SAND2016-6151PE

Exceptional service in the national interest

Sandia National Laboratories

Photos placed in horizontal position with even amount of white space between photos and header

Hard Drive Sampling Events

Linda Gonzales, SNL WCO

Dwight Stockham, SNL, Classified Project Leader

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND NO. 2011-XXXXP

Sampling Events

- First event began January 21, 2014
  - Prepared Sampling and Analysis Plan S14-03, Cyber Media Sampling and Analysis
    - In accordance with SNL Procedure PLA 96-02, Sampling and Analysis Plan for Characterization of Low-Level Radioactive and Mixed Waste
    - Coordinated with our Sample Management Office
    - Obtained samples of the various unclassified media types
    - Use of an internal industrial shredder services

Media Collected

Sandia National Laboratories

- Collected the following unclassified media for sampling:
  - Desktop computer hard drives (5 manufacturers, total: 8)
    - IBM, Maxtor, Seagate, Simpletech, Western Digital

  - Blackberry phones (Various kinds, total: 20)
  - Personal Digital Assistants (PDAs) (3 manufacturers, total: 12)
    - Dell, HP, Sony
  - Laptop computer hard drives (5 manufactures, total: 8)
    - Axiom, Conner, Hatachi, IBM, Seagate

  - Laptop computers (5 manufactures, total: 5)
    - Apple, Dell Latitude D600, HP Compaq tc4200, IBM ThinkPad Type 2687
    - Lenovo ThinkPad, Type 6477

Sampling Events

- Secure Digital (SD) cards - Large (6 manufactures, total: 8)
  - Callunacard, Kingston, Kodak, Lexar, Simple Tech, Viking
- Secure Digital (SD) cards - Small (13 manufactures, total: 41)
  - Cannon, Dane-Eelc, DG Vision, Edge, Handspring Backup Module
  - HP, IBM, Kingston, Kodak, Lexar, Linksys, SanDisk, Simple Technology

- Flash Drives (2 manufacturers, total: 87)
  - CEFC (Blue), Magic Ram Micro Flash

Sampling Events

- USB Flash Drives (Thumb Drives) (32 manufacturers, total: 71)
  - ActivCard, Combustion Research Facility, Cruzer Micro 2GB, diskGO Secure, FLEXnet, Gemalto, Genepix Pro 5, Infocus, Iomega, IronKey, JMC, Kanguru, Lexar, Linksys, Logitech, Memorex, Olympus, Pen Drive Plus, Phison, Pocket Disk 128 MB, PQ1 Intelligent Stick, Ra, Safenet, Samsung, SanDisk, Simple Tech, Sony, Stealth MXP Bio by MXI Security, SuperFlash Drive, Texas Instruments, TransCAD, Wolverine, 5 unknown manufacturers

- Memory boards (21 manufacturers, total: 69)
  - Altera Max, AMPc, Apacer, Axiom, Dell, DIGI Track by Hirsch Electronics Corp., DiskOnChip M-Systems, Edge, Elpida, hynix, IBM, Infineon, Kingston, Lettering System Font Card, M Product of Singapore, Nanya, Samsung, SanDisk, SST, Toshiba, Visiontek, 3 unknown manufacturers

Sampling Events

- Each media was shredded into pieces that would pass through a 9.5 mm sieve (as required for TCLP)
- Two 100 gram composite samples were taken for each type
- Analysis – TCLP for TC and UHC metals (not Hg)
  - For metals, used SW-846 Method 1311 (TCLP)
  - Then SW-846 Method 6010C (ICP-AE) or 6020A (ICP-MS) or equivalent methods
  - TCLP for Sb, As, Ba, Be, Cd, Cr, Pb, Ni, Se, Ag, and Tl
  - 30-day turn-around from the analytical laboratories
- Samples were processed through SNL's Sample Management Office
- The results were requested to verified and validated

Results of First Sampling Event

- Results Received – 2/19/14
  - PDAs failed for Lead
  - Flash Drives failed for Lead
  - Memory Boards failed for Lead
- Data Validation Report – 3/12/14

Second Sampling Event

- After discussions with the waste management department, it was determined that the sampling size was not adequate for desktop computer and laptop computer hard drives.
- Sampling and Analysis Plan S14-03, Cyber Medial Sampling and Analysis – January 14, 2016
- Samples from various manufacturers were collected.
- They were shredded so that the material passed through a 9.5 mm sieve
- The shredded material was thoroughly mixed
  - Minimum of ten 100 gram composite samples - desktop computer hard drives
  - Minimum of four 100 gram samples - labtop hard drives.

Desktop Hard Drives

Sandia National Laboratories

- Types and Manufactures – dates range from 2000 - 2012
  - 1 eServer (IBM) made in Japan
  - 1 Fujitsu Limited made in the Philippines
  - 4 Hitachi – 2 made in Singapore, 1 in Thailand, 1 in China
  - 2 HP made in Singapore
  - 2 IBM Deskstar – 1 made in Thailand, 1 made in Hungary
  - 7 Maxtor – 5 made in Singapore, 1 made in Japan, 1 made in China
  - 3 Quantum made in Japan
  - 6 Samsung- 1 made in Korea, 5 made in China
  - 11 Seagate – 3 made in China, 4 made in Singapore, 3 made in Thailand, 1 made in Malaysia
  - 16 Western Digital – 9 made in Thailand, 6 in Malaysia, 1 in Singapore
  - Total: 53

Laptop Hard Drives

- Types and Manufactures – dates range from 2008 – 2012
  - 2 Dell made in Singapore
  - 1 Hitachi made in Thailand
  - 10 HPs – 6 made in Signapore, 4 made in Thailand
  - 14 Seagates made in China
  - 14 Western Digital made in Malaysia
  - Total: 41

Results

- Sampling and analytical results for the 2016 sampling event at SNL indicate that they do no meet the definition of a RCRA toxicity characteristic
- Desk Top Hard Drives
  - Antimony - .07
  - Barium – 3.5
  - Chromium - .2
  - Lead – .5
  - Nickel – .9

Laptop Hard Drives

Antimony - .05

Barium – 3.6

Chromium - .1

Lead - .1

Nickel - .9

- Arsenic, Beryllium, Cadmium, Selenium and Silver were non detect (ND)
- Data was validated as of 3/3/16

Contributing Factor to the Results

Sandia National Laboratories

- Sandia, as a federal facility, is required to purchase office computing equipment (towers, laptops, monitors, printers, even copiers) that are EPEAT registered.
- Sandia has been doing so since FY07
- EPEAT's website:
- http://www.epeat.net/resources/criteria/#tabs-1=pcanddisplays
- On the website, under "Design for End of Life" – there is a requirement for the "identification and removal of components containing hazardous materials."

Solid State Hard Drives

- Solid state hard drives were not included in either sampling event and therefore have to be managed as hazardous waste until proven otherwise.
- SNL is currently in the process of sampling solid state hard drives.

Next Steps

- SNL revised 2 profiles to move classified desktop and laptop hard drives and they are currently in review
  - ASLA000000032, Classified Non-Radioactive Non-Hazardous Waste
  - ASLA000000033, Macroencapsulated Classified Non-Radioactive Hazardous Waste
- One comment received - our DOE approval memo needs revision to point to DOE O 471.6, Admin Chg 2, Information Security (*note this memo is part of the existing profile*)
  - Our current memo points to NAP 70.4, Information Security
  - We also need to correct the subject line
- The DOE Nevada approval memo does not point to DOE O 471.6, and the NNSSWAC currently points to the NAP
- We tried to include UCI hard drives as filler since they have to be dispositioned similar to classified hard drives
  - This was not acceptable to the reviewers

Value Added

- Labtop and Desktop Hard Drives do not have to be managed as hazardous waste
- They do not have to be macroencapsulated
- We can disposition classified hard drives from our other SNL sites outside of SNL/NM as they do not fall under our RCRA permit

What's Next

- SNL will obtain a revise DOE approval memo for classified pointing to DOE O 471.6.
- NNSS will revise their approval memo to pint to DOE O 471.6.
- SNL will work with DOE to officially document that UCI hard drives can be buried in lieu of destruction, similar to classified hard drives
  - Currently we have a large amount of UCI hard drives that have to be witness destroyed at an incinerator
- SNL will work with DOE Nevada to add UCI hard drives as a waste stream acceptable for burial at the NNSS in their classified disposal cell
- The NNSSWAC would have to be revised to allow this new waste stream