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THE CONTINENTAL SCIENTIFIC DRILLING PROGRAM
DATA BASE - 1982

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Abstract--The Continental Scientific Drilling Program (CSDP) data base maintained at Lawrence Livermore National Laboratory is funded by the Office of Basic Energy Sciences of the Department of Energy. It is a central repository of information concerning approximately 1800 government funded and scientifically interesting drill holes in the United States. This data base can help reduce drilling costs and maximize scientific value of drilling efforts of government agencies and industry. The services of the CSDP data base are free of charge and available to all.

Introduction

The scientific community uses information obtained from drill holes to gain knowledge of the earth's history. A large amount of public and private funds is invested each year in drilling programs for geologic exploration. Most deep drilling programs have been in the oceans. The Deep Sea Drilling Program (1968) and the International Phase of Ocean Drilling (1975) are only two of these ocean drilling programs. But the concept of plate tectonics has shifted attention from the oceans to the continents. It became clear to the geoscience community in the 1970's that there was a need to maximize the scientific value of current and planned continental drilling efforts of government agencies and industry, and to supplement these efforts with holes drilled solely for scientific purposes (National Academy of Sciences, 1979, p. 8). The Continental Scientific Drilling Program was formed to provide this central focus for continental drilling and to direct communication and cooperation of various constituencies, thus maximizing the results of investments. As part of this program, Lawrence Livermore National Laboratory (LLNL) was funded by the Office of Basic Sciences of the Department of Energy (OBES/DOE) to establish a data management program (Howard, 1979). A data base was established and acts as a central repository which catalogues information on United States drill holes. Through the unrestricted use of this data base, it is possible to reduce drilling costs and maximize the scientific value of current and planned efforts of government agencies and industry by 1) offering the opportunity to add on

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experiments, and 2) supplementing information from existing drill holes included in the data base (Energy and Technology Review, 1981, p. 25).

Initially, CSDP data base was to catalog federally funded drill holes. Most of these holes were drilled by DOE, and can be found in the list of DOE-funded drill holes (Howard, et al., 1980). This was quickly expanded to include scientifically interesting holes that are not federally funded. "Scientifically interesting" holes are those which are drilled in an area that has little or no previous information, holes reaching geologic basement, record setting holes, and other selected holes. The data base currently catalogs approximately 1860 drill holes. Most of these holes are government funded (at federal and/or state levels). Some are commercially funded.

The sources of information for the data base are varied. A nucleus for the data base of DOE-funded drill holes was provided by the A.D. Little Corporation (Little, 1979). United States Geological Survey (USGS) has provided their drilling inventories for fiscal years 1979, 1980, and 1981. Scientifically interesting drill holes from the Lawrence Berkeley Laboratory (LBL) Geothermal Resources Information Database (GRID) and USGS Geotherm Data Base are included. A number of holes are brought to our attention by state geologists and members of academia. Any person with information about a drill hole that meets CSDP data base requirements is encouraged to contact us in order that the hole may be included in the data base.

Data Base Structure

CSDP data base is maintained on the Livermore Computer Center (LCC) CDC 7600's through the Master Control Program. There are 24 textual and numerical parameters (arrays) for each drill hole.

Information about drill holes to be entered into the data base is generally submitted to us on drill hole data sheets (Appendix), which we have designed to collate the necessary information about each hole. The information is then taken from these sheets and formatted to the parameters in which the data are stored. An attempt is made to maintain the exact form in which the data are submitted, but some changes may be made to meet the parameter restrictions - integer format, length of text, word order, etc. English measurement units are currently used, since the drilling industry has yet to convert to the metric system.

Data Base Parameters (arrays)

IDN: A number assigned to the hole by us for record keeping purposes.
Hole Designation: The name of the hole.

Holes in Group: If there are many similar nearby holes in a project, they may be entered as a group of drill holes (entered once as a group rather than each hole entered individually) with the number of holes for the project noted.

Purpose: The reason(s) for which the hole was drilled. The categories are:

CG	Coal gasification
C	Coal
EG	Engineering geology
EQ	Earthquake studies
G	Gas
GE	Geologic exploration
GP	Geopressure
GT	Geothermal
HF	Heat flow
HDR	Hot dry rock
HW	Hot water
MER	Methane removal
MR	Mineral resources
NPR	Naval petroleum reserves
NT	Nuclear testing
NWR	Nuclear waste repository
OG	Oil and gas
OR	Oil recovery
OS	Oil shale
PS	Petroleum storage
RM	Radionuclide migration
U	Uranium
WR	Water resources

Site Location: County and state.

Site Coordinates: Latitude-longitude location is preferable for plotting procedures. If it is not possible to locate the drill hole by this method, Township-Range location may be used. Township-Range location must be identified by a baseline or meridian.

Surface Elevation: Mean feet above sea level of the drill hole.

Depth: Depth of the hole. If the hole is proposed, the planned depth should be entered.

Start Date: Start date of drilling. If the hole hasn't been started yet, this should be the proposed start date.

Completion Date: Completion of date of drilling.

Status: The current condition of the hole - proposed, injection, observation, plugged, etc.

Geologic Setting: The lithologic description of the formations penetrated by the drill hole.

Drilling Stages: Diameters and corresponding depths of the hole.

Casing Stages: Diameters and corresponding depths of casing in the hole.

Samples: Samples taken from the drill hole (note core, sidewall, or cuttings) and corresponding depths.

Geophysical Logs: A list of geophysical logs which have been run in the hole.

Well Testing: Any tests that have been performed in the hole.

Funding Agency: The government and/or private agency that paid for the drill hole. If there is more than one funding agency, list all.

Additional Information: Any necessary or pertinent information for the hole not included in other parameters; examples - project name, publication reference number, KGRA location, specific or multi purpose of hole.

Total Cost: The total cost of the hole. If the entry is for a group of holes, this value indicates total cost of all holes in the group.

Principal Investigator: The person responsible for the hole. This is the person who may be contacted for further information.

Information Submitted by: The person who submitted, and generally the one who has checked, the information listed for each hole. This person is not necessarily the principal investigator.

Date: The date the information for a hole was first entered into the CSDP data base.

Update: As new information becomes available for a hole, it is entered and the update is shown in addition to the original entry date.

The data base is constantly updated. Individual entries are updated as information on them is received. New drill holes are added as we learn about them.

Data Output

Any of the above parameters can be sorted on and ordered. For example, all holes sorted by depth; holes in oil shale; holes with temperature logs, sorted by depth; holes in California, drilled between 1970 and 1980, sorted by county; a large number of combinations are possible. The data can then be printed in two different formats - full page printouts or tabular listings. Full page printouts show all information included in the data base about one drill hole (Fig. 1). Tabular listings show selected parameters for any number of holes. Figure 2 is a page from a listing of all holes in California, sorted by county. It shows, from left to right, county, state, hole designation, purpose, depth, and record number. Most parameters can be printed on listings.

Data Base Access

The services of CSDP data base are available to all, and are free of charge. For printouts or information about the data base, please call or write:

HOLE DESIGNATION CER RB MHF-3
SURFACE ELEVATION 6517 FEET
SITE COORDINATES

T03S, R98W, S11NW
6TH PRINCIPAL MERIDIAN

START DATE (YR-MO-DA) 74-05-10
COMPLETION DATE 74-09-17

GEOLOGIC SETTING (DEPTHS IN FEET) -

GREEN RIVER 445-2980; WASATCH 2980-5590;
FORT UNION 5590-6452; MESAVERDE 6452-TD

DRILLING STAGES (DIAMETERS (IN.) AND DEPTHS (FT.))

26. 0-290; 15. 290-5603; 9.88 5603-TD

SAMPLES (DEPTHS IN FEET)

CONVENTIONAL CORE 5925-7085

PRINCIPAL INVESTIGATOR

R. L. MANN
CER CORPORATION
2225 E. FLAMINGO RD
LAS VEGAS, NV 89109
(702) 735-7136

INFORMATION SUBMITTED BY:

CHARLES ATKINSON
PROJECT MANAGER
DOE / NEVADA OPERATIONS OFFICE
2225 E. FLAMINGO RD.
LAS VEGAS, NV 89109
(702) 735-7136

FUNDING AGENCY(S): DOE; CONSORTIUM

COLORADO

SITE LOCATION RIO BLANCO CO., COLORADO

DEPTH 8170 FEET

PURPOSE: GAS

LOGGING (DEPTHS IN FEET)

INDUCTION, LATEROLOG, SONIC, MICROSEISMOGRAM,
GAMMA, NEUTRON POROSITY, TEMPERATURE

CASING STAGES (DIAMETERS (IN.) AND DEPTHS (FT.))

16. 0-290; 10.75 0-5600; 7. 0-8165

WELL TESTING

DRILL STEM, PRE AND POST FRACTURE TESTS,
SPINNER, AUDIO

ADDITIONAL INFORMATION

WESTERN GAS SANDS PROJECT. TEST ADVANCED
HYDRAULIC FRACTURING TECHNOLOGY AND COMPARE
TO NUCLEAR STIMULATION

DATE 80-07-16
UPDATE 81-10-09

RECORD 1652

Figure 1. Full page printout showing all information included in the CSDP data base about one drill hole.

COUNTY	STZ	CSDP - CONTINENTAL SCIENTIFIC DRILLING HOLE DESIGNATION	PUR- POSE	DEPTH	RECORD
ALAMEDA	CA	LLNL-SH-1	GE	155	2209
ALAMEDA	CA	LLNL-SH-2	GE	155	2210
BUTTE	CA	T12N/R1E-34RD1 (TEST HOLE 2)	WR	1400	413
CALUSA	CA	1 WILBUR HOT SPRINGS	GT	3757	1225
CALUSA	CA	SUNDECO-BAILEY MINERALS 1	GT	9104	1904
FRESNO	CA	COALINGS POLYMER INJECTION WELLS	OR	2271	1345
FRESNO	CA	VEE 3	U	2943	1842
FRESNO	CA	17S/15E-19A01M	U	1611	1844
FRESNO	CA	TEXAS PACIFIC LUCAS 1	U	1141	1845
FRESNO	CA	42-30 J	U	5010	2018
FRESNO	CA	WILSON S71-7	U	5000	2019
FRESNO	CA	HELM UNIT 23-35	U	4765	2020
FRESNO	CA	NORD-MONTARA A-5	U	5100	2021
FRESNO	CA	34-3P	U	5010	2022
FRESNO	CA	NOBLE 15	U	5000	2023
FRESNO	CA	CALIFORNIA LANDS 37-15	U	5000	2024
FRESNO	CA	YOUNG 4-15	U	5000	2025
FRESNO	CA	COELHO	U	5000	2026
FRESNO	CA	BOSTON RANCH 2	U	5000	2027
GLENN	CA	BUTTE CITY	WR	1450	1959
HUMBOLDT	CA	GBL	HF	540	294
IMPERIAL	CA	KERSHAW 1-3	GT	12000	295
IMPERIAL	CA	S.H. ELMORE 1	GT	12000	296
IMPERIAL	CA	HOLLY SUGAR-DOE 44P	GT	10000	298
IMPERIAL	CA	BORCHARD A-3	GT	12888	299
IMPERIAL	CA	FEDERAL-DOE-SPERRY 87-6	GT	6290	1
IMPERIAL	CA	LACEY 1-28	GT	6600	790
IMPERIAL	CA	MERCER 1-28	GT	13383	904
IMPERIAL	CA	MERCER 2-28	GT	13381	905
IMPERIAL	CA	SLATER 1	GT	13097	906
IMPERIAL	CA	VEYSEY 7	GT	5689	907
IMPERIAL	CA	VEYSEY 8	GT	8905	908
IMPERIAL	CA	VEYSEY 9	GT	6802	909
IMPERIAL	CA	VEYSEY 10	GT	6828	910
IMPERIAL	CA	EMANUELLI 1	GT	12831	60
IMPERIAL	CA	EAST BRAWLEY STRAT TEST 1	GT	850	923
IMPERIAL	CA	EAST BRAWLEY STRAT TEST 1A	GT	2002	924
IMPERIAL	CA	ORITA C-131	GT	2002	925
IMPERIAL	CA	CA-964 48A-7	GT	6916	926
IMPERIAL	CA	CA-964 48B-7	GT	3524	927
IMPERIAL	CA	CA-964 48-7	GT	7523	928
IMPERIAL	CA	SHARP 1	GT	6070	929
IMPERIAL	CA	SHARP 2	GT	6487	930
IMPERIAL	CA	MESA 5-1	GT	6017	931
IMPERIAL	CA	MESA 6-1	GT	8032	932
IMPERIAL	CA	MESA 6-2	GT	6004	933
IMPERIAL	CA	MESA 8-1	GT	6204	934
IMPERIAL	CA	CA-1903 18-28	GT	8002	936
IMPERIAL	CA	CA-1903 16-29	GT	8022	937
IMPERIAL	CA	CA-1903 46-7	GT	3094	938
IMPERIAL	CA	FEDERAL 16-30	GT	7999	939

Figure 2. One page of a tabular listing of all drill holes in California included in the CSDP data base, showing county, state, hole designation, purpose, depth, and record number.

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Changes and Development

The data base is being changed from Master Control Program (MCP) to FRAMIS: MCP manages data as a flat file, while FRAMIS has a relational arrangement. Both data base management systems were developed at LLNL. We are evaluating computer programs to generate U.S. and state maps showing drill hole locations. References to other drill hole data bases are now being added, and these will be included with each data printout.

Plea for Help

The main purposes of this data base are to catalog specific drill holes and to maximize the scientific value of current and planned drilling efforts. To do this, we need current material. Existing data base entries must be updated with accurate data. Outdated and incomplete information quickly limits the usefulness of the data base. Holes that meet the data base requirements - government funded and/or scientifically interesting - are important to include. If you know of drill holes that meet these requirements, please write or call to inform us of them.

Especially important is publicity of drill holes that offer the opportunity for add-on scientific investigations. The Continental Scientific Drilling Committee of The National Research Council publishes a "Drilling Early Warning Newsletter" (DEW) when such a drilling project is brought to their attention. Pertinent information about such projects should be directed to Robert Andrews, Staff Officer of Continental Scientific Drilling Committee, 202-389-6319.

CSDP Data Management Workers

A number of people of the Earth Sciences Department of LLNL have worked on the compilation of data, the formation of the data base, and its maintenance. They are:

Project Leader: Nancy Howard
Advisor: Don Emerson
Programmer: Glenn Hage

Technicians: Mary Lou Higuera, William Richardson, Carmela Bell
Geologists: Gayle Pawloski, Bern Qualheim, Neil Crow

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A. D. Little Inc., Report on the Department of Energy drilling and well technology activities, Washington, DC (1979), 10pp.

Howard, N. W., Continental drilling for scientific purposes data management program, Lawrence Livermore National Laboratory, Livermore, CA, Report UCRL-82819 (1979).

Howard, N.W., Qualheim, B. J., Hage, G., Higuera, M. L., Pawloski, G. A., and Bell, C., The LLL continental drilling for scientific purposes data base: DOE-funded drill holes, Lawrence Livermore National Laboratory, Livermore, CA, Report UCRL-52909 (1980).

National Academy of Sciences, Continental Scientific Drilling Program, Washington, DC (1979).

Energy and Technology Review, Lawrence Livermore National Laboratory, Livermore, CA, February (1981).

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APPENDIX

CONTINENTAL SCIENTIFIC DRILLING PROGRAM
DATA BASE

DRILL HOLE DATA SHEET

1. Hole designation: _____
2. Project name (if applicable): _____
3. Number of similar holes in group: _____
4. Purpose of hole: _____

5. Site location: State _____

County _____

Coordinates Lat. (deg) _____ (min) _____ (sec) _____

Long. (deg) _____ (min) _____ (sec) _____

Latitude-Longitude location is preferable for
plotting procedures. If this information isn't
available, use Township-Range location.

_____ 1/4 _____ 1/4 _____ 1/4 Sec _____ T _____ R _____

_____ Baseline/Meridian

6. Surface elevation: _____ ft
7. Depth: _____ ft
8. Start date of drilling (state proposed date if drilling hasn't started): _____
9. Completion date of drilling: _____
10. Hole status (circle):

production injection abandoned plugged currently drilling

temperature proposed disposal capped observation

water level open other _____

11. Geologic setting (age, formation, rock type, depth from top to bottom of formation):

12. Drilling stages (diameter and depth):

13. Casing stages (diameter and depth):

14. Samples (type, interval):

Core _____

Cuttings _____

Others _____

15. Logs taken (circle):

electric	acoustic televiewer	nuclear	density
induction	sonic	gamma	temperature
laterolog	sonic attenuation	gamma-gamma	magnetic
microlog	3D	neutron porosity	gravity
microlaterolog			dip
SP	other	_____	

16. Well testing (circle):

drill stem fluid flow formation other _____

17. Funding agency:

federal _____

state _____

private _____

other _____

18. Additional information or comments:

19. Total cost of drilling: _____

20. Principal investigator:

Name _____

Address _____

Phone Commercial () _____

FTS _____

21. Submitter of information:

Name _____

Address _____

Phone Commercial () _____

FTS _____

22. Date: _____

Information should be sent to

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