



Industrial User Facility Inspection Report U.S. EPA, Region 8

Name of industry and location:

TTM Technologies
8192 Southpark Lane
Littleton, CO 80120

Mailing Address:

10570 Bradford Road
Littleton, CO 80127

Control Authority / NPDES Permit No.

South Platte Renew (SPR)
NPDES Permit No. CO-0032999

IU – NPDES ID

COPIU0029

Date of visit:

June 26, 2025

Approximate Time of visit:

0930 - 1200

Name(s) / Affiliation / email of inspector(s):U.S. EPA:

Al Garcia, garcia.al@epa.gov

SPR:

- Maureen Mulcahy mmulcahy@englewoodco.gov
- Jon Bridges jbridges@englewoodco.gov
- Heather Hurtado hhurtado@englewoodco.gov
- Emma Hebert ehbert@englewoodco.gov

General Facility Information:Representatives at Inspection:

- Craig Washburn – Sr Manager – EHS/Security/Sustainability, craig.washburn@ttmtech.com
- Lisa Reinartsen – Sr Manager-EHS/Security/Sustainability, lisa.reinartsen@ttmtech.com
- Robert Parrish – EHS Regional Manager, robert.parrish@ttmtech.com
- Brain Santos – EHS Director
- Kevin Youngberg – EHS Superintendent <mailto:Hollmann.mattew@dystar.com>

Type of Business Operations:

- Printed Circuit Board Manufacturing

Facility Information:

- 120 employees
- Production: five days/week, (Monday through Friday) – three 8-hour shifts
- Maintenance/Cleaning: Saturday and Sunday – day shift.

Inspection Description:

Al Garcia from the U.S. Environmental Protection Agency (EPA) and Maureen Mulcahy, Jon Bridges, Heather

Hurtado, and Emma Hebert from SPR conducted a significant industrial user (SIU) inspection of the TTM Technologies facility (facility) located at 8192 Southpark Lane, Littleton, CO 80120. The SIU inspection was conducted as part of the EPA Pretreatment Audit of the SPR's Publicly Owned Treatment Works (POTW) and EPA-approved Pretreatment Program. The inspection of the facility provides current conditions of the facility's unit operations and consisted of an evaluation of the waste streams generated from the unit operations and management of these waste streams, including potential for spills and slug discharges. The facility discharges process wastewater from the printed circuit board manufacturing to the sewer collection system leading to the SPR's POTW.

Upon arriving at the facility on June 26, 2025, at approximately 0930, Al Garcia of the EPA presented credentials to the facility representatives and explained the purpose of the inspection. During the opening interview, the facility representatives provided an overview of the operations and processes at the facility, waste streams generated, and the management/discharge of these waste streams. The opening interview was followed by a facility tour to visually inspect the unit operations. The EPA conducted a closing conference to discuss potential findings and recommendations identified during the inspection.

Process Description:

The facility, located at 8192 Southpark Lane, Littleton, CO 80120, manufactures printed circuit boards, per customer specifications. The facility has 120 employees and operates 24 hours per day Monday through Friday in three 8-hour shifts and one day shift on Saturday and Sunday for maintenance and cleaning. The Google Maps view of the facility is shown in Figure 1.



Figure 1 – TTM Technologies - Google Maps View

Chemical and Raw Materials Storage –

The facility receives the raw materials and chemicals in the receiving/shipping dock located on the northwest corner of the building. The majority of the chemicals are received in 55-gallon drums and are transported by dolly into the three chemical storage bays (acid/caustic-base/oxidizers).

- Sulfuric acid
- Nitric acid
- Copper sulfate
- Isopropyl alcohol, acetone
- Sodium hydroxide
- Toluene agents – used in solder mask dry process and in 5-gallon containers
- Solder mask
- Photo resist and resist stripper
- Oxidizer agents
- Copper-clad fiberglass boards

The facility transfers the chemical supply from the chemical storage bays with an electric hand pump into small transfer containers to the process lines, as needed. Each chemical storage bay is equipped with a containment trench to collect spills and determines management of these spills according to the slug discharge control plan.

Printed Circuit Board Manufacturing:

The copper-clad fiberglass boards are sent to the preclean line consisting of five tanks to remove dirt, oxide layers and metallic residues that may be on the boards. The rinsewaters from this process are sent to the ion-exchange treatment system and the chemical baths when spent, are managed and treated according to a slug discharge control plan approved by SPR.

The cleaned boards are imaged using laser direct imaging process. A lamination photoresist is applied on a board and the image is laser printed onto the board. The laser printed board is sent to the Develop Etch and Strip line to be etched in a 3-stage (tanks) system using hydrochloric acid and sodium chloride to remove the unexposed photoresist and stripped to remove the remaining copper. The boards are then sent to the 6-stage oxide line to remove the copper oxide and then to the electroless copper line. The electroless copper line consists of 32-tanks to deposit copper on the boards. The boards are then sent to the automated copper plating line consisting of up to 16 stages, including three copper sulfate tanks to electrolytically plate copper. The boards then may be sent to the 6-stage manual copper dip process line. Note: depending on customer specifications, the boards may be sent through the plating processes again. The completed boards are sent to the oxide line, laminated, layered, and mechanically drilled. The layered boards are then sent back to the wet cleaning and plating processes.

The plated boards are then cleaned in preparation for the finishing processes for oxidation protection:

- Hot air solder leveler (HASL) used to deposit molten solder (tin/lead alloy) on the board. Excess solder is removed and levelled on the board using hot air knives.
- Reflow – similar to HASL, except the solder flux is plated on the boards using a hot oil immersion bath.
- Nickel/gold plating
 - Electrolytic hard gold plating – 13-stages using cyanide baths
 - Electroless nickel electroless palladium immersion gold (ENEPIG) plating
 - The cyanide baths on both lines are monitored for cyanide limits under the metal finishing Pretreatment Standards for New Sources found in 40 C.F.R §433.17

The boards are sent to the drill and rout department and a solder mask protective coating is applied and a silk screen is applied over the solder mask. The solids, rags and waste masks from the silk-screening process is

hauled off-site by Clean Harbors. The screens are pressure washed after use and the wastewater is sent to the non-metals waste treatment. The boards are then routed, inspected/tested for quality control, packaged and shipped to the customer.

The facility sends the city supply water through a reverse osmosis (RO) treatment system to generate RO water for process use. The reject water generated from the RO treatment is discharged directly to the SPR sanitary sewer. Floor washdowns are conducted using mops and buckets. The floor washdown water is sent to satellite accumulation areas and sent to waste treatment.

Wastewater Management:

Metal Bearing Wastewater Treatment –

The metal-bearing wastewaters generated from the wet processing lines are piped from the process lines to the influent sump and are pumped to a series of three tanks for pH adjustment (using primarily sodium hydroxide). The pH-adjusted wastewater is sent through a mixed media filter (gravel-sand pit) and then to a bag filter for preliminary treatment. The filtered wastewater is then pumped through a series of three ion-exchange filters to remove metals through cation reactions. The ion-exchange canisters are regenerated about every two weeks using hydrochloric acid. The ion-exchange regeneration waste is sent to the facility's batch treatment system.

The wastewater from the ion-exchange canisters is pH adjusted and pumped to the effluent tank for final pH adjustment.

Non-Metal bearing Wastewater Treatment –

The non-metal bearing rinsewaters are sent to an effluent sump within the waste treatment area and then pumped to the effluent tank where it joins the treated metals-bearing wastewater for final pH adjustment to pH setpoints of 7.5 to 10.0. The wastewater in the final pH adjustment tank (effluent tank) is neutralized using either sulfuric acid or sodium hydroxide. The discharge valve from this tank is shut off unless the pH setpoints are achieved, prior to discharge. The wastewater in the final effluent tank discharges about 500 gallons every 15 minutes with each batch discharge lasting about 4 minutes.

Batch Wastewater Treatment –

The facility has six batch storage tanks that receives wastewater from the wet processing line that requires flocculation and precipitation for treatment. The batch tanks are pH adjusted to a pH of 9.5. Flocculant is added to aid in precipitation. The precipitated solids settle to the bottom of the tank, are collected and sent to the filter press. The filter press generates about 1 cubic yard of RCRA characteristic F006 filter cake per week. The facility hauls off about four to six supersacks every 3-4 weeks to World Resources Center. The centrate from the filter press is sent back to the effluent sump, where it mixes with the non-metal bearing wastewater for further pH adjustment.

EPA Classification of the Industrial User

Based on observations and information received during the inspection, the facility is a printed circuit board manufacturer categorized as subject to the Metal Finishing Pretreatment Standards for New Sources (PSNS) found in 40 C.F.R. § 433.17 and the standards and conditions found in Title 7, Chapter 5, Division 25 of the Littleton Pretreatment Ordinance.

Summary of Findings

TTM Technologies
NPDES ID# COPIU0029
June 26, 2025

Pretreatment Inspection Findings	Follow up Action Items
No corrective action items identified.	No corrective action items identified.

Report Review and Signature		
Drafter Name	Address/Phone Number	Date
Al Garcia	U.S. EPA Region 8 1595 Wynkoop Street 8WD-CWW Denver, Colorado 80202 303-312-6382	07/02/2025
Reviewer Name	Address/Phone Number	Date
Stephanie Passarelli	U.S. EPA Region 8 1595 Wynkoop Street 8ENF-W-NP Denver, Colorado 80202 303-312-6803	7/8/25
Supervisor Signature/Name	Address/Phone Number	Date
	U.S. EPA Region 8 1595 Wynkoop Street 8WD-CWW Denver, Colorado 80202	07/09/2025
Michael Boeglin	303-312-6250	