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UGS FY2010 GEOLOGIC DATA PRESERVATION PROJECT

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ABSTRACT

In response to the U.S. Geological Survey FY2010 National Geological and Geophysical Data Preservation Program (NGGDPP) announcement, the Utah Geological Survey (UGS) proposed a collaborative project in three internal programs that focuses on four goals of the UGS data preservation plan. The major focus of this project is conversion of existing paper records to digital formats. The Geologic Hazards Program proposed to organize, scan, and create metadata for our geologic hazard and engineering geology document collection and continue digital scanning and metadata creation for historical aerial photography housed at the UGS. The Geologic Mapping Program proposed to scan, clean, georeference, and create metadata for historical geologic maps housed at the UGS. The Utah Core Research Center (UCRC) proposed to create additional metadata on our rock core collection and convert paper records to digital formats of our thin section collection and the Cyprus Coal Map Collection housed within the center. All three internal programs collaborated as a single NGGDPP project and all quantities of inventorying and metadata creation stated in the original proposal were exceeded. Specifically, the UGS created metadata for 627 engineering geology and geologic hazard reports (over 23,000 pages), 20,389 aerial photographs, 331 geologic maps, 1647 boxes of rock core, 1496 thin sections, and 194 coal maps.

INTRODUCTION

Scope of Project

The Utah Geological Survey (UGS) began geologic data preservation activities in the U.S. Geological Survey (USGS) National Geological and Geophysical Data Preservation Program (NGGDPP) with the FY2007 grant award, and has continued in the program with subsequent awards in FY2008, FY2009, and FY2010.

In recognition of the value and importance of physical and digital geologic resources, the UGS has created a long-range data preservation plan for inventorying, archiving, and preserving geologic, geophysical, and engineering data, maps, well logs, and physical samples for future use by government agencies, industry, academia, and the general public. This project is a part of our long-range data preservation plan activities.

In response to the USGS FY2010 NGGDPP announcement, the UGS proposed a collaborative project in three internal programs that focuses on four goals of the UGS data preservation plan. The major focus of this project is conversion of existing paper records to digital formats. The Geologic Hazards Program proposed to organize, scan, and create metadata for our geologic hazard and engineering geology document collection and continue digital scanning and metadata creation for historical aerial photography housed at the UGS. The Geologic Mapping Program proposed to scan, clean, georeference, and create metadata for historical geologic maps housed at the UGS. The Utah Core Research Center (UCRC) proposed to create additional metadata on our rock core collection and convert paper records to digital formats of our thin section collection and the Cyprus Coal Map Collection housed within the center. All three internal programs collaborated as a single NGGDPP project and all quantities of inventorying and metadata creation stated in the original proposal were exceeded.

Utah Core Research Center

The UGS's Utah Core Research Center (http://geology.utah.gov/emp/corecenter/index.htm), established in 1951 and now occupying a 13,866-square-foot warehouse, offers public access to Utah's

most comprehensive collection of geological samples for petroleum-industry research, workshops, geologic short courses, and cooperative industry and/or UGS projects.

UCRC holdings include rock core from more than 875 oil and gas wells, and subsurface cutting samples from more then 3800 wells, throughout the state. The UCRC collection also includes rock core from major oil shale and tar sand deposits; type oils from all the producing formations in the state; a small number of geotechnical borehole samples; and representative samples from Utah's coal mines, metallic and non-metallic mineral deposits, industrial rocks and minerals, and geothermal wells. Great Salt Lake sediment and brine samples are also stored at the UCRC. The UCRC provides service to all interested individuals, universities, and companies requiring direct observation of actual samples for their research or investigations, and it acts as a repository for irreplaceable geologic samples that might otherwise be discarded.

RESULTS

The FY2010 Utah NGGDPP project consisted of a collaborative project in three internal programs. The Geologic Hazards Program created metadata for over 23,000 pages from our geologic hazard and engineering geology document collection and over 20,000 historical aerial photographs housed at the UGS. The Geologic Mapping Program inventoried and created metadata for over 300 historical geologic maps housed at the UGS. The UCRC photographed and updated metadata for over 1600 core boxes, and created metadata for over 1400 thin sections and inventoried the Cyprus Coal Map Collection.

Table 1 lists the UGS collections that were part of the FY2010 Utah NGGDPP project, along with their respective National Digital Catalog (NDC) collection identification numbers, item quantities originally proposed to be inventoried and/or have metadata created for, and the actual number of items that were inventoried and for which metadata was created. The goals set forth in our original proposal (November 17, 2009) that included the proposed quantities of inventorying and creation of metadata were all exceeded during the course of this project.

Table 1 – FY2010 NGGDPP Award Progress Summary

Collection			Item Quanities	
Name		NDC ID	Proposed	Completed
Geologic Hazard and Engineering Geology Documents		4777844	10,000 pages	23,735 pages
Historical Aerial Photography		4777842	20,000 frames	20,389 frames
Historical Geologic Maps		2203971	300 maps	331 maps
UCRC Collections	Core Collection	2369695	833 core boxes	1647 core boxes
	Thin Section Collection	1088754	1300 thin sections	1496 thin sections
	Cyprus Coal Map Collection	4777854	Inventory	194 maps

In addition to our original proposal, we inventoried, cleaned, and scanned our collection of historical (1936-1952) U.S. Department of Agriculture, Soil Conservation Service (SCS) semi-controlled orthophotomaps (generally 15-minute quadrangle size) for Utah in 2010. The UGS digitally scanned these maps at 600 dpi, then georeferenced them with a minimum of four points to create GeoTIFF images of each map. The process generally followed the requirements of the USGS Digital Raster Graphic (DRG) map format. The images were then transferred to the Utah Automated Geographic Reference Center (AGRC) for serving on their ImageServer (http://gis.utah.gov/sgid-image-server/) with on-the-fly

clipping to produce a seamless image where adjacent orthophotomaps are available. This dataset represents the earliest known available orthophoto data of Utah.

Metadata created as part of this project followed the NGGDPP specifications (Data Preservation Working Group, 2006; USGS, 2008, 2009) and an XML template (http://datapreservation.usgs.gov/docs/collectionMetadataExample.xml) developed by the NGGDPP. The UGS provided the metadata to the USGS in XML format for upload into the NDC, with one XML file for each collection.

Historical Aerial Photography Metadata Creation

The UGS Historical Aerial Photography Collection contains aerial photography of Utah originally taken from 1935 to the present, and includes over 75,000 frames and associated indexes, orthophotomaps (semi-controlled orthophotos), and other materials. Aerial photographs are highly sought after for use in geologic, geotechnical, and environmental investigations to document geologic hazards, land-use, geomorphologic, and other changes that may have occurred in a particular area, along with mapping geology, cultural, and vegetation features. The Geologic Hazards Program inventoried, scanned, and created metadata on 20,389 frames in the collection.

As part of the metadata creation process, the UGS developed the ImageryManager database system to manage the collection and store associated metadata. The system uses a Microsoft SQL Server 2008 back-end database and a C# Windows front-end application developed specifically for storing aerial photography and other imagery metadata. The system was developed using modern programming tools and methods, and allows for continued expansion of metadata records and future functionality improvements. We are currently developing a web-based search application for public access to frames in the public domain, which is expected to be available late 2011.

During the metadata creation process, individual aerial photography frames were sorted by the original acquiring agency, project code, and frame number, creating project sets. These project sets were then assessed for importance in current geologic projects at the UGS and public needs, and a priority list was developed. Project sets in priority order were then sent to Utah Correctional Industries (UCI) at the Utah State Prison for digital scanning using UGS-owned and maintained scanners (Epson Expression 10000XL and Creo EverSmart Select II). To be as cost-effective as possible, UCI was used for the majority of digital scanning services. Because UCI uses these types of projects to provide work experience for prison inmates, they are able to perform the work at a small fraction of commercial rates.

Due to degradation from use, potential for loss and theft, and replacement (high cost or irreplaceable) issues, a goal of the UGS Geologic Data Preservation Plan is to digitally scan frames for general use by end-users. This allows end-users access to a high-quality reproduction of the original paper photograph or film positive/negative that can be printed or used in software applications without damaging the original. UCI scanned the paper photograph frames using color profiled Epson 10000XL scanners and film photograph frames on a Creo EverSmart Select II scanner with an Adobe RGB (1998) color profile. Paper photograph frames were scanned at full-size, with a resolution of 800 dpi, 8-bit color or grayscale depth, and saved in TIFF format. Film photograph frames were scanned at full-size, with a resolution of 1200 dots per inch (dpi), 8-bit color or grayscale depth, and saved in TIFF format. In addition, UCI entered basic metadata into the TIFF files using Adobe's XMP metadata system for subsequent upload into our ImageryManager database.

After scanning each frame, a quality control check at UCI was performed on each digital file to verify the correct filename based on a pre-defined file naming system, and that the scan was of high quality. Digital files that did not meet the quality control requirements were sent back for rescanning.

During file transfer from UCI to the UGS, a second quality control check was performed to verify correct filenames and file quality. The UGS found very few digital files produced by UCI that did not meet our quality requirements and that required subsequent rescanning.

Index maps associated with each project set, where available, were scanned on a Contex Chroma HS 42 scanner, with a resolution of 600 dpi, 8-bit color or grayscale depth, and saved in TIFF and Adobe PDF formats. These index maps were then enhanced in Adobe Photoshop to remove scanning artifacts, dust, and other defects in the scanned image. After enhancement, each index map with coordinate data was georeferenced in ESRI ArcGIS 10 software, after which frame center points were digitized if possible given the index map format. Each index map was georeferenced using the North American Datum of 1927 (NAD27), the native map datum, and was then converted to the current NAD83 datum for metadata entry into the ImageryManager database. Metadata on the index maps was not collected as part of this project, and data is not included within the metadata XML file uploaded to the USGS.

Metadata within the XML file for the historical aerial photography follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 4777842 to the Historical Aerial Photography Collection.

- Title – The title field was populated with the individual aerial frame project year, project code, and roll number, flight line number, and frame number, where available. Example: Aerial Photograph: 1937 AAJ-AAK 10-1-1

- Alternate Title – The alternate title field was populated with the name of the original acquiring agency. Example: Original Acquiring Agency: USDA, Agricultural Adjustment Administration

- Abstract – The abstract field was populated with a standard description of the individual record. Example: This item represents a single aerial photography frame that is part of the Utah Geological Survey (UGS) Historical Aerial Photography Collection, housed at the UGS offices in Salt Lake City. Frames may be available from the DNR Library (801) 537-3333.

- Data Type – The data type field was populated with a common descriptor from the controlled list. Example: Photographs

- Supplemental Information – The supplemental information field was populated with the location of the digital file at the UGS. Example: UGS Digital Location: I:\Imagery\1937_AAJ-AAK\10-AAJ_1-1.tif

- Coordinates – The coordinates field was populated with geographic longitude and latitude frame center point coordinates (NAD83). Example: -110.60219, 40.20762

- Online Resource – The online resource field was populated with a URL address of a web page describing the Historical Aerial Photography Collection. Example: http://geology.utah.gov/ghp/consultants/aerial_compilations.htm

- Date – The date field was populated with the date of the aerial photograph, as printed on the frame. Example: 1935-04-12

- Dataset Reference Date – The dataset reference date field was populated with the date of the digital scan. Example: 2009-01-02

Engineering Geology and Geologic Hazard Report Metadata Creation

The UGS has collected reports, maps, memorandums, field notes, and other geologic hazard and engineering geology documents since the formation of the Site Investigation Section (now Geologic Hazards Program) in 1980. Few copies were ever produced of most of the documents in the collection. These documents are used in geologic hazard investigations, geologic and geologic hazazd mapping projects, during emergency response activities, and in response to public inquiries. The UGS incorporated brief metadata on some of these documents into the UGS-developed Hazards Bibliography (HAZBIB) Microsoft Access database, starting in 1992.

Due to age, quality control issues, and use of outdated database technology (i.e., not multi-user capable), and that the HAZBIB database is no longer functioning properly, additional use and maintenance is not cost-effective. In addition, none of the documents referenced in the database are available electronically or internally text searchable. In order to make these valuable geologic hazard and engineering geology documents more easily available for research and use, we built a new database system (HAZDOCS) based on the open-source ResourceSpace digital asset management system (http://www.resourcespace.org/) to enter, store, query, and retrieve metadata and scanned documents. The Geologic Hazards Program inventoried and created metadata on 23,735 pages (627 reports) in the collection.

The UGS collected and sorted geologic hazard and engineering geology documents from our data holdings and sent them to UCI for scanning (using the universally used Adobe PDF format), optical character recognition (OCR), and partial metadata creation. UCI entered basic metadata fields, such as title, author, date, publisher, report number, county/state location, document type, and media type into XMP compliant metadata within the PDF file. A UGS geologist or geological technician evaluated each document and associated metadata and entered metadata fields of geologic hazard type (keywords), geographic coordinates, copyright status, and other technical information or notes as needed in ResourceSpace during the document upload process.

Metadata within the XML file for the engineering geology and geologic hazard reports follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 4777844 to the Engineering Geology and Geologic Hazard Document Collection.

- Title – The title field was populated with the individual report title. Example: Report; Geotechnical/Engineering Geology Reconnaissance Study; Proposed Approximate Eight-Acre, One-Lot Subdivison; North and East of Tomahawk Drive and North of Limekiln Gulch; Salt Lake City, Utah.

- Abstract – The abstract field was populated with a standard description of the individual record and report author. Example: Report contained in the Utah Geological Survey HAZDOCS (engineering geology, geologic hazard, and geotechnical reports and data) system. Author: Gordon, W.

- Data Type – The data type field was populated with a common descriptor from the controlled list. Example: Reports

- Supplemental Information – The supplemental information field was populated with the ResourceSpace (HAZDOCS) resource identification number. Example: Resource Space/HAZDOCS Resource ID 436

- Coordinates – The coordinates field was populated with geographic longitude and latitude of the approximate center of the report-referenced project area (NAD83). Example: -110.60219, 40.20762

- Online Resource – The online resource field was populated with a URL address of the HAZDOCS system. Example: http://geoarc.geology.utah.gov

- Date – The date field was populated with the date of the report. Example: 1994-01-03

- Dataset Reference Date – The dataset reference date field was populated with the date of the digital scan. Example: 2011-06-23

Geologic Map Metadata Creation

The UGS Geologic Map Database (called MAPBIB) contains an inventory of approximately 2850 geologic maps covering various parts of Utah, that date from about 1890 to present, and that vary from formally published USGS and UGS Map and Bulletin Series maps, to informal consulting reports and internal unpublished "sketch" maps. About half of these maps were published in production runs in which hundreds of copies were printed – most of these maps are still widely distributed and readily available. However, over 1000 of the maps in our MAPBIB database were produced in only very limited numbers, are completely out of print, are in obscure or remote libraries, or are limited-distribution "gray" literature that is very hard to locate. For a few hundred maps – we do not know the exact number – only a single copy may exist. Our long-term goal is to locate and preserve the best possible copy of all maps in the database, and to produce and archive a high-resolution digital copy of each map.

For the FY2010 Utah NGGDPP project, we archived 331 geologic maps. This involved completing the following steps: (1) assigned priorities to the first group of geologic maps in the MAPBIB database – these were geologic maps, mostly 7.5' quadrangles, produced by the UGS between about 1960 and 2000; priorities were based primarily on scale, detail, completeness, and "best available" coverage of an area; priority-1 maps were the best maps of a given area; priority-5 maps were maps that have limited geologic value, but that do have some historic value; (2) searched out the best paper or Mylar copies of about 300 of the priority-1 maps; (3) cleaned and flattened the copies; (4) scanned the copies at 400 dpi resolution on a Contex Chroma HS 42 large-format scanner that had been carefully cleaned and calibrated; (5) scanned all accompanying plates on the large-format scanner; booklets and other text were scanned by UCI; (6) imported scans into Adobe Photoshop software where images were checked for accuracy and clarity, cleaned, and straightened; (7) georeferenced the maps in ESRI ArcGIS 10 software using at least 16 control points to make sure that high precision was maintained, and saved the georeferenced maps as low compression JPEG files; (8) imported or digitized the map footprint into a spatial database for future spatial indexing and locating; (9) created Adobe PDF files of all of the maps and supporting materials to allow for easier distribution to the public; (10) created metadata that recorded dates, sources, procedures, and georeferencing information; and (11) prepared files for public distribution. These files are currently in the UGS review process.

Once the files are reviewed and approved, they will be served to the public by our sister-agency, the Utah Automated Geographic Reference Center, which is the agency charged with serving Utah geographic data to the public. Links to this data are then placed on the UGS website using searchable lists and interactive maps. Most important of all, the archive map files are stored in our UGS digital archive databank, and copies are sent to State Archives where valuable data is stored and managed. This latter step assures that the data will be "migrated" forward periodically to make sure file integrity is maintained and map files are preserved for future generations.

Metadata within the XML file for the geologic maps follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 2203971 to the Geologic Map Collection.

- Title – The title field was populated with the full title of the geologic map. Example: Tertiary stratigraphy of the Goose Creek district, Cassia County, Idaho, and adjacent parts of Utah and Nevada.

- Alternate Title – The alternate title field was populated with a shortened title containing key identifying terms. Example: Goose Creek district, Idaho, Utah, and Nevada. Scale: 63360

- Abstract – The abstract field was populated with a brief explanation of the archive map file contents and purpose. Example: This digital file is a high-resolution scan or copy of a published geologic map. It was created to archive a geologic map that could be lost to future generations.

- Data Type – The data type field was populated with a common descriptor from the controlled list. Example: Maps

- Supplemental Information – The supplemental information field was populated with the remaining components of a formal bibliographic reference for the map, including authors, publisher, and plate or figure number. Example: Mapel, W.J.; Hail, W.J., Jr.; Utah Geological Society, Guidebook to the Geology of Utah no. 11, p. 1-16, fig. 2.

- Coordinates – The coordinates field was populated with a calculated center point of each map in longitude and latitude (NAD83). Example: -114, 42.0354

- Online Resource – The online resource field was populated with a URL address of a web page that contains either the map, or a searchable index or database that will help any future user to find the digital map files. Example: http://geology.utah.gov/maps/geomap/index.htm

- Date – The date field was populated with the publication date of the geologic map; generally, this is only known to the nearest year. Example: 1956-01-01

- Dataset Reference Date – The dataset reference date field was populated with the date that the map was scanned for the data preservation archives. Example: 2010-03-31

UCRC Rock Core and Cuttings Collection Metadata Creation

For the FY2010 Utah NGGDPP project, the Utah Core Research Center (UCRC) photographed and created additional metadata for 1647 core boxes. For this project, the UGS manually collected and

entered the metadata into the Integral database. The UGS developed the Microsoft Access Integral database in the early 1990s (based on an earlier database) to store metadata associated with the UCRC Core Collection for management of the collection. New metadata that was generated by this project was exported from the Integral database into Microsoft Excel for conversion into a XML file in conformance with NGGDPP specifications for upload into the NDC.

Metadata within the XML file for the UCRC Core Collection follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 2369695 to the UCRC Core Collection.

- Title – The title field was populated with the combined information of the well operator, well name, well number, and the oil field/district name, if applicable. Example: Mountain Fuel Supply Co Cedar Rim 3; Cedar Rim

- Alternate Title – The alternate title field was populated with the American Petroleum Institute (API) number assigned to each well. If no API number was available for a well, a false API number was used in the Integral database and well metadata for identification purposes. Example: 43-013-30040-0000 [real API number used here]

- Abstract – The abstract field was populated with a description of the individual record. Example: Utah Core Research Center, geological sample. 31 boxes core, not continuous.

- Data Type – The data type field was populated with a descriptor from the controlled list that was most applicable (fluid sample, hand sample, rock core, rock cuttings). Example: Rock Core

- Supplemental Information – The supplemental information field was populated with the UCRC phone number as a resource to obtain more information about sample holdings. Example: Phone, (UCRC): (801)537-3359.

- Coordinates – The coordinates field was populated with geographic longitude and latitude coordinates in NAD83. Example: -110.60219, 40.20762

- Alternate Geometry – The alternate geometry field was populated with the Public Land Survey System (PLSS) section, township, and range, as an alternate method for locating well bores. Example: SWNE 19 3S 6W UM Duchesne UT

- Online Resource – The online resource field was populated with a URL address of a web page describing the UCRC collections. Example: http://geology.utah.gov/emp/ucrc/index.html

- Date – The date field was populated with the date of metadata creation, as the well drilled date was not available at the time of this project. Example: 2010-04-12

- Dataset Reference Date – The dataset reference date field was populated with the date of the donation of the geological sample. If no donation date was available, the date of the creation of the metadata document was used. Example: 1994-01-02

- Vertical Extent – The vertical extent field was populated with sample depth information and defined as the unit of measurement, maximum value, and minimum value. Example: feet, 8508, 7890

UCRC Thin Section Collection Metadata Creation

For the FY2010 Utah NGGDPP project, the UCRC created metadata on 1496 thin sections. For this project, the UGS manually collected and entered the metadata into the Integral database. New metadata that was generated by this project was exported from the Integral database into Microsoft Excel for conversion into a XML file in conformance with NGGDPP specifications for upload into the NDC.

Metadata within the XML file for the UCRC Thin Section Collection follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 1088754 to the UCRC Thin Section Collection.

- Title – The title field was populated with the combined information of the well operator, well name, well number, and the oil field/district name, if applicable. Example: Hunt Oil Company State 1-16; Wildcat

- Alternate Title – The alternate title field was populated with the American Petroleum Institute (API) number assigned to each well. If no API number was available for a well, a false API number was used in the Integral database and well metadata for identification purposes. Example: 43-013-30040-0000 [real API number used here]

- Abstract – The abstract field was populated with a description of the individual record. Example: Utah Core Research Center, geological sample. 31 boxes core, not continuous.

- Data Type – The data type field was populated with a descriptor from the controlled list that was most applicable (fluid sample, hand sample, rock core, rock cuttings). Example: Thin Section

- Supplemental Information – The supplemental information field was populated with the UCRC phone number as a resource to obtain more information about sample holdings. Example: Phone, (UCRC): (801)537-3359.

- Coordinates – The coordinates field was populated with geographic longitude and latitude coordinates in NAD83. Example: -110.60219, 40.20762

- Alternate Geometry – The alternate geometry field was populated with the PLSS section, township, and range, as an alternate method for locating well bores. Example: SWNE 19 3S 6W UM Duchesne UT

- Online Resource – The online resource field was populated with a URL address of a web page describing the UCRC collections. Example: http://geology.utah.gov/emp/ucrc/index.html

- Dataset Reference Date – The dataset reference date field was populated with the date of the donation of the geological sample. If no donation date was available, the date of the creation of the metadata document was used. Example: 1994-01-02

- Vertical Extent – The vertical extent field was populated with sample depth information and defined as the unit of measurement, maximum value, and minimum value. Example: feet, 8508, 7890

UCRC Cyprus Coal Map Collection Inventory and Metadata Creation

For the FY2010 Utah NGGDPP project, the UCRC inventoried and created metadata on 194 coal maps. For this project, the UGS manually collected and entered the metadata into a Microsoft Excel spreadsheet. Metadata that was generated by this project was exported from the spreadsheet into a XML file in conformance with NGGDPP specifications for upload into the NDC.

Metadata within the XML file for the UCRC Cyprus Coal Map Collection follow the NGGDPP specification and include the following fields with a description of each field:

- Collection ID – A unique identifier assigned by the NGGDPP for each collection within the NDC. The USGS assigned an identification of 4777854 to the UCRC Cyprus Coal Map Collection.

- Title – The title field was populated with the map name. Example: Kaiser Engineers Kaiparowits Coal Mining Project Drill Hole Location & Classification

- Abstract – The abstract field was populated with a description of the individual record. Example: Utah Core Research Center, Cyprus Coal Map Collection; Box # 1, 1"= 24000, Dwg# 020-03

- Data Type – The data type field was populated with a descriptor from the controlled list that was most applicable (fluid sample, hand sample, rock core, rock cuttings). Example: Map

- Supplemental Information – The supplemental information field was populated with the UCRC phone number as a resource to obtain more information about sample holdings. Example: Phone, (UCRC): (801)537-3359.

- Coordinates – The coordinates field was populated with geographic longitude and latitude coordinates in NAD83. Example: -110.60219, 40.20762

- Alternate Geometry – The alternate geometry field was populated with the PLSS section, township, and range, as an alternate method for locating well bores. Example: T40-41S R3-4E SLBM Kane UT

- Online Resource – The online resource field was populated with a URL address of a web page describing the UCRC collections. Example: http://geology.utah.gov/emp/ucrc/index.html

- Dataset Reference Date – The dataset reference date field was populated with the date of the inventory of the map. Example: 2011-05-01

DATA AVAILABILITY

General metadata and other information about the UGS UCRC Core, Thin Section, and Coal Map; Geologic Map; and Historical Aerial Photography Collections are available at the UGS website

(http://geology.utah.gov/) or by contacting the UGS at (801) 537-3300 and asking for the Geologic Information Program.

Information about the Historical Aerial Photography Collection, along with three published sets, is available at http://geology.utah.gov/ghp/consultants/aerial_compilations.htm. Due to the size of the scanned aerial photo frames, they are not yet available on the UGS website. Interested users may contact the UGS at (801) 537-3300 to acquire additional information or acquire copies that are in the public domain. We are currently developing a web-based search application for public access to aerial photography in the public domain that is expected to be available late-2011.

Information about the Geologic Map Collection is available at http://geology.utah.gov/maps/geomap/index.htm and GIS data for some of the maps is available at http://geology.utah.gov/maps/gis/index.htm and on the AGRC SGID Database Server (http://gis.utah.gov/sgid_connect). Scanned geologic maps are also being distributed by AGRC using their ESRI ImageServer as reviews are completed. Information about connecting to the ImageServer is available at http://gis.utah.gov/servers.

Information about the UCRC Core Collection is available at http://geology.utah.gov/emp/ucrc/index.html. Interested users may obtain additional information about the samples and/or arrange to view the samples by contacting the UCRC at http://geology.utah.gov/emp/corecenter/index.htm or (801) 537-3359.

Information about the collection of historical (1936-1952) U.S. Department of Agriculture, Soil Conservation Service semi-controlled orthophotomaps maps for Utah is available at ftp://ftp.agrc.utah.gov/Imagery/UGS_Historical/ and for connecting to the ImageServer at http://gis.utah.gov/servers.

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