Missing Well Locations:
An Environmental Risk Assessment
and
Regulatory Problem for Louisiana

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ABSTRACT

The focus of this project is to examine 48,953 well permits and create a digital database of the locations from various public records. The Basin Research Institute(BRI), Louisiana State University, in cooperation with the Louisiana Department of Natural Resources, Office of Conservation, will obtain paper records of each well permit. Using various purchased commercial oil and gas, mapping and surveying software and data management programs, (Geographix, Arcview, AutoCad Map and ProCogo) a digital latitude and longitude for each of the missing wells is being obtained. Current status of the project is that all 48,953 permits have been examined. Of that total 48,559 have been completed and digital locations have been obtained, 270 need additional information to be completed, and no determination is possible for 124 well permits. Upon completion each permit is placed in one of the following databases determined by status-Active Producers (11,450) of which 11,444 are complete or 99.99%, , Shut-in Producers (2,305) of which 2,300 are complete or 99.78%, Abandoned Previous Producer (17,513) of which 17,332 are complete or 98.96%, Abandoned Dry (9,029) of which 8,883 are complete or 98.38%, Permit Expired (7,083) of which 7,040 are complete or 99.39%, and Miscellaneous Wells (1,573) of which 1,560 are complete or 99.17%. The databases will be available in both digital and hard copy format. The completed database will help Louisiana implement risk-based regulatory policies and streamline existing policies, and provide industry and the public with access to information for all phases of the oil and gas business.

TABLE OF CONTENTS

DISCLAIMER ii

ABSTRACT iii

TABLE OF CONTENTS iv

EXECUTIVE SUMMARY 1

EXPERIMENTAL 1

RESULTS AND DISCUSSION 5

CONCLUSIONS 6

REFERENCES 7

APPENDIX A 8

EXECUTIVE SUMMARY

One of the critical problems affecting oil and gas operations in Louisiana is the substantial lack of information on well locations in the Louisiana Department of Natural Resource Office of Conservation computer data base to allow an informed decision on environmental and safety matters. It is impossible for Louisiana to implement risk based regulatory policies or streamline existing polices without accurate data on where oil and gas wells are currently located.

Currently 48,953 wells permits do not have an accurate well location easily available to public or private agencies. This lack of information is a major loophole. Regulatory decisions or policies created using the current incomplete information is not in the best interest of the operators of oil and gas wells, the state regulators or the federal regulators who must police compliance with current regulations

BRI in cooperation with the Louisiana Department of Natural Resources, Office of Conservation, in obtaining paper records of each well permit. From this record using various purchased commercial oil and gas, mapping and surveying software and data management programs, (Geographix, Arcview, AutoCad Map and ProCogo) the digital latitude and longitude for each of the missing wells is being obtained. The information is entered into computer databases covering Active Producers (11,450), Shut-in Producers (2,305), Abandoned Previous Producer (17,513), Abandoned Dry (9,029), Permit Expired (7,083), and Miscellaneous wells (1,573).

In September 2002 we requested a one-year no cost extension which was granted. Milestone 12 from our original schedule has been reassigned as Milestone 14 and two additional Milestones 12 and 13 have been added under Administrative Tasks to cover this and subsequent Technical Progress Reports. Work has continued on the project at a pace to complete the work in a timely manner. Current status of the project is that 48,953 permits have been examined. Of that total 48,556 have been completed and digital locations have been obtained, 273 need additional information to be completed, and no determination is possible for 123 well permits. Milestones 10 , 12, and 13 are completed with the completion of this report.

EXPERIMENTAL

The methodology used to evaluate well permits is the following. We have created a master database using Microsoft Excel to track each permit. Various fields within the data base are used to categorize each permit by location, the volume that it will ultimately reside in, the coordinate survey used to determine a valid geographic coordinate, source of the coordinate, and date it was processed. Using the current well permit status code the following volumes will be created (Table1).

Table 1- Volumes

Volume	Status*	Number of wells
1. Active Producing Wells	Status 10,11,22,64	11,450
2 Shut-in Productive Wells	Status 18,31,32,33,34,36,37	2,305
3. Abandoned Wells-Previous Producers	Status 16,19,20,23,26,30	17,513
4. Abandoned Wells- Dry Hole	Status 29	9,029
5. Wells- Permit Pending or Expired	Status 1,2,3	7,083
6. Wells -No Status or Other	All other Status's, No Status	1,573
	Totals	48,953

* Appendix A

Using the master database a list of the permits needed for the project was created. The local geologic information data provider [Geodata] obtained a copy of the well permit plat showing the permitted location of the well from existing copy, microfiche, or microfilm from the Office of Conservation card files, which was then provided to BRI..

From the paper copy BRI researchers obtain various pertinent information that is entered into the master database. Geographic coordinates can easily be confused if care is not taken to obtain all possible information about a particular well location. The final output coordinates for this project will be Spheroid- Clarke-1866, North American Datum -1927, Geographic latitude

and longitude. As Louisiana also uses the Lambert x/y state plane coordinate system, output coordinates in this system will also be determined. Another problem is the combination of other coordinate systems that have been accepted by the State of Louisiana that need to be converted to either of the above coordinate systems. Louisiana is also divided at the Mississippi/ Louisiana border into North and South Lambert zones further complicating the process. The following table lists the various coordinate systems, datums and zones for coordinates accepted by the state

.

Zone Codes	**Survey Datum**	**Coordinate System**
N - North	1927	Lambert
S - South	1983	Geographic Lat/Long

Initial evaluation of each paper record determines the methodology that will be used to obtain a coordinate. The five categories of classification are as follows.

The first is **"P"** for plat, in which case the surveyed information exists on the paper copy in the correct format or a convertible format. In this case the information is entered directly into the master database and the permit is marked as completed by entering a date in the completion date field.

Category two is **"G"** for Geographix, when the paper copy shows a call from a section line or a call from a section corner.

Examples: 330' FNL and 225' FSL of Section 21 Township 9N Range 2E

330' East and 600 North of SWC of Section 21 Township 9N Range 2E

Using GeoGraphix software each well will be plotted and a digital latitude and longitude value for each well that currently lacks such data will then be obtained. GeoGraphix can also handle wells in what is called North-East format where footage calls are from a single known point

Examples: 330' East and 600 North of Lat. 29° 56' 36.345" Long. 93°32' 22.467"

330' East and 600 North of Lat 29.943428 Long 93.539574

After classification the permit is entered into GeoGraphix and a coordinate is obtained.

Category three is **"M"** for monument. In this case the paper copy shows a call from a surveyed monument. Using ProCogo or AutocadMap an accurate coordinate for monument calls is obtained

Example: From USC&GS "HUDSON 1929" S 13deg33' 53" E 15,180.67 ft.

Category four is **"N"** for NeuraLog, when the paper copy has enough information to locate three points on the plat. We will then use our existing NeuraLog system to scan the paper plat and from other existing features with valid coordinates, (other existing wells, monuments shown on the plat, roads, etc.) Neuralog will triangulate a valid coordinate.

Category five is **"O"** for other. In this group the paper copy is missing, unreadable or lacks significant information to obtain a coordinate. In some cases the plat has footage calls for areas have no public survey. Louisiana has major areas that lack public survey information. In these areas the wells may be unable to be spotted to the degree of precision that the state would like. Additional information will be obtained to plot these permits if possible.

Additional categories have been added after discussions with our Department of Natural resources liaison. All are Geographix related.

Category six is "**GC**" where a center of section call for wells with no additional descriptive information beyond the section township and range paper location obtained. .

Category seven is "**GP**" where geographix was used to obtain the start point such as a corner of a section or a well location and PROcogo was then used to find the actual location.

Category eight is "**GS**" where a center of section call for wells with no additional descriptive information beyond the section township and range and **no** paper location exisits. The SONRIS database was used to obtain section township and range.

RESULTS AND DISCUSSION

The master database is being created covering Active Producers (11,450), Shut-in Producers (2,305), Abandoned Previous Producer (17,513), Abandoned Dry (9,029), Permit Expired (7,083), and Miscellaneous wells (1,573).

Active data entry is complete as of March 31 all 48,953 permits have been examined. Of that total 48, 559 or 99.20% have been completed and a digital location has been obtained, 273 are currently classified as "Other" and additional information is being obtained from Texaco to provide a valid coordinate. For 124 permits no determination can be made..

Upon completion each permit is placed in one of the following databases determined by status:

Volume 1 Active Producers (11,450) of which 11,444 are complete or 99.99%

Volume 2 Shut-in Producers (2,305) of which 2,300 are complete or 99.78%

Volume 3 Abandoned Previous Producer (17,513) of which 17,332 are complete or 98.96%

Volume 4 Abandoned Dry (9,029) of which 8,883 are complete or 98.38%

Volume 5 Permit Expired (7,083) of which 7,040 are complete or 99.39%

Volume 6 Miscellaneous Wells (1,573) of which 1,560 are complete or 99.17%.

Milestone 10 - Completion of 95% of total wells for all volumes was completed. In addition we have continued work on Task 5 - Technology Transfer, by exhibiting publicly our results at the Gulf Coast Association of Geological Societies meeting in Austin, Texas from October 30 through November 1, 2002.

Our problem in the areas where there exists no valid public survey data to create a land grid in GeoGraphix was solved by C. H. Fenstermaker of Lafayette they plotted our south Louisiana problems using aerial and satellite photography. After discussions with the project liaison from the Department of Natural Resources we have implemented a procedure that handled all problems in north Louisiana. Currently 273 wells of the total database have a problem we hope to be able to solve by obtaining the coordinates from Texaco as they are all Texaco wells in one field. However 124 permits have insufficient or non existent data and cannot be plotted. We have currently completed about 98 % of the project.

CONCLUSIONS

The State of Louisiana, Department of Natural Resources computer well database has 48,953 well locations where latitude and longitude coordinates are missing. This project has been designed to fill this gap in information. When this project is completed, using this computer database which will be made available in both digital and hard copy format, Louisiana operators and the public will be better able categorize wells allowing streamlined work flows, increased efficiencies and greater accuracy in creating oil and gas prospects. Regulators will be able to track and record information more efficiently and implement risk based streamlined policies. As of March 31, 2003, 100 % of the total database containing 48,953 permits has been examined and valid locations determined for 99.18%.

REFERENCES

None.

APPENDIX A

Well Status Codes	
CODE	STATUS
1	PERMITTED
2	INJECTION PERMITTED
3	PERMIT EXPIRED
10	ACTIVE - PRODUCING
11	ACTIVE PRODUCING/CYCLIC INJECTION
13	OPERATOR CHANGE - NO MD10RA
16	MULTIPLE COMPLETED/PA-35 WELL
17	EDUCATIONAL/SERVICE COMPANY
18	TEMPORALLY ABANDONED WELL
19	INACTIVE WELL, NO RESPONSIBLE PARTY
20	PA-35 WELL
21	REVERTED TO LANDOWNER-FRESH WATER
22	REVERTED TO SINGLE COMPLETION
23	ACT 404 ORPHAN WELL-ENG
24	REVERTED L/O-RESIDENT CONSUMPTION
25	FEDERAL WELLS-FORMERLY STATE JURISDICTION
26	ACT 404 ORPHAN WELL-INJECTION & MINING
27	ABANDONED SWD - NOT PLUGGED
28	UNABLE TO LOCATE WELL-NO P&A
29	DRY AND PLUGGED
30	PLUGGED AND ABANDONED
31	SHUT-IN DRY HOLE - FU
32	SHUT-IN DRY HOLE - NFU

Well Status Codes	
CODE	STATUS
33	SHUT-IN PRODUCTIVE - FU
34	SHUT-IN PRODUCTIVE - NFU
36	SHUT-IN WAITING ON PIPELINE
37	SHUT-IN WAITING ON MARKET
41	INJECTION - GAS
42	INJECTION - WATER
43	INJECTION - OTHER
44	STORAGE CAVITY - LIQUID
45	STORAGE CAVITY - GAS
46	FORMATION STORAGE - GAS
47	STORAGE CAVITY - LPG
49	OBSERVATION
50	FIRE FLOOD
61	HAZARDOUS WASTE DISPOSAL
62	INDUSTRIAL NH WASTE DISPOSAL
63	SALT WATER DISPOSAL
64	ACTIVE PRODUCING/ANNULAR SWD
65	CLASS V - INJECTION
66	COMMERCIAL SALT WATER DISPOSAL
71	BRINE
72	SULPHUR
73	WATER
74	GEOPRESSURE
75	LIGNITE
76	URANIUM

Well Status Codes	
CODE	STATUS
77	BROMINE
78	IRON ORE
80	* UNKNOWN *
99	SALT WATER OIL RECOVERY POINT