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Documentation for the Machine-Readable Version of The Revised New General Catalogue of Nonstellar Astronomical Objects

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DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF

THE REVISED NEW GENERAL CATALOGUE OF NONSTELLAR ASTRONOMICAL OBJECTS

Wayne H. Warren Jr.

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National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

TABLE OF CONTENTS

LIST OF TABLES

Table

DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF *THE REVISED NEW GENERAL CATALOGUE OF NONSTELLAR ASTRONOMICAL OBJECTS*

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ABSTRACT

This document provides detailed descriptions of the contents and format of the machine-readable version of the catalogue being distributed by the Astronomical Data Center. Coding for the various scales and abbreviations used in the catalogue are tabulated and certain revisions to the machine version made to improve storage efficiency and notation are described.

SECTION 1 - INTRODUCTION

The Revised New General Catalogue of Nonstellar Astronomical Objects (RNGC) (Sulentic and Tifft 1973) is a modern, revised and expanded version of the *New General Catalogue of Nebulae and Clusters of Stars* (Dreyer 1888). While incorporating the many corrections to the original edition found over the years, the *RNGC* objects were verified on Palomar Observatory Sky Survey (POSS) prints and plates for southern objects especially taken for the purpose (about 90 southern objects could not be verified) and are tied to the POSS where possible by the inclusion of rectangular coordinates on the prints. New object descriptions are provided for objects which were examined during the course of the work, Galactic coordinates are given, and new magnitudes are reported along with their sources.

This document describes the magnetic tape version of the *RNGC*, as distributed by the Astronomical Data Center. It is intended to enable users to read and process the data without problems or guesswork. For more extensive descriptions of the data in the *RNGC* and an explanation of the procedures used to develop or derive them, the published catalogue reference below should be consulted since it contains an extensive introduction with a wealth of valuable information. A copy of this document should be supplied with any machine-readable copy of the catalogue.

SOURCE REFERENCE

Sulentic, J. W. and Tifft, W. G. 1973, *The Revised New General Catalogue of Nonstellar Astronomical Objects* (Tucson: The University of Arizona Press).

SECTION 2 - TAPE CONTENTS

Byte-by-byte descriptions of the contents of the tape files of the *RNGC* are given in Tables 1-4. The suggested format specifications are for FORTRAN formatted read statements and can be modified depending upon individual programming and processing requirements. Since data fields contain blanks where data are absent, care must be exercised when processing the data for certain purposes. Alternate format specifications are given in parentheses.

Table 1. Tape Contents. *RNGC*, Data File

Byte(s)	Units	Suggested Format	Description
1- 5	---	I5	The *RNGC* number (same as the original NGC number).
6	---	A1	Letter designations for anonymous sources near NGC objects or for double or multiple systems having the same assigned number.
7	---	1X	Blank
8- 9	---	I2	Type of object, coded as follows: 1 Open cluster 2 Globular cluster 3 Diffuse nebula 4 Planetary nebula 5 Galaxy 6 Cluster associated with nebulosity 7 Nonexistent 8 Object in Large Magellanic Cloud 9 Object in Small Magellanic Cloud 0 Unverified southern object The codes can be combined to form double digit numbers such as 19 (open cluster in SMC), 38 (diffuse nebula in LMC), or 25 (globular cluster in external galaxy).
10	---	1X	Blank
11- 12	hours	I2	Right ascension (α) for equinox 1975.
13	---	1X	Blank
14- 17	min	F3.1	α

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
18	---	1X	Blank
19- 21	°	I3	Declination (δ) for equinox 1975. Sign always in byte 19.
22	---	1X	Blank
23- 24	'	I2	δ
25	---	1X	Blank
26- 31	°	F6.2	Galactic longitude ℓ^{II}. Not present for nonexistent objects, in which case the field is blank.
32	---	1X	Blank
33- 38	---	F5.2	Galactic latitude b^{II}. Not present for nonexistent objects, in which case the field is blank. A sign is present in byte 33 only for negative values.
39	---	1X	Blank
40- 42	mm	I3	X coordinate on Palomar Observatory Sky Survey (POSS) print. The origin is the lower left corner of the blue print. A position was always determined from the southernmost and westernmost POSS print upon which the object is clearly visible.
43	---	1X	Blank
44- 46	mm	I3	Y coordinate on POSS print.
47	---	1X	Blank
48- 51	mag	F4.1	Magnitude (rounded to the nearest half magnitude), generally taken from sources having the largest number of objects, in order to have data as homogeneous as possible. Blank if no data present.
52	---	1X	Blank

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
53	---	A1	Source of magnitude, coded as follows: 1. de Vaucouleurs and de Vaucouleurs 1964. 2. Zwicky *et al.* 1961-1968. 3. Vorontsov-Velyaminov, Krasnogorskaya, Arhipova 1962-1968. 4. Lindsay 1958. 5. Collinder 1931. 6. Arp 1965. 7. Vorontsov-Velyaminov 1931. 8. Bok and Bok 1962; van den Bergh and Hagen 1968.
54	---	1X	Blank
55- 74	---	20A1 (5A4)	The original visual appearance of the object, as transcribed from Dreyer (1888). Table 5 gives the code translations for the original Dreyer and *RNGC* codes. Certain codes have been modified from the original computerized version and the published version in order to change them back to what they should be in astronomical notation, e.g. ##, #, $ were changed to ", ', and &, respectively. If a description is too long for the data field, a "9" will be found in the cross references field (bytes 97-116) and the remainder of the description will be found in the "Old Description Supplement" in file 2 of the catalogue (see Table 2).
75	---	1X	Blank
76- 95	---	20A1 (5A4)	Palomar Sky Survey (new) description of each object. Table 6 gives the *RNGC* description codes (the code changes described under the old description also apply to the new description). If a description is too long, an "8" will be found in the cross reference field and additional information given in the "New Description Supplement" in file 3 of the catalogue (see Table 3).
96	---	1X	Blank

Table 1. (concluded)

Byte(s)	Units	Suggested Format	Description
97-116	---	20A1 (5A4)	Cross references to major specialized catalogues. The code key is given in Table 7. If the field is too short to accommodate all of the necessary information, then an "X" will be found in byte 116 and additional information given in file 4 of the catalogue (see Table 4).

Table 2 gives the format description for the "Old Description Supplement" found in file 2 of the catalogue. This file contains an entry if a "9" appears in the cross reference field of the data file.

Table 2. Tape Contents. *RNGC* Old Description Supplement.

Byte(s)	Suggested Format	Description
1- 5	I5	*RNGC* number.
6- 7	2X	Blank
8-30	23A1	Additional information from Dreyer description.

Table 3 gives the format description for the "New Description Supplement" found in file 3 of the catalogue. This file contains an entry if an "8" appears in the cross reference field of the data file.

Table 3. Tape Contents. *RNGC* New Description Supplement.

Byte(s)	Suggested Format	Description
1- 5	I5	*RNGC* number.
6	A1	Letter designation for *RNGC* object.
7	1X	Blank
8-44	37A1	Additional information from *RNGC* description.

Table 4 gives the format description for the "Cross Reference Supplement" found in file 4 of the catalogue. This file contains an entry if an "X" is present in byte 116 of the cross reference field.

Table 4. Tape Contents, *RNGC* Cross Reference Supplement.

Byte(s)	Suggested Format	Description
1- 5	I5	*RNGC* number.
6	A1	Letter designation for *RNGC* object.
7	1X	Blank
8-30	23A1	Additional cross reference information.

Table 5 contains definitions of the brightness, size and shape scales that Dreyer adopted from Sir John Herschel. It also gives the original codes, *RNGC* codes and code translations used in the Dreyer descriptions.

Table 5. Dreyer Scales and Old Description Codes

Brightness

1.	Excessively faint
2.	Very faint
3.	Faint
4.	Considerably faint
5.	Pretty faint
6.	Pretty bright
7.	Considerably bright
8.	Bright
9.	Very bright
10.	Extremely bright

Size

1.	Excessively small	3" - 4" diameter
2.	Very small	10" - 20" "
3.	Small	20" - 30" "
4.	Considerably small	20" - 30" "
5.	Pretty small	50" - 60" "
6.	Pretty large	50" - 60" "
7.	Considerably large	3' - 4' "
8.	Large	3' - 4' "
9.	Very Large	8' - 10' "
10.	Excessively large	20' and larger

Shape

1. Round
2. Very little extended
3. Elliptic or oval
4. Considerably extended
5. Pretty much extended
6. Much extended
7. Very much extended
8. Extremely extended

Table 5. (continued)

Dreyer Code	*RNGC Code*	*Code Translation*
ab	AB	about
alm	ALM	almost
am	AM	among
app	APP	appended
att	ATT	attached
B	B	bright
b	B	brighter (always coupled with another letter)
bet	BET	between
bf	BF	brighter toward following side
biN	BIN	binuclear
bn	BN	bright toward north side
bp	BP	brighter toward preceding side
bs	BS	brighter toward south side
C	C	compressed
c	C	considerably
ch	CH	chevelure
Cl	CL	cluster
co	CO	coarse, coarsely
com	COM	cometic
cont	CONT	in contact
D	D	double
d	D	diameter
def	DEF	defined
dif	DIF	diffused
diffic	DIFFIC	difficult
dist	DIST	distance
E	E	extended
e	E	extremely, excessively
ee	EE	most extremely
er	ER	easily resolvable
exc	EXC	excentric
F	F	faint
f	F	following
g	G	gradually
gr	GR	group
i	I	irregular
iF	IF	irregular figure
inv	INV	involved, involving
L	L	large
l	L	little (adv), long (adj)
M	M	middle or in the middle
m	M	much
mm	MM	mixed magnitudes
mn	MN	milky nebulosity
N	N	nucleus or to a nucleus
n	N	north
neb	NEB	nebula

Table 5. (concluded)

Dreyer Code	*RNGC Code*	*Code Translation*
nf	NF	north following
np	NP	north preceding
nr	NR	near
p	P	poor
p	P	preceding
p	P	pretty (before F, B, L, S) (size and brightness blocks)
pg	PG	pretty
pm	PM	pretty much
ps	PS	pretty suddenly
quad	QUAD	quadrilateral
quar	QUAR	quartile
R	R	round
r	R	resolvable
Ri	RI	rich
RR	RR	exactly round
rr	RR	partially resolved, some stars seen
rrr	RRR	well, resolved, clearly consisting of stars
S	S	small
s	S	suddenly
s	S	south
sc	SC	scattered
sev	SEV	several
sf	SF	south following
sh	SH	shaped
sm	SM	smaller
sp	SP	south preceding
st	ST	stars
stell	STELL	stellar
susp	SUSP	suspected
trap	TRAP	trapezium
triN	TRIN	trinuclear
v	V	very
var	VAR	variable
vv	VV	an intensive of V
*	*	a star (or stars)
*10	*10	a star of 10th magnitude
**	**	double star
* *	***	triple star
Δ	TRI	triangle, forms a triangle with
⊕	GCL	globular cluster of stars
0	PLN	planetary nebula
st9	ST9	stars from the 9th magnitude downward
st9...13	ST9...13	stars from 9th to 13th magnitude
?	()	items questioned by Dreyer enclosed in parentheses
"	"	arcseconds (** in published catalogue)
'	'	arcminutes (* in published catalogue)

Table 6 gives the *RNGC* codes and their translations, followed by the codes for type 7 (nonexistent code in bytes 8-9 of the data records) comments.

Table 6. *RNGC* (New) Description Codes and Type 7 Comment

RNGC Code	*Translation*
ALM	almost
APP-AP	appendage
APPEARANCE	appearance
ARC	arc
AREA	area
ARMS-AMS	arms
AROUND	around
ATT-AT	attached
B-BRT	bright, brighter
BAR	bar
BD	broad
BET	between
BIN	binuclear
BISECTS	bisects
BM	brighter toward center
BRIDG(E)	bridge
BRIGHTEST	brightest
BRUSHES	brushes
BULG(E)	bulge
CHAIN	chain
CL(USTER)	cluster (object appears in or near a prominent cluster of galaxies)
CLOS(E)	close
COM	companion(s)
COMMON	common
COMP	compact
COMPL	complete
COMPLEX	complex
CONNECTS	connects
CON...T)	contact, in contact
CT	center, middle, central
CURVED	curved
D	defined
DB	double
DIF	diffuse (ness)
DISK-DSK	disk
DIST	distribution
DK	dark
DST	distortion
DUMBELL	dumbell
DWF	dwarf

Table 6. (continued)

RNGC Code	*Translation*
E	elliptical like (possessing normal elliptical galaxy characteristics)
EDGE	edge
EFFECT	effect
EL	elongated
END	end
EON	edge on system
EO	equatorial
EXT-EXTEN	extended, extensive, extension
F	faint
F-FO	following
FEATURELESS	featureless
FEW	few
FIELD-FLD	field
FIL	filament, filamentary
FL(AT)	flat
FORM(ING)	form(ing)
FPM	form
GALAXY	galaxy
GALAXIES	galaxies
GRP	group
H	high
HALO	halo
HSB-HISB	high surface brightness
IMAG(E)	image
IN	in
INC-INCL	inclined
INT	internal
INTEN	intensity
INTERACT	interact
INVIS(IBLE)	invisible
INVOLVED	involved
IRR(EG)	irregular
IRRR	irregularly round
JET	jet
KN(OT)(S)	knot(s)
KNOTTY-KNY	knotty

Table 6. (continued)

RNGC Code	*Translation*
LBM	little brighter toward center
LG-LGE	large
LIKE	like
LN(S)	lanes
LOOP	loop
LSB-LOSB	low surface brightness
M	much
MANY	many
MATCH	match
MOTTLED	mottled
MW	Milky Way
N	narrow, thin
N-NO(RTH)	north
NEB	nebula
NO	no
NR	near, nearly
NUC(LEUS)	nucleus
O	open
OBJ(ECT)	object
OBSC	obscure(ing)
OFF	off
ON	on
OUT(ER)	outer
OV-OVAL	oval
P	poor(ly)
P-PR	preceding
PAIR	pair
PART	part
PCH(Y,S)	patch, patchy, patches
PD	poorly defined
PEC	peculiar
PER-PERIP(H)	peripheral, periphery
PLUME	plume
POOR	poor
POSSIBLE	possible
PRINT	print
R	round
RECT	rectangular
REGION	region
RESOLVED	resolved
RG-RNG-RING	ring
RI(CH)	rich

Table 6. (continued)

RNGC Code	*Translation*
S-SOUTH-SPIRAL	south, spiral (clear in context)
SB	barred spiral
SBC	SBc type galaxy
SBM	suddenly brighter toward center
SC	Sc type galaxy
SEV-SV	several
SHAPE	shape
SHORT	short
SIDE	side
SL	slight, slightly
SM	small
SO)	SO galaxy
SPN	spindle
STE-STEL-STELLAR	stellar
STR-STRUCTURE(LESS)	structure (less)
SUP	superimposed
SUS(SUSP)	suspected
TIDAL	tidal
TIW	tightly wound
TO	to
TRIPLE	triple
U-UNIF	uniform
USB	uniform surface brightness
V	very
VIS(IBLE)	visible
WD	well defined
WI-W/	with
WINGS	wings
WIO-WO-W/O	without
WK	weak
WPD	warped
&	and ($ in printed edition)
)	?
-	to. of
'	arcminutes (≠ in printed edition)
"	arcseconds (≠≠ in printed edition)
*	star
24-	24-inch Curtis Schmidt plate description

Table 6. (concluded)

Code for Type 7 Comments:

BAKER	Baker 1933, 1937
DC	Carlsen 1940
DEV	de Vaucouleurs and de Vaucouleurs 1964
LINDSAY	Lindsay 1963, 1964
NF	not found
NOCL	no cluster
S-SULENTIC	J. W. Sulentic (visual interpretation from POSS)
V-VV-VORONTSOV-VELYAMINOV	Vorontsov-Velyaminov *et al.* 1962-1968
Z-ZWICKY	Zwicky *et al.* 1961-1968

Table 7 gives references to the major specialized catalogues coded in the final data field of each record in the main file and in the cross reference supplement file.

Table 7. Cross References for *RNGC* Objects

RNGC Code	*Translation*
Axxx	Arp, 1966, *Atlas of Peculiar Galaxies*
AG	Arp, 1965, *Catalogue of Globular Clusters*
BMC	Hodge 1961, *Blue LMC Clusters*
D	de Vaucouleurs and de Vaucouleurs 1964, *Reference Catalogue of Bright Galaxies*
D*	de Vaucouleurs and de Vaucouleurs 1964, *Reference Catalogue of Bright Galaxies* (with supplemental data)
G	Gum 1955, *Catalogue of Southern H II Regions*
H	Henize 1956, *Catalogue of Nebulae in the Magellanic Clouds*
HO	Hogg 1959, *Catalogue of Open and Globular Clusters*
HOxxxA	Holmberg 1931, *Catalogues of Double and Multiple Galaxies*
ICxxxx	Dreyer 1895, 1908, *Index Catalogues*
K	Kron 1956, *Catalogue of SMC Clusters*
L	Linsay 1956, *Catalogue of SMC Clusters*
LH	Hodge and Lucke 1970, *Catalogue of LMC Associations*
LY	Lynds 1965, *Catalogue of Bright Nebulae*
M	Genkin and Genkina 1969, *Catalogue of Galaxies with Determined Masses*
Mxxx	Becvar 1959, *Messier Catalogue*
P	Perek and Kohoutek 1967, *Catalogue of Galactic Planetary Nebulae*
PKS	Bolton *et al.* 1964, Price and Milne 1965, Day *et al.* 1966, Shimmins *et al.* 1966, Shimmins and Day 1968, *Parkes Catalogues of Southern Radio Sources*

Table 7. (concluded)

RNGC Code	*Translation*
R	Alter *et al.* 1970, *Catalogue of Star Clusters and Associations*
S	Minkowski 1968, *Catalogue of Seyfert Galaxies*
S(#)	Karpowicz and Rudnicki 1968, *Catalogue of Supernovae*
SH	Sharpless 1956, *Catalogue of H II Regions*
SL	Shapley and Lindsay 1963, *Catalogue of Clusters in the LMC*
V	Vorontsov-Velyaminov, Krasnogorskaya and Arhipova 1962-1968, *Morphological Catalogue of Galaxies*
V*	Vorontsov-Velyaminov, Krasnogorskaya and Arhipova 1962-1968, *Morphological Catalogue of Galaxies* (with additional comments)
(V)	Vorontsov-Velyaminov, Krasnogorskaya and Arhipova 1962-1968, *Morphological Catalogue of Galaxies* (ID questioned by authors)
Z	Zwicky *et al.* 1961-1968, *Catalogue of Galaxies and of Clusters of Galaxies*
Z*	Zwicky *et al.* 1961-1968, *Catalogue of Galaxies and of Clusters of Galaxies* (with additional comments)
3Cxxx	Edge *et al.* 1959, *Third Cambridge Catalogue of Radio Sources*
4Cxx.xx	Pilkington and Scott 1965; Gower *et al.* 1967, *Fourth Cambridge Catalogue of Radio Sources*
8	Object has supplementary data for *RNGC* (new) description (file 3 of catalogue)
9	Object has supplementary data for Dreyer (old) description (file 2 of catalogue)
X	Object has supplmentary data for cross references (file 4 of catalogue)

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 8 is sufficient to describe the indigeneous characteristics of the machine-readable *RNGC* files to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, number of tracks, and internal coding (EBCDIC, ASCII, etc.) is not included. This information should always be supplied if secondary copies are transmitted to other users or installations. Data for the four catalogue files are separated by commas.

Table 8. Tape Characteristics. *RNGC*

NUMBER OF FILES	4
LOGICAL RECORD LENGTH (BYTES)	116, 30, 44, 30
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	8163, 176, 1037, 61

* Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS AND REFERENCES

The Revised New General Catalogue of Nonstellar Astronomical Objects was received a number of years ago on a BCD coded tape containing seven files. The formats of the files corresponded very closely to the printed formats of the seven sections of the published edition. Although the format of the data file was satisfactory for computer processing, the multicolumn structure of the supplement files and the presence of titling information and blank records made those files unsuitable for computer searching, sorting, etc. The final three files of precession tables are not necessary for modern computer processing of the catalogue to other equinoxes; hence, they have been removed from the machine-readable version. The following modifications were made to the first four files:

1. All files were converted from 026 to 029 coding: the character coded files are thus available in EBCDIC or ASCII internal coding. Due to the unavailability of certain other standard characters of astronomical notation to the authors of the catalogue, substitutions were made in the tape and printed editions. Thus, the following conversions were made to the files in order to restore the correct astronomical notation:

Tape	Published Version	Converted to
@@	≠≠	"
@	≠	'
$	$	&

The presence of parentheses to denote ? in the old (Dreyer) descriptions and a right parenthesis to denote ? in the new (*RNGC*) descriptions remain unchanged.

2. Plus (+) signs were added to all positive declinations in the data file (byte 19).

3. The logical record length of the data file was changed from 120 bytes to 116 bytes, since bytes 117-120 were never used.

4. The two- and three-column formats of files 2-4 were changed to the standard structure of one object per record after titles and blank records were deleted. The 120-byte logical record length files were then changed to their present 30-, 44-, and 30-byte lengths.

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SECTION 5 - SAMPLE LISTING

The sample listings given on the following pages illustrate logical data records from each catalogue file just as they are recorded on the tape. Groups of records from the beginning and end of each file are shown. The beginning of each record and bytes within the record are indicated by the column heading index across the top of each page (digits read vertically). Since file 1 contains records of length greater than 115 bytes, the remaining byte (blank in all cases shown) is printed in a second row.

LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: ENGC, DATA FILE
RECORDS 1 TO 15
TAPE FILE 45
RECORD LENGTH 116 BYTES
INPUT VOLSER ADC007

COLUMN HEADING / INDEX																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345															
RECORD	1	1	5	0	6.0	+27 34	111.11	-34.14	56	328	13.5	2	F,S,R,BET*116*14 VF,	R,BH,FDIF ATTFOSIDE	D*,Z,V*,HO2A	
RECORD	2	2	5	0	6.0	+27 32	111.10	-34.18	56	327	15.0	2	VF,S,S OF1	SLEL,BH,DKLHS	D*,Z,V*,HO2B	
RECORD	3	3	5	0	6.0	+ 8 9	104.58	-53.00	174	254	14.5	2	F,VS,R,ALHSTEL	SLEL,USB	Z,V	
RECORD	4	4	5	0	6.9	+ 8 1	104.87	-53.19	160	245			EF	ALHSTEL		
RECORD	5	5	5	0	6.5	+35 13	112.98	-26.67	37	98	14.5	2	VF,VS,H=*13,14	R,R,BH	Z*,V	
RECORD	6	6	7	0	7.0	+32 22							EF,VS,CE	=7831 S		
RECORD	7	7	5	0	7.1	-30 3	14.05	-80.14	36	141	13.0	3	EF,CL,HE,VGLBH	EON,PL,HISB,VAN&PCHI	D*,V	
RECORD	8	8	5	0	7.5	+23 42	110.53	-38.00	34	121	15.0	3	VF,H IN H END	LOOKS LIKE DB*	D*,V*,HO3B	
RECORD	9	9	5	0	7.6	+23 40	110.55	-38.03	32	120	14.5	2	F,R,*9,10 SF	SLEL,BH,DKLHCT,APPSP	D*,Z,V*,HO3A	
RECORD	10	10	5	0	7.4	-34 1	354.12	-78.59	150	256			F,CL,VLE,GLBH	DIFS,STELHUC	D	
RECORD	11	11	5	0	7.4	+37 18	113.61	-24.65	31	210	14.5	2	VF,VS,VLE,2VF*INV	SPH,BH	Z,V	
RECORD	12	12	5	0	7.5	+ 4 28	103.33	-56.63	154	56	14.5	2	EF,PL,VGLBH	R,VDIF,LBH,SSTR SUSP	D,Z,V	
RECORD	13	13	5	0	7.5	+33 17	112.80	-28.60	28	301	14.0	2	VF,VS,S ST*HEB	EL,DIF,SBH,DSK	D*,V,Z	
RECORD	14	14	5	0	7.4	+15 40	108.09	-45.82	156	338	13.5	2	VF,PS,R,GLBH	DB),BETZ,SLEL,BH	Z,V*,A235	
RECORD	15	15	5	0	7.8	+21 28	110.01	-40.19	153	327	15.0	2	VE,VS,R,BH	S,BH,DKLHS,*CLOSENFO	Z,V	

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

TAPE FILE NAME: RNGC, DATA FILE
RECORDS 8149 TO 8163
TAPE FILE 45
RECORD LENGTH 116 BYTES
INPUT VOLSER ADC007

COLUMN HEADING INDEX: 1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD	8149	7826	7	0	3.9	-20	52							CL,VP,VLC	NOCL S	
RECORD	8150	7827	5	0	4.2	+ 5	5	102.27	-55.79	197	89	14.5	2	VP,S,R,*12,13EP	R,BM,SLDIF,COM2*S	E,V
RECORD	8151	7828	5	0	5.1	-13	33	83.19	-72.70	185	54	14.0	3	EP,S,E130,SBMB,*15SP	EL,UNISB,CURVED	V*,A144
RECORD	8152	7829	5	0	5.1	-13	33	83.19	-72.70	185	54	14.0	3	EP,ES,R,(NBB),P OF 2	STEL,PDIPHALO	A144
RECORD	8153	7830	7	0	4.9	+ 8	14							EP,NBB*13M		
RECORD	8154	7831	5	0	6.0	+32	27	112.27	-29.36	43	257	14.0	3	EP,VS,MR,VP*VMR	EON,BM,EISB	
RECORD	8155	7832	5	0	5.3	- 3	50	96.41	-64.22	186	251	13.5	2	VP,VS,R,VGPSEBM,2*SP	EL,BM,	V*,IC5386
RECORD	8156	7833	7	0	5.2	+27	30							CL,VS,VP,2.5',(NBBS)	NO CL S	
RECORD	8157	7834	5	0	5.4	+ 8	13	104.37	-52.89	182	258	15.5	2	EEP,VS	DIP,LBM,STELNUC,S	E*,V
RECORD	8158	7835	5	0	5.5	+ 8	17	104.44	-52.83	180	261	15.5	3	EP,S,R	DIP,SLEL	V
RECORD	8159	7836	5	0	6.7	+32	56	112.54	-28.91	36	282			EP,VS,R,BET2*	SLE[illegible]M.ALMSTEL	
RECORD	8160	7837	5	0	5.6	+ 8	12	104.[illegible]4	-52.92	179	257	16.0	3	EP,P OF DNEB	STEL,38CLOSE	
RECORD	8161	7838	5	0	5.7	+ 8	12	104.48	-52.93	179	257	15.5	2	EP,P OF DNEB	SLEL,ALMSTEL,37CLOSE	
RECORD	8162	7839	5	0	5.7	+27	31	111.02	-34.18	56	326			VP,PS,DIP,RESOLVABLE	EL,SLDIF,BM,COM2*E	
RECORD	8163	7840	7	0	5.8	+ 8	17							EP,S	EP S	

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LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: MNGC, OLD DESNW SUPPL

RECORDS 1 TO 30

TAPE FILE 46

RECORD LENGTH 30 BYTES

INPUT VOLSER ADC007

```
COLUMN
HEADING  1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
INDEX

RECORD  1    111  *N2',(=113)
RECORD  2    134  *10NP45"
RECORD  3    188  ST10...18
RECORD  4    266  RESOLVABLE
RECORD  5    362  ST 13-18
RECORD  6    404  BETA AND SP
RECORD  7    460  RESOLVABLE
RECORD  8    523  POS 90DEGREES
RECORD  9    615  RESOLVABLE
RECORD 10    628  NR
RECORD 11    654  *11...18
RECORD 12    737  736 27"S
RECORD 13    750  POS 173DEGREES
RECORD 14    751  POS 173DEGREES
RECORD 15    870  S OF 871
RECORD 16    872  SEV P*INV
RECORD 17    877  *12 SP 1'
RECORD 18    894  CONNECTED
RECORD 19    895  CONNECTED
RECORD 20    994  NR 993
RECORD 21   1152  VDIFFIC
RECORD 22   1405  P ST INV
RECORD 23   1456  COMP 130DEG,9"
RECORD 24   1524  POS340DEG,0.5'
RECORD 25   1617  N 5"
RECORD 26   1625  *6P4BS
RECORD 27   1730  (OST D,TEI10")
RECORD 28   1770  ST11...18
RECORD 29   1788  *INV IN THE NEBY
RECORD 30   1803  (NEB)
```

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LISTING OF RECORDS FROM TAPE FILE

```
TAPE FILE NAME: RNGC, OLD [illegible]
       RECORDS    147 TO  [illegible]
     TAPE FILE    46
 RECORD LENGTH    30 BYTES
  INPUT VOLSER    ADC007
```

COLUMN HEADING INDEX

```
         1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	147	6558	ST16
RECORD	148	6564	ST 15
RECORD	149	6603	ST15
RECORD	150	6626	ST14...16
RECORD	151	6642	RRR,ST16
RECORD	152	6656	ST11...15
RECORD	153	6681	ST14...17
RECORD	154	6684	*7P
RECORD	155	6705	ST11...
RECORD	156	6712	VGLBM
RECORD	157	6715	RRR,ST 15
RECORD	158	6723	ST14...16
RECORD	159	6752	RRR
RECORD	160	6779	ST11...14
RECORD	161	6781	S* MP
RECORD	162	6809	ST 12...15
RECORD	163	6872	*92 10.5S
RECORD	164	6934	*9P
RECORD	165	7044	ST 15...18
RECORD	166	7078	RRR,ST VS
RECORD	167	7089	ST RS
RECORD	168	7099	ST12...16
RECORD	169	7437	V DIFFIC
RECORD	170	7511	V DIFFIC
RECORD	171	7607	(MEBS)
RECORD	172	7646	(MEB)
RECORD	173	7778	STELL
RECORD	174	7779	STELL
RECORD	175	7805	STELL
RECORD	176	7813	*8.5P 3RS

```
L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

          TAPE FILE NAME: RNGC, NEW DESCR SUPPL
                 RECORDS       1 TO      30
               TAPE FILE     47
            RECORD LENGTH     44 BYTES
             INPUT VOLSER   ADC007

C O L U M N                                                                                                                 1111111111111111
H E A D I N G              1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
I N D E X        1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD     1     22   NUC OFF CT
RECORD     2     23   DKPCH FO SIDE
RECORD     3     24   DKLNS IN DSK
RECORD     4     25   ALNSTELNUC
RECORD     5     26   DKLN NR EDGE
RECORD     6     28   STELCOM CLOSE SP
RECORD     7     34   PEC NEB NPR
RECORD     8     35   SEV KNS OR COMS NR
RECORD     9     37   CONCLOSE NP,SEV NF
RECORD    10     39   * S OF NUC
RECORD    11     45   V KN
RECORD    12     55   KNS & DKPCHS
RECORD    13     72   * OR COM CLOSENPR
RECORD    14     78   WEAK BAR
RECORD    15     86   2ND CLOSE N OF 1ST
RECORD    16     88   STELNUC,*CLOSE P NUC
RECORD    17     89   FAN-LIKE ARMS
RECORD    18     92   IRR DIFHALO
RECORD    19     95   COMPLEX PCHY INT STR
RECORD    20     99   A FEW KNS VISIBLE
RECORD    21    105   JET OR EL COM ATT N
RECORD    22    109   DIFCOM 3*SPR
RECORD    23    125   DIFARM FSIDE,DB*CLOSE SPR
RECORD    24    128   LGE RECTANGULAR NUC
RECORD    25    134   *CLOSE N OF DISK
RECORD    26    145   COMPLEX PCHYSTR IN CT
RECORD    27    151   KNARMS&EG,FIL FROM FO ARM TO EG
RECORD    28    157   KNY&DIF PERIPH
RECORD    29    159   SLDIF PERIPH
RECORD    30    160   FDIFARMS IN FAINTER DSK
```

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

TAPE FILE NAME: NGC, NEW DESCR SUPPL
RECORDS 1008 TO 1037
TAPE FILE 47
RECORD LENGTH 44 BYTES
INPUT VOLSER ADC007

```
C O L U M N                                                                                                    1111111111111111
H E A D I N G             111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111
I N D E X       1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	1008	7599	* NORTH ARM
RECORD	1009	7606	SEV * SUP
RECORD	1010	7609	EOM COM S,EL COM N
RECORD	1011	7610	DKLNS
RECORD	1012	7620	SSTR SVSP
RECORD	1013	7647	BRIGHTEST IN CL)
RECORD	1014	7667	LGROUND NEB F END
RECORD	1015	7674	COM CLOSE NP
RECORD	1016	7678	B IRR RG
RECORD	1017	7679	FDIF PCM CLOSE F
RECORD	1018	7685	VDIF SSTR
RECORD	1019	7713	PCHY MOTTLED PERIPH
RECORD	1020	7714	SSTR SUSP
RECORD	1021	7716	DKLNS,ARMS IN DIF HALO
RECORD	1022	7721	DKPCHS NRCT,PD SSTR
RECORD	1023	7723	PERIPH DKLNS
RECORD	1024	7727	DIF FIL
RECORD	1025	7741	SOUTH ARM VCOMPLEX & KN
RECORD	1026	7747	COM 2'F
RECORD	1027	7752	WD ARMS,SEV*SUP
RECORD	1028	7755	SEV BKNS IN RING
RECORD	1029	7756	DKLNS
RECORD	1030	7759	EL COM ATT F
RECORD	1031	7764A	BRIDGE 10 SP,*ORSTELCOM 1'S
RECORD	1032	7771	DKLN S SIDE
RECORD	1033	7782	PDPERIPH SSTR
RECORD	1034	7793	COMPLEX DIFPCHYSTR,ELCOM NP
RECORD	1035	7794	DIFHALO
RECORD	1036	7806	KN OR COM 1'F
RECORD	1037	7819	WDDIF ARMS

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LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: RNGC, NOTES SUPPL
RECORDS 1 TO 30
TAPE FILE 48
RECORD LENGTH 30 BYTES
INPUT VOLSER ADC007

COLUMN HEADING

```
                    1         2         3         4         5         6         7         8         9         0         1         2         3         4         5
          1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	1	70	IC1539
RECORD	2	221	M32,M
RECORD	3	224	M31,M
RECORD	4	383	4C32.05
RECORD	5	545	4C-01.08,PKS,8,HO42A
RECORD	6	547	4C-01.08,PKS,HO42B
RECORD	7	741	PKS,IC1751
RECORD	8	1068	PKS,4C-00.13,A37,M
RECORD	9	1275	4C41.07,S1
RECORD	10	1952	PKS,M1
RECORD	11	1961	IC2133)
RECORD	12	2146	4C78.06,M
RECORD	13	2535	HO94A
RECORD	14	2798	HO117A
RECORD	15	3034	4C69.12,3C231,M
RECORD	16	3079	4C55.19
RECORD	17	3226	A94
RECORD	18	3227	HO187A
RECORD	19	3379	M105
RECORD	20	3623	A317,M
RECORD	21	3627	HO246A
RECORD	22	3786	A294
RECORD	23	3862	4C19.40
RECORD	24	4192	M98
RECORD	25	4235	IC3098
RECORD	26	4258	M106,M
RECORD	27	4261	4C06.44
RECORD	28	4303	HO379A
RECORD	29	4321	HO387A
RECORD	30	4374	3C272.1,PKS,M84

```
L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

          TAPE FILE NAME: RNGC, NOTES SUPPL
                 RECORDS       32 TO      61
              TAPE FILE      48
           RECORD LENGTH     30 BYTES
            INPUT VOLSER   ADC007

C O L U M N                       1111111111222222222233333333334444444444555555555566666666667777777777888888888899999999990000000000111111
H E A D I N G                                                                                                                111111111111111
I N D E X              123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD      32    4406  N86
RECORD      33    4438  H0409A
RECORD      34    4472  H0413A,S1,M
RECORD      35    4486  3C274,PKS,4C12.45,Nd7,
RECORD      36    4618  H0438A
RECORD      37    4625  IC3675
RECORD      38    4631  A281
RECORD      39    4649  H0448A
RECORD      40    4651  PKS,3C275.1
RECORD      41    4676A A242,IC820
RECORD      42    4747  H0468C
RECORD      43    4782  3C278,M
RECORD      44    4783  PKS,H0485B,M
RECORD      45    5861  IC3961)
RECORD      46    5194  H0526A,4C47.36.1,M
RECORD      47    5195  H0526B
RECORD      48    5236  N83
RECORD      49    5258  H0532A
RECORD      50    5394  H0563B
RECORD      51    5457  4C54.30.1,A26,M
RECORD      52    5532  4C10.39,PKS
RECORD      53    5569  H0630C
RECORD      54    5929  H0710B
RECORD      55    5953  H0 714B
RECORD      56    6166  H0751A
RECORD      57    6946  4C59.31.1,M
RECORD      58    7236  4C13.82.1,PKS
RECORD      59    7237  4C13.82.1,PKS
RECORD      60    7469  H0803A,M
RECORD      61    7714  H0810A
```