Thesis Title: Prospect Generation of Infill/Step-Out Wells in Northwest Denton County, Texas: A Geological, Geophysical, & Economic Analysis of the Strawn Group (Fort Worth Basin).

1. Introduction

1.1. Background:

1.1.1. Overview of hydrocarbon production and exploration in Northwest Denton County, Texas and the Fort Worth Basin

1.1.2. Significance of the Strawn group in the region.

1.1.3. Importance of successful prospect generation of future development.

1.1.4. Highlight significant discoveries & production trends within the Fort Worth Basin.

1.1.5. Discuss the importance of continued exploration/development & the role of exploratory & development drilling in expanding hydrocarbon reserves.

1.1.6. Emphasize the challenges & opportunities in modern exploration within the Fort Worth Basin, particularly in frontier areas or underexplored formations.

1.2. **Problem Statement**:

1.2.1. Identify & evaluate potential drilling locations within the Strawn Groups in Northwest Denton County for a successful Development Well(s).

1.3. Objectives:

1.3.1. Conduct a comprehensive analysis of available Geological & Geophysical data in Northwest Denton County, Texas (Fort Worth Basin)

1.3.2. Acquire & Analyze relevant data (seismic, well logs, production data, etc.).

1.3.3. Identify & evaluate potential drilling locations based on geological, geophysical, & economic factors.

1.3.4. Assess the risks associated with each prospect & develop mitigation strategies.

1.3.5. Conduct an economic evaluation to assess the potential profitability of the exploratory/developmental well(s).

1.3.6. Develop a comprehensive prospect evaluation report, including prospect map, and present finding in a clear &concise manner.

2. Regional Geology

2.1. Tectonic Setting:

2.1.1. Brief overview of the regional tectonic framework of the Fort Worth Basin.

2.1.2. Describe the major tectonic events that shaped the basin's geology (Ouachita Orogeny).

2.1.3. Discuss the structural & stratigraphic controls on hydrocarbon accumulation in the study area.

2.2. Stratigraphy:

2.2.1. Provide a detailed overview of the stratigraphic succession within the Fort Worth Basin.

2.2.2. Detailed description of the stratigraphy of Pennsylvanian System in Northwest Denton County, with a focus on the Strawn Gorup.

2.2.3. Discuss the depositional environment & facies distributions within the target formation.

2.2.4. Identify potential reservoir rocks, source rocks, and seal rocks.

3. Data Acquisition & Analysis

3.1. Data Collection:

3.1.1. Acquire & compile relevant data:

3.1.1.1. Well logs (gamma ray, resistivity, density, neutron, sonic, ect.)

3.1.1.2. Seismic data (2D and/or 3D)

3.1.1.3. Core data (if available)

3.1.1.4. Production data from existing wells

3.1.1.5. Regional geological maps & publications

3.1.1.6. Geochemical data (e.g., source rock maturity data)

3.1.1.7. Economic data (oil & gas prices, drilling & completion costs)

3.1.2. Data management & quality control

3.2. Geological Analysis:

3.2.1. Structural Analysis:

3.2.1.1. Interpretation of seismic data to identify faults, fold, and other structural features.

3.2.1.2. Mapping of structural contours and fault planes.

3.2.1.3. Analyze the impact of structural features on hydrocarbon trapping.

3.2.2. Stratigraphic Analysis:

3.2.2.1. Facies analysis using well log data & core descriptions.

3.2.2.2. Identification of potential reservoir zones within the target formations.

3.2.2.3. Mapping of Isopach & Isochore maps & facies distribution.

3.2.2.4. Analyze the impact of depositional environment & facies distribution on reservoir quality.

3.2.3. Petroleum System Analysis:

3.2.3.1. Evaluate the presence & characteristics of all elements of a working Petroleum System (Source rocks, Reservoir Rock, Seal, Trap, Migration Pathway

3.2.3.2. Assess the maturity of the source rock & the timing of hydrocarbon generation.

4. Prospect Identification & Evaluation

4.1. Prospect Identification:

4.1.1. Integration of geological & geophysical data to identify potential drilling locations.

4.1.2. Application of mapping techniques (e.g. Structural Maps, Isopach Maps, Isochore Maps, Facies Maps) to delineate prospective areas.

4.1.3. Consider different pay types (e.g. structural, stratigraphic, unconventional).

4.1.4. Prioritize areas with high prospectivity based on geological & geophysical evidence.

4.2. Prospect Evaluation:

4.2.1. Geological Evaluation:

4.2.1.1. Assess the presence & characteristics of all elements of a working petroleum system.

4.2.1.2. Assessment of structural & stratigraphic controls on hydrocarbon accumulation at each prospect.

4.2.1.3. Evaluation of reservoir quality (porosity, permeability, fluid saturation) within the target formations(s).

4.2.1.4. Analyze potential for hydrocarbon accumulation & migration.

4.2.2. Production History Analysis:

4.2.2.1. Analysis of production data from nearby wells to assess potential productivity & identify areas of high production potential.

5. Economic Evaluation

5.1. Cost Estimation:

5.1.1. Estimate drilling & completion costs.

5.1.2. Consider potential costs associated with environmental permits & regulations

5.2. Production Forecasting:

5.2.1. Forecast potential production rates & reserves based on geological & engineering assumptions

5.2.2. Utilize decline curve analysis & other techniques to predict future production.

5.3. Economic Analysis:

5.3.1. Conduct an economic analysis to determine the profitability of the exploratory well.

5.3.2. Calculate estimated ultimate recovery (EUR).

5.3.3. Determine the project's net present value (NPV) & internal rate of return (IRR) & rate of return (ROR)

6. Risk Assessment

6.1. Geological Risks:

6.1.1. Assessment of potential geological risks, such as:

6.1.1.1. Uncertainty in structural interpretation.

6.1.1.2. Reservoir heterogeneity & compartmentalization.

6.1.1.3. The presence of water or other fluids.

6.1.1.4. Uncertainties in source rock maturity & hydrocarbon generation.

6.2. Economic Risks:

6.2.1. Assessment of potential economic risks, such as:

6.2.1.1. Fluctuations in oil & gas prices.

6.2.1.2. Unexpected drilling & completion costs.

6.2.1.3. Changes in regulatory requirements.

6.3. Risk Mitigation Strategies:

6.3.1. Develop & Evaluate potential risk mitigation strategies, such as:

6.3.1.1. Sidetrack options

6.3.1.2. Alternative completion techniques.

6.3.1.3. Hedging strategies for oil & gas prices.

7. Results & Discussion

7.1. Prospect Map:

7.1.1. Present a map outlining the most promising drilling locations within the study area.

7.2. Prospect Evaluation Report:

7.2.1. Summarize the geological, geophysical, & economic evaluation of the identified prospects.

7.3. Risk Assessment Report:

7.3.1. Present the results of the risk assessment & discuss recommended mitigation strategies.

7.4. Discussion of Results:

7.4.1. Discuss the implications of the findings for future development & exploration drilling activities in the Forth Woth Basin, specifically Northwest Denton County, Texas.

7.4.2. Address the limitations of the study.

8. Conclusions & Recommendations

8.1. Conclusions:

8.1.1. Summarize the key findings & conclusions of the study.

8.2. Recommendations:

8.2.1. Provide recommendations for future exploration and development activities in the study area.

8.2.2. Suggest areas for further research and data acquisition.

9. References

9.1. List all cited sources in a consistent format.

10. Appendices

10.1. Include supporting data, maps & figures.