

RECON NEWSLETTER

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Special points of interest:

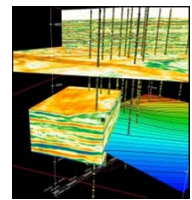
- [Recon 2.3.5 Release](#)
- [New AGM Website](#)
- [Advanced 3-D True Stratigraphic Thickness Calculations in Recon](#)

AGM Announces New Recon™ Release

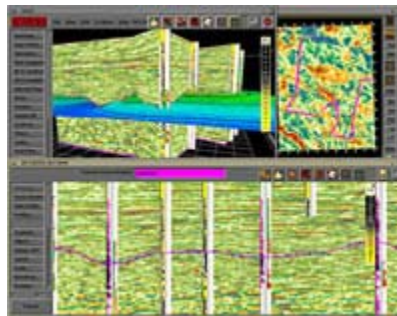
Continuing its tradition of creating easy-to-use, yet powerful 3-D geological interpretation solutions, AGM has released its next significant update of Recon.

This release, Version 2.3.5, focuses on a wide variety of useful workflows ranging from advances in 3-D surface modeling algorithms to the generation of presentation quality graphics.

Customers currently under maintenance contract will receive this new version automatically. All others should contact sales@austingeo.com.



**3-D Seismic
Volume Rendering probe
in Recon**



Three-Window Workflow

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New AGM Website

For full details on what's new and improved in this Recon release, please visit AGM's new website at:

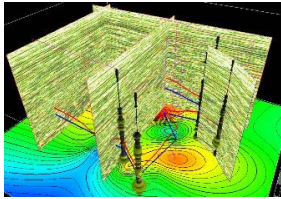
www.austingeo.com

While visiting our new website, we invite you to explore all the exciting news and latest information it contains. This website

has been significantly enhanced in response to the suggestions we have received from our customers. As always, your thoughts about how to improve the usefulness of our website to you are most appreciated. Please send your comments to:

webmaster@austingeo.com

What's New in Recon 2.3.5?



Seismic arbitrary and well to well cross-sections in Recon

Some of the exciting new features of Recon include:

- Comprehensive, easy-to-use annotation features to create live presentation-quality hardcopy cross-sections.
- Knowledge management enhancements: free-form interval database, 3-D and 2-D hyperlinks for external documents.
- Dynamic reprojection of wells in 2-D cross-sections when editing the line of section in 3-D.
- Automatic re-datuming of seismic stratigraphic cross-sections when dragging & dropping inter-well picks.
- Advanced 3-D true stratigraphic thickness calculations.
- Unlimited length seismic cross-section displays.
- Distance and surface-merge controls for advanced conformable gridding techniques.

Advanced 3-D Stratigraphic Thickness Calculations in Recon

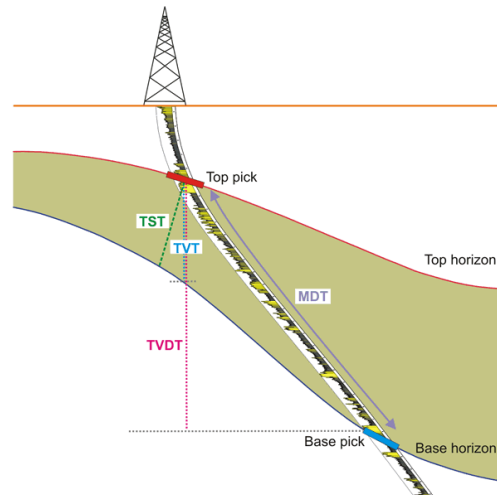
“This incorrect assumption can lead to significant errors in determining thickness values.”

Proper thickness calculations are crucial for the accurate determination of hydrocarbon reserves. These calculations become especially challenging in the case of deviated wells penetrating dipping reservoir zones with non-uniform thickness.

Traditional 2-D geological interpretation software has long used parallel bed assumptions in the calculation of true stratigraphic and true vertical thicknesses. This incorrect assumption can lead to significant errors in determining thickness values used for hydrocarbon reserve calculations.

The figure above describes four most commonly used thickness definitions for the case of a deviated well penetrating a reservoir zone:

1. TVD(T) (true vertical depth thickness) – Calculated by subtracting elevation (TVDSS) of



base pick from elevation of top pick.

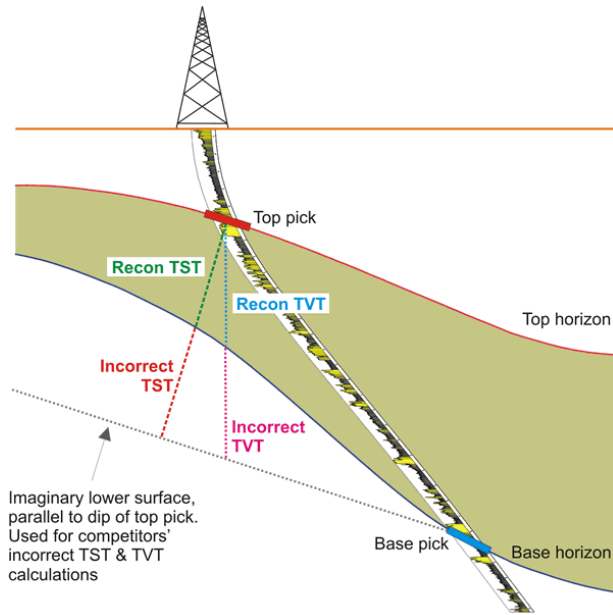
2. MDT (measured depth thickness) – Measured along the wellbore trajectory.

3. TVT (true vertical thickness) – Measured vertically through the wellbore entry point into the zone. TVT uses the zone's top pick dip/azimuth values.

4. TST (true stratigraphic thickness) – Measured perpendicular to the top zone surface at the wellbore entry point.

To determine the thickness we need an equation that corrects for wellbore deviation, zone dip and zone thickness variation.

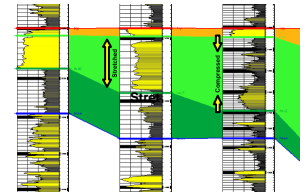
In this case, TVT is the appropriate thickness used for accurate volumetric reserve calculations.



The scenario shown on the left shows how the parallel bed assumption can lead to 100% overestimation in the calculation of TVT and TST.

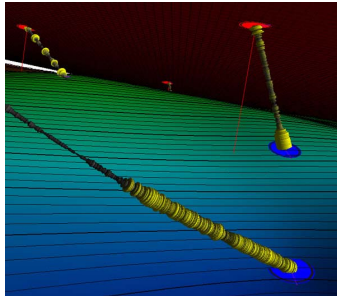
Recon calculates more accurate TVT and TST values by using the dip and azimuth information associated with the top of zone pick.

By intersecting a 3-D line perpendicular to the pick's dip with the base of zone surface, a true 3-D stratigraphic thickness value is calculated.



Notice how the depth lattices for the stratigraphically equivalent sections are stretched and compressed in this Recon cross-section. Recon enables you to correlate deviated and horizontal wells directly in TST (True Stratigraphic Thickness)

The figure below shows 3-D gamma ray logs in Recon with picks showing dip & azimuth. Lines are projected perpendicular to the dip of the red top



Angle a: The wellbore inclination (inclination from vertical, 90° = horizontal) obtained from the directional survey.

Angle b: The azimuthal difference between the direction of the bed dip (from dip/azimuth for pick at top of zone) and the direction of the deviated wellbore (azimuth obtained from the directional survey).

Angle c: Zone dip angle obtained from dip/azimuth data for pick at top of zone.

Using Recon's interactive 2-D and 3-D integrated interpretation environment will release you from your dependence on outdated 2-D calculation methods founded on incorrect assumptions.

Recon's advanced 3-D stratigraphic thickness calculations enable you to improve the quality of your interpretations and increase the accuracy of your reserve determinations.

picks and intersected with the base of zone surface to obtain the most accurate 3-D stratigraphic thickness.

Based on the angles defined in the figure on the right, the following thickness types can be calculated:

$$TVDT = MDT \times \cos(a)$$

$$TVT = MDT \times \{ \cos(a) - [\sin(a) \times \cos(b) \times \tan(c)] \}$$

$$TST = TVT \times \cos(c)$$

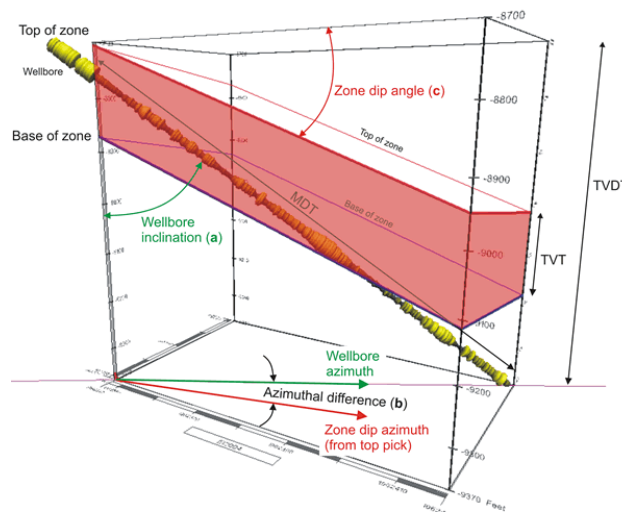


Illustration of angles and thickness values used to calculate thickness of the intersection of a deviated well with a dipping zone.

“By intersecting a 3-D line perpendicular to the pick's dip with the base of zone surface, a true 3-D stratigraphic thickness value is calculated.”



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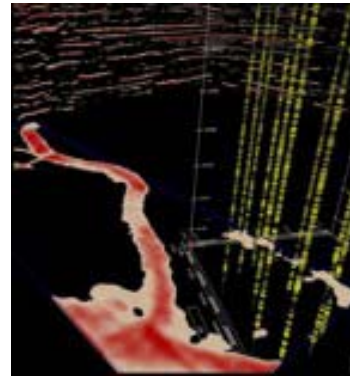
AGM

*Ultimate 3-D Geological
Interpretation Solutions*

Visit AGM on the Web
www.austingeo.com

Founded in 1996, AGM has been helping high tech oil & gas companies implement next-generation geological interpretation solutions. Customers depend on AGM to provide powerful, easy-to-use software that directly contributes to their business bottom line. AGM is proud to bring exciting new 3-D geological interpretation tools to your desktop.

For more information on AGM's innovative 3-D geological interpretation solutions, contact Bev Taylor at (713) 952-4141 or send him an email: btaylor@austingeo.com



Volume rendering of seismic channels revealed using Recon StratalSlice

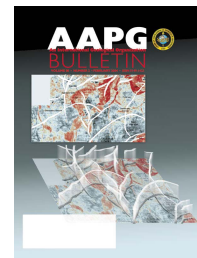
Stratal Slicing Technology in AAPG Bulletin

The February 2004 edition of the AAPG Bulletin features a case study highlighting the stratal slicing technology.

The authors, Dr. Hongliu Zeng and Tucker Hentz, introduce a seismic-sedimentological approach for mapping high frequency sequences and systems tracts using well log and three-dimensional seismic data. This case study shows that stratal slicing in lithology-conditioned seismic data provides an accurate reconstruction of the high-frequency 3-D sequence stratigraphic framework.

With the new Recon StratalSlice™ software from AGM you will be able to reveal complex depositional patterns in your 3-D seismic data, thus yielding a unique insight into your reservoir's stratigraphic architecture and facies distribution.

Recon StratalSlice™ offers an easy-to-use workflow designed to quickly generate new geologic time surfaces by proportionally slicing between reference seismic horizons. Stratal-Slice is integrated with Recon and offers seamless integration with Landmark's OpenWorks and Seis-Works.



AAPG members can download the AAPG Bulletin Stratal Slicing Paper from the AAPG website at:

www.aapg.org