THE TOWN OF LYSANDER

Lysander Data Center Advisory Committee Meeting

November 6th, 2026

Other Pollution Concerns from the spreadsheet

• Generator Air Pollution		3.1
• Other Air Pollution	2.4	
• eWaste from the site		2.1
• Diesel Storage for generators	1.9	
• Spent fuel rods storage/transport	2.2	

Other Air Pollution

Other Air Pollution:

- In addition to air pollution from backup power systems, the following air pollution risks may exist (some are minimized when using a closed loop cooling system):
  - Solvents from routine cleaning and maintenance
  - PFAs from immersive coolant system leaks
  - Greenhouse gases from refrigerant leaks
  - VOC's from glycol off-gassing during maintenance or from leaks
  - Emissions from fire suppression systems
  - Particulate matter and off-gassing from e-waste handling

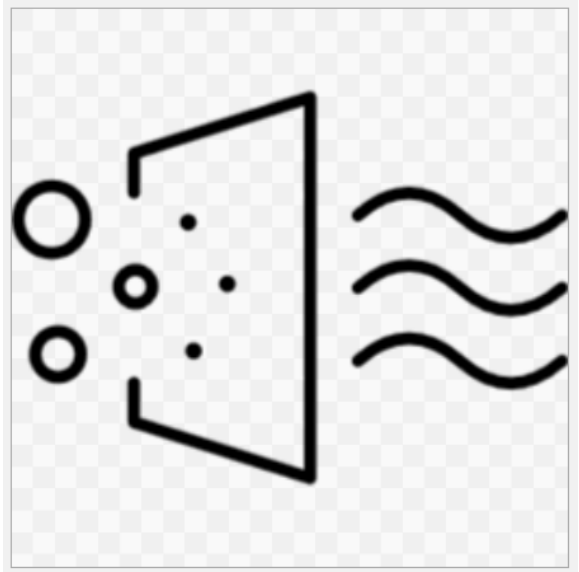


Image source: iconpacks.net

Other Air Pollution:

- Some of these are not unique to data centers:
- Solvents from routine cleaning and maintenance

  •This is a source of pollution that occurs at almost all industrial facilities, and anywhere cleaning agents are used.

  •Data centers actually produce far fewer of these emissions than other industrial users because they are not constantly cleaning food preparation surfaces or de-greasing parts, etc.

- Greenhouse gasses from refrigerant leaks

  •This is a potential source of pollution from any facility with air conditioning or refrigerators/freezers, including any industrial user with a fleet of air conditioned or refrigerated vehicles.

  •We currently have local industrial users with very large scale refrigeration operations.

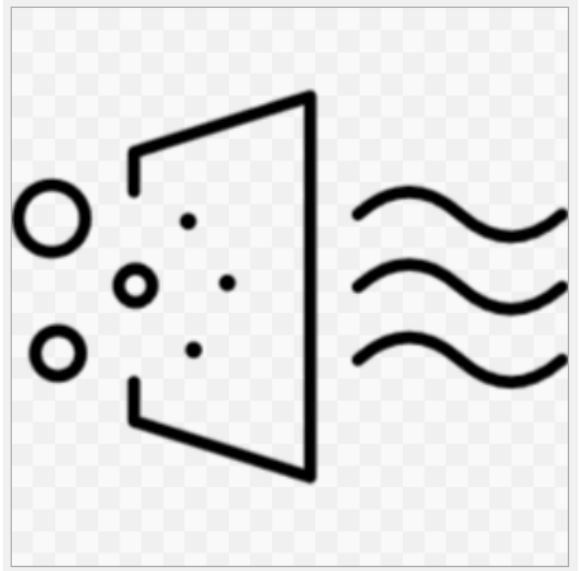


Image source: iconpacks.net

Other Air Pollution:

- Some of these are not unique to data centers (continued):
- VOC's from glycol off-gassing during maintenance or from leaks

  •Glycol based coolants are widely used in motorized vehicles and in large scale food and beverage processing

  •Multiple companies with large truck fleets, and large scale food processors already exist in our industrial zones using glycol based coolants

  •These companies routinely monitor for leaks and safely perform system maintenance including system flushes

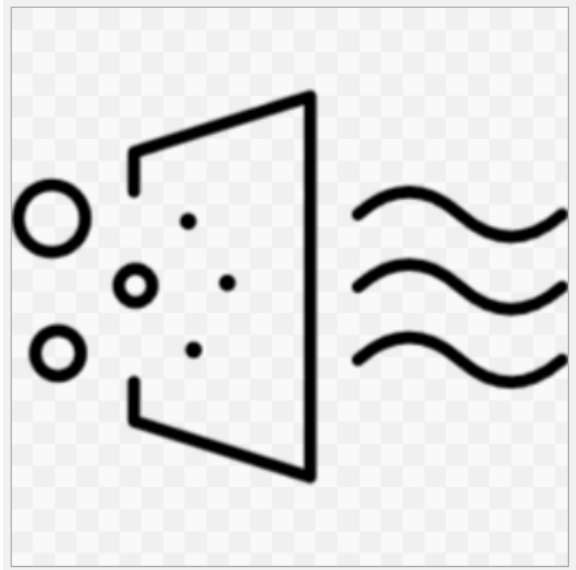


Image source: iconpacks.net

Other Air Pollution:

- While liquid spills can often be mitigated with secondary containment basins, the primary defense against air pollution from gas leaks is detection

  •Glycol based leaks are easily detected with chemical sensing cables and optical sensors designed specifically for glycol based solutions

  •PFA's and Refrigerant leaks are detected using infrared detecting systems

  •Infrared systems can detect micro leaks long before a pipe ever bursts

- Infrared gas detection systems

  •Different gases absorb infrared light at different rates

  •The system shines an infrared light across the air to be tested and measures how much light makes it through

  •The difference is the amount that was absorbed.



Image source: gdscorp.com

Other Air Pollution:

- Data Centers using air flow as their primary cooling technology require massive air flow
  - In the event of a leak, these systems cannot effectively filter exhaust air to remove pollutants because the filters would restrict airflow to the point it doesn't effectively cool the facility
  - They count on high air flow to dilute the pollutants to acceptable levels
  - We do not believe an air cooled system can be used for the proposed facility as air flow isn't efficient enough to remove the amount of heat generated
- Data Centers using immersion cooling technologies don't require the same air flow
  - These systems can, and should, use vent hoods to route exhaust air through special carbon filters to remove PFAs and HEPA filters to remove particulates
- Data Centers using liquid cooled (non-immersive) cooling still require significant air flow and may not be able to filter exhaust air

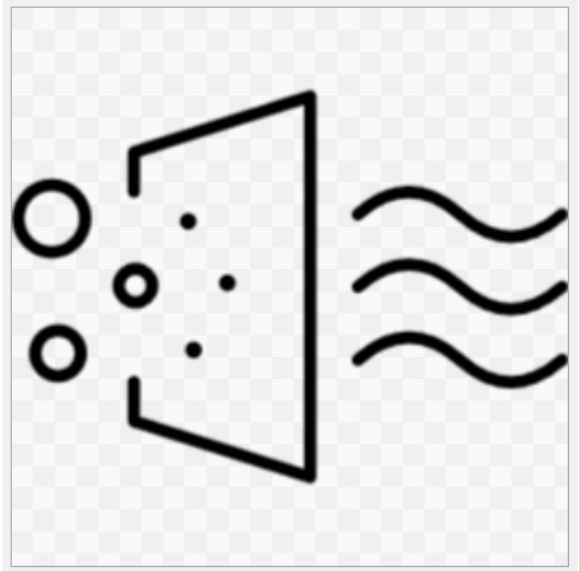


Image source: iconpacks.net

e-Waste

e-waste:

- **E-Waste handling: on-site vs off-site:**
  - Data Security drives the need for some on-site handling
    - Rather than sending customer data off-site, many data centers physically destroy hard drives and other memory capable devices (GPU's, SSD's, NVME, RAM, SD Cards,etc) locally
    - These are often shredded to ensure that data is destroyed
  - Off-site handling is a combination of reselling, re-using, and recycling of waste
    - Devices that contain no data and retain monetary value are resold
    - Devices that can be stripped for components are disassembled
    - Broken and shredded items are pulverized and smelted down for scrap

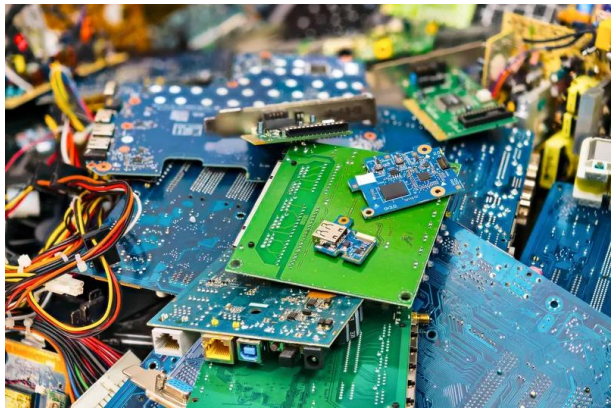


Image source: igrccooling.com

e-waste:

- Data Centers replace equipment every three to five years to keep up with the latest technology.
- As mentioned, they process some e-waste on-site due to data security concerns.
- Typically this is done by a specialized team or outsourced to a certified IT Asset Destruction (ITAD) contractor.
- The act of shredding these electronics can cause the following air pollution risks:
  - PM2.5 particulate matter, including heavy metals
  - Brominated Flame Retardants (BFRs)
    - Most modern electronics boards are coated with BFR's for fire prevention.
    - BFR's are persistent in the environment similar to the way PFAs are persistent
  - Fiberglass and Silica dust

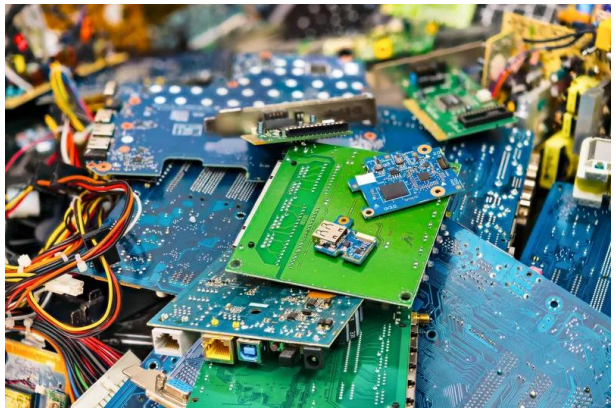


Image source: igrccooling.com

e-waste:

- **On-site e-waste pollution mitigation:**
  - The ITAD team typically shreds equipment in a dedicated negative pressure room
  - The negative pressure room ensures pollutants can’t escape through the doors or walls.
  - Specialized “source capture” hoods are installed directly above the shredding blades to capture particulates the instant they’re created.
  - The BFRs and particulates are passed through carbon and HEPA filters to remove them from the air
  - This filtered material is later handled by an off-site process

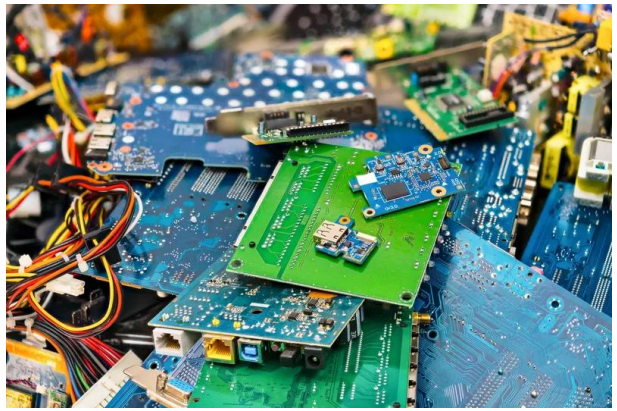


Image source: igrccooling.com

e-waste:

- **On-site e-waste pollution mitigation:**
  - Air quality in and immediately surrounding the negative pressure room are monitored to meet OSHA and EPA compliance respectively
    - Monitoring equipment must track lead, cadmium, and beryllium levels per OSHA standard.
    - Mercury is not present in modern data center electronics
    - PM2.5 and PM10 monitoring is required to ensure the HEPA filters are operating correctly

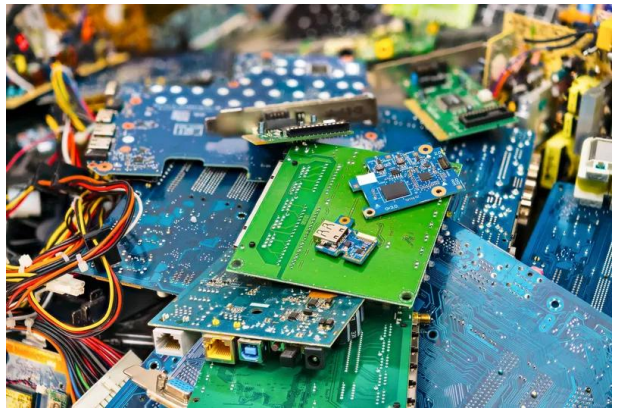


Image source: igrccooling.com

e-waste:

- ***An on-site risk:***

  - Some data centers outsource on-site e-waste processing to mobile shredding contractors

    - This is generally done to avoid the capital expense of building the dedicated negative pressure shredding room and to reduce the overall site footprint

    - They use mobile shredding trucks with less rigorous carbon and HEPA filtration

    - The heat generated by the shredders can build up in the confined truck space and accelerate the volatilization of toxic BFRs

    - There is often a dust plume that escapes when the technician opens the rolling door at the end of the operation

  - **Recommendation:** Require the developer to build a dedicated negative pressure shredding facility for any on-site e-waste processing

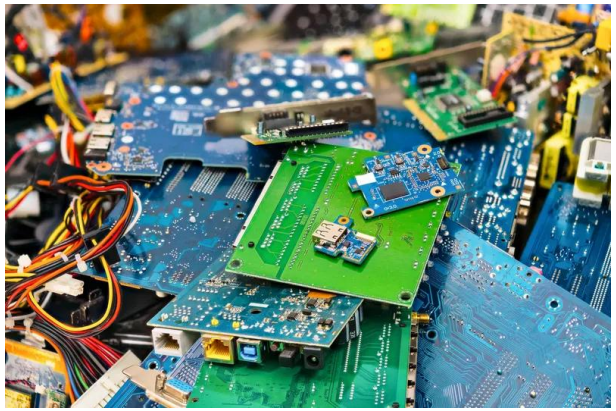


Image source: igrccooling.com

e-waste:

- **Off-site e-waste pollution mitigation:**

  - Rigorous Industry standards and certifications exist for the proper handling and disposal of data center e-waste by downstream processors.

    - R2v3 (Sustainable Electronics Recycling International)
    - e-Stewards (Basel Action Network)

  - Both standards require systematic documentation of the entire downstream chain, requiring serialized Certificates of Destruction or Diversion
  - Both standards require strict audits to prove compliance (The e-Stewards audit uses hidden GPS trackers to prove compliance)
  - R2v3 focuses on re-use first model, while e-Stewards relies on a strict tracking and containment approach



Image source: Smithsonian Magazine

e-waste:

- **Off-site e-waste pollution mitigation:**
  - Both standards put restrictions on what can be exported to developing nations
  - **Recommendation:** The data center must require one or both of these certifications from all downstream e-waste processors
    - *"Out of sight, out of mind" is not an acceptable solution for off-site e-waste*
    - *We have a moral obligation to ensure our e-waste doesn't become a burden for the people in other parts of the world.*



Image source: Smithsonian Magazine

Fire Supression Systems

Fire Suppression:

- **Emissions from fire suppression systems:**

  - Traditional water based fire suppression is not an option for data centers since water destroys electronics
  - Gas based systems that instantly extinguish fires and leave no residue have traditionally been the standard.
  - There have been a number of gas based systems with extreme environmental consequences
    - Halon – Bromine based and highly effective, but it is an extreme halocarbon that depletes the ozone layer
    - FM-200 is a hydrofluorocarbon . It does not deplete the ozone layer, but it traps heat in the environment and promotes global warming
    - Novec 1230 does not deplete ozone or increase global warming, but it breaks down in the atomosphere and rains down PFAs that permanently pollute the water table
  - The DEC determined that Novec 1230 was the source of drinking water well contamination after it was used to put out a 2023 battery energy storage facility fire in East Hampton, NY



Image source: Kord Fire Protection

Fire Suppression:

- **New Low Emission fire suppression systems:**
  - Inert Gas Systems (Inergen / IG-541 / IG-55)
    - Uses a pressurized mixture of naturally occurring gases already present in the air (nitrogen, argon, and carbon dioxide)
    - The idea is to add enough of this mix to the air in the room to reduce its overall oxygen concentration from 21% to 15%, the point at which a fire dies out.
    - Unlike the previous systems, this solution is relatively safe for people stuck in the room with the fire since people can survive in a 15% oxygen environment
    - Unfortunately, these gases can't be compressed to a liquid so they require a large footprint for tank storage (approx 3000, 140 Liter high pressure cylinders for a 270 MW data center)
    - Older systems created a sonic boom like sound when they deployed due to the sudden high pressure release of the gases



Image source: Kord Fire Protection

Fire Suppression:

- **New Low Emission fire suppression systems:**
  - High-Pressure Water Mist (HPWM)
    - HPWM systems spray a mist of pure atomized water micro-droplets (under 200 microns)
    - The mist instantly turns to steam when it encounters the heat of the fire, absorbing thermal energy
    - It extinguishes the fire very quickly without wetting or destroying the live electronic components.
    - It uses 90% less water than traditional sprinkler systems
    - The mist is completely safe for humans
    - And the mist has the added benefit of clearing smoke particles from the air



Image source: Kord Fire Protection

Fire Suppression:

- **New Low Emission fire suppression systems:**
  - High-Pressure Water Mist (HPWM)
    - In standby state, the system's pipes are completely dry and not pressurized.
  - This greatly diminishes the chance of damage from leaks
    - This system is considered extremely safe for people stuck in the room with a fire
    - Because it only uses pure water it's considered to be a very environmentally friendly system



Image source: Kord Fire Protection

Fire Suppression:

- **New Low Emission fire suppression systems:**
  - High-Pressure Water Mist (HPWM)
    - The downside is that this mist is easily blown away from the servers by the air handling system
  - The HPWM system must be integrated with the air handling system to turn off the fans before it can be deployed.
    - The system operates at very high pressure so it requires very expensive specialized pumps and steel tubing and fittings
    - It requires rigorous ongoing maintenance and inspections



Image source: Kord Fire Protection

Fire Suppression:

- **New Low Emission fire suppression systems:**

  •The current standard for data center fire suppression is a three tiered approach:

  1. Aspirating Smoke Detection – constantly pulls in air from the room and tests for smoke

  2. Localized Gaseous Fire Suppression – Novec 1230 (or its generic alternative) is the current choice by most developers

  3. Facility Wide Double interlock sprinklers – the fail safe in case the gas fails, currently HPWM is the best choice

  •In our case, HPWM could be used for both tier two and tier three to avoid PFA contamination of the adjacent wetlands and the aquifer



Image source: Kord Fire Protection

Recommendations

Recommendations

- **Recommendations**
- Re-emphasize our recommendation for a closed loop cooling system
- Mandate the installation of floor-level chemical sensing cables and optical sensors to immediately detect physical glycol coolant leaks
- Mandate room-level infrared gas detection arrays to intercept airborne PFAS and refrigerant micro-vapor leaks before structural pipe failures occur.
- Ban the use of Mobile e-waste Shredding Contractors
- Mandate a Dedicated, Negative-Pressure ITAD Facility for on-site e-waste shredding
- Require the developer to verify that all downstream electronic waste recycling partners hold active R2v3 or e-Stewards certifications
- Ban the use of Novec 1230 and its generic equivalents for newly installed fire suppression systems
- Encourage the deployment of High-Pressure Water Mist (HPWM) systems for Dual-Tier Fire Protection Systems
- Require the HPWM systems to be fully integrated with the building's air handling units to automatically shut off high-velocity cooling fans prior to discharge

Next Steps

Next Steps

- Finish talking about pollution concerns
- What did we miss?
- What needs clarification?

Thank You