

**Table 1. Data items of interest for National Geothermal Data System. Compiled by S. M. Richard from proposals by State Geological Surveys and phone conversations with NGDS Boise State project partners.**

<b>Data Item</b>	<b>Item count</b>	<b>Services</b>	<b>Notes</b>
Metadata	1170000	CSW, ISO19139	Will have to integrate metadata generated using a variety of specifications.
Borehole temperature data	570000	WFS: observation; WCS for continuous; WITSML log	Different kinds of temperature observations may need some clarification. Use coverage service for continuous temperature logs.
Borehole lithology log	94800	WFS: mapped feature; WITSML log?	Treat as borehole features with described intervals modeled as GeoSciML mapped features. Investigate WITSML log data structure as alternative
Water source characterization	84800	CUAHSI observation; WFS:observation, chemical property	Water sample is sampling feature, but there are a wide variety of possible characteristics of interest, including chemical, physical, and flow-related. Thus a soft-typed approach with {property, Measured value} pairs is recommended. Use Water Chemistry Data Item as part of this service
Document	15500	Document repository	Catalog service used to discover documents using metadata that includes URL to retrieve document from repository. Repository management discipline will have to evolve as repository grows.
Developed geothermal system feature	13700	for documents, catalog service using location; ISO19139 metadata: WFS geothermal system feature	<b>Need to model a 'geothermal system feature'</b> , determine what important characteristics to describe are.
Water Chemistry	7260	CUAHSI observation; WFS:observation, chemical property; EarthChem chemistry service	Probably would be included as facet of water source characterization, as well as separate services to report water chemistry and quality. May be able to use EarthChem service here as well.
Bottom hole temperature	5950	WFS: observation, temperature	
Heat flow measurement	2700	WFS: observation, heat flow	
Digital well log	1400	WFS: WITSML log; OGC coverage	Properties measured by log may also be observed property for observation instances associated with other kinds of sampling features (site, sample...)
Rock chemistry	1000	WFS:observation, chemical property; EarthChem chemistry service	Similar logical schema to water chemistry service, different constituents in analyses.
Hot spring description	650	for documents, catalog service using location; ISO19139 metadata; WFS: hot spring xml?	<b>Need to model a 'Hot spring feature'</b> , determine what important characteristics to describe are. Note a hot spring may be considered a kind of Water source, thus this model and water source characterization model may be closely related.

Data Item	Item count	Services	Notes
Drill stem test	400	WFS: observation. WITSML	Need to investigate WITSML to learn if it has reusable parts for DST's
Text description	200	Document repository or content management system	These may be treated as documents or nodes in a content management system like Drupal, or simply package in a database? Need more information on precisely what the information items are.
Geologic Unit geothermal characterization	150	WFS: sample, GeologicUnit: physical properties	<b>Need to define</b> physical properties necessary for geothermal characterization that are not in GeoSciML.
Volcanic vent description	140	WFS: geologicFeature: vent	<b>Need to model</b> a 'Volcanic vent feature', determine what important characteristics to describe are.
Thermal conductivity measurement	100	WFS: observation: thermal conductivity	
Active Fault	100	WFS: GeoSciML fault	fault feature, what is required content
Flow rate	100	WFS: observation: flow rate	
Geologic map	50	WMS for scans, WFS for vector data; Document repository	File discovery from catalog and download from repository for file-based (shapefiles, MIF, e00, fileGeodatabase, GML) map representations.
Permeability	20	WFS:observation: permeability	
Enhanced geothermal system feature	20	WFS: Geothermal feature	<b>Need to model</b> a 'Enhanced geothermal system feature', determine what important characteristics to describe are.
Resource suitability map	10	WMS for scans, WFS for vector data; Document repository	<b>Need to model</b> a 'resource suitability feature'. File discovery from catalog and download from repository for file-based (shapefiles, MIF, e00, fileGeodatabase, GML)
Alteration description	5	WFS: sample, GeologicUnit:	GeoSciML provides properties for alteration. Feature is sample or geologic Unit.
Fluid inclusion data	5	WFS: observation: equilibration temp, etc	FLINC observation results data type
Geothermal map	2	WMS for scans, WFS for vector data; Document repository	Need to explore what defines such a map. File discovery from catalog and download from repository for file-based (shapefiles, MIF, e00, fileGeodatabase, GML)
Aquifer temperature map	1	WMS for scans, WCS--coverage, temperature/depth grid	

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Crustal Stress data		WFS: observation, stress state tensor	stress measurement
Gravity data		WFS: observation, gravity station; WCS gravity grid; WMS for scanned map	
Intrusive body with heat		WFS: Geologic unit	Geologic unit is intrusive body, geologic unit description
Earthquake epicenter		WFS: mapped feature: 3D point, EQ epicenter feature	<b>Need to model</b> a 'earthquake epicenter feature'
Samples		WFS: sample; use SWE xml	In general, samples will need to be associated with other observation data.
Production statistics record		Energistics ProdML	<b>Need to model</b> a 'geothermal production record'. Energistics ProdML is concerned with production for oil and gas, may be able to extend easily for geothermal. Check CUAHSI for stuff on water well production. Guess that

Notes.

Data item is an information resource identified by a stake holder as an item of interest.

Item count is the approximate number of instances for that item projected in the system.

Services summarizes the existing service profiles and markup languages that may be used for a data item.

