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Mineral commodity sources for ancient peoples of the Lower Indus River Valley

by

Robert G. Schmidt and R. William Matthews

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A computer-based data file of 222 potential mineral commodity sources in the regions around the Indus River Valley has been prepared for use by scientists studying ancient peoples of that area and also those reviewing modern mineral resources. The area covered by the file includes much of Pakistan except the most mountainous north, and Rajasthan State, in India. A few records of precious metals and sparse commodities are included from adjacent regions.

The file is available on a floppy disk for use on PC-type computers, and the disk also contains operating instructions along with INDUS, a very simple program for access and manipulation of the data set.

Many of the mineral commodities used by the more advanced ancient civilizations were derived from sources outside the centers of habitation, and the provenance of these commodities is of great importance in understanding the economic structures of the ancient societies. The mineral resource literature for a region is commonly highly specialized, widely dispersed, and tends to be slanted toward deposits of those sizes and grades suitable for consumption by modern industry, so that it is difficult to use or may seem to have scant relevance for scientists considering the resource needs of ancient peoples. This file is an experiment in providing a means of quick assessment of the potential sources of a commodity in a specific region, and references where more information may be obtained. If it seems to serve a useful purpose, it is our hope that other economic geologists will compile similar data bases for other areas.

The Lower Indus Valley Data File includes both small occurrences of usable material and resources of sizes and grades appropriate only for modern industrial use. The metallic ores listed include those of gold, silver, copper, lead, zinc, and iron; and several miscellaneous metallic and nonmetallic commodities such as the raw material for slag and plaster, mineral pigments, dye mordants, and cosmetics are also included. This data set can provide some and hopefully most, but certainly not all, of the potential sources of a particular commodity. Unfortunately it probably will not, by itself, help decide which deposits were the most likely sources. Even rough estimates of

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the times when deposits were worked might be helpful in this regard, but dated workings are very sparse in this region.

The individual data fields and some of the problems related to them are discussed in the following section:

RECORD NUMBER: The sequential number assigned to the record which is also the characteristic that enables you to go directly to a record without searching. It may be changed as records are deleted or re-ordered.

DEPOSIT NAME: There may be much variation in the spelling of deposit names as recorded in literature, and this creates a problem for automatic searches because the program INDUS accepts no variation in spelling. Wherever possible, the variations in spelling should be included under SYNONYMS. (INDUS will, however, search for part of a long name).

LOCATION, NEAREST TOWN, ETC: While INDUS is not able to search this field, it may be possible to use it with other data programs. Consequently, the contents of the field have been set up with the key word first, for example, "10 km north of Nok Kundi", would be entered as "Nok Kundi, 10 km north of".

MAP SHEET: The alphanumeric identifier for 15 minute quadrangle maps in India and Pakistan. It always has the same form.

ORIGINAL ENTRY FORM NUMBER: A number that permanently relates the record to an original hard copy entry form. It may not be sequential, and searches using it are slow in INDUS.

DEPOSIT TYPE: A geologic term that identifies the style of mineralization believed to be present. The compiler may assign a type where none is given in the original description, or a more current classification can be applied. For many sites described in older references the compiler has attempted to reclassify the deposit in modern terms; he has almost certainly erred in some instances because it was often necessary to work on scant information.

EXPLOITABLE ELEMENTS: Those metallic elements believed to be present in the deposit in significant amount, the amount depending on the particular element. The deposits included in the file are generally those that contain one or more of the elements, gold, silver, copper, lead, zinc, and iron. Other usable elements may be listed as well when they are known to be present. This field can be searched for any individual element using INDUS. The symbol (AU, Ag, etc.) must be used, except for sulfur; search for that under "Other Mineral Commodities."

OTHER MINERAL COMMODITIES: This category can be used for such nonmetallic materials as gem stones, carving stones, cosmetics, alum, alunite, barite, sulfur, salt, etc. The names should be spelled out.

ORE MINERALS: Those natural minerals that might be extracted from the deposit for use, either in raw form or after smelting or other processing.

HOST ROCKS, AGES: The mostly unmineralized rock immediately surrounding the ore. The age is indicated by a standard division of geologic time.

ASSOCIATED IGNEOUS ROCKS, AGE: Where igneous rock is not the host, its presence nearby may still be significant in understanding how the deposit formed.

AGE OF MINERALIZATION: The geologic time when the mineral deposit was formed. The deposit may be contemporaneous with enclosing rocks or may have formed much later. Few records have information in this field.
OTHER MINERALS PRESENT: Non-ore minerals that occur with the ore. These may provide important information about how the deposit formed.
IMPORTANT ORE CONTROL OR LOCUS: Geologic feature that contributed to the orebody forming where it did.
GEOLOGIC NOTES: Other pertinent or interesting information that may have been included in the original reference, or added by the compiler..
REFERENCE: Published book(s) or article(s) from which information was obtained. Citations are given in standard U. S. Geological Survey style. Any particular site may have several references covered in one record, or a separate record for each reference. In some cases, details of information from different sources are not in agreement.
SIGNIFICANCE: Each occurrence is roughly evaluated as to its resource potential in both an ancient (i. e., pre-industrial revolution) and a modern context, so that the localities can be separated according to the data user's interests and needs. In general, deposits interpreted to have been significant to ancient miners must have consisted of ores of mineral composition, grain size, and richness sufficient that satisfactory concentrates could be made by hand sorting or other relatively simple concentrating processes. Modern uses can accept much lower grades and much more complex mineralogy, but require a larger total resource, often by several orders of magnitude. The categories of relative significance are as follows:

1. Potential former supplier, significant resource may remain.
2. Potential former supplier, unknown remaining resource.
3. Unlikely as former resource, significant modern resource.
4. Unlikely as former resource, modern resource unknown or mined out.
5. Potential former supplier, judged not a resource by modern standards.
6. Other occurrences and possible resources, evaluation not attempted.
7. Included sites other than mineral resource localities. This category includes ancient metallurgical sites that occur separate from a known mine.

THINGS POTENTIALLY EXPLOITABLE BY ANCIENT PEOPLE: Based on the known or assumed deposit types, the compiler has estimated potential co-products that were probably present and that might have been exploitable by ancient peoples besides metallic ores, such as slag raw material, plaster, dye stuff, mordants, pigments, cosmetics, and chemical raw materials. Modern usefulness is not implied here. Medicinal uses are included with chemical raw materials. The minerals to supply the assumed co-products are judged likely to be present based on deposit geology, and may not be specifically mentioned in the report.

Entries in this field required much judgment by the compiler as most references were concerned only with one or a few metallic commodities.
MINING HISTORY: Particular attention has been given to references to early mining or smelting. In published descriptions of many deposits however, no clear distinction was made between abandoned historic operations and ancient workings.

Where the fields provided for text were not large enough, the texts have been continued on another part of the form, as indicated by "(cont.)", "*", or "**".

None of the references found in this study have dealt with the complex problem of identifying the source deposits from which particular objects have been made. Very few references were found to include the detailed geochemical information needed for such provenancing.

Using the included program, INDUS, the file can be searched for records fitting specific characteristics in any of 20 separate fields. These include selecting localities according to their significance to ancient users, or in like manner to modern users, or by country, province, map sheet, deposit type, commodity, authorship of reference, and evidence of ancient mining or smelting.

The data file is maintained as an open-ended, ever-growing compilation available on a floppy disk for use on PC-type computers. It is anticipated that it will be revised and updated periodically and will probably grow to 300 or more records. Users are encouraged to send corrections and additions to the authors at: U.S. Geological Survey, 954 National Center, Reston, VA 22092, USA.

INDUS, also included on the disk, is a simple program that may be used to access the individual records, find a specific record, search for particular commodities, modify records, or add new ones. While somewhat limited in scope, INDUS makes it possible to utilize the data base without access to any other program. Depending on the data processing facilities available to the user, it may be possible to read the file into any of several commercial data base programs where the standard format may be modified, records alphabetized, and unwanted records deleted.

ACKNOWLEDGMENTS: The data file has had a long and arduous history closely following the evolution of changing forms of data bases. We are particularly indebted to Johanna R. Humphrey and Andrew Klafter of the Department of Anthropology, National Museum of Natural History, Smithsonian Institution, who were indispensable in helping make the changes along the way.

Instructions for using the Lower Indus Valley System mineral commodity data file

The data file is provided on a 5.25 inch high density floppy disk for use on PC-type computers, and the disk also contains INDUS, a very simple program for access and manipulation of the data set.

Before using the disk you should make a backup copy, as it is very easy to make changes to the data, sometimes unintentionally.

Getting started--. To operate the system, place the floppy disk in 5.25 high-density drive, type INDUS, and press the ENTER key. The main menu (Figure 1) appears, which offers you a choice of adding, locating, modifying, or printing the individual records describing commodity sources. If you select "1" (add a record), you will be presented with a series of 5 screens with blanks for you to type information for a new record. It will be automatically assigned the record number following the last number already in the data set.

If you wish to locate an existing record using any of the several search methods available, select "2" (locate a record) and you will be given a menu (Figure 2, top). Choose the category you wish to use for a search, either to specify a particular record by number or group of records by category; type the identifying number for that category and press ENTER. The computer will ask for a record number, deposit name, etc. (Figure 2, bottom); when you furnish that information and press ENTER it will begin the search for any match that occurs. INDUS does not need the complete name; it can search for part of a name or synonym.

Working with a record--. When a record is found that has a data value that matches your request, the computer will show you the matching record (Figure 3). With the cursor in the space at the bottom of the screen, you can type "C" to continue through the record or "Q" to quit and return to the main menu. If you select records by record number rather than a name (field value), you can step through the file one record at a time starting with any record.

Changing a record--. To make changes to records, select "3" on the main menu and enter the identifying information to find the record(s). The modify and locate options on the main menu operate in the same fashion, but you must be in the modify mode to make changes to a record. Editing either new or old records goes much more smoothly if you press the "insert" key first.

Printing a record--. When you select one of the several print options the computer will locate a record based on your selection criteria and ask if you want it printed

(Figures 4-9). To obtain a print, type "Y" and press ENTER. Whatever your choice, you will then be asked if you want to print another record. If you answer "Y", it will locate the next match and ask if you want to print it. Otherwise leave the "N" on the screen, press ENTER and you will return to the original menu.

The "Print Division/State" through "Print Modern Significance" options provide partial records from which you can choose, by number, those for which you want a complete print. "Print Exploitable Element" selects all records of locations with the element you have designated; "Print Mineral Commodity" works the same way for the non-metallic materials like gemstones, carving stones, cosmetics, mica, gypsum, alunite, salt, sulfur, etc.

"Print Ancient Significance" selects all records having significance categories 1, 2, and 5, those sources that may have or are known to have been used by ancient people. "Print Modern Significance" selects all records having significance categories 1, 2, 3, and 4, sources that might still contain minable ore.

Ending operations--. To end the program operation, type "0" (zero) at the main or locate menu. The records you have added and the changes made to old records have been saved as part of the file.

Although this program has been used by the U.S. Geological Survey, no warranty, expressed or implied, is made by the USGS as to the accuracy and functioning of the program and related program material, nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the USGS in connection therewith.

Figure 1. The INDUS main menu screen.

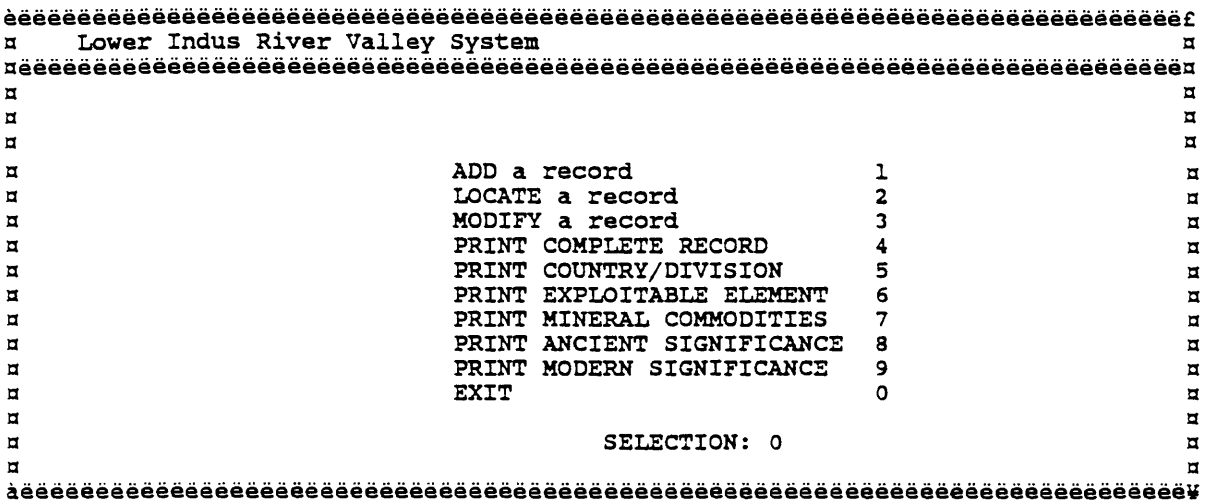
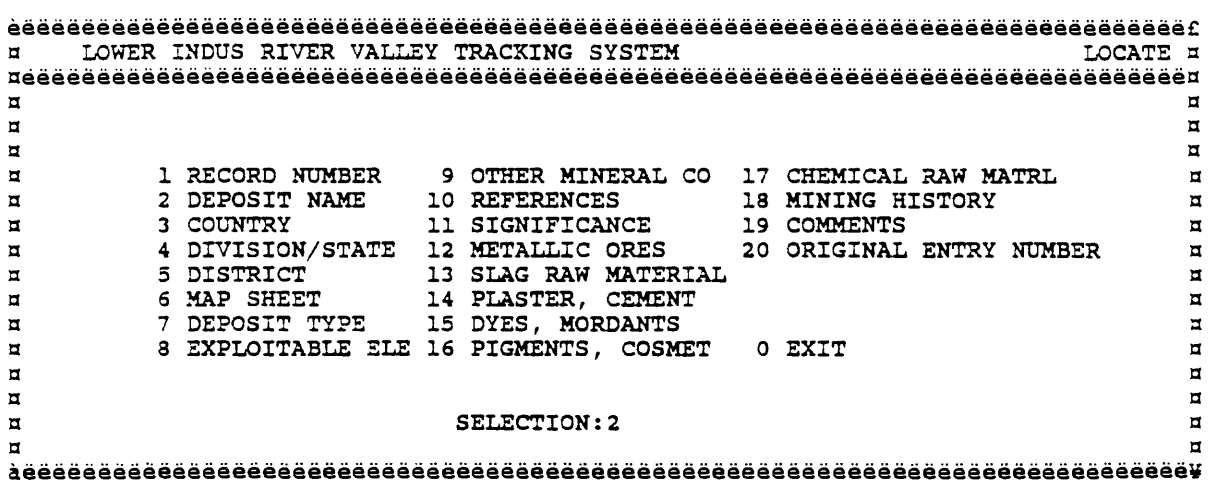


Figure 2. Menu of categories for locating a file (top), and entry form for search value or keyword (bottom).



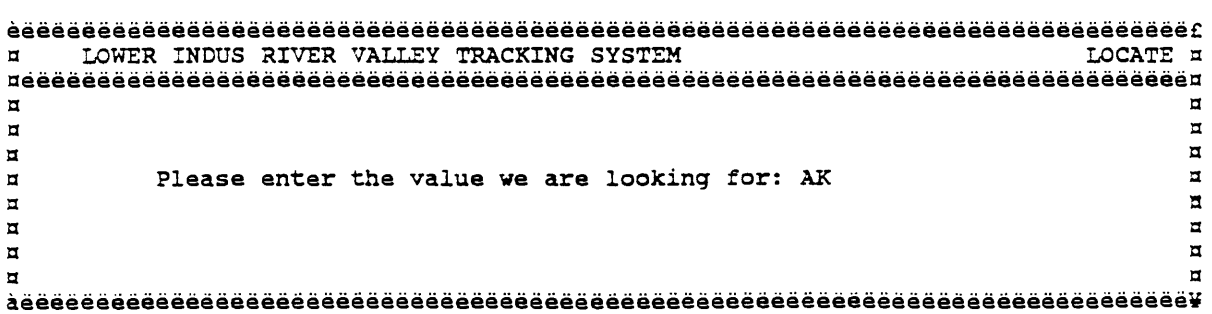


Figure 3. The five screens depicting one standard record. Where fields are left blank, the information was probably lacking in the original references.

```
Mineral Commodity Sources, Lower Indus River Valley  Page 1   LOCATE

COMPILER: R. SCHMIDT                DATE: 01/03/85  RECORD NUMBER:   9

DEPOSIT NAME:
     SAINDAK
SYNONYMS:

COUNTRY:
     PAKISTAN
DIVISION/STATE:
     BALUCHISTAN/QUETTA DIVISION
DISTRICT:
     CHAGAI
LOCATION, NEAREST TOWN, ETC:
     NOK KUNDI, ABOUT 90 MILES WEST OF, CLOSE TO IRANIAN BORDER


LATITUDE: 29/17/--N     LONGITUDE: 061/34/--E      MAP SHEET: 30 G/11
                       ORIGINAL ENTRY NUMBER:   9

                Enter C to CONTINUE, Q to QUIT: C
```

```
Mineral Commodity Sources, Lower Indus River Valley  Page 2   LOCATE
DEPOSIT TYPE:
     PORPHYRY COPPER WITH ASSOCIATED SKARNS AND PERIPHERAL VEINS
EXPLOITABLE ELEMENTS:
     CU/PB/AG/FE/AU
OTHER MINERAL COMMODITIES:
     ALUNITE, VARIOUS JAROSITES
ORE MINERALS:
     CHALCOPYRITE, GALENA, AZURITE, MALACHITE, CHALCOCITE, HEMATITE;
     SOME GALENA IN VEINS WAS ANALYSED AND IS SILVER-BEARING
HOST ROCKS, AGES:
     VOLCANIC, VOLCANICLASTIC, VARIOUS SEDIMENTARY STRATA,
     PALEOCENE TO OLIGOCENE IN AGE
ASSOCIATED IGNEOUS ROCKS, AGE:
     QUARTZ-MONZONITE PORPHYRY
AGE OF MINERALIZATION:
     LATE TERTIARY
OTHER MINERALS PRESENT:
     NATROJAROSITE, PYRITE; GARNET, HEMATITE, AND CALCITE IN SKARNS.
IMPORTANT ORE CONTROL OR LOCUS:
     N-S FAULTS CONTROLLED INTRUSIVE

Enter P for PREVIOUS SCREEN, C to CONTINUE, Q to QUIT: C
```

```
Mineral Commodity Sources, Lower Indus River Valley  Page 3   LOCATE

GEOLOGIC NOTES:
     CU-PB-AG IN LEAN PERIPHERAL VEINS, HEMATITE IN SKARNS, RELATED
      TO QUARTZ MONZONITE PORPHYRY STOCK.  MINERALIZATION  ON LOWELL-
      GUILBERT MODEL, COPPER DISSEMINATED IN INTRUSIVE; CU-PB-AG IN
      LEAN PERIPHERAL VEINS, HEMATITE IN SKARNS.
     GOLD IS RECOVERABLE ONLY IF DEPOSIT IS OPENED AS A MODERN COPPER
      MINE, IRON IN MAGNETITE MAY BE ALSO; THESE WOULD NOT HAVE BEEN
      RESOURCES FOR ANCIENT MINERS.


REFERENCE:
     AHMED, W., KHAN, S.N. & SCHMIDT, R.G., 1972; GEOLOGY AND COPPER
      MINERALIZATION IN THE SAINDAK QUADRANGLE, CHAGAI DISTRICT,
      WEST PAKISTAN:  U.S. GEOL. SURVEY  PROF. PAPER 716-A, 21 P.


     Enter P for PREVIOUS SCREEN, C to CONTINUE, Q to QUIT: C
```

```
Mineral Commodity Sources, Lower Indus River Valley  Page 4   LOCATE

SIGNIFICANCE: 1
  1. Potential former supplier, significant resource may remain.
  2. Potential former supplier, unknown remaining resource.
  3. Unlikely as former resource, significant modern resource.
  4. Unlikely as former resource, modern resource unknown or mined out.
  5. Potential former supplier, judged not a resource by modern standards.
  6. Other occurrences and possible resources, evaluation not attempted.
  7. Included sites other than mineral resource localities.

THINGS POTENTIALLY EXPLOITABLE BY ANCIENT PEOPLE:

        Metallic Ores: X              Slag Raw Materials: X
       Plaster, Cement:                  Dyes, Mordants: X
   Pigments, Cosmetics: X          Chemical Raw Materials:

    Other:
```

Enter P for PREVIOUS SCREEN, C to CONTINUE, Q to QUIT: C

```
Mineral Commodity Sources, Lower Indus River Valley  Page 5   LOCATE

MINING HISTORY:
                        Old Mining noted: Y                  Dumps Present: Y
      Mine Producing at time of report:                       Slag Present: Y

  Prehistoric:
    Pits Present: Y     Shafts Present:       Workings, type unspecified:
  Historic:
    Pits Present: Y     Shafts Present:       Workings, type unspecified:
  Unspecified Age:
    Pits Present: Y     Shafts Present:       Workings, type unspecified:

MINING COMMENTS:
        MOST OLD WORKINGS WERE ON VEINS PERIPHERAL TO PORPHYRY COPPER
         DEPOSIT; THEY PROBABLY SOUGHT SILVER OR COPPER.  LOCAL PRESENCE
         OF LITHARGE INDICATES THAT SOME GALENA WAS PROCESSED FOR SILVER
         HERE.  PITS WERE NOTED ON HEMATITE SKARNS; THESE MAY HAVE
         SOUGHT INCLUDED COPPER MINERALS, OR WERE FOR SLAG OR IRON ORE.
```

Enter P for PREVIOUS SCREEN, C to CONTINUE, Q to QUIT: C

Would you like to LOCATE another record? N

Figure 4. A complete record in printed form.

COMPILER: R. SCHMIDT DATE: 01/01/86 RECORD NUMBER: 75

DEPOSIT NAME:
BHANGARH IRON
SYNONYMS:

COUNTRY:
INDIA
DIVISION/STATE:
RAJASTHAN
DISTRICT:
ALWAR
LOCATION, NEAREST TOWN, ETC:

LATITUDE: 27/05/30N LONGITUDE: 076/21/--E MAP SHEET: 54 A/08
ORIGINAL ENTRY NUMBER 75
DEPOSIT TYPE:
NOT CLASSIFIED
EXPLOITABLE ELEMENTS:
FE MN
OTHER MINERAL COMMODITIES:

ORE MINERALS:
LIMONITE, MAGNETITE, MANGANESE OXIDES

HOST ROCKS, AGES:
ARAVALLI SERIES, NEAR BASE

ASSOCIATED IGNEOUS ROCKS, AGE:

AGE OF MINERALIZATION:

OTHER MINERALS PRESENT:

IMPORTANT ORE CONTROL OR LOCUS:

GEOLOGIC NOTES:

ONE ORE SAMPLE 59.67 PERCENT IRON, 12.7 PERCENT MANGANESE.
REFERENCE:
LA TOUCHE, T.H.D., 1918, A BIBLIOGRAPHY OF INDIAN GEOLOGY AND PHYSICAL GEOGRAPHY, PT. 2, AN ANNOTATED INDEX OF MINERALS OF ECONOMIC VALUE: CALCUTTA, P. 277-278.
SIGNIFICANCE: 2
1. Potential former supplier, significant resource may remain.
2. Potential former supplier, unknown remaining resource.
3. Unlikely as former resource, significant modern resource.
4. Unlikely as former resource, modern resource unknown or mined out.
5. Potential former supplier, judged not a resource by modern standards.
6. Other occurrences and possible resources, evaluation not attempted.
7. Included sites other than mineral resource localities.

THINGS POTENTIALLY EXPLOITABLE BY ANCIENT PEOPLE:
Metallic Ores: X Slag Raw Materials: X
Plaster, Cement: Dyes, Mordants:
Pigments, Cosmetics: X Chemical Raw Materials:
Other:

MINING HISTORY:
Evidence of Old Mining: Y Dumps Present:
Mine Producing at time of report: Slag Present:
Prehistoric:
Pits Present: Shafts Present: Workings, type unspecified:
Historic:
Pits Present: Shafts Present: Workings, type unspecified: Y
Unspecified Age:
Pits Present: Shafts Present: Workings, type unspecified:
MINING COMMENTS:
WORKED ON AN EXTENSIVE SCALE

Figure 5. Three "Division/State" type printed reports for Baluchistan. This report category permits you to print short reports for all records from a selected jurisdiction.

```
          DIVISION/STATE REPORT                              Page   1

COUNTRY: PAKISTAN           DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: CHAGAI
    RECORD NUMBER:   1      MAP SHEET: 30 O/04
    DEPOSIT NAME:
         KOH-I-SULTAN
    EXPLOITABLE ELEMENTS:
         S
    OTHER MINERAL COMMODITIES:
         ALUNITE


COUNTRY: PAKISTAN           DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: CHAGAI OR KHARAN KALAT
    RECORD NUMBER:   2      MAP SHEET: 34 H/01
    DEPOSIT NAME:
         RAS KOH
    EXPLOITABLE ELEMENTS:
         CU
    OTHER MINERAL COMMODITIES:


COUNTRY: PAKISTAN           DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: CHAGAI
    RECORD NUMBER:   3      MAP SHEET: 34 C/07
    DEPOSIT NAME:
         KOH MARANI
    EXPLOITABLE ELEMENTS:
         CU/PB
    OTHER MINERAL COMMODITIES:
```

Figure 6. Views of the screen showing how you choose an element to be searched in the "Print exploitable element" mode, and the screen when an element has been located. Pressing ENTER causes a short report to be printed.

```
INDUS SYSTEM   EXPLOITABLE ELEMENTS                                  PRINT

        Please enter the value we are looking for: PB
```

```
INDUS SYSTEM   EXPLOITABLE ELEMENTS                                  PRINT

        We are searching for PB  In EXPLOITABLE ELEMENTS

        We are at record number    3

DEPOSIT NAME:
     KOH MARANI
COUNTRY:
     PAKISTAN
DIVISION/STATE:
     BALUCHISTAN/QUETTA DIVISION
DISTRICT:
     CHAGAI
EXPLOITABLE ELEMENTS:
     CU/PB
OTHER MINERAL COMMODITIES:

        Do you want to print this record? Y
```

Figure 7. Two typical "Exploitable element" short reports.

```
          EXPLOITABLE ELEMENT - PB                          1

COUNTRY: PAKISTAN            DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: CHAGAI
    RECORD NUMBER:   3      MAP SHEET: 34 C/07
    DEPOSIT NAME:
         KOH MARANI
    EXPLOITABLE ELEMENTS:
         CU/PB
    OTHER MINERAL COMMODITIES:

    MINING HISTORY:
                 Evidence of Old Mining: Y      Dumps Present:
         Mine Producing at time of report:          Slag Present:
    PREHISTORIC
         Pits:      Shafts:      Workings:
    HISTORIC
         Pits:      Shafts:      Workings:
    UNSPECIFIED AGE
         Pits: Y    Shafts:      Workings:


COUNTRY: PAKISTAN            DIVISION/STATE: BALUCHISTAN
    DISTRICT: KHUZDAR
    RECORD NUMBER:  52      MAP SHEET: 35 I/10
    DEPOSIT NAME:
         GUNGA
    EXPLOITABLE ELEMENTS:
         BA--PB--HG
    OTHER MINERAL COMMODITIES:

    MINING HISTORY:
                 Evidence of Old Mining:        Dumps Present:
         Mine Producing at time of report:          Slag Present:
    PREHISTORIC
         Pits:      Shafts:      Workings:
    HISTORIC
         Pits:      Shafts:      Workings:
    UNSPECIFIED AGE
         Pits:      Shafts:      Workings:
```

Figure 8. Two typical "Other mineral commodity" short reports.

```
          MINERAL COMMODITIES REPORT - ALUNITE                    1

COUNTRY: PAKISTAN           DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: CHAGAI
    RECORD NUMBER:   9     MAP SHEET: 30 G/11
    DEPOSIT NAME:
         SAINDAK
    EXPLOITABLE ELEMENTS:
         CU/PB/AG/FE/AU
    OTHER MINERAL COMMODITIES:
         ALUNITE, VARIOUS JAROSITES
    MINING HISTORY:
              Evidence of Old Mining: Y      Dumps Present: Y
         Mine Producing at time of report:       Slag Present: Y
    PREHISTORIC
         Pits: Y   Shafts:     Workings:
    HISTORIC
         Pits: Y   Shafts:     Workings:
    UNSPECIFIED AGE
         Pits: Y   Shafts:     Workings:


COUNTRY: PAKISTAN           DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
    DISTRICT: KACHHI
    RECORD NUMBER:  51     MAP SHEET: 34 O/12
    DEPOSIT NAME:
         SANNI
    EXPLOITABLE ELEMENTS:
         S
    OTHER MINERAL COMMODITIES:
         ALUNITE
    MINING HISTORY:
              Evidence of Old Mining: Y      Dumps Present:
         Mine Producing at time of report:       Slag Present:
    PREHISTORIC
         Pits:     Shafts:     Workings:
    HISTORIC
         Pits:     Shafts: Y   Workings:
    UNSPECIFIED AGE
         Pits:     Shafts:     Workings:
```

Figure 9. A sample record obtained in the "Print ancient significance mode." The "Print modern significance" report contains the same information.

```
          ANCIENT SIGNIFICANCE REPORT                              1

  COUNTRY: PAKISTAN            DIVISION/STATE: BALUCHISTAN/QUETTA DIVISION
      DISTRICT: CHAGAI
      RECORD NUMBER:   5     MAP SHEET: 34 C/11
      DEPOSIT NAME:
           DIRANG KALAT LEAD MINE
      EXPLOITABLE ELEMENTS:
           PB/CU/ZN
      OTHER MINERAL COMMODITIES:

      SIGNIFICANCE: 2
       1. Potential former supplier, significant resource may remain.
       2. Potential former supplier, unknown remaining resource.
       3. Unlikely as former resource, significant modern resource.
       4. Unlikely as former resource, modern resource unknown or mined out.
       5. Potential former supplier, judged not a resource by modern standards.
       6. Other occurrences and possible resources, evaluation not attempted.
       7. Included sites other than mineral resource localities.
      THINGS POTENTIALLY EXPLOITABLE BY ANCIENT PEOPLE:
                Metallic Ores: X          Slag Raw Materials:
               Plaster, Cement:               Dyes, Mordants:
           Pigments, Cosmetics:        Chemical Raw Materials:
      Other:

      MINING HISTORY:
                      Evidence of Old Mining:        Dumps Present:
           Mine Producing at time of report: Y        Slag Present:
      PREHISTORIC
           Pits:      Shafts:      Workings:
      HISTORIC
           Pits:      Shafts:      Workings:
      UNSPECIFIED AGE
           Pits:      Shafts:      Workings:
```

Structure for database: C:geo2.dbf
Number of data records: 222
Date of last update : 8/28/92

Field	Field Name	Type	Width	Dec
1	RECNUM	Character	3	
2	INDUSNUM	Character	3	
3	DEPOSITNAM	Character	64	
4	SYNONYMS	Character	64	
5	COUNTRY	Character	15	
6	DIVISION	Character	40	
7	DISTRICT	Character	40	
8	NEARTOWN1	Character	64	
9	NEARTOWN2	Character	64	
10	LATITUDE	Character	10	
11	LONGITUDE	Character	11	
12	MAPSHEET	Character	7	
13	DEPOTYPE	Character	64	
14	METALSPRES	Character	64	
15	OTHERCOMOD	Character	64	
16	OREMINRAL1	Character	64	
17	OREMINRAL2	Character	64	
18	HOSTROCKS1	Character	64	
19	HOSTROCKS2	Character	64	
20	ASSOCIGN	Character	64	
21	AGEMINERAL	Character	64	
22	OTHERMINGY	Character	64	
23	ORECONTRL1	Character	64	
24	ORECONTRL2	Character	64	
25	GEONOTES1	Character	64	
26	GEONOTES2	Character	64	
27	GEONOTES3	Character	64	
28	GEONOTES4	Character	64	
29	GEONOTES5	Character	64	
30	GEONOTES6	Character	64	
31	GEONOTES7	Character	64	
32	GEONOTES8	Character	64	
33	REFERENCE1	Character	64	
34	REFERENCE2	Character	64	
35	REFERENCE3	Character	64	
36	REFERENCE4	Character	64	
37	REFERENCE5	Character	64	
38	REFERENCE6	Character	64	
39	REFERENCE7	Character	64	
40	REFERENCE8	Character	64	
41	SIGNIFICAN	Character	1	
42	METALORES	Character	1	
43	SLAGRAWMAT	Character	1	
44	PLASTERCEM	Character	1	
45	DYEMORDANT	Character	1	
46	PIGMENTCOS	Character	1	
47	CHEMRAWMAT	Character	1	
48	OTHER	Character	64	
49	NOMINING	Character	1	
50	SLAGPRESNT	Character	1	
51	DUMPSPREST	Character	1	
52	MINEPRODUC	Character	1	
53	MPREPITS	Character	1	
54	MPRESHAF	Character	1	
55	MPREWORK	Character	1	

56	MHISPITS	Character	1
57	MHISSHAF	Character	1
58	MHISWORK	Character	1
59	MUNKPITS	Character	1
60	MUNKSHAF	Character	1
61	MUNKWORK	Character	1
62	MINCOMM1	Character	64
63	MINCOMM2	Character	64
64	MINCOMM3	Character	64
65	MINCOMM4	Character	64
66	MINCOMM5	Character	64
67	COMPILDATE	Character	8
68	COMPILER	Character	25
** Total **			2615