References in EXFOR and connection to other databases

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NRDC-2007 Actions:
  A14 Investigate ways to include DOI in EXFOR
  A15 Investigate possibility to exchange additional "Reference" files containing references, DOI, NSR key and send to others for comments.
  A31 Correct BibTeX output in the NDS system to take correct authors list from NSR when available.

DOI (Digital Object Identifier) is important information providing a universal access to Web publications. NSR-Keyno is an identifier of publication in NSR database (Nuclear Science References) – important and widely used bibliography database within nuclear data community. NSR has also Web interface and can be accessed using Keyno. Both DOI and Keyno being used in Web retrieval systems can be very useful for user providing external information and/or original publications. That is why it would be very useful to have DOI and Keyno available in EXFOR system*. Essentially, there is two ways to include this information to the system: it can be either (A14) included to EXFOR files or (A15) to be exchanged between NRDC members by different ways (outside of basic EXFOR exchange system).

*Note. "EXFOR system" means EXFOR-exchange files (Trans, Prelim), EXFOR-CINDA dictionaries, EXFOR database, utility-tools, retrieval and other software.

1. DOI in EXFOR files   (A14)

Two ways to include DOI (and possibly – NSR) seems to be reasonable:

1) in-line extension of Reference code, for example:

```
REFERENCE  (J,PL/B,30,36,196909:10.1016/0370-2693(69)90281-0)
REFERENCE  (J,PL/B,30,36,196909[10.1016/0370-2693(69)90281-0])
REFERENCE  (J,PL/B,30,36,196909;DOI=10.1016/0370-2693(69)90281-0)
```

Although, needs trivial changes of EXFOR software (CHEX), it is not acceptable, because of 66 column limit of EXFOR lines.

2) using free text in the line following Reference code with convention for 12th position:

```
REFERENCE  (J,PL/B,30,36,196909)
           $DOI=10.1016/0370-2693(69)90281-0
           $NSR=1969SC17
```

This way is similar to EXFOR+ format (the only difference is that symbol "#" is used to identify extensions). It does not need any modifications of software (unless some EXFOR reading software can interpret this information), but needs NRDC convention, good will of compilers, accuracy and consistency in implementation. In case of NRDC decision, such extensions can be done for known DOI and NSR. Extension lines can be suppressed (hidden) when displayed for ordinary user.

In wider perspective, this method of extension could be agreed for any type of additional information in EXFOR format with following formulation:

"**Non-standard keywords:**
- Flag: symbol '$' in position 12 (positions 1 to 11 are blank)
- Name: any text starting from position 13 and ending with symbol '='
- Value: starts after symbol '=' and ends by end of line."
  [This could be a subject for discussion on NRDC-meeting.]

2. Additional "Reference" files with DOI and NSR-key   (A15)

Since 2005, NDS-NNDC EXFOR Web retrieval system generates links to Web journals and NSR. The links age generated using (1) additional dictionary for construction URL from EXFOR references and (2) software matching EXFOR references with NSR data. Using option (1), the system constructs URL directly from Reference-code, i.e. DOI is not known. Using option (2) the software finds NSR-Keyno, imports DOI from NSR and generates URL (link to Web journals) from DOI. The purpose of A15 is to share known at NDS NSR information for EXFOR references with other centres with final goal to be used in their retrieval systems.

Format of the additional reference file could be following:

```
 REFERENCE (J,PL/B,30,36,196909) $DOI=10.1016/0370-2693(69)90281-0   $NSR=1969SC17
```

(one line for one reference-code).

Extended version* of the format containing also ENTRY and URL (if DOI is not known):

```
$REF=(J,PR/C,1,1226,197004) $ENTRY=10036 $NSR=1970RO12   $DOI=10.1103/PhysRevC.1.1226
$REF=(J,NP/A,161,593,197102) $ENTRY=10037 $NSR=1971BO07 $DOI=10.1016/0375-9474(71)90388-5
$REF=(J,NP/A,142,619,1970) $ENTRY=10038 $NSR=1970DA02   $DOI=10.1016/0375-9474(70)90818-3
$REF=(J,PR,185,961,196909) $ENTRY=10039 $URL=http://publish.aps.org/abstract/PR/v185/p961
```

*EXFOR, 11/09/08. Summary,: ENTRY: 17,488;
    References: 26,470;   Lines: 13,350;   NSR: 12,333;   DOI: 8,377;   URL: 1,252

3. Correct BibTeX output in the NDS system using NSR   (A31)

Since 2006, NDS EXFOR Web retrieval system provides BibTeX output for users using LaTeX. Because EXFOR format does not foresee storage of separate <Authors, Title> for every Reference, the only way to provide this information for correct citation is to import it from another system(s). At present, it was implemented using connection EXFOR-NSR: EXFOR database has an internal table with following columns.

Reference	NSR-Keyno	DOI	Title	AuthorList	etc.

This table can be populated from different sources: right now it is automatic connection to NSR only, but it could also other sources - for example, BibTeX files (they are often available from journals on Web and can be taken downloaded automatically).

So, BibTeX could be also a format for exchange of "Additional Reference" information between data centres outside of basic EXFOR format. Right now, both NDS Web and CD-ROM EXFOR retrieval system can generate BibTeX output. This is an example of output of non-interactive EXFOR retrieval program:

```
@techreport{S_INDC(JPN)-191/U_138_200306,
    title="Measurements of activation cross sections producing →
        short-lived nuclei in the energy range of 2 - 3 MeV with pulsed →
        neutron beam",
    author="Shimizu, T. and Yamamoto, H. and Kasaishi, M. and Miyazaki, →
        I. and Shibata, M. and Kawade, K. and Hori, J. -I. and Nishitani, T. ",
    note="Japanese report to the I.N.D.C.",
    series="INDC(JPN)",
    pages="138",
    year="2003",
    number="191/U",
    type="Conference Report",
    exfor="22838",
    x4iref="4",
    x4ref="S,INDC(JPN)-191/U,138,200306",
    nsrkey="2003SHZZ"
}

@article{J_NP/A_334_35_1980,
    title="Resonance Neutron Capture in $^{52}$Cr",
    author="Kopecky, J. and Chrien, R. E. and Liou, H. I. ",
    journal="Nuclear Physics, Section A",
    volume="334",
    pages="35",
    year="1980",
    doi="10.1016/0375-9474(80)90137-2",
    URL="http://dx.doi.org/10.1016/0375-9474(80)90137-2",
    exfor="22711",
    x4iref="1",
    x4ref="J,NP/A,334,35,1980",
    nsrkey="1980KO01"
}

@article{J_NP/A_188_535_1972,
    title="Study of the (n,|g) Reaction in the Mass Region A = 50 - 63",
    author="Kopecky, J. and Abrahams, K. and Stecher-Rasmussen, F. ",
    journal="Nuclear Physics, Section A",
    volume="188",
    pages="535",
    year="1972",
    doi="10.1016/0375-9474(72)90218-7",
    URL="http://dx.doi.org/10.1016/0375-9474(72)90218-7",
    exfor="22711",
    x4iref="2",
    x4ref="J,NP/A,188,535,1972",
    nsrkey="1972KO15"
}
```

Program reading BibTeX file can filter lines, ignoring those which are not relevant for a local system.

Conclusion

Methods of exchange of bibliography information in EXFOR system could be evaluated as following:

1. Additional text in EXFOR files.
   [+] does not need to create second exchange system.
   [−] may need modifications of software reading/interpreting EXFOR format.

   BAD (may need changes in EXFOR format and programs)

2. Simple "Additional Reference" files with DOI and/or NSR (outside of EXFOR files).
   [+] EXFOR is not changed.
   [−] does not help to exchange <Authors, Title> if article is not in NSR.

   OK, if article will appear in NSR quickly, so Title and Authors can be imported.

3, Full "Additional Reference" files in BibTeX format.
   [+] comprehensive;
   [−] more work for compiler;
   [−] duplication of NSR information.

   NOT GOOD, if NSR available and compiled quickly.