

Integrating Examination of Internal Multiples into QC Process Flow

The next QC step is to match the GP multiple-only synthetic to the ISS multiple estimation of the field data at the well location (Figure 11).

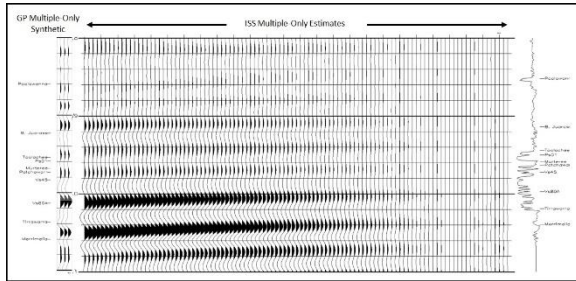


Figure 11. Well match between ISS Multiple Estimate and GP multiple-only synthetic.

This step of the QC process (Figure 11) is clearly validated as the ISS multiple-only estimate from the field data matches the well-location estimate of the multiple only. The final QC step is to match the seismic data with multiples suppressed via adaptive subtraction to the GP primary-only synthetic that has the non-stationary wavelets. The results of this step are shown in Figure 12.

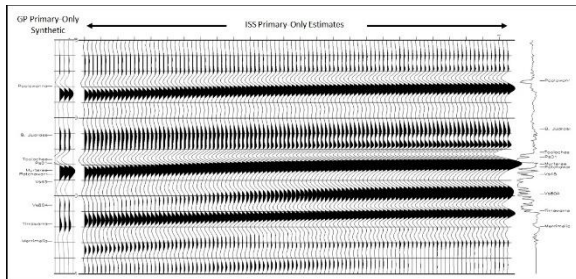


Figure 12. Well match between the GP primary-only synthetic and the adaptive subtraction of the ISS multiples from the migrated field data. Again, non-stationary wavelets are employed.

The final comparison for this field example shown in Figure 13 indicates how the true pick of the base of the coal beds was determined only after application of this QC process. This warns not to stretch synthetics too quickly to get a well match.

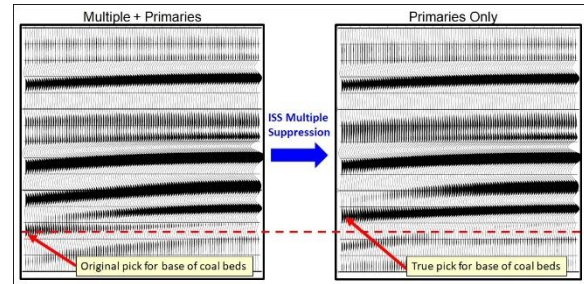


Figure 13. Field data vs. multiple-suppressed field data (primaries-only).

Conclusions

A thorough examination of the physical relationship between internal multiples, seismic data and well logs has been shown to highlight the method for incorporating this analysis into the QC process flow. The creation of 4 versions of seismic synthetics not only results in the ability to examine the impact of multiples within seismic data, but also enhances the validity of the interpreter's evaluation of the data. Failure to identify, estimate, suppress and validate the impact of internal multiples may result in dramatic errors in identifying geologic structures and the presence of hydrocarbons. The tools and techniques have also been shown to fit nicely into the process flow to permit this level of examination in a timely and efficient manner.

References

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