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DIV OF HAZARDOUS WASTE MANAGEMENT

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

RCRAInfo CM&E EVALUATION – VIOLATION FORM

*EPA ID Number	PAD980550594	EIN	
Handler Name	Sunoco, Inc. (Marcus Hook Refinery)		
Street	Delaware Ave. at Green St.		
City	Marcus Hook	State: PA	Zip Code: 19061

Actual Generator Status (Check only if different from Notified Status): LQG ☐ SQG ☐ CESQG ☐ Closed ☒ Non-Handler ☐

Universe Change Required? (Generator Status Change Required): YES ☐ NO ☒ If YES, complete the Universe Change Section (on reverse side of this form)

RCRA Non-Notifier? YES ☐ NO ☒ If YES, complete the Handler Section (on reverse side of this form)

Other Facility Information Changes? YES ☐ NO ☒ If YES, complete the Handler Section (on reverse side of this form)

***EVALUATION** ☐ Add ☒ Update ☐ Delete — *You must provide an Evaluation Identifier (also known as the Sequence Number).*

*Evaluation Identifier	*Type	*Evaluation Start Date (mm/dd/yy)	*Agency	Responsible Person	Suborganization
U	GME	06/01/16	S	PAJAW	

Day Zero (mm/dd/yyyy): 06/01/2016

You need to specify Day Zero for all evaluation types except CDI, CSE, FUI, SNY, and SNN, otherwise it defaults to Evaluation Start Date. For CDI, CSE, FUI, and SNY evaluations, you must select a previous CEI Start Date for the Day Zero. SNN evaluation type does not require a Day Zero.

Reclassified SV Date: *Only applicable for SNY evaluation type as appropriate*

Notes:

Evaluation Indicator Field (Check all that apply)

☐ Citizen Complaint ☐ Multimedia Inspection ☒ Sampling ☐ Not Subtitle C

Focused Coverage Areas (Use Only for Evaluation Type FCI)

Regulation-Specific FCI

BIF ☐ CCI ☐ CFI ☐ INC ☐ LDR ☐ PTB ☐ PTX ☐
THI ☐ UIC ☐ UOI ☐ UWR ☐ OTHER (specify):

Routine/Standardized FCI

CAR ☐ CPC ☐ DOS ☐ EMR ☐ IEI ☐ ISI ☐ RTI ☐

Does this Evaluation Add/Update/Delete a Violation?	YES ☐ NO ☒	*If Yes, fill in the Violations Section(s) on page 2 of this form.*
Does this Evaluation link to a Commitment?	YES ☐ NO ☒	*If Yes, please use the RCRAInfo 3007 Information Requests and Commitments Form.*
Does this Evaluation link to a 3007 Request?	YES ☐ NO ☒	*If Yes, please use the RCRAInfo 3007 Information Requests and Commitments Form.*

OUTSTANDING VIOLATIONS COVERED BY ABOVE EVALUATION? YES ☐ NO ☒ *If Yes, fill in information below.*

*Seq. No.	*Violation Type	*Agency	*Regulation Citation (Type + Citation) (ex. FR 262.1)	*Date Determined (mm/dd/yyyy)

*Required Fields

RCRAInfo CM&E EVALUATION – VIOLATION FORM

EPA ID Number	Handler Name

VIOLATIONS SECTION
(Additional Violations can be added/updated/deleted using the RCRAInfo CM&E Additional Violations Form)

VIOLATION ☐ Add ☐ Update ☐ Delete — **Link to Above Evaluation** ☐

Seq. No	*Violation Type*	*Agency*	*Determined Date (mm/dd/yyyy)*	*Return to Compliance (RTC) Qualifier*	*Actual RTC Date (mm/dd/yyyy)*
				☐ *A RTC Qualifier is required if entering an Actual RTC Date.*	

Notes:

LINK CITATIONS TO ABOVE VIOLATION? YES ☐ NO ☐ ***If Yes, fill in information below***

Citation Type	*Citation*	*Citation Type*	*Citation*

VIOLATION ☐ Add ☐ Update ☐ Delete — **Link to Above Evaluation** ☐

Seq. No	*Violation Type*	*Agency*	*Determined Date (mm/dd/yyyy)*	*Return to Compliance (RTC) Qualifier*	*Actual RTC Date (mm/dd/yyyy)*
				☐ *A RTC Qualifier is required if entering an Actual RTC Date*	

Notes:

LINK CITATIONS TO ABOVE VIOLATION? YES ☐ NO ☐ ***If Yes, fill in information below***

Citation Type	*Citation*	*Citation Type*	*Citation*

HANDLER SECTION ***(Fill out if RCRA Non-Notifier)***

Handler Name		**Contact**			
Street					
City		**State**		**Zip Code**	
County					

UNIVERSE CHANGE SECTION ***(Fill out if Universe Change Required)***

i. Indicate the Facility's current Universe(s):

ii. Indicate the new RCRAInfo Generator Universe:
Note: All TSD activity changes must be handled by the IOR and cannot be made using this form

LQG ☐ SQG ☐ CEG ☐
Non-Handler ☐ Closed ☐

iii. Indicate the new transporter status:
(Only fill out if the facility requires a transporter status change)

Transporter ☐
If the transporter box is checked, you must check at least one mode of transportation below
☐ Air ☐ Water
☐ Rail ☐ Other
☐ Highway

Non-Transporter ☐
Check non-transporter if the facility is currently listed in RCRAInfo as a transporter AND no longer transports hazardous waste

*Required Fields

APPENDIX A

COMPREHENSIVE GROUND-WATER MONITORING EVALUATION WORKSHEET

The following worksheets have been designed to assist the enforcement officer/ technical reviewer in evaluating theground-water monitoring system an owner/operator uses to collect and analyze samples of ground water. The focus of the worksheets is technical adequacy as it relates to obtaining and analyzing representative samples of ground water. The basis of the worksheets is the final RCRA Ground Water Monitoring Technical Enforcement Guidance Document which describes in detail the aspects of ground-water monitoring which EPA deems essential to meet the goals of RCRA. Appendix A is not a regulatory checklist. Specific technical deficiencies in the monitoring system can, however, be related to the regulations as illustrated in Figure 4.3 taken from the RCRA Ground-Water Monitoring Compliance Order Guide (COG) (included at the end of the appendix). The enforcement officer, in developing an enforcement order, should relate the technical assessment from the worksheets to the regulations using Figure 4.3 from the COG as a guide.

Comprehensive Ground-Water Monitoring Evaluation	Y/N
I. Office Evaluation Technical Evaluation of the Design of the Ground-Water Monitoring System	
A. Review of Relevant Documents	
1. What documents were obtained prior to conducting the inspection:	
a. RCRA Part A permit application?	N
b. RCRA Part B permit application?	N
c. Correspondence between the owner/operator and appropriate agencies or citizen's groups?	N
d. Previously conducted facility inspection reports?	Y
e. Facility's contractor reports? closure certification report	Y
f. Regional hydrogeologic, geologic, or soil reports?	Y
g. The facility's Sampling and Analysis Plan?	Y
h. Ground-water Assessment Program Outline (or Plan, if thefacility is in assessment monitoring)?	Y
i. Other (specify) _____	—

	Y/N
B. Evaluation of the Owner/Operator's Hydrogeologic Assessment	
1. Did the owner/operator use the following direct techniques in the hydrogeologic assessment:	Info. not available for review
a. Logs of the soil borings/rock corings (documented by a professional geologist, soil scientist, or geotechnical engineer)?	
b. Materials tests (e.g., grain size analyses, standard penetration tests, etc.)?	
c. Piezometer installation for water level measurments at different depths?d. Slug tests?	
e. Pump tests?	
f. Geochemical analyses of soil samples?	
g. Other (specify) (e.g., hydrochemical diagrams and wash analysis)	
2. Did the owner/operator use the following indirect technique to supplement direct techniques data:	
a. Geophysical well logs?	
b. Tracer studies?	
c. Resistivity and/or electromagnetic conductance?	
d. Seismic Survey?	
e. Hydraulic conductivity measurements of cores?	
f. Aerial photography?	
g. Ground penetrating radar?	
h. Other (specify)	
3. Did the owner/operator document and present the raw data from the site hydrogeologic assessment?	
4. Did the owner/operator document methods (criteria) used to correlate and analyze the information?	
5. The owner/operator prepare the following:	
a. Narrative description of geology?	
b. Geologic cross sections?	
c. Geologic and soil maps?	
d. Boring/coring logs?	
e. Structure contour maps of the differing water bearing zones and confining layer?	
f. Narrative description and calculation of ground-water flows?	

	Y/N
g. Water table/potentiometric map? info. not available for review	
h. Hydrologic cross sections?	
6. Did the owner/operator obtain a regional map of the area and delineate the facility?	
If yes, does this map illustrate: a. Surficial geology features?	
b. Streams, rivers, lakes, or wetlands near the facility?	
c. Discharging or recharging wells near the facility?	
7. Did the owner/operator obtain a regional hydrogeologic map?	
If yes, does this hydrogeologic map indicate: a. Major areas of recharge/discharge?	
b. Regional ground-water flow direction?	
c. Potentiometric contours which are consistent with observed water level elevations?	
8. Did the owner/operator prepare a facility site map?	Y
If yes, does the site map show: a. Regulated units of the facility (e.g., landfill areas,impoundments)? map shows only M.C.C.	Y
b. Any seeps, springs, streams, ponds, or wetlands?	N
c. Location of monitoring wells, soil borings, or test pits?	Y
d. How many regulated units does the facility have? 1 for RCRA CME	–
If more than one regulated unit then, • Does the waste management area encompass all regulated units?	N/A
• Is a waste management area delineated for each regulated unit?	N/A
C. Characterization of Subsurface Geology of Site 1. Soil boring/test pit program:	Info. not available for review
a. Were the soil borings/test pits performed under thesupervision of a qualified professional?	
b. Did the owner/operator provide documentation for selecting the spacing for borings?	
c. Were the borings drilled to the depth of the first confining unit below the uppermost zone of saturation or ten feet into bedrock?	
d. Indicate the method(s) of drilling:	

	Y/N
Auger (hollow or solid stem) ____ Mud rotary ____ Reverse rotary ____ Cable tool ____ Jetting ____ Other (specify) _____	Info. not available for review
e. Were continuous sample corings taken?	
f. How were the samples obtained (checked method[s]) • Split spoon ____ • Shelby tube, or similar ____ • Rock coring ____ • Ditch sampling ____ • Other (explain) _____	
g. Were the continuous sample corings logged by a qualified professional in geology?	
h. Does the field boring log include the following information: • Hole name/number?	
• Date started and finished?	
• Driller's name?	
• Hole location (i.e., map and elevation)?	
• Drill rig type and bit/auger size?	
• Gross petrography (e.g., rock type) of each geologic unit?	
• Gross mineralogy of each geologic unit?	
• Gross structural interpretation of each geologic unit and structural features (e.g., fractures, gouge material, solution channels, buried streams or valleys, identification of depositional material)?	
• Development of soil zones and vertical extent and description of soil type?	
• Depth of water bearing unit(s) and vertical extent of each?	
• Depth and reason for termination of borehole?	
• Depth and location of any contaminant encountered in borehole?	
• Sample location/number?	
• Percent sample recovery?	
• Narrative descriptions of: —Geologic observations?	
—Drilling observations?	
i. Were the following analytical tests performedon the core samples: • Mineralogy (e.g., microscopic tests and x-ray diffraction)?	
• Petrographic analysis: —degree of crystallinity and cementation of matrix?	
—degree of sorting, size fraction (i.e., sieving), textural variations?	
—rock type(s)?	

	Y/N
—soil type? Info. not available for review	
—approximate bulk geochemistry?	
—existence of microstructures that may effect or indicate fluid flow?	
• Falling head tests?	
• Static head tests?	
• Settling measurements?	
• Centrifuge tests?	
• Column drawings?	
D. Verification of Subsurface Geological Data	
1. Has the owner/operator used indirect geophysical methods to supplement geological conditions between borehole locations?	
2. Do the number of borings and analytical data indicate that the confining layer displays a low enough permeability to impede the migration of contaminants to any stratigraphically low water-bearing units?	
3. Is the confining layer laterally continuous across the entire site?	
4. Did the owner/operator consider the chemical compatibility of the site-specific waste types and the geologic materials of the confining layer?	
5. Did the geologic assessment address or provide means for resolution of any information gaps of geologic data?	
6. Do the laboratory data corroborate the field data for petrography?	
7. Do the laboratory data corroborate the field data for mineralogy and subsurface geochemistry?	
E. Presentation of Geologic Data	
1. Did the owner/operator present geologic cross sections of the site?	
2. Do cross sections:	
a. identify the types and characteristics of the geologic materials present?	
b. define the contact zones between different geologic materials?	
c. note the zones of high permeability or fracture?	
d. give detailed borehole information including:	

	Y/N
• location of borehole? Info. not available for review	
• depth of termination?	
• location of screen (if applicable)?	
• depth of zone(s) of saturation?	
• backfill procedure?	
3. Did the owner/operator provide a topographic map which was constructed by a licensed surveyor?	
4. Does the topographic map provide:	
a. contours at a maximum interval of two-feet?	
b. locations and illustrations of man-made features (e.g., parking lots, factory buildings, drainage ditches, storm drain, pipelines, etc.)?	
c. descriptions of nearby water bodies?	
d. descriptions of off-site wells?	
e. site boundaries?	
f. individual RCRA units?	
g. delineation of the waste management area(s)?	
h. well and boring locations?	
5. Did the owner/operator provide an aerial photograph depicting the site and adjacent off-site features?	
6. Does the photograph clearly show surface water bodies, adjacent municipalities, and residences and are these clearly labelled?	
F. Identification of Ground-Water Flowpaths	
1. Ground-water flow direction	
a. Was the well casing height measured by a licensed surveyor to the nearest 0.01 feet?	
b. Were the well water level measurements taken within a 24 hour period?	
c. Were the well water level measurements taken to the nearest 0.01 feet?	
d. Were the well water levels allowed to stabilize after construction and development for a minimum of 24 hours prior to measurements?	
e. Was the water level information obtained from (check appropriate one):	
• multiple piezometers placed in single borehole? ____	
• vertically nested piezometers in closely spaced separate ____	
• boreholes? ____	
• monitoring wells? ____	

	Y/N
f. Did the owner/operator provide construction details for the piezometers? Info.	not
g. How were the static water levels measured (check method[s]). avai	lable for review
• Electric water sounder ____	
• Wetted tape ____	
• Air line ____	
• Other (explain) ____	
h. Was the well water level measured in wells with equivalent screened intervals at an equivalent depth below the saturated zone?	
i. Has the owner/operator provided a site water table (potentiometric) contour map?	
If yes,	
• Do the potentiometric contours appear logical and accurate based on topography and presented data? (Consult water level data)	
• Are ground-water flow-lines indicated?	
• Are static water levels shown?	
• Can hydraulic gradients be estimated?	
j. Did the owner/operator develop hydrologic cross sections of the vertical flow component across the site using measurements from all wells?	
k. Do the owner/operator's flow nets include:	
• piezometer locations?	
• depth of screening?	
• width of screening?	
• measurements of water levels from all wells and piezometers?	
2. Seasonal and temporal fluctuations in ground-water	
a. Do fluctuations in static water levels occur? If yes, are the fluctuations caused by any of the following:	
—Off-site well pumping	unknown
—Tidal processes or other intermittent natural variations (e.g., river stage, etc.)	Y
—On-site well pumping	Info. not
—Off-site, on-site construction or changing land use patterns available for revie	
—Deep well injection	
—Seasonal variations	
—Other (specify) ____	
b. Has the owner/operator documented sources and patterns that contribute to or affect the ground-water patterns below the waste management?	
c. Do water level fluctuations alter the general ground-water gradients and flow directions?	
d. Based on water level data, do any head differentials occur that may indicate a vertical flow component in the saturated zone?	

	Y/N
e. Did the owner/operator implement means for gauging long term effects on water movement that may result from on-site or off-site construction or changes in land-use patterns?	Info. not available for review
3. Hydraulic conductivity	
a. How were hydraulic conductivities of the subsurface materials determined?	
• Single-well tests (slug tests)?	
• Multiple-well tests (pump tests)	
• Other (specify) _____	
b. If single-well tests were conducted, was it done by:	
• Adding or removing a known volume of water?	
• Pressurizing well casing?	
c. If single well tests were conducted in a highly permeable formation, were pressure transducers and high-speed recording equipment used to record the rapidly changing water levels?	
d. Since single well tests only measure hydraulic conductivity in a limited area, were enough tests run to ensure a representative measure of conductivity in each hydrogeologic unit?	
e. Is the owner/operator's slug test data (if applicable) consistent with existing geologic information (e.g., boring logs)?	
f. Were other hydraulic conductivity properties determined?	
g. If yes, provide any of the following data, if available: • Transmissivity _____ • Storage coefficient _____ • Leakage _____ • Permeability _____ • Porosity _____ • Specific capacity _____ • Other (specify) _____	
4. Identification of the uppermost aquifer	
a. Has the extent of the uppermost saturated zone (aquifer) in the facility area been defined? If yes,	
• Are soil boring/test pit logs included?	
• Are geologic cross-sections included?	
b. Is there evidence of confining (competent, unfractured, continuous, and low permeability) layers beneath the site? If yes,	
• how was continuity demonstrated? _____	
c. What is hydraulic conductivity of the confining unit (if present)? CM/Sec How was it determined?	

	Y/N
d. Does potential for other hydraulic communication exist (e.g., lateral incontinuity between geologic units, facies changes, fracture zones, cross cutting structures, or chemical corrosion/alteration of geologic units by leachage? If yes or no, what is the rationale? _____ _____ _____	Info. not available for review
G. Office Evaluation of the Facility's Ground-Water Monitoring System—Monitoring Well Design and Construction: These questions should be answered for each different well design present at the facility. 1. Drilling Methods a. What drilling method was used for the well? • Hollow-stem auger ☐ • Solid-stem auger ☐ • Mud rotary ☐ • Air rotary ☐ • Reverse rotary ☐ • Cable tool ☐ • Jetting ☐ • Air drill w/ casing hammer ☐ • Other (specify) _____	unknown
b. Were any cutting fluids (including water) or additives used during drilling? If yes, specify: • Type of drilling fluid _____ • Source of water used _____ • Foam _____ • Polymers _____ • Other _____	unknown
c. Was the cutting fluid, or additive, identified?	
d. Was the drilling equipment steam-cleaned prior to drilling the well? • Other methods _____	
e. Was compressed air used during drilling? If yes, • was the air filtered to remove oil?	
f. Did the owner/operator document procedure for establishing the potentiometric surface? If yes, • how was the location established?	
g. Formation samples	

	Y/N
• Were formation samples collected initially during drilling?	unknown
• Were any cores taken continuous?	
• If not, at what interval were samples taken?	
• How were the samples obtained? —Split spoon —Shelby tube —Core drill —Other (specify)	
• Identify if any physical and/or chemical tests were performed on the formation samples (specify) _____ _____ _____	
2. Monitoring Well Construction Materials a. Identify construction materials (by number) and diameters (ID/OD) Material / Diameter • Primary Casing: stainless steel / 4" • Secondary or outside casing (doubleconstruction): stainless steel / 6" • Screen: unknown / unknown	
b. How are the sections of casing and screen connected? • Pipe sections threaded	unknown
• Couplings (friction) with adhesive or solvent	
• Couplings (friction) with retainer screws	
• Other (specify)	
c. Were the materials steam-cleaned prior to installation? • If no, how were the materials cleaned? _____	
3. Well Intake Design and Well Development a. Was a well intake screen installed?	
• What is the length of the screen for the well? _____	
• Is the screen manufactured?	
b. Was a filter pack installed?	
• What kind of filter pack was employed? _____	
• Is the filter pack compatible with formationmaterials?	
• How was the filter pack installed? _____	

	Y/N
• What are the dimensions of the filter pack? _____	unknown
• Has a turbidity measurement of the well water ever been made?	Y
• Have the filter pack and screen been designed for the insitu materials? _____	unknown
c. Well development • Was the well developed?	unknown
• What technique was used for well development? —Surge block —Bailer —Air surging —Water pumping —Other (specify) _____	
4. Annular Space Seals a. What is the annular space in the saturated zone directlyabove the filter pack filled with: —Sodium bentonite (specify type and grit) —Cement (specify neat or concrete) —Other (specify)	
b. Was the seal installed by: —Dropping material down the hole and tamping —Dropping material down the inside of hollow-stem auger —Tremie pipe method —Other (specify)	unknown
c. Was a different seal used in the unsaturated zone? If yes,	unknown
• Was this seal made with? —Sodium bentonite (specify type and grit) —Cement (specify neat or concrete)- Other (specify)	
• Was this seal installed by? —Dropping material down the hole and tamping —Dropping material down the inside of hollow stem auger —Other (specify)	
d. Is the upper portion of the borehole sealed with a concrete cap to prevent infiltration from the surface?	unknown
e. Is the well fitted with an above-ground protectivedevice and bumper guards?	Y
f. Has the protective cover been installed with locks to prevent tampering?	Y

	Y/N
H. Evaluation of the Facility's Detection Monitoring Program	
1. Placement of Downgradient Detection Monitoring Wells	
a. Are the ground-water monitoring wells or clusters located immediately adjacent to the waste management area?	N
b. How far apart are the detection monitoring wells? 800' - 1200'	
c. Does the owner/operator provide a rationale for thelocation of each monitoring well or cluster?	N
d. Does the owner/operator identified the well screenlengths of each monitoring well or clusters?	N
e. Does the owner/operator provide an explanation for the well screen lengths of each monitoring well orcluster?	N
f. Do the actual locations of monitoring wells orclusters correspond to those identified by the owner/operator?	Y
2. Placement of Upgradient Monitoring Wells	
a. Has the owner/operator documented the location ofeach upgradient monitoring well or cluster?	Y
b. Does the owner/operator provide an explanation forthe location(s) of the upgradient monitoring wells?	N
c. What length screen has the owner/operator employed inthe background monitoring well(s)?	unknown
d. Does the owner/operator provide an explanation for the screen length(s) chosen?	↓
e. Does the actual location of each background monitoring well or cluster correspond to that identified by the owner/operator?	Y
I. Office Evaluation of the Facility's Assessment Monitoring Program	
1. Does the assessment plan specify:	
a. The number, location, and depth of wells?	unknown
b. The rationale for their placement and identify the basis that will be used to select subsequent sampling locations and depths in later assessment phases?	↓
2. Does the list of monitoring parameters include all hazardous waste constituents from the facility?	↓

	Y/N
a. Does the water quality parameter list include other important indicators not classified as hazardous waste constituents?	Y
b. Does the owner/operator provide documentation for he listed wastes which are not included?	Unknown
3. Does the owner/operator's assessment plan specify the procedures to be used to determine the rate of constituent migration in the ground-water?	
4. Has the owner/operator specified a schedule of implementation in the assessment plan?	
5. Have the assessment monitoring objectives been clearly defined in the assessment plan?	
a. Does the plan include analysis and/or re-evaluation to determine if significant contamination has occurredin any of the detection monitoring wells?	
b. Does the plan provide for a comprehensive program of investigation to fully characterize the rate and extent of contaminant migration from the facility?	
c. Does the plan call for determining the concentrations of hazardous wastes and hazardous waste constituentsin the ground water?	
d. Does the plan employ a quarterly monitoring program?	Y
6. Does the assessment plan identify the investigatory methods that will be used in the assessment phase?	Unknown
a. Is the role of each method in the evaluation fully described?	
b. Does the plan provide sufficient descriptions of the direct methods to be used?	
c. Does the plan provide sufficient descriptions of the indirect methods to be used?	
d. Will the method contribute to the further characterization of the contaminant movement?	
7. Are the investigatory techniques utilized in the assessment program based on direct methods?	
a. Does the assessment approach incorporate indirect methods to further support direct methods?	
b. Will the planned methods called for in the assessment approach ultimately meet performance standards for assessment monitoring?	
c. Are the procedures well defined?	
d. Does the approach provide for monitoring wells similar in design and construction as the detectionmonitoring wells?	

	Y/N
e. Does the approach employ taking samples during drilling or collecting core samples for further analysis?	unknown
8. Are the indirect methods to be used based on reliable and accepted geophysical techniques?	
a. Are they capable of detecting subsurface changesresulting from contaminant migration at the site?	
b. Is the measurement at an appropriate level of sensitivity to detect ground-water quality changes at the site?	
c. Is the method appropriate considering the nature of the subsurface materials?	
d. Does the approach consider the limitations of these methods?	
e. Will the extent of contamination and constituent concentration be based on direct methods and sound engineering judgment? (Using indirect methods tofurther substantiate the findings.)	
9. Does the assessment approach incorporate any mathe-matical modeling to predict contaminant movement?	
a. Will site specific measurements be utilized toaccurately portray the subsurface?	
b. Will the derived data be reliable?	
c. Have the assumptions been identified?	
d. Have the physical and chemical properties of the site-specific wastes and hazardous waste constituentsbeen identified?	
J. Conclusions	
1. Subsurface geology	
a. Has sufficient data been collected to adequately define petrography and petrographic variation?	N
b. Has the subsurface geochemistry been adequately defined?	N
c. Was the boring/coring program adequate to definesubsurface geologic variation?	N
d. Was the owner/operator's narrative description complete and accurate in its interpretation of the data?	unknown
e. Does the geologic assessment address or provide means to resolve any information gaps?	unknown
2. Ground-water flowpaths	
a. Did the owner/operator adequately establish the hori-zontal and vertical components of ground-water flow?	N

	Y/N
b. Were appropriate methods used to establish ground-water flowpaths?	unknown
c. Did the owner/operator provide accurate documentation?	
d. Are the potentiometric surface measurements valid?	
e. Did the owner/operator adequately consider the seasonal and temporal effects on the ground-water?	
f. Were sufficient hydraulic conductivity tests performed to document lateral and vertical variationin hydraulic conductivity in the entire hydrogeologic subsurface below the site?	
3. Uppermost Aquifer a. Did the owner/operator adequately define the upper-most aquifer?	unknown
4. Monitoring Well Construction and Design a. Do the design and construction of the owner/operator's ground-water monitoring wells permit depth discrete ground-water samples to be taken?	unknown
b. Are the samples representative of ground-water quality?	unknown
c. Are the ground-water monitoring wells structurally stable?	Y
d. Does the ground-water monitoring well's design and construction permit an accurate assessment of aquifer characteristics?	unknown
5. Detection Monitoring a. Downgradient Wells • Do the location, and screen lengths of the ground-water monitoring wells or clusters in the detection monitoring system allow the immediate detection of a release of hazardous waste or constituents from the hazardous waste management area to the uppermost aquifer?	N
b. Upgradient Wells • Do the location and screen lengths of the upgradient (background) ground-water monitoring wells ensure the capability of collecting ground-water samples representative of upgradient (background) ground-water quality including any ambient heterogenous chemical characteristics?	N
6. Assessment Monitoring a. Has the owner/operator adequately characterized site hydrogeology to determine contaminant migration?	unknown
b. Is the detection monitoring system adequately designed and constructed to immediately detect any contaminant release?	unknown

	Y/N
c. Are the procedures used to make a first determinationof contamination adequate?	unknown
d. Is the assessment plan adequate to detect, characterize, and track contaminant migration?	
e. Will the assessment monitoring wells, given site hydrogeologic conditions, define the extent and concentration of contamination in the horizontal and vertical planes?	
f. Are the assessment monitoring wells adequately designed and constructed?	
g. Are the sampling and analysis procedures adequate to provide true measures of contamination?	
h. Do the procedures used for evaluation of assessment monitoring data result in determinations of the rate of migration, extent of migration, and hazardous constituent composition of the contaminant plume?	
i. Are the data collected at sufficient frequency and duration to adequately determine the rate of migration?	
j. Is the schedule of implementation adequate?	
k. Is the owner/operator's assessment monitoring plan adequate?	
• If the owner/operator had to implement hisassessment monitoring plan, was it implemented satisfactorily?	
II. Field Evaluation	
A. Ground-Water Monitoring System	
1. Are the numbers, depths, and locations of monitoring wells in agreement with those reported in the facility's monitoring plan? (See Section 3.2.3.)	Y
B. Monitoring Well Construction	
1. Identify construction material material diameter a. Primary Casing stainless steel 4" b. Secondary or outside casing stainless steel 6"	
2. Is the upper portion of the borehole sealed with conrete to prevent infiltration from the surface?	unknown
3. Is the well fitted with an above-ground protective device?	Y
4. Is the protective cover fitted with locks to prevent tampering? If a facility utilizes more than a single well design, answer the above questions for each well design?	Y

	Y/N
III. Review of Sample Collection Procedures	
A. Measurement of Well Depths /Elevation	
1. Are measurements of both depth to standing water and depth to the bottom of the well made?	Y
2. Are measurements taken to the 0.01 feet?	Y
3. What device is used?	electric sounding tape
4. Is there a reference point established by a licensed surveyor?	unknown
5. Is the measuring equipment properly cleaned betweenwll locations to prevent cross contamination?	Y
B. Detection of Immiscible Layers	
1. Are procedures used which will detect light phase immiscible layers?	Y
2. Are procedures used which will detect heavy phase immiscible layers?	N
C. Sampling of Immiscible Layers	
1. Are the immiscible layers sampled separately prior to well evacuation?	N
2. Do the procedures used minimize mixing with watersoluble phases?	N
D. Well Evacuation	
1. Are low yielding wells evacuated to dryness?	Y
2. Are high yielding wells evacuated so that at least three casing volumes are removed?	Y
3. What device is used to evacuate the wells? bladder pump	—
4. If any problems are encountered (e.g., equipmentmalfunction) are they noted in a field logbook?	Y

	Y/N
E. Sample Withdrawal	
1. For low yielding wells, are samples for volatiles, pH, and oxidation/reduction potential drawn first after the well recovers?	Y
2. Are samples withdrawn with either flurocarbon/resins or stainless steel (316, 304 or 2205) sampling devices?	Y
3. Are sampling devices either bottom valve bailers or positive gas displacement bladder pumps?	Y
4. If bailers are used, is fluorocarbon/resin coated wire, single strand stainless steel wire, or monofilament used to raise and lower the bailer?	Y
5. If bladder pumps are used, are they operated in acontinuous manner to prevent aeration of the sample?	N/A
6. If bailers are used, are they lowered slowly to prevent degassing of the water?	Y
7. If bailers are used, are the contents transferred to the sample container in a way that minimizes agitation and aeration?	Y
8. Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior to insertion into the well?	Y
9. If dedicated sampling equipment is not used, is equipment disassembled and thoroughly cleaned between samples?	N/A
10. If samples are for inorganic analysis, does the cleaning procedure include the following sequential steps: a. Dilute acid rinse (HNO_3 or HC1)?11. If samples are for organic analysis, does the cleaning procedure include the following sequential steps:	Y
11. If samples are for inorganic analysis, does the cleaning procedure include the following sequential steps: a. Nonphosphate detergent wash?	Y
b. Tap water rinse?	
c. Distilled/deionized water rinse?	
d. Acetone rinse?	
e. Pesticide-grade hexane rinse?	

	Y/N
12. Is sampling equipment thoroughly dry before use?	Y
13. Are equipment blanks taken to ensure that sample cross-contamination has not occurred?	Y
14. If volatile samples are taken with a positive gas displacement bladder pump, are pumping rates below 100 ml/min?	N/A
F. In-situ or Field Analyses	
1. Are the following labile (chemically unstable) parameters determined in the field:	
a. pH?	Y
b. Temperature?	↓
c. Specific conductivity?	↓
d. Redox potential?	N/A
e. Chlorine?	↓
f. Dissolved oxygen?	↓
g. Turbidity?	N
h. Other (specify) _____	
2. For in-situ determinations, are they made after well evacuation and sample removal?	Y
3. If sample is withdrawn from the well, is parameter measured from a split portion?	Y
4. Is monitoring equipment calibrated according to mannufacturers' specifications and consistent with SW-846?	Y
5. Is the date, procedure, and maintenance for equipment calibration documented in the field logbook?	Y
IV. Review of Sample Preservation and Handling Procedures	
A. Sample Containers	
1. Are samples transferred from the sampling device directly to their compatible containers?	Y

	Y/N
2. Are sample containers for metals (inorganics) analyses polyethylene with polypropylene caps?	Y
3. Are sample containers for organics analysis glass bottles with fluorocarbonresin-lined caps?	Y
4. If glass bottles are used for metals samples are the caps fluorocarbonresin-lined?	N/A
5. Are the sample containers for metal analyses cleanedusing these sequential steps:	
a. Nonphosphate detergent wash?	Y
b. 1:1 nitric acid rinse?	↓
c. Tap water rinse?	↓
d. 1:1 hydrochloric acid rinse?	↓
e. Tap water rinse?	↓
f. Distilled/deionized water rinse?	↓
6. Are the sample containers for organic analyses cleaned using these sequential steps:	
a. Nonphosphate detergent/hot water wash?	Y
b. Tap water rinse?	↓
c. Distilled/deionized water rinse?	↓
d. Acetone rinse?	↓
e. Pesticide-grade hexane rinse?	↓
7. Are trip blanks used for each sample container type to verify cleanliness?	Y
B. Sample Preservation Procedures	
1. Are samples for the following analyses cooled to 4°C:	
a. TOC?	Y
b. TOX?	↓
c. Chloride?	↓
d. Phenols?	↓
e. Sulfate?	↓
f. Nitrate?	↓
g. Coliform bacteria?	N/A
h. Cyanide?	N/A
i. Oil and grease?	Y
j. Hazardous constituents (}261, Appendix VIII)?	Y

	Y/N
2. Are samples for the following analyses field acidified to pH <2 with HNO_3:	
a. Iron?	Y
b. Manganese?	
c. Sodium?	
d. Total metals?	
e. Dissolved metals?	
f. Fluoride?	
g. Endrin?	N/A
h. Lindane?	
i. Methoxychlor?	
j. Toxaphene?	
k. 2,4, D?	
l. 2,4,5 TP Silvex?	
m. Radium?	
n. Gross alpha?	
o. Gross beta?	
3. Are samples for the following analyses field acidfied to pH <2 with H_2SO_4:	
a. Phenols?	Y
b. Oil and grease?	Y
4. Is the sample for TOC analyses field acified to pH <2 with HCl?	Y
5. Is the sample for TOX analysis preserved with 1 ml of 1.1 M sodium sulfite?	N
6. Is the sample for cyanide analysis preserved with NaOH to pH >12?	N/A
C. Special Handling Considerations	
1. Are organic samples handled without filtering?	Y
2. Are samples for volatile organics transfered to the appropriate vials to eliminate headspace over the sample?	Y
3. Are samples for metal analysis split into two portions?	Y
4. Is the sample for dissolved metals filtered through a 0.45 micron filter? not in field	Y
5. Is the second portion not filtered and analyzed for total metals?	Y
6. Is one equipment blank prepared each day of ground-water sampling?	Y

	Y/N
V. Review of Chain-of-Custody Procedures	
A. Sample Labels	
1. Are sample labels used?	Y
2. Do they provide the following information:	
a. Sample identification number?	
b. Name of collector?	
c. Date and time of collection?	
d. Place of collection?	
e. Parameter(s) requested and preservitives used?	
3. Do they remain legible even if wet?	
B. Sample Seals	
1. Are sample seals placed on those containers to ensure samples are not altered?	Y
C. Field Logbook	
1. Is a field logbook maintained?	Y
2. Does it document the following:	
a. Purpose of sampling (e.g., detection or assesment)?	Y
b. Location of well(s)?	
c. Total depth of each well?	
d. Static water level depth and measurement technique?	
e. Presence of immiscible layers and detection method?	
f. Collection method for immiscible layers and sample identification numbers?	
g. Well evacuation procedures?	
h. Sample withdrawal procedure?	
i. Date and time of collection?	
j. Well sampling sequence?	
k. Types of sample containers and sample identification number(s)?	
l. Preservative(s) used?	
m. Parameters requested?	
n. Field analysis data and method(s)?	
o. Sample distribution and transporter?	
p. Field observations?	

	Y/N
—Unusual well recharge rates?	Y
—Equipment malfunction(s)?	
—Possible sample contamination?	
—Sampling rate?	
D. Chain-of-Custody Record	
1. Is a chain-of-custody record included with each sample?	Y
2. Does it document the following:	
a. Sample number?	Y
b. Signiture of collector?	
c. Date and time of collection?	
d. Sample type?	
e. Station location?	
f. Number of containers?	
g. Parameters requested?	
h. Signatures of persons involved in chain-of-custody?	
i. Inclusive dates of custody?	
E. Sample Analysis Request Sheet	
1. Does a sample analysis request sheet accompany each sample?	Y
2. Does the request sheet document the following:	
a. Name of person receiving the sample?	Y
b. Date of sample receipt?	
c. Duplicates?	
d. Analysis to be performed?	
IV. Review of Quality Assurance/Quality Control	
A. Is the validity and reliability of the laboratory and field generated data ensured by a QA/QC program?	Y
B. Does the QA/QC program include:	
1. Documentation of any deviation from approved procedures?	Y

	Y/N
2. Documentation of analytical results for:	
a. Blanks?	Y
b. Standards?	
c. Duplicates?	
d. Spiked samples?	
e. Detectable limits for each parameter being analyzed?	
C. Are approved statistical methods used?	Y
D. Are QC samples used to correct data?	Y
E. Are all data critically examined to ensure it has been properly calculated and reported?	Y
VII. Surficial Well Inspection and Field Observation	
A. Are the wells adequately maintained?	Y
B. Are the monitoring wells protected and secure?	Y
C. Do the wells have surveyed casing elevations?	Unknown
D. Are the ground-water samples turbid?	Y
E. Have all physical characteristics of the site been noted in the inspector's field notes (i.e., surface waters, topography, surface features)?	Y
F. Has a site sketch been prepared by the field inspector with scale, north arrow, location(s) of buildings, location(s) of regulated units, locations of monitoring wells, and a rough depiction of the site drainage pattern?	Y

	Y/N
VIII. Conclusions	
A. Is the facilitycurrently operating under the correct monitoring progaram according to the statistical analyses performed by the current operator?	N
B. Does the ground-water monitoring system, as designed and operated, allow for detection or assessment of any possible ground-water contamination caused by the facility?	N
C. Does the sampling and analysis procedures permit the owner/operator to detect and, where possible, assess the nature and extent of a release of hazardous constituents to ground water from the monitored hazardous waste management facility?	N

Figure 4.3
Relationship of Technical Inadequacies to Ground-Water Performance Standards

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
1. Uppermost Aquifer must be correctly identified.	• failure to consider aquifers hydraulically interconnected to the uppermost aquifer.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• incorrect identification of certain formations as confining layers or aquitards.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to use test drilling and/or soil borings to characterize subsurface hydrogeology.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
2. Ground-water flow directions and rates must be properly determined.	• failure to use piezometers or wells to determine ground-water flow rates and directions (or failure to use a sufficient number of them).	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to consider temporal variations in water levels when establishing flow directions (e.g., seasonal variations, short-term fluctuations due to pumping).	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to assess significance of vertical gradients when evaluating flow rates and directions.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to use standard/consistent benchmarks when establishing water level elevations.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure of the owner/operator (o/o) to consider the effect of local withdrawal wells on ground-water flow direction.	§265.90(a) §265.91(a)(1)
	• failure of the o/o to obtain sufficient water level measurements.	§265.90(a) §265.91(a)(1)

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
6. Downgradient monitoring wells must be constructed so as to yield samples that are representative of in-situ ground-water quality.	See No. 4 above.	
7. Samples from background and downgradient wells must be properly collected and analyzed.	• failure to evacuate stagnant water from the well before sampling.	§265.90(a), §265.92(a) §265.93(d)(4) §2705.14(c)(4)
	• failure to sample wells within a reasonable amount of time after well evacuation.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• improper decisions regarding filtering or non-filtering of samples prior to analysis (e.g., use of filtration on samples to be analyzed for volatile organics).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• use of an inappropriate sampling device.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• use of improper sample preservation techniques.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
7. Samples from background and downgradient wells must be properly collected and analyzed. (Continued)	• samples collected with a device that is constructed of materials that interfere with sample integrity.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• samples collected with a non-dedicated sampling device that is not cleaned between sampling events.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• improper use of a sampling device such that sample quality is affected (e.g., degassing of sample caused by agitation of bailer).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• improper handling of samples (e.g., failure to eliminate headspace from containers of samples to be analyzed for volatiles).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure of the sampling plan to establish procedures for sampling immiscibles (i.e., "floaters" and "sinkers").	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure to follow appropriate QA/QC procedures.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure to ensure sample integrity through the use of proper chain-of-custody procedures.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure to demonstrate suitability of methods used for sample analysis (other than those specified in SW-846).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure to perform analysis in the field on unstable parameters or constituents (e.g., pH, Eh, specific conductance, alkalinity, dissolved oxygen).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
3. Background wells must be located so as to yield samples that are not affected by the facility.	• failure of the o/o to consider the effect of local withdrawal wells on ground-water flow direction.	§265.90(a) §265.91(a)(1)
	• failure of the o/o to obtain sufficient water level measurements.	§265.90(a) §265.91(a)(1)
	• failure of the o/o to consider flow path of dense immiscibles in establishing upgradient well locations.	§265.90(a) §265.91(a)(1)
	• failure of the o/o to consider seasonal fluctuations in ground-water flow direction.	§265.90(a) §265.91(a)(1)
	• failure to install wells hydraulically upgradient, except in cases where upgradient water quality is affected by the facility (e.g., migration of dense immiscibles in the upgradient direction, mounding water beneath the facility).	§265.90(a) §265.91(a)(1)
	• failure of the o/o to adequately characterize subsurface hydrogeology.	§265.90(a) §265.91(a)(1)
	• wells intersect only ground water that flows around facility.	§265.90(a) §265.91(a)(1)
4. Background wells must be constructed so as to yield samples that are representative of in-situ ground-water quality.	• wells constructed of materials that may release or absorb constituents of concern	§265.90(a) §265.91(a)
	• wells improperly sealed—contamination of sample is a concern.	§265.90(a) §265.91(a), (c)
	• nested or multiple screen wells are used and it cannot be demonstrated that there has been no movement of ground water between strata.	§265.90(a) §265.91(a)(1, 2)

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
4. Background wells must be constructed so as to yield samples that are representative of in-situ ground-water quality. (Continued)	• improper drilling methods were used, possibly contaminating the formation.	§265.90(a) §265.91(a)
	• well intake packed with materials that may contaminate sample.	§265.90(a) §265.91(a), (c)
	• well screens used are of an inappropriate length.	§265.90(a) §265.91(a)(1, 2)
	• wells developed using water other than formation water.	§265.90(a) §265.91(a)
	• improper well development yielding samples with suspended sediments that may bias chemical analysis.	§265.90(a) §265.91(a)
	• use of drilling muds or nonformation water during well construction that can bias results of samples collected from wells.	§265.90(a) §265.91(a)
5. Downgradient monitoring wells must be located so as to ensure the immediate detection of any contamination migrating from the facility.	• wells not placed immediately adjacent to waste management area.	§265.90(a) §265.91(a)(2)
	• failure of o/o to consider potential pathways for dense immiscibles.	§265.90(a) §265.91(a)(2)
	• inadequate vertical distribution of wells in thick or heavily stratified aquifer.	§265.90(a) §265.91(a)(2)
	• inadequate horizontal distribution of wells in aquifers of varying hydraulic conductivity.	§265.90(a) §265.91(a)(2)
	• likely pathways of contamination (e.g., buried streams channels, fractures, areas of high permeability) are not intersected by wells.	§265.90(a) §265.91(a)(2)
	• well network covers uppermost but not interconnected aquifers.	§265.90(a) §265.91(a)(2)

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
7. Samples from background and downgradient wells must be properly collected and analyzed. (Continued)	• use of sample containers that may interfere with sample quality (e.g., synthetic containers used with volatile samples).	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	• failure to make proper use of sample blanks.	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)

CME Inspection: Sunoco Middle Creek Conveyance, Marcus Hook, Delaware County
Performed: June 1st, 2016
Jennifer A. Wilson, Licensed Professional Geologist, PA DEP Southeast Regional Office

The Sunoco Middle Creek Conveyance is located at the Sunoco Marcus Hook Refinery in Marcus Hook, Pennsylvania. The refinery was in operation since 1902, and ceased operations in 2012. The conveyance is a 1.5-mile section of what was Middle Creek, and was used to transport process wastewater and stormwater runoff from several oil-water separators at the facility. Closure was achieved in 1995, with the final stabilization and capping of wastes in the channel. There are five wells for the Middle Creek Conveyance: MW-17, MW-28, MW-30, MW-40, and MW-86. MW-86 is the upgradient well. However, MW-86 seems to be more contaminated with respect to volatile organics, such as benzene, than the downgradient wells.

MSCs were exceeded for a number of compounds in the wells, including total dissolved solids, chemical oxygen demand, iron, chromium, sodium, chloride, manganese, lead, benzene, and bis(2-ethylhexyl)phthalate, though the latter also showed up in the field blank in a lesser concentration. The water from the wells was less turbid than previously, possibly die to purging the well with a bladder pump rather than a bailer. Neither Sunoco nor PADEP did analysis for dissolved metals. Consequently, there is no accurate assessment of what is going on with metals at this facility. There is a great deal of made land at this facility, the sediments of which could arguably be the primary source of metals in these analyses, despite the historical presence of lead and chromium in the refinery processes. Without a dissolved metals analysis, it is difficult to tell.

The number and spacing of wells at this facility seem to be inadequate, given the length of the Middle Creek Conveyance. The utility of MW-86 as an upgradient well seems questionable, as well, since it seems to be more impacted by the facility than the downgradient wells.

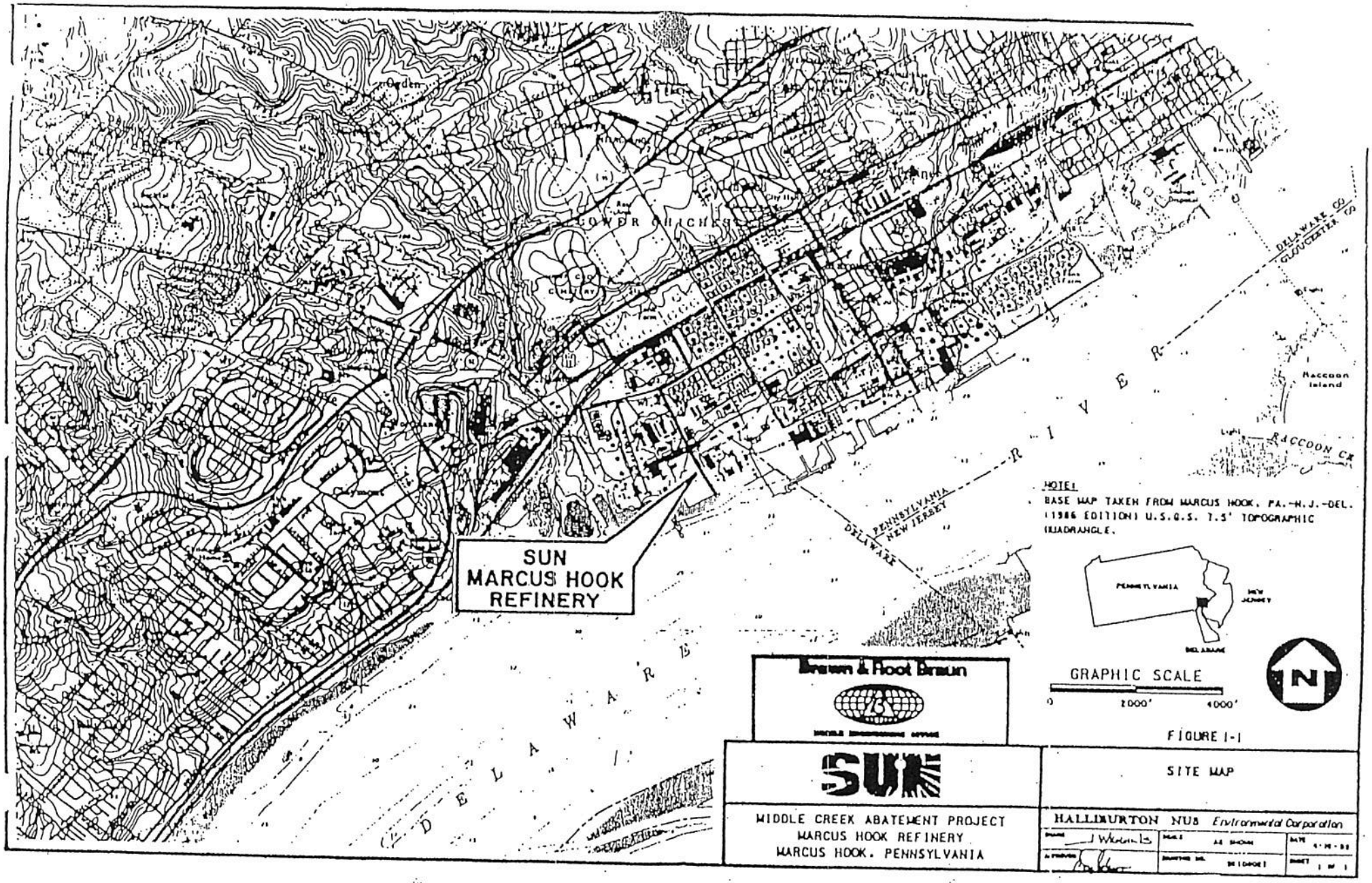
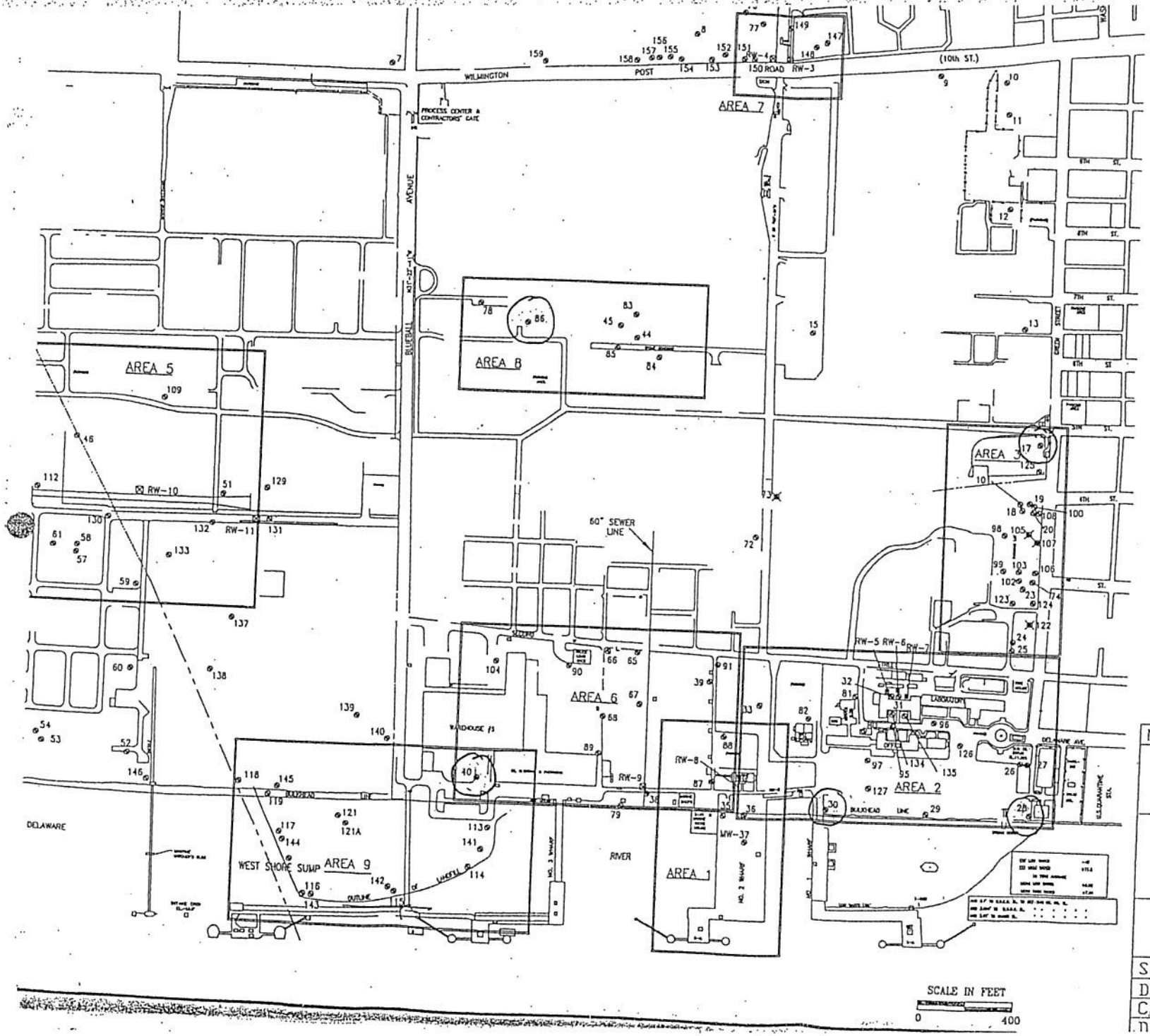

SUN
MARCUS HOOK
REFINERY
Ogden
LOWER CHICHESTER
DELAWARE RIVER
PENNSYLVANIA
NEW JERSEY
DELAWARE CO
GLOUCESTER CO
Raccoon Island
RACCOON CK
NOTE:
BASE MAP TAKEN FROM MARCUS HOOK, PA.-N.J.-DEL. (1986 EDITION) U.S.G.S. 7.5' TOPOGRAPHIC QUADRANGLE.
PENNSYLVANIA
NEW JERSEY
DELAWARE
GRAPHIC SCALE
0
2000'
4000'
N
Brown & Root Braun
SUN
MIDDLE CREEK ABATEMENT PROJECT
MARCUS HOOK REFINERY
MARCUS HOOK, PENNSYLVANIA
SITE MAP
HALLIBURTON NUS Environmental Corporation
AS SHOWN

FIGURE 1-1

AREA 10: No. 2 TANK

Notes:
1. MW-37 WAS FORM
2. RW-8 WAS FORM



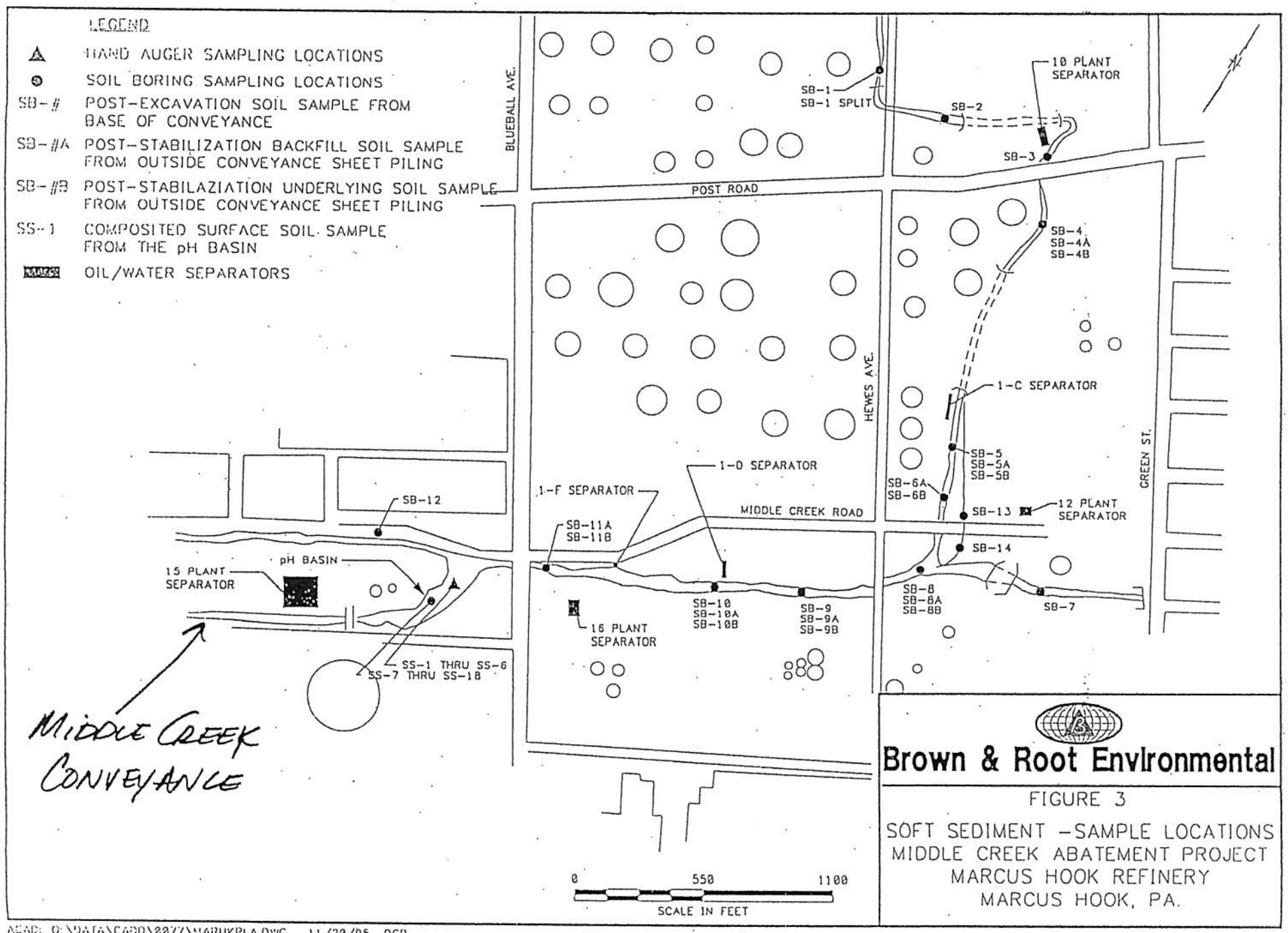
No.	REVISION

SUNOCO

SUNOCO, INC. (R&
MARCUS HOOK REFI
MARCUS HOOK, PENNS

SITE PLAN

SCALE - 1' = 400'	JOB No. -
DRAWN BY A. Taylor	REV.
CHECKED BY -	DWG. NAME
DATE 04/07/199	



ACAD: O:\DATA\CADD\8077\MARHKPLA.DWG 11/20/95 DGB

MIDDLE CREEK ABATEMENT PROJECT
POST-CLOSURE PLAN RCRA SAMPLING
FIELD MEASUREMENTS
SECOND QUARTER 2016

Well	Well Diameter (inches)	Product Depth (feet)	Water Depth (feet)	Well Depth (feet)	One Purge Volume (gallons)
MW-17	4	No LNAPL	3.23	14.40	7.29
MW-28	4	No LNAPL	4.43	9.35	3.21
MW-30	4	No LNAPL	3.57	9.25	3.71
MW-40	4	No LNAPL	6.04	10.70	3.04
MW-86	4	No LNAPL	3.15	19.75	10.84

Well		Purge Volume (gallons)	pH	Temperature (°C)	Conductivity (mS/cm)	Turbidity (NTU)
MW-17	A	0	10.59	17.57	0.233	512
	B	8	10.58	18.40	0.248	513
	C	16	10.48	17.10	0.285	695
	D	22	10.42	16.39	0.316	960
MW-28	A	0	9.15	21.93	0.267	3.6
	B	3	9.37	22.23	0.198	8.6
	C	6	9.25	22.44	0.282	60.8
	D	10	9.33	22.58	0.322	70.4
MW-30	A	0	8.99	18.25	1.13	91
	B	4	9.12	17.65	1.07	15.1
	C	8	9.75	17.59	1.12	64.2
	D	12	10.17	17.71	1.16	63
MW-40	A	0	NA	NA	NA	NA
	B	3	NA	NA	NA	NA
	C	6	11.42	15.79	0.818	543
	D	NA	NA	NA	NA	NA
MW-86	A	0	8.45	21.55	0.505	12.5
	B	10	8.64	19.76	0.516	16.5
	C	20	8.71	19.04	0.522	22.5
	D	32	8.54	18.63	0.531	33.7

Notes:
NA = Not Available/Not Sampled

MIDDLE CREEK ABATEMENT PROJECT
POST-CLOSURE PLAN RCRA SAMPLING
DATA CALCULATIONS
SECOND QUARTER 2016

	pH (SU)	Cond (µmhos/cm)	TOC (mg/L)	TOX (µg/L)		Mean Monitoring	Mean Background	Number of Samples	Standard Deviation Background	Standard Deviation Monitoring Data	Variance Background	Variance Monitoring	T-Test	T-Test	
													t*	t_c	
	MW-17					X	u	N	s	s	(s^2)	(s^2)			
MW-17A	10.59	233	5.3	**10.0**		10.52	7.00	4	0.336	0.071	0.113	0.0050	20.5	5.841	pH
MW-17B	10.58	248	5.6	**10.0**		271	1,013	4	159	32.38	25,137	1,048	-9.18	4.541	Cond
MW-17C	10.48	285	6.2	**10.0**		6.0	6.88	4	2.26	0.612	5.09	0.375	-0.75	4.541	TOC
MW-17D	10.42	316	6.9	**10.0**		10.0	35.8	4	25.6	0.00	653	0.00	-2.02	4.541	TOX
	MW-28														
MW-28A	9.15	267	2.1	**10.0**		9.28	6.97	4	0.223	0.0841	0.0498	0.00707	19.3	5.841	pH
MW-28B	9.37	198	1.7	**10.0**		267	728	4	17.6	44.8	311	2,003	-19.2	4.541	Cond
MW-28C	9.25	282	1.9	**10.0**		1.98	4.90	4	1.42	0.192	2.02	0.0369	-4.08	4.541	TOC
MW-28D	9.33	322	2.2	**10.0**		10.0	58.8	4	81.8	0.00	6,692	0.00	-1.19	4.541	TOX
	MW-30														
MW-30A	8.99	1,130	5.8	**10.0**		9.51	6.90	4	0.359	0.4785	0.129	0.22892	8.72	5.841	pH
MW-30B	9.12	1,070	5.3	**10.0**		1,120	950	4	99.4	32	9,876	1,050	3.26	4.541	Cond
MW-30C	9.75	1,120	5.6	**10.0**		5.63	9.20	4	5.83	0.205	33.9	0.042	-1.23	4.541	TOC
MW-30D	10.17	1,160	5.8	**10.0**		10.0	23.6	4	27.3	0.00	747	0.00	-0.995	4.541	TOX
	MW-40														
MW-40A	NA	NA	21.6	**10.0**		11.42	6.75	1	0.189	0.000	0.0358	0.000	49.34	5.841	pH
MW-40B	NA	NA	14.8	**10.0**		818	1,674	1	541	0.0	292,478	0	-3.17	4.541	Cond
MW-40C	11.42	818	21.7	**10.0**		19.4	7.50	3	3.72	3.229	13.8	10.429	4.8	4.541	TOC
MW-40D	NA	NA	NA	NA		10.0	75.0	3	13.0	0.00	170	0.00	-9.99	4.541	TOX
	MW-86														
MW-86A	8.45	505	9.2	**10.0**		8.59	6.92	4	0.328	0.099	0.108	0.0097	9.72	5.841	pH
MW-86B	8.64	516	9.0	**10.0**		519	1,260	4	16.6	9.4	277	89	-77.5	4.541	Cond
MW-86C	8.71	522	9.2	**10.0**		9.2	15.0	4	4.53	0.087	20.5	0.0075	-2.58	4.541	TOC
MW-86D	8.54	531	9.2	**10.0**		10.0	147	4	99.7	0.00	9,938	0.00	-2.75	4.541	TOX

NOTES:
Bold = Indicates a laboratory analytical result below the laboratory reporting limit; therefore, one-half of the detection limit was used in calculations.
TOC = Total Organic Carbon
TOX = Total Organic Halogen
SU = Standard unit
µmhos/cm = Micromhos per centimeter
mg/L = Milligram per liter
µg/L = Microgram per liter
NA = Not Available / Not sampled

2510-FM-BWM0092 Rev. 3/2006

Date Prepared: 6/28/16

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

I.D. Number: PAD980550594

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(To be submitted quarterly for all monitoring wells)

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INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").

Facility Name: Marcus Hook Industrial Complex

Monitoring Point Number: MW-17 ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient ☒ Downgradient

Location: County Delaware Municipality: Marcus Hook Borough

Sampling Point: Latitude: 39 ° 48 ' 53 . 7" Longitude: 75° 24' 56 . 0"

Depth to Water Level: 3.23 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.24 ft. Elevation of Water Level: 5.47 ft./MSL

Sampling Depth: 3.23-11.48 ft. Sampling Method: ☐ Pumped ☒ Bailed

Well Purged ☒ Yes ☐ No ☐ Grab

Sampled Filtered: ☐ Yes ☒ No Well Volumes Purged: 3

Spring Flow Rate: N/A GPM Filter Pore Size: N/A microns

Sample Date: (mm/dd/yy) 06/01/16 Sample Collection Time: See attached chain of custody

Sample Collector's Name: Corey Correll

Sample Collector's Affiliation: Stantec Consulting Services Inc.

Laboratory Performing Analysis: Eurofins Lancaster Laboratories

Lab Accreditation Number(s) 36-00037

Lab Sample Number: See laboratory reports Lab Analysis Date: See laboratory reports

Comments: One-half of the reporting detection limit is used for the non-detected values in the calculations reported in Section II.

I.D. No. PAD980550594
Monitoring Point No. MW-17
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

I. PARAMETERS USED AS INDICATORS OF GROUND WATER CONTAMINATION–RESULTS

Replicates (Enter all data in mg/l except as indicated)

Storet No.	Parameters	Values				Analysis Method Number
(00403)	pH (SU)	10.59	10.58	10.48	10.42	Horiba U-52
(00095)	Spec. Cond. (umhos/cm)	233	248	285	316	Horiba U-52
(00680)	Total Organic Carbon (mg/l)	5.3	5.6	6.2	6.9	SM 5310 C-2000
(70353)	Total Organic Halogen (µg/l)	ND(20)	ND(20)	ND(20)	ND(20)	SW846 9020B
( )						

ND = Not Detected (laboratory reporting limit)

II. TESTS FOR SIGNIFICANCE –CALCULATIONS

(attach all necessary data)

A. Arithmetic results for this quarter (background values based on first year's sample results in the upgradient wells; or as otherwise approved by the Department).

(Enter all data in mg/l except as indicated).

		$(\overline{X}_b)$ Background Mean	(S^2_b) Background Variance	(X_m) Monitoring Mean	(S^2_m) Monitoring Variance
(00403)	pH (SU)	7.00	0.113	10.52	0.0050
(00095)	Spec. Cond. (umhos/cm)	1,013	25,137	271	1,048
(00680)	Total Organic Carbon	6.88	5.09	6.0	0.375
(70353)	Total Organic Halogen (µg/l)	35.8	653	10.0	0.00
( )					

B. Student's T-Test (at the specified level of significance using Cochran's Approximation to the Behrens-Fisher single-tailed solution of the comparison of two independent samples with unequal population variances; or an equivalent approved method in 40 CFR 264.97(h)).

Level of Significance Used – **.01** .05 (highlight/bold one)

2510-FM-BWM0092 Rev. 3/2006

I.D. No. PAD980550594
Monitoring Point No. MW-17
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(Enter all data in mg/l except as indicated).

		(t*) weighted t-statistic	(t_c) comparison t-statistic	Significant Change? (Highlight/bold One)	
(00403)	pH (SU) (use two-tailed test)	20.5	+/-5.841	**Y**	N
(00095)	Spec. Cond. (umhos/cm)	-9.18	+/-4.541	**Y**	N
(00680)	Total Organic Carbon	-0.75	+/-4.541	Y	**N**
(70353)	Total Organic Halogen (µg/l)	-2.02	+/-4.541	Y	**N**
( )				Y	N

Name, Address and Title of Individual Performing the Tests for Significance:

Michael Malone, Senior Geologist

Stantec Consulting Services Inc.

1060 Andrew Drive, Suite 140

West Chester, Pennsylvania 19380

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SOLID WASTE MGMT.
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I.D. Number	PAD980550594
Monitoring Point No.	MW-17
Sample Date	06/01/16

Marcus Hook Industrial Complex
Post-Closure Groundwater Quality Parameters and
Site-Specific Contamination Indicator Parameters

Site-Specific Organic Parameters	Value	Units
Benzene	ND (0.5)	µg/l
Ethylbenzene	ND (0.5)	µg/l
Toluene	ND (0.5)	µg/l
Xylene (total)	ND (0.5)	µg/l
Acenaphthene	ND (0.3)	µg/l
Anthracene	ND (0.2)	µg/l
Benzo(a)anthracene	ND (0.2)	µg/l
Benzo(a)pyrene	ND (0.3)	µg/l
Di-n-butylphthalate	ND (0.5)	µg/l
Chrysene	ND (0.2)	µg/l
Bis(2-ethylhexyl)phthalate	ND (0.9)	µg/l
Fluorene	ND (0.3)	µg/l
Naphthalene	ND (0.2)	µg/l
Phenanthrene	ND (0.2)	µg/l
Phenol	ND (0.4)	µg/l
SGT-HEM (TPH)	ND (1400)	µg/l
Site-Specific Inorganic Parameters	**Value**	**Units**
Chromium (total)	3.2 J	µg/l
Lead	ND (5.1)	µg/l
Cyanide (total)	6.3 J	µg/l

NOTES:
µg/l = Micrograms per liter
ND = Laboratory analytical result was non-detect; method detection limit in parentheses.
J = Estimated value
SGT-HEM (TPH) = Total Petroleum Hydrocarbons

2510-FM-BWM0092 Rev. 3/2006

Date Prepared: 6/28/16

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

I.D. Number: PAD980550594

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(To be submitted quarterly for all monitoring wells)

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INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").

Facility Name: Marcus Hook Industrial Complex

Monitoring Point Number: MW-28 ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient ☒ Downgradient

Location: County Delaware Municipality: Marcus Hook Borough

Sampling Point: Latitude: 39 ° 48 ' 38 . 7" Longitude: 75° 24' 48 . 8"

Depth to Water Level: 4.43 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.81 ft. Elevation of Water Level: 2.31 ft./MSL

Sampling Depth: 4.43 - 7.88 ft. Sampling Method: ☐ Pumped ☒ Bailed

Well Purged ☒ Yes ☐ No ☐ Grab

Sampled Filtered: ☐ Yes ☒ No Well Volumes Purged: 3

Spring Flow Rate: N/A GPM Filter Pore Size: N/A microns

Sample Date: (mm/dd/yy) 06/01/16 Sample Collection Time: See attached chain of custody

Sample Collector's Name: Corey Correll

Sample Collector's Affiliation: Stantec Consulting Services Inc.

Laboratory Performing Analysis: Eurofins Lancaster Laboratories

Lab Accreditation Number(s) 36-00037

Lab Sample Number: See laboratory reports Lab Analysis Date: See laboratory reports

Comments: One-half of the reporting detection limit is used for the non-detected values in the calculations reported in Section II.

I.D. No. PAD980550594
Monitoring Point No. MW-28
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

I. PARAMETERS USED AS INDICATORS OF GROUND WATER CONTAMINATION–RESULTS

Replicates (Enter all data in mg/l except as indicated)

Storet No.	Parameters	Values				Analysis Method Number
(00403)	pH (SU)	9.15	9.37	9.25	9.33	Horiba U-52
(00095)	Spec. Cond. (umhos/cm)	267	198	282	322	Horiba U-52
(00680)	Total Organic Carbon (mg/l)	2.1	1.7	1.9	2.2	SM 5310 C-2000
(70353)	Total Organic Halogen (µg/l)	ND(20)	ND(20)	ND(20)	ND(20)	SW846 9020B
( )						

ND = Not Detected (laboratory reporting limit)

II. TESTS FOR SIGNIFICANCE –CALCULATIONS

(attach all necessary data)

A. Arithmetic results for this quarter (background values based on first year's sample results in the upgradient wells; or as otherwise approved by the Department).
(Enter all data in mg/l except as indicated).

		$(\overline{X}_b)$ Background Mean	(S^2_b) Background Variance	(X_m) Monitoring Mean	(S^2_m) Monitoring Variance
(00403)	pH (SU)	6.97	0.0498	9.28	0.00707
(00095)	Spec. Cond. (umhos/cm)	728	311	267	2,003
(00680)	Total Organic Carbon	4.90	2.02	1.98	0.0369
(70353)	Total Organic Halogen (µg/l)	58.8	6,692	10.0	0.00
( )					

B. Student's T-Test (at the specified level of significance using Cochran's Approximation to the Behrens-Fisher single-tailed solution of the comparison of two independent samples with unequal population variances; or an equivalent approved method in 40 CFR 264.97(h)).

Level of Significance Used – **.01** .05 (highlight/bold one)

2510-FM-BWM0092 Rev. 3/2006

I.D. No. PAD980550594
Monitoring Point No. MW-28
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(Enter all data in mg/l except as indicated).

		(t*) weighted t-statistic	(t_c) comparison t-statistic	Significant Change? (Highlight/bold One)	
(00403)	pH (SU) (use two-tailed test)	19.3	+/-5.841	**Y**	N
(00095)	Spec. Cond. (umhos/cm)	-19.2	+/-4.541	**Y**	N
(00680)	Total Organic Carbon	-4.08	+/-4.541	Y	**N**
(70353)	Total Organic Halogen (µg/l)	-1.19	+/-4.541	Y	**N**
( )				Y	N

Name, Address and Title of Individual Performing the Tests for Significance:

Michael Malone, Senior Geologist

Stantec Consulting Services Inc.

1060 Andrew Drive, Suite 140

West Chester, Pennsylvania 19380

I.D. Number	PAD980550594
Monitoring Point No.	MW-28
Sample Date	06/01/16

Marcus Hook Industrial Complex
Post-Closure Groundwater Quality Parameters and
Site-Specific Contamination Indicator Parameters

Site-Specific Organic Parameters	Value	Units
Benzene	ND (0.5)	µg/l
Ethylbenzene	ND (0.5)	µg/l
Toluene	ND (0.5)	µg/l
Xylene (total)	ND (0.5)	µg/l
Acenaphthene	ND (0.3)	µg/l
Anthracene	ND (0.2)	µg/l
Benzo(a)anthracene	ND (0.2)	µg/l
Benzo(a)pyrene	ND (0.3)	µg/l
Di-n-butylphthalate	ND (0.5)	µg/l
Chrysene	ND (0.2)	µg/l
Bis(2-ethylhexyl)phthalate	ND (0.9)	µg/l
Fluorene	ND (0.3)	µg/l
Naphthalene	0.4 J	µg/l
Phenanthrene	ND (0.2)	µg/l
Phenol	ND (0.4)	µg/l
SGT-HEM (TPH)	ND (1400)	µg/l
Site-Specific Inorganic Parameters	**Value**	**Units**
Chromium (total)	21.0	µg/l
Lead	ND (5.1)	µg/l
Cyanide (total)	ND (5.0)	µg/l

NOTES:
µg/l = Micrograms per liter
ND = Laboratory analytical result was non-detect; method detection limit in parentheses.
J = Estimated value
SGT-HEM (TPH) = Total Petroleum Hydrocarbons

2510-FM-BWM0092 Rev. 3/2006

Date Prepared: 6/28/16

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

I.D. Number: PAD980550594

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(To be submitted quarterly for all monitoring wells)

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INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").

Facility Name: Marcus Hook Industrial Complex

Monitoring Point Number: MW-30 ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient ☒ Downgradient

Location: County Delaware Municipality: Marcus Hook Borough

Sampling Point: Latitude: 39 ° 48 ' 35 . 6" Longitude: 75° 24' 57 . 6"

Depth to Water Level: 3.57 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.79 ft. Elevation of Water Level: 3.77 ft./MSL

Sampling Depth: 3.57-7.43 ft. Sampling Method: ☐ Pumped ☒ Bailed

Well Purged ☒ Yes ☐ No ☐ Grab

Sampled Filtered: ☐ Yes ☒ No Well Volumes Purged: 3

Spring Flow Rate: N/A GPM Filter Pore Size: N/A microns

Sample Date: (mm/dd/yy) 06/01/16 Sample Collection Time: See attached chain of custody

Sample Collector's Name: Corey Correll

Sample Collector's Affiliation: Stantec Consulting Services Inc.

Laboratory Performing Analysis: Eurofins Lancaster Laboratories

Lab Accreditation Number(s) 36-00037

Lab Sample Number: See laboratory reports Lab Analysis Date: See laboratory reports

Comments: One-half of the reporting detection limit is used for the non-detected values in the calculations reported in Section II.

I.D. No. PAD980550594
Monitoring Point No. MW-30
Sample Date 6/1/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

I. PARAMETERS USED AS INDICATORS OF GROUND WATER CONTAMINATION–RESULTS

Replicates (Enter all data in mg/l except as indicated)

Storet No.	Parameters	Values				Analysis Method Number
(00403)	pH (SU)	8.99	9.12	9.75	10.17	Horiba U-52
(00095)	Spec. Cond. (umhos/cm)	1,130	1,070	1,120	1,160	Horiba U-52
(00680)	Total Organic Carbon (mg/l)	5.8	5.3	5.6	5.8	SM 5310 C-2000
(70353)	Total Organic Halogen (µg/l)	ND(20)	ND(20)	ND(20)	ND(20)	SW846 9020B
( )						

ND = Not detected (laboratory reporting limit)

II. TESTS FOR SIGNIFICANCE –CALCULATIONS

(attach all necessary data)

A. Arithmetic results for this quarter (background values based on first year's sample results in the upgradient wells; or as otherwise approved by the Department).

(Enter all data in mg/l except as indicated).

		$(\overline{X}_b)$ Background Mean	(S^2_b) Background Variance	(X_m) Monitoring Mean	(S^2_m) Monitoring Variance
(00403)	pH (SU)	6.90	0.129	9.51	0.22892
(00095)	Spec. Cond. (umhos/cm)	950	9,876	1,120	1,050
(00680)	Total Organic Carbon	9.20	33.9	5.63	0.042
(70353)	Total Organic Halogen (µg/l)	23.6	747	10.0	0.00
( )					

B. Student's T-Test (at the specified level of significance using Cochran's Approximation to the Behrens-Fisher single-tailed solution of the comparison of two independent samples with unequal population variances; or an equivalent approved method in 40 CFR 264.97(h)).

Level of Significance Used – **.01** .05 (highlight/bold one)

2510-FM-BWM0092 Rev. 3/2006

I.D. No. PAD980550594
Monitoring Point No. MW-30
Sample Date 6/1/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(Enter all data in mg/l except as indicated).

		(t*) weighted t-statistic	(t_c) comparison t-statistic	Significant Change? (Highlight/bold One)	
(00403)	pH (SU) (use two-tailed test)	8.72	+/-5.841	**Y**	N
(00095)	Spec. Cond. (umhos/cm)	3.26	+/-4.541	Y	**N**
(00680)	Total Organic Carbon	-1.23	+/-4.541	Y	**N**
(70353)	Total Organic Halogen (µg/l)	-0.995	+/-4.541	Y	**N**
( )				Y	N

Name, Address and Title of Individual Performing the Tests for Significance:

Michael Malone, Senior Geologist

Stantec Consulting Services Inc.

1060 Andrew Drive, Suite 140

West Chester, Pennsylvania 19380

I.D. Number	PAD980550594
Monitoring Point No.	MW-30
Sample Date	06/01/16

Marcus Hook Industrial Complex
Post-Closure Groundwater Quality Parameters and
Site-Specific Contamination Indicator Parameters

Site-Specific Organic Parameters	**Value**	**Units**
Benzene	1.0	µg/l
Ethylbenzene	ND (0.5)	µg/l
Toluene	ND (0.5)	µg/l
Xylene (total)	ND (0.5)	µg/l
Acenaphthene	ND (0.3)	µg/l
Anthracene	ND (0.2)	µg/l
Benzo(a)anthracene	ND (0.2)	µg/l
Benzo(a)pyrene	ND (0.3)	µg/l
Di-n-butylphthalate	ND (0.5)	µg/l
Chrysene	ND (0.2)	µg/l
Bis(2-ethylhexyl)phthalate	ND (0.9)	µg/l
Fluorene	ND (0.3)	µg/l
Naphthalene	0.7 J	µg/l
Phenanthrene	ND (0.2)	µg/l
Phenol	ND (0.4)	µg/l
SGT-HEM (TPH)	1400 J	µg/l
Site-Specific Inorganic Parameters	**Value**	**Units**
Chromium (total)	2.6 J	µg/l
Lead	ND (5.1)	µg/l
Cyanide (total)	7.6 J	µg/l

NOTES:
µg/l = Micrograms per liter
ND = Laboratory analytical result was non-detect; method detection limit in parentheses.
J = Estimated value
SGT-HEM (TPH) = Total Petroleum Hydrocarbons

2510-FM-BWM0092 Rev. 3/2006

Date Prepared: 6/28/16

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

I.D. Number: PAD980550594

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(To be submitted quarterly for all monitoring wells)

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INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").

Facility Name: Marcus Hook Industrial Complex

Monitoring Point Number: MW-40 ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient ☒ Downgradient

Location: County Delaware Municipality: Marcus Hook Borough

Sampling Point: Latitude: 39 ° 48 ' 28 . 7" Longitude: 75° 24' 17 . 6"

Depth to Water Level: 6.04 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: NM ft. Elevation of Water Level: NM ft./MSL

Sampling Depth: 6.04 - 9.27 ft. Sampling Method: ☐ Pumped ☒ Bailed

Well Purged ☒ Yes ☐ No ☐ Grab

Sampled Filtered: ☐ Yes ☒ No Well Volumes Purged: 2

Spring Flow Rate: N/A GPM Filter Pore Size: N/A microns

Sample Date: (mm/dd/yy) 06/01/16 Sample Collection Time: See attached chain of custody

Sample Collector's Name: Corey Correll

Sample Collector's Affiliation: Stantec Consulting Services Inc.

Laboratory Performing Analysis: Eurofins Lancaster Laboratories

Lab Accreditation Number(s) 36-00037

Lab Sample Number: See laboratory reports Lab Analysis Date: See laboratory reports

Comments: NM = Not measured; monitoring well has not been resurveyed since repairs completed in April 2015, and casing was cut below grade with protective steel plate installation in March 2016.

One-half of the reporting detection limit is used for the ND values in the calculations reported in Sec. III.

I.D. No. PAD980550594
Monitoring Point No. MW-40
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

I. PARAMETERS USED AS INDICATORS OF GROUND WATER CONTAMINATION–RESULTS

Replicates (Enter all data in mg/l except as indicated)

Storet No.	Parameters	Values				Analysis Method Number
(00403)	pH (SU)	NA	NA	11.42	NS	Horiba U-52
(00095)	Spec. Cond. (umhos/cm)	NA	NA	818	NS	Horiba U-52
(00680)	Total Organic Carbon (mg/l)	21.6	14.8	21.7	NS	SM 5310 C-2000
(70353)	Total Organic Halogen (µg/l)	ND(20)	ND(20)	ND(20)	NS	SW846 9020B
( )						

NS = Not Sampled; well went dry prior to third purge volume; ND = Not detected (laboratory reporting limit); NA = sample field parameters not available.

II. TESTS FOR SIGNIFICANCE –CALCULATIONS

(attach all necessary data)

A. Arithmetic results for this quarter (background values based on first year's sample results in the upgradient wells; or as otherwise approved by the Department).

(Enter all data in mg/l except as indicated).

		$(\overline{X}_b)$ Background Mean	(S^2_b) Background Variance	(X_m) Monitoring Mean	(S^2_m) Monitoring Variance
(00403)	pH (SU)	6.75	0.0358	11.42[1]	0.000[1]
(00095)	Spec. Cond. (umhos/cm)	1,674	292,478	818[1]	0[1]
(00680)	Total Organic Carbon	7.50	13.8	19.4	10.429
(70353)	Total Organic Halogen (µg/l)	75.0	170	10.0	0.00
( )					

B. Student's T-Test (at the specified level of significance using Cochran's Approximation to the Behrens-Fisher single-tailed solution of the comparison of two independent samples with unequal population variances; or an equivalent approved method in 40 CFR 264.97(h)).

Level of Significance Used – **.01** **.05** (highlight/bold one)

[1] The monitoring mean and variance for pH and Specific Conductance are generated from one (1) field reading.

2510-FM-BWM0092 Rev. 3/2006

I.D. No. PAD980550594
Monitoring Point No. MW-40
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(Enter all data in mg/l except as indicated).

		(t*) weighted t-statistic	(t_c) comparison t-statistic	Significant Change? (Highlight/bold One)	
(00403)	pH (SU) (use two-tailed test)	49.34	+/-5.841	**Y**	N
(00095)	Spec. Cond. (umhos/cm)	-3.17	+/-4.541	Y	**N**
(00680)	Total Organic Carbon	4.8	+/-4.541	**Y**	N
(70353)	Total Organic Halogen (µg/l)	-9.99	+/-4.541	**Y**	N
( )				Y	N

Name, Address and Title of Individual Performing the Tests for Significance:

Michael Malone, Senior Geologist

Stantec Consulting Services Inc.

1060 Andrew Drive, Suite 140

West Chester, Pennsylvania 19380

I.D. Number	PAD980550594
Monitoring Point No.	MW-40
Sample Date	06/01/16

Marcus Hook Industrial Complex
Post-Closure Groundwater Quality Parameters and
Site-Specific Contamination Indicator Parameters

Site-Specific Organic Parameters	**Value**	**Units**
Benzene	ND (0.5)	µg/l
Ethylbenzene	ND (0.5)	µg/l
Toluene	ND (0.5)	µg/l
Xylene (total)	ND (0.5)	µg/l
Acenaphthene	ND (0.3)	µg/l
Anthracene	1 J	µg/l
Benzo(a)anthracene	0.4 J	µg/l
Benzo(a)pyrene	0.3 J	µg/l
Di-n-butylphthalate	ND (0.5)	µg/l
Chrysene	0.3 J	µg/l
Bis(2-ethylhexyl)phthalate	1 J	µg/l
Fluorene	ND (0.3)	µg/l
Naphthalene	ND (0.2)	µg/l
Phenanthrene	0.4 J	µg/l
Phenol	ND (0.4)	µg/l
SGT-HEM (TPH)	ND (1400)	µg/l
Site-Specific Inorganic Parameters	**Value**	**Units**
Chromium (total)	28.4	µg/l
Lead	23.2	µg/l
Cyanide (total)	6.2 J	µg/l

NOTES:
µg/l = Micrograms per liter
ND = Laboratory analytical result was non-detect; method detection limit in parentheses.
J = Estimated value
SGT-HEM (TPH) = Total Petroleum Hydrocarbons

2510-FM-BWM0092 Rev. 3/2006

Date Prepared: 6/28/16

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

I.D. Number: PAD980550594

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(To be submitted quarterly for all monitoring wells)

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided herein. Replacement/substitution of or attachment to this form is prohibited. Improperly completed forms may be rejected by the Department, may be considered to be violations of the Department's Rules and Regulations, and may result in assessment of fines and penalties.

General References: 264a.97, 40 CFR 264.97(h), 40 CFR Part 264, Subpart F, as Incorporated by reference at 25 Pa. Code 264a.1 and 40 CFR 265.92(b); 40 CFR 265.92(a)-(e), 40 CFR 265.93 and 40 CFR Part 265, Subpart F, as incorporated by reference at 25 Pa. Code 265a.1.

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").

Facility Name: Marcus Hook Industrial Complex

Monitoring Point Number: MW-86 ☒ Well ☐ Spring ☐ Stream ☐ Other

☒ Upgradient ☐ Downgradient

Location: County Delaware Municipality: Marcus Hook Borough

Sampling Point: Latitude: 39 ° 48 ' 47 . 5" Longitude: 75° 25' 26 . 5"

Depth to Water Level: 3.15 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.94 ft. Elevation of Water Level: 10.99 ft./MSL

Sampling Depth: 3.15 ft. Sampling Method: ☐ Pumped ☒ Bailed

Well Purged ☒ Yes ☐ No ☐ Grab

Sampled Filtered: ☐ Yes ☒ No Well Volumes Purged: 3

Spring Flow Rate: N/A GPM Filter Pore Size: N/A microns

Sample Date: (mm/dd/yy) 06/01/16 Sample Collection Time: See attached chain of custody

Sample Collector's Name: Corey Correll

Sample Collector's Affiliation: Stantec Consulting Services Inc.

Laboratory Performing Analysis: Eurofins Lancaster Laboratories

Lab Accreditation Number(s) 36-00037

Lab Sample Number: See laboratory reports Lab Analysis Date: See laboratory reports

Comments: One-half of the reporting detection limit is used for the non-detected values in the calculations reported in Section II.

I.D. No. PAD980550594
Monitoring Point No. MW-86
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

I. PARAMETERS USED AS INDICATORS OF GROUND WATER CONTAMINATION–RESULTS

Replicates (Enter all data in mg/l except as indicated)

Storet No.	Parameters	Values				Analysis Method Number
(00403)	pH (SU)	8.45	8.64	8.71	8.54	Horiba U-52
(00095)	Spec. Cond. (umhos/cm)	505	516	522	531	Horiba U-52
(00680)	Total Organic Carbon mg/l)	9.2	9.0	9.2	9.2	SM 5310 C-2000
(70353)	Total Organic Halogen (µg/l)	ND(20)	ND(20)	ND(20)	ND(20)	SW846 9020B
( )						

ND = Not detected (laboratory reporting limit)

II. TESTS FOR SIGNIFICANCE –CALCULATIONS

(attach all necessary data)

A. Arithmetic results for this quarter (background values based on first year's sample results in the upgradient wells; or as otherwise approved by the Department).

(Enter all data in mg/l except as indicated).

		$(\overline{X}_b)$ Background Mean	(S^2_b) Background Variance	(X_m) Monitoring Mean	(S^2_m) Monitoring Variance
(00403)	pH (SU)	6.92	0.108	8.59	0.0097
(00095)	Spec. Cond. (umhos/cm)	1,260	277	519	89
(00680)	Total Organic Carbon	15.0	20.5	9.2	0.0075
(70353)	Total Organic Halogen (µg/l)	147	9,938	10.0	0.00
( )					

B. Student's T-Test (at the specified level of significance using Cochran's Approximation to the Behrens-Fisher single-tailed solution of the comparison of two independent samples with unequal population variances; or an equivalent approved method in 40 CFR 264.97(h)).

Level of Significance Used – **.01** .05 (highlight/bold one)

I.D. No. PAD980550594
Monitoring Point No. MW-86
Sample Date 06/01/16

HAZARDOUS WASTE MONITORING QUARTERLY REPORT

(Enter all data in mg/l except as indicated).

		(t*) weighted t-statistic	(t_c) comparison t-statistic	Significant Change? (Highlight/bold One)	
(00403)	pH (SU) (use two-tailed test)	9.72	+/-5.841	**Y**	N
(00095)	Spec. Cond. (umhos/cm)	-77.5	+/-4.541	**Y**	N
(00680)	Total Organic Carbon	-2.58	+/-4.541	Y	**N**
(70353)	Total Organic Halogen (µg/l)	-2.75	+/-4.541	Y	**N**
( )				Y	N

Name, Address and Title of Individual Performing the Tests for Significance:

Michael Malone, Senior Geologist

Stantec Consulting Services Inc.

1060 Andrew Drive, Suite 140

West Chester, Pennsylvania 19380

I.D. Number	PAD980550594
Monitoring Point No.	MW-86
Sample Date	06/01/16

Marcus Hook Industrial Complex
Post-Closure Groundwater Quality Parameters and
Site-Specific Contamination Indicator Parameters

Site-Specific Organic Parameters	Value	Units
Benzene	ND (0.5)	µg/l
Ethylbenzene	ND (0.5)	µg/l
Toluene	ND (0.5)	µg/l
Xylene (total)	ND (0.5)	µg/l
Acenaphthene	ND (0.3)	µg/l
Anthracene	ND (0.2)	µg/l
Benzo(a)anthracene	ND (0.2)	µg/l
Benzo(a)pyrene	ND (0.3)	µg/l
Di-n-butylphthalate	ND (0.5)	µg/l
Chrysene	ND (0.2)	µg/l
Bis(2-ethylhexyl)phthalate	ND (0.9)	µg/l
Fluorene	ND (0.3)	µg/l
Naphthalene	0.3 J	µg/l
Phenanthrene	ND (0.2)	µg/l
Phenol	ND (0.4)	µg/l
SGT-HEM (TPH)	ND (1400)	µg/l
Site-Specific Inorganic Parameters	**Value**	**Units**
Chromium (total)	ND (2.0)	µg/l
Lead	ND (5.1)	µg/l
Cyanide (total)	ND (5.0)	µg/l

NOTES:
µg/l = Micrograms per liter
ND = Laboratory analytical result was non-detect; method detection limit in parentheses.
J = Estimated value
SGT-HEM (TPH) = Total Petroleum Hydrocarbons

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

Report Date: June 13, 2016

Project: Marcus Hook RCRA

Submittal Date: 06/01/2016
Group Number: 1667446
PO Number: MARCUS HOOK
State of Sample Origin: PA

Client Sample Description	Lancaster Labs (LL) #
MW-17-20160601 Grab Groundwater	8406618
MW-28-20160601 Grab Groundwater	8406619
MW-30-20160601 Grab Groundwater	8406620
MW-40-20160601 Grab Groundwater	8406621
MW-86-20160601 Grab Groundwater	8406622

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Electronic Copy To Sunoco c/o Stantec Attn: Jennifer Menges

Respectfully Submitted,

Amek Carter
Specialist

(717) 556-7252

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Analysis Report

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Sample Description: MW-17-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406618
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 11:45 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR17

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit	Dilution Factor
GC/MS Volatiles	**EPA 624**		**ug/l**		**ug/l**	
10371	Benzene	71-43-2	N.D.		0.5	1
10371	Ethylbenzene	100-41-4	N.D.		0.5	1
10371	Toluene	108-88-3	N.D.		0.5	1
10371	Xylene (total)	1330-20-7	N.D.		0.5	1
GC/MS Semivolatiles	**EPA 625**		**ug/l**		**ug/l**	
10334	Acenaphthene	83-32-9	N.D.		0.3	1
10334	Anthracene	120-12-7	N.D.		0.2	1
10334	Benzo(a)anthracene	56-55-3	N.D.		0.2	1
10334	Benzo(a)pyrene	50-32-8	N.D.		0.3	1
10334	Di-n-butylphthalate	84-74-2	N.D.		0.5	1
10334	Chrysene	218-01-9	N.D.		0.2	1
10334	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.		0.9	1
10334	Fluorene	86-73-7	N.D.		0.3	1
10334	Naphthalene	91-20-3	N.D.		0.2	1
10334	Phenanthrene	85-01-8	N.D.		0.2	1
10334	Phenol	108-95-2	N.D.		0.4	1
Metals	**SW-846 6010B**		**ug/l**		**ug/l**	
07051	Chromium	7440-47-3	3.2	J	2.0	1
01754	Iron	7439-89-6	294		33.3	1
07055	Lead	7439-92-1	N.D.		5.1	1
07058	Manganese	7439-96-5	10.1		1.2	1
01767	Sodium	7440-23-5	21,200		167	1
Wet Chemistry	**EPA 300.0**		**ug/l**		**ug/l**	
00224	Chloride	16887-00-6	20,100		2,000	10
00228	Sulfate	14808-79-8	42,500		3,000	10
	EPA 335.4		**ug/l**		**ug/l**	
00237	Total Cyanide (water)	57-12-5	6.3	J	5.0	1
	EPA 420.4		**ug/l**		**ug/l**	
00434	Phenols (water)	n.a.	N.D.		15	1
	EPA 1664A		**ug/l**		**ug/l**	
00612	SGT-HEM (TPH)	n.a.	N.D.		1,400	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

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Analysis Report

Sample Description: MW-17-20160601 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406618
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 11:45 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR17

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10371	BTEX by 624	EPA 624	1	U161601AA	06/08/2016	14:24	Jason M Long	1
10334	SVOCs 625	EPA 625	1	16154WAO625	06/06/2016	20:04	Linda M Hartenstine	1
08108	625 Water Extraction	EPA 625	1	16154WAO625	06/03/2016	09:00	Bradley W VanLeuven	1
07051	Chromium	SW-846 6010B	1	161551848010	06/06/2016	19:41	Cindy M Gehman	1
01754	Iron	SW-846 6010B	1	161551848010	06/06/2016	19:41	Cindy M Gehman	1
07055	Lead	SW-846 6010B	1	161551848010	06/06/2016	19:41	Cindy M Gehman	1
07058	Manganese	SW-846 6010B	1	161551848010	06/06/2016	19:41	Cindy M Gehman	1
01767	Sodium	SW-846 6010B	1	161551848010	06/06/2016	19:41	Cindy M Gehman	1
01848	ICP-WW, 3005A (tot rec) - U3	SW-846 3005A	1	161551848010	06/06/2016	08:15	Lisa J Cooke	1
00224	Chloride	EPA 300.0	2	16154972901B	06/04/2016	03:42	Alexandria M Lanager	10
00228	Sulfate	EPA 300.0	2	16154972901B	06/04/2016	03:42	Alexandria M Lanager	10
00237	Total Cyanide (water)	EPA 335.4	1	16157102101A	06/06/2016	16:17	David A Seavey	1
00434	Phenols (water)	EPA 420.4	1	16155113101A	06/06/2016	10:58	David A Seavey	1
00492	Cyanide Water Distillation	EPA 335.4	1	16157102101A	06/05/2016	14:35	Joseph E McKenzie	1
00491	Phenol Distillation (water)	EPA 420.4	1	16155113101A	06/03/2016	13:45	Barbara A Washington	1
00612	SGT-HEM (TPH)	EPA 1664A	1	16161807801A	06/09/2016	17:53	Michelle L Lalli	1

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Analysis Report

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Sample Description: MW-28-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406619
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 11:10 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR28

CAT No.	Analysis Name		CAS Number	Result		Method Detection Limit	Dilution Factor
GC/MS Volatiles		**EPA 624**		**ug/l**		**ug/l**	
10371	Benzene		71-43-2	N.D.		0.5	1
10371	Ethylbenzene		100-41-4	N.D.		0.5	1
10371	Toluene		108-88-3	N.D.		0.5	1
10371	Xylene (total)		1330-20-7	N.D.		0.5	1
GC/MS Semivolatiles		**EPA 625**		**ug/l**		**ug/l**	
10334	Acenaphthene		83-32-9	N.D.		0.3	1
10334	Anthracene		120-12-7	N.D.		0.2	1
10334	Benzo(a)anthracene		56-55-3	N.D.		0.2	1
10334	Benzo(a)pyrene		50-32-8	N.D.		0.3	1
10334	Di-n-butylphthalate		84-74-2	N.D.		0.5	1
10334	Chrysene		218-01-9	N.D.		0.2	1
10334	bis(2-Ethylhexyl)phthalate		117-81-7	N.D.		0.9	1
10334	Fluorene		86-73-7	N.D.		0.3	1
10334	Naphthalene		91-20-3	0.4	J	0.2	1
10334	Phenanthrene		85-01-8	N.D.		0.2	1
10334	Phenol		108-95-2	N.D.		0.4	1
Metals		**SW-846 6010B**		**ug/l**		**ug/l**	
07051	Chromium		7440-47-3	21.0		2.0	1
01754	Iron		7439-89-6	278		33.3	1
07055	Lead		7439-92-1	N.D.		5.1	1
07058	Manganese		7439-96-5	130		1.2	1
01767	Sodium		7440-23-5	26,100		167	1
Wet Chemistry		**EPA 300.0**		**ug/l**		**ug/l**	
00224	Chloride		16887-00-6	37,200		10,000	50
00228	Sulfate		14808-79-8	7,700		1,500	5
		EPA 335.4		**ug/l**		**ug/l**	
00237	Total Cyanide (water)		57-12-5	N.D.		5.0	1
		EPA 420.4		**ug/l**		**ug/l**	
00434	Phenols (water)		n.a.	N.D.		15	1
		EPA 1664A		**ug/l**		**ug/l**	
00612	SGT-HEM (TPH)		n.a.	N.D.		1,400	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

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Analysis Report

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Sample Description: MW-28-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406619
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 11:10 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR28

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10371	BTEX by 624	EPA 624	1	U161601AA	06/08/2016	14:47	Jason M Long	1
10334	SVOCs 625	EPA 625	1	16154WAO625	06/06/2016	20:29	Linda M Hartenstine	1
08108	625 Water Extraction	EPA 625	1	16154WAO625	06/03/2016	09:00	Bradley W VanLeuven	1
07051	Chromium	SW-846 6010B	1	161551848010	06/06/2016	19:44	Cindy M Gehman	1
01754	Iron	SW-846 6010B	1	161551848010	06/06/2016	19:44	Cindy M Gehman	1
07055	Lead	SW-846 6010B	1	161551848010	06/06/2016	19:44	Cindy M Gehman	1
07058	Manganese	SW-846 6010B	1	161551848010	06/06/2016	19:44	Cindy M Gehman	1
01767	Sodium	SW-846 6010B	1	161551848010	06/06/2016	19:44	Cindy M Gehman	1
01848	ICP-WW, 3005A (tot rec) - U3	SW-846 3005A	1	161551848010	06/06/2016	08:15	Lisa J Cooke	1
00224	Chloride	EPA 300.0	1	16154972901B	06/02/2016	20:09	Alexandria M Lanager	50
00228	Sulfate	EPA 300.0	1	16154972901B	06/02/2016	19:55	Alexandria M Lanager	5
00237	Total Cyanide (water)	EPA 335.4	1	16157102101A	06/06/2016	16:18	David A Seavey	1
00434	Phenols (water)	EPA 420.4	1	16158113101A	06/09/2016	16:52	David A Seavey	1
00492	Cyanide Water Distillation	EPA 335.4	1	16157102101A	06/05/2016	14:35	Joseph E McKenzie	1
00491	Phenol Distillation (water)	EPA 420.4	1	16158113101A	06/06/2016	09:00	Nancy J Shoop	1
00612	SGT-HEM (TPH)	EPA 1664A	1	16161807801A	06/09/2016	17:53	Michelle L Lalli	1

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Analysis Report

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Sample Description: MW-30-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406620
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 10:30 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR30

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit	Dilution Factor
GC/MS Volatiles	**EPA 624**		**ug/l**		**ug/l**	
10371	Benzene	71-43-2	1		0.5	1
10371	Ethylbenzene	100-41-4	N.D.		0.5	1
10371	Toluene	108-88-3	N.D.		0.5	1
10371	Xylene (total)	1330-20-7	N.D.		0.5	1
GC/MS Semivolatiles	**EPA 625**		**ug/l**		**ug/l**	
10334	Acenaphthene	83-32-9	N.D.		0.3	1
10334	Anthracene	120-12-7	N.D.		0.2	1
10334	Benzo(a)anthracene	56-55-3	N.D.		0.2	1
10334	Benzo(a)pyrene	50-32-8	N.D.		0.3	1
10334	Di-n-butylphthalate	84-74-2	N.D.		0.5	1
10334	Chrysene	218-01-9	N.D.		0.2	1
10334	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.		0.9	1
10334	Fluorene	86-73-7	N.D.		0.3	1
10334	Naphthalene	91-20-3	0.7	J	0.2	1
10334	Phenanthrene	85-01-8	N.D.		0.2	1
10334	Phenol	108-95-2	N.D.		0.4	1
Metals	**SW-846 6010B**		**ug/l**		**ug/l**	
07051	Chromium	7440-47-3	2.6	J	2.0	1
01754	Iron	7439-89-6	63.7	J	33.3	1
07055	Lead	7439-92-1	N.D.		5.1	1
07058	Manganese	7439-96-5	7.2		1.2	1
01767	Sodium	7440-23-5	137,000		167	1
Wet Chemistry	**EPA 300.0**		**ug/l**		**ug/l**	
00224	Chloride	16887-00-6	215,000		20,000	100
00228	Sulfate	14808-79-8	22,100		1,500	5
	EPA 335.4		**ug/l**		**ug/l**	
00237	Total Cyanide (water)	57-12-5	7.6	J	5.0	1
	EPA 420.4		**ug/l**		**ug/l**	
00434	Phenols (water)	n.a.	N.D.		15	1
	EPA 1664A		**ug/l**		**ug/l**	
00612	SGT-HEM (TPH)	n.a.	1,400	J	1,400	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

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Analysis Report

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Sample Description: MW-30-20160601 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406620
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 10:30 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR30

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10371	BTEX by 624	EPA 624	1	U161601AA	06/08/2016	15:11	Jason M Long	1
10334	SVOCs 625	EPA 625	1	16154WAO625	06/06/2016	20:54	Linda M Hartenstine	1
08108	625 Water Extraction	EPA 625	1	16154WAO625	06/03/2016	09:00	Bradley W VanLeuven	1
07051	Chromium	SW-846 6010B	1	161551848010	06/06/2016	19:47	Cindy M Gehman	1
01754	Iron	SW-846 6010B	1	161551848010	06/06/2016	19:47	Cindy M Gehman	1
07055	Lead	SW-846 6010B	1	161551848010	06/06/2016	19:47	Cindy M Gehman	1
07058	Manganese	SW-846 6010B	1	161551848010	06/06/2016	19:47	Cindy M Gehman	1
01767	Sodium	SW-846 6010B	1	161551848010	06/06/2016	19:47	Cindy M Gehman	1
01848	ICP-WW, 3005A (tot rec) - U3	SW-846 3005A	1	161551848010	06/06/2016	08:15	Lisa J Cooke	1
00224	Chloride	EPA 300.0	1	16154972901B	06/02/2016	20:36	Alexandria M Lanager	100
00228	Sulfate	EPA 300.0	1	16154972901B	06/02/2016	20:22	Alexandria M Lanager	5
00237	Total Cyanide (water)	EPA 335.4	1	16157102101A	06/06/2016	16:19	David A Seavey	1
00434	Phenols (water)	EPA 420.4	1	16158113101A	06/09/2016	16:56	David A Seavey	1
00492	Cyanide Water Distillation	EPA 335.4	1	16157102101A	06/05/2016	14:35	Joseph E McKenzie	1
00491	Phenol Distillation (water)	EPA 420.4	1	16158113101A	06/06/2016	09:00	Nancy J Shoop	1
00612	SGT-HEM (TPH)	EPA 1664A	1	16162807802A	06/10/2016	14:18	Yolunder Y Bunch	1

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Analysis Report

Sample Description: MW-40-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406621
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 09:45 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR40

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit	Dilution Factor
GC/MS Volatiles	**EPA 624**		**ug/l**		**ug/l**	
10371	Benzene	71-43-2	N.D.		0.5	1
10371	Ethylbenzene	100-41-4	N.D.		0.5	1
10371	Toluene	108-88-3	N.D.		0.5	1
10371	Xylene (total)	1330-20-7	N.D.		0.5	1
GC/MS Semivolatiles	**EPA 625**		**ug/l**		**ug/l**	
10334	Acenaphthene	83-32-9	N.D.		0.3	1
10334	Anthracene	120-12-7	1	J	0.2	1
10334	Benzo(a)anthracene	56-55-3	0.4	J	0.2	1
10334	Benzo(a)pyrene	50-32-8	0.3	J	0.3	1
10334	Di-n-butylphthalate	84-74-2	N.D.		0.5	1
10334	Chrysene	218-01-9	0.3	J	0.2	1
10334	bis(2-Ethylhexyl)phthalate	117-81-7	1	J	1	1
10334	Fluorene	86-73-7	N.D.		0.3	1
10334	Naphthalene	91-20-3	N.D.		0.2	1
10334	Phenanthrene	85-01-8	0.4	J	0.2	1
10334	Phenol	108-95-2	N.D.		0.4	1
Metals	**SW-846 6010B**		**ug/l**		**ug/l**	
07051	Chromium	7440-47-3	28.4		2.0	1
01754	Iron	7439-89-6	9,240		33.3	1
07055	Lead	7439-92-1	23.2		5.1	1
07058	Manganese	7439-96-5	132		1.2	1
01767	Sodium	7440-23-5	96,100		167	1
Wet Chemistry	**EPA 300.0**		**ug/l**		**ug/l**	
00224	Chloride	16887-00-6	141,000		10,000	50
00228	Sulfate	14808-79-8	196,000		15,000	50
	EPA 335.4		**ug/l**		**ug/l**	
00237	Total Cyanide (water)	57-12-5	6.2	J	5.0	1
	EPA 420.4		**ug/l**		**ug/l**	
00434	Phenols (water)	n.a.	39	J	15	1
	EPA 1664A		**ug/l**		**ug/l**	
00612	SGT-HEM (TPH)	n.a.	N.D.		1,400	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

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Analysis Report

Sample Description: MW-40-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406621
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 09:45 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR40

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10371	BTEX by 624	EPA 624	1	U161601AA	06/08/2016	15:34	Jason M Long	1
10334	SVOCs 625	EPA 625	1	16154WAO625	06/06/2016	21:19	Linda M Hartenstine	1
08108	625 Water Extraction	EPA 625	1	16154WAO625	06/03/2016	09:00	Bradley W VanLeuven	1
07051	Chromium	SW-846 6010B	1	161551848010	06/06/2016	19:50	Cindy M Gehman	1
01754	Iron	SW-846 6010B	1	161551848010	06/06/2016	19:50	Cindy M Gehman	1
07055	Lead	SW-846 6010B	1	161551848010	06/06/2016	19:50	Cindy M Gehman	1
07058	Manganese	SW-846 6010B	1	161551848010	06/06/2016	19:50	Cindy M Gehman	1
01767	Sodium	SW-846 6010B	1	161551848010	06/06/2016	19:50	Cindy M Gehman	1
01848	ICP-WW, 3005A (tot rec) - U3	SW-846 3005A	1	161551848010	06/06/2016	08:15	Lisa J Cooke	1
00224	Chloride	EPA 300.0	1	16154972901B	06/02/2016	20:50	Alexandria M Lanager	50
00228	Sulfate	EPA 300.0	1	16154972901B	06/02/2016	20:50	Alexandria M Lanager	50
00237	Total Cyanide (water)	EPA 335.4	1	16157102101A	06/06/2016	16:20	David A Seavey	1
00434	Phenols (water)	EPA 420.4	1	16158113101A	06/09/2016	16:57	David A Seavey	1
00492	Cyanide Water Distillation	EPA 335.4	1	16157102101A	06/05/2016	14:35	Joseph E McKenzie	1
00491	Phenol Distillation (water)	EPA 420.4	1	16158113101A	06/06/2016	09:00	Nancy J Shoop	1
00612	SGT-HEM (TPH)	EPA 1664A	1	16162807802A	06/10/2016	14:18	Yolunder Y Bunch	1

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Analysis Report

Sample Description: MW-86-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406622
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 12:20 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR86

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit	Dilution Factor
GC/MS Volatiles	**EPA 624**		**ug/l**		**ug/l**	
10371	Benzene	71-43-2	N.D.		0.5	1
10371	Ethylbenzene	100-41-4	N.D.		0.5	1
10371	Toluene	108-88-3	N.D.		0.5	1
10371	Xylene (total)	1330-20-7	N.D.		0.5	1
GC/MS Semivolatiles	**EPA 625**		**ug/l**		**ug/l**	
10334	Acenaphthene	83-32-9	N.D.		0.3	1
10334	Anthracene	120-12-7	N.D.		0.2	1
10334	Benzo(a)anthracene	56-55-3	N.D.		0.2	1
10334	Benzo(a)pyrene	50-32-8	N.D.		0.3	1
10334	Di-n-butylphthalate	84-74-2	N.D.		0.5	1
10334	Chrysene	218-01-9	N.D.		0.2	1
10334	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.		0.9	1
10334	Fluorene	86-73-7	N.D.		0.3	1
10334	Naphthalene	91-20-3	0.3	J	0.2	1
10334	Phenanthrene	85-01-8	N.D.		0.2	1
10334	Phenol	108-95-2	N.D.		0.4	1
Metals	**SW-846 6010B**		**ug/l**		**ug/l**	
07051	Chromium	7440-47-3	N.D.		2.0	1
01754	Iron	7439-89-6	80.6	J	33.3	1
07055	Lead	7439-92-1	N.D.		5.1	1
07058	Manganese	7439-96-5	288		1.2	1
01767	Sodium	7440-23-5	12,100		167	1
Wet Chemistry	**EPA 300.0**		**ug/l**		**ug/l**	
00224	Chloride	16887-00-6	9,800		1,000	5
00228	Sulfate	14808-79-8	17,500		1,500	5
	EPA 335.4		**ug/l**		**ug/l**	
00237	Total Cyanide (water)	57-12-5	N.D.		5.0	1
	EPA 420.4		**ug/l**		**ug/l**	
00434	Phenols (water)	n.a.	N.D.		15	1
	EPA 1664A		**ug/l**		**ug/l**	
00612	SGT-HEM (TPH)	n.a.	N.D.		1,400	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

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Analysis Report

Sample Description: MW-86-20160601 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406622
LL Group # 1667446
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 06/01/2016 12:20 by CC

Submitted: 06/01/2016 19:20
Reported: 06/13/2016 15:34

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

RCR86

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time		Analyst	Dilution Factor
10371	BTEX by 624	EPA 624	1	U161601AA	06/08/2016	15:57	Jason M Long	1
10334	SVOCs 625	EPA 625	1	16154WAO625	06/06/2016	21:43	Linda M Hartenstine	1
08108	625 Water Extraction	EPA 625	1	16154WAO625	06/03/2016	09:00	Bradley W VanLeuven	1
07051	Chromium	SW-846 6010B	1	161551848010	06/06/2016	19:53	Cindy M Gehman	1
01754	Iron	SW-846 6010B	1	161551848010	06/06/2016	19:53	Cindy M Gehman	1
07055	Lead	SW-846 6010B	1	161551848010	06/06/2016	19:53	Cindy M Gehman	1
07058	Manganese	SW-846 6010B	1	161551848010	06/06/2016	19:53	Cindy M Gehman	1
01767	Sodium	SW-846 6010B	1	161551848010	06/06/2016	19:53	Cindy M Gehman	1
01848	ICP-WW, 3005A (tot rec) - U3	SW-846 3005A	1	161551848010	06/06/2016	08:15	Lisa J Cooke	1
00224	Chloride	EPA 300.0	1	16154972901B	06/02/2016	21:03	Alexandria M Lanager	5
00228	Sulfate	EPA 300.0	1	16154972901B	06/02/2016	21:03	Alexandria M Lanager	5
00237	Total Cyanide (water)	EPA 335.4	1	16157102101A	06/06/2016	16:21	David A Seavey	1
00434	Phenols (water)	EPA 420.4	1	16158113101A	06/09/2016	16:58	David A Seavey	1
00492	Cyanide Water Distillation	EPA 335.4	1	16157102101A	06/05/2016	14:35	Joseph E McKenzie	1
00491	Phenol Distillation (water)	EPA 420.4	1	16158113101A	06/06/2016	09:00	Nancy J Shoop	1
00612	SGT-HEM (TPH)	EPA 1664A	1	16162807802A	06/10/2016	14:18	Yolunder Y Bunch	1

Quality Control Summary

Client Name: Stantec
Reported: 06/13/2016 15:34

Group Number: 1667446

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL
	ug/l	ug/l
Batch number: U161601AA	Sample number(s):	8406618-8406622
Benzene	N.D.	0.5
Ethylbenzene	N.D.	0.5
Toluene	N.D.	0.5
Xylene (total)	N.D.	0.5
Batch number: 16154WAO625	Sample number(s):	8406618-8406622
Acenaphthene	N.D.	0.3
Anthracene	N.D.	0.2
Benzo(a)anthracene	N.D.	0.2
Benzo(a)pyrene	N.D.	0.3
Di-n-butylphthalate	N.D.	0.5
Chrysene	N.D.	0.2
bis(2-Ethylhexyl)phthalate	N.D.	1
Fluorene	N.D.	0.3
Naphthalene	N.D.	0.2
Phenanthrene	N.D.	0.2
Phenol	N.D.	0.4
Batch number: 161551848010	Sample number(s):	8406618-8406622
Chromium	N.D.	2.0
Iron	N.D.	33.3
Lead	N.D.	5.1
Manganese	N.D.	1.2
Sodium	N.D.	167
Batch number: 16154972901B	Sample number(s):	8406618-8406622
Chloride	N.D.	200
Sulfate	N.D.	300
Batch number: 16155113101A	Sample number(s):	8406618
Phenols (water)	N.D.	15
Batch number: 16157102101A	Sample number(s):	8406618-8406622
Total Cyanide (water)	N.D.	5.0
Batch number: 16158113101A	Sample number(s):	8406619-8406622
Phenols (water)	N.D.	15
Batch number: 16161807801A	Sample number(s):	8406618-8406619
SGT-HEM (TPH)	N.D.	1,400
Batch number: 16162807802A	Sample number(s):	8406620-8406622
SGT-HEM (TPH)	N.D.	1,400

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Stantec
Reported: 06/13/2016 15:34

Group Number: 1667446

LCS/LCSD

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: U161601AA	Sample number(s): 8406618-8406622								
Benzene	20	21.49	20	21.53	107	108	80-120	0	30
Ethylbenzene	20	21.09	20	21.5	105	107	80-120	2	30
Toluene	20	20.98	20	21.32	105	107	80-120	2	30
Xylene (total)	60	64.58	60	64.98	108	108	80-120	1	30
	ug/l	ug/l	ug/l	ug/l					
Batch number: 16154WAO625	Sample number(s): 8406618-8406622								
Acenaphthene	50	49.02	50	48.73	98	97	71-118	1	30
Anthracene	50	48.87	50	48.66	98	97	80-114	0	30
Benzo(a)anthracene	50	50.57	50	50.79	101	102	76-117	0	30
Benzo(a)pyrene	50	48.28	50	48.48	97	97	76-112	0	30
Di-n-butylphthalate	50	50.21	50	51.02	100	102	77-116	2	30
Chrysene	50	50.7	50	51.57	101	103	81-118	2	30
bis(2-Ethylhexyl)phthalate	50	50.75	50	51.26	102	103	77-118	1	30
Fluorene	50	49.13	50	48.89	98	98	80-116	0	30
Naphthalene	50	45.82	50	46.83	92	94	52-115	2	30
Phenanthrene	50	48.32	50	48.19	97	96	78-112	0	30
Phenol	50	31.12	50	29.59	62	59	14-69	5	30
	ug/l	ug/l	ug/l	ug/l					
Batch number: 161551848010	Sample number(s): 8406618-8406622								
Chromium	200	200.99			100		80-120		
Iron	1000	974.37			97		80-120		
Lead	150	149.1			99		80-120		
Manganese	500	501.7			100		80-120		
Sodium	10000	9870.98			99		80-120		
	ug/l	ug/l	ug/l	ug/l					
Batch number: 16154972901B	Sample number(s): 8406618-8406622								
Chloride	3000	3009.15			100		90-110		
Sulfate	7500	7444.13			99		90-110		
Batch number: 16155113101A	Sample number(s): 8406618								
Phenols (water)	200	218.34			109		90-110		
Batch number: 16157102101A	Sample number(s): 8406618-8406622								
Total Cyanide (water)	200	209.9	200	208.6	105	104	90-110	1	20
Batch number: 16158113101A	Sample number(s): 8406619-8406622								
Phenols (water)	200	214.58			107		90-110		
	ug/l	ug/l	ug/l	ug/l					
Batch number: 16161807801A	Sample number(s): 8406618-8406619								
SGT-HEM (TPH)	20000	13400	20000	13700	67	69	64-114	2	18
Batch number: 16162807802A	Sample number(s): 8406620-8406622								
SGT-HEM (TPH)	20000	13800	20000	13300	69	67	64-114	4	18

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Stantec
Reported: 06/13/2016 15:34

Group Number: 1667446

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ug/l	MS Spike Added ug/l	MS Conc ug/l	MSD Spike Added ug/l	MSD Conc ug/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 161551848010	Sample number(s): 8406618-8406622 UNSPK: P396689									
Chromium	N.D.	200	199.21	200	202.4	100	101	75-125	2	20
Iron	N.D.	1000	968.51	1000	964.56	97	96	75-125	0	20
Lead	N.D.	150	144.01	150	145.62	96	97	75-125	1	20
Manganese	374.23	500	855.82	500	869.66	96	99	75-125	2	20
Sodium	153185.12	10000	161866.92	10000	160218.32	87 (2)	70 (2)	75-125	1	20
	ug/l	ug/l	ug/l	ug/l	ug/l					
Batch number: 16154972901B	Sample number(s): 8406618-8406622 UNSPK: P406597									
Chloride	5501.96	20000	24138.88			93		90-110		
Sulfate	N.D.	50000	48107.51			96		90-110		
Batch number: 16155113101A	Sample number(s): 8406618 UNSPK: P402412									
Phenols (water)	N.D.	200	202.81	200	221.55	101	111*	90-110	9*	6
Batch number: 16157102101A	Sample number(s): 8406618-8406622 UNSPK: P406279									
Total Cyanide (water)	N.D.	200	207.9			104		90-110		
Batch number: 16158113101A	Sample number(s): 8406619-8406622 UNSPK: 8406619									
Phenols (water)	N.D.	200	223.7	200	210.15	112*	105	90-110	6	6
	ug/l	ug/l	ug/l	ug/l	ug/l					
Batch number: 16161807801A	Sample number(s): 8406618-8406619 UNSPK: P399992									
SGT-HEM (TPH)	N.D.	20800	5000			24*		64-132		
Batch number: 16162807802A	Sample number(s): 8406620-8406622 UNSPK: P407176									
SGT-HEM (TPH)	1770.9	20800	14375	20800	13645.8	61*	57*	64-132	5	25

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc ug/l	DUP Conc ug/l	DUP RPD	DUP RPD Max
Batch number: 161551848010	Sample number(s): 8406618-8406622 BKG: P396689			
Chromium	N.D.	N.D.	0 (1)	20
Iron	N.D.	N.D.	0 (1)	20
Lead	N.D.	N.D.	0 (1)	20
Manganese	374.23	371.89	1	20
Sodium	153185.12	154752.92	1	20
	ug/l	ug/l		
Batch number: 16154972901B	Sample number(s): 8406618-8406622 BKG: P406597			

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Stantec
Reported: 06/13/2016 15:34

Group Number: 1667446

Laboratory Duplicate (continued)

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc ug/l	DUP Conc ug/l	DUP RPD	DUP RPD Max
Chloride	5501.96	5520.58	0 (1)	15
Sulfate	N.D.	N.D.	0 (1)	15
Batch number: 16157102101A	Sample number(s): 8406618-8406622 BKG: P406279			
Total Cyanide (water)	N.D.	N.D.	0 (1)	20

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: BTEX by 624
Batch number: U161601AA

	1,2-Dichloroethane-d4	Fluorobenzene	4-Bromofluorobenzene
8406618	99	94	82
8406619	99	95	81
8406620	98	94	81
8406621	97	95	87
8406622	99	94	83
Blank	96	92	85
LCS	96	100	93
LCSD	98	100	95
Limits:	78-118	88-107	80-118

Analysis Name: SVOCs 625
Batch number: 16154WAO625

	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Phenol-d6	2-Fluorophenol	2,4,6-Tribromophenol
8406618	94	102	97	43	65	74
8406619	96	99	100	50	68	66
8406620	82	84	99	43	61	63
8406621	91	88	108	49	67	89
8406622	92	95	85	43	60	64
Blank	97	98	114	46	71	96
LCS	99	96	107	55	78	97
LCSD	99	95	106	53	76	98
Limits:	60-119	62-116	55-124	10-75	10-105	11-154

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 16657 Group # 1667446 Sample # 8406618-23

COC # 502302

Client Information

Client: Stantec	Acct. #: Evergreen
Project Name/#: Marcus Hook RCRA Sampling	PWSID #:
Project Manager: Jennifer Menges	P.O. #:
Sampler: Correll	Quote #:
State where samples were collected: PA	For Compliance: Yes ☐ No ☐

Matrix

☐ Tissue ☐ Sediment ☐ Soil ☒ Ground ☐ Potable ☐ Surface ☐ NPDES Water Other: ____

Analysis Requested

Preservation Codes

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Other	Total # of Containers	EPA 624 Water (H)	EPA 625 Water Extraction (O)	SGT-HEM (TPH) (H)	Metals by SW846-6010B (~~B/O~~)	Chloride/sulfate 300.0 (~~H~~O)	Phenolics (00434 Phenols/water) (S)	Total Cyanides (TCN) (B/O)			
MW-17-20160601	6-1-16	1145	X			X		12	X	X	X	X	X	X	X			
MW-28-20160601	↓	1110	X			X		12	X	X	X	X	X	X	X			
MW-30-20160601	↓	1030	X			X		12	X	X	X	X	X	X	X			
MW-40-20160601	↓	0945	X			X		12	X	X	X	X	X	X	X			
MW-86-20160601	↓	1220	X			X		12	X	X	X	X	X	X	X			

For Lab Use Only
FSC: ____
SCR#: ____

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks
EPA 624: Benzene, Toluene, Ethylbenzene, Total Xylenes.
metals: Chromium, Iron, Lead, Manganese, Sodium.
EPA 625:
Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Bis(2-Ethylhexyl)phthalate, Chrysene, Di-N-butylphthalate, Fluorene, Naphthalene, Phenanthrene, Phenol

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: Jennifer.Menges@Stantec.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
[signature]	6-1-16	1245	[signature]	6-1-16	1245
[signature]	6/1/16	1920			
			[signature]	6/1/16	1920

EDD Required? Yes No
If yes, format: EQUIS

Site-Specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:
UPS ____ FedEx ____ Other ____

Temperature upon receipt 2.7-5.5 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 148667

Group Number(s): 1667446

Client: Stantec

Delivery and Receipt Information

Delivery Method:	ELLE Courier	Arrival Timestamp:	06/01/2016 19:20
Number of Packages:	5	Number of Projects:	1
State/Province of Origin:	PA		

Arrival Condition Summary

Shipping Container Sealed:	No	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	No
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	2
Samples Intact:	Yes	Trip Blank Type:	HCl
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Wesley Miller (2308) at 22:00 on 06/01/2016

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT121	5.5	DT	Wet	Y	Bagged	N
2	DT121	2.7	DT	Wet	Y	Bagged	N
3	DT121	4.5	DT	Wet	Y	Bagged	N
4	DT121	3.9	DT	Wet	Y	Bagged	N
5	DT121	2.1	DT	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Analysis Report

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ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

Report Date: June 10, 2016

Project: Marcus Hook RCRA

Submittal Date: 06/01/2016
Group Number: 1667448
PO Number: MARCUS HOOK
State of Sample Origin: PA

Client Sample Description	Lancaster Labs (LL) #
MW-40A-20160531 Grab Groundwater	8406625
MW-40B-20160531 Grab Groundwater	8406626
MW-40C-20160531 Grab Groundwater	8406627
MW-30A-20160531 Grab Groundwater	8406628
MW-30B-20160531 Grab Groundwater	8406629
MW-30C-20160531 Grab Groundwater	8406630
MW-30D-20160531 Grab Groundwater	8406631
MW-28A-20160531 Grab Groundwater	8406632
MW-28B-20160531 Grab Groundwater	8406633
MW-28C-20160531 Grab Groundwater	8406634
MW-28D-20160531 Grab Groundwater	8406635
MW-17A-20160531 Grab Groundwater	8406636
MW-17B-20160531 Grab Groundwater	8406637
MW-17C-20160531 Grab Groundwater	8406638
MW-17D-20160531 Grab Groundwater	8406639
MW-86A-20160531 Grab Groundwater	8406640
MW-86B-20160531 Grab Groundwater	8406641
MW-86C-20160531 Grab Groundwater	8406642
MW-86D-20160531 Grab Groundwater	8406643

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

Electronic Copy To Sunoco c/o Stantec Attn: Jennifer Menges

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Respectfully Submitted,

Amek Carter
Specialist

(717) 556-7252

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Analysis Report

Sample Description: MW-40A-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406625
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 07:35 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	21,600	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 20:55	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-40B-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406626
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 07:38 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	14,800	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 21:35	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-40C-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406627
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 07:41 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		**SM 5310 C-2000**	**ug/l**	**ug/l**	
00273	Total Organic Carbon	n.a.	21,700	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 21:48	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-30A-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406628
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 08:21 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		**SM 5310 C-2000**	**ug/l**	**ug/l**	
00273	Total Organic Carbon	n.a.	5,800	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 22:01	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-30B-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406629
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 08:25 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	5,300	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 22:14	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-30C-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406630
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 08:29 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	5,600	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 22:27	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-30D-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406631
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 08:33 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	5,800	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 22:55	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-28A-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406632
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 09:00 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	2,100	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 23:08	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-28B-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406633
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 09:03 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		SM 5310 C-2000	ug/l	ug/l	
00273	Total Organic Carbon	n.a.	1,700	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 23:22	Joseph E McKenzie	1

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-28C-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406634
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 09:06 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		SM 5310 C-2000	ug/l	ug/l	
00273	Total Organic Carbon	n.a.	1,900	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301A	06/08/2016 23:35	Joseph E McKenzie	1

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-28D-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406635
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 09:10 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	2,200	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/08/2016 23:48	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-17A-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406636
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:13 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	**SM 5310 C-2000**		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	5,300	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 00:27	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-17B-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406637
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:17 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	5,600	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 00:41	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-17C-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406638
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:21 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	**SM 5310 C-2000**		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	6,200	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 00:54	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-17D-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406639
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:25 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		SM 5310 C-2000	ug/l	ug/l	
00273	Total Organic Carbon	n.a.	6,900	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 01:21	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-86A-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406640
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:45 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	SM 5310 C-2000		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	9,200	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 01:35	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-86B-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406641
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:50 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry	**SM 5310 C-2000**		ug/l	ug/l	
00273	Total Organic Carbon	n.a.	9,000	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 01:48	Joseph E McKenzie	1

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Analysis Report

Sample Description: MW-86C-20160531 Grab Groundwater
Sunoco M.H.(RCRA)

LL Sample # WW 8406642
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 10:55 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		SM 5310 C-2000	ug/l	ug/l	
00273	Total Organic Carbon	n.a.	9,200	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 02:01	Joseph E McKenzie	1

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Analysis Report

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Sample Description: MW-86D-20160531 Grab Groundwater
Sunoco M.H. (RCRA)

LL Sample # WW 8406643
LL Group # 1667448
Account # 16657

Project Name: Marcus Hook RCRA

Collected: 05/31/2016 11:01 by CC

Submitted: 06/01/2016 19:20
Reported: 06/10/2016 14:13

Stantec
1060 Andrew Drive
Suite 140
West Chester PA 19380

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Wet Chemistry		SM 5310 C-2000	ug/l	ug/l	
00273	Total Organic Carbon	n.a.	9,200	500	1

Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/17.

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00273	Total Organic Carbon	SM 5310 C-2000	1	16160237301B	06/09/2016 02:14	Joseph E McKenzie	1

Quality Control Summary

Client Name: Stantec
Reported: 06/10/2016 14:13

Group Number: 1667448

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result ug/l	MDL ug/l
Batch number: 16160237301A	Sample number(s): 8406625-8406634	
Total Organic Carbon	N.D.	500
Batch number: 16160237301B	Sample number(s): 8406635-8406643	
Total Organic Carbon	N.D.	500

LCS/LCSD

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 16160237301A	Sample number(s): 8406625-8406634								
Total Organic Carbon	25000	25781			103		91-113		
Batch number: 16160237301B	Sample number(s): 8406635-8406643								
Total Organic Carbon	25000	25781			103		91-113		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc ug/l	MS Spike Added ug/l	MS Conc ug/l	MSD Spike Added ug/l	MSD Conc ug/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 16160237301A	Sample number(s): 8406625-8406634 UNSPK: 8406625									
Total Organic Carbon	21584.5	10000	31018.5			94		91-113		
Batch number: 16160237301B	Sample number(s): 8406635-8406643 UNSPK: 8406635									
Total Organic Carbon	2152	10000	12323			102		91-113		

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

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Analysis Report

Quality Control Summary

Client Name: Stantec
Reported: 06/10/2016 14:13

Group Number: 1667448

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc ug/l	DUP Conc ug/l	DUP RPD	DUP RPD Max
Batch number: 16160237301A	Sample number(s): 8406625-8406634 BKG: 8406625			
Total Organic Carbon	21584.5	22068	2	3
Batch number: 16160237301B	Sample number(s): 8406635-8406643 BKG: 8406635			
Total Organic Carbon	2152	2118	2 (1)	3

RECEIVED
DEP-SERO
ECP/WASTE MGMT
16 JUN 31 PM 1:35

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 16657 Group # 1667448 Sample # 8406625-43

COC # 502301

Client Information

Client: Stantec	Acct. #: Evergreen
Project Name/#: Marcus Hook RCRA Sampling	PWSID #:
Project Manager: Jennifer Menges	P.O. #:
Sampler: Correll	Quote #:
State where samples were collected: PA	For Compliance: Yes ☐ No ☐

Matrix: Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☒ NPDES ☐ Surface ☐ | Other: ____

Analysis Requested — Preservation Codes: TOC by SM5310-C-2000 (0); TOX by SW-846 9020B (0)

For Lab Use Only: FSC: ____ SCR#: ____

Preservation Codes: H=HCl, T=Thiosulfate, N=HNO_3, B=NaOH, S=H_2SO_4, O=Other

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Other	Total # of Containers	TOC by SM5310-C-2000	TOX by SW-846 9020B	Remarks
MW-40A-20160531	5-31-16	0735	X			X		3	X	X	
MW-40B-20160531		0738	X			X		3	X	X	
MW-40C-20160531		0741	X			X		3	X	X	
MW-30A-20160531		0821	X			X		3	X	X	
MW-30B-20160531		0825	X			X		3	X	X	
MW-30C-20160531		0829	X			X		3	X	X	
MW-30D-20160531		0833	X			X		3	X	X	
MW-28A-20160531		0900	X			X		3	X	X	
MW-28B-20160531		0903	X			X		3	X	X	
MW-28C-20160531		0906	X			X		3	X	X	

Turnaround Time (TAT) Requested (please circle): Standard (circled) Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: ____

E-mail address: Jennifer.Menges@stantec.com

Relinquished by	Date	Time	Received by	Date	Time
[signature]	6-1-16	1245	[signature]	6-1-16	1245
[signature]	6/1/16	1920			
			[signature]	6/1/16	1920

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

EDD Required? Yes (circled) No

If yes, format: EQUIS

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ____ Other ____

Temperature upon receipt 2.1 - 3.9 °C

Environmental Analysis Request/Chain of Custody

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Acct. # 16657 Group # 16667448 Sample # 84066625-43

COC #502303

Client Information

Client: Stantec
Acct. #: Evergreen
Project Name/#: Tree Marcus Hook RCRA Sampling
PWSID #:
Project Manager: Jennifer Menges
P.O. #:
Sampler: Correll
Quote #:
State where samples were collected: PA
For Compliance: Yes ☐ No ☐

For Lab Use Only
FSC:
SCR#:

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Sediment	Tissue	Ground Water	Potable	Surface	NPDES	Other:	Total # of Containers	TOC by SM5310-C-2000 (O)	TOX by SW846 9020B (O)	Remarks
MW-28D-20160531	5-31-16	0910	X					X						X	X	
MW-17A-20160531	↓	1013	X					X						X	X	
MW-17B-20160531		1017	X					X						X	X	
MW-17C-20160531		1021	X					X						X	X	
MW-17D-20160531		1025	X					X						X	X	
MW-86A-20160531		1045	X					X						X	X	
MW-86B-20160531		1050	X					X						X	X	
MW-86C-20160531		1055	X					X						X	X	
MW-86D-20160531		1101	X					X						X	X	

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: _____

E-mail address: Jennifer.Menges@stantec.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Corey Correll	6-1-16	1245	[illegible]	6-1-16	1245
[illegible]	6-1-16	1920			
			[illegible]	6/1/16	1920

EDD Required? Yes No
If yes, format: EQUIS

Site-Specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier:
UPS _____ FedEx _____ Other _____

Temperature upon receipt 2.1-3.9 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 148667

Group Number(s): 1667448

Client: Stantec

Delivery and Receipt Information

Delivery Method:	ELLE Courier	Arrival Timestamp:	06/01/2016 19:20
Number of Packages:	5	Number of Projects:	1
State/Province of Origin:	PA		

Arrival Condition Summary

Shipping Container Sealed:	No	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	No	Sample Date/Times match COC:	Yes
Samples Chilled:	Yes	VOA Vial Headspace ≥ 6mm:	No
Paperwork Enclosed:	Yes	Total Trip Blank Qty:	2
Samples Intact:	Yes	Trip Blank Type:	HCl
Missing Samples:	No	Air Quality Samples Present:	No
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Wesley Miller (2308) at 22:00 on 06/01/2016

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT121	5.5	DT	Wet	Y	Bagged	N
2	DT121	2.7	DT	Wet	Y	Bagged	N
3	DT121	4.5	DT	Wet	Y	Bagged	N
4	DT121	3.9	DT	Wet	Y	Bagged	N
5	DT121	2.1	DT	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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NELAP Certifications: NJ PA010, NY 11759, PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

June 17, 2016

Ms. Kathy Binkley
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17601

Certificate of Analysis

Project Name:	**TOX BY 9023/9020**	Workorder:	**2148405**
Purchase Order:		Workorder ID:	**Group 1667449**

Dear Ms. Binkley:

Enclosed are the analytical results for samples received by the laboratory on Friday, June 3, 2016.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mr. Brad W Kintzer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

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ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Brad W. Kintzer
Mr. Brad W Kintzer
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

SAMPLE SUMMARY

Workorder: 2148405 Group 1667449

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2148405001	MW-40A-20160531	Water	5/31/2016 07:35	6/3/2016 09:39	Collected by Client
2148405002	MW-40B-20160531	Water	5/31/2016 07:38	6/3/2016 09:39	Collected by Client
2148405003	MW-40C-20160531	Water	5/31/2016 07:41	6/3/2016 09:39	Collected by Client
2148405004	MW-30A-20160531	Water	5/31/2016 08:21	6/3/2016 09:39	Collected by Client
2148405005	MW-30B-20160531	Water	5/31/2016 08:25	6/3/2016 09:39	Collected by Client
2148405006	MW-30C-20160531	Water	5/31/2016 08:29	6/3/2016 09:39	Collected by Client
2148405007	MW-30D-20160531	Water	5/31/2016 08:33	6/3/2016 09:39	Collected by Client
2148405008	MW-28A-20160531	Water	5/31/2016 09:00	6/3/2016 09:39	Collected by Client
2148405009	MW-28B-20160531	Water	5/31/2016 09:03	6/3/2016 09:39	Collected by Client
2148405010	MW-28C-20160531	Water	5/31/2016 09:06	6/3/2016 09:39	Collected by Client
2148405011	MW-28D-20160531	Water	5/31/2016 09:10	6/3/2016 09:39	Collected by Client
2148405012	MW-17A-20160531	Water	5/31/2016 10:13	6/3/2016 09:39	Collected by Client
2148405013	MW-17B-20160531	Water	5/31/2016 10:17	6/3/2016 09:39	Collected by Client
2148405014	MW-17C-20160531	Water	5/31/2016 10:21	6/3/2016 09:39	Collected by Client
2148405015	MW-17D-20160531	Water	5/31/2016 10:25	6/3/2016 09:39	Collected by Client
2148405016	MW-86A-20160531	Water	5/31/2016 10:45	6/3/2016 09:39	Collected by Client
2148405017	MW-86B-20160531	Water	5/31/2016 10:50	6/3/2016 09:39	Collected by Client
2148405018	MW-86C-20160531	Water	5/31/2016 10:55	6/3/2016 09:39	Collected by Client
2148405019	MW-28D-20160531	Water	5/31/2016 11:01	6/3/2016 09:39	Collected by Client

SAMPLE SUMMARY

Workorder: 2148405 Group 1667449

Notes

- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
- The Chain of Custody document is included as part of this report.
- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

ALS Environmental

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State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405001** Date Collected: 5/31/2016 07:35 Matrix: Water

Sample ID: **MW-40A-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/9/16 13:34	PAG	A

Brad W. Kintzer

Mr. Brad W Kintzer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405002** Date Collected: 5/31/2016 07:38 Matrix: Water

Sample ID: **MW-40B-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/9/16 14:01	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405003** Date Collected: 5/31/2016 07:41 Matrix: Water

Sample ID: **MW-40C-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/9/16 14:39	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405004** Date Collected: 5/31/2016 08:21 Matrix: Water

Sample ID: **MW-30A-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/10/16 13:03	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405005** Date Collected: 5/31/2016 08:25 Matrix: Water

Sample ID: **MW-30B-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/10/16 14:21	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405006** Date Collected: 5/31/2016 08:29 Matrix: Water

Sample ID: **MW-30C-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/10/16 14:53	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405007** Date Collected: 5/31/2016 08:33 Matrix: Water

Sample ID: **MW-30D-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/13/16 15:28	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405008** Date Collected: 5/31/2016 09:00 Matrix: Water

Sample ID: **MW-28A-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/14/16 11:35	PAG	A

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State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405009** Date Collected: 5/31/2016 09:03 Matrix: Water

Sample ID: **MW-28B-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/14/16 11:59	PAG	A

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State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405010** Date Collected: 5/31/2016 09:06 Matrix: Water

Sample ID: **MW-28C-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 11:34	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405011** Date Collected: 5/31/2016 09:10 Matrix: Water

Sample ID: **MW-28D-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 11:58	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405012** Date Collected: 5/31/2016 10:13 Matrix: Water

Sample ID: **MW-17A-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 12:20	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405013** Date Collected: 5/31/2016 10:17 Matrix: Water

Sample ID: **MW-17B-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 12:43	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405014** Date Collected: 5/31/2016 10:21 Matrix: Water

Sample ID: **MW-17C-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 13:37	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405015** Date Collected: 5/31/2016 10:25 Matrix: Water

Sample ID: **MW-17D-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 14:00	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405016** Date Collected: 5/31/2016 10:45 Matrix: Water

Sample ID: **MW-86A-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 14:24	PAG	A

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State Certifications: DE ID 11, MA PA0102, MD 128, VA 460157, WV 343

ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405017** Date Collected: 5/31/2016 10:50 Matrix: Water

Sample ID: **MW-86B-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/15/16 15:12	PAG	A

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405018** Date Collected: 5/31/2016 10:55 Matrix: Water

Sample ID: **MW-86C-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/16/16 11:21	PAG	A

Brad W. Kintzer

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ANALYTICAL RESULTS

Workorder: 2148405 Group 1667449

Lab ID: **2148405019** Date Collected: 5/31/2016 11:01 Matrix: Water

Sample ID: **MW-28D-20160531** Date Received: 6/3/2016 09:39

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
WET CHEMISTRY										
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			6/16/16 11:57	PAG	A

Brad W. Kintzer

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F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER: INSTRUCTIONS ON THE BACK.

COC ALS * 2 1 4 8 4 0 5 *

Client Name: Eurofins Lancaster Laboratories, Inc.
Address: 2425 New Holland Pike, Lancaster, PA 17601
Contact: Kathy Binkley
Phone#: 656-2300 EXT.1393
Project Name/#: - Group 1667449
Bill To:

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y KathyBinkley@EurofinsUS.com
Fax? [ ] -Y No.:

Container Type / Container Size / Preservative

ANALYSES/METHOD REQUESTED

Cooler Temp: 1 Therm ID: IR-350
No. of Coolers: _____ Y N Initial
Custody Seals Present? [ ] [ ]
(if present) Seals Intact? [ ] [ ]
Received on Ice? [ ] [ ]
COC/Labels Complete/Accurate? [ ] [ ]
Cont. In Good Cond.? [ ] [ ]
Correct Containers? [ ] [ ]
Correct Sample Volumes? [ ] [ ]
Correct Preservation? [ ] [ ]
Headspace/Volatiles? [ ] [ ]
Courier/Tracking #:

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOX	Sample/COC Comments
MW-40A-20160531	05/31/16	07:35	G	GW	1	8406644
MW-40B-20160531	05/31/16	07:38	G	GW	1	8406645
MW-40C-20160531	05/31/16	07:41	G	GW	1	8406646
MW-30A-20160531	05/31/16	08:21	G	GW	1	8406647
MW-30B-20160531	05/31/16	08:25	G	GW	1	8406648
MW-30C-20160531	05/31/16	08:29	G	GW	1	8406649
MW-30D-20160531	05/31/16	08:33	G	GW	1	8406650
MW-28A-20160531	05/31/16	09:00	G	GW	1	8406651

Enter Number of Containers Per Sample or Field Results Below.

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments: Equis EDD format needed.

LOGGED BY (signature): DATE 6/3/16 TIME
REVIEWED BY (signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Kathy Binkley / ELLE	6-2-16	1550	2	6-3-16	8:00
3	6-3-16	9:39	4	6/3/16	0951
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [X] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ]
PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- Equis EDD format needed.

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS

ALS Environmental

34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 214840S
ALS Quote #:
2 of 3

Client Name: Eurofins Lancaster Laboratories, Inc.
Address: 2425 New Holland Pike, Lancaster, PA 17601
Contact: Kathy Binkley
Phone#: 656-2300 EXT.1393
Project Name/#: Group 1667449
Bill To:
TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y KathyBinkley@EurofinsUS.com
Fax? [ ] -Y No.:

Container Type / Container Size / Preservative

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOX										Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
MW-28B-20160531	05/31/16	09:03	G	GW	1										8406652
MW-28C-20160531	05/31/16	09:06	G	GW	1										8406653
MW-28D-20160531	05/31/16	09:10	G	GW	1										8406654
MW-17A-20160531	05/31/16	10:13	G	GW	1										8406655
MW-17B-20160531	05/31/16	10:17	G	GW	1										8406656
MW-17C-20160531	05/31/16	10:21	G	GW	1										8406657
MW-17D-20160531	05/31/16	10:25	G	GW	1										8406658
MW-86A-20160531	05/31/16	10:45	G	GW	1										8406659

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: IR352
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. In Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments: Equis EDD format needed.

LOGGED BY (signature): Date: Time:
REVIEWED BY (signature): Date: Time:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Kathy Binkley / ELLE	6-2-16	1030	2	6-3-16	8:00
3	6-2-16	9:39	4	6/3/16	9:32
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ] [ ]
State Samples Collected In: [ ] NY [ ] NJ [X] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ]
PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- Equis EDD format needed.

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water, GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F.717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

COC #: 2148905 — 3 of 3
ALS Quote #:

Client Name: Eurofins Lancaster Laboratories, Inc.
Address: 2425 New Holland Pike, Lancaster, PA 17601
Contact: Kathy Binkley
Phone#: 656-2300 EXT.1393
Project Name/#: Group 1667449
Bill To:

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y KathyBinkley@EurofinsUS.com
Fax? [ ] -Y No.:

Receipt Information (completed by Receiving Lab)
Cooler Temp: 1 Therm ID: 17352
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			AG
(if present) Seals Intact?			
Received on Ice?	✓		
COC/Labels Complete/Accurate?	✓		
Cont. in Good Cond.?	✓		
Correct Containers?	✓		
Correct Sample Volumes?	✓		
Correct Preservation?	✓		
Headspace/Volatiles?			

Courier/Tracking #:

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOX	Sample/COC Comments
MW-86B-20160531	05/31/16	10:50	G	GW	1	8406660
MW-86C-20160531	05/31/16	10:55	G	GW	1	8406661
MW-28D-20160531	05/31/16	11:01	G	GW	1	8406662

Enter Number of Containers Per Sample or Field Results Below.

ALS Field Services: __Pickup __Labor __Composite Sampling __Rental Equipment __Other:

Project Comments: Equis EDD format needed.

LOGGED BY(signature): [signature] DATE 6/3/16 TIME
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Kathy Binkley / EUL	6-2-16	1550	2 [signature]	6-3-16	8:01
3 [signature]	6-3-16	7:39	4 [signature]	6/3/16	0939
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [X] PA [ ] NC [ ]
Reportable to PADEP? Yes [ ] PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- Equis EDD format needed.

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Ol=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 10/11

ALS

Date of Issue: 06/10/2016 04:11:27

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004168 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-86
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	I078110	**Intact:**	Yes
Legal Seal:	I078113	**Intact:**	Yes
Legal Seal:	I078114	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004168 **Status:** Completed

Legal Seal:	I078115	**Intact:**	Yes
Legal Seal:	I078116	**Intact:**	Yes
Legal Seal:	I078117	**Intact:**	Yes
Legal Seal:	I078118	**Intact:**	Yes
Legal Seal:	I078119	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.73 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	2.6 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004168 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	5.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108883	Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004168 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 06/10/2016 04:10:42

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004166 **Status:** Completed

---

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-28
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	I002081	**Intact:**	Yes
Legal Seal:	I002084	**Intact:**	Yes
Legal Seal:	I002085	**Intact:**	Yes

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004166 **Status:** Completed

Legal Seal:	I002090	**Intact:**	Yes
Legal Seal:	I002087	**Intact:**	Yes
Legal Seal:	I002088	**Intact:**	Yes
Legal Seal:	I002089	**Intact:**	Yes
Legal Seal:	I002086	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: TIC: trimethyl pentane

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	3.1 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004166 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	19.2 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004166 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
108883 Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 06/10/2016 04:08:33

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004165 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-30
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	I079203	**Intact:**	Yes
Legal Seal:	I079206	**Intact:**	Yes
Legal Seal:	I079207	**Intact:**	Yes

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004165 **Status:** Completed

Legal Seal:	I079208	**Intact:**	Yes
Legal Seal:	I079209	**Intact:**	Yes
Legal Seal:	I079210	**Intact:**	Yes
Legal Seal:	I079211	**Intact:**	Yes
Legal Seal:	I079212	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	3.9 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	2.7 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004165 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.65 UG/L (B)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	21.2 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108883	Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004165 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 06/10/2016 04:06:12

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004167 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-17
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	G049726	**Intact:**	Yes
Legal Seal:	G049729	**Intact:**	Yes
Legal Seal:	G049730	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004167 **Status:** Completed

Legal Seal:	I079213	**Intact:**	Yes
Legal Seal:	I079214	**Intact:**	Yes
Legal Seal:	I079215	**Intact:**	Yes
Legal Seal:	I079216	**Intact:**	Yes
Legal Seal:	I093356	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	2.8 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004167 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	16.2 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108883	Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004167 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 06/10/2016 04:04:32

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004169 **Status:** Completed

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Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: field blank
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	I078100	**Intact:**	Yes
Legal Seal:	I078103	**Intact:**	Yes
Legal Seal:	I078104	**Intact:**	Yes

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004169 **Status:** Completed

Legal Seal:	I078105	**Intact:**	Yes
Legal Seal:	I078106	**Intact:**	Yes
Legal Seal:	I078107	**Intact:**	Yes
Legal Seal:	I078108	**Intact:**	Yes
Legal Seal:	I078109	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004169 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	11.7 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108883	Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004169 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 06/10/2016 04:03:10

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004164 **Status:** Completed

---

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-40
Reason: Routine Sampling
Project: NOT INDICATED
Suite: VOAWW
Matrix: Water

Legal Seal:	I079496	**Intact:**	Yes
Legal Seal:	I079194	**Intact:**	Yes
Legal Seal:	I079195	**Intact:**	Yes

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004164 **Status:** Completed

Legal Seal:	I079202	**Intact:**	Yes
Legal Seal:	I079198	**Intact:**	Yes
Legal Seal:	I079200	**Intact:**	Yes
Legal Seal:	I079201	**Intact:**	Yes
Legal Seal:	I079197	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: TIC: dimethyl-3-heptanol, acetic acid, dimethyl-2-butanol

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
630206	1,1,1,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
71556	1,1,1-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79345	1,1,2,2-Tetrachloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79005	1,1,2-Trichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75343	1,1-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75354	1,1-Dichloroethene	1.2 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
563586	1,1-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87616	1,2,3-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96184	1,2,3-Trichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
120821	1,2,4-Trichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95636	1,2,4-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
96128	1,2-Dibromo-3-chloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106934	1,2-Dibromoethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95501	1,2-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
107062	1,2-Dichloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78875	1,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108678	1,3,5-Trimethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
541731	1,3-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
142289	1,3-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106467	1,4-Dichlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
594207	2,2-Dichloropropane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
591786	2-Hexanone	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
99876	4-Isopropyltoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67641	Acetone	6.4 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
71432	Benzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108861	Bromobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75274	Bromodichloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004164 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
75252	Bromoform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74839	Bromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75150	Carbon Disulfide	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
56235	Carbon Tetrachloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108907	Chlorobenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75003	Chloroethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75014	Chloroethene (vinyl chloride)	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
67663	Chloroform	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74873	Chloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156592	cis-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061015	cis-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
124481	Dibromochloromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
74953	Dibromomethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75718	Dichlorodifluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100414	Ethylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
87683	Hexachlorobutadiene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98828	Isopropylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108383	m/p-Xylene	1.0 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
78933	MEK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
1634044	Methyl Tert-Butyl Ether	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75092	Methylene Chloride	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108101	MIBK	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
91203	Naphthalene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
104518	n-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
103651	n-Propylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95498	o-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
95476	o-Xylene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
106434	p-Chlorotoluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98566	PCTFB	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
135988	Sec-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
100425	Styrene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75650	t-Butyl alcohol	10.9 UG/L	06/03/2016 02:00 AM	DLY	EPA 624
540885	tert-Butyl Acetate	2.5 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
98066	Tert-Butylbenzene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
127184	Tetrachloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
109999	Tetrahydrofuran	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004164 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
108883 Toluene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
156605 trans-1,2-Dichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
10061026 trans-1,3-Dichloropropene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
79016 Trichloroethene	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
75694 Trichlorofluoromethane	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624
108054 Vinyl Acetate	0.50 UG/L (U)	06/03/2016 02:00 AM	DLY	EPA 624

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/09/2016 04:12:28

DEP Bureau of Laboratories - Harrisburg
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2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** I2016019308 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-28
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	I002084	**Intact:**	Yes
Legal Seal:	I002081	**Intact:**	Yes
Legal Seal:	I002086	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** I2016019308 **Status:** Completed

Legal Seal:	I002087	**Intact:**	Yes
Legal Seal:	I002088	**Intact:**	Yes
Legal Seal:	I002089	**Intact:**	Yes
Legal Seal:	I002090	**Intact:**	Yes
Legal Seal:	I002085	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	113.6 MG/L	06/02/2016 12:30 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	0.22 MG/L	06/24/2016 09:40 PM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	19.278 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	45.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	35.350 MG/L	06/10/2016 11:23 AM	CREITMEYER	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	564.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	13.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	3727.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	6.117 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	4.190 MG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	449.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
71890X MERCURY, DISSOLVED	<1 UG/L	06/03/2016 01:23 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:43 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	8.0 pH units	06/02/2016 12:30 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	6.801 MG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/15/2016 11:23 AM	CREITMEYER	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	25.530 MG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	330.00 umhos/cm	06/02/2016 03:24 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	30.3 MG/L	06/23/2016 03:40 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	0.56 MG/L	06/03/2016 12:50 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	0.04 MG/L	06/02/2016 11:06 AM	TBEAR	EPA 353.2

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** I2016019308 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	2.06 MG/L	06/17/2016 01:56 PM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	<5 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	<5.0 UG/L	06/20/2016 02:42 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	<20.0 MG/L	06/09/2016 06:07 PM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	31.02 NTU	06/02/2016 03:51 PM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	27.000 UG/L	06/09/2016 11:23 AM	CREITMEYER	EPA 200.7

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** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/09/2016 04:09:22

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
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Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** I2016019309 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-40
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	I079496	**Intact:**	Yes
Legal Seal:	I079195	**Intact:**	Yes
Legal Seal:	I079197	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** I2016019309 **Status:** Completed

Legal Seal:	I079198	**Intact:**	Yes
Legal Seal:	I079200	**Intact:**	Yes
Legal Seal:	I079201	**Intact:**	Yes
Legal Seal:	I079202	**Intact:**	Yes
Legal Seal:	I079194	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	87.8 MG/L	06/02/2016 12:37 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	0.78 MG/L	06/24/2016 09:53 PM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	10.777 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	219.000 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	81.630 MG/L	06/10/2016 11:38 AM	CREITMEYER	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	54.000 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	76.000 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	26380.000 UG/L	06/10/2016 11:38 AM	CREITMEYER	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	55.372 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	10.810 MG/L	06/10/2016 11:38 AM	CREITMEYER	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	340.000 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7
71890X MERCURY, DISSOLVED	1.15 UG/L	06/03/2016 01:23 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:44 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	10.3 pH units	06/02/2016 12:37 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	80.200 MG/L	06/10/2016 11:38 AM	CREITMEYER	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/15/2016 11:38 AM	CREITMEYER	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	100.800 MG/L	06/10/2016 11:38 AM	CREITMEYER	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	981.00 umhos/cm	06/02/2016 03:26 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	132.3 MG/L	06/23/2016 11:15 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	0.41 MG/L	06/03/2016 01:06 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	0.06 MG/L	06/02/2016 11:08 AM	TBEAR	EPA 353.2

Analytical Report For

Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** I2016019309 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	23.83 MG/L	06/22/2016 11:06 AM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	41.98 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	23.02 UG/L	06/20/2016 02:45 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	165.5 MG/L	06/03/2016 05:36 AM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	419.84 NTU	06/02/2016 03:57 PM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	169.000 UG/L	06/09/2016 11:38 AM	CREITMEYER	EPA 200.7

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** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/09/2016 04:07:26

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
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Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** I2016019328 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-86
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	I078110	**Intact:**	Yes
Legal Seal:	I078114	**Intact:**	Yes
Legal Seal:	I078115	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** I2016019328 **Status:** Completed

Legal Seal:	I078116	**Intact:**	Yes
Legal Seal:	I078117	**Intact:**	Yes
Legal Seal:	I078118	**Intact:**	Yes
Legal Seal:	I078119	**Intact:**	Yes
Legal Seal:	I078113	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	232.6 MG/L	06/02/2016 02:04 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	0.12 MG/L	06/25/2016 02:48 AM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	<3.0 UG/L	06/03/2016 01:28 PM	SCHOY	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	86.000 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	73.010 MG/L	06/10/2016 11:49 AM	CREITMEYER	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	<50 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	14.000 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	203.000 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	1.410 UG/L	06/03/2016 01:28 PM	SCHOY	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	17.360 MG/L	06/10/2016 11:49 AM	CREITMEYER	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	358.000 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
71890X MERCURY, DISSOLVED	<1 UG/L	06/03/2016 01:28 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:45 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	7.3 pH units	06/02/2016 02:04 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	7.013 MG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 01:28 PM	SCHOY	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/15/2016 11:49 AM	CREITMEYER	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	11.890 MG/L	06/10/2016 11:49 AM	CREITMEYER	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	488.00 umhos/cm	06/02/2016 03:42 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	8.9 MG/L	06/23/2016 10:05 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	0.88 MG/L	06/03/2016 01:55 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	<.04 MG/L	06/02/2016 12:28 PM	TBEAR	EPA 353.2

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** I2016019328 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	8.89 MG/L	06/17/2016 04:22 PM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	27.42 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	7.00 UG/L	06/20/2016 03:16 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	25.2 MG/L	06/09/2016 06:25 PM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	2.00 NTU	06/03/2016 11:45 AM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:49 AM	CREITMEYER	EPA 200.7

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Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/09/2016 04:06:03

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Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** I2016019310 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: field blank
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	I078100	**Intact:**	Yes
Legal Seal:	I078104	**Intact:**	Yes
Legal Seal:	I078105	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** I2016019310 **Status:** Completed

Legal Seal:	I078106	**Intact:**	Yes
Legal Seal:	I078107	**Intact:**	Yes
Legal Seal:	I078108	**Intact:**	Yes
Legal Seal:	I078109	**Intact:**	Yes
Legal Seal:	I078103	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	1.0 MG/L	06/06/2016 02:07 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	<.02 MG/L	06/24/2016 09:55 PM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	<3.0 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	<0.03 MG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	<50 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	<20 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	<1.0 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	<0.01 MG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
71890X MERCURY, DISSOLVED	<1 UG/L	06/03/2016 01:25 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:44 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	6.6 pH units	06/02/2016 12:43 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	<1.00 MG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/15/2016 11:41 AM	CREITMEYER	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	<.2 MG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	<1.0 umhos/cm	06/02/2016 03:27 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	<1.0 MG/L	06/23/2016 10:03 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	<0.20 MG/L	06/03/2016 12:00 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	<.04 MG/L	06/02/2016 11:10 AM	TBEAR	EPA 353.2

Analytical Report For

Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** I2016019310 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	<0.50 MG/L	06/17/2016 02:46 PM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	<5 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	17.74 UG/L	06/20/2016 02:48 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	<20.0 MG/L	06/09/2016 06:09 PM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	<1 NTU	06/03/2016 11:30 AM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:41 AM	CREITMEYER	EPA 200.7

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.

* denotes tests that the laboratory is not accredited for

** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/09/2016 04:05:54

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** I2016019317 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-17
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	G049726	**Intact:**	Yes
Legal Seal:	G049730	**Intact:**	Yes
Legal Seal:	I079213	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** I2016019317 **Status:** Completed

Legal Seal:	I079214	**Intact:**	Yes
Legal Seal:	I079215	**Intact:**	Yes
Legal Seal:	I079216	**Intact:**	Yes
Legal Seal:	I093356	**Intact:**	Yes
Legal Seal:	G049729	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	58.0 MG/L	06/02/2016 01:24 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	<.02 MG/L	06/24/2016 10:03 PM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	3.728 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	55.000 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	29.700 MG/L	06/10/2016 11:44 AM	CREITMEYER	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	<50 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	21.000 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	5381.000 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	17.993 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	6.171 MG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	186.000 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
71890X MERCURY, DISSOLVED	1.12 UG/L	06/03/2016 01:27 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:44 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	8.8 pH units	06/02/2016 01:24 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	7.297 MG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 01:57 PM	JOWERNER	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/15/2016 11:44 AM	CREITMEYER	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	21.050 MG/L	06/10/2016 11:44 AM	CREITMEYER	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	281.00 umhos/cm	06/02/2016 03:29 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	19.0 MG/L	06/23/2016 03:45 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	0.51 MG/L	06/03/2016 01:39 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	0.20 MG/L	06/02/2016 11:38 AM	TBEAR	EPA 353.2

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** I2016019317 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	6.18 MG/L	06/17/2016 03:02 PM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	6.42 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	14.35 UG/L	06/20/2016 02:53 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	48.6 MG/L	06/09/2016 06:11 PM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	82.48 NTU	06/03/2016 11:40 AM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	57.000 UG/L	06/09/2016 11:44 AM	CREITMEYER	EPA 200.7

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** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/09/2016 04:04:26

DEP Bureau of Laboratories - Harrisburg
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Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** I2016019375 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-30
Reason: Routine Sampling
Project: NOT INDICATED
Standard Anlysis: 209
Matrix: Water

Legal Seal:	I079203	**Intact:**	Yes
Legal Seal:	I079206	**Intact:**	Yes
Legal Seal:	I079207	**Intact:**	Yes

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** I2016019375 **Status:** Completed

Legal Seal:	I079208	**Intact:**	Yes
Legal Seal:	I079209	**Intact:**	Yes
Legal Seal:	I079210	**Intact:**	Yes
Legal Seal:	I079211	**Intact:**	Yes
Legal Seal:	I079212	**Intact:**	Yes

Stream Condition:

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00410 ALKALINITY REPORTED @ pH 4.5	113.6 MG/L	06/07/2016 07:01 PM	MTUZINSKI	SM 2320B
00610A AMMONIA TOTAL AS NITROGEN	0.36 MG/L	06/24/2016 11:00 PM	CRADEK	EPA 350.1
01000H ARSENIC, DISSOLVED (WATER & WASTE) BY ICPMS	7.920 UG/L	06/03/2016 12:00 AM	SCHOY	EPA 200.8
01005A BARIUM, DISSOLVED (WATER & WASTE) BY ICP	49.000 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01025A CADMIUM, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
00915A CALCIUM, DISSOLVED (WATER & WASTE) BY ICP	30.400 MG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01030A CHROMIUM, DISSOLVED (WATER & WASTE) BY ICP	<50 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01040A COPPER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01046A IRON, DISSOLVED (WATER & WASTE) BY ICP	715.000 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01049H LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	1.990 UG/L	06/03/2016 12:00 AM	SCHOY	EPA 200.8
00925A MAGNESIUM, DISSOLVED (WATER & WASTE) BY ICP	5.563 MG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01056A MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	19.000 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
71890X MERCURY, DISSOLVED	<1 UG/L	06/03/2016 02:39 PM	LOJEDA	EPA 245.1
00556H OIL AND GREASE METHOD 1664 (HEXANE)	<5.0 MG/L	06/06/2016 03:47 PM	WBUCK	EPA 1664A
** Comment ** No matrix interference check done-2nd container not provided				
00403 pH, Lab (Electrometric)	8.1 pH units	06/07/2016 07:01 PM	MTUZINSKI	SM 4500H-B
** Comment ** Time Limit For Test Exceeded				
00935A POTASSIUM, DISSOLVED WATER & WASTE) BY ICP	7.538 MG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
01145H SELENIUM, DISSOLVED (WATER &WASTE) BY ICPMS	<7 UG/L	06/03/2016 12:00 AM	SCHOY	EPA 200.8
01075A SILVER, DISSOLVED (WATER & WASTE) BY ICP	<10 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
00930A SODIUM, DISSOLVED (WATER & WASTE) BY ICP	139.000 MG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7
00095 SPECIFIC CONDUCTIVITY @ 25.0 C	1018.00 umhos/cm	06/14/2016 02:44 PM	MTUZINSKI	SM 2510B
00940A Total Chloride-Colorimetric *	250.3 MG/L	06/23/2016 11:21 PM	CRADEK	SM 4500-CL E
** Comment ** Currently not certified for drinking water				
00951 Total Fluoride-Ion Chromatograph	0.50 MG/L	06/08/2016 04:55 AM	FVODOPIVEC	EPA 300.0
00620A Total Nitrate Nitrogen-Colorimetric	0.12 MG/L	06/02/2016 01:23 PM	TBEAR	EPA 353.2

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** I2016019375 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
00680 Total Organic Carbon	4.60 MG/L	06/17/2016 08:21 PM	MAMCNULTY	SM 5310 C
70353 TOTAL ORGANIC HALIDES	18.20 UG/L	06/24/2016 02:46 PM	WBUCK	EPA 9020B
32730D Total Phenols	13.37 UG/L	06/20/2016 03:29 PM	RRANGEL	EPA 420.4
00945A Total Sulfate-Colorimetric	<20.0 MG/L	06/14/2016 02:28 PM	LHREHA	EPA 375.2
82079 TURBIDITY, NEPHELMETRIC	7.13 NTU	06/02/2016 05:30 PM	TVOROBEYCH	EPA 180.1
01090A ZINC, DISSOLVED (WATER & WASTE) BY ICP	<10.0 UG/L	06/13/2016 02:02 PM	MDEIGHAN	EPA 200.7

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* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/12/2016 04:05:49

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-28
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	I002085	**Intact:**	Yes
Legal Seal:	I002086	**Intact:**	Yes
Legal Seal:	I002087	**Intact:**	Yes

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Legal Seal:	I002088	**Intact:**	Yes
Legal Seal:	I002084	**Intact:**	Yes
Legal Seal:	I002090	**Intact:**	Yes
Legal Seal:	I002082	**Intact:**	Yes
Legal Seal:	I002083	**Intact:**	Yes
Legal Seal:	I002081	**Intact:**	Yes
Legal Seal:	I002089	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: This sample contains a small amount of a heavily weathered mid- to heavy-weight petroleum product.

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
95943	1,2,4,5-Tetrachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120821	1,2,4-Trichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95501	1,2-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
541731	1,3-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99650	1,3-Dinitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106467	1,4-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
130154	1,4-Naphthoquinone	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
90131	1-Chloronaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
90120	1-Methylnaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108-60-1	2,2'-oxybis(1-Chloropropane)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
58902	2,3,4,6-Tetrachlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95954	2,4,5-Trichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88062	2,4,6-Trichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120832	2,4-Dichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
105679	2,4-Dimethylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
51285	2,4-Dinitrophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
121142	2,4-Dinitrotoluene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87650	2,6-Dichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
606202	2,6-Dinitrotoluene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
53963	2-Acetylaminofluorene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
91587	2-Chloronaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95578 2-Chlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91576 2-Methylnaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95487 2-Methylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88744 2-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
88755 2-Nitrophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
109068 2-Picoline (2-Methylpyridine)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1319773 3&4-Methylphenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91941 3,3'-Dichlorobenzidine	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Mid-level LCS recovery low. Results may be biased low.				
56495 3-Methylcholanthrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
99092 3-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
534521 4,6-Dinitro-2-methylphenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
92671 4-Aminobiphenyl	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
101553 4-Bromophenyl-phenyl ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59507 4-Chloro-3-methylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106478 4-Chloroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
7005723 4-Chlorophenyl-phenyl ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100016 4-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100027 4-Nitrophenol	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99558 5-Nitro-o-toluidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
57976 7,12-Dimethylbenz(a)-anthracen	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
83329 Acenaphthene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
208968 Acenaphthylene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98862 Acetophenone	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62533 Aniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120127 Anthracene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
140578 Aramite	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98555 a-Terpineol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56553 Benz(a)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
50328 Benzo(a)pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
205992	Benzo(b)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	3.5 UG/L	07/08/2016 02:00 AM	CARWALTER	EPA 625
Mid-Level LCS recovery high. Results may be biased high.					
85687	Butylbenzylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.Continuing calibration recoveries low. Results may be biased low.					
88857	Dinoseb	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/08/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.Continuing calibration recoveries low. Results may be biased low.				
67721 Hexachloroethane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 003 **Date Collected:** 06/01/2016 11:10:00 AM **Lab Sample ID:** O2016004206 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/12/2016 04:04:11

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-86
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	I078113	**Intact:**	Yes
Legal Seal:	I078114	**Intact:**	Yes
Legal Seal:	I078115	**Intact:**	Yes

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Legal Seal:	I078116	**Intact:**	Yes
Legal Seal:	I078110	**Intact:**	Yes
Legal Seal:	I078118	**Intact:**	Yes
Legal Seal:	I078119	**Intact:**	Yes
Legal Seal:	I078111	**Intact:**	Yes
Legal Seal:	I078112	**Intact:**	Yes
Legal Seal:	I078117	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: This sample contains the following Tentatively Identified Compounds: bromacil; three other small peaks which could not be identified. This sample contains a heavily weathered mid- to heavy-weight petroleum product.

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95943 1,2,4,5-Tetrachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120821 1,2,4-Trichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95501 1,2-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
541731 1,3-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99650 1,3-Dinitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106467 1,4-Dichlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
130154 1,4-Naphthoquinone	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
90131 1-Chloronaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
90120 1-Methylnaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108-60-1 2,2'-oxybis(1-Chloropropane)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
58902 2,3,4,6-Tetrachlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95954 2,4,5-Trichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88062 2,4,6-Trichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120832 2,4-Dichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
105679 2,4-Dimethylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
51285 2,4-Dinitrophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
121142 2,4-Dinitrotoluene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87650 2,6-Dichlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
606202 2,6-Dinitrotoluene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
53963 2-Acetylaminofluorene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
91587	2-Chloronaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95578	2-Chlorophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91576	2-Methylnaphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95487	2-Methylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88744	2-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
88755	2-Nitrophenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
109068	2-Picoline (2-Methylpyridine)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1319773	3&4-Methylphenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91941	3,3'-Dichlorobenzidine	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Mid-level LCS recovery low. Results may be biased low.					
56495	3-Methylcholanthrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.					
99092	3-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
534521	4,6-Dinitro-2-methylphenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
92671	4-Aminobiphenyl	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
101553	4-Bromophenyl-phenyl ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59507	4-Chloro-3-methylphenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106478	4-Chloroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
7005723	4-Chlorophenyl-phenyl ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100016	4-Nitroaniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100027	4-Nitrophenol	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99558	5-Nitro-o-toluidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
57976	7,12-Dimethylbenz(a)-anthracen	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
83329	Acenaphthene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
208968	Acenaphthylene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98862	Acetophenone	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62533	Aniline	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120127	Anthracene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
140578	Aramite	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98555	a-Terpineol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56553	Benz(a)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
50328	Benzo(a)pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.					
205992	Benzo(b)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
85687	Butylbenzylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.					
88857	Dinoseb	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/08/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
67721 Hexachloroethane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	4.9 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 005 **Date Collected:** 06/01/2016 12:15:00 PM **Lab Sample ID:** O2016004208 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	2.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/12/2016 04:04:09

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

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Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-17
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	G049726	**Intact:**	Yes
Legal Seal:	G049729	**Intact:**	Yes
Legal Seal:	G049730	**Intact:**	Yes

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

Legal Seal:	I079213	**Intact:**	Yes
Legal Seal:	G049728	**Intact:**	Yes
Legal Seal:	I079215	**Intact:**	Yes
Legal Seal:	I079216	**Intact:**	Yes
Legal Seal:	I093356	**Intact:**	Yes
Legal Seal:	G049727	**Intact:**	Yes
Legal Seal:	I079214	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: This sample contains a heavily weathered mid- to heavy-weight petroleum product.

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95943 1,2,4,5-Tetrachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120821 1,2,4-Trichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95501 1,2-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
541731 1,3-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99650 1,3-Dinitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106467 1,4-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
130154 1,4-Naphthoquinone	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
90131 1-Chloronaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
90120 1-Methylnaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108-60-1 2,2'-oxybis(1-Chloropropane)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
58902 2,3,4,6-Tetrachlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95954 2,4,5-Trichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88062 2,4,6-Trichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120832 2,4-Dichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
105679 2,4-Dimethylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
51285 2,4-Dinitrophenol	24.8 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
121142 2,4-Dinitrotoluene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87650 2,6-Dichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
606202 2,6-Dinitrotoluene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
53963 2-Acetylaminofluorene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
91587 2-Chloronaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95578 2-Chlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91576 2-Methylnaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95487 2-Methylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88744 2-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
88755 2-Nitrophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
109068 2-Picoline (2-Methylpyridine)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1319773 3&4-Methylphenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91941 3,3'-Dichlorobenzidine	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Mid-level LCS recovery low. Results may be biased low.				
56495 3-Methylcholanthrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
99092 3-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
534521 4,6-Dinitro-2-methylphenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
92671 4-Aminobiphenyl	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
101553 4-Bromophenyl-phenyl ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59507 4-Chloro-3-methylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106478 4-Chloroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
7005723 4-Chlorophenyl-phenyl ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100016 4-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100027 4-Nitrophenol	12.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99558 5-Nitro-o-toluidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
57976 7,12-Dimethylbenz(a)-anthracen	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
83329 Acenaphthene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
208968 Acenaphthylene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98862 Acetophenone	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62533 Aniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120127 Anthracene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
140578 Aramite	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98555 a-Terpineol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56553 Benz(a)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
50328 Benzo(a)pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
205992	Benzo(b)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	1.4 UG/L	07/08/2016 02:00 AM	CARWALTER	EPA 625
Mid-Level LCS recovery high. Results may be biased high.					
85687	Butylbenzylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.Continuing calibration recoveries low. Results may be biased low.					
88857	Dinoseb	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/08/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
67721 Hexachloroethane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 004 **Date Collected:** 06/01/2016 11:45:00 AM **Lab Sample ID:** O2016004207 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/12/2016 04:07:16

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-40
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	I079496	**Intact:**	Yes
Legal Seal:	I079194	**Intact:**	Yes
Legal Seal:	I079195	**Intact:**	Yes

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Legal Seal:	I079197	**Intact:**	Yes
Legal Seal:	I079193	**Intact:**	Yes
Legal Seal:	I079200	**Intact:**	Yes
Legal Seal:	I079201	**Intact:**	Yes
Legal Seal:	I079202	**Intact:**	Yes
Legal Seal:	I079192	**Intact:**	Yes
Legal Seal:	I079198	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: Sample pH upon receipt was 10.DILUTED BEFORE ANALYSISLOW SURROGATE RECOVERY - POSSIBLE MATRIX INTERFERENCEThis sample contains one small peak which could not be identified. This sample also contains a heavily weathered mid- to heavy-weight petroleum product.

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95943 1,2,4,5-Tetrachlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120821 1,2,4-Trichlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95501 1,2-Dichlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
541731 1,3-Dichlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99650 1,3-Dinitrobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106467 1,4-Dichlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
130154 1,4-Naphthoquinone	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
90131 1-Chloronaphthalene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
90120 1-Methylnaphthalene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108-60-1 2,2'-oxybis(1-Chloropropane)	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
58902 2,3,4,6-Tetrachlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95954 2,4,5-Trichlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88062 2,4,6-Trichlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120832 2,4-Dichlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
105679 2,4-Dimethylphenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
51285 2,4-Dinitrophenol	245 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
121142 2,4-Dinitrotoluene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87650 2,6-Dichlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
606202 2,6-Dinitrotoluene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
53963 2-Acetylaminofluorene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
91587 2-Chloronaphthalene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95578 2-Chlorophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91576 2-Methylnaphthalene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95487 2-Methylphenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88744 2-Nitroaniline	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
88755 2-Nitrophenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
109068 2-Picoline (2-Methylpyridine)	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1319773 3&4-Methylphenol	49.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91941 3,3'-Dichlorobenzidine	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Mid-level LCS recovery low. Results may be biased low.				
56495 3-Methylcholanthrene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
99092 3-Nitroaniline	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
534521 4,6-Dinitro-2-methylphenol	49.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
92671 4-Aminobiphenyl	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
101553 4-Bromophenyl-phenyl ether	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59507 4-Chloro-3-methylphenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106478 4-Chloroaniline	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
7005723 4-Chlorophenyl-phenyl ether	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100016 4-Nitroaniline	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100027 4-Nitrophenol	122 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99558 5-Nitro-o-toluidine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
57976 7,12-Dimethylbenz(a)-anthracen	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
83329 Acenaphthene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
208968 Acenaphthylene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98862 Acetophenone	49.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62533 Aniline	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120127 Anthracene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
140578 Aramite	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98555 a-Terpineol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56553 Benz(a)anthracene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
50328 Benzo(a)pyrene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.					
205992	Benzo(b)fluoranthene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
85687	Butylbenzylphthalate	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.Continuing calibration recoveries low. Results may be biased low.					
88857	Dinoseb	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	49.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/08/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.Continuing calibration recoveries low. Results may be biased low.				
67721 Hexachloroethane	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	49.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	12.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 001 **Date Collected:** 06/01/2016 09:45:00 AM **Lab Sample ID:** O2016004204 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	24.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/12/2016 04:10:12

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: field blank
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	I078100	**Intact:**	Yes
Legal Seal:	I078103	**Intact:**	Yes
Legal Seal:	I078104	**Intact:**	Yes

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Legal Seal:	I078105	**Intact:**	Yes
Legal Seal:	I078102	**Intact:**	Yes
Legal Seal:	I078107	**Intact:**	Yes
Legal Seal:	I078108	**Intact:**	Yes
Legal Seal:	I078109	**Intact:**	Yes
Legal Seal:	I078101	**Intact:**	Yes
Legal Seal:	I078106	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: This sample does not contain any Tentatively Identified Compounds.This sample contains benzoic acid at an estimated concentration of 5.6ug/L. The BOL is not accredited for the analysis of benzoic acid.

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
95943 1,2,4,5-Tetrachlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
120821 1,2,4-Trichlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
95501 1,2-Dichlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
541731 1,3-Dichlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
99650 1,3-Dinitrobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
106467 1,4-Dichlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
130154 1,4-Naphthoquinone	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
90131 1-Chloronaphthalene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
90120 1-Methylnaphthalene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
108-60-1 2,2'-oxybis(1-Chloropropane)	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
58902 2,3,4,6-Tetrachlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
95954 2,4,5-Trichlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
88062 2,4,6-Trichlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
120832 2,4-Dichlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
105679 2,4-Dimethylphenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
51285 2,4-Dinitrophenol	24.5 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
121142 2,4-Dinitrotoluene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
87650 2,6-Dichlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
606202 2,6-Dinitrotoluene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
53963 2-Acetylaminofluorene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
91587 2-Chloronaphthalene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
95578 2-Chlorophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
91576 2-Methylnaphthalene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
95487 2-Methylphenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
88744 2-Nitroaniline	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
88755 2-Nitrophenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
109068 2-Picoline (2-Methylpyridine)	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
1319773 3&4-Methylphenol	4.9 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
91941 3,3'-Dichlorobenzidine	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Mid-level LCS recovery low. Results may be biased low.				
56495 3-Methylcholanthrene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
99092 3-Nitroaniline	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
534521 4,6-Dinitro-2-methylphenol	4.9 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
92671 4-Aminobiphenyl	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
101553 4-Bromophenyl-phenyl ether	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
59507 4-Chloro-3-methylphenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
106478 4-Chloroaniline	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
7005723 4-Chlorophenyl-phenyl ether	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
100016 4-Nitroaniline	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
100027 4-Nitrophenol	12.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
99558 5-Nitro-o-toluidine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
57976 7,12-Dimethylbenz(a)-anthracen	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
83329 Acenaphthene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
208968 Acenaphthylene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
98862 Acetophenone	4.9 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
62533 Aniline	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
120127 Anthracene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
140578 Aramite	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
98555 a-Terpineol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
56553 Benz(a)anthracene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
50328 Benzo(a)pyrene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.					
205992	Benzo(b)fluoranthene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
85687	Butylbenzylphthalate	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.					
88857	Dinoseb	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	4.9 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/09/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
67721 Hexachloroethane	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	4.9 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	1.2 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 006 **Date Collected:** 06/01/2016 12:45:00 PM **Lab Sample ID:** O2016004209 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	2.4 UG/L (U)	07/09/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.

Date of Issue: 07/12/2016 04:10:22

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Name of Sample Collector: Jennifer A Wilson
Date Received: 06/02/2016

County: Delaware **State:**
Municipality: Marcus Hook Boro

SUNOCO LOGISTICS
100 GREEN STREET
MARCUS HOOK PA. 19061

Facility/Permit ID: PAD980550594 **FIX ID:** 292969
Facility: SUNOCO PARTNERS M&T - MARCUS HOOK REFINERY
Sub-Facility: **FIX ID:** 0
Name:

Sample Medium: Ground Water
Sample Medium Type: Water

Location: MW-30
Reason: Routine Sampling
Project: NOT INDICATED
Suite: SV-WW
Matrix: Water

Legal Seal:	I079206	**Intact:**	Yes
Legal Seal:	I079207	**Intact:**	Yes
Legal Seal:	I079208	**Intact:**	Yes

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Legal Seal:	I079209	**Intact:**	Yes
Legal Seal:	I079203	**Intact:**	Yes
Legal Seal:	I079211	**Intact:**	Yes
Legal Seal:	I079212	**Intact:**	Yes
Legal Seal:	I079204	**Intact:**	Yes
Legal Seal:	I079205	**Intact:**	Yes
Legal Seal:	I079210	**Intact:**	Yes

Stream Condition:

Sample Lab Comment: This sample contains a heavily weathered mid- to heavy-weight petroleum product.This sample contains benzoic acid at an estimated concentration of 5.3ug/L. The BOL is not accredited for the analysis of benzoic acid.

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
95943	1,2,4,5-Tetrachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120821	1,2,4-Trichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95501	1,2-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
541731	1,3-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99650	1,3-Dinitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106467	1,4-Dichlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
130154	1,4-Naphthoquinone	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
90131	1-Chloronaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
90120	1-Methylnaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108-60-1	2,2'-oxybis(1-Chloropropane)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
58902	2,3,4,6-Tetrachlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95954	2,4,5-Trichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88062	2,4,6-Trichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120832	2,4-Dichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
105679	2,4-Dimethylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
51285	2,4-Dinitrophenol	24.8 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
121142	2,4-Dinitrotoluene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87650	2,6-Dichlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
606202	2,6-Dinitrotoluene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
53963	2-Acetylaminofluorene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
91587	2-Chloronaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95578	2-Chlorophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91576	2-Methylnaphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95487	2-Methylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
88744	2-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
88755	2-Nitrophenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
109068	2-Picoline (2-Methylpyridine)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1319773	3&4-Methylphenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91941	3,3'-Dichlorobenzidine	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Mid-level LCS recovery low. Results may be biased low.Continuing calibration recoveries low. Results may be biased low.Matrix spike recoveries low. Results and/or reporting limits may be biased low.					
56495	3-Methylcholanthrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.					
99092	3-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
534521	4,6-Dinitro-2-methylphenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
92671	4-Aminobiphenyl	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.Matrix spike recoveries low. Results and/or reporting limits may be biased low.					
101553	4-Bromophenyl-phenyl ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59507	4-Chloro-3-methylphenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
106478	4-Chloroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
7005723	4-Chlorophenyl-phenyl ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100016	4-Nitroaniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100027	4-Nitrophenol	12.4 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
99558	5-Nitro-o-toluidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
57976	7,12-Dimethylbenz(a)-anthracen	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.Matrix spike recoveries low. Results and/or reporting limits may be biased low.					
83329	Acenaphthene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
208968	Acenaphthylene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98862	Acetophenone	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62533	Aniline	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120127	Anthracene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
140578	Aramite	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98555	a-Terpineol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56553	Benz(a)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
50328	Benzo(a)pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Test Codes / CAS # - Description		Reported Results	Date And Time Analyzed	Analyst	Test Method
Low-level LFB recovery low. Reporting limit may be biased low.					
205992	Benzo(b)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
191242	Benzo(g,h,i)perylene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
207089	Benzo(k)fluoranthene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100516	Benzyl alcohol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111911	bis(2-Chloroethoxy)methane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
111444	bis(2-Chloroethyl)ether	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117817	bis(2-Ethylhexyl)phthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
85687	Butylbenzylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
510156	Chlorobenzilate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
218019	Chrysene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
2303164	Diallate (Cis & Trans)	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
53703	Dibenzo(a,h)anthracene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
132649	Dibenzofuran	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84662	Diethylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60515	Dimethoate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
60117	Dimethylaminoazobenzene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
131113	Dimethylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
84742	Di-n-butylphthalate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
117840	Di-n-octylphthalate	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.					
88857	Dinoseb	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.					
122394	Diphenylamine	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298044	Disulfoton	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
62500	Ethyl methanesulfonate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
56382	Ethyl Parathion	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
	EXTRACTED DATE	06072016 Day	07/08/2016 02:00 AM	CARWALTER	EPA 625
206440	Fluoranthene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.					
86737	Fluorene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
118741	Hexachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87683	Hexachlorobutadiene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
77474	Hexachlorocyclopentadiene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
Continuing calibration recoveries low. Results may be biased low.Low-level LFB recovery low. Reporting limit may be biased low.				
67721 Hexachloroethane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
1888717 Hexachloropropene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
193395 Indeno-1,2,3-cd-pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
465736 Isodrin	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Continuing calibration recoveries low. Results may be biased low.				
78591 Isophorone	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
120581 Isosafrole	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
66273 Methyl Methanesulfonate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298000 Methyl Parathion	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
91203 Naphthalene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
98953 Nitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
924163 N-Nitrosodibutylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
55185 N-Nitrosodiethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
62759 N-Nitrosodimethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
621647 N-Nitrosodipropylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
10595956 N-Nitrosomethylethylamine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
59892 N-Nitrosomorpholine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
100754 N-nitrosopiperidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
930552 N-Nitrosopyrrolidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
126681 O,O,O-Triethylphosphorothioate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
95534 o-Toluidine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
76017 Pentachlorethane	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
608935 Pentachlorobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
82688 Pentachloronitrobenzene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
87865 Pentachlorophenol	5.0 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
Low-level LFB recovery low. Reporting limit may be biased low.				
85018 Phenanthrene	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
108952 Phenol	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
298022 Phorate	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
23950585 Pronamide	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
129000 Pyrene	1.2 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
110861 Pyridine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
94597 Safrole	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625
3689245 Sulfotep	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

Analytical Report For
Land Recycling & Waste Management

Sample ID: 2119 002 **Date Collected:** 06/01/2016 10:30:00 AM **Lab Sample ID:** O2016004205 **Status:** Completed

Test Codes / CAS # - Description	Reported Results	Date And Time Analyzed	Analyst	Test Method
297972 Thionazine	2.5 UG/L (U)	07/08/2016 02:00 AM	CARWALTER	EPA 625

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

ORGANICS LABORATORY QUALIFIERS

U - Indicates analysis was performed for the compound but it was not detected. The sample quantitation limit is reported.

J - Indicates an estimated value, below the quantitation limit, but above the method detection limit.

N - Indicates presumptive evidence of a compound.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

P - This flag is used with a target analyte when there is greater than a 25% difference between the results obtained from the primary and confirmation columns for dual column analysis methods (e.g. pesticides, triazines, PCBs, etc)

Q - This flag identifies the average of multiple results from multiple analyses, or the average of the averages of dual column analysis methods.

X - Non-target analytes co-elute with compound. Identification unable to be confirmed.