1858-P1

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16. Abstract

Pipelines are a major transporter of commodities not only in Texas, but also in the entire United States. According to the 1997 Commodity Flow Survey, over 22 thousand tons of commodities were moved via pipeline in the U.S. A modal breakdown indicates that pipelines transport almost a quarter of the commodities moved, second to only trucks with 50 percent. The total pipeline mileage in Texas approaches 270,000 miles, which represents as much as 17 percent of the total pipeline mileage in the U.S. and links many segments of the country with energy sources located on the Gulf Coast.

The critical role of pipeline transportation, and the largely unseen nature of the system, makes it increasingly important for TxDOT to understand the scope of pipeline operations and relationship to other modes of transportation. Knowledge of the location and interaction dynamics of pipelines with other forms of transportation is essential for TxDOT to be able to plan and execute transportation improvements in the future. The products of this research, including reports and GIS databases, are designed to provide TxDOT with an understanding of the location, function, and inter-connectivity of the State's pipeline system.

This document describes the two GIS databases created for TxDOT Research Project 0-1858, *The Value of Pipelines to the Transportation System of Texas*. The GIS databases represent Research Product 1858-P1.

The two GIS databases are:

1) Texas Pipeline System, and
2) Texas Pipeline Intermodal Connections.

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TEXAS PIPELINE SYSTEM

GIS INFORMATION MANUAL

Research Project 0-1858
Product 1858-P1

Prepared for:

Texas Department of Transportation

Prepared by:

Rail Research Center/AAR Affiliated Lab
Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843-3135

August 2001

DISCLAIMER

The content of the GIS databases is only as accurate as the data collected or provided to the research team during this research effort. Users of the data should take great care in understanding the data accuracy and the appropriate uses of the data. The pipeline database is not of survey quality and should never be used to locate pipelines around excavation areas. Each entity responsible for the creation and development of the GIS data continue to analyze the data for accuracy and precision.

ACKNOWLEDGMENTS

The authors wish to thank Mr. Raul Cantu, the Project Director and Mr. Jim Randall of the TP&P for their support in this research effort. In addition, the authors would like to recognize the contribution of the project monitoring committee in setting a clear direction for this important project.

For the GIS databases, the authors would like to thank members of both TxDOT and the Railroad Commission of Texas. From TxDOT's Information Systems Division, the authors wish to thank Mr. Phil Hancock, Ms. Amber Allardyce, and Mr. Stephen Shackelford of TxDOT's Information System. And from the Railroad Commission of Texas, the authors wish to thank Mr. Stephen Pitner, Ms. Mary McDaniel, and Ms. Lorelei Weitzel.

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Pipelines are a major transporter of commodities not only in Texas, but also in the entire United States. According to the 1997 Commodity Flow Survey, over 22 thousand tons of commodities were moved via pipeline in the U.S. A modal breakdown indicates that pipelines transport almost a quarter of the commodities moved, second to only trucks with 50 percent. The total pipeline mileage in Texas approaches 270,000 miles, which represents as much as 17 percent of the total pipeline mileage in the U.S. and links many segments of the country with energy sources located on the Gulf Coast.

The critical role of pipeline transportation, and the largely unseen nature of the system, makes it increasingly important for Texas Department of Transportation (TxDOT) to understand the scope of pipeline operations and relationship to other modes of transportation. Knowledge of the location and interaction dynamics of pipelines with other forms of transportation is essential for TxDOT to be able to plan and execute transportation improvements in the future. The products of this research, including reports and Geographic Information System (GIS) databases, are designed to provide TxDOT with an understanding of the location, function, and inter-connectivity of the State's pipeline system.

This document describes the two GIS databases created for TxDOT Research Project 0-1858, *The Value of Pipelines to the Transportation System of Texas*. The GIS databases represent Research Product 1858-P1.

The two GIS databases are:

3) Texas Pipeline System, and
4) Texas Pipeline Intermodal Connections.

SECTION II. TEXAS PIPELINE SYSTEM

1. File Description

The Railroad Commission of Texas (RRC) created the Texas Pipeline System GIS database by acquiring digital data from pipeline companies and incorporating data through research, data collection, and data transformation.

The following sections describe the state-level efforts by the RRC and national efforts by the U.S. Department of Transportation (USDOT), Office of Pipeline Safety (OPS).

Railroad Commission of Texas

The RRC developed the statewide pipeline GIS database that includes liquid and gas transmission, gathering, and flow pipelines under their jurisdiction. Additionally, the RRC has completed an agreement with OPS to become the state repository for Texas' interstate pipelines, nearly 80,000 miles in length.

The database acquired from the RRC for this project currently includes over 210,000 miles of inter- and intrastate pipelines. Estimates indicate Texas contains over 270,000 miles of pipelines, of which 80,000 cross into bordering states. Continuing efforts by the RRC will increase the amount of information and degree of accuracy of the initial data and add information on the remaining pipelines.

U.S. Department of Transportation – Office of Pipeline Safety

An effort to create a national pipeline GIS is currently being undertaken by the USDOT Office of Pipeline Safety and is titled the *National Pipeline Mapping System* (NPMS). For the NPMS, pipeline operators contribute data voluntarily to either a state repository or the national repository. As stated previously, the RRC is the Texas state repository. The purpose of the NPMS is for tracking all natural gas transmission pipelines, hazardous liquid trunklines, and Liquid Natural Gas (LNG) facilities in the United States for use in assessing the risks associated with the Nation's liquid and gas pipeline infrastructure.

Accuracy

Positional accuracy of +/- 500 feet has been attempted for both the RRC and NPMS efforts. The spatial accuracy of the pipeline operators' submissions and other available sources dictate the actual positional accuracy. For the NPMS, positional accuracy is designated in categories ranging from "Excellent" (within 50 feet) to "Poor" (501-1000 feet). The Railroad Commission does not provide incremental accuracy levels in any publications or the pipeline database.

Coordinate System

Projection: Geographic
Units: Decimal Degrees
Datum Name: North American Datum 1983 (NAD83)
Ellipsoid Name: GRS1980

File Format

Files developed by TTI and submitted to TxDOT are in the Environmental Systems Research Institute (ESRI) shapefile (.shp) format created in the ArcView Version 3.2a software package.

File Naming Convention – Pipeline polylines

1) Statewide Pipeline System: Pipeline_State.shp; .shx; .dbf; .prj

2) Pipeline System by TxDOT District: Pipeline_<TxDOT District Abbreviation>.shp; .shx; .dbf; .prj

TxDOT District Abbreviations:

- ABL – Abilene
- AMA – Amarillo
- ATL – Atlanta
- AUS – Austin
- BMT – Beaumont
- BWD – Brownwood
- BRY – Bryan
- CHS – Childress
- CRP – Corpus Christi
- DAL – Dallas
- ELP – El Paso
- FTW – Fort Worth
- HOU – Houston
- LRD – Laredo
- LBB – Lubbock
- LFK – Lufkin
- ODA – Odessa
- PAR – Paris
- PHR – Pharr
- SJT – San Angelo
- SAT – San Antonio
- TYL – Tyler
- WAC – Waco
- WFS – Wichita Falls
- YKM – Yoakum

2. Railroad Commission of Texas Digital Map Information User's Guide

RAILROAD COMMISSION OF TEXAS

INFORMATION TECHNOLOGY SERVICES DIVISION

USER'S GUIDE

DIGITAL MAP INFORMATION

PUBLICATION NUMBER: OGA094

PUBLISHED BY THE
RAILROAD COMMISSION OF TEXAS
P.O. BOX 12966
AUSTIN, TEXAS 78711

The Information Technology Services Division (ITS) developed this publication for the general public in response to inquiries concerning the availability of digital map data. Any request for assistance with using the manual will be given every consideration.

First Edition: January 2000

Publication Number: OGA094

TABLE OF CONTENTS

This Table of Contents reflects the page numbers as they fall in this document only.

I. GENERAL INFORMATION

IDENTIFICATION

Developed For:	Users of RRC Mapping Information
By:	RRC of Texas, Information Technology Services Division, Hope Morgan, Dir.
Computer:	Digital Alpha Workstation, UNIX 4.OD Operating System

OUTPUT MEDIUMS

The Digital Well Location Mapping information is available for output onto the following mediums:

CD-ROM (Compact Disk)
FTP (File Transfer Protocol)

TAR and GZIP

The Railroad Commission uses the UNIX commands TAR and GZIP on all GIS export files. TAR, an acronym for "tape archiving", is commonly used to combine – or "archive" -- two or more files for storage or distribution. The RRC uses GZIP to compress TARed files.

RRC GIS data files can be uncompressed and unarchived on UNIX operating systems with the following commands:

```
gunzip <file_name>.tar.gz
tar xf <file_name>.tar
```

The Railroad Commission has successfully uncompressed and unarchived GIS export files using WinZip 6.3 and PKZip 2.6 on an IBM-compatible PC. It is assumed more recent versions of both WinZip and PKZip retain their previous extract capabilities.

Once the original RRC GIS digital data file is uncompressed and unarchived, the user will have all requested data layers in the appropriate format for a particular county or USGS quadrangle.

Disk Size Requirements

Documentation for the UNIX command GZIP states, in part, "The GZIP command uses the Lempel-Ziv algorithm used in the ZIP and PKZIP commands. The amount of compression obtained depends on the size of the input and the distribution of common substrings." GZIP compresses the typical RRC shapefile data set 55 percent - 65 percent and .E00 files 80 percent - 90 percent. Therefore, users should expect and plan for uncompressed RRC GIS export files to

occupy, depending on the export format, anywhere from 1.5 to almost twice the disk space of the compressed files.

Also, ESRI software users should be aware that ArcInfo and ArcView may require considerable amounts of free disk space to successfully execute commands. For example, ArcInfo documentation states that the CLEAN command "requires free disk space around 13 times the size of (the) <in_cover> to create temporary scratch files."

SYSTEM DESCRIPTION

The Railroad Commission of Texas exports double-precision map data from ARC/INFO version 7.2.1 mounted on a Digital Alpha workstation operated by UNIX ver. 4.0D. Exports are to Environmental Systems Research Institute's (ESRI) ARC/INFO interchange file (.E00) and shapefile (.SHP) formats.

Interchange files, used to transfer ARC/INFO coverage information amongst machines, is a fixed-length ASCII file. Each interchange file has an .E00 file extension and contains all coverage information and appropriate INFO file information.

Shapefiles, developed by ESRI for use with its ARCVIEW software, store a feature's geographic location and attribute information. The shapefile format is a collection of three different files:

<shape_file>.SHP – contains a feature's geometry.
<shape_file>.SHX – contains a feature's geometry index.
<shape_file>.DBF – contains a feature's dBase attribute information.

ESRI considers their interchange file format to be proprietary and the shapefile format cannot be adequately explained here. If necessary, users can access detailed information about both file formats at:

http://www.geocities.com/~vmushinskiy/fformats/fformats.htm

ARCVIEW shapefiles are created from the RRC's ARC/INFO map data. Features are translated from ARC/INFO to ARCVIEW in the following manner:

A/I Feature Class	A/V Shapefile Type
Points	Type 1 – Point
Tic	Type 1 – Point
Node	Type 1 – Point
Arcs	Type 3 – Line
Polygons	Type 5 – Polygon
Region	Type 5 – Polygon
Annotation	**NOT SUPPORTED**

COORDINATE SYSTEM

MIMS: The Railroad Commission exports all map data to the Geographic projection (Latitude/longitude). The following parameters define the Geographic projection:

Projection:	Geographic
Units:	Decimal Degrees
Datum:	NAD27

Region subclasses (.PAT<subclass_name>) were not supported by ESRI prior to Rev. 7.0 and will not import into ARC/INFO versions prior to Rev. 7.0.

Annotation subclasses will import into versions prior to Rev. 6.0 but will not function the same way they do at Rev. 6.0.

PC ARC/INFO, Rev. 3.4.2D or higher, will import RRC double-precision .E00 interchange files but will create single-precision coverages.

ArcCAD 11.2 and 11.3 and versions of PC ARC/INFO prior to Rev. 3.4.2D require single-precision interchange files. Please contact the Railroad Commission for assistance.

DISCLAIMER

The digital data described in this manual was generated by the Geographic Information System of the Railroad Commission of Texas. Base map information was obtained directly from U.S. Geological Survey 7.5 minute quadrangle maps. Patent Survey lines from Texas General Land Office maps were interpreted as accurately as possible over the U.S. Geological Survey base. Oil and gas well data or pipeline data (if included) was obtained from public records of the Railroad Commission. The mapping system from which this data was extracted is currently under development. The data is intended solely for the internal use of the Railroad Commission, which makes no claim as to its accuracy or completeness.

II. DISCUSSION OF FILES

AVAILABLE MAP DATA

****

Please note that GIS feature layers may not necessarily exist in all counties or in all USGS quadrangles. If a GIS feature layer - such as railroads or government lands - does not exist in a particular county or USGS quadrangle, you will not receive a file for that feature layer. The absence of feature layers in particular counties and USGS quadrangles is already accounted for in the data pricing.

****

The digital data used to create the files was taken from the forms system within the RRC, from the General Land Office (GLO) county survey maps, and, United States Geological Survey (USGS) quadrangle maps.

ESRI's export formats are recognized and accepted industry-wide and are easily imported to and used in many GIS and CAD software packages. However, the user is responsible for confirming that their specific GIS or CAD software fully supports the importation and use of either interchange files or shapefiles.

Available digital map data layers includes:

1. Basemap:
    a. Airports
    b. Cemeteries
    c. Cities
    d. Government Lands
    e. Political Boundaries (includes, where applicable, county, state, offshore and gulf area boundaries.)
    f. Railroads
    g. Roads
    h. Ship Channels
    i. Subdivisions
    j. Surveys (Includes, where applicable, abstracts and bay tracts.)
    k. Water Features
2. Wells:
    a. Utility Well Locations
    b. Surface Well Locations
    c. Bottom Well Locations
    d. For horizontal and directional wells, arcs connecting surface and bottom locations.
3. Pipelines:
    a. Pipelines – Abandoned
    b. Pipelines – Liquid
    c. Pipelines – Gas

FILE NAMING CONVENTIONS

The archived and compressed files you receive from the Railroad Commission are named as follows:

If you ordered data by county:

1. The 1st letter is a "C"
2. The county FIPS code follows the initial letter.
3. If you ordered .E00 interchange files, "_e00" follows the FIPS or quad number
4. If you ordered .SHP shapefiles, "_shp" follows the FIPS or quad number
5. All files have the suffix ".tar.gz"

   Examples:

   a. Harris County exported to .E00 files: c201_e00.tar.gz
   b. County FIPS code 307 exported to .SHP files: c307_shp.tar.gz

If you ordered data by USGS quadrangle:

1. The 1st letter is a "Q"
2. The USGS quad number follows the initial letter
3. If you ordered .E00 interchange files, "_e00" follows the FIPS or quad number
4. If you ordered .SHP shapefiles, "_shp" follows the FIPS or quad number
5. All files have the suffix ".tar.gz"

   Examples:

   a. USGS quad SOUTHMOST exported to .E00 files: 597432_e00.tar.gz
   b. USGS quad number 3099142 exported to .SHP files: q3099142_shp.tar.gz

A. Exports by *County FIPS Code* to ArcInfo .E00 interchange files and *County Name* to ArcInfo .E00 interchange files:

1. Airport arcs:	air<fips_number>.e00
2. Cemetery arcs/points:	cem<fips_number>.e00
3. City arcs:	cit<fips_number>.e00
4. County Boundary arcs/polys/regions:	cty<fips_number>.e00
5. Government Land arcs:	gov<fips_number>.e00
6. Railroad arcs:	rail<fips_number>.e00
7. Road arcs:	road<fips_number>.e00
8. Ship Channel arcs:	ship<fips_number>.e00
9. Subdivision arcs/points:	subd<fips_number>.e00
10. Survey arcs/polygons/regions:	surv<fips_number>.e00
11. Water arcs/polygons:	watr<fips_number>.e00
12. Wells:	
Utility Well points:	well<fips_number>u.e00
Surface Well points:	well<fips_number>s.e00
Bottom Well points:	well<fips_number>b.e00
Surface/Bottom arcs:	well<fips_number>l.e00
13. Pipelines:	

B. Exports by *County FIPS Code* to ArcView Shape files and *County Name* to ArcView Shape files:

1. Airport arcs: air<fips_number>.shp; .shx; .dbf
2. Cemetery arcs: cem<fips_number>l.shp; .shx; .dbf
   - points: cem<fips_number>p.shp; .shx; .dbf
3. City arcs: cit<fips_number>.shp; .shx; .dbf
4. County Boundary arcs: cty<fips_number>l.shp; .shx; .dbf
   - polygons: cty<fips_number>a.shp; .shx; .dbf
   - coastal regions: cty<fips_number>g.shp; .shx; .dbf
   - counties regions: cty<fips_number>h.shp; .shx; .dbf
   - gulfareas regions: cty<fips_number>i.shp; .shx; .dbf
   - offshore regions: cty<fips_number>j.shp; .shx; .dbf
   - state regions: cty<fips_number>k.shp; .shx; .dbf
5. Government Land arcs: gov<fips_number>.shp; .shx; .dbf
6. Railroad arcs: rail<fips_number>.shp; .shx; .dbf
7. Road arcs: road<fips_number>.shp; .shx; .dbf
8. Ship Channel arcs: ship<fips_number>.shp; .shx; .dbf
9. Subdivision arcs: subd<fips_number>l.shp; .shx; .dbf
   - points: subd<fips_number>p.shp; .shx; .dbf
10. Survey arcs: surv<fips_number>l.shp; shx; dbf
    - polygons: surv<fips_number>a.shp; shx; dbf
    - abstract region: surv<fips_number>s.shp; shx; dbf
    - baytract region: surv<fips_number>b.shp; shx; dbf
11. Water arcs: watr<fips_number>l.shp; .shx; .dbf
    - polygons: watr<fips_number>a.shp; .shx; .db
12. Wells:
    - Utility Well points: well<fips_number>u.shp; .shx; .dbf
    - Surface Well points: well<fips_number>s.shp; .shx; .dbf
    - Bottom Well points: well<fips_number>b.shp; .shx; .dbf
    - Surface/Bottom arcs: well<fips_number>l.shp; .shx; .dbf

File Naming Convention For Exports By USGS Quadrangle To .E00 Interchange Files:
Exported by USGS quadrangle to .E00 interchange files comply with 8.3 naming conventions. Information about the 8.3 naming convention can be found in Appendix E.

<feature_layer_letter>{well_feature_type_number}<latitude_identifier>
<five_digit_quadrangle_number>

<feature_layer_letter>: A single letter identifying one of the 13 possible GIS data layers. This letter always occupies the first position in the shapefile name. Feature layer letters are:

a = airports	b = cemeteries	c = cities
d = boundaries	e = government lands	f = railroads
g = roads	h = ship channels	i = subdivisions
j = surveys	k = water	l = wells
m = pipelines		

{well_feature_type_number}: Only horizontal/directional arcs and utility, surface and bottom well point locations require feature type numbers. No other feature type other than wells will have a feature type number. Well feature type numbers always occupy the second position in the filename. Well feature type numbers are:

utility well points	1
surface well points	2
bottom well points	3
surface/bottom arcs	4

<latitude_identifier>: A single letter identifying one of 12 possible latitudes in Texas. This letter always occupies the second position in the shapefile name except for well .E00 interchange files, where the latitude identifier occupies the third position . Latitude identifiers are:

a = 25th latitude	b = 26th latitude	c = 27th latitude
d = 28th latitude	e = 29th latitude	f = 30th latitude
g = 31st latitude	h = 32nd latitude	i = 33rd latitude
j = 34th latitude	k = 35th latitude	l = 36th latitude

<five_digit_quadrangle_number>: The last five digits of a USGS quadrangle number.

EXAMPLES

1. Airport .E00 files are created for USGS quadrangle number 3501231. The airport file is named:

ak01231.e00

a: Is the feature layer letter for Airports

k: Is the latitude identifier for the 35th latitude – the USGS quadrangle number's first two digits.

01231: The USGS quadrangle's last five digits.

2. Cemetery .E00 files are created for USGS quadrangle number 2798112. The cemetery file is named:

bc98112.e00

b: Is the feature layer letter for Cemeteries

c: Is the latitude identifier for the 27th latitude – the USGS quadrangle number's first two digits.

98112: The USGS quadrangle's last five digits.

3. Bottom well location .E00 files are created for USGS quadrangle number 3294321. The bottom well location file is named:

l3h94321.e00

l: Is the feature layer letter for Wells

3: Is the feature type number for Bottom Wells
h: Is the latitude identifier for the 32nd latitude – the USGS quadrangle number's first two digits.
94321: The USGS quadrangle's last five digits.

Naming Convention for Quadrangle Exports to Shapefiles: Exports by USGS quadrangle to .SHP shapefiles comply with 8.3 naming conventions. Information about the 8.3 naming convention can be found in Appendix E.

<feature_layer_letter><feature_type_number><latitude_indentifier>
<five_digit_quadrangle_number>

<feature_layer_letter>: A single letter identifying one of the 13 possible GIS data layers. This letter always occupies the first position in the shapefile name. Feature layer letters are:

a = airports	b = cemeteries	c = cities
d = boundaries	e = government lands	f = railroads
g = roads	h = ship channels	i = subdivisions
j = surveys	k = water	l = wells
m = pipelines		

<feature_type_number>: A single number identifying the feature type. Feature types are always point, line or polygon. (Shapefiles do not support annotation features.) Since feature layers may contain multiple point or polygon shapefiles, refer to the table below for specific feature type numbers for particular feature layers. The feature number always occupies the second position.

FEATURES	FEATURE LAYER LETTERS	TYPES	FEATURE TYPE NUMBERS
airport	a	arcs	1
cemeteries	b	arcs	1
		points	2
cities	c	arcs	1
boundaries	d	arcs	1
		polygons	2
		coastal polygons	3
		county polygons	4
		gulfareas polygons	5
		offshore polygons	6
		state polygons	7
government land	e	arcs	1
railroads	f	arcs	1
roads	g	arcs	1
ship channels	h	arcs	1
subdivisions	i	arcs	1

		points	2
surveys	j	arcs	1
		polygons	2
		abstract polygons	3
		baytracts polygons	4
water	k	arcs	1
		polygons	2
Wells	l	utility well points	1
		surface well points	2
		bottom well points	3
		surface/bottom arcs	4
pipelines	m	arcs	1

<latitude_identifier>: A single letter identifying one of 12 possible latitudes in Texas. This letter always occupies the third position in the shapefile name. Latitude identifiers are:

a = 25th latitude	b = 26th latitude	c = 27th latitude
d = 28th latitude	e = 29th latitude	f = 30th latitude
g = 31st latitude	h = 32nd latitude	i = 33rd latitude
j = 34th latitude	k = 35th latitude	l = 36th latitude

<five_digit_quadrangle_number>: The last five digits of a USGS quadrangle number.

EXAMPLES

1. Airport shapefiles are created for USGS quadrangle number 3501231. The airport arc shapefiles are named:

a1k01231.shp, .shx, .dbf

a: Is the feature layer letter for Airports
1: Is the feature type number for Airport arcs
k: Is the latitude identifier for the 35th latitude – the USGS quadrangle number's first two digits.
01231: The USGS quadrangle's last five digits.

2. Cemetery shapefiles are created for USGS quadrangle number 2798112. The cemetery point shapefiles are named:

b2c98112.shp, .shx, .dbf

b: Is the feature layer letter for Cemeteries
2: Is the feature type number for Cemetery points
c: Is the latitude identifier for the 27th latitude – the USGS quadrangle number's first two digits.

98112: The USGS quadrangle's last five digits.

3. Boundary shapefiles are created for USGS quadrangle number 3294321. The offshore polygon shapefiles are named:

d6h94321.shp, .shx, .dbf

d: Is the feature layer letter for Boundaries
6: Is the feature type number for Offshore polygons
h: Is the latitude identifier for the 32nd latitude – the USGS quadrangle number's first two digits.
94321: The USGS quadrangle's last five digits.

III. RAILROAD COMMISSION MAPPING TERMS

MAPPING TERMS USED AT THE RRC

SURVEY
A survey is a certified measured description of a piece of land. The term sometimes refers to the land itself. In Texas, original surveys were performed as part of the patenting process whereby land was transferred from the public domain. These "*patent surveys*," recorded at the Texas General Land Office, constitute an official land grid for the State and are the basis for subsequent land surveys.

BLOCK
A block is a defined set of original land surveys. A block has an identifying name and/or number, and surveys within it are usually consecutively numbered, mile-square sections. Land grants from the State of Texas to railroad companies were often patented in blocks and sections. The term block is also used as a unit of a subdivision, i.e., subdivision/block/lot.

SECTION
A section refers to a square land survey measuring exactly one mile on each side. Some of the land transferred from the public domain by the state of Texas was surveyed and patented in units of square miles. The Texas General Land Office officially considers these units sections. Also, it was common that larger land grants, such as school lands and capitol lands, were subsequently surveyed into square mile units for the convenience of sale; these surveys are also called sections. In addition, the term "*section*" is commonly used to describe surveys in a group that have been assigned consecutive survey numbers, even though some of them do not have the proper shape or size to truly be sections.

ABSTRACT
In Texas, the term abstract refers to an original land survey describing an area transferred from the public domain by either the Republic of Texas or the State of Texas. These surveys are recorded in the "*State Abstract of Land Titles*," which is maintained by the Texas General Land Office. Each survey so recorded is assigned an abstract number, which is unique within the county in which the survey falls. Because Texas has never performed a uniform statewide land

survey, these original surveys called "*Patent Surveys*" constitute the State's Official Land Survey System.

IV. FILE LAYOUT AND DATA DICTIONARY

DATA DICTIONARY

This data dictionary defines unique RRC map attribute items and is structured as follows:

<ITEM NAME> <INPUT WIDTH, OUTPUT WIDTH, TYPE {NUMBER_OF_DECIMALS}>

Item Name:
The name of an attribute item in a data file

Input Width:
Number of spaces (or bytes) used to store item values.

Output Width:
Number of spaces used to display the item values.

Type:
One of the following data types:

B – Whole numbers stored as binary integers.
C – Character
D – Dates
F – Decimal numbers stored in internal floating-point.
I – Integers
N – Decimals

Number_of_Decimals:
Number of digits to the right of the decimal place for data types holding decimals.

GENERAL ARC ATTRIBUTE INFORMATION

All coverage arc attribute tables (<COVERAGE_NAME.AAT>) have the following two items:

DTYPE: (2,3,B)
Data type. All data types are given in Appendix A. (Arcs where DTYPE and LTYPE both = 0, are USGS quad boundary arcs.)

LTYPE: (2,3,B)
Line type. All line types are given in Appendix A. (Arcs where DTYPE and LTYPE both = 0, are USGS quad boundary arcs.)

COUNTY BOUNDARY ATTRIBUTE INFORMATION

Data Items in the <COVERAGE_NAME>.PATCOASTAL AND
<COVERAGE_NAME>.PATGULFAREAS AND
<COVERAGE_NAME>.PATOFFSHORE:

FIPS: (3,3,C)
Federal Information Processing Standard code (FIPS) is a three character county code. FIPS codes are listed in Appendix B.

COUNTYNAME1: (14,14,C)
(named C_NAME1 in shape files) The county name is in upper case letters.

DISTRICT: (2,2,C)
RRC field office territories or designated areas.

SPZONE: (1,1,C)
The State Plane Coordinate System is based on the Lambert Conformal Conic projection. This coordinate system includes five horizontal state plane coordinate zones following the county boundaries throughout Texas. Measurements are in feet. The zones are named and numbered as follows:

STATE PLANE ZONE	ZONE NAME	ZONE NUMBER	FIPS ZONE
1	North	5326	4201
2	North Central	5351	4202
3	Central	5376	4203
4	South Central	5401	4204
5	South	5426	4205

COUNTYNAME2: (14,14,C)
(Named C_NAME2 in shape files). The county name where only the first letter of the name is capitalized.

DATA ITEMS IN THE <COVERAGE_NAME>.PATGULFAREAS:

AREANAME: (50,50,C)
The FIPS code and county name for a gulf area. FIPS codes and names are listed in Appendix B.

RAILROAD ATTRIBUTE INFORMATION

DATA ITEMS IN THE <COVERAGE_NAME>.AAT:

RAIL_COID: (4,5,B)
Railroad company identification number

SUBDIVISION ATTRIBUTE INFORMATION

DATA ITEMS IN THE <COVERAGE_NAME>.PAT:

FIPS: (3,3,C)
Three character county code. FIPS codes are listed in Appendix B.

NAME: (55,55,C)
The subdivision name.

SURVEY ATTRIBUTE INFORMATION
DATA ITEMS IN THE <COVERAGE_NAME>.PATABSTRACT:

ANUM: (12,12,C)
Abstract Number, e.g., A-0000. Assigned to the surveyed parcel by the General Land Office at the time of patenting. If the abstract number field contains a "?" or is blank, then no abstract number was found.

L1SURNAM: (32,32,C)
Survey name. The name of the original grantee or the name of the company, individual or eleemosynary institution that is common among a formed group of surveys as shown on the General Land Office (GLO) county patent survey map or the GLO State Abstract of Land Titles.

L2BLOCK: (10,10,C)
Block Number. The number or letter used in description of a group of surveys identified as a Block on the GLO map. Example: 101

L3SURNUM: (8,8,C)
Section number. Further describes an abstracted surveyed parcel. Or, when preceded by "SUR", a surveyed parcel further divided into numbered abstracted areas. Example: SUR 101

L4SURNAM: (32,32,C)
Sub-Survey name of the grantee when the survey is a part of a larger refined area surveyed by a common party, and is only added if it is shown on the GLO map. A scrap file number corresponding to GLO records may also appear in the field.

L5SFOMF: (9,9,C)
Scrap or mineral file number from the GLO Abstract of Land Titles

FIPS: (3,3,C)
Three character county code. FIPS codes are listed in Appendix B.

DATA ITEMS IN THE <COVERAGE_NAME>.PATBAYTRACT:

BAYNUM: (9,9,C)
Provided by the General Land Office

BAYID: (3,3,C)

Bay area name abbreviations.

TRACTNUM: (6,6,C)
Provided by the General Land Office

WATER ATTRIBUTE INFORMATION

DATA ITEM IN THE <COVERAGE_NAME>.PAT:

TYPE: (1,1,C)
Identifies a polygon as either land (L) or water (W).

WELL ATTRIBUTE INFORMATION

****
For some historical wells, fields such as APINUM and CWELLNUM may be blank due to the limited amount of research time to capture this information.
****

UTILITY WELLS:

API: (8,8,C)
(Utility, Bottom and Surface Wells .PAT) Eight-character field equivalent to APINUM minus the 2 digit STATE Code and minus the 2 digit STCODE.

COUNTY: (3,3,C)
(Utility, Bottom and Surface Wells) Three character FIPS county code. FIPS codes are listed in Appendix B.

RELIAB: (2,2,C)
(Utility, Bottom and Surface Wells .PAT) Indicates the reliability of the well spot (the accuracy of the location of the well). Valid reliability codes are listed in Appendix C.

SURFACE-ID: (4,7,B)
(Utility, Bottom and Surface Wells .PAT) Surface well identification number.

SYMNUM: (2,3,B)
(Utility, Bottom and Surface Wells .PAT) Indicates the type of well under Datatype 50 in Appendix A.

WELLID: (5,5,C)
(Utility, Bottom and Surface Wells .PAT) Character field equal to APINUM's last five digits.

BOTTOM WELLS:

API: (8,8,C)
(Utility, Bottom and Surface Wells .PAT) Eight character field equivalent to APINUM minus the 2 digit STATE and minus 2 digit STCODE.

API10: (10,10,C)
(Bottom Wells .PAT) Ten character field equivalent to APINUM minus the 2 digit STATE Code.

APINUM: (12,12,C)
(Bottom Wells .PAT) The American Petroleum Institute (API) number of the wellbore in which the well is located. This 12-digit number includes a two-digit state code (Texas=42), an eight-digit API code, and a two-digit sidetrack code. (A sidetrack code identifies wells drilled from within a wellbore.)

BOTTOM-ID: (4,7,B)
(Bottom Wells .PAT) Bottom well identification number.

COUNTY: (3,3,C)
(Utility, Bottom and Surface Wells) Three character FIPS county code. FIPS codes are listed in Appendix B.

CWELLNUM: (6,6,C)
(Bottom Wells .PAT) Current well number as assigned by the operator.

FRESHWTR: (1,1,C)
(Bottom Wells .PAT) If given the value "Y", indicates a well converted to a fresh water well.

LAT: (8,12,F,7)
(Bottom and Surface Wells .PAT) Latitudinal position of the well. Datum is 1927.

LONG: (8,12,F,7)
(Bottom and Surface Wells .PAT) Longitudinal position of the well. Datum is 1927.

RADIOACT: (1,1,C)
(Bottom Wells .PAT) Whether the well is radioactive (if the bore contains any known radioactive material).

Y - well is radioactive.
N - well is not radioactive.

RELIAB: (2,2,C)
(Utility, Bottom and Surface Wells .PAT) Indicates the reliability of the well spot (the accuracy of the location of the well). Valid reliability codes are listed in Appendix C.

STATE: (2,2,C)
(Bottom Wells .PAT) Two character API-assigned identifier. Texas = 42

STCODE: (2,2,C)
(Bottom Wells .PAT) Side Track Code. Side tracks are numbered incrementally from 1 to 9, then from A through Z.

POSITION 1:1	POSITION 2:2
D = Directional	1 to 9 or,
H = Horizontal	A to Z
W = Well	

SURFACE-ID: (4,7,B)
(Utility, Bottom and Surface Wells .PAT) Surface well identification number.

SYMNUM: (2,3,B)
(Utility, Bottom and Surface Wells .PAT) Indicates the type of well under Datatype 50 in Appendix A.

WELLID: (5,5,C)
(Utility, Bottom and Surface Wells .PAT) Character field equal to APINUM's last five digits.

WELLID7: (7,7,C)
(Bottom Wells .PAT) Character field equal to APINUM's last five digits plus STCODE.

SURFACE WELLS:

API: (8,8,C)
(Utility, Bottom and Surface Wells .PAT) Eight character field equivalent to APINUM minus the 2 digit STATE Code and minus the 2 digit STCODE.

COUNTY: (3,3,C)
(Utility, Bottom and Surface Wells) Three character FIPS county code. FIPS codes are listed in Appendix B.

LAT: (8,12,F,7)
(Bottom and Surface Wells .PAT) Latitudinal position of the well. Datum is 1927.

LONG: (8,12,F,7)
(Bottom and Surface Wells .PAT) Longitudinal position of the well. Datum is 1927.

RELIAB: (2,2,C)
(Utility, Bottom and Surface Wells .PAT) Indicates the reliability of the well spot (the accuracy of the location of the well). Valid reliability codes are listed in Appendix C.

SURFACE-ID: (4,7,B)
(Utility, Bottom and Surface Wells .PAT) Surface well identification number.

SYMNUM: (2,3,B)
(Utility, Bottom and Surface Wells .PAT) Indicates the type of well under Data type 50 in Appendix A.

WELLID: (5,5,C)
(Utility, Bottom and Surface Wells .PAT) Character field equal to APINUM's last five digits.

WELL ARCS:

API_NUM: (12,12,C)
(Well Arcs .AAT) The American Petroleum Institute (API) number of the wellbore in which the well is located. This 12-digit number includes a two-digit state code (Texas=42), an eight-digit API code, and a two-digit sidetrack code. (A sidetrack code identifies wells drilled from within a wellbore.)

BOTT-ID: (4,7,B)
(Well Arcs .AAT) Bottom well identification number.

LTYPE: (2,3,B)
(Well Arcs .AAT) Line type of the directional well line

SURF-ID: (4,7,B)
(Well Arcs .AAT) Surface well identification number.

PIPELINE ATTRIBUTE INFORMATION

****
The Texas Railroad Commission is currently in the process of modifying and updating pipeline attributes to conform with the National Pipeline Mapping System (NPMS). Users of RRC pipeline data can expect specific items within the pipeline attribute table to be updated at any time.
****

DATA ITEMS IN THE <PIPELINE>.AAT

LINE_TYPE: (2,3,B)
Line type. All line types are given in Appendix A.

T4PERMIT: (5,5,C)
RRC-assigned five-digit pipeline permit number.

DIAMETER: (5,5,C)
Nominal diameter, in inches, of the pipeline segment.

FLUIDS: (20,20,C)
Abbreviation for the primary commodity carried by the pipeline system. The following is a listing of fluid categories and their systypes. Appendix D has a complete listing of specific products within the fluid categories.

Fluid Category	Land Systypes	Offshore Systypes
Acetylene	Q	
Alcohols	P	
Ammonia	P	
Benzenes	P	
Butanes	Q	
Carbon Dioxide	K	
Condensate	K	
Crude	L (Gathering)	A
Crude	O (Transmission)	A
Diesels	P	
Ethanes	Q	
Ethlyene	Q	
Ethylene (Gas)	T	
E/P Mix	Q	
Feedstock	P	
Fuel Oil	P	
Gasoline	P	
Hydrogen Gas	T	
Jet Fuel	P	
Kerosene	P	
LPG	Q	
Natural Gas	T (Transmission)	Z
Natural Gas	G (Gathering)	Z
Natural Gas Liquids	Q	
Nitrogen	P	
Oxygen	T	
Pentanes	Q	
Propanes	Q	
Refined Products	P	

SYSTEM: (35,35,C)
Operator-assigned name for a functional grouping of pipelines.

SUBSYSTEM: (35,35,C)
Operator-assigned name for a smaller subsection of a pipeline system. A subset of the SYSTEM attribute.

SYSTYPE: (2,2,C)
Abbreviation for the system type description. The character "A" is added to the abbreviation if the segment is abandoned.

G = Gas Gathering
K = Carbon Dioxide
L = Crude Gathering
O = Crude Transmission
P = Non_HVL Liquid Products
Q = HVL Products
T = Gas Transmission

See Appendix D for full listing of systypes.

COUNTY: (3,3,C)
The County FIPS code. FIPS codes are listed in Appendix B.

INTRA: (1,1,C)
Designates a pipeline as either inter or intrastate. "Y" indicates an intrastate pipeline, "N" indicates an interstate pipeline.

IDLE: (1,1,C)
Designates a pipeline as either idle or active. "Y" indicates an idle pipeline, "N" indicates a pipeline that is active but not currently in use. "Idle" does not mean the pipeline is abandoned. Idle pipelines are included in total pipeline miles permitted, abandoned pipelines are not.

MODDATE: (10,10,C)
Date pipeline segment was digitized or last modified (YYYY-MM-DD)

MILES: (4,8,F)
Pipeline length, in miles. Generated by the Arc/Info software.

SYS-ID: (16,16,I)
A six-digit RRC-generated system identifier. This item may not be present in all pipeline attribute files. The first number is the region number. Second is the system-type number. A four digit RRC assigned sequence number completes the item.

Region Numbers	Region Name
1	Amarillo
2	Midland
3	Kilgore
4	Austin
5	Houston
6	Dallas
7	Corpus Christi
8&9	Multi-Regional

System Type Number	System Type Name
3	Gas
4	Liquid
5	

V. APPENDIX A

DATA AND LINE TYPE ASSIGNMENTS

This appendix lists all data and line types. Data and line types are RRC defined data categories relevant to RRC mapping. Line types are listed beneath data types. For example, data type 10 represents the general data type, political boundaries. Line type 37 of data type 10 represents national political boundaries; line type 2 of data type 10 represents state political boundaries, etc.

DATA TYPE	Data Type Name:
10	**POLITICAL BOUNDARIES**
	2 - State
	3 - County
	21 - City
	37 - National
	58 - Offshore - Three League Line
11	**POLITICAL BOUNDARY ANNOTATION**
	29 - County, State
	81 - Town
	84 - City
	113 - Major Cities
12	**ORIGINAL LAND SURVEYS**
	5 - Block Line
	6 - Overlap Block Lines
	7 - Survey, Section Lines
	8 - Abstract Division Lines
	28 - Offshore Abstract Division
	29 - Offshore Tract, Survey Line
	30 - Offshore Block Line
	32 - Offshore Overlap Tract, Survey Line
	77 - Annotation Outline Arrow
	113 - Overlap Survey, Section Lines
	126 - Survey Annotation Outline
13	**SURVEY ANNOTATION**
	2 - Ex. Small Survey
	5 - Small Survey

6 - Small Offshore Tract/Survey
55 - Medium Survey, Section
56 - Medium Offshore Tract/Survey
62 - Medium Survey, Section
64 - Small Overlap Survey
96 - Abstract Annotation for Multi-Parcel Abstracts
102 - Large Block, Grant, League
111 - Large Offshore Block
112 - Large Block, Grant, League

17 WATER FEATURES
10 - Creeks
11 - Coastline
12 - Canals
27 - Rivers
31 - Lakes
35 - Original River Course Under Lake
55 - Dam Structures

18 WATER ANNOTATION
42 - Creeks and Small Lakes
44 - Rivers and Lakes

19 TRANSPORTATION LINES
14 - Heavy/Medium Duty
15 - Unimproved Roads
16 - Light Duty Roads and Streets
17 - Railroads
24 - Ship Channel

20 TRANSPORTATION ANNOTATION
2 - Highways
14 - Railroads
103 - Highways
107 - Ship Channel

21 TRANSPORTATION SYMBOLS
30 - State Highway/3 digit
31 - State Highway/4 digit
32 - Interstate Highway
33 - Farm or Ranch Road
34 - Park or Recreational Road
35 - U.S. Highway

24 GOVERNMENT LAND
116 - Parks and Military Reservations

25 **GOVERNMENT LAND ANNOTATION**
26 - Small
30 - Medium
32 - Large

26 **CEMETERIES**
36 - Cemetery Boundary

27 **CEMETERY ANNOTATION**
69 - Cemetery Name

28 **CEMETERY SYMBOLS**
48 - Cemetery Symbol

29 **AIRPORTS**
36 - Runways and Boundaries

30 **AIRPORT ANNOTATION**
69 - Airport Name

31 **SUBDIVISION LINES**
9 - Subdivision Lot Line
124 - Subdivision Outline
125 - Subdivision Labor Line

32 **SUBDIVISION ANNOTATION**
117 - Ex. Small Subdivision
118 - Small Subdivision
119 - Medium Subdivision
120 - Large Subdivision

50 **OIL & GAS WELLS**
2 Permitted Location
3 Dry Hole
4 Oil Well
5 Gas Well
6 Oil/Gas Well
7 Plugged Oil Well
8 Plugged Gas Well
9 Canceled/Abandoned Location
10 Plugged Oil/Gas Well
11 Injection/Disposal
17 Storage from Oil
18 Storage from Gas
19 Shut-In (Oil)

20 Shut-In (Gas)
21 Inj/Disposal From Oil
22 Inj/Disposal From Gas
23 Inj/Disposal From Oil/Gas
36 Geothermal Well
73 Brine Mining
74 Water Supply
75 Water Supply from Oil
76 Water Supply from Gas
77 Water Supply from Oil/Gas
78 Observation
79 Observation from Oil
80 Observation from Gas
81 Observation from Oil/Gas
1. Storage
2. Service
90 Service from Oil
91 Service from Gas
92 Service from Oil/Gas
103 Storage from Oil/Gas
104 Inj/Disposal from Storage
105 Inj/Disposal from Storage/Oil
106 Inj/Disposal from Storage/Gas
107 Inj/Disposal from Storage/Oil/Gas
108 Observation from Storage
109 Observation from Storage/Oil
110 Observation from Storage/Gas
111 Observation from Storage/Oil/Gas
112 Service from Storage
113 Service from Storage/Oil
114 Service from Storage/Gas
115 Service from Storage/Oil/Gas
116 Plugged Storage
117 Plugged Storage/Oil
118 Plugged Storage/Gas
119 Plugged Storage/Oil/Gas
120 Brine Mining
121 Brine Mining/Oil
122 Brine Mining/Gas
123 Brine Mining/Oil/Gas
124 Inj/Disposal from Brine Mining
125 Inj/Disposal from Brine Mining/Oil
126 Inj/Disposal from Brine Mining/Gas
127 Inj/Disposal from Brine Mining/Oil/Gas
128 Observation from Brine Mining
129 Observation from Brine Mining/Oil

130 Observation from Brine Mining/Gas
131 Observation from Brine Mining/Oil/Gas
132 Service from Brine Mining
133 Service from Brine Mining/Oil
134 Service from Brine Mining/Gas
135 Service from Brine Mining/Oil/Gas
136 Plugged Brine Mining
137 Plugged Brine Mining/Oil
139 Plugged Brine Mining/Gas
139 Plugged Brine Mining/Oil/Gas
140 Storage Brine Mining
141 Storage Brine Mining/Oil
142 Storage Brine Mining/Gas
143 Storage Brine Mining/Oil/Gas
144 Inj/Disposal from Storage/Brine Mining
145 Inj/Disposal from Storage/Brine Mining/Oil
146 Inj/Disposal from Storage/Brine Mining/Gas
147 Inj/Disposal from Storage/Brine Mining/Oil/Gas
148 Observation from Storage/Brine Mining
149 Observation from Storage/Brine Mining/Oil
150 Observation from Storage/Brine Mining/Gas
151 Observation from Storage/Brine Mining/Oil/Gas
152 Plugged Storage/Brine Mining
153 Plugged Storage/Brine Mining/Oil
154 Plugged Storage/Brine Mining/Gas
155 Plugged Storage/Brine Mining/Oil/Gas

56 DIRECTIONAL DRILL LINES

25 - Horizontal Drainhole Line
42 - Directional Well Line
43 - Directional Well Line

57 GRAPHIC WELL SYMBOLS

12 - Core Test
13 - Directional Surface Location
15 - Radioactive Symbol
16 - Sulphur Test
86 - Horizontal Drainhole
87 - Sidetrack Well Surface Location

VI. APPENDIX B COUNTY FIPS CODES

COUNTY	FIPS CODE
Anderson	001
Andrews	003

Angelina	005
Aransas	007
Archer	009
Armstrong	011
Atascosa	013
Austin	015
Bailey	017
Bandera	019
Bastrop	021
Baylor	023
Bee	025
Bell	027
Bexar	029
Blanco	031
Borden	033
Bosque	035
Bowie	037
Brazoria	039
Brazos	041
Brewster	043
Briscoe	045
Brooks	047
Brown	049
Burleson	051
Burnet	053
Caldwell	055
Calhoun	057
Callahan	059
Cameron	061
Camp	063
Carson	065
Cass	067
Castro	069
Chambers	071
Cherokee	073
Childress	075
Clay	077
Cochran	079
Coke	081
Coleman	083
Collin	085
Collingsworth	087
Colorado	089
Comal	091
Comanche	093
Concho	095

Cooke	097
Coryell	099
Cottle	101
Crane	103
Crockett	105
Crosby	107
Culberson	109
Dallam	111
Dallas	113
Dawson	115
Deaf Smith	117
Delta	119
Denton	121
Dewitt	123
Dickens	125
Dimmitt	127
Donley	129
Duval	131
Eastland	133
Ector	135
Edwards	137
Ellis	139
El Paso	141
Erath	143
Falls	145
Fannin	147
Fayette	149
Fisher	151
Floyd	153
Foard	155
Fort Bend	157
Franklin	159
Freestone	161
Frio	163
Gaines	165
Galveston	167
Garza	169
Gillespie	171
Glasscock	173
Goliad	175
Gonzales	177
Gray	179
Grayson	181
Gregg	183
Grimes	185
Guadalupe	187

Hale	189
Hall	191
Hamilton	193
Hansford	195
Hardeman	197
Hardin	199
Harris	201
Harrison	203
Hartley	205
Haskell	207
Hays	209
Hemphill	211
Henderson	213
Hidalgo	215
Hill	217
Hockley	219
Hood	221
Hopkins	223
Houston	225
Howard	227
Hudspeth	229
Hunt	231
Hutchinson	233
Irion	235
Jack	237
Jackson	239
Jasper	241
Jeff Davis	243
Jefferson	245
Jim Hogg	247
Jim Wells	249
Johnson	251
Jones	253
Karnes	255
Kaufman	257
Kendall	259
Kenedy	261
Kent	263
Kerr	265
Kimble	267
King	269
Kinney	271
Kleberg	273
Knox	275
Lamar	277
Lamb	279

Lampasas	281
La Salle	283
Lavaca	285
Lee	287
Leon	289
Liberty	291
Limestone	293
Lipscomb	295
Live Oak	297
Llano	299
Loving	301
Lubbock	303
Lynn	305
McCulloch	307
McLennan	309
McMullen	311
Madison	313
Marion	315
Martin	317
Mason	319
Matagorda	321
Maverick	323
Medina	325
Menard	327
Midland	329
Milam	331
Mills	333
Mitchell	335
Montague	337
Montgomery	339
Moore	341
Morris	343
Motley	345
Nacogdoches	347
Navarro	349
Newton	351
Nolan	353
Nueces	355
Ochiltree	357
Oldham	359
Orange	361
Palo Pinto	363
Panola	365
Parker	367
Parmer	369
Pecos	371

Polk	373
Potter	375
Presidio	377
Rains	379
Randall	381
Reagan	383
Real	385
Red River	387
Reeves	389
Refugio	391
Roberts	393
Robertson	395
Rockwall	397
Runnels	399
Rusk	401
Sabine	403
San Augustine	405
San Jacinto	407
San Pactricio	409
San Saba	411
Schleicher	413
Scurry	415
Shakelford	417
Shelby	419
Sherman	421
Smith	423
Somervell	425
Starr	427
Stephens	429
Sterling	431
Stonewall	433
Sutton	435
Swisher	437
Tarrant	439
Taylor	441
Terrell	443
Terry	445
Throckmorton	447
Titus	449
Tom Green	451
Travis	453
Trinity	455
Tyler	457
Upshur	459
Upton	461
Uvalde	463

Val Verde	465
Van Zandt	467
Victoria	469
Walker	471
Waller	473
Ward	475
Washington	477
Webb	479
Wharton	481
Wheeler	483
Wichita	485
Wilbarger	487
Willacy	489
Williamson	491
Wilson	493
Winkler	495
Wise	497
Wood	499
Yoakum	501
Young	503
Zapata	505
Zavala	507

OFFSHORE COUNTY AREAS	FIPS CODE
South Padre Island-SB	600
North Padre Island-SB	601
Mustang Island-SB	602
Matagorda Island-SB	603
Brazos-SB	604
Galveston-SB	605
High Island-SB	606
Sabine Pass-SB	607
South Padre Island-LB	700
North Padre Island-LB	701
Mustang Island-LB	702
Matagorda Island-LB	703
Brazos-LB	704
Brazos-S	705
Galveston-LB	706
Galveston-S	707
High Island-LB	708
High Island-S	709
High Island-E	710
High Island-E-S	711
Mustang Island-E	712

North Padre Island-E	713
South Padre Island-E	714
Sabine Pass-LB	715

VII. APPENDIX C WELL RELIABILITY CODES

WELL RELIABILITY CODES

The reliability of a well's location is determined by the source used to spot the well into the Well Location Database. Valid codes are:

CODES

10	Historic Map (non-RRC)
15	RRC Hardcopy Map
16	Spotted from Reliability Code 15 wells
17	Location adjusted during survey maintenance
20	WELLBORE Distances
25	Unit or hearing plat, plat with form for another well, or form for this well without a plat.
30	Operator reported location (distances without plat or plat without distances).
40	Operator reported location (distances and plat).
45	Field Inspection by RRC personnel.
48	Spotted from Reliability Code 50 wells
50	U.S.G.S. 7.5 minute quad or aerial photograph.
55	Coordinates from operator.
59	Coordinates – RRC personnel reported 2D GPS (Accuracy of 200-300 feet.)
60	Coordinates – RRC personnel reported 3D GPS (Accuracy of about 15 feet.)

VIII. APPENDIX D: FLUID TYPES AND SYSTYPES

FLUID TYPES	LAND SYSTYPES	OFFSHORE SYSTYPES
Acetylene	Q	
Alcohols	P	
Ammonia	P	
Benzenes	P	
Butanes	Q	
Butadiene		
Butane/Butylene		
Butane/Distillates		
Butane/Pentane		
Butylene		
Iso-Butane		
Isobutane		

Carbon Dioxide CO2	K	
Condensate Slop Oil Water	K	
Crude	L (Gathering)	A
Crude O/G Oil Petroleum	O (Transmission)	A
Diesels	P	
Ethanes	Q	
Ethlyene	Q	
Ethylene (Gas)	T	
E/P Mix E/P Propane Ethane/Propane Ethane/Propane Mix P/P Mix EPBC	Q	
Feedstock	P	
Fuel Oil Bistone Fuel Gas Fuel Oil/Natural Gas Fuel Oils/Gas Fuel Residum	P	
Gasoline Gasoline/Diesel/Jet Gasoline/Fuel Oils	P	
Hydrogen Gas Liquid Hydrogen Pure H2 Raw H2	T	
Jet Fuel	P	
Kerosene	P	

LPG	Q	
Raw LPG		
Natural Gas	T (Transmission)	Z
Natural Gas	G (Gathering)	Z
Dry Gas		
Natural		
Natural Gas/Cond		
Sweet Gas		
Synthesis		
Natural Gas Liquids	Q	
NGL		
Refinery Off Gas		
Nitrogen	P	
Oxygen	T	
Oxygen/Nit.		
Pentanes	Q	
Propanes	Q	
Methyl Propane		
Propadiene		
Propane/Butane		
Propane/LPG		
Propane/Propylene		
Propylene		
Propylene Oxide		
Propyne		
Refined Products	P	
Acnylonitrile		
Cutter Stock		
Cyclohexane		
Deisohex Stock		
Distillates		
Dripoline		
Feed Gas		
HCL Acid Anhydrous		
Hexene		
HPG		
Isoprene		
Methanol		
MTBE		

Naptha
Products
Raffinate
RPG
Tertiary Butyl Alcohol
Toluene

SYSTYPES

A = Offshore (Liquids)
B = Apartment Complexes
C = Compressor Station
D = Distribution
E = Interstate Transmission Gas
F = Non-Jurisdictional Gathering
G = Gas Gathering
H = Government (Housing Authority)
I = LP Gas Distribution
J = Direct Sales Customer
K = Carbon Dioxide Pipelines
O = Crude Transmission
M = Municipal Distribution
N = City Not Served
L = Crude Gathering
P = Product Lines (NOT Highly Volatile)
Q = Other Liquid Lines (Highly Volatile)
S = Municipal Supply Line
T = Transmission
U = Underground Liquid Storage
V = Underground Gas Storage
W = Mobile Home Parks
X = Liquified Natural Gas
Z = Offshore (Gas) Gathering

IX. APPENDIX E NAMING CONVENTIONS

8.3 NAMING CONVENTION

The 8.3 naming convention stipulates that, exclusive of the filename suffix, a digital filename cannot be more than 8 characters long.

Although some computer operating systems and software programs accept file names longer than 8 characters, the Railroad Commission adheres to the 8.3 naming convention for a number of reasons.

1. ESRI, the manufacturer of ArcInfo and ArcView, suggests that their users adhere to the 8.3 naming convention. ESRI, in various ways to various extents, codes its software to enforce compliance with the 8.3 naming convention.
2. All RRC GIS data is compressed. Unfortunately, some decompression software packages truncate long filenames such as, "water3402112.shp" to meaningless names like, "water34~1.shp"
3. The Railroad Commission is committed to making its digital data accessible and usable to as wide an audience as possible. Adherence to the 8.3 naming convention ensures that at least one major hurdle of data portability is cleared.

3. Data Dictionary Additions

Two additional fields added to the pipeline database will enable easier understanding of the location by indicating the county name, based on the Federal Information Processing Standards (FIPS) code provided originally, and the TxDOT District name. Fields identifying segment lengths were also added to the pipeline database.

Data Dictionary Additions

1. COUNTY – County designation (String)

2. TXDOT – TxDOT District designation (String).

If the County designation represents an offshore location, the TxDOT District is indicated as "Offshore." The 25 TxDOT Districts and "Offshore" designation are listed below as indicated in the database.

- Abilene
- Amarillo
- Atlanta
- Austin
- Beaumont
- Brownwood
- Bryan
- Childress
- Corpus Christi
- Dallas
- El Paso
- Fort Worth
- Houston
- Laredo
- Lubbock
- Lufkin
- Odessa
- Paris
- Pharr
- San Angelo
- San Antonio
- Tyler
- Waco
- Wichita Falls
- Yoakum
- Offshore

3. LENGTH – Length in decimal degrees (number, 10 decimal places)

The software using the designated units defined by the projection generated the length, which are in units of decimal degrees.

4. LENGTH_MET – Length in meters (number, 5 decimal places)

This measurement is calculated from the LENGTH field.

5. LENGTH_MI – Length in miles (number, 5 decimal places)

This measurement is calculated from the LENGTH field.

SECTION III. TEXAS PIPELINE INTERMODAL CONNECTIONS

1. File Description

The GIS database developed by TTI will enable TxDOT to identify pipeline intermodal connections by location, type, and modal connections for use in transportation planning activities.

Data Sources

Two main data sources were used to collect this data. The first was Pennwell Corporation. TTI purchased a facility database that contained locations of interconnections between pipeline facilities and other modes of transportation. **Pennwell will allow TxDOT to use the information internally, but will not permit dissemination of the data to outside sources.**

The second data source was a report performed by the Houston-Galveston Area Council (HGAC) titled *Intermodal Facility Inventory*. This report was published in January of 2000 and provides an extensive inventory of intermodal connections within HGAC's Transportation Management Area (TMA), which includes eight counties. TTI personnel examined the document and identified intermodal facilities that involve pipeline connections.

Coordinate System

Projection: Geographic
Units: Decimal Degrees
Datum Name: North American Datum 1983 (NAD83)
Ellipsoid Name: GRS1980

File Format

Files developed by TTI and submitted to TxDOT are in the Environmental Systems Research Institute shapefile (.shp) format created in the ArcView Version 3.2a software package.

File Naming Convention – Pipeline Intermodal Connections points

1) Statewide Pipeline Intermodal Connections: Pipe_Connect_State.shp; .shx; .dbf; .prj

2) Pipeline Intermodal Connections by TxDOT District: Pipe_Connect_<TxDOT District Abbreviation>.shp; .shx; .dbf; .prj

TxDOT District Abbreviations:

- ABL – Abilene
- AMA – Amarillo
- ATL – Atlanta
- AUS – Austin
- BMT – Beaumont
- BWD – Brownwood
- BRY – Bryan
- CHS – Childress
- CRP – Corpus Christi
- DAL – Dallas
- ELP – El Paso
- FTW – Fort Worth
- HOU – Houston
- LRD – Laredo
- LBB – Lubbock
- LFK – Lufkin
- ODA – Odessa
- PAR – Paris
- PHR – Pharr
- SJT – San Angelo
- SAT – San Antonio
- TYL – Tyler
- WAC – Waco
- WFS – Wichita Falls
- YKM – Yoakum

2. Data Dictionary

1. TTI_ID – Unique identification number created by TTI (Number)

2. FAC_NAME – Facility Name (String)

3. FAC_OPERAT – Facility Operator (String)

4. FAC_OWNER – Facility Owner (String)

5. FAC_TYPE – Facility Type (String)

Abbreviation	Definitions
CP	Chemical Plant
PB	Public Port
PP	Private Port
PT	Pipeline Terminal
REF	Refinery
TF	Tank Farm

6. ADDRESS – Facility Address (String)

7. CITY – City designation (String)

8. STATE – State designation (String)

9. ZIP – Zip designation (String)

10. COUNTY – County designation (String)

11. LATITUDE – Latitude designation (Number, 5 decimal places)

12. LONGITUDE – Longitude designation (Number, 5 decimal places)

13. CONNECTION – Modes of Connection (String)

14. RAIL – Rail Connection (String)

    A value of "R" indicates a pipeline-railroad intermodal connection.

15. TRUCK – Truck Connection (String)

    A value of "T" indicates pipeline-truck intermodal connection.

16. MARINE – Marine Connection (String)

    A value of "M" indicates a pipeline-marine intermodal connection.

17. COMM_TYPE – Commodity Type (String)

18. COMM_VOL – Commodity Volume (String)

19. MODE_TYPES – Intermodal connections (String)

    Indicates the intermodal connection combinations: "R" = Rail; "T" = Truck; "M" = Marine

    e.g. R T = Pipeline connection with both Rail and Truck

20. TXDOT –TxDOT District designation (String)

- Abilene
- Amarillo
- Atlanta
- Austin
- Beaumont
- Brownwood
- Bryan
- Childress
- Corpus Christi
- Dallas
- El Paso
- Fort Worth
- Houston
- Laredo
- Lubbock
- Lufkin
- Odessa
- Paris
- Pharr
- San Angelo
- San Antonio
- Tyler
- Waco
- Wichita Falls
- Yoakum

21. SOURCE – Data Source (String)

The two major sources of data included in the databases are: Pennwell (for TxDOT internal use only) and Houston-Galveston Area Council's *Intermodal Facility Inventory*, January 2000.