NPDES Inspection Report – Industrial User

Name of industry and location:	Control authority / Permit No. / Facility ID:
Microchip Technology, Inc. 1150 E Cheyenne Mountain Blvd Colorado Springs, CO 80906	Colorado Springs Utilities Permit No. SIUEC - 0080 NPDES ID: COPIU005B Inspection ID: 202507_COPIU005B NAICS Code: 334413 – Semiconductor and Related Device Manufacturing Latitude: 38.789051˚N, Longitude: -104.806197˚W
Date of visit:	**Time of visit:**
July 16, 2025	8:00 a.m. – 11:30 a.m.

Name(s) / Affiliation of inspector(s):

[redacted] / U.S. Environmental Protection Agency, Region 8
[redacted] / U.S. Environmental Protection Agency, Region 8
[redacted] / U.S. Environmental Protection Agency, Region 8
[redacted] / Environmental Section Supervisor / Colorado Springs Utilities
[redacted] / Environmental Specialist / Colorado Springs Utilities (Lead)

Name / Title / Affiliation:

[redacted] / Facility Manager / Microchip Technology, Inc.
[redacted] / Environmental Engineer / Microchip Technology, Inc.
[redacted] / Principal Engineer / Microchip Technology, Inc.
[redacted] / Facilities Technician / Microchip Technology, Inc.

Report Review and Signature		
Drafter Name	Address/Phone Number	Date
	U.S. EPA Region 8 **1595 Wynkoop Street** **8ECA-W-NW** **Denver, Colorado 80202**	**09/12/25**
[redacted]	[redacted]	
Reviewer Name	Address/Phone Number	Date
	U.S. EPA Region 8 **1595 Wynkoop Street** **8ECA-W-NW** **Denver, Colorado 80202**	**08/28/25**
[redacted]	[redacted]	
Supervisor Signature/Name	Address/Phone Number	Date
	U.S. EPA Region 8 **1595 Wynkoop Street** **8ECA-W-NW** **Denver, Colorado 80202**	**09/11/2025**
[redacted]	[redacted]	

Inspection Description:

On July 16, 2025, U.S. Environmental Protection Agency (EPA) inspectors [redacted], and [redacted] (jointly referred to as “EPA inspectors”) and the City of Colorado Springs Utilities (CSU) inspectors [redacted] and [redacted], conducted an industrial user inspection of Microchip Technology, Inc. (“Microchip” or “facility”), in Colorado Springs, Colorado, as part of a pretreatment compliance inspection (PCI) of the CSU. The CSU had identified Microchip as a categorical Significant Industrial User (SIU) permitted to discharge to the CSU’s sanitary sewer system under Permit Number SIUEC - 0080 (Permit). The inspection was announced. The inspection was conducted to evaluate the CSU’s inspection procedures as part of the PCI. [redacted] led the inspection, and the EPA inspectors observed the inspection and asked clarifying questions as necessary.

Upon arriving to the facility at approximately 8:00 a.m., the CSU introduced the inspectors to Microchip’s Facility Manager, [redacted] as well as their Principal Engineer, [redacted], Environmental Engineer, [redacted], and Facilities Technician, [redacted]. The EPA inspectors began the opening conference by presenting their credentials. The inspectors then explained the general purpose and procedures of the inspection. During the opening conference, [redacted] and [redacted] provided an overview of the Facility’s operations, focusing on the processes that generate wastewater.

Following the opening conference, [redacted], and [redacted] accompanied the inspectors on a facility walkthrough, beginning with the fabrication area where the microchip manufacturing process was observed through glass windows. The walkthrough continued to the chemical room, where active chemicals are fed into the production area, and the chemical storage area, where unused chemicals are maintained (Photos #1–3). The group then proceeded to the loading dock area, where materials are received and shipped (Photos #4–6). A storm drain was noted in this area, but facility representatives confirmed it is self-contained. Inspectors returned to the chemical room to evaluate hazardous waste storage and the storage rooms for acids, bases, and solvents (Photos #8–10).

Next, the walkthrough moved to the wastewater treatment system in Building 5, where inspectors observed the fluoride neutralization tanks (Photo #12), acid neutralization tanks (Photo #13), Outfalls 002 and 003 (Photos #14 and 15), the facility’s Foxboro monitoring system (Photo #16), and the reverse osmosis (RO) system (Photo #17). The inspection proceeded to the 90-day hazardous materials storage area (Photo #18). Facility representatives explained that this building is locked during the day and includes sign-in sheets and accumulation logs to document materials dropped off, detailing type and quantity. Manifests record any waste removed, with facility representatives verifying all waste prior to disposal. A drain in the storage area collects spills, directing them to a self-contained pit outside that is hauled off-site.

Inspectors then observed the facility’s 7,000-gallon solvent tank, equipped with leak detection to alert the facility of any leaks. Veolia is contracted to remove approximately 3,000 gallons of waste solvent every 90 days (Photo #19). The walkthrough concluded in Building 4, where the metal treatment system was inspected. A self-contained pit was observed in Building 4 and facility representatives stated that any spills would be pumped out and directed through the treatment system (Photo #25). In Building 4, process wastewater first passes through metals rinse tanks and a nano filter (Photos #21 and 23). Once optimal conductivity is reached, water transfers to metals concentrate tank 1, then conical tanks 1 and 2. The supernatant moves to metals product tanks 4 and 5, then tank 1 for pH neutralization. Solids from conical tanks 1 and 2 are directed to the filter press, filtered, and shipped as non-hazardous waste (Photo #22). Remaining wastewater undergoes pH neutralization and fluoride complexation for reprocessing. Finally, Outfall 001 was observed, equipped with continuous pH and fluoride monitors (Photo #24).

The inspectors conducted a closing conference with [redacted], and [redacted] and provided general observations and from the inspection. The EPA and CSU representatives left the Facility at approximately 11:30 a.m.

1. What does this industry produce?

Microchip specializes in designing, developing, manufacturing, and marketing a diverse array of semiconductor integrated circuits for applications in computers, telecommunications, industrial control and instrumentation, and consumer electronics. Their products cater to a broad spectrum of industries, including industrial, automotive, consumer, aerospace and defense, communications, and computing.

2. How is the industry classified by the POTW?

Microchip performs process operations associated with the manufacture of semiconductors and is therefore classified as a categorical Significant Industrial User subject to the National General Pretreatment Regulations under 40 CFR Part 403 and the Electrical and Electronic Components Point Source Category under 40 CFR Part 469 Subpart A § 469.18 (a) and (b). Under this classification, Microchip is subject to the pretreatment standards for new sources and the local limits.

3. Have there been any significant changes in processes or flow?

There have not been any significant changes since CSU's last inspection in 2024. Production has decreased, but not more than 25%.

4. What raw materials are used?

The semiconductor manufacturing process is complex and requires a variety of raw materials, each stage demanding specific materials and technologies to achieve optimal results. Essential raw materials include silicon, photoresists, and various gases and chemicals such as nitrogen, hydrogen, ammonia, hydrofluoric acid, and sulfuric acid. Metals like aluminum and copper, insulating materials such as silicon dioxide and silicon nitride, along with various polymers and plastics, are also crucial to the process.

5. What processes are used to make the product(s)? Indicate any wastes generated and destination of wastes.

The production of semiconductor devices involves seven key manufacturing disciplines: Electroplating/Deposition, Diffusion, Thin Films, Photo, Etch, Chemical Mechanical Polishing (CMP), and Implant. Each product requires specific operations or chemical recipes within these disciplines.

The semiconductor fabrication process begins with a silicon wafer. The first step is deposition, where thin films of conductive, insulating, or semiconducting materials are applied to the wafer, establishing the initial layer for printing. Next, new wafers are cleaned and prepared for diffusion, involving oxide growth to protect the silicon substrate and ensure uniform oxide layering. The wafers are then cleaned again and proceed to the photo step, where a uniform layer of photoresist is applied. This layer is exposed to UV light, which modifies the photoresist and prints an image of the next layer onto the wafer. Depending on whether the photoresist is positive or negative, it is then washed off.

Subsequent processes include etching, implantation, or thin films, depending on the wafer's position in the production cycle. Etching removes exposed silicon dioxide, enabling doping in the implant step or laying a thin film in the etched silicon. During implantation, wafers are subjected to gases and an implant beam, inserting gas atoms into the silicon to modify its conductivity.

These steps are repeated in various sequences to complete the wafer. The CMP process employs a mechanical polisher with a chemical buffer to smooth the wafer surface, ensuring high-quality printing during the photo exposure step. This process is crucial for manufacturing wafers with geometries below 0.35 microns.

6. Where is water used and what is the source of the water (city, well, river, etc.)?

City water is treated with Reverse Osmosis (RO) and utilized in the Recovery RO Unit (Photo #17). Reject water is collected in a holding tank and then sent to a central unit for reclamation. Subsequently, RO water undergoes deionization and is reused in various processes, including diffusion, photo, etch, and wafer scrubbing.

7. Describe the processes which discharge wastewater.

Microchip discharges an average of 800,000 gallons per day of process wastewater from semiconductor fabrication facilities located in Buildings 2, 3, 4, and 5, which are managed through two wastewater treatment plants. The computer chip manufacturing processes at Microchip operate 24 hours a day, seven days a week. The majority of the discharged wastewater consists of deionized water used for rinsing semiconductor wafers after etching and coating chemical processes. Wastewater from these processes undergoes fluoride complexation, metals treatment, and pH adjustment before discharge to the sewer system.

Additionally, the facility rinses chemical totes and drums onsite. Totes and drums are RCRA triple-rinsed in the chemical storage area (Photo #3), with wastewater discharged into a trench flowing to wastewater treatment. Rinsed drums awaiting pickup for recycling are stored in a bermed area outside the loading dock (Photo #6), while rinsed totes are cut down and recycled (Photo #7).

8. Describe the sample location. Are the CA and industry using the same location?

Samples are collected from Outfalls 001, 002, and 003. Outfalls 001 and 002 are continuously monitored for pH and fluoride (Photos #24 and 14). Sampling for Outfall 003 is conducted from the top of the tank, where a hatch is used to collect grab samples. Samplers access the sample port via a ladder (Photo #15).

9. Describe the treatment system in place.

Microchip operates two wastewater treatment facilities to manage effluent from its semiconductor manufacturing operations. The first plant, located in Building 4, processes wastewater from Buildings 1, 2, 3, and 4, while the second plant in Building 5 handles waste exclusively from Building 5 operations.

Each production facility has segregated drainage systems to separately collect acids, bases, and solvents. The pretreatment system for semiconductor fabrication incorporates three treatment processes: elementary pH neutralization, fluoride complexation, and metals treatment (not applicable to Building 5).

The Building 4 facility operates dual processing systems: one for Building 4 fabrication wastewater and another for combined effluent from Buildings 1, 2, and 3. The treatment system comprises eight tanks dedicated to pH neutralization, fluoride complexation, and batch metals treatment, including:

- Six 5,000-gallon tanks for chemical waste neutralization
- One 4,500-gallon calcium chloride holding tank
- One 6,000-gallon metals treatment tank

The metals treatment system uses polymer binding agents in a batch discharge process, handling approximately 4,000 gallons per batch twice monthly (Photo #21). Solids are filtered and shipped off as non-hazardous waste (Photo #22). Remaining wastewater undergoes pH neutralization and fluoride complexation for reprocessing.

Building 4 also houses three tanks for cyanide destruction, decommissioned since 2023. Electroplating involves silver cyanide treatment, currently inactive but available for future use.

The metals wastewater from Building 4 fabrication processes first enters metal rinse tanks 2 and 3, then passes through a nano filter. Once optimal conductivity is achieved, the water is transferred to metals concentrate tank 1, followed by conical tanks 1 and 2. The supernatant then moves to metals product tanks 4 and 5, before reaching tank 1 for pH neutralization. Solids from conical tanks 1 and 2 are directed to the filter press. Nonmetals from Building 4 fabrication processes proceed to tank 1 for pH neutralization, then sequentially through tanks 2, 3, 4, and 5, before being discharged to the flume. Wastewater from Buildings 1, 2, and 3 follows a similar path through pH neutralization and tanks 2, 3, 4, and 5, ending at the flume. Retention time between each tank ranges from 10 to 20 minutes, depending on flow rate.

The waste treatment system in Building 5 consists of two distinct processes: acid waste and fluoride waste. It includes three 3,000-gallon tanks for fluoride treatment and three 6,000-gallon tanks for chemical waste neutralization. Hydrofluoric (HF) waste flows sequentially through HF Tanks 1, 2, and 3, followed by acid waste neutralization (AWN) Tanks 1, 2, and 3, before being discharged through the flume. Acid waste similarly passes through AWN Tanks 1, 2, and 3, then exits via the flume. Retention times vary between 20-30 minutes for HF waste and 10-20 minutes for acid waste, depending on the flow rate.

Calcium chloride is used for fluoride complexation of fluoride ions. For pH adjustment, magnesium hydroxide, sodium hydroxide, and sulfuric acid are used, which is essential for neutralizing the various acid wastes generated during computer chip manufacturing. The metals stream is treated in batches using a nano filtration system, a coagulation system, or both (Photo #23). Effluent pH and fluoride concentrations are continuously monitored and controlled by computer systems. Microchip maintains detailed computerized records of flow, pH, and fluoride concentrations using Foxboro computer systems (Photo #16).

10. What chemicals are maintained at the facility? How are they stored? Is adequate spill prevention in place?

Chemicals for acid and fluoride waste neutralization are maintained onsite. Those not in use are stored in a dedicated room above a self-contained pit (Photo #1), with separate rooms for acids, bases, and solvents (Photos #9 and 10). In the event of a spill, chemicals in Building 4 would be pumped out and disposed of, while spills in Building 5 would be directed to acid waste neutralization, entering the treatment train.

Acids and bases are brought into the production room as required, automatically fed onto the production floor after achieving the correct dilutions and concentrations. Solvents are similarly distributed, pumped to overhead lines and gravity-fed throughout the system. Weekly inspections ensure there are no leaks. Active chemicals were observed near a floor drain leading to wastewater treatment (Photo #2), with spill kits readily available. During the inspection, hazardous chemicals were stored in a hazardous storage cabinet in Building 5 (Photo #8), with a drain leading to the solvent tank. Storage and management of hazardous materials are detailed in the facility's Toxic Organic Management Plan (TOMP). Active chemicals are stored in tanks within secondary containment (Photo #11).

11. Are any hazardous wastes stored or discharged?

Yes, hazardous waste is generated in fabrication and engineering operations. The facility stores hazardous waste in a 90-day storage area for hazardous waste, which is manually checked and doesn't lead anywhere (Photo #18). The building is locked, and sign-in sheets and accumulation logs are maintained to document any materials that are dropped off in the area, including the type of material and the quantity. Any spills would drain into a self-contained pit.

Additionally, the facility has two solvent storage containers onsite. The first is a 500-gallon tank located in the Bulk Chemical Distribution Area, which collects solvent waste from the Building 5 process through a sealed piping system. This tank is within secondary containment, and when full, the solvent is transferred to the main solvent tank in Building 2. The main tank is a 7,000-gallon self-contained pit equipped with leak detection technology. Typically, the facility disposes of waste solvent every 90 days, with approximately 3,000 gallons hauled offsite by a third-party contractor, Veolia (Photo #19).

FINDINGS AND CORRECTIVE ACTIONS

There were no findings or corrective actions identified during the inspection. No response from Microchip to the EPA is requested at this time.