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**POWER PURCHASE AGREEMENT FOR RENEWABLE
ENERGY FROM LANDFILL GAS - INSTALLATION OF NEW
GENERATING CAPACITY FOR THE CITY OF BRISTOL
VIRGINIA'S LANDFILL
ENVIRONMENTAL ASSESSMENT
Washington County, Virginia**

Prepared by:
TENNESSEE VALLEY AUTHORITY

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Purpose and Need for Action

The Tennessee Valley Authority (TVA) proposes to enter into a power purchase agreement (PPA) with INGENCO Renewable Development, LLC (INGENCO) to purchase electric power generated at the City of Bristol (see Figure 1), Virginia's integrated solid waste management facility (landfill) in Washington County, Virginia (Attachment A). The landfill is located in Washington County, Virginia (see Figure 1) near Bristol, Virginia. The PPA, executed through TVA's Renewable Standard Offer (RSO) program, would be for 20 years.

INGENCO plans to install 18 Detroit Series 60, 12.7 liter landfill gas (LFG) fueled engines in 2014. The engines would be grouped into three separate, six-engine module sets. The combustion gases from each module set would exit the building through a separate 37 foot exhaust stack. Each exhaust stack would contain a silencer, muffler and stack extension. Only 12 of the 475 horsepower engines would be initially used to generate power for INGENCO's RSO contract which is based on a gross nameplate capacity of 4,500 kilowatts (kW). Six (6) of the engines would be available as stand-by spares and for future generation opportunities. With all 18 engines in operation, the site would have a gross nameplate capacity of 6,300 kW.

TVA produces or obtains electricity from a diverse portfolio of energy sources such as nuclear, fossil, hydro, solar, wind, and biomass. In order to help fulfill the objectives of its 2011 Integrated Resource Plan (TVA 2011), 2007 Strategic Plan (TVA 2007), and 2008 Environmental Policy (TVA 2008), TVA has undertaken efforts to expand the contribution of renewable and low greenhouse gas-emitting sources in its generation portfolio.

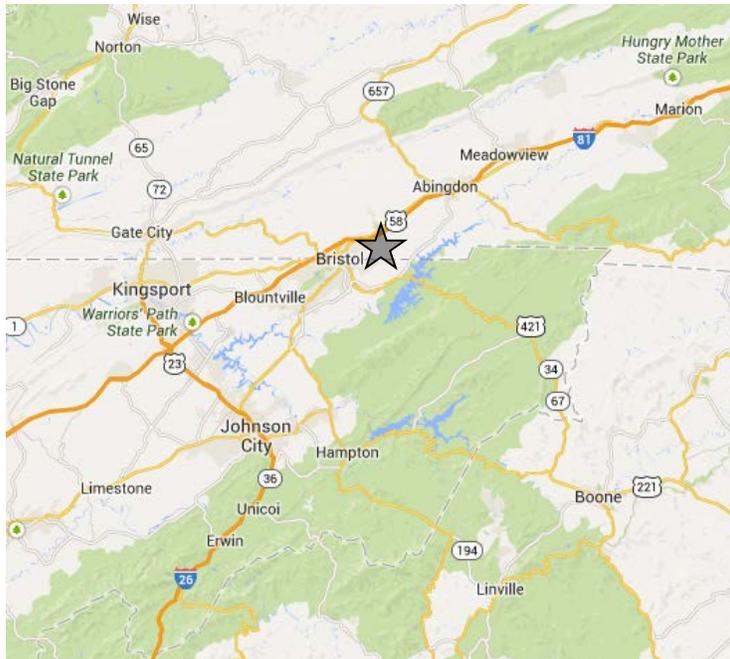


Figure 1. Project Vicinity at Bristol Virginia

The landfill is on land owned by the City of Bristol and the generation facility would be constructed and operated by INGENCO. TVA prepared this environmental assessment

(EA) under the National Environmental Policy Act (NEPA) and TVA's procedures implementing NEPA.

The generation of LFG occurs during decomposition of solid waste. The utilization of LFG for the production of electricity would qualify as a renewable power source in the RSO program. The more energy generated from renewable resources such as LFG, the less energy would need to be generated from nonrenewable resources such as fossil fuels. The proposed facility would utilize LFG as a fuel source to generate electricity. Otherwise the LFG would be combusted by flares and emitted into the atmosphere.

Proposed Action

Under the proposed action, TVA would execute a PPA with INGENCO under the RSO program that would result in the installation of a 6.3 megawatt (MW) electric generating facility fueled by LFG that is produced at the landfill. Only 4.5 MW of the installed capacity will be used to generate power for the RSO program in the near term. The current PPA would allow TVA to purchase electricity from the 4.5 MW of capacity for a 20-year period. The landfill is operated by the City of Bristol. It presently operates an open flare to burn excess LFG emitted from the decomposing buried waste. The flare is connected to a gas collection and control system (GCCS) in the landfill, and to filtration systems to remove particulate matter.

Implementation of the proposal would reduce the amount of LFG being incinerated in the flare or escaping directly into the air (i.e., fugitive emissions) and reduce methane (a greenhouse gas) emissions from the landfill. The new generating units would be placed within a new 6,500 square foot (sq ft) building on a concrete pad adjacent to the existing GCCS and flare on a 2.5-acre compound leased by INGENCO. The leased property is a previously graded area within the landfill boundaries. The proposed additions and modifications include the following:

- Construction of facility site foundation including; upgrading electric service, LFG feed line, access road and parking area.
- Installation of a 6,500 sq ft building to house the generation units and associated equipment.
- Installation of 18 power generation units, 475 horsepower and 350 kW each, fueled by LFG. The 18 units have a combined fuel heat input total of 66.2 million British thermal units per hour. The units would each have a Detroit Diesel Series 60, 12.7 liter engine manufactured in the period 1995 – 1998, one electrical generator, auxiliary systems to connect with the GCCS, and a treatment system consisting of filtration system to remove particulate matter (10 microns and larger) and to compress and dehydrate the gas before use.

Additionally, any LFG not used as fuel for the engines will be controlled by the existing open flare.

- Installation of oil fuel storage tanks with loading facilities and containment. Initially one 12,000 gallon diesel tank would be installed. A second tank for alternate or "green diesel or biodiesel fuel" may be installed in the future; a foundation pad for the additional tank would be constructed.

Background

TVA supplies this power through several different generation methods - nuclear, fossil, hydro, solar, wind, and biomass (including LFG) sources. The more energy that can be generated from renewable resources such as LFG, the less energy needs to be generated from non-renewable resources.

The landfill facility consists of three permitted landfill units located on one contiguous property. The first landfill unit (Solid Waste Permit Number 221) accepted waste from 1977 to 1986 and is currently closed. According to the *Initial Design Capacity Report*, submitted on June 2, 1998, the unit has a design capacity of 694,700 cubic yards (yd³). The landfill facility is designed to accept municipal solid waste, commercial waste, and some industrial waste from local industries. The facility does not accept bulk liquids, hazardous, radioactive, infectious or medical hospital wastes, or asbestos wastes.

The second landfill unit (Solid waste Permit No. 498) is still open but currently receiving no new waste; it accepted waste from 1986 to 2002. The second landfill has a design capacity of about 1,199,224 yd³ and is equipped with a leachate collection system. As approved by Virginia Department of Environmental Quality (VDEQ), wastes in the second landfill unit are being reclaimed through landfill mining. Excavated material is screened to separate the waste from daily/intermediate cover. The waste is then disposed in the third landfill unit. Once all waste has been excavated from the second landfill unit, the area would be used for a Construction and Demolition Debris Landfill in the mined waste footprint.

The third landfill unit (Solid waste Permit Number. 588) is active and has operated since March 1998. This landfill unit was created through the reclamation of an abandoned mining quarry. Waste delivered to the landfill facility is sorted and then mechanically baled to increase waste compaction. The design capacity of the third landfill unit is 7,700,000 yd³. Total capacity for the entire landfill facility is 9,593,924 yd³.

Presently, the LFG produced from the landfill is being captured collected and combusted using an open flare unit to control the non-methane organic compound emissions from LFG. The flare capacity is 2,400 standard cubic feet per minute (scfm). The U.S. Environmental Protection Agency (USEPA) estimates that a land fill gas-to-energy (LFGTE) project can capture up to 60-90 percent of the LFG being emitted from a landfill; the remainder escapes as fugitive emissions to the atmosphere (USEPA [LFG Energy Project Development Handbook](#)). As solid waste continues to be added to the landfill and the existing and future waste decomposes, more LFG will be generated. The facility is not classified as a major hazardous air pollutant facility, and the installation of generating engines would not change its classification.

LFG containing methane is a potential odor nuisance; it is also a health hazard and potentially explosive in high concentrations. Methane is considered a compound of concern to air quality because of its potency as a greenhouse gas. Because of these properties, it is important for landfills to keep methane at safe levels. This is accomplished by capturing and burning the LFG (methane) in a flare as it is released from the landfill.

Combustion (i.e., burning) breaks methane down into water, nitrogen oxides (NO_x) and CO₂. Depending on the make-up of the LFG, the other by-products of combustion of LFG include sulfur dioxide (SO₂) and particulate matter. These compounds are regulated by state and federal laws, and facilities generating these compounds must obtain air permits to construct and operate those facilities.

Number 2 heating oil would be used for engine startup; however, the basic annual average fuel ratio is expected to be 95 percent LFG or greater on an energy input basis.

Other Environmental Reviews and Documentation

This EA tiers from the final environmental impact statement for TVA's Integrated Resource Plan (IRP; TVA 2011).

Permits, Licenses, and Approvals

The landfill consists of three units located on one contiguous property, and currently operates under provisions of the VDEQ Solid Waste Disposal Facility Permit Numbers 221, 498, and 588.

The landfill facility is subject to the New Source Performance Standards, 40 CFR 60, Subpart WWW, for Municipal Solid Waste Landfills. This facility is also subject to the hazardous air pollutant requirements of 40 CFR Part 63, Subpart AAAA – National Emission Standards for Hazardous Air Pollutants (NESHAPs): Municipal Solid Waste Landfills.

The City of Bristol has a Title V Operating Permit for the operation of the existing flare (Number 11174), which was effective March, 2011. INGENCO received a VDEQ air operating permit for the proposed engines on October 15, 2013 (see draft Attachment B). These new engines will be subject to 40 CFR Part 63 - Subpart ZZZZ - NESHAPs for Reciprocating Internal Combustion Engines.

Alternatives

The study area for this EA includes the area where the generating units and associated components would be installed. The archaeological area of potential effect (APE) is the footprint of the proposed facilities where ground disturbance would occur and the architectural APE is a 0.5-mile radius around the proposed new facilities.

TVA is considering two alternatives: the No Action Alternative and Action Alternative.

The No Action Alternative

Under the No Action Alternative, TVA would not purchase the power from this proposed facility, and the LFG-fueled engine system may not be installed by INGENCO. The excess LFG produced by the landfill would continue to be flared to the atmosphere (current rate is up to 2,400 scfm). LFG levels will continue to rise as additional waste is added to the landfill and the older waste decomposes. This would increase the amount of LFG that would need to be combusted by the flare if the generating facility were not installed.

The Action Alternative

Under the Action Alternative, TVA would enter into a 20-year PPA with INGENCO to purchase electric power generated from the proposed facility under the RSO program. In order to generate electricity for sale to TVA, the LFG/Heating oil-fueled engine systems would be installed in 2014 along with site preparation, and associated facilities. The LFG produced by the landfill would be used in the engine to produce up to 4.5 MW of power initially. Up to 6.3 MW of power could be produced for TVA at a later date; however, INGENCO would need to execute a separate PPA to sell the additional 1.8 MW of power to TVA. LFG collected from the landfill would fuel the generating facility with the balance sent to the existing flare.

The Detroit Series 60, 12.7 liter engines are capable of firing in single-fuel mode using only No. 2 fuel oil, or in a dual-fuel mode using a pilot charge of No. 2 fuel oil and LFG. At a 350 kW generator output, the engines have a fuel heat input rate of 3.325 million Btu per hour (MMBtu/hr) burning No. 2 fuel oil, or 3.68 MMBtu/hr under dual-fuel burning conditions. Engines in each module would have a common cooling system, a proprietary control system, and a switch gear serving and controlling the module that is designed and built by INGenco for operations with LFG. The proposed INGenco LFG generation facility would have each of the three engine modules would have a small cooling tower which would have a total water recirculation of 180 gallons per minute. Based on the fuel heat input rate, each engine has the potential to combust up to 118 scfm of LFG containing 50 percent methane by volume at maximum load, for a total capacity to burn 2,135 scfm of LFG.

Preferred Alternative

TVA's Preferred Alternative is the Action Alternative under which TVA would execute a PPA with INGenco to purchase up to 4.5 MW of power generated from the LFG engine systems at the City of Bristol's landfill under the RSO program.

Affected Environment and Anticipated Impacts

Site Description

Located in Washington County, Virginia, the Bristol Landfill and surrounding areas are found within the Southern Limestone Dolomite Valleys and Low Rolling Hills region of the Ridge and Valley Eco-region of Virginia (Griffith et al. 1998). This region occurs between the Blue Ridge Mountains on the east and the Cumberland Plateau on the west, and is a relatively low lying area made up of roughly parallel ridges and valleys that were formed through extreme folding and faulting events in past geologic time. The Southern Limestone/Dolomite Valleys and Rolling Hills is a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly undulating valleys and rounded ridges and hills, with many caves and springs. Soils vary in their productivity, and land cover includes oak-hickory and oak-pine forests, pasture, intensive agriculture, and urban and industrial (Griffith et al. 1998).

Impacts Evaluated

Through internal scoping of the proposed action, TVA has determined that there are no wetlands, floodplains, or streams present on the proposed site. No new hazardous and non-hazardous wastes would be generated. No Wild and Scenic Rivers or natural areas are present in the vicinity and the visual resources would not change from the existing surroundings. Consequently the proposed action is consistent with Executive Order (EO) 11990 (Protection of Wetlands) and EO 11988, (Floodplain Management).

The project's potential impact on terrestrial plants and animals, water quality, noise, transportation, and environmental justice were found to be minimal. These resources, along with socioeconomics and environmental justice are evaluated in the following sections. With the following analysis, this review satisfies the requirements for compliance with EO 13112 (Invasive Species), EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds), and EO 11514 (Protection and Enhancement of Environmental Quality). The impacts of the proposed project on threatened and endangered species, cultural resources, hazardous materials, and air quality and climate change were evaluated in greater detail because of the potential for these resources to be affected

Vegetation and Wildlife. The proposed project footprint is confined to the existing landfill area which has been heavily impacted by previous and current landfill operations. Much of the project area is either already devoid of natural vegetation (a large landfill, associated buildings, parking lots, etc.) or consists of early successional habitats dominated by herbaceous vegetation (construction parking, transport routes, portions of landfill area). There are no forested habitats within the project footprint. Within the footprint of the proposed action, most of the native vegetation has been cleared and herbaceous weedy species dominate the landscape. No designated critical habitats for plant species are known from within five miles of the proposed project.

Although diverse wildlife communities are present in the area surrounding the landfill, few wildlife species occur within the landfill and project site. Those that are present include native and non-native species attracted to the early successional habitats and the food source provided by the garbage dumped at the landfill. Wildlife use of habitat within the project footprint likely is limited to highly maintained areas frequented by human activity such as; American crow, European starling, house sparrow, mourning dove and northern mockingbird. Black and turkey vultures also may be nearby. Mammals including coyote, raccoon, white-tailed deer, and Virginia opossum may use the area as a travel corridor between adjacent forest habitats. The project area also may be used by common rodents such as white-footed mouse, woodland vole, and insectivores including short-tailed shrew. Reptiles such as eastern fence lizard, garter snake, and rat snake that may be present in adjacent forest habitat or along the stream located within the forest habitat to the east and may utilize the open area within the project footprint for sunning on warm days. Noise and movement associated with mobilization, equipment operations, and human presence have the potential to displace any wildlife present to adjacent areas. It is expected that some wildlife would return to the project area upon completion of construction activities.

Since the action area has been previously cleared of all native vegetation, only minor additional impacts to terrestrial plant communities would be expected. Construction and operation of the proposed generators would have minimal impacts on vegetation or wildlife.

Water Quality. The proposed facility would be located on a previously disturbed area associated with the existing landfill. The facility would not directly impact any perennial streams. During construction, ground disturbance would be minimized and all work done in accordance to best management practices (BMPs). The project site is already cleared of vegetation, meaning that an increase of storm water runoff from an increase in impervious surface area from the proposed facilities would be minimal and potential impacts minor and insignificant. Operation of the facility would not result in the generation of any additional liquid wastes.

Noise. The addition of the engine systems would increase noise generation at the landfill. There would be a temporary increase in noise during construction. Engine noise from operations may be audible due to the opening in the stack vent, used for releasing exhaust to the outside. Employees would wear standard hearing protection consistent with the United States Occupational Safety and Health Administration standards.

Because of the proximity of the project location to the active landfill and the lack of nearby noise sensitive receptors, noise from operations would not significantly alter the environment from its present noise conditions.

Transportation. The new engines would be moved to the project site using commercial trailer trucks on the existing local road network. There would be a temporary increase in the number of workers at the site during installation for a short period of one or two weeks. Also approximately twelve daily automobile trips would be related to the new permanent employees. In addition there would be occasional deliveries of No.2 heating oil to the storage tanks. This would result in only a minor increase in vehicle traffic over the normal busy traffic of trucks coming in and out of the landfill to drop off waste.

Socioeconomics and Environmental Justice. The construction of the generating facility would create temporary short-term jobs. As the maintenance and operation the facility would require 24-hour attention there would be three work shifts daily for a total of six permanent jobs. The creation of so small a number of jobs at an existing landfill facility would not cause any disproportionate effects on low-income or minority populations in Washington County. There would be no change in current operations of the landfill that could affect nearby residences as a result of this project. Therefore, there would be minor impacts to socioeconomics and no disproportionate impacts to disadvantaged or minority populations.

Threatened and Endangered Species

Affected Environment - A review of the TVA Heritage Database (database) indicated there are no federally listed species, but three Tennessee state-listed plant species are known to occur within five miles of the landfill; see Table 1 in Attachment C. In addition the Virginia Heritage Program reports a record of *Carex roanensis*, a sedge considered to be a species of concern, as occurring in Washington County. Habitat to support these state-listed species does not occur within or adjacent to the project area. Since no known occurrences of federal or state-listed plant species or habitat to support these species are known on or immediately adjacent to the proposed Action area, no impacts to sensitive plant species are expected to occur from the Action Alternative.

The database (queried in October 2013) indicated records of 10 federal and/or state-listed aquatic animal species known from within a 10-mile radius of the proposed INGenco LFG Facility. These records include one insect, seven fishes, and two freshwater mussels (Table 2, Attachment C). Of these records, the marbled darter and tan riffleshell are federally listed as endangered; however, these two species are considered extirpated (currently absent) from this portion of their former range. The spotfin chub is federally listed as threatened. Records of 29 additional federal and/ or state-listed aquatic species and designated critical habitat for spotfin chub (in the North Fork Holston River) occur within Washington County, Virginia. Because Beaver Creek and Boone Lake-South Fork Holston watersheds are not connected to the other watersheds in Washington County, these additional species were not included in this evaluation. Since no streams or aquatic habitat occurs within the project area and no indirect effects (i.e., runoff) from the project footprint and operation would affect any nearby permanent aquatic habitat, adoption of the action alternative would not result in impacts to aquatic threatened and endangered species.

One federally protected species (bald eagle) and two federally endangered species (gray bat and Virginia northern flying squirrel) have been documented in Washington County, Virginia (Table 3, Attachment C). Gray bat also has been documented in adjacent Sullivan County, Tennessee. Although the Indiana bat is not documented for the relevant counties, guidance issued in 2013 from the U. S. Fish and Wildlife Service (USFWS) directs federal action agencies to review projects occurring within the known range of the federally endangered Indiana bat (USFWS 2013a). No Virginia or Tennessee state-listed terrestrial

animal species have been documented within a three-mile radius of the City of Bristol Landfill.

Bald eagles and their nests are protected by the Bald and Golden Eagle Protection Act of 1940 and managed under the National Bald Eagle Management Guidelines (USFWS 2007). Bald eagles typically establish nests in the crowns of large trees with prominent views that are located near large waterways over which they forage. The closest documented nest is greater than three miles from the City of Bristol Landfill, near Hidden Valley Lake in Hidden Valley Wildlife Management Area, close to the border between Russell and Washington counties. Suitable nesting habitat is not present in the footprint of the project area.

Gray bats inhabit caves throughout the year, migrating between caves used for hibernation during winter and caves used for summer roosting and maternity (Tuttle 1976). Foraging and travel typically occur over aquatic features, including streams, ponds, rivers and reservoirs (Best *et al.* 1995). The closest documented occurrence of gray bat is summer use (i.e., roosting) within a manmade subsurface concrete structure (culvert) approximately two miles from the City of Bristol's landfill. Four caves have been documented within three miles of the project area. All are greater than 1.5 miles from the project area. Suitable foraging or travel habitat is not found within the footprint of the project area.

Indiana bats hibernate during winter in caves and migrate to roost in trees during spring and summer. Roosting during spring and summer primarily occurs under exfoliating bark or cracks and crevices of snags, but use of exfoliating bark, cracks, crevices, and hollows of live trees also has been documented. Indiana bats change roost trees frequently within an area during summer months, yet still maintain some site fidelity to areas used during the summer, returning to those areas in subsequent years (USFWS 2013b). Foraging typically occurs along the tree canopy and stream and forested road corridors and used for travel. Suitable habitat for Indiana bat does not occur within the footprint of the project area.

Virginia northern flying squirrels inhabit spruce, fir, spruce-hardwood, and northern hardwood forests, with a well-developed understory. Occurrence of this species in hardwood forest generally is associated with presence of a spruce/fir forest nearby. Virginia northern flying squirrel primarily occurs in moist forests with widely spaced mature trees and an abundance of snags, lichens and fungi (primary food source) available. Cavities in mature trees are preferred as den sites (NatureServe 2013). Suitable habitat for this species is not present in the project area.

Environmental Consequences - No suitable habitat for federally or state-listed aquatic, or terrestrial animal and plant species occur within the project area. Under either alternative, there would be no direct, indirect, or cumulative impacts to federally or state-listed endangered or threatened species or their habitats as a result of the implementation of either alternative. The requirements of Section 7 of the Endangered Species Act are therefore satisfied.

Cultural Resources

Affected Environment - For below-ground cultural resources the affected environment is defined by the proposed lease boundary. There are no previously recorded archaeological resources within the affected environment. The National Register of Historic Places database includes no archaeological properties within the affected area. The proposed lease boundary, and the entire existing landfill, has been constructed on a former natural

depression. Because the affected environment consists of a previously disturbed and graded area within the landfill boundaries, the probability of undocumented archaeological resources is nil.

For historic architectural resources, the affected environment is defined by a circle of 0.5-mile radius surrounding the proposed 6,500 sq ft building, fuel storage tanks, and exhaust stacks. The center and the southwestern quadrant of this area is highly disturbed and contains no historic architectural resources. It consists of the existing landfill, the re-graded clay borrow area, and the open quarry and associated facilities. Large parts of the affected environment, especially in the southeastern and northwestern quadrants, consist of undeveloped forest lands and scrub/shrub. The northern half of the affected area is a combination of such lands (undeveloped forest lands and scrub/shrub) and residential communities along Shakesville Road, Kings Mill Pike, Pendergrass Road, and smaller dead-end lanes. No structures are shown within the affected area on the 1897 U.S. Geological Service (USGS) Bristol Virginia-Tennessee Sheet 1:125,000 topographic quadrangle. The 1934 USGS Bristol Virginia-Tennessee 1:24,000 topographic quadrangle shows six structures within a 0.5-mile radius of the proposed facilities, all located along Shakesville Road. Comparison with recent aerial photos at www.bing.com indicates that three of these structures are no longer extant. The three remaining structures appear to be residential dwellings. A search of the National Register of Historic Places database identified no listed properties within the affected area.

Environmental Consequences - The No Action Alternative would have no impacts on archaeological sites or historic architectural resources because this alternative involves no physical work.

Under the Action Alternative, all construction activity would take place within the extent of the existing landfill, which is highly disturbed and lacks intact subsurface cultural deposits. Therefore, no archaeological sites could potentially be affected by the proposed undertaking. There appears to be no direct line of sight from any of the three, extant pre-1935 structures to the proposed facilities due to the effects of topography and a thick stand of trees. The Action Alternative would result in no physical changes outside the proposed lease boundary. Therefore, the Action Alternative has no potential to impact historic architectural resources. Pursuant to 36 CFR Part 800.3(a)(1) of the regulations implementing section 106 of the National Historic Preservation Act, TVA finds that the proposed undertaking does not have the potential to affect historic properties and as such, has no further obligations under section 106.

Air Quality and Climate Change

Affected Environment - The air shed of Washington County, Virginia is in attainment with respect to the National Ambient Air Quality Standards for fine particulate matter of 2.5 microns and smaller (PM_{2.5}) and ozone (the 8-hour standard). The proposed action can increase NO_x emissions and particulate emissions and, thus, impact the levels of ozone and PM_{2.5} in and around Washington County. Particulate matter of 10 microns and larger (PM₁₀) levels could also increase under the proposed action. Nonmethane organic compounds (NMOCs), NO_x, and carbon monoxide (CO), the secondary pollutants resulting from combusting LFG, can react chemically in the atmosphere to form ozone [40 CFR Part 52, §52.21(b)]. Nitrogen oxides and SO₂ can react chemically to form PM_{2.5}. The New Source Review permitting program ensures that air quality in attainment areas is not degraded from the addition of a new or modified emission sources.

LFG emissions from landfills cannot be stopped, because they are a natural part of the breakdown of waste. LFG is formed by bacteria breaking down the waste material during the decomposition process. The LFG is comprised of about 50 percent methane, 50 percent CO₂ with less than one percent of NMOCs and trace amounts of organic compounds (USEPA 2010a). Uncontrolled, this LFG seeps out of cracks and fractures in the ground to the atmosphere as gas pressure builds within the landfill from the decomposition process.

Methane is considered a compound of concern for climate change because of its potency as a greenhouse gas. When compared to CO₂, methane is more than 20 times more powerful in its ability to warm the atmosphere (USEPA 2010a). Methane's odor makes it a potential nuisance. It is also a health hazard and potentially explosive in high concentrations. Because of these properties, landfills are required to capture and control methane emissions once the estimated emission level exceeds 50 mega grams or 50 metric tons per year (40 CFR Part 60 Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills). Methane emissions are controlled by burning the gas in a flare as it is released from the landfill. Combustion breaks methane down into water and CO₂. Other compounds in the LFG are broken down into NO_x, SO₂ and PM_{2.5}.

Carbon monoxide, NO_x, SO₂ and PM_{2.5} are considered "secondary pollutant emissions," which means that they are pollutants formed by the destruction of a more dangerous pollutant, in this case, methane. These compounds are regulated by state and federal laws, and facilities generating these compounds over a certain threshold amount must obtain permits to operate. The increase in measurable emissions would place the landfill into a category requiring a minor source permit from the state of Virginia. If the proposed additions are constructed, the facility will have the potential to emit 236 tons per year (tpy) of CO and 113 tpy of NO_x. The installation of the 18 LFG engines and generators and the burning of the LFG in the engines instead of the flare results in an increase in CO and NO_x emissions. This is due to lower combustion temperatures and larger amounts of air consumed by engines compared to the flare.

Burning LFG in flares achieves the same methane safety goals as burning it in an engine system, but a flare does not utilize the energy available within the gas source. LFGTE projects are considered to be environmentally favorable because of the reduction in methane release, and because these projects produce energy that can replace energy generated by nonrenewable resources, such as fossil fuels. The combustion of both fossil fuels and LFG produce CO₂, which is a greenhouse gas. In practical terms however, the USEPA does not consider CO₂ emitted from LFGTE projects to be a climate change contributor, "because the carbon was contained in recently living biomass and would have been emitted through the natural decomposition process" (USEPA 2010b). In other words, it would have been released as part of the natural cycle of breaking down carbon that was "fixed" in living organisms. Since oil and coal do not decompose, CO₂ from fossil fuels would not be released to the atmosphere, unless the fuel source is burned.

USEPA considers the indirect avoidance of fossil fuel combustion (and the secondary pollutants from the burning of those fossil fuels) to be a favorable trade-off for the slight increase in emissions that occurs when changing from a flare to an engine. In other words, the benefit of using the energy contained within LFG outweighs the increased NO_x and emissions. Overall, there is a substantial improvement to air quality by using a LFGTE system (USEPA 2010b). This is a result of the reduction of methane and hazardous air

pollutant emissions, and an indirect reduction in the use of non-renewable fossil fuels that are more polluting than LFG.

Presently, the LFG released from the landfill is controlled using a flare. The air permit for the landfill, from VDEQ, has reference number 11174. The last effective date was March 11, 2011. The VDEQ issued a Stationary Source Permit to Construct and Operate the proposed LFGTE project on October 15, 2013. Based on the potential emissions from this new facility, it is considered a minor source for air pollutants.

The draft permit is for the three groups of six engines with each group of six engines being exhausted through a separate stack (*i.e.* three stacks total). Each engine is rated at 475 horsepower or 350 kW. The total output of the 18 engines will be 6,300 kW. The proposed engines are affected facilities under the Maximum Achievable Control Technology standards of 40 CFR 63, Subpart ZZZZ – NESHAPs for Stationary Reciprocating Internal Combustion Engines. The permit lists the following requirements for controlling pollutant emissions.

1. On an average annual operating basis, fuel for the engines can contain no less than 2 parts No. 2 heating oil per 100 parts LFG.
2. During normal operation, the LFG fraction must be at least 88 percent LFG. For INGENCO's proposed PPA with TVA, the LFG fraction must be at least 95 percent LFG to avoid this project being considered a co-firing project.
3. The engines can be run no more than 500 hours per year on 100 percent No. 2 heating oil?. Operation of engines at less than 88 percent LFG will be counted as part of the 500 hours of operation on diesel fuel.
4. Particulate matter emissions will be controlled by filtering the LFG through 10 micron filters and using only ultra-low sulfur fuel.
5. Nitrogen oxide emissions will be controlled by after charge air cooling, air-to-fuel ratio control, and inlet air temperature control. The temperature of charge air to each engine shall not exceed 140 degrees Fahrenheit
6. Carbon monoxide emissions from each engine will be controlled by turbocharging and air-to-fuel ratio control.
7. Volatile organic compound emissions from each engine will be controlled by good combustion practices.
8. All of the engines must be provided with adequate access for inspection. The types and amount of fuel must be continuously monitored. Also, the inlet charge air temperature must be monitored to insure that it remains below 140 degrees Fahrenheit and the pressure drop across the biogas filter must be monitored to ensure that it is working properly.

The permit also specifies the types of emissions testing, monitoring, and record keeping that will be required to ensure compliance with the permit and hazardous air pollutant regulations.

Environmental Consequences - Under the No Action Alternative, the three sets of reciprocating engines with electrical generation systems may not be installed, and the existing flare would continue to combust all the collected LFG. TVA would also not purchase the energy from this project. Pollutant emissions from the incineration of LFG coming from the natural decomposition of waste materials placed in the landfill would continue to be generated, and the volume of LFG would increase as the landfill accumulates more waste that decomposes.

Under the Action Alternative, the proposed engines would be installed in 2014, pollutant emissions from the operation of the LFG to energy systems is expected to be below the major source threshold of 250 tons per year (tpy)¹ (236 tpy of CO, 113 tpy of NO_x, 54.6 tpy of volatile organic compounds, 2.5 tpy of SO₂, and 27.3 tpy each of PM₁₀ and PM_{2.5}). Each of the eighteen engines would be capable of combusting approximately 125 cubic feet per minute of LFG that would otherwise be flared or escape the landfill uncontrolled. There would be benefits associated with the replacement of fossil fuel fired electrical generation with renewable LFG.

Air quality compliance would continue to be accomplished through the Federal Clean Air Act and the VDEQ clean air regulations.

Any increases in air emissions from operation of the engines would be considered favorable in contrast with increased methane levels that would otherwise escape from the landfill as waste decomposition continues and LFG levels increase. The generation of these emissions may also be somewhat offset by the potential replacement of fossil fuel power generation.

Hazardous Materials

The hazardous material of concern for this project is diesel fuel and, to a lesser extent, gasoline. Both diesel fuel and gasoline are shipped as hazardous materials under the U. S. Department of Transportation (USDOT) regulations, based on their flammability or combustibility (USDOT 2013). Because of the likely volumes involved much greater emphasis will be placed on the diesel fuel.

It is likely that during the project construction phase there will be limited quantities of diesel fuel and gasoline stored onsite for the use of construction-related equipment. Since the area that is newly disturbed by the construction activity would be greater than one acre then the requirement for a permit stipulating a stormwater pollution prevention plan (SWPPP) is triggered (USEPA 2012). The SWPPP emphasizes the minimization of soil transport associated with stormwater by the employment of measures for the prevention of erosion and control of sedimentation. However, the requirements in the applicable State and Federal regulations for the management and storage of onsite chemicals, including gasoline and diesel, are such that the likelihood that these chemicals will contaminate stormwater is significantly reduced.

During operation of the engines planned diesel fuel storage tank system, which would have a capacity of 20,000 gallons and the potential to contaminate waters of the U.S., must be managed in accordance with the Oil Pollution Prevention regulations (USEPA 2013). These regulations call for the preparation of a Spill Prevention Control and Countermeasure

¹ This threshold applies to all industrial facilities that are not included in the list of 28 industrial classifications subject to a 100-tpy threshold.

(SPCC) Plan for the site. The SPCC plan specifies a number of mechanical and administrative controls to reduce the potential for the occurrence of a spill of various types of oil (including diesel fuel and gasoline), and to manage and clean up the spill, if one does occur. Mechanical controls include barriers such as secondary containment with a capacity to contain at least the entire contents of the tank. Administrative controls include specified inspections, testing, and preventative maintenance.

With the adoption of the required BMPs in accordance with the regulatory requirements by SWPPP and SPCC referenced above, the potential contamination by diesel fuel and/or gasoline would be minimized. Environmental impacts from hazardous materials would be minimal.

Mitigation Measures

As a standard practice, under the Action Alternative, BMPs would be implemented to minimize potential environmental effects associated with the construction and operation of the proposed facility. VDEQ regulations for air emissions, water quality, and hazardous material storage; which impose compliance requirements and ensures monitoring compliance would be implemented. TVA does not require any additional mitigation measures for this project.

Acronyms and Abbreviations

APE	Area of Potential Effect
BMPs	Best Management Practices
CO	Carbon monoxide
CO ₂	Carbon dioxide
EA	Environmental Assessment
EO	Executive Order
GCCS	Gas Collection and Control System
kW	Kilowatt
landfill	City of Bristol Sanitary Landfill
LFG	Landfill Gas
LFGTE	Landfill Gas-to-Energy
MW	Megawatt
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NMOCs	Non-Methane Organic Compounds
NO _x	Nitrogen oxides
PM ₁₀	Particulate Matter of 10 microns and larger
PM _{2.5}	Particulate Matter 2.5 microns and smaller
PPA	Power Purchase Agreement
RSO	Renewable Standard Offer
scfm	Standard Cubic Feet per Minute
SO ₂	Sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
sq ft	Square Foot (Feet)
SWPPP	Storm Water Pollution Prevention Plan
tpy	Tons per Year
TVA	Tennessee Valley Authority
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service

TVA Preparers

Michael F. Broder

Position: Atmospheric Analyst
Involvement: Air Resources

Michael G. Browman

Position: Environmental Engineer
Involvement: Hazardous Materials

Stephen C. Cole

Position: Archaeologist (Contractor)
Involvement: Cultural Resources Analysis

Patricia B. Cox

Position: Specialist, Botanical
Involvement: Threatened and Endangered Plant Species and Plant Communities

Charles S. Howard

Position: Specialist, Aquatic Endangered Species Biologist
Involvement: Threatened and Endangered Aquatic Species and Aquatic Ecology

Holly G. LeGrand

Position: Terrestrial Zoologist
Involvement: Threatened and Endangered Animal Species and Terrestrial Ecology

Craig L. Phillips

Position: Aquatic Community Ecologist
Involvement: Aquatic Ecology

Kim Pilarski-Hall

Position: Specialist, Wetlands
Involvement: Wetland Resources and Natural Areas

Ed Stephens

Position: Project Manager
Involvement: Project Coordination

Richard L. Toennisson

Position: Contract NEPA Specialist
Involvement: NEPA Compliance and Document Preparation

Mathew Valente

Position: Natural Areas (Contractor)
Involvement: Natural Areas

References

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Attachments

Attachment A – Plans

Attachment B - Air Permit

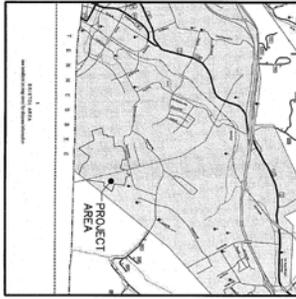
Attachment C - Project Information

Attachment A - Plans

INGENCO CITY OF BRISTOL

INTEGRATED SOLID WASTE MANAGEMENT FACILITY LANDFILL GAS-TO-ENERGY FACILITY

CITY OF BRISTOL, VIRGINIA



PROJECT AREA
V001 GENERAL LAYOUT MAP
WASHINGTON COUNTY
1" = 60' METERS



SITE DATA

ADDRESS	2123 SWANWATER ROAD
OWNERS	INGENCO INTERNATIONAL ENERGY
TAX PARCEL ID	425-4-4
ZONING	M-2, GENERAL INDUSTRIAL
PROPOSED USE	LANDFILL GAS-TO-ENERGY FACILITY
PROPERTY DIMENSIONS & AREA	447.00' X 124.00' (55,428.00 SF)
SETBACK REQUIREMENTS	10' FROM ALL SIDES
BUILDING AREA	6,646 SF
FLOOR AREA	1 - Story
PERMITTED	1 - Space per employee per shift
PERMITTED	Permitted - 1 Shift @ 1 W/C
PERMITTED	NO SIGN PROHIBITED
PERMITTED	MAINTAIN EXISTING SURROUNDING FENCING AND STAKE MARKING
PERMITTED	LANDFILL GAS-TO-ENERGY FACILITY
FLOOR ZONE DESIGNATION	INDUSTRIAL
PERMITTED	PERMITTED BY LOCAL ORDINANCE
PERMITTED	PERMITTED BY LOCAL ORDINANCE
PERMITTED	PERMITTED BY LOCAL ORDINANCE

DRAWING INDEX

- C-1 TITLE SHEET
- C-2 EXISTING CONDITIONS PLAN
- C-3 PROPOSED CONSTRUCTION AND SEWAGE CONTROL PLAN
- C-4 LANDFILL AND UTILITY PLAN
- C-5 EROSION CONTROL NOTES AND DETAILS
- C-7 NOTES AND DETAILS

SOILS INDEX

- 40 - UNDESIGNED, 0 TO 30 PERCENT SILT
- 50 - UNDESIGNED, 30 TO 50 PERCENT SILT
- 60 - UNDESIGNED, 50 TO 70 PERCENT SILT
- 70 - UNDESIGNED, 70 TO 90 PERCENT SILT
- 80 - UNDESIGNED, 90 TO 100 PERCENT SILT

GENERAL PROJECT INFORMATION

PROJECT NAME	INGENCO LANDFILL GAS-TO-ENERGY FACILITY
CLIENT	INGENCO INTERNATIONAL ENERGY
DESIGNER	RESOURCE INTERNATIONAL, LTD.
DATE	2020.18.18
PROJECT NO.	202018.18
SHEET NO.	G-1

- GENERAL NOTES**
- REFER TO ALL GENERAL NOTES AND SPECIFICATIONS IN ACCORDANCE WITH CURRENT VIRGINIA STANDARDS.
 - PROVIDE ALL INFORMATION REQUIRED FROM CITY OF BRISTOL, OR GOVERNMENT.
 - PROPERTY LINE INFORMATION PROVIDED BY OWNER.
 - EXISTING CONDITIONS AND PROPOSED CONSTRUCTION SHALL BE SHOWN ON ALL DRAWINGS. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE NOTED.
 - CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND ELEVATIONS OF ALL UTILITIES (UNDERGROUND/ABOVE GROUND) PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES.
 - THE PROJECT AREA LIES OUTSIDE THE 500 YEAR FLOODPLAIN AS SHOWN BY FEMA MAP 1603000200090.
 - CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM ALL APPLICABLE AGENCIES PRIOR TO ANY CONSTRUCTION.
 - CONTRACTOR SHALL NOTIFY THE CITY OF BRISTOL PRIOR TO ANY LAND DISTURBANCE ACTIVITIES ON SITE.
 - ACCESS TO THE EXISTING LANDFILL ROAD, CONTRACTOR SHALL MAINTAIN CONSTANT ACCESS WITH LANDFILL. ALL PROPOSED INTERFERENCE WITH THE OPERATION OF THE LANDFILL.
 - ALL OUTDOOR LIGHTING SHALL BE BATTERY/PAK POWERED WITH FULL CUT-OFF FEATURES DOWNWARD FACING.

SITE TABULATION

AREA, 250 ACRES (GROSS SQ FT)	42,138 SQ FT
EXISTING CONDITIONS	2123 SWANWATER ROAD
PROPOSED CONSTRUCTION	LANDFILL GAS-TO-ENERGY FACILITY
PERMITTED	PERMITTED BY LOCAL ORDINANCE
PERMITTED	PERMITTED BY LOCAL ORDINANCE
PERMITTED	PERMITTED BY LOCAL ORDINANCE

GENERAL PROJECT INFORMATION

PROJECT NAME	INGENCO LANDFILL GAS-TO-ENERGY FACILITY
CLIENT	INGENCO INTERNATIONAL ENERGY
DESIGNER	RESOURCE INTERNATIONAL, LTD.
DATE	2020.18.18
PROJECT NO.	202018.18
SHEET NO.	G-1

COMMUNICATION INFORMATION

PROJECT NAME	INGENCO LANDFILL GAS-TO-ENERGY FACILITY
CLIENT	INGENCO INTERNATIONAL ENERGY
DESIGNER	RESOURCE INTERNATIONAL, LTD.
DATE	2020.18.18
PROJECT NO.	202018.18
SHEET NO.	G-1

APPROVAL BLOCK

DESIGNED BY	CTW/EJH
DRAWN BY	CTW
CHECKED BY	EJH
DATE	6-26-2013

REVISIONS

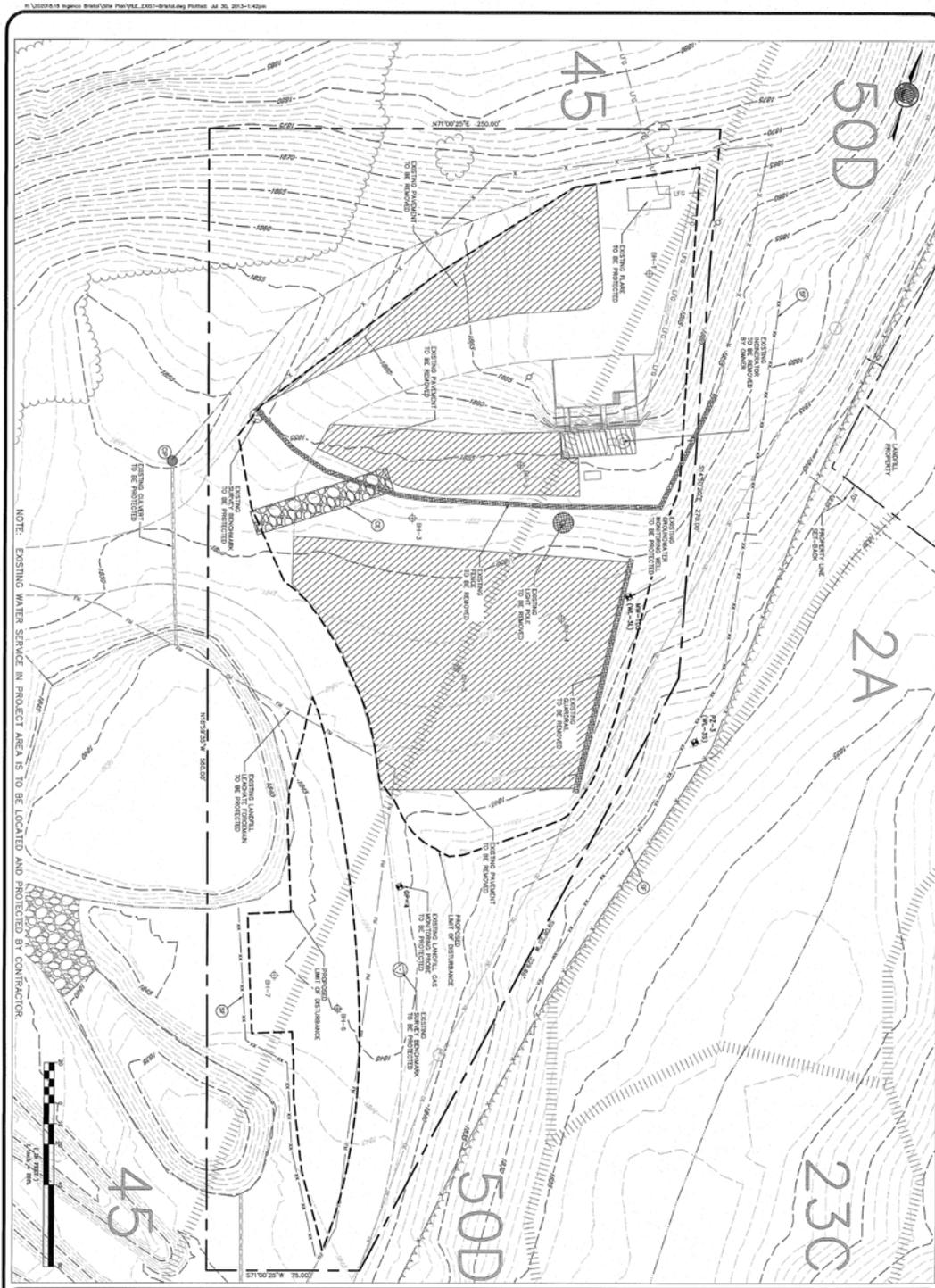
NO.	DESCRIPTION
1	7-26-13 REVISED PER CITY COMMENTS



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(804) 550-9200 FAX (804) 550-9259

INGENCO
CITY OF BRISTOL
INTEGRATED SOLID WASTE MANAGEMENT FACILITY
LANDFILL GAS-TO-ENERGY FACILITY
CITY OF BRISTOL, VIRGINIA

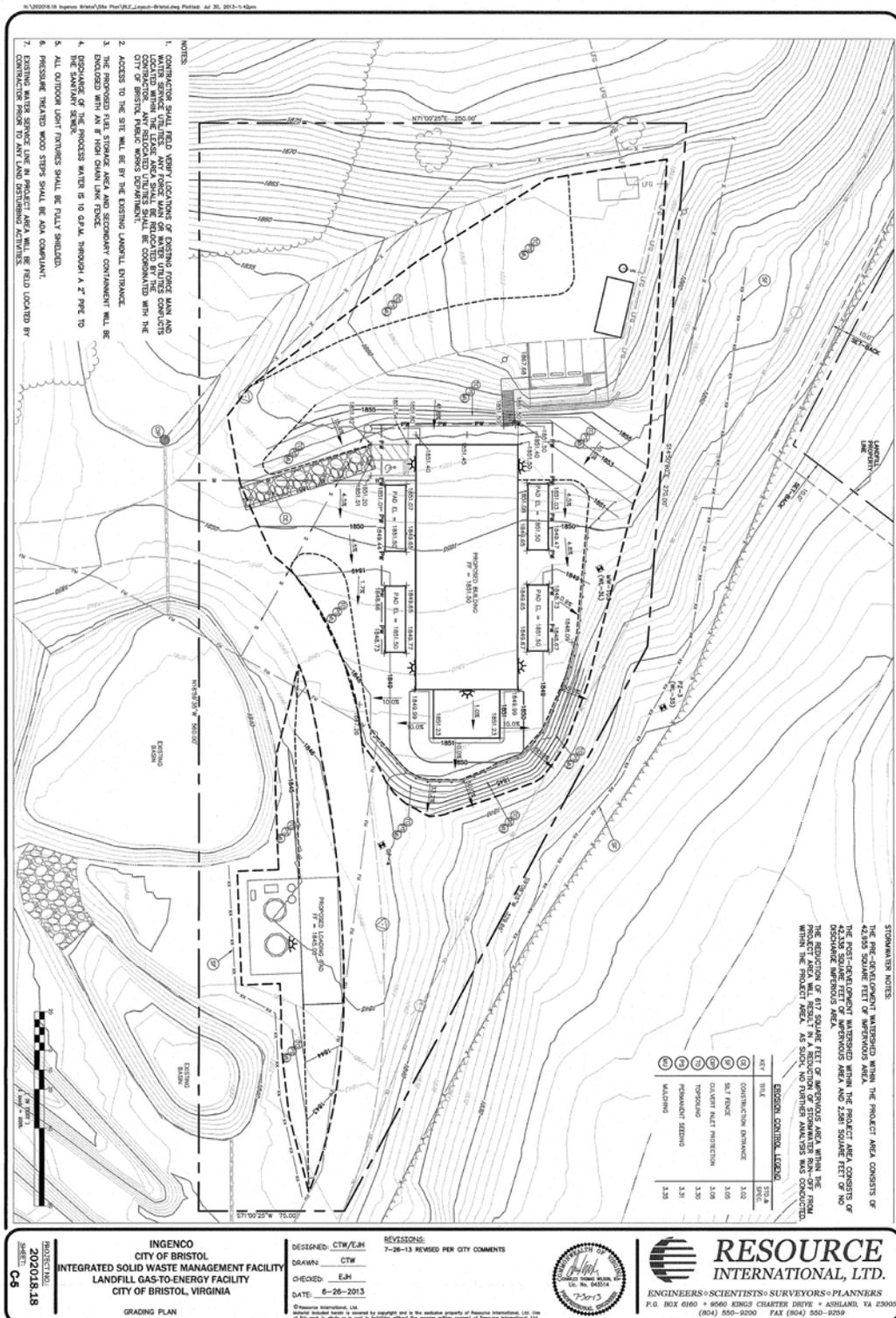
TITLE SHEET
PROJECT NO. 202018.18
SHEET G-1



NOTE: EXISTING WATER SERVICE IN PROJECT AREA IS TO BE LOCATED AND PROTECTED BY CONTRACTOR.



PROJECT NO: 202018.18 SHEET: C-3	INGENCO CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY LANDFILL GAS-TO-ENERGY FACILITY CITY OF BRISTOL, VIRGINIA	DESIGNED: CTW/ELM DRAWN: CTW CHECKED: ELM DATE: 6-26-2013	REVISIONS: 7-26-13 REVISED PER CITY COMMENTS		RESOURCE INTERNATIONAL, LTD. ENGINEERS • SCIENTISTS • SURVEYORS • PLANNERS P.O. BOX 6160 • 9060 KINGS CREEPER DRIVE • ARLAND, VA 23005 (804) 550-9200 FAX (804) 550-9259
	DEMOLITION PLAN & PHASE 1 EROSION AND SEDIMENT CONTROL PLAN				
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	7/30/13				



15 10/2018 18 Resource International, Inc. Project No. 202018.18 - Erosion Control Plan for the City of Bristol, Virginia

EROSION CONTROL NARRATIVE

The project will consist of the construction of a building for the County's existing and proposed building. The project will consist of the construction of a building for the County's existing and proposed building. The project will consist of the construction of a building for the County's existing and proposed building.

EXISTING SITE CONDITIONS

The project site is currently vacant and the location of the City of Bristol's proposed building is shown on the site plan. The project site is currently vacant and the location of the City of Bristol's proposed building is shown on the site plan. The project site is currently vacant and the location of the City of Bristol's proposed building is shown on the site plan.

PROPOSED EROSION CONTROL MEASURES

The proposed erosion control measures include the installation of silt fences, sediment basins, and other measures to prevent erosion and sediment transport. The proposed erosion control measures include the installation of silt fences, sediment basins, and other measures to prevent erosion and sediment transport.

CONSTRUCTION PHASES

The construction phases include site preparation, foundation construction, and building construction. The construction phases include site preparation, foundation construction, and building construction. The construction phases include site preparation, foundation construction, and building construction.

CONSTRUCTION SCHEDULE

The construction schedule is estimated to be completed within 12 months. The construction schedule is estimated to be completed within 12 months. The construction schedule is estimated to be completed within 12 months.

CONSTRUCTION MONITORING

The project will be monitored during construction to ensure that all erosion control measures are properly installed and maintained. The project will be monitored during construction to ensure that all erosion control measures are properly installed and maintained. The project will be monitored during construction to ensure that all erosion control measures are properly installed and maintained.

CONSTRUCTION PLAN

The construction plan shows the location of the proposed building and the proposed erosion control measures. The construction plan shows the location of the proposed building and the proposed erosion control measures. The construction plan shows the location of the proposed building and the proposed erosion control measures.

CONSTRUCTION DETAILS

The construction details provide information on the materials and methods to be used for the proposed building and erosion control measures. The construction details provide information on the materials and methods to be used for the proposed building and erosion control measures. The construction details provide information on the materials and methods to be used for the proposed building and erosion control measures.

CONSTRUCTION NOTES

The construction notes provide additional information on the proposed building and erosion control measures. The construction notes provide additional information on the proposed building and erosion control measures. The construction notes provide additional information on the proposed building and erosion control measures.

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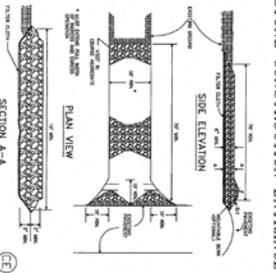
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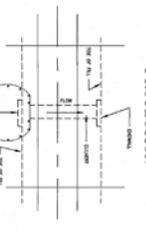
EROSION CONTROL NOTES

1. Erosion control measures shall be installed and maintained in accordance with the Virginia Department of Transportation (VDOT) Erosion Control Manual, 2012 Edition, and the City of Bristol Erosion Control Manual, 2018 Edition.
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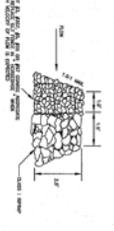
STONE CONSTRUCTION ENTRANCE



SILT FENCE CULVERT INLET PROTECTION



OPTIONAL STONE COMBINATION



EROSION CONTROL NOTES

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CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



SILT FENCE NOTES

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ORGANIC MULCH MATERIALS AND APPLICATION RATES

MATERIAL	RATE	NOTES
Straw or Hay	1.0 - 2.0 lbs per 100 sq ft	Use straw or hay with a minimum of 10% nitrogen content.
Wood Chips	2.0 - 4.0 lbs per 100 sq ft	Use wood chips with a minimum of 10% nitrogen content.
Compost	1.0 - 2.0 lbs per 100 sq ft	Use compost with a minimum of 10% nitrogen content.
Manure	1.0 - 2.0 lbs per 100 sq ft	Use manure with a minimum of 10% nitrogen content.
Grass Clippings	1.0 - 2.0 lbs per 100 sq ft	Use grass clippings with a minimum of 10% nitrogen content.
Leaf Litter	1.0 - 2.0 lbs per 100 sq ft	Use leaf litter with a minimum of 10% nitrogen content.
Other	1.0 - 2.0 lbs per 100 sq ft	Use other materials with a minimum of 10% nitrogen content.

INGENCO
CITY OF BRISTOL
INTEGRATED SOLID WASTE MANAGEMENT FACILITY
LANDFILL GAS-TO-ENERGY FACILITY
CITY OF BRISTOL, VIRGINIA
EROSION CONTROL NOTES AND DETAILS

DESIGNED: CTW/EAH
DRAWN: CTW
CHECKED: EAH
DATE: 6-26-2013

REVISIONS:
7-26-13 REVISED PER CITY COMMENTS



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(804) 550-8000 FAX (804) 550-8009

Attachment B - Air Permit

RECEIVED
OCT 17 2013



BY:.....

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

SOUTHWEST REGIONAL OFFICE

355-A Deadmore Street, Abingdon, Virginia 24210

Phone (276) 676-4800 Fax (276) 676-4899

www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Allen J. Newman, P.E.
Regional Director

October 15, 2013

Mr. Robert L. Greene, Ph.D.
Environmental Compliance Manager
INGENCO Renewable Development, LLC
2250 Dabney Road
Richmond, Virginia 23230

Location: City of Bristol
Registration No. 11733

Dear Dr. Greene:

Attached is a permit to construct and operate a landfill gas to electricity generating facility in accordance with the provisions of the Virginia State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

In the course of evaluating the application and arriving at a final decision to approve the project, the Department of Environmental Quality (DEQ) deemed the application complete on June 28, 2013, and solicited written public comments by placing a newspaper advertisement in the *Bristol Herald Courier* on August 19, 2013. A public hearing was held on September 25, 2013. The required comment period, provided by 9 VAC 5-80-1170 D expired on October 10, 2013.

This permit approval to construct and operate shall not relieve INGENCO Renewable Development, LLC of the responsibility to comply with all other local, state, and federal permit regulations.

The proposed engines are affected facilities under the Maximum Achievable Control Technology (MACT) standards of 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, and the proposed boiler is an affected facility under MACT Subpart JJJJJ – National Emission

Mr. Robert L. Greene, Ph.D.
October 15, 2013
Page 2

Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources. You are therefore, subject to owner/operator requirements of the MACT standards. In summary, each unit is required to comply with certain federal emission standards and operating limitations over its useful life. The DEQ advises you to review the MACT standards to ensure compliance with applicable emission and operational limitations. As the owner/operator you are also responsible for monitoring, notification, reporting and recordkeeping requirements of the MACT standards. Notifications shall be sent to EPA, Region III. The provisions of MACT Subpart ZZZZ can be found at <http://www.epa.gov/ttn/atw/rice/ricepg.html>. The provisions of MACT Subpart JJJJJ can be found at <http://www.epa.gov/ttn/atw/area/arearules.html>.

The Board's Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. 9 VAC 5-170-200 provides that you may request direct consideration of the decision by the Board if the Director of the DEQ made the decision. Please consult the relevant regulations for additional requirements for such requests.

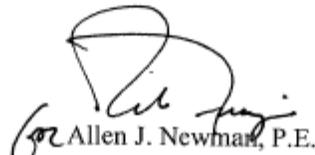
As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director
Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

If you have any questions concerning this permit, please contact Rob Feagins at (276) 676-4835.

Sincerely,


Allen J. Newmar, P.E.
Regional Director

INGENCO LFG Bristol, Virginia

Mr. Robert L. Greene, Ph.D.
October 15, 2013
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AJN/ABM/P-11733-13

Attachments: Permit
Source Testing Report Format



COMMONWEALTH of VIRGINIA

Douglas W. Domenech
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
SOUTHWEST REGIONAL OFFICE
355-A Deadmore Street, Abingdon, Virginia 24210
Phone (276) 676-4800 Fax (276) 676-4899
www.deq.virginia.gov

David K. Paylor
Director

Allen J. Newman, P.E.
Regional Director

MAJOR STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

INGENCO Renewable Development, LLC
2250 Dabney Road
Richmond, Virginia 23230
Registration No. 11733

is authorized to construct and operate

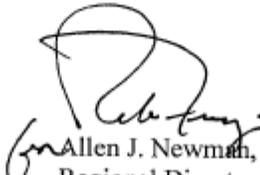
a landfill gas to electricity generating facility

located at

Bristol Virginia Integrated Solid Waste Management Facility, 2125
Shakesville Road, Bristol, Virginia

in accordance with the Conditions of this permit.

Approved on October 15, 2013.


Allen J. Newman, P.E.
Regional Director

Permit consists of 15 pages.
Permit Conditions 1 to 41.

INTRODUCTION

This permit approval is based on the permit application dated October 8, 2012, including amendment information dated November 7, 2012, January 1, 2013, April 26, and 30, 2013, May 3, 13, 17, and 22, 2013, and June 11, 2013, and supplemental information dated October 5, 2012, April 9, 26, and 30, 2013, and June 28, 2013. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-20 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

PROCESS REQUIREMENTS

1. **Equipment List** – Equipment at this facility consists of the following:

Equipment to be Constructed:			
Reference No.	Equipment Description	Rated Capacity	Federal Requirements
Group A A1 – A6	Six Detroit Diesel Series 60, 12.7 liter engines manufactured from 1995 – 1998, each mated with a generator and sharing a common stack	475 brake horsepower and 350 kilowatts, each	-----

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Equipment to be Constructed:			
Reference No.	Equipment Description	Rated Capacity	Federal Requirements
Group B B1 – B6	Six Detroit Diesel Series 60, 12.7 liter engines manufactured from 1995 – 1998, each mated with a generator and sharing a common stack	475 brake horsepower and 350 kilowatts, each	-----
Group C C1 – C6	Six Detroit Diesel Series 60, 12.7 liter engines manufactured from 1995 – 1998, each mated with a generator and sharing a common stack	475 brake horsepower and 350 kilowatts, each	-----

Equipment exempt from permitting			
Reference No.	Equipment Description	Rated Capacity	Exempt Citation
I	Hydrotherm PB-105/120W boiler	0.13 MMBtu/hr	9 VAC 5-80-1105 B.1.a.(2)
T1	No. 2 fuel oil/diesel storage tank	12,000 gallons	9 VAC 5-80-1105 B.8.e.
T2	Diesel lube oil storage	500 gallons	9 VAC 5-80-1105 B.8.e.
T3	Used diesel lube oil storage	500 gallons	9 VAC 5-80-1105 B.8.e.
T4	Fuel oil storage	275 gallons	9 VAC 5-80-1105 B.8.e.

Specifications included in the permit under this Condition are for informational purposes only and do not form enforceable terms or conditions of the permit.
 (9 VAC 5-80-1180 D 3)

2. **Equipment Identification** – The facility shall be constructed such that the engines are arranged in groups where each group contains six engines and emissions from the six engines exhaust through a single stack common to that group. Reference numbers as indicated in Condition 1 shall be affixed to the engines. Each reference number shall be prominently displayed and legible at all times. Each engine and reference number shall be provided with adequate access for inspection.
 (9 VAC 5-80-1180)
3. **Emission Controls** – Particulate emissions from each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be controlled by good combustion practices, filtration of landfill gas

(LFG) through a 10 micron filter and combustion of low sulfur liquid fuels. Each engine and filtration system shall be provided with adequate access for inspection.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

4. **Emission Controls** – Emissions of nitrogen oxides (NO_x) from each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be controlled by charge air aftercooling, air-to-fuel ratio control, INGENCO enhanced tuning techniques and INGENCO combustion control system. The temperature of charge air to each engine shall not exceed 140 °F on an hourly average basis. The permittee shall maintain documentation that demonstrates the INGENCO combustion control system has been installed on each engine. Each engine shall be provided with adequate access for inspection.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
5. **Emission Controls** – Carbon monoxide (CO) emissions from each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be controlled by turbocharging, air-to-fuel ratio control, INGENCO enhanced tuning techniques and good combustion practices. Each engine shall be provided with adequate access for inspection.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
6. **Emission Controls** – Volatile organic compound (VOC) emissions from each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be controlled by good combustion practices. Each engine shall be provided with adequate access for inspection.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
7. **Monitoring Devices** – Each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be equipped with devices to continuously measure and record the amount of each type of fuel throughput to the engine. Results of each measurement shall be recorded no less than once per minute and shall include, at a minimum, the date, time, engine identification, amount of fuel throughput and landfill gas fraction. Each device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the respective engine is operating.
(9 VAC 5-80-1180 D and 9 VAC 5-50-20 C)
8. **Monitoring Devices** – Each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall be equipped with a device to continuously measure engine inlet charge air temperature. Each device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each device shall be provided with adequate access for inspection and shall be in operation when the respective engine is operating.
(9 VAC 5-80-1180 D and 9 VAC 5-50-20 C)

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9. **Monitoring Devices** – The landfill gas filtration system shall be equipped with devices to continuously measure the differential pressure across the landfill gas filter. At a minimum, devices shall be located just before and just after the filter. Each device shall be installed, maintained, calibrated and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer’s written requirements or recommendations. Each device shall be provided with adequate access for inspection and shall be in operation whenever any engine is operating on landfill gas.
(9 VAC 5-80-1180 D and 9 VAC 5-50-20 C)
10. **Monitoring Device Observation** – The permittee shall observe the devices used to continuously measure the differential pressure across the landfill gas filtration system no less than once per day whenever landfill gas is combusted in any of the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6). A record of each observation shall be maintained, including, at a minimum, the date, time, engine identification, pressure drop readings and name of the observer.
(9 VAC 5-80-1180 D and 9 VAC 5-50-20 F)
11. **Monitoring Device Observation** – The permittee shall observe the monitoring devices used to measure inlet charge air temperature no less than once per hour whenever the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) are operating. A record of each observation shall be maintained, including, at a minimum, the date, time, engine identification, charge air temperature and name of the observer.
(9 VAC 5-80-1180 D and 9 VAC 5-50-20 F)
12. **Emissions Testing** – The facility shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. Sampling ports shall be provided when requested at the appropriate locations and safe sampling platforms and access shall be provided.
(9 VAC 5-50-30 F and 9 VAC 5-80-1180)

OPERATING LIMITATIONS

13. **Operating Hours** – Each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall operate no more than 500 hours per year on 100 percent liquid fuel, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months. This condition applies at all times except startup, shutdown and malfunction. Operation of an engine on less than 88 percent landfill gas fraction for more than 20 consecutive minutes shall not be considered as startup, shutdown or malfunction and shall be counted toward the 500 hours per year limit.
(9 VAC 5-80-1180)

14. **Fuel Throughput** – The annual average ratio of liquid fuel to total fuel combusted in each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall not be less than two parts liquid fuel to 100 parts total fuel on an energy equivalent basis, calculated monthly on a rolling 12-month basis.
(9 VAC 5-80-1180)
15. **Startup** – The permittee shall start no more than two engine groups in the same hour. If any engine group is operating, then the permittee shall start no more than one additional engine group in any following hour.
(9 VAC 5-80-1180)
16. **Fuel** – The approved fuels for the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) are distillate oil, diesel fuel, biodiesel fuel and landfill gas. A change in the fuels may require a permit to modify and operate.
(9 VAC 5-80-1180)
17. **Fuel Specifications** – The fuels for the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall meet the specifications below:
 - DISTILLATE OIL which meets the ASTM D396 specification for Grades 1 or 2:
Maximum sulfur content per shipment: 0.0015%
 - DIESEL FUEL which meets the ASTM D975 specification for Grades 1 or 2 diesel fuel:
Maximum sulfur content per shipment: 0.0015%
 - BIODIESEL FUEL which meets the ASTM D6751 specification:
Maximum sulfur content per shipment: 0.0015%(9 VAC 5-80-1180)
8. **Fuel Certification** – The permittee shall obtain a certification from the fuel supplier with each shipment of distillate oil, diesel fuel and biodiesel fuel. Each fuel supplier certification shall include the following:
 - a. The name of the fuel supplier;
 - b. The date on which the fuel was received;
 - c. The quantity of fuel delivered in the shipment;
 - d. A statement that the distillate oil complies with the American Society for Testing and Materials specifications (ASTM D396) for Grades 1 or 2; or a statement that the diesel fuel complies with the American Society for Testing and Materials specifications (ASTM D975) for S15 diesel fuel oil; or a statement that the biodiesel fuel complies with the American Society for Testing and Materials specification (ASTM D6751);

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e. The sulfur content of the distillate oil, diesel fuel or biodiesel fuel.

Fuel sampling and analysis, independent of that used for certification, as may be periodically required or conducted by DEQ may be used to determine compliance with the fuel specifications stipulated in Condition 17. Exceedance of these specifications may be considered credible evidence of the exceedance of emission limits.
 (9 VAC 5-80-1180)

EMISSION LIMITS

19. **Emission Limits** – Emissions from the operation of the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) on 100 percent liquid fuel shall not exceed the following limits:

	<u>Each Stack</u>	<u>Combined Total</u>
Total Particulate Matter (PM10, filterable & condensable)	2.0 lb/hr	1.50 tons/yr
Total PM2.5 (filterable & condensable)	2.0 lb/hr	1.50 tons/yr
Nitrogen Oxides (as NO ₂)	42.90 lb/hr	32.20 tons/yr
Carbon Monoxide	5.39 lb/hr	4.04 tons/yr
Volatile Organic Compounds	1.0 lb/hr	0.75 ton/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3 – 6, 13, 17, 18, 23 – 25, and 28 – 30.
 (9 VAC 5-80-1180 and 9 VAC 5-50-260)

20. **Emission Limits** – Emissions from the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) during startup shall not exceed the following limits:

	<u>Each Stack</u>
Total Particulate Matter (PM10, filterable & condensable)	1.75 lb/hr
Total PM2.5 (filterable & condensable)	1.75 lb/hr
Nitrogen Oxides (as NO ₂)	12.3 lb/hr
Carbon Monoxide	19.66 lb/hr

These emissions are derived from the estimated overall emission contribution from operating limits. Startup is defined as the initial firing of fuel transitioning to sustained operation on at least 88 percent gas fraction (i.e. 0 – 88%) within a maximum time period of 20 minutes. Operation of an engine on less than 88 percent gas fraction for more than 20 consecutive minutes shall be counted toward the 500 hours per year operating limit specified in Condition 12 of this permit. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3 – 6, and 15.
 (9 VAC 5-80-1180 and 9 VAC 5-50-260)

21. **Emission Limits** – Emissions from the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) during baseload operation shall not exceed the following limits:

	<u>Each Stack</u>
Total Particulate Matter (PM10, filterable & condensable)	2.2 lb/hr
Total PM2.5 (filterable & condensable)	2.2 lb/hr
Nitrogen Oxides (as NO ₂)	11.2 lb/hr
Carbon Monoxide	25.4 lb/hr
Volatile Organic Compounds	4.41 lb/hr
Sulfur Dioxide	0.20 lb/hr

Baseload operation is defined as the operation of an engine at a gas fraction equal to or greater than 88 percent. These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3 – 6, 16 – 18, and 23 – 30.
 (9 VAC 5-80-1180 and 9 VAC 5-50-260)

22. **Emission Limits** – Emissions from the operation of the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall not exceed the following limits:

	<u>Combined Total</u>
Total Particulate Matter (PM10, filterable & condensable)	27.3 tons/yr
Total PM2.5 (filterable & condensable)	27.3 tons/yr

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	Combined <u>Total</u>
Nitrogen Oxides (as NO ₂)	113.0 tons/yr
Carbon Monoxide	236.0 tons/yr
Volatile Organic Compounds	54.6 tons/yr
Sulfur Dioxide	2.5 tons/yr

These emission limits apply at all times except during operation of the engines on 100 percent liquid fuel as defined in this permit. These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 3 – 6, 14, 16 – 18, 23, and 26 – 30.

(9 VAC 5-80-1180 and 9 VAC 5-50-260)

23. **Visible Emission Limit** – Visible emissions from the stack exhaust for each group of engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) shall not exceed 10% opacity except during one 6-minute period in any one hour in which visible emissions shall not exceed 20% opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown and malfunction.
 (9 VAC 5-80-1180 and 9 VAC 5-50-260)

INITIAL COMPLIANCE DETERMINATION

24. **Stack Test** – Initial performance tests shall be conducted for NO_x, CO, VOC, PM10 and PM2.5 from one group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) using appropriate reference methods to determine compliance with the emission limits contained in Condition 19. The tests shall be performed while operating each engine on 100% distillate oil or diesel fuel. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after startup of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Southwest Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.
 (9 VAC 5-50-30 and 9 VAC 5-80-1200)
25. **Stack Test** – Initial performance tests shall be conducted for NO_x, CO, VOC, PM10 and PM2.5 from one group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) using appropriate reference methods to determine compliance with the emission limits contained in

Condition 19. The tests shall be performed while operating each engine on 100% biodiesel fuel. The tests shall be performed, reported, and demonstrate compliance within 60 days of initial operation on biodiesel fuel but in no event later than 180 days after initial startup of the engine group on biodiesel fuel. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Southwest Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

26. **Stack Test** – Initial performance tests shall be conducted for NO_x, CO, VOC, PM10 and PM2.5 from one group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) using appropriate reference methods to determine compliance with the emission limits contained in Condition 21. The tests shall be performed while operating each engine in dual fuel mode using approximately 88% landfill gas fraction. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after startup of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Southwest Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

27. **Stack Test** – Initial performance tests shall be conducted for NO_x, CO, VOC, PM10 and PM2.5 from one group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) using appropriate reference methods to determine compliance with the emission limits contained in Condition 21. The tests shall be performed while operating each engine in dual fuel mode using approximately 92% landfill gas fraction. The tests shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after startup of the permitted facility. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Southwest Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

28. **Visible Emissions Evaluation** – Concurrently with the initial performance tests required in Conditions 24 – 27, Visible Emission Evaluations (VEE) in accordance with 40 CFR Part 60, Appendix A, Method 9, shall be conducted by the permittee on the group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) being tested. Each test shall consist of 30 sets of 24 consecutive observations (at 15 second intervals) to yield a six-minute average. The

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evaluation shall be performed, reported, and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after startup of the permitted facility. Should conditions prevent concurrent opacity observations, the Southwest Regional Office shall be notified in writing, within seven days, and visible emissions testing shall be rescheduled within 30 days. Rescheduled testing shall be conducted under the same conditions (as possible) as the initial performance tests. The details of the tests are to be arranged with the Southwest Regional Office. One copy of the test result shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

CONTINUING COMPLIANCE DETERMINATION

29. **Stack Test** – Performance tests shall be conducted for NO_x, CO, VOC, PM10 and PM2.5 from one engine group (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) using appropriate reference methods to determine compliance with the emission limits contained in Conditions 19 and 21. The tests shall, at a minimum, be conducted once every five years, with each group of engines rotated for testing purposes. The tests shall be performed as specified in Conditions 24 – 27. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Southwest Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

30. **Visible Emissions Evaluation** – Concurrently with the performance tests required in Condition 29, Visible Emission Evaluations (VEE) in accordance with 40 CFR Part 60, Appendix A, Method 9, shall be conducted by the permittee on the group of engines (Ref. Nos. A1 – A6, B1 – B6 or C1 – C6) being tested. Each test shall consist of 30 sets of 24 consecutive observations (at 15 second intervals) to yield a six-minute average. Should conditions prevent concurrent opacity observations, the Southwest Regional Office shall be notified in writing, within seven days, and visible emissions testing shall be rescheduled within 30 days. Rescheduled testing shall be conducted under the same conditions (as possible) as the performance tests. The details of the tests are to be arranged with the Southwest Regional Office. One copy of the test result shall be submitted to the Southwest Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

RECORDS

31. **On Site Records** – The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format

of such records shall be arranged with the Southwest Regional Office. These records shall include, but are not limited to:

- a. Results of each engine inlet charge air temperature observation.
- b. Results of each LFG filtration system differential pressure observation.
- c. Hourly, monthly and annual throughput of each type of fuel to the engines including the information required by Condition 7 of this permit. Annual throughput shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- d. Annual average ratio of liquid fuel to total fuel combusted in each engine (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) on an energy equivalent basis, calculated monthly on a rolling 12-month basis.
- e. Annual operating hours of each engine firing 100 percent liquid fuel in accordance with Condition 13. Annual hours of operation shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- f. All fuel supplier certifications.
- g. Hourly and annual emissions from the engines (Ref. Nos. A1 – A6, B1 – B6 and C1 – C6) using calculation methods and factors approved by DEQ to verify compliance with the emission limitations in Conditions 19 through 22. Annual emissions shall be calculated monthly as the sum of each consecutive 12-month period.
- h. Engine information including make, model, serial number, model year, maximum engine power (bhp), and engine displacement for each engine.
- i. Each startup of each engine, including, at a minimum, engine identification, time of start and duration of the startup event which is considered the time from initial fuel combustion to the time of operation on at least 88 percent landfill gas fraction.
- j. Results of all performance evaluations, stack tests and visible emission evaluations.
- k. Scheduled and unscheduled maintenance, operating procedures and operator training.

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These records shall be available for inspection by the DEQ and shall be current for the most recent five years.
(9 VAC 5-80-1180 and 9 VAC 5-50-50)

NOTIFICATIONS

32. **Initial Notifications** - The permittee shall furnish written notification to the Southwest Regional Office of:
- a. The actual date on which construction of the landfill gas to electricity generating facility commenced within 30 days after such date.
 - b. The actual startup date of the landfill gas to electricity generating facility within 15 days after such date.
- (9 VAC 5-50-50 and 9 VAC 5-80-1180)

GENERAL CONDITIONS

33. **Permit Invalidation** – This permit to construct the landfill gas to electricity generating facility shall become invalid, unless an extension is granted by the DEQ, if:
- a. A program of continuous construction is not commenced within 18 months from the date of this permit.
 - b. A program of construction is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.
- (9 VAC 5-80-1210)
34. **Permit Suspension/Revocation** - This permit may be suspended or revoked if the permittee:
- a. Knowingly makes material misstatements in the permit application or any amendments to it;
 - b. Fails to comply with the conditions of this permit;
 - c. Fails to comply with any emission standards applicable to a permitted emissions unit;
 - d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or
 - e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emissions limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.
- (9 VAC 5-80-1210 G)

35. **Right of Entry** - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:
- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
 - b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
 - c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and
 - d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.

(9 VAC 5-170-130 and 9 VAC 5-80-1180)

36. **Maintenance/Operating Procedures** – The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment and process equipment which affect such emissions:
- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
 - b. Maintain an inventory of spare parts.
 - c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.
 - d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.

(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

37. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records

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Registration Number: 11733
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shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9 VAC 5-20-180 J and 9 VAC 5-80-1180 D)

38. **Notification for Facility or Control Equipment Malfunction** – The permittee shall furnish notification to the Southwest Regional Office of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone or telegraph. Such notification shall be made as soon as practicable but no later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within two weeks of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Southwest Regional Office.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)
39. **Violation of Ambient Air Quality Standard** – The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)
40. **Change of Ownership** – In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current minor NSR permit issued to the previous owner. The new owner shall notify the Southwest Regional Office of the change of ownership within 30 days of the transfer.
(9 VAC 5-80-1240)
41. **Permit Copy** – The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

SOURCE TESTING REPORT FORMAT

Report Cover

1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Test Dates.
4. Tester; name, address and report date

Certification

1. Signed by team leader/certified observer (include certification date)
2. Signed by responsible company official
3. *Signed by reviewer

Copy of approved test protocol

Summary

1. Reason for testing
2. Test dates
3. Identification of unit tested & the maximum rated capacity
4. *For each emission unit, a table showing:
 - a. Operating rate
 - b. Test Methods
 - c. Pollutants tested
 - d. Test results for each run and the run average
 - e. Pollutant standard or limit
5. Summarized process and control equipment data for each run and the average, as required by the test protocol
6. A statement that test was conducted in accordance with the test protocol or identification & discussion of deviations, including the likely impact on results
7. Any other important information

Source Operation

1. Description of process and control devices
2. Process and control equipment flow diagram
3. Sampling port location and dimensioned cross section Attached protocol includes: sketch of stack (elevation view) showing sampling port locations, upstream and downstream flow disturbances and their distances from ports; and a sketch of stack (plan view) showing sampling ports, ducts entering the stack and stack diameter or dimensions

Test Results

1. Detailed test results for each run
2. *Sample calculations
3. *Description of collected samples, to include audits when applicable

Appendix

1. *Raw production data
2. *Raw field data
3. *Laboratory reports
4. *Chain of custody records for lab samples
5. *Calibration procedures and results
6. Project participants and titles
7. Observers' names (industry and agency)
8. Related correspondence
9. Standard procedures

* Not applicable to visible emission evaluations

Attachment C - Project Information

Table 1. Plants of conservation concern known from within 5 miles of the Bristol Landfill and in Washington County, VA.

Common Name	Scientific name	Federal Status	TN State Status	TN State Rank
American ginseng	<i>Panax quinquefolius</i>	--	S-CE	S3S4
Roan sedge	<i>Carex roanensis</i>	SOC	SLNS (VA)	S1 (VA)
Skunk cabbage	<i>Symplocarpus foetidus</i>	--	END	S1
Twisted rosy stalk	<i>Streptopus amplexifolius</i>	--	THR	S1

Federal status abbreviations: SOC=species of concern

State status abbreviations: SLNS =state listed, no status

State rank abbreviations: S1=critically imperiled with less than five occurrences; S2 =imperiled with six to twenty occurrences; S3 =rare or uncommon with 21 to 100 occurrences; S#S#=occurrence numbers are uncertain

Table 2. Records of federal and state-listed aquatic animal species within ten miles of the proposed project.¹

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
INSECT					
Cherokee Clubtail	<i>Gomphus consanguis</i>	BC		TRKD	S2
FISHES					
Blotchside Logperch	<i>Percina burtoni</i>	E		SPCO	S1
Blueside Darter	<i>Etheostoma jessiae</i>	H		TRKD	S1
Longhead Darter	<i>Percina macrocephala</i>	H		THR	S2
Marbled Darter	<i>Etheostoma marmorinum</i>	X?	END	END	S1
Popeye Shiner	<i>Notropis ariommus</i>	E		SPCO	S2S3
Spotfin Chub	<i>Erimonax monachus</i>	E	THR	THR	S1
Tennessee Dace	<i>Phoxinus tennesseensis</i>	E		NMGT	S3
MUSSELS					
Tan Riffleshell	<i>Epioblasma florentina walkeri</i>	X	END	END	S1
Tennessee Pigtoe	<i>Fusconaia barnesiana</i>	H		SPCO	S2

¹ Source: TVA Natural Heritage Database, queried on 10/09/2013

² Heritage Element Occurrence Rank; E = extant record ≤25 years old; BC = Good or fair estimated viability; H = historical record >25 years old; X = extirpated; ? = inexact or uncertain.

³ Status Codes: END = Endangered; THR = Threatened; NMGT = In Need of Management; SPCO = Listed Special Concern; TRKD = Tracked by state natural heritage program (no legal status)

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S2S3 = Denotes a range of ranks because the exact rarity of the element is uncertain.

Table 3. Species of Conservation Concern within Washington County, VA, and/or Sullivan County, Tennessee, and/or within a 3-mile Radius of the City of Bristol, Virginia, Landfill¹

Common Name	Scientific Name	Status	
		Federal ²	State (Rank ³)
Birds			
Bald eagle ⁴	<i>Haliaeetus leucocephalus</i>	DM	S2S3 (THR)
Mammals			
Gray bat	<i>Myotis grisescens</i>	LE	S1S2 (END)
Indiana bat ⁵	<i>Myotis sodalis</i>	LE	S1 (END)
Virginia northern flying squirrel ⁴	<i>Glaucomys sabrinus fuscus</i>	LE	S1 (END)

¹ TVA Natural Heritage Data, 10/11/2013

²Status Codes: DM = Delisted, recovering, and in need of monitoring; END = State-listed as Endangered; LE = Listed Endangered; NMGT = In Need of Management; PS = Partial Status; SPCO = Species of Special Concern in Virginia; THR = State-listed as Threatened;

³State Ranks: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Rare and uncommon; S4 = Widespread, abundant and apparently secure, but with cause for long-term concern

⁴Documented in Washington County, Virginia, but not within 3 miles of project area.

⁵Has not been documented in counties relevant to the project, but 2013 guidance from the U. S. Fish and Wildlife Service directs federal action agencies to review projects occurring within known range of the species.

DETROIT DIESEL



SERIES 60[®] Truck Power

Number of Cylinders	6 Inline	
Air System	Turbocharged Air-to-Air Charge Cooling	
Control	DDEC [®]	
Specifications	12.7L	14.0L
Bore and Stroke	5.12 in x 6.30 in (130 mm x 160 mm)	5.24 in x 6.62 in (133 mm x 168 mm)
Displacement	778 cu in (12.7 liters)	858 cu in (14.0 liters)
Compression Ratio	17.25:1	16.75:1
Dimensions: (approx.)		
Length	57 in (1448 mm)	57 in (1448 mm)
Width	34 in (864 mm)	34 in (914 mm)
Height	50 in (1273 mm)	50 in (1273 mm)
Weight (dry)	2640 lbs (1199 kg)	2640 lbs (1199 kg)



Ratings 380 – 515 Horsepower

Maximum HP @ RPM	Peak Torque @ RPM
12.7L	
390 HP @ 1800 RPM	1350FT-LB @ 1200 RPM
380 HP @ 1800 RPM	1350FT-LB @ 1200 RPM
380/390 HP @ 1800 RPM	1350FT-LB @ 1200 RPM
445 HP @ 1800 RPM	1450FT-LB @ 1200 RPM
435 HP @ 1800 RPM	1450FT-LB @ 1200 RPM
425 HP @ 1800 RPM	1450FT-LB @ 1200 RPM
425/445 HP @ 1800 RPM	1450FT-LB @ 1200 RPM
455 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
450 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
445 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
445/455 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
14.0L	
490 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
455 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
455/490 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
515 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
490 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
455 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
455/515 HP @ 1800 RPM	1550FT-LB @ 1200 RPM
515 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
490 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470/515 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470/515 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
490 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470 HP @ 1800 RPM	1650FT-LB @ 1200 RPM
470/490 HP @ 1800 RPM	1650FT-LB @ 1200 RPM

Series 60 Features

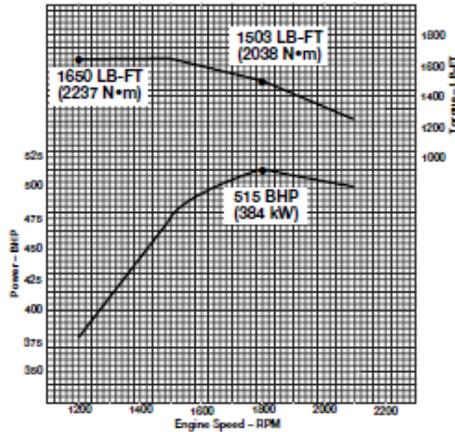
- Cylinder Head**
 - Better air flow for improved performance
- Camshaft / Overhead**
 - Optimized injector and valve events
 - Ceramic intake, exhaust and injector rollers
 - Better roller durability under adverse conditions
- One Piece (Monotherm) Piston**
 - Reduced friction
 - Closed oil gallery
 - Improved ring cooling
 - Higher compression ratio
 - Lower ring / liner wear
 - Reduced oil soot loading
 - Better cold engine performance with higher C/R
- EGR Cooler**
 - Tube in shell design for improved durability
 - Improved efficiency
 - Simpler stainless steel housing with less welding
 - 10 lb. weight reduction
- New Injector**
 - Improved end of injection quality and faster response time for better efficiency
 - Reduced weight – 2.5 lbs.
 - Stainless steel injector sleeve replaces copper tube
- DDEC V – Detroit Diesel Electronic Controls**
 - Increased capability for future needs
 - Improved reliability
- Series 60 Continues To Provide Truckers With The Best Combination Of:**
 - Performance
 - Reliability
 - Proven Durability
 - High Residual Value
 - Flexible Power Ratings
 - Excellent Parts And Service Support
 - Fuel Economy
 - Low Cost Of Operation
 - Driver Satisfaction
 - Proven Electronics – DDEC

Reliability, Performance & Fuel Economy Leader

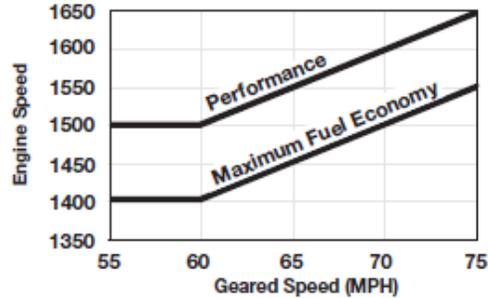
Photograph illustrates a typical truck engine
Rating conditions of SAE: 77°F (25°C) and 29.31 In Hg (99 kPa) Barometer (Dry)

For a complete listing of standard and optional equipment, consult your distributor or authorized Detroit Diesel Corporation representative.

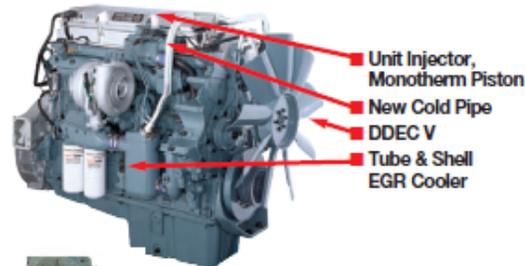
Series 60 - 515 HP



380-515 HP Gearing Recommendation Chart



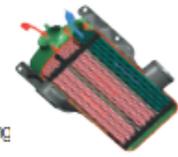
What's New - It's Simple



- Unit Injector, Monotherm Piston
- New Cold Pipe
- DDEC V
- Tube & Shell EGR Cooler



- EGR Cooler
 - Tube In Shell Design For Improved Durability
 - Improved Efficiency
 - Simpler Stainless Steel Housing With Less Welding
 - 10 Lb. Weight Reduction



- New Fuel Injector
 - Improved End Of Injection Quality And Faster Response Time For Better Efficiency
 - Reduced Weight - 2.5 Lbs.
 - Stainless Steel Injector Sleeve Replaces Copper Tube



- Electronic Controls - DDEC V
 - Increased Capability For Future Needs Power
 - Improved Reliability



- Cylinder Head
 - Better Air Flow For Improved Performance
- Camshaft / Overhead
 - Optimized Injector And Valve Events
 - Ceramic Intake, Exhaust and Injector Rollers For Better Roller Durability Under Adverse Conditions



- One Piece (Monotherm) Piston
 - Reduced Friction For Improved Performance
 - Closed Oil Gallery For Improved Ring Cooling And Longer Life
 - Higher Compression Ratio For Better Cold Weather Starting

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