



NEW ZEALAND
PETROLEUM & MINERALS

PETROLEUM DIGITAL DATA SUBMISSION STANDARDS

July 2016

Version 2.0

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Version 1.0 Published **July 2007**
Version 1.1 Revised **September 2008**
Version 1.2 Rebranded **May 2011**
Version 2.0 Revised **January 2016**
Version 2.1 Revised **July 2016**

1. Background

The petroleum exploration industry in New Zealand generates a vast amount of geo scientific and resource information each year. New Zealand Petroleum & Minerals, a branch within the Ministry of Business, Innovation and Employment is responsible for the collection, preservation and dissemination of all statutory information submitted by permit holders. This information makes a significant contribution to promoting effective and efficient petroleum exploration.

Acknowledgement: Much of the technical information in this document is sourced from Australian Requirements for the Submission of Exploration Digital Data (Version 4.2), prepared by the Australian Government Geoscience Information Committee (GGIC, formerly GGIPAC).

2. Legislation

The statutory information is submitted under the Crown Minerals Act 1991 Section 90 and the Crown Minerals (Petroleum) Regulations 2007.

Section 97A of the Crown Minerals Act 1991 states that the chief executive may prescribe the form and electronic format of any documents if not otherwise prescribed in regulations.

The intention of this document is to set out the form and electronic format of any documents not otherwise prescribed in regulations made under the Act by detailing the preferred formats and compilation process to ensure that all critical metadata is captured and supporting data is included.

Thus achieving three broad objectives:

- maximise the amount of digital data submitted to New Zealand Petroleum & Minerals
- maximise the usefulness of statutory digital data released to open file.
- minimise the costs associated with acceptance, storage and release of submitted information.

It is anticipated that the document will be reviewed annually by New Zealand Petroleum & Minerals and therefore provide an opportunity to amend and update formats/media to encompass the impact of any new and relevant technologies.

3. Technical Report Availability

The confidentiality period of reports and associated data submitted for work carried out within a permit by a permit holder is prescribed in the Crown Minerals Act 1991. All material becomes publicly available when this confidentiality period expires and can be freely accessed by explorers thus ensuring that exploration efforts are not duplicated and new models can be developed on the basis of earlier data.

All paper collections have been scanned and made available for free download via the New Zealand Petroleum & Minerals Website.

4. Archival Practice

Paper: stored and preserved by New Zealand Petroleum and Minerals, a branch of the Ministry of Business, Innovation and Employment in accordance with the Public Records Act 2002 and as designated by the Chief Archivist.

Digital: managed by New Zealand Petroleum & Minerals using recognised digital archiving principles:

- Monitoring the condition of the media upon which the data is stored to ensure long term integrity is maintained;
- Transcribing to new high density media before the old media deteriorate and reading equipment/drives become obsolete;
- Maintaining backup and disaster recovery strategies for digital data and applications;
- Providing environmental storage conditions as recommended by global standards.

NOTE: All submitted digital media will be retained by New Zealand Petroleum and Minerals and is not available for return to the submitter.

5. Submission Requirements

The standards allow flexibility in data submission media however the chosen media should be appropriate to the volume and type of data submitted. Paper submissions are not accepted.

Note that submitted media such as hard drives may be password protected for transport and the password supplied to NZP&M under separate cover.

5.1 ACCEPTABLE MEDIA

Legacy data will be accepted on original media if resubmission is required.

- E-mail (files less than 12Mb)
- CD-ROM, DVD-ROM and Blu-Ray (BRD), read only, no multisession
- Magnetic Tape: 3590 / 3592 / LTO-4 / LTO-6
- Portable Hard Drive
- USB Memory stick

5.2 MEDIA LABELLING

The media (disc/tapes, etc.) submitted must be labelled with the following information where applicable, on both the disc/tape itself and on the cover.

- Company name

- Well/Project/Survey names
- Permit number and relevant work program obligation
- Type of report
- Year
- Table of contents if space permits

NOTE: If submissions are in relation to a Petroleum Prospecting Permit (PPP) and the permit holder has the status of speculative prospector, then “PPP – Speculative Prospecting Status” must be clearly stated on all media.

5.3 FILE NAMING CONVENTION

In order to easily identify files and associate submissions with work programme obligations, file names and folders must follow a logical format. File names should contain information relevant to the well name and type of file, optionally permit and WPO numbers can be included. A logical folder format should include report, appendices, enclosures and separate subfolders for wireline run numbers, etc.

For example:

Petroleum Reports – Wellname_WCR.pdf or Wellname_MWD_EOWR.pdf
Wireline and MWD/LWD (downhole geophysics)
 – Wellname_tool /data type_(MEM/RT)_run #.DLIS

5.4 TECHNICAL REPORTS AND DATA

Refer to Crown Minerals (Petroleum) Regulations 2007 Schedule 7 and Schedule 8. All text based reports of any kind should retain the well-established structure and sequence of hardcopy (paper) reporting and must include the following information:

- A title page that contains
 - the permit number
 - the name of the permit holder (Operator)
 - the Work Programme Obligation Number
 - the title of the activity
 - the author of the activity
 - the date of the report
 - the filename and internal company report number if applicable
 - if applicable, the total line km/km² of 2D/3D geophysical data collected/processed

NOTE: If submissions are in relation to a Petroleum Prospecting Permit (PPP) and the permit holder has a status of speculative prospector, then “PPP – Speculative Prospecting Status” must be clearly stated on the report.

- A detailed contents page listing
 - all figures, tables and plates
 - all plans, maps, figures and any other attachments
 - any appendices such as additional contractor reports and tabular data
 - links to sections within pdf's to be fully bookmarked
- Abstract or Introduction

Any code, colour or shading used on a map, profile, or other document or record must be explained in an accompanying legend.

All original contractor drilling and formation testing data associated with a well completion report must be submitted where applicable, and includes but is not restricted to

- composite well log
- wireline, MWD/LWD data in full DLIS (if available from contractor) and LAS formats
- wireline, MWD/LWD log prints
- mudlogging ASCII and LAS data
- mudlogging log prints

5.5 PRODUCTION REPORTS AND DATA

Annual reports on mining activities and production operations including calculated and/or measured production rates for oil, condensate, liquefied petroleum gas, gas and water are to be submitted in accordance with regulations 39, 40 and 41 of the Crown Minerals (Petroleum) Regulations 2007. Annual reports should conform to the standards listed in section 5.4 of this document.

Submissions of raw production data are to be supplied in a separate Microsoft Excel attachment and not included within the body of the report.

NZP&M has developed a production data template, this template will be used for all production data submissions.

The intention is to standardise these submissions enabling the data to be more efficiently aggregated and analysed by NZP&M. The preferred reporting units are SI as described by the Bureau International des Poids et Mesures (BIPM). If other units of measure are used this must be clearly stated on the template in the UOM section.

Consistent usage of units of measure, data exchange and unit conversion are encouraged, refer to Energetics Unit of Measure Standard V1.0 for standard unit names, symbols, derived units and conversion factors.

Petroleum production data and annual summary reporting templates are available as a separate download from NZP&M under Permit Reporting Requirements

5.6 EBCDIC HEADERS FOR DIGITAL SEISMIC SURVEY DATA

Refer to regulation 10 of the Crown Minerals (Petroleum) Regulations 2007.

SEGY headers are to contain the following information in order to enable complete identification of the data.

- survey name
- line name for two-dimensional surveys or in-line range for three-dimensional surveys
- date the data was acquired
- acquisition company (including vessel name or crew) and the acquisition parameters
- data description (e.g. angle stack, stacking velocity, offset gathers, etc.)
- processing information, including
 - the processing sequence
 - the time correction
 - the gain curve
 - the bandpass filter
 - the polarity and phase
 - the details of the legal person (not an individual) that undertook the processing
 - the year of processing
 - the seismic reference datum
 - the data type (stack or gather)
- projection, datum, spheroid, and co-ordinate units
- sample interval
- shot-to-trace relationship for two-dimensional surveys
- trace length
- trace header format
- for two-dimensional data, the trace header byte locations for shot points, common depth points, or station locations, and the X and Y co-ordinate locations
- for three-dimensional data, the trace header byte locations for in-line and crossline numbers, and the X and Y co-ordinate locations
- for three-dimensional surveys, the corner points
- if data was processed, how it was processed

5.6.1 SEG Y TRACE DATA AND BYTE LOCATION

SEGY trace byte locations must be populated in accordance with current SEG Y standards and recommendations.

Byte Locations:

- 1 – 4: trace sequence number
- 9 – 12: original field number
- 13 – 16: trace number within field
- 17 – 20: SP (preferred location)

- 21 – 24: CDP/CMP (incrementing by 1)
- 29 – 30: trace ID code
- 115 – 116: number of samples
- 117 – 118: sample interval ($\mu\text{s}/\text{mm}$)
- 189 – 192: inline number (preferred location)
- 193 – 196: X line number (preferred location)

5.7 DIGITAL DATA TYPE

Submitted data must be supplied in the format as originally recorded, and be a direct copy of the data supplied by the contracting company to the operator.

Accepted formats are listed in Table 1; refer to table notes on page 10.

Table 1. Data types and formats

Data Type	Examples	Format and Suffix	Comments
Tabular data¹	Point locations, geochemistry, heavy mineral, petrochemical, diamond indicator, uphole data, velocity data, drilling data and mudlogging. Raw Production Data	Delimited ASCII ¹ (.txt/.csv) Microsoft Excel (.xls / .xlsx) Log ASCII Standard (.LAS)	Tabular data to be separated from associated reports. Mudlogging to include Gas data, interp/percent lith, etc.
Report text	Well Completion, Annual Production Reports, documents, figures, etc.	Adobe Acrobat (.pdf) ^{2,3}	Text based PDF (not image based) Disable PDF security ³
Maps, plans, figures, photographs and image logs not embodied in report text	Maps, plans, figures, core photographs, aerial photographs etc.	GEOTIFF/TIFF (.tif), JPEG (.jpg), GIF (.gif), PNG (.png), CGM/CGM+ (.cgm) Adobe Acrobat (.pdf) ^{2,3}	Colour TIFF (min 300dpi, 24 bit) Greyscale TIFF (min 300dpi, 8 bit) JPG (min 300dpi), GIF/PNG (8 bit)
Digital images of interpretation maps		GEOTIFF (.tif)	Image quality as above. Refer 5.7.2
GIS data	Data in GIS format	MapInfo tables (.tab & support files) ESRI shapefiles (.shp & support files) Autocad (.dwg), KML (.kml), KMZ (.kmz)	Refer to metadata, section 5.7.3 for the spatial reference system (Datum/projection if applicable).
Geophysics and other remotely sensed data	Raw and processed located data, gridded data, magnetics, radiometrics, DTM and gravity data	ASEG GDF2/GFX (.gdf, .gfx), ASCII tab delimited ¹ (.asc) ER Mapper Grid (.grd, .ers), XML (.xml, .xsd & schema) GEOTIFF/TIFF (.tif)	Raw data must include obs logs, ancillary sound velocity profiles, calibration data, etc. Image quality as above. Refer 5.7.2
Geophysical and other remotely sensed images	Images derived from geophysical/remote sensing surveys, e.g. TMI, Bouguer radiometrics, Landsat 5 & 7	GEOTIFF/TIFF (.tif), JPEG (.jpg), GIF (.gif), Adobe Acrobat (.pdf) ^{2,3} , CGM, CGM+ (.cgm), PNG (.png), Compressed ER Mapper (.ecw)	Image quality as above. Refer 5.7.2 ECW Best quality (least loss)
Seismic data	Raw data, Processed data	SEG D (.sgd) SEG Y (Rev. 1) (.sgy) (32bit IBM Floating Point only)	
	Navigation data	UKOOA P1/90, OGP P1/11, UKOOA P2/94, OGP P2/11 (field). 3D Bin Grid, UKOOA P6/98 (.uka), OGP P6/98, SPS (Rev2.1)	Includes new IOGP format equivalents for older UKOOA formats
	Seismic velocities and models	Western format (.wgf) SEG Y (Rev.1) (.sgy) (32bit IBM Floating Point only) Delimited ASCII (.txt)	Includes migration (raw/final/smoothed) anisotropy (eta/epsilon/delta) final stacking (HDVA)
	Processed sections	CGM, CGM+ format with metadata (.cgm) Geophysical Image formats as above	Image quality as above
Petrophysical and geophysical log data	Raw/processed wireline, MWD/LWD, mudlogging logs	DLIS (.dlis), LIS (.lis), LAS (.las) Delimited ASCII ¹ (.asc), WELLOGML (POSC)	Raw DLIS files are required in addition to derived LAS. Include calibrations/UOM ⁴
	Log plots including wireline, MWD/LWD, mudlogging and composite well log	TIFF (.tif), JPEG (.jpg), GIF (.gif), PNG (.png) PDS (.pds), Adobe Acrobat (.pdf) ^{2,3}	Image quality as above Plots to be continuous if possible, not paginated ⁵
	Processed down-hole velocity data (e.g VSP)	SEG Y (Rev.1) (.sgy) (32bit IBM Floating Point only)	

¹ Tab or space delimited files are strongly preferred over comma delimited. Tab or space delimited files are easier to read prior to uploading and resolve issues seen when importing files with embedded commas in text fields. The required 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.

² This format has been chosen because of its wide acceptance in industry as a standard format, the ease of creation from other formats, the availability of free software to read the files and its ability to be searched for words or phrases.

³ Submitted reports require a bibliographic reference including the assigned report number to be inserted at the front of the document. If the document is password protected and /or security is set it will be rejected.

⁴ Units of measure can change over time and it is important that for data to remain relevant, the UOM and calibration methods used are noted where applicable.

⁵ Composite logs, mudlogs and wireline plots should not be paginated, but submitted as a continuous plot in PDS, PDF or TIFF format. Where PDF's are paginated they must be accompanied by a high-res continuous TIFF.

5.7.1 Text

The preferred format for the text report and any appendices is Adobe Acrobat PDF. In most cases operators will need to convert the text from the native format (WORD, EXCEL etc.) to PDF format. The report text (including table of contents) and any figures, tables, graphs, small maps or plans (up to A3, 420 x 297mm) that form part of the report must be embedded into a single PDF.

The report must be bookmarked to reflect the contents page/pages and to assist navigation through the document. Table data and photographs can be included in the PDF but should also be supplied in formats as listed in Table 1, especially where image quality and size is impacted by conversion to pdf.

- All photographs including core photographs, environmental photographs etc., are to be submitted as high quality JPEG files with a minimum resolution of 300dpi and 64k colours.
- Tabular data is to be supplied as delimited ASCII, refer Table 1. Files to include column headings, units and explanation of any abbreviations.
- Copies of journal extracts or any published items should only be included if the author owns the Copyright for the work. Otherwise copyright-protected material should be fully referenced with standard bibliographic information.

5.7.2 Maps, Plans

For items greater than A3 size, embedding in the report PDF is not considered appropriate and must be submitted as high quality image files. These should preferably be left in their native form, refer Table 1.

High quality PDFs may be submitted if these native formats are not available, but file size should be limited to less than 25Mb.

Where possible general plans (excluding logs) should not exceed A0 size (1189 x 841mm).

Minimum resolution for plans in TIFF, JPEG & CGM formats is 300dpi.

5.7.3 Meta Data Requirements

Metadata should provide sufficient information about a dataset for it to be used properly. The standard recommended by ANZLIC for metadata should be used where appropriate. However, some data require more information for intelligent use, and some data require specific metadata covered under other international standards. Geospatial metadata must adhere with standards and guidelines specified by the Australia New Zealand Land Information Council (ANZLIC).

<http://www.linz.govt.nz/about-linz/what-were-doing/projects/anzlic-metadata-profile>

Any georeferenced data including maps and plans or location information for well headers, side-track kick-off points or total depth, etc., should be referenced to the New Zealand Geodetic Datum NZGD2000 and projection NZTM or World Geodetic System WGS84. Legacy data requiring resubmission will be accepted as originally supplied.

5.7.4 File Verification Listing

Data submissions are to include a list of all the files included in the submission as an appendix to the report or in a separate text file.

6. Data Delivery Address

Data Submission:

Postal address

New Zealand Petroleum & Minerals
PO Box 1473
Wellington, 6140
New Zealand

Street address

15 Stout Street
Wellington, 6011
New Zealand

If data submission file size is less than 12 Mb it can be emailed as an attachment to nzpam@mbie.govt.nz Subject: Data Submission

7. Checklist

Technical Reports

- title page:
 - PPP – Speculative Prospecting Status if applicable
 - permit number
 - name of the permit holder (Operator)
 - work Programme Obligation Number
 - title of the activity
 - author of the activity
 - date of the report
 - file name
- abstract
- total line km/km² of 2D/3D geophysical data collected/processed
- detailed contents page listing
- figures, tables and plates
- plans, maps, figures and any other attachments
- appendices such as additional contractor reports and tabular data
- contractor ASCII/DLIS/LAS data and log images collected for wireline, MWD/LWD and mudlogging. Are filenames and run numbers easily identifiable?
- PDF's adequately bookmarked

Media

- PPP – Speculative Prospecting Status if applicable
- company name
- project/survey/Well name
- permit number
- type of report
- year
- table of content if space permits

8. Glossary

ALF - Airborne Laser Fluorescence

ANZLIC - Australia & New Zealand Land Information Committee (<http://www.anzlic.org.au>)

ASCII - American Standard Code for Information Interchange

AVO - Amplitude Versus Offset

CDP - Common Depth Point

CGM - Concatenated Graphics Metafile

CMP - Common Mid-Point

DLIS - Digital Logging International Standard

EBCDIC - Extended Binary Coded Decimal Interchange Code

GDF2 - General Data Format (Version 2)

GEOTIFF - Geo-referenced Tagged Image File Format

GIF - Graphics Interchange Format

GML - Geography Markup Language

GXF - Grid Exchange Format

IP - Induced Potential

JPG - JPEG Joint Photographic Experts Group

LAS - Log ASCII Standard

LIS - Logging International Standard (Binary format)

MWD - Measurement While Drilling

OGC - Open GIS Consortium Organisation (<http://www.opengis.org>)

P1/90 - Navigation data standard format

PDF - Portable Document Format

PDS - Schlumberger log file

PNG - Portable Network Graphics

POSC - Petro-technical Open Software Consortium (<http://www.posc.org>)

PPDM - Public Petroleum Data Model

SAR - Side Aperture Radar

SDTS - Spatial Data Transfer System

SEG - Society of Exploration Geophysicists

SGML - Standard Generalized Markup Language

SP - Spontaneous Potential

TEM - Transient ElectroMagnetics

TIF - TIFF Tagged Image File Format

TIF - Tape Image File

TMI - Total Magnetic Intensity

TWT - Two Way Time

UKOOA - United Kingdom Offshore International Operators Association

UTM - Universal Transverse Mercator

VSP - Vertical Seismic Profile

WPO - Work Program Obligation

XML - Extensible Markup Language

XMML - Exploration and Mining Markup Standard Language