OKB «GIDROPRESS»

ASC «ROSATOM» COMPANY

VVER historical evolution

VVER designs

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

OKB “GIDROPRESS” was established on January 28,1946

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

35 VVER - 440 Units have already been constructed and commissioned.	
23 VVER - 440 Units are in operation at present.	
VVER-440 (V-179, V-213, V-230, V-270)	Total power: 10120 MW
31 VVER - 1000 Units are in operation at present.	
VVER-1000 (V-187, V-302, V-320, V-338, V-428, V-446)	Total power: 31000 MW

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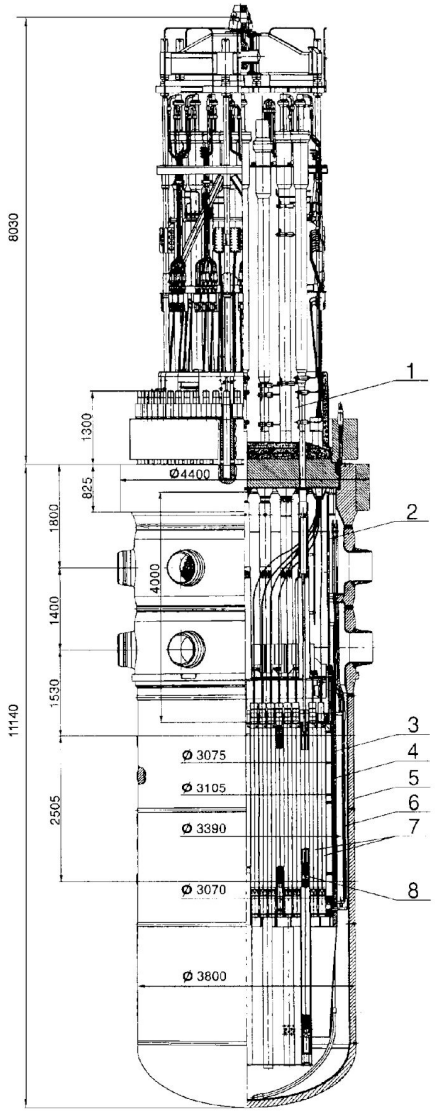
V-1 design (VVER-210)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



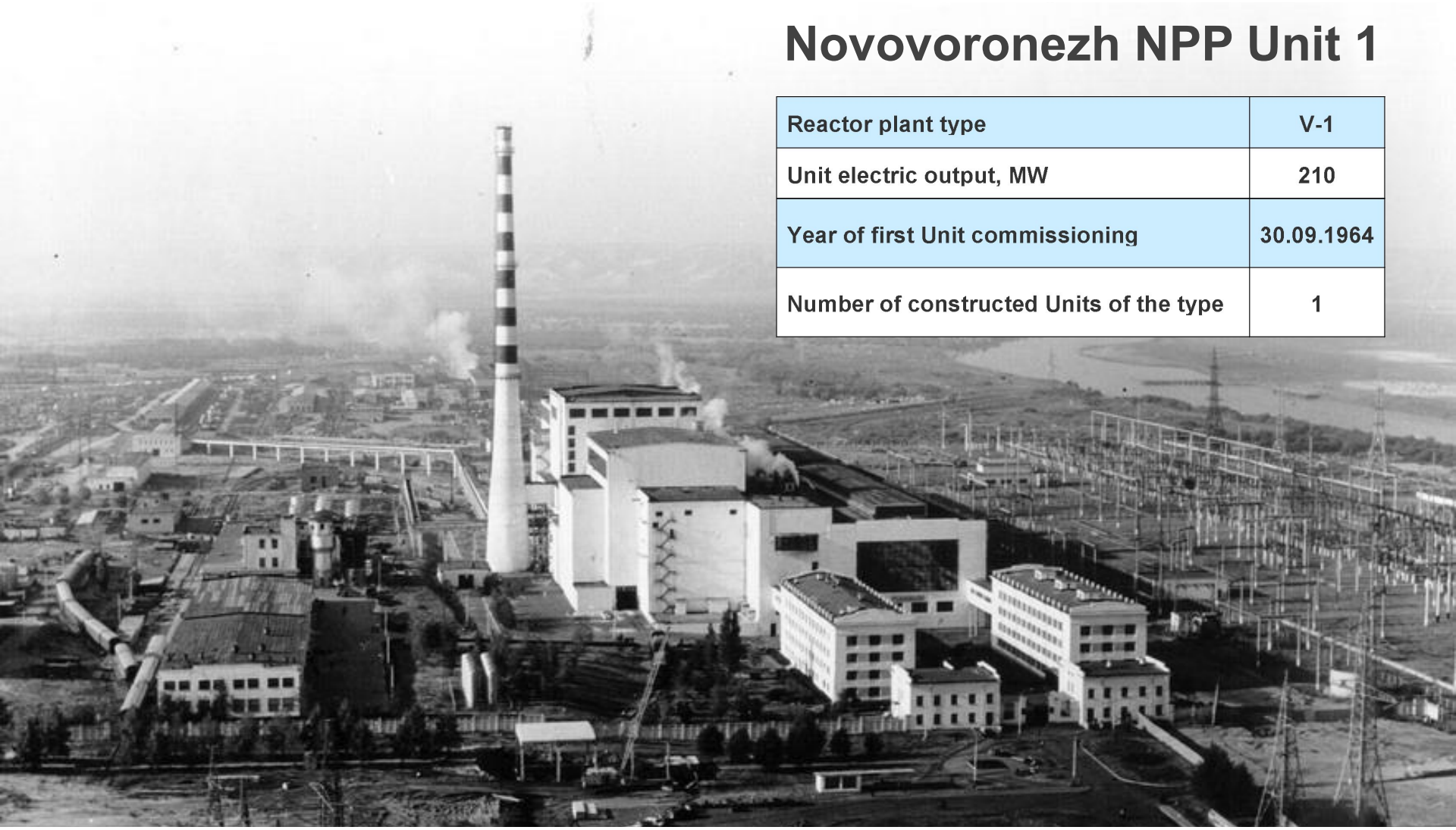
V-1 design (VVER-210)

Thermal power, MW	760
Primary pressure, MW	9,8
Pressure of generated steam, MPa	3,1

1 – upper unit
2 – hold-down grid
3 – core barrel
4 – basket
5 – vessel
6 – shield
7 – fuel assembly
8 – shim assembly

VVER historical evolution
VVER designs

OKB «GIDROPRESS»



Novovoronezh NPP Unit 1

Reactor plant type	V-1
Unit electric output, MW	210
Year of first Unit commissioning	30.09.1964
Number of constructed Units of the type	1

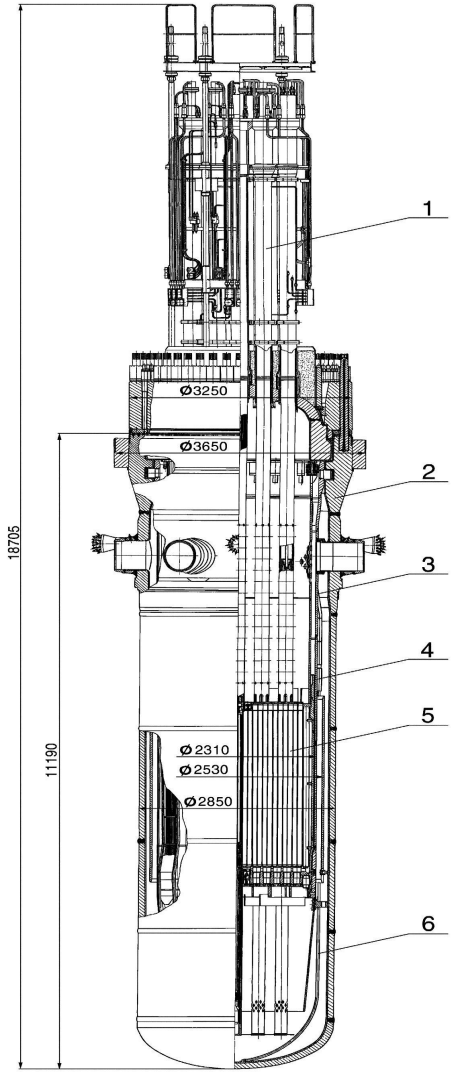
OKB «GIDROPRESS»

V-2 design (VVER-70)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-2 design (VVER-70)

Thermal power, MW	265
Primary pressure, MW	9,8
Pressure of generated steam, MPa	3,1

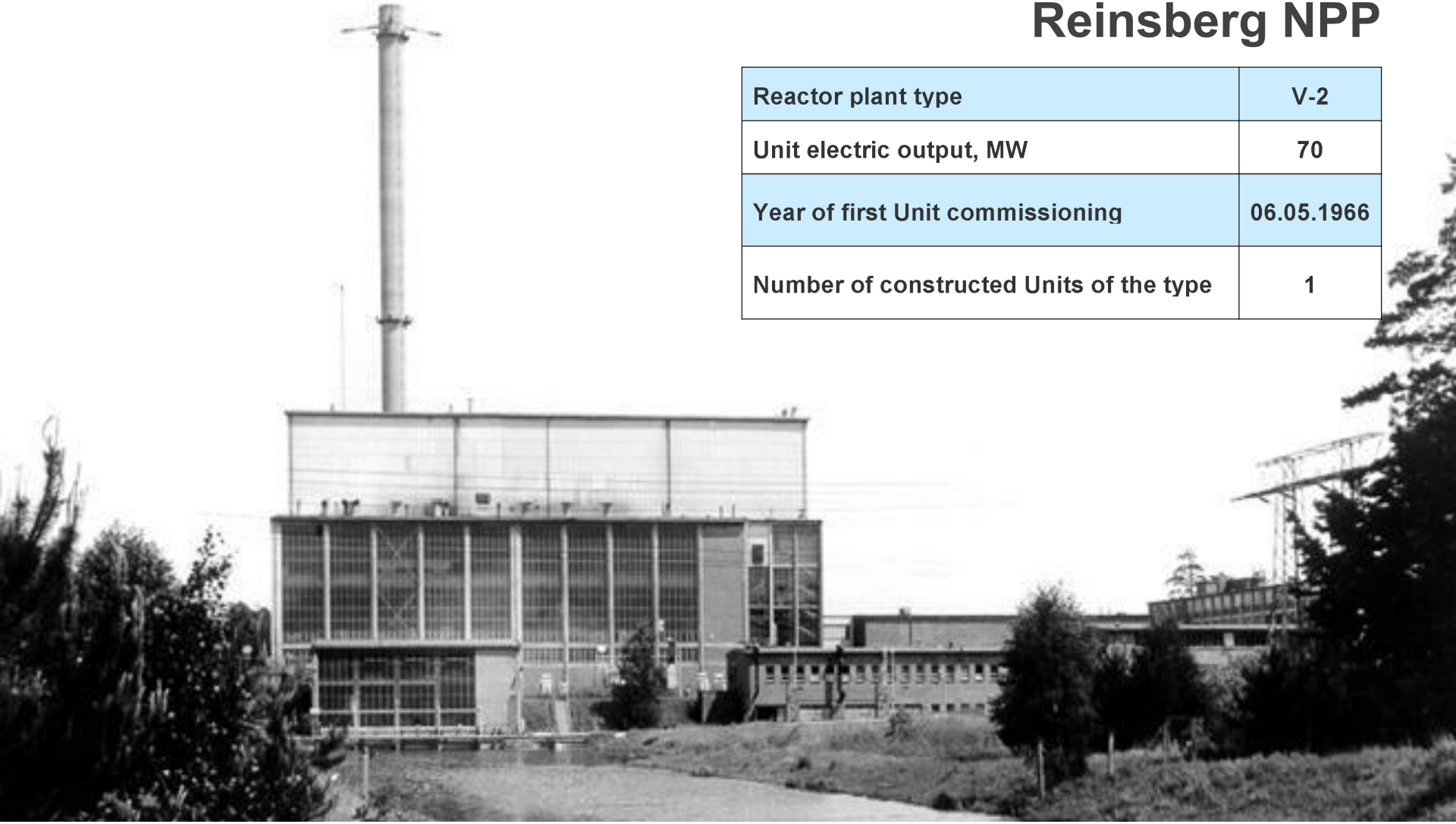
1 – upper unit
2 – reactor vessel
3 – core barrel
4 – reactor core
5 – shield
6 – drain pipe

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reinsberg NPP

Reactor plant type	V-2
Unit electric output, MW	70
Year of first Unit commissioning	06.05.1966
Number of constructed Units of the type	1



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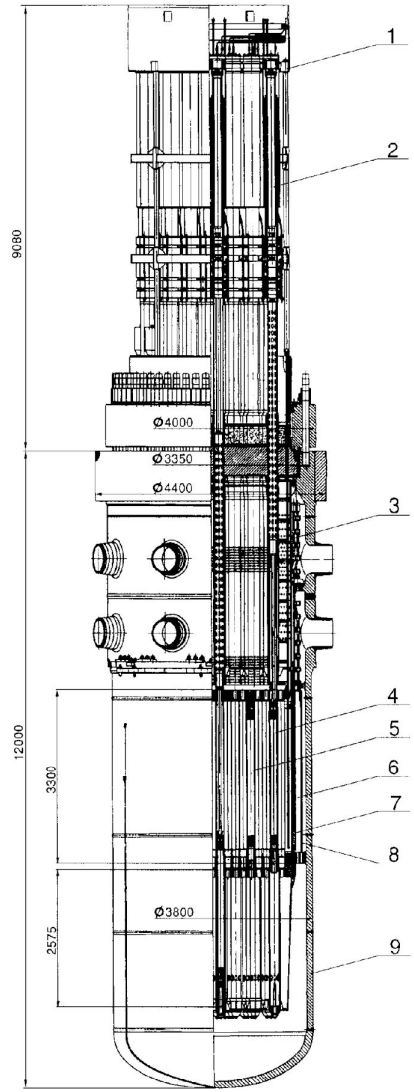
V-3M design (VVER-365)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-3M design (VVER-365)

Thermal power, MW	1320
Primary pressure, MW	10,29
Pressure of generated steam, MPa	3,3

1 – upper unit
2 – control rod drive
3 – hold-down grid
4 – shim/control/scram assembly
5 – fuel assembly
6 – removable basket
7 – core barrel
8 – shield
9 – reactor vessel

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Novovoronezh NPP Unit 2

Reactor plant type	V-3M
Unit electric output, MW	365
Year of first Unit commissioning	30.12.1969
Number of constructed Units of the type	1

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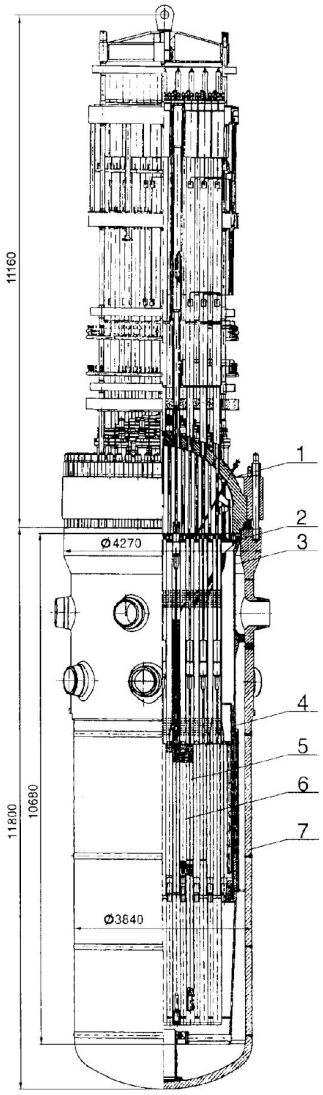
V-179 design (VVER-440)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-179 design (VVER-440)

Thermal power, MW	1375
Primary pressure, MW	12,26
Pressure of generated steam, MPa	4,6
Number of control rods used without boron concentration control, pcs	73

1 – reactor top head
2 – core barrel support
3 – core barrel
4 – protective tube unit
5 – scram/control/shim assembly
6 – fuel assembly
7 – reactor vessel

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Novovoronezh NPP Unit 3
(the first one of the type)

Reactor plant type	V-179
Unit electric output, MW	417
Year of first Unit commissioning	12.1971
Number of constructed Units of the type	2

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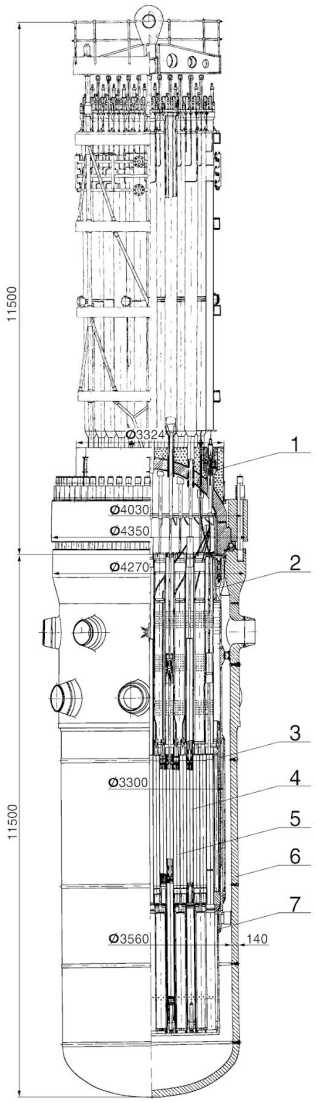
V-230 design (VVER-440)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



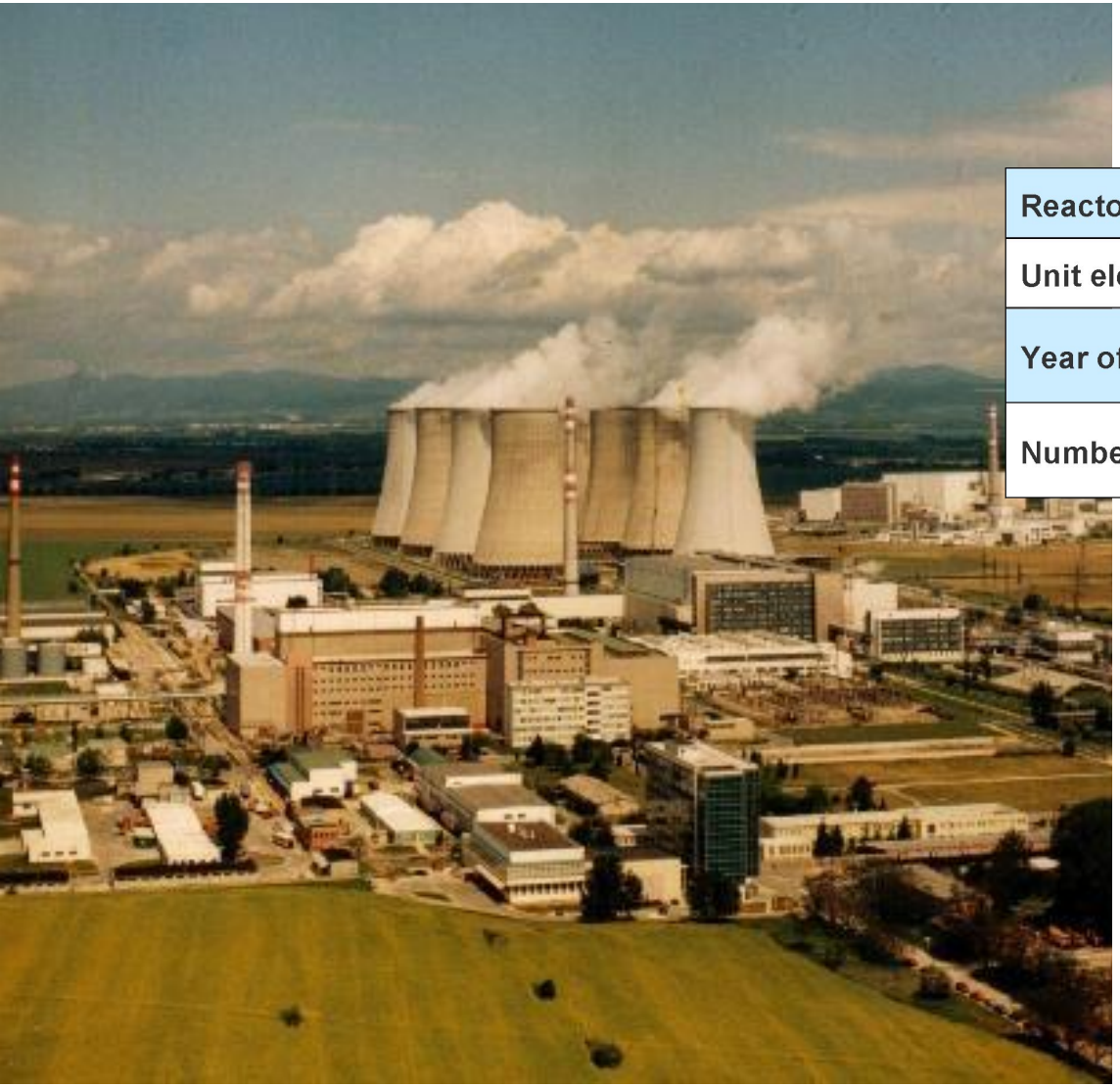
V-230 design (VVER-440)

Thermal power, MW	1375
Primary pressure, MW	12,26
Pressure of generated steam, MPa	4,6
Number of control rods used with boron concentration control, pcs.	37

1 – reactor top head
2 – protective tube unit
3 – core barrel
4 – scram/control/shim assembly
5 – fuel assembly
6 – vessel
7 – core barrel bottom

VVER historical evolution
VVER designs

OKB «GIDROPRESS»



Kola NPP Unit 1
(the first one of the type)

Reactor plant type	V-230
Unit electric output, MW	440
Year of first Unit commissioning	06.1973
Number of constructed Units of the type	12

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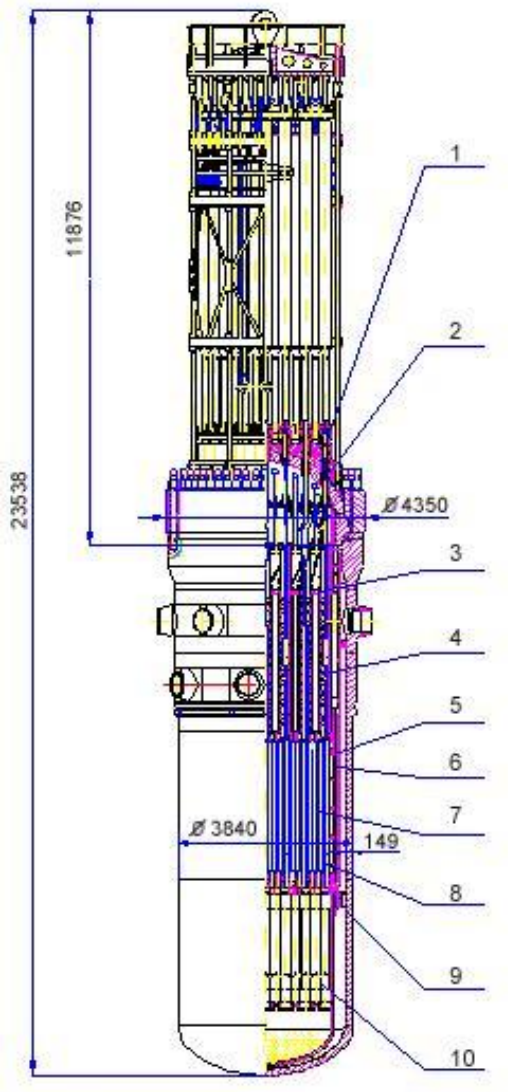
V-270 design (VVER-440)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-270 design (VVER-440)

Thermal power, MW	1375
Primary pressure, MW	12,26
Pressure of generated steam, MPa	4,6

1 – scram/control/shim drive
2 – upper unit
3 – protective tube unit
4 – intermediate rod
5 – basket
6 – core barrel
7 – fuel assembly
8 – scram/control/shim assembly
9 – reactor vessel
10 – core barrel bottom

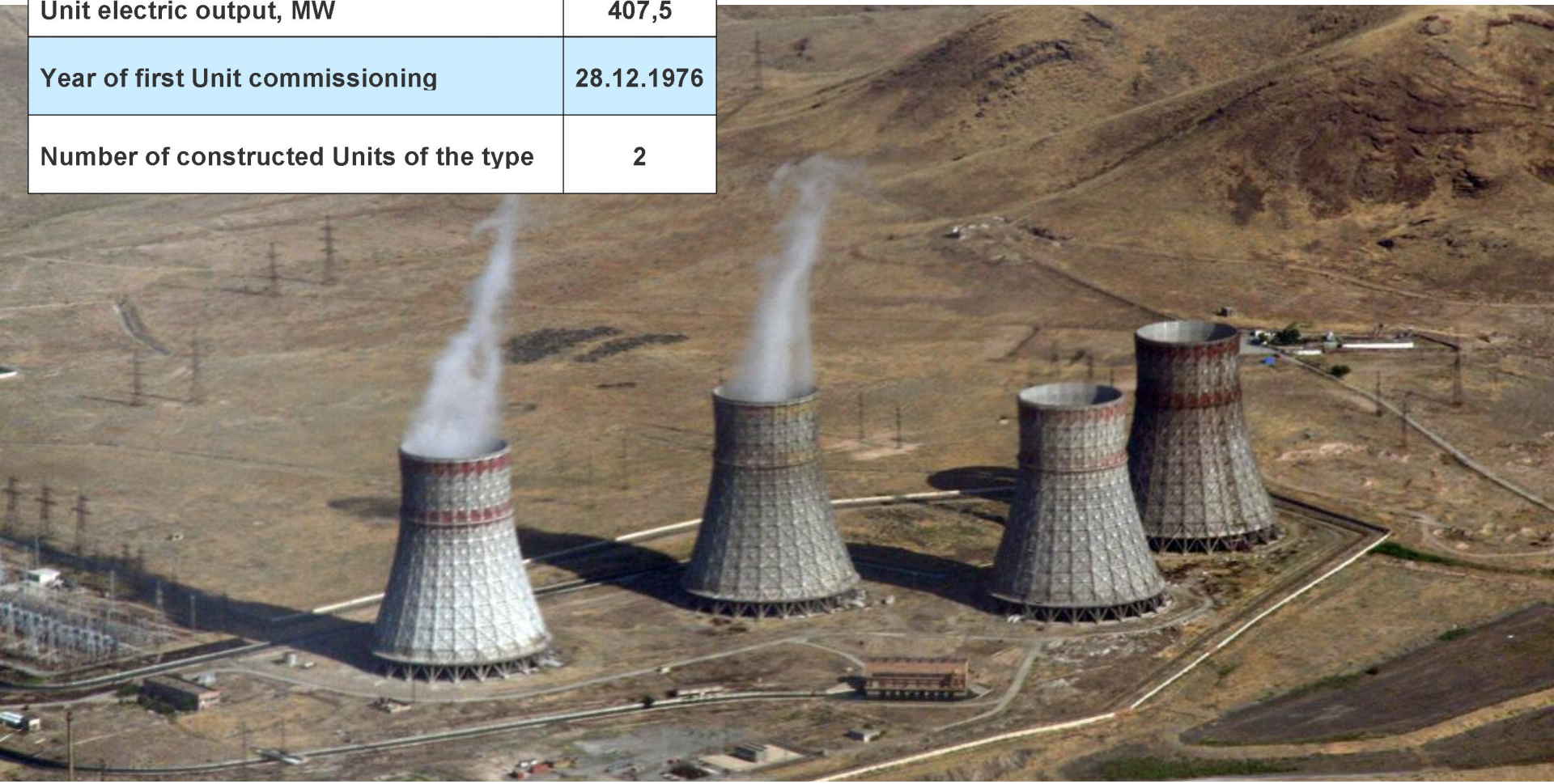
The reactor and reactor internals are additionally secured against seismic impact (SSE of magnitude 9)

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Armenian NPP Unit 1
(the first one of the type)

Reactor plant type	V-270
Unit electric output, MW	407,5
Year of first Unit commissioning	28.12.1976
Number of constructed Units of the type	2



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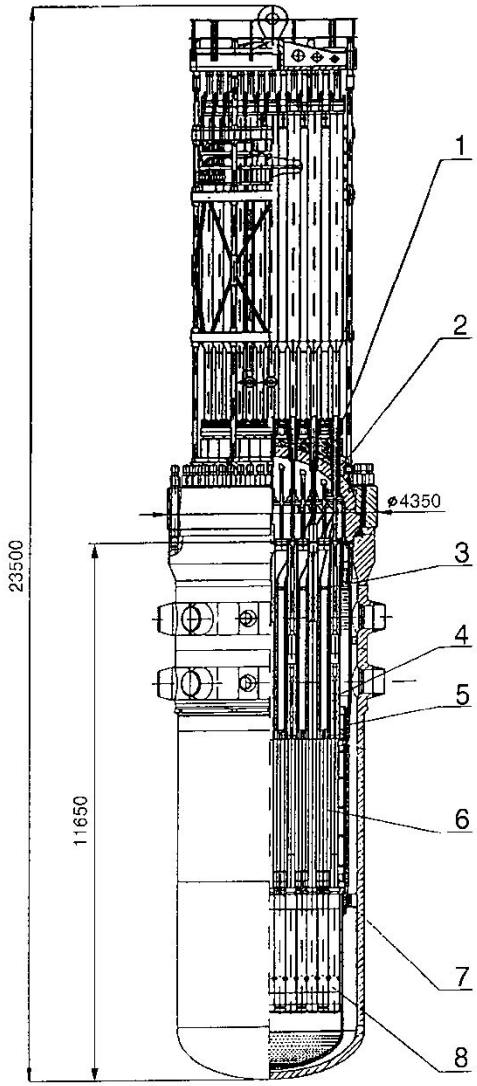
V-213 design (VVER-440)

VVER historical evolution
VVER designs

OKB «GIDROPRESS»



V-213 design (VVER-440)

Thermal power, MW	1375
Primary pressure, MW	12,26
Pressure of generated steam, MPa	4,6

1 – scram/control/shim drive
2 – upper unit
3 – protective tube unit
4 – intermediate rod
5 – core barrel
6 – reactor core
7 – reactor vessel
8 – core barrel bottom

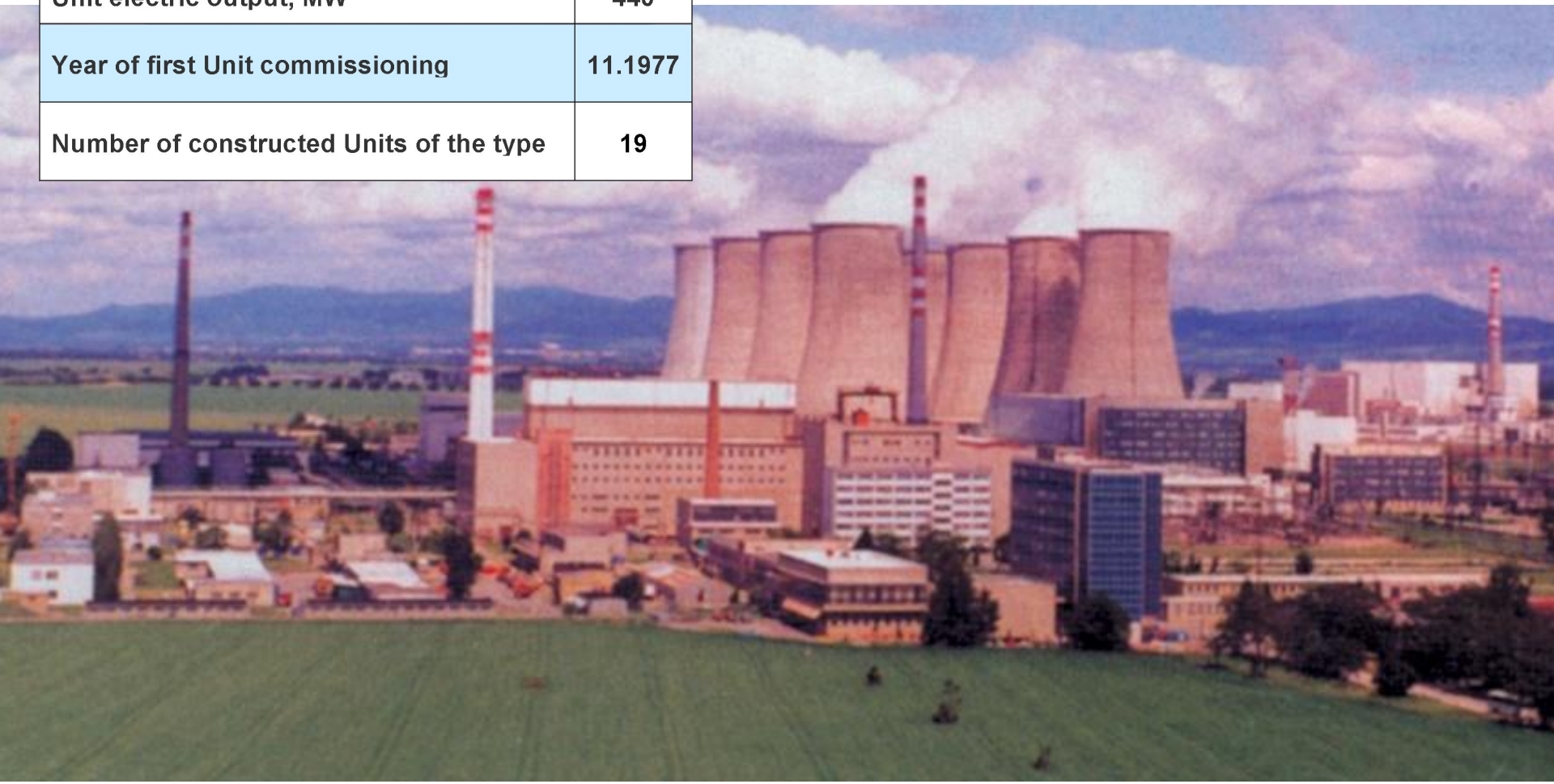
The structure and safety systems are designed to withstand in case of Dnom 500 break.

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-213
Unit electric output, MW	440
Year of first Unit commissioning	11.1977
Number of constructed Units of the type	19

Loviisa NPP Unit 1
(the first one of the type)



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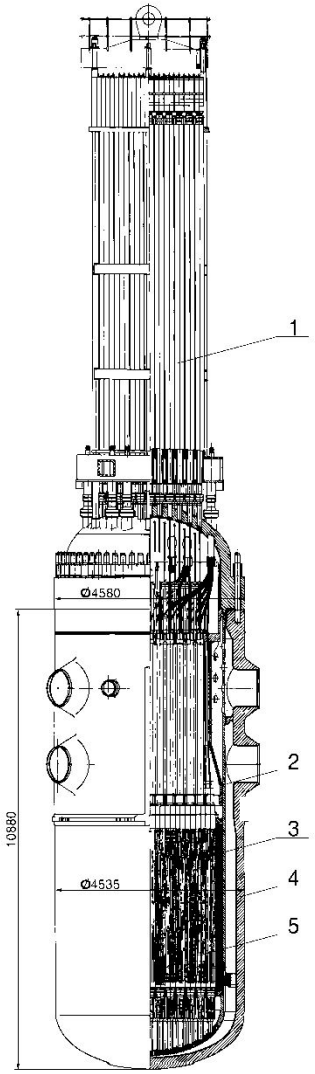
V-187 design (VVER-1000)

VVER historical evolution
VVER designs

OKB «GIDROPRESS»



V-187 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

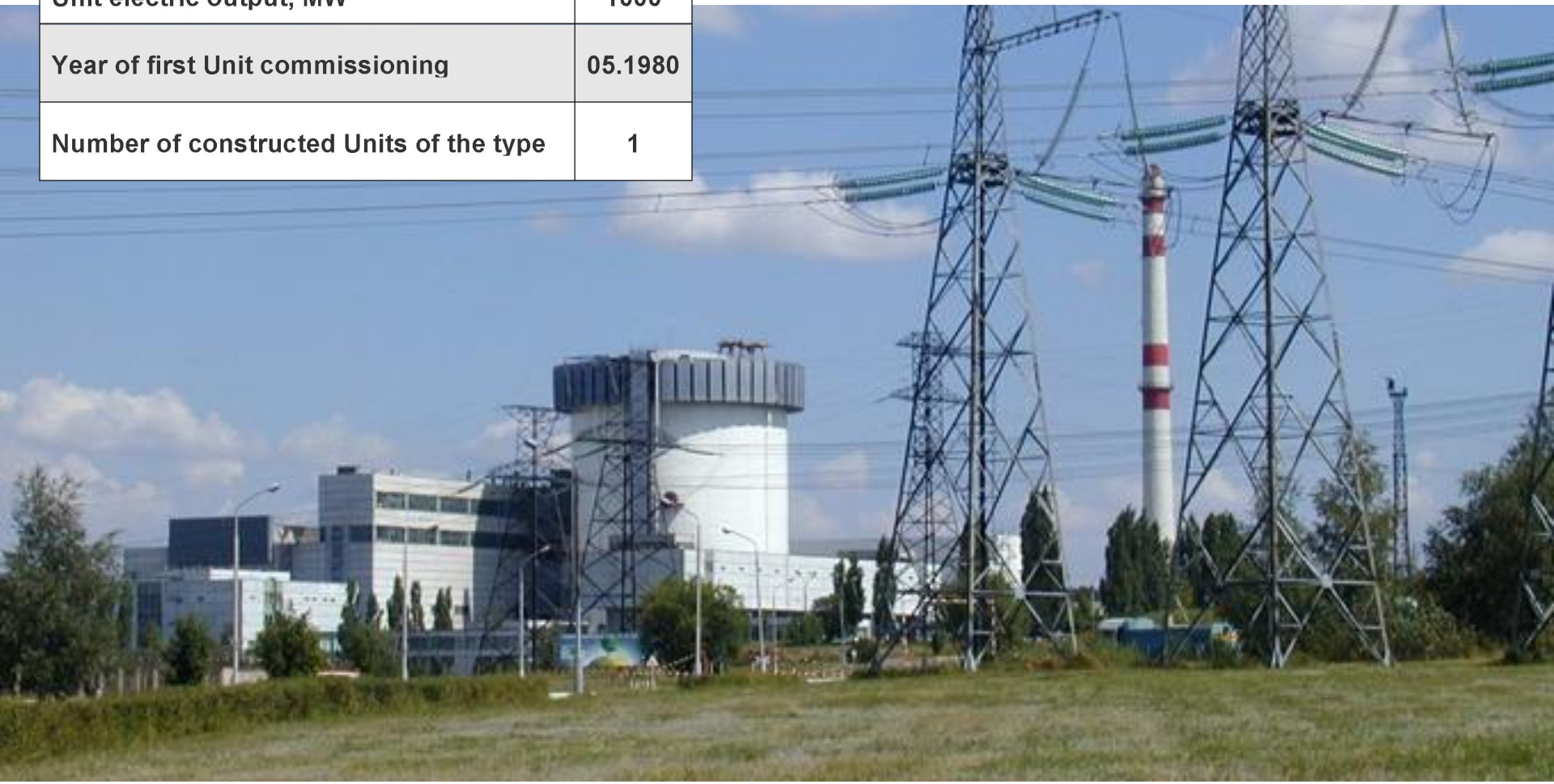
1 – upper unit
2 – protective tube unit
3 – core barrel
4 – reactor vessel
5 – reactor core

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-187
Unit electric output, MW	1000
Year of first Unit commissioning	05.1980
Number of constructed Units of the type	1

Novovoronezh NPP Unit 5

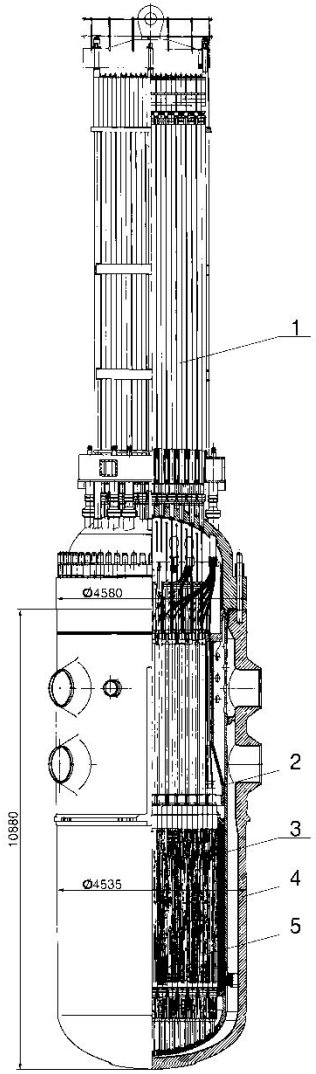


V-302 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-302 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

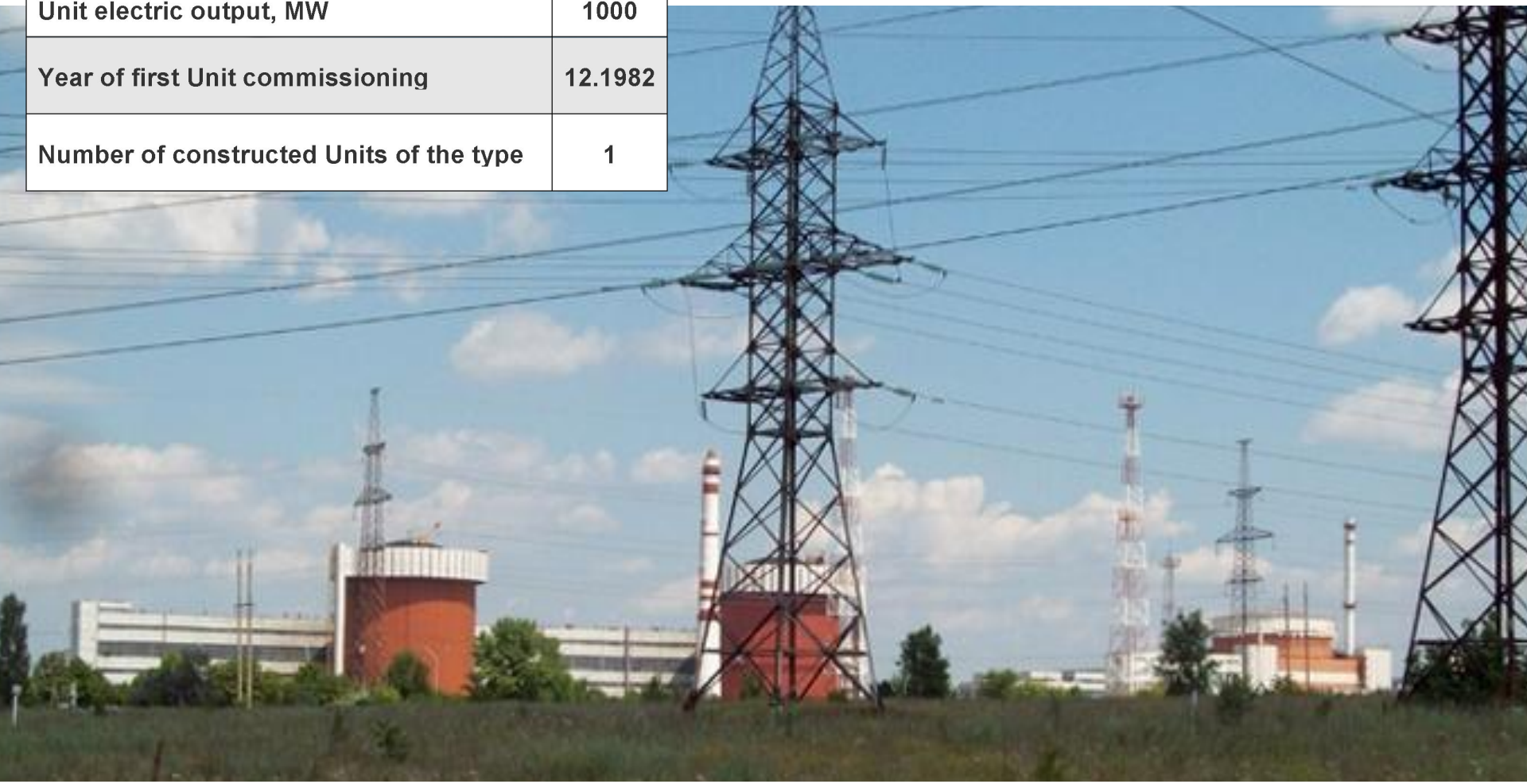
1 – upper unit
2 – protective tube unit
3 – core barrel
4 – reactor vessel
5 – reactor core

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-302
Unit electric output, MW	1000
Year of first Unit commissioning	12.1982
Number of constructed Units of the type	1

South Ukraine NPP Unit 1



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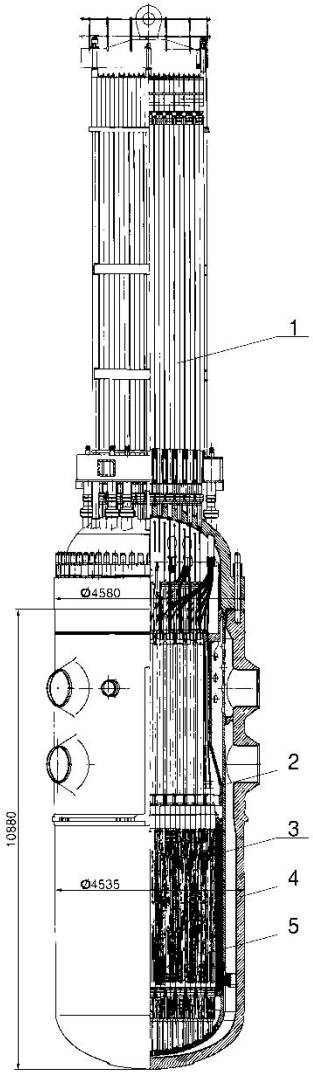
V-338 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-338 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

1 – upper unit
2 – protective tube unit
3 – core barrel
4 – reactor vessel
5 – reactor core

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-338
Unit electric output, MW	1000
Year of first Unit commissioning	05.1984
Number of constructed Units of the type	3

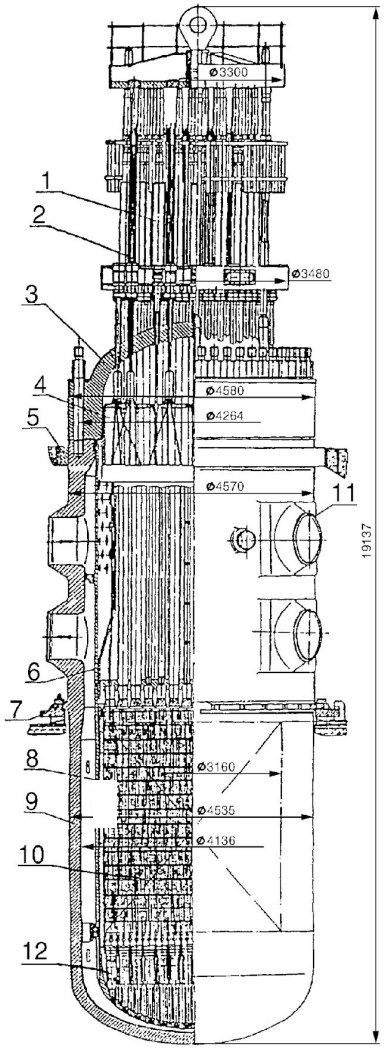
Kalinin NPP Unit 1
(the first one of the type)

V-320 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-320 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

1 – step electromagnetic drive
2 – instrumentation tube jacket
3 – upper unit
4 – protective tube unit
5 – thrust ring
6 – core barrel
7 – support ring
8 – core baffle
9 – welded vessel
10 – reactor core
11 – ECCS nozzle
12 – fuel assembly support thimbles

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-320
Unit electric output, MW	1000
Year of first Unit commissioning	12.1984
Number of constructed Units of the type	23
Number of Units under construction	2

Zaporozhye NPP Unit 1
(the first one of the type)

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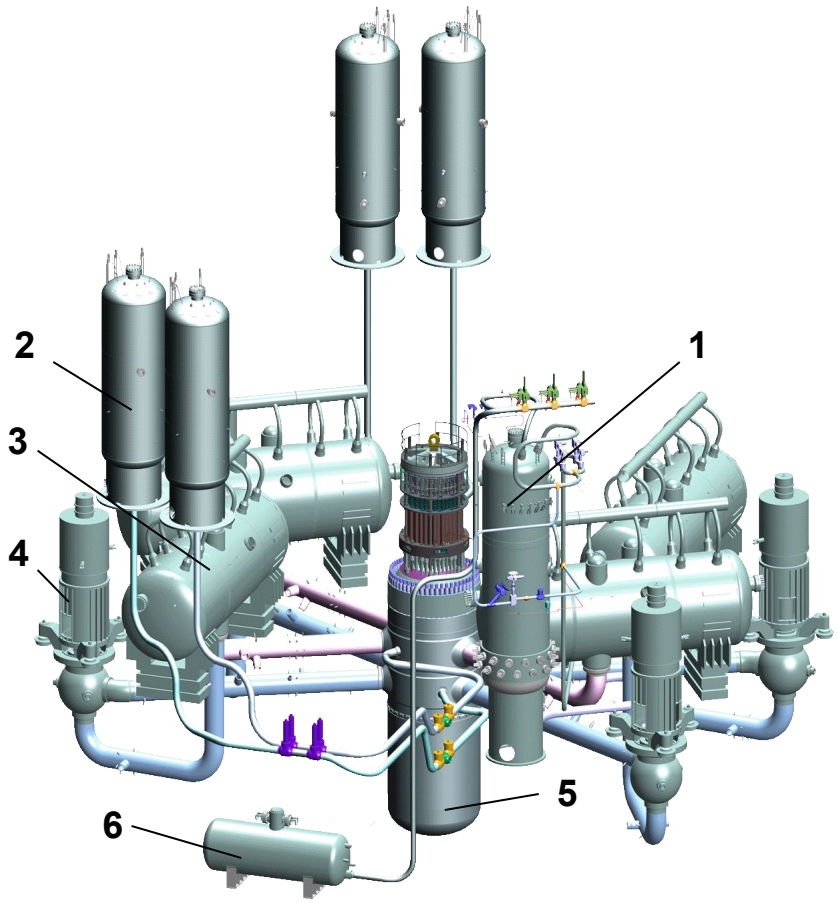
V-428 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-428 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

1 - pressurizer

2 - ECCS tank

3 - steam generator

4 - reactor coolant pump set

5 - reactor

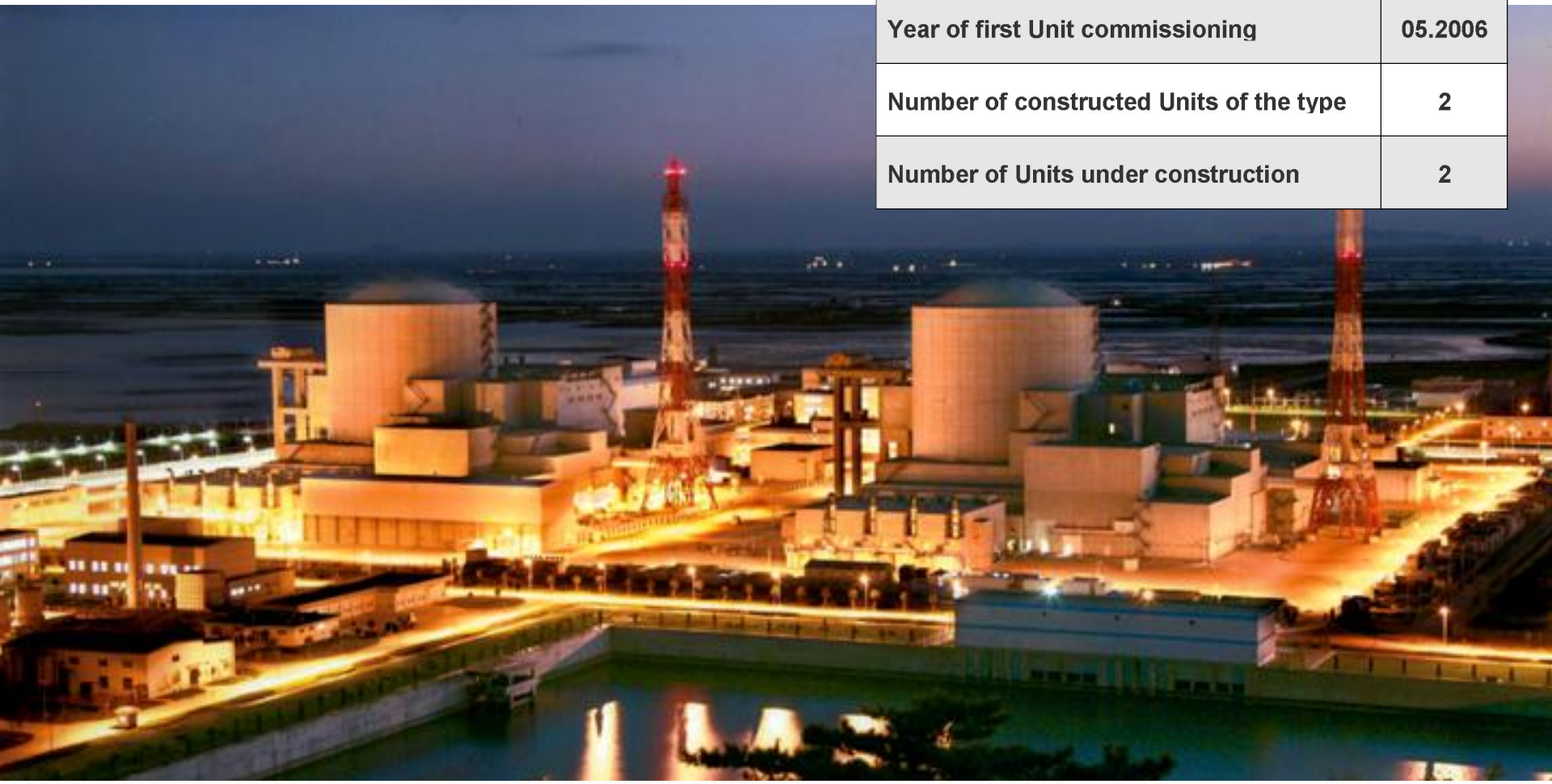
6 - relief tank

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Tianwan NPP Unit 1
(the first one of the type)

Reactor plant type	V-428
Unit electric output, MW	1000
Year of first Unit commissioning	05.2006
Number of constructed Units of the type	2
Number of Units under construction	2



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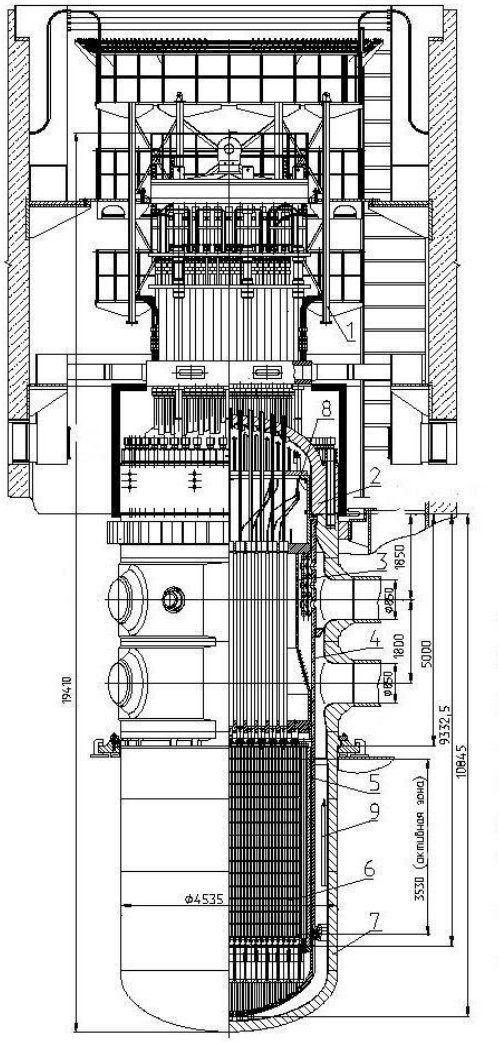
V-446 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-446 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

1 – wiring unit

2 – upper unit

3 – protective tube unit

4 – core barrel

5 – core baffle

6 – reactor core

7 – reactor vessel

8 – in-core instrumentation detectors

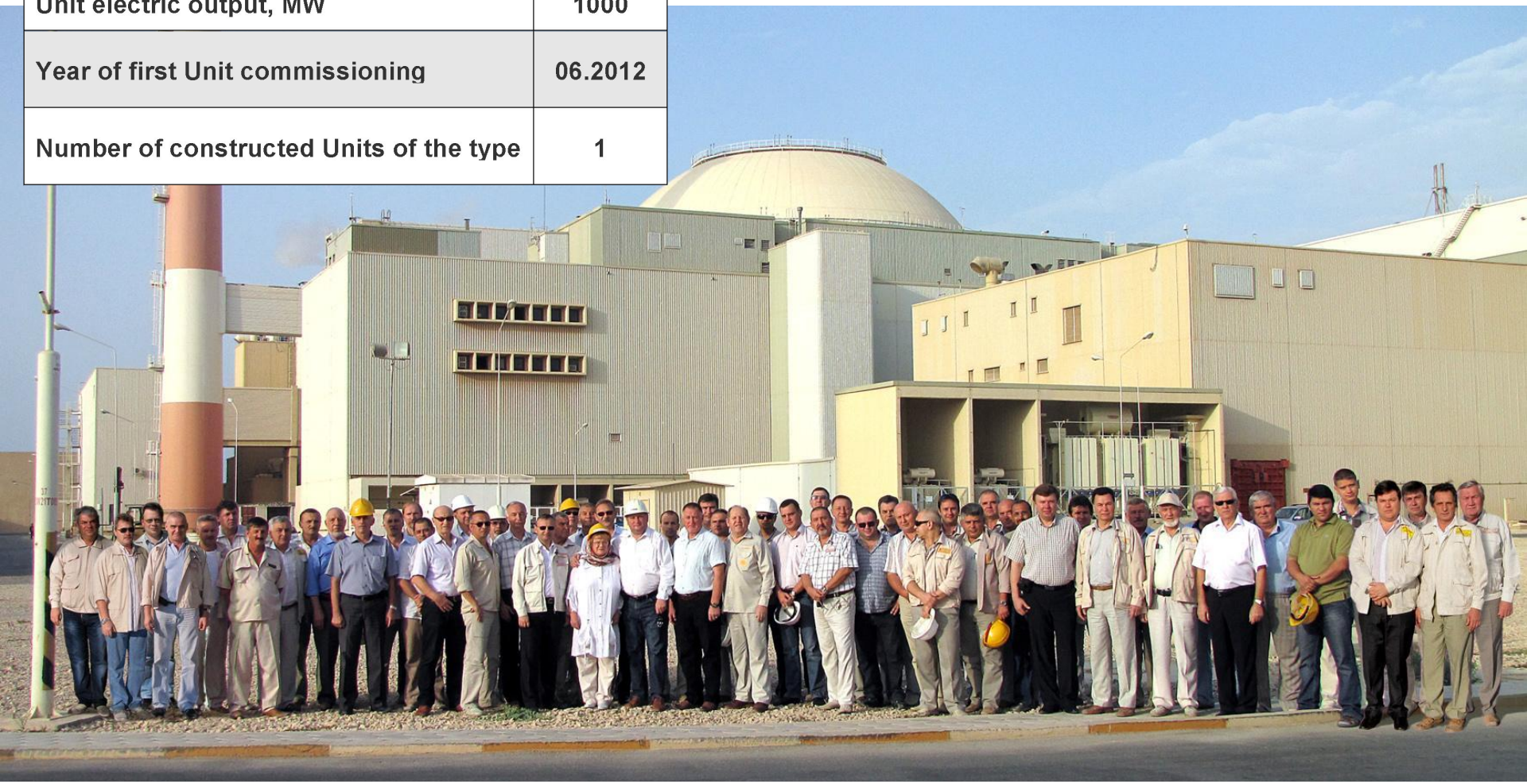
9 – surveillance specimens

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-446
Unit electric output, MW	1000
Year of first Unit commissioning	06.2012
Number of constructed Units of the type	1

Bushehr NPP



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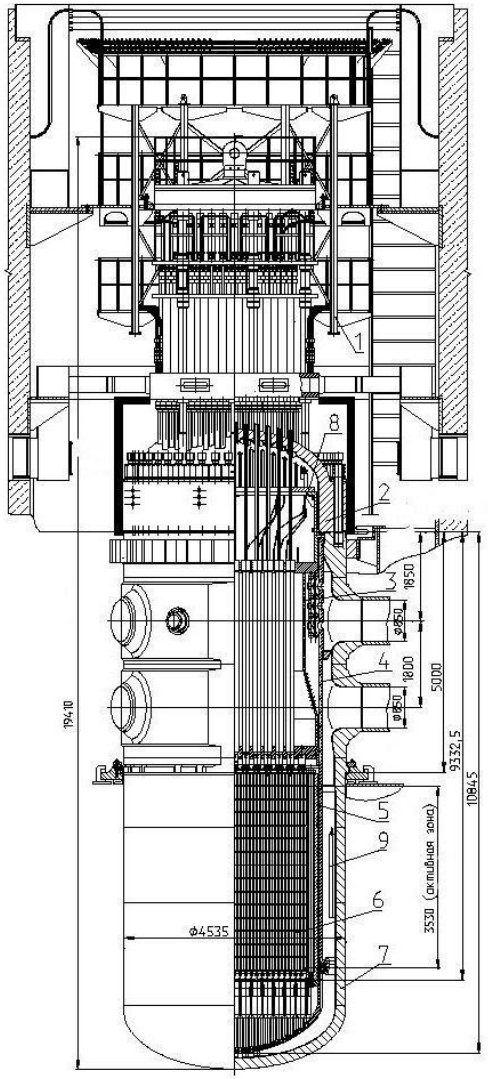
V-412 design (VVER-1000)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



V-412 design (VVER-1000)

Thermal power, MW	3000
Primary pressure, MW	15,7
Pressure of generated steam, MPa	6,3

1 – wiring unit

2 – upper unit

3 – protective tube unit

4 – core barrel

5 – core baffle

6 – reactor core

7 – reactor vessel

8 – in-core instrumentation detectors

9 – surveillance specimens

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-412
Unit electric output, MW	1000
Year of first Unit commissioning	09.2012 (first criticality)
Number of constructed Units of the type	1
Number of Units under construction	1
Number of Units being prepared for construction	2

Kudankulam NPP
(the first one of the type)

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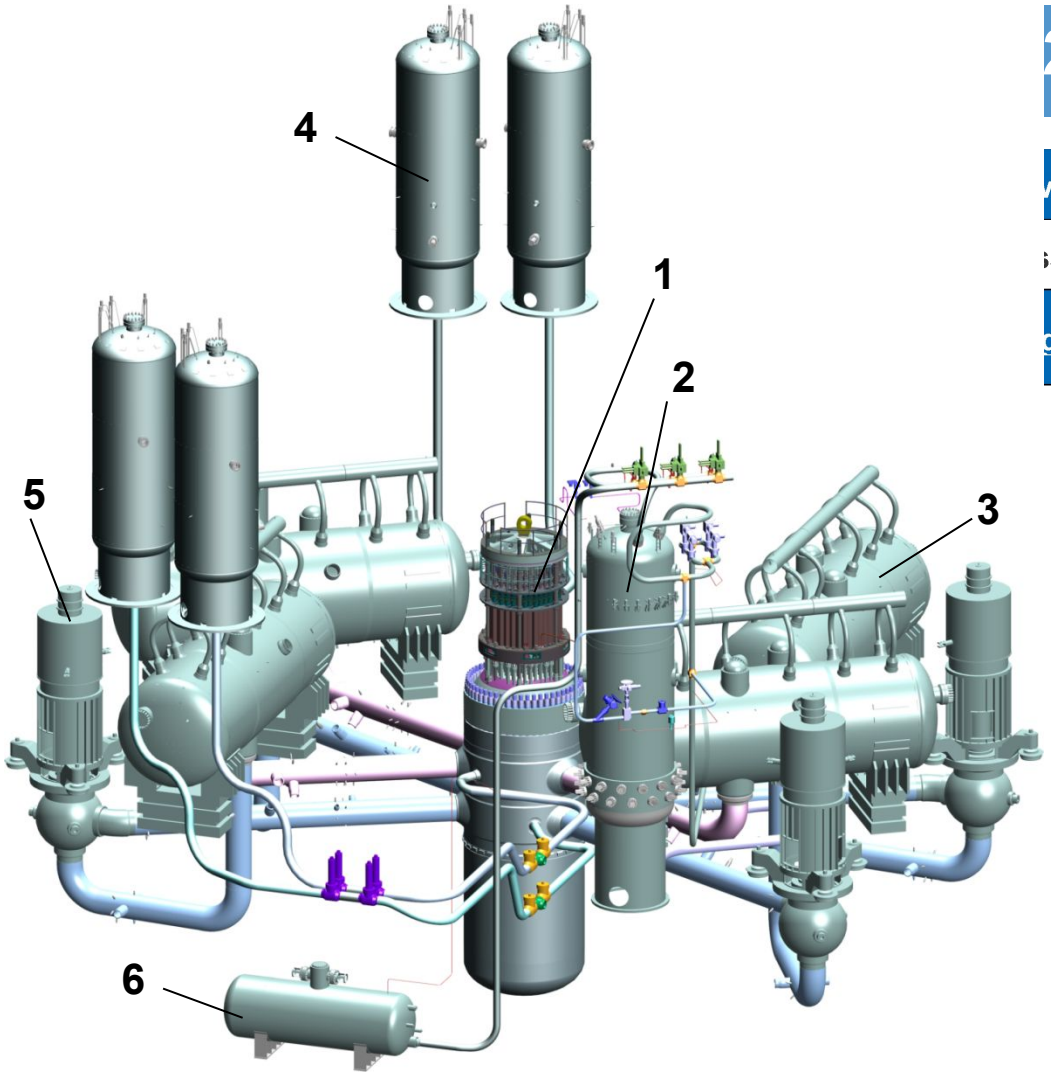
V-392M design (VVER-1200)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



2M design (VVER-1200)

ver, MW	3200
ssure, MW	16,2
generated steam, MPa	7,0

1 - reactor

2 - pressurizer

3 – steam generator

4 – ECCS tank

5 – reactor coolant pump set

6 – relief tank

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-392M
Unit electric output, MW	1200
Year of first Unit commissioning	2014
Number of constructed Units of the type	2

Novovoronezh NPP-2 Unit 1
(the first one of the type)

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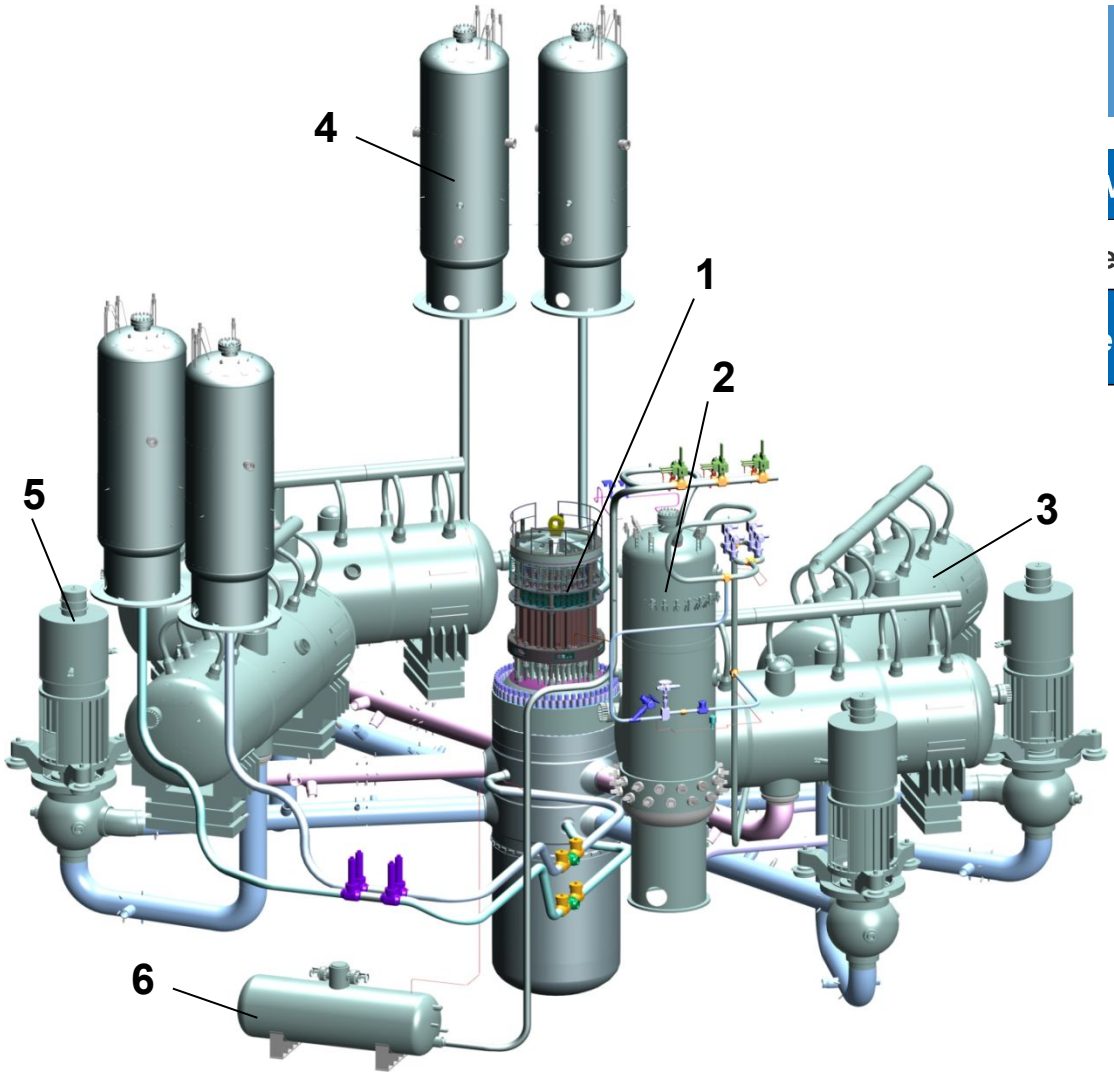
V-491 design (VVER-1200)

VVER historical evolution

VVER designs

OKB «GIDROPRESS»



design (VVER-1200)

MW	3200
e, MW	16,2
erated steam, MPa	7,0

1 - reactor

2 - pressurizer

3 – steam generator

4 – ECCS tank

5 – reactor coolant pump set

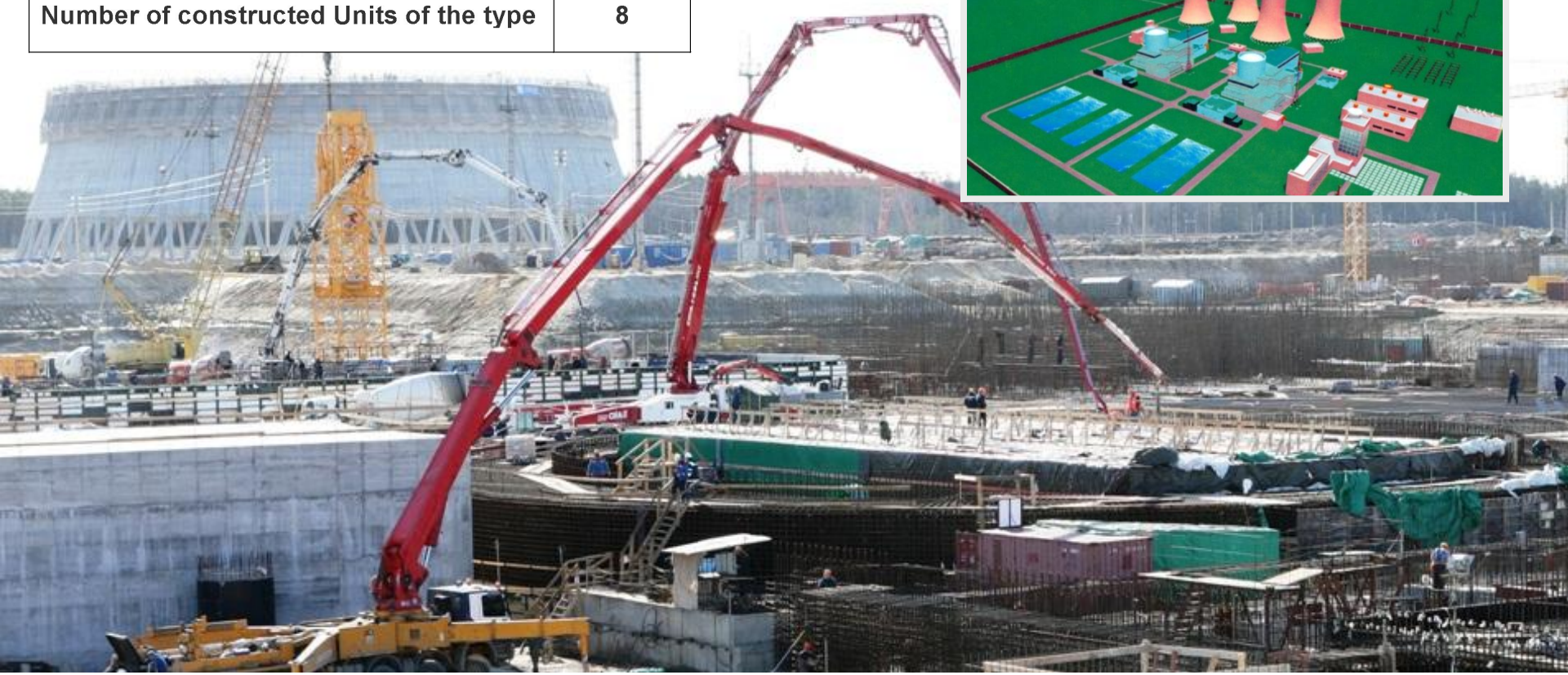
6 – relief tank

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

Reactor plant type	V-491
Unit electric output, MW	1200
Year of first Unit commissioning	2015
Number of constructed Units of the type	8

Leningrad NPP-2 Unit 1
(the first one of the type)



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V-510 design (VVER-1300)

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

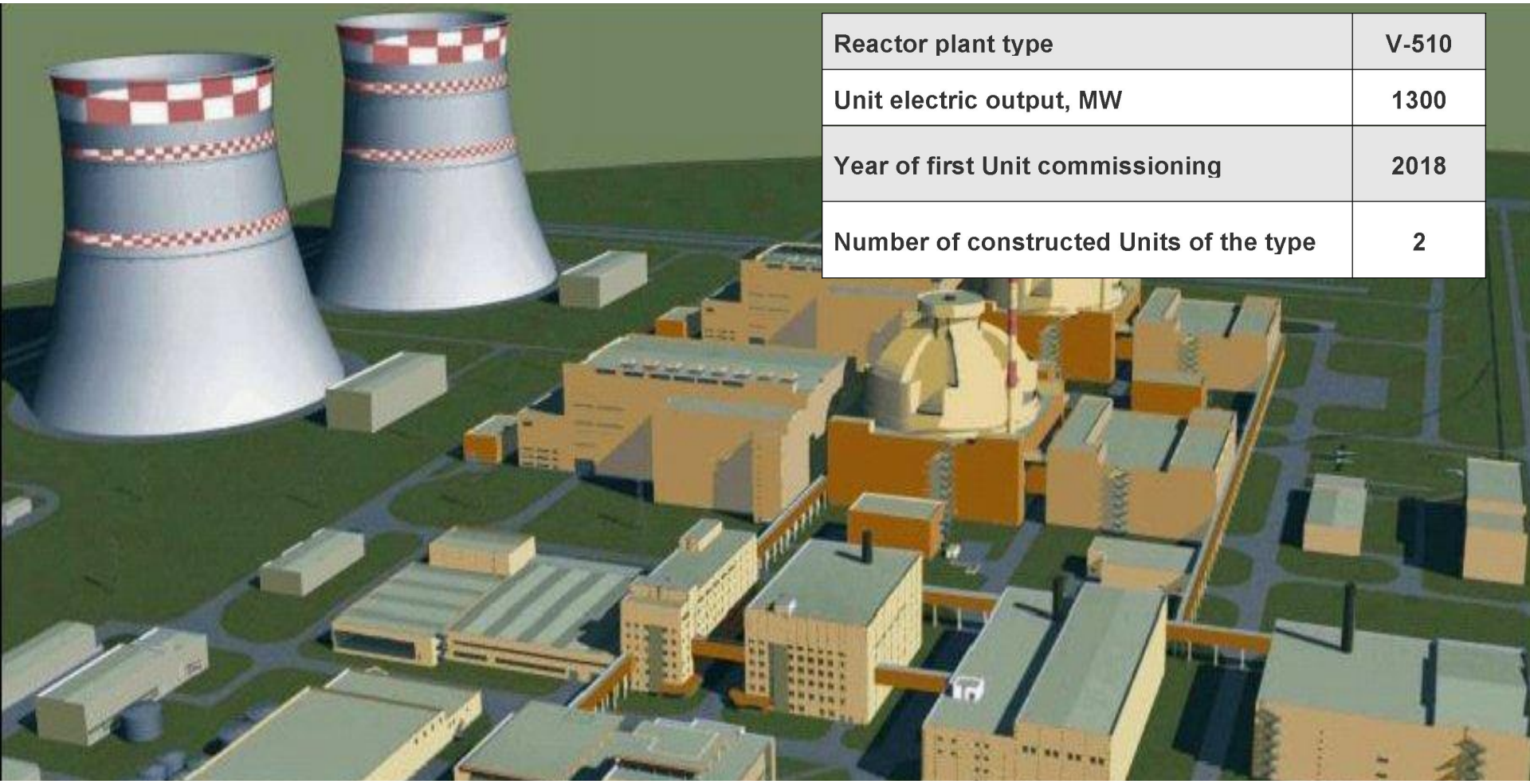
V-510 design (VVER-1300)

Thermal power, MW	3300
Primary pressure, MW	16,2
Pressure of generated steam, MPa	7,0

VVER historical evolution
VVER designs

OKB «GIDROPRESS»

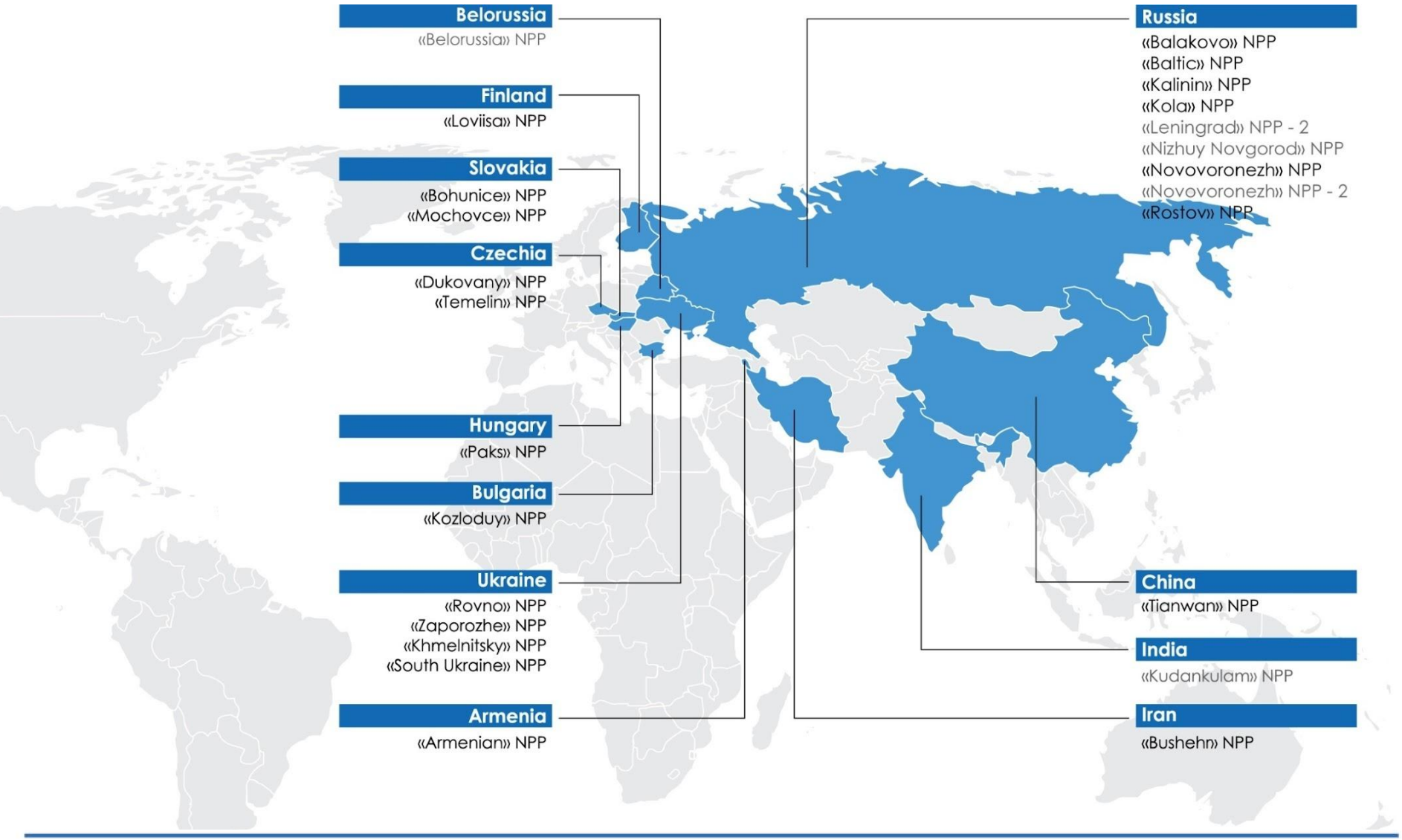
Nizhniy Novgorod NPP Unit 1



Reactor plant type	V-510
Unit electric output, MW	1300
Year of first Unit commissioning	2018
Number of constructed Units of the type	2

VVER NPP

OKB «GIDROPRESS»



We invite you to cooperation

OKB «GIDROPRESS»

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