93	0.86	ug/L
2DCE	5	2.483	15.59 M	35.60	ug/L
LOROFORM	6	2.733	10.52 M	0.16	ug/L
1TCA	7	2.933	3.08 M	0.02	ug/L
RBON TETRACHLORIDE	8	3.133	0.83 M	0.00	ug/L
E	9	3.966	1502.69 M	18.50	ug/L
E	11	6.216	3219.70 M	11.71	ug/L
	9		4782.13	74.81	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 12:27:28
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E16.CHR (A:\)
Sample : SG-228
Operator : SGN

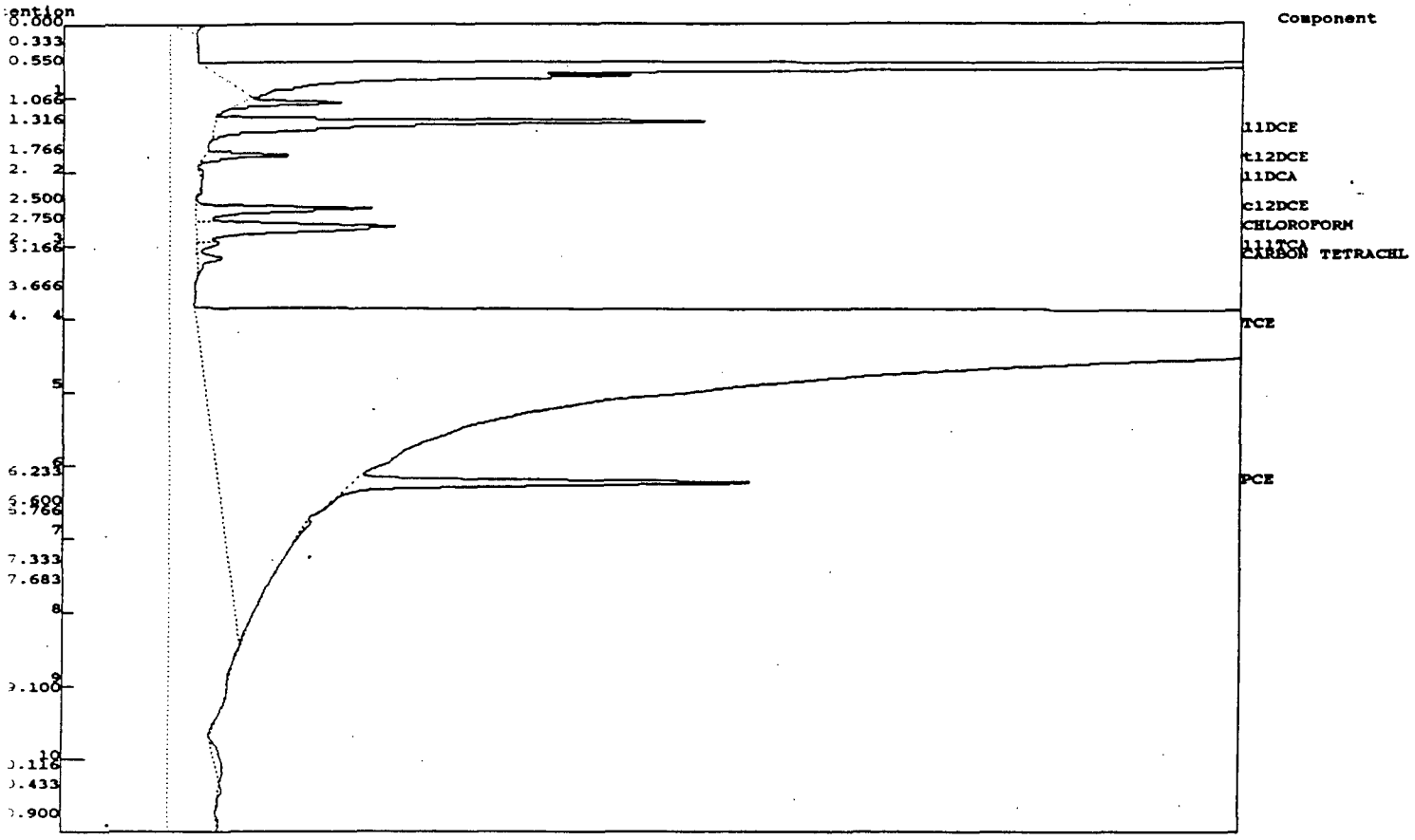


Component	Number	Retention	Area	External	Units
11DCE	1	1.316	25.15 M	3.40	ug/L
CDS	0	1.466	0.19 M	N/A	
c12DCE	5	2.500	0.23 M	0.53	ug/L
CHLOROFORM	6	2.750	1.79 M	0.03	ug/L
111TCA	7	2.950	0.11 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.166	0.99 M	0.00	ug/L
TCE	9	3.983	49.72 M	0.61	ug/L
PCE	11	6.233	20.74 M	0.08	ug/L
	8		98.91	3.65	

300958

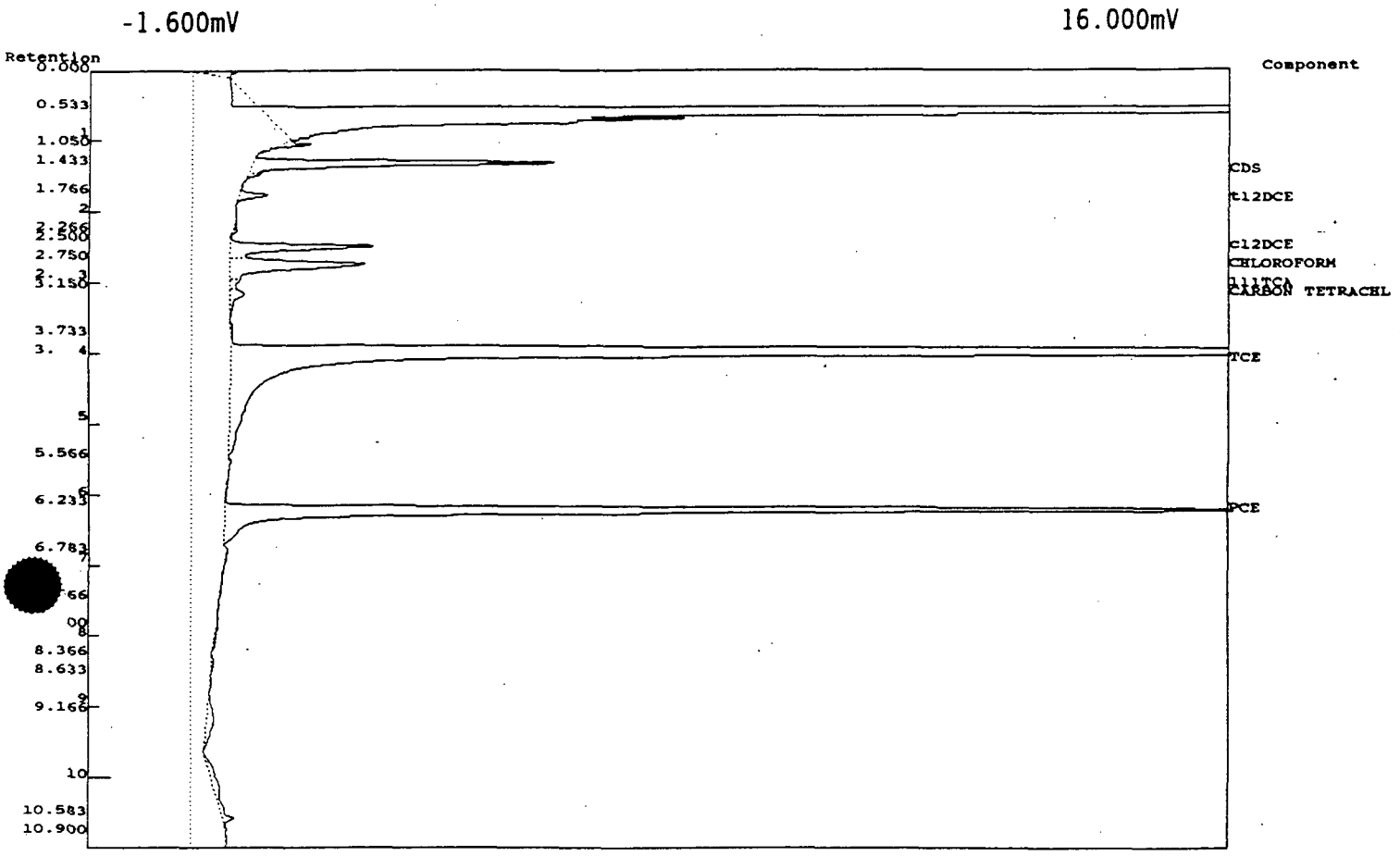
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 12:46:28
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E17.CHR (A:\)
Sample : SG-229
Operator : SGN

-1.600mV 16.000mV



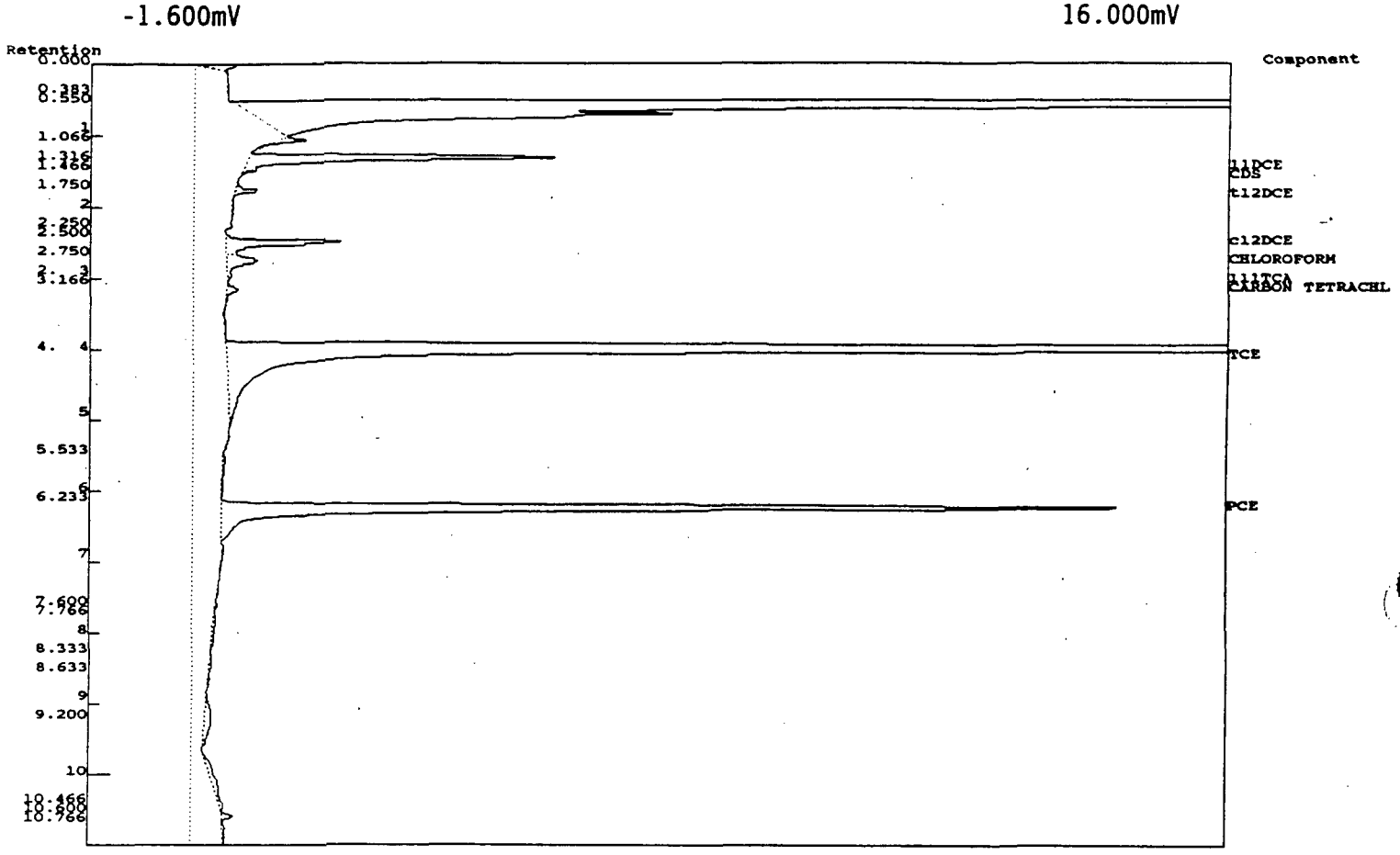
Component	Number	Retention	Area	External	Units
)CE	1	1.316	41.16 M	5.57	ug/L
:DCE	3	1.766	5.37 M	9.12	ug/L
)CA	4	2.000	0.34 M	0.32	ug/L
:DCE	5	2.500	13.70 M	31.27	ug/L
OROFORM	6	2.750	22.83 M	0.34	ug/L
TCA	7	2.966	2.11 M	0.01	ug/L
BON TETRACHLORIDE	8	3.166	2.90 M	0.00	ug/L
	9	4.100	16662.87 M	205.10	ug/L
	11	6.233	32.57 M	0.12	ug/L
9			16783.86	251.85	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 13:05:30
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E18.CHR (A:\)
Sample : SG-230
Operator : SGN



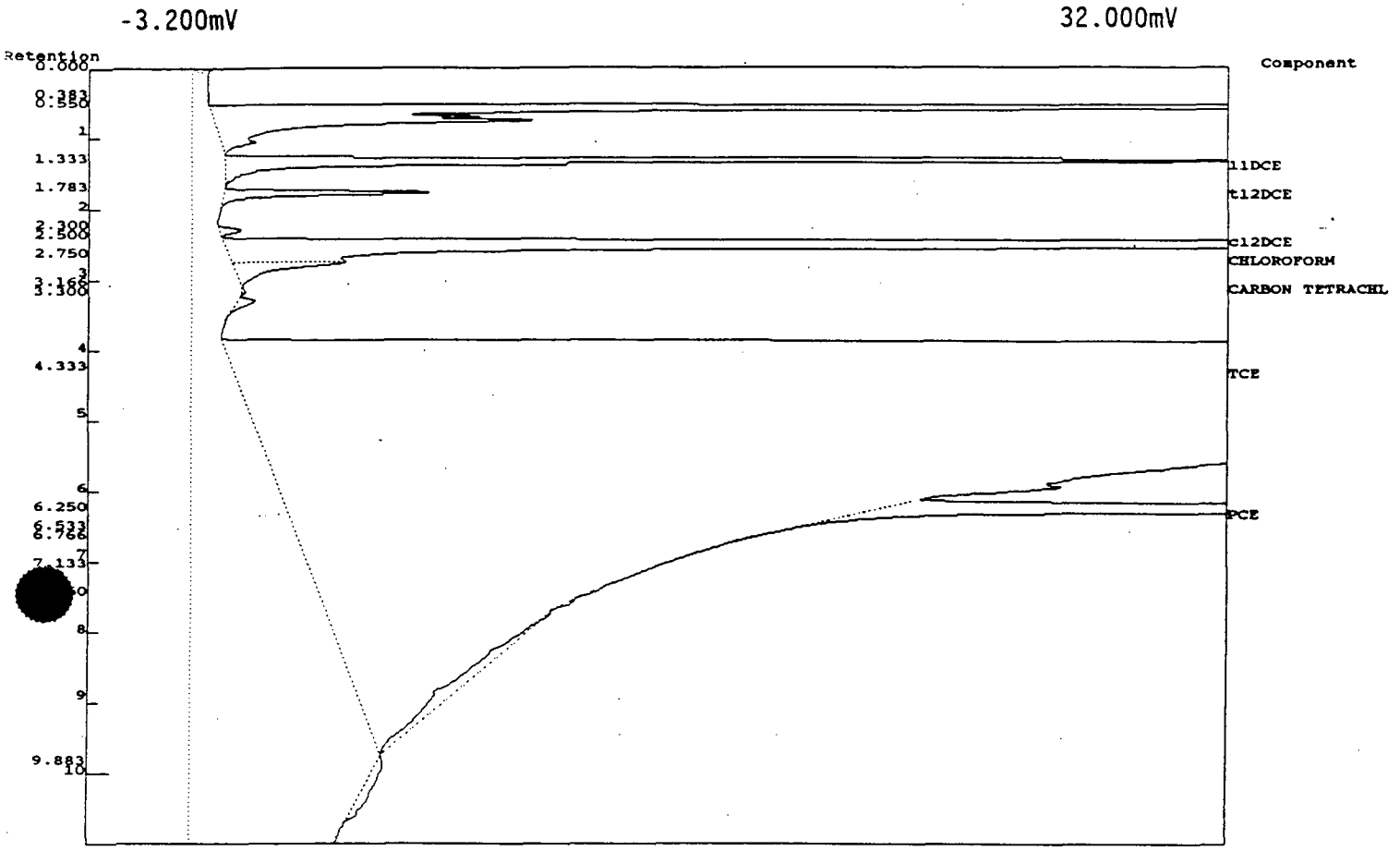
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	23.72 M	3.21	ug/L
CDS	0	1.433	0.94 M	N/A	
t12DCE	3	1.766	2.00	3.39	ug/L
c12DCE	5	2.500	12.41 M	28.34	ug/L
CHLOROFORM	6	2.750	16.87 M	0.25	ug/L
111TCA	7	2.916	1.13 M	0.01	ug/L
CARBON TETRACHLORIDE	8	3.150	2.57 M	0.00	ug/L
TCE	9	3.983	288.11 M	3.55	ug/L
PCE	11	6.233	97.29	0.35	ug/L
	9		445.04	38.10	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 13:24:29
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E19.CHR (A:\)
Sample : SG-730
Operator : SGN



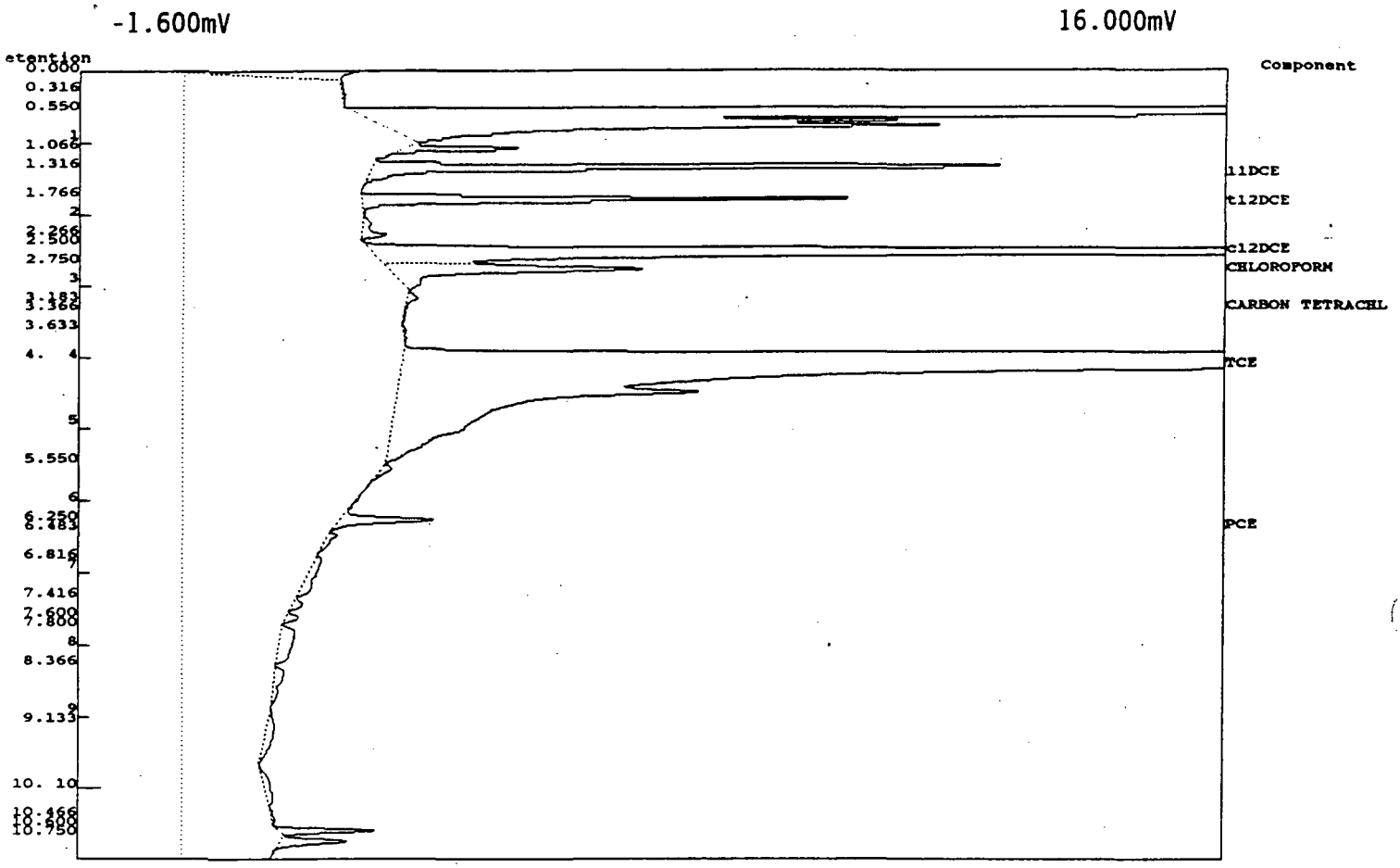
Component	Number	Retention	Area	External	Units
1DCE	1	1.316	23.98 M	3.24	ug/L
DS	0	1.466	0.72 M	N/A	
12DCE	3	1.750	1.50	2.54	ug/L
12DCE	5	2.500	9.50 M	21.68	ug/L
HLOROFORM	6	2.750	4.05 M	0.06	ug/L
11TCA	7	2.950	0.41 M	0.00	ug/L
ARBON TETRACHLORIDE	8	3.166	1.11	0.00	ug/L
CE	9	4.000	231.08 M	2.84	ug/L
CE	11	6.233	84.37 M	0.31	ug/L
	9		356.73	29.68	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 13:43:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E20.CHR (A:\)
Sample : SG-231
Operator : SGN



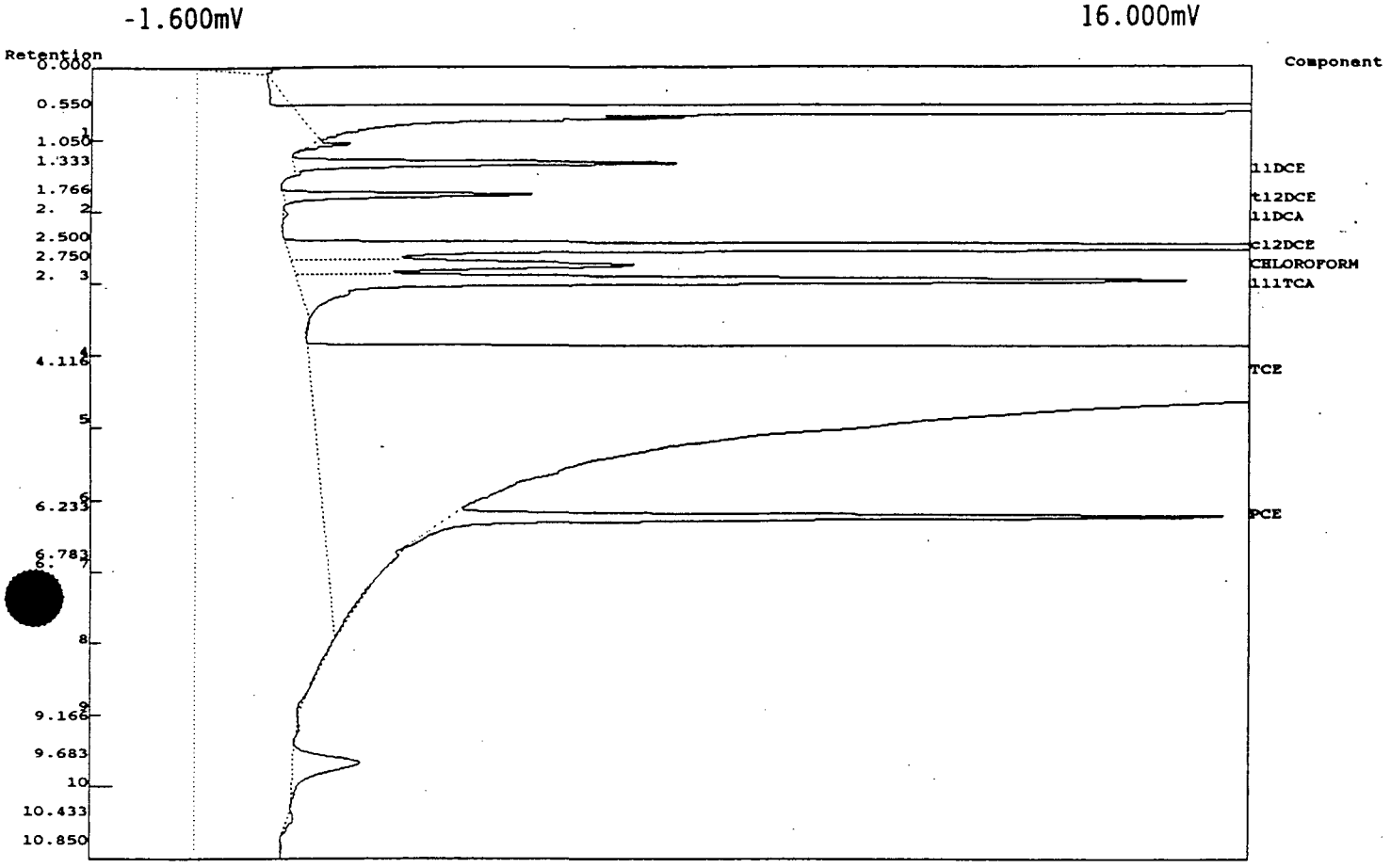
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	160.10 M	21.66	ug/L
12DCE	3	1.783	29.41 M	49.93	ug/L
12DCE	5	2.500	817.54 M	1866.52	ug/L
HLOROFORM	6	2.750	31.30 M	0.47	ug/L
ARBON TETRACHLORIDE	8	3.166	0.47	0.00	ug/L
CE	9	4.333	44259.98 M	544.79	ug/L
CE	11	6.250	409.29 M	1.49	ug/L
	7		45708.10	2484.85	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 14:02:31
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E21.CHR (A:\)
Sample : SG-232
Operator : SGN



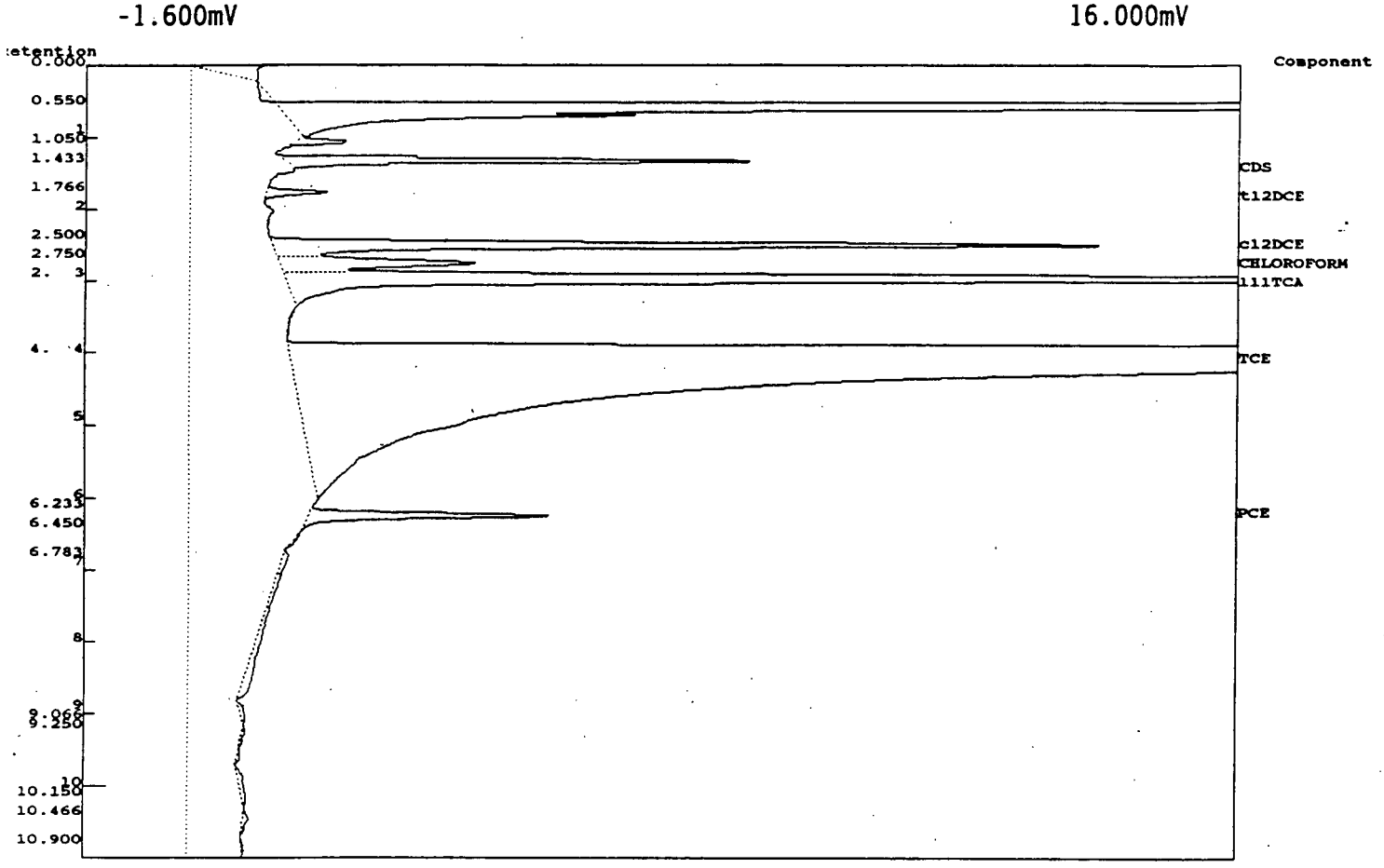
Component	Number	Retention	Area	External	Units
1DCE	1	1.316	47.15	6.38	ug/L
12DCE	3	1.766	32.70	55.52	ug/L
12DCE	5	2.500	173.13 M	395.28	ug/L
HLOROFORM	6	2.750	32.05 M	0.48	ug/L
ARBON TETRACHLORIDE	8	3.183	1.07	0.00	ug/L
CE	9	4.016	1900.23 M	23.39	ug/L
CE	11	6.250	8.01 M	0.03	ug/L
	7		2194.34	481.07	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 14:21:32
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E22.CHR (A:\)
Sample : SG-233
Operator : SGN



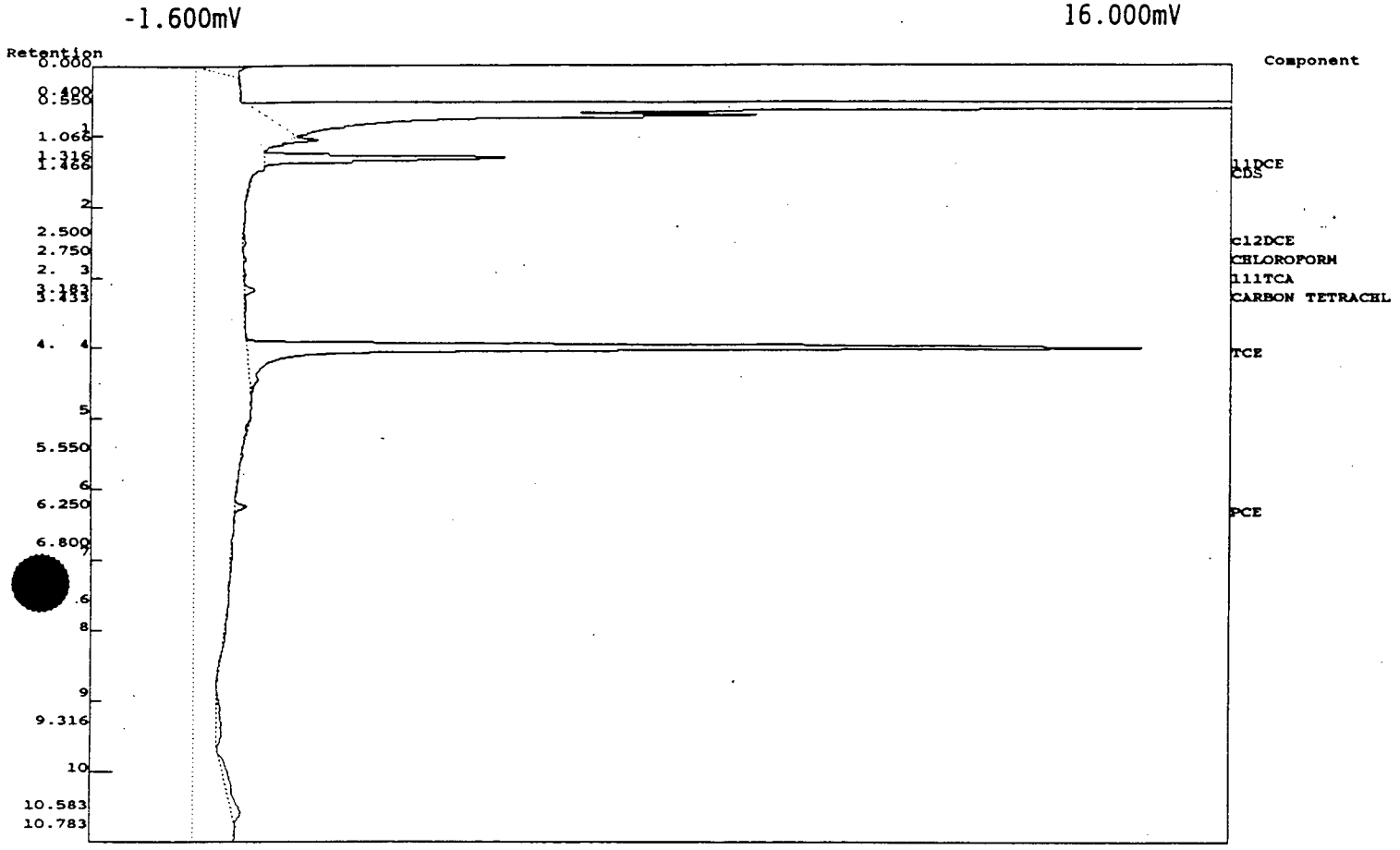
Component	Number	Retention	Area	External	Units
11DCE	1	1.333	27.62 M	3.74	ug/L
t12DCE	3	1.766	16.70 M	28.36	ug/L
11DCA	4	2.033	0.43 M	0.40	ug/L
c12DCE	5	2.500	186.40 M	425.56	ug/L
CHLOROFORM	6	2.750	40.84 M	0.61	ug/L
111TCA	7	2.966	100.51 M	0.60	ug/L
TCE	9	4.116	18508.65 M	227.82	ug/L
PCE	11	6.233	66.38 M	0.24	ug/L
	8		18947.52	687.32	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 14:40:32
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E23.CHR (A:\)
Sample : SG-234
Operator : SGN



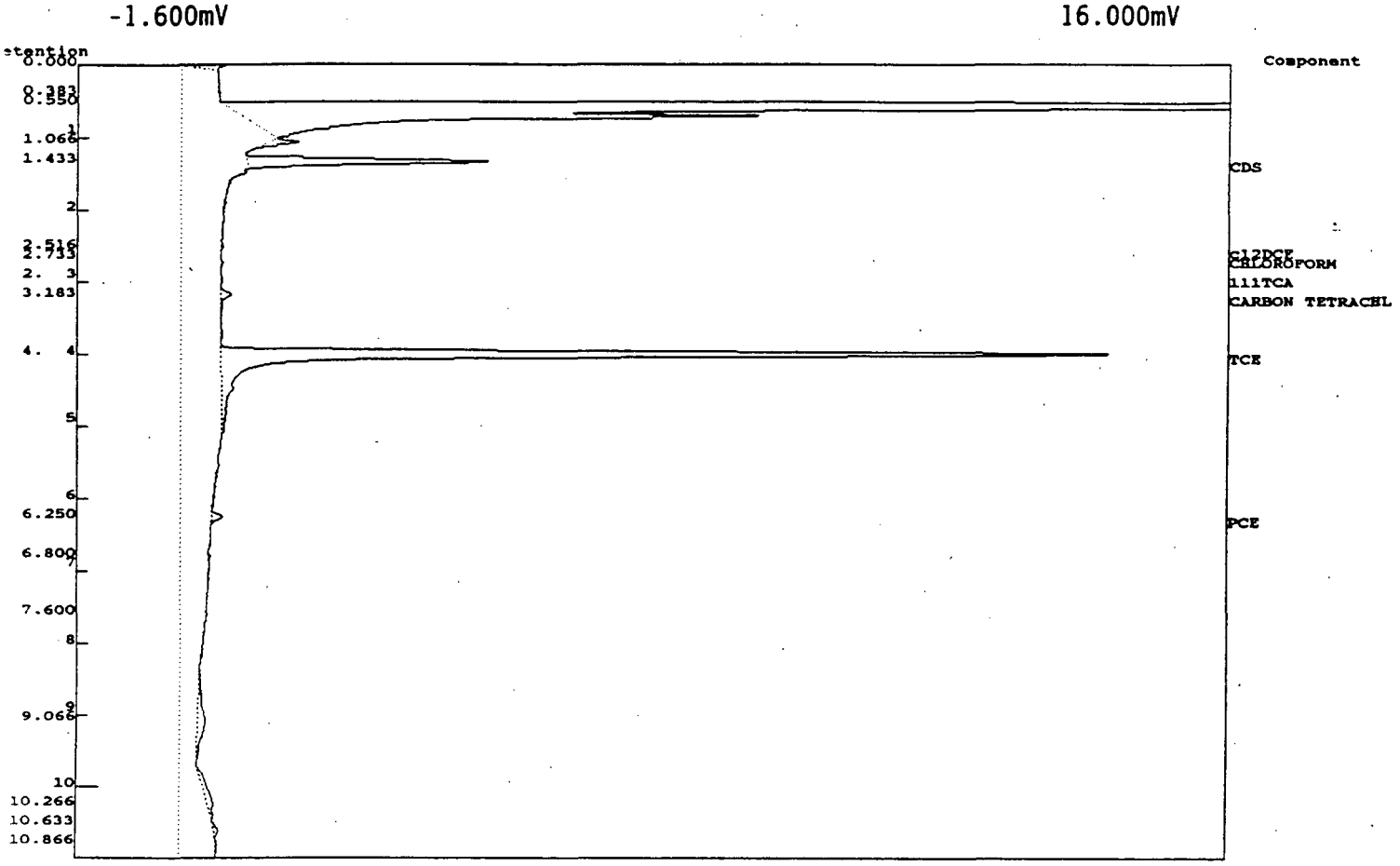
Component	Number	Retention	Area	External	Units
1DCE	1	1.333	32.18 M	4.35	ug/L
DS	0	1.433	0.13 M	N/A	
12DCE	3	1.766	4.24 M	7.20	ug/L
12DCE	5	2.500	68.07 M	155.42	ug/L
HLOROFORM	6	2.750	23.16 M	0.35	ug/L
11TCA	7	2.966	153.15 M	0.92	ug/L
CE	9	4.016	5180.19 M	63.76	ug/L
CE	11	6.233	19.84 M	0.07	ug/L
	8		5480.96	231.07	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 15:12:35
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E24.CHR (A:\)
Sample : EB-31
Operator : SGN



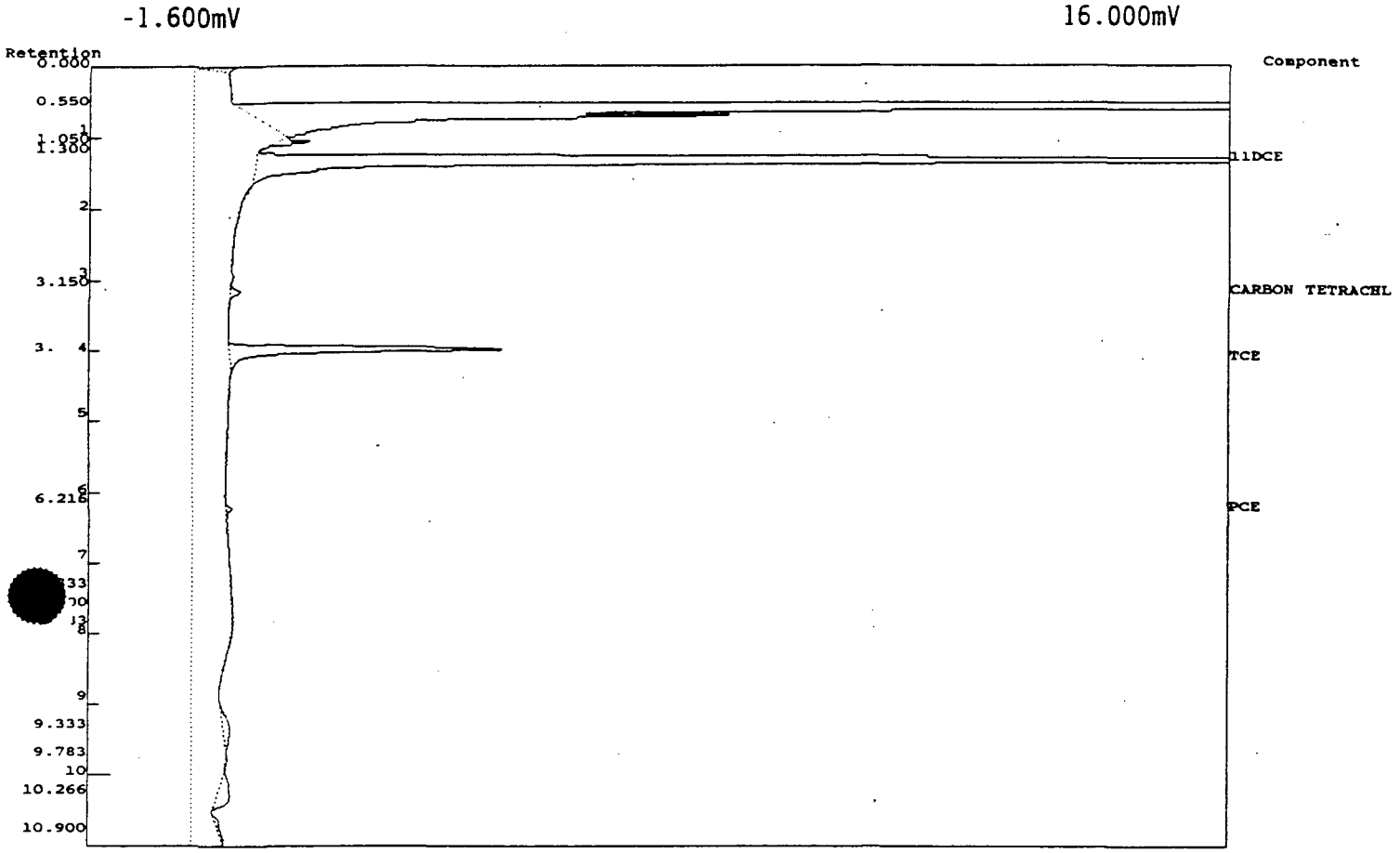
Component	Number	Retention	Area	External	Units
11DCE	1	1.316	17.90 M	2.42	ug/L
CDS	0	1.466	0.12 M	N/A	
c12DCE	5	2.500	0.29 M	0.67	ug/L
CHLOROFORM	6	2.750	0.24 M	0.00	ug/L
111TCA	7	2.966	0.15 M	0.00	ug/L
CARBON TETRACHLORIDE	8	3.183	0.92 M	0.00	ug/L
TCE	9	4.000	82.87 M	1.02	ug/L
PCE	11	6.250	0.96 M	0.00	ug/L
	8		103.46	3.12	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 15:35:06
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E25.CHR (A:\)
Sample : EB-31-R
Operator : SGN



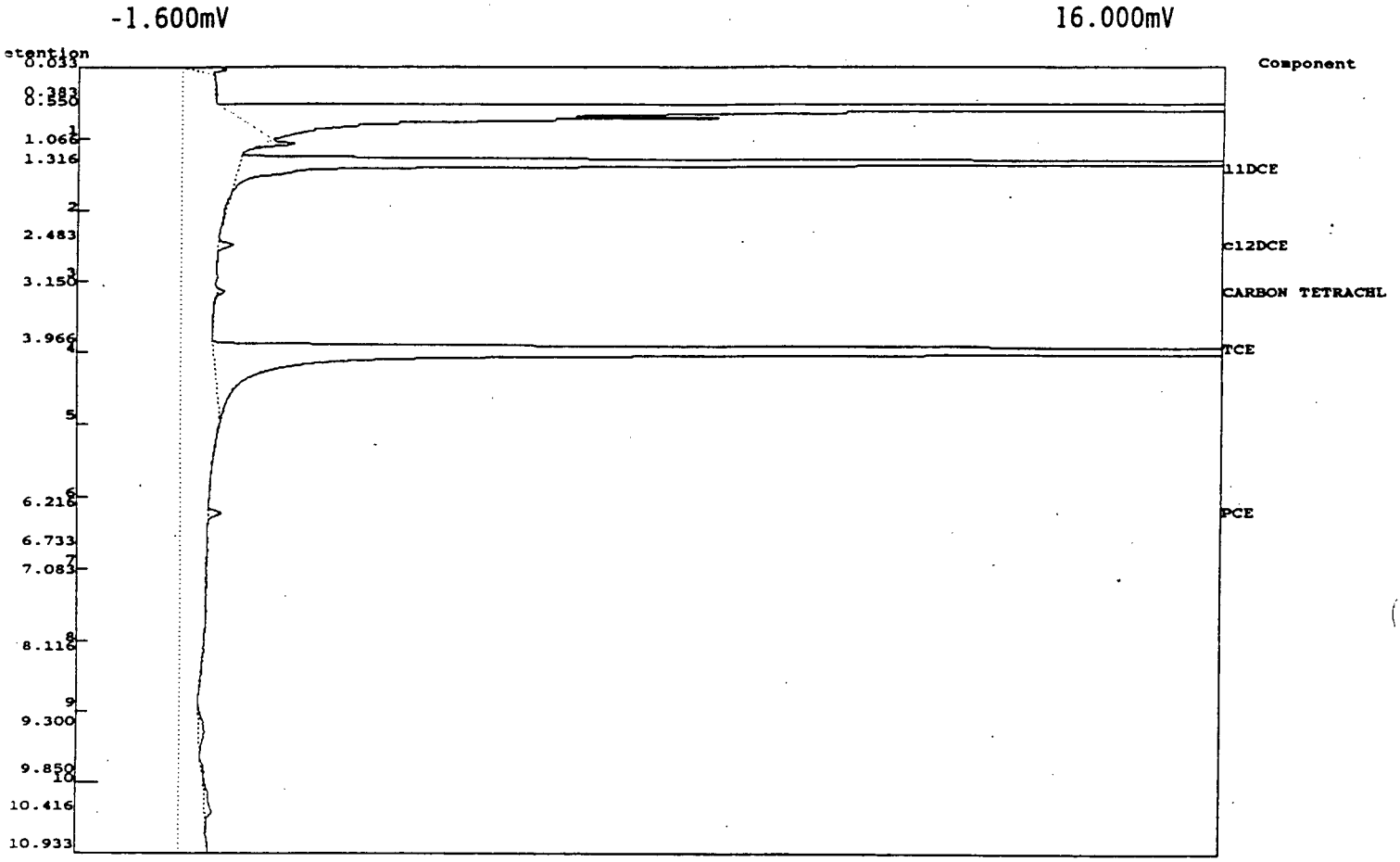
Component	Number	Retention	Area	External	Units
DCE	1	1.333	18.62 M	2.52	ug/L
S	0	1.433	0.15 M	N/A	
2DCE	5	2.516	0.14 M	0.33	ug/L
LOROFORM	6	2.733	0.21 M	0.00	ug/L
1TCA	7	2.966	0.17 M	0.00	ug/L
RBON TETRACHLORIDE	8	3.183	1.10 M	0.00	ug/L
E	9	4.000	85.19 M	1.05	ug/L
E	11	6.250	0.93 M	0.00	ug/L
	8		106.51	2.90	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 16:51:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E29.CHR (A:\)
Sample : SG-229 (1000X)
Operator : SGN



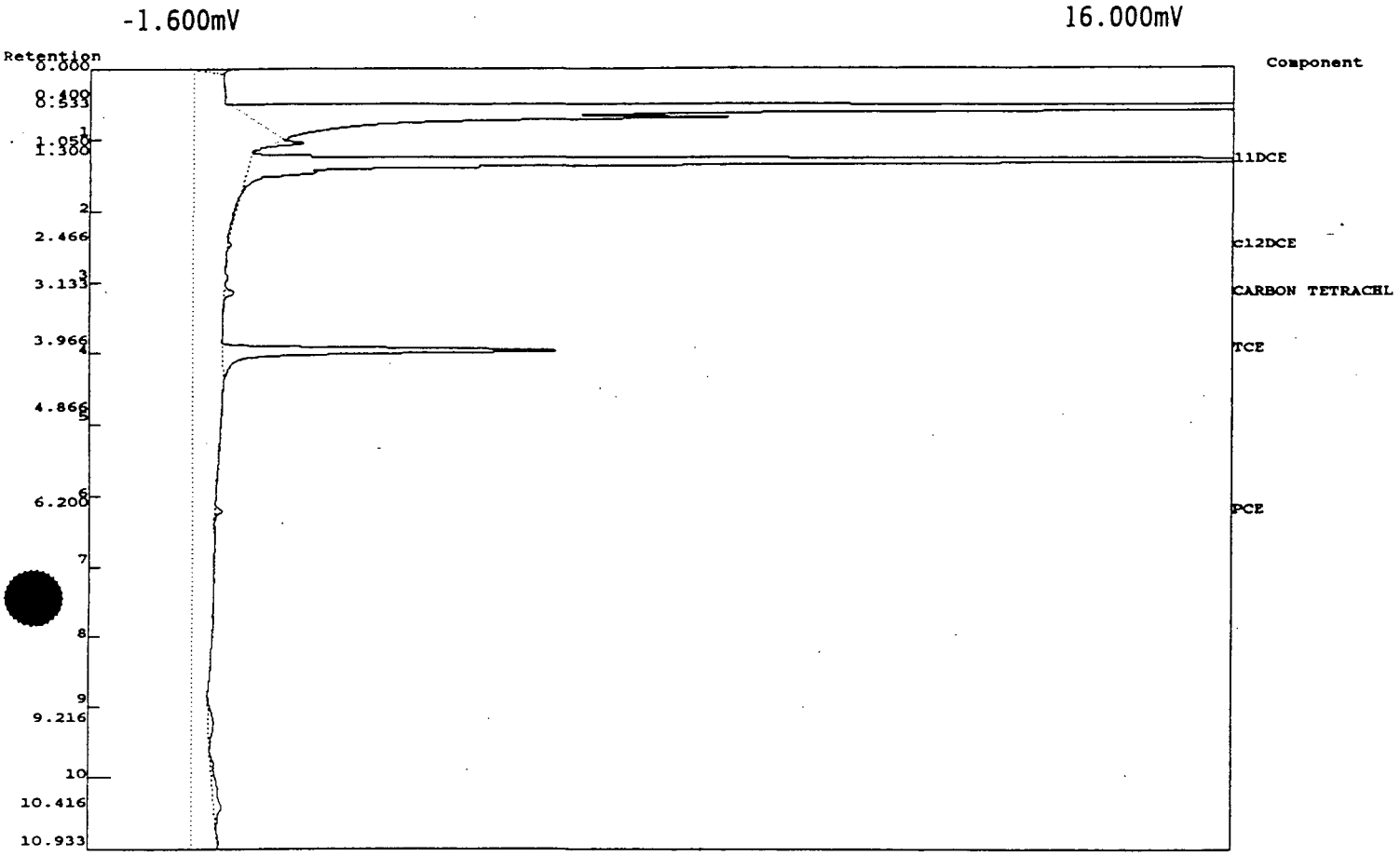
Component	Number	Retention	Area	External	Units
11DCE	1	1.300	131.83 M	17.83	ug/L
CARBON TETRACHLORIDE	8	3.150	1.00	0.00	ug/L
TCE	9	3.983	24.35 M	0.30	ug/L
PCE	11	6.216	0.57 M	0.00	ug/L
	4		157.75	18.13	

Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 17:10:09
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E30.CHR (A:\)
Sample : SG-231 (1000X)
Operator : SGN



Component	Number	Retention	Area	External	Units
1DCE	1	1.316	117.52 M	15.90	ug/L
12DCE	5	2.483	1.12 M	2.56	ug/L
ARBON TETRACHLORIDE	8	3.150	0.34 M	0.00	ug/L
CE	9	3.966	249.44 M	3.07	ug/L
CE	11	6.216	1.07 M	0.00	ug/L
	5		369.49	21.53	

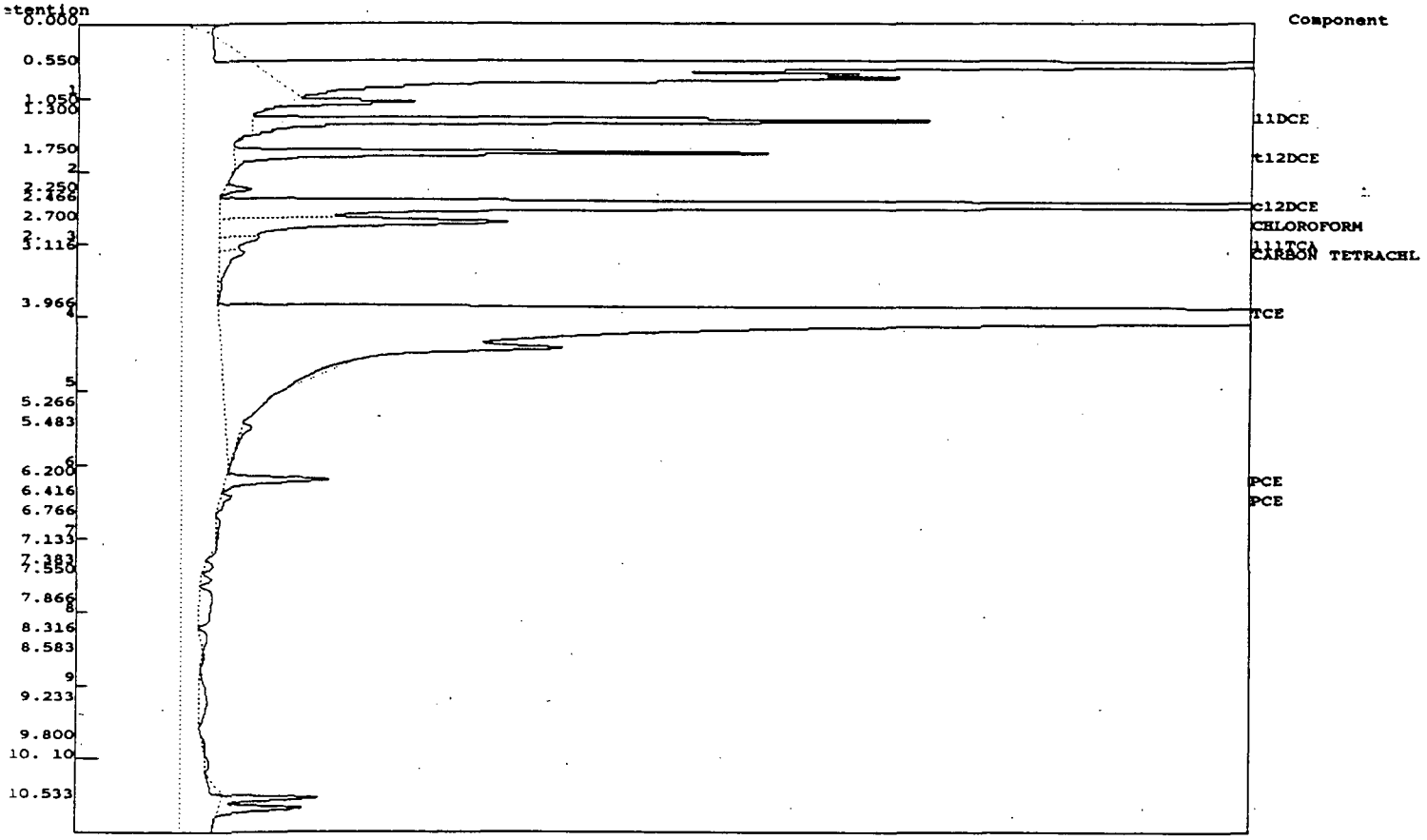
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 17:29:10
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E31.CHR (A:\)
Sample : SG-233 (1000X)
Operator : SGN



Component	Number	Retention	Area	External	Units
11DCE	1	1.300	115.77	15.66	ug/L
c12DCE	5	2.466	0.28	0.65	ug/L
CARBON TETRACHLORIDE	8	3.133	0.91	0.00	ug/L
TCE	9	3.966	30.82 M	0.38	ug/L
PCE	11	6.200	0.73 M	0.00	ug/L
	5		148.51	16.69	

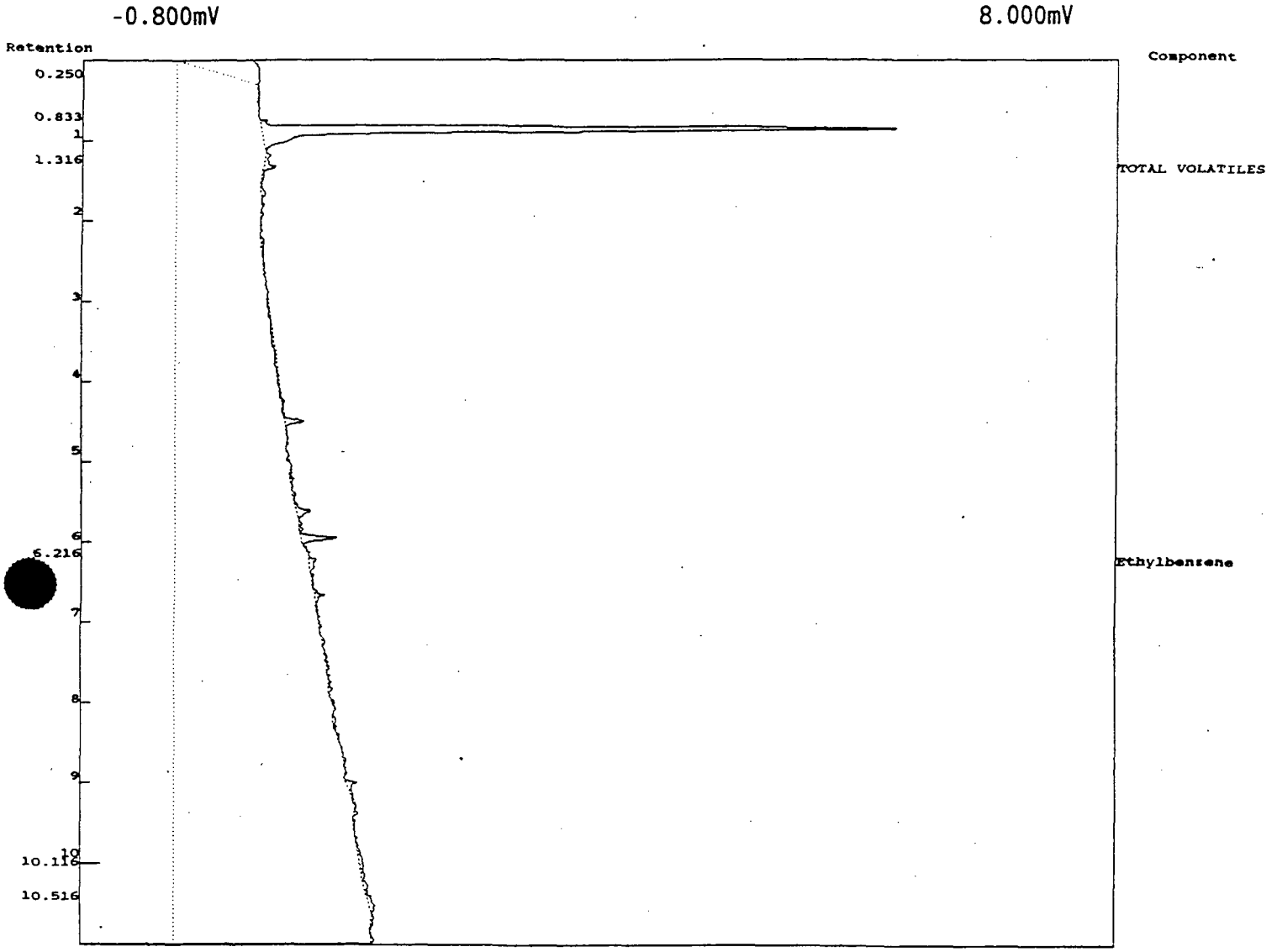
Lab name : COLUMBIA TECH
Analysis date : 06/06/2000 17:48:11
Method : 8010
Description : ECD - CHANNEL 2
Data file : JUN06E32.CHR (A:\)
Sample : SG-232-R
Operator : SGN

-1.600mV 16.000mV



Component	Number	Retention	Area	External	Units
DCE	1	1.300	50.86 M	6.88	ug/L
2DCE	3	1.750	34.78 M	59.05	ug/L
2DCE	5	2.466	181.07 M	413.40	ug/L
LOROFORM	6	2.700	33.90 M	0.51	ug/L
1TCA	7	2.916	5.40 M	0.03	ug/L
RBON TETRACHLORIDE	8	3.116	5.79 M	0.00	ug/L
E	9	3.966	1935.85 M	23.83	ug/L
E	11	6.200	8.71	0.03	ug/L
E	11	6.416	1.39	0.01	ug/L
	9		2257.75	503.74	

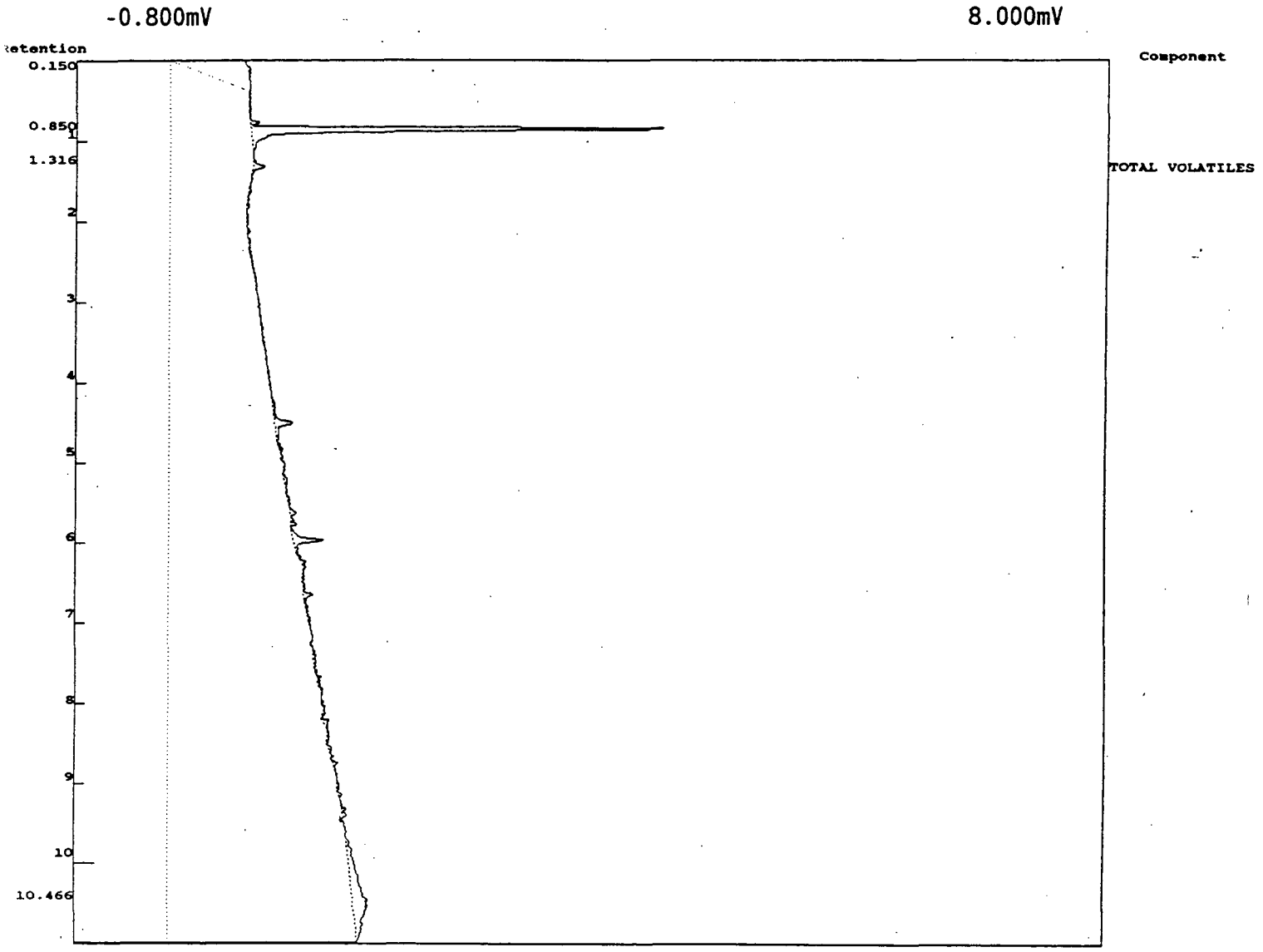
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F6.CHR (A:\)
Sample : SG-160-R
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	3.30	3.30	ug/L
Ethylbenzene	4	6.216	0.40 M	0.47	ug/L
	2		3.70	3.77	

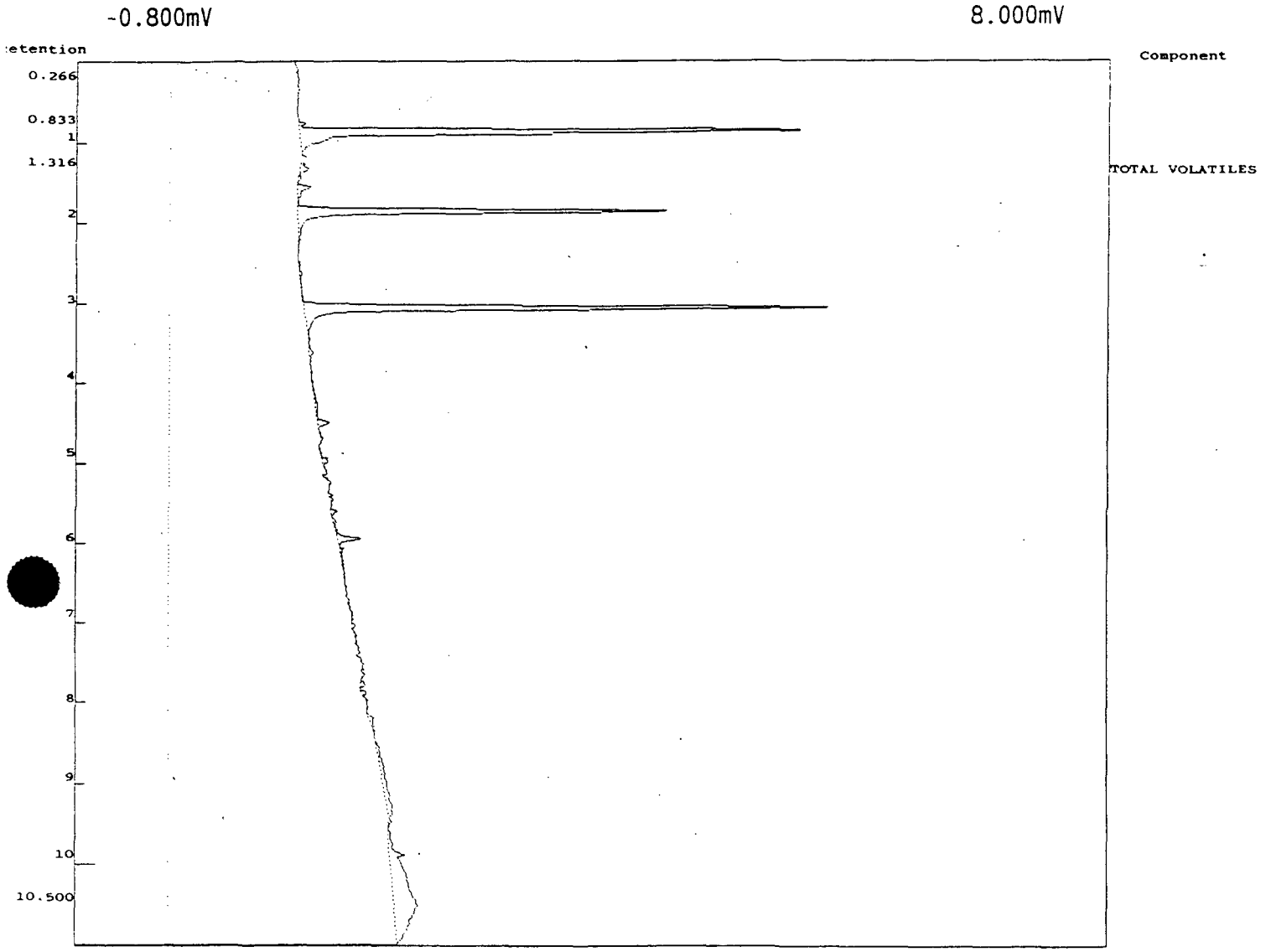
300972

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F7.CHR (A:\)
Sample : EB-30
Operator : SGN



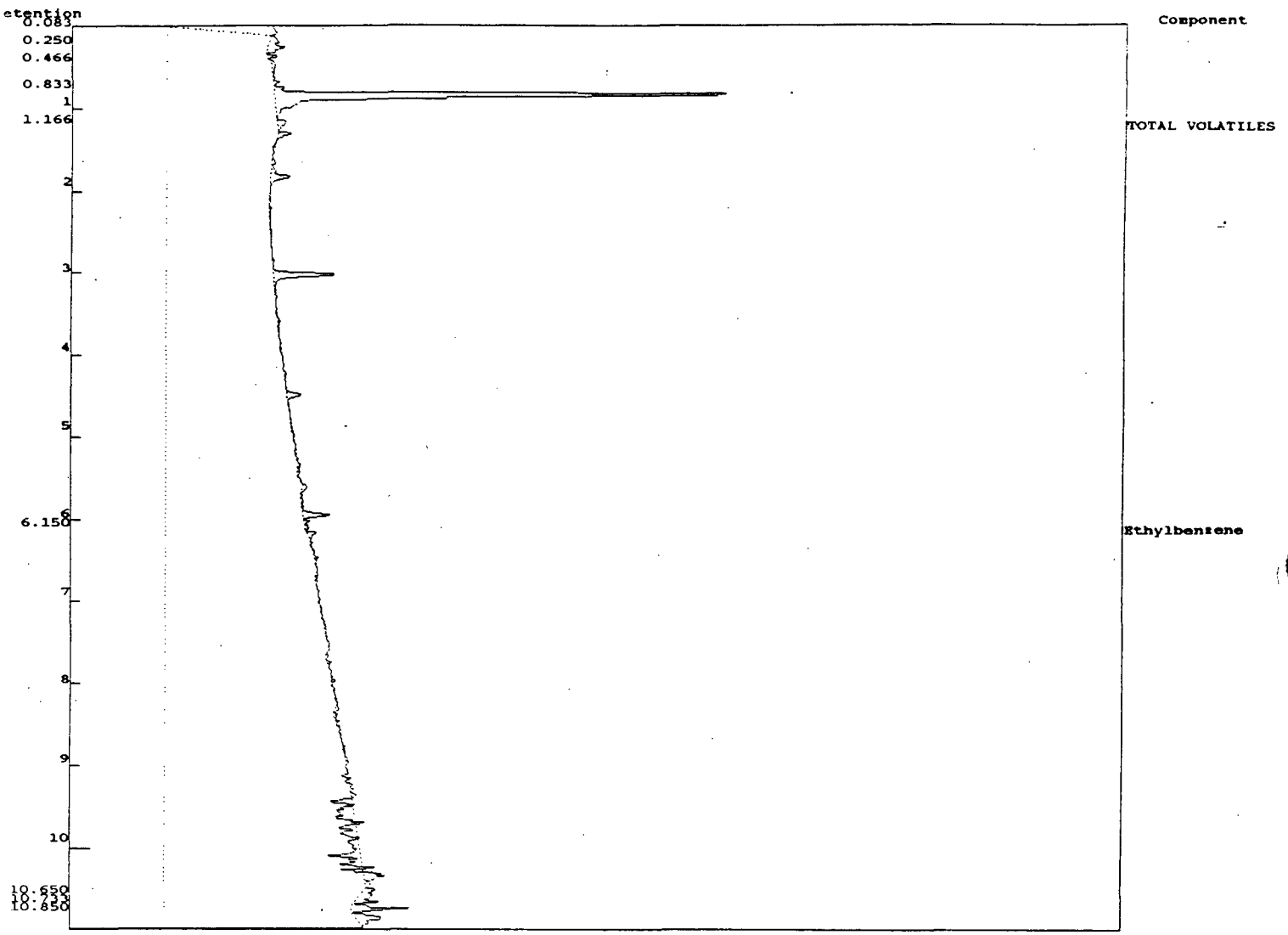
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.316	3.63 M	3.63	ug/L
1			3.63	3.63	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F10.CHR (A:\)
Sample : SG-219
Operator : SGN



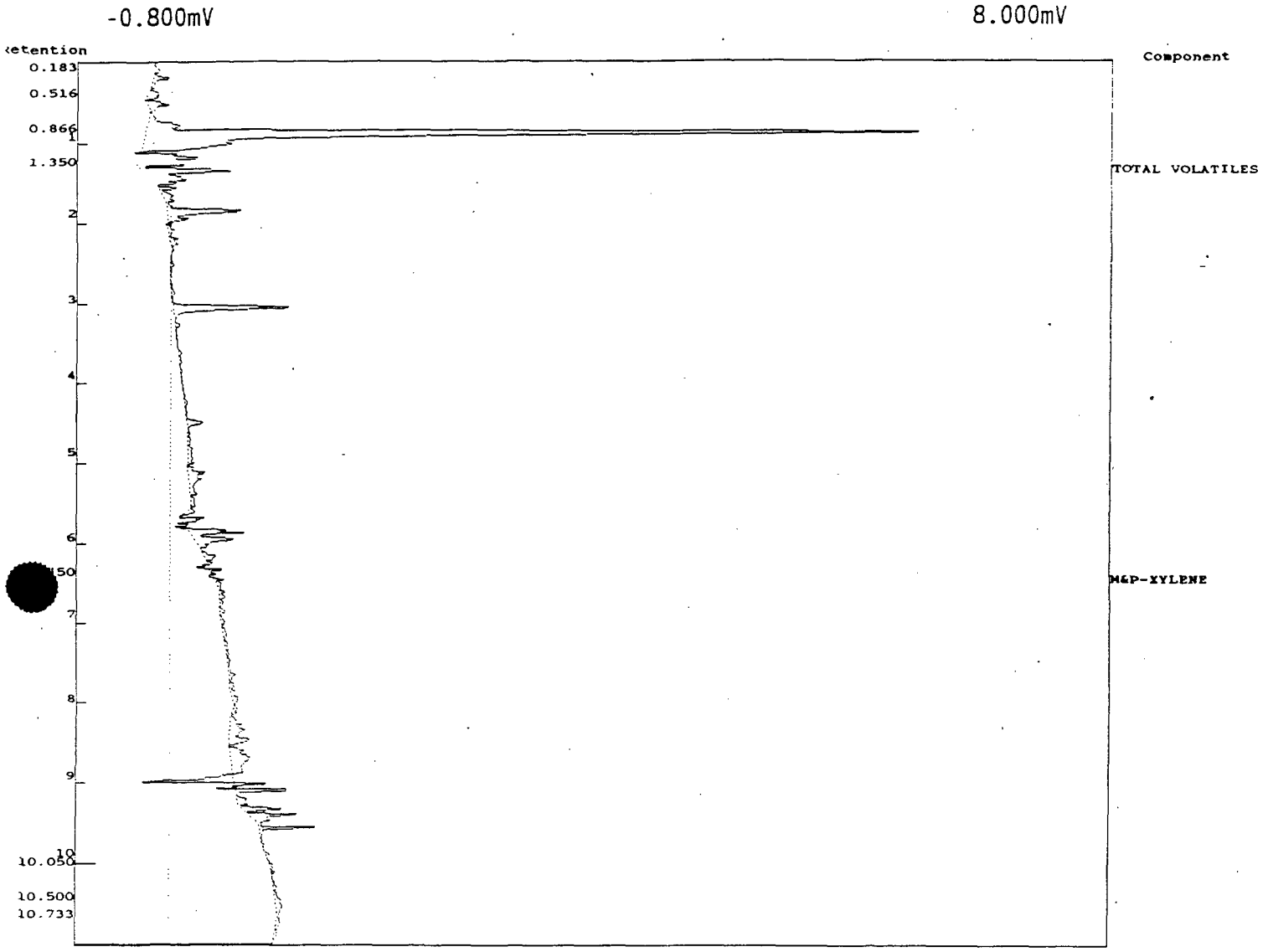
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	32.52	32.52	ug/L
	1		32.52	32.52	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F11.CHR (A:\)
Sample : SG-223
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.166	4.96	4.96	ug/L
hylbenzene	4	6.150	0.24 M	0.29	ug/L
	2		5.21	5.25	

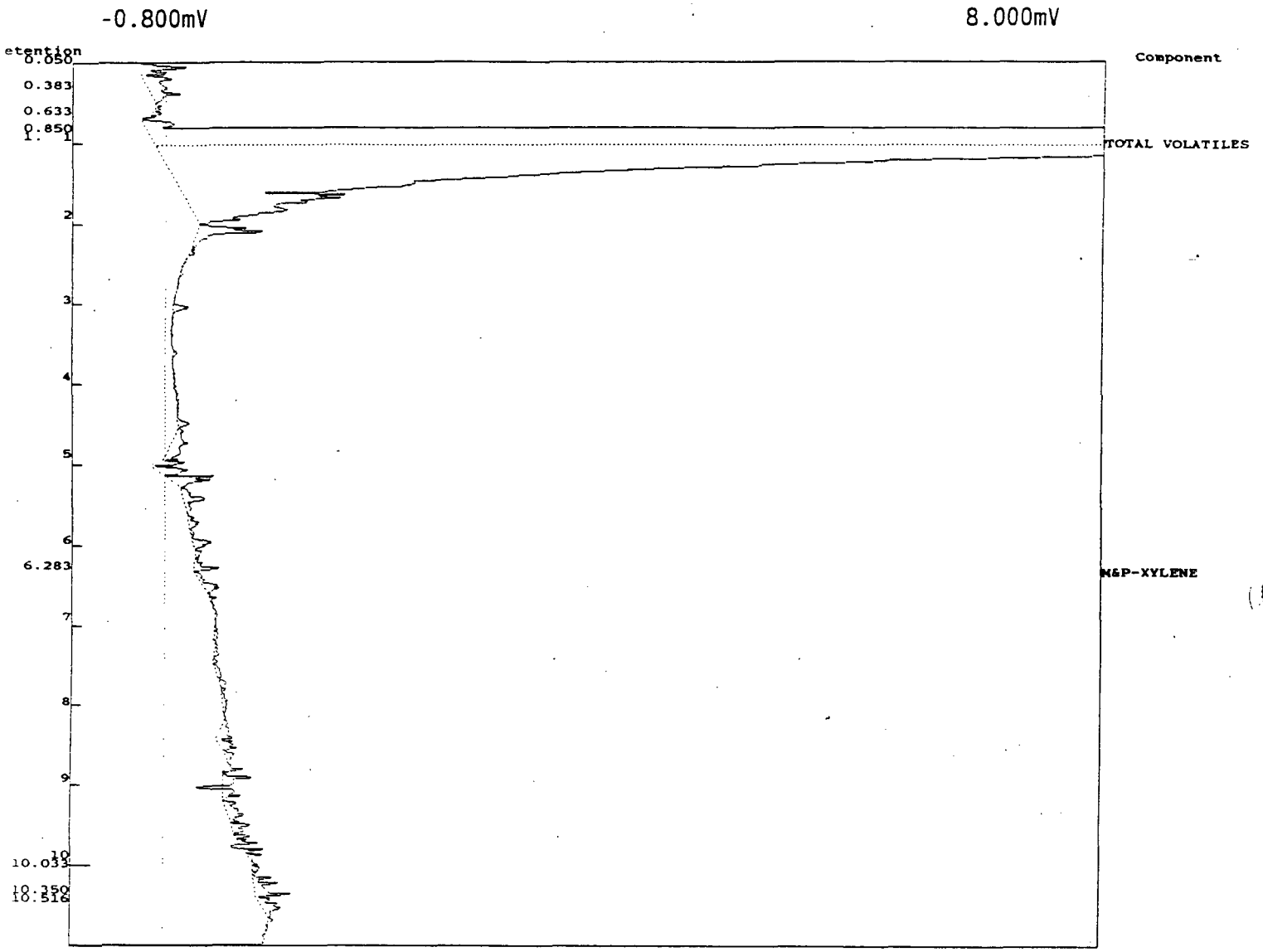
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F12.CHR (A:\)
Sample : SG-224
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.350	25.81 M	25.81	ug/L
M&P-XYLENE	5	6.450	0.61 M	0.76	ug/L
	2		26.42	26.57	

300976

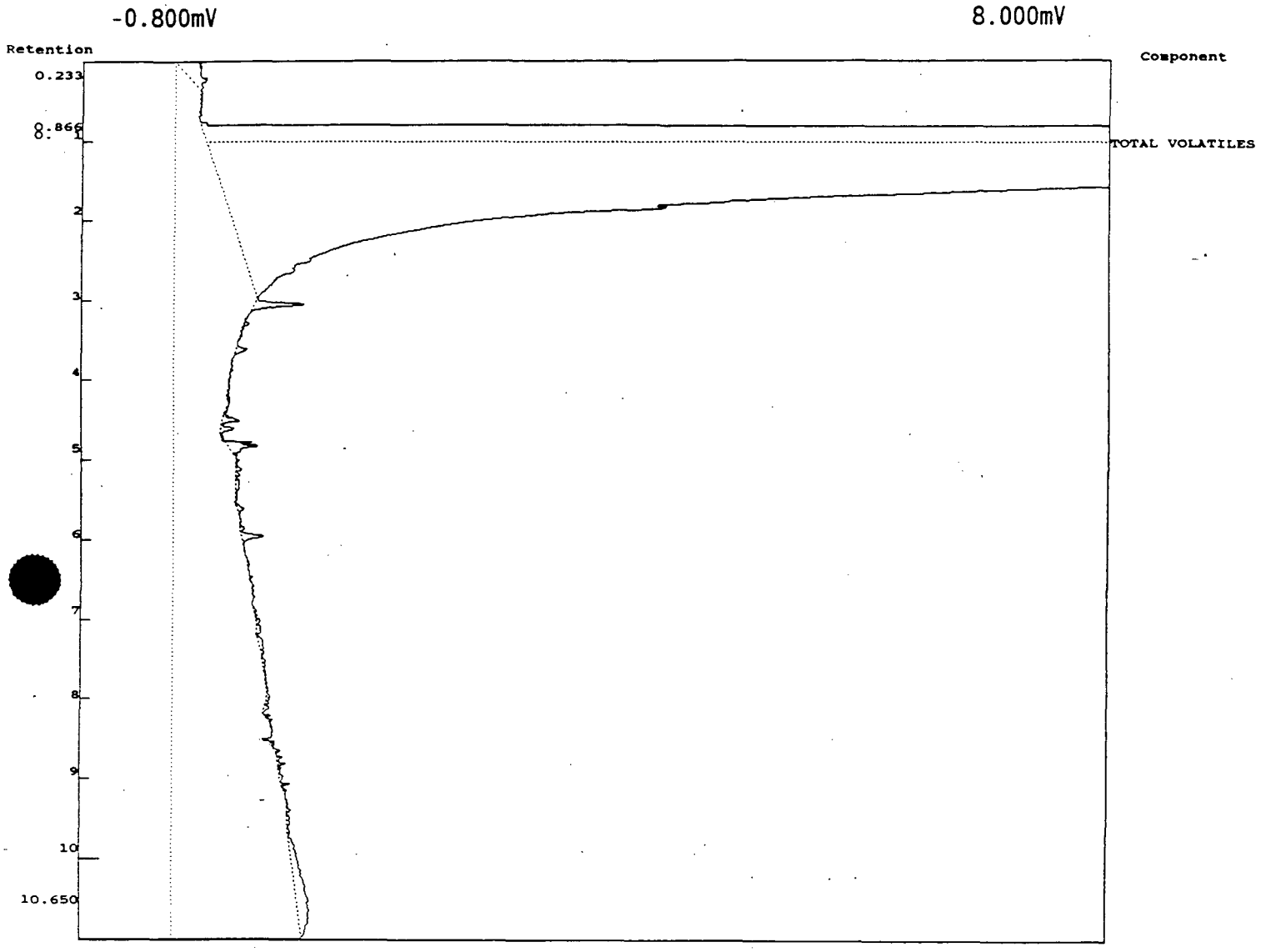
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F13.CHR (A:\)
Sample : SG-225
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.000	260.36 M	260.36	ug/L
P-XYLENE	5	6.283	0.73 M	0.91	ug/L
	2		261.08	261.27	

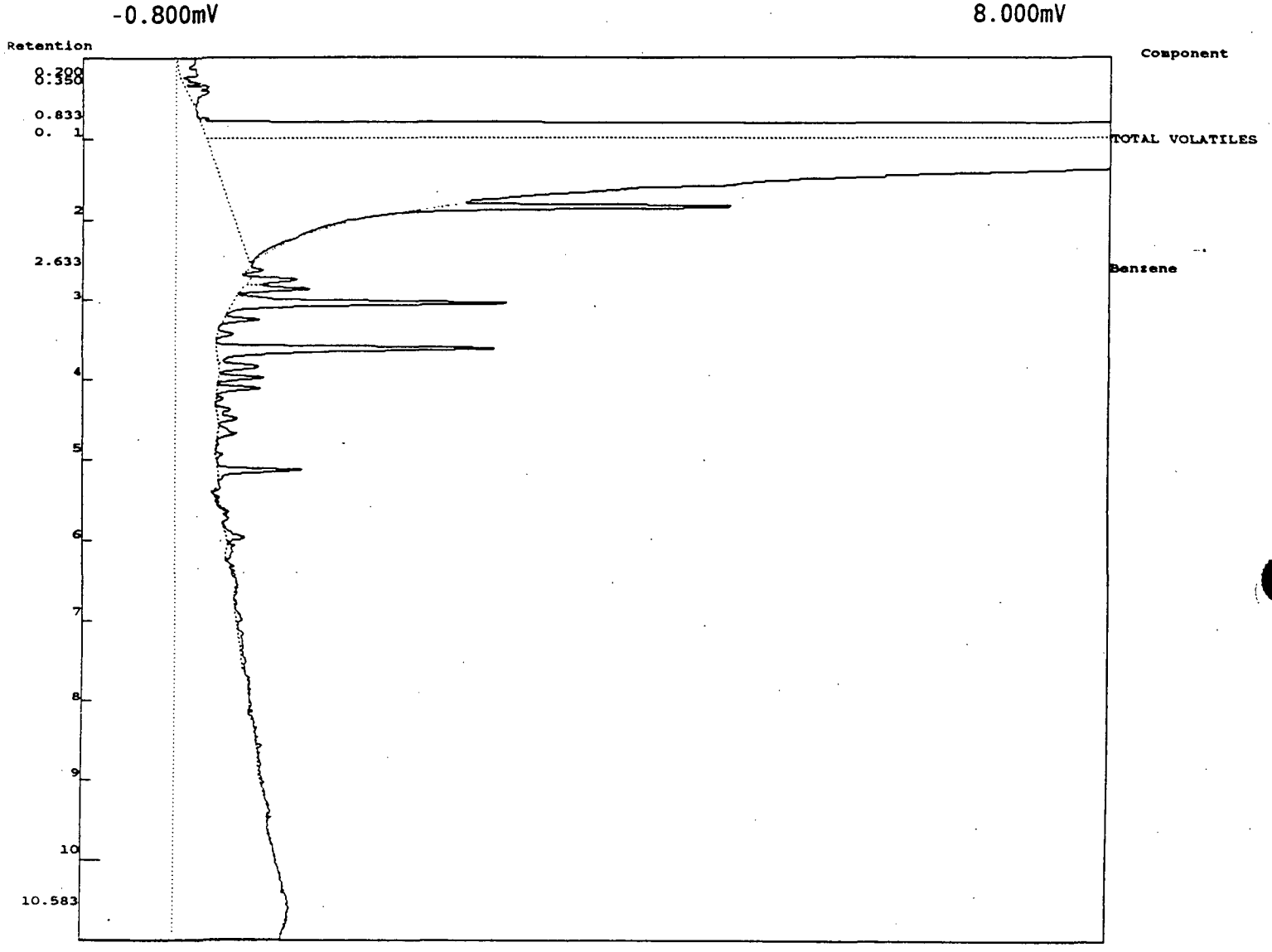
300977

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F14.CHR (A:\)
Sample : SG-226
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	1162.57 M	1162.57	ug/L
	1		1162.57	1162.57	

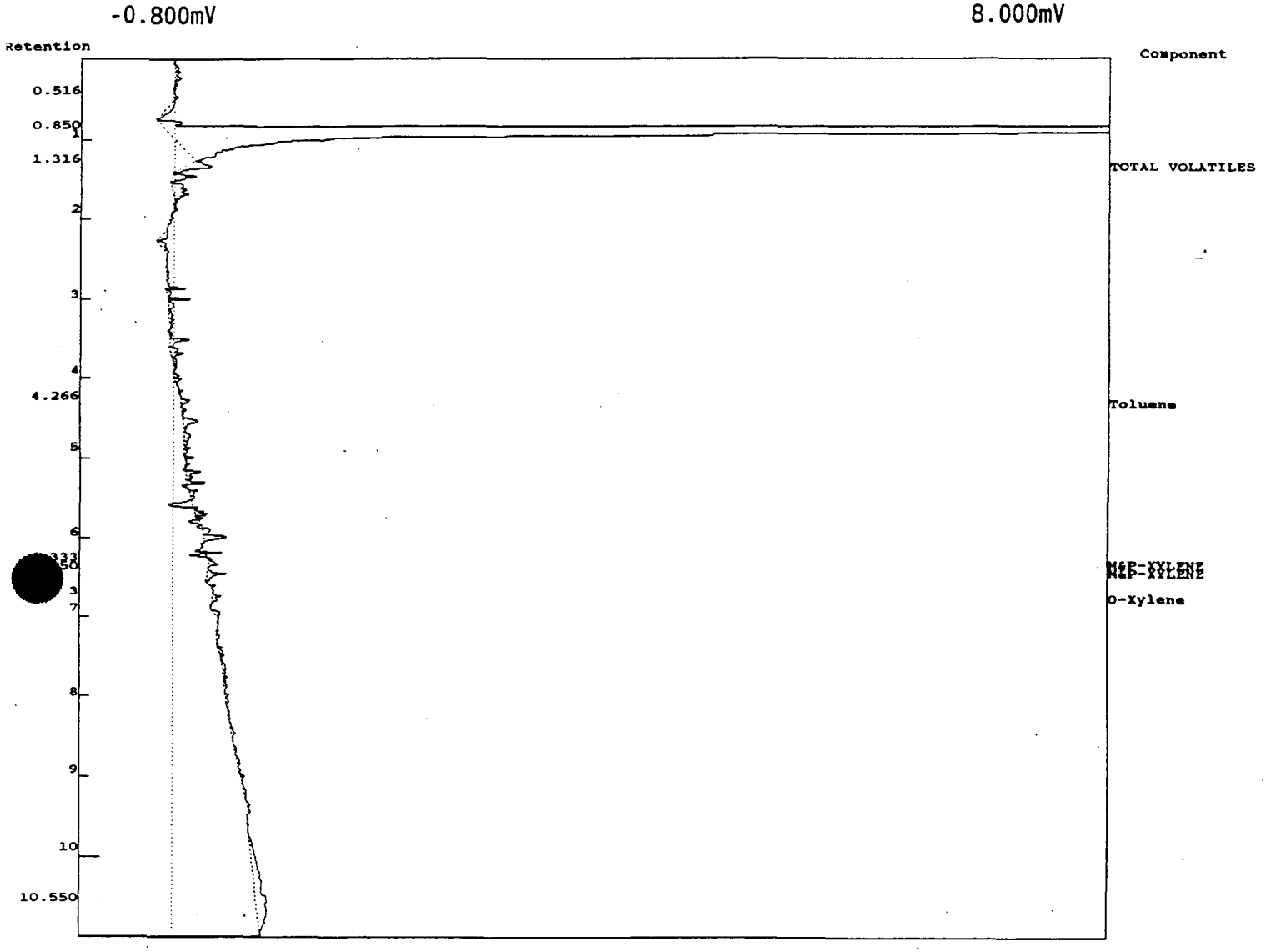
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F15.CHR (A:\)
Sample : SG-227
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	698.07 M	698.07	ug/L
enzene	2	2.633	0.43 M	0.36	ug/L
	2		698.50	698.43	

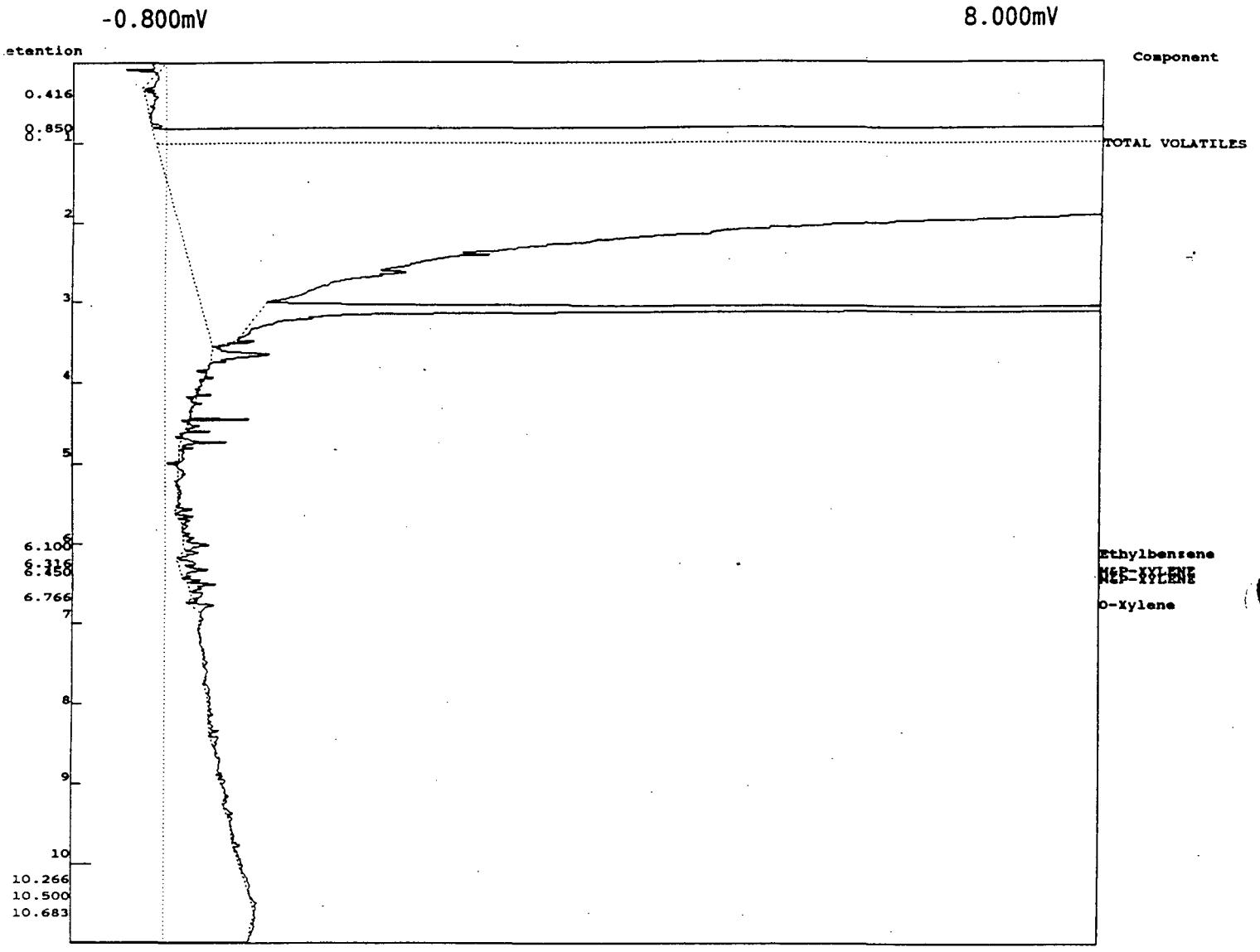
300979

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F16.CHR (A:\)
Sample : SG-228
Operator : SGN



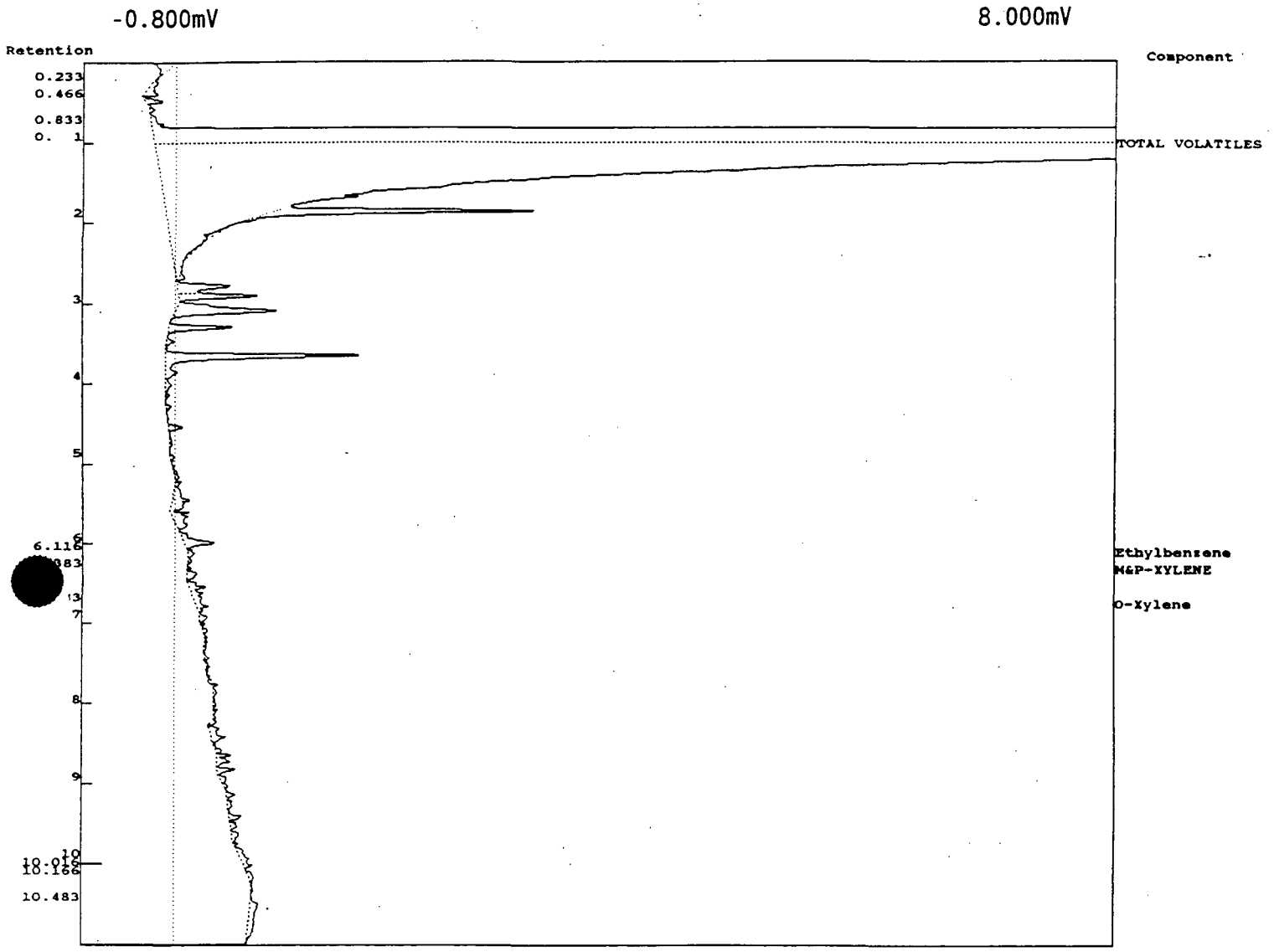
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.316	9.47 M	9.47	ug/L
Toluene	3	4.266	0.20 M	0.20	ug/L
M&P-XYLENE	5	6.333	0.22 M	0.28	ug/L
M&P-XYLENE	5	6.450	0.48 M	0.60	ug/L
O-Xylene	6	6.733	0.20 M	0.25	ug/L
	5		10.58	10.80	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F17.CHR (A:\)
Sample : SG-229
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	3257.90 M	3257.90	ug/L
thylbenzene	4	6.100	0.45	0.53	ug/L
&P-XYLENE	5	6.316	1.42	1.77	ug/L
&P-XYLENE	5	6.450	0.20	0.25	ug/L
-Xylene	6	6.766	0.67	0.81	ug/L
	5		3260.64	3261.27	

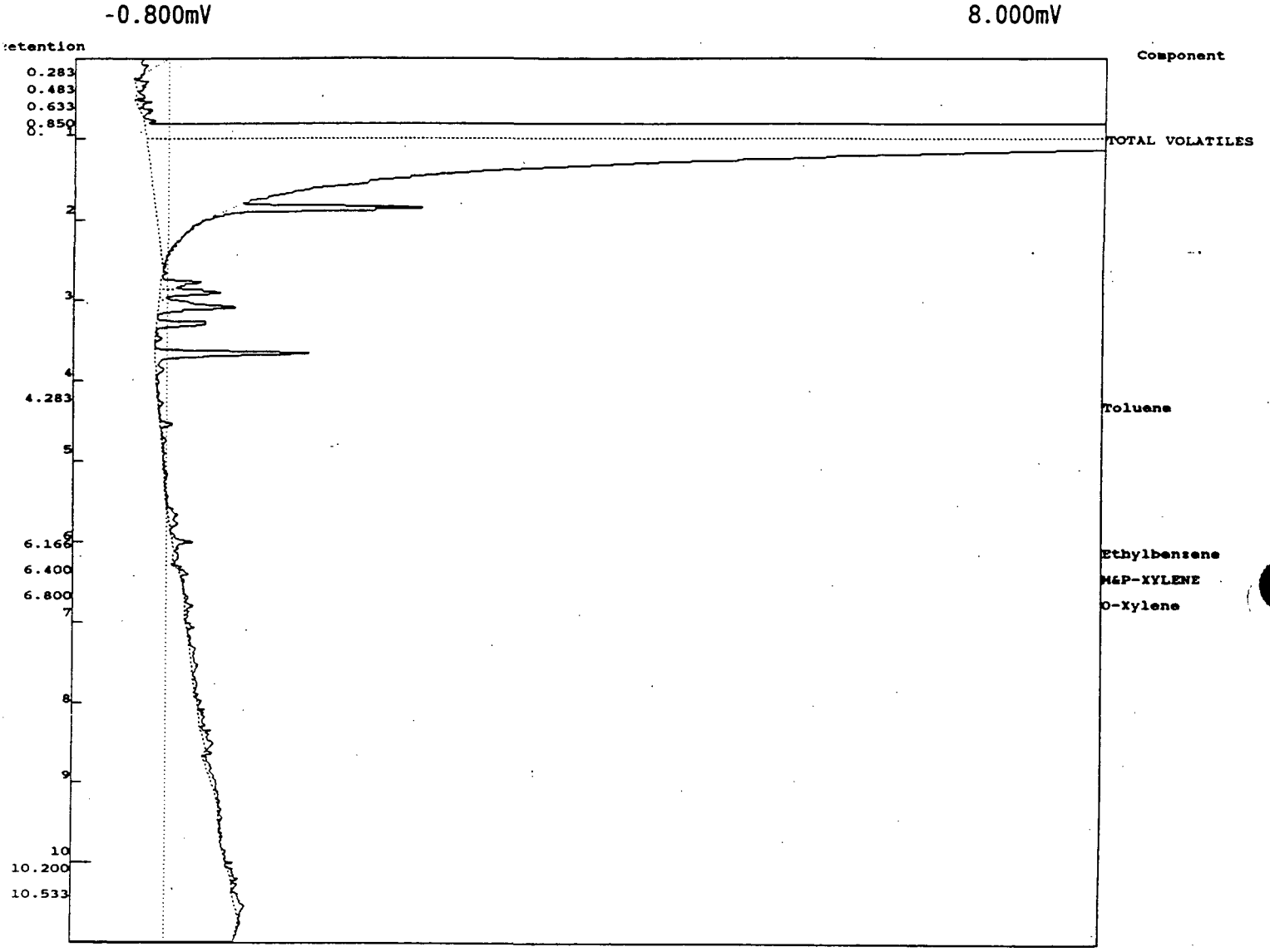
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F18.CHR (A:\)
Sample : SG-230
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	385.89 M	385.89	ug/L
Ethylbenzene	4	6.116	0.24	0.28	ug/L
M&P-XYLENE	5	6.383	0.43	0.54	ug/L
O-Xylene	6	6.783	1.45	1.77	ug/L
	4		388.01	388.48	

300982

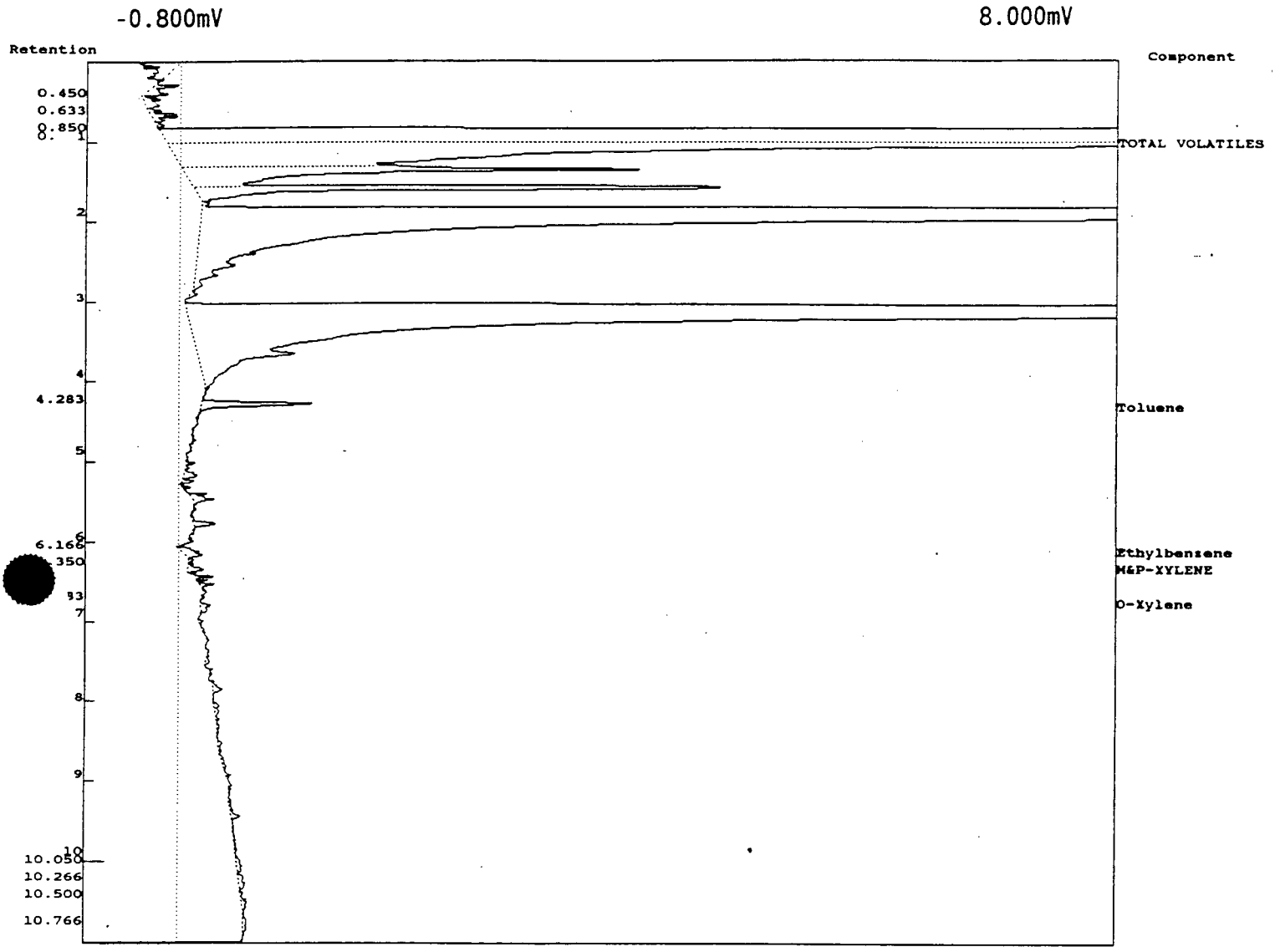
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F19.CHR (A:\)
Sample : SG-730
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	293.65 M	293.65	ug/L
oluene	3	4.283	0.20	0.20	ug/L
thylbenzene	4	6.166	0.32	0.37	ug/L
&P-XYLENE	5	6.400	0.22	0.27	ug/L
-Xylene	6	6.800	0.34	0.42	ug/L
	5		294.73	294.92	

300983

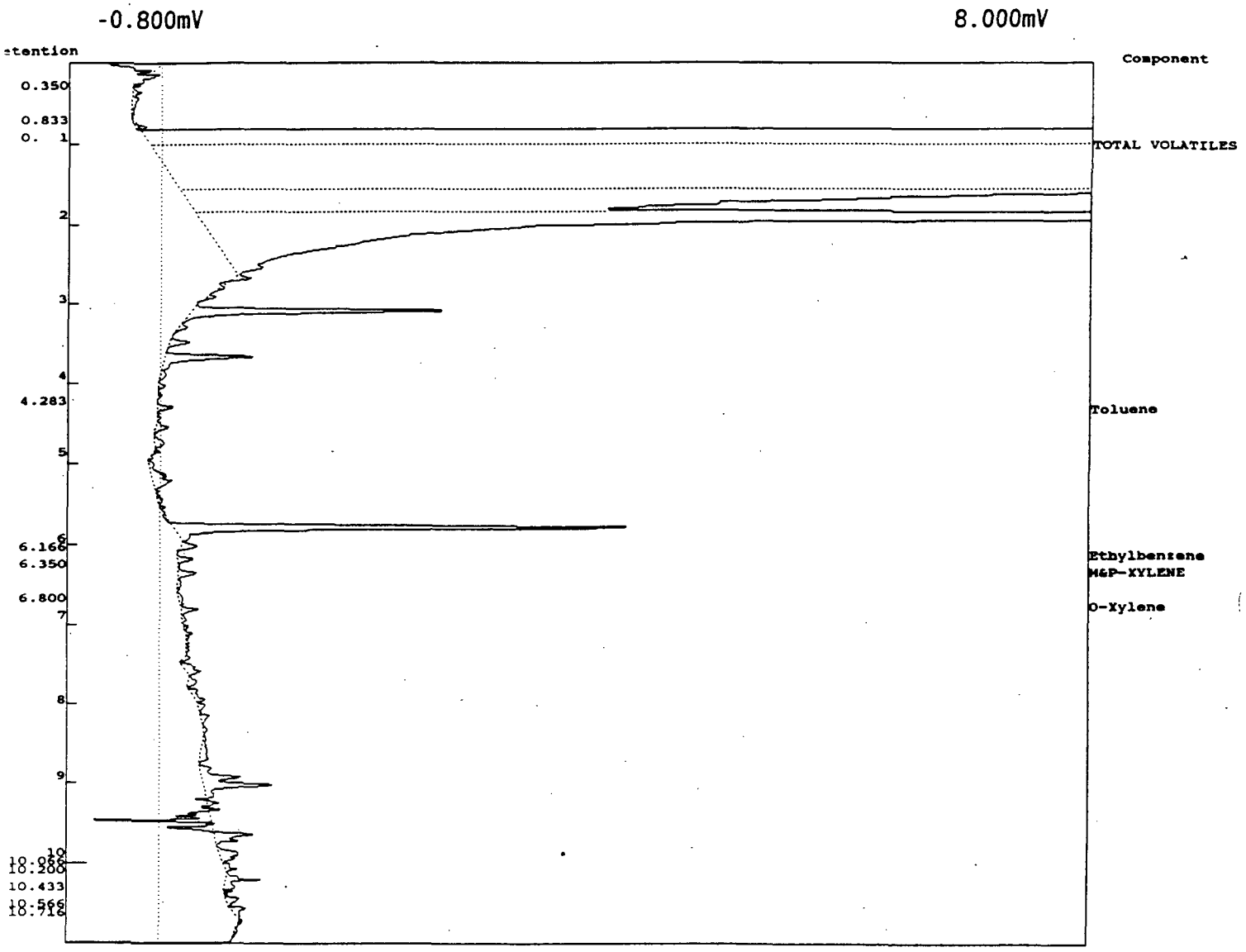
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F20.CHR (A:\)
Sample : SG-231
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	0.983	2298.36 M	2298.36	ug/L
Toluene	3	4.283	3.10 M	3.10	ug/L
Ethylbenzene	4	6.166	0.78 M	0.92	ug/L
M&P-XYLENE	5	6.350	0.50 M	0.63	ug/L
O-Xylene	6	6.783	0.34 M	0.41	ug/L
	5		2303.08	2303.42	

300984

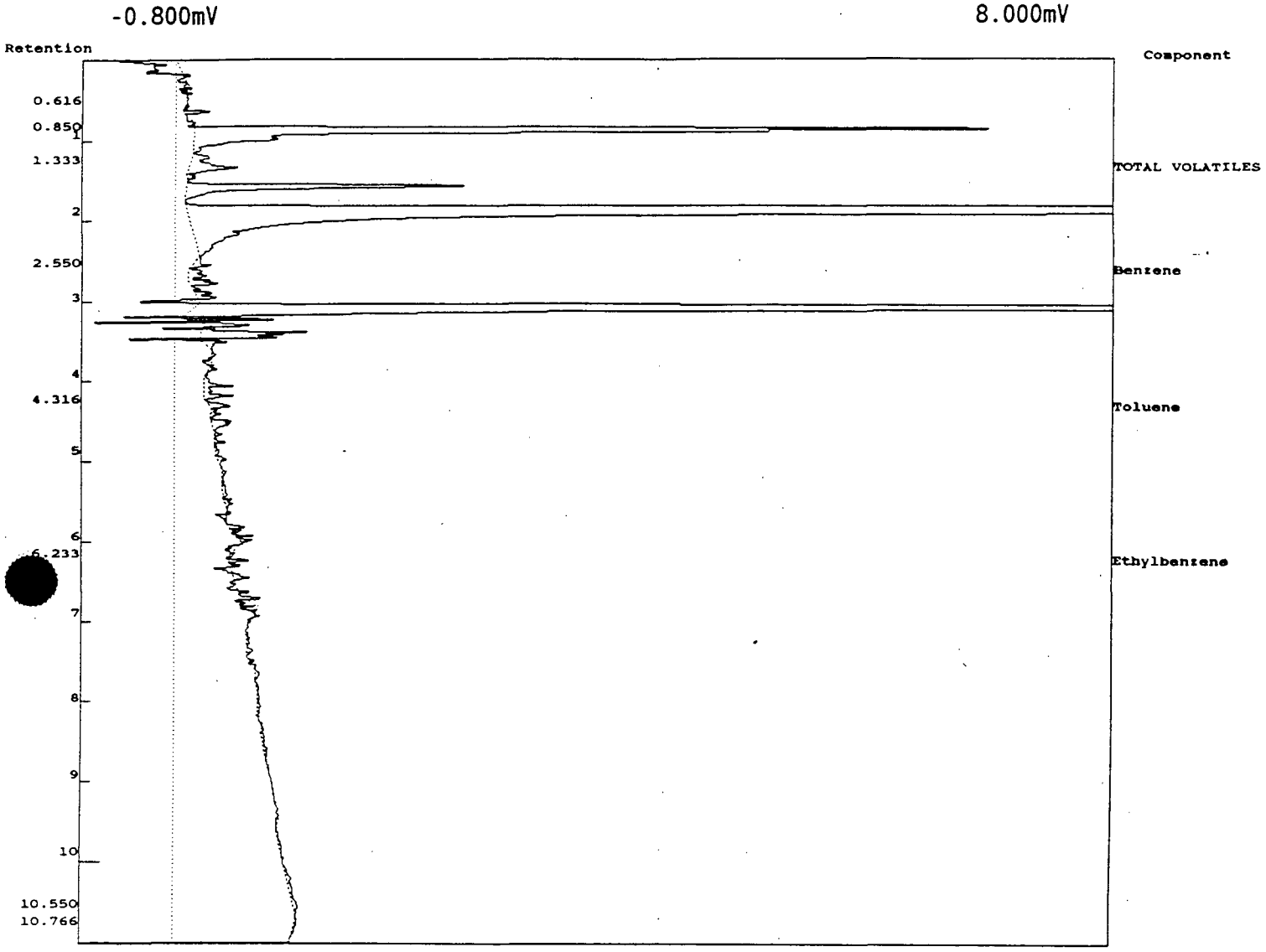
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F21.CHR (A:\)
Sample : SG-232
Operator : SGN



Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	0.983	1922.56 M	1922.56	ug/L
oluene	3	4.283	0.52	0.52	ug/L
thylbenzene	4	6.166	0.43	0.50	ug/L
&P-XYLENE	5	6.350	0.80	1.00	ug/L
-Xylene	6	6.733	0.22	0.27	ug/L
-Xylene	6	6.800	0.42	0.51	ug/L
	6		1924.95	1925.36	

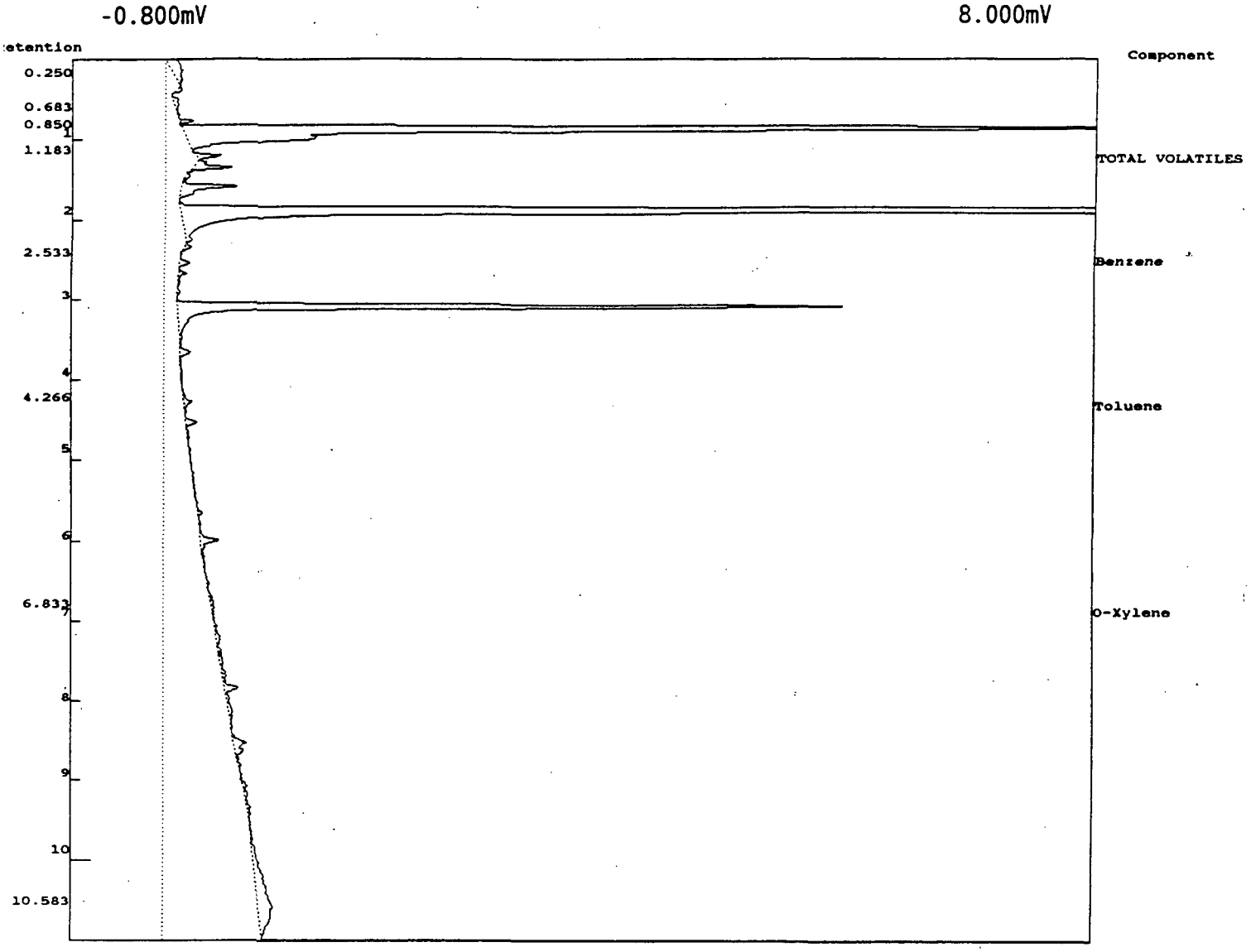
300985

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F22.CHR (A:\)
Sample : SG-233
Operator : SGN



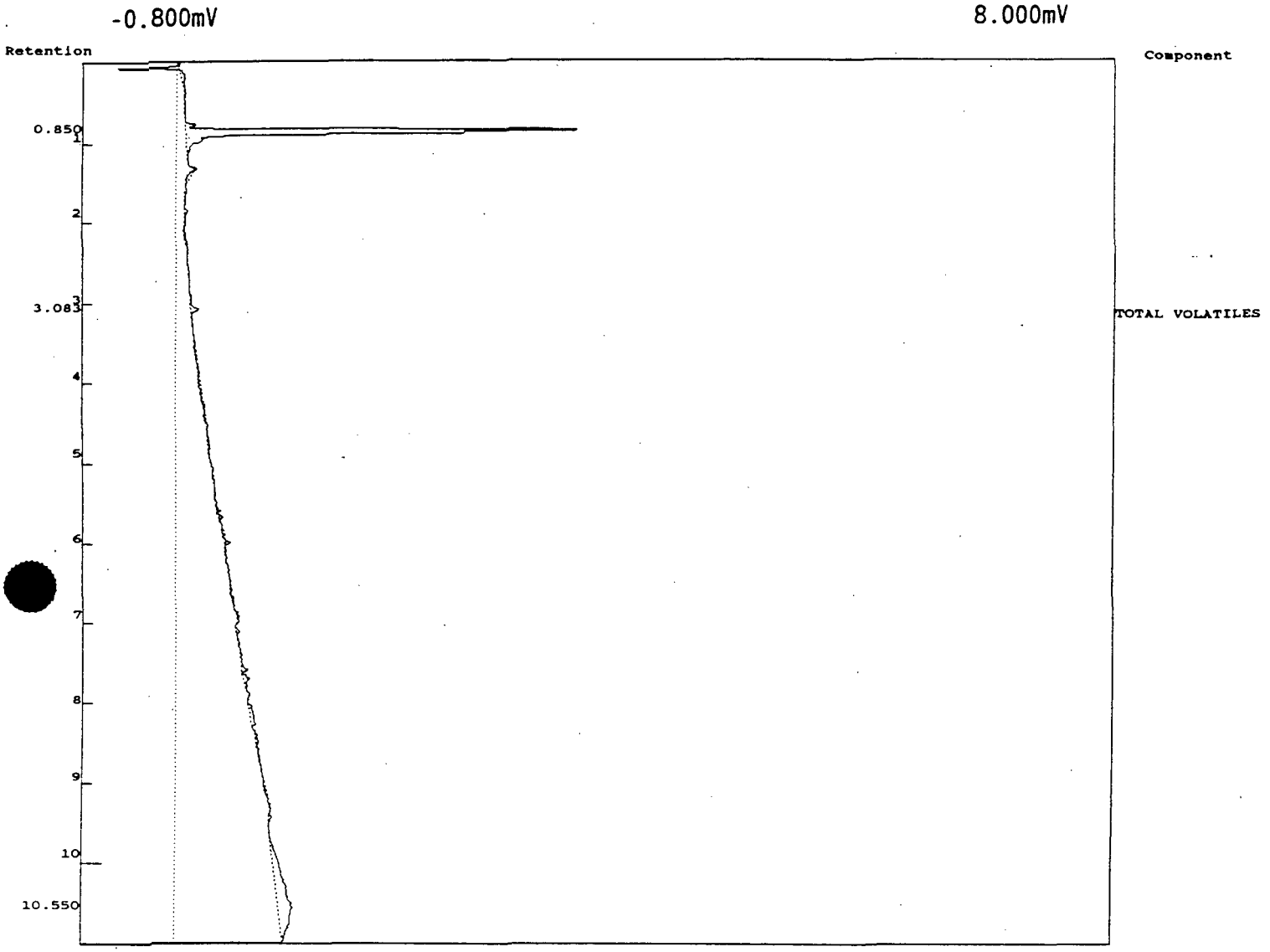
Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.333	339.84 M	339.84	ug/L
Benzene	2	2.550	0.53 M	0.45	ug/L
Toluene	3	4.316	0.53 M	0.53	ug/L
Ethylbenzene	4	6.233	0.48 M	0.56	ug/L
	4		341.39	341.38	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F23.CHR (A:\)
Sample : SG-234
Operator : SGN



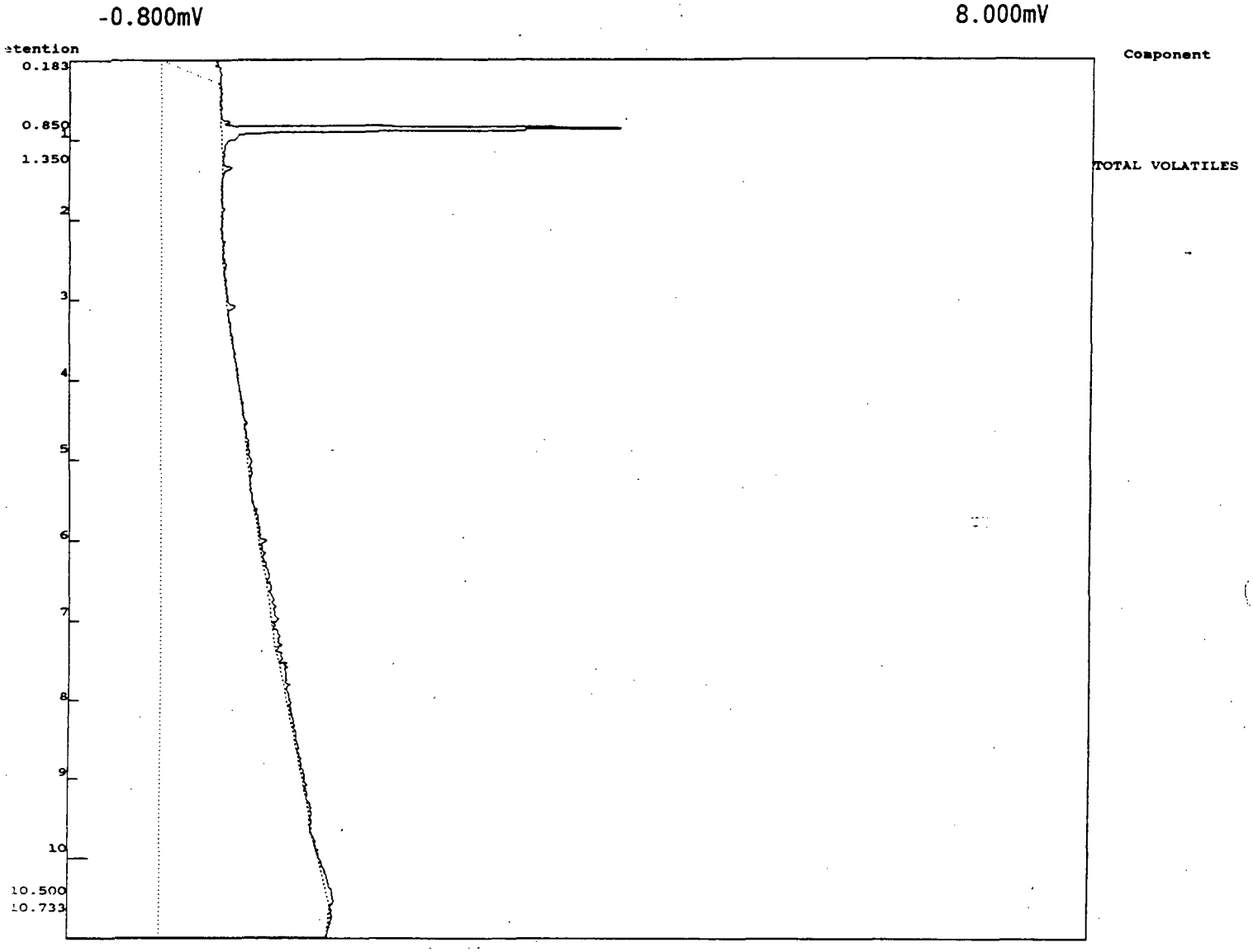
Component	Number	Retention	Area	External	Units
OTAL VOLATILES	1	1.183	101.62	101.62	ug/L
enzene	2	2.533	0.30	0.26	ug/L
oluene	3	4.266	0.40	0.40	ug/L
-Xylene	6	6.833	0.25	0.31	ug/L
	4		102.58	102.58	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F24.CHR (A:\)
Sample : EB-31
Operator : SGN



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	3.083	1.32	1.32	ug/L
	1		1.32	1.32	

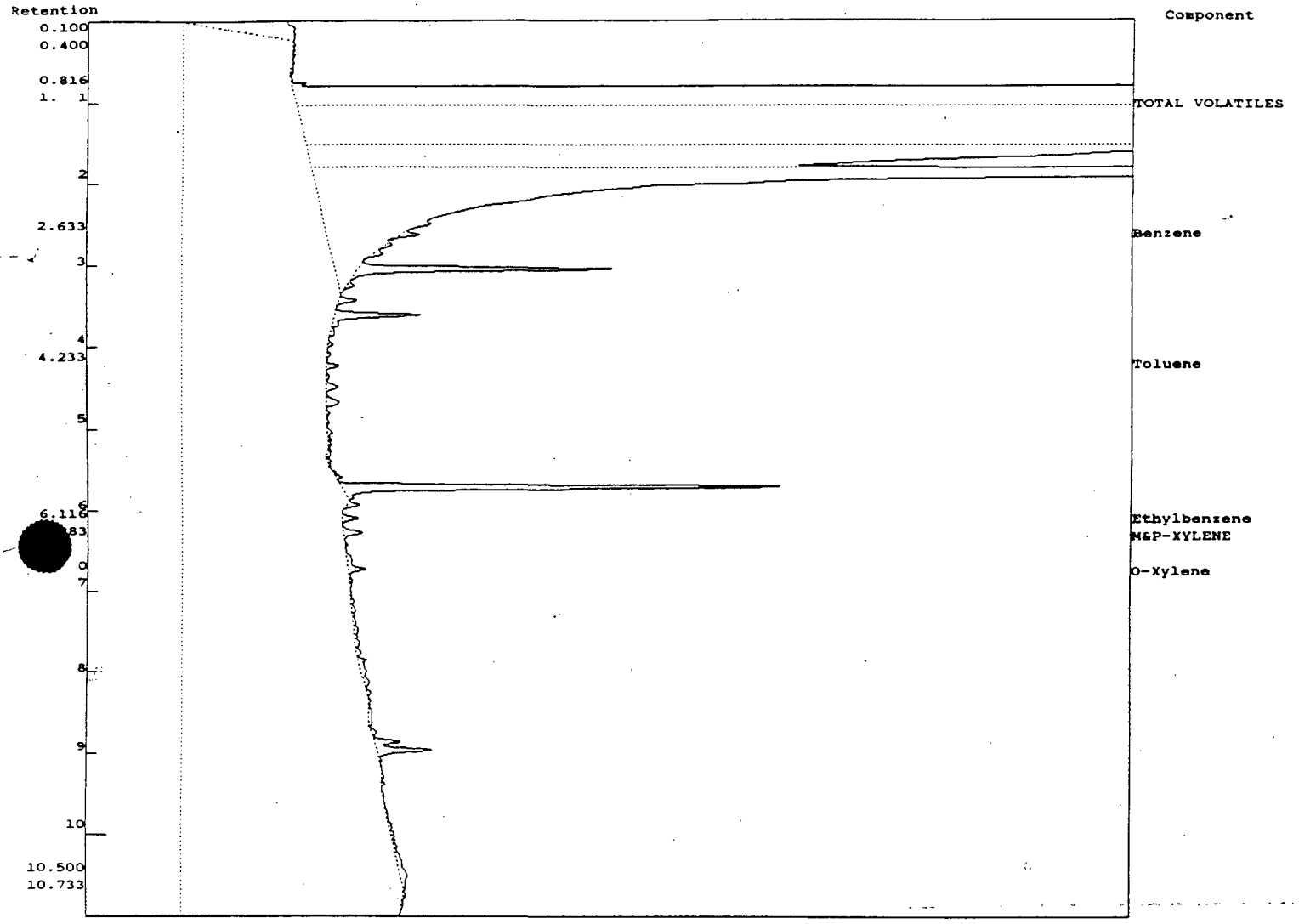
Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F25.CHR (A:\)
Sample : EB-31-R
Operator : SGN



Component	Number	Retention	Area	External	Units
TAL VOLATILES	1	1.350	7.18	7.18	ug/L
	1		7.18	7.18	

Lab name : WINNIE
Description : FID - Channel 1
Data file : JUN06F32.CHR (A:\)
Sample : SG-232-R
Operator : SGN

-0.800mV 8.000mV



Component	Number	Retention	Area	External	Units
TOTAL VOLATILES	1	1.000	1460.08 M	1460.08	ug/L
Benzene	2	2.633	0.89 M	0.75	ug/L
Toluene	3	4.233	0.33	0.33	ug/L
Ethylbenzene	4	6.116	0.48	0.56	ug/L
M&P-XYLENE	5	6.283	0.64	0.79	ug/L
O-Xylene	6	6.750	1.00	1.23	ug/L
	6		1463.42	1463.74	

300990