

Digital Library for DOE Field Laboratories

Dustin Crandall & Kelly Rose

2022 Resource Sustainability Annual Project Review Meeting
Pittsburgh PA, 5:00 PM Tuesday October 25, 2022



Project Overview

NETL Research and Innovation Center – Remediation & Reuse of Onshore Resources Field Work Proposal

2021 \$590k	2022 \$130k	2023 \$250k	2024 \$250k	Total Project Value (2021 – 2024)
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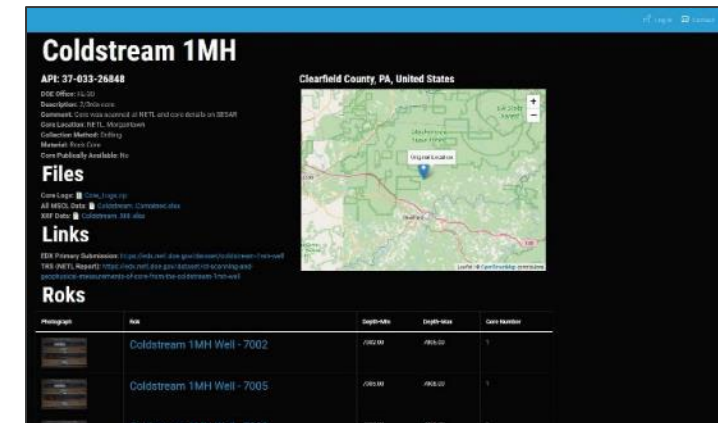
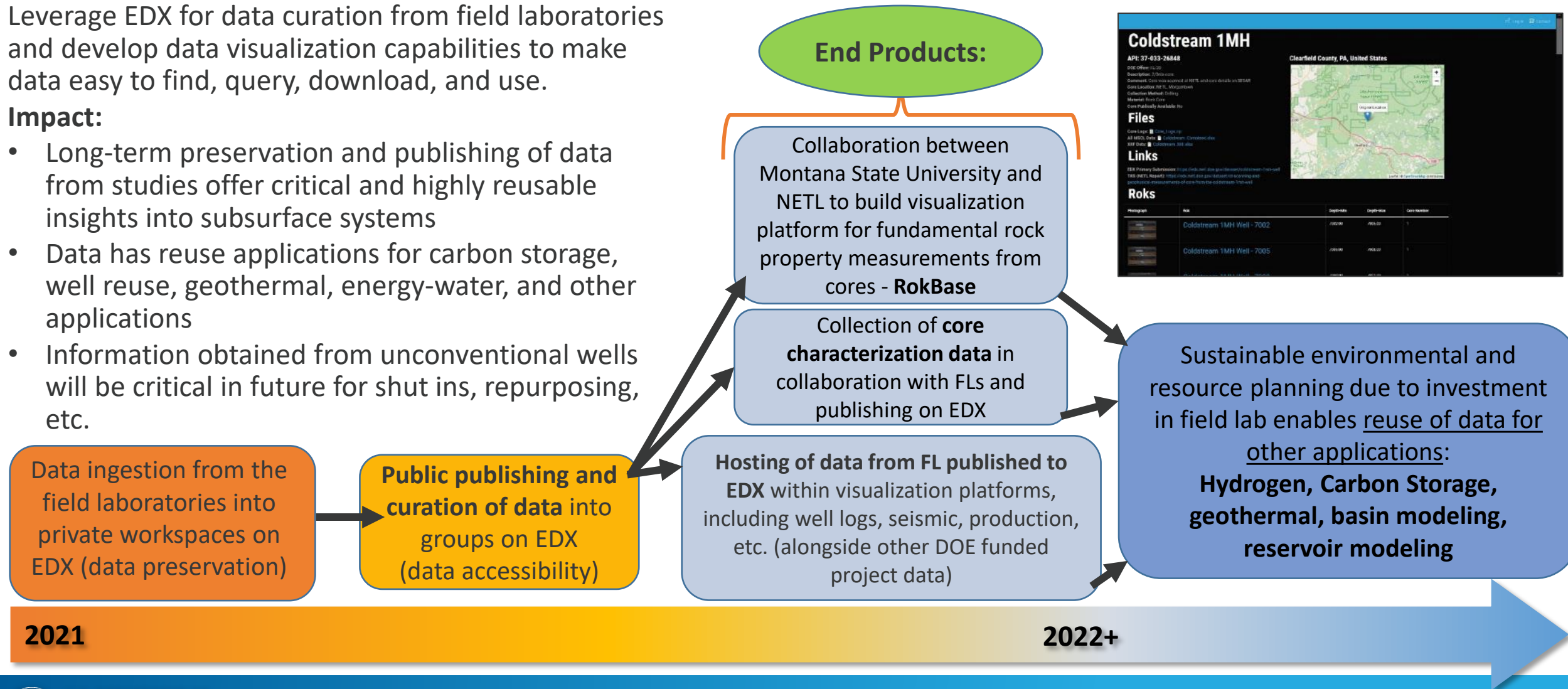
- **Started in 2021; FWP Number: 1022415**
- **As DOE Funded field projects started winding down a need was recognized to ensure that the investment associated with these unique and valuable field laboratories was preserved and available.**
- **Each field project has a requirement associated with their efforts to make the data publicly available through the Energy Data eXchange.**
 - Familiarity with EDX system, focus on achieving science goals, and the plethora of other obligations on these massive projects resulted in less than fully accessible data sets being stored.
- **Need to create a more user accessible resource platform was apparent, and with the projects ending the timing associated with this was now.**

Overall Project Scope

Overview: Obtain and scan core from field projects. Leverage EDX for data curation from field laboratories and develop data visualization capabilities to make data easy to find, query, download, and use.

Impact:

- Long-term preservation and publishing of data from studies offer critical and highly reusable insights into subsurface systems
- Data has reuse applications for carbon storage, well reuse, geothermal, energy-water, and other applications
- Information obtained from unconventional wells will be critical in future for shut ins, repurposing, etc.



Task 22.0 Digital Library for DOE Field Laboratories

- The ~\$150M DOE investment in field laboratories since 2014 has produced unprecedented data through partnerships.
- These 'learning-by-doing' labs are creating a public dataset of critical information that has never been as comprehensive for exploratory field efforts.
- Currently, this data is not easily accessible and curated in a form that allows widespread access. This project will develop the platform through which the DOE Oil and Gas Field Lab data are easily accessible, searchable, and downloadable per project, along with accompanying reports.

Task Team Members

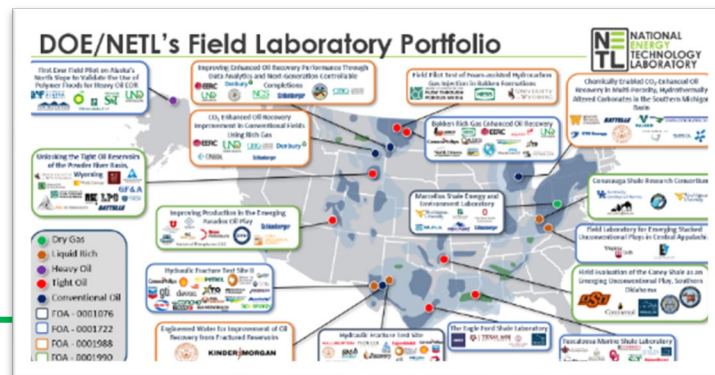
- **PIs:** Dustin Crandall, and Kelly Rose
- **Other Key Personnel:** Chad Rowan, Maneesh Sharma, Thomas Paronish, Bryan Tennant, Natalie Mitchell, Thomas Naberhaus (previously Andrew Bean, Paige Morkner, Rhiannon Schmitt, Johnathan Moore)

Task 22.0 Digital Library for DOE Field Laboratories

Need: Enable coordinated access to results from the ~\$150M DOE investment in Field Laboratories + Industry Cost Share since 2014

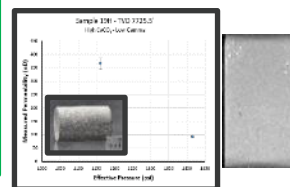
- Access to basic rock property laboratory-collected data
- Access to field-generated results from the DOE Oil & Gas Field Laboratories
- A format where data are downloadable per project, along with accompanying reports (instead of dispersed through tech literature)
- Enables future R&D, sustainable resource planning, and environmental management associated with U.S. O&G basins

Example: HFTS I Basic Rock Property Data + Field Data = Enabling Insights as part of the Multilab HFTS Project



Issue

- The unique and in-depth data associated with the field laboratory investments can be difficult to access, limiting the utilization beyond the original project scope.

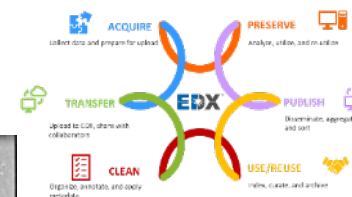


Fundamental Rock Property Measurements

Production and Other Data from the Field Laboratories



Sustainable Environmental and Resource Planning Due to Investment in Field Laboratories



End Product

- Digitized rock fundamental property data, organized along with field data generated by the O&G Field Laboratories, for up to eight UCR Field Laboratory sites.

Project Goals and Milestones

Original Milestones

Identifier	Type ¹	Expected Completion Date	Description (What, How, Who, Where)
22.A	Project	06/2021	Work with NETL Project Managers to understand breadth and scope of data and knowledge products available from each FL project, focusing on FLs with earlier completion dates first.
22.B	Project	08/2021	Develop strategies for ingestion of FL data into EDX.
22.C	Project	11/2021	Initiate development of FL data exploration and visualization capabilities to enhance discovery and access to oil and gas data.
22.D	Project	02/2022	Beta version of FL data exploration and visualization on private EDX space for internal testing. Obtain feedback on the design from HQ and NETL Project Managers for OGFL projects.
22.E	Major	06/2022	Public facing beta version of FL capabilities on EDX platform.
22.F	Project	09/2022	Data from minimum four FLs uploaded to FL capabilities and available on EDX.
22.G	Project	03/2023	Data from minimum eight FLs uploaded to platform and available.
22.H	Major	06/2023	Process for dynamically updating data from ongoing projects codified and implemented on field projects on site.
22.I	Project	09/2023	Data from minimum 12 FLs uploaded to platform and available.
22.J	Major	02/2024	Data from all 17 FLs uploaded to platform and available.
22.K	Project	03/2024	Initial maintenance plan developed.
22.L	Major	09/2024	Dynamically updating of data from field projects shown to be functioning.
22.M	Project	12/2024	Maintenance plan and process presented to ensure stability.

Accomplishments

- **22.A and 22.B—Met with HFTS and MSEEL project managers in 2021 to establish workflow for data to EDX**
 - Integration of HFTS I Phase I & II data completed by HFTS project.
 - Integration of MSEEL data into EDX required aid by NETL researchers (1.8TB), with big dataset integration of seismic and wireline data ongoing (100+TB).
 - Continued along these lines with research contacts and collaborations
- **Work initiated by Montana State University to develop a database with access to core details, RokBase**
 - Met with EDX team to establish interoperability needs for RokBase development.
- **With reduction in funding toward this project in 2022, had to slow some of the efforts. But still making good progress. Slower push of some data public than initially envisioned.**

Data Integration from Field Projects

- **Ingest data to private workspaces for organization, development of metadata**
 - Different projects have different data streams and structures, resulting in need to handle appropriately.
 - From these three examples, 2.2 TB to 220 GB

This screenshot shows the EDX workspace interface for the 'Caney Shale Field Laboratory'. The top navigation bar includes links for EDX Home, EDX Workspaces, DOE Workspaces, and NETL Workspaces, along with a 'Create Workspace' button. The workspace header displays the title 'Caney Shale Field Laboratory' and a brief description: 'Files associated with the Caney Shale Field Project. Initially a depository for non-destructive core scanning of the Tomaney 1-35-...'. It also shows 'Users: 16', a 'Favorite' button, a 'Manage EDX Chat' button, an 'Edit' button, and a 'Data Usage: 543.435 GB' badge. Below the header is a navigation bar with links to Dashboard, Submissions (0), EDX Drive (1859), Digital Notebooks (0), Cart (0), Forum (*), and More. The main content area shows the 'Workspaces / Caney Shale Field Laboratory / EDX Drive' breadcrumb. A search bar is present with the text 'Search resources...' and a dropdown menu set to 'Created'. Below the search bar, it states '3 resources found in current directory.' and provides a 'Filter Facets' button. At the bottom, there are buttons for 'Create Folder', 'Upload File', 'Add URL Resource', and a 'Recycle Bin' button.

This screenshot shows the EDX workspace interface for the 'HFTS 1 Data' workspace. The top navigation bar is identical to the previous screenshot. The workspace header displays the title 'HFTS 1 Data' and a brief description: 'Hydraulic Fracturing Test Site 1 data'. It shows 'Users: 26', a 'Favorite' button, a 'Manage EDX Chat' button, an 'Edit' button, and a 'Data Usage: 2.22 TB' badge. Below the header is a navigation bar with links to Dashboard, Submissions (0), EDX Drive (304), Digital Notebooks (0), Cart (0), Forum (*), and More. The main content area shows the 'Workspaces / HFTS 1 Data / EDX Drive' breadcrumb. A search bar is present with the text 'Search resources...' and a dropdown menu set to 'Created'. Below the search bar, it states '0 resources found in current directory.' and provides a 'Filter Facets' button. At the bottom, there are buttons for 'Create Folder', 'Upload File', 'Add URL Resource', and a 'Recycle Bin' button.

This screenshot shows the EDX workspace interface for the 'ESUP CT Scanning' workspace. The top navigation bar is identical to the previous screenshots. The workspace header displays the title 'ESUP CT Scanning' and a brief description: 'ESUP cores CT scanned at NETL in June 2020'. It shows 'Users: 7', a 'Favorite' button, a 'Manage EDX Chat' button, an 'Edit' button, and a 'Data Usage: 219.236 GB' badge. Below the header is a navigation bar with links to Dashboard, Submissions (0), EDX Drive (32), Digital Notebooks (0), Cart (0), Forum (*), and More. The main content area shows the 'Workspaces / ESUP CT Scanning / EDX Drive' breadcrumb. A search bar is present with the text 'Search resources...' and a dropdown menu set to 'Created'. Below the search bar, it states '1 resource found in current directory.' and provides a 'Filter Facets' button. At the bottom, there are buttons for 'Create Folder', 'Upload File', 'Add URL Resource', and a 'Recycle Bin' button.

Public Data from Field Projects

MSEEL and MFTS Data Curated in EDX Groups

- <https://edx.netl.doe.gov/group/marcellus-shale-energy-and-environment-laboratory>
- <https://edx.netl.doe.gov/group/hfts-1-phase-1-group>
- <https://edx.netl.doe.gov/group/gti-hfts-2s>

This screenshot shows the EDX Groups page for the 'Marcellus Shale Energy and Environment Laboratory'. The page features a search bar at the top with the text 'Search Submissions on EDX'. Below the search bar, there are tabs for 'Submissions', 'Activity Stream', and 'About'. The main content area displays '22 submissions found' and lists three datasets: 'MSEEL MIP 4H Well Data', 'MSEEL MIP 6H Well Data', and 'MSEEL MIP 5H Well Data'. Each dataset entry includes a brief description, a 'ZIP' button, and a 'Show Resources' link. The left sidebar shows the group name, a description, and statistics: 2 followers, 22 submissions, 124.733 GB data usage, and 68 resources. A 'Follow' button is also present.

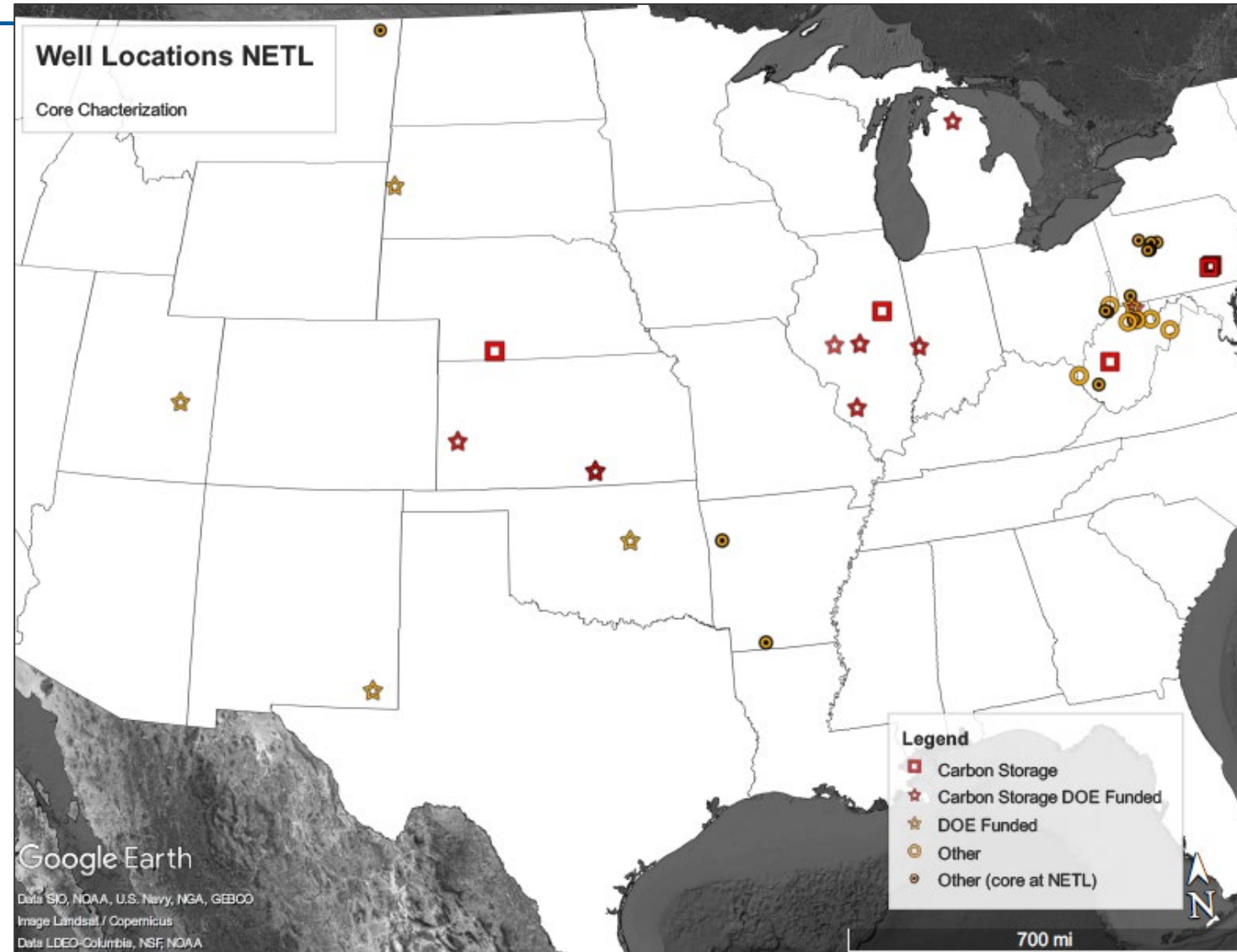
This screenshot shows the EDX Groups page for the 'HFTS 1 - Phase 1 Group'. The page features a search bar at the top with the text 'Search Submissions on EDX'. Below the search bar, there are tabs for 'Submissions', 'Activity Stream', and 'About'. The main content area displays '11 submissions found' and lists three datasets: 'HFTS-1 Phase 1 Microseismic Data and Results', 'HFTS-1 Phase 1 Slant Core Well Proppant Analysis', and 'HFTS-1 Phase 1 Individual Well Files'. Each dataset entry includes a brief description, a 'ZIP' button, and a 'Show Resources' link. The left sidebar shows the group name, a description, and statistics: 3 followers, 11 submissions, 197.365 GB data usage, and 40 resources. A 'Follow' button is also present.

This screenshot shows the EDX Groups page for the 'GTI-HFTS-2' group. The page features a search bar at the top with the text 'Search Submissions on EDX'. Below the search bar, there are tabs for 'Submissions', 'Activity Stream', and 'About'. The main content area displays '4 submissions found' and lists three datasets: 'Individual Test Well Data', 'Fiber Optic Data', and 'Microseismic Data and Reports'. Each dataset entry includes a brief description, a 'ZIP' button, and a 'Show Resources' link. The left sidebar shows the group name, a description, and statistics: 0 followers, 4 submissions, 456.53 GB data usage, and 17 resources. A 'Follow' button is also present.

Core Characterization

29 Reports/Data Across FWP's

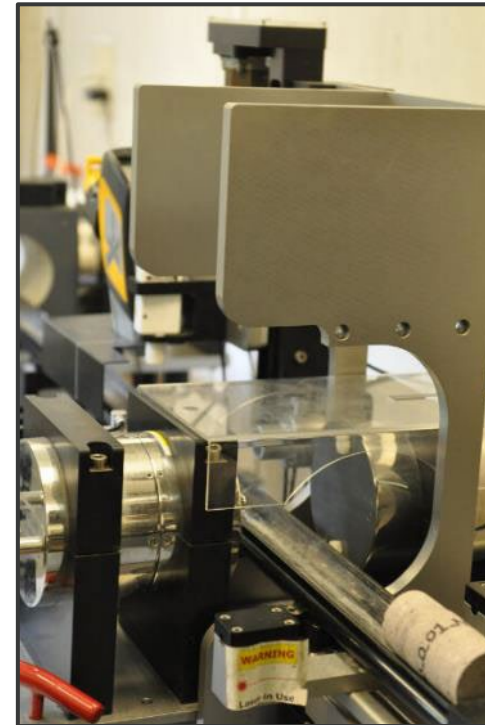
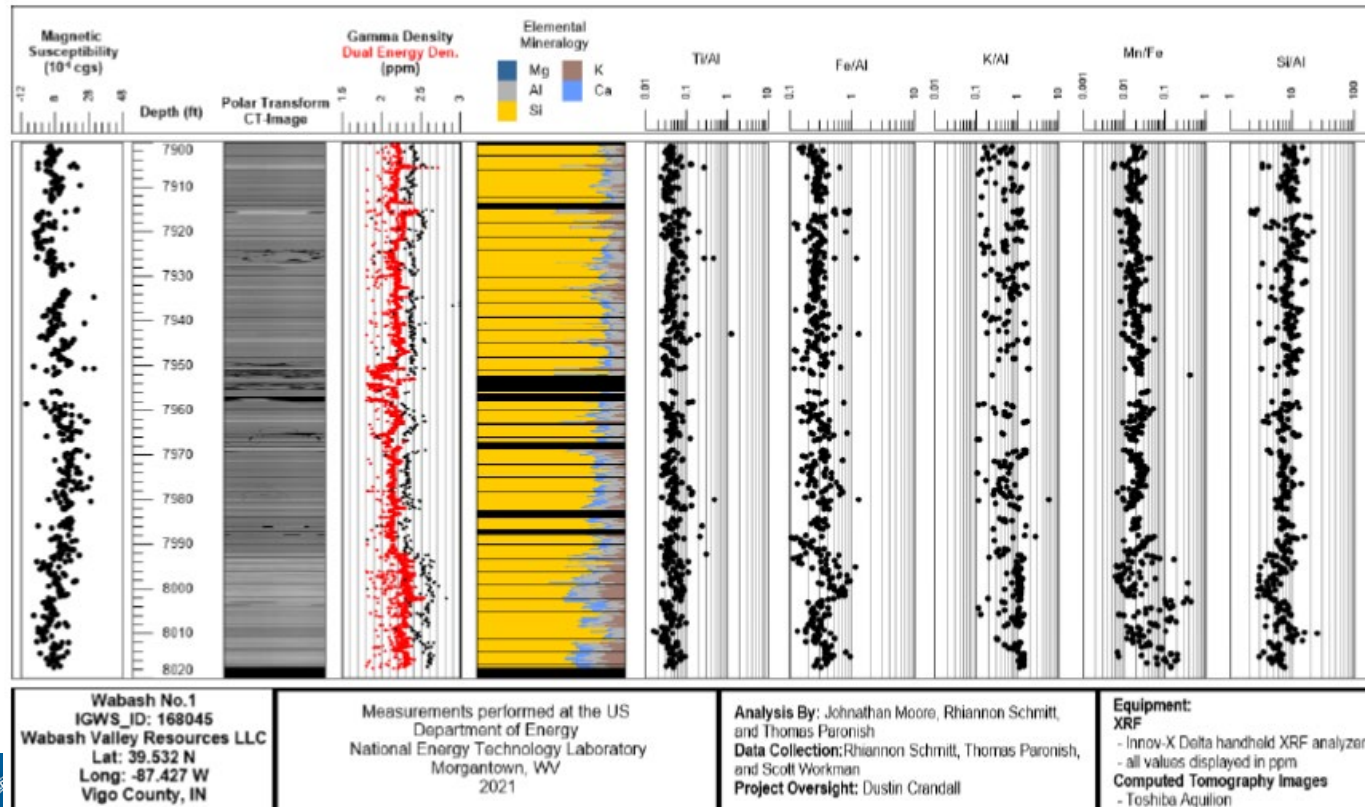
- An underlying data stream that has made initial roll out of this information more consistent is the core characterization work that has been performed at NETL
 - Ability to scan with multi-scale computed tomography and a high-resolution multi-sensor core logger
 - Pipeline to get the data out as public facing technical reports
 - Data pipeline to NETL EDX Group
- <https://edx.netl.doe.gov/group/core-characterization>



GeoTek Core Logger

POC: Thomas.Paronish@netl.doe.gov

- The GeoTek Multi-Sensor Core Logger at NETL obtains high-resolution data including p-wave velocity, gamma density, natural gamma, resistivity, magnetic susceptibility, and handheld X-ray fluorescence spectrophotometry on whole or split-core samples.

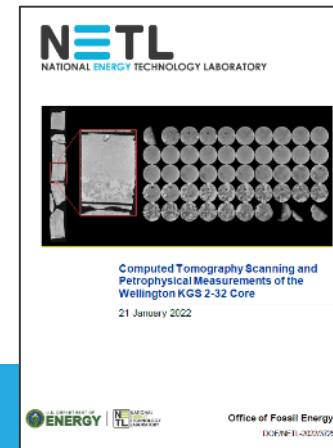
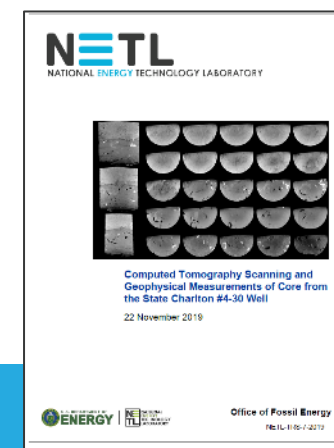
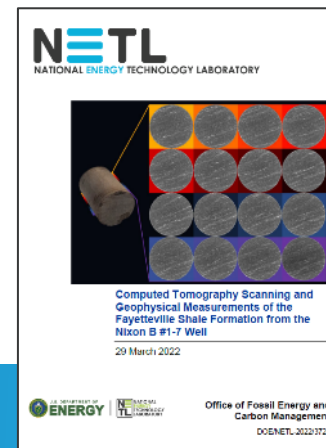
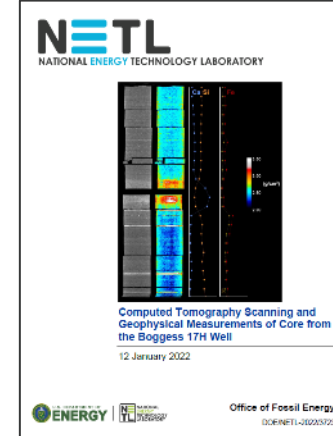
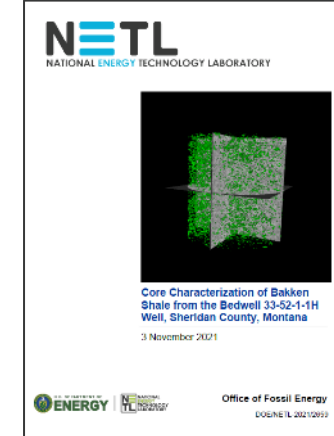
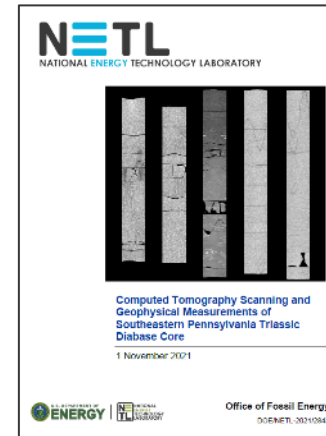
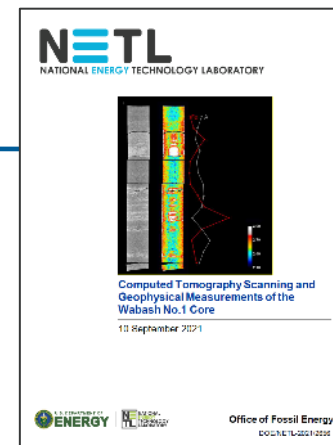
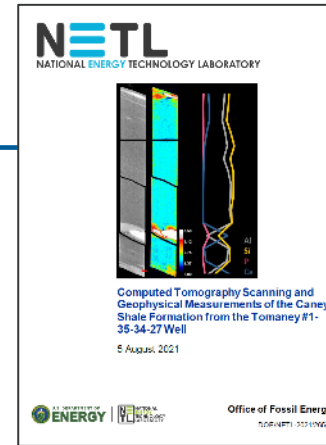


Medical CT Scanning + Core Logging

8 technical reports from past 18 months.

- **Non-destructive CT scanning and logging of core from energy relevant wells across the country**
- **Core from a range of energy applications**
 - oil/gas production wells, carbon storage reservoirs & seals, nuclear storage, geothermal production,.
- **Core from across the county**
 - Pennsylvania, West Virginia, Illinois, Oklahoma, South Dakota, Ohio, Indiana, Utah, Montana, Maryland, New Mexico, Nebraska ...
- **Data is made publicly available for download via the Energy Data eXchange (EDX)**

<https://edx.netl.doe.gov/group/core-characterization>



Core Characterization EDX Group Page

<https://edx.netl.doe.gov/group/core-characterization>

- **Over 4 TB of core scale data available**
 - 58 resources. 29 wells and 29 associated reports describing the data
 - *as of 10/25/22 ... more in progress!
 - Older data (pre ~2020) is poorly stored in some instances
 - Again, familiarity with EDX
 - Newer data more accessible

The screenshot shows the 'Core Characterization' group page on the NETL Energy Data eXchange. The page header includes the NETL logo, 'National Energy Technology Laboratory', and navigation links for 'Support and Services', 'Activity', 'Launch EDX Chat', and a user profile for 'Dustin Crandall'. The main navigation bar contains 'Search', 'Contribute', 'Groups', 'Portfolios', 'Workspaces', 'Tools', and 'Users'. The breadcrumb trail indicates the current location: 'Home / Groups / Core Characterization'. The page features a grid of dataset thumbnails on the left, each with a NETL logo and a brief description. On the right, there are tabs for 'Submissions', 'Activity Stream', 'About', and 'Nominated Submissions', along with a 'Create Submission' and 'Edit' button. A search bar for datasets is present, with a dropdown menu showing 'Relevance'. Below the search bar, it states '57 submissions found'. Two specific dataset entries are highlighted: 'MIP3H_Scans' and 'yawkey98'. Each entry includes a description, a list of file formats (e.g., ZIP, PPTX, PNG, TIF, JPEG, AVI, XLSX), the dataset size, and the number of resources. For example, 'MIP3H_Scans' has a dataset size of 96.186 GB and 114 resources. The 'Core Characterization' group summary shows 8 followers and 57 submissions, with a 'Follow' button. At the bottom, it displays 'Data Usage: 4.047 TB' and 'Resources: 870'.

Core Characterization EDX Group Page

<https://edx.netl.doe.gov/group/core-characterization>

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The screenshot shows the 'MIP3H_Scans' dataset page. At the top, there's a breadcrumb trail: Home / Submissions / MIP3H_Scans. Below this is a navigation bar with tabs: Dataset (selected), Groups, Activity, and Provide Feedback. To the right of the tabs are three buttons: View Metadata (yellow), Add Resource (blue), and Options (green). The main content area has the title 'MIP3H_Scans'. Under 'License(s)', it shows 'No License Restrictions' and 'License Not Specified'. A paragraph of text describes the data: 'CT scans and multi-sensor core logger data to accompany the NETL technical report Paronish, T.; Mackey, P.; Crandall, D.; Moore, J.; Brown, S.; Carr, T.; Martin, K. Computed Tomography Scanning and Geophysical Measurements of Core from the Marcellus Shale Energy and Environment Laboratory; NETL-TRS-X-2018; EPAAct Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2018; p 60.' Below this, it says 'Followers: 0' with a '+ Follow' button. A blue bar contains the text 'Citation (Click to Copy)' and the citation text: 'Dustin Crandall, MIP3H_Scans, 2018-11-29, https://edx.netl.doe.gov/dataset/mip3h-scans'. An orange bar contains the text 'Apply for DOI'. The 'Data and Resources' section has two buttons: 'Download Checked' and 'Check All'. Below these is a search bar 'Filter resources by name...' and a dropdown 'Date: Newest → Oldest'. A table of resources is shown with columns for checkboxes, resource names, licenses, and actions. The first resource is 'MSEEL_77_7425_MIC Y Slices.zip' with 'No License Restrictions' and 'Preview' or 'Download' buttons.

This block shows the continuation of the resource list. The second resource is 'MIP3H_SRA_SampleTracking_ID&Procedure.xlsx' with 'License Not Specified' and 'Preview' or 'Download' buttons. At the bottom, there is a pagination bar with numbers 1, 2, 3, 4, 5, 6, ..., 12, and a right arrow.

Core Characterization EDX Group Page

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Computed Tomography Scanning and Geophysical Measurements of the Smackover Formation from the Roberson 18-19 Core

License(s):

- No License Restrictions
- License Not Specified

Core Characterization of the Smackover Formation using XRF, multi-core logging, and CT scanning.

Followers: 0

Follow

Authors

Natalie Mitchell Thomas Paronish Johnathan Moore Dustin Crandall Sarah Brown Karl B. Jarvis Rhiannon Schmitt Ben Dotson

Citation (Click to Copy)

Natalie Mitchell, Thomas Paronish, Johnathan Moore, Dustin Crandall, Sarah Brown, Karl B. Jarvis, Rhiannon Schmitt, Ben Dotson, Computed Tomography Scanning and Geophysical Measurements of the Smackover Formation from the Roberson 18-19 Core, 8/23/2022, <https://edx.netl.doe.gov/dataset/computed-tomography-scanning-and-geophysical-measurements-of-the-smackover-formation-from-the-roberston-18-19-core>

Data and Resources

Filter resources by name...



Date: Newest → Oldest

☐ gif.zip License Not Specified

⋮

☐ Micro CT Tifs Downscaled No License Restrictions

☐ Roberson Data Notes No License Restrictions

☐ Multi Sensor Core Logger No License Restrictions

1 2 »

Keywords

Computed Tomography Core Characterization Smackover XRF limestone

Additional Info

Core Characterization EDX Group Page

<https://edx.netl.doe.gov/group/core-characterization>

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 - **Newer** data more accessible
 - Use of zipped folders to combine data subsets
 - Use of notes files

Roberson Data Notes

No License Restrictions

[URL: http://edx.netl.doe.gov/dataset/710fb872-29c1-4ccf-a1ac-318938c1affa/resource/d95e24d1-baa6-48a6-8562-1b7cc489ff6a/download](http://edx.netl.doe.gov/dataset/710fb872-29c1-4ccf-a1ac-318938c1affa/resource/d95e24d1-baa6-48a6-8562-1b7cc489ff6a/download)

Core Photos

The Roberson core is a limestone containing the Snackover Formation.

There were 4 cored sections.

The cores from the flat box (1/3 core) were photographed.

The photographs of the cores are in their respective core folders labelled Core 1, etc.

MSCL- GeoTek MultiSensor Core Logger

The excel sheets contain processed data collected from the Roberson slabbbed core (2/3 core).

Data includes p-wave velocity, XRF, gamma density, and magnetic susceptibility.

The XRF data for the core was collected from 2 different Olympus XRF instruments (Olympus 1 and Olympus Vanta).

Olympus 1 XRF was attached to the logger and a suite of data was collected from depths 8882 to 9038ft and 9075 to 9170ft.

Olympus 1 XRF died.

Olympus Vanta HH XRF is new and was run on the core from depth 9038- 9075ft. The core was then run through the logger to collect the other types of data, w

All the data from Olympus 1 and Olympus Vanta were combined into one excel sheet and used to make the elemental and ratio logs.

Videos

Videos of the core include GIF, AVI, and Tif format.

The videos are animation showing variation along the length of the core.

High and Low Energy Tif Stacks

Medical x-ray CT scans of high and low energy tif stacks.

Dual Energy Density Measurements

The DepthID and High Energy Density Data folders were processed to produce the density data excel sheet.

High energy tif used.

Micro CT Tifs Full Resolution

No License Restrictions

[URL: http://edx.netl.doe.gov/dataset/710fb872-29c1-4ccf-a1ac-318938c1affa/resource/2abc7bf6-a874-49b9-892b-95958b4e10c4/download](http://edx.netl.doe.gov/dataset/710fb872-29c1-4ccf-a1ac-318938c1affa/resource/2abc7bf6-a874-49b9-892b-95958b4e10c4/download)

Zip File Browser

Individual files can be downloaded by clicking on the file's name.

Zip File

Roberson 8906.7 1-15H umCT.tif

Roberson 8926.0 1-15H C2B13 4x umCT.tif

Roberson 8926.0 1-15H C2B13 umCT.tif

Roberson 9005.4 1-15H C3B8 10x umCT.tif

Roberson 9005.4 1-15H C3B8 M70 umCT.tif

Roberson 9093.6 1-15H C4B7 10x umCT.tif

Roberson 9093.6 1-15H C4B7 M70 umCT.tif

Revision History

File Name	Date	User
(Currently Viewing) Micro CT Tifs Full Resolution	September 15, 2022, 16:37:17 (EST)	mitchellna
micro_ct_tifs_full_resolution.zip	September 15, 2022, 14:43:53 (EST)	mitchellna

Moving Beyond the Core Characterization EDX Group

Beta Viewing and Feedback Session at Tools Demo!

- Organization is improved, but still not as human accessible as desired
- RokBase

About RokBase | RokBase

rokbase.org

N E TL

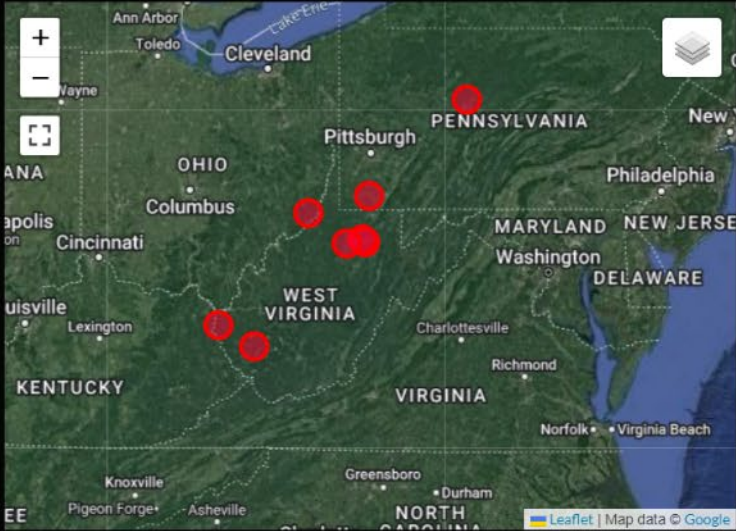
NATIONAL
ENERGY
TECHNOLOGY
LABORATORY

RokBase

Log in

About RokBase

RokBase is a platform designed to allow for easy exploration and visualization of high resolution data from field operations. Projects funded by the Department of Energy are the primary focus, though other relevant data streams can be included. The current instance of RokBase is focused on data associated with Core Characterization Technical Report Series (TRS) on the Energy Data eXchange (EDX). All wells are listed on the home page, within each link is an EDX link for the TRS, all associated data from the Multi-Sensor CoreLogger (MSCL) (includes XRF, gamma density, p-wave velocity, and magnetic susceptibility data), zipped high resolution CT data, and visualization links for medical CT scans of each individual cored section. The visualization includes both a static images and CT videos. All data on RokBase is available for download.



Rok Collections

Well Name	API	Core Location	Publicly Available	Funding Agency
Armstrong #1	47-091-01116	WVGES, Morgantown	Yes	FE-30

RokBase Homepage

- Integrating geospatial information with well data

Rok Collections

Well Name	API	Core Location	Publicly Available	Funding Agency
Armstrong #1	47-091-01116	WVGES, Morgantown	Yes	FE-30
Coldstream 1MH	37-033-26848	NETL, Morgantown	Yes	FE-30
Dunham Pad A 4H	47-091-01285	NETL, Morgantown	Yes	FE-30
Jay P Smith #1	47-099-01572	WVGES, Morgantown	Yes	FE-30
Nathan Goff #55	47-033-05106	WVGES, Morgantown	Yes	FE-30
Tippens 6H	34-111-24358	SWN, Fayetteville, AK	No	FE-30
Whipkey ST 1	37-059-24715	NETL, Morgantown	Yes	FE-30
Yawkey #98	47-045-01815	NETL, Morgantown	No	FE-30

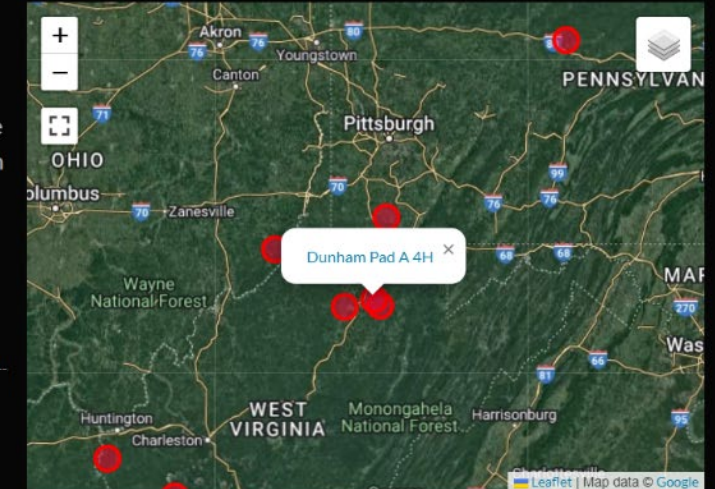


RokBase

Login

About RokBase


RokBase is a platform designed to allow for easy exploration and visualization of high resolution data from field operations. Projects funded by the Department of Energy are the primary focus, though other relevant data streams can be included. The current instance of RokBase is focused on data associated with Core Characterization Technical Report Series (TRS) on the Energy Data eXchange (EDX). All wells are listed on the home page, within each link is an EDX link for the TRS, all associated data from the Multi-Sensor CoreLogger (MSCL) (includes XRF, gamma density, p-wave velocity, and magnetic susceptibility data) along with geospatial CT data and distribution data for



tion Publicly Available Funding Agency

RokBase Beta Capabilities

- Detailed Well Info
- Links to full well data downloads and links to EDX Group info



RokBase




Log in

Dunham Pad A 4H

API: 47-091-01285

DOE Office: FE-30
Description: 2/3rds core
Comment: Core was scanned at NETL and core details on SESAR
Core Location: NETL, Morgantown
Collection Method: Drilling
Material: Rock Core
Core Publically Available: Yes

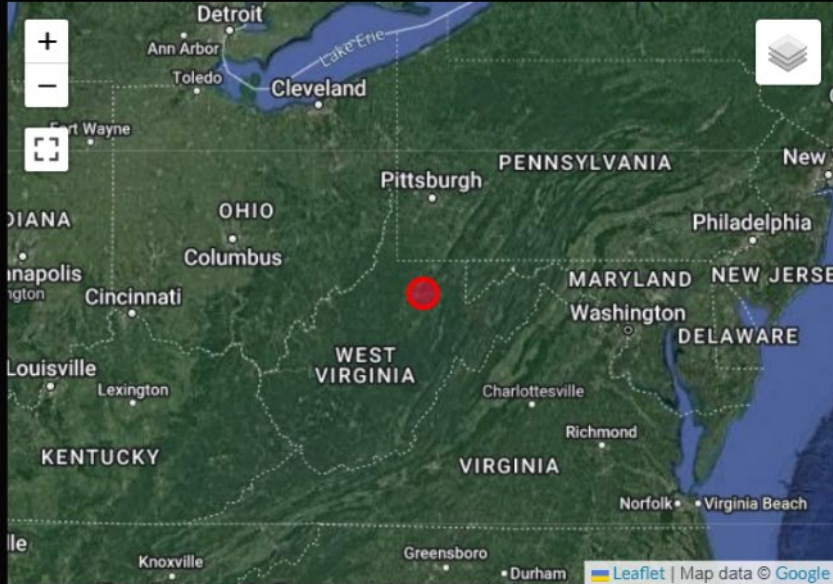
Files

Core Logs:  [Core_Logs.zip](#)
All MSCL Data:  [DunhamPadA_4H_Combined.xlsx](#)
XRF Data:  [XRF Files.zip](#)

Links
















EDX Primary Submission: <https://edx.netl.doe.gov/dataset/dunham-pad-a-4h-well>
TRS (NETL Report): <https://edx.netl.doe.gov/dataset/ct-scanning-and-geophysical-measurements-of-the-marcellus-formation-from-the-dunham-pad-a-4h-well>

Taylor County, WV, United States



RokBase Beta Capabilities

- Individual Core Box & CT Scan Data Visualization

	Dunham Pad A 4H - 7502	7502.00	7505.00	1
	Dunham Pad A 4H - 7505	7505.00	7508.00	1
	Dunham Pad A 4H - 7508	7508.00	7511.00	1
	Dunham Pad A 4H - 7511	7511.00	7514.00	1
	Dunham Pad A 4H - 7514	7514.00	7517.00	1
	Dunham Pad A 4H - 7517	7517.00	7520.00	1
	Dunham Pad A 4H - 7520	7520.00	7523.00	1
	Dunham Pad A 4H - 7523	7523.00	7526.00	1
	Dunham Pad A 4H - 7526	7526.00	7529.00	1
	Dunham Pad A 4H - 7529	7529.00	7532.00	1
	Dunham Pad A 4H - 7532	7532.00	7535.00	1
	Dunham Pad A 4H - 7535	7535.00	7538.00	1
	Dunham Pad A 4H - 7538	7538.00	7541.00	1
	Dunham Pad A 4H - 7541	7541.00	7544.00	1
	Dunham Pad A 4H - 7544	7544.00	7547.00	1

Dunham Pad A 4H - 7526

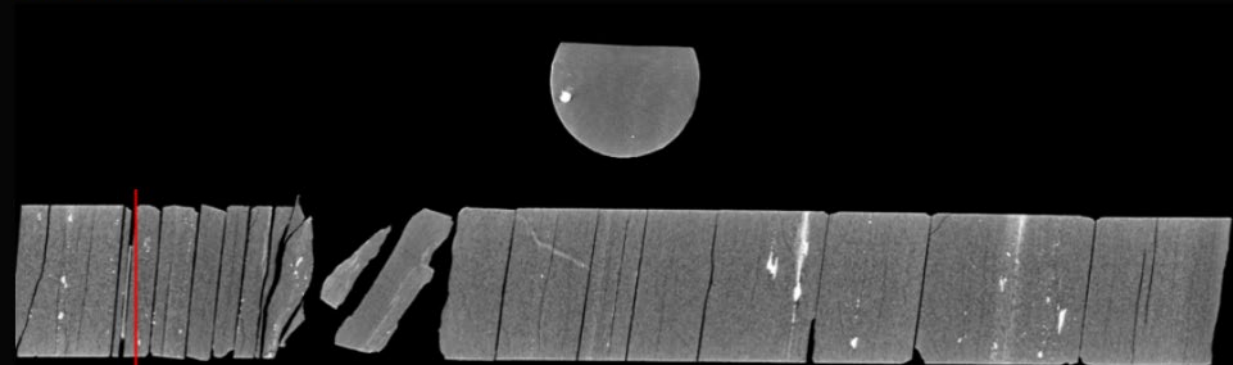
Dunham Pad A 4H

Core Number: 1
Depth-Min: 7526.00
Depth-Max: 7529.00
Classification: Shale
Geologic Age: Devonian
Geological Unit: Marcellus

Photograph



Processed CT Data



Single Medical CT Image

Linking Additional Data Streams in RokBase

- Structured data ingestion process to be flexible for other data streams
 - Coldstream en echelon fracture
 - TRS 2018 > Geosphere 2020 > RokBase 2022

The screenshot displays the RokBase web interface. At the top, the NETL logo and 'RokBase' title are visible. The main content area is titled 'Coldstream 1MH Well - 7100' and includes a 'Coldstream 1MH' section with the following details: Core Number: 2, Depth-Min: 7100.00, Depth-Max: 7103.00, Classification: Shale, Geologic Age: Devonian, Geological Unit: Marcellus, Physiographic Feature: En echelon fractures are present at a depth of 7100 ft, and Industrial CT Scans: Coldstream_Ind_CT_Video_7100.avi. To the right, a 'Photograph' section shows a photo of a core sample. Below this, a 'Single Medical CT Image' section shows a grayscale CT scan of a rock sample. At the bottom, a video player is embedded, showing a 3D visualization of the core sample with a yellow/orange fracture network. The video player controls show a duration of 00:08 / 00:15.

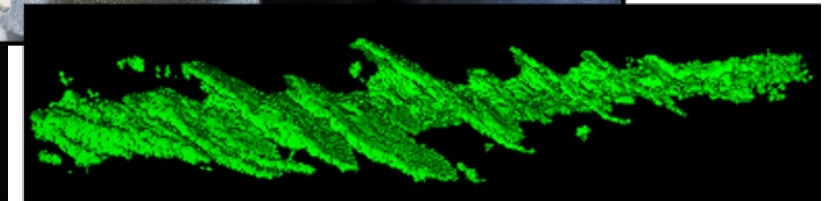


Computed Tomography Scanning and Geophysical Measurements of Core from the Coldstream 1MH Well

15 March 2018



Office of Fossil Energy
NETL-TRS-5-2018

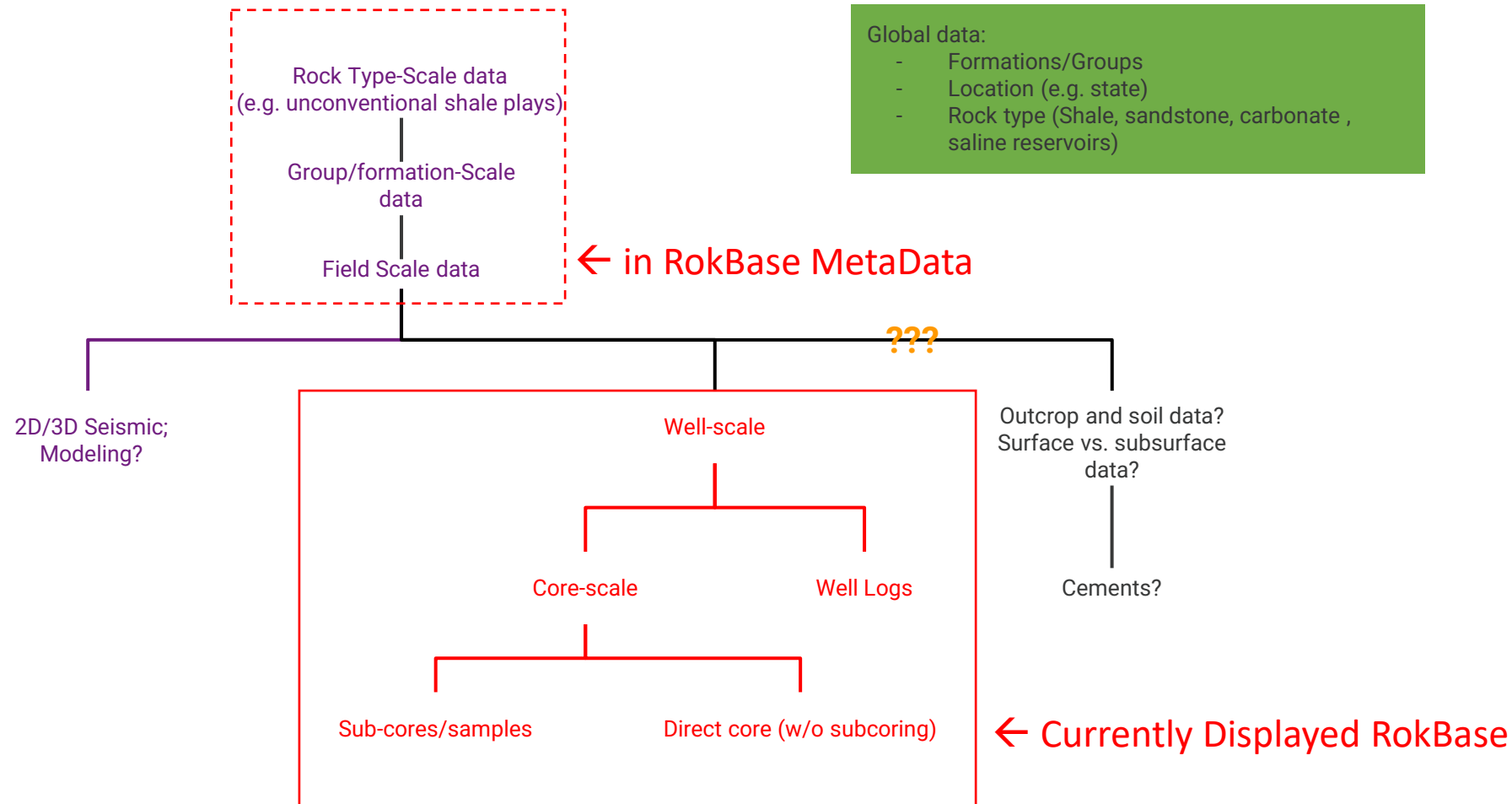


Andrews, G.D.M., Brown, S.R., Moore, J., Crandall, D., Mackey, P. (2020) **Computed Tomography X-Ray Scanning Reveals the Transition from Planar to Sigmoidal En Échelon Morphology in a Single Vein**, Geosphere
<https://doi.org/10.1130/GES02191.1>

RokBase Data Structure

Parent/Child Structure Allows for Wide Range of Data to be Co-Collected

- Using the core characterization data stream to build the architecture, beta test, and refine whilst keeping an open backend for multiple data streams and visualizations

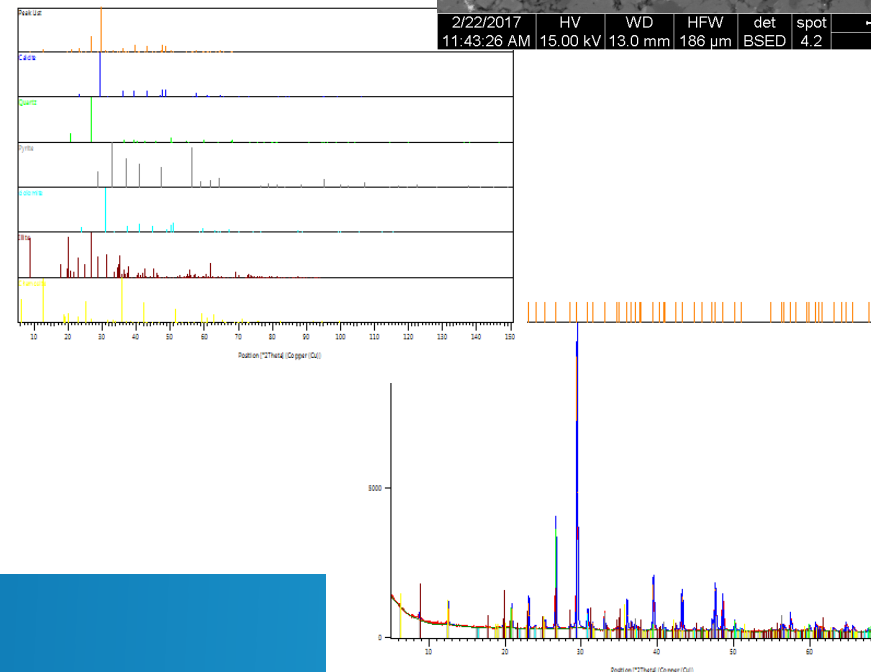
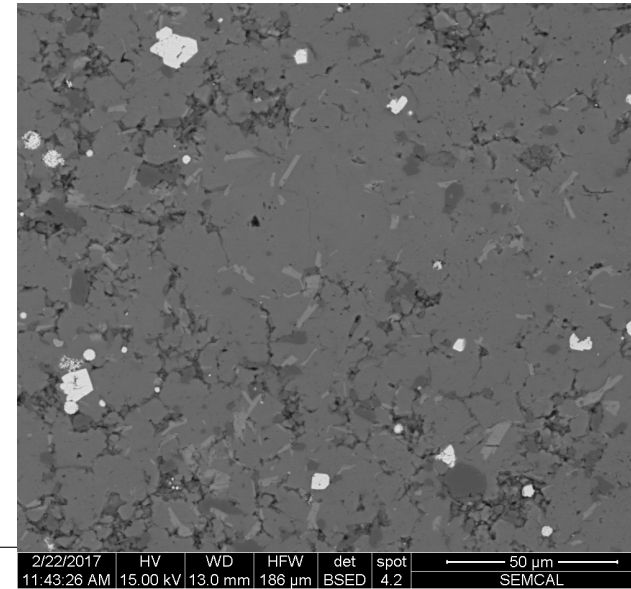
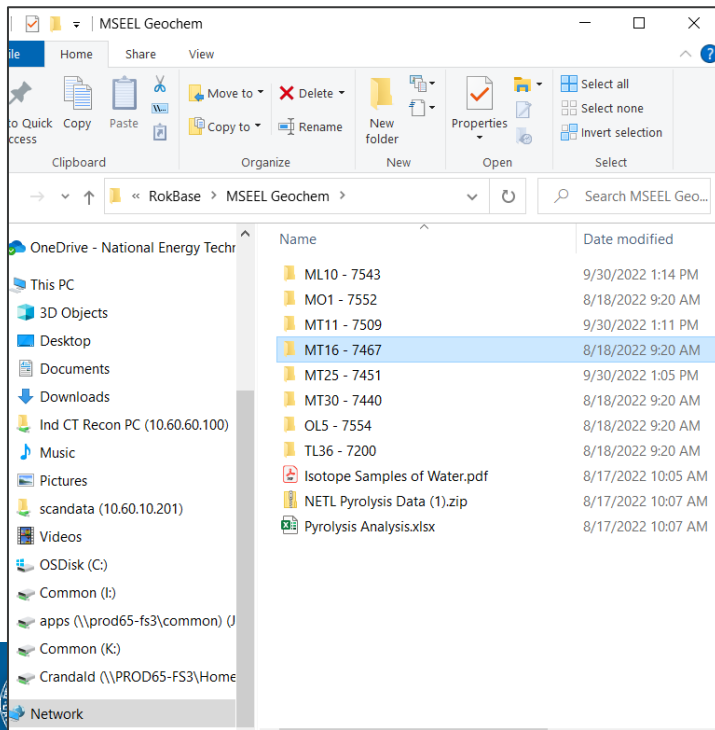


Using MSEEL Geochemistry Data as an expanded Trial Case

Work in progress, over the next weeks

- **Familiarity with MSEEL MIP3H Well Geochemistry, so using this as broader test case**

- SEM, water isotopes, pyrolysis, sorption data.



Drilled

Whole well
(Ternary representation: XRD; XRF; ICP-MS,
etc.)(chemostratigraphic data types)

Core
(chemostratigraphic
data types)

Sub-cores/samples
(ICP-MS)

Raw data (direct w/o
subcoring)

Integration with Field Laboratory Data Streams

- **And that brings it back to the discussion of field lab data. The richness of these data sets is incredible and the investment from the DOE is laudable.**
 - Acquisition, uploading, and curation takes time and effort
 - Individual resources from these sets can have profound impacts
 - HFTS Fracture spacing data use in the multiple national lab fundamentals of shale effort
 - Individual resources can diverge into a wide array of insights
 - Coldstream en echelon fracture
 - Z. Karpyn fracture scan in 2008 ... (PhDs > multiphase insights > Digital Rocks Portal)
- **The true utility and outcomes from these field efforts may not be known for decades, but only if they are accessible**



Summary and Work in Progress

- **Data ingestion from field laboratories underway**
 - Data in private workspaces
- **Data curation from field laboratories underway**
 - Data is being collected into public EDX Groups
- **Beta version of more user-friendly integrated platform (RokBase) complete**
 - Tools demo after this talk
 - Geochemistry data streams incorporation underway
- **Expansion of RokBase utility and incorporation with Cloud Based EDX++ platform underway**

Acknowledgements, contacts, and links

Thank you to all the field labs and their DOE sponsors for making such a rich field to play in.

Thank you to the NETL collaborators, past and present, for the work shown here today.

Any questions?

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<https://edx.netl.doe.gov/group>