



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 18, 2023 – 08:19 PM EDT

PDB ID : 1R5O  
Title : crystal structure analysis of sup35 complexed with GMPPNP  
Authors : Kong, C.; Song, H.  
Deposited on : 2003-10-11  
Resolution : 3.20 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

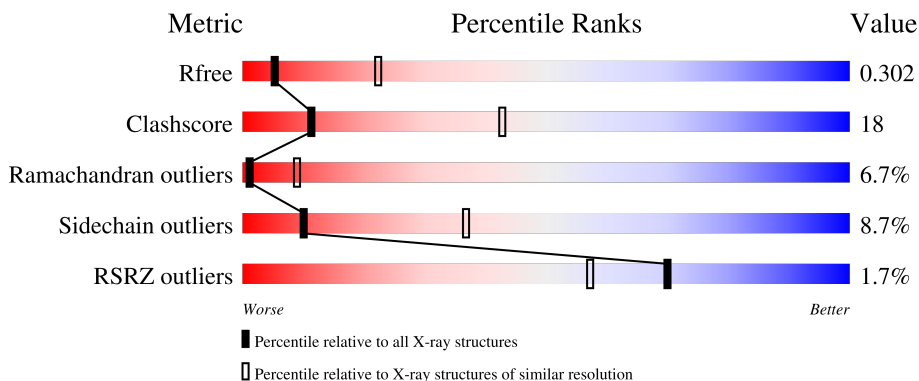
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	467	

## 2 Entry composition [i](#)

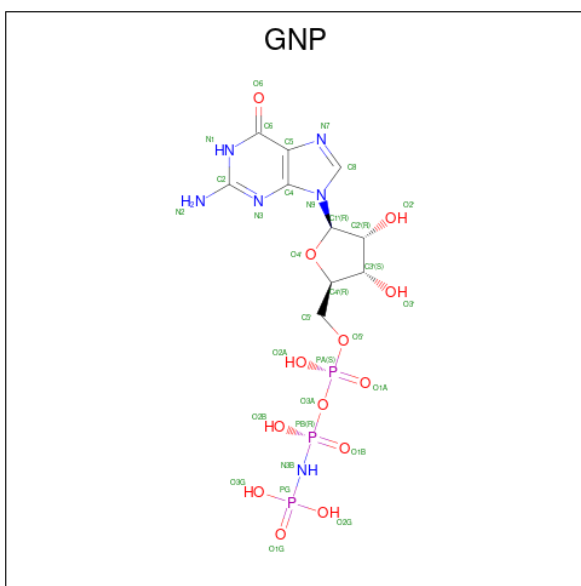
There are 3 unique types of molecules in this entry. The entry contains 3310 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Eukaryotic peptide chain release factor GTP-binding subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	409	3222	2024	557	622	19	0	0	0

- Molecule 2 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: C<sub>10</sub>H<sub>17</sub>N<sub>6</sub>O<sub>13</sub>P<sub>3</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	32	10	6	13	3	0	0

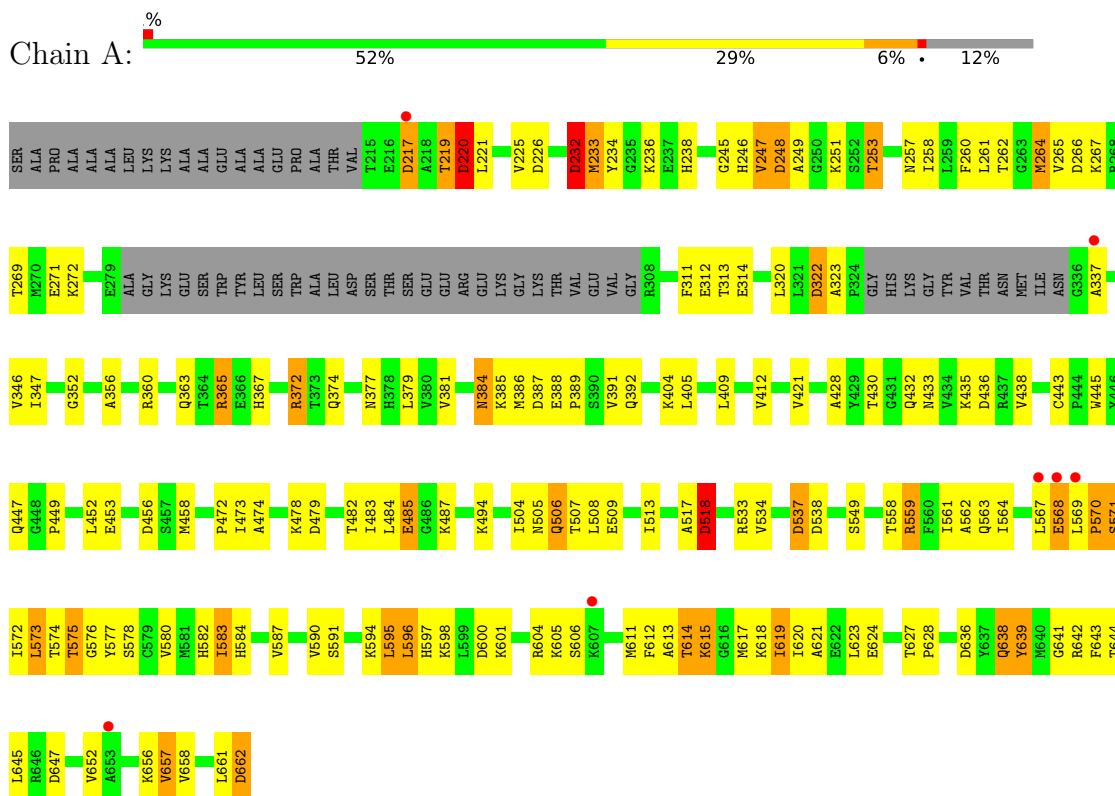
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	56	Total 56 O	0	0

### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Eukaryotic peptide chain release factor GTP-binding subunit



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.52Å 82.52Å 168.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.20 46.35 – 3.00	Depositor EDS
% Data completeness (in resolution range)	97.7 (20.00-3.20) 97.7 (46.35-3.00)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	0.14	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.85 (at 3.01Å)	Xtrriage
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.266 , 0.320 0.245 , 0.302	Depositor DCC
$R_{free}$ test set	570 reflections (4.76%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	68.2	Xtrriage
Anisotropy	0.235	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 53.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	3310	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	51.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.75% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GNP

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.57	0/3273	0.83	12/4412 (0.3%)

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	662	ASP	CB-CG-OD2	6.70	124.33	118.30
1	A	220	ASP	CB-CG-OD2	6.40	124.06	118.30
1	A	436	ASP	CB-CG-OD2	6.34	124.01	118.30
1	A	600	ASP	CB-CG-OD2	6.19	123.87	118.30
1	A	537	ASP	CB-CG-OD2	6.13	123.82	118.30
1	A	232	ASP	CB-CG-OD2	5.95	123.65	118.30
1	A	217	ASP	CB-CG-OD2	5.88	123.59	118.30
1	A	636	ASP	CB-CG-OD2	5.82	123.53	118.30
1	A	387	ASP	CB-CG-OD2	5.63	123.37	118.30
1	A	518	ASP	CB-CG-OD2	5.45	123.21	118.30
1	A	322	ASP	CB-CG-OD2	5.04	122.84	118.30
1	A	226	ASP	CB-CG-OD2	5.02	122.82	118.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3222	0	3234	116	0
2	A	32	0	13	3	0
3	A	56	0	0	12	0
All	All	3310	0	3247	116	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 18.

All (116) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:384:ASN:HD21	1:A:428:ALA:H	1.23	0.86
1:A:246:HIS:HE2	1:A:347:ILE:HA	1.47	0.80
1:A:570:PRO:HA	3:A:31:HOH:O	1.82	0.79
1:A:389:PRO:HA	1:A:392:GLN:HE21	1.48	0.79
1:A:389:PRO:HA	1:A:392:GLN:NE2	2.04	0.72
1:A:583:ILE:HG23	1:A:643:PHE:HB3	1.74	0.69
1:A:313:THR:HG21	1:A:456:ASP:HB2	1.74	0.69
1:A:257:ASN:ND2	1:A:261:LEU:HD12	2.08	0.68
1:A:563:GLN:HA	1:A:619:ILE:O	1.95	0.67
1:A:613:ALA:O	1:A:614:THR:HB	1.94	0.67
1:A:563:GLN:HG2	1:A:620:ILE:HG22	1.79	0.65
1:A:595:LEU:HG	1:A:619:ILE:HD11	1.77	0.65
1:A:656:LYS:HG3	3:A:28:HOH:O	1.97	0.64
1:A:262:THR:HG21	1:A:311:PHE:HB2	1.81	0.62
1:A:236:LYS:NZ	1:A:312:GLU:OE1	2.25	0.60
1:A:620:ILE:O	1:A:620:ILE:HG13	1.99	0.60
1:A:597:HIS:HB2	1:A:620:ILE:HG12	1.84	0.60
1:A:246:HIS:NE2	1:A:347:ILE:HA	2.15	0.59
1:A:573:LEU:HA	1:A:612:PHE:HB2	1.84	0.59
1:A:374:GLN:HG2	3:A:44:HOH:O	2.03	0.58
1:A:430:THR:OG1	1:A:432:GLN:HG3	2.03	0.58
1:A:573:LEU:H	1:A:573:LEU:HD13	1.69	0.58
1:A:580:VAL:O	1:A:645:LEU:HA	2.05	0.57
1:A:365:ARG:HG3	1:A:412:VAL:HG11	1.87	0.57
1:A:221:LEU:HD12	1:A:644:THR:HG23	1.86	0.57
1:A:267:LYS:O	1:A:271:GLU:HG3	2.05	0.57
1:A:313:THR:HB	1:A:456:ASP:OD1	2.05	0.56
1:A:596:LEU:HD22	1:A:597:HIS:CE1	2.40	0.56
1:A:221:LEU:HD12	1:A:644:THR:CG2	2.37	0.55
1:A:246:HIS:CE1	1:A:347:ILE:HD13	2.42	0.55
1:A:647:ASP:HB2	1:A:652:VAL:HG21	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:558:THR:O	1:A:624:GLU:HA	2.09	0.53
1:A:572:ILE:HG21	1:A:577:TYR:CG	2.43	0.53
1:A:253:THR:HG21	2:A:1986:GNP:N7	2.24	0.53
1:A:221:LEU:HD11	1:A:582:HIS:HB2	1.90	0.52
1:A:483:ILE:HD11	1:A:533:ARG:HE	1.74	0.52
1:A:538:ASP:O	3:A:25:HOH:O	2.19	0.52
1:A:363:GLN:HB2	1:A:367:HIS:CE1	2.43	0.52
1:A:435:LYS:HA	1:A:452:LEU:HD12	1.90	0.52
1:A:474:ALA:HB3	1:A:485:GLU:HG3	1.90	0.52
1:A:360:ARG:HD2	3:A:52:HOH:O	2.09	0.51
1:A:220:ASP:CG	1:A:221:LEU:H	2.14	0.51
1:A:379:LEU:O	1:A:421:VAL:HA	2.10	0.51
1:A:432:GLN:HB3	1:A:438:VAL:HG12	1.91	0.51
1:A:647:ASP:CB	1:A:652:VAL:HG21	2.41	0.51
1:A:573:LEU:HD22	1:A:574:THR:N	2.27	0.50
1:A:236:LYS:HE2	1:A:314:GLU:O	2.12	0.50
1:A:221:LEU:N	1:A:221:LEU:HD22	2.27	0.50
1:A:619:ILE:HD11	1:A:621:ALA:HB2	1.94	0.50
1:A:257:ASN:O	1:A:261:LEU:HB2	2.11	0.49
1:A:574:THR:OG1	1:A:575:THR:N	2.43	0.49
1:A:269:THR:O	1:A:272:LYS:HB3	2.12	0.49
1:A:247:VAL:HG13	1:A:363:GLN:HE22	1.76	0.49
1:A:246:HIS:NE2	1:A:347:ILE:HD13	2.26	0.48
1:A:590:VAL:HG21	1:A:623:LEU:HD23	1.94	0.48
1:A:245:GLY:C	1:A:251:LYS:HZ1	2.17	0.48
1:A:494:LYS:O	1:A:513:ILE:HD11	2.12	0.48
1:A:388:GLU:OE1	1:A:389:PRO:HD2	2.14	0.48
1:A:433:ASN:HB2	1:A:438:VAL:HG13	1.95	0.48
1:A:614:THR:O	1:A:615:LYS:C	2.52	0.48
1:A:652:VAL:HG13	3:A:35:HOH:O	2.14	0.47
1:A:389:PRO:CA	1:A:392:GLN:HE21	2.24	0.47
1:A:573:LEU:CD2	1:A:574:THR:N	2.77	0.47
1:A:508:LEU:C	1:A:508:LEU:HD23	2.36	0.47
1:A:248:ASP:HA	2:A:1986:GNP:H5'2	1.97	0.46
1:A:570:PRO:O	1:A:571:SER:CB	2.64	0.46
1:A:405:LEU:O	1:A:409:LEU:HG	2.15	0.46
1:A:598:LYS:HG3	1:A:617:MET:HE3	1.97	0.46
1:A:638:GLN:O	1:A:639:TYR:C	2.53	0.46
1:A:508:LEU:CD2	1:A:534:VAL:HB	2.45	0.45
1:A:384:ASN:ND2	1:A:385:LYS:H	2.15	0.45
1:A:613:ALA:O	1:A:614:THR:CB	2.64	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:249:ALA:HB1	1:A:346:VAL:HG12	1.99	0.45
1:A:508:LEU:HD21	1:A:534:VAL:HB	1.98	0.45
1:A:245:GLY:C	1:A:251:LYS:NZ	2.71	0.45
1:A:573:LEU:H	1:A:573:LEU:CD1	2.30	0.45
1:A:590:VAL:O	1:A:590:VAL:HG13	2.17	0.45
1:A:504:ILE:HG13	1:A:506:GLN:HB3	2.00	0.44
1:A:246:HIS:HE2	1:A:347:ILE:HD13	1.81	0.44
1:A:487:LYS:HD3	3:A:24:HOH:O	2.18	0.44
1:A:433:ASN:ND2	1:A:438:VAL:HG22	2.32	0.44
1:A:559:ARG:O	1:A:661:LEU:HB2	2.18	0.44
1:A:384:ASN:HD21	1:A:428:ALA:N	2.04	0.44
1:A:258:ILE:O	1:A:262:THR:HB	2.18	0.44
1:A:573:LEU:HA	1:A:612:PHE:CB	2.48	0.43
1:A:372:ARG:NH1	1:A:377:ASN:HA	2.34	0.43
1:A:567:LEU:O	3:A:57:HOH:O	2.21	0.43
1:A:473:ILE:HG23	1:A:484:LEU:HD22	2.01	0.43
1:A:590:VAL:CG2	1:A:623:LEU:HD23	2.49	0.43
1:A:236:LYS:HA	3:A:20:HOH:O	2.19	0.43
1:A:449:PRO:HB2	1:A:453:GLU:HB3	2.00	0.43
1:A:517:ALA:O	1:A:518:ASP:C	2.57	0.43
1:A:568:GLU:HB3	1:A:569:LEU:H	1.69	0.43
1:A:582:HIS:O	1:A:643:PHE:HA	2.18	0.43
1:A:573:LEU:CD2	1:A:574:THR:H	2.33	0.42
1:A:253:THR:HG21	2:A:1986:GNP:C8	2.49	0.42
1:A:320:LEU:N	1:A:320:LEU:HD12	2.34	0.42
1:A:262:THR:HG23	1:A:264:MET:HE2	2.01	0.42
1:A:658:VAL:HB	3:A:28:HOH:O	2.20	0.42
1:A:478:LYS:HD2	3:A:46:HOH:O	2.19	0.41
1:A:233:MET:HG3	1:A:563:GLN:HE21	1.85	0.41
1:A:561:ILE:HG22	1:A:562:ALA:N	2.35	0.41
1:A:266:ASP:OD2	1:A:266:ASP:C	2.59	0.41
1:A:472:PRO:HB3	1:A:584:HIS:HD2	1.84	0.41
1:A:570:PRO:HD3	3:A:35:HOH:O	2.19	0.41
1:A:262:THR:HG23	1:A:264:MET:CE	2.50	0.41
1:A:386:MET:HA	1:A:391:VAL:HG11	2.02	0.41
1:A:443:CYS:SG	1:A:445:TRP:CE2	3.14	0.41
1:A:234:TYR:CZ	1:A:642:ARG:HG3	2.55	0.41
1:A:381:VAL:HG23	1:A:421:VAL:HG13	2.03	0.41
1:A:627:THR:HA	1:A:628:PRO:HD3	1.97	0.41
1:A:260:PHE:HA	1:A:265:VAL:O	2.21	0.41
1:A:221:LEU:HD13	1:A:221:LEU:HA	1.90	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:564:ILE:O	1:A:618:LYS:HA	2.22	0.40
1:A:641:GLY:HA2	1:A:657:VAL:CG1	2.51	0.40
1:A:352:GLY:O	1:A:356:ALA:HB2	2.21	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	403/467 (86%)	310 (77%)	66 (16%)	27 (7%)	<b>1</b> <b>9</b>

All (27) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	225	VAL
1	A	232	ASP
1	A	248	ASP
1	A	568	GLU
1	A	570	PRO
1	A	571	SER
1	A	575	THR
1	A	594	LYS
1	A	604	ARG
1	A	605	LYS
1	A	479	ASP
1	A	518	ASP
1	A	614	THR
1	A	615	LYS
1	A	323	ALA
1	A	537	ASP
1	A	601	LYS
1	A	220	ASP

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Mol	Chain	Res	Type
1	A	337	ALA
1	A	505	ASN
1	A	595	LEU
1	A	638	GLN
1	A	219	THR
1	A	576	GLY
1	A	606	SER
1	A	587	VAL
1	A	247	VAL

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	356/398 (89%)	325 (91%)	31 (9%)	10 37

All (31) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	217	ASP
1	A	219	THR
1	A	232	ASP
1	A	233	MET
1	A	238	HIS
1	A	253	THR
1	A	264	MET
1	A	322	ASP
1	A	365	ARG
1	A	372	ARG
1	A	384	ASN
1	A	404	LYS
1	A	447	GLN
1	A	458	MET
1	A	482	THR
1	A	485	GLU
1	A	506	GLN

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Mol	Chain	Res	Type
1	A	507	THR
1	A	509	GLU
1	A	549	SER
1	A	559	ARG
1	A	573	LEU
1	A	578	SER
1	A	583	ILE
1	A	591	SER
1	A	596	LEU
1	A	611	MET
1	A	619	ILE
1	A	639	TYR
1	A	657	VAL
1	A	662	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	257	ASN
1	A	315	HIS
1	A	363	GLN
1	A	367	HIS
1	A	377	ASN
1	A	384	ASN
1	A	392	GLN
1	A	506	GLN
1	A	542	GLN
1	A	563	GLN
1	A	584	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GNP	A	1986	-	29,34,34	1.66	6 (20%)	33,54,54	2.28	10 (30%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GNP	A	1986	-	-	4/14/38/38	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1986	GNP	PB-O3A	-4.14	1.53	1.59
2	A	1986	GNP	C6-N1	4.04	1.40	1.33
2	A	1986	GNP	PB-O2B	-3.17	1.48	1.56
2	A	1986	GNP	PG-O2G	-3.07	1.48	1.56
2	A	1986	GNP	C8-N7	-2.17	1.30	1.34
2	A	1986	GNP	PG-O1G	2.08	1.49	1.46

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1986	GNP	C5-C6-N1	-8.33	112.03	123.43
2	A	1986	GNP	C2-N1-C6	5.07	123.99	115.93
2	A	1986	GNP	O2B-PB-O1B	3.53	117.31	109.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1986	GNP	O2G-PG-O3G	3.40	116.69	107.64
2	A	1986	GNP	O3G-PG-O1G	-3.07	105.73	113.45
2	A	1986	GNP	C3'-C2'-C1'	2.73	105.09	100.98
2	A	1986	GNP	O1G-PG-N3B	-2.61	107.92	111.77
2	A	1986	GNP	C2-N3-C4	-2.57	112.42	115.36
2	A	1986	GNP	PB-O3A-PA	-2.20	124.86	132.62
2	A	1986	GNP	N3-C2-N1	-2.03	124.52	127.22

There are no chirality outliers.

All (4) torsion outliers are listed below:

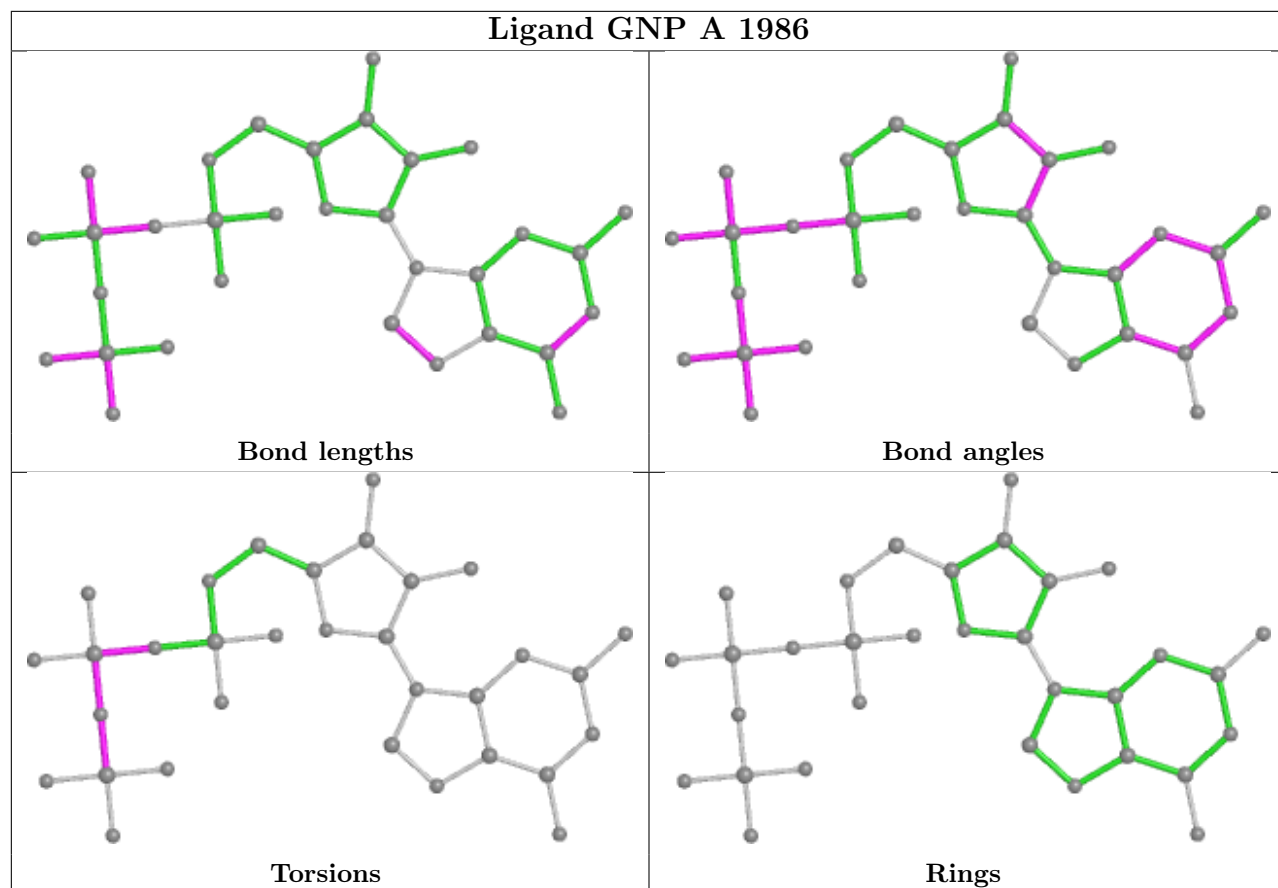
Mol	Chain	Res	Type	Atoms
2	A	1986	GNP	PB-N3B-PG-O1G
2	A	1986	GNP	PG-N3B-PB-O1B
2	A	1986	GNP	PG-N3B-PB-O3A
2	A	1986	GNP	PA-O3A-PB-O1B

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1986	GNP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	409/467 (87%)	-0.19	7 (1%) 70 57	15, 47, 90, 100	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	568	GLU	3.1
1	A	607	LYS	2.9
1	A	567	LEU	2.9
1	A	337	ALA	2.6
1	A	569	LEU	2.4
1	A	217	ASP	2.3
1	A	653	ALA	2.1

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

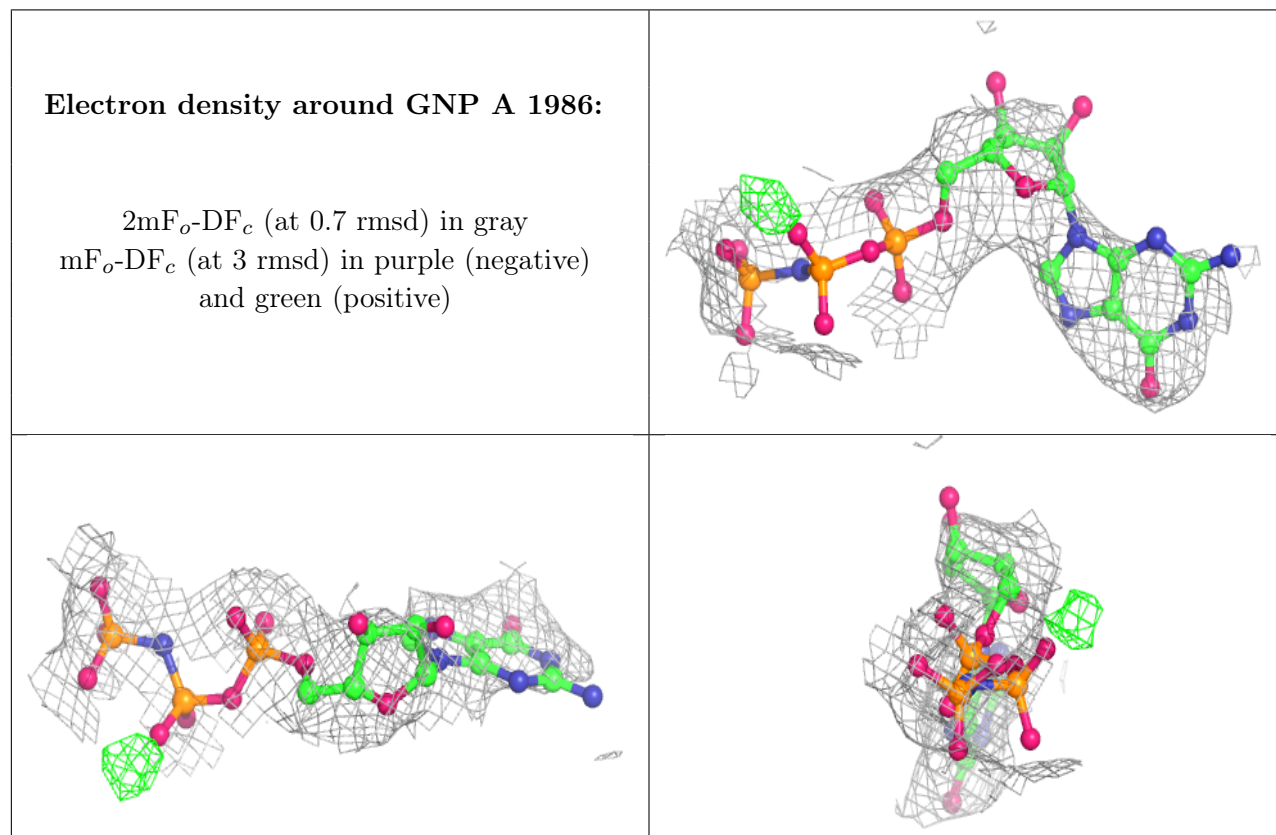
### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	GNP	A	1986	32/32	0.86	0.23	115,116,123,123	0



The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.