

DOCUMENTATION PAGE

Project: Utah Forge; Jul 2023	For: Frontier Observatory for Research in Geothermal Energy (FORGE), Energy & Geoscience Institute
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Report Date: Aug 15, 2023	
Title/Subtitle: Final Report	Author(s): Dana Jurick, Artur Guzik
Contractor Name and Address: Neubrex Energy Services (US), LLC 11125 Hwy 159 West Bellville, TX 77418	Type of Report: Final Technical Report
Client Name: Forge	P.O. No:
	Consultant Name & Address: N/A
Supplementary Note: Report is supported by a PowerPoint presentation.	Wells: Utah Forge 16B(78)-32 (API: NA)
Key Words: Utah Forge 16B(78)-32, Evo 1 Temperature, Strain, Acoustic DTS, DSS, DAS DFOS Monitoring	
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File Name:	

Final Deliverables Transmittal Page*

From: Neubrex Energy Services (US), LLC.	To: Energy & Geoscience Institute
Address: 11125 Hwy 159 West Bellville, TX 77418 Phone: 713-899-1545	Address: 423 Wakara Way, Suite 300 Salt Lake City, UT 84108 Phone: (801) 581-5126
Attention: Dana Jurick	Attention: Dr. John McLennan
Deliverable Description	Format
Project Final Report:	PDF Digital
Processed Digital Data	File names: See following pages

Sent By: Dana Jurick, Neubrex Energy Services (US), LLC

Signature: _____

Date: _____

Received By: _____

Signature: _____

Date: _____

***Please sign and return dated copy/scan to:** dana.jurick@neubrex.com

Data description

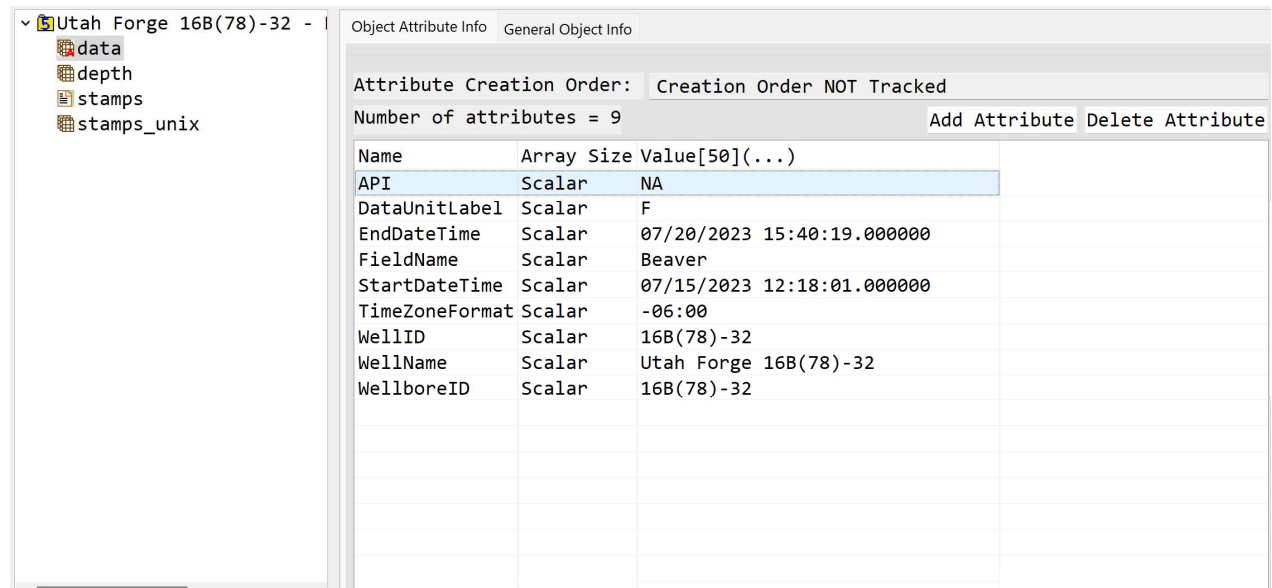
The following data is made available in electronic form as files.

All measurements were performed between **Jul 13, 2023, 01:13** and **Jul 14, 2023, 11:13**.

All reported times are UTC-06:00.

File format

Files are provided in HDF5 or csv formats. For HDF5 file the following structure is used. Traces time stamps are provided in standard and UNIX formats.



Name	Array	Size	Value[50](...)
API	Scalar		NA
DataUnitLabel	Scalar		F
EndDateTime	Scalar		07/20/2023 15:40:19.000000
FieldName	Scalar		Beaver
StartDateTime	Scalar		07/15/2023 12:18:01.000000
TimeZoneFormat	Scalar		-06:00
WellID	Scalar		16B(78)-32
WellName	Scalar		Utah Forge 16B(78)-32
WellboreID	Scalar		16B(78)-32

Figure 1. The HDF5 file format

File reading tools

HDF5 file can be read using various applications and many programming languages. An example code in Python is provided along all deliverables. Using the reader and plotting library the sample data set as shown below can be created.

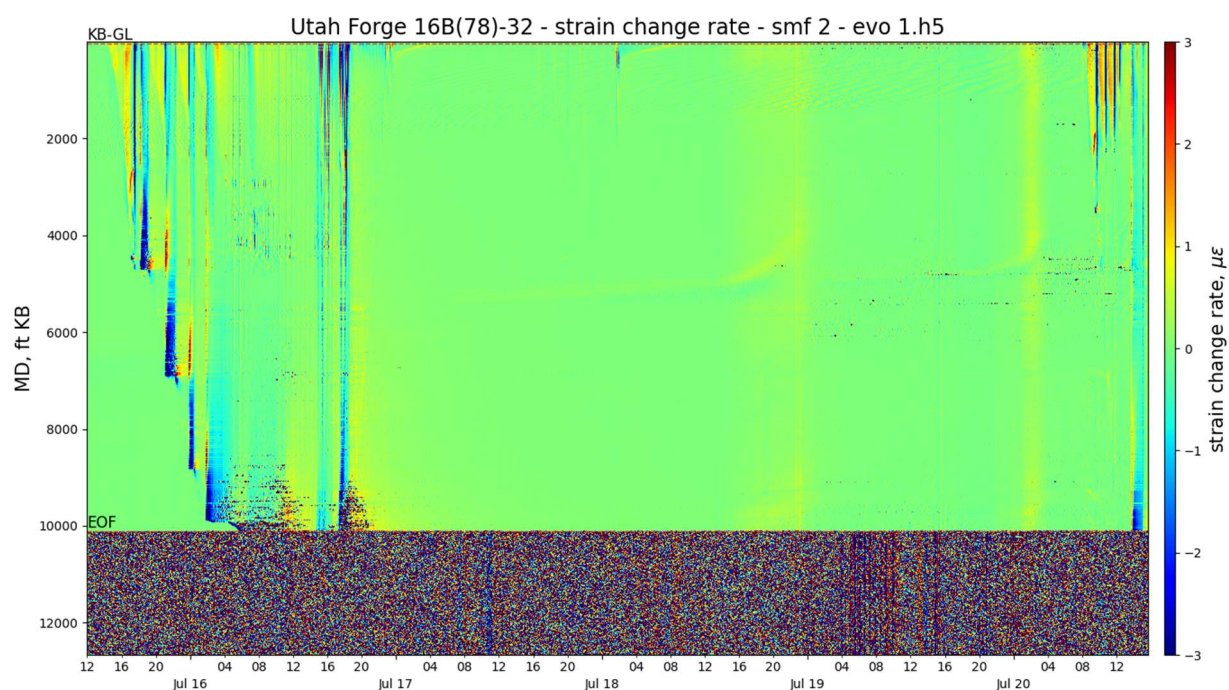


Figure 2. Example of data file content plot

Well Utah Forge 16B(78)-32

List of deliverables for this well is shown in tables below.

Table 1. Deliverable files – names and description of their content

File name	Description of content
Utah Forge 16B(78)-32 - DTS - mmf 2 - evo 1.h5	Absolute temperature
Utah Forge 16B(78)-32 - strain change - smf 2 - evo 1.h5	RFS based strain change rate
Utah Forge 16B(78)-32 - strain change rate - smf 2 - evo 1.h5	RFS based strain change rate
Utah Forge 16B(78)-32 - absolute strain - smf 2 - evo 1.h5	Absolute strain
Utah Forge 16B(78)-32 - FBE - smf 1 - part 1 - evo 1.h5	FBE data (PRODML format)
Utah Forge 16B(78)-32 - FBE - smf 1 - part 2 - evo 1.h5	FBE data (PRODML format)
Utah Forge 16B(78)-32 - FBE - smf 1 - part 3 - evo 1.h5	FBE data (PRODML format)

Table 2. Data distributed in electronic form

File name	First trace	Last trace	Number of traces	Samples per trace	Format
Utah Forge 16B(78)-32 - DTS - mmf 2 - evo 1.h5	Jul 15, 2023, 12:18:01	Jul 20, 2023, 15:40:19	1,720	6,214	HDF5
Utah Forge 16B(78)-32 - strain change - smf 2 - evo 1.h5	Jul 15, 2023, 11:55:41	Jul 20, 2023, 15:43:15	6,193	37,775	HDF5

Utah Forge 16B(78)-32 - strain change rate - smf 2 - evo 1.h5	Jul 15, 2023, 11:55:41	Jul 20, 2023, 15:43:15	6,193	37,775	HDF5
Utah Forge 16B(78)-32 - absolute strain - smf 2 - evo 1.h5	Jul 15, 2023, 10:52:09	Jul 20, 2023, 16:12:38	6	75,367	HDF5
Utah Forge 16B(78)-32 - FBE - smf 1 - part 1 - evo 1.h5	Jul 17, 2023, 13:26:33	Jul 17, 2023, 18:59:01	9,975	1,174	HDF5
Utah Forge 16B(78)-32 - FBE - smf 1 - part 2 - evo 1.h5	Jul 18, 2023, 08:00:03	Jul 20, 2023, 09:03:01	88,290	1,174	HDF5
Utah Forge 16B(78)-32 - FBE - smf 1 - part 3 - evo 1.h5	Jul 20, 2023, 09:50:15	Jul 20, 2023, 15:23:43	10,005	1,174	HDF5