HAZARDOUS WASTE SECTION - COMPLIANCE BRANCH
FILE TRANSMITTAL & DATA ENTRY FORM

Your Name: Phil Orozco

Facility ID Number: NCD981014749

Facility Name: Cree Durham

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County (if not on report): DURHAM

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WASTE MANAGEMENT
HAZARDOUS WASTE SECTION

COMPLIANCE EVALUATION INSPECTION (CEI) REPORT

1. FACILITY INFORMATION:

Name:	Cree Durham
EPA ID Number:	**NCD981014749**
Type of Facility:	Large Quantity Generator (LQG)
Facility Location:	4600 Silicon Drive Durham, NC 27703
Telephone Number:	919-407-4412

2. FACILITY CONTACT(S): Robin Housh, Environmental Engineer, Environmental Health & Safety (EHS); 919-407-6103 Robin_Housh@cree.com

3. SURVEY PARTICIPANTS:
Robin Housh;
Donna Lazzari – Manager, EHS III (919-407-6101; cell: 910-547-8583);
Thomas Graham – EHS Technician II;
Phillip G. Orozco – Environmental Senior Specialist, NCDEQ – Hazardous Waste Section, Inspector.

4. DATE OF INSPECTION: **February 18, 2016** [10:00 – 13:00]

5. PURPOSE OF INSPECTION: An un-announced on-site inspection was conducted to evaluate the facility's compliance with the hazardous waste management regulations as described at Chapter 40 of the Code of Federal Regulations, (40 CFR) Parts 260-270, 273 and 279; and, Title 15A Chapter 13 of the North Carolina Administrative Code (NCAC). Previous CEIs were conducted on March 11, 2014, October 12, 2011, September 29, 2011, and September 17, 2010.

6. FACILITY DESCRIPTION:
Cree, Inc. develops, manufactures and markets semiconductor materials and electronic devices made from silicon carbide (SiC) and gallium nitride (GaN). The facility produces compound semiconductors such as blue and green light-emitting diodes (LEDs) for use in automotive and cellular backlighting; full color indoor and outdoor displays; indicator- lamps, and other lighting applications. Cree also manufactures and sells SiC wafers used in research of optoelectronics (DVD optical storage systems research & CD-ROM), microwaves, power device application (high efficiency SiC power rectifiers), and certain gemstones applications. The manufacturing processes include Crystal Growth (the facility grows their own crystals), Wafering (the crystal is cut in thin wafers), Wafer Polishing, Epitaxy (where the wafers are edged to provide the required characteristics) and Fabrication (LEDs and Microwave). Hazardous waste (HW) is generated primarily from the wafering and polishing processes.
Since the last inspection, my contacts James Dill and Randy Arnott have left the company.

GENERAL INFORMATION:
Cree- Durham Facility

- Legal owner of business: Cree, Inc.
- Legal owner of property: Cree, Inc.
- Square footage of occupied space : (TSD only)
- Acreage: 30.26 acres
- Operating shifts: 7 day/24 hour operation
- Number of employees: 2,126

- List of waste streams (**non-RCRA regulated waste**):
  Aqueous fluoride mixtures
  Acid & caustic contaminated wipes/rags
  Glycol/water mixtures
  Used oil, rags, filters
  Polishing slurries
  Silicon sludge
  NMP/water mixtures
  Gold etching solutions
- Areas inspected: Refer to report
- Water supply (municipal or well): municipal (City of Durham)
- NPDES Permit #NCG030433
- Municipal sewer/septic/on-site treatment facility: municipal (Durham County)
- # of on-site water wells : 3
- Groundwater monitoring wells on-site: Y or N (this pertains to any GW contamination currently existing on the property.) No
- Distance to closest off-site well (within 1-mile or unknown) : unknown
- Closest private residence : adjacent property on east side of Cree B-10

Names & Job Titles of those who are involved in HW (records, moving HW from SAA to storage, managing Universal Waste, Used oil, etc.):
Cree allows ~ 140 technicians & workers to move hazardous waste from the sub-fab areas to the central storage or wastewater treatment facility. This is a combined total for Cree's two sites. Those involved are:
EHS Technicians
EHS Engineers
Semiconductor Production Workers
Manufacturing Equipment Maintenance Technicians
Subfab Materials Technicians

7. HAZARDOUS WASTE STREAMS INCLUDE:
D001 (waste oils), D002 (hydrochloric acid, hydrofluoric acid, nitric acid, phosphoric acid, sodium hydroxide, potassium hydroxide), D003, D005, D007, D008, D009, D026
F003 (acetone, methanol, xylene); F005, F006

8. AREAS OF REVIEW AND INSPECTION:

- **Emergency Preparedness:** Arrangements with local authorities: regular tours at the facility with various fire departments in Durham County; contact with the local hospital and police departments. In July, 2012, Cree sent letters similar to those developed by the HW Section to the appropriate authorities in order to better document compliance with 40 CFR 265.37.

- **Contingency Plan (CP)** – A revised plan was sent out on 11/18/13. Requirements were discussed and reviewed. The emergency coordinator is Robin Housh.

- **Inspection Records** (tanks & container storage) – Inspection records for tanks and containers appeared to be in compliance.

- **Manifests / LDR** – Manifest and LDR records since the previous inspection appeared to be complete.

- **Training Records** –
  Thomas Graham completed RCRA training on 1/6/14, 1/5/15, 11/30/15;
  Donna Lazzari began her HW management responsibilities on 1/6/14 and was trained on 2/26/14, 3/10/15, 1/11/16;
  Robin Housh - began her HW management responsibilities on 6/15/15 and was trained on 7/21/15;
  Nathan Daigle, Director, EHS – began his HW management responsibilities on 1/28/13 and was last trained on 5/18/15 (*the 2014 training date was not noted by the inspector on the day of inspection*.)

- **Job Descriptions** – The records reviewed appeared to be in compliance.

- **Biennial Report –** *The 2015 report had not been submitted as of the day of inspection.*

- **Transporters:**
  Freehold Cartage Inc. NJD 054 126 164
  Hazmat Environmental Group, Inc. NYD980769947

- **TSD's:**
  Eastman Business Park NYD 980 592 497
  Rineco Chemical Industries ARD 981 057 870
  Envirite of Ohio OHD 980 568 992
  Clean Harbors El Dorado ARD 069 748 192
  DART Acquisitions, LLC NCD 121 700 777
  AERC Company, Inc. PAD 367 216 (used Lamps)

- S**atellite Accumulation Areas (SAAs):**
  WWR Building – Filter press located inside. F006 waste is immediately taken to the outside roll-off box after use of the press. Therefore, the container is managed as a satellite accumulation container and is not dated.

- **STORAGE AREAS:**
  Hazardous Waste Container Storage Areas (north and south main container storage)
  Universal Waste Storage area on north storage pad since 2010.
  Building 1 – outside
  Solvent tank #1 and back-up tote (hazardous waste, both 250-gal.)
  Wafer Clean Tank (D002 hazardous waste)

  Building 1 – sub-fab
  Column WC-1 Wafer Bond Remover Drums
  Column B-1 KOH tote
  Column B-1 Mixed Acid transfer tote (connected to acid tanks going to the elementary neutralization unit)

  Building 4 – outside
  Mixed acid tanks T-10 and T-11 (part of elementary neutralization unit which is considered to fall under the regulatory authority of the Clean Water Act and not the RCRA rules.)

  Building 5 – outside
  Solvent Tank #2 (hazardous waste)

  Building 5 – sub-fab
  ~~Sulfuric acid/phosphoric acid drum~~
  Nitric acid tote
  Ammonium Hydroxide tote

~~Mixed acid/fluoride tote (hazardous)~~
KOH tote
Hydrogen peroxide drum cabinet
Photo Resist drum cabinet
TMAH/355 drum cabinet
TMAH base tote

Building 8 – sub fab
Column D-32 Mixed Acid transfer tote (connected to acid tanks going to the elementary neutralization unit)
Non-hazardous glycol drum

Outside Storage Pads:
Hazardous Waste Main Container Storage Areas (North)
Universal waste is located in the covered storage area on the north road

WWR Building – outside –
Filter cake roll-off container (F006) labeled with a start date of 12/23/13.

- **External Condition of Facility:** No adverse conditions observed.

9. WASTE MINIMIZATION: A written plan is in place.

10. TANK REQUIREMENTS (Part 265 Subpart J):
The integrity of HW storage tanks is documented and certified by a Professional Engineer (P.E.) as required by the rules. David Tucker, P.E., of Edmundson Engineers certified all tanks. Certification dates are as follows: Acid tank – 6/13/04; Mixed Solvent tanks – 6/1/04; and the Clean Waste tank (T-35) on 5/22/07. Integrity reports in accordance with 40 CFR 265.192 were reviewed in past inspections and appeared to be in compliance.
Secondary Containment was designed, installed & operated to prevent possible migration of HW or liquid to the soil, groundwater or surface water in accordance with 40 CFR 265.193(b).
Ancillary equipment includes two pumps associated with the acid waste tanks. Both pumps have secondary containment. Aboveground piping is visually inspected for leaks on a daily basis.
Inspections of the tank system are conducted and documented each operating day as required by 40 CFR 265.195.

11. SUBPART BB and CC RULES:
Subpart BB and CC regulations apply to the following:
Building 1 (outside) - Solvent Waste Tank # 1 and Solvent Waste Back-up Tote;
Building 5 (outside) - Solvent Waste Tank # 2 and Solvent Waste Back-up Tote;
Building 10 (outside) - Solvent Waste drums.
Hazardous Waste Container Storage Area
DOT compliant containers are used as the control technology for all applicable 55-gallon containers and totes.

A waste determination with respect to the average volatile organic concentration of waste at the point of waste generation of the solvent waste was completed in accordance with 40 CFR 265.1084. Equipment subject to the BB Rules appeared to be appropriately marked and tagged with an identification number. A diagram indicating the location of this equipment is on file. A Subpart BB-CC manual including applicable records is maintained by Cree.

The required air monitoring testing is conducted by Thomas Graham. As required, Method 21 is used to calibrate the PID meter and a calibration log is maintained. Rather than choosing a quarterly or annual air

monitoring schedule, Cree monitors on a monthly basis to ensure requirements are met if any new valves or pumps are added to the tank systems or the system design changes.

12. SITE DEFICIENCIES:

None.

Phillip G. Orozco

Environmental Senior Specialist, NCDEQ

March 22, 2016