

Landfill Gas Proximity Analysis: Potential Direct Users in West Virginia

September 2007

FINAL REPORT



Prepared for:

West Virginia Department of Commerce
Division of Energy



Prepared by:

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DISCLAIMER

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Cover photo courtesy of Raleigh County Solid Waste Authority.

Landfill Gas Proximity Analysis: Potential Direct Users in West Virginia

This report maps industrial facilities located within five miles of West Virginia landfills. Of West Virginia's 18 operating municipal waste landfills, 15 have potential direct-use facilities located within a five-mile radius.

Landfill gas (LFG) projects across the nation are primarily industrial but include hospitals, high schools and a federal research campus. LFG is also often injected into the natural gas production system by directly injecting unprocessed landfill gas into a natural gas reserve or is used by landfill itself for leachate evaporation. Of the numerous industrial applications that use natural gas, examples of projects in place include: sludge incineration at wastewater treatment plants, brick kilns, pet food production, auto assembly, biodiesel production, food products and chemical production to name a few.

Methodology

This report emphasizes potential direct use by manufacturing businesses and hospitals although it is possible that some public, retail or commercial properties could also become direct users. Manufacturing establishments were selected as candidate users via energy use data published by the Energy Information Administration's Manufacturing Energy Consumption Survey (MECS) 2002, which reports average percents of energy use by type for major – and some minor - industries by region. Businesses were selected if they represent an industry reported to use natural gas for 30% or greater of their total energy needs as estimated by the MECS. Businesses are ranked by one of two tiers, with the First Tier being industries that on average use natural gas for more than 50 percent of their energy needs. Second Tier businesses represent industries for which the MECS data reports natural gas usage of between 30 and 50 percent (e.g. food products, transportation equipment, furniture).

For every business actual gas use is specific to that facility and businesses in Second Tier industries are expected to have a wider range of possible gas use. For example, within food and kindred products manufacturing the production of canned fruits and vegetables and beverages requires large amounts of natural gas relative to other food processing industries.¹ Another example is cement manufacturing which on average uses natural gas for only eight percent of energy needs. Even though most cement manufactures use coal as the base fuel, LFG has been used to fire kilns for cement manufacturing in Oregon and Missouri. While cement manufacturing facilities are excluded from this project, the industry may be worthy of more evaluation.

Selected sites are also required to have ten or more employees. Exceptions include:

- Facilities with less than 10 employees that are located at the same site as another potential user, e.g. in Nicholas County, Columbia Forest Products (2 employees) is located next to Gauley Mountain Moulding (8 employees)

¹ California Energy Commission, citing Standard & Poor's DRI, Quarterly Fuel and Energy Report, February 1998. <http://www.energy.ca.gov/pier/iaw/industry/food.html>

- Multiple similar facilities at one site, e.g. multiple metal and metal equipment manufacturing companies in Triadelphia.
- Businesses in industries that are likely to have high levels of gas use in spite of small employment, e.g. aluminum die-casting companies

Businesses in both tiers will require future follow-up analysis to acquire more precise information on gas usage. The selected businesses are based on industry averages and it is thus possible that some businesses are low-level gas users or even not users at all.

Both hospitals and larger nursing homes (greater than 90 employees) are included in the following maps and are considered First Tier potential users due to the likelihood of these type facilities having gas heat and water heating. Hospitals also have established history as landfill gas users. In the 1980s, gas from the Berkley County Solid Waste Authority's landfill was used directly by the Veteran's Administration hospital in the area. That landfill is now closed and methane produced thus ceased to be of a usable volume.

Maps

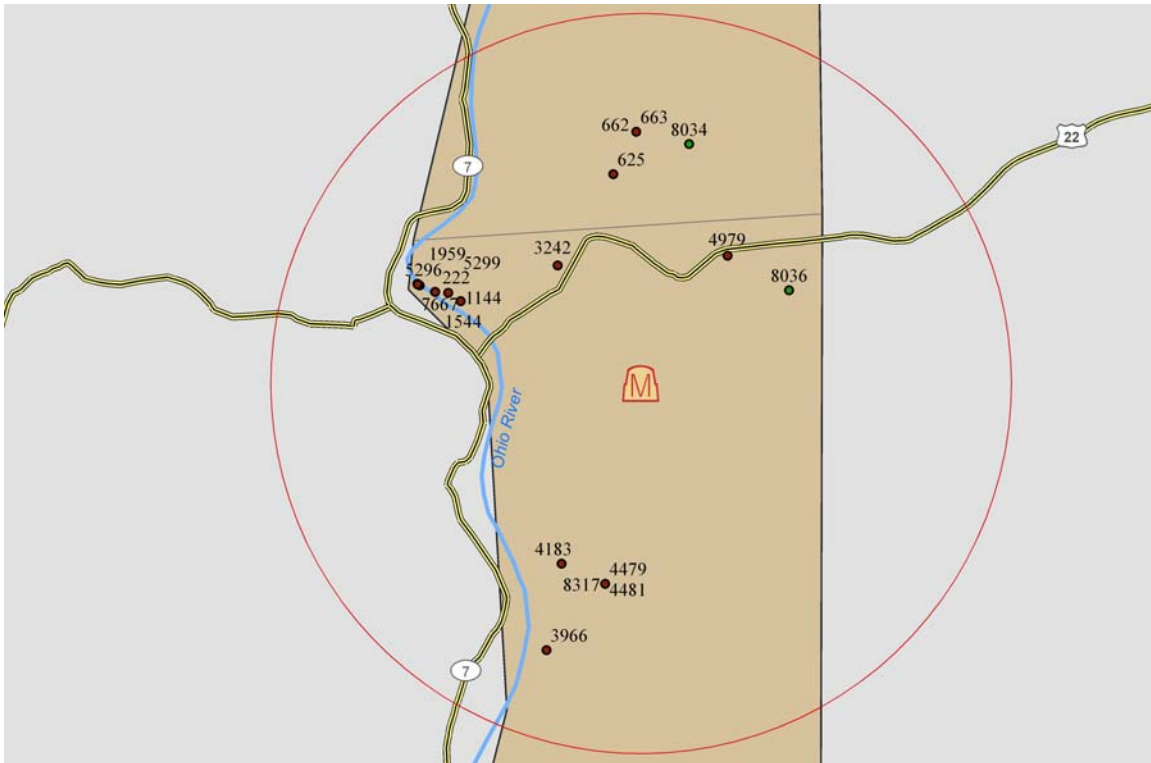
The following county-level maps depict a five-mile radius surrounding each of the 15 landfills with candidate direct-use facilities. Direct use facilities have been developed for landfills further than 5 miles from their industrial user, but five miles is much more cost-effective distance.

Landfill information on the location of the fill, reported waste acceptance and estimated methane generation in standard cubic feet per minute (scfm) is also shown. Estimated methane production is based on the age of the fill and annual waste acceptance rates. The estimates shown here are based on waste acceptance rates in 2003 as published by the West Virginia Department of Environmental Protection.² Methane generation figures were calculated using the U.S. Environmental Protection Agency's Landfill Methane Outreach Program's LFGcost-Web Model (Version 1.3).

For the following maps, red dots represent a manufacturing facility and green dots a hospital or nursing care facility.

² WVDEP Solid Waste Management Board, September 2004. Table 3-2: 2003 WASTE SOURCES FOR PUBLIC LANDFILLS OPERATING ON SEPTEMBER 1, 2004 and Table 3-3: 2003 WASTE SOURCES FOR PRIVATE LANDFILLS OPERATING ON SEPTEMBER 1, 2004.

Brooke County Landfill



Landfill Information:

Colliers, WV

45,000 tons waste acceptance per year

200 scfm estimated methane production

First Tier Businesses

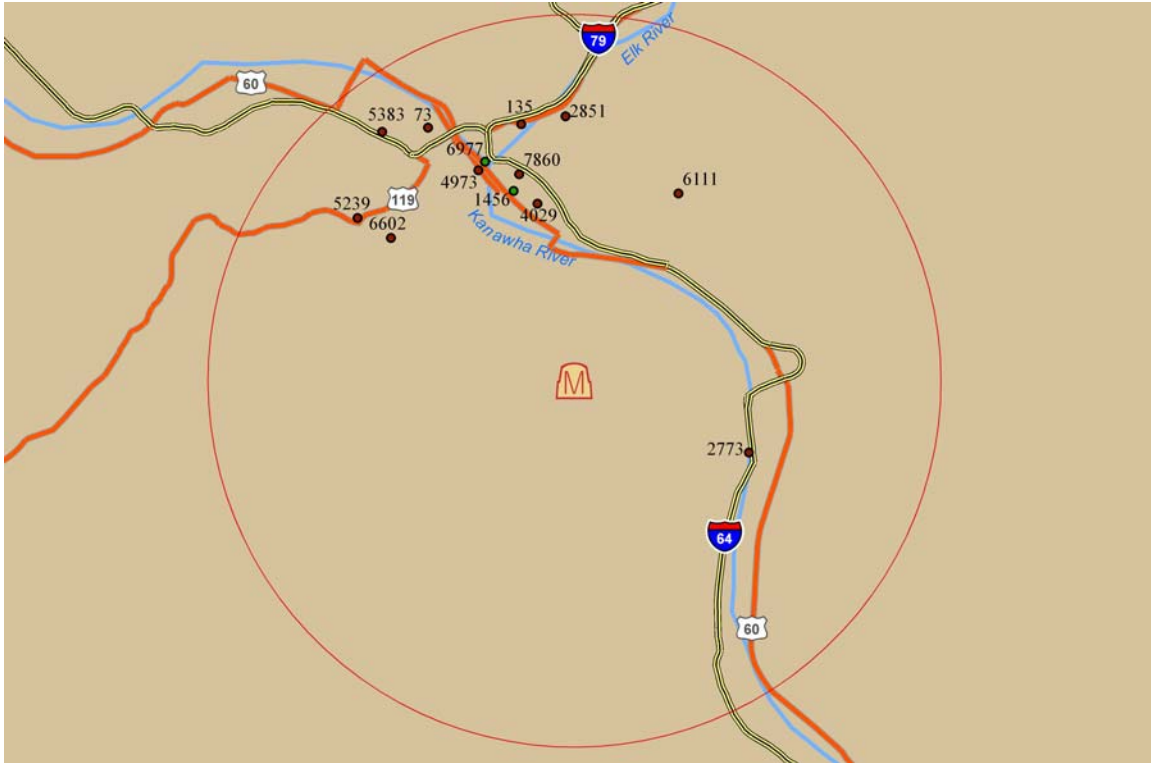
- **4183: Koppers Inc** -- Manufactures coal tar products; manufactures carbon & graphite products; manufactures chemical products; manufactures coke produced in chemical recovery coke ovens
- **4481: Louis Berkman Co** -- Manufactures terneplate; manufactures asphalt coatings & sealers; sheet metal fabricator
- **8317: Wheeling-Nisshin Inc** --Manufactures coated or plated products
- **4979: Mittal Steel USA Isg Inc** -- Manufactures cold-rolled steel
- **222: Allegheny Hancock Corp** -- Steel fabricator
- **4479: Louis Berkman Co** -- Sheet metal fabricator
- **625: Ball Corp** -- Manufactures metal cans
- **1959: Crown Cork & Seal Co Inc** -- Manufactures metal cans
- **7667: United States Can Co** -- Manufactures metal cans; commercial printing; commercial lithographic printing
- **1544: Chrome Deposit Corp** -- Provides hard chrome plating; steel & aluminum roll electro-blasting texturing services
- **5296: NEO Industries Inc** -- Plating service; management services; welding service

- **8036: Weirton Medical Center** – medical hospital
- **8034: Weirton Geriatric Center** - skilled nursing care facility

Second Tier Businesses

- **5299: Nestle Purina Petcare Co** -- Manufactures cat food; manufactures metal cans; manufactures dry pet food; manufactures pet supplies
- **622/663: Barney's Weir-Cove Bakery** -- Retail and commercial bakery; manufactures cookies & crackers
- **3242: Gus's Goodies** -- Retail and commercial bakery; manufactures cookies & crackers
- **3966: Johnson Towing Corp** -- Builds & repairs barges; towing & tug boat service
- **1144: Bulldog Rack Co Inc** -- Manufactures nonwood office & store shelving

City of Charleston Landfill



Landfill Information:

Charleston, WV

190,000 tons waste acceptance per year

140 scfm estimated methane production

First Tier Businesses

- **73: Absolute Upholstery Inc** -- Custom canvas products
- **5383: NI Industries Inc** -- Manufactures white lead, lead oxides & lead sulfate inorganic pigments; manufactures chemical products
- **4973: Minuteman Press** - Offset printing; book binding; typesetting service
- **1456: Charleston Area Medical Center** – medical hospital
- **6977: St. Francis Hospital** – medical hospital

Second Tier Businesses

- **6111: R G Gunnoe Farms LLC** -- Manufactures sausages from slaughtered meat; manufactures salads; wholesales meat & meat products; meat processing
- **2773: Flowers Baking Co of West VA** -- Retail bakery; commercial bakery
- **7860: Virginia West Steel Corp** -- Fabricated structural steel & plate work, sash, frames, molding & trim, ornamental iron work & prefab components
- **4029: Kanawha Manufacturing Co** -- Manufactures plate work for metalworking; trenching service; manufactures gray iron castings; manufactures underground mobile mining loading equipment; sheet metal and steel fabricator

- **2851: Freedom Industries Inc** -- Manufactures purification & dust collection equipment; wholesales chemicals & allied products
- **6602: Schindler Elevator Corp** -- Manufactures elevators, escalators & moving walkways
- **135: Ae Parts Distribution** -- Manufactures motor vehicle engines & parts
- **5239: National Dentex Corp** -- manufactures dental equipment & supplies

Putnam County Landfills - Disposal Service and Sycamore



Landfill Information:

Location:

Waste acceptance per year:

Estimated methane production:

Disposal Service Inc.

Hurricane, WV

45,000 tons

270 scfm

Sycamore

Hurricane, WV

100,000 tons

360 scfm

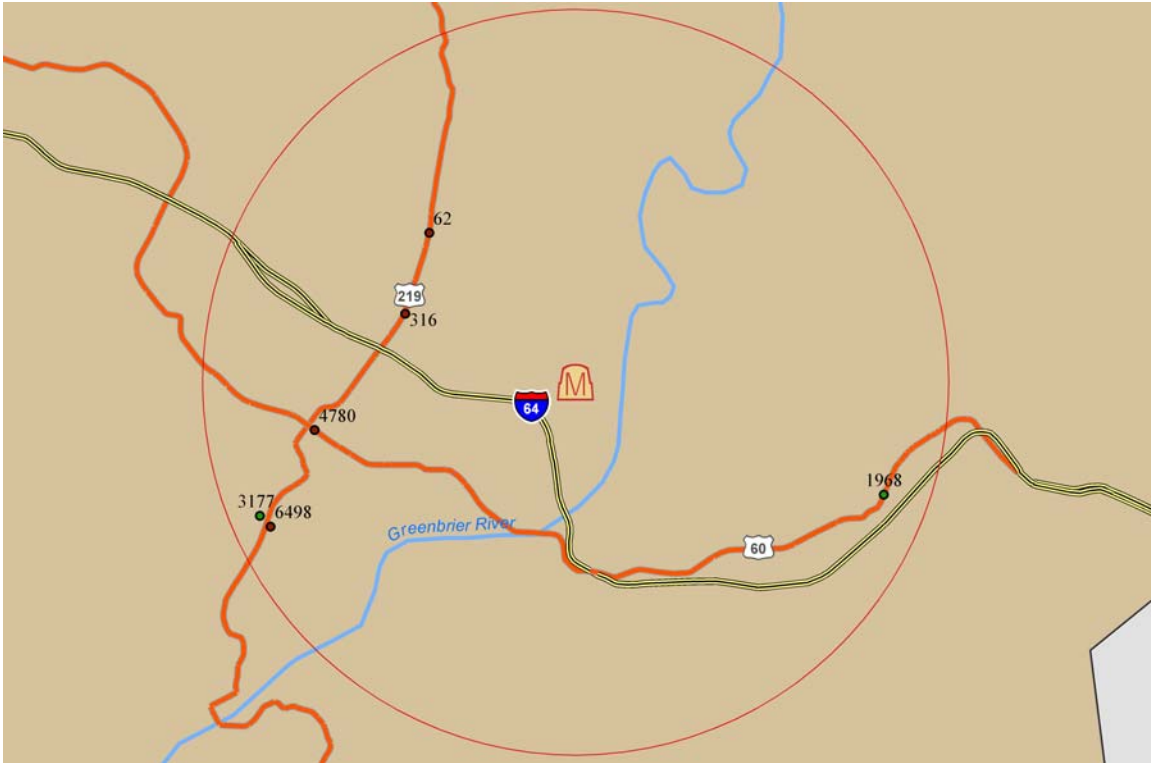
First Tier Businesses

- **3209: Greif Inc** -- Manufactures fiber cans, drums & similar products
- **165: Air Systems Sheet Metal Co** -- Manufactures ducts; sheet metal fabricating
- **6681: Service Wire Co** -- Manufactures steel wire & related products; manufactures nonferrous wiredrawing & insulating
- **6045: Putnam Health Care Corp.** – skilled nursing care facility

Second Tier Businesses

- **7246: T-Shirt International Inc** -- Screen printing of cotton broadwoven fabric; manufactures embroidery & art needlework; manufactures trimming fabrics
- **3214: Griffin Industries Inc** -- Manufactures animal & marine fats & oils

Greenbrier County Landfill



Landfill Information:

Lewisburg, WV

45,000 tons waste acceptance per year

80 scfm estimated methane production

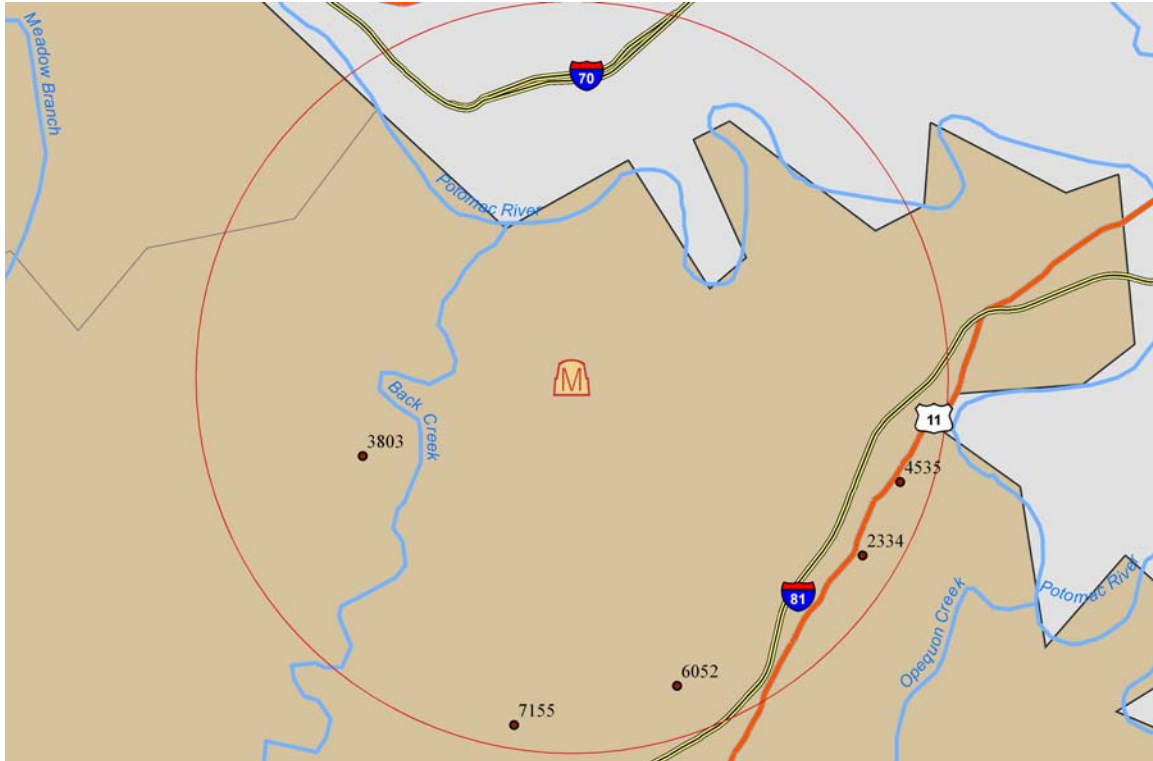
First Tier Businesses

- **316: American Foam Technologies Inc** -- Manufactures foam charge mixtures; manufactures plastic foam products
- **6498: S & B Die Casting** -- Manufacturers aluminum die casting
- **62: ABB Inc** -- Manufactures power related transformers; manufactures switchgear & switchboard apparatus
- **3177:** Greenbrier County Nursing Home - skilled nursing care facility
- **1968:** CSX Hotels/The Greenbrier – resort hotel

Second Tier Businesses

- **4780: Meadow River Enterprises Inc** -- Manufactures railroad seats; manufactures signs & advertising specialties; manufactures panel & distribution boards & other related apparatus; sheet metal fabricator; welding service

Berkeley County Landfill – LCS Services



Landfill Information:

Hedgesville, WV

120,000 tons waste acceptance per year

600 scfm estimated methane production

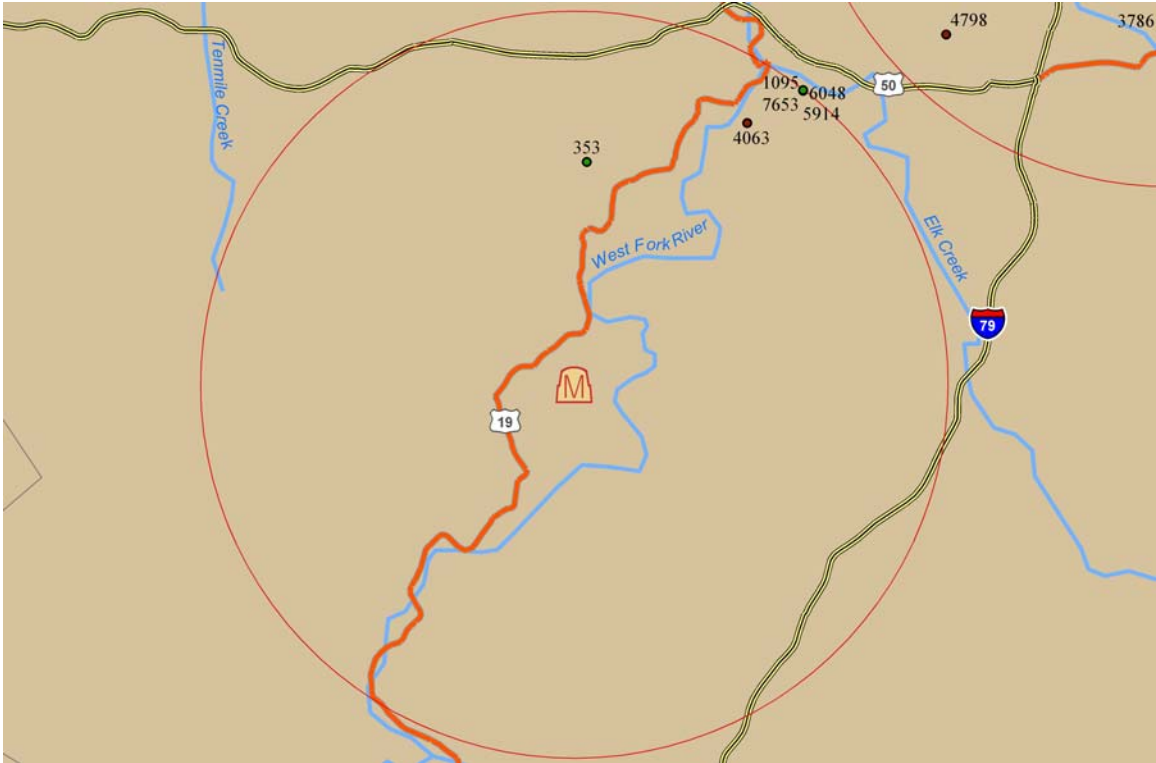
First Tier Businesses

- **2334: E I Du Pont De Nemours & Co** – Manufactures thermoplastic materials
- **6052: Quad Graphics Inc** - Commercial lithographic printing; publishes & prints magazines; manufactures all types of process variable controllers; commercial gravure printing

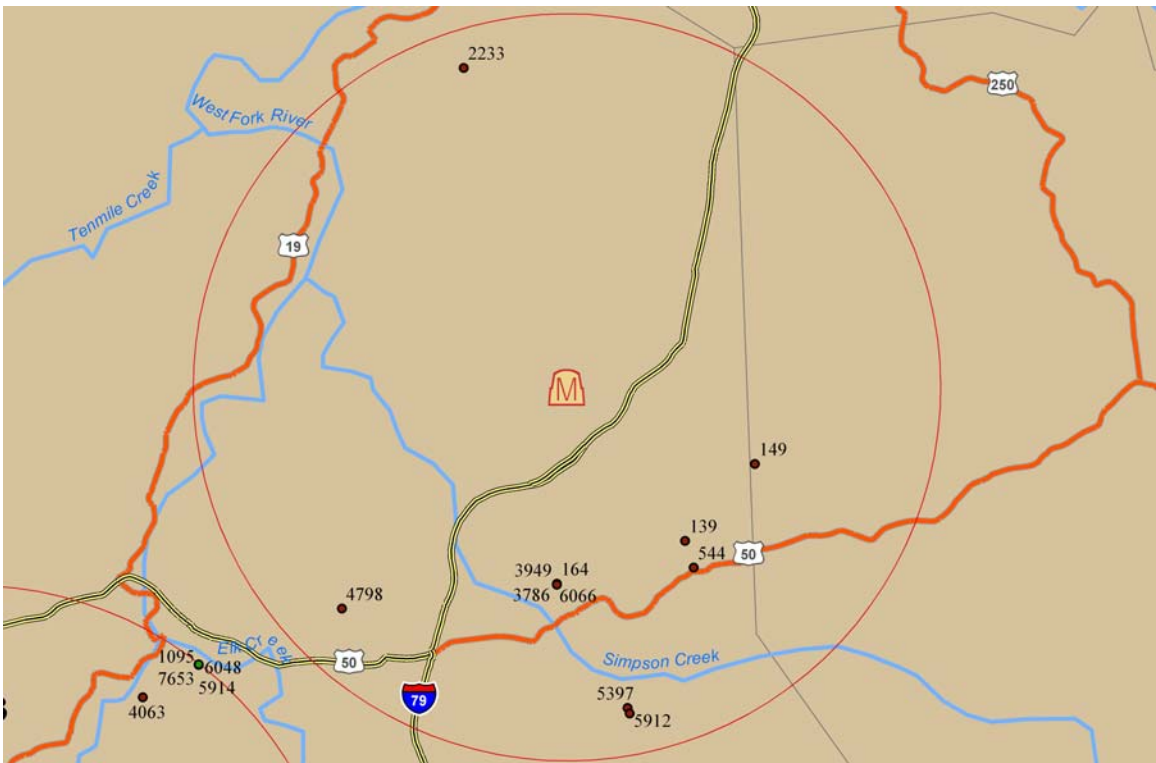
Second Tier Businesses

- **3803: J T B Machining** – Manufactures stamped or pressed metal machine parts
- **7155: Sunset Water Services Inc** – Manufactures swimming pool filter & water conditioning systems
- **4535: M & S Equipment Services LLC** – Manufactures truck bodies & body parts; wholesales industrial machinery & equipment

Harrison County Landfill - S&S



Harrison County Landfill – Meadowfill



Landfill Information:

Location:

Waste acceptance per year:

Estimated methane production:

S&S Grading

Clarksburg, WV

70,000 tons

280 scfm

Meadowfill Landfill

Bridgeport, WV

290,000 tons

1,500 - 2,200 scfm

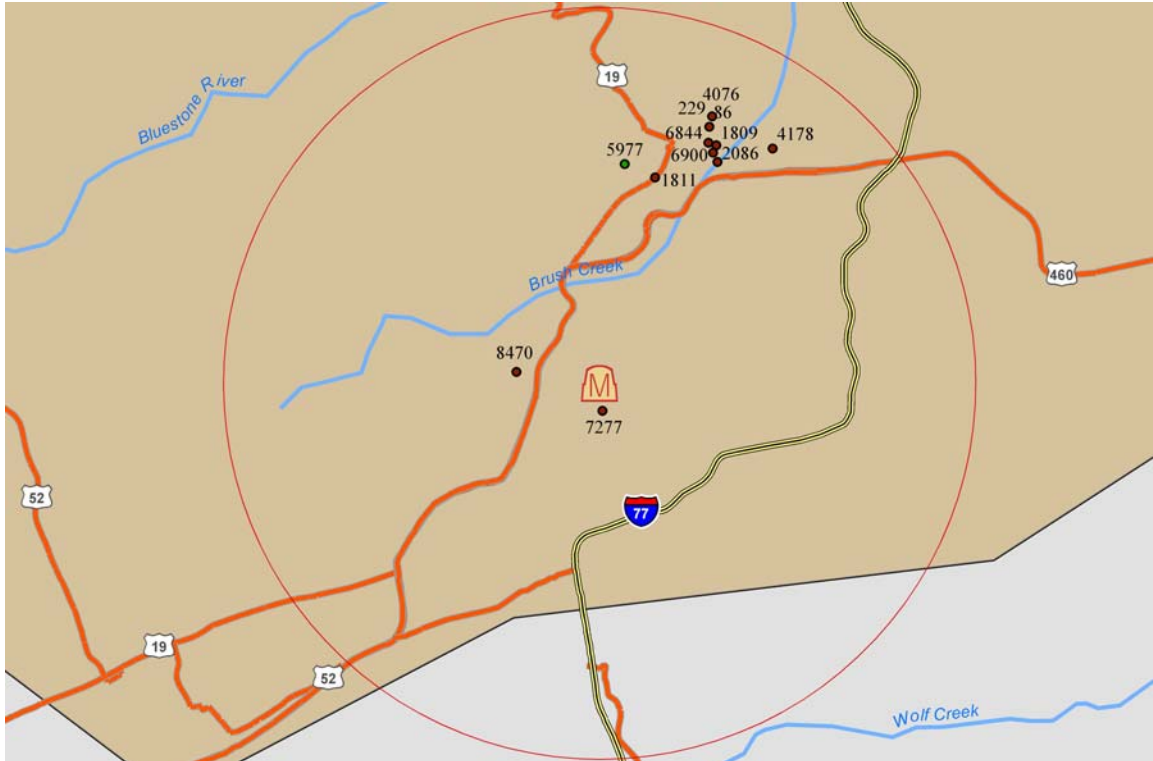
First Tier Businesses

- **149: AFG Industries Inc** – Manufactures flat plate glass
- **164: Air Systems Sheet Metal Co** – Steel fabricator; sheet metal fabricator
- **6066: Quality Machine Co Inc** – Steel fabricator; machine shop, jobbing & repair services; sheet metal fabricator; welding service
- **5397: North American Fastener Corp** – Manufactures wire or cut steel staples
- **5912: Prebena America Inc** – Manufactures wire or cut steel nails
- **3949: John M Hill Inc** – Sandblasting & gunite service
- **5914: Precision Coil Inc** – Aluminum rolling & drawing; manufactures extruded aluminum products; metal heat treating services; manufactures electronic coils & transformers; sheet metal fabricator
- **7653: United Hospital Center** – medical hospital
- **353: AMFM of Clarksburg** - skilled nursing care facility

Second Tier Businesses

- **3786: J F Allen Co Inc** – Manufactures asphalt paving mixtures & blocks; concrete contractor; heavy highway & street construction
- **4798: Medical Action Industries Inc** – Manufactures plastic and metal containers
- **139: Aero Corp** – Manufactures collapsible, rubberized fabric fuel tanks
- **2233: Doddridge Controls Inc** – Manufactures industrial electric controls & control accessories; computer integrated systems design services; manufactures switchgear & switchboard apparatus
- **544: Aurora Flight Sciences** – Manufactures aircraft parts & equipment
- **4063: Kellar & Son** – Manufactures wood pallets & skids
- **1095: Broughton Foods Co LLC** – Manufactures fluid milk; dairy products store; manufactures frozen desserts & novelties; wholesales fresh dairy products
- **6048: Pyrotek** – Manufactures conveyors & conveying equipment; manufactures rolling mill machinery

Mercer County Landfill



Landfill Information:

Princeton, WV

53,000 tons waste acceptance per year

280 scfm estimated methane production

First Tier Businesses

- **4076: Kenneth E Snider Inc** – Sawing & planing mill; retail lumber sales; logging
- **86: Acme Wood Preserving Inc** – Treats wood railroad cross-ties
- **2086: Danzer North America Inc** – Manufactures hardwood & softwood veneer stock; hardwood dimension & flooring mill ; wholesales veneer
- **229: Allegheny Wood Products** – Manufactures kiln dried lumber; hardwood dimension & flooring mill (KNOWN GAS-FIRED KILN)
- **8470: WV Coil Manufacturing Inc** – Manufactures extruded aluminum rod coils
- **1811: Conner Instant Printing Inc** - Commercial offset printing; computer typesetting; glue, spiral wire, plastic, side wire & saddle stitch binding
- **7277: Taylor Services Pressure** – Metal part sandblasting service
- **5977: Princeton Community Hospital** – medical hospital

Second Tier Businesses

- **6900: Southern States Cooperative** – Manufactures animal feed; liquefied petroleum gas dealer; manufactures phosphatic and nitrogenous fertilizers
- **4178: Kolmar Products Corp** – Manufactures soft drinks

- **1809: Conn-Weld Industries Inc** – Manufactures crushing, pulverizing & screening equipment; manufactures blowers & fans
- **6844: Smith Services Inc** – Electrical motor rebuilding for industrial plant machines, power generators & electrical circuit breakers

Nicholas County Landfill



Landfill Information:

Calvin, WV

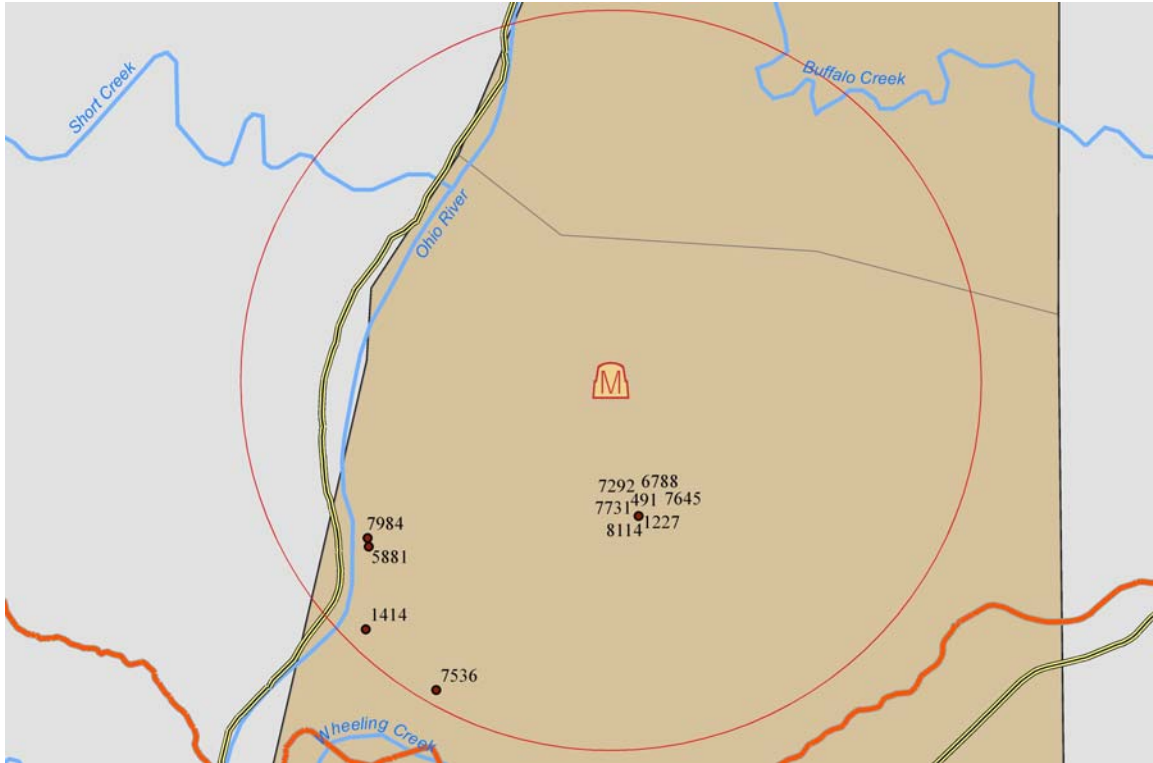
23,000 tons waste acceptance per year

400 scfm estimated methane production

Second Tier Businesses

- **1736: Columbia Forest Products Inc** -- Manufactures hardwood veneer & plywood
- **2951: Gauley Mountain Moulding Corp** -- Manufactures unfinished & prefinished wooden moldings

Ohio County Landfill - Short Creek (formerly North Fork)



Landfill Information:

Short Creek, WV

245,000 tons waste acceptance per year

1,000 - 1,400 scfm estimated methane production

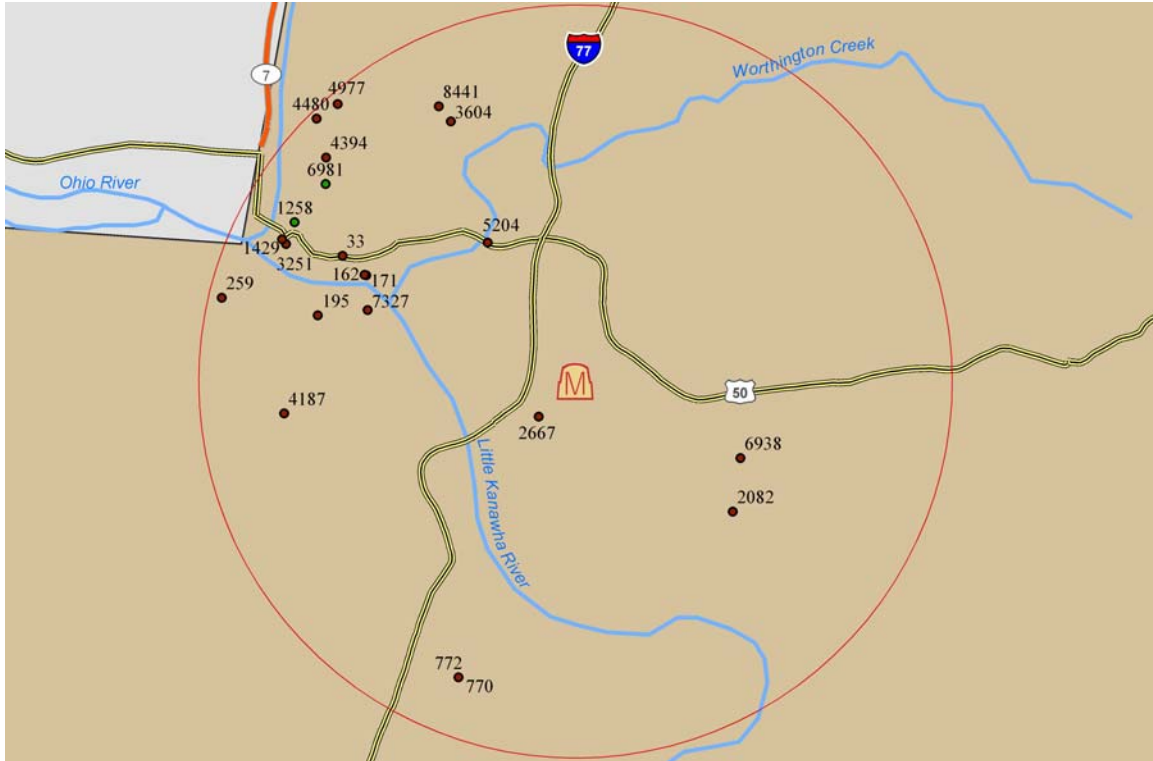
First Tier Businesses

- **1414: Centre Foundry & Machine** -- Manufactures cast iron gray ingot molds
- **7984: Warwood Tool Co** -- Manufactures hammers
- **7645: United Fabricating Inc** -- Steel & sheet metal fabricator
- **8114: West Coat Co Inc** -- Metal coating service

Second Tier Businesses

- **6788: Silgan Plastics Corp** -- Manufactures plastic bottles
- **7292: Tech-Seal Products Inc** -- Manufactures rubber acid bottles; manufactures unsupported plastics film & sheet; sheet metal fabricator
- **1227: Cabin Creek Inc** -- Manufactures mine hoists
- **491: ASAP Inc** -- Manufactures electrical equipment for engines
- **7731: Valley Auto Electric Inc** -- Manufactures automotive alternators, motor vehicle parts & accessories; manufactures relays & industrial controls
- **5881: Positech International Inc** -- Manufactures internal combustion engine oil filters, excluding auto; manufactures motor vehicle parts & accessories
- **7536: Troy Group Inc** -- Manufactures carbon paper & inked ribbons; photographic equipment & supplies

Wood County Landfill - Northwestern



Landfill Information:

Parkersburg, WV

220,000 tons waste acceptance per year

1,000 – 1,600 scfm estimated methane production

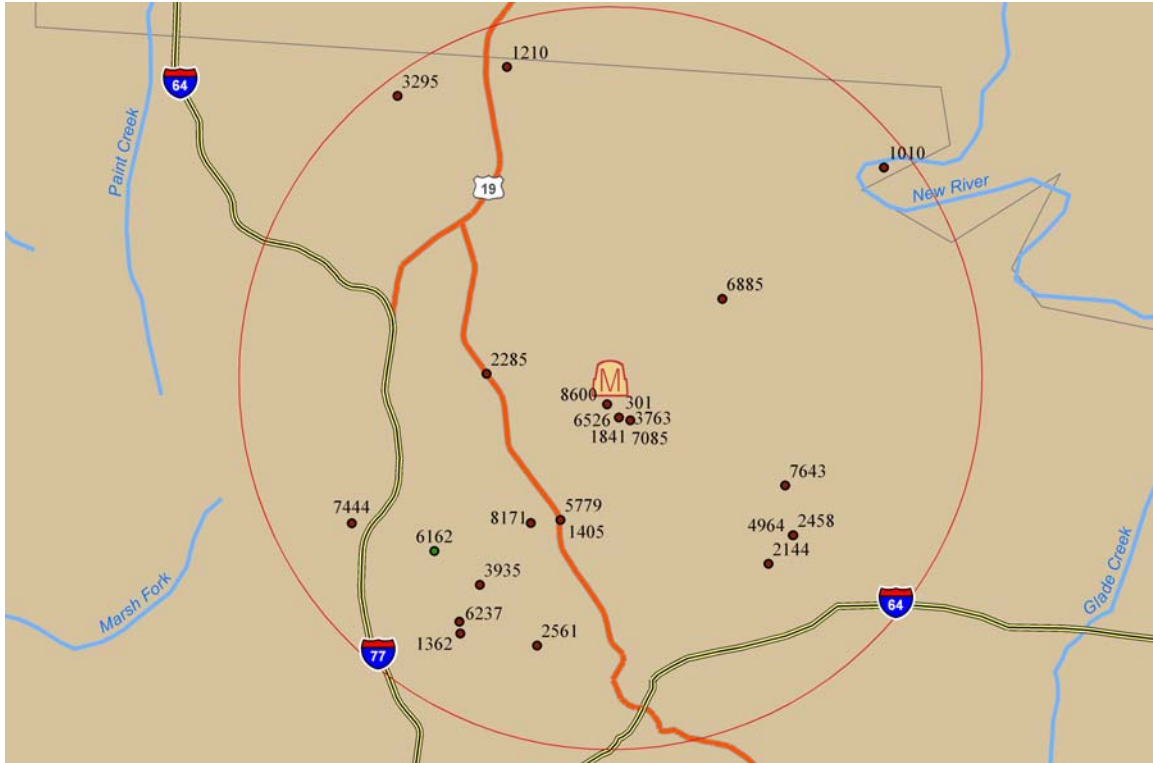
First Tier Businesses

- **171: Airgas Mid America Inc** -- Manufactures industrial gases
- **162: Air Products & Chemicals Inc** -- Manufactures industrial gases; wholesales welding equipment & supplies
- **1429: Champion Industries** - Commercial lithographic printing; book binding service; commercial printing; book printer; manifold business form printing; typesetting service
- **3251: Gwp Industries Inc** -- Manufactures wooden pallets (KNOWN GAS-FIRED KILN)
- **4394: Linde Gas LLC** -- Manufactures industrial gases; wholesales industrial gases; petroleum refining; wholesales welding equipment & supplies
- **3604: Huffman Truss Inc** -- Manufactures building & structural wood members
- **8441: Woodcraft Supply Corp** -- Manufactures decorative wood & woodwork; wholesales industrial woodworking machinery; knife, saw & tool sharpening & repair service
- **1258: Camden-Clark Memorial Hospital** – medical hospital
- **6981: Hospital of St. Joseph** – medical hospital

Second Tier Businesses

- **770/772: Benson International Inc** -- Manufactures truck trailers; general truck repair services; manufactures industrial trucks & tractors; manufactures dump truck bodies
- **2082: Danser Inc** -- Steel fabricator; manufactures nonmetallic mineral statuary & other decorative products; manufactures concrete products; plate metal fabricator; sheet metal fabricator; manufactures nonclay refractories
- **6938: Specialty Piping Corp** -- Metal pipe fabricators
- **2667: Federal Industrial Services** -- Shot peening services
- **4187: Kreinik Manufacturing Co Inc** -- Manufactures needle & handcraft thread; wholesales sewing supplies & notions
- **195: Alfred Nickles Bakery Inc** -- Commercial bakery
- **7327: Tetra Technologies Inc** -- Manufactures inorganic chemicals; wholesales industrial chemical process equipment
- **259: Almeda Inc** -- Pipe, pipe fittings & miscellaneous metal works; plate & structural metal fabricating
- **33: A J R Inc** -- Manufactures truck trailers; manufactures extruded aluminum products; manufactures truck bodies & body parts
- **5204: Murray's Sheet Metal Co Inc** -- Sheet metal fabricator; fabricates pipes & fittings; fabricates architectural metalwork; plate metal fabricator; roofing contractor; steel fabricator
- **4480: Louis Berkman Co** -- Manufactures sheet metal specialties; manufactures metal cans; manufactures metal containers
- **4977: Mister Bee Potato Chips** -- Manufactures potato chips

Raleigh County Landfill



Landfill Information:

Beckley, WV

150,000 tons waste acceptance per year

450 – 800 scfm estimated methane production

First Tier Businesses

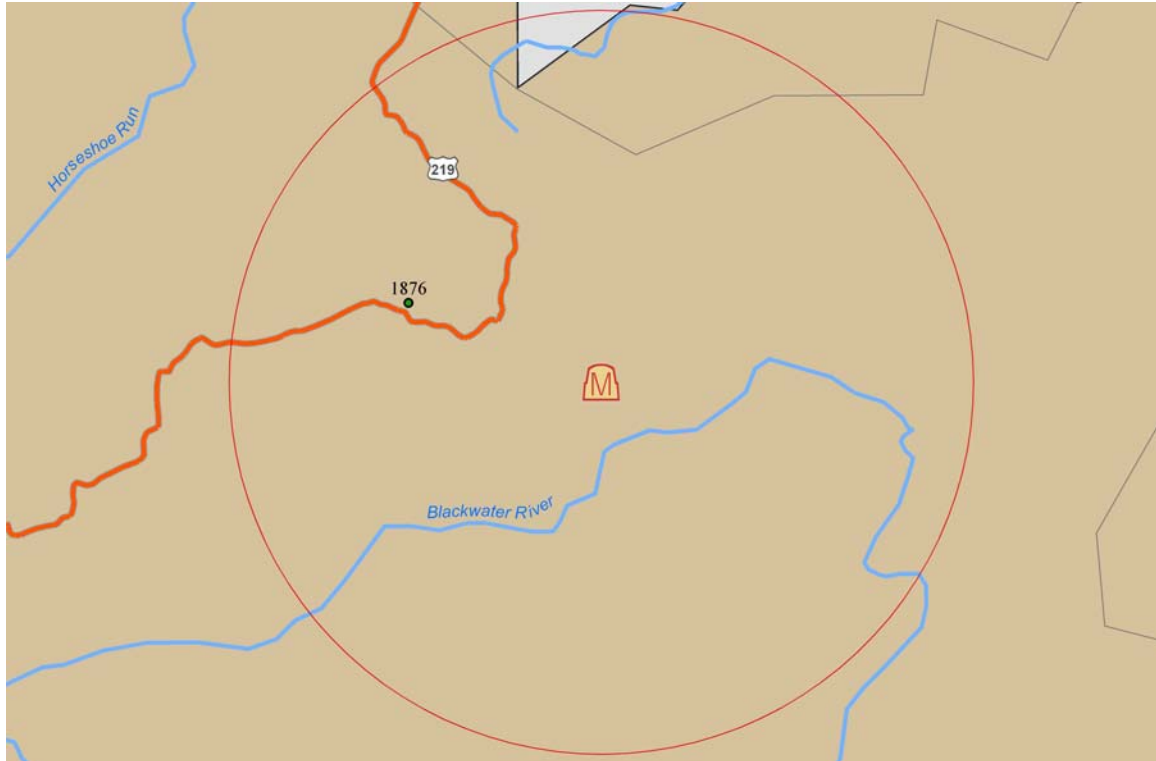
- **3935: Joe L Smith Jr Inc** - Commercial lithographic printing
- **7085: Stockhausen Inc** -- Manufactures industrial organic chemicals
- **6162: Raleigh General Hospital** – medical hospital

Second Tier Businesses

- **301: American Electric Equipment** -- Manufactures electrical mining equipment
- **8600: Superior Highwall Miners LP** - Manufacturers mining machinery
- **2561: Excel Window Co** -- Custom metal windows & doors
- **1362: Ccbcc Operations LLC** -- Manufactures nonalcoholic carbonated beverages; wholesales groceries
- **6237: Rees Electric Co Inc** -- Manufactures electric motors or generators coils; manufactures electronic coils & transformers
- **2144: Dejoy Corp** -- Manufactures mining machinery; sheet metal fabricator; steel fabricator

- **4964: Mining Controls Inc** -- Manufactures power related transformers; manufactures electric panelboards & distribution boards; manufactures capacitors & condensers; manufactures electrical equipment & supplies
- **2458: Elgin National Industries Inc** -- Manufactures electrical equipment & supplies
- **7444: Townley Manufacturing Co Inc** -- Manufactures rubber & plastic hoses & beltings; wholesales industrial hose, belting & packing; manufactures mining machinery
- **8171: West Virginia Glass Co Inc** -- Manufactures window & door frames; glass store; wholesales glass construction materials; custom picture framing service; manufactures glass products; fabricates architectural metalwork
- **1405: Central States Industries Inc** -- Manufactures rubber & plastic hoses & beltings; wholesales mill supplies; manufactures mining machinery
- **5779: PI Products Inc** -- Manufactures pulleys, scraper blades & rubber vulcanizing
- **7643: United Dairy Inc** -- Processes, pasteurizes, homogenizes & bottles milk
- **3763: J & J Fabricating Inc** -- Plate metal fabricator
- **1841: Control Products Inc** -- Manufactures lighting equipment; earthmoving service; manufactures relays & industrial controls
- **6526: S Triple Corp** -- Structural steel & plate metal fabricating services
- **2285: Dr Pepper 7-Up Bottling Co** -- Manufactures soft drinks; wholesales groceries
- **6885: Southeast Steel & Mfg Co** -- Steel tubing
- **1010: Bowyer Mine Supply Inc** -- Steel fabricator; fabricates architectural metalwork; plate metal fabricator; sheet metal fabricator; welding service
- **3295: Hamer Pellet Fuel Co** -- Manufactures pellet & BB guns
- **1210: C U E Of West Virginia LLC** -- Manufactures custom molded urethane products for the automotive & mining industries

Tucker County Landfill



Landfill Information:

Thomas, WV

75,000 tons waste acceptance per year

400 – 450 scfm estimated methane production

First Tier Businesses

- **1876: Cortland Acres Association** -- skilled nursing care facility

Wetzel County Landfill



Landfill Information:

New Martinsville, WV

85,000 tons waste acceptance per year

600 – 650 scfm estimated methane production

First Tier Businesses

- **5905: PPG Industries Inc** -- Manufactures alkalies & chlorine
- **683: Bayer MaterialScience LLC** -- Manufactures inorganic chemicals; manufactures plastics materials & resins; manufactures inorganic pigments; metal heat treating services
- **4284: Lanam Foundry Inc** -- Manufactures gray iron castings
- **4607: Marble King Inc** -- Manufactures toy marbles; manufactures pressed & blown glass; manufactures cut stone & stone products; manufactures glass products
- **5085: Mountain Care Management** - skilled nursing care facility
- **5323: New Martinsville Health Care** - skilled nursing care facility

Second Tier Businesses

- **1339: Carter & Mayes Shirtmakers Inc** -- Manufactures men's & boys' sport shirts; manufactures women's & misses' outerwear; manufactures men's & boys' athletic uniforms; manufactures men's & boys' work clothing
- **6968: Sprouse Building Products Inc** -- Manufactures plastic window frames & sash