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Working with Legacy Management for Long-term Geospatial Data Management

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Session 6

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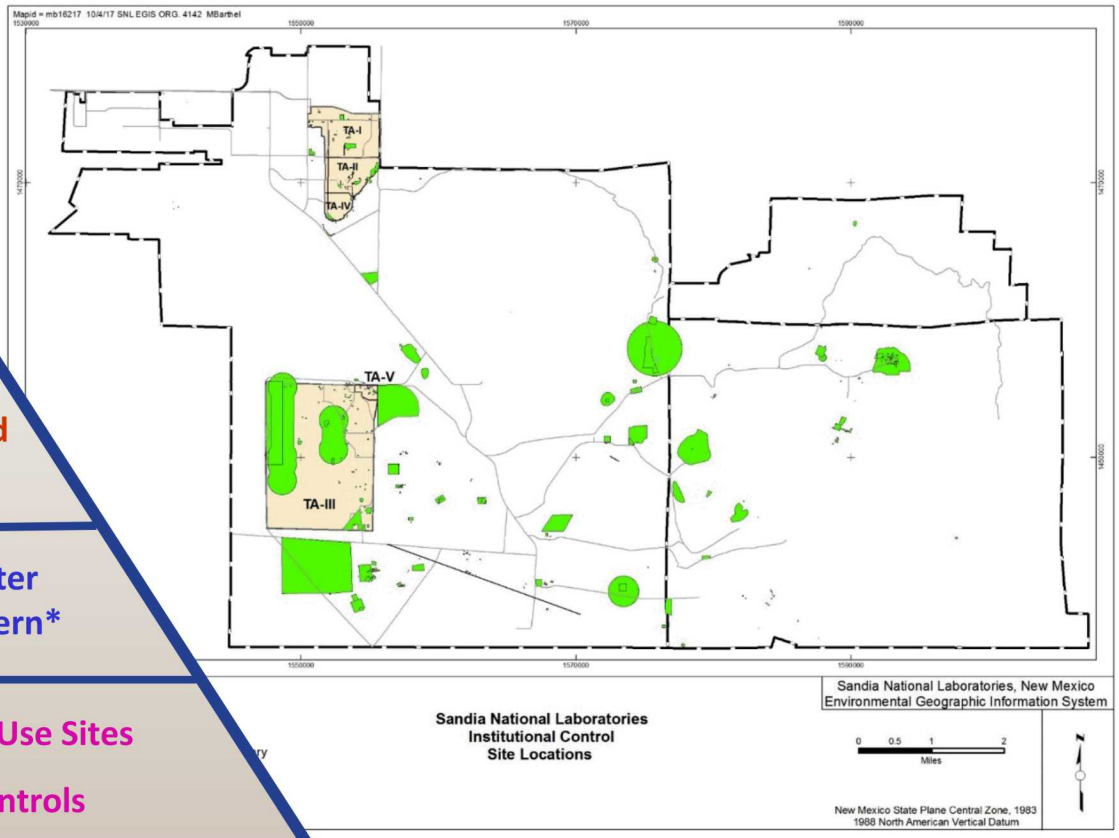
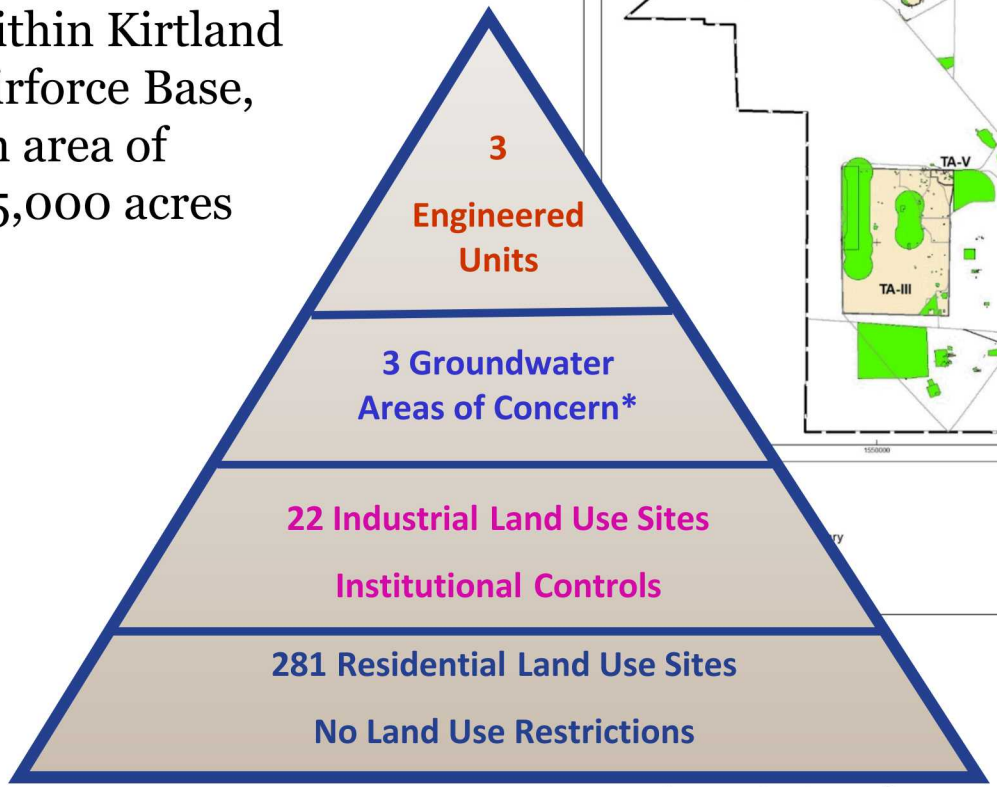
Sandia's LTS Program Covers a Vast Area

Our LTS Sites are wholly contained within Kirtland Airforce Base, an area of 65,000 acres





Sandia's LTS Requirements Flow-down Context

Sandia Level

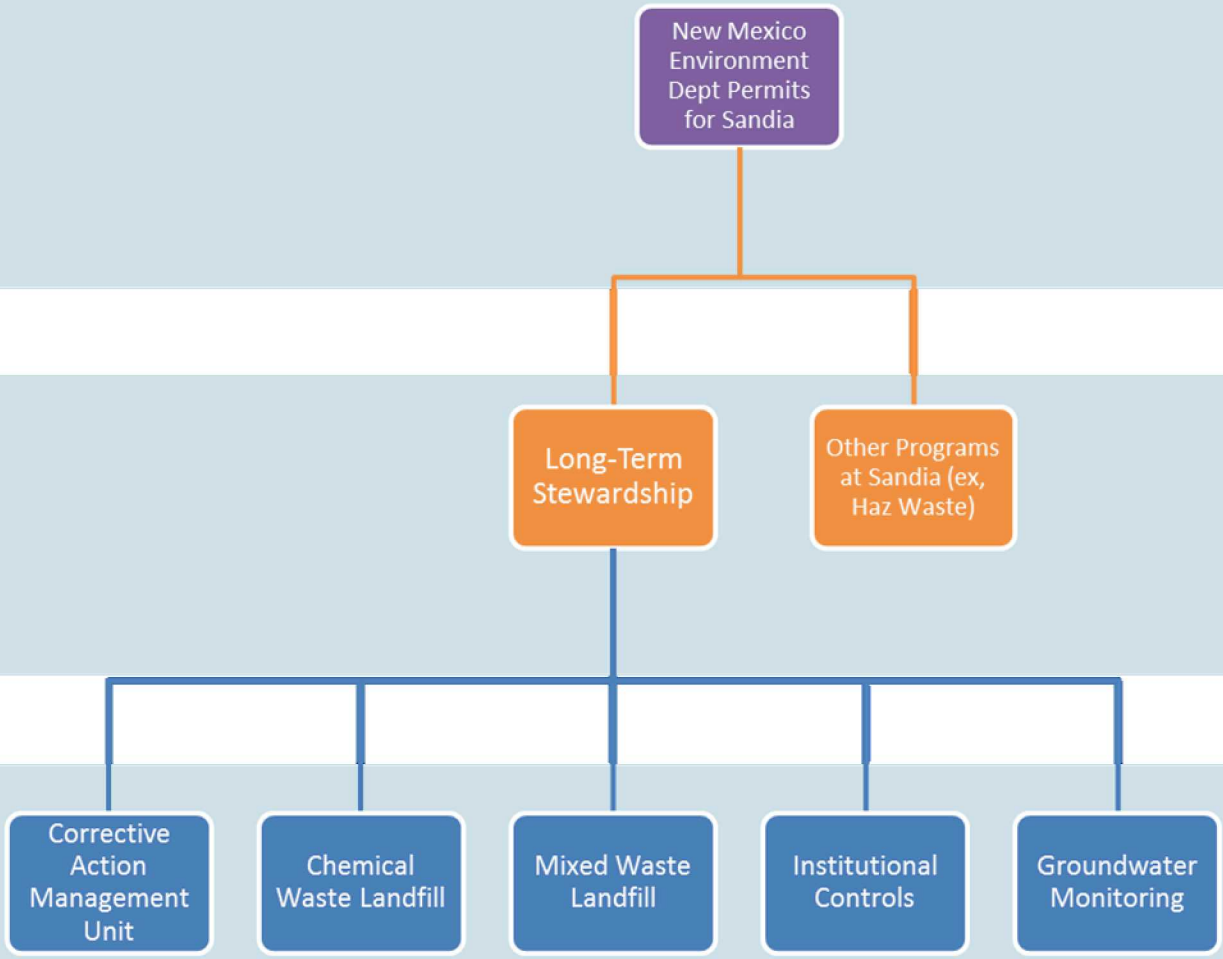
- Source of LTS requirements.
- NMED issues these permits to the DOE/SNL
- January 2015: NMED issued a revised permit which stabilized many LTS requirements

Program Level

- DOE's LTS definition captures a specific subset of source requirements.
- DOE program definition drives DOE funding process: NW PMU direct-funded program.
- LTS is an environmental and geosciences subject matter; as such, Sandia operates LTS from 4100.

LTS Project Decomposition

- 4142 decomposes the LTS Program into these 5 projects.
- Each project is responsible for a subset of the LTS requirements. The task lead is responsible for their requirements subset including 1, each, annual report delivered to NMED as evidence of compliance.



3 Engineered Units with Evapo-transpirative Covers

Chemical Waste Landfill (CWL)

Post Closure Care Permit

- Excavated 1997 to 2002; cover since 2005
- Monitoring: Groundwater, Soil Gas, Cover Condition

Corrective Action Management Unit (CAMU) Post Closure Care Plan

- Contains CWL treated soils and monitoring systems
- Monitoring: Leachate collection system, Soil Gas, Soil Temperature, Soil Moisture, Cover Condition

Mixed Waste Landfill Long Term Monitoring and Maintenance Plan

- Intrusion barrier & cover since 2009
- Monitoring: Groundwater, Soil Gas, Cover Condition

Institutional Controls Project

- 315 Legacy ER Sites on SNL/KAFB
  - Administrative Controls: Information Management; Evaluate Use Plans within ½ mile (e.g., NEPA; Land Use Permit)
- 22 are Designated Industrial Land Use Areas with Controls
  - Annual site inspections of Physical Controls: Signs, Fences
  - Submit annual report about the inspections/conditions

Working with Legacy Management for Long-term Geospatial Data Management – Why?

- Sandia's LTS program has a vast amount of data for over 300 sites
- In 2018 the final RCRA surface site was transferred from EM to NNSA's LTS at Sandia.
- We wanted to think about geospatial data lifecycle and knowledge management
- Do we have the right data sets and formats?
- We looked at LM data plans as a way to explore those questions

As a case study, we are partnering with Joshua Linard, the Technical Data Manager for DOE/LM, and the manager for the Geographic Environmental Management System (GEMS) on what the requirements for an LTS GIS data transfer to LM

Data Life Cycle Management : A critical component for LTS

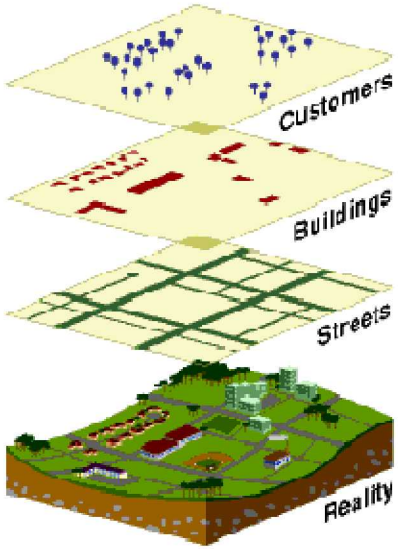
Our ER/LTS records system has been in existence for over 25 years

We have had several instances of trying to retrieve data that has been archived for 10 +years

Example 1 – Incompatible formats --Retrieval of late 1990's sampling data failed due to file format incompatibility with modern systems

Example 2 – storage of data in multiple file formats - in 2015 we were asked by regulators to add data to our geologic data sets. We were successful because we had **paper, digital pdf files, and ESRI Shapefiles as part of the archived data**

Geospatial Data and the LM Transition Plans



All the GIS data types are mentioned in the LM Transition Plan

- **Points** – well locations, sampling locations, points of interest, etc.
- **Lines** – boundaries, roads, buildings, fence lines, utilities, land surveys, etc.
- **Polygons** –areas of interest, areas of concern, etc.
- **Rasters** – ortho imagery, scanned raster maps, etc.
- **Geospatially related information**: sampling results tied to geographic locations, etc.

The key for future use of this data when it is transitioned to LM, is to have fully documented geospatial data sets

The LM Transition Plans requires that FGDC compliant metadata as well as contextual information be part of the transition of the geospatial data to LM

Contents of the LM Transition Plan

- LM has different transition plans based on the site type
- But the guidance for transitioning geospatial data is consistent between the plans

General Topics Covered:

- Authorities and Accountabilities
- Site Conditions – are they accurately and Comprehensively Documented
- Engineered Controls, Operations & Maintenance Requirements and Emergency/Contingency Planning are Documented
- Institutional Controls, Real Property Records and Enforcement Authorities
- Regulatory Requirements and Authorities
- Long-term Surveillance and Maintenance Budget, Funding and Personnel Requirements
- Information and Records Management Requirements
- Public Education, Outreach, Information and Notice Requirements
- Natural, Cultural and Historical Resource Management Requirements
- Business Closure Functions, Pensions and Benefits, Contract Closeout or Transfer
- Real Property requirements

Many of the above categories contain geospatial information

What makes Geospatial Data Unique

Geospatial data are a special subset of digital data, which represents information tied to a location at the earth's surface or sub-surface.

- Additional characteristics unique to spatial data:
- **Scale:** Geospatial data are multi-scaled and have multi-resolutions.
- **Temporal:** Geospatial data can be both current and historical.
- **Format:** Geospatial data can be in the form of aerial photos, maps, surveys, GPS data, satellite imagery, elevation data, etc.
- **Relationships:** The power of geospatial data is the ability to derive new data from relationships between data layers and stored as part of the data structure
- **Spatial representation:** Geospatial data represent many facets of phenomena on the earth and are stored as points, lines, polygons, regions, volumes and grids.

Bread Crumbs…

Even with a good data life cycle plan and a good record keeping system, we discovered that data can be lost…

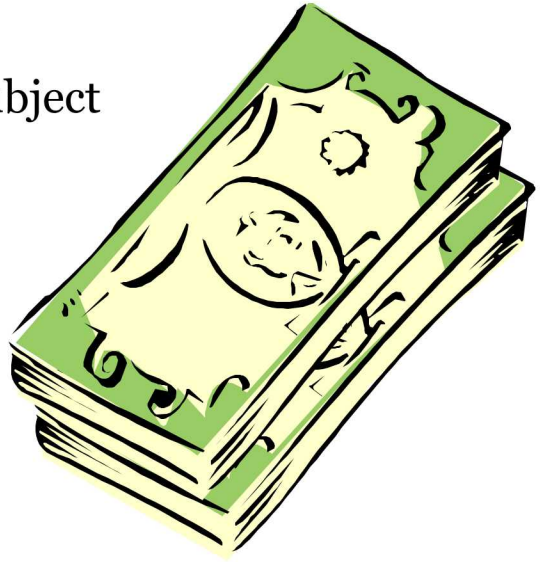
A File Plan - is one way of periodically leaving a "bread crumb" in the records file system that describes the following:

- **What** the geospatial data is
- **Where** the geospatial data is
- **Currency of the data**
- **Status of the data**

We will add these "bread crumbs" for our geospatial data as part of our data life cycle management plan

Long Term Costs

Preservation of digital data is expensive and unknown:



- **Knowing what to migrate** requires knowledgeable subject matter experts and information professionals
- **Migration** of the data itself
- **Building and maintaining indexes** to archived information
- **Cost of hardware/software** to build spatial data repositories
- **License agreements** for archive software
- **Costs of archive maintenance** for archive software
- **Maintaining functionality and context** of archived data
- **Creating and maintaining FGDC compliant metadata** that will contain information about how geospatial data are being managed in the long term

Immediately Realized Benefits

Verification and validation that our core GIS data is okay

By working with LM now we realized:

- **Land surveys are needed of Engineered Units**
- **That we can work with LM to test our geospatial data metadata**
- **We need to evaluate our contextual data**
- **Importance of Knowledge Management for LTS –**
  - ***Long time team members are retiring, staff are transitioning and records are not always as accessible as we had hoped***

- **We will be developing a *Geospatial Data Lifecycle Management Plan***
  - This would allow for metadata and contextual data development
  - Periodic checks on the documentation of the geospatial data
  - Periodic checks on the completeness of the geospatial data
  - Periodic submissions to our records system ("bread crumbs") about the location of our GIS data and records in our digital systems

Lessons Learned

- **Plan for LM Transition EARLY**
- **Review records and geospatial data early**
  - To include planning for any updates or data migration as part of data life cycle management
- **Examine the FGDC compliant metadata early**
  - Work with LM to determine if your geospatial metadata meets their requirements

Working together we can preserve information about the DOE Legacy Sites

Questions?