

Submission of digital mineral exploration data — moving toward a national standard

by

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In March 1999, the Department of Minerals and Energy began accepting in digital format a wide range of statutory mineral exploration reports, data and information from tenement holders. At this stage, submission of statutory information in digital format is not compulsory.

Submission of reports conforming to the 'Requirements for the Submission of Mineral Exploration Information in Digital Format' will mean that tenement holders 'reach agreement with the Director, Geological Survey of Western Australia in regard to the required format [for digital data]' under Note 8 of the 'Guidelines for Mineral Exploration Reports on Mining Tenements' issued in accordance with Section 115A of the Mining Act 1978.

The 'Requirements' have evolved out of consultation between industry groups and representatives, followed by discussions with authorities in other States responsible for custodianship of statutory mineral exploration reports. A draft of the 'Requirements' was subsequently considered by the Government Geologist's Information Policy Advisory Committee (GGIPAC) and has been accepted with minor amendment as a standard that will be used by most State governments.

The purpose of setting standard formats for digital data is to ensure industry submits complete datasets in a format capable of being read five to ten years in the future.

This paper comprises a subset of standard formats expressly for use in Western Australia. Table 1 contains a summary of the requirements for various types of digital data.

Additional information on data types

Tabular data: for example geochemistry, hole collar locations, lithology logs and downhole survey data, to be submitted as ASCII tab-delimited files complete with metadata as per the 'Requirements', or in the AMIRA P431 or PPDM data model formats.

Geophysical data other than seismic: these data include magnetic, gravity, radiometric, electromagnetic (e.g. TEM, SIROTEM), and for both raw and processed located data the standard ASEG GDF2 format is required. Gridded data must be submitted in either ASEG GXF or ER Mapper gridded format.

Geophysical images: these are images derived from magnetics or gravity and include TMI and Bouguer images. As for maps, these should be submitted as PDF, TIFF, or EPS depending on the size of the full-scale plot.

Seismic data, petrophysical and geophysical log data, and downhole velocity data: international standards already exist for these data (Table 1).

Geo-referenced spatial data (polygons and lines): geo-referenced spatial data include multi-vector polygons or lines that relate to geology, geography or exploration activities (e.g. exploration activity area polygons, sampling traverses, areas drilled, etc). Maps and plans from derived datasets should be submitted in PDF or TIFF formats. The data dictionary should provide a full explanation of information provided in the polygon attribute file where codes are used in the data.

Text: including figures and tables normally provided in hard copy reports, must be submitted as PDF with the security set to allow copy and paste but not to edit the document.

Maps, plans and figures (not forming part of text): should be submitted in either PDF (preferably), TIFF or EPS formats.

Photographs (not forming part of text): these include core photographs, environmental photographs etc. and should be submitted as either PNG or JPG files.

Tabular data

The main issues involved in the submission of digital tabular data concern the variety of data types received and the lack of 'standards' applied to some of these data. In an attempt to minimize the impact of these issues, a system

Table 1. Acceptable formats for digital data submitted as part of statutory mineral exploration reports

<i>Data type</i>	<i>Description</i>	<i>Format</i>	<i>Parameter</i>	<i>Suffix</i>
Tabular data ^(a)	Geochemistry, drill-log data and surveying data	Delimited ASCII (prefer Tab-delimited)	Standard as described below or AMIRA P431 or PPDM format	.dat
Geophysics (other than seismic)	Raw and processed located data	ASEG GDF2	—	.gdf
	gridded data	ASEG GXF ER Mapper grid		.gxf .ers
Geophysical images	Images derived from magnetics or gravity e.g. TMI, Bouguer	TIFF (colour) PDF EPS	300 dpi, 24 bit Normal ^(b)	.tif .pdf .eps
Seismic data	Raw and processed data	SEG Y SEG D SEG B	—	.seg
	Navigation data	UKOOA P1/90 SPS		.uka .sps
	Processed sections	CGM+ format	With line number	.cgm
Petrophysical and geophysical log data	Raw and processed wireline and MWD data	DLIS, LIS LAS ASCII	As defined by latest industry standard	.lis .las .asc
	Log plots <1145 mm in length at full scale	PDF	Normal ^(b)	.pdf
	Log plots >1145 mm in length at full scale	PDF EPS	With scaling factor ^(b)	.pdf .eps
Downhole velocity data	Processed downhole velocity data	SEG Y files	—	.seg
Geo-referenced polygons and lines (derived datasets)	Maps, plans	PDF TIFF	Normal ^(b) 300 dpi, 24 bit	.pdf .tif
Text	Includes text, figures etc. normally provided in hard copy	PDF	Normal ^(b)	.pdf
Maps, plans, figures (not included in text)	Files of maps <1145 mm in length at full scale	PDF	Normal ^(b)	.pdf
	Files of maps >1145 mm in length at full scale	TIFF PDF EPS	300 dpi, 24 bit With scaling factor ^(b)	.tif .pdf .eps
Photographs (not included in text)	Core photographs, aerial photographs etc.	PNG JPG	—	.png .jpg

NOTES: (a) Where several related database files cover one theme (e.g. surveying data, drill logs, look-up tables etc.) tabular data should be submitted in a self-extracting zip file containing all relevant files.

(b) PDF files should be created from the original plot file where possible and a scaling factor included for plots greater than 1145 mm in length.

of standards is proposed below that will facilitate confident interpretation of statutory exploration data in the future.

The standards have been designed to allow the future user maximum flexibility and ensure that critical metadata and supporting data such as authority or look-up tables are included. Metadata are by far the most critical issue affecting digital data and will require a change in philosophy on data submission. Most companies submit metadata as part of the text of a printed report — now we propose that critical metadata are included in the ‘header’ to the real data. This is recommended as the report and the digital data may become separated over time and the purpose of these standards is to ensure the digital data can be used in isolation from the report and still provide essential data for intelligent interpretation.

The ‘metadata’ being requested in the ‘file header’ are data usually provided in the printed report submitted to the Department. The objective of including the metadata with the ‘real’ data is to remove the reliance on having to search for other data packages (i.e. the report plus the digital data) to build a complete set of data.

Generally, the preferred file format for tabular data is a ‘flat file’ rather than a ‘relational’ file system. This allows more flexibility in the format and also reduces the need for relational keys between files. However, some datasets, particularly drill logs incorporating lithological, geochemical, structural and other data, including authority and look-up tables, may have to be submitted as a series of related flat files. Where possible, formats have been devised using existing standards in industry such as SDTS, UKOOA and ANZLIC. Where relational

standards such as PPDM and AMIRA P431 are in existence, the format has been structured to allow easy importation of the data to systems running on those standards.

It is expected that software vendors in the mineral exploration industry will develop user-friendly packages to enable companies to provide the data in DME formats.

Release of information

The Western Australia Department of Minerals and Energy will be making available open-file digital data as self-extracting zip files that will be supplied on request to the customer. It is planned that with the compliance of industry to the proposed standards, the use and manipulation of the data in the future will be easy to use and understandable by all.