

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Application Review

Issue Date: XX January 2021

Region: Fayetteville Regional Office
County: Richmond
NC Facility ID: 7700101
Inspector's Name: N/A
Date of Last Inspection: N/A
Compliance Code: N/A

Facility Data			Permit Applicability (this application only)
<p>Applicant (Facility's Name): International Tie Disposal, LLC - Project Tie</p> <p>Facility Address: International Tie Disposal, LLC - Project Tie 174 Marks Creek Church Road Hamlet, NC 28345</p> <p>SIC: 3624 / Carbon and Graphite Products NAICS: 335991 / Carbon and Graphite Product Manufacturing</p> <p>Facility Classification: Before: Permit/Registration Pending After: Synthetic Minor Fee Classification: Before: N/A After: Synthetic Minor</p>			
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	<p>Application Number: 7700101.20A Date Received: 06/16/2020 Application Type: Greenfield Facility Application Schedule: State Existing Permit Data Existing Permit Number: N/A Existing Permit Issue Date: N/A Existing Permit Expiration Date: N/A</p>
Jill DeLisio (704) 321-0802 13700 Providence Rd. Weddington, NC 28104	Basil A. Polivka II Director of Pyrolysis Program (704) 321-0802 13700 Providence Rd. Weddington, NC 28104	Basil A. Polivka II Director of Pyrolysis Program (704) 321-0802 13700 Providence Rd. Weddington, NC 28104	
Review Engineer: Jeffrey D. Cole		Comments / Recommendations:	
Review Engineer's Signature:	Date:	<p>Issue: 10676R00 Permit Issue Date: XX January 2021 Permit Expiration Date: 31 December 2028</p>	

1. Purpose of Application:

International Tie Disposal, LLC - Project Tie is a greenfield biochar manufacturing facility located in Hamlet, Richmond County. The biochar production process uses pyrolysis to create biochar from creosote treated railroad ties and untreated wood. The company has requested the initial air quality permit for this facility.

The facility will be classified as Synthetic Minor due to potential NOx, CO and VOC emissions before controls exceeding the Title V permitting thresholds.

The application did not contain any confidential information.

The facility contact for the permit application is Mr. Basil A. Polivka II, Director of Pyrolysis Program, (704-321-0802). The facility utilized a consultant to prepare the permit application. The contact at the consultant, Trinity Consultants, is Ms. Nicole Saniti, P.E. (704-553-8838 x104).

2. Facility Description

International Tie Disposal, LLC - Project Tie submitted a permit application for a new facility located at 174 Marks Creek Church Road, Hamlet, Richmond County, North Carolina. The proposed facility will manufacture biochar using a controlled heating process known as pyrolysis. The pyrolysis process volatilize unwanted chemical components to produce the carbonaceous biochar. The facility will have 426 kilns and 62 natural gas-fired afterburners onsite. The proposed facility will operate 24 hours per day, 7 days per week, 365 days per year. To maintain emissions below the Title V thresholds, only 160 of the 426 kilns will operate daily. This will be accomplished by the facility initially firing 62 kilns in the first of 3 daily 8 hour shifts. As the first of the 62 kilns finish its 7 to 8-hour pyrolysis process, its afterburner is removed and placed on the next kiln starting its pyrolysis process. This process will continue throughout the day until a total of 160 kilns have completed the pyrolysis process. This would equate to a maximum of 58,400 kilns (160 kilns per day for 365 days per year) per 12 consecutive month period.

The proposed facility will receive logs (untreated lumber) and creosote-treated railroad ties by railcar in the tie unloading and sorting area. Received materials will be offloaded and stacked in the raw material storage area. Raw material staging and handling will be performed using a tracked excavator with a handling arm. All raw material from the storage area is then loaded onto a conveyor and fed into a Chomper (Crusher) where it is reduced in size to 3 to 4 inch by 12 to 18-inch and then loaded by conveyor into individual kilns in the raw material staging area. The crusher is located inside an intermodal shipping container that is open on 2 ends to accommodate the conveyors. Empty kilns are transported to the kiln loading area for charging with crushed logs (untreated lumber) or crushed ties. The capacity of each kiln will be approximately 2,000 pounds of woody raw material.

A kiln loaded with raw material will then be transported to the processing area using a wheel-loader. Each loaded kiln is then fitted with a removable, refractory-lined exhaust stack/afterburner (0.125 mmBtu/hr natural gas-fired). This exhaust stack allows the mounted afterburners to create a tight seal with the kiln. The afterburner is then started and brought up to operating temperature. Pyrolysis within the kiln is initiated by the natural gas-fired kiln burner that is a component of the kiln itself. The kiln burner is direct fired (natural gas) and has a maximum heat input capacity of 0.0078 mmBtu/hr. Once the pyrolysis is initiated, the kiln burner is turned off as the pyrolysis process is self-sustaining and does not require additional natural gas combustion. The kiln's integral seal-cover lid is then opened, and the afterburner is used to control kiln emissions. The pyrolysis processing period is estimated to last 7 to 8 hours.

At the end of the pyrolysis operation the kiln's integral seal-cover lid is closed. Note that this integral seal-cover lid must be closed before the exhaust stack/afterburner is removed to keep the biochar from combusting and resulting in ash rather than biochar, as desired. The exhaust stack/afterburner then is removed and placed on an adjacent kiln, already loaded with raw material, in preparation for firing. Exhaust stacks/afterburners are handled by a mid-sized loader. The kiln that has completed pyrolysis is then moved to the cooling area for a period for approximately 10 to 18 hours. There are no emissions from the kilns during the cool-down period.

After the cool-down period, the kiln containing biochar is transported to the biochar sorting processing line by a mid-sized wheel loader. Up to ~500 pounds of biochar will be produced by a single kiln pyrolysis process. The biochar is then loaded into a hopper equipped with a hood and a dust collection capture vent to capture fugitive dust. This biochar sorting processing line is located inside multiple intermodal shipping containers that are sealed with foam gaskets. Each container is

equipped with dust collection vents that vent to one of two external bagfilters. The line contains a series of conveyors and is equipped with the following equipment:

- A magnet (to remove bolts and spikes left in the ties through the processing)
- A crusher to reduce the size of the biochar to no greater than 3 inches
- A detwigger which removes any large unconverted wood
- A hammermill to reduce the size of the biochar to no greater than 1 inch
- A drum magnet followed by a 3 deck open screener to separate the biochar into 4 sizes.
- A destoner to separate the good biochar from the smaller unconverted wood
- A rollermill to further reduce the size of the biochar

The biochar then moves into a bucket elevator and moves up to a screener. The biochar then moves into small hoppers in the top of the bagging container. The biochar is then bagged in super sacks which are moved by Bobcat loader to the biochar storage area for loading onto railcars. Packaged product will then be loaded directly onto pallets for shipment by rail offsite. Product trucks will travel to and from the biochar sorting processing line via the product transport route. Emissions from truck transport are shown in the haul road emission calculations. Note that the company has also estimated emissions from biochar storage tanks and their loading by conveyor in their permit application in case this type of storage option is needed for a future customer.

Other sources of emissions of regulated pollutants may include small fuel tanks, propane storage tanks, and maintenance activities such as welding. The company asserts that these sources, individually and collectively, are negligible sources of emissions and are exempt from permitting requirements.

In terms of odor control, the company has done research to determine whether odor will be a concern with this facility and to develop a plan to minimize any odor issues. Evaluating potential odor issues, the company quoted a scientific paper titled, "Environmental Implications of Increased Biomass Energy Use (National Renewable Energy Laboratory, March 1992) which stated, "Local noise and odor regulations also apply to biomass production facilities. In most cases, these problems have been resolved through appropriate siting and proper drainage and ventilation of fuel storage piles. Wood waste piles of hardwood species with degradable sugars are most susceptible to odor problems." A data search noted that railroad ties are historically made of hardwoods, such as oak, that are then coated with creosote. Company officials sought data on sugars present in weathered railroad ties, but they could not find any information. Additionally, the company stated that they have searched for data on composition studies of aged hardwoods for sugars, but similarly could not find much information. Company officials stated that they visited a NC site where there were thousands of ties stored long-term but stated that they did not observe any obnoxious odor (or really any odor). While long term storage sites might have a subtle mildewy smell associated with wet wood, the proposed International Tie Disposal, LLC - Project Tie facility will store the received wood material stacked in the tie storage area. This wood material will be processed continuously thus long-term storage is not anticipated.

Application Chronology:

06/16/20 FRO received the greenfield permit application package. The application package included a check in the amount of \$50 for the permit processing fee. The application appeared to be incomplete for processing as it was missing numerous forms, did not contain a request for a Zoning Consistency Determination, emissions estimates showed that the facility would likely be classified synthetic minor (and thus required a \$400 permit application fee) and was not sealed by a P.E.

06/17/20 FRO sent the facility a letter acknowledging receipt of the incomplete application and requesting that they resubmit a complete application along with an additional \$350 permit fee.

PERMIT APPLICATION CLOCK OFF

08/12/20 FRO received an updated greenfield permit application package. The application package included a check in the amount of \$350 for the additional permit processing fee. The application appeared to be complete, contained a request for a Zoning Consistency Determination, and was sealed by a P.E. However, the associated Form A did not include the facility's 911 address which is required to issue an air quality permit.

08/24/20 Ms. Heather Carter, Regional Air Quality Supervisor, Mr. Greg Reeves, Compliance Coordinator, Mr. Cole and Mr. Polivka II participated in a teleconference where the proposed facility was discussed and permitting questions were addressed. Mr. Polivka II noted that the proposed site for the facility had yet to be zoned industrial and the company had an alternate site that was already zoned industrial. Mr. Reeves stated that he believed that the company could submit a second greenfield permit application for the alternate site and could choose either location. Mr. Polivka II stated that the company would submit a duplicate permit application for International Tie Disposal, LLC - Project Tie with the different address. Mr. Cole reminded Mr. Polivka II that a separate \$400 permit application fee would also need to be included as well. Mr. Cole reminded Mr. Polivka II that the company had not sent DAQ the 911 street address of the proposed facility. Also, Ms. Carter emphasized DEQ's strong suggestion to International Tie Disposal, LLC to start outreach efforts with their proposed facility's county and community. Shortly after this teleconference, Mr. Polivka II emailed Mr. Cole with the proposed facility's 911 street address.

PERMIT APPLICATION CLOCK ON

09/24/20 Ms. Heather Carter sent a Permit Additional Information (PAI) letter to Mr. Polivka II asking the company to provide information on the following permitting issues:

- Proof of business registration with the North Carolina Secretary of State's Office.
- Given the proximity of the locations, what are the intended operations for each location and will they overlap? If so, how will they overlap?
- Reasoning for why these proposed facilities are not considered one source for permitting classification and rule applicability?

PERMIT APPLICATION CLOCK OFF

10/06/20 Mr. Polivka II had a TEAMS meeting with DAQ Central Office, FRO Regional Office and Richmond County Economic Development personnel to discuss the company's efforts to reach out to the local community and explain what the facility will do and how the community would benefit from its facility.

10/19/20 Mr. Polivka II sent an email to Heather Carter stating that the company is withdrawing the permit application for International Tie Disposal, LLC - Project Tie 2 with the different facility address. A copy of the scanned letter was attached to the email. The original permit application address was rezoned for heavy industrial use; therefore, the facility requested withdrawal of the alternate application.

10/23/20 Mr. Polivka II sent the information in the 09/24/20 request.

PERMIT APPLICATION CLOCK ON

11/06/20 Mr. Cole sent an email to Mr. Polivka II requesting the following information:

- A process diagram showing how the structures are oriented/connected and showing the emission points of each operation/structure.
- A detailed description of the shredding operation equipment including how it will be shrouded or enclosed (i.e. what equipment parts are included in the shroud: shredding point, drop point(s), conveyor, etc).
- Is there any wet suppression used as part of the shredding operation? If so, describe the equipment in detail including where it will be located/positioned and application rate.
- The manufacturer's name, model numbers and specifications of the shredding equipment.
- A detailed description of the product handling and packaging processing including which portions of the process are to be enclosed in the shipping containers.
- A detailed description of the product handling and packaging processing's emission control system including submission of the proper new and/or updated NCDEQ forms reflecting any additional emissions controls.
- How fugitive dust emissions will be addressed from vehicle traffic and movement of equipment on the property?

PERMIT APPLICATION CLOCK OFF

12/09/20 Mr. Polivka II sent the information in the 11/06/20 request.

PERMIT APPLICATION CLOCK ON

- 12/28/20 Mr. Cole sent an email to Mr. Polivka II requesting the following information:
- You noted in all of your permit applications that biochar storage silos would be located near the biochar processing line and your emission calculations include the silos' estimated emissions. However, your detailed process description and diagram, submitted recently, do not discuss or show the silos. Are you including the silos in your emission calculations as an option so that you could possibly add them in future?
 - I have the 6/10/20 Zoning Consistency Determination noting that, "The determination is pending further information and cannot be made at this time." When did you receive the notice that the land had been rezoned? Did you send me that attached to an email, if so, when was it sent? If not, please scan and attach that document and email it to me.
 - I believe that we have spoken about your efforts to address community concerns about possible noise and dust emissions. Have you received any feedback from the public on potential odors generated from your proposed facility? If so, can you describe your efforts to ensure objectionable odors do not leave the site?

PERMIT APPLICATION CLOCK OFF

12/30/20 Mr. Polivka II responded to the questions in the 12/28/20 email from Mr. Cole.
PERMIT APPLICATION CLOCK ON

12/30/20 Mr. Cole sent an email to Mr. Polivka II requesting that he send DAQ a copy of the updated Zoning Consistency Determination from the Richmond County Planning Director.

01/06/21 Mr. Cole received an updated Zoning Consistency Determination from the Richmond County Planning Director.

3. Zoning

The permit application received on 8/12/20 included a request for a Zoning Consistency Determination from the Richmond County Zoning and Planning Department dated 6/10/20.

On 11/14/19, FRO received a completed Zoning Consistency Determination from the Richmond County Zoning and Planning Department. The determination was signed by Tracy R. Parns, Planning Director, dated 06/10/20, indicating that "...The determination is pending further information and cannot be made at this time." But then, on 01/06/21, FRO received an updated, completed, Zoning Consistency Determination, dated 01/06/21, from the Richmond County Zoning and Planning Department. The determination was signed by Tracy R. Parns, Planning Director, dated 01/06/21, indicating that "...*The proposed operation IS consistent with applicable zoning ordinances (within H-1 zoning of parcel).*"

4. Changes in Equipment, Emissions and Regulations and PE Review Requirements

A PE Seal was required for this permit under 15A NCAC 02Q .0112. The permit application contained Form D5 that was sealed and signed by Nicole Saniti, P.E. (N.C. Seal #038716) on 08/11/20.

This is a request for a Greenfield air permit. New equipment to be installed is as follows:

- Biochar Kilns (ID No. ES-1)
- Afterburners (Natural Gas-fired; 0.125 mmBtu/hr each) (ID No. CD-1) to control emissions from individual Biochar Kilns ID No. ES-1
- Crusher and Kiln Loading (ID No. IES-EX-1)
- Product Handling and Packaging (ID No. IES-EX-2)
- Haul Roads (ID No. IES-EX-3)
- Diesel Storage Tank (ID No. IES-EX-4)
- Maintenance Welding (ID No. IES-EX-5)
- Biochar Storage Silos (ID No. IES-EX-6)

The facility’s permitted emission sources and controls are as follows:

Emission Source ID	Emission Source Description	Control System ID	Control System Description
ES-1	Biochar Kilns (426 Units) each with integral Natural Gas-Fired Kiln Burner (0.0078 mmBtu/hr maximum heat input)	CD-1	Afterburners (62 units) Natural Gas-Fired (0.125 mmBtu/hr each maximum heat input)

The facility's Insignificant / Exempt Activities are as follows:

Source	Exemption Regulation	Source of TAPs?	Source of Title V Pollutants?
IES-EX-1 Crusher and Kiln Loading	2Q .0102 (h)(5)	Yes	Yes
IES-EX-2 Product Handling and Packaging (System housed in intermodal shipping containers equipped with dust collection vents that vent to one of two external cartridge-type bagfilters [3,048 square feet of filter area, each].)	2Q .0102 (h)(5)	Yes	Yes
IES-EX-3 Haul Roads	2Q .0102 (h)(5)	No	Yes
IES-EX-4 Diesel Storage Tank	2Q .0102 (h)(5)	Yes	Yes
IES-EX-5 Maintenance Welding	2Q .0102 (h)(5)	Yes	Yes
IES-EX-6 Biochar Storage Silos	2Q .0102 (h)(5)	Yes	Yes

5. NSPS, NESHAP, PSD, Attainment Status, and 112(r)

- **NSPS**

- ✓ None of the emission sources at the facility are subject to any current NSPS regulation.
- ✓ The natural gas-fired Afterburners (0.125 mmBtu/hr each) (ID No. CD-01) and the 0.0078 mmBtu/hr kiln burners (one located in each kiln) do not involve incineration of solid waste, and therefore are not subject to NSPS CCCC or DDDD.
- ✓ The natural gas-fired Afterburners (0.125 mmBtu/hr each) (ID No. CD-01) are not subject to NSPS Subpart CCCC since they are control devices and therefore do not meet the definition of a CISWI unit in 40 CFR 60.2265.

- **NESHAP**

- ✓ None of the emission sources at the facility are subject to any current NESHAP regulation.

- **PSD** – Potential emissions of NO_x and VOC both exceed PSD thresholds. The facility is accepting a PSD Avoidance condition to avoid PSD permitting. PSD minor-source increment tracking has been triggered in Richmond County for PM₁₀, SO₂ and NO_x. This application will consume 1.1 lb/hr of PM₁₀, 0.01 lb/hr of SO₂ and 22.3 lb/hr of NO_x.

- **Attainment Status** – Richmond County is in attainment

- **112(r)** – The facility does not store any of the subject materials above the 112(r) threshold quantities and is therefore not required to maintain a written Risk Management Plan (RMP).

6. Facility Emissions Review:

Pollutant	Expected Actual Emissions (tons/yr)	Potential Emissions Before Controls (tons/yr)	Potential Emissions After Controls (tons/yr)
PM	7.30	53.95	7.30
PM ₁₀	4.80	35.40	4.80
PM _{2.5}	3.52	25.63	3.52
SO ₂	0.03	0.15	0.03
NO _x	97.84	699.71	97.84
CO	19.57	139.94	19.57
VOC	13.12	321.86	13.12
Highest Individual HAP (Methanol)	2,050 lbs/yr	5,470 lbs/yr	2,050 lbs/yr
Total HAP	2,180 lbs/yr	6,360 lbs/yr	2,180 lbs/yr

The Expected Actual Emissions in the table above are taken from the permit application. The biochar kiln emissions for CO, NO_x, VOC and Methanol were estimated based on emission factors derived from a source test report for a similar pyrolysis operation in Weld County, Colorado (Biochar Now; conducted on 12/22/15) including an additional 25% safety factor. This 2015 source test was conducted using creosote treated railroad ties. The biochar kiln emissions for PM, PM₁₀ and PM_{2.5} were estimated based on emission factors derived from a source test report at Biochar Now, Berthoud, CO (conducted from 10/08/19 to 10/14/19) including an additional 25% safety factor. This 2019 source test was conducted using untreated wood. Sulfur dioxide (SO₂), HAP and TAP emissions from the process initiation combustion and afterburners are calculated using DEQ's Natural Gas Combustion Emissions Calculator, Revision N (Jan 2017).

Emissions of all other pollutants (i.e., all HAPs/TAPs except: Chromium, 1,4-Dichlorobenzene, 2,3,7,8-Tetrachlorodibenzo-p-dioxins, Bis-[2-ethylhexyl] phthalate, Creosol isomers (m, p, o) and Pentachlorophenol) from the biochar kilns were calculated based on emission factors from AP-42, 5th Edition, Section 1.6 Wood Residue Combustion in Boilers, Tables 1.6-3 and 1.6-4 (Sept 2003). Emission of Chromium, 1,4-Dichlorobenzene, 2,3,7,8-Tetrachlorodibenzo-p-dioxins, Bis-[2-ethylhexyl] phthalate, Creosol isomers (m, p, o) and Pentachlorophenol, were estimated using test data from the Craven County Wood Energy facility in North Carolina (Oct 2013). These test data are from creosote treated wood combustion taken from a publicly available permit application submitted by Carolina Coastal Clean Power, LLC to NCDAQ, PSD Air Quality Construction and operating permit Application (Oct 2013) (NC facility ID 3100116). The permitted combustion sources that were located at Coastal Carolina Clean Power, LLC (later known as Duplin BioEnergy, LLC) were two coal/natural gas/No. 2 and No. 4 fuel oil/tire derived fuel/pelletized paper fuel/flyash briquette/unadulterated wood/adulterated wood including wood waste, railroad ties and engineered wood - fired steam, electric generating, boilers each of (215 million Btu per hour maximum heat input rate). For all of these pollutants, potential emissions were calculated using the maximum of the test data and AP-42 emission factor or the test data if an AP-42 factor was not available. The afterburner

control efficiency of 95% was applied to all uncontrolled VOC and volatile HAP and TAP emission rates.

Emissions from feedstock handling (crushing and kiln loading) are calculated based on the maximum throughput of feedstock, and emission factors obtained from the table in the memorandum "Particulate Matter Potential to Emit Emission Factors from Activities at Sawmills, Excluding Boilers, Located in Pacific Northwest Indian Country", May 8, 2014, from Dan Meyer, US EPA Region 10. A capture efficiency of 90% is applied for the crusher being located in an intermodal shipping container with openings at 2 sides, which reduce PM emissions to the atmosphere.

Emissions from product handling and packaging are calculated based on published factors in AP-42 Section 11.19.2 – Crushed Stone Processing and Pulverized Mineral Processing. Emission factors in lb/ton are multiplied by the maximum material throughput in tons. This biochar sorting processing line will utilize a conveyor system housed in intermodal shipping containers that are sealed with foam gaskets. Each container is equipped with dust collection vents that vent to one of three external cartridge-type bagfilters. A capture efficiency of 90% and a control efficiency of 99% is applied for enclosures and bagfilters, respectively, which reduce PM emissions to the atmosphere.

When the permit application was submitted the company included the option of having biochar storage silos. Subsequently, the company discovered that their end user for our biochar will not have rail access, so the biochar will need transported via rail in super sacks filled at the enclosed processing line, then offloaded onto trucks near the final destination. So initially, instead of silos, they are utilizing a “covering,” which will be built to cover the super sacks. There will be no biochar-related emissions associated with the covering as the super sacks will already be filled at the bagging station. For possible future storage needs the company included emission calculations for storage silos as well. The storage silo emissions are based on AP-42 Section 13.2.4 - Aggregate Handling and Storage Piles, Equation 1. Equation 1 is used to calculate the quantity of particulate emissions generated by drop operation, in this case, material being transferred to storage silos using 2 conveyers.

Potential emissions from haul roads were calculated using the methods presented in AP-42, 5th Edition, Section 13.2.2 Unpaved Roads (Nov 2006).

7. Facility Wide Air toxics:

Toxic pollutant emissions from the facility operations are detailed in the table below. There are no toxic pollutant emissions that exceed the toxic air pollutant permitting emissions rates (TPERs). Therefore, no air dispersion modeling demonstration is required. There will be a 02Q .0711 toxics condition in the permit, but there is not a 02D .1100 toxics condition in the permit.

Pollutant	Expected Actual Emissions After Controls	TPER (02Q .0711(b))	% TPER	Exceed TPER?
Acetaldehyde	3.35 x 10 ⁻⁷ lb/hr	28.43 lb/hr	1.18 x 10 ⁻⁸	No
Acrolein	5.31 x 10 ⁻⁷ lb/hr	0.08 lb/hr	6.64 x 10 ⁻⁶	No
Ammonia (as NH3)	6.27 x 10 ⁻² lb/hr	2.84 lb/hr	0.0221	No
Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds)	1.03 x 10 ⁻² lb/yr	0.194 lb/yr	0.0531	No

Pollutant	Expected Actual Emissions After Controls	TPER (02Q .0711(b))	% TPER	Exceed TPER?
Benzo(a)pyrene (Component of 83329/POMTV & 56553/7PAH)	1.38 x 10 ⁻⁴ lb/yr	3.044 lb/yr	4.53 x 10 ⁻⁵	No
Beryllium Metal (unreacted) (Component of BEC)	5.14 x 10 ⁻⁴ lb/yr	0.378 lb/yr	1.36 x 10 ⁻³	No
Cadmium Metal, elemental, unreacted (Component of CDC)	1.92 x 10 ⁻³ lb/yr	0.507 lb/yr	3.79 x 10 ⁻³	No
Carbon tetrachloride	1.05 x 10 ⁻³ lb/yr	618.006 lb/yr	1.70 x 10 ⁻⁶	No
Chlorine	7.03 x 10 ⁻⁷ lb/hr	0.95 lb/hr	7.40 x 10 ⁻⁷	No
Chlorine	1.01 x 10 ⁻³ lb/day	1.6 lb/day	6.31 x 10 ⁻⁴	No
Chlorobenzene	2.11 x 10 ⁻⁶ lb/day	92.7 lb/day	2.28 x 10 ⁻⁸	No
Chloroform	6.54 x 10 ⁻⁴ lb/yr	396.631 lb/yr	1.65 x 10 ⁻⁶	No
Chromium (VI) Non-Specific Compounds, as Chrom(VI) (Component CRC)	1.64 x 10 ⁻³ lb/yr	0.008 lb/yr	0.205	No
Cresol (mixed isomers)	1.22 x 10 ⁻¹⁰ lb/hr	2.32 lb/hr	5.26 x 10 ⁻¹¹	No
DEHP (Di(2-ethylhexyl)phthalate)	2.72 x 10 ⁻⁷ lb/day	1.3 lb/day	2.09 x 10 ⁻⁷	No
1,4 - Dichlorobenzene(p)	3.87 x 10 ⁻¹¹ lb/hr	69.50 lb/hr	5.57 x 10 ⁻¹³	No
Ethylene dichloride (1,2-dichloroethane)	6.77 x 10 ⁻⁴ lb/yr	350.511 lb/yr	1.93 x 10 ⁻⁶	No
Formaldehyde	1.47 x 10 ⁻³ lb/hr	0.16 lb/hr	9.19 x 10 ⁻³	No
n-Hexane	0.317 lb/day	46.3 lb/day	6.85 x 10 ⁻³	No
Hydrogen chloride (hydrochloric acid)	1.69 x 10 ⁻⁵ lb/hr	0.74 lb/hr	2.28 x 10 ⁻⁵	No
Manganese & compounds	2.05 x 10 ⁻³ lb/day	1.3 lb/day	1.58 x 10 ⁻³	No
Mercury, vapor (Component of HGC)	4.48 x 10 ⁻⁶ lb/day	0.025 lb/day	1.79 x 10 ⁻⁴	No
Methylene chloride	1.29 x 10 ⁻⁸ lb/hr	1.79 lb/hr	7.21 x 10 ⁻⁹	No
Methylene chloride	6.77 x 10 ⁻³ lb/yr	2,213.752 lb/yr	3.06 x 10 ⁻⁶	No
Nickel metal (Component of NIC)	4.22 x 10 ⁻⁵ lb/day	0.3 lb/day	1.41 x 10 ⁻⁴	No
PCB (polychlorinated biphenyls)	1.85 x 10 ⁻⁷ lb/yr	7.656 lb/yr	2.42 x 10 ⁻⁸	No
Pentachlorophenol	1.01 x 10 ⁻¹⁰ lb/hr	0.03 lb/hr	3.37 x 10 ⁻⁹	No
Pentachlorophenol	1.45 x 10 ⁻⁷ lb/day	0.1 lb/day	1.45 x 10 ⁻⁶	No
Phenol	2.27 x 10 ⁻⁹ lb/hr	1.00 lb/hr	2.27 x 10 ⁻⁹	No
Styrene	8.45 x 10 ⁻⁸ lb/hr	11.16 lb/hr	7.57 x 10 ⁻⁹	No
TCE (trichloroethylene)	8.88 x 10 ⁻⁴ lb/yr	5,442.14 lb/yr	1.63 x 10 ⁻⁷	No
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (Component of CLDC & 83329/POMTV)	9.13 x 10 ⁻¹⁰ lb/yr	0.0002767 lb/yr	3.30 x 10 ⁻⁶	No

Pollutant	Expected Actual Emissions After Controls	TPER (02Q .0711(b))	% TPER	Exceed TPER?
Toluene	6.67×10^{-5} lb/hr	58.97 lb/hr	1.13×10^{-6}	No
Toluene	6.59×10^{-4} lb/day	197.96 lb/day	3.33×10^{-6}	No
Vinyl chloride	4.20×10^{-4} lb/yr	35.051 lb/yr	1.20×10^{-5}	No
Xylene (mixed isomers)	1.11×10^{-9} lb/hr	68.44 lb/hr	1.62×10^{-11}	No
Xylene (mixed isomers)	1.60×10^{-6} lb/day	113.7 lb/day	1.41×10^{-8}	No

8. Facility Compliance Status:

This is a greenfield facility and has no previous compliance history. The facility has not commenced construction.

9. Stipulation Review:

The following regulations are applicable to this facility:

Regulation	Affected Sources	Emission Limit or Requirement
15A NCAC 02D .0202	Facility-wide	Permit Renewal and Emission Inventory Requirement
15A NCAC 02D .0515	Biochar Kilns ES-1 Crusher and Kiln Loading IES-EX-1 Product Handling and Packaging IES-EX-2	$E = 4.10 * (P)^{0.67}$ for $P \leq 30$ tons/hr $E = 55 * (P)^{0.11} - 40$ for $P > 30$ tons/hr
15A NCAC 02D .0516	Facility-wide	$SO_2 \leq 2.3$ lb/mmBtu
15A NCAC 02D .0521	Facility-wide	20% opacity
15A NCAC 02D .0535	Facility-wide	Notification requirement
15A NCAC 02D .0540	Facility-wide	Fugitive Dust Control Requirement

Regulation	Affected Sources	Emission Limit or Requirement
Initial Testing Requirement Ad-Hoc 15A NCAC 02D .0605	Biochar Kilns ES-1	<p style="text-align: center;">Testing Requirements</p> <p>Test for PM (Filterable and Condensable Particulate Matter), NOx, CO, VOC, Visible Emissions (VE), and HAPs/TAPs emitted.</p> <p>Source testing shall be conducted on the exhaust stacks of four (4) different kilns and afterburners for each raw material type, creosote treated railroad ties and untreated lumber, for a total of eight (8) different kilns and afterburners that have not been previously tested.</p> <p>Testing within 90 days of startup for each raw material type to verify emission factors and confirm the operating temps of the afterburners</p> <p style="text-align: center;">Submit Test Report within 30 days after testing completed along with permit modification application to incorporate afterburner operating temperature into permit. 15 day notice of testing</p>
Subsequent Testing Requirement Ad-Hoc 15A NCAC 02D .0605	Biochar Kilns ES-1	<p style="text-align: center;">Subsequent Testing Requirements</p> <p>Test for PM, NOx, CO, VOC, Visible Emissions (VE), and HAPs/TAPs emitted.</p> <p>Source testing shall be conducted on the exhaust stacks of four (4) different kilns and afterburners for each raw material type, creosote treated railroad ties and untreated lumber, for a total of eight (8) different kilns and afterburners that have not been previously tested.</p> <p>Subsequent testing within no more than 13 months after the previous performance test to verify emission factors and confirm or reestablish operating temps of the afterburners</p> <p>Submit Test Report within 30 days after testing completed.</p> <p>May request change in frequency of testing after 3 consecutive annual tests showing that emission factors for that given pollutant are less than or equal to the emission factor as submitted in the permit application.</p>
15A NCAC 02D .0611	Afterburners CD-1	<p style="text-align: center;">Afterburner Requirements</p> <p>Maintain minimum combustion zone operating temperature (rolling average over 3 hours) established during initial source testing</p> <p>Continuously record rolling 3-hour combustion zone operating temperature(s)</p> <p style="text-align: center;">Annual internal I&M and calibration of instrumentation, Recordkeeping I&M per manufacturer's recommendations</p>
15A NCAC 02D .1806	Facility-wide	Odor Requirement
15A NCAC 02Q .0309	Facility-wide	Written Startup Notification within 15 days after startup of process.

Regulation	Affected Sources	Emission Limit or Requirement
15A NCAC 02Q .0315 Synthetic Minor	Facility-wide	NOx < 100 TPY CO < 100 TPY VOC < 100 TPY Operations/Restrictions: No more than 58,400 kilns will process biochar in the kilns per 12 consecutive months. No more than 58,400 tons of raw material will be processed in the kilns per 12 consecutive months. The Permittee shall perform inspections and maintenance per the requirements of 15A NCAC 2D .0611 "Afterburner Requirements." Recordkeeping (record monthly and total annually): Number of kiln operations per month on each type of raw material. The amounts of each raw material processed per month, in tons. Semi-Annual Reporting (12-month rolling totals): Number of kiln operations on each type of raw material. The amounts of each raw material processed, in tons. Emissions of NOx, CO and VOC, in tons.
15A NCAC 02Q .0317	Facility-wide	PSD Avoidance NOx < 250 tons per consecutive 12-month period VOC < 250 tons per consecutive 12-month period Comply by meeting the requirements of the Synthetic Minor limitations
15A NCAC 02Q .0711	Facility-wide	Toxics Emissions exceeding TPERs requires permitting

10. Conclusions, Comments, and Recommendations:

I recommend that air permit 10636R00 be issued to International Tie Disposal, LLC - Project Tie.

- The following modifications have been made to IBEAM Permit Writer:
 - ✓ Adjusted column widths, bolded and shaded to improve appearance.
 - ✓ In the cover letter, added a note to indicate that source testing is required to be conducted no later than 90 days after startup of the biochar production processes.
 - ✓ In the cover letter, added a note to indicate that subsequent source testing is required to be conducted no more than 12 months after the previous performance test.
 - ✓ In the cover letter, added a note to indicate that a startup notification is required within 15 days after startup of the biochar production processes.
 - ✓ Added a stipulation that addresses equipment labeling as follows:
“EQUIPMENT LABELING - All on-site permitted equipment shall be labeled with the emission source ID number listed in the Emission Source Table of this permit and a numerical sequence number that differentiates each biochar kiln from the others onsite and

each afterburner from the others onsite. This shall be completed upon startup of the sources and control devices.”

- ✓ Added Ad-Hoc condition for initial source testing of Biochar Kilns to include testing for PM (Filterable and Condensable Particulate Matter), NO_x, CO, VOC, Methanol, HAP/TAP and visible emissions.
- ✓ Added Ad-Hoc condition for subsequent source testing of Biochar Kilns to include testing for PM (Filterable and Condensable Particulate Matter), NO_x, CO, VOC, Methanol, HAP/TAP and visible emissions.
- ✓ Changed the title of 15A NCAC 02D .0611 Stipulation from “Thermal Oxidizer Requirements” to read “Afterburner Requirements.”
 - ✓ Removed the text, “of each primary heat exchanger and associated inlet/outlet valves to ensure structural integrity.” from the 15A NCAC 02D .0611 Thermal Oxidizer stipulation.
- ✓ Deleted the sentence in the 02Q 0309 Startup Notification condition that states that “...*Any existing equipment being replaced is permitted to operate in compliance until the replacement equipment is operational...*”
- ✓ In the 2Q .0317 PSD Avoidance permit condition, changed “Operations Restrictions” subsection to read “Operations Restrictions, Recordkeeping Requirements, and Reporting Requirements”.

Review Engineer: _____ Date: _____

Permit Coordinator: _____ Date: _____

AQ Supervisor: _____ Date: _____

\jdc

cc: FRO Files