CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

The conclusions reached at the end of this research and development work, and recommendations, for the future extensions are included in this chapter.

7.1 CONCLUSIONS

- An expert system name, SeisExpert, has been successfully developed.

- Over 120 rules developed during the present work have been built into a commercially available expert system shell, 'Flex' (from Logic Programming Associates, UK). Information received from the user is chained through these rules to interpret the seismic maps.

- A graphics user interface has been developed in Visual Basic language, through which the expert system seeks information from the user. A lot of information can be provided from visual inspection of the seismic snaps which leads to a tentative interpretation of the geological structures.

- The analytical tools built into the 'Applications' part of the shell such as cross-correlation, instantaneous phase and reflection strength further aid in inferring the interpretation.

- Simple structures such as horizontal or sloping beds, folds, anticlines, salt domes etc. could be interpreted from answers obtained from the user based

on visual observation of the seismic snaps, which could be further confirmed when invoking cross-correlation program for over 30 horizons. However, this technique often failed to identify discontinuities such as faults.

- The secondary attributes namely instantaneous phase, reflection strength, which are characteristic of a reflection horizon, were able to successfully track horizons across fault planes also.

- An extensive help module has been built and integrated into the expert system which makes it possible for the user to comfortably browse through the various features of the system.

7.2 RECOMMENDATATIONS

- The expert system in its present form is capable of delineating geological structures of fair complexity including faults. However, for very complex structures with complex multiple faults or stratigraphic unconformities, it may be necessary to augment the rule-base as well as addition of some more seismic attributes such as instantaneous frequency, weighted average frequency and apparent polarity, in the "Applications" part of the software.

- The analytical work on the seismic data has been done using programming language C++. This poses a few restrictions in the amount of data that can be read or written through files. This process can be handled equally well or even better by making use of advanced visual programming through MFC [Microsoft Foundation Classes] and data storage into a database, which is a more structured persistent storage than simple text files.

- The capability of rule-based expert system can be expanded by adding Artificial Neural Network based models. Some work has already been reported on use of neural nets for fault identification. Because of its superior pattern recognition capability, Support Vector Machines may perhaps be better suited in discriminating between confusing similar structural features and needs to be explored.