

The AGS-M Format

for the electronic transfer of monitoring data

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A CIRIA Project Report contains the results of a research project carried out by CIRIA. Its technical content has been approved by a CIRIA Steering Group. The report has been checked for technical accuracy, and has received limited editing and formatting.



Summary

This report contains a paper copy of the Association of Geotechnical and Geoenvironmental Specialists Format (AGS-M) for the electronic transfer of monitoring data which was developed as part of CIRIA Research Project 631. The report contains the data tables and supporting information required for the transfer of monitoring data in a format compatible with that used for the existing 3rd Edition of the AGS Format for the electronic transfer of geotechnical and geoenvironmental data. An electronic version of this report and accompanying examples for different types of geotechnical, structural and geochemical monitoring instruments is available for download from the AGS web site (www.ags.org.uk).

The AGS-M Format for the electronic transfer of monitoring data

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Although every effort has been made to check the accuracy of the information and validity of the guidance given in this document, neither the members of the Working Party nor the Association of Geotechnical and Geoenvironmental Specialists accept any responsibility for misstatements contained herein or misunderstanding arising herefrom.

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Foreword

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1 INTRODUCTION

The Association of Geotechnical and Geoenvironmental Specialists (AGS) AGS-M Format is an add-on module to the 3rd Edition of the AGS Format for the Electronic Transfer of Geotechnical and Geoenvironmental Data. The AGS-M module provides a standard format for the transfer of monitoring data between a data Provider and a data Receiver. Geotechnical, structural and geochemical data are specifically catered for, but the Format is flexible and extensible and other types of monitoring data may be transferred. The AGS-M module may be used on its own, or in combination with the 3rd Edition of the AGS Format. Software that is fully compliant with the 3rd Edition of the AGS Format can handle AGS-M Format monitoring data without modification.

2 WHY DO WE NEED THE AGS-M FORMAT?

A similar question was asked of the AGS Format for the Electronic Transfer of Geotechnical Data from Site Investigations when it first appeared in 1992. Few practitioners today question the usefulness and validity of the Format after having benefited from the enormous savings (in time and resources) that its implementation has brought.

The amount of time and resourcing potentially required to carry out a successful programme of instrumentation installation and monitoring however, can be an order of magnitude greater than that required for site investigation. The increasing use of brownfield sites for construction, sometimes very close to existing buildings and infrastructure, will also lead to the greater use of monitoring equipment to ensure their safety. Additionally, instruments themselves are being continuously improved with the increasing use of automatically logged, real-time instruments, that again increase the amount of data produced.

The aim of the AGS-M module is to facilitate the handling of this data, enabling easy transfer of information between individuals, without imposing a particular process or piece of software on any party. It therefore helps the reporting process between client and contractor, and as the module can be incorporated in the software (or hardware) of electronic instruments themselves, it can also help a user's internal processes by removing the need for the additional translation of data-logged readings.

This monitoring module is based on the 3rd Edition of the AGS Format and is fully compatible with it. As such it is a tried and tested format and commercially available software already exists that will easily manage AGS-M files.

This document explains the structure of the module and goes into some technical detail. It is envisaged that most users will import and export data files using the commercial programs available and will not need to understand the intricacies of the file structure. This document will still be an invaluable reference tool as it contains dictionaries of instrument abbreviations and has a comprehensive set of guideline notes and examples in the Appendices.

In the ten years it has been in existence, the AGS Format for the Electronic Transfer of Geotechnical and Geoenvironmental Data has revolutionised the handling of SI data. If you are familiar with using this then you are already qualified to use AGS-M. Even if you are not, evidence shows that the little time and expense required to obtain the ability to use this format will prove immensely beneficial.

3 SCOPE

The AGS-M Format in this report is an additional module for the 3rd Edition of the AGS Format released in 1999. It can be used as either a standalone module or in conjunction with AGS Format data files. This document presents an interim implementation of the AGS-M Format that utilises the user defined Groups and Headings facility of the AGS Format. It is envisaged that this module will be integrated into a future revision of the main AGS Format.

4 BACKGROUND

This report contains a paper copy of the AGS-M Format developed during CIRIA research project 631 *Towards integrated design and construction in ground engineering: demonstrating and establishing a monitoring data transfer protocol*. The project built on the existing GEMINI format developed by London Underground Limited and CIRIA which was used to handle the data obtained from the geotechnical monitoring instrumentation during construction of the Jubilee Line Extension in London in the late 1990s.

The GEMINI format was modified by the research team to produce an AGS compatible ‘monitoring module’ which was then trialled using real monitoring data. A revised version of the AGS-M Format was produced following the trials. An electronic copy of this report is available for download from the AGS web site at www.ags.org.uk. Example data files for specific types of geotechnical, structural and geochemical monitoring instruments are also available for download on the AGS web site. Any feedback or questions relevant to the AGS-M Format should be raised on the discussion board on the AGS web site.

5 CONCEPTS

5.1 Data

The AGS-M Format provides for the electronic transfer of monitoring data such that the receiver can recreate the factual engineering plots included in the producers monitoring report. The majority of these plots will take the form of the variation with time of a measured physical parameter or a geochemical determinand. It is not the intention of the Format to transfer raw data, calibration information, or derived interpretations. These concepts are considered further in Appendix 2 Section 1.

5.2 File Format

The file format is intended to provide the widest possible level of acceptance and, in view of this, it is considered that the data should be transmissible using American Standard Code for Information Interchange (ASCII) files. The rules for creating Data Files are detailed in Section 10. They have been drawn up to enable the use of the AGS Format by the simplest existing programs, in particular spreadsheets, as well as more comprehensive database systems. An example AGS format file is given in Appendix 3 and a series of worked examples for most common instrument types is given on the AGS web site at www.ags.org.uk.

5.3 Data Dictionary

To provide maximum flexibility and to allow the file formats to be more easily recognised by the non-specialist, the Data Dictionary approach has been adopted. The Data Dictionary can be compatible with a wide range of existing programs and should aid the structuring of future software. The Groups and Fields constituting the Data Dictionary are given in Section 11.

5.4 Groups and Fields

To structure the data in a consistent and logical manner they have been divided into Data Groups within which a series of Fields are defined. The Data Groups have been chosen to relate to specific elements of data which are obtained, such as project information, reference point and monitoring point details.

Fields within each Data Group identify specific items such as instrument response zone, pressure reading, etc. They have been defined as having the status of **KEY** or **COMMON**.

Key Fields are necessary in order to define the data unambiguously. The Common Data Fields contain the associated data. The Data Fields and Data Groups listed are extensive and should cover the majority

of requirements. However, rules are given for the creation of other Fields and Groups, should the need arise to transfer particular data not otherwise covered by the AGS-M Format. The AGS-M Format relies on strict adherence to the 'RULES' and the creation of additional Fields or Groups should be considered as a last resort.

It must also be recognised that there is a hierarchy of Groups, as most are reliant on others to maintain uniqueness of data. This hierarchy is defined in Section 10.3.

5.5 Units

Details of the default units to be used for each of the Data Fields are given in Section 11.6. These are the preferred units for each of the data dictionary definitions and should be used wherever possible. They will be either the appropriate SI units or the unit defined by the particular British Standard relating to that specific item of data. A "data units" field is included within the data set in accordance with the rules. It is recommended that these data units are used whenever possible in order to avoid potential confusion.

It is recognised that situations will occur where neither the SI unit nor the British Standard unit is being used. Provision is made for non-standard data units to be declared in the data transfer file. Reference should be made to Section 10.1; Rule 18 for the appropriate data format rules relating to non-standard units.

5.6 Monitoring Point

A monitoring point is the location at which a reading is taken. Each monitoring point is located at a specified distance from a reference point. A reference point is defined by a set of co-ordinates that locate the point exactly in space (either on a local or national grid).

If a monitoring point is actually at the reference point, for example a level pin, then the monitoring point is defined as a "0" distance away from the reference point.

All instruments can be defined either at a reference point or a distance from one. The examples in Appendix 2 illustrate several possible monitoring situations and it is recommended to specify how each instrument type is to be referenced with monitoring contractors. Detailed worked examples for most common types of instrument are given on the AGS web site.

6 FILE SECURITY

6.1 Labelling

Clear labelling of files and media and conventions for their security and management are vital to the implementation of a practical system. These aspects are dealt with in Appendix 3 of the 3rd Edition of the AGS Format.

6.2 Virus Protection

The transfer of data between computer systems can render the data vulnerable to attack by a virus. Precluding executable files from the data set reduces the risk of transfer of a virus. Proprietary virus scanning programs, of which there are a number commonly available, check the files for the presence of viruses. A virus-checking program should be used by the producer of the data to scan each data set medium prior to despatch and also by the receiver of the file before using it.

7 PRELIMINARY AND FINAL DATA

The data files are structured in order to allow the presentation of preliminary data as well as its updating during the course of a project, prior to issue of the final data. Preliminary data in electronic format can be useful where rapid analysis of the data is required to provide feedback into the design or construction. However, the need for this facility needs to be very carefully considered by the receivers before including it in their Contract Specifications since it will require the imposition of rigorous management procedures. The highlighting of changes in data is considered to pose significant difficulties and hence preliminary data should be replaced by subsequent data and not merely updated by it. Where the highlighting of changes is required, this should be a facility incorporated in the receiver's software. This does not preclude submission of parts of the data on separate disks but the producer must ensure that the data within all separate issues are compatible, and that updates are carried through all sub-sets of the data. Each issue must be given a unique issue sequence number.

8 SPECIFICATION

Example Particular Specification Clauses for implementing the AGS-M Format are given in Appendix 4.

9 UPDATING

Any updates of the format will be posted on the AGS web site at www.ags.org.uk.

10 RULES

The Rules have been the subject of much discussion and these notes seek to explain the overall framework within which they are formulated.

A fundamental consideration has been that potential users of the Format should be able to use standard software tools to produce the data files. The spreadsheet is the most basic tool for the task, allowing data "tables" to be created and ASCII data files to be produced. Likewise, data files produced according to the Rules can be read directly by spreadsheet software. Although the Rules make it possible for users to manipulate AGS/AGS-M data files using spreadsheets alone, it is to be expected that more specific software will be used to automate the reading and writing of the data files. These software systems may range from simple data entry and edit programs through to complete database systems with data translation modules for AGS/AGS-M files.

Another fundamental point to bear in mind when assessing these Rules is that the resulting data file has been designed to be easy for the computer to read. The data files do not replace the printed reports which they accompany. However, the layout does allow data items to be readily identified should the need arise.

10.1 The Rules

The following rules must be used when creating an AGS/AGS-M Format file.

Rule 1

The data file shall be entirely composed of ASCII characters. The extended ASCII character set must not be used.

Rule 2

Each data file shall contain one or more data GROUPs. Each data GROUP contains related data.

Rule 3

Within each GROUP, data items are contained in data FIELDs. Each data FIELD contains a single data VARIABLE. Each line of the AGS Format file may contain several data FIELDs.

Rule 4

The order of data FIELDS on each line within a GROUP is defined at the head of each GROUP by a set of data HEADINGS.

Rule 5

Data HEADINGS and GROUP names shall be taken from the approved Data Dictionary for data covered by these. In cases where there is no suitable entry, a user-defined HEADING may be used in accordance with Rules 21,22 and 23.

Rule 6

The data HEADINGS fall into one of 2 categories: KEY or COMMON

KEY fields must appear in each GROUP, but may contain null data (see Rule 15).

KEY fields are necessary to uniquely define the data.

The following sub-rules apply to KEY fields and are required to ensure Data Integrity.

(See Note 3)

Rule 6a

*HOLE_ID shall always be the first field except in the **PROJ GROUP, where *PROJ_ID shall be the first field. *HOLE_ID is also omitted from the **ABBR, **CODE, **DICT, **TREM, **UNIT and **FILE GROUPS.

Rule 6b

There must not be more than one line of data in each GROUP with the same combination of KEY field entries.

Rule 6c

Within each project every data entry made in the KEY fields in any GROUP must have an equivalent entry in its PARENT GROUP.

eg All HOLES referenced in any GROUP must be defined in the **HOLE GROUP.
See GROUP HIERARCHY TABLE in Section 10.3.

Rule 7

All data VARIABLES may contain any alphanumeric data (ie both text and numbers). Numerical data shall be in numerals. eg 10 not TEN. (See also Note 2).

Note that all numerals must be presented as a text field.

Rule 8

Data GROUP names, data field HEADINGS and data VARIABLES must be enclosed in double quotes ("...").

Note that for inches or seconds, (") must not appear as part of the data variable.

Rule 9

The data field HEADINGS and data VARIABLES on each line of the data file shall be separated by a comma (,).

Rule 10

Each GROUP name shall be preceded by 2 asterisks (**).

eg "**HOLE"

Rule 11

HEADINGS shall be preceded by 1 asterisk (*).

eg "*HOLE_ID"

Rule 12

No line of data HEADINGS or data VARIABLES shall exceed 240 characters. The character count shall include delimiting quotes and commas.

eg "*HOLE_ID","*HOLE_NATE" = 23 characters

Rule 13

A line of data HEADINGS exceeding 240 characters may be continued on immediately following lines. A data HEADING must not itself be split between lines. A comma must be placed at the end of a HEADINGS line that is to be continued.

eg "*PROJ_ID","*PROJ_NAME","*PROJ_LOC","*PROJ_CLNT","*PROJ_CONT",
 "*PROJ_ENG","*PROJ_MEMO","*PROJ_DATE","*PROJ_AGS"

Rule 14

A line of data VARIABLES exceeding 240 characters must be continued on immediately following lines. Data VARIABLES may be split between lines. A VARIABLE continuation line shall begin with the special name <CONT> in place of the first data VARIABLE (PROJ_ID, HOLE_ID or TREM_DATE). The continued data shall then be placed in the correct field order by inserting the appropriate number of Null data VARIABLES before it. Note that each line of data in a GROUP shall contain the same number of VARIABLES.

(See also Note 4).

eg **PROJ"
 "*PROJ_ID","*PROJ_NAME","*PROJ_LOC","*PROJ_CLNT","*PROJ_CONT","*PROJ_ENG","*PROJ_DATE","*PROJ_AGS"
 "<UNITS>","","","","","","dd/mm/yyyy",""
 "DEMO","AGS – M Document example","","CIRIA","Client and ","","",""
 "<CONT>","","","","partners","DJR","09/11/1999","3M"

Rule 15

Null data VARIABLES must be included as 2 consecutive double quotes ("").

(See also Note 2)

eg , "",

Rule 16

Data GROUPs may be repeated within a file with different HEADINGS.

Rule 17

The number of data HEADINGS per GROUP shall not exceed 60.

Rule 18

A UNITS line must be placed immediately after the HEADINGS line in all GROUPs except **ABBR, **CODE, **DICT and **UNIT. An entry must be made for each data VARIABLE. Null entries (") must be used for data VARIABLES that are unitless, eg text. The line must begin with the special name <UNITS> in place of the first data VARIABLE (PROJ_ID, HOLE_ID or TREM_DATE).

(See also Note 5)

eg **HOLE"
 "*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*HOLE_FDEP","*HOLE_STAR","*HOLE_REM"
 "<UNITS>","","m","m","m","m","dd/mm/yyyy",""

Rule 18a

A line of UNITS exceeding 240 characters may be continued on immediately following lines. A UNIT must not itself be split between lines. A comma must be placed at the end of a UNITS line that is to be continued.

eg **HOLE"
 "*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*HOLE_FDEP","*HOLE_STAR","*HOLE_REM"
 "<UNITS>","","m",
 "m","m","m","dd/mm/yyyy","

Rule 18b

Each data file shall contain the ****UNIT GROUP**. See Section 11 for the ****UNIT GROUP** defining the units used. This **GROUP** uses units defined in the 'pick' list in Appendix 1 which contains all the standard SI units used in all other **AGS GROUPs**, as well as some common non-SI equivalents.

Rule 19

Each data file shall contain the ****PROJ GROUP**.

Rule 20

Each data file shall contain the ****ABBR GROUP** to define any data abbreviations where these have been used as data entries in the data **GROUPs**. This applies to standard abbreviations selected from the 'pick' lists in Appendix 1 and user defined abbreviations.

Rule 21

Each file shall contain the ****DICT GROUP** to define non-standard **GROUP** and **HEADING** names where these have been used in the data **GROUPs**.

Rule 22

Each non-standard **GROUP** name shall contain the prefix ****?**.

A **GROUP** name shall not be more than 4 characters long excluding the ****?** prefix and shall consist of uppercase letters only.

eg ****?TESX**

Rule 23

Each non-standard **HEADING** shall contain the prefix ***?**.

A **HEADING** name shall not be more than 9 characters long excluding the ***?** prefix and shall consist of uppercase letters, numbers or the underscore character only. **HEADING** names shall start with the **GROUP** name followed by an underscore character, except for **HEADINGs** which duplicate a **HEADING** in another **GROUP**, in which case this **HEADING** shall be used instead.

eg ***?TESX_CALN**

Rule 24

Miscellaneous computer files (eg digital images) may be included with a data file. Each such file should be defined in a ****FILE GROUP**. File names shall not contain more than 8 characters in the main body and not more than 3 characters in the extension.

Correct example:	FNAME.XLS
Incorrect example:	A LONG NAME.XYZ

Rule 25

Every data file that contains an ****ICCT GROUP** for insitu geochemical test results must also contain a ****CODE GROUP** that defines the codes used for each determinand given in the **CNMT_TYPE** field of the ****ICCT GROUP**. This applies to standard codes selected from the 'pick' lists in Appendix 1 of the 3rd Edition of the **AGS Format** and user defined codes.

10.2 Notes on the Rules

The following notes explain some points of detail in the Rules.

Note 1**ASCII 'CSV' Files**

The Rules define ASCII data files of a type commonly referred to as CSV (Comma Separated Value). This type of file is produced and read by some spreadsheet (and other) systems. The data items are separated by commas and are surrounded by quotes (").

Note 2**Numeric and Character Data - Delimiters**

The Rules permit any Data Field to contain text, since this allows characters in numeric fields and caters for those countries which use the comma in place of the decimal point. For these reasons ALL Data Fields must be surrounded by quotes.

Note that most spreadsheet and database systems provide a VALUE() function (or similar) to convert text data to numeric data. This function can be used where calculations need to be carried out on data imported from AGS/AGS-M files.

Note 3

Key and Common Fields

The Data Fields defined by the Format fall into one of two categories:

KEY Fields must be included every time a Data Group appears in a data file.

COMMON Fields are all other fields.

KEY Fields are important for maintaining data integrity. Without this the receiving software may not be able to use the data in a meaningful way.

For the purpose of creating AGS/AGS-M files this means that data entered into KEY Fields must be unique in each GROUP and that the corresponding entries are made in the PARENT GROUP. See GROUP HIERARCHY TABLE (Section 10.3).

Note 4

Continuation Lines

It should be noted that some spreadsheets impose a finite limit (eg 240) on the number of characters within a single Data Field. The Rules define a scheme for producing continuation lines where there are long Data Fields. Although the scheme may seem complex at first sight, it is the system automatically produced by spreadsheets if the long data items are continued on additional rows IN THE SAME DATA COLUMN. Similarly, these Data Files will 'read into spreadsheets' and preserve the long data items in their correct column order, for any length of data. The special <CONT> symbol must appear in the HOLE_ID, PROJ_ID or TREM_DATE fields, and thus <CONT> should never be used as a HOLE_ID or PROJ_ID.

Note 5

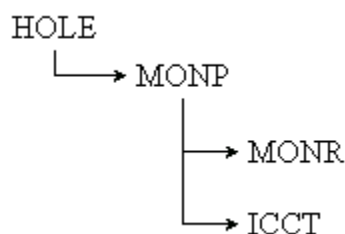
Units

Note that a UNITS line must be included in every GROUP (except ABBR, CODE, DICT and UNIT) even where the default units are used.

Details of the default units to be used for each of the Data Fields are given in the Data Groups below. These are the preferred units for each of the data dictionary definitions and should be used wherever possible. They will either be the appropriate SI units or the unit defined by the particular British Standard relating to that specific item of data. It is recognised that situations will occur where neither the SI unit nor the British Standard unit are being used. All entries in the <UNITS> line must be defined in the **UNIT GROUP.

10.3 Group Hierarchy

The AGS-M Format Data Groups are organised in a hierarchy with an inverted tree like structure. At the top of the tree is the HOLE Group, and all other data Groups lie below this. The MONP Group lies below HOLE, and the two Groups for readings, MONR and ICCT, lie below MONP. HOLE is termed the



"parent" Group of MONP. Each Group has only one parent, but there can be many Groups below each parent. Each Group is linked to its parent (the Group above it in the hierarchy) by Key Fields. Equally, each Group is linked to the Group(s) below it by Key Fields. For this structure to work, and the link to be made correctly between related Groups, the data in the Key Fields must be consistent and unique. If a Data Group is included in an AGS-M submission, its parent Group must also be included, and this applies all the way up to the top of the tree. Therefore the HOLE

Group must always be present and if there is any monitoring data the MONP Group must be present.

The following table defines the Group hierarchy by indicating the parent for each Group. The Key Fields that create the link between these Groups are indicated in the Data Dictionary below.

There are seven Groups that are not part of this hierarchy. The PROJ, ABBR, CODE, TREM, DICT, FILE and UNIT Groups sit above the tree, and each have a general purpose. The PROJ, ABBR and UNIT Groups must always be included in an AGS-M Format submission as they define the project, the abbreviations and the units used within the Groups. The CODE Group must be included if the ICCT Group is used for insitu geochemical testing, as the CODE Group defines the determinand codes used. The DICT Group must be included with this interim implementation of the AGS-M Format as it uses user defined Groups and Headings. The FILE Group must be included if any associated files (non-AGS format files) are included in the submission. The TREM Group is used as a site diary and is optional.

Group Name	Contents	Parent Table
PROJ	Project Information	
HOLE	Reference Point Information	
?MONP	Monitoring Point	HOLE
?MONR	Monitoring Point Reading	MONP
?ICCT	Insitu Contamination and Chemical Testing	MONP
?TREM	Time Related Remarks	
ABBR	Abbreviations	
CODE	CNMT and ICCT 'Pick' List Codes	
DICT	User Defined Groups and Headings	
FILE	Associated Files	
UNIT	Definition of <UNITS>	

11 DATA DICTIONARY

11.1 Data Sets

This Section defines the data dictionary entries for the Data Groups with their associated Key and Common Data Fields.

The status of the individual Data Fields is shown by

Status	Symbol
KEY	*
COMMON	

11.2 Units of Measurement

The units of measurement shall be those given in the UNITS line. The preferred units are defined. The unit of measurement shall not be included in the ASCII Data Field.

11.3 Examples

Typical examples are given against most of the Data Fields to indicate the type of information which may be expected. They are not intended to be representative of any one soil or rock and hence may not be mutually compatible.

11.4 Notes

See Appendix 1 for a list of the standard abbreviations to be used in the indicated fields. Other abbreviations may be defined as required, see Rule 20 and 25.

11.5 AGS-M Groups and Headings

In this interim implementation of the AGS-M Format the new Groups and Headings are prefixed by a ? to indicate that they are user defined; the definitions being given in the DICT Group. It is the intention that these new Groups and Headings will be included in the next full release of the AGS Format, and at that time the ? prefix will no longer be required.

11.6 Tables

Group Name : PROJ - Project Information				
Status	Heading	Unit	Description	Example
*	PROJ_ID		Project identifier	6421/A
	PROJ_NAME		Project title	Acme Gas Works
	PROJ_LOC		Location of site	London Road, Croydon
	PROJ_CLNT		Client name	Acme Enterprises
	PROJ_CONT		Contractors name	Acme Drilling Ltd
	PROJ_ENG		Project Engineer	Acme Consulting
	PROJ_MEMO		General project comments	
	PROJ_DATE	dd/mm/yyyy	Date of production of data	31/07/1999
	?PROJ_CID		Monitoring Contractor ID	KS123
	PROJ_AGS		AGS Edition Number	3M
	FILE_FSET		Associated file reference	FS1

Group Name : ABBR - Abbreviations				
Status	Heading	Unit	Description	Example
*	ABBR_HDNG		Field Heading in Group	HOLE_TYPE
*	ABBR_CODE		Abbreviation used	TP
	ABBR_DESC		Description of Abbreviation	Trial pit/Trench

Group Name : CODE - CNMT and ICCT 'Pick' List Codes				
Status	Heading	Unit	Description	Example
*	CODE_CODE		Code	CL
	CODE_DESC		Code Description	Chloride

Group Name : DICT - User Defined Groups and Headings				
Status	Heading	Unit	Description	Example
*	DICT_TYPE		Flag to indicate Group or Heading definition	HEADING
*	DICT_GRP		Group Name	ISPT
*	DICT_HDNG		Heading Name	ISPT_CALN
	DICT_STAT		Heading status KEY or COMMON (blank for Group)	COMMON
	DICT_DESC		Description	Corrected N value
	DICT_UNIT		Units	
	DICT_EXMP		Example	20

Group Name : FILE - Associated Files				
Status	Heading	Unit	Description	Example
*	FILE_FSET		File set reference number	FS128
*	FILE_NAME		File name	BH1COR08.JPG
	?FILE_DOCT		Document Type	PH (See Appendix 1)
	FILE_DESC		Description of content	BH1 Core photo box 8
	FILE_TYPE		File type	JPG
	FILE_PROG		Parent program and version number	Paintshop Pro v 5.0
	FILE_DATE	dd/mm/yyyy	File date	31/07/1999

Group Name : HOLE - Reference Point Information				
Status	Heading	Unit	Description	Example
*	HOLE_ID		Reference Point ID	327/16A
	HOLE_TYPE		Type of reference point	CP (See Appendix 1)
	HOLE_NATE	m	National Grid Easting of Reference Point	523145
	HOLE_NATN	m	National Grid Northing of Reference Point	178456
	HOLE_GL	m	Level of reference point relative to datum	16.23
	HOLE_FDEP	m	Final depth of borehole	32.60
	HOLE_REM		General remarks on reference point	5m from corner of building N23
	HOLE_LETT		Ordnance Survey letter grid reference	TQ 123 456
	HOLE_LOCX	m	Local grid x co-ordinate	565
	HOLE_LOCY	m	Local grid y co-ordinate	421
	HOLE_LOCZ	m	Level to local datum	+106.6
	HOLE_ORNT	deg	Orientation of Reference Line (degrees from north)	010
	HOLE_INCL	deg	Inclination of Reference Line (measured positively down from horizontal)	65
	HOLE_LOCM		Method of location	dGPS
	HOLE_LOCA		Location sub division within project	SubStation 1
	FILE_FSET		Associated file reference	FS2

Group Name : ?ICCT - Insitu Contaminant and Chemical Testing				
Status	Heading	Unit	Description	Example
*	?HOLE_ID		Reference Point ID	327/16A
*	?MONP_DIS	m	Distance from Reference Point	2.30
*	?MONP_ID		Monitoring Point ID (optional)	ZT402
*	?ICCT_DATE	dd/mm/yyyy	Date of reading	16/05/2001
*	?ICCT_TIME	hhmmss	Time of reading	164000
*	?CNMT_TYPE		Determinand	GMETH (See Appendix 1 of the 3rd Edition AGS Format)
*	?CNMT_TTYP		Test type	GAS (See Appendix 1 of the 3rd Edition AGS Format)
	?ICCT_RESL		Test result	54.76
	?ICCT_UNIT		Test result units	%vol (See Appendix 1)
	?ICCT_CAS		Chemical Abstract Service registry number (where appropriate)	
	?ICCT_METH		Test method/instrument type	
	?ICCT_REM		Comments on test	
	?ICCT_LIM		Method/instrument detection limit	
	?ICCT_NAME		Client/laboratory preferred name of determinand	Methane Gas
	?ICCT_LAB		Name of testing laboratory/Organisation	Chemical Test House
	?ICCT_CRED		Accrediting body (When appropriate)	UKAS
	?FILE_FSET		Associated file reference	FS22

Group Name : ?MONP - Monitoring Point				
Status	Heading	Unit	Description	Example
*	?HOLE_ID		Reference Point ID	6422/A
*	?MONP_DIS	m	Distance of monitoring point from Reference Point	2.30
*	?MONP_ID		Monitoring Point ID (optional)	ZT402
	?MONP_DATE	dd/mm/yyyy	Installation date	16/05/2001
	?MONP_TYPE		Instrument type	TS (See Appendix 1)
	?MONP_TRZ	m	Distance to start of response zone from Reference Point ID datum	5.50
	?MONP_BRZ	m	Distance to end of response zone from Reference Point ID datum	7.50
	?MONP_BRGA	deg	Bearing of monitoring axis A (compass bearing)	090
	?MONP_BRGB	deg	Bearing of monitoring axis B (compass bearing)	180
	?MONP_BRGC	deg	Bearing of monitoring axis C (compass bearing)	NA
	?MONP_INCA	deg	Inclination of instrument axis A (measured positively down from horizontal)	
	?MONP_INCB	deg	Inclination of instrument axis B (measured positively down from horizontal)	
	?MONP_INCC	deg	Inclination of instrument axis C (measured positively down from horizontal)	
	?MONP_RSCA		Reading sign convention in direction A	Displacement to East +ve
	?MONP_RSCB		Reading sign convention in direction B	Displacement to South +ve
	?MONP_RSCC		Reading sign convention in direction C	Displacement up +ve
	?MONP_REM		Remarks	Behind wall
	?FILE_FSET		Associated File Reference	FS27

Group Name : ?MONR - Monitor Point Reading				
Status	Heading	Unit	Description	Example
*	?HOLE_ID		Reference Point ID	6422/A
*	?MONP_DIS	m	Distance from Reference Point	2.30
*	?MONP_ID		Monitoring Point ID (optional)	ZT402
*	?MONR_DATE	dd/mm/yyyy	Date of reading	16/05/2001
*	?MONR_TIME	hhmmss	Time of reading	164000
	?MONR_DSTA	m	Distance A from Reference Point (slip indicator top rod)	2.73
	?MONR_DSTB	m	Distance B from Reference Point (slip indicator bottom rod)	11.56
	?MONR_DSPA	mm	Displacement in direction A	0.024
	?MONR_DSPB	mm	Displacement in direction B	0.127
	?MONR_DSPC	mm	Displacement in direction C	-10.842
	?MONR_PRES	kN/m2	Pressure	20.64
	?MONR_ANGA	deg	Rotation/Tilt in direction A	0.023
	?MONR_ANGB	deg	Rotation/Tilt in direction B	-0.284
	?MONR_ANGC	deg	Rotation in direction C	2.42
	?MONR_STRA	%	Strain in direction A	-1.87
	?MONR_STRB	%	Strain in direction B	1.09
	?MONR_STRC	%	Strain in direction C	1.23
	?MONR_FORC	kN	Force	62.8
	?MONR_TEMP	DegC	Temperature	21.2
	?MONR_WDEP	m	Depth to water from reference point ID datum	6.42
	?MONR_EAST	m	Absolute position (Easting)	523145
	?MONR_NRTH	m	Absolute position (Northing)	178456
	?MONR_LEV	m	Absolute position (Level)	10.2
	?MONR_WHD	m	Head of water above tip	2.10
	?MONR_GAUG	m	Gauge length	0.50
	?MONR_FLOW	l/s	Flow	20.1
	?MONR_REM		Details for instrument reference, probe logger, serial numbers	
	?FILE_FSET		Associated File Reference	FS27

Group Name : ?TREM - Time Related Remarks				
Status	Heading	Unit	Description	Example
*	?TREM_DATE	dd/mm/yyyy	Date of remark	16/05/2001
*	?TREM_TIME	hhmmss	Time of remark	120000
	?TREM_REM		Time related remark	Completion of concrete pour for slab G12
	?FILE_FSET		Associated File Reference	FS28

Group Name : UNIT - Unit Codes				
Status	Heading	Unit	Description	Example
*	UNIT_UNIT		Unit Used	ohmcm (See Appendix 1)
	UNIT_DESC		Description	Ohm centimetres

Groups ABBR, CODE and UNIT

Introduction

Codes or abbreviations are used in a number of the AGS-M Format Groups in order to ensure consistency in terminology and for brevity. This Appendix defines a series of 'pick' lists of the standard codes and abbreviations and the Group and Field in which each is to be used.

The ICCT Group is used for all insitu geochemical testing results. The codes used in the CNMT_TYPE and CNMT_TTYP fields define the determinand tested and the test type. The standard codes are given in the CODE Group 'pick' lists in Appendix 1 of the 3rd Edition of the AGS Format. For all other Groups the standard abbreviations are given in the ABBR Group 'pick' list below.

Whilst these lists are extensive, they are not intended to be exhaustive and it may be necessary to use some additional codes on a specific project. Guidance on using additional codes is given in Appendix 2.

All the abbreviations used in any Group within an AGS-M Format submission must be defined in the ABBR and CODE Groups included in the submission. This applies to both standard codes given in the 'pick' lists, and user defined, project specific codes.

The units used to report test results must be stated in the <UNITS> line of each Group and for insitu geochemical testing must be given in the ICCT_UNIT field of the ICCT Group. The abbreviations to be used for standard units are given in the UNIT 'pick' list below. All units used in an AGS-M Format submission must be defined in a UNIT group. This applies to both standard units given in the following 'pick' list and user defined units.

Notes on 'Pick' List Codes

1. Combined abbreviations may be used as appropriate from the ABBR 'pick' list.
eg IP+CP+RC

Group Name : ABBR - Abbreviations 'Pick' List		
ABBR_HDNG	ABBR_CODE	ABBR_DESC
HOLE_TYPE	CH	Slope surface protection stripping
HOLE_TYPE	CP	Cable percussion (shell and auger)
HOLE_TYPE	DCP	Dynamic cone penetrometer
HOLE_TYPE	DP	Dynamic probe sampling
HOLE_TYPE	EXP	Logged exposure
HOLE_TYPE	GCOP	GCO probe
HOLE_TYPE	ICBR	In situ CBR test
HOLE_TYPE	IDEN	In situ density test
HOLE_TYPE	INST	Instrument
HOLE_TYPE	IRDX	In situ redox test
HOLE_TYPE	IRES	In situ resistivity
HOLE_TYPE	IVAN	In situ penetration vane test
HOLE_TYPE	IP	Inspection pit
HOLE_TYPE	OP	Observation pit/trench
HOLE_TYPE	RC	Rotary cored

Group Name : ABBR - Abbreviations 'Pick' List		
ABBR_HDNG	ABBR_CODE	ABBR_DESC
HOLE_TYPE	RCG	Rotary drilling in common ground
HOLE_TYPE	RO	Rotary open hole
HOLE_TYPE	SCP	Static cone penetrometer
HOLE_TYPE	TP	Trial pit/trench
HOLE_TYPE	TRAV	Linear logging traverse or scanline survey
HOLE_TYPE	VC	Vibrocore
HOLE_TYPE	W	Wash boring
MONP_TYPE	DM	Discontinuity monitoring
MONP_TYPE	TMU	Tiltmeter - Uniaxial
MONP_TYPE	TMB	Tiltmeter – Biaxial
MONP_TYPE	ICM	Inclinometer - Manual
MONP_TYPE	ICE	Inclinometer – Electronic
MONP_TYPE	LC	Load cell
MONP_TYPE	ETR	Rod Extensometer
MONP_TYPE	ETM	Magnetic Extensometer
MONP_TYPE	ETT	Tape Extensometer
MONP_TYPE	EPCE	Embedment pressure cell – electronic
MONP_TYPE	EPCH	Embedment pressure cell – hydraulic
MONP_TYPE	EPCP	Embedment pressure cell – pneumatic
MONP_TYPE	IPCE	Interface pressure cell – electronic
MONP_TYPE	IPCH	Interface pressure cell – hydraulic
MONP_TYPE	IPCP	Interface pressure cell – pneumatic
MONP_TYPE	PPCE	Push in pressure cell – electronic
MONP_TYPE	PPCH	Push in pressure cell – hydraulic
MONP_TYPE	PPCP	Push in pressure cell – pneumatic
MONP_TYPE	MSET	Leveling point or plate
MONP_TYPE	TS	Total station point
MONP_TYPE	ESET	Electronic settlement cell/gauges
MONP_TYPE	HSET	Hydraulic settlement cell/gauges
MONP_TYPE	PSET	Pneumatic settlement cell/gauges
MONP_TYPE	SP	Standpipe
MONP_TYPE	SPIE	Standpipe piezometer
MONP_TYPE	HPIE	Hydraulic piezometer
MONP_TYPE	PPIE	Pneumatic Piezometer
MONP_TYPE	EPIE	Electronic Piezometer
MONP_TYPE	SG	Strain gauge
MONP_TYPE	TP	Temperature measuring point
MONP_TYPE	GWMP	Groundwater monitoring point
MONP_TYPE	GMP	Gas monitoring point
MONP_TYPE	SLIP	Slip indicator

Group Name : ABBR - Abbreviations 'Pick' List		
ABBR_HDNG	ABBR_CODE	ABBR_DESC
FILE_DOCT	CR	Construction record
FILE_DOCT	GEN	General
FILE_DOCT	MS	Method statement
FILE_DOCT	TECH	Technical paper
FILE_DOCT	PH	Photograph
FILE_DOCT	REP	Report
FILE_DOCT	VI	Video clip
FILE_DOCT	DRAW	Drawing
FILE_DOCT	CAL	Calibration data
FILE_DOCT	RAW	Raw data

Group Name : UNIT - Unit 'Pick' List	
UNIT_UNIT	UNIT_DESC
Length	
mm	millimetre
cm	centimetre
m	metre
km	kilometre
in	inch
ft	foot
yd	yard
mi	mile
Area	
cm ²	square centimetre
m ²	square metre
km ²	square kilometre
hect	hectare
in ²	square inch
ft ²	square foot
yd ²	square yard
mi ²	square mile
acre	acre
Volume	
cm ³	cubic centimetre
m ³	cubic metre
l	litre
in ³	cubic inch
ft ³	cubic foot
yd ³	cubic yard

Group Name : UNIT - Unit 'Pick' List	
gal	gallon
Force	
N	Newton
kN	kiloNewton
MN	megaNewton
lbf	pounds force
tonf	tons force
kgf	kilograms force
Mass	
g	gram
kg	kilogram
Mg	megagram (tonne)
lb	pound
t	ton
kips	kilopound
Pressure	
kN/m ²	kiloNewtons per square metre
kPa	kiloPascal
MN/m ²	megaNewtons per square metre
MPa	megaPascal
GPa	gigaPascal
psi	pounds per square inch
psf	pounds per square foot
ksi	kips per square inch
ksf	kips per square foot
tsf	tons per square foot
kg/cm ²	kilograms per square centimetre
bar	bar
Density	
kN/m ³	kiloNewtons per cubic metre
Mg/m ³	megagrams per cubic metre
pcf	pounds per cubic foot
g/cm ³	grams per cubic centimetre
kg/m ³	kilograms per cubic metre
Time	
s	second
min	minute
hr	hour
day	day
month	month
yr	year

Group Name : UNIT - Unit 'Pick' List	
hhmm	hours minutes
hhmmss	hours minutes seconds
dd/mm/yyyy	day month year
Velocity	
mm/s	millimetres per second
cm/s	centimetres per second
m/s	metres per second
km/hr	kilometres per hour
ft/min	feet per minute
mph	miles per hour
Flow	
l/s	litres per second
l/min	litres per minute
m ³ /s	cubic metres per second
gpm	gallons per minute
mgd	million gallons per day
cfs	cubic feet per second
Concentration	
ug/l	micrograms per litre
mg/l	milligrams per litre
g/l	grams per litre
ug/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
ppb	parts per billion
ppm	parts per million
%	percentage
% dry weight	percentage of dry weight
%vol	percentage volume
colonies/ml	colonies per millilitre
colonies/l	colonies per litre
CFU/ml	colony forming units per millilitre
CFU/g	colony forming units per gram
MPN/ml	most probable number per millilitre
MPN/100ml	most probable number per 100 millilitres
MPN/l	most probable number per litre
Miscellaneous	
m ² /MN	square metres per megaNewton
ft ² /t	square feet per ton
m ² /yr	square metres per year
ft ² /yr	square feet per year
ft ² /day	square feet per day

Group Name : UNIT - Unit 'Pick' List	
Nm	Newton metre
deg	degree (angle)
DegC	degree Celsius
DegF	degree Fahrenheit
uV	microVolt
mV	milliVolt
ohm	Ohm
ohmcm	Ohm centimetre
uS/cm	microSiemens per centimetre
kJ/kg	kiloJoules per kilogram
counts/s	counts per second
Yes	Yes
No	No

APPENDIX 2 Suggested Usage of the AGS-M Format

Introduction

This Appendix is intended to help both new and experienced users of the AGS Format. It presents some general issues; provides guidance on avoiding common problems and introduces features that are new to the AGS-M Format.

If you have a specific problem in using the AGS-M Format which is not addressed in this Appendix, then refer to the Discussion Forum on the AGS web site to see if your query has already been answered, or ask a question of the AGS-M Format committee.

Key to symbols



The indicated text provides general information that is relevant to users of the AGS-M Format.



The indicated text describes an AGS recommended procedure.

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- 7 Adding new instrument types
- 8 Compatibility with the AGS Format
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- 11 Using a relational database to create or edit AGS-M Format data
- 12 Reporting test units
- 13 Standard abbreviation 'pick' lists and user defined abbreviations
- 14 Associated files
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1 What monitoring data does AGS-M transfer?

The AGS-M Format aims to transfer sufficient information to allow the receiver to recreate the factual engineering plots that are included in the paper version of the instrumentation monitoring report. Most of these plots will show the variation with time of a physical parameter or a geochemical determinand. The raw instrument readings that the data provider has taken in the field, or the calibration factors that have been applied to the raw readings, are not transferred as part of the AGS-M Format. Similarly, interpreted information which has been derived from the factual data is not transferred by the AGS-M Format. However, the Format is flexible and data outside the scope of the Format may be transferred as associated files which are referenced in the AGS-M data, if this is agreed between the data provider and receiver (Appendix 2 Section 14).

The following types of data are defined, and may be transferred using the AGS-M Format or as associated files as indicated below:

- General information about the project. Given in the AGS-M Format PROJ Group.
- Location of each instrument reference point. Given in the AGS-M Format HOLE Group.
- Details of each monitoring point. Given in the AGS-M Format MONP Group.
- The readings (after the application of any calibrations or corrections) of physical parameters from each monitoring point. Given in the AGS-M MONR Group.
- The results of insitu measurements of geochemical determinands (after the application of any calibrations or corrections) from each monitoring point. Given in the AGS-M ICCT Group.
- The raw instrument readings (prior to the application of any calibrations or corrections) of physical parameters or geochemical determinands from each monitoring point. These are not given in the AGS-M Format, but may be included in an attached file referenced from the FILE_FSET in either MONR or ICCT with the associated calibrated result.
- Calibration information or initial base readings for the instrument which are used to obtain the corrected readings. These are not given in the AGS-M Format, but may be included in an attached file referenced from the FILE_FSET in MONP or HOLE, depending on the instrument type. For instruments where there are single entries in MONP the data is referenced from MONP eg a single earth pressure cell. For installations where multiple monitoring points are defined in MONP, each with their own calibration, the data is referenced in MONP, eg a series of tiltmeters up a bridge abutment. For installations where multiple monitoring points are defined in MONP, but they combine to act as one instrument, then the data is referenced in HOLE eg a manually read borehole inclinometer.
- Calibration information for a readout unit or measurement gauge which is used to read many installations across the project. This is not given in the AGS-M Format, but may be included in an attached file referenced from the FILE_FSET in PROJ.

2 Reference points, monitoring points and key fields

The AGS-M Format makes the distinction between reference points and monitoring points as follows:

- The monitoring point is the precise location at which a reading is taken. It may be a single instrument such as a precise levelling point, or it may be an individual location within a long instrument, such as a particular depth within a borehole inclinometer at which readings are taken.
- The reference point is the general location of the instrument that has been surveyed in with co-ordinates and a level. For example, in the case of an instrument installed in a borehole, the reference point would be the top of the borehole. For a set of tiltmeters installed up a bridge

pier, the reference point may be the base of the pier. For a precise levelling point the reference point and the monitoring point locations are likely to be the same.

Each reference point can have one or more monitoring points. But each monitoring point must have only one reference point.

The monitoring points are related to their respective reference point by an off-set distance. For an instrument in a borehole the off-set distance is the depth down the borehole to the monitoring point (or points). For a set of tiltmeters installed up a bridge pier the off-set distance is the distance up the pier to the tiltmeter from the reference point at the pier base. For a precise levelling point, where the reference point and the monitoring point are the same, the off-set distance is zero.

The position of any monitoring point should ideally be uniquely defined by a combination of its reference point and off-set distance; these are the main Key Fields which uniquely identify the instrument, and are used in the AGS-M Format to make the link between the instrument details and its associated readings. If it is not possible to uniquely identify an instrument by these two Key Fields alone, then the MONP_ID Key Field may be added to produce a unique combination of the three Key Fields.

The reference point name is given in HOLE_ID, and the location of the reference point is defined by its nominal co-ordinates and level given in the HOLE_NATE, HOLE_NATN and HOLE_GL fields in the HOLE Group. The HOLE_ID is repeated in the MONP, MONR and ICCT Groups. If the reference point moves (for example a borehole installed in an active landslip) the nominal co-ordinates and level given in HOLE should not be changed. To record the movement create a monitoring point at the top of the borehole and record the relative movement or absolute position with time using the appropriate fields in MONR.

The off-set distance between the reference point and the monitoring point is given in MONP_DIS in the MONP Group, and is repeated in the MONR and ICCT Groups with the readings. MONP_DIS is a Key Field and must always be included. If the off-set distance is zero, then MONP_DIS must be given as 0.

MONP_ID may be the instrument serial number, or some other reference, and is optional if the instrument can be uniquely identified by a combination of its reference point and off-set distance alone. If the instrument can not be uniquely identified without MONP_ID then it must be included in the MONP, MONR and ICCT Groups.

3 Instrument orientations and sign conventions



Where a reference point relates to a line of monitoring points, the orientation of the line is given in the HOLE Group. For example:

- An inclinometer installed in a vertical borehole: the inclination given in HOLE_INCL is 90, the orientation given in HOLE_ORNT is NA (not applicable).
- An extensometer installed at an angle of 45 degrees upwards on a bearing to the east in the roof of a tunnel: the inclination in HOLE_INCL is -45 (down is +ve, up is -ve for HOLE_INCL), and the orientation given in HOLE_ORNT is 090 (bearings are given as three digits).
- A set of strain gauges installed along a horizontal excavation prop orientated north-south: HOLE_INCL is 0 and HOLE_ORNT is 180.

The orientation of the reading axis of a monitoring point is given in the MONP Group. If the monitoring point has more than one reading axis, the orientation of each axis is given in MONP. For example:

- A horizontally mounted tiltmeter on the east-west wall of a building: the bearing of the measuring axis given in MONP_BRGA is 090 and the inclination of the axis given in MONP_INCA is 0.

- A strain rosette with two reading axes, glued on to the vertical side of an east-west trending excavation prop: the bearing of the horizontal measuring axis is 090 (given in MONP_BRGA), and of the vertical axis is NA (not applicable, given in MONP_BRGB). The inclination of the horizontal axis is 0 (given in MONP_INCA) and of the vertical axis is 90 (given in MONP_INCB).

The AGS-M Format does not define any sign conventions for instrument readings reported in MONR. The sign conventions for each measuring point must be defined in MONP. For some instruments a sign convention is not relevant, if the reading can only ever be positive. For monitoring points with more than one axis, the sign convention must be given for each axis. The sign convention is defined in words and must be unambiguous. The sign convention, orientation and inclination of the reading axis must be mutually compatible. For example:

- A horizontally mounted tiltmeter on the east-west wall of a building: with a reading axis bearing 090 and an inclination of 0, the sign convention (given in MONP_RSCA) may be "Clockwise tilt down to the east is +ve".
- A precise levelling point installed on the side of a building with a reading axis bearing of NA, and an inclination of 90, the sign convention (given in MONP_RSCA) may be "Displacement up is +ve".

Instruments for insitu geochemical measurements are omni-directional and the measured values can only be +ve, therefore the bearing, inclination and reading sign convention in MONP are not applicable (NA).



4 MONP and MONR Examples

The following examples illustrate how to report the installation details and readings of physical parameters for common instruments using the MONP and MONR Groups. General concepts are not repeated in subsequent examples. Detailed, worked examples for most common instrument types are given on the AGS web site at www.ags.org.uk.

a) Total station survey point on a building

- The reference point and the monitoring point locations are the same.
- The reference point ID is given in HOLE_ID
- The off-set of the monitoring point from the reference point is zero and is given as 0 in MONP_DIS
- The combination of HOLE_ID and MONP_DIS uniquely define the survey point, so no MONP_ID is required, and may be left blank.
- The co-ordinates and level of the reference point given in HOLE (in HOLE_NATE, HOLE_NATN and HOLE_GL) may be the initial precise readings on the point, or may be rounded readings.
- The co-ordinates and level of the reference point may additionally, or alternatively, be given to a local grid and datum in HOLE using HOLE_LOCX, HOLE_LOCY and HOLE_LOCZ.
- The orientation and inclination of the reference point in HOLE_ORNT and HOLE_INCL are not relevant, and are given as NA (Not applicable).
- Photographs of the reference point may be given as an associated file and referenced in FILE_FSET in HOLE.
- The date that the survey point was installed is given in MONP_DATE.
- The HOLE_TYPE is INST to indicate Instrument

- The type of instrument is given using the pick list code TS for Total station survey point in MONP_TYPE.
- If the readings are reported as Easting, Northing and Level then the bearings and inclinations of the measurement axes are:
 - MONP_BRGA = 090 (ie Eastings)
 - MONP_BRGB = 000 (ie Northings)
 - MONP_BRGC = NA (ie Level, bearing is Not Applicable)
 - MONP_INCA = 0 (ie Eastings, horizontal axis)
 - MONP_INCB = 0 (ie Northings, horizontal axis)
 - MONP_INCC = 90 (ie Level, vertical axis)
- If absolute readings of Easting, Northing and Level are being reported, then there are no sign conventions and MONP_RSCA, MONP_RSCB and MONP_RSCC are NA (Not applicable)
- Absolute readings of Easting, Northing and Level are reported in MONR_EAST, MONR_NRTH and MONR_LEV.
- If relative displacements from an initial base reading are being reported, then the sign conventions for displacements in each axis must be given, for example:
 - MONP_RSCA = Displacement to East +ve.
 - MONP_RSCB = Displacement to South +ve
 - MONP_RSCC = Displacement up +ve.
- Relative displacements would be reported in MONR_DSPA, MONR_DSPB and MONR_DSPC.
- The date and time of every set of readings must be given in MONR_DATE and MONR_TIME. The date is always given in the format dd/mm/yyyy eg 05/12/2001, the following formats are not acceptable 5/12/2001, 05/12/01, 5 Dec 2001 or 12/05/2001. The time is always given to the 24 hour clock in the format hhmmss eg 104500, the following formats are not acceptable 1045, 10:45:00, 1045am.

b) Bi-axial tiltmeter on a building

- If the tiltmeter is installed on its own near ground level, then the reference point and monitoring point locations will be the same, and MONP_DIS will be zero. Inclusion and orientation of the reference line (HOLE_INCL and HOLE_ORNT) are not relevant.
- The HOLE_TYPE is INST to indicate Instrument.
- The instrument type given in MONP_TYPE is TMB
- The serial number of the tiltmeter can be given in MONP_ID, but it is not required to uniquely define the instrument, and so may be left blank
- The calibration details of the instrument can be given as an associated file and referenced in FILE_FSET in MONP.
- If one axis of the tiltmeter is horizontal, aligned east-west, and the second axis is horizontal, aligned north-south, the bearing, inclination and sign conventions given in MONP may be as follows:
 - MONP_BRGA = 090
 - MONP_BRGB = 180
 - MONP_INCA = 0
 - MONP_INCB = 0
 - MONP_RSCA = Clockwise rotation down to the east is +ve
 - MONP_RSCB = Anticlockwise rotation down to the south is +ve
- The readings will be reported using MONR_ANGA and MONR_ANGB.

c) Manually read inclinometer in a borehole

- The reference point is the top of the borehole. The reference point ID is the borehole number. There are multiple monitoring points, one at each depth down the inclinometer at which readings are taken. Each monitoring point is identified by its depth below ground level, given in MONP_DIS. MONP_ID is not relevant and is left blank.
- The HOLE_TYPE given in HOLE is CP for cable percussion borehole.
- The co-ordinates and ground level of the top of the borehole are given in HOLE.
- The instrument type given in MONP_TYPE is ICM for inclinometer - manual.
- The inclination and orientation of the borehole are given in HOLE. If the borehole is vertical HOLE_INCL is 90 and HOLE_ORNT is NA.
- Each depth at which readings are taken in the inclinometer is considered to be a separate monitoring point and must be defined in MONP, even though the orientations, inclinations and reading sign conventions will be the same for every point. The nominal bearings of the keyways are given in MONP_BRGA and MONP_BRGB. MONP_BRGC is not applicable. The inclination of the measuring direction for both keyways is horizontal (ie 0), as the resultant horizontal displacements are reported. The reading sign convention for the two keyway directions must be stated. An example partial data set for MONP would be as follows:

HOLE_ID	MONP_DIS	MONP_BRGA	MONP_BRG B	MONP_INCA	MONP_INCB	MONP_RSC	
						A	B
BH10	6.00	100	190	0	0	Towards east +ve	Towards south +ve
BH10	7.00	100	190	0	0	Towards east +ve	Towards south +ve
BH10	8.00	100	190	0	0	Towards east +ve	Towards south +ve

- The readings, given as displacements in mm from the base reading at each depth, are reported in MONR_DSPA and MONR_DSPB, observing the sign conventions given in MONP.
- A set of base readings will be taken for each inclinometer installation which define the initial shape of the tube in the ground and which are then used in the calculation procedure to determine the incremental displacement for each subsequent set of readings. These base readings may be considered as calibration data for the installation and are therefore not reported in the AGS-M Format. If they are required they may be given as an attached file and referenced in the FILE_FSET of the HOLE Group.
- The raw instrument readings of the angle of the measuring torpedo in the keyways at each depth are not reported in the AGS-M format. Similarly, the intermediate calculated readings of absolute shape of the inclinometer installation at each reading date are not reported. The only results reported are the final relative displacements after application of the calibration factors and subtraction of the base readings.
- If spiral twist is measured it provides additional detail on the configuration of the installation, and is required by the data receiver to fully understand the incremental displacement data ie although the keyways may be nominally aligned at 100/190 degrees at the surface, they may be rotated to 150/240 degrees at 50m depth. Spiral twist information is therefore part of the instrument definition, and is not calibration data. It is reported in MONP by giving the precise, rather than the nominal, keyway bearing at each measurement depth in MONP_BRGA and MONP_BRGB.

d) Piezometer in a borehole

- The reference point is the top of the borehole, and the reference ID is the borehole number.

- The off-set from the reference point given in MONP_DIS is the depth below ground level to the piezometer tip; this allows multiple piezometers in a borehole to be uniquely identified.
- The combination of HOLE_ID and MONP_DIS uniquely define the piezometer, so no MONP_ID is required, and may be left blank.
- The top and bottom of the piezometer response zone (sand filter pocket) are given as depths below ground level in MONP_TRZ and MONP_BRZ.
- The HOLE_TYPE is CP for cable percussion borehole
- The instrument type is given as SPIE for a standpipe piezometer in MONP_TYPE.
- The orientation and inclination of the borehole are given in HOLE_ORNT and HOLE_INCL.
- Bearing and inclination of the piezometer are not relevant as the instrument is omnidirectional, so MONP_BRGA and MONP_INCA may be left blank or given as NA.
- The reading sign convention is only relevant with piezometers that can measure negative heads, in which case MONP_RSCA would be "Positive head is +ve".
- The readings are reported as either depth to water from reference point datum (ie depth below ground level) in MONR_WDEP or as head of water above tip level in MONR_WHD.

e) Slip indicator in a borehole

- The readings are reported in MONR using fields MONR_DSTA and MONR_DSTB. The depth below ground level that the top of the bottom rod gets stopped is reported in MONR_DSTB, and the depth below ground level that the bottom of the top rod gets stopped is reported in MONR_DSTA.
- The length of the top rod used is reported in MONR_GAUG; so the results of using several top rods of different lengths can be reported.
- The monitoring point is defined as at the base of the slip indicator tube, and is given as the depth of the installation in MONP_DIS. The combination of HOLE_ID and MONP_DIS uniquely define the survey point, so no MONP_ID is required, and may be left blank.

f) Set of strain gauges on an excavation prop

- The reference point is located at the end of the prop, and the set of strain gauges may all be given the same HOLE_ID.
- The strain rosettes on the side and top of the prop are both at the same distance from the reference point, given in MONP_DIS.
- The combination of HOLE_ID and MONP_DIS does not uniquely identify each strain rosette, therefore each rosette must additionally be given a monitoring point identifier in MONP_ID to make the combination of HOLE_ID, MONP_DIS and MONP_ID unique. The MONP_ID may simply be "Top" and "Side", or "A" and "B", or some project specific referencing system.
- The strain measurements are reported after they have been resolved to the measurement axes defined in MONP_BRGA, MONP_BRGB, MONP_BRGC, MONP_INCA, MONP_INCB and MONP_INCC, and are reported using the sign conventions defined in MONP_RSCA, MONP_RSCB and MONP_RSCC. The raw readings from each strain arm in each rosette are not reported in AGS-M.

g) Set of crack monitoring pins manually measured by a Demec gauge

- A set of three or four pins are installed to straddle a crack. The distance between pairs of pins is manually measured by a Demec gauge and this data is used to calculate the displacement across the crack, and the shear displacement along the crack. The orientation of these two axes of displacement are defined in MONP. For a horizontal crack in a north-south trending, vertical wall the MONP entries would be as follows:

MONP_BRGA = NA
MONP_BRGB = 180
MONP_INCA = 90
MONP_INCB = 0
MONP_RSCA = Crack opening +ve
MONP_RSCB = Right lateral shear +ve

- The displacement and shear displacement would be reported in MONR_DSPA and MONR_DSPB.
- The readings of distance between pairs of pins is raw data and is not reported in AGS-M. If this information is required it may be included as an attached file referenced in the FILE_FSET of MONR.



5 Insitu gas and geochemical monitoring

If samples of soil, water or gas are taken in the field for subsequent geochemical analysis in the laboratory, then the sampling and testing may be fully reported using the HOLE, SAMP and CNMT Groups of the 3rd Edition of the AGS Format. However, if testing is carried out insitu and no samples are taken, then the results are reported using the AGS-M Format as follows:

- The location of the reference point is defined using the various Headings in the HOLE Group.
- The details of the monitoring point installation are given in MONP. This applies to both fixed installations and readings taken with a handheld instrument.
- The results of physical readings such as flow, temperature and pressure, are given in MONR.
- The results of chemical readings are given in ICCT. The ICCT Group uses the same concepts and pick list items for reporting chemical test results as does the CNMT Group of the 3rd Edition of the AGS Format, however, instead of sample details it includes date and time Headings, and links to the monitoring point definitions given in MONP.

Examples

a) Gas monitoring well

A series of gas monitoring wells at a landfill site are periodically monitored for gas flow, pressure and composition using a handheld readout unit. Barometric pressure is also recorded.

- Each well is given a borehole number in HOLE_ID. The reference point is ground level. The monitoring point is the base of the response zone of the well screen, and therefore MONP_DIS and MONP_BRZ are the same. MONP_TRZ gives the top of the response zone of the well screen. The instrument MONP_TYPE is GMP for gas monitoring point. If the installation is also used for groundwater monitoring then the instrument MONP_TYPE is GMP+GWMP.
- The installation is omni-directional therefore bearing and inclination are not relevant in MONP. The parameters being measured can only be +ve, and therefore the reading sign convention in MONP is also not relevant.
- Each set of readings is given a consistent pair of date and time values ie the time reading is nominal, rather than precise to the second. MONR_TIME and ICCT_TIME (as well as MONR_DATE and ICCT_DATE) must be identical for a group of readings in a single installation which are to be considered as a set.
- The gas pressure and flow from the installation are recorded in MONR_PRES and MONR_FLOW respectively.
- The gas composition is recorded using the relevant ICCT Headings. The pick list codes for CNMT_TYPE and CNMT_TTYP are given in Appendix 1 of the 3rd Edition of the AGS Format. An example partial set of readings is given below:

HOLE ID	MONP DIS	ICCT DATE	ICCT TIME	CNMT TYPE	CNMT TTYP	ICCT RESL	ICCT UNIT	ICCT METH
GW02	10.50	21/06/2001	143500	GMETH	GAS	64.23	%vol	Handheld infrared gas analyser
GW02	10.50	21/06/2001	143500	GOX	GAS	33.82	%vol	Handheld infrared gas analyser
GW02	10.50	21/06/2001	143500	GCARD	GAS	0.12	%vol	Handheld infrared gas analyser

- If barometric pressure is recorded at the site each day that readings are taken, then a monitoring point is defined for the barometer with its own HOLE_ID. The readings are reported in MONR_PRES.

b) Water gauging station at a tunnel outlet

An automatic data logger is used to record every 12 hours the water flowing out of a tunnel drainage system. The flow rate is determined by an instrumented float on a v-notch weir and the pH and conductivity are measured by electrical probes.

- The reference point is the weir, and its location is defined in HOLE. The reference point and monitoring point are the same, therefore MONP_DIS is zero.
- HOLE_TYPE is INST, and MONP_TYPE is GWMP.
- In MONP the bearing, inclination and reading sign convention are not relevant.
- The flow over the weir is reported in MONR_FLOW, expressed as l/s.
- The pH and conductivity are reported in ICCT with CNMT_TYPE of PHS and CONDW respectively, and with CNMT_TTYP of WATER.
- The raw electrical output from the transducers is not reported in AGS-M. Similarly, the float level on the weir is not reported, nor are the calibration or conversions factors by which the electrical outputs are converted to the reported readings.

6 Time related remarks



If an incident affects a particular instrument or a particular data reading in a single instrument then it is best reported as a remark in MONR_REM on the date and time at which it occurred or was noted, and associated with the particular reading that is affected eg Installation vandalised. Cover damaged, and repaired.

If there is an event on the site that is of a more general nature that may affect the results on a number of instruments then this can be reported in TREM as a time related remark. TREM can be used to report a site diary of key events eg Heavy rain for 2 days, site flooded.

7 Adding new instrument types



New instrument types not covered in this document can be reported using the AGS-M Format by the following procedure:

- A pick list abbreviation for the new instrument type must be defined in the ABBR Group. See Section 13 below for details. The abbreviation is used in MONP_TYPE.
- The readings may be reported using one or more of the existing fields in MONR. If suitable fields do not exist in MONR, then new fields may be added by creating user defined Headings using the DICT Group. See Section 15 below for details. The preferred units for reporting the

result will also be given in DICT. Equally if additional fields are required in MONP to describe the instrument details these can be defined in DICT.

- The units used to report the results must be defined in the UNIT Group. See Section 12 below for details.



8 Compatibility with the AGS Format

The AGS-M Format is based on the 3rd Edition of the AGS Format. The formats are compatible and may be used together on a project which involves both geotechnical investigation and monitoring. So, for example, a project in which inclinometers are installed in boreholes would use the AGS-M Format data Groups MONP and MONR to present the details of the inclinometers and their readings, and the AGS Format data Groups SAMP and GEOL to record the samples taken in the boreholes and the geology logged.

However, the following AGS Format 3rd Edition Groups must not be used in a combined data submission:

- HPGI and HPGO for horizontal profile gauge installations and observations
- INST and IOBS for single point instrument installations and observations
- PREF and POBS for piezometer installations and observations
- PROF and PROB for profiling instrument installations and observations

The function of all these eight Groups has been replaced by MONP and MONR in AGS-M. It is the AGS's intention that the AGS-M Format will be merged in to the next version of the AGS Format, and that HPGI, HPGO, INST, IOBS, PREF, POBS, PROF and PROB will be deleted from the AGS Format at that time.

Until the AGS-M Format is merged with the AGS Format, the additional Groups and Fields of the AGS-M Format are defined within the AGS Format using the DICT Group. This means that in this interim period the AGS-M is already totally AGS Format compatible. The DICT Group must be included in an AGS-M submission during the interim period. The method of using the DICT Group is described in Section 15 below. An example DICT Group is included as part of an example AGS-M data file in Appendix 3.

The AGS Format will continue to develop in response to user's requirements. The AGS Format drafting committee intends to maintain backward compatibility to the immediately previous version, but can not guarantee full backward compatibility to earlier versions. Wherever possible the committee will give advance warning of significant format changes intended to be implemented in the next version (as given above).

The availability of format conversion programs, to convert old data sets to the current version of the AGS Format, will be announced on the AGS web site at www.ags.org.uk.

9 Data format, data integrity and data correctness checks



The AGS-M Format is designed for the transfer of monitoring data between a Provider and a Receiver. The data will be produced by a software program and received into another program. It is tempting for both the Provider and Receiver to assume that because the data has been output from a computer program it must be correct. This is a dangerous assumption. The onus is on the Provider to produce correct data, but the Receiver should also satisfy himself that it is correct, before using it. There is a series of checks that both Provider and Receiver should carry out on each data set issued or received.

a) Data format checks

Does the data format comply 100% with the format defined by the AGS-M Format Rules set out in this document?

- i) The best way to check the data format is to use one of the commercially available AGS data format checking programs that has been updated to handle the AGS-M Format. The available programs are listed on the software page of the AGS web site at www.ags.org.uk. A data format checking program should allow you to check the following:
- Is the PROJ Group present in the data file.
 - Is the total line length correct.
 - Are <CONT> continuation lines handled correctly.
 - Are there missing or extra commas or quotation marks.
 - Are the Group and Heading names correct.
 - Is the <UNITS> line present.
 - The program may also check other aspects of the data format.
 - The program will not be able to check that the columns of data line up correctly under the correct Heading or Units, so the file should be imported into a spreadsheet to check this (see (ii) below).
- ii) If an AGS-M Format checking program is not available then a partial check may be carried out by importing each data file into a spreadsheet.
- Import the AGS-M Format File into the spreadsheet using the Comma Separated Value (CSV) import filter.
 - If the Headings continue onto a second line, they will not line up over the correct column. Cut and paste them to the correct columns.
 - If the Units continue onto a second line they will not line up over the correct column. Cut and paste them to the correct columns.
 - Check that all the columns of data line up correctly under the correct column Heading, if not, there are some missing commas or other problems in the data set.
 - Check that the Units are appropriate for the Heading that they are under. If not there may be some missing commas or the wrong Units may have been given.
 - Make sure that no quotation marks appear in the data. If they do this will often highlight mismatched quotation marks.
 - Check that the <CONT> continuation lines follow on correctly.
 - Beware, if you are subsequently going to import the AGS-M Format file into a specialist program that expects strict AGS-M Format files, then do not edit or save the AGS-M Format file from your spreadsheet if it does not produce strict AGS-M Format CSV files (see Section 10 below).
- iii) The data files can be imported into a word processor or text editor and checked by eye.
- Switch off word wrapping, or set the line length to greater than 240 characters. Use a non-proportional font.
 - Checking by eye is extremely tedious and it is not easy to spot formatting errors. However, it is sometimes necessary to resort to this, when methods (i) and (ii) fail to show up format problems which may prevent the data from being read correctly.

b) Data integrity checks

The AGS-M Format defines a hierarchy of the data Groups, with the HOLE Group at the top and all the other data Groups below this in an inverted tree-like structure. Each Group is linked to the one above it and the one(s) below it by Key Fields. For this structure to work correctly the data in the Key Fields must be consistent. If the Key Field data is not consistent, or is missing, then the integrity of the data set breaks down and data may be 'lost' or unrecognisable to the Receiver's software.

- i) Data integrity checks could be carried out by eye on a small data set.
 - Import each table into a spreadsheet. If the Headings or Units continue onto a second line cut and paste them to the correct columns and print it out.
 - Carry out the checks and cross-checks described below in (ii).
 - It is not practical to carry out this process by eye on a data set with anything more than a dozen or so reference points.
- ii) For medium to large size data sets an integrity check can only be sensibly and rigorously carried out by one of the commercially available geotechnical/monitoring relational database programs that has in-built data integrity checking procedures. The available programs are listed on the software page of the AGS web site at www.ags.org.uk. The program should check for the following integrity problems:
 - Each line of data in every Group must have a combination of data in the Key Fields that is not repeated in any other lines of data in that Group. This unique combination of Key Field data must exist wherever there is a related item in any Group lower down in the hierarchy. As one progresses down the hierarchy additional Key Fields are required to ensure this uniqueness at each level. This is illustrated in more detail below.
 - The reference point ID given in the HOLE Group must be unique. If there are two reference points with IDs of H1 in the data set, then this is a data integrity error and must be changed. One of the reference points must be re-numbered eg H1A.
 - The reference point ID must be consistent throughout the data set. For example, reference point H1A must always be written exactly in this way. Variants such as 1A, H1a, H1, H-1A, H1(A), H 1A etc are not acceptable. The program will check every data Group below HOLE in the hierarchy and every line of data in every Group must have a reference point ID which is in HOLE. If the reference point ID is not in HOLE or is formatted differently from the version in HOLE or is missing then this is an integrity error and must be corrected.
 - For every monitoring point in the data set, and for every reading on every monitoring point, there must be a unique, unambiguous and consistent combination of reference point ID and distance from the monitoring point to the reference point. For example, the first four monitoring points in the following table are uniquely defined, but the fifth sample is ambiguous, and does not satisfy data integrity, and must be corrected. MONP_DIS must always be given. If the monitoring point is at the reference point, then MONP_DIS is zero and must be given as 0 to avoid ambiguity.

HOLE_ID	MONP_DIS	MONP_ID
H1A	0	
H1A	10.00	Top
H1A	10.01	
H1A	10.02	
H1A		
H1A	10.00	Side

- If there are two or more monitoring points at the same distance from the reference point, and it is not possible to make the combination of HOLE_ID and MONP_DIS unique, then a MONP_ID must be added (as in the example above) to make the combination of HOLE_ID, MONP_DIS and MONP_ID unique.
- For all readings given in MONR and ICCT a date and time must be given. The combination of HOLE_ID, MONP_DIS, MONP_ID, MONR_DATE and MONR_TIME given in MONR must be unique for every reading. Similarly, the combination of HOLE_ID, MONP_DIS, MONP_ID, ICCT_DATE and ICCT_TIME given in ICCT must be unique for every result.

iii) The golden rules for data integrity are:

- Within each Group the Key Fields must contain sufficient information that uniquely identifies that item of data within that Group. There must be no duplicates and no ambiguities.
- The data in the Key Fields must be identical in the Groups both above and below each Group in the hierarchy, to ensure that the data can be linked together correctly.
- As you move down the hierarchy of Groups to increasing levels of detail, more Key Fields are needed at each level to ensure that the data is uniquely identified.

c) Data correctness checks

Perhaps the most difficult check to carry out is to determine if the data given in the AGS-M Format file is correct. This check can only be automated to a certain degree, and relies largely on careful checking by eye, and on the experience of the checker to spot rogue results. The following checks should be carried out. Some of these checks apply only to the AGS-M Format data set, but others are of a more general nature, and apply equally to the paper version of the report.

i) AGS-M Format checks

- Is the data set complete? Have all the monitoring points and readings carried out been fully reported.
- Does the data given in the AGS-M Format file agree 100% with the data given in the paper report?
- Are the <UNITS> correct? The data Provider's software may add the <UNITS> fields automatically, without the intervention of the person who has typed in the data, or without recognising the units used by the data logger, and errors can result.
- Are the <UNITS> the same as the preferred units given in this document? Different units may be used, but the Receiver should ensure that the receiving software correctly identifies the units.
- Have the sign conventions for each reading been stated and correctly applied?

ii) General checks on the AGS-M Format file and the paper report

- Is the data factually correct? Are there any systematic errors that effect all the readings of a particular instrument or type, and are there any rogue readings that effect just a few of the results? These problems are often only spotted once someone starts to use the readings, and analyse them in detail. It is prudent to do some quick plots of the data during the checking

process to look for rogue or anomalous results. Some of the geotechnical/monitoring database programs allow the user to set minimum and maximum values for each parameter, and any values falling outside this range are flagged as anomalous.

- Have the calibration and calculation of monitoring readings been carried out correctly?
- Have the interpretations within the 'factual' data been carried out correctly?



10 Using a spreadsheet to create or edit AGS-M Format data

a) Data integrity problems

The AGS-M Format has been designed so that it can be created and viewed in a spreadsheet. This can work quite satisfactorily for small projects where it is practical to carry out the checks described in Section 9 above by eye. However, with medium to large projects it is impractical to carry out these checks with sufficient rigor and in particular, experience has shown that it becomes impossible to maintain data integrity within a large data set. Inconsistent reference point numbering becomes almost inevitable when many spreadsheets are created by a number of different people.

b) CSV file format problems

When the AGS Format was first conceived in 1992, most of the spreadsheet programs on the market were able to output files in CSV (Comma Separated Value) format, with each variable on a line separated from the next by a comma. If all the values (text, number or date) were forced to be in text format they would each be surrounded by inverted commas. This became the basis of the AGS Format. However, with the march of software progress, spreadsheet programs have become more "intelligent", and a number of the current spreadsheets output CSV format files that only put inverted commas around text fields that contain commas in the text. All other text, number or date fields are not surrounded by inverted commas. If a text field includes an inverted comma in the text, the inverted comma may be bracketed by two inverted commas. Any of these variants of the CSV format would not satisfy the AGS / AGS-M Format Rules. Also, leading or trailing zeros may be truncated from numbers, and the date format may be altered. As a result of these inconsistencies, spreadsheet generated or edited CSV files may not be handled correctly by programs designed to receive strict AGS-M Format files.

To check whether your spreadsheet is capable of producing AGS-M Format data files run the following test:

- Open a new blank spreadsheet. Select the whole spreadsheet, and set all the cells to text format.
- Type in the following three lines of data:

a	b	c	d
1	2.00	0.03	
	a,a	b"b	01/11/2001

- Save the spreadsheet in CSV format.
- Open the CSV file in a text editor, such as Notepad, using a non-proportional font, with all formatting and word-wrapping switched off. You should see the following file:

```
"a","b","c","d"
"1","2.00","0.03",""
","a,a","b"b","01/11/2001"
```
- If you see anything else, your spreadsheet has failed the test. (Note: AGS files do not allow " within a field. The b"b example above is shown to test the CSV capabilities of your spreadsheet.)

Excel95, Excel97 and Excel2000 fail this test and can not be used by themselves to create or edit AGS-M Format files. However, a free Excel add-in is available to registered users of the format and will be sent to you upon receipt of your registration fee. See Appendix 5 for details of the registration fee.

11 Using a relational database to create or edit AGS-M Format data



For medium to large projects it is essential to use a dedicated geotechnical/monitoring relational database to generate the AGS-M Format data set to ensure data integrity. Such a program should be able to handle all the monitoring and geotechnical data for a project. The program should have 'persistent referential integrity' built in to it, which can not be overridden or circumvented and this will ensure that the reference point IDs, monitoring point distances and monitoring point IDs are consistent throughout the database. The available relational database programs that utilise the AGS-M Format are referenced on the software page of the AGS web site at www.ags.org.uk

The golden rules for producing high quality, correct AGS-M Format data are:

- All the data is entered into one dedicated program which has in-built rules for enforcing data integrity.
- Each item of data is only entered once. For example, the reference point details are only input once. When the monitoring point details or the readings are being entered the reference point details are called up from the program and do not have to be entered again.
- All the pages for the paper report (eg the reference point and monitoring point summaries, and plots of readings) are produced directly from the same database and by the same program at the same time as the AGS-M Format data files are produced.
- The program has some in-built procedures for checking for gross errors and rogue results.
- The checking of the data is thorough, is done on the paper version of the data and includes the plotting out of the data to spot rogue results.
- A person with appropriate experience who is able to spot rogue results, errors and inconsistencies should review the data.
- The AGS-M Format data files are run through a format-checking program before being issued.
- Use of a spreadsheet program alone cannot satisfy the above requirements. Only a dedicated geotechnical/monitoring relational database program (or a spreadsheet with sophisticated macros that emulate the behaviour of a relational database) can be expected to produce high quality AGS-M Format data for medium to large size projects. However, a database program cannot perform miracles; it requires correct data to be input, by competent people, who carry out thorough checking before issuing any output.

12 Reporting test units



A <UNITS> line must be included in every data Group except ABBR, CODE, DICT and UNIT. If you are creating or viewing an AGS-M Format file in a spreadsheet this line of information will be visible below the column Headings and should be carefully checked as follows:

- a) Checks on all data Groups (except ABBR, CODE, DICT and UNIT)
 - Import the AGS-M Format file into a spreadsheet using the Comma Separated Value (CSV) import filter.
 - If the <UNITS> continues onto a second line, you must first cut and paste the second line into the correct columns.
 - Are the units lined up under the correct column Heading?

- Are the units the same as defined in the AGS-M Format? This is desirable, but it is not essential. For example the work may have been carried out overseas, or to a different standard method and therefore different units may have been used. The same units must be used as given in the paper version of the report.
- Are the units correct for the data that is given beneath? Experience has shown that this is a common error.
- The units given in the <UNITS> line must be defined in the UNIT Group. Standard units are given in the 'pick' list in Appendix 1. Where standard units are used the format must comply exactly with that given in the 'pick' list in Appendix 1.
- If you are creating or viewing data in a dedicated geotechnical relational database program, the units embedded in the AGS-M Format data file may not be displayed by the program in all views of the data. The program may assume that the units stated in the AGS-M Format have been used and display these units, rather than those in the AGS-M Format file. Similarly, when creating an AGS-M Format file, the program may automatically generate the <UNITS> information, assuming the AGS-M Format default values, irrespective of the units actually used. There is therefore potential for significant systematic errors, which will only be avoided by careful checking by the data Provider and Receiver.
- Authors of dedicated geotechnical relational database programs should ensure that their software requires the data Provider to input the units, or confirm the default units, for each parameter. The program should also display the units as embedded in the received AGS-M Format file.

b) The ICCT Group

The procedure for checking the test units for insitu chemical test results reported in the ICCT Group is different to that used for all other data Groups. The following points should be recognised:

- The <UNITS> line in the ICCT Group gives only the units of the MONP_DIS, ICCT_DATE and ICCT_TIME fields (preferred units are m, dd/mm/yyyy and hhmmss respectively).
- The <UNITS> line does not give the units of the test results and is left blank for ICCT_RESL (ie a null "" is given). The units of the test results are given in the ICCT_UNIT field of the ICCT Group for every test result. It is necessary to check the units for every test result, not just the <UNITS> line.
- The units used for a particular test should follow the appropriate testing standard that has been specified and should be agreed between the data Provider and Receiver. The AGS-M Format does not specify preferred units for the tests reported in the ICCT Group.
- The units used in the AGS-M Format submission should be the same as those used in the paper report.
- For each test type the same units should be used throughout an AGS-M Format submission. The units given in ICCT_UNIT for a given test type should not be different on different samples.
- If several partial data submissions are made, then the units for a given test type should remain the same.
- The units given in ICCT_UNIT must be defined in the UNIT Group. Standard units are given in the 'pick' list in Appendix 1. Where standard units are used the format must comply exactly with that given in the 'pick' list in Appendix 1.

c) The UNIT Group

All units used in an AGS-M Format submission must be defined in the UNIT Group; this includes standard units given in the 'pick' list in Appendix 1, and user defined units. The following guidelines should be followed for all units:

- Where standard units are used, the format must be exactly as given in the 'pick' list in Appendix 1. This is required so that computer software can be programmed to automatically recognise the units.
- User defined units must be composed of only standard ASCII characters. No non-ASCII or extended ASCII characters shall be used. For example, do not use the Greek mu symbol for 1/1000000, but instead use the abbreviation "u", eg um.
- Do not use any superscripted characters. For example do not use kN/m² but instead use kN/m2.
- The units are case sensitive, therefore ensure that you exactly match the case of the standard units and that you have the correct case for any user defined units. For example, the standard unit is kN/m2 and therefore KN/m2 or kn/m2 are not acceptable.
- Before creating new user defined units, consult the Discussion Forum of the AGS web site at www.ags.org.uk to see if anybody else has already suggested an appropriate style of presentation for the unit. If not, add details to the Discussion Forum of what you propose to do. The AGS-M Format committee will consider all suggestions posted in the Discussion Forum when preparing the next revision of the AGS-M Format.

13 Standard abbreviation 'pick' lists and user defined abbreviations



All abbreviations used within the AGS-M Format data files of a submission must be defined in the ABBR Group, including the standard abbreviations given in the 'pick' lists in Appendix 1. Chemical test codes are defined in the CODE Group and are required for a submission of AGS-M data that includes the ICCT Group.

a) User defined abbreviations in the ABBR Group

The 'pick' lists in Appendix 1 define a set of standard abbreviations, and indicate which Headings they should be used in. The data Group definitions indicate the Headings for which 'pick' lists of abbreviations are available. Headings which are indicated to have 'pick' lists available can also contain text items which are not taken from the relevant 'pick' list. If an abbreviation is used, then it must come from the 'pick' list, or a user defined abbreviation must be created. If a standard abbreviation exists for an item, then the abbreviation should be used, not a full text equivalent.

User defined abbreviations must be given in the ABBR Group and should follow these guidelines:

- User defined abbreviations should not duplicate an item for which a standard abbreviation is already given in the 'pick' lists.
- The abbreviation given in ABBR_CODE must not duplicate a code already given in the 'pick' lists for the same Heading. For example in the 'pick' lists "SP" is given as an abbreviation for "Standpipe" in MONP_TYPE. "SP" must not be used as a user defined abbreviation in MONP_TYPE.
- ABBR_CODE should be considered as not case sensitive. Therefore "Sp" and "sp" are the same as the existing code "SP" and should not be used as a user defined abbreviation within MONP_TYPE where "SP" is already defined in the 'pick' lists.
- ABBR_CODE should be restricted to the letters A to Z and the numbers 0 to 9 and should not contain spaces.
- The abbreviations should be agreed between the Provider and Receiver.
- All abbreviations must be defined in the ABBR Group including the standard abbreviations given in the 'pick' lists in Appendix 1, for example:

```
***ABBR"  

"*ABBR_HDNG", "*ABBR_CODE", "*ABBR_DESC"
```

"MONP_TYPE", "SP", "Standpipe"
"MONP_TYPE", "TS", "Total station point"
"MONP_TYPE", "LC", "Load cell"
"HOLE_TYPE", "INST", "Instrument"
"HOLE_TYPE", "CP", "Cable percussion (shell and auger)"

- Before creating new abbreviations, consult the Discussion Forum of the AGS web site at www.ags.org.uk to see if anybody else has already suggested an appropriate abbreviation. If not, add details to the Discussion Forum of what you propose to do. The AGS-M Format committee will consider all suggestions posted in the Discussion Forum when preparing the next revision of the AGS-M Format.

b) User defined chemical codes in the CODE Group

User defined chemical codes must be given in the CODE Group and should follow these guidelines:

- User defined chemical codes must not duplicate a standard code which is already given in the 'pick' lists.
- CODE_CODE should be considered as not case sensitive. Therefore "Tol" and "tol" are the same as the existing code "TOL" and should not be used.
- CODE_CODE must be restricted to the letters A to Z and the numbers 0 to 9 and must not contain spaces.
- The codes should be agreed between the Provider and Receiver.
- All codes must be defined in the CODE Group including the standard codes given in Appendix 1 of the 3rd Edition of the AGS Format, for example:

```
***CODE"  
"*CODE_CODE", "*CODE_DESC"  
"BIOXW", "Biochemical oxygen demand"
```

- Before creating new codes, consult the Discussion Forum of the AGS web site at www.ags.org.uk to see if anybody else has already suggested an appropriate code. If not, add details to the Discussion Forum of what you propose to do. The AGS Format committee will consider all suggestions posted in the Discussion Forum when preparing the next revision of the AGS Format.

14 Associated files



Data may be included in an AGS-M Format compatible submission for items that are not covered by the AGS-M Format by including the data in an associated file and referencing it in the AGS-M Format. The associated files may be in any file format that is acceptable to the Provider and Receiver. It is preferable that associated files are not compressed, however, large files that will not fit on to a single disk may be compressed using the ZIP file format. Zipped files must indicate the original file format plus the zipped file format. Compressed files should only be used in agreement between the Provider and Receiver. The AGS-M Format files in a submission should not be compressed.

All associated files must have an up to 8 character file name and a 3 character file type extension. Long file names must not be used.

The referencing procedure is in two parts:

- a) The associated data files are collected together into data sets. Each data set must have a unique reference number and this reference number is given in the FILE_FSET field of the relevant Group as follows:

- General data files that refer to the whole site should be collected together in a file set that is referenced in the FILE_FSET field of the PROJ Group. Such data files may include the report text as a word processor file, the site plan as a CAD file, a set of general site photographs as JPG files or the investigation Bill of Quantities as a spreadsheet file. For example:

```
***PROJ"
"*PROJ_ID","*PROJ_NAME","*PROJ_LOC","*PROJ_DATE","*PROJ_AGS","*FILE_FSET"
"<UNITS>","","","dd/mm/yyyy","",""
"7845","Trumpington Sewerage","Trumpington","28/05/2001","3","FS1"
```

- Data files that refer to specific reference points or boreholes should be collected together in a file set that is referenced in the FILE_FSET field of the HOLE Group. Such data files may include a set of photographs as JPG files showing the reference point location, or a detailed location plan as a CAD file.

```
***HOLE"
"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*FILE_FSET"
"<UNITS>","","m","m","m","",""
"H1","INST","532154","176163","78.4","FS2"
"BH10","CP","532246","176047","64.9","FS3"
```

- Data files that refer to specific monitoring points should be collected together in a file set that is referenced in the FILE_FSET field of MONP. Such data may include calibration files for the instrument or a detailed specification of the instrument type.

```
***?MONP"
"*?HOLE_ID","*?MONP_DIS","*?MONP_TYPE","*?FILE_FSET"
"<UNITS>."m","",""
"H1","0","TS","FS21"
"BH10","12.50","SP","FS204"
```

- b) The contents of each file set are described in the FILE Group. The File Name within each File Set must be unique, so that the combination of the Key Fields of FILE_FSET and FILE_NAME is unique.

```
***FILE"
"*FILE_FSET","*FILE_NAME","*FILE_DESC","*FILE_TYPE","*FILE_PROG","*FILE_DATE","*?FILE_DOCT"
"<UNITS>","","","","","dd/mm/yyyy","",""
"FS1","trumptxt.doc","Factual report text","DOC","Word 97","27/05/2001","REP"
"FS1","trumpsi.zip","Site plan","DWG+ZIP","AutoCAD ver 14 + PKZip ver 2.04g","24/05/2001","DRAW"
"FS1","trump011.jpg","Photo of site looking North","JPG","Paintshop Pro ver 5","02/05/2001","PH"
"FS1","trump021.jpg","Photo of site looking South","JPG","Paintshop Pro ver 5","02/05/2001","PH"
"FS1","trumpboq.xls","Final BOQ","XLS","Excel 97","27/05/2001","GEN"
"FS2","h1p01.jpg","H1 location photograph","JPG","Paintshop Pro ver 5","09/05/2001","PH"
"FS3","bh10plan.dwg","BH10 location plan","DWG","AutoCAD ver 14","06/05/2001","DRAW"
"FS21","h1.xls","Tiltmeter H1 calibration file","XLS","Excel 2000","09/05/2001","CAL"
"FS204","bh10inst.doc","BH10 pneumatic piezometer installation details","DOC","Word 97","21/05/2001","CR"
```

15 User defined Headings and Groups

In this interim release of the AGS-M Format all Groups and Headings which are additional to the 3rd Edition of the AGS Format are considered to be user defined and their definitions are given in the DICT Group, which must be included with every AGS-M Format data file.

The AGS-M Format contains Groups and Headings covering all the common monitoring methods. However, if you find that you have carried out some work that is not covered by the Format it is possible to customise the Format to include your additional requirements by the use of the DICT Group as described below.

- a) Any additions you make should use these guidelines:
 - If the AGS-M Format already includes the Headings you want to use, but you would prefer them to be in a different Group, for example, because your monitoring readings summary spreadsheet includes both installation details and data readings. Do not change the AGS-M Format to fit your software. Instead, change your software, or write a conversion routine to output the data in correct AGS-M Format.
 - If the data you wish to include is not covered in any of the AGS-M Groups and Headings, look at the AGS 3rd Edition Groups and Headings to see if your requirement is catered for there.
 - If you need to add some additional Headings, try to put them into an existing AGS-M Format Group, rather than create a new Group for them.
 - If your new Headings do not readily fit into an existing Group, then you may create a new Group. However, this is envisaged to be a rare occurrence, as all monitoring installation details should go in Group MONP and all monitoring readings should go in Groups MONR or ICCT.
 - Any new Headings or Groups created should be specifically agreed between the Provider and Receiver.
 - Do not create a new Group which only has PROJ_ID as the Key Field. Instead, add new Headings to the PROJ Group.
 - Do not create a new Group which only has HOLE_ID as the Key Field. Instead, add new Headings to the HOLE Group.
 - Do not create a new Group which only has HOLE_ID, MONP_DIS and MONP_ID as the Key Fields. Instead, add new Headings to MONP Group.
 - Do not create a new Group which only has HOLE_ID, MONP_DIS, MONP_ID, MONR_DATE and MONR_TIME as the Key Fields. Instead, add new Headings to MONR Group.
 - Do not create a new Group for insitu chemical test results. Instead add new Headings to ICCT.
 - Before adding a new Heading or Group consult the Discussion Forum of the AGS web site at www.ags.org.uk, to see if anybody else has already suggested a solution to your requirements. If not, then add details to the Discussion Forum of what you propose to do. The AGS-M Format committee will consider all suggestions posted in the Discussion Forum when preparing the next revision of the AGS-M Format.
- b) To add a new Heading to an existing Group.
 - Define the new Heading in the DICT Group. Indicate whether the new field is a KEY field or a COMMON field. For example, to add a new field for chainage along the project to the HOLE Group, create the following line in the DICT Group.

```

***DICT
**DICT_TYPE",**DICT_GRP",**DICT_HDNG",**DICT_STAT",**DICT_DESC",**DICT_UNIT",
**DICT_EXMP"
HEADING",HOLE",HOLE_CHAN",COMMON",Chainage",m",4563"

```

Add the new Heading to the existing Group, together with its data. The new Heading contains the prefix *?

```

***HOLE
**HOLE_ID",**HOLE_NATE",**HOLE_NATN",**HOLE_CHAN"
"<UNIT>",m",m",m"
MP102",523145",178456",2034"
MP342",523250",178346",2157"

```

c) To add a new Group and Headings.

All monitoring installation details should go in Group MONP and all monitoring readings should go in Group MONR or ICCT. Any general geotechnical information can be reported using the appropriate Group in the 3rd Edition of the AGS Format. Therefore, the need to create a new Group for monitoring data should be very rare. If you have determined that there is not a suitable Group in AGS-M or in the 3rd Edition of the AGS Format for your data, then you may create a user defined Group using the following procedure.

- Define the new Group and its new Headings in the DICT Group. For example, to define a new Group for plate loading test results.

```

***DICT
**DICT_TYPE",**DICT_GRP",**DICT_HDNG",**DICT_STAT",**DICT_DESC",**DICT_UNIT",
**DICT_EXMP"
GROUP",PLTT",",",",Plate loading test results",",",
HEADING",PLTT",HOLE_ID",KEY",Test location number",",PLT01"
HEADING",PLTT",PLTT_DPTH",KEY",Test depth",m",2.55"
HEADING",PLTT",PLTT_DIAM",COMMON",Plate diameter",m",0.95"
HEADING",PLTT",PLTT_INTE",COMMON",Initial loading modulus",MN/m2",55.6"
HEADING",PLTT",PLTT_UNRE",COMMON",Unload/reload modulus",MN/m2",127.4"
HEADING",PLTT",PLTT_REM",COMMON",Notes",",Maintained load test."

```

- Create the new Group. The Group name contains the prefix ***? and add the new Headings with the corresponding data. Each new Heading contains the prefix *?

```

***?PLTT
**?HOLE_ID",**?PLTT_DPTH",**?PLTT_DIAM",**?PLTT_INTE",**?PLTT_UNRE",**?PLTT_REM"
"<UNITS>",m",m",MN/m2",MN/m2",
PLT15",0.50",0.95",4.76",11.8",Maintained load test"
PLT15",1.60",0.95",62.6",178",Maintained load test"
PLT15",3.40",0.95",137",279",Maintained load test"

```

16 Text formatting, fonts and special characters



a) Text formatting

The AGS-M Format is designed to transfer only the data related to monitoring installations and readings. It is not intended to transfer any formatting of the data. If your data includes any formatting it will either be lost, or could cause problems to the Receiver. To minimise such problems use the following guidelines.

- When entering data into your software, do not add any formatting in the data. Let your software control formatting of the output.
- Do not use Tabs to horizontally position your data.
- Do not use multiple spaces to horizontally position your data.
- Do not use multiple carriage returns to vertically position your data.
- Do not embed columns or tables in your data.
- Ensure that your software does not output any formatting or format control codes when creating an AGS-M Format file.

b) Fonts

The AGS-M Format does not transfer any font information. Use the following guidelines:

- When entering data into your software do not add any font information, let your software control fonts within its in-built output formatting.
- Do not use bold, italic or underline in your data.
- Do not use superscripted or subscripted numbers. For example, use MN/m³ and CaCO₃.
- When entering data in Scientific Notation, do not use 10 to the power something, but use the exponent format eg 6.1E-6.
- Ensure that your software does not output any font information or font control codes when creating an AGS-M Format file.

c) Special characters

Rule 1 of the AGS-M Format Rules states that the extended ASCII character set must not be used. The extended character set includes characters such as accented letters, Greek letters and symbols. The way that extended characters are displayed in your software may depend on the language setting of your operating system, the code page set up, the font you are using and your printer set up. The results can be unpredictable, with either the wrong character being displayed, or no character being shown. The Rules therefore require you to avoid the extended ASCII character set. Some suggestions follow:

- When typing an angle, do not use the degree symbol, but use "deg" instead eg 45 deg.
- When entering units do not use the superscripted 2 or 3, but use a normal 2 or 3 instead eg kN/m².
- When entering units do not use the Greek mu symbol for 1/1000000, but instead use the abbreviation "u". eg ug/kg.
- Do not use accented letters.
- Do not use the special mathematical or copyright symbols, but replace them with composites made from the standard keyboard symbols, or with words.
Eg Greater than or equal to: >=
Plus or minus: +/-
Approximately: approx
Copyright: (c)
Trade Mark: (TM)
Registered TradeMark: (R)
- Do not use any characters or symbols that are not on your keyboard or that require you to use an "Insert symbol" option in your software.

17 Declaration of AGS-M Format data files



The AGS wishes to encourage data Providers to declare on their paper reports when the data contained within the report is also available in AGS-M Format. This will become of considerable benefit to third party Receivers, who are not the primary Receivers that commissioned the report. To this end the AGS provides the following AGS-M Format logo to Registered Users of the Format.



The logo should be used as follows:

- The logo should be included in a prominent position on the front cover, or inside front cover, of the Factual Report to indicate that the data contained within the report has also been provided to the primary Receiver in AGS-M Format.
- The logo should also be included on every datasheet within the report, as these are frequently separated from the main text of the report.
- The logo is only to be used by Registered Users of the Format. A list of Registered Users is given on the AGS web site at www.ags.org.uk.

APPENDIX 3 EXAMPLE AGS-M DATA FILE

Additional examples are available from the AGS website at www.ags.org.uk

```
***PROJ"
"*PROJ_ID","*PROJ_NAME","*PROJ_CLNT","*PROJ_CONT","*PROJ_ENG","*PROJ_MEMO","*PROJ_DATE","*PROJ_AGS","*?PROJ_CID"
"<UNITS>","","","","","","dd/mm/yyyy","",""
"DEMO","AGS – M Document example","CIRIA","Client and partners","DJR","","09/11/1999","3M","123abc"

***DICT"
"*DICT_TYPE","*DICT_GRP","*DICT_HDNG","*DICT_STAT","*DICT_DESC","*DICT_UNIT","*DICT_EXMP"
"HEADING","PROJ","PROJ_CID","COMMON","Monitoring Contractor ID","","KS123"
"HEADING","FILE","FILE_DOCT","COMMON","Document Type","","PH"
"GROUP","MONP","","","Monitoring Point","",""
"HEADING","MONP","HOLE_ID","KEY","Reference Point ID","","6422/A"
"HEADING","MONP","MONP_DIS","KEY","Distance of monitoring point from Reference Point","m","2.3"
"HEADING","MONP","MONP_ID","KEY","Monitoring Point ID (optional)","","ZT402"
"HEADING","MONP","MONP_DATE","COMMON","Installation date","dd/mm/yyyy","16/05/2001"
"HEADING","MONP","MONP_TYPE","COMMON","Instrument type","","TS"
"HEADING","MONP","MONP_RSCA","COMMON","Reading sign convention in direction A","","Displacement up +ve"
"HEADING","MONP","MONP_TRZ","COMMON","Distance to start of response zone from Reference Point ID datum","m","5.5"
"HEADING","MONP","MONP_BRZ","COMMON","Distance to end of response zone from Reference Point ID datum","m","7.5"
"GROUP","MONR","","","Monitor Point Reading","",""
"HEADING","MONR","HOLE_ID","KEY","Reference Point ID","","6422/A"
"HEADING","MONR","MONP_DIS","KEY","Distance from Reference Point","m","2.3"
"HEADING","MONR","MONP_ID","KEY","Monitoring Point ID (optional)","","ZT402"
"HEADING","MONR","MONR_DATE","KEY","Date of reading","dd/mm/yyyy","16/05/2001"
"HEADING","MONR","MONR_TIME","KEY","Time of reading","hhmmss","164000"
"HEADING","MONR","MONR_WHD","COMMON","Head of water above tip","m","2.10"
"GROUP","TREM","","","Time related remarks","",""
"HEADING","TREM","TREM_DATE","KEY","Date of remark","dd/mm/yyyy","16/05/2001"
"HEADING","TREM","TREM_TIME","KEY","Time of remark","hhmmss","120000"
"HEADING","TREM","TREM_REM","COMMON","Time related remark","","Completion of concrete pour for slab G12"

***HOLE"
"*HOLE_ID","*HOLE_TYPE","*HOLE_NATE","*HOLE_NATN","*HOLE_GL","*HOLE_FDEP","*HOLE_STAR","*HOLE_REM","*FILE_FSET"
"<UNITS>","","m","m","m","m","dd/mm/yyyy","",""
"BH456","CP","12345","45678","43.7","3.2","","Hole base 40.5 mAoD",""
"BH457","CP","12346","45679","43.7","5.5","","Hole Base 38.2 mAoD","FS001"

***?MONP"
"*?HOLE_ID","*?MONP_DIS","*?MONP_ID","*?MONP_DATE","*?MONP_TYPE","*?MONP_RSCA","*?MONP_TRZ","*?MONP_BRZ"
"<UNITS>","m","","dd/mm/yyyy","","","m","m"
"BH456","3.1","PZ1","09/11/1999","EPIE","Positive head is +ve","2.8","3.1"
"BH457","5.3","PZ2","09/11/1999","EPIE","Positive head is +ve","4.5","5.3"

***?MONR"
"*?HOLE_ID","*?MONP_DIS","*?MONP_ID","*?MONR_DATE","*?MONR_TIME","*?MONR_WHD"
"<UNITS>","m","","dd/mm/yyyy","hhmmss","m"
"BH456","3.1","PZ1","02/01/2002","010000","1.75"
"BH456","3.1","PZ1","02/01/2002","020000","1.94"
```

"BH456","3.1","PZ1","02/01/2002","030000","2.10"
 "BH456","3.1","PZ1","02/01/2002","040000","2.26"
 "BH456","3.1","PZ1","02/01/2002","050000","2.41"
 "BH456","3.1","PZ1","02/01/2002","060000","2.54"
 "BH456","3.1","PZ1","02/01/2002","070000","2.67"
 "BH456","3.1","PZ1","02/01/2002","080000","2.76"
 "BH456","3.1","PZ1","02/01/2002","090000","2.84"
 "BH456","3.1","PZ1","02/01/2002","100000","2.47"
 "BH456","3.1","PZ1","02/01/2002","110000","2.81"
 "BH456","3.1","PZ1","02/01/2002","120000","2.37"
 "BH456","3.1","PZ1","02/01/2002","130000","2.50"
 "BH456","3.1","PZ1","02/01/2002","140000","2.28"
 "BH456","3.1","PZ1","02/01/2002","150000","2.16"
 "BH456","3.1","PZ1","02/01/2002","160000","2.05"
 "BH456","3.1","PZ1","02/01/2002","170000","2.94"
 "BH456","3.1","PZ1","02/01/2002","180000","2.85"
 "BH456","3.1","PZ1","02/01/2002","190000","2.75"
 "BH456","3.1","PZ1","02/01/2002","200000","2.68"
 "BH456","3.1","PZ1","02/01/2002","210000","2.60"
 "BH456","3.1","PZ1","02/01/2002","220000","2.49"
 "BH456","3.1","PZ1","02/01/2002","230000","2.38"
 "BH456","3.1","PZ1","03/01/2002","000000","2.26"
 "BH457","5.3","PZ2","02/01/2002","010000","2.37"
 "BH457","5.3","PZ2","02/01/2002","020000","2.14"
 "BH457","5.3","PZ2","02/01/2002","030000","2.01"
 "BH457","5.3","PZ2","02/01/2002","040000","1.90"
 "BH457","5.3","PZ2","02/01/2002","050000","1.81"
 "BH457","5.3","PZ2","02/01/2002","060000","1.78"
 "BH457","5.3","PZ2","02/01/2002","070000","1.80"
 "BH457","5.3","PZ2","02/01/2002","080000","1.81"
 "BH457","5.3","PZ2","02/01/2002","090000","1.80"
 "BH457","5.3","PZ2","02/01/2002","100000","1.35"
 "BH457","5.3","PZ2","02/01/2002","110000","1.28"
 "BH457","5.3","PZ2","02/01/2002","120000","1.35"
 "BH457","5.3","PZ2","02/01/2002","130000","1.47"
 "BH457","5.3","PZ2","02/01/2002","140000","1.92"
 "BH457","5.3","PZ2","02/01/2002","150000","1.52"
 "BH457","5.3","PZ2","02/01/2002","160000","1.39"
 "BH457","5.3","PZ2","02/01/2002","170000","1.33"
 "BH457","5.3","PZ2","02/01/2002","180000","1.32"
 "BH457","5.3","PZ2","02/01/2002","190000","1.28"
 "BH457","5.3","PZ2","02/01/2002","200000","1.28"
 "BH457","5.3","PZ2","02/01/2002","210000","1.27"
 "BH457","5.3","PZ2","02/01/2002","220000","1.25"

***UNIT"

"*UNIT_UNIT","*UNIT_DESC"

"dd/mm/yyyy","day month year"

"hhmmss","hours minutes seconds"

"m","metre"

"kPa","kiloPascal"

***ABBR"

*ABBR_HDNG","*ABBR_CODE","*ABBR_DESC"

MONP_TYPE","EPIE","Electronic Piezometer"

HOLE_TYPE","CP","Cable percussion (shell and auger)"

FILE_DOCT","DRAW","Drawing"

***?TREM"

?TREM_DATE","?TREM_TIME","*?TREM_REM"

<UNITS>","hhmmss",""

"01/01/2002","030000","Dewatering pumps 1 and 2 failed"

"01/01/2002","160000","Dewatering pumps 1 and 2 restarted"

***FILE"

*FILE_FSET","*FILE_NAME","*FILE_DESC","*FILE_TYPE","*FILE_PROG","*FILE_DATE","*?FILE_DOCT"

<UNITS>","","";","";","";","dd/mm/yyyy",""

"FS001","BH457.pdf","Borehole log","PDF","Adobe Acrobat Version 4","24/08/1999","DRAW"

Introduction

In order to assist in the drafting of monitoring and ground investigation specifications, examples of the type of clauses and associated notes for guidance for implementing digital data are given in this Appendix. Not all of these clauses are likely to be required in all contracts but the intention is to provide the appropriate clauses for most scales of monitoring and ground investigation.

General

- 1 Unless otherwise required in the Contract, the Contractor is to provide data in digital format, as well as in paper form.
- 2 The definitive copy of the field and laboratory data shall be the paper copy.

Format

- 3 The format of the digital data files shall comply with the CIRIA/Association of Geotechnical and Geoenvironmental Specialists (AGS) publication 'The AGS-M Format for the electronic transfer of monitoring data'.
- 4 Any new groups or fields shall only be created with the Engineer's approval.

Security

- 5 All disks, or other agreed transmission media, shall be securely labelled and clearly marked with:
 - The title 'AGS-M Format Data'
 - The project identification (PROJ_ID)
 - The date of issue to the Engineer
 - The name of the Contractor
 - The name of the Engineer
 - The unique issue sequence number

If more than one disk, or other agreed transmission medium, is required, then each shall be clearly labelled to indicate the order in which the Engineer should read the data. The split of the data into separate files shall be decided by the Contractor. The unique sequence number shall run sequentially from the start of the contract.

Where more than one disk is required for a particular issue of digital data, this fact shall be clearly identified on the labels in that issue.

- 6 Until the completion of the maintenance period, the Contractor shall keep an index detailing:
 - The heading 'AGS-M Format Data'
 - The title 'Media Index Record'
 - The project identification (PROJ_ID)
 - The unique issue sequence number
 - The date of Issue to the Engineer
 - The name of the Contractor issuing the transmission media
 - The name of the Engineer to whom the transmission media was issued
 - A general description of the data transferred and/or a file listing for associated files.

For each AGS-M Format data set, including all associated files, the index will detail:

- The file name including the extension
- The date the file was created
- The time the file was created
- The file size in bytes

A general description of the data contained in each file and/or a file listing for associated files. The Contractor shall retain one copy of the index sheet and shall issue to the Engineer a copy of the completed index sheet with the disk(s), or other agreed transmission medium.

- 7 All data files shall be checked for viruses before issue using a recent proprietary antivirus program.

Preliminary Data

- 8 The Contractor shall issue digital copies of all preliminary data whenever required by the Engineer.
- 9 The preliminary data may be subject to update as necessary.
- 10 In addition to the labelling given in Clause 5, the disks shall be labelled 'PRELIM' and a unique sequence number given to the disk for each issue of digital data to the Engineer.
- 11 A list of data items not included in the digital data but included in the paper copy shall be provided.
- 12 All preliminary data in digital form shall be able to be presented in the same form as it is to be used for the Factual Report. The digital data must be produced from the same source/program as that used to produce the factual report.

Factual Report

- 13 In addition to the labelling given in Clause 5 of this specification, the disk(s), or other agreed transmission media, submitted with the Factual Report shall be labelled 'FINAL'.
- 14 The digital data provided by the Contractor with the Factual Report is required to be complete and a total replacement of any previous preliminary data.
- 15 In addition to the paper copies of the Factual Report, the Contractor shall provide a Report with a digital copy of those field and laboratory data and associated files specified in the Contract to be in digital form. This report shall consist of a disk(s), or other agreed transmission medium, containing the digital data and associated files, paper copies of any data or drawings not included in digital form. The file format for associated files shall be agreed in advance between the Contractor and the Engineer. The paper copies shall be firmly bound within stiff covers.

Dummy Set of Data

- 16 Prior to the start of work on the Contract the Contractor shall submit to the Engineer a dummy set of data in the required format for the approval of the Engineer.

Submitting Data

- 17 Updated disks, or other agreed media, shall be provided as required by the Engineer as work proceeds. The Contractor shall make two identical copies of each disk, whether preliminary or final. The first copy shall be retained by the Contractor until the expiry of the contract maintenance period. The second copy will be issued to the Engineer.

Units of Measurement

- 18** The preferred units of measurement shall be those given in the CIRIA/AGS publication 'The AGS-M Format for the electronic transfer of monitoring data' unless other units of measurement for digital data are given in the Contract. The units of measurement must be given in the AGS Format files, and must be the same as those used in the paper version of the report.

Notes for guidance on the use of the specification for digital data

The numbering of these notes corresponds to the relevant clause number of the specification for digital data. The term 'Engineer' shall be replaced with 'Project Manager' or other term dependant on the Contract conditions.

General

- NG 1** A copy of the digital data may in some circumstances accompany every issue of the paper copies and the data shall be subject to the same timing and submission requirements. However, the Engineer may, depending on the contract, prefer to receive digital data only after a significant amount of data has been collected.
- NG 2** The paper copy is definitive. It is however noted that certain data may only be available in electronic form, such as that derived from data loggers, in which case it is suggested that graphical representation (eg a plot of data with time) should be submitted in the final report where a very long list of printed numbers would be inappropriate. The specification should include an appropriate clause.

Format

- NG 3** The acceptable media for the transmission of data should be given on a site specific basis. The data dictionary defining the data groups and headings is given in the CIRIA/AGS publication 'The AGS-M Format for the electronic transfer of monitoring data'.
- NG 4** The Engineer is responsible for contacting the AGS to ensure that any digital data proposed to be used, and which are not included in the CIRIA/AGS publication mentioned in NG 3, have not already been assigned a heading. By following this procedure, new standard headings can be issued.

Security

- NG 5** It is critical that disks, or other agreed transmission media, are properly labelled to ensure easy identification.
- NG 6** The index is also critical to the proper management of disks, or other agreed transmission media. The CIRIA/AGS publication mentioned in NG 3 gives an example of the form of index which can be adopted.
- NG 7** The virus scanning software shall be capable of scanning the included associated files, for example for macro viruses.

Preliminary Data

- NG 8** Only the preliminary data or Factual Report may be required in digital form for some contracts. The timing of submission of the digital data may also require specifying.
- NG 9** The Engineer and the Contractor must be aware of the problems posed by the presence of small sets of data in a series of files and the potential for, and the presence of, errors in the data sets. These become very important if the data is being transferred to a database where incoming data is added to existing data. The organisation of the data prior to issue is the responsibility of the

Contractor. The Contractor's system must ensure that data originating from different sources within the Contractor's organisation is compatible.

- NG 10** The sequential numbering of data issues must be rigorously adhered to so that no data versions are issued out of sequence. When errors or inconsistencies are noted in the data, by either the Engineer or Contractor, they should be corrected by the Contractor and a corrected data set issued. When a change or addition is made to data within an issue, a complete data group should be reissued, not just the changed fields. This may not require complete replacement of the whole data set which includes other previous issues.
- NG 11** The requirement for identification of data items, which are not included in the preliminary data set ensures that no information is left out when each digital data record is issued.

Factual Report

- NG 15** The requirements given for the Report containing the digital data are to ensure that the bound volume is as complete as the full paper copy. The requirement for data items, which are not included in the digital data, to be given ensures that no information is left out when the digital data is issued.

Dummy Set of Data

- NG 16** This requirement ensures that the Contractor is using the standard headings and that the digital data can be accurately transferred.

Submitting Data

- NG 17** The second copy will be given to the Engineer who should, immediately on receipt, make a backup copy for security purposes. The Engineer is likely to be receiving information from a number of sources within the Contractor's organisation, e.g. field data and laboratory data. The Contractor's data management system must ensure that all issues are compatible and numbered in the correct sequential order. The Engineer must be prepared to manage the data as it arrives. Any file transmitted during the Contract may contain all or part of the data available at that time. It may contain survey data and /or results from data logging as well as individual readings.

Units of Measurement

- NG 18** It is necessary for the Engineer to be certain exactly what the units of measurement are for the data being received. It is recognised that units may be specified elsewhere in the contract. All units must be specified for the digital data.

APPENDIX 5 AGS-M Format User Support

1 Introduction

The AGS web site is designed to support users of the AGS/AGS-M Format. It contains the latest publication in Acrobat PDF, Word7 and RTF format together with the data dictionary and latest 'pick' list codes in CSV format. The site also contains a discussion board where users can discuss questions with the AGS Format committee members and other users. The web site address is www.ags.org.uk.

2 Web Site Format Login

Before you can download the AGS/AGS-M publication or submit questions to the discussion board you must request a login name to access the restricted areas of the web site. Site logins are free of charge and can be requested on line in 5 to 10 minutes. When the on site form is completed you will be emailed an activation code for your account and instructions on how to log on.

3 Discussion board

The discussion board is an area of the web site that has been designed for the support of AGS/AGS-M Format users. If you are in any doubt on the use of a particular aspect of the Format then you are advised to consult the discussion board for questions and discussions on the particular subject.

If you are unable to find the information you require on a current discussion thread then you can place a new question on the discussion board. The discussion board is monitored by the AGS and you should receive an answer to your questions within a couple of days.

Full instructions on how to use the discussion board are available on the web site.

4 'Pick' List Codes

The latest version of the 'pick' list codes can be viewed and downloaded from the web site. Users should check this list before defining a non-standard 'pick' list code. If the required 'pick' list item is not on the web site list then you may submit it to the online suggestion box. All suggestions will be considered and commented on by the AGS/AGS-M Format Working Party. Appropriate codes will be added to the web site list and an update notification emailed to all registered users of the AGS/AGS-M Format.

5 Downloading This Publication

Registered users of the AGS Web site can download this document in Acrobat PDF file format free of charge. The document is distributed as shareware and can be read without charge.

6 AGS/AGS-M Format Registration

If your company uses the AGS/AGS-M Format to transmit data electronically we request that you register your use of the AGS/AGS-M Format for a small fee. A list of registered companies is available on the web site. Registration forms and information on current charges can be downloaded from the web site.

If you receive AGS/AGS-M Format data we ask you to ensure that your data producer is registered to use the AGS/AGS-M Format.

7 Update Notification

Registered users of the Format will receive AGS/AGS-M Format news and updates by email.

8 Registration Benefits

Registered users of the format will also:

- Be sent this publication in RTF and Word 7 format
- Be sent the current 'pick' lists and data dictionary in CSV file format
- Be sent a free Excel add-in to produce AGS-M Format data
- Be able to use the AGS Data Logo on their reports
- Be able to download the example AGS/AGS-M file from the web site
- Be included on the list of registered users
- Make suggestions for future additions of the AGS/AGS-M Format

9 Suggestions for Future Additions

Registered users of the format will be able to suggest additions to the format's data dictionary via an online suggestion box. All suggestions will be considered and commented on by the AGS/AGS-M committee and all appropriate suggestions will be included in the next release of the format.