

THE CANADA SOIL INFORMATION SYSTEM (CanSIS)

MANUAL FOR DESCRIBING PERFORMANCE/ MANAGEMENT DATA

LAND RESOURCE RESEARCH INSTITUTE
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AGRICULTURE AND FOODS
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MANUAL FOR DESCRIBING
PERFORMANCE/MANAGEMENT DATA

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Land Resource Research Institute
Contribution no. LRRI 108

Research Branch
Agriculture Canada
Revised 1981

Copies of this manual are available from:

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K1A 0C6

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1977

The Canada Soil Information System (CanSIS) Manual
for Describing Performance/Management Data

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PURPOSE OF THE MANUAL

The soil performance/management (P/M) file of CanSIS (the Canada Soil Information System) provides a computerized system for recording data which is sufficiently comprehensive to encompass within one organizational framework all types of data relevant to soil performance. It is sufficiently flexible to allow data for a broad range of crop types and management conditions to be stored in one consistent format. This manual and the data collection forms to which it applies present an approach for recording data in a format suitable for direct computer input and storage.

To achieve this objective, the data are grouped into five major data types. Each data type exists as a separate computer file in CanSIS. The groupings of input data, as they are described in this manual, are as follows:

Location, site characteristics, past management, climate:

all of these properties relate to the entire study area and are recorded in file 1.

Imposed management: this factor can be constant over the study area or may constitute a series of treatments leading to differing crop performances. This is file 7.

Soil climate: this property can relate to the entire area or can reflect observations specific to particular treatments. Observations for specific treatments are in file 3.

Soil physical and chemical properties: samples taken for analysis are frequently representative of the entire experimental area before the experiment. To determine the effects of imposed management on the soil, more intensive sampling may be required after the study. Provision is made to record data on the basis of the entire plot, groups of treatments, or individual treatments, in file 4.

Crop growth and development, production and quality: these properties can be measured over the entire area or for individual treatments and replicates. The data structure is sufficiently flexible that both of these possibilities or some intermediate combination can be accommodated in file 6.

Information in the P/M file can come from a variety of sources: detailed soil management studies, crop variety trials, soil testing laboratory files, crop insurance records, or farm surveys. While the quality and completeness of the data tend to decrease through this range, the number of sites varies from relatively few for the soil management studies to large numbers for the soil testing, crop insurance, and farm survey information. When all this information is stored in one consistent format, the reliable data can be used to develop hypotheses and recommendations and the less reliable but more numerous data can be used for verification and generalization.

RATIONALE FOR THE SOIL PERFORMANCE/MANAGEMENT FILES

Agricultural researchers, in the course of their operational and research projects, collect descriptive and observational data on many soils and in many different environmental areas. They often modify the natural environmental conditions with controlled treatments in an attempt to determine the effects upon the natural state. These effects are usually expressed in terms of physical or chemical changes in the properties of the soil, or yield and quality differences in the crop grown on the soil. The descriptive and observational data are often augmented by information from pertinent available literature as well as by detailed laboratory analyses. On the basis of such data, the researcher evaluates and makes recommendations on requirements for soil or crop management. These data thus represent one of the most comprehensive, systematic, and scientifically oriented data bases available in Canada.

In the past, some field and laboratory data were included in research reports. Experience has shown, however, that these data represent only a minor amount of the total collected or available. Large volumes of data are lost or become otherwise unavailable as personnel retire or take up other duties, or as volumes of data grow beyond manageable size.

Recognizing the need to preserve such data, the Canada Soil Survey Committee in 1970 formulated a recommendation that a national soil data system be established. Work on a system began in 1972. Since that time, the concept of the soil data bank has expanded. This manual **and accompanying** input documents represent the performance/management portion of the system.

The use of this manual and corresponding input forms in no way negates the necessity for careful site selection, accurate and timely observations, applications, and analyses, and overall good research practices. In fact the reverse is true, because the data will be accessible to a much larger audience than has been the case in the past. The ultimate usefulness of the system rests with those who collect and use the data.

DATA INPUT DOCUMENT

An input document is a preprinted form (or collection of forms) on which original information is recorded, and from which punched cards (or other input media) are created. For purposes of the performance/management data files as described in this manual, the data input document consists of five separate sets of forms, each of which is tied to the overall performance/management files by a common 13-space header. Within each file there is one or more unique segment, identified by the file number and a card type number. A segment groups related data together within a file and a unique card type number is assigned. For any one small-plot experiment, input data may not be available for some segments. The researcher uses only those segments for which he has data. If data are not available for some fields within a segment, those fields should be left blank.

To use the input document properly the coder must follow the instructions as outlined in the manual. The treatment levels, data units, and variable definitions must be adhered to. Although a concerted attempt

has been made to develop a comprehensive system for Canada, it is certain that in some situations the manual and input forms will be inadequate. In such cases one could capture as much data as possible on the standard form, and record other data using the segments for special notes and interpretative comments. These free-format segments should accommodate any variable for which the form does not provide space.

Terminology definitions are not included in this manual. Definitions applicable to the portion of the document up to and including the soil morphology segment are covered thoroughly in the CanSIS Manual for Describing Soils in the Field (1978), compiled by the Working Group on Soil Survey Data. Conventional usage is assumed for agronomic terms.

STYLES OF DATA ENTRY

There are three ways in which data are entered into the input document:

1. Fixed entry

Fixed entries are data entries of a fixed length at a fixed location on the coding form, such as location, special notes, or interpretative comments. These data are entered either by the use of codes or in free format.

2. Self-defining entry

For self-defining entries, data are input in one of two ways:

- a. By circling an entry name (a letter followed by a series of numbers which specifies not only the field but also its value). For example, D446** describes the field "types of amendments used" and specifies "granular fertilizer." Within any one field an attempt is made to circle the best choice. Intergrade situations can be handled by circling two entries. This style of data entry is used for site description, soil classification, historical plot management, current-year plot management, and methods segments.
- b. By indicating the horizon number in which a variable is found. This is accomplished by using horizontal slashes (-) for one or more of the appropriate top six horizons (horizons 1 to 6), and vertical slashes for one or more of the appropriate lower six horizons (horizons 7 to 12). If a variable occurs in the first and seventh horizons, for example, this is indicated: $\begin{matrix} + & \square & \square & \square & \square & \square \\ \square & \square & \square & \square & \square & \square \end{matrix}$. This style of data entry is used exclusively for profile descriptions on the form identified as Site 3E/pg 3.

3. Value-coded entry

The data slot of a value-coded entry consists of a unique entry name (two-decimal digit) followed by a fixed-field entry. This type of entry occurs frequently in the methods segment, which appears in the margin of the input documents. A typical example appears on the form Site 7E: 55 $\begin{matrix} \square & \square & \square & \square \\ \square & \square & \square & \square \end{matrix}$, where 55 describes the field "total precipitation

during growing season in centimetres." The precipitation in centimetres is recorded in the space provided.

Attention is directed to data entry in the special notes and interpretative comments segments. At present, all data recorded here are in free format occupying one space per character; the data can be numerical or alphabetical, and either with or without punctuation. The purpose of these segments is to provide space for recording data that cannot be accommodated elsewhere on the form.

In that the data are recorded in free format, these segments will have minimal capability for computer search in the near future.

It should be noted that numerical data entries are right-justified and alphabetical data entries are left-justified in most fixed-entry and value-coded fields.

EXPLANATION OF THE FORM OF THE MANUAL

The descriptions and instructions in this manual have been set out in the following manner.

1. The input documents are described in five sections representing the types of information contained in the five files: site description data (file 1, Site 1E-8E); experimental treatment description (file 7, Treatment 1-4); soil temperature and moisture data (file 3, Weather 1); soil-related physical and chemical data (file 4, Soil 1-8); and crop development, yields, and quality data (file 6, Crop 1-9).
2. Within each section (file), all possible data segments are listed, to indicate the nature of the information that can be recorded.
3. The header information (which is the key information linking a data set together) and how it is to be recorded are then described.
4. The information on crop and soil observations or treatments and methods of recording them are then outlined.

RETRIEVALS

The organization of the manual reflects the segmented structure of the performance/management portion of the CanSIS system. Apart from the header information, which is numbered 1, each segment is numbered consecutively and incrementally. Data units within each segment are subdivided and assigned numbers (data field names) in a hierarchical manner. For example, 9C indicates fertilizer (macronutrients), 9C1 indicates the element nitrogen, N, and 9C11 indicates the rate of application of nitrogen. The data field names are noted in the index of data field names, appendix D. The data field names are used only to facilitate data retrieval and are of no significance to data collection and recording.

The CanSIS data base system allows the users to make information requests that will retrieve data from CanSIS data files and to produce reports using the retrieved data.

To facilitate output, all the information in the soil performance/management file has been organized into 12 normalized relations. These relations have been defined and implemented on a data base management system called RAPID. On this system, the information is accessible to users at a computer terminal for interactive data manipulation or through various report-writing and statistical software packages. The structure of the relations in the RAPID system and the procedures for accessing the information are described in the manual on Output from the Soil Performance/Management File of CanSIS (draft edition, 1981). The software packages used to access data include DREAM, EASYTRIEVE, and SAS.

ACKNOWLEDGMENT

Acknowledgment goes to all those who have contributed to and worked on the preparation of this manual, especially to W. Hamm and L. Johns who worked on the original version of this manual. Also, thanks go to the many users who made useful and constructive criticisms.

FILE 1 - SITE DESCRIPTION DATA
(FORMS: SITE 1E-8E)

GENERAL

File 1 consists of the following data segments: identification, location, site description, soil classification, soil morphology, historical plot management, current-year plot management, special notes, interpretative comments, weather, and methods. These data are captured on 58 card types. Data are recorded as fixed-field, self-defining, or value-coded, the difference depending on the character of the data and the ease by which they can be captured in the field.

The methods for filling in the header key information are outlined first and then the types of data input are described for each card type.

FILE 1 CONTENTS

| <u>Card Type</u> | <u>Information</u> | <u>Form Name</u> | <u>Pages</u> |
|------------------|----------------------------|------------------|--------------|
| All | Header Key information | Sites 1E-8E | 1-8 |
| | Type of Data Segment | | |
| 01-02 | identification | Site 1E | 1 |
| 03 | location | Site 1E | 1 |
| 04 | site description | Site 1E | 1 |
| 04 | soil classification | Site 2E | 2 |
| 05 | soil morphology | Site 3E | 3 |
| 04 | historical plot management | Site 4E | 4 |
| 04 | first-year-past management | Site 5E | 5 |
| 04 | current plot management | Site 6E | 6 |
| 58 & 04 | weather and methods | Site 7E | 7 |
| 06-31 | special notes | Site 8E | 8 |
| 32-52 | interpretative comments | Site 8E | 8 |

CODING NOTES

- Alphabetical entries are left-justified and numerical entries are right-justified.

| | |
|------------|--|
| M.I.O.A.S. | |
| PHOSPHORUS | |
| NITROGEN | |

| |
|-------|
| 4.50 |
| 25.00 |
| 30.00 |

- Decimal places are indicated by a shaded area. If no value exists for a decimal place, a zero must be inserted.

| |
|-------|
| 6.00 |
| 3.00 |
| 120.0 |

- All header key fields must be filled in up to the card type.

1.2

THE HEADER KEY

The performance/management files are tied together by a unique 13-column header key which precedes data input on every segment used:

| | | | | | | | |
|------|------|------|-----------------|----|----|------------|-----------------|
| FILE | PROV | YEAR | PROJECT ID. NO. | | | AGENCY NO. | SUPERV. INITIAL |
| 1 | 2 | 4 | 5 | 6 | 7 | 11 | 12 |
| 1 | 03 | 72 | 2000 | 11 | 3 | LH | |
| 1A | 1B | 1C | 1D | | 1E | 1F | |

All data fields in the header must be completed, on each page used.

The header consists of:

1A - File number - a preprinted number ranging from 1 to 7.

1B - Province - the province in which the plot for the experiment was located. This space requires a coded input, which appears on page A1, appendix A; e.g., Saskatchewan is coded 03.

1C - Year - the year in which the research was conducted; e.g., 1972 is coded 72.

1D - Project identification number - some unique five-digit number assigned by you or your agency to your experiment.

1E - Agency number - the agency under whose auspices the plot experiment was conducted. This space requires a coded input which appears on page A1, appendix A; e.g., the code number for university is 3.

1F - Supervisor's initials - two initials of the research supervisor in charge of the plot experiment.

CODING INSTRUCTIONS FOR CARD TYPES 01, 02, 03, 04, 05, AND 58

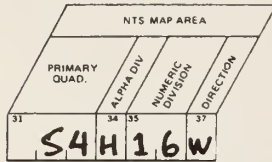
Card Type 01, Form Name: Site 1E/pg 1

| | |
|--|------------------|
| <u>IDENTIFICATION SEGMENT</u> | COLUMNS 16-80 |
| PROJECT INITIATION | 16-17 |
| Two-digit code representing the year in which the project started; e.g., for 1972 code 72. | |
| PROJECT CESSATION | 18-19 |
| Two-digit code representing the year in which the project ended; e.g., for 1974 code 74. | |
| PURPOSE OF EXPERIMENT | 20-80 |
| PURPOSE | 20 |
| General purpose of project. Codes on page A1, appendix A. | |

| | COLUMNS |
|--|------------------|
| TYPE | 21 |
| General type of plot experiment. Codes on page A1, appendix A. | |
| NAME OF PROJECT | 22-80 |
| Brief project title. Free format. | |
| Note: title must fit within the allotted spaces (58). | |
| <u>Card Type 02, Form Name: Site 1E/pg 1</u> | |
| <u>IDENTIFICATION SEGMENT (continued)</u> | COLUMNS 16-58 |
| INCLUDED SEGMENTS AND CREDIBILITY | |
| The data fields require a numerical code entry showing degree of credibility. The codes are located on page A1, appendix A. | |
| <u>Appropriate codes must be entered for all segments that are utilized for your project.</u> | |
| <u>Card Type 03, Form Name: Site 1E/pg 1</u> | |
| <u>LOCATION SEGMENT</u> | COLUMNS 16-30 |
| MUNICIPALITY, COUNTY, OR DISTRICT | 16-18 |
| Depends on existing legal survey. Must be assigned a provincially unique, numerical, three-digit code. (To be coordinated by the province if desired.) | |
| QTR. SECTION | 19-20 |
| Quarter-section described as NE, NW, SE, or SW. | |
| SECTION NO. | 21-22 |
| Two-digit number, right-justified, ranging from 1 to 36. | |
| TOWNSHIP | 23-25 |
| Actual township number is entered. Right-justified with leading column blank. | |
| TOWNSHIP MODIFIER | 26 |
| Alphabetical modifier used in some instances on boundary between two different systems. | |
| RANGE OR CONCESSION | 27-28 |
| Two-digit number, right-justified. | |
| HEADING | 29 |
| East or West from meridian. | |
| MERIDIAN | 30 |
| Meridian recorded by its number. Coast meridian assigned code 9. | |
| Note: If this survey system does not apply to your area, leave spaces blank. | |
| NTS MAP AREA | 31-37 |
| National Topographic System map sheet number is entered; e.g., "54 H16 - West half" is coded as indicated below. | |
| PRIMARY QUAD | 31-33 |
| ALPHA DIVISION | 34 |
| NUMERIC DIVISION | 35-36 |

DIRECTION

E or W for east or west half sheet, * for full sheet.



PLOT CENTER - POINT LOCATION

COLUMNS

LATITUDE

38-64

DEGREES

38-44

MINUTES

38-40

SECONDS

41-42

LONGITUDE

43-44

DEGREES

45-51

MINUTES

45-47

SECONDS

48-49

MILITARY GRID REFERENCE

50-51

ZONE

52-64

ALPHA LET.

52-53

100 000 METRE

54

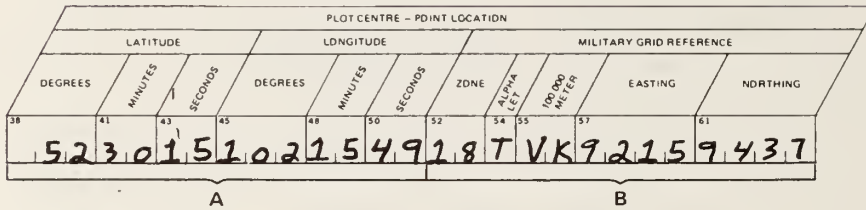
EASTING

55-56

NORTHING

57-60

61-64



A - e.g., 52°30'15" latitude, 102°15'49" longitude.

B - Universal Transverse Mercator military grid reference, e.g., 18TVK92159437

LEGAL SUBDIVISIONS



In Western Canada, each section of land can be described in terms of legal subdivisions (LSD). Each LSD encompasses 40 acres (16 hectares). A plot occupying parts of two LSD's can be indicated. Numerical entries are right-justified (see description below).

Legal Subdivisions

Sections may be divided into legal subdivisions of 40 acres (16 hectares) as in diagram:

| | | | |
|----|----|----|----|
| 13 | 14 | 15 | 16 |
| 12 | 11 | 10 | 9 |
| 5 | 6 | 7 | 8 |
| 4 | 3 | 2 | 1 |

Each number indicates a legal subdivision (LSD) within a section of land.

Card Type 04, Form Name: Site 1E/pg 1

SITE DESCRIPTION SEGMENT

The site description segment consists of self-defining and value-coded entries; consequently column numbers are not appropriate.

Value-coded entries are filled by entering a particular numerical value in the fixed field. Note that the number of decimal places is predetermined within the field. The decimal is entered in the shaded area.

Self-defining fields are filled by circling the best choice or choices.

| SITE DESCRIPTION SEGMENT | | | | | | | | | | | | | | |
|--------------------------|------|------|---------------|---|---|---|-----------|----------------|-----------|----|----|----|----|---|
| FILE | PROJ | YEAR | PROJECT ID NO | | | | AGENCY NO | SUPPLY INITIAL | CARD TYPE | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | |
| 1 | 0 | 3 | 7 | 2 | 0 | 0 | 0 | 1 | 1 | 3 | L | H | 0 | 4 |

SLOPE

value-coded → 01 25 * Percent slope coded

- Slope type*
 A 001** Simple
 A 002** Complex

- Class*
- | % slope | class |
|--------------------|-------|
| A 101** 0-0.5 | 1 |
| A 102** 0.5 + to 2 | 2 |
| A 103** 2 + to 5 | 3 |
| A 104** 5 + to 9 | 4 |
| A 105** 9 + to 15 | 5 |
| A 106** 15 + to 30 | 6 |
| A 107** 30 + to 45 | 7 |
| A 108** 46 + to 70 | 8 |

self-defining →

- Aspect*
 A 201** North
 A 202** Northeast

Card Type 04, Form Name: Site 2E/pg 2

SOIL MAP UNIT NOTATION

The purpose of this section is to record all information as it appears on a soil map.

The soil map section is completed by circling the code, indicating whether the plot site is at a location that is mapped by soil series or by soil association. The complete map notation is then entered in the fixed fields. The example codes the following map unit notation:

E5LHy3L
La3

Note: All entries are left-justified.

ALTERNATE SOIL MAP UNIT NOTATION

For maps where the form of the map symbol is not compatible with the fixed fields provided, the symbol information should be entered in the alternate map unit notation section. If more than 16 fields are required, use three periods as symbols for "continued" at both the end and the beginning of the break, continuing into the spaces for second or third soil area.

For subscript, e.g. E_G, code as E>G; i.e., G less than E. For superscript, E^T_G is coded as E<T>G

SOIL MAP UNIT NOTATION

- C 161** Soil series
C 162** Soil association

- 08 E, 5, . . Dominant
- 09 H, Y, 3, . . Significant
- 10 Significant
- 11 3, Slope
- 12 L, Texture
- 13 L, A, Landform

Card Type 05 and Card Type 04, Form Name: Site 3E/pg 3

Form 3 is made up of card type 05 and card type 04 (cont'd.). Card type 05 is the soil morphology segment and has information encoded on layers and horizons. Card type 04 (cont'd.) is the continuation of the soil morphology segment and contains additional information on the layers and horizons that are described on card type 05.

Card Type 05, Form Name: Site 3E/pg 3SOIL MORPHOLOGY SEGMENT

The first three basic variables, that is, layer and horizon designation, layer and horizon depth and thickness, and color, are arranged in fixed format whereby the required data are entered in fixed spaces. Layers and horizons are described beginning with the uppermost, regardless of whether or not this is organic, and proceeding downward in increasing order until all horizons are noted. The "card number" columns are to be regarded as horizon numbers. Note that a maximum of 12 layers or horizons can be accommodated. A site with more than 12 layers or horizons can be described only if certain layers or horizons are combined with others to yield a maximum of 12. For further detail on completing this segment refer to the CanSIS Manual for Describing Soils in the Field.

| | COLUMNS |
|---|---------|
| LAYER/HORIZON DESIGNATION | 19-28 |
| LITHOLOGICAL DISCONTINUITY | 19 |
| To express lithological discontinuity, roman numerals are converted to arabic numerals, e.g., II = 2, III = 3, etc. | |
| MASTER LAYER/HORIZON | 20-22 |
| Expressed in uppercase letters and always left-justified. | |
| SUFFIXES | 23-27 |
| Expressed in uppercase letters and always left-justified. | |
| MODIFIER | 28 |
| LAYER/HORIZON DEPTH AND THICKNESS | 29-40 |
| MODAL (cm) | 29-34 |
| UPPER LIMIT | 29-31 |
| LOWER LIMIT | 32-34 |
| RANGE (cm) | 35-40 |
| MINIMUM | 35-37 |
| MAXIMUM | 38-40 |
| COLOR | 41-51 |
| ASPECT | 41-42 |
| Code on page A2, appendix A | |
| HUE | 43-47 |
| NUMERAL | 43-45 |
| SYMBOL | 46-47 |
| VALUE | 48-49 |
| CHROMA | 50-51 |

Note: Hue, value, and chroma represent Munsell notations. Note that numerals are right-justified (the decimal space must be filled, i.e., zeros must be recorded). The "symbol" (letter or letters) is left-justified; an unused field should remain blank.

SOIL MORPHOLOGY SEGMENT (continued)

All other variables are arranged as self-defining entries (six squares beside the code for the variable). Each square refers to a layer or horizon as described in the fixed-entry fields (card type 05). The presence of a variable in any of the first six layers or horizons is indicated by marking a horizontal slash (-) in the appropriate square. The presence of a variable in any of the 7th to 12th layers or horizons is indicated with a vertical slash (|). Variables occurring in one or more of the first and one or more of the last six layers or horizons, e.g., 1st and 7th or 3rd and 9th, are indicated with a plus (+).

This entry indicates sand textures in horizons 1, 2, 3, 5, 7, 9, and 10.

This entry indicates that layers 1 to 6 inclusive have a texture of silty clay loam. If a seventh layer were present it would be recorded under 1 as a vertical slash (|) in the square opposite the appropriate textural class.

| File | Province | Year | Project Id. No. | Agency | Sup. Initials | Card Type |
|------|----------|------|-----------------|--------|---------------|-----------|
| 1 | 2 | 4 | 6 | 11 | 12 | 14 |
| 037 | 2 | 00 | 011 | 3 | LH | 04 |

TEXTURE

Class

| | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------|---|---|---|---|---|---|
| Coarse sand | | | | | | |
| Sand | + | - | + | | - | |
| Fine sand | | | | | | |
| Very fine sand | | | | | | |
| Loamy coarse sand | | | | | | |
| Loamy sand | | | | | | |
| Loamy fine sand | | | | | | |
| Loamy very fine sand | | | | | | |
| Silty clay loam | - | - | - | - | - | - |

HISTORICAL PLOT MANAGEMENT SEGMENT

All entries are self-defining and value-coded. The coder circles the best choice for self-defining entries and fills in the appropriate value in the fixed format of the value-coded entries. The crops portion of first-year-past management is also included on this form.

FIRST-YEAR-PAST MANAGEMENT

The field entitled Fertilizer Analysis, under First-Year-Past Management (Fertilizer Macronutrients), requires some additional explanation, as follows:

The rate is a numerical right-justified value. The rate is the amount of nutrient N, P₂O₅, K₂O, or S applied.

FERTILIZER (MACRONUTRIENTS)
 N: 19 Rate (kg/ha)

The fertilizer analysis is recorded as it appears on the commercial packaging, left-justified. The hyphens occupy one column each.

20 34-0-0 ***** FERTILIZER ANALYSIS

Placement:

- E 221** Broadcast-soil
- E 222** Broadcast-sprayed
- E 223** Side band
- E 224** Seed placed
- E 225** Foliar applied
- E 226** Injected

Incorporated:

- E 227** Yes
- E 228** No

Time of Application:

- E 231** Fall
- E 232** Spring

For Fertilizer (Micronutrients), the chemical symbol of the element is left-justified and numerical entries are right-justified.

FERTILIZER (MICRONUTRIENTS)

ONE:

27 B. ** ← Element

28 050 ← Rate (kg/ha)

29 B.P.R.A.X. ← Carrier

Placement:

- E 301** Broadcast-soil
- E 302** Broadcast-sprayed
- E 303** Side band
- E 304** Seed placed

Card Type 04, Form Name: Site 6E/pg 6

CURRENT-YEAR PLOT MANAGEMENT SEGMENT

| File | Province | Year | Project Id. No. | Agency Sup. Initials | Card Type |
|------|----------|------|-----------------|----------------------|-----------|
| 1 | 2 | 4 | 6 | 11 12 | 14 |
| 1 | 03 | 72 | 00011 | 3LH | 04 |



CURRENT YEAR PLOT MANAGEMENT SEGMENT

47 .4 ** No. of replicates

48 4.2* No. of treatments/repl.

A* 49 1.680 Area of one replicate (sq.m.)

50 .40 Area of one treatment (sq.m.)

51 .10 Area sampled for yield and quality (sq.m.)

52 S.P.R.I.N.G.F.I.E.L.D. Variety

A*: The minimum area of one replicate = area of one treatment (m²) x number of treatments per replicate, e.g. (4.0 x 42 = 168).

The segment for current-year plot management consists of self-defining and value-coded entries. In the example, by circling F001** the coder indicates that a field-scale implement was used for preseeding tillage. Also note that value-coded entries that require numerical values are right-justified. The value-coded entry 52, which describes the field "Variety", provides space for a variety name, left-justified.

When a crop variety trial is being coded, the entry for variety is left blank. The identification segment on the form Site 1E is used to indicate that a variety trial is being coded. The variety names must then be listed in file 7 (treatments) as levels within a factor (see file 7, page 2.4 of this manual).

Card Type 58, Form Name: Site 7E/pg 7

WEATHER SEGMENT

The weather segment accommodates data that relate to the whole plot.

This segment is used to record daily air temperature, soil temperature, soil moisture, rainfall, evaporation, potential evapotranspiration, and moisture deficit.

Measurements of temperature and moisture content and amounts are associated with the date (columns 19-22) of observation.

Measurements of precipitation, evaporation, potential evapotranspiration, and moisture deficit, representing periods longer than 1 day, are associated with the period specified by starting and ending dates. Daily observations are associated with the day of observation.

If soil temperature and soil moisture are measured for specific treatments, the soil temperature and soil moisture segment of file 3 (on form Weather 1/pg 13) should be used for input.

| | |
|-------------|------------------|
| CARD NUMBER | COLUMNS 16-18 |
|-------------|------------------|

The card number is used to arrange the events in proper order. These numbers are entered by the coder. Each line of this form should have a different card number. Where more than one page is used, page 1 should have card numbers from 1 to 26, page 2 numbers from 27 to 52, and so on.

| | |
|-------|------------------|
| DATE | COLUMNS 19-22 |
| DAY | 19-20 |
| MONTH | 21-22 |

The field for date (day and month) provides the common time base for all subsequent fields in the weather segment that relate to a specific card number. In the example that follows, card type 58, card number 6 indicates that on May 11 the minimum temperature was +42°F, the maximum temperature was +68°F, and there was a 1.5 h rainfall amounting to 16 mm.*

| | | | | | | |
|------|----------|------|-----------------|--------|---------------|-----------|
| File | Province | Year | Project Id. No. | Agency | Sup. Initials | Card Type |
| 1 | 03 | 72 | 0011 | 3 | LH | 5,8 |



WEATHER SEGMENT

| Card Number | Date | | Air Temperature | | | Soil Temperature | | | Soil Moisture | | | Precipitation Events in Growing Season | | | | | | | | | | | | | | | | |
|-------------|------|---|-----------------|------|---|------------------|------------|-------|---------------|------------|-------|--|----------------|----------------|-------|---|---|---|---|---|---|---|---|---|---|---|---|--|
| | Day | M | ± | Min. | ± | Max. | Depth (cm) | | Temp. | Depth (cm) | | % | Duration Hours | Rain-fall (mm) | | | | | | | | | | | | | | |
| | | | | | | | Upper | Lower | | ± | Upper | | | | Lower | | | | | | | | | | | | | |
| 16 | 19 | | 23 | | | | 29 | | | 38 | | | 47 | | | | | | | | | | | | | | | |
| 0,01 | 1 | 0 | S | + | 4 | 5 | + | 7 | 6 | 0 | 1 | S | + | 4 | 7 | 0 | 1 | S | 3 | 8 | 2 | | | | | | | |
| 0,02 | | | | | | | | | | 1 | S | | 3 | 0 | 4 | 2 | 1 | S | 3 | 0 | 3 | 8 | 8 | | | | | |
| 0,03 | | | | | | | | | | 3 | 0 | | 4 | 5 | 3 | 8 | 3 | 0 | 4 | 5 | 4 | 0 | 2 | | | | | |
| 0,04 | | | | | | | | | | 4 | S | | 6 | 0 | 3 | 4 | 4 | S | 6 | 0 | 4 | 0 | 6 | | | | | |
| 0,05 | | | | | | | | | | 6 | 0 | | 9 | 0 | 3 | 3 | 6 | 0 | 9 | 0 | 4 | 1 | 0 | | | | | |
| * 0,06 | 1 | 1 | 0 | S | + | 4 | 2 | + | 6 | 8 | | | | | | | | | | | | | | 1 | 5 | 1 | 6 | |
| 0,07 | 1 | 2 | 0 | S | | 4 | 3 | | 7 | 3 | | | | | | | | | | | | | | | | | | |
| 0,08 | 1 | 3 | 0 | S | | 4 | 8 | | 7 | 5 | | | | | | | | | | | | | | | | | | |

The date must be entered when data appear in any of the subsequent fields. Repeating data can be indicated by an arrow, as shown in the example.

AIR TEMPERATURE
 ± MINIMUM
 ± MAXIMUM

COLUMNS
 23-28
 23-25
 26-28

A positive or negative sign must be entered for temperatures above or below zero. The unit of measurement (°F or °C) must be indicated in the methods segment.

SOIL TEMPERATURE
 DEPTH (cm)
 UPPER
 LOWER
 ± TEMPERATURE

COLUMNS
 29-37
 29-34
 29-31
 32-34
 35-37

The range of depths must be recorded for all soil temperature measurements. The positive or negative sign must be indicated for soil temperature.

The unit of measurement must be circled in the methods segment.

| | |
|---------------|-------|
| SOIL MOISTURE | 38-46 |
| DEPTH (cm) | 38-43 |
| UPPER | 38-40 |
| LOWER | 41-43 |
| PERCENT | 44-46 |

The method for determining soil moisture must be coded in the methods segment.

| | |
|--|-------|
| PRECIPITATION EVENTS IN GROWING SEASON | 47-52 |
| DURATION (HOURS) | |
| RAINFALL (mm) | |

| | |
|-------------|-------|
| EVAPORATION | 53-56 |
|-------------|-------|

The unit of measurement and the method of measurement must be indicated in the methods segment.

The evaporation measurement must be expressed in terms of the standard CDA pan. The conversion factor applied to it is entered in entry number 54 as a value-coded entry in the methods segment.

| | |
|------------------------------|-------|
| POTENTIAL EVAPOTRANSPIRATION | 57-60 |
|------------------------------|-------|

Units must be indicated in the methods segment.

| | |
|------------------|-------|
| MOISTURE DEFICIT | 61-64 |
|------------------|-------|

Moisture deficit is coded as - (negative). If there is an excess of moisture, code as + (positive).

Units must be indicated in the methods segment.

| | |
|-----------------------|-------|
| PERIOD OF OBSERVATION | 65-72 |
|-----------------------|-------|

For measurements of precipitation, evaporation, potential evapotranspiration, and moisture deficit, which can represent amounts accrued over an extended period of time, the procedure for capturing this information is as follows:

- a) the date on which the observation starts is recorded in columns 19-22;
- b) the amount of moisture measured is recorded in the appropriate fields of the form (between columns 47 and 64); and
- c) the starting and ending dates with which this measurement should be associated are entered in columns 65-72.

Card Type 04, Form Name: Site 7E/pg 7

METHODS SEGMENT

The methods segment is designed to enable the coder to indicate specific information relevant to the data in a segment. It includes such information as measurement units and analysis methods.

The importance of this information makes it imperative that all applicable fields are indicated in the appropriate manner.

The methods segment uses all three styles of data entry, as shown at A, B, and C in the following example.

| File | Province | Year | Project to No. | Agency | Sup. Initials | Card Type |
|------|----------|------|----------------|--------|---------------|-----------|
| 1 | 037 | 2000 | 11 | 34 | H | 04 |

METHODS SEGMENT

AIR TEMPERATURE
Units
1601** Degrees celsius
1602** Degrees Fahrenheit

SOIL TEMPERATURE
Units
1611** Degrees celsius
1612** Degrees Fahrenheit

SOIL MOISTURE
Method
1621** Gravimetric (oven dry basis)
1622** Volumetric

EVAPORATION
Units
1631** Inches
1632** Centimeters
1633** Milliliters
Method
1641** CDA pan
1642** Class A pan
1643** Other pan
1644** Vaporimeter
1645** Calculated

54 Conversion factor to CDA pan

POTENTIAL EVAPOTRANSPIRATION
Units
1651** Inches
1652** Centimeters

MOISTURE DEFICIT
Units
1661** Inches
1662** Centimeters

55 Total precipitation during growing season in cm.

61 Agro Climate Area

Climate Reference Station

56

| File | Province | Year | Project to No. | Agency | Sup. Initials | Card Type |
|------|----------|-------|----------------|--------|---------------|-----------|
| 1 | 03 | 72000 | 11 | 3 | LH | 58 |

WEATHER SEGMENT

| Card Number | Date | | Air Temperature | | | Soil Temperature | | | Soil Moisture | | | Precipitation Events in Growing Season | |
|-------------|------|-----|-----------------|-------|-------|------------------|-------|-----|---------------|-------|----------------|--|-----|
| | Day | M | Min | ± | Max | Depth (cm) | | ± | Depth (cm) | | Duration Hours | Rain Fall (mm) | |
| | | | | | | Upper | Lower | | Upper | Lower | | | |
| 16 | 19 | 23 | 29 | | | | | | | | 47 | | |
| | 0,0 | 1 | 1,0 | 0,5 | + 4,5 | + 7,6 | 0 | 1,5 | + 4,7 | 0 | 1,5 | 3,8 | 2 |
| | 2 | | | | | | 1,5 | 3,0 | 4,2 | 1,5 | 3,0 | 3,8 | 8 |
| | 3 | | | | | | 3,0 | 4,5 | 3,8 | 3,0 | 4,5 | 4,0 | 2 |
| | 4 | | | | | | 4,5 | 6,0 | 3,4 | 4,5 | 6,0 | 4,0 | 6 |
| | 5 | | | | | | 6,0 | 9,0 | 3,3 | 6,0 | 9,0 | 4,1 | 0 |
| | 6 | 1,2 | 0,5 | + 4,2 | + 6,8 | | | | | | | 1,5 | 1,6 |
| | 7 | 1,2 | | 4,3 | 7,3 | | | | | | | | |
| | 8 | 1,3 | | 4,8 | 7,5 | | | | | | | | |

A - Self-defining: Circle the entry name that identifies the appropriate field or value.

B - Value-coded: Enter the value in the fixed field. The value is right-justified. The shaded field is for decimal places and must be filled in if anything is coded in this field.

C - Free format: Alphabetical entry, left-justified.



FILE 7: TREATMENTS ENCODED USING THE FACTOR-LEVEL TECHNIQUE
(FORMS: TREATMENT 1-4)

File 7 is the recommended format for coding information related to imposed management and experimental treatments. (In an earlier version of the data input forms this information was coded on a series of forms called file 2. File 2 forms still allow data coding in an acceptable form for computer input and manipulation but their use is discouraged as they offer less flexibility both for input and output of data.) Treatments applied to the whole plot, global treatments, can be described on forms from file 1. In some cases the amount of information that can be collected is restricted by the form. It is more desirable and efficient, however, to record all global data on forms of file 7 as these data can be described in a standard format and more completely. Both historical and current-year data can be coded in this file.

GENERAL APPROACH

The factor-level technique allows the encoding of up to six different factors, each with up to 20 levels. These factors and levels are used to specify treatments. It is necessary to decide what factors constitute treatments in the experiments, and within each factor how many levels have been used. These are then defined and described on pages 9, 10, and 11 of the forms. A factor constitutes the type of treatment that has been applied, such as nitrogen application, and within that factor the levels may be range of rates of N applied; or, for the same factor, the rate may be constant and the levels may be a range of sources of N.

Treatments consist of a combination of specific levels of the various factors. These are specified by filling in page 12 of the forms. This page simply assigns unique treatment numbers to the combination of levels of factors.

CARD TYPE

The card type is located in columns 19-20. In the factor definition segment on pages 9 and 10 of the forms, the card type numbers are replaced by factor numbers. The header key information (which uniquely identifies a record) is separated from the data by the card type or factor number.

In keeping with the previous section of the manual, the methods for filling in the header key information are outlined first and then the types of data input are described by card type or factor number (columns 19-20).

FILE 7 CONTENTS

| <u>Card Type</u> | <u>Information</u> | <u>Form Name</u> | <u>Pages</u> |
|----------------------------|-------------------------|------------------|--------------|
| All | Header Key Information | Treatments 1-4 | 9-12 |
| Factor number (col. 19-20) | Type of Data Segment | | |
| 01, 02, 03 | factor definition | Treatment 1 | 9 |
| 04, 05, 06 | factor definition | Treatment 2 | 10 |
| Card type (col. 19-20) | | | |
| 07 | amendments | Treatment 3 | 11 |
| 08 | coded treatment numbers | Treatment 4 | 12 |

CODING NOTES

1. Alphabetical entries are left-justified and numerical entries are right-justified.

| |
|----------------------|
| M.I.O.A.S. |
| P.H.Ø.S.P.H.Ø.R.U.S. |
| N.I.T.R.Ø.G.E.N. |

| |
|------|
| 4.50 |
| 2500 |
| 3000 |

2. Decimal places are indicated by a shaded area. If no decimal exists, decimal places must be filled with zeros.

| |
|------|
| 6.00 |
| 3.00 |
| 1200 |

3. All header key fields must be filled in up to card type or factor number, except on page 11 of the form where association, column 18, may or may not be filled in.

THE HEADER KEY

| File/Dossier | Province | Year/Année | Project Id. No. du projet | Agency/Org. - Init. or surveillant |
|--------------|----------|------------|---------------------------|------------------------------------|
| 1 2 | 4 | 6 | 11 12 | |
| 7 | 03 | 72 | 000213 | LH |
| 1A 1B | 1C | 1D | 1E 1F | |

Plus additional information depending on form (see note on page 2.3).

All data fields in the header must be completed on each page used.

The header consists of:

1A - File number - a preprinted number ranging from 1 to 7.

1B - Province - the province in which the plot for the experiment was located. This space requires a coded input, which appears on page A1, appendix A; e.g., Saskatchewan is coded 03.

1C - Year - the year in which the research was conducted; e.g., 1972 is coded 72.

1D - Project identification number - some unique five-digit number assigned by you or your agency to your experiment.

1E - Agency number - the agency under whose auspices the plot experiment was conducted. This space requires a coded input which appears on page A1, appendix A; e.g., the code number for university is 3.

1F - Supervisor's initials - two initials of the research supervisor in charge of the plot experiment.

Note

On the forms for the factor definition segment (Treatment 1/pg 9 and Treatment 2/pg 10), the header key also includes columns 14-18 up to but not including the factor number.

On the form for soil amendment description (Treatment 3/pg 11), the header key also includes factor number (column 14) and level number (column 15-17). Association does not have to be coded.

On the form for treatment description (Treatment 4/pg 12), the header key also includes the coded treatment number (columns 15-17).

CODING INSTRUCTIONS FOR ENCODING TREATMENTS USING THE FACTOR-LEVEL TECHNIQUE (Factor numbers 01, 02, 03, 04, 05, 06, and card types 07 and 08)

Factor Numbers 01-06, Form Names: Treatment 1/pg 9 and 2/pg 10

FACTOR DEFINITION SEGMENT

There is no restriction on what items may be used as factors or levels. For illustration of the use of factors, see page 2.7 of this manual. In order to maintain some consistency, it is suggested that where any of the items listed in file 1 constitute factors, they be coded as follows:

- a) Where the factor appears as a heading in file 1 (for example, soil moisture and drainage), use the heading directly up to the first 12 characters or spaces (for example, soil moisture; see Appendix A13 for a listing of the recommended headings).
- b) Where the factor appears as a self-defining entry, the code is entered in fields 23 to 34 (on the forms at page 9 or 10) to characterize the factor. A brief explanation of the code should follow in the free-format section, in fields 38 to 80, for each factor.
- c) Factors that take the form of soil amendments should be described on page 11 of the forms, and the levels within these factors specified. Their first 12 characters should also be encoded as factors on pages 9 and 10 of the forms, using class names such as herbicide and/or fungicide in the factor code section (columns 23 to 34); the exact names of the herbicide and/or fungicide may be coded in the levels section using the first 12 characters of the name; a brief description of the factors should be inserted in free format. The number of levels should be specified, but it is not necessary to recode the levels on pages 9 and 10 if they are coded on page 11 of the forms. The purpose of this record is to give a quick summary of the variable factors in an experiment in a standardized form.
- d) Any other factors not covered by these instructions should be entered in free format. In order to retain search capability the entries in this field should be as uniform as possible. It is advisable to check with the CanSIS project leader at L.R.R.I., Ottawa, for advice on the form and type of free-format entries to be used.

The number of levels within a factor is encoded after each factor (columns 35-36). For an example of the use of levels, see page 2.6 of this manual.

In experiments where the levels cannot be conveniently described as soil amendments, the levels within a factor should be encoded below that factor (level codes, columns 23-34) on one of the forms (page 9 or 10). Abbreviations that are relatively self-explanatory should preferably be used for the levels. Where possible, an additional explanation of the level (e.g., units, abbreviations, etc.) may be included with the description of the factor in fields 38 to 80, the free-format section. Where more space is required, these explanations are best given in the special notes section, on the form identified as Site 8E/pg 8, or in the interpretive comments section on the same form. Where levels may be described as an amendment, only the number of levels is noted on pages 9 and 10 of the forms; description of individual levels is provided on page 11.

In some cases, two aspects of a factor may be studied in one experiment, for example, fertilizer rate and source, or herbicide rate and crop growth stage at the time of application. In this case one factor has two or more sets of levels associated with it. This situation is managed by using a different factor number for each set of levels and linking all levels that refer to the same factor by noting the numbers of linked factors in column 37.

Example Coded Using the Factor-Level Technique

The following example should illustrate most of the procedures for coding treatments by the factor-level technique.

Consider a fertilizer trial studying rates and sources of nitrogen on stubble and fallow with two crops, wheat and rapeseed, on dryland and under irrigation. The following treatments were applied:

- Phosphate was applied at 40 lb/acre to wheat and 30 lb/acre to rapeseed, source 11-55-0.
- Nitrogen was applied at rates of 0, 50, and 100 lb/acre, sources ammonium nitrate and urea; the 100 lb rate was also applied as a split treatment. No potash or sulfur was applied.
- Irrigation was applied to wheat on June 25 at 2.5 cm, and on July 15 at 3.6 cm; it was applied to rapeseed on June 29 at 3.2 cm, and on July 24 at 4.3 cm.
- The wheat was sprayed with carbyne on June 15 at 4.5 oz/acre and the rapeseed with TCA on May 29 at 3 lb/acre.
- The whole area of the experiment was sprayed with malathion on June 20, with active ingredient at 12 oz/acre, and again on July 10, at 10 oz/acre.

In this example five separate factors must be considered. The first step is to outline the factors by name and number of levels associated with each, and to note any factors that are linked together. This is outlined in the factor definition segment.

Explanation of the factor codes

| | |
|---------------------------------|--|
| Factor 1 - Previous crops grown | Levels - Stubble and fallow |
| Factor 2 - Current crops | Levels - Wheat and rapeseed |
| Factor 3 - Nitrogen source | Levels - Ammonium nitrate and urea |
| Factor 4 - Nitrogen rate | Levels - 0, 50, 100, and 50 plus 50 lb/ac |
| Factor 5 - Irrigation | Levels - Dryland and irrigated |

Notes: Factor 1

The factor "Previous crops grown" appears as a heading in file 1. It is therefore coded as CROPS GROWN, as shown in the list in appendix A13. The free-format section of factor 1 (columns 38-80) is used to explain the use of the cropped land. See example 1-1, page 2.6 of the manual.

Past land use, the subject of factor 1, does not constitute an amendment to the soil; therefore, its associated levels are described on page 9 of the forms. The levels are defined first by using the appropriate codes from file 1 for previous crops grown and then by giving a brief free-format explanation. Also, to code this information in file 1 both types of previous land use would be circled on the form Site 5E/pg 5. See example 1-2, page 2.6.

If the level codes are coded here, they are filled in as a record only. They are not defined as an amendment and appear only here, not on page 11, form Treatment 3.

Factors 3 and 4

Factors 03 and 04 are related; both the factors have nitrogen as their factor code. Their levels are different, in that factor number 03 has sources (ammonium nitrate and urea) as levels and factor number 04 has various rates of application and one split as the levels. These two factors are related on form 9 where factor 03 is described; below the factor code column 37 provides space to indicate in what factor additional properties are defined. See examples 1-1, page 2.6 and 1-3, page 2.7.

| | |
|--|----|
| Additional properties of this amendment are defined in factor | 37 |
| D'autres propriétés de cet amendement sont définies dans le facteur | 4 |

Examples 1-1 and 1-2 Factor definition

| | | | | | | | | | | | | | | | | | | |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| File No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Province | 7 | 0 | 3 | 7 | 5 | 8 | M | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Z |

FACTOR DEFINITION SEGMENT
DEFINITION DU FACTEUR

1-1

| | | | | | |
|--|---------------------|----|----|----|-----------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 35 | No. Levels Nbr/niv |
| Factor Code Code de facteur | 0141CARRIPS.GROW.O2 | | | | |
| Additional properties of this amendment are defined in factor D autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| PASTURE FALLING OR STABLE | | | | | |

A

| | | | | | |
|--|--------------------|----|----|----|-----------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 35 | No. Levels Nbr/niv |
| Factor Code Code de facteur | 0241CURRENT.CROP.A | | | | |
| Additional properties of this amendment are defined in factor D autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| CROPS MATURING WHEAT | | | | | |

A

| | | | | | |
|--|-----------------|----|----|----|-----------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 35 | No. Levels Nbr/niv |
| Factor Code Code de facteur | 0341NITROGEN.O2 | | | | |
| Additional properties of this amendment are defined in factor D autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| SOURCES AMMONIUM NITR. ATE AND UREA | | | | | |

1-2

| | | | | | |
|-----------------------------|----|----|----|----|----------------------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 34 | Level Codes Codes des niveaux |
| 0101D574.FALLOW | | | | | F |
| 0102D529.SITABLE | | | | | A |
| 0103 | | | | | C |
| 0104 | | | | | T |
| 0105 | | | | | O |
| 0106 | | | | | R |

| | | | | | |
|-----------------------------|----|----|----|----|----------------------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 34 | Level Codes Codes des niveaux |
| 0201 | | | | | F |
| 0202 | | | | | A |
| 0203 | | | | | C |
| 0204 | | | | | T |
| 0205 | | | | | O |
| 0206 | | | | | R |

| | | | | | |
|-----------------------------|----|----|----|----|----------------------------------|
| Factor No. N° du facteur | 19 | 21 | 23 | 34 | Level Codes Codes des niveaux |
| 0301 | | | | | F |
| 0302 | | | | | A |
| 0303 | | | | | C |
| 0304 | | | | | T |
| 0305 | | | | | O |
| 0306 | | | | | R |

A - Levels described on form Treatment 3/pg 11.

B - Levels not described on form Treatment 3/pg 11.

C - Codes from file 1.

Example 1-3 Factor definition

| | |
|-----------------------|-------|
| Région | 7 |
| Province | 03 |
| Ville | 76 |
| Année | 1991 |
| Project No | 468 |
| Project No du facteur | 00002 |
| Supervisor | 1112 |
| Appr/Obr | 1415 |
| Appr/Obr | 18 |

FACTOR DEFINITION SEGMENT
DÉFINITION DU FACTEUR

| | | | | | |
|--|----|----|----|----|-----------------------|
| Factor No No du facteur | 19 | 21 | 23 | 35 | NO/LEVELS Nbre/niv |
| Factor Code Code de facteur | | | | | |
| 04141NITRAGEN 04 | | | | | |
| Additional properties of this amendment are defined in factor D'autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| 4. RATES OF APPLICATION | | | | | |
| MONIE SPLIT APPLICATION | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 58 | | | | | |
| 59 | | | | | |
| 80 | | | | | |

| | | | | | |
|--|----|----|----|----|-----------------------|
| Factor No No du facteur | 19 | 21 | 23 | 35 | NO/LEVELS Nbre/niv |
| Factor Code Code de facteur | | | | | |
| 05411IRRIGATION 03 | | | | | |
| Additional properties of this amendment are defined in factor D'autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| DRY LAND 1 2 LEVEL OF | | | | | |
| IRRIGATION PER CROP | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 58 | | | | | |
| 59 | | | | | |
| 80 | | | | | |

| | | | | | |
|--|----|----|----|----|-----------------------|
| Factor No No du facteur | 19 | 21 | 23 | 35 | NO/LEVELS Nbre/niv |
| Factor Code Code de facteur | | | | | |
| 06141 | | | | | |
| Additional properties of this amendment are defined in factor D'autres propriétés de cet amendement sont définies dans le facteur | | | | | |
| Free format observations / Observations (sans format) | | | | | |
| 37 | | | | | |
| 38 | | | | | |
| 58 | | | | | |
| 59 | | | | | |
| 80 | | | | | |

| | | | | |
|-------------|----|----|----|----|
| Factor No | 19 | 21 | 23 | 34 |
| Level Codes | 04 | 01 | | |
| Level Codes | 04 | 02 | | |
| Level Codes | 04 | 03 | | |
| Level Codes | 04 | 04 | | |
| Level Codes | 04 | 05 | | |
| Level Codes | 04 | 06 | | |
| Level Codes | 04 | 07 | | |
| Level Codes | 04 | 08 | | |
| Level Codes | 04 | 09 | | |
| Level Codes | 04 | 10 | | |
| Level Codes | 04 | 11 | | |
| Level Codes | 04 | 12 | | |
| Level Codes | 04 | 13 | | |
| Level Codes | 04 | 14 | | |
| Level Codes | 04 | 15 | | |

F A C T O R F O U Q U A T R E

| | | | | |
|-------------|----|----|----|----|
| Factor No | 19 | 21 | 23 | 34 |
| Level Codes | 05 | 01 | | |
| Level Codes | 05 | 02 | | |
| Level Codes | 05 | 03 | | |
| Level Codes | 05 | 04 | | |
| Level Codes | 05 | 05 | | |
| Level Codes | 05 | 06 | | |
| Level Codes | 05 | 07 | | |
| Level Codes | 05 | 08 | | |
| Level Codes | 05 | 09 | | |
| Level Codes | 05 | 10 | | |
| Level Codes | 05 | 11 | | |
| Level Codes | 05 | 12 | | |
| Level Codes | 05 | 13 | | |
| Level Codes | 05 | 14 | | |
| Level Codes | 05 | 15 | | |

F A C T O R F I V E N O

| | | | | |
|-------------|----|----|----|----|
| Factor No | 19 | 21 | 23 | 34 |
| Level Codes | 06 | 01 | | |
| Level Codes | 06 | 02 | | |
| Level Codes | 06 | 03 | | |
| Level Codes | 06 | 04 | | |
| Level Codes | 06 | 05 | | |
| Level Codes | 06 | 06 | | |
| Level Codes | 06 | 07 | | |
| Level Codes | 06 | 08 | | |
| Level Codes | 06 | 09 | | |
| Level Codes | 06 | 10 | | |
| Level Codes | 06 | 11 | | |
| Level Codes | 06 | 12 | | |
| Level Codes | 06 | 13 | | |
| Level Codes | 06 | 14 | | |
| Level Codes | 06 | 15 | | |

F A C T O R S I X

Card Type 07, Form Name: Treatment 3/pg 11SOIL AMENDMENT DESCRIPTION (columns 21-69)

Amendments refer to treatments that are applied to the soil, the seed, or the crop. On the soil amendment description form all amendments should be recorded including all data that have such properties as rate, time of application, and placement associated with them. The form can be used to describe crop variety, seeding rate and date; fertilizer applications; organic amendments; application of pesticides and irrigation water; and similar data.

Factors consisting of amendments are specified, with detail covering each level, on the forms at page 11. It does not matter whether the specified rate of a particular amendment is applied to one or several treatments, or to the whole plot. The sections of the plot to which a particular level of a soil amendment is applied are specified on page 12, form Treatment 4.

In the example (page 2.6), past land use does not constitute an amendment to factor 1, and its associated levels are described on page 9 of the forms. Factors 2-5 can be considered as amendments of sorts and have therefore been coded on the form at page 11.

The factor number from page 9 or 10 of the form is inserted in column 14 of page 11, and level numbers are inserted in columns 16-17. The latter are levels within the factor coded in column 14. In example 2, page 2.13, for factor 2 (column 14), level 1 (columns 16-17) represents the crop wheat - Manitou, and level 2 represents the crop rapeseed - Midas.

ASSOCIATION (column 18)

Association is an alphabetical listing to coordinate or associate a number of management inputs that constitute one level within a factor.

In example 2, page 2.13, it is used in three ways.

Level 1 of factor 2 represents the crop wheat; the association, column 18, uses an alphabetical listing to define the series of factors associated with this crop, that is, phosphate, nitrogen in the carrier MAP, and herbicide. Level 2 represents rapeseed, and associations A, B, C, and D represent the features general to the rapeseed plot.

Association is used (i) to describe general management for a crop type; (ii) in lines 16 and 17 of the example, to characterize the split nitrogen treatment; and (iii) in lines 19, 20, 21, and 22, to list the separate water treatments, dates, and amounts that constitute an irrigation treatment. See example 2, page 2.13.

Special Notes on Factors

Management factors that apply to the total plot area are encoded on page 11 of the forms as factor A (A for all) and listed as levels 1, 2, 3, and so on, or as associations within a level. In this example malathion was applied over the whole plot in two sprays. It is therefore encoded as factor A level 01A and 01B because the total application is the sum of

these two. If it were desirable to keep the applications completely separate they would be listed as factor A level 01 and factor A level 02. See example 2, page 2.13, lines 9 and 10.

INFORMATION TYPE (column 21)

Column 21 is filled in from the code outlined in the methods section at the left side of the form. This code indicates the type of information to be described and identifies the codes listed in the appendix to be used. See example 2, page 2.13.

CHEMICAL SYMBOL OR FORMULA, CROP CODE (columns 22-25)

The purpose of the field is to capture significant codes (chemical symbols or formulas, crop codes) that characterize the information being recorded. Where crop variety, seeding rate, and method are being recorded, this field contains the code from form Site 6E/pg 6 that represents the crop, for example, F021 for spring wheat. If special amendments are used these would also be coded using the code from form Site 6E/pg 6; for instance, for manure additions this field would contain F244. If the amendment is a plant nutrient, it is listed in the manner normally used, that is, oxides for phosphorus (P_2O_5) and potassium (K_2O) and chemical symbol for other amendments, for example, N, S, MN, or CU.

TREATMENT (columns 26-37)

In the treatment code (methods) field the type of treatment is identified. This is essentially a free-format field designed to make the form more readable to the user. It should be used to list crop varieties where more than one variety or crop is used in the study. Otherwise it is best utilized to record a class name for the type of treatment being described in the form. The following table gives some examples of appropriate entries:

Sample Treatment Codes

| <u>Information type</u> | <u>Information type code (CODED)</u> | <u>Chemical symbol or formula (CODED)</u> | <u>Example of Treatment code (CODED)</u> |
|-----------------------------|--------------------------------------|---|--|
| <u>Column number</u> | <u>21</u> | <u>22-25</u> | <u>26-37</u> |
| Crop species and variety | C | F021 (self-defining entry from file 1) | GLENLEA |
| Fertilizer (macronutrients) | F | N (elemental symbol) | NITROGEN |
| | | P_2O_5 (formula) | PHOSPHORUS |
| Fertilizer (micronutrients) | G | MN | MANGANESE |

| | | | |
|---|---|------|--------------------------|
| Herbicides | H | | BARBAN <u>or</u> CARBYNE |
| Insecticides | I | | MALATHION |
| Fungicides | J | | FORMALIN |
| Irrigation | W | | IRRIGATION |
| Special soil amendment or management practice | A | F244 | MANURE |
| | | F234 | MULCH |

SOURCE CODE (columns 38-39)

In the source code field the appropriate code is entered to characterize the source or carrier for the amendment being applied to the soil. Seed quality, if the information is available, may be coded in this field. Appropriate codes for the various information types are listed in appendix A, as follows:

| <u>Information type</u> | <u>Appendix page</u> |
|--------------------------|----------------------|
| Macronutrients | A2 and A3 |
| Micronutrients | A3, A4, and A5 |
| Herbicides | A6 |
| Insecticides | A7 |
| Fungicides | A7 |
| Crop seed source quality | A7 |

For source codes for compounds not contained in this list, please contact the CanSIS project leader, L.R.R.I., Ottawa and a unique code will be assigned.

PERCENT COMPOSITION (columns 40-43)

The field for percent composition is designed to allow coding of the nutrient content of fertilizer materials. All entries must be right-justified and unused decimal places must be filled in with zeros.

RATE OF APPLICATION (columns 44-48)

In the field for application rate, the amounts of amendments applied are recorded. A five-character field is provided to allow for a wide range of units and for two places of decimals. Numbers in this field must be right-justified. Unused decimal places must be filled in with zeros.

UNITS (columns 49-53)

The units field contains the units associated with the rate of application. The types of units allowed are restricted to the list in the methods section at the left side of the form at page 11. Rates originally measured in other units must be converted to the most appropriate of these units for entry into the form.

BASIS (columns 54-55)

The basis field is also associated with the rate of application: it defines the terms in which the rate of application is expressed. The codes are found on the left side of the form at page 11.

Note that where the rate of application is expressed as "total", it will be assumed that the rate of application multiplied by the percent composition will give the rate of application of active compound applied. Exceptions to this are rates of P₂O₅ and K₂O, where it will be assumed that the rate of application times the percent composition yields the rate of application of the oxide.

DATE (columns 56-61)

Time (h) columns 56-57
Day columns 58-59
Month columns 60-61

Columns 56-61 are set up to capture data on the time of application. The figure on time of day may be relevant in some studies such as foliar application of fertilizer (Hanway technique) or some herbicides.

CODE (column 62)

The codes for this field are listed in appendix A, on pages A2, for time of fertilizer placement, and A5, for seeding. They define more specifically how nutrients and seeds were applied.

METHOD OF APPLICATION (columns 63-64)

The method refers primarily to seeding methods, irrigation methods (appendix A5), and pesticide application methods (pages A6, A7, A8).

PLACEMENT/INCORPORATION (columns 65-66)

Placement or incorporation is coded for fertilizer materials and pesticides using the codes in appendix A2.

FORM OF MATERIAL (column 67)

The form of material is specified by an alphabetical code found at the left side of the form in the methods section.

MIXTURE OR ASSOCIATION (columns 68-69)

In the field for mixture or association, codes can be used to specify amendments applied as mixtures, for example, blended fertilizers or fertilizer-herbicide mixtures. Refer to example 2, page 2.13, lines 2, 3, 6, and 7, and columns 22-37, 68-69. The field may also be used to associate amendments from different factors. For example, when "fertigation" is described it is desirable to associate the water application with the application of nutrient; however, irrigation would probably appear as one factor and the rate of nutrient application as another. The systems capability for association would be used in this case to show that the nutrient was applied in the irrigation water.

YEAR (columns 70-71)

When this field is blank it is understood that the amendments described on page 11 of the forms are applied in the year listed in the header code. When this is not the case (e.g., lime or tile drainage may have been provided several years before the study), these amendments may be noted on page 11 and the year of application recorded in columns 70-71. When this field is left blank, the year will be recorded as that noted in the header code.

Note

Where more than one aspect of an amendment is used as a factor-level combination (e.g., factors 3 and 4, source and rate of nitrogen; see page 2.5) information is coded up to and including column 37 of the treatment field for both factors 3 and 4, and subsequently only in either factor 3 or factor 4 as appropriate. See example 2, page 2.13, lines 11, 12, and 13-17.

Card Type 08, Form Name: Treatment 4/pg 12

TREATMENT DESCRIPTION

Assignment of Unique Coded Treatment Numbers

After all the factors and levels within those factors have been outlined, the combinations that constitute specific treatments are arranged on page 12 of the forms. It is on this page that the unique coded treatment numbers are assigned for use throughout the remainder of the forms to associate the results obtained with the appropriate combination of levels and factors. This is done by choosing any convenient series of three-digit numbers as coded treatment numbers, and encoding under the appropriate factor columns the number of the levels that constitute that treatment.

| | | | | |
|--------------|----------|------------|---|---|
| File/Dossier | Province | Year/Année | Projet, Id. No. No d'ident. du projet | Agency/Org. Superviseur surveillant |
| 7 | 03 | 76 | B.M.0.01 | 4GR0 |
| 1 2 | 4 | 6 | 11 12 | 14 |

TREATMENT DESCRIPTION

| Coded Treatment No. No du traitement | Card Type Type de fiche | Nesting Order Factors & Levels Ordre de combinaison Facteurs et niveaux | | | | | |
|---|----------------------------|--|-----|-----|-----|-----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| 15 | 18 19 | 21 | 23 | 25 | 27 | 29 | 31 |
| 0.01 | Z 0.8 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | |
| 2 | Z 0.8 | | | | 2 | | |
| 3 | Z 0.8 | | | | 3 | | |
| 4 | Z 0.8 | | | | 4 | | |
| 5 | Z 0.8 | | | 2 | 2 | | |
| 6 | Z 0.8 | | | | 3 | | |
| 7 | Z 0.8 | | | | 4 | | |
| 8 | Z 0.8 | | | 1 | 1 | 0.2 | |

A - coded treatment number 001

- Factor 1, level 01 - fallow
- Factor 2, level 01 - Manitou wheat
- Factor 3, level 01 - nitrogen, source ammonium nitrate
- Factor 4, level 01 - nitrogen, rate 000 lb/ac
- Factor 5, level 01 - irrigation, 000 cm.

In this section a series of numbers ranging from 900 to 999 can be defined to describe treatments or analyses from a variety of plots. In the example that follows, the number 901 represents all the plots on fallow and 902 all the plots on stubble; 903 represents all the wheat plots, 904 all the wheat plots on stubble, and 905 all the rapeseed plots on fallow. In this way treatments applying to these groupings can be described.

| Coded Treatment No. No du traitement | | Card Type Type de fiche | | Nesting Order Factors & Levels Ordre de combinaison Facteurs et niveaux | | | | | |
|---|---|----------------------------|----|--|----|----|----|----|----|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 |
| 15 | | 18 | 19 | 21 | 23 | 25 | 27 | 29 | 31 |
| 901 | Z | 0 | 8 | 01 | | | | | |
| 902 | Z | 0 | 8 | 02 | | | | | |
| 903 | Z | 0 | 8 | | 01 | | | | |
| 904 | Z | 0 | 8 | 02 | 01 | | | | |
| 905 | Z | 0 | 8 | 01 | 02 | | | | |

Note: Coded treatment number 900 indicates all treatments over the whole plots.

1. All treatments, all replicates (whole-plot characteristics).

| Coded Treat. No. No du traitement | | Replicate No de répétition | |
|--------------------------------------|-----|-------------------------------|--|
| 14 | 17 | | |
| 9,0,0 | 9,0 | | |

- whole-plot characteristic

2. An experiment with six replicates of which four were sampled would be coded as follows:

| Coded Treat. No. No du traitement | | Replicate No de répétition | |
|--------------------------------------|-----|-------------------------------|--|
| 14 | 17 | | |
| 9,0,0 | 9,4 | | |

- all treatments - average of four replicates

3. Specific treatment, average of four replicates.

| Coded Treat. No. No du traitement | | Replicate No de répétition | |
|--------------------------------------|-----|-------------------------------|--|
| 14 | 17 | | |
| 9,0,0 | 9,4 | | |

Treatment 1 - average of four replicates
Treatment 1 - average of all replicates

4. Specific treatment, specific replicate.

| Codea Treat. No. No du traitement | | Replicate No de répétition | |
|--------------------------------------|-----|-------------------------------|--|
| 14 | | 17 | |
| 0.01 | 0.2 | | |

- Treatment 1, replicate 2

FILE 3 - SOIL TEMPERATURE AND SOIL MOISTURE (DATA FOR SPECIFIED TREATMENTS)
(FORM: WEATHER 1)

GENERAL

The data fields in this segment duplicate many of the data fields in the weather segment on the form identified as Site 7E/pg 7. If the soil temperature and moisture measurements are characteristic of the whole plot, the form for Site 7E should be used. However, when these characteristics are treatment-dependent, or when soil temperature and moisture measurements are recorded on a treatment (or treatment and replicate) basis, the form identified as Weather 1/pg 13 should be used for data input.

| File/Dozier | Province | Year/Année | Project No./No. du projet | Agency/Org. Sup./Institution |
|-------------|----------|------------|---------------------------|------------------------------|
| 1 2 | 4 | 6 | 11 12 | |
| 3 0374 | 0002 | 13ED | | |

SOIL TEMPERATURE and SOIL MOISTURE SEGMENT (DATA FOR SPECIFIED TREATMENTS)
TEMPÉRATURE et HUMIDITÉ DU SOL (DONNÉES POUR LES TRAITEMENTS PARTICULIERS)

| Code Treat No. No du traitement | Replicate No de répétition | Date | | Depth (cm) Profondeur (cm) | | Card Type Type de fiche | Soil Temp. Temp. du sol | % Soil Moisture Humidité du sol (%) |
|------------------------------------|-------------------------------|-------------|---------------|-------------------------------|---------------------|----------------------------|----------------------------|--|
| | | Day Jour | Month Mois | Upper Supérieure | Lower Inférieure | | | |
| 14 | 17 | 19 | 21 | 23 | 26 | 29 | 31 | 34 |
| 0.01 | 0.1 | 1.0 | 0.5 | 0.0 | 0.15 | 0.1 | +5.8 | 3.51 |
| | | | | 2.5 | 3.0 | 0.1 | | 3.72 |
| | | | | 3.0 | 4.5 | 0.1 | | 3.75 |
| | | | | 4.5 | 6.0 | 0.1 | | 3.63 |
| | | | | 6.0 | 9.0 | 0.1 | | 3.86 |
| | 2.04 | | | 0.0 | 2.5 | 0.1 | +5.8 | 3.49 |
| | | | | 1.5 | 3.0 | 0.1 | | 3.73 |
| | | | | 3.0 | 4.5 | 0.1 | | 3.75 |
| | | | | 4.5 | 6.0 | 0.1 | | 3.63 |
| | | | | 6.0 | 9.0 | 0.1 | | 3.84 |
| | 2.01 | | | 0.0 | 1.5 | 0.1 | +5.9 | 3.52 |
| | | | | 2.5 | 3.0 | 0.1 | | 3.74 |
| | | | | 3.0 | 4.5 | 0.1 | | 3.74 |
| | | | | 4.5 | 6.0 | 0.1 | | 3.60 |
| | | | | 6.0 | 9.0 | 0.1 | | 3.91 |
| | 0.4 | | | 0.0 | 1.5 | 0.1 | +5.9 | 3.50 |
| | | | | 1.5 | 3.0 | 0.1 | | 3.21 |
| | | | | 3.0 | 4.5 | 0.1 | | 3.70 |

| Code Treat No. No du traitement | Replicate No de répétition | Date | | Depth (cm) Profondeur (cm) | | Card Type Type de fiche | Soil Temp. Temp. du sol | % Soil Moisture Humidité du sol (%) |
|------------------------------------|-------------------------------|-------------|---------------|-------------------------------|---------------------|----------------------------|----------------------------|--|
| | | Day Jour | Month Mois | Upper Supérieure | Lower Inférieure | | | |
| 14 | 17 | 19 | 21 | 23 | 26 | 29 | 31 | 34 |
| 0.02 | 0.4 | 2.0 | 0.5 | 0.0 | 0.15 | 0.1 | | 3.63 |
| | | | | 2.04 | 0.6 | 0.1 | | 3.74 |
| | | | | 3.0 | 0.0 | 0.1 | | 3.48 |

| File/Dozier | Province | Year/Année | Project No./No. du projet | Agency/Org. Sup./Institution | Card Type |
|-------------|----------|------------|---------------------------|------------------------------|-----------|
| 1 2 | 4 | 6 | 11 12 | 14 | |
| 1 0374 | 0002 | 13ED | | | 0.4 |

METHODS SEGMENT
MÉTHODES

| SOIL TEMPERATURE | TEMPÉRATURE DU SOL |
|------------------|--------------------|
| Units | Unités |
| °C | F901** |
| °F | F902** |

| SOIL MOISTURE | HUMIDITÉ DU SOL |
|---|---------------------------------------|
| Method | Méthode |
| Percent by weight (oven dry basis) F911** | Pourcentage en poids (séchage au fur) |
| Percent by volume (oven dry basis) F912** | Pourcentage en volume |

3.2

The card type is located in columns 29-30 and separates the header key information (which uniquely identifies a record) from the data or observations. In keeping with the previous files, the methods for filling in the header key information are outlined first and then the types of data input are described by card type.

FILE 3 CONTENTS

| <u>Card Type</u> | <u>Information</u> | <u>Form Name</u> | <u>Pages</u> |
|------------------|---|------------------|--------------|
| All | Header Key Information Type of Observation | Weather 1 | 13 |
| 01 | soil temperature and soil moisture | Weather 1 | 13 |
| 04 file 1 | methods | Weather 1 | 13 |

CODING NOTES

1. Alphabetical entries are left-justified and numerical entries are right-justified.

| | |
|---------------------|---------|
| M I D A S | 4 5 0 |
| P H Ø S P H Ø R U S | 2 5 0 0 |
| N I T R Ø G E N | 3 0 0 0 |

2. Decimal places are indicated by a shaded area. If no value exists for a decimal place, a zero must be inserted.

| |
|---------|
| 6 0 0 |
| 3 0 0 |
| 1 2 0 0 |

3. In cases where day or month, or both, is unknown, insert two zeros in appropriate columns.
4. All header key fields must be filled in, up to the card type.
5. The methods segment at the bottom of the form must be completed.

THE HEADER KEY (columns 1-28)

The performance/management files are tied together by a unique 13-column header key which precedes data input on every segment used:

| File/Dossier | | Province | Year/Année | | Project Id. No. No d'ident. du projet | | Agency/Org. Supervisor surveillant | |
|--------------|----|----------|------------|----|--|--|--|--|
| 1 | 2 | 4 | 6 | 11 | 12 | | | |
| 3 | 03 | 72 | 0,0,0,11 | 3 | 4 | | | |
| 1A | 1B | 1C | 1D | 1E | 1F | | | |

| Coded Treat. No. No du traitement | | Replicate No de répétition | | Date | | Depth (cm) Profondeur (cm) | |
|--------------------------------------|-----|-------------------------------|-----|-------------|---------------|-------------------------------|---------------------|
| 14 | | 17 | | Day Jour | Month Mois | Upper Supérieure | Lower Inférieure |
| 19 | 21 | 23 | 26 | | | | |
| 0,0,1 | 0,1 | 1,0 | 0,5 | 0,0,0 | 0,15 | | |
| 1G | 1H | 1I | 1I | 1J | 1J | | |

3.3

All data fields in the header must be completed on each page used.

The header consists of:

1A - File number - a preprinted number ranging from 1 to 7 (column 1).

1B - Province - the province in which the plot for the experiment was located. This space requires a coded input, which appears on page A1, appendix A (column 2-3); e.g., Saskatchewan is coded 03.

1C - Year - the year in which the research was conducted; e.g., 1972 is coded 72 (columns 4-5).

1D - Project identification number - some unique five-digit number assigned by you or your agency to your experiment (columns 8-10).

1E - Agency number - the agency under whose auspices the plot experiment was conducted (column 11). This space requires a coded input which appears on page A1, appendix A; e.g., the code number for university is 3.

1F - Supervisor's initials - two initials of the research supervisor in charge of the plot experiment (columns 12-13).

In this file a coded treatment number, replicate, date, and depth form part of the unique header key.

1G CODED TREATMENT NUMBER (columns 14-16)

Coded treatment numbers are assigned in file 7 on page 12 of the forms.

Refer to notes starting on page 2.14.

1H REPLICATE (columns 17-18)

See notes on page 2.15.

1I DATE (columns 19-22)

1I1 DAY (columns 19-20)

1I2 MONTH (columns 21-22)

1J DEPTH (cm) (columns 23-28)

1J1 UPPER (columns 23-25)

1J2 LOWER (columns 26-28)

CODING INSTRUCTIONS FOR SOIL TEMPERATURE AND SOIL MOISTURE
(Card Types 01 and 04, File 1)

Card Type 01, Form Name: Weather 1/pg 13

SOIL TEMPERATURE AND SOIL MOISTURE SEGMENT

SOIL TEMPERATURE (columns 31-33)

Units must be coded in the methods segment at the bottom of the form.

SOIL MOISTURE (columns 34-37)

The method of analysis must be coded in the methods segment at the bottom of the form.

Card Type 04 (File 1)METHODS SEGMENT

The methods segment at the bottom of the form Weather 1/pg 13 must be completed.

SOIL TEMPERATURE UNITS - self-defining entry

SOIL MOISTURE METHOD - self-defining entry

FILE 4 - SOIL PHYSICAL AND CHEMICAL DATA
(FORMS: SOIL 1-8)

GENERAL

File 4 provides for a comprehensive description of soil physical and chemical properties. The file consists of eight card types: soil physical data segment, soil chemical data segment (general), soil chemical data segment (salinity), soil chemical data segment (macronutrients), soil chemical data segment (micronutrients), recommended fertilizer applications, and an additional soil analysis segment.

The card type is located in columns 29-30 and separates the header key information (which uniquely identifies a record) from the data or observations. For the first seven forms, analytical methods are recorded in the methods segment on the lower portion of each form. These methods are designated by means of self-defining entries and are stored in file 1. In keeping with the previous files, the methods for filling in the header key information are outlined first and then the types of data input are described by card type.

FILE 4 CONTENTS

| <u>Card Type</u> | <u>Information</u> | <u>Form Name</u> | <u>Pages</u> |
|------------------|------------------------------|------------------|--------------|
| All | Header Key Information | Soil 1-8 | 14-21 |
| | Type of Observation | | |
| 04 - File 1 | methods | Soil 1-8 | 14-21 |
| 01 - File 4 | physical data | Soil 1 | 14 |
| 02 - File 4 | chemical data general | Soil 2 | 15 |
| 03 - File 4 | chemical data salinity | Soil 3 | 16 |
| 04 - File 4 | chemical data macronutrients | Soil 4 | 17 |
| 05 - File 4 | chemical data micronutrients | Soil 5 | 18 |
| 06 - File 4 | chemical data micronutrients | Soil 6 | 19 |
| 07 - File 4 | soil test recommendations | Soil 7 | 20 |
| 08 - File 4 | additional soil data | Soil 8 | 21 |

CODING NOTES

- Alphabetical entries are left-justified and numerical entries are right-justified.

| | |
|------------|-------|
| MIDAS | 450 |
| PHOSPHORUS | 25.00 |
| NITROGEN | 30.00 |

- Decimal places are indicated by a shaded area. If no value exists for a decimal place, a zero must be inserted.

| |
|--------|
| 6.00 |
| 3.00 |
| 1.20.0 |

3. In cases where day or month, or both, is unknown, insert two zeros in appropriate columns.
4. All header key fields must be filled in, up to the card type.
5. The methods segment of the form must be coded.

THE HEADER KEY (columns 1-28)

The performance/management files are tied together by a unique 13-column header key which precedes data input on every segment used:

| File/Dossier | | Province | | Year/Année | | Project Id. No. No d'ident. du projet | | Agency/Organisme Supervisor Inif. Init. du surveillant | | Coded Treat. No. No du traitement | | Replicate No de répétition | | Date | | Depth (cm) Profondeur (cm) | |
|--------------|----|----------|------|------------|----|---|------|--|----|--------------------------------------|--|-------------------------------|--|------|--|-------------------------------|----|
| 1 | 2 | 4 | 6 | 11 | 12 | 14 | 17 | 19 | 23 | 26 | | | | | | | |
| 1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H | 1I | | | | | | | | | 1J |
| 4 | 03 | 72 | 2000 | 0113 | 4H | 9009 | 0060 | 5000 | 00 | 08 | | | | | | | |

All data fields in the header must be completed, on each page used.

The header consists of:

1A - File number - a preprinted number ranging from 1 to 7 (column 1).

1B - Province - the province in which the plot for the experiment was located. This space requires a coded input, which appears on page A1, appendix A (columns 2-3); e.g., Saskatchewan is coded 03.

1C - Year - the year in which the research was conducted; e.g., 1972 is coded 72 (columns 4-5).

1D - Project identification number - some unique five-digit number assigned by you or your agency to your experiment (columns 6-10).

1E - Agency number - the agency under whose auspices the plot experiment was conducted (column 11). This space requires a coded input which appears on page A1, appendix A; e.g., the code number for university is 3.

1F - Supervisor's initials - two initials of the research supervisor in charge of the plot experiment (columns 12-13).

In this file a coded treatment number, replicate, date, and depth form part of the unique header key.

1G CODED TREATMENT NUMBER (columns 14-16)

Coded treatment numbers are assigned in file 7 on page 12.
Refer to notes starting on page 2.14.

1H REPLICATE (column 17-18)

See notes on page 2.15.

A - Code 900 indicates the soil physical characteristics of the whole plot (all treatments).

B - Code 90 indicates all replicates.

C - Soil moisture retention - moisture percentage on an oven-dry basis.

D - Particle size analysis reported to nearest percentage point.

E - Methods segment must be coded.

Example 4 Soil chemical data segment (general) (see page 4.5)

| SOIL CHEMICAL DATA SEGMENT (GENERAL) COMPOSITION CHIMIQUE DU SOL (EN GÉNÉRAL) | | | | | | | | | | | | | | Exchangeable Cation meq/100 g / Cations échangeables | | | | | | | | | |
|--|----------|------------|--|------------------|------------------------|--------------------------------------|-----------------------------------|--------|------------------------------|--------------------|--------------------|---------------------------|--------------------------------------|--|------------------------------|-------------------------------|--------------------------------------|---------------------------|----|----|----|------|------|
| File/Dossier | Province | Year/Année | Project Id. No. / No. d'ident. du projet | Agency/Organisme | Supervisor / Directeur | Coord Treat. No. / No. du traitement | Replicate No. / No. de répétition | Date | Depth (cm) / Profondeur (cm) | Upper / Supérieure | Lower / Inférieure | Card Type / Type de fiche | % Organic Carbon / Carbone organique | % Calcium carbonate / Carbonate de calcium | Total Nitrogen / Azote total | Buffered / Solution tamponnée | Permanent charge / Charge permanente | Neutral Salt / Sel neutre | | | | Buff | |
| 1 | 2 | 4 | 6 | 11 | 12 | 14 | 17 | 19 | 21 | 23 | 26 | 29 | 31 | 35 | 39 | 42 | 46 | 50 | 54 | 58 | 62 | | |
| 4 | 03 | 72 | 000011 | 34 | H | 900900 | 0605 | 000008 | 0,2 | | | | 292 | 075026 | 307 | | | | | | | | |
| | | | | | | | | 008015 | 0,2 | | | | 294 | 090025 | 316 | | | | | | | | 2330 |
| | | | | | | | | 015023 | 0,2 | | | | 183 | 125016 | 295 | | | | | | | | 2940 |
| | | | | | | | | | 0,2 | | | | | | | | | | | | | | 2820 |
| | | | | | | | | | 0,2 | | | | | | | | | | | | | | |
| | | | | | | | | | 0,2 | | | | | | | | | | | | | | |

| METHODS SEGMENT / MÉTHODES | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------|------------|--|------------------|------------------------|---------------------------|---|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| File/Dossier | Province | Year/Année | Project Id. No. / No. d'ident. du projet | Agency/Organisme | Supervisor / Directeur | Card Type / Type de fiche | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 4 | 6 | 11 | 12 | 14 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 03 | 72 | 000011 | 34 | H | 0,4 | | | | | | | | | | | | | | | | | | | | | |
| ORGANIC CARBON | | | | | | | CARBONE ORGANIQUE | | | | | | | EXCHANGEABLE CATIONS | | | | | | | CATIONS ÉCHANGEABLES | | | | | | |
| Dry combustion, induction furnace | | | | | | | G181** | | | | | | | Buffered | | | | | | | Solution tamponnée | | | | | | |
| Wet oxidation (Allison) | | | | | | | G182** | | | | | | | NH ₄ OAc, pH 7.0 | | | | | | | G241** | | | | | | |
| Wet oxidation (Walkley Black) | | | | | | | G183** | | | | | | | NH ₄ OAc, pH 8.2 | | | | | | | G242** | | | | | | |
| Dry combustion, resistance furnace | | | | | | | G184** | | | | | | | BaCl ₂ , pH 8.0 | | | | | | | G243** | | | | | | |
| | | | | | | | | | | | | | | Ca(OAc) ₂ -CaCl ₂ , pH 7.0 | | | | | | | G244** | | | | | | |
| | | | | | | | | | | | | | | Ca(OAc) ₂ , pH 5.0 | | | | | | | G245** | | | | | | |
| | | | | | | | | | | | | | | NaOAc, pH 8.2 | | | | | | | G246** | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CALCIUM CARBONATE EQUIVALENT | | | | | | | EQUIVALENT EN CARBONATE DE CALCIUM | | | | | | | Neutral salt | | | | | | | Sel neutre | | | | | | |
| Gas volumetric | | | | | | | G201** | | | | | | | Extractant | | | | | | | Solution d'extraction | | | | | | |
| Gravimetric | | | | | | | G202** | | | | | | | CaCl ₂ | | | | | | | G251** | | | | | | |
| Pressure | | | | | | | G203** | | | | | | | KCl | | | | | | | G252** | | | | | | |
| Citrate buffer | | | | | | | G204** | | | | | | | NaCl | | | | | | | G253** | | | | | | |
| Titrimetric | | | | | | | G205** | | | | | | | BaCl ₂ | | | | | | | G254** | | | | | | |
| | | | | | | | | | | | | | | K ₂ SO ₄ | | | | | | | G255** | | | | | | |
| TOTAL NITROGEN | | | | | | | AZOTE TOTAL | | | | | | | Analytical Procedure | | | | | | | Méthode analytique | | | | | | |
| Semi-micro, NO ₂ & NO ₃ included | | | | | | | G211** | | | | | | | EDTA titration | | | | | | | G261** | | | | | | |
| Semi-micro, NO ₂ & NO ₃ not included | | | | | | | G212** | | | | | | | Phosphate titration | | | | | | | G262** | | | | | | |
| Macro-Kjeldahl, NO ₂ & NO ₃ included | | | | | | | G213** | | | | | | | EtOH titration | | | | | | | G263** | | | | | | |
| Macro-Kjeldahl, NO ₂ & NO ₃ not incl. | | | | | | | G214** | | | | | | | Aluminon titration | | | | | | | G264** | | | | | | |
| Micro-Kjeldahl | | | | | | | G215** | | | | | | | Flame photometry | | | | | | | G265** | | | | | | |
| Nitrogen analyser | | | | | | | G216** | | | | | | | Atomic absorption | | | | | | | G266** | | | | | | |
| | | | | | | | | | | | | | | Auto-analyser | | | | | | | G267** | | | | | | |
| CATION EXCHANGE CAPACITY | | | | | | | CAPACITÉ D'ÉCHANGE CATIONIQUE | | | | | | | Buffered Method Used | | | | | | | Solution tamponnée méthode utilisée | | | | | | |
| Permanent charge | | | | | | | Charge permanente | | | | | | | NH ₄ OAc, pH 7.0 | | | | | | | G271** | | | | | | |
| Neutral salt, long method | | | | | | | G231** | | | | | | | NH ₄ OAc, pH 8.0 | | | | | | | G272** | | | | | | |
| Neutral salt, rapid method | | | | | | | G232** | | | | | | | BaCl ₂ , pH 8.0 | | | | | | | G273** | | | | | | |
| | | | | | | | | | | | | | | Ca(OAc) ₂ - CaCl ₂ , pH 7.0 | | | | | | | G274** | | | | | | |
| | | | | | | | | | | | | | | Ca(OAc) ₂ , pH 5.0 | | | | | | | G275** | | | | | | |
| | | | | | | | | | | | | | | NaOAc, pH 8.2 | | | | | | | G276** | | | | | | |

- A - Code 900 indicates all treatments.
- B - Code 90 indicates all replicates.
- C - Arrows indicate repeating data.
- D - All numerical values are right-justified.
- E - Exchangeable cations must be expressed in milliequivalents per hundred grams.
- F - Methods segment must be coded.

CODING INSTRUCTIONS FOR SOIL PHYSICAL AND CHEMICAL PROPERTIES INCLUDING METHODS (Card Types 01, 02, 03, 04, 05, 06, 07, and 08)

All the methods and some units of measurements for card types 01 to 08 of file 4 are encoded by circling the appropriate self-defining entry codes on the bottom portion of the forms. This section must be completed for each analytical procedure used.

A complete list of the heading codes for methods is given in appendix D.

Card Type 01, Form Name: Soil 1/pg 14
(See example 3, page 4.3)

| | COLUMNS |
|---|---------|
| <u>SOIL PHYSICAL DATA SEGMENT</u> | 31-71 |
| SOIL MOISTURE RETENTION, percentage by weight Sample preparation, sample state, and method must be coded in the methods segment on bottom of the form. | 31-42 |
| PARTICLE SIZE ANALYSIS Pretreatment, dispersion, and method must be coded in the methods segment on bottom of the form. | 43-68 |
| BULK DENSITY, g/cm ³ Sample state and method must be coded in the methods segment. | 69-71 |

Card Type 02, Form Name: Soil 2/pg 15
(See example 4, page 4.4)

SOIL CHEMICAL DATA SEGMENT (GENERAL) (columns 31-80)

The methods segment is to be coded for all fields that are used, after the field showing card type 02.

Card Type 03, Form Name: Soil 3/pg 16

| | COLUMNS |
|--|---------|
| <u>SOIL CHEMICAL DATA SEGMENT (SALINITY)</u> | 31-74 |
| ELECTRICAL CONDUCTIVITY, mmhos/cm at 25°C Extract source and method must be coded in the methods segment of the form. | 31-34 |

| | |
|--|-------|
| PERCENT WATER AT SATURATION | 35-38 |
| WATER EXTRACT DETERMINATION, $\mu\text{g/g}$ | 39-74 |

Methods of extract determinations must be coded in the methods segment at the bottom of the form.

Card Type 04, Form Name: Soil 4/pg 17

SOIL CHEMICAL DATA SEGMENT (MACRONUTRIENTS) (columns 31-70)

The methods segment must be coded for all data fields that are used after the one showing card type 04.

Card Type 05, Form Name: Soil 5/pg 18

SOIL CHEMICAL DATA SEGMENT (MICRONUTRIENTS) (columns 31-80)

The methods segment must be coded for all data fields that are used after the one showing card type 05. Values are recorded in $\mu\text{g/g}$.

Card Type 06, Form Name: Soil 6/pg 19

SOIL CHEMICAL DATA SEGMENT (MICRONUTRIENTS CONTINUED)

The methods segment must be coded for all data fields that are used after the one showing card type 06. Values are recorded in $\mu\text{g/g}$.

Card Type 07, Form Name: Soil 7/pg 20

SOIL TEST RECOMMENDATIONS

| | |
|-------------------------------------|-------|
| ORGANIC MATTER, PERCENTAGE | 31-34 |
| SOIL TEST LABORATORY NUMBER | 35-41 |
| RECOMMENDED FERTILIZER APPLICATIONS | 50-66 |
| N | 50-54 |
| P-P ₂ O ₅ | 55-58 |
| K-K ₂ O | 59-62 |
| Lime | 63-66 |

Units for recommended fertilizer applications must be coded in the methods segment at the bottom of the form, in the area designated card type 04, file 1.

Card Type 08, Form Name: Soil 8/pg 21

ADDITIONAL SOIL ANALYSIS SEGMENT

In some cases the allowable entries in file 4 will not include all the analyses carried out. Card type 08 has been developed to handle multiple analyses by different methods, units that differ from the fixed ones on card types 1 through 7, or analyses for elements and properties not specified in the earlier card types. Card type 08 on form 21 is quite flexible in design and should allow for the capture of most types of soil data.

To encode data in card type 08, three items of information are required.

1. A four-character code which characterizes the type and method of analysis being carried out.
2. The concentration or numerical representation of the result of the analysis; this may be any number from 9999.99 to 0.01.
3. A one-character code representing the units associated with this number. Where percentage units are used, it will be assumed that they are on a weight basis.

The current list of four-character codes to identify analysis type and method is given in appendix C. This list will be expanded as the need arises. Please contact this office to ensure that additions to this table are uniquely chosen.

A data entry on this form consists of an 11-column unit which is repeated four times across the page; i.e., four separate analyses may be encoded per line. If more than one line is required for the analyses at one depth and one date, the consecutive lines should have a unique number in the two columns labeled "card number."

For these data:

1. extractable Mn as measured by dithionite-citrate-bicarbonate extractant with a concentration measured at 36.25 ppm
2. selenium extracted by lithium metaborate with a concentration measured at 14.30 ppm

one would code:

| Analysis 1 Analyse 1 | | | | Analysis 2 Analyse 2 | | |
|--|---------------|----------------|--|-------------------------|----------------|--|
| Code - Type and Method Type et methode | Concentration | Units / Unités | Code - Type and Method Type et methode | Concentration | Units / Unités | |
| 33 | 37 | 43 44 | 48 | | 54 | |
| A230 | 36.25 | AA | A254 | 14.30 | A | |

1 { 2

Codes for units are found on the left side of the form.

FILE 6 - CROP DEVELOPMENT, YIELD, AND QUALITY DATA
(FORMS: CROP 1-9)

File 6 is the recommended format for encoding observations on crop development, yield, quality, and samples of crop parts at various growth stages. In an earlier draft of the forms, portions of this information was coded in file 5. The current format (file 6) has the following advantages:

1. An expanded range of types of samples may be encoded; for example, the above-ground portion for forage trials, leaf petioles for tissue testing, and so forth.
2. Multiple samples, or harvests, or both, can be recorded for the same plot.
3. Samples or observations of the crop at various important phenological growth stages may be recorded.

GENERAL

File 6 consists of nine card types and may be divided into two sections:

- 1) Pages 22 through 25 of the forms, corresponding to card types 01, 02, 03, and 04, are designed to capture observations on crop development, phenology, and damage.
- 2) Pages 26 through 30 of the forms, containing card types 05, 06, 07, 08, and 09, are designed to capture data from plant samples and analyses.

In this group of forms, the observations section (pages 22-25) is directly suited to observations on cereal crops. It can be used for other crops also, until more appropriate specialized forms can be developed for phenological observations on other crop types.

The card type is located in columns 29 and 30 and separates the header key information (which uniquely identifies a record) from the data or observations. In keeping with the previous files, the methods for filling in the header key information are outlined first and then the types of data input are described by card types.

FILE 6 CONTENTS

| <u>Card Type</u> | <u>Information</u> | <u>Form Name</u> | <u>Pages</u> |
|------------------|---|------------------|--------------|
| All | Header Key Information | Crops 1-9 | 22-30 |
| 01 | Type of Observation crop development stage observations | Crop 1 | 22 |
| 02 | seeding methods and crop emergence observations | Crop 2 | 23 |
| 03 | free-format description | Crop 3 | 24 |
| 04 | damage | Crop 4 | 25 |
| 05 | yield and quality | Crop 5 | 26 |

5.2

| | | | |
|----|--------------------|--------|----|
| 06 | elemental analysis | Crop 6 | 27 |
| 07 | oilseed analysis | Crop 7 | 28 |
| 08 | feed analysis | Crop 8 | 29 |
| 09 | enzyme activity | Crop 9 | 30 |

CODING NOTES

1. Alphabetical entries are left-justified and numerical entries are right-justified.

| | |
|---------------------|---------|
| M I D A S | 4 5 0 |
| P H O S P H O R U S | 2 5 0 0 |
| N I T R O G E N | 3 0 0 0 |

2. Decimal places are indicated by a shaded area. If no value exists for a decimal place, a zero must be inserted.

| |
|---------|
| 6 0 0 |
| 3 0 0 |
| 1 2 0 0 |

3. In cases where the day or month, or both, is unknown, insert zeros in appropriate columns.
4. All header key fields must be filled in, up to the card type.

THE HEADER KEY (columns 1-28)

The performance/management data bank is tied together by a unique header key which precedes data input on every segment used:

| File/Dossier | | Province | Year/Année | | Project Id. No. No d'ident. du projet | | Agency/Organisme Supervisors Init. Init. du surveillant | | Sample Type Type d'échantillon | | Purpose/Objet | | Date | | Codeg Treat. No. No du traitement | | Replicate No de répétition | |
|--------------|----|----------|------------|----|---------------------------------------|----|---|----|--------------------------------|----|---------------|----|------|--|-----------------------------------|--|----------------------------|--|
| 1 | 2 | 4 | 6 | 11 | 12 | 14 | 19 | 20 | 22 | 24 | 27 | | | | | | | |
| 6 | 03 | 72 | 00 | 01 | 13 | LH | GRAIN | M1 | 11 | 08 | 00 | 19 | 0 | | | | | |
| 1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H | 1I | 1J | 1K | | | | | | | | |

All data fields in the header must be completed, on each page used.

The header consists of:

1A - File number - a preprinted number ranging from 1 to 7 (column 1).

1B - Province - the province in which the plot for the experiment was located. This space requires a coded input, which appears on page A1, appendix A; e.g., Saskatchewan is coded 03 (columns 2-3).

1C - Year - the year in which the research was conducted; e.g., 1972 is coded 72 (columns 4-5).

1D - Project identification number - some unique five-digit number assigned by you or your agency to your experiment (columns 6-10).

1E - Agency number - the agency under whose auspices the plot experiment was conducted. This space requires a coded input which appears on page A1, appendix A; e.g., the code number for university is 3 (column 11).

1F - Supervisor's initials - two initials of the research supervisor in charge of the plot experiment (columns 12-13).

In this file a coded sample type, the purpose, and the sample date form part of the unique header key.

1G SAMPLE TYPE columns 14-18

Codes for this field are listed on page A9, appendix A, to characterize the type of plant part sampled or observed. In general the researcher should select whichever code best fits his sample. For setting up the form and in the interests of consistency it is suggested (but not required) that the following codes be used:

| FORMS | SAMPLE TYPE CODE |
|------------|--|
| Page 22 | - PHEND |
| Page 23 | - PHEND |
| Page 24 | - Stage of growth at which the observations were made |
| Page 25 | - DAMAG |
| Page 26-30 | - whichever is appropriate from appendix A9 Yield and quality |

1H PURPOSE column 19

Codes for this field are listed on page A9, appendix A. In general the researcher should select whichever code best fits his sample. For setting up the form and in the interests of consistency it is suggested (but not required) that the following codes be used:

| FORMS | PURPOSE CODE |
|------------|---|
| Page 22 | - P |
| Page 23 | - P |
| Page 24 | - P to specify observation or D to specify damage |
| Page 25 | - D damage |
| Page 26-30 | - appropriate code from appendix page A9 |

1I SAMPLE DATE columns 20-23

1I1 DAY columns 20-21

1I2 MONTH columns 22-23

Examples of some sample dates are as follows:

| <u>Card type</u> | <u>Sample Date</u> |
|------------------|--|
| 01 | seeding date |
| 02 | seeding date <u>or</u> date at which population was assessed |
| 03 | dates of observation |
| 04 | dates of damage assessment |
| 05-09 | harvest date or quality assessment date |

The above are examples of data that can be recorded.

- 1J CODED TREATMENT NUMBER columns 24-26
Numbers are as assigned on page 12 of the forms;
also refer to notes in this manual concerning assignment of unique
coded treatment numbers (referring to page 12 of the forms).
- 1K REPLICATE columns 27-28
See notes on page 2.15 of this manual.

Your suggestions for additional requirements in this file are
essential to its further development and will be appreciated.

CODING INSTRUCTIONS FOR DEVELOPMENT AND PHENOLOGICAL OBSERVATIONS (Card
Types 01, 02, 03, 04, Crop 1-4)

Card Type 01, Form Name: Crop 1/pg 22

This card allows dates of crop development stages to be recorded.

| <u>CROP DEVELOPMENT STAGES SEGMENT</u> | COLUMNS |
|--|---------|
| | 34-80 |
| SAMPLING TECHNIQUE | 66 |
| Codes are listed in appendix A8. | |
| STAND UNIFORMITY | 67-80 |
| A subjective assessment of stand uniformity should be encoded in free format; e.g., excellent, spotty, etc. | |

Card Type 02, Form Name: Crop 2/pg 23

The card is designed for the capture of detailed observations
at seeding and emergence.

SEEDING METHODS AND CROP EMERGENCE OBSERVATIONS

| | COLUMNS |
|--|---------|
| SEEDING | 34-39 |
| DEPTH (cm) | 34-36 |
| ROW SPACING (cm) | 37-39 |
| METHOD CODE | 40 |
| Codes are listed in appendix A9. | |
| MODIFIER | 41 |
| If the population is adjusted after seeding, for example, by thinning by hand, this should be noted by coding T in column 41. Also, this column can be used for a code to describe seeding which is found in appendix A, page A5. | |
| METHOD | 42-53 |
| Suggested codes are listed in appendix A9. | |
| PLANT POPULATION (ESTIMATED) | 54-59 |
| This is calculated from the seeding rate. | |
| PLANT POPULATION (ACTUAL) | 60-65 |
| This is a number determined by field observation after emergence. | |
| UNITS | 66-71 |
| Suggested codes are listed in appendix A10. | |
| ASSESSMENT METHOD (ACTUAL) | 72-80 |
| Suggested codes are listed in appendix A10. | |

Example 5. Seeding methods and crop emergence

| File/Dossier | | Province | Year/Année | | Project Id. No. No. d'ident. du projet | | Agency/Organisme | | Supervisors Init. du surveillant | | Sample Type Type d'échantillon | | Purpose/Objet | | Date | | Coded Treat. No. No du traitement | | Replicate No de répétition | | Card Type Type de fiche | | | | |
|--------------|----|----------|------------|----|--|----|------------------|----|----------------------------------|----|--------------------------------|----|---------------|----|------|----|-----------------------------------|----|----------------------------|----|-------------------------|----|---|---|---|
| 1 | 2 | 4 | 6 | 8 | 10 | 11 | 12 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 22 | 24 | 26 | 27 | 28 | 29 | 30 | 31 | | | |
| 6 | 04 | 72 | 35 | 00 | 53 | 3 | G | R | P | H | E | N | D | P | 0 | 9 | 0 | 5 | 9 | 0 | 0 | 9 | 0 | 0 | 2 |
| | | | | | | | | | | | | | A | | B | | C | | | | | | | | |

SEEDING METHODS AND CROP EMERGENCE OBSERVATIONS
MÉTHODES DE SEMIS ET DONNÉES SUR LA LEVÉES DES CULTURES

| Depth (cm) Profondeur (cm) | | Row Spacing (cm) Espace/ rangée (cm) | | Meth. Code. Meth. Modifieur/Qualificatif | | Method/Méthode | | | | | | | | | | Plant Population (Estimated) Population végétale (approximative) | |
|----------------------------|-----|--------------------------------------|----|--|----|----------------|----|----|----|----|----|----|----|----|----|--|----|
| 34 | 37 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| 4.0 | 1.8 | A | | | D | 0 | 4 | B | D | S | C | R | | | | | |
| | | D | | E | | | | | | | | | | | | | |

- A - Sample type - fixed as PHEND - see appendix A9
- B - Purpose - fixed as P - see appendix A9
- C - Date of detailed observations at seeding and emergence
- D - Method code - appendix A9
- E - Method - see appendix A9

Card Type 03, Form Name: Crop 3/pg 24

This card type allows the researcher to make brief free-format observations on the crop at various stage of development.

FREE-FORMAT DESCRIPTION

The crop condition is noted in free format in columns 31-80. These notes must be brief as the space provided is restricted to 50 spaces. Use one line of description for each unique coded treatment number or replicate number.

Card Type 04, Form Name: Crop 4/pg 25

CROP DAMAGE SEGMENT

This card is set up to capture information on the types and extent of damage the crop has suffered.

The effects of various specific types of damage, and some general ones as well, can be recorded on this form. Particularly severe types of damage or crop loss events not accommodated here may be coded on card 03 as well.

LODGING 1-9 column 41

Lodging can be recorded on a subjective scale of 1-9 where zero lodging damage is coded as 1.

If the level of crop damage is assessed in a general way, it may be recorded in the following columns.

| | |
|--|---------|
| MAJOR DAMAGE, PERCENTAGE | COLUMNS |
| CAUSE | 46-47 |
| Suggested codes are listed in appendix A8. | 48-49 |
| SIGNIFICANT DAMAGE, PERCENTAGE | 50-51 |
| CAUSE | 52-53 |
| Suggested codes are listed in appendix A8. | |
| DAMAGE ASSESSMENT TECHNIQUE | 54-56 |
| Code SUB if assessment is subjectively estimated, or MEA if the assessment is an actual measurement. | |

CODING INSTRUCTIONS FOR YIELD AND QUALITY OBSERVATIONS
(Card Types 05, 06, 07, 08, and 09, Crop 5-9)

Card Type 05, Form Name: Crop 5/pg 26

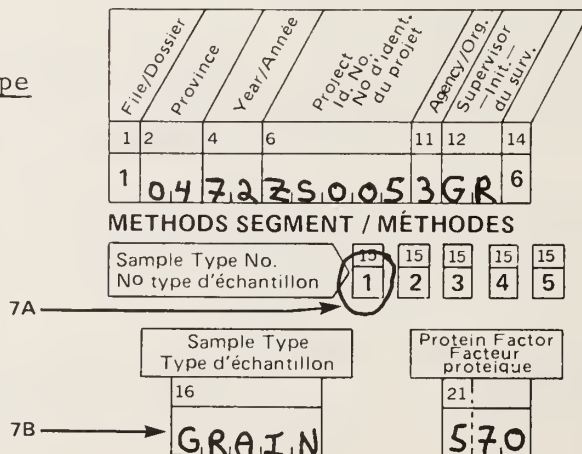
CROP YIELD AND QUALITY SEGMENT

Card type 05 is designed for standard cereal trials, with space to encode yield, protein, major elements, test weight, and grade (see example 9).

METHODS SEGMENT

Methods and units to be associated with a sample type are coded in the methods segment on the left hand side of the page. Within a sample type the methods, units, and so forth, must be kept constant and these are coded only once per record. It is possible to encode yield and quality data with different units, methods, etc. for up to five different sample types (see example 7A).

Example 7 Sample Type



Each sample type is assigned a sample type number by circling the appropriate number (see example 7A). The sample type code is then recorded in the box labeled "sample type" (columns 16-20) (see example 7B) corresponding to the sample type as encoded in the data part of the form (columns 14-18). (See example 9, page 5.8).

Additional information on units, moisture basis, and methods of reporting to be associated with a sample type is circled.

Example 8. Methods

| | | |
|--|----------------------------|---|
| Yield / Rendement | British Britannique | 24 ← → 25 L,B,/,A,C,* B,U,/,A,C,* C,W,T,/,A,C B,R,T,/,A,C |
| | Metric Métrique | K,G,/,H,A,* M,T,/,H,A,* |
| Moisture Basis Humidité | | 30 ← → 40 Ø,V,E,N,*,D,R,Y,*,*,* A,I,R,*,D,R,Y,*,*,* A,S,*,R,E,P,Ø,R,T,E,D A,D,J,*,1,5,.,5,%,*,* A,D,J,*,.,.,%,*,* |
| | | |
| Nitrogen and Protein Nitrogen et Protéine | Reporting Rapport | 41 ← → 49 E,A,C,H,*,R,E,P,*,* R,E,P,*,A,V,E,*,* C,Ø,M,P,Ø,S,I,L,T,E |
| | Moisture Basis Humidité | 50 ← → 60 Ø,V,E,N,*,D,R,Y,*,*,* A,I,R,*,D,R,Y,*,*,* A,S,*,R,E,P,Ø,R,T,E,D A,D,J,*,1,5,.,5,%,*,* A,D,J,*,.,.,%,*,* |
| Elemental Analysis Analyse élémentaire | Reporting Rapport | 61 ← → 69 E,A,C,H,*,R,E,P,*,* R,E,P,*,A,V,E,*,* C,Ø,M,P,Ø,S,I,L,T,E |
| | Moisture Basis Humidité | 70 ← → 80 Ø,V,E,N,*,D,R,Y,*,*,* A,I,R,*,D,R,Y,*,*,* A,S,*,R,E,P,Ø,R,T,E,D A,D,J,*,1,5,.,5,%,*,* A,D,J,*,.,.,%,*,* |

This space used to record moisture basis adjusted to a level other than 15.5%.

This information is entered only once per sample type, regardless of how many copies of the form named crop 5 are required to complete the yield and quality data. If data are entered for a second sample type, the methods segment should be filled in again and a different sample type number should be circled.

| | COLUMNS |
|---|---------|
| CROP YIELD AND QUALITY SEGMENT | 31-36 |
| YIELD | |
| Quality of yield is recorded in units specified in the methods section, at a moisture content also specified. | |
| MOISTURE CONTENT, percentage oven-dry basis | 37-39 |
| PERCENT NITROGEN | 40-43 |
| Moisture basis should be specified in the methods segment. | |
| PERCENT PROTEIN | 44-47 |
| Moisture basis should be specified in the methods segment. Protein will be encoded in columns 44-47 and will routinely be listed after the grade. Ranges will be added as they become part of the grading system. For example, protein in wheat will be listed as 1CWRS 13.5, where grade was encoded as 1CRS and protein was encoded as 13.5%. | |
| ELEMENTAL ANALYSIS, PERCENT | 48-62 |
| Moisture basis should be reported in the methods segment. | |
| TEST WEIGHT | 63-69 |
| 1b/bu | 63-65 |
| g/0.5 L | 66-69 |
| WEIGHT, g/1000 KERNELS | 70-73 |
| PERCENT PLUMP KERNELS | 74-76 |
| GRADE | 77-80 |
| Since grade has only 4 columns, the codes in appendix A10 have to be used to encode it. The information is retrieved from the data file in output format. | |

| e.g., GRADE | OUTPUT FORMAT | CODE |
|--|---------------|------|
| No. 1 Canadian western red spring wheat | 1CWRS | 1CRS |

Card Type 06, Form Name: Crop 6/pg 27

ELEMENTAL ANALYSIS SEGMENT

Card type 06 can be used to capture detailed data on chemical elements. There is no restriction on the number of elements that may be recorded.

Card Number

Elements should be grouped on the same card number when they have been assayed on the same reporting basis and the same moisture basis. If more than six elements are analyzed, the first six will go on card number 01 (coded in columns 31 and 32 by the researcher) and the next six on card number 02, etc.

If the sample type is changed, for instance, from straw to grain, card numbers will start at 01 again (see example 10, page 5.11). The moisture basis and other information such as methods of analysis should be specified in Special Notes on the form named Site 8E.

ELEMENTAL ANALYSIS SEGMENT

Elemental analysis data are encoded in a repeating unit consisting of an elemental identifier, a concentration field, and a units field.

ELEMENT 1

The first two columns of an element field should contain the chemical symbol for the element; e.g., MG in columns 33-34 signifies magnesium. Then the concentration is listed and the units are coded. If the chemical symbol consists of one letter only, it is to be left-justified.

SYMBOL

Chemical symbol for element

CONCENTRATION

UNITS

Codes are found on the left-hand side of the form named Crop 6 (see example 10 page 5.11). Other elements are to be coded as for element 1.

Card Type 07, Form Name: Crop 7/pg 28

OILSEED ANALYSIS SEGMENT

Card type 07 is used to capture data from oilseed crops.

Card Type 08, Form Name: Crop 8/pg 29

FEED ANALYSIS SEGMENT

Card type 08 contains space to record data particularly relevant to feed crops.

Card Type 09, Form Name: Crop 9/pg 30

ENZYME ACTIVITY SEGMENT

Card type 09 gives some capability to encode enzymatic activity.

It appears likely that further card types will be developed in this file to handle additional types of data, for example from forestry and horticulture. Please forward to the CanSIS project leader, L.R.R.I., Ottawa, your needs for handling additional types of data. These will be developed as the requirements are defined.

APPENDIXES

APPENDIX A

DATA CODES FOR AGRICULTURAL SMALL PLOT DATA (Performance/Management File)

HEADER

| <u>Province</u> | codes for columns 2 and 3, all forms |
|-----------------------|--------------------------------------|
| British Columbia | 01 |
| Alberta | 02 |
| Saskatchewan | 03 |
| Manitoba | 04 |
| Ontario | 05 |
| Quebec | 06 |
| Newfoundland | 07 |
| New Brunswick | 08 |
| Nova Scotia | 09 |
| Prince Edward Island | 10 |
| Yukon Territory | 11 |
| Northwest Territories | 12 |

| <u>Agency</u> | code for column 11, all forms |
|---------------|-------------------------------|
| Provincial | 1 |
| Federal | 2 |
| University | 3 |
| Industry | 4 |
| Other | 5 |

IDENTIFICATION SEGMENT

| <u>General Purpose</u> | code for column 20 of card type 1 on form Site 1E/pg 1 |
|-------------------------------------|--|
| Crop variety trials | 1 |
| Fertilizer response trials | 2 |
| Micronutrient response trials | 3 |
| Soil and crop management trials | 4 |
| Soil amendment trials | 5 |
| Certified seed growing | 6 |
| Other crops on certified seed farms | 7 |
| Grower production information | 8 |
| Crop insurance | 9 |
| Soil testing | 0 |

| <u>Type</u> | code for column 21 of card type 1 on form Site 1E/pg 1 |
|----------------------|--|
| Field trials | 1 |
| Nonreplicated trials | 2 |
| Replicated trials | 3 |
| Other | 4 |

| <u>Credibility</u> | code for columns 16-58 of card type 2 on form Site 1E/pg 1 |
|---------------------|--|
| Very credible | 1 |
| Credible | 2 |
| Moderately credible | 3 |
| Credibility unknown | 4 |

SOIL MORPHOLOGY SEGMENT

| <u>Soil Aspect</u> | code for columns 41-42 of card type 5 on form Site 3E/pg 3 |
|--------------------------|--|
| Matrix moist | 01 |
| Matrix dry | 02 |
| Exped moist | 03 |
| Exped dry | 04 |
| Inped moist | 05 |
| Inped dry | 06 |
| Crushed moist | 07 |
| Crushed dry | 08 |
| Natural wet and reduced | 09 |
| Natural wet and oxidized | 10 |
| Pressed wet and reduced | 11 |
| Pressed wet and oxidized | 12 |
| Rubbed wet and oxidized | 13 |
| Rubbed dry | 14 |

TIME OF FERTILIZER APPLICATION

| <u>Time</u> | code for column 62 of card type 07 on form Treatment 3/pg 11 |
|---------------------------------|--|
| Spring (preseeding for annuals) | 1 |
| At seeding | 2 |
| Postseeding | 3 |
| Fall | 4 |
| Summer | 5 |
| After first cut | 6 |
| After second cut | 7 |

FERTILIZER PLACEMENT

| <u>Placement</u> | code for columns 65-66 of card type 07 on form Treatment 3/pg 11 |
|--|--|
| Broadcast or sprayed (incorporated) | A |
| Broadcast or sprayed (nonincorporated) | B |
| Side-banded | C |
| Seed-placed | D |
| Foliar-applied | E |
| Deep-placed | F |
| Injected | G |
| Other | H |
| Fertilizer seed-placed at highest rate specified. Additional as broadcast highest rate at seed placement to be put in free format in special notes | K |

FERTILIZER CHEMICAL COMPOSITION: MACRONUTRIENTS

code for columns 38-39 of card type 07 on the form Treatment 3/pg 11

Source:

| <u>Compound</u> | <u>Formula</u> | <u>Code</u> |
|---------------------|-----------------------------------|-------------|
| Ammonia (anhydrous) | NH ₃ | 01 |
| Ammonia (aqua) | NH ₃ .H ₂ O | 02 |
| Ammonium nitrate | NH ₄ NO ₃ | 03 |

| | | |
|------------------------------------|---|----|
| Ammonium phosphate (monovalent) | $\text{NH}_4\text{H}_2\text{PO}_4$ | 04 |
| Ammonium phosphate (bivalent) | $(\text{NH}_4)_2\text{HPO}_4$ | 05 |
| Superphosphates | $\text{Ca}_x(\text{H}_x\text{PO}_4)_x \cdot \text{H}_2\text{O}$ | 06 |
| Ammonium sulfate | $(\text{NH}_4)_2\text{SO}_4$ | 21 |
| Calcium nitrate | $\text{Ca}(\text{NO}_3)_2$ | 22 |
| Potassium nitrate | KNO_3 | 23 |
| Potassium chloride | KCl | 31 |
| Potassium sulfate | K_2SO_4 | 32 |
| Sulfate of potash magnesia | $\text{K}_2\text{SO}_4 \cdot \text{MgSO}_4$ | 33 |
| Calcium sulfate | CaSO_4 | 41 |
| Elemental sulfur | S | 42 |
| Sodium sulfate | Na_2SO_4 | 43 |
| Magnesium sulfate (Epsom salts) | MgSO_4 | 44 |
| Urea | $\text{CO}(\text{NH}_2)_2$ | 51 |
| Limestone | | 61 |
| Dolomitic limestone | | 62 |
| Calcitic limestone | | 63 |
| Burnt lime | | 64 |
| Marl | | 65 |

FERTILIZERS: MICRONUTRIENTS

for columns 38-39 of card type 07 on form Treatment 3/pg 11

Source (compound):

| <u>Copper</u> | <u>Formula</u> | <u>Code</u> |
|------------------------------------|--|-------------|
| Copper(ic) sulfate pentahydrate | $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ | 01 |
| Copper(ic) sulfate monohydrate | $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ | 02 |
| Basic copper(ic) sulfates | $\text{CuSO}_4 \cdot 3\text{Cu}(\text{OH})_2$ | 03 |
| Malachite | $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ | 04 |
| Azurite | $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$ | 05 |
| Cuprous oxide | Cu_2O | 06 |
| Cupric oxide | CuO | 07 |
| Chalcopyrite | CuFeS_2 | 08 |
| Chalcosite | Cu_2S | 09 |
| Copper(ic) acetate | $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$ | 10 |
| Copper(ic) oxalate | $\text{CuC}_2\text{O}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ | 11 |
| Copper(ic) ammonium phosphate | $\text{Cu}(\text{NH}_4)\text{PO}_4 \cdot \text{H}_2\text{O}$ | 12 |
| Copper - S fusions | $\text{CuC}_2\text{O}_4\text{-S}$ | 13 |
| Copper chelates | Na_2CuEDTA NaCuHEDTA | 14 |
| Copper polyflavonoids | | 15 |

Zinc

| | | |
|------------------------------|---|----|
| Zinc sulfate monohydrate | $\text{ZnSO}_4 \cdot \text{H}_2\text{O}$ | 21 |
| Zinc sulfate heptahydrate | $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ | 22 |
| Basic zinc sulfate | $\text{ZnSO}_4 \cdot 4\text{Zn}(\text{OH})_2$ | 23 |
| Zinc oxide | ZnO | 24 |

| | | |
|--------------------------------|--|----|
| Zinc carbonate | ZnCO ₃ | 25 |
| Zinc sulfide | ZnS | 26 |
| Zinc frits | (silicates) | 27 |
| Zinc phosphate | Zn ₃ (PO ₄) ₂ | 28 |
| Zinc chelates | Na ₂ ZnEDTA | 29 |
| | NaZnNTA | |
| | NaZnHEDTA | |
| Zn polyflavonoid | | 30 |
| Zn ligninsulfonate | | 31 |
| <u>Iron</u> | | |
| Ferrous sulfate | FeSO ₄ .7H ₂ O | 41 |
| Ferric sulfate | Fe ₂ (SO ₄) ₃ .4H ₂ O | 42 |
| Ferrous oxide | FeO | 43 |
| Ferric oxide | Fe ₂ O ₃ | 44 |
| Ferrous ammonium phosphate | Fe(NH ₄)PO ₄ .H ₂ O | 45 |
| Ferrous ammonium sulfate | (NH ₄) ₂ SO ₄ .FeSO ₄ .6H ₂ O | 46 |
| Iron frits | Varied | 47 |
| Iron ammonium polyphosphate | Fe(NH ₄)HP ₂ O ₇ | 48 |
| Iron chelates | NaFeEDTA | 49 |
| | NaFeHEDTA | |
| | NaFeEDDHA | |
| | NaFeDTPA | |
| Iron polyflavonoids | | 50 |
| Iron ligninsulfonates | | 51 |
| Iron methoxyphenylpropane | FeMPP | 52 |
| <u>Molybdenum</u> | | |
| Sodium molybdate | Na ₂ MoO ₄ .2H ₂ O | 61 |
| Ammonium molybdate | (NH ₄) ₆ Mo ₇ O ₂₄ .4H ₂ O | 62 |
| Molybdenum trioxide | MoO ₃ | 63 |
| Molybdenum sulfide | MoS ₂ | 64 |
| Molybdenum frits | | 65 |
| <u>Boron</u> | | |
| Borax | Na ₂ B ₄ O ₇ .10H ₂ O | 71 |
| Sodium pentaborate | Na ₂ B ₁₀ O ₁₆ .10H ₂ O | 72 |
| Sodium tetraborate: fertilizer | | |
| borate - 46, | | |
| fertilizer | Na ₂ B ₄ O ₇ .5H ₂ O | 73 |
| borate - 65 | Na ₂ B ₄ O ₇ | 70 |
| Solubor | Na ₂ B ₄ O ₇ .5H ₂ O + Na ₂ B ₁₀ O ₁₆ .10H ₂ O | 74 |
| Boric acid | H ₃ BO ₃ | 75 |
| Colemanite | Ca ₂ B ₆ O ₁₁ .5H ₂ O | 76 |
| Boron frits | | 77 |
| <u>Manganese</u> | | |
| Manganese sulfate | MnSO ₄ .3H ₂ O | 81 |
| Manganese oxide | MnO | 82 |
| Manganese methoxyphenylpropane | MnMPP | 83 |

| | | |
|---------------------|-------------------|----|
| Manganese chelate | MnEDTA | 84 |
| Manganese carbonate | MnCO ₃ | 85 |
| Manganese chloride | MnCl ₂ | 86 |
| Manganese oxide | MnO ₂ | 87 |
| Manganese frits | | 88 |

MANURE

Note - both columns 38 and 39 must be coded

Type of Manure code for column 38 card type 07 on form Treatment 3/pg 11

| | |
|---------|---|
| Beef | 1 |
| Pig | 2 |
| Poultry | 3 |
| Horse | 4 |
| Sheep | 5 |
| Other | 6 |
| Dairy | 7 |

Form of Manure code for column 39 of card type 07 on form Treatment 3/pg 11

| | |
|------------|---|
| Fresh | 1 |
| Decomposed | 2 |
| Liquid | 3 |
| Unknown | 0 |

IRRIGATION

Irrigation Method code for columns 63-64 of card type 07 on form Treatment 3/pg 11

| | |
|-----------------|---|
| Spring flood | A |
| Border dyke | B |
| Ditch | C |
| Furrow | D |
| Sprinkler | E |
| Side roll | F |
| Center pivot | G |
| Hand-moved | H |
| Trickle or drip | J |

SEEDING

Seeding Method code for columns 63-64 of card type 07 on form Treatment 3/pg 11

| | |
|--------------------------|---|
| Double-disc drill | A |
| Single-disc drill | B |
| Hoe drill | C |
| Discer | D |
| Broadcast | E |
| Experimental plot seeder | F |
| Hand-planted | G |
| Other | H |

Code to Describe Seeding code for column 62 of card type 07 on form Treatment 3/pg 11

| | |
|-----------------|---|
| Cover crop | A |
| With cover crop | B |

| | |
|----------------------------------|---|
| Without cover crop | C |
| Spread on the surface | D |
| Spread on the surface and buried | E |

HERBICIDE

| <u>Chemical</u> | code for columns 38-39 of card type 07 on form Treatment 3/pg 11 |
|---|--|
| 2,4-D ester | 01 |
| 2,4-D amine | 02 |
| MCPA | 03 |
| 2,4-DB (Embutox) | 04 |
| MCPB (Tropotox) | 05 |
| Bromoxynil (Brominil) | 06 |
| Bromoxynil & MCPA (Buctril M or Brominil M) | 07 |
| Dicamba | 08 |
| Dicamba & 2,4-D or MCPA (Banvel) | 09 |
| Dichlorprop | 10 |
| Dichlorprop & 2,4-D (Estaprop) | 11 |
| Linuron (Lorox or Afalon) | 12 |
| Niclofen (TOK RM) | 13 |
| Benazolin | 14 |
| Dinoseb amine (SINOX PE) | 15 |
| Chloramben (amiben) | 16 |
| Paraquat (Gramoxone) | 17 |
| Alachlor (Lasso) | 18 |
| Simazine (Fallow Gard) | 19 |
| Atrazine | 20 |
| Bladex | 21 |
| Basagran | 22 |
| Metolachlor/Atrazine | 23 |
| Killmore | 24 |
| Monolinuron (Afesine) | 25 |
| Estamine | 26 |
| Triallate (Avadex BW) | 51 |
| Barban (Carbyne) | 52 |
| Benzoylprop-ethyl (Endaven) | 53 |
| Difensoquat (Avenge) | 54 |
| Asulam (Asulox F) | 55 |
| Mecoprop (Compitox) | 56 |
| Glyphosate (Roundup) | 57 |
| | 58 |
| Trifluralin (Treflan) | 71 |
| TCA | 72 |
| Dalapon | 73 |
| Dinitramine (Cobex) | 74 |
| EPTC (Eptam) | 75 |
| R-25788 (Eradicane) | 76 |
| Butylate (Sutan) | 77 |
| Metobromuron (Patoran) | 78 |
| Metribuzin (Lexone, Sencor) | 79 |
| | 80 |

Application Method code for columns 63-64 of card type 07 on form
Treatment 3/pg 11

| | |
|----------------|---|
| Soil-applied | A |
| Foliar-applied | B |
| Seed-applied | C |

INSECTICIDES

Chemical code for columns 38-39 of card type 07 on form Treatment 3/pg 11

| | |
|---------------------------|----|
| Dimethoate (Cygon) | 01 |
| Demeton | 02 |
| Malathion | 03 |
| Carbaryl (Sevin) | 04 |
| Endrin | 05 |
| Leptophos (Phosvel) | 06 |
| Carbofuran (Furadan) | 08 |
| Lindane | 09 |
| Aldrin | 10 |
| Heptachlor | 11 |
| Azinphos-methyl (Guthion) | 12 |
| Trichlorfon (Dylox) | 13 |
| Methomyl (Lannate) | 14 |
| Chlorpyrifos (Lorsban) | 15 |
| Methoxychlor | 16 |
| Carbophenothion | 17 |
| Basudin (Diazinon) | 18 |
| Thimet (Phorate) | 19 |
| Disyston | 20 |
| Dieldrin | 21 |
| Dasinit (Fensulfothion) | 22 |

Application Method code for columns 63-64 of card type 07 on form
Treatment 3/pg 11

| | |
|----------------|---|
| Soil-applied | A |
| Foliar-applied | B |
| Seed-applied | C |

FUNGICIDES

Chemical code for columns 38-39 of card type 07 on form Treatment 3/pg 11

| | |
|--|----|
| Formaldehyde (Formalin) | 01 |
| Metiram (Polyram) | 02 |
| Maneb (Agrox N-M) | 03 |
| Carbathiin & Thiram (Vitaflor - 280) | 04 |
| Thiocyanomethylthio-benzothiazole (Busan TCMTB) | 05 |
| Mancozeb (Dithane M-45) | 06 |
| Carbathiin (Vitaflor - 250) | 07 |
| Nemacur (fenamifos) | 08 |
| Gammason | 09 |
| Milgo E | 10 |
| | 11 |
| | 12 |

Application Method code for columns 63-64 of card type 07 on form
Treatment 3/pg 11

| | |
|----------------|---|
| Soil-applied | A |
| Foliar-applied | B |
| Seed-applied | C |

SEED QUALITY

Source Codes code for columns 38-39 of card type 07 on form Treatment 3/pg 11

| | |
|---|----|
| Uncertified, uncleaned, unknown quality | 1 |
| Uncertified, cleaned | 2 |
| Certified | 3 |
| Registered | 4 |
| Breeder seed | 5 |
| Foundation seed | 6 |
| <u>Corn</u> | |
| Single cross | 7 |
| Double cross | 8 |
| Three-way cross | 9 |
| Other cross | 10 |

CROP DAMAGE

Cause code for columns 48-49 and 52-53 of card type 04 on form Crop 4/pg 25

| | |
|-----------------------------------|----|
| Adverse weather (20-29) | 20 |
| Spring frost | 21 |
| Fall frost | 22 |
| Spring drought | 23 |
| Summer drought | 24 |
| Drought | 25 |
| Snow, early-season | 26 |
| Snow, harvest | 27 |
| Hail | 28 |
| Excessive rain | 29 |
| Disease (50-59) | 50 |
| Pests (60-69) | 60 |
| Insect pests | 61 |
| Birds | 62 |
| Weeds | 63 |
| Improper use of chemicals (40-49) | 40 |
| Pesticides | 41 |
| Fertilizers | 45 |
| Adverse soil conditions | 30 |
| Other (miscellaneous) | 70 |

CROP SAMPLING

Techniques code for column 66 of card type 01 on form Crop 1/pg 22

| | |
|--------------|---|
| Rod-row | 1 |
| Square metre | 2 |
| Entire plot | 3 |
| Cut strips | 4 |

SAMPLE TYPES code for columns 14-18 of all card types in file 6

| <u>A Crop Development Observations</u> | <u>CODE</u> |
|--|-------------|
| Dates of phenological stages of crops | PHEND |
| Detailed observations on seeding | PLANT |
| Emergence | EMERG |
| Third leaf stage | 3RDLF |
| Fifth leaf stage | 5THLF |
| Tillering | TILLR |
| Heading | HEADG |
| Soft dough | SFTDO |
| Harvest | HARVT |
| Observation on crop damage | DAMAG |
| <u>B Yield and Quality Samples</u> | |
| Grain | GRAIN |
| Seed | SEEDS |
| Fruit | FRUIT |
| Tubers | TUBER |
| Straw | STRAW |
| Above-ground portion | ABGDP |
| Economic yield | ECYLD |
| Leaves | LEAFS |
| Leaves and stems | LESTM |
| Petioles | PETOL |
| Roots | ROOTS |
| Nodules | NODUL |

This list will be incomplete and new codes may be added. When doing so please contact this office so that we are aware of the additions. These codes must be five characters in length.

PURPOSE code for column 19 of all card types in file 6

| | <u>Code</u> |
|--|-------------|
| Sample for yield only | Y |
| Sample for yield and quality | M |
| Sample for tissue analysis | A |
| Sample for after-storage quality | S |
| Sample for yield or quality or both, from bulked sample of previous harvest | B |
| Estimated by inspector | I |
| Estimated by farmer | F |
| Observations of the crop development or dates of phenological events | P |
| Observation at various growth stages associated with crop damage | D |

Again, this list is not exhaustive and additions may be made to it after contacting this office. As for the sample type, the purpose must be coded.

METHOD OF SEEDING code for card type 02 on form Crop 2/pg 23

| <u>Method</u> | <u>Code (column 40)</u> | <u>Coded Method (columns 42-53)</u> |
|-------------------|-------------------------|-------------------------------------|
| Double disc drill | A | DOUBDSCDRILL |
| Single disc drill | B | SINGDSCDRILL |

A10

| | | |
|------------------------------|---|--------------|
| Hoe drill | C | HOEDRILL |
| Discer | D | DISCER |
| Broadcast | E | BROADCAST |
| Experimental plot seeder | F | EXPTLSEEDER |
| Hand-planted | G | HANDPLANTED |
| Corn planter | J | CORNPLANTER |
| Broadcast with fertilizer | K | BROADCSTFERT |
| Other | H | OTHER |

Units code for columns 66-71 of card type 02 on form Crop 2/pg 23

| | |
|-------------------------|--------|
| Actual units | |
| Plants per acre | ACRE |
| Plants per hectare | HECTAR |
| Plants per square metre | MSQ |
| Plants per square yard | YDSQ |
| Plants per rod of row | RODROW |
| Plants per metre of row | MROW |
| Percent | PERCNT |

ASSESSMENT METHOD code for columns 72-80 of card type 02 on form Crop 2/pg 23

| | |
|-------------------------------|-------------|
| Germination assessment | GERMINATION |
| Plant counts per square yard | PL/YDSQ |
| Plant counts per square metre | PL/MSQ |
| Plant counts per metre of row | PL/MROW |
| Plant counts per rod of row | PL/ROD |

GRADE OF GRAIN codes for columns 77-80 of card type 05 on form Crop 5/pg 26

| <u>Grain</u> | <u>Output Format</u> | <u>Code</u> | |
|------------------------------------|----------------------|---------------------|-------------------------|
| <u>WHEAT</u> | | | |
| No. 1 Canada Western Red Spring | 1CWRS | 1CRS | |
| No. 2 Canada Western Red Spring | 2CWRS | 2CRS | |
| No. 3 Canada Western | 3CWRS | 3CRS | |
| No. 1 Canada Utility | 1CU | red | 1CU R* *Color must also |
| No. 2 Canada Utility | 2CU | white | 2CU W* be coded |
| No. 3 Canada Utility | 3CU | mixed or unknown | 3CU M* |

AMBER DURUM

| | | |
|----------------------|-----|-----|
| No. 1 Canada Western | 1AD | 1AD |
| No. 2 Canada Western | 2AD | 2AD |
| No. 3 Canada Western | 3AD | 3AD |
| No. 4 Canada Western | 4AD | 4AD |
| No. 5 Canada Western | 5AD | 5AD |

RED WINTER

| | | |
|------------------------------------|-------|------|
| No. 1 Canada Western Red Winter | 1CWRW | 1CRW |
|------------------------------------|-------|------|

| <u>Grain</u> | <u>Output Format</u> | <u>Code</u> | |
|---|----------------------|-------------|-------------------------|
| No. 2 Canada Western Red Winter | 2CWRW | 2CRW | |
| No. 3 Canada Western Red Winter | 3CWRW | 3CRW | |
| <u>SOFT WHITE SPRING</u> | | | |
| No. 1 Canada Western Soft White Spring | 1CWSWS | 1SWS | |
| No. 2 Canada Western Soft White Spring | 2CWSWS | 2SWS | |
| No. 3 Canada Western Soft White Spring | 3CWSWS | 3SWS | |
| No. 4 Canada Western Soft White Spring | 4CWSWS | 4SWS | |
| <u>OATS</u> | | | |
| No. 1 Canada Western | 1CW | 1CW | |
| No. 2 Canada Western | 2CW | 2CW | |
| Extra No. 1 Feed | X1FEED | X1FE | |
| No. 1 Feed | 1FEED | 1FEE | |
| No. 2 Feed | 2FEED | 2FEE | |
| No. 3 Feed | 3FEED | 3FEE | |
| <u>BARLEY</u> | | | |
| No. 1 Canada Western Six-Row | 1CW6R | 1C6R | |
| No. 2 Canada Western Six-Row | 2CW6R | 2C6R | |
| No. 1 Canada Western Two-Row | 1CW2R | 1C2R | |
| No. 2 Canada Western Two-Row | 2CW2R | 2C2R | |
| No. 1 Feed | 1FEED | 1FEE | |
| No. 2 Feed | 2FEED | 2FEE | |
| No. 3 Feed | 3FEED | 3FEE | |
| <u>RYE</u> | | | |
| No. 1 Canada Western | 1CW | 1CW | |
| No. 2 Canada Western | 2CW | 2CW | |
| No. 3 Canada Western | 3CW | 3CW | |
| Canada Western Ergoty | Ergoty | Ergo | |
| <u>CORN</u> | | | |
| No. 1 Canada Western | 1CW | 1CW* | *Color must be coded |
| No. 2 Canada Western | 2CW yellow | 2CW Y* | |
| No. 3 Canada Western | 3CW white | 3CW W* | |
| No. 4 Canada Western | 4CW or | 4CW* | |
| No. 5 Canada Western | 5CW mixed | 5CW M* | |
| <u>EXPERIMENTAL</u> | | | |
| <u>WHEAT</u> | | | |
| No. 1 Canada Western Experimental | 1 CW EXPERIMENTAL | 1CEX | |
| No. 2 Canada Western Experimental | 1 CW EXPERIMENTAL | 2CEX | |

| <u>Grain</u> | <u>Output Format</u> | <u>Code</u> |
|--------------|----------------------|-------------|
|--------------|----------------------|-------------|

BARLEY

| | | |
|--------------------------------------|------------------|------|
| No. 1 Canada Western Experimental | 1CW EXPERIMENTAL | 1CEX |
| No. 2 Canada Western Experimental | 2CW EXPERIMENTAL | 2CEX |

FLAXSEED

| | | |
|----------------------|-----|-----|
| No. 1 Canada Western | 1CW | 1CW |
| No. 2 Canada Western | 2CW | 2CW |
| No. 3 Canada Western | 3CW | 3CW |
| No. 4 Canada Western | 4CW | 4CW |

| <u>Grain</u> | <u>Output Format</u> | <u>Code</u> |
|--------------|----------------------|-------------|
|--------------|----------------------|-------------|

RAPESEED

| | | |
|--------------|------|------|
| No. 1 Canada | 1CRS | 1CRS |
| No. 2 Canada | 2CRS | 2CRS |
| No. 3 Canada | 3CRS | 3CRS |

MUSTARD

| | | | |
|--------------|-------------|------|-------------------------|
| No. 1 Canada | 1C yellow | 1CY* | *Color must be coded |
| No. 2 Canada | 2C oriental | 2C0* | |
| No. 3 Canada | 3C brown or | 3CB* | |
| No. 4 Canada | 4C mixed | 4CM* | |

BUCKWHEAT

| | | |
|--------------|----|----|
| No. 1 Canada | 1C | 1C |
| No. 2 Canada | 2C | 2C |
| No. 3 Canada | 3C | 3C |

PEAS

| | | |
|-------------------------------|------|------|
| No. 1 Canada Western | 1CW | 1CW |
| No. 2 Canada Western | 2CW | 2CW |
| No. 3 Canada Western | 3CW | 3CW |
| Extra No. 4 Canada Western | X4CW | X4CW |
| No. 4 Canada Western | 4CW | 4CW |

SUNFLOWERS

| | | |
|--------------|----|----|
| No. 1 Canada | 1C | 1C |
| No. 2 Canada | 2C | 2C |
| No. 3 Canada | 3C | 3C |

CODES FOR FILE 7

columns 26-37 of card type 07 on form Treatment 3/pg 11
 columns 23-34 of factor numbers 1-6 on forms Treatment 1/pg 9
 and Treatment 2/pg 10
 columns 23-34 of level codes forms Treatment 1/pg 9 and
 Treatment 2/pg 10

Some suggested codes to describe treatments that appear as headings in File 1 are given below. In most cases, specific details of the treatment can be described by using appropriate self-defining entries at the start of the 12-character code.

12-character code
 for factor or
 level

Description

| | |
|----------------------------|--|
| SLOPE | - used to define general aspects of slope |
| SOIL MOISTURE | - general aspects of soil moisture and drainage |
| RUNOFF | - used where runoff conditions constitute a treatment |
| SEEPAGE | - seepage conditions |
| EROSION | - several types and degrees of erosion can be defined |
| STONE & ROCK | - variable stoniness conditions |
| TEXTURE | - any texture conditions of surface, subsurface, or parent material; for use on form Site 1E <u>not</u> Site 3E |
| TAXONOMY | - soil taxonomy treatments |
| MORPHOLOGY | - soil morphology |
| LAND USE | - general type of land use |
| CROPS GROWN | - can summarize crops grown 2 years or more before current trial or crops in year before trial, by use of appropriate self-defining entry codes and note of the year (columns 70-71) |
| PEST CONTROL | - where differences in weed, insect, or disease control constitute part of the treatment |
| EQUIPMENT | - for scale of equipment or type of seedbed preparation |
| SPECIAL PROB MANAGEMENT | - special soil problems, such as salinity - for special soil management problems or general description of management practices |
| CURRENT CROP | - levels consist of species and variety of crops grown |

The techniques for characterizing amendments are the same for treatments before the trial as for those during the trial, only the date is changed (ie. year).

APPENDIX B

SOME COMMON FERTILIZER ANALYSES AND THEIR CHEMICAL COMPOSITIONS

| <u>Analysis</u> | <u>Chemical</u> | |
|-----------------|---|----------|
| 46-0-0 | Urea | Solution |
| 34-0-0-0 | Ammonium nitrate | Solution |
| 34-0-0-11 | Ammonium sulfate and urea | Granular |
| 21-0-0-24 | Ammonium sulfate | Granular |
| 82-0-0 | Anhydrous ammonia | Gaseous |
| *28-0-0 | Ammonium nitrate and urea | Prilled |
| *11-48-0 | Monoammonium phosphate | Granular |
| 18-46-0 | Diammonium phosphate | Granular |
| *23-23-0 | Urea and ammonium phosphate | Granular |
| | Ammonium nitrate and ammonium phosphate | Granular |
| *27-14-0 | Urea and ammonium phosphate | Granular |
| | Ammonium nitrate and ammonium phosphate | Granular |
| 16-20-0-14 | Ammonium nitrate and ammonium sulfate | Granular |
| 0-45-0 | Triple superphosphate | Granular |
| 0-0-60 | Potassium chloride | Granular |
| *0-0-50-17.6 | Potassium sulfate | Granular |
| *21-0-0 | Aqua ammonia | Solution |
| 15-0-0 | Calcium nitrate | Granular |
| 0-0-0-16 | Calcium sulfate | Granular |
| *0-0-0-95 | Elemental sulfur | Powdered |

*The actual nutrient content may vary depending on the manufacturer.

APPENDIX C

SOIL ANALYTICAL METHOD CODES

For card type 08 in File 4. These codes specify what is being analyzed and the significant features of the analysis.

A codes represent all the detail specified.

B codes are used to signify that additional details are specified in special notes.

Nitrogen

Total Nitrogen

| | |
|---|------|
| A001 Semimicro, NO ₂ + NO ₃ included | B001 |
| A002 Semimicro, NO ₂ + NO ₃ not included | B002 |
| A003 Macro-Kjeldahl, NO ₂ + NO ₃ included | B003 |
| A004 Macro-Kjeldahl, NO ₂ + NO ₃ not included | B004 |
| A005 Micro-Kjeldahl | B005 |
| A006 Nitrogen analyzer | B006 |

Nitrate Nitrogen

| | |
|--|------|
| A007 Steam distillation (MgO) | B007 |
| A008 Incubated | B008 |
| A009 Extractable by CuSO ₄ .Ag ₂ SO ₄ (by volume) | B009 |
| A010 NO ₃ electrode | B010 |
| A011 Cadmium reduction | B011 |
| A012 Phenoldisulfonic acid by volume | B012 |
| A013 Phenoldisulfonic acid by weight | B013 |
| A014 Extracted by 0.5 N NaHCO ₃ | B014 |
| A015 Extractable by CuSO ₄ .Ag ₂ SO ₄ (by weight) | B015 |
| A702 Extractable by CuSO ₄ .Ag ₂ SO ₄ | B702 |
| A706 PDS acid colorimetry | B706 |

Ammonium Nitrogen

| | |
|-------------------------------|------|
| A016 Steam distillation (MgO) | B016 |
|-------------------------------|------|

Phosphorus

Total Phosphorus

| | |
|--|------|
| A023 Digestion with HClO ₄ | B023 |
| A024 Fusion with Na ₂ CO ₃ | B024 |

Organic Phosphorus

| | |
|--|------|
| A025 Ignition | B025 |
| A026 Extraction with H ₂ SO ₄ | B026 |
| A027 Extraction with HCl ₂ H ₂ SO ₄ | B027 |

Inorganic Phosphorus

| | |
|--|------|
| A028 Soluble in dilute acid fluoride (weight basis) | B028 |
| A029 Soluble in NaHCO ₃ (Olsen) | B029 |
| A030 Soluble in dilute HCl ₂ H ₂ SO ₄ | B030 |

| | |
|---|------|
| A031 Soluble in H ₂ O | B031 |
| A032 Isotopic dilution of ³² P | B032 |
| A033 Soluble in dilute acid fluoride (volume basis) | B033 |

Available Potassium

| | |
|--|------|
| A040 Extraction with NH ₄ OAc, pH 7 | B040 |
| A041 Extracted in NaHCO ₃ | B041 |

Exchangeable Potassium (buffered to pH other than neutrality)

| | |
|--------------------------|------|
| A042 EDTA titration | B042 |
| A043 Phosphate titration | B043 |
| A044 EtOH titration | B044 |
| A045 Gravimetric | B045 |
| A046 Flame photometry | B046 |
| A047 Atomic absorption | B047 |
| A048 Auto-analyzer | B048 |

Exchangeable Potassium (Neutral salt)

| | |
|--------------------------|------|
| A056 EDTA titration | B056 |
| A057 Phosphate titration | B057 |
| A058 EtOH titration | B058 |
| A059 Aluminon titration | B059 |
| A060 Flame photometry | B060 |
| A061 Atomic absorption | B061 |
| A062 Auto-analyzer | B062 |

Exchangeable Potassium (neutral NH₄OAc, pH 7)

| | |
|--------------------------|------|
| A613 EDTA titration | B613 |
| A614 Phosphate titration | B614 |
| A615 EtOH titration | B615 |
| A616 Gravimetric | B616 |
| A617 Flame photometry | B617 |
| A618 Atomic absorption | B618 |
| A619 Auto-analyzer | B619 |

Potassium (water-extractable)

| | |
|--------------------------|------|
| A049 EDTA titration | B049 |
| A050 Phosphate titration | B050 |
| A051 EtOH titration | B051 |
| A052 Gravimetric | B052 |
| A053 Flame photometry | B053 |
| A054 Atomic absorption | B054 |
| A055 Auto-analyzer | B055 |

Sulfur (available)

| | |
|--------------------------------------|------|
| A063 Acetate soluble | B063 |
| A064 Bicarbonate soluble | B064 |
| A065 Extracted in NaHCO ₃ | B065 |
| A066 Extracted in AlCl ₃ | B066 |

Sulfate Sulfur (water-extractable)

| | |
|---|------|
| A067 SO ₄ -gravimetric BaSO ₄ | B067 |
|---|------|

Calcium (exchangeable neutral salt)

| | |
|--------------------------|------|
| A075 EDTA titration | B075 |
| A076 Phosphate titration | B076 |
| A077 EtOH titration | B077 |
| A078 Aluminon titration | B078 |
| A079 Flame photometry | B079 |
| A080 Atomic absorption | A080 |
| A081 Auto-analyzer | A081 |

Calcium (exchangeable buffered to pH other than neutrality)

| | |
|--------------------------|------|
| A082 EDTA titration | B082 |
| A083 Phosphate titration | A083 |
| A084 EtOH titration | B084 |
| A085 Gravimetric | B085 |
| A086 Flame photometry | B086 |
| A087 Atomic absorption | B087 |
| A088 Auto-analyzer | B088 |

Calcium (exchangeable neutral NH_4OAc , pH 7)

| | |
|--------------------------|------|
| A620 EDTA titration | B620 |
| A621 Phosphate titration | B621 |
| A622 EtOH titration | B622 |
| A623 Gravimetric | B623 |
| A624 Flame photometry | B624 |
| A625 Atomic absorption | B625 |
| A626 Auto-analyzer | B626 |

Calcium (water-extractable)

| | |
|--------------------------|------|
| A089 EDTA titration | B089 |
| A090 Phosphate titration | B090 |
| A091 EtOH titration | B091 |
| A092 Gravimetric | B092 |
| A093 Flame photometry | B093 |
| A094 Atomic absorption | B094 |
| A095 Auto-analyzer | B095 |

Magnesium (exchangeable neutral NH_4OAc , pH 7)

| | |
|--------------------------|------|
| A096 EDTA titration | B096 |
| A097 Phosphate titration | B097 |
| A098 EtOH titration | B098 |
| A099 Gravimetric | B099 |
| A100 Flame photometry | B100 |
| A101 Atomic absorption | B101 |
| A102 Auto-analyzer | B102 |

Magnesium (exchangeable neutral salt)

| | |
|--------------------------|------|
| A103 EDTA titration | B103 |
| A104 Phosphate titration | B104 |
| A105 EtOH titration | B105 |
| A106 Aluminon titration | B106 |
| A107 Flame photometry | B107 |
| A108 Atomic absorption | B108 |
| A109 Auto-analyzer | B109 |

Magnesium (exchangeable buffered to pH other than neutrality)

| | |
|--------------------------|------|
| A110 EDTA titration | B110 |
| A111 Phosphate titration | B111 |
| A112 EtOH titration | B112 |
| A113 Gravimetric | B113 |
| A114 Flame photometry | B114 |
| A115 Atomic absorption | B115 |
| A116 Auto-analyzer | B116 |

Magnesium (water-extractable)

| | |
|--------------------------|------|
| A117 EDTA titration | B117 |
| A118 Phosphate titration | B118 |
| A119 EtOH titration | B119 |
| A120 Aluminon titration | B120 |
| A121 Flame photometry | B121 |
| A122 Atomic absorption | B122 |
| A123 Auto-analyzer | B123 |
| A703 Gravimetric | |

Aluminum (exchangeable neutral salt)

| | |
|--------------------------|------|
| A131 EDTA titration | B131 |
| A132 Phosphate titration | B132 |
| A133 EtOH titration | B133 |
| A134 Aluminon titration | B134 |
| A135 Flame photometry | B135 |
| A136 Atomic absorption | B136 |
| A137 Auto-analyzer | B137 |

Aluminum (elemental analysis), Various Extracts

| | |
|--|------|
| A138 Acid (HNO_3 , HClO_4 , HF) | B138 |
| A139 Lithium metaborate | B139 |
| A140 Sodium carbonate | B140 |
| A141 Dithionite-citrate-bicarbonate | B141 |
| A142 Extractable in 0.02 M CaCl_2 | B142 |
| A143 DTPA-TEA extract | B143 |
| A144 EDTA extract | B144 |
| A145 0.1 N HCl extract | B145 |
| A146 Acid ammonium oxalate | B146 |
| A147 Sodium pyrophosphate | B147 |

Sodium (exchangeable neutral NH_4OAc , pH 7)

| | |
|--------------------------|------|
| A148 EDTA titration | B148 |
| A149 Phosphate titration | B149 |
| A150 EtOH titration | B150 |
| A151 Gravimetric | B151 |
| A152 Flame photometry | B152 |
| A153 Atomic absorption | B153 |
| A154 Auto-analyzer | B154 |

Sodium (exchangeable buffered to pH other than neutrality)

| | |
|--------------------------|------|
| A155 EDTA titration | B155 |
| A156 Phosphate titration | B156 |
| A157 EtOH titration | B157 |
| A158 Gravimetric | B158 |
| A159 Flame photometry | B159 |
| A160 Atomic absorption | B160 |
| A161 Auto-analyzer | B161 |

Sodium (extractable water)

| | |
|--------------------------|------|
| A162 EDTA titration | B162 |
| A163 Phosphate titration | B163 |
| A164 EtOH titration | B164 |
| A165 Gravimetric | B165 |
| A166 Flame photometry | B166 |
| A167 Atomic absorption | B167 |
| A168 Auto-analyzer | B168 |

Carbonate (water extract)

| | |
|---------------------|------|
| A176 Acid titration | B176 |
|---------------------|------|

Bicarbonate (water extract)

| | |
|---------------------|------|
| A177 Acid titration | B177 |
|---------------------|------|

Chloride (water extract)

| | |
|-------------------------------|------|
| A185 Mohr titration | B185 |
| A186 Potentiometric titration | B186 |
| A187 Cl electrode | B187 |

Copper

| | |
|---|------|
| A194 Perchloric acid | B194 |
| A195 EDTA-HCl extractable | B195 |
| A196 Acid HNO_3 , HClO_4 , HF | B196 |
| A197 Lithium metaborate | B197 |
| A198 Sodium carbonate | B198 |

Zinc

| | | |
|------|--|------|
| A205 | Perchloric acid | B205 |
| A206 | EDTA-HCl extractable | B206 |
| A207 | Acid HNO ₃ , HClO ₄ , HF | B207 |
| A208 | Lithium metaborate | B208 |
| A209 | Sodium carbonate | B209 |

Iron

| | | |
|------|--|------|
| A210 | Perchloric acid | B210 |
| A211 | EDTA-HCl extractable | B211 |
| A212 | Acid HNO ₃ , HClO ₄ , HF | B212 |
| A213 | Lithium metaborate | B213 |
| A214 | Sodium carbonate | B214 |
| A215 | Dithionite-citrate-bicarbonate | B215 |
| A216 | Acid ammonium oxalate | B216 |
| A217 | Sodium pyrophosphate | B217 |
| A218 | Acid ammonium acetate | B218 |
| A219 | Neutral ammonium acetate | B219 |
| A220 | Dithionite-citrate extraction | B220 |
| A221 | DTPA-TEA extractable elements | B221 |
| A222 | Orthophenanthrolic extraction | B222 |

Manganese

| | | |
|------|--|------|
| A225 | Perchloric acid | B225 |
| A226 | EDTA-HCl extractable | B226 |
| A227 | Acid HNO ₃ , HClO ₄ , HF | B227 |
| A228 | Lithium metaborate | B228 |
| A229 | Sodium carbonate | B229 |
| A230 | Dithionite-citrate-bicarbonate | B230 |
| A231 | Acid ammonium oxalate | B231 |
| A232 | Sodium pyrophosphate | B232 |
| A233 | Acid ammonium acetate | B233 |
| A234 | Extractable in 0.02 M CaCl ₂ | B234 |
| A235 | DTPA-TEA extractable elements | B235 |
| A236 | EDTA extractable elements | B236 |
| A237 | 0.1 N HCl extractable | B237 |

Boron

| | | |
|------|--|------|
| A240 | Perchloric acid | B240 |
| A241 | Acid HNO ₃ , HClO ₄ , HF | B241 |
| A242 | Sodium carbonate | B242 |
| A243 | Hot H ₂ O soluble azomethine-H | B243 |
| A244 | Hot H ₂ O soluble currinin | B244 |
| A245 | Hot H ₂ O soluble dianthrimide | B245 |
| A246 | DTPA-TEA extractable elements | B246 |
| A247 | EDTA extractable elements | B247 |
| A248 | 0.1 N HCl extractable elements | B248 |

Selenium

| | | |
|------|--|------|
| A251 | Acid HNO ₃ , HClO ₄ | B251 |
| A252 | Acid HNO ₃ , H ₂ SO ₄ | B252 |
| A253 | Acid HNO ₃ , HClO ₄ , HF | B253 |
| A254 | Lithium metaborate | B254 |
| A255 | Sodium carbonate | B255 |

| | | |
|------|-----------|------|
| A256 | DTPA-TEA | B256 |
| A257 | EDTA | B257 |
| A258 | 0.1 N HCl | B258 |

Molybdenum

| | | |
|------|--|------|
| A263 | Perchloric acid | B263 |
| A264 | Acid HNO_3 , HClO_4 , HF | B264 |
| A265 | Lithium metaborate | B265 |
| A266 | Sodium carbonate | B266 |
| A267 | DTPA-TEA | B267 |
| A268 | EDTA | B268 |
| A269 | 0.1 N HCl | B269 |

Lead

| | | |
|------|--|------|
| A274 | Perchloric acid | B274 |
| A275 | EDTA-HCl extractable | B275 |
| A276 | Acid HNO_3 , HClO_4 , HF | B276 |
| A277 | Lithium metaborate | B277 |
| A278 | Sodium carbonate | B278 |

Cobalt

| | | |
|------|--|------|
| A286 | Perchloric acid | B286 |
| A287 | EDTA-HCl extractable | B287 |
| A288 | Acid HNO_3 , HClO_4 , HF | B288 |
| A289 | Lithium metaborate | B289 |
| A290 | Sodium carbonate | B290 |

Mercury

| | | |
|------|---|------|
| A298 | Acid HNO_3 - H_2SO_4 | B298 |
|------|---|------|

Arsenic

| | | |
|------|---|------|
| A306 | Vapor generator | B306 |
| A307 | Acid HCl - H_2SO_4 | B307 |

Beryllium

| | | |
|------|--------------------|------|
| A315 | Lithium metaborate | B315 |
| A316 | Sodium carbonate | B316 |

Cadmium

| | | |
|------|--|------|
| A324 | Perchloric acid | B324 |
| A325 | EDTA extractable | B325 |
| A326 | Acid HNO_3 , HClO_4 , HF | B326 |
| A327 | Lithium metaborate | B327 |
| A328 | Sodium carbonate | B328 |

Chromium

| | | |
|------|--|------|
| A336 | Perchloric acid | B336 |
| A337 | EDTA extractable | B337 |
| A338 | Acid HNO ₃ , HClO ₄ , HF | B338 |
| A339 | Lithium metaborate | B339 |
| A340 | Sodium carbonate | B340 |

Strontium

| | | |
|------|--|------|
| A348 | Perchloric acid | B348 |
| A349 | Acid HNO ₃ , HClO ₄ , HF | B349 |
| A350 | Lithium metaborate | B350 |
| A351 | Sodium carbonate | B351 |

Vanadium

| | | |
|------|--|------|
| A360 | Perchloric acid | B360 |
| A361 | Acid HNO ₃ , HClO ₄ , HF | B361 |
| A362 | Lithium metaborate | B362 |
| A363 | Sodium carbonate | B363 |

Nickel

| | | |
|------|--|------|
| A371 | Perchloric acid | B371 |
| A372 | EDTA extractable | B372 |
| A373 | Acid HNO ₃ , HClO ₄ , HF | B373 |
| A374 | Lithium metaborate | B374 |
| A375 | Sodium carbonate | B375 |

Fluorine

| | | |
|------|---|------|
| A383 | Hot H ₂ SO ₄ and steam distillate | B383 |
| A384 | Calcium oxide and steam distillate | B384 |
| A385 | Lithium metaborate | B385 |
| A386 | Boron (III) oxide | B386 |

pH

| | | |
|------|--------------------------------|------|
| A394 | Water 1:1 supernatant | B394 |
| A395 | Water 1:1 suspension | B395 |
| A396 | Water 1:5 supernatant | B396 |
| A397 | Water 1:5 suspension | B397 |
| A398 | Water-saturated paste | B398 |
| A399 | Water-saturated extract | B399 |
| A400 | Calcium chloride supernatant | B400 |
| A401 | Calcium chloride suspension | B401 |
| A402 | Potassium chloride supernatant | B402 |
| A403 | Potassium chloride suspension | B403 |
| A404 | Sodium fluoride supernatant | B404 |
| A405 | Sodium fluoride suspension | B405 |
| A406 | Water 1:1 paste | B406 |
| A407 | Calcium chloride paste | B407 |

Organic Carbon

| | |
|---|------|
| A413 Dry combustion, induction furnace | B413 |
| A414 Wet oxidation (Allison) | B414 |
| A415 Wet oxidation (Walkley-Black) | B415 |
| A416 Dry combustion, resistance furnace | B416 |

Organic Matter

| | |
|---|------|
| A424 Dry combustion, induction furnace | B424 |
| A425 Wet oxidation (Allison) | B425 |
| A426 Wet oxidation (Walkley-Black) | B426 |
| A427 Dry combustion, resistance furnace | B427 |
| A428 Pyrophosphate soluble | B428 |

Calcium Carbonate Equivalent

| | |
|---|------|
| A436 Gas volumetric | B436 |
| A437 Gravimetric approximate quantitative | B437 |
| A438 Pressure. | B438 |
| A439 Citrate buffer | B439 |
| A440 Titrimetric | B440 |

Electrical Conductivity implied units mmhos cm⁻¹

| | |
|--------------------------------|------|
| A449 Saturated, mixed | B449 |
| A450 Saturated, capillary rise | B450 |
| A451 1:5 soil:water | B451 |
| A453 1:1 soil:water | B453 |

Percent H₂O at which electrical conductivity is measured

| | |
|------------------|------|
| A452 Gravimetric | B452 |
|------------------|------|

Cation Exchange Capacity

Permanent charge

| | |
|---------------------------------|------|
| A460 Neutral salt, long method | B460 |
| A461 Neutral salt, rapid method | B461 |

Buffered

| | |
|---|------|
| A462 NH ₄ OAc, pH 7.0 | B462 |
| A463 NH ₄ OAc, pH 8.2 | B463 |
| A464 BaCl ₂ , pH 8.0 | B464 |
| A465 Ca(OAc) ₂ -CaCl ₂ , pH 7.0 | B465 |
| A466 Ca(OAc) ₂ , pH 5.0 | B466 |
| A467 NaOAc, pH 8.2 | B467 |

Soil Moisture %

1/10 Atmosphere tension

| | |
|-------------------------|------|
| A475 Disturbed sample | B475 |
| A476 Undisturbed sample | B476 |
| A477 Field measurement | B477 |

1/3 Atmosphere tension

| | |
|-------------------------|------|
| A478 Disturbed sample | B478 |
| A479 Undisturbed sample | B479 |
| A480 Field measurement | B480 |

15 Atmosphere tension

| | |
|-------------------------|------|
| A481 Disturbed sample | B481 |
| A482 Undisturbed sample | B482 |
| A483 Field measurement | B483 |

Hygroscopic Moisture

| | |
|-------------------------|------|
| A484 Disturbed sample | B484 |
| A485 Undisturbed sample | B485 |
| A486 Field measurement | B486 |

Particle Size Analysis

Total sand >50 μm

| | |
|-------------------------|------|
| A494 Pipette | B494 |
| A495 Hydrometer | B495 |
| A496 Plummet | B496 |
| A497 Decanting | B497 |
| A498 Ultrasonic sieving | B498 |
| A499 X-ray | B499 |
| A500 Wet sieving | B500 |

Total silt 50-2 μm

| | |
|-------------------------|------|
| A501 Pipette | B501 |
| A502 Hydrometer | B502 |
| A503 Plummet | B503 |
| A504 Decanting | B504 |
| A505 Ultrasonic sieving | B505 |
| A506 X-ray | B506 |
| A507 Wet sieving | B507 |

Total clay <2 μm

| | |
|-------------------------|------|
| A508 Pipette | B508 |
| A509 Hydrometer | B509 |
| A510 Plummet | B510 |
| A511 Decanting | B511 |
| A512 Ultrasonic sieving | B512 |
| A513 X-ray | B513 |
| A514 Wet sieving | B514 |

Bulk Density

| | |
|-------------------------|------|
| A522 Field state | B522 |
| A523 Air-dry | B523 |
| A524 Oven-dry | B524 |
| A525 30 cm absorption | B525 |
| A526 1/3 bar desorption | B526 |

Specific Gravity

| | |
|-----------------|------|
| A534 Pycnometer | B534 |
|-----------------|------|

Atterberg Limits

| | |
|----------------------|------|
| A542 Plastic limit | B542 |
| A543 Liquid limit | B543 |
| A544 Shrinkage limit | B544 |

Specific Surface Area by Sorption

| | |
|--------------------------|------|
| A552 Ethylene glycol | B552 |
| A553 Glycerol | B553 |
| A554 Gases | B554 |
| A555 Water | B555 |
| A556 Orthophenanthroline | B556 |

Aggregate Stability

| | |
|--------------------------|------|
| A564 Wet sieving | B564 |
| A565 Dry sieving | B565 |
| A566 Rainfall simulation | B566 |

Infiltration Rate

| | |
|-----------------------------|------|
| A574 Rainfall simulation | B574 |
| A575 Flooding | B575 |
| A576 Watershed hydrograph | B576 |
| A577 Portable infiltrometer | B577 |
| A578 Auger hole | B578 |

Hydraulic Conductivity

| | |
|----------------------------|------|
| A586 Constant head | B586 |
| A587 Falling head | B587 |
| A588 Auger hole | B588 |
| A589 Piezometer | B589 |
| A590 Double tube | B590 |
| A591 Shallow-well pump-in | B591 |
| A592 Permeameter | B592 |
| A593 Steady-state | B593 |
| A594 Air entry permeameter | B594 |

Porosity

| | |
|----------------------------------|------|
| A602 Bulk density determinations | B602 |
| A603 Air-space pycnometer | B603 |
| A604 Tension table | B604 |

Textural Designation

| | | |
|------|--------------------------------|------|
| A611 | Textural triangle | B611 |
| A612 | Estimated | B612 |
| | 0100 coarse sand | |
| | 0200 sand | |
| | 0300 fine sand | |
| | 0400 very fine sand | |
| | 0500 loamy coarse sand | |
| | 0600 loamy sand | |
| | 0700 loamy fine sand | |
| | 0800 loamy very fine sand | |
| | 0900 coarse sandy loam | |
| | 1000 sandy loam | |
| | 1100 fine sandy loam | |
| | 1200 very fine sandy loam | |
| | 1300 loam | |
| | 1400 silt loam | |
| | 1500 silt | |
| | 1600 sandy clay loam | |
| | 1700 fine sandy clay loam | |
| | 1800 very fine sandy clay loam | |
| | 1900 clay loam | |
| | 2000 silty clay loam | |
| | 2100 sandy clay | |
| | 2200 silty clay | |
| | 2300 clay | |
| | 2400 heavy clay | |
| | 2500 organic | |

Oxygen Diffusion Rate

| | | |
|------|--------------------|------|
| A707 | Platinum electrode | B707 |
|------|--------------------|------|

APPENDIX D

DATA FIELD* NAMES USED FOR DATA RETRIEVALFIELD NAME

FILE 1 SITE DATA

- 1 HEADER
 1A FILE NUMBER
 1B PROVINCE
 1C YEAR
 1D PROJECT IDENTIFICATION NUMBER
 1E AGENCY NUMBER
 1F SUPERVISOR'S INITIALS
- 2 IDENTIFICATION SEGMENT
 2A PROJECT INITIATION
 2B PROJECT CESSATION
 2C PURPOSE OF EXPERIMENT
 2C1 PURPOSE
 2C2 TYPE
 2C3 NAME OF PROJECT (FREE FORMAT)
- 3 IDENTIFICATION SEGMENT (continued)
INCLUDED SEGMENTS AND CREDIBILITY
 3A IDENTIFICATION
 3B LOCATION
 3C SITE DESCRIPTION
 3D SOIL CLASSIFICATION
 3E SOIL MORPHOLOGY
 3F HISTORICAL PLOT MANAGEMENT
 3G CURRENT-YEAR PLOT MANAGEMENT
 3H SPECIAL NOTES
 3I INTERPRETATIVE COMMENTS
 3J WEATHER
 3S SOIL TEMPERATURE AND SOIL MOISTURE
 3T PHYSICAL DATA
 3U CHEMICAL DATA (GENERAL)
 3V CHEMICAL DATA (SALINITY)
 3W CHEMICAL DATA (MACRONUTRIENTS)
 3X CHEMICAL DATA (MICRONUTRIENTS)
 3ZF GROWTH STAGES
 3ZG PHENOLOGY SEGMENT
 3ZH GROWTH (FREE FORMAT)
 3ZI DAMAGE
 3ZJ YIELD AND QUALITY
 3ZK ELEMENTAL ANALYSIS
 3ZL OILSEED ANALYSIS
 3ZM FEED ANALYSIS
 3ZN ENZYME ACTIVITY
 3ZØ LEVEL DEFINITION
 3ZP FACTOR DEFINITION
 3ZQ FACTOR LEVEL NESTING

*A data field represents a specific unit of data. The alphanumeric field names are codes that identify data units of any size.

4

LOCATION SEGMENT

- 4A LEGAL LOCATION
 - 4A1 MUNICIPALITY, COUNTY, OR DISTRICT
 - 4A2 QUARTER-SECTION
 - 4A3 SECTION NUMBER
 - 4A4 TOWNSHIP
 - 4A5 TOWNSHIP MODIFIER
 - 4A6 RANGE OR CONCESSION
 - 4A7 HEADING
 - 4A8 MFRIDIAN
- 4B NTS MAP AREA
 - 4B1 PRIMARY QUADRANT
 - 4B2 ALPHA DIVISION
 - 4B3 NUMERIC DIVISION
 - 4B4 DIRECTION
- 4C PLOT CENTER - POINT LOCATION
 - 4C11 LATITUDE
 - 4C111 DEGREES
 - 4C112 MINUTES
 - 4C113 SECONDS
 - 4C12 LONGITUDE
 - 4C121 DEGREES
 - 4C122 MINUTES
 - 4C123 SECONDS
 - 4C2 MILITARY GRID REFERENCE
 - 4C21 ZONE
 - 4C22 ALPHA LETTER
 - 4C23 100 000 METRE
 - 4C24 EASTING
 - 4C25 NORTHING
- 4D LEGAL SUBDIVISIONS

5

SITE DESCRIPTION SEGMENT

- 5A SLOPE
 - 5A1 PERCENT SLOPE
 - 5A2 SLOPE TYPE
 - 5A3 CLASS
 - 5A4 ASPECT
 - 5A5 SAMPLE SITE POSITION ON SLOPE
 - 5A6 SLOPE LENGTH
- 5B SOIL MOISTURE AND DRAINAGE
 - 5B1 MOISTURE REGIME SUBCLASS
 - 5B2 SOIL SITE DRAINAGE CLASSES
 - 5B3 SOIL PERVIOUSNESS CLASSES
- 5C SURFACE RUNOFF
- 5D SEEPAGE
- 5E EROSION
 - 5E1 GENERAL WATER EROSION
 - 5E2 GULLY EROSION
 - 5E3 WIND
- 5F STONINESS
- 5G ROCKINESS
- 5H DEPTH TO BEDROCK
- 5I DEPTH TO PERMAFROST
- 5J DEPTH TO APPARENT WATER TABLE
- 5K DEPTH TO LIME

5L ELEVATION OF SITE
 5M TEXTURE OF SURFACE
 5M1 CLASS
 5M2 TEXTURE MODIFIERS
 5N TEXTURE OF SUBSOIL
 5N1 CLASS
 5N2 TEXTURE MODIFIERS
 5Ø TEXTURE OF PARENT MATERIAL
 5Ø1 CLASS
 5Ø2 TEXTURE MODIFIERS
 5Q SOIL IDENTIFICATION
 5Q1 SOIL MAP UNIT NOTATION
 5Q11 SOIL SERIES
 SOIL ASSOCIATION
 5Q12 DOMINANT
 5Q13 SIGNIFICANT
 5Q14 SIGNIFICANT
 5Q15 SLOPE
 5Q16 TEXTURE
 5Q17 LANDFORM
 5Q2 ALTERNATE SOIL MAP UNIT
 5Q21 MAJOR SOIL AREA
 5Q211 72
 5Q212 73
 5Q213 FRACTION OF AREA SAMPLED
 5Q22 SECOND SOIL AREA
 5Q221 75
 5Q222 83
 5Q223 FRACTION OF AREA SAMPLED
 5Q23 THIRD SOIL AREA
 5Q231 77
 5Q232 78
 5Q233 FRACTION OF AREA SAMPLED

6 SOIL CLASSIFICATION SEGMENT

6A CLI
 6A11 1ST RATING FROM
 6A12 TO
 6A13 2ND RATING FROM
 6A22 TO
 6A23 2ND RATING AS FRACTION OF TOTAL
 6B SOIL TAXONOMY
 6B1 YEAR OF TAXONOMIC SYSTEM
 6B2 BRUNISOLIC
 6B3 CHERNOZEMIC
 6B4 CRYOSOLIC
 6B5 GLEYSOLIC
 6B6 LUVISOLIC
 6B7 ORGANIC
 6B8 PODZOLIC
 6B9 REGOSOLIC
 6B10 SOLONETZIC
 6C MECHANICAL IMPEDENCE
 6C1 DEPTH TO CONSTRICTING LAYER (cm)
 6C2 TYPE OF CONSTRICTING LAYER

- 7 SOIL MORPHOLOGY SEGMENT
 - 7A LAYER/HORIZON DESIGNATION
 - 7A1 LITHOLOGIC DISCONTINUITY
 - 7A2 MASTER LAYER/HORIZON
 - 7A3 SUFFIXES
 - 7A4 MODIFIER
 - 7B LAYER/HORIZON DEPTH AND THICKNESS
 - 7B1 MODAL (cm)
 - 7B11 UPPER LIMIT
 - 7B12 LOWER LIMIT
 - 7B2 RANGE (cm)
 - 7B21 MIN
 - 7B22 MAX
 - 7C COLOR
 - 7C1 ASPECT
 - 7C2 HUE
 - 7C21 NUMERAL
 - 7C22 SYMBOL
 - 7C3 VALUE
 - 7C4 CHROMA
 - 7D TEXTURE
 - 7D1 CLASS
 - 7D2 TEXTURE MODIFIERS
 - 7E SOIL STRUCTURE
 - 7E1 GRADE
 - 7E2 CLASS SIZE
 - 7E3 KIND
 - 7E4 KIND MODIFIER
 - 7F CONSISTENCE
 - 7F1 WET
 - 7F2 MOIST
 - 7F3 DRY
 - 7F4 PLASTICITY
 - 7G EFFERVESCENCE
 - 7G1 REAGENT
 - 7G2 DEGREE OF EFFERVESCENCE
- 8 HISTORICAL PLOT MANAGEMENT SEGMENT
 - 8A PAST MANAGEMENT ON PLOT (LAND USE)
 - 8A1 URBAN
 - 8A2 AGRICULTURE
 - 8A3 ROUGH GRAZING AND RANGELAND
 - 8A4 WOODLAND
 - 8A5 WETLAND
 - 8A6 OTHER
 - 8B AGRICULTURAL LAND USE, CROPPING HISTORY, CROPS GROWN
 - 8B1 CEREALS AND RELATED CROPS
 - 8B2 OTHER FIELD CROPS
 - 8B3 FORAGE AND SEED CROPS
 - 8B4 FALLOW
 - 8B5 MARKET VEGETABLE CROPS
 - 8B6 MARKET FRUIT CROPS
 - 8B7 SPECIALTIES
 - 8B8 AVERAGE LENGTH OF ROTATION
 - 8B9 NUMBER OF YEARS UNDER CULTIVATION

- 8C1 TYPES OF AMENDMENTS USED
- 8C2 EFFECTIVENESS OF:
 - 8C21 WEED CONTROL
 - 8C22 INSECT CONTROL
 - 8C23 DISEASE CONTROL

9 FIRST-YEAR-PAST MANAGEMENT

- 9A CROPS GROWN
 - 9A1 CEREALS AND RELATED CROPS
 - 9A2 OTHER FIELD CROPS
 - 9A3 FORAGE AND SEED CROPS
 - 9A4 FALLOW
 - 9A5 MARKET VEGETABLE CROPS
 - 9A6 MARKET FRUIT CROPS
 - 9A7 SPECIALTIES
- 9B FERTILIZER MANAGEMENT
 - 9B1 RECOMMENDATION
 - 9B2 FORM OF FERTILIZER
- 9C FERTILIZER (MACRONUTRIENTS)
 - 9C1 N
 - 9C11 RATE (kg/ha)
 - 9C12 FERTILIZER ANALYSIS
 - 9C13 PLACEMENT
 - 9C14 INCORPORATED
 - 9C15 TIME OF APPLICATION
 - 9C2 P₂O₅
 - 9C21 RATE (kg/ha)
 - 9C22 FERTILIZER ANALYSIS
 - 9C23 PLACEMENT
 - 9C24 INCORPORATED
 - 9C25 TIME OF APPLICATION
 - 9C3 K₂O
 - 9C31 RATE (kg/ha)
 - 9C32 FERTILIZER ANALYSIS
 - 9C33 PLACEMENT
 - 9C34 INCORPORATED
 - 9C35 TIME OF APPLICATION
 - 9C4 S
 - 9C41 RATE (kg/ha)
 - 9C42 FERTILIZER ANALYSIS
 - 9C43 PLACEMENT
 - 9C44 INCORPORATED
 - 9C45 TIME OF APPLICATION
- 9D FERTILIZER (MICRONUTRIENTS)
 - 9D1 ONE:
 - 9D11 ELEMENT
 - 9D12 RATE (kg/ha)
 - 9D13 CARRIER
 - 9D14 PLACEMENT
 - 9D15 INCORPORATED
 - 9D16 TIME OF APPLICATION
 - 9D2 TWO:
 - 9D21 ELEMENT
 - 9D22 RATE (kg/ha)
 - 9D23 CARRIER

- 9D24 PLACEMENT
 - 9D25 INCORPORATED
 - 9D26 TIME OF APPLICATION
 - 9D3 THREE:
 - 9D31 ELEMENT
 - 9D32 RATE (kg/ha.)
 - 9D33 CARRIER
 - 9D34 PLACEMENT
 - 9D35 INCORPORATED
 - 9D36 TIME OF APPLICATION
 - 9E1 WEED CONTROL METHODS
 - 9E2 CHEMICAL CONTROL
 - 9E21 ONE:
 - 9E211 TRADE NAME
 - 9E212 RATE (ACTIVE INGREDIENT kg/ha)
 - 9E213 TIME OF APPLICATION
 - 9E22 TWO:
 - 9E221 TRADE NAME
 - 9E222 RATE (ACTIVE INGREDIENT kg/ha)
 - 9E223 TIME OF APPLICATION
 - 9E23 THREE:
 - 9E231 TRADE NAME
 - 9E232 RATE (ACTIVE INGREDIENT kg/ha)
 - 9E233 TIME OF APPLICATION
 - 9F INSECTICIDES AND FUNGICIDES APPLICATION
 - 9F11 TRADE NAME
 - 9F12 RATE (ACTIVE INGREDIENT kg/ha)
 - 9F21 TRADE NAME
 - 9F22 RATE (ACTIVE INGREDIENT kg/ha)
 - 9G SPECIAL SOIL MANAGEMENT PRACTICES
 - 9H ESTIMATED YIELD (kg/ha)
- 10 CURRENT-YEAR PLOT MANAGEMENT
- 10A EXPERIMENTAL DESIGN
 - 10A1 SHAPE OF PLOT
 - 10A2 DESIGN
 - 10A3 NUMBER OF REPLICATES
 - 10A4 NUMBER OF TREATMENT PER REPLICATE
 - 10A5 AREA OF ONE REPLICATE
 - 10A6 AREA OF ONE TREATMENT
 - 10A7 AREA SAMPLED FOR YIELD AND QUALITY (m²)
 - 10B TRIAL CONDUCTED
 - EQUIPMENT UTILIZED
 - 10B1 FIELD-SCALE EQUIPMENT
 - 10B2 SPECIALIZED-SCALE EQUIPMENT
 - 10C1 CEREALS AND RELATED CROPS
 - 10C2 OTHER FIELD CROPS
 - 10C3 FORAGE AND SEED CROPS
 - 10C4 FALLOW
 - 10C5 MARKET VEGETABLE CROPS
 - 10C6 MARKET FRUIT CROPS
 - 10C7 SPECIALTIES
 - 10C8 VARIETY
- 10D GROWER NUMBER
 - 10E FERTILIZER MANAGEMENT
 - 10F SEEDBED PREPARATION

- 10G WEED CONTROL METHODS
- 10H SPECIAL SOIL MANAGEMENT PRACTICES
- 10I1 SPECIAL SOIL AMENDMENTS USED
- 10I2 RATE OF AMENDMENTS APPLIED (kg/ha)
- 10J SPECIAL SOIL PROBLEMS

- 11 SPECIAL NOTES (FREE FORMAT)

- 12 INTERPRETATIVE COMMENTS

- 13 WEATHER SEGMENT
 - 13B DATE
 - 13B1 DAY
 - 13B2 MONTH
 - 13C AIR TEMPERATURE
 - 13C1 ±MINIMUM
 - 13C2 ±MAXIMUM
 - 13D SOIL TEMPERATURE
 - 13D1 DEPTH (cm)
 - 13D11 UPPER LIMIT
 - 13D12 LOWER LIMIT
 - 13D2 ±TEMPERATURE
 - 13E SOIL MOISTURE
 - 13E1 DEPTH (cm)
 - 13E11 UPPER LIMIT
 - 13E12 LOWER LIMIT
 - 13E2 PERCENTAGE
 - 13F PRECIPITATION EVENTS IN GROWING SEASON
 - 13F1 DURATION (h)
 - 13F2 RAINFALL (mm)
 - 13G EVAPORATION
 - 13H POTENTIAL EVAPOTRANSPIRATION
 - 13I ±MOISTURE DEFICIT
 - 13J PERIOD OF OBSERVATION
 - 13J1 FROM
 - 13J11 DAY
 - 13J12 MONTH
 - 13J2 TO
 - 13J21 DAY
 - 13J22 MONTH

- 14 METHODS SEGMENT
 - 14A1 AIR TEMPERATURE UNITS
 - 14A2 SOIL TEMPERATURE UNITS
 - 14A3 SOIL MOISTURE METHOD
 - 14B EVAPORATION
 - 14B1 UNITS
 - 14B2 METHOD
 - 14B3 CONVERSION FACTOR TO CDA PAN
 - 14C POTENTIAL EVAPOTRANSPIRATION UNITS
 - 14D MOISTURE DEFICIT
 - 14E TOTAL PRECIPITATION DURING GROWING SEASON (cm)
 - 14E11 AGROCLIMATIC AREA
 - 14E12 CLIMATE REFERENCE STATION

FILE 7

- 1 HEADER
 - 1A FILE NUMBER
 - 1B PROVINCE
 - 1C YEAR
 - 1D PROJECT IDENTIFICATION NUMBER
 - 1E AGENCY NUMBER
 - 1F SUPERVISOR'S INITIALS
 - 1G FACTOR NUMBER
 - 1H LEVEL NUMBER
 - 1I ASSOCIATION

- 2 LEVEL DESCRIPTION SEGMENT
 - 2A1 INFORMATION TYPE
 - 2A2 SOURCE CODE
 - 2A3 METHOD OF APPLICATION
 - 2A4 PLACEMENT INCORPORATION
 - 2B CHEMICAL SYMBOL, FORMULA, OR CROP CODE
 - 2C TREATMENT CODE (METHODS)
 - 2D PERCENTAGE COMPOSITION
 - 2E RATE OF APPLICATION
 - 2F UNITS
 - 2G BASIS
 - 2H DATE
 - 2H1 TIME (h)
 - 2H2 DAY
 - 2H3 MONTH
 - 2I CODE
 - 2J FORM OF MATERIAL
 - 2K MIXTURE OR ASSOCIATION
 - 2I YEAR

- 3 FACTOR DEFINITION SEGMENT*
 - *3A1 FACTOR NUMBER 01
 - 3A11 FACTOR CODE
 - 3A12 NUMBER OF LEVELS
 - 3A13 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A14 FREE-FORMAT OBSERVATIONS
 - 3A11 LEVEL CODE
 - *3A2 FACTOR NUMBER 02
 - 3A21 FACTOR CODE
 - 3A22 NUMBER OF LEVELS
 - 3A23 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A24 FREE-FORMAT OBSERVATIONS
 - 3A21 LEVEL CODE
 - *3A3 FACTOR NUMBER 03
 - 3A31 FACTOR CODE
 - 3A32 NUMBER OF LEVELS
 - 3A33 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A34 FREE-FORMAT OBSERVATIONS
 - 3A31 LEVEL CODE

*For information on factors, retrieval must specify card number 41; for information on levels, retrieval must specify card number 1-40.

- *3A4 FACTOR NUMBER 04
 - 3A41 FACTOR CODE
 - 3A42 NUMBER OF LEVELS
 - 3A43 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A44 FREE-FORMAT OBSERVATIONS
 - 3A41 LEVEL CODE
- *3A5 FACTOR NUMBER 05
 - 3A51 FACTOR CODE
 - 3A52 NUMBER OF LEVELS
 - 3A53 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A54 FREE-FORMAT OBSERVATIONS
 - 3A51 LEVEL CODE
- *3A6 FACTOR NUMBER 06
 - 3A61 FACTOR CODE
 - 3A62 NUMBER OF LEVELS
 - 3A63 ADDITIONAL PROPERTIES OF THIS AMENDMENT ARE DEFINED IN FACTOR
 - 3A64 FREE-FORMAT OBSERVATIONS
 - 3A61 LEVEL CODE

- 4 NESTING ORDER
 - 4A LEVELS OF FACTOR 1
 - 4B LEVELS OF FACTOR 2
 - 4C LEVELS OF FACTOR 3
 - 4D LEVELS OF FACTOR 4
 - 4E LEVELS OF FACTOR 5
 - 4F LEVELS OF FACTOR 6

FILE 3

SOIL TEMPERATURE AND SOIL MOISTURE DATA

- 1 HEADER
 - 1A FILE NUMBER
 - 1B PROVINCE
 - 1C YEAR
 - 1D PROJECT IDENTIFICATION NUMBER
 - 1E AGENCY NUMBER
 - 1F SUPERVISOR'S INITIALS
 - 1G CODED TREATMENT NUMBER
 - 1H REPLICATE
 - 1I DATE
 - 1I1 DAY
 - 1I2 MONTH
 - 1J DEPTH (cm)
 - 1J1 UPPER LIMIT
 - 1J2 LOWER LIMIT
- 2 SOIL TEMPERATURE AND SOIL MOISTURE SEGMENT
 - 2A ±SOIL TEMPERATURE
 - 2B SOIL MOISTURE
- 14 METHODS SEGMENT
 - 14J1 SOIL TEMPERATURE UNITS
 - 14J2 SOIL MOISTURE METHOD

FILE 4

- 1 HEADER
 - 1A FILE NUMBER
 - 1B PROVINCE
 - 1C YEAR
 - 1D PROJECT IDENTIFICATION NUMBER
 - 1E AGENCY NUMBER
 - 1F SUPERVISOR'S INITIALS
 - 1G CODED TREATMENT NUMBER
 - 1H REPLICATE
 - 1I DATE
 - 1I1 DAY
 - 1I2 MONTH
 - 1J DEPTH (cm)
 - 1J1 UPPER LIMIT
 - 1J2 LOWER LIMIT
- 2 SOIL-PHYSICAL DATA SEGMENT
 - 2A SOIL MOISTURE RETENTION PERCENTAGE
 - 2A1 1/10 ATMOSPHERE
 - 2A2 1/3 ATMOSPHERE
 - 2A3 15 ATMOSPHERES
 - 2A4 HYGROSCOPIC MOISTURE
 - 2B PARTICLE SIZE ANALYSIS
 - 2B1 PERCENTAGE
 - 2B11 3 IN. SIEVE
 - 2B12 3/4 IN. SIEVE
 - 2B13 No. 4 SIEVE
 - 2B14 No. 10 SIEVE
 - 2B2 PERCENTAGE OF SAMPLE (<2 mm)
 - 2B21 VERY COARSE SAND
 - 2B22 COARSE SAND
 - 2B23 MEDIUM SAND
 - 2B24 FINE SAND
 - 2B25 VERY FINE SAND
 - 2B26 TOTAL SAND
 - 2B27 TOTAL SILT 50-2 μm
 - 2B281 TOTAL CLAY <2 μm
 - 2B282 FINE CLAY <0.2 μm
 - 2C BULK DENSITY g/cm^3
- 14K METHODS SEGMENT FILE 1
 - 14K1 SOIL MOISTURE RETENTION
 - 14K11 SAMPLE PREPARATION
 - 14K12 SAMPLE STATE
 - 14K13 METHOD
 - 14K2 PARTICLE SIZE ANALYSIS
 - 14K21 REMOVAL OF:
 - 14K22 DISPERSION
 - 14K23 METHOD
 - 14K3 BULK DENSITY
 - 14K31 SAMPLE STATE
 - 14K32 METHOD
 - 14K33 ORGANIC SOILS

3 SOIL CHEMICAL DATA SEGMENT (GENERAL)

- 3A ORGANIC CARBON PERCENTAGE
- 3B CALCIUM CARBONATE EQUIVALENT PERCENTAGE
- 3C TOTAL NITROGEN PERCENTAGE
- 3D CATION EXCHANGE
 - 3D1 BUFFERED
 - 3D2 PERMANENT
- 3E EXCHANGEABLE CATIONS meq/100 g
 - 3E1 NEUTRAL SALT
 - 3E11 Ca
 - 3E12 Mg
 - 3E13 Al
 - 3E2 BUFFERED
 - 3E21 Ca
 - 3E22 Mg
 - 3E23 Na
 - 3E24 K
- 3F pH

14L METHODS SEGMENT FILE 1

- 14L1 ORGANIC CARBON
- 14L2 CALCIUM CARBONATE EQUIVALENT
- 14L3 TOTAL NITROGEN
- 14L4 CATION EXCHANGE CAPACITY
 - 14L41 PERMANENT CHARGE
 - 14L42 BUFFERED
- 14L5 EXCHANGEABLE CATIONS
 - 14L51 NEUTRAL SALT
 - 14L52 BUFFERED METHOD
 - 14L53 ANALYTICAL PROCEDURE
 - 14L54 ANALYTICAL PROCEDURE
- 14L6 pH
 - 14L61 SAMPLE STATE
 - 14L62 METHOD
 - 14L63 MEASUREMENT

4 SOIL CHEMICAL DATA SEGMENT (SALINITY)

- 4A ELECTRICAL CONDUCTIVITY mmhos/cm at 25°C
- 4B PERCENTAGE WATER AT SATURATION
- 4C WATER EXTRACT DETERMINATIONS mg/g

| | |
|--------|----------------------|
| 4C1 Ca | 4C5 CO ₃ |
| 4C2 Mg | 4C6 HCO ₃ |
| 4C3 Na | 4C7 Cl |
| 4C4 K | 4C8 SO ₄ |
| | 4C9 NO ₃ |

14M METHODS SEGMENT

- 14M1 ELECTRICAL CONDUCTIVITY AND WATER EXTRACT DETERMINATIONS
 - EXTRACT DETERMINATIONS
 - EXTRACT SOURCE
- 14M2 WATER EXTRACT DETERMINATIONS
 - EXTRACT DETERMINATIONS
 - 14M21 Ca
 - 14M22 Mg
 - 14M23 Na

14M24 K
14M25 CO₃
14M26 HCO₃
14M27 Cl
14M28 SO₄
14M29 NO₃

5 SOIL CHEMICAL DATA SEGMENT (MACRONUTRIENTS)

5A NITROGEN
5A1 NITRATE
5A11 VALUE 1
5A12 VALUE 2
5B EXTRACTABLE PHOSPHORUS
5B1 VALUE 1
5B2 VALUE 2
5B3 VALUE 3
5C EXTRACTABLE POTASSIUM
5C1 VALUE 1
5C2 VALUE 2
5D EXTRACTABLE SULFUR
5D1 VALUE 1
5D2 VALUE 2

14N METHODS SEGMENT

14N1 NITRATE-N
14N11 METHOD 1
14N12 METHOD 2
14N2 AMMONIUM-N METHOD
14N3 EXTRACTABLE P
14N31 METHOD 1
14N32 METHOD 2
14N33 METHOD 3
14N4 EXTRACTABLE K
14N41 METHOD 1
14N42 METHOD 2
14N5 EXTRACTABLE S
14N51 METHOD 1
14N52 METHOD 2

6 SOIL CHEMICAL DATA SEGMENT (MICRONUTRIENTS)

6A EXTRACTABLE Cu
6A1 VALUE 1
6A2 VALUE 2
6B EXTRACTABLE Zn
6B1 VALUE 1
6B2 VALUE 2
6C EXTRACTABLE Fe
6C1 VALUE 1
6C2 VALUE 2
6D EXTRACTABLE Al
6D1 VALUE 1
6D2 VALUE 2
6E EXTRACTABLE Mn
6E1 VALUE 1
6E2 VALUE 2

- 6F EXTRACTABLE B
 - 6F1 VALUE 1
 - 6F2 VALUE 2
- 6G EXTRACTABLE Se
 - 6G1 VALUE 1
 - 6G2 VALUE 2
- 6H EXTRACTABLE Mo
 - 6H1 VALUE 1
 - 6H2 VALUE 2
- 7 SOIL TEST RECOMMENDATIONS
 - 7A ORGANIC MATTER PERCENTAGE
 - 7B SOIL TEST LAB NUMBER
 - 7C RECOMMENDED FERTILIZER APPLICATIONS
 - 7C1 N
 - 7C2 P-P₂O₅
 - 7C3 K-K₂O
 - 7C4 Lime
- 14P UNITS FOR RECOMMENDED FERTILIZER APPLICATIONS
 - 14P1 N₂, P₂O₅ and K₂O
 - 14P2 Lime
- 8 ADDITIONAL SOIL METHODS
 - 8A METHOD AND ANALYSIS TYPE
 - 8A1 ANALYSIS 1
 - 8A2 ANALYSIS 2
 - 8A3 ANALYSIS 3
 - 8A4 ANALYSIS 4
 - 8B CONCENTRATION VALUE
 - 8B1 ANALYSIS 1
 - 8B2 ANALYSIS 2
 - 8B3 ANALYSIS 3
 - 8B4 ANALYSIS 4
 - 8C UNITS
 - 8C1 ANALYSIS 1
 - 8C2 ANALYSIS 2
 - 8C3 ANALYSIS 3
 - 8C4 ANALYSIS 4

FILE 6

CROP DEVELOPMENT, YIELD, AND QUALITY DATA

- 1 HEADER
 - 1A FILE NUMBER
 - 1B PROVINCE
 - 1C YEAR
 - 1D PROJECT IDENTIFICATION NUMBER
 - 1E AGENCY NUMBER
 - 1F SUPERVISOR'S INITIALS
 - 1G SAMPLE TYPE
 - 1H PURPOSE
 - 1I DATE
 - 1I1 DAY
 - 1I2 MONTH

- 1J CODED TREATMENT NUMBER
- 1K REPLICATE
- 2 GROWTH STAGES SEGMENT
 - 2B AVERAGE EMERGENCE
 - 2B1 DAY
 - 2B2 MONTH
 - 2C THIRD LEAF
 - 2C1 DAY
 - 2C2 MONTH
 - 2D FIFTH LEAF
 - 2D1 DAY
 - 2D2 MONTH
 - 2E TILLERING
 - 2E1 DAY
 - 2E2 MONTH
 - 2F HEADING
 - 2F1 DAY
 - 2F2 MONTH
 - 2G SOFT DOUGH
 - 2G1 DAY
 - 2G2 MONTH
 - 2H SWATHING
 - 2H1 DAY
 - 2H2 MONTH
 - 2I HARVEST
 - 2I1 DAY
 - 2I2 MONTH
 - 2J SAMPLING TECHNIQUE
 - 2K STAND UNIFORMITY
 - 2L SEEDING
 - 2L1 DEPTH (cm)
 - 2L2 ROW SPACING (cm)
 - 2M METHOD CODE
 - 2N MODIFIER
 - 2Ø METHOD
 - 2P PLANT POPULATION
(ESTIMATED)
 - 2Q PLANT POPULATION
(ACTUAL)
 - 2R UNITS
 - 2S ASSESSMENT METHOD
(ACTUAL)
- 3 FREE-FORMAT DESCRIPTION
 - 3A DESCRIPTION
- 4 DAMAGE SEGMENT
 - 4A RUST, PERCENTAGE
 - 4A1 LEAF
 - 4A2 STEM
 - 4B MILDEW, PERCENTAGE
 - 4C SMUT, PERCENTAGE
 - 4D SEPTORIA, PERCENTAGE
 - 4E LODGING, 1-9
 - 4F LODGING, PERCENTAGE
 - 4G BROKEN STALKS, PERCENTAGE

4H MAJOR DAMAGE, PERCENTAGE
 4I CAUSE
 4I1
 4I2
 4J SIGNIFICANT DAMAGE, PERCENTAGE
 4K CAUSE
 4K1
 4K2
 4L DAMAGE ASSESSMENT TECHNIQUE, SUBJECTIVE OR MEASUREMENT

5 YIELD AND QUALITY SEGMENT
 5A YIELD
 5B MOISTURE CONTENT, PERCENTAGE, OVEN-DRY BASIS
 5C NITROGEN, PERCENTAGE
 5D PROTEIN, PERCENTAGE
 5E ELEMENTAL ANALYSIS, PERCENTAGE
 5E1 P
 5E2 K
 5E3 S
 5E4 Ca
 5E5 Mg
 5F TEST WEIGHT
 5F1 lb/bu
 5F2 g/0.5 L
 5G WEIGHT, g/1000 KERNELS
 5H PLUMP KERNELS, PERCENTAGE
 5I GRADE

METHODS SEGMENT

14T3 YIELD
 14T31 UNITS BRITISH OR METRIC
 14T32 MOISTURE BASIS
 14T4 NITROGEN AND PROTEIN, PERCENTAGE
 14T41 REPORTING BASIS
 14T42 MOISTURE BASIS
 14T5 ELEMENTAL ANALYSIS
 14T51 REPORTING BASIS
 14T52 MOISTURE BASIS

Note: If numbers 2-5 are circled on the left hand side of the form, then the field names in the Methods Segment are 15-18 respectively.

6 ELEMENTAL ANALYSIS SEGMENT
 6A ELEMENT 1
 6A1 SYMBOL
 6A2 CONCENTRATION
 6A3 UNITS
 6B ELEMENT 2
 6B1 SYMBOL
 6B2 CONCENTRATION
 6B3 UNITS
 6C ELEMENT 3
 6C1 SYMBOL
 6C2 CONCENTRATION
 6C3 UNITS

- 6D ELEMENT 4
 - 6D1 SYMBOL
 - 6D2 CONCENTRATION
 - 6D3 UNITS
- 6E ELEMENT 5
 - 6E1 SYMBOL
 - 6E2 CONCENTRATION
 - 6E3 UNITS
- 6F ELEMENT 6
 - 6F1 SYMBOL
 - 6F2 CONCENTRATION
 - 6F3 UNITS

7 OILSEED ANALYSIS SEGMENT

- 7A OIL CONTENT, PERCENTAGE, DRY BASIS
- 7B IODINE VALUE
- 7C PROTEIN CONTENT, PERCENTAGE OF OIL-FREE MEAL
- 7D TOTAL CONTENT OF GLUCOSINOLATE IN OIL-FREE MEAL
- 7E ERUCIC ACID
- 7F ALLYLISOTHYOCYANATE mg/g

8 FEED ANALYSIS SEGMENT

- 8A DIGESTABLE DRY MATTER, PERCENTAGE
- 8B FAT, PERCENTAGE
- 8C FIBER, PERCENTAGE
- 8D ASH, PERCENTAGE

9 ENZYME ACTIVITY SEGMENT

- 9A ENZYME NAME
- 9B ACTIVITY
- 9C UNITS
- 9D ABBREVIATED METHOD OF ASSAY

RETRIEVAL NOTES

FOR CROP DAMAGE CODE (CAUSE) - CONVERSION OLD CODE TO NEW CODE

old code <10.

(old code x10) + 10 = new code

APPENDIX E

PERFORMANCE/MANAGEMENT DATA KEYPUNCHING INSTRUCTIONS

This form consists of 50 pages (14 x 8.5) of which only 6 are of similar format. Of these, 4 pages are entirely free-format entries; 20 are entirely fixed-column positional entries; and the rest are a combination of these on the same page.

a) Fixed-column Positional Entries

- Each page is self-defining. That is, all data to be keyed from it are on that page.
- All punched cards must start with the 13 to 23 columns of data normally found in the top left-hand corner of each page.
- The length of these "prefix" data and the number of cards vary from page to page.
- Key only the lines for which data are entered. The order in which the cards are keyed is unimportant.

b) Free-format Entries (card type 04)

- Key only circled and box-filled entries on 6 or 12 column tab boundaries. Entries are of three types.

| <u>on form</u> | <u>keyed as</u> | | | | | | |
|---|-----------------|-----------|---|----------|-----------|---------------|------------|
| C201** | 'C201 ' | 6 columns | | | | | |
| C601** <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>+</td><td>-</td><td>1</td><td>+</td><td>+</td></tr></table> | + | - | 1 | + | + | 'C601 +-1 ++' | 12 columns |
| + | - | 1 | + | + | | | |
| 07 <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td>0</td><td>3</td></tr></table> * | | 0 | 3 | '07 03 ' | 6 columns | | |
| | 0 | 3 | | | | | |

- Columns 1 to 15 are duplicated for each card required.
- Starting in column 16 up to 75, in any order, key as many entries as possible per card. Do not, however, split entries between cards.
- The *'s and unfilled boxes are keyed as blanks.

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MacDonald, K. B.
The Canada Soil Information
System (CanSIS) :



