

GEOLOGICAL ATLAS OF THE WESTERN CANADA SEDIMENTARY BASIN — A MULTI-INSTITUTIONAL, MULTI-DISCIPLINARY COMPILATION

Grand D. Mossop
Alberta Geological Survey⁽¹⁾

INTRODUCTION

The Western Canada Sedimentary Basin is remarkable in two essential regards. First, there is superb natural exposure of practically all of the basin strata in the Rocky Mountain thrust belt. Pre-orogenic Proterozoic to Jurassic passive margin strata of the continental terrace crop out extensively in the imbricate thrust slices that dominate the various ranges of the Canadian Rockies. Syn-orogenic Jurassic to Tertiary rocks of the foreland basin, that formed cratonward of the eastwardly advancing thrust belt, are extensively exposed in the Front Ranges and Foothills region. The availability of two- and three-dimensional surface exposure in the deformed belt is a tremendous boon to the stratigrapher/sedimentologist (not to mention the structural geologist/tectonist), for internal facies transitions and even large-scale elements of stratigraphic architecture can be literally walked out and mapped. Such control is not available to the subsurface geologist, who is constrained by the one-dimensional nature of the borehole. The natural field laboratory of the deformed belt thus allows for otherwise unachievable insights not only into the nature and origin of the rocks themselves but also into the close tectono-stratigraphic interrelationship between the Rockies and the associated sedimentary strata of the undeformed craton (see Porter, Price and McCrossan, 1982).

Second, the subsurface component of the Western Canada Sedimentary Basin is amongst the most comprehensively explored and documented in the world. In point of fact, the density of drill hole control is not particularly exceptional. What is exceptional is that comprehensive data from virtually all of the wells in western Canada are publicly available. Governments in the west showed remarkable foresight when they structured the conservation boards and related government jurisdictions in the 1940's. The guiding principle they have espoused from the beginning is that all logs, cuttings and cores from oil and gas wells must be released, typically after a proprietary period of one year, for examination and interpretation by any interested party — be they industry competitors, academics or government scientists. There can be absolutely no doubt that the *available* database of information on the subsurface of the Western Canada Sedimentary Basin is truly unparalleled in the world, both in nature and in scope.

Given the exceptional character of both the surface and the subsurface control in the west, and acknowledging the importance of appropriate conceptual integration of the Cordilleran and cratonic realms, it is clear that the Western Canada Sedimentary Basin is an ideal candidate for comprehensive tectono-stratigraphic synthesis and basin analysis. This paper sets out the essentials of our project to conduct such a regional synthesis, and to publish a new *Geological Atlas of the Western Canada Sedimentary Basin*. It is a complex undertaking — truly multi-institutional and multi-disciplinary in scope.

HISTORY AND PROJET DEVELOPMENT

From its fledgling beginnings in the early part of this century, spurred considerable by the discovery of Leduc in 1947, the Canadian oil industry has grown progressively to higher and higher levels of maturation. By the early 1960's there was sufficient borehole control in the basin to establish the basic stratigraphic framework. A group of farsighted industry, government and academic geologists in the Alberta Society of Petroleum Geologists (now the Canadian Society of Petroleum Geologists) banded together to undertake a comprehensive regional synthesis of the entire Phanerozoic succession in the basin. The result was the production of the first "Atlas" of western Canada — the *Geological History of Western Canada*, edited by McCrossan and Glaister (1964). By any standards, it was a landmark publication, later emulated in various other parts of the world.

1. Mailing address — Alberta Research Council, P.O. Box 8330, Stn. F, Edmonton, Alberta, T6H 5X2 (403)438-7657

Since the early 1970's, there have been a number of attempts on the part of individuals within the Canadian Society of Petroleum Geologists (CSPG) to organize the compilation of a new geological atlas for western Canada. These have repeatedly floundered. The difficulty seems to have been that, although there has always been a relatively large bank of individuals ready to contribute to the compilation, there has been a singular lack of success in identifying individuals who could secure employer support for the dedication of four of five person-years to proper project management and editing.

By the early 1980's, there was still no concrete move toward the compilation of a new Atlas, but demand remained, and copies of the old Atlas became collectors items. A reprinting was seriously considered. The initiative collapsed, however, because it was discovered that the original plates had deteriorated beyond use, and that re-creating them would involve prohibitive unit costs.

The present initiative to compile and produce a dynamic new atlas of the Western Canada Sedimentary Basin is based on the precept that success is possible only if the project is managed effectively at its core, in a reliable, through-going fashion, coupled of course to ultimate reliance on multitudinous volunteer contributors to conduct the basic geological syntheses.

Imperial Oil served as the hub of the project in the 1960's. This time, with the commitment of support from a broad range of private and public sector constituencies, the core of the Project lies in the government realm.

Geologists throughout the west are again actively involved in taking stock of their basin in a truly regional context. There is optimism that, with the application of modern computer techniques and the application of thoughtful standards in the systematic geological characterization, the job can be done efficiently and effectively.

BACKGROUND RATIONALE

In the years since publication of the first Atlas, the database of wells in western Canada has increased many fold. The resolution and reliability of subsurface information has been subject to quantum advancements. Geologic ideas on the stratigraphic and structural evolution of the basin have been revolutionized, most centrally by the concepts of plate tectonics, which were not widely accepted at the time of compilation of the first Atlas. In addition, there has been very considerable evolution in basin analysis techniques that embrace previously uncharted concepts of basin architecture, seismic stratigraphy, sedimentation patterns and facies relationships, thermal/organic maturity, and regional hydrodynamic reconstruction.

The essence of the Atlas concept is the provision of a regional perspective on the basin, for reference in the early stages of new exploration plays and resource development projects in the energy and mineral industries, and also for a multitude of applications in academia and government. The production of a new and dynamic atlas is envisaged as a significant spur to increased effectiveness in all of the studies that rely on an atlas background. Rendered flexible by the availability of a readily updated computer database, the new Atlas should serve as a standard reference for decades to come.

OBJECTIVES

A goal of the Atlas Project can be stated as follows: As a community of geologists in western Canada, to compile and produce a new atlas of the subsurface geology of the Western Canada Sedimentary Basin.

There are two output objectives:

- 1) to establish an electronic database of consistently interpreted subsurface information, with associated software; and

- 2) to produce a printed volume, published jointly by the Canadian Society of Petroleum Geologists and the Alberta Research Council.

Key output elements for each of the 19 designated stratigraphic "slices" include:

- maps (1:5,000,000) — structure, isopach, lithofacies, paleogeology, basic paleogeography
- cross-sections — regional, log based
- type logs and type cross-sections
- stratigraphic correlation charts
- text, with integrated or separate chapter treatment of those geological, geophysical, geochemical and geotechnical parameters that are inherent in a modern basin analysis

In addition to the 19 chapters dealing with specific stratigraphic intervals, there will be chapters on the overall evolution of the principal "tectonic domains" — Peace River Arch, Alberta Basin, Sweetgrass Arch and Williston Basin; and on certain "theme" elements — overall tectonic framework, hydrogeology/geothermics, thermal/organic maturity and economic geology/resources.

The geographic limits of the Atlas are — the Canada/U.S. border to the Tathlina Arch in the southern Northwest Territories, and the Precambrian Shield edge in the east to the Foothills and Canadian Rockies in the west. Mapping in the disturbed belt will be concentrated in stratigraphic zones where proper palinspastic restoration can be achieved.

ATLAS PROJECT STRUCTURE

Project Sponsors

Project Sponsors are identified as "institutions formally committed to the success of the project, and bearing financial responsibility for core support". There are four Project Sponsors (figure 1), each of which exercises a measure of reporting and accountability control, and all of which are drawn together through representation on the Management Committee. The Atlas Management Committee bears overall responsibility for strategic decisions relating to the project, and is involved in overseeing financial aspects and schedule regulation.

Data Donors

From the outset, it was resolved that, rather than contemplate picking every well anew, the Atlas compilation would be based upon existing electronic data files, modified and restructured in accordance with the iterative input of each of the chapter teams. The original databases, which represent a commercial value of many hundreds of thousands of dollars, have been contributed to the Atlas Project by the Data Donors. Figure 2 itemizes the data and donors involved.

Atlas Project Sponsors*

| | Management Committee Representative |
|--|--|
| Alberta Energy/Alberta Forestry, Lands and Wildlife | Michael Day |
| Alberta Research Council | Jan Boon |
| Canadian Society of Petroleum Geologists | Jim Dixon |
| Geological Survey of Canada | Walter Nassichuk |

* Institutions formally committed to the success of the project and bearing financial responsibility for core support.

Figure 1. Atlas Project Sponsors

Atlas Data Donors*

Subsurface Stratigraphic Data

- Alberta
- Saskatchewan
- Manitoba and British Columbia

Subsurface Lithology Data

Hydrogeological Data

Structural/Palimpsestic Data

Donors

Energy Resources Conservation Board
Saskatchewan Energy and Mines
Chevron Canada/Digitech

Canadian Stratigraphic Service/Home Oil

Canada Institute of Formation Evaluation

Shell Canada

- * Institutions and corporations that have contributed important basic data to the Atlas compilation.

Figure 2. Data Donors

Contributors

Each chapter in the Atlas is the responsibility of a team of two to nine individual earth scientists. The leadership and composition of teams for the 19 chapters dealing with “stratigraphic slices” have been largely determined. Formulation of the teams for the “tectonic domain” and “theme” chapters is not yet complete, but a large number of volunteers have come forward.

Figure 3 lists the presently confirmed contributors, in the context of the chapter structure of the Atlas. In total, there are some 90 geologists committed to involvement as contributors, and the numbers continue to grow.

Ultimately, all contributors to the Atlas have a voice in influencing the scientific approach of the project. This is manifest in countless informal ways, but is drawn together in the meetings of the Contributors Assembly — a kind of “parliament” for the deliberation and ratification of fundamental technical matters. As it is clearly impractical to involve such a large group of people in technical decisions beyond the most fundamental level, responsibility of immediate scientific direction is vested in the Steering Committee (figure 3). The Atlas Steering Committee consists of senior Advisers and Coordinators, who in addition to their ongoing role in providing scientific leadership are also charged with serving as Associate Editors of the printed Atlas.

Project Staff

Overall project management is localized in the Alberta Research Council, with operational responsibility vested in the office of the Atlas Project Manager. The headquarters staff members are listed in figure 4.

Practically all of the electronic data processing for the project, including virtually all of the software development, is handled by Irina Shetsen, with the support of the Alberta Geological Survey’s Department Computing Group. Jiri Losert is an Alberta Energy geologist seconded to the Atlas Project for the purposes of compiling the detailed regional cross-sections upon which most of the fundamental stratigraphic decisions are based. Myriad tasks associated with technological and geological support for the project are discharged by Mika Madunicky and Dermot O’Shea.

A number of other Alberta Research Council staff members are involved in the work of various Atlas chapter teams, on a basis not dissimilar to that of other contributors. The only chapter that is being compiled in-house by Alberta Research Council staff is that dealing with Hydrogeology/Geothermics, under the direction of Brian Hitchon.

Atlas Chapters/Contributors

| | |
|---|--|
| <i>Quaternary</i> Mark Fenton – Leader Ted Connolly | Alberta Research Council Etcetera |
| Foreland Basin Dave Smith – Co-ordinator | Canadian Hunter |
| <i>Uppermost Cretaceous – Tertiary</i> Emlyn Koster – Leader Tom Jerzykiewicz Grant Smith Rick Marsh Hugh Hendry Art Sweet Mike Dawson Kimberley Safton Gary Diakiw Rick Richardson | Tyrrell Museum of Palaeontology Geological Survey of Canada Geological Survey of Canada Energy Resources Conservation Board University of Saskatchewan Geological Survey of Canada Geological Survey of Canada |
| <i>Cretaceous Colorado/Alberta</i> Dale Leckie – Leader | Alberta Geological Survey Geological Survey of Canada |
| <i>Cardium</i> Fed Krause – Leader Don Keith | University of Calgary Alberta Geological Survey |
| <i>Dunvegan</i> Janok Battacharya – Leader David Safton | McMaster University Sage Geological |
| <i>Viking</i> Catherine Szata Margaret Hanna | Sage Geological |
| <i>Blairmore/Mannville</i> Jim Christopher – Leader Brad Hayes Doug Minken Brent McKercher Jonathan Fennel | Saskatchewan Energy and Mines Canadian Hunter Maryanne Petroleum Knee Hill Energy |
| <i>Jurassic-Kootenay</i> Terry Poulton – Leader Jim Christopher Brad Hayes Jiri Losert Joan Tittlemore | Geological Survey of Canada Saskatchewan Energy and Mines Canadian Hunter Alberta Energy |
| Carboniferous/Permian/Triassic | |
| <i>Triassic</i> Dan Edwards – Leader Eleanor Halton Jim Barclay Dave Gibson | Krishelle Pan Canadian Geological Survey of Canada Geological Survey of Canada |

Figure 3. Contributors

| | |
|--|--|
| <i>Permian</i> Charles Henderson – Leader Barry Richards | University of Calgary Geological Survey of Canada |
| <i>Carboniferous</i> Barry Richards – Leader Charles Henderson Fred Trollope Alf Hartling Kirk Ozadetz Jim Barclay | Geological Survey of Canada University of Calgary Pan Canadian Geological Survey of Canada Geological Survey of Canada |
| Devonian Ian McIlreath – Co-ordinator | PetroCanada |
| <i>Wabamun/Palliser</i> Henk Halbertsma – Leader Nic Meijer-Drees | Geological Survey of Canada |
| <i>Winterburn</i> Nigel Watts – Leader Steve Switzer Jeff Packard | Alberta Energy Company Chevron Texaco |
| <i>Woodbend</i> Tim Marchant – Leader | Amoco Canada |
| <i>Beaverhill Lake/Souris River</i> Walter Keith – Leader Dave Lane Katy Ma | Saskatchewan Energy and Mines Canadian Stratigraphic Service |
| <i>Elk Point</i> Nic Meijer-Drees Nancy Wilson | Geological Survey of Canada Esso |
| Lower Paleozoic Don Kent – Co-ordinator | University of Regina |
| <i>Middle Ordovician–Silurian</i> Brian Norford – Leader Mike Cecile Fran Haidl | Geological Survey of Canada Geological Survey of Canada Saskatchewan Energy and Mines |
| <i>Middle Cambrian–Middle Ordovician</i> Lee Slind – Leader Doug Paterson Glen Andrews | Geological Survey of Canada Saskatchewan Energy and Mines Shell Canada |
| <i>Proterozoic–Lower Cambrian</i> Fran Hein – Leader | Dalhousie |
| <i>Precambrian Basement</i> Ron Burwash – Leader John Wilson | University of Alberta Alberta Geological Survey |

Figure 3. Continued

Steering Committee

| | | |
|-----------------------------|----------------|---------------------------|
| Chairman | Grant Mossop | Alberta Geological Survey |
| Adviser | Andy Baillie | Retired |
| Adviser | Perry Glaister | Retired |
| Lower Paleozoic Coordinator | Don Kent | University of Regina |
| Devonian Coordinator | Ian McIlreath | PetroCanada |
| Foreland Basin Coordinator | Dave Smith | Canadian Hunter |

Contributors for Domain and Theme Chapters

Domain Chapters

Peace River Arch
Sweetgrass Arch
Williston Basin
Alberta Basin

Theme Chapters

Tectonic Framework
Hydrogeology/Geothermics
Thermal/Organic Maturity
Geophysics
Geotechnical/Engineering
Economic Geology/Resources

| | |
|-------------------|-------------------------------------|
| Stefan Bachu | Alberta Geological Survey |
| Sebastian Bell | Geological Survey of Canada |
| Sherry Carroll | CICO |
| Jim Christopher | Saskatchewan Energy and Mines |
| Jeffrey Freeman | |
| Helmut Geltsetzer | Geological Survey of Canada |
| Brian Hitchon | Alberta Geological Survey |
| Walter Jones | University of Alberta |
| Don Kent | University of Regina |
| Gerald Kvill | North Canadian |
| Andre Lytviak | Alberta Geological Survey |
| Michael Marchand | Canterra Energy |
| Rick Marsh | Energy Resources Conservation Board |
| Theodora Masran | Geochem |
| Pat McLellan | Shell Canada |
| Bob McMechan | Shell Canada |
| Jim Podruski | Geological Survey of Canada |
| Ray Price | Geological Survey of Canada |
| Rick Richardson | Alberta Geological Survey |
| Volkmar Schmidt | |
| Frank Staplin | |
| Richard Trotter | Dalhousie University |
| Jim Underschultz | Alberta Geological Survey |
| Laurence Vigrass | University of Regina |
| Gordon Williams | Summus |
| Andrew Zolnai | Cal-Cad |

Figure 3. Continued

Atlas Project Staff – Alberta Research Council

Master Atlas

Project Manager
Computing Specialist
Project Geologist
Project Technologist
Student Geologist

Grant Mossop
Irina Shetsen
Jiri Losert*
Mika Madunicky
Dermot O'Shea

* seconded from Alberta Energy

Atlas Hydrogeology

Principal Investigator
Fluid/Heat Flow Specialist
Project Hydrogeologist
Computing Specialist
Project Technologist
Computing Technologist

Brian Hitchon
Stefan Bachu
Jim Underschultz
Andre Lytviak
Mika Madunicky
Michel Brulotte

Figure 4. Atlas Project Staff

Internal accountability for the project is manifest through line structures in the Basin Analysis and Petroleum Geology Group, Alberta Geological Survey, Natural Resources Division, to the Research Committee of the Alberta Research Council, and ultimately to the Alberta Research Council Board of Directors.

Patrons

A number of corporate bodies have undertaken to support the Canadian Society of Petroleum Geologists in their underwriting of printing costs for the published Atlas volume. A listing of these Patrons is set out in figure 5.

Budget and expenditures

Atlas-related activities take place in literally dozens of offices throughout western Canada. It should be emphasized that the vast majority of these activities involve expenditure of time and money that is contributed to the project by individuals and their employers. Full accounting for these expenditures is an elusive matter, but over the life of the project they are estimated to amount to dollar equivalents equal to some three or four times that of the "core" budget of the budget.

Atlas Patrons*

Petro-Canada
Texaco Canada Resources
Esso Resources Canada
Husky Oil Operations
Mobil Canada
Norcen Energy Resources
Shell Canada
Unocal Canada
Amoco Canada Petroleum
BP Resources Canada
Chevron Canada

* Corporations that have expressed willingness to financially support the CSPG in underwriting Atlas printing costs.

Figure 5. Project Patrons

Budget and expenditure figures for this "core" are set out in figure 6. They show that, to the end of fiscal year 1987/88, the project was within budget. On the basis of experience to date, it would appear that sufficient monetary resources are committed to the project to allow for satisfactory completion in 1991.

Expenditure and Revenue (\$000)
Budget/Actual

| | Phase I | | Phase II | | | | | Totals |
|--------------------------|----------------|---------------|-----------------|--------------|--------------|--------------|--------------|---------------|
| | July 85–Dec 86 | Jan 86–Mar 87 | 1988/89 | 1989/90 | 1990/91 | | | |
| Expenditure | | | | | | | | |
| Supplies and Services | 6.8 | 5.4 | 40.4 | 18.1 | 45.0 | 18.0 | 22.0 | 108.5 |
| Fixed Assets | 4.0 | 1.3 | 28.0 | 23.0 | 10.0 | – | – | 34.3 |
| <i>Transfer Costs</i> | | | | | | | | |
| Computing | 4.0 | 4.2 | 34.0 | 24.6 | 40.0 | 40.0 | 25.0 | 133.8 |
| Drafting | 2.0 | 2.5 | 5.0 | 3.8 | 5.0 | 110.0 | 70.0 | 191.3 |
| Editing | 0.5 | 0.3 | 0.8 | – | 1.8 | 4.0 | 12.0 | 18.1 |
| Printing | 0.5 | 0.6 | – | – | – | – | 160.0 | 160.6 |
| Manpower and Overhead | 83.2 | 85.1 | 284.6 | 267.3 | 208.7 | 185.0 | 109.3 | 855.4 |
| Total Expenditure | 101.0 | 99.4 | 392.8 | 336.8 | 310.5 | 357.0 | 398.3 | 1502.0 |
| Revenue | | | | | | | | |
| Alberta Research Council | 101.0 | 99.4 | 213.8 | 181.8 | 200.5 | 132.0 | 48.3 | 662.0 |
| Alberta Energy | – | – | 179.0 | 155.0 | 110.0 | 115.0 | 120.0 | 500.0 |
| CSPG | – | – | – | – | – | – | 160.0 | 160.0 |
| Drafting (AE) | – | – | – | – | – | 110.0 | 70.0 | 180.0 |
| Total Revenue | 101.0 | 99.4 | 392.8 | 336.8 | 310.5 | 357.0 | 398.3 | 1502.0 |

Figure 6. Budget and Expenditures

SCHEDULE AND WORKPLAN

The overall schedule and workplan for the Atlas Project is outlined in figure 7. The Phase I feasibility study (July 1985-December 1986) involved the marshalling of resources and support to the threshold of a "Go/No Go" decision on whether or not to proceed with the actual compilation. The study concluded that "the production of a new Geological Atlas of the Western Canada Sedimentary Basin appears to be technically, strategically and financially sound" (Mossop, 1986), and a "Go" decision was taken by the Project Sponsors.

Atlas Workplan

Phase I Feasibility Study

- secure conceptual support
- secure financial support
- secure input data
- initial contributor recruitment
- prototype mapping study
- Phase I report/"GO" decision

Phase II Operations

Start-Up

- computing
- regional cross-sections
- recruitment of contributors

Compilation

- stratigraphic cross-sections
- correlation charts
- type logs and sections
- maps
- theme chapters
- manuscript preparation

Production

- drafting
- editing
- printing

Phase III

- documentation and release of data base and software systems
- ongoing update and analysis

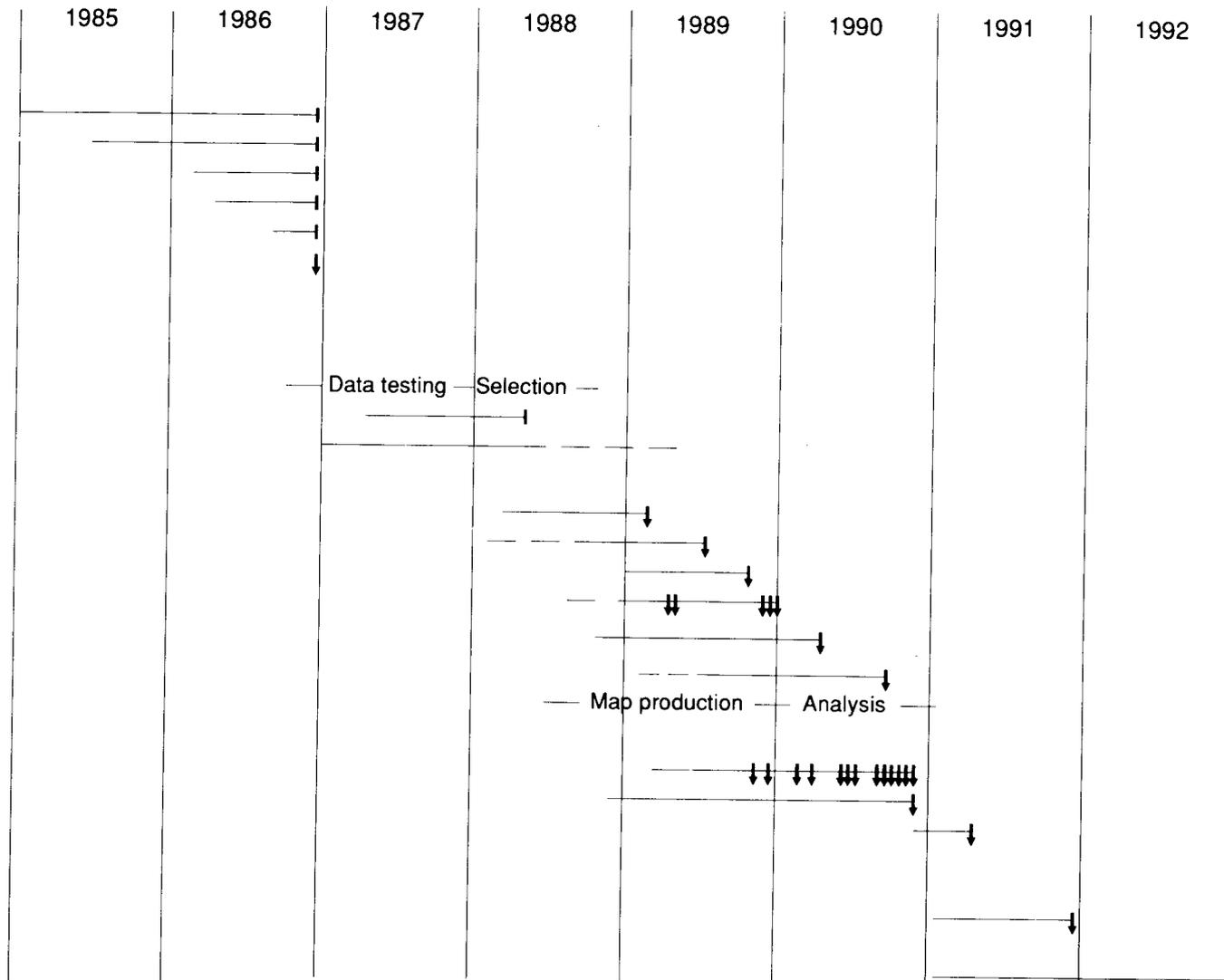


Figure 7. Atlas Schedule and Workplan

The Phase II compilation was initiated in early 1987, with publication of the printed Atlas scheduled for the spring of 1991.

The first year of Phase II was devoted to:

- 1) implementation and testing of the electronic databases that constitute the basic input into the mapping;
- 2) design and programming of an automated system for processing voluminous amounts of subsurface data;
- 3) design and testing of programs for the optimization of control points selection and for establishment of subsurface stratigraphic equivalents;
- 4) completion of initial master cross-sections, across the basin and along its axis; and
- 5) additional recruitment and consolidation of contributors into chapter teams.

Year two (1988-89) is being devoted to completion of the cross-section work, resolution of problematic correlations, establishment of stratigraphic tables and correlation charts, initiation of computer mapping, and processing of subsurface lithologic data.

Year three (1989-90) will see completion of most of the basic maps, initial application of map analysis techniques, consolidation of the information that is necessary input into the "theme" and "tectonic domain" chapters, and initiation of manuscript preparation.

Early in year four (1990-91), Atlas Project results will be presented for scrutiny and discussion at the annual conference of the Canadian Society of Petroleum Geologists. This will be followed by final review and editing prior to going to press at Christmas, 1990. It is expected that the printed Atlas will be published in March, 1991, with release of the digital Atlas database later that year or in early 1992.

A contemplated Phase III is envisaged as an ongoing endeavour, involving continuous updating and modernization of the Atlas database and the associated software (figure 7). If it is approved by the Project Sponsors, it will result in the realization of a "living atlas" concept.

SUMMARY AND CONCLUSIONS

The project to compile a new Geological Atlas of the Western Canada Sedimentary Basin is a complex endeavour involving multi-disciplinary, multi-institutional cooperation. The 1988 perspective, about a third of the way through the operational phase of the compilation, is that the Atlas Project is based on sound background rationale and that it embraces meaningful and achievable objectives. The key components of its current status are that:

- 1) core funding for the project is in place through the support of Project Sponsors;
- 2) digital data files on subsurface stratigraphy, lithology and other important parameters have been contributed to the project by the Data Donors and are installed on the Alberta Research Council computing facilities;
- 3) an electronic data processing system has been designed and developed for the integration of data sets and derivation of a wide range of controlled output;
- 4) the complement of Atlas contributors has grown to 90, and the makeup of 19 of the 29 chapter teams has been established;
- 5) detailed log cross-sections, across the basin and along its axis, have been completed, allowing for elucidation and resolution of key correlation questions; and
- 6) a systematic network of committees and reporting structures has been established, allowing for appropriate levels of project accountability.

In all essential regards, the compilation of the new Geological Atlas of the Western Canada Sedimentary Basin remains a technical, strategically and financially sound undertaking.

DISCUSSION

The concept on a geological atlas has always been the "intellectual property" of the CSPG, and their support for the current initiative has been unstinting from the very beginning. It must be emphasized that the vast majority of effort in this project is in the form of contributed technical input on the part of volunteer geologists, with the support of their employers. Practically all of this effort has been mobilized through the CSPG. In addition, the CSPG has undertaken the not inconsiderable financial burden of underwriting the printing costs of the published volume. They have accordingly solicited and received the backing of numerous corporate bodies — the Project Patrons.

Notwithstanding any of the above, it is clear that various government jurisdictions are this time playing an absolutely central role in the Atlas undertaking. Three of the Project Sponsors are government bodies — Alberta Energy, Alberta Research Council and the Geological Survey of Canada. The project is managed in one of the provincial geological surveys — the Alberta Geological Survey. Government surveys have committed very considerable resources of essential data and manpower to the conduct of the project. The leadership provided by government is essential to project success.

In the final analysis, then, the compilation of a new Geological Atlas of the Western Canada Sedimentary Basin is a complex cooperative endeavour involving dozens of individual contributors: geologists working in industry, government and academia; and a large number of institutions and corporations — Project Sponsors, Data Donors, Patrons and Contributors' Employers. The degree of success that the Atlas Project achieves will be a direct reflection of the degree of goodwill and cooperation that can be sustained amongst all the parties.

As the project matures, there remains very considerable scope for input from new sources. Enquiries about any aspect of the project are most welcome. Additional information on the project is contained in the Phase I feasibility report (Mossop, 1986) and in the 1987/88 Annual Report of the project (Mossop, 1988).

ACKNOWLEDGEMENTS

The Atlas Project would be absolutely unviable without the enlightened support of the Project Sponsors, Data Donors, Contributors, Contributors' Employers, Patrons and Project Staff, all of whom, enumerated in tabular form above, are most sincerely acknowledged.

For help in assembling this article, I would like to specifically acknowledge the help of my closest working colleagues: Irina Shetsen, Jiri Losert, Mika Madunicky and Dermot O'Shea; the management of the Alberta Geological Survey and the Graphics Department of the Alberta Research Council.

REFERENCES

- McCrossan, R.G. and Glaister, R.P. (Eds.), 1964, Geological history of Western Canada: Calgary, Alberta Society of Petroleum Geologists, 232 p.
- Mossop, G.D., 1986, Geological Atlas of the Western Canada Sedimentary Basin — Phase I report and Phase II prospectus: Alberta Research Council Open File Report, 136 p.
- Mossop, G.D., 1988, Geological Atlas of the Western Canada Sedimentary Basin — Annual Report, 1987/88: Edmonton, Alberta Research Council, 14 p.
- Porter, J.W., Price, R.A. and McCrossan, R.G., 1982, The Western Canada Sedimentary Basin: Philosophical Transactions of the Royal Society of London, Pt. A, Vol. 305, p. 169-192.