



2018 Long-Term Stewardship Conference

Working with Legacy Management for Long-term Geospatial Data Management

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Session 6

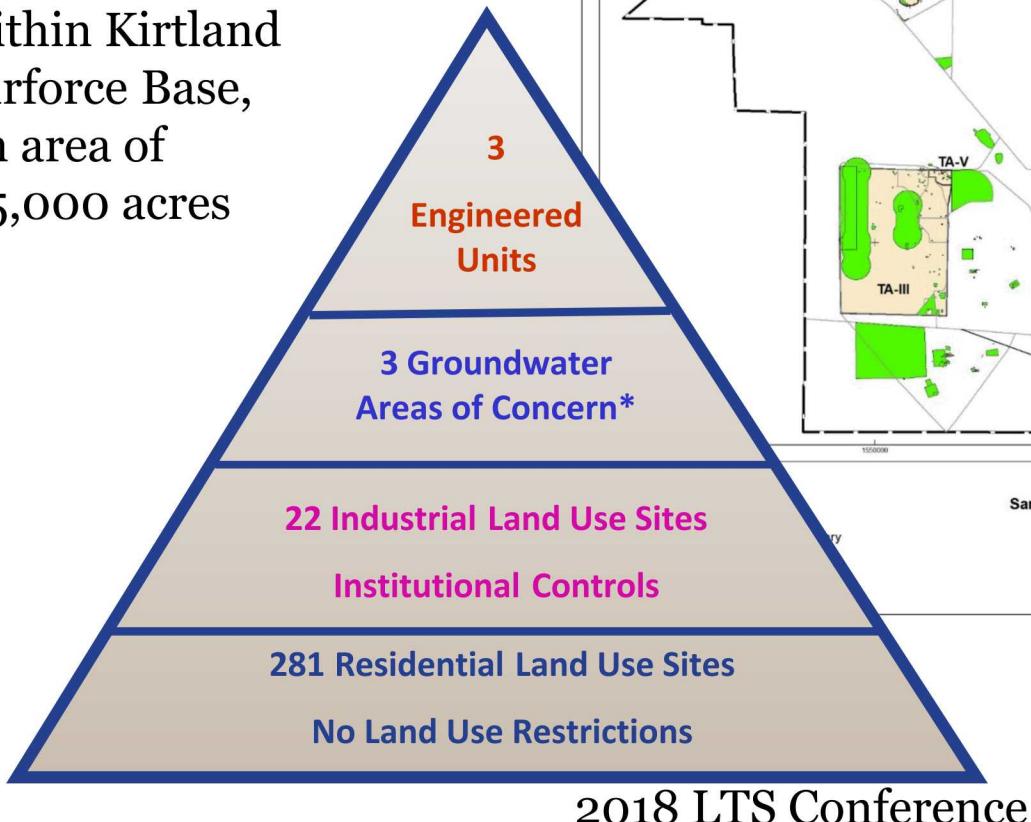
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Sandia National Laboratories

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Sandia National Laboratories

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DOE Office of Legacy Management

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

New Mexico Environment Dept Permits for Sandia

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.

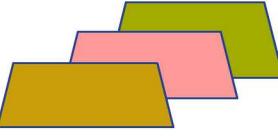
Long-Term Stewardship

Other Programs at Sandia (ex, Haz Waste)

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



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





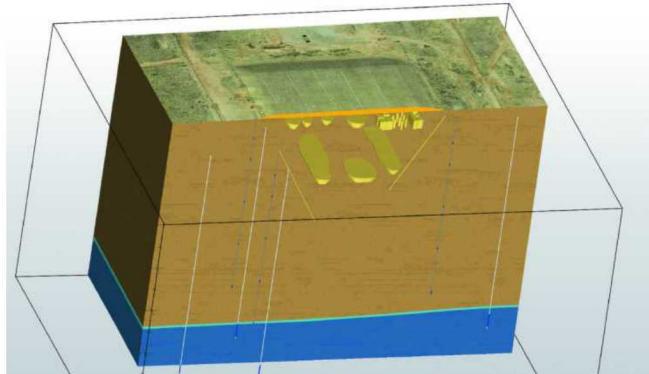
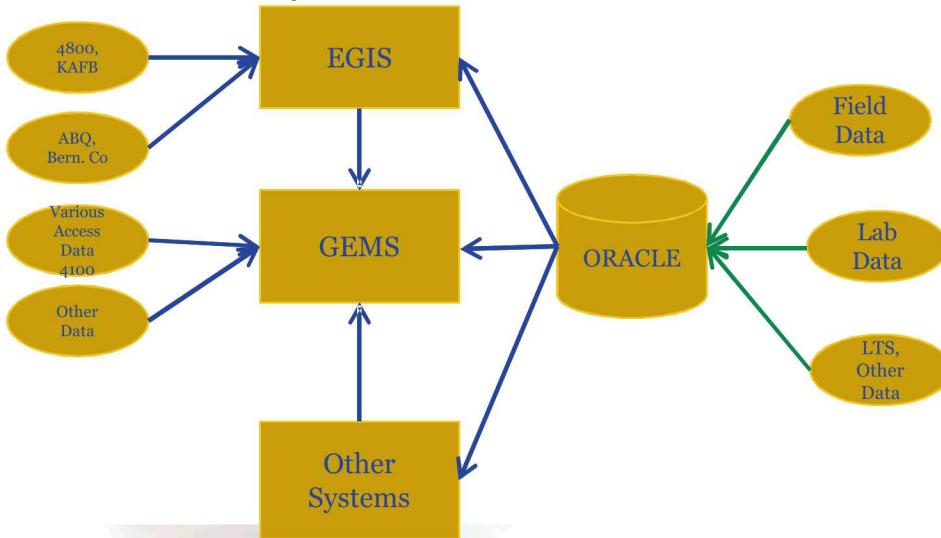
Institutional Controls Project

- 315 Legacy ER Sites on SNL/KAFB
 - Administrative Controls: Information Management; Evaluate Use Plans within 1/2 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



Other LTS Elements

- Analytical and Geospatial data systems.
- Analytical Services: Sample Packaging, Shipping, Data Package Review, V&V
- Field Services: ERFO
- Community Outreach Activities

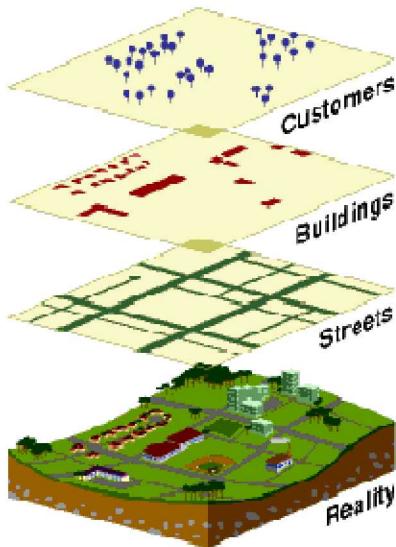


Working with Legacy Management for Long-term Geospatial Data Management - Why?

- Sandia's LTS program has a vast amount of data for over 300 sites
- We wanted to assess if we are capturing the right data and geospatial data for the eventual transition to LM
- We wanted to plan for our geospatial data transition for LM as part of our LTS data lifecycle management program

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 his requirements for an LTS GIS data transfer to GEMS.

A Focus on Geospatial Data (for now)



SNL LTS has a robust GIS system that has recently been through a data refresh cycle. During this time all historical data related to LTS was converted to the newer ESRI Geodatabase format, data layers were “cleaned up” and data was normalized.

We felt that looking the LM Transition plan for geospatial data would be a good starting point for assessing where SNL LTS is compared to the LM GEMS data requirements.

Contents of the LM Transition Plan

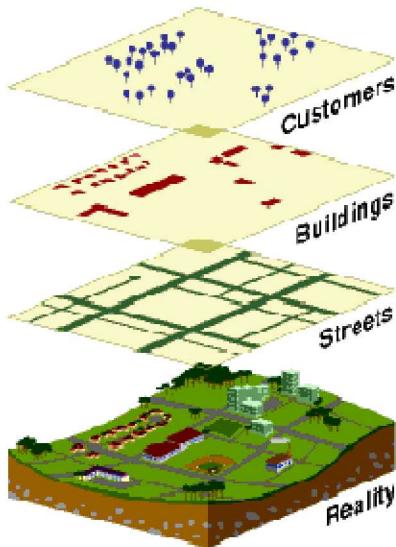
We obtained copies of the LM Transition planning documents, and did a simple review of the contents and compared it to our information

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

Geospatial Data and the LM Transition Plan



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

- **Vectors** – boundaries, roads, buildings, fence lines, utilities, land surveys, etc
- **Rasters** – ortho imagery, scanned raster maps, etc
- **Points** – well locations, sampling locations, points of interest, 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 Plan requires that FGDC Compliant metadata as well as contextual information be part of the transition of the geospatial data to LM

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.

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 sampling data from the late 1990's – This failed because we no longer had any way of reading the files – the file format type was not compatible with modern systems

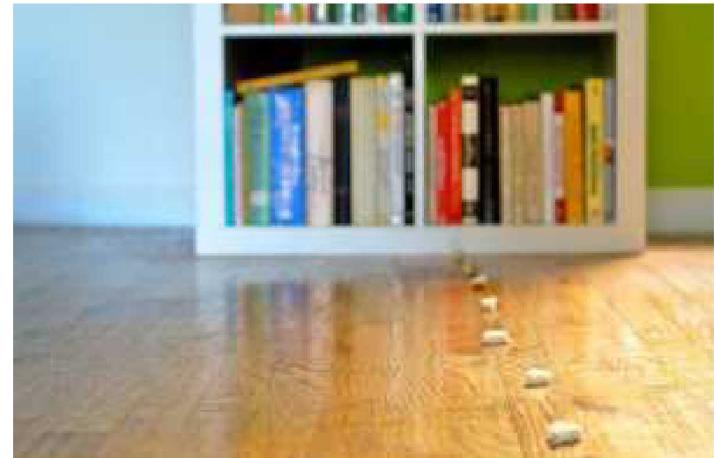
Example 2 – storage of data in multiple file formats - in 2015 we were asked by regulators to add data to our geologic data sets. We were successful because we had **paper, digital pdf files, and ESRI Shapefiles as part of the archived data**

Bread Crumbs...

We discovered that even with a good data life cycle plan, and a good records system 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** - 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



Lessons Learned

- **Plan for LM Transition EARLY**
- **Review records and geospatial data Early**
 - so that any updates or data migration can be part of a data life cycle management plan
- **Examine the FGDC Compliant Metadata Early**
 - Work with LM to determine if your geospatial metadata meets their requirements
- **Consider developing a Geospatial Data lifecycle management plan**
 - This would allow for metadata development
 - Periodic checks on the documentation of the geospatial data
 - Periodic checks on the completeness of the geospatial data

Working Together We Can Preserve information about the DOE Legacy Sites

