The main technical and technologic decisions for the Ob and Taz bays gas field development

LECTURER

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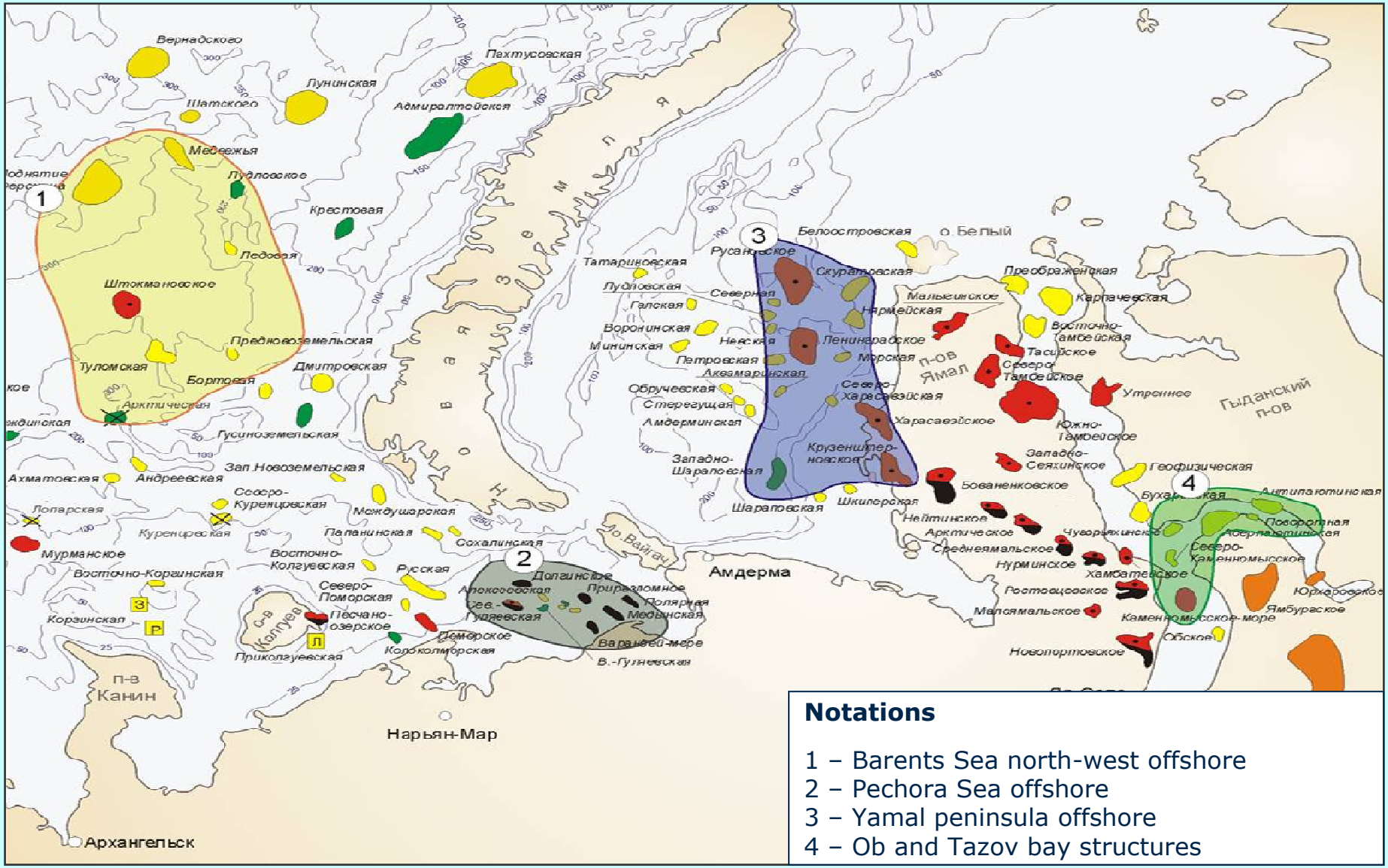
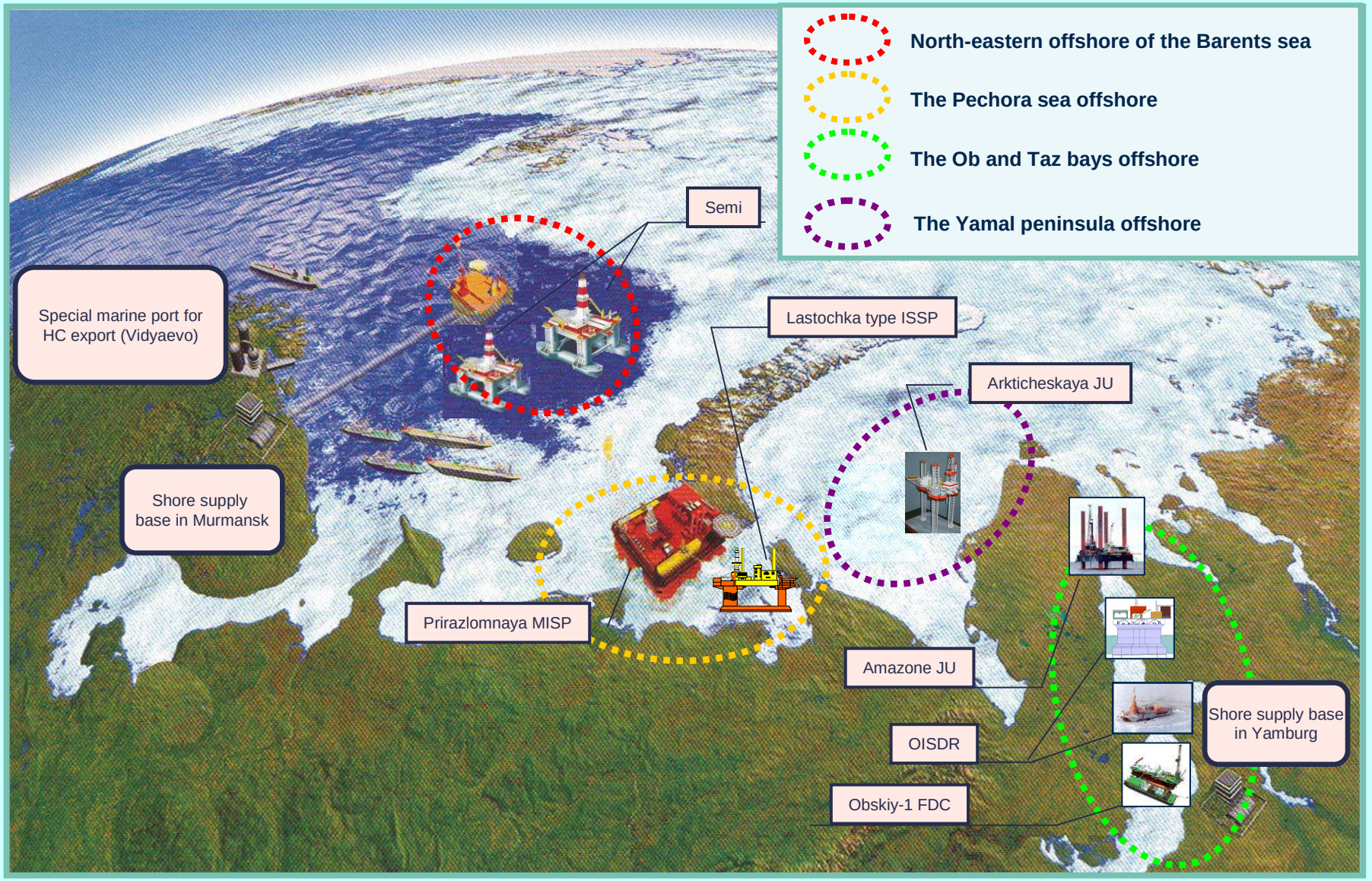
THE COMPLEX ARRANGEMENT LAYOUT OF THE ARCTIC SHELF



Notations

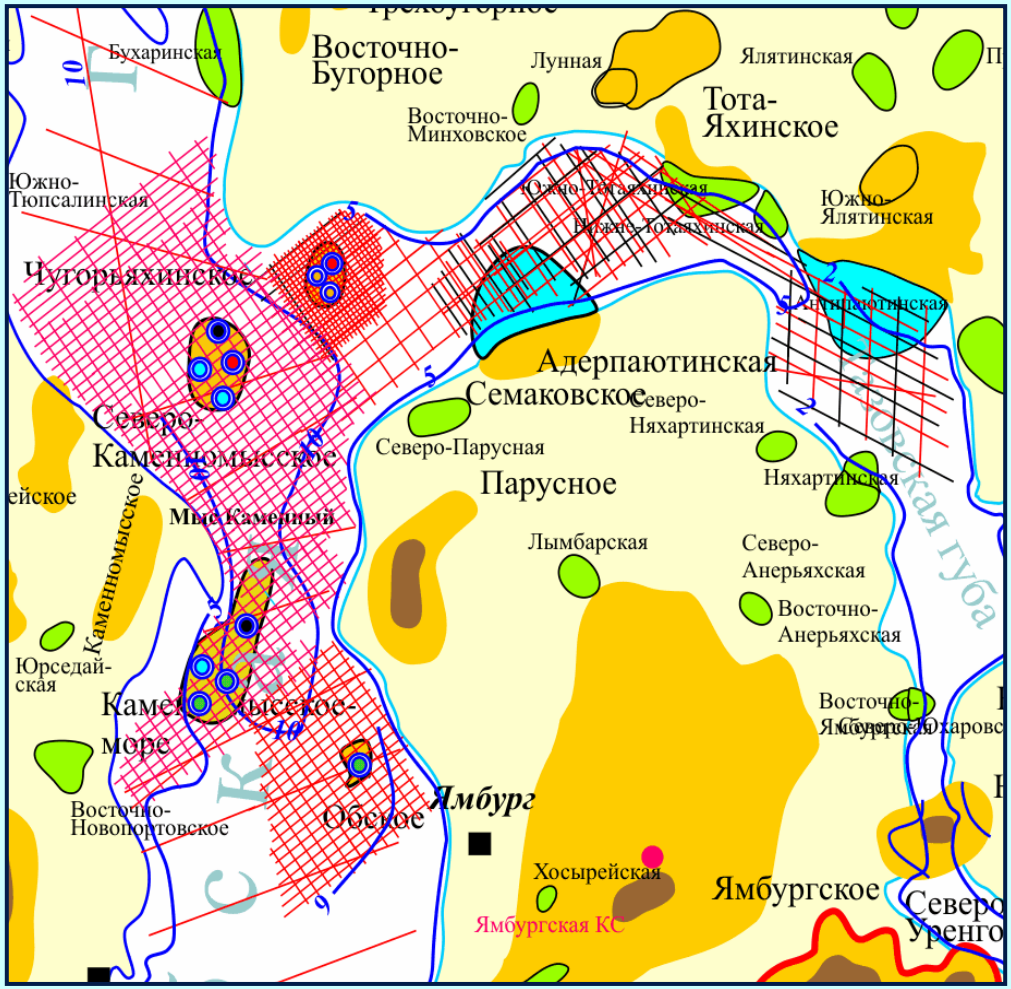
1 – Barents Sea north-west offshore
2 – Pechora Sea offshore
3 – Yamal peninsula offshore
4 – Ob and Tazov bay structures

REGIONS OF OPERATIONS



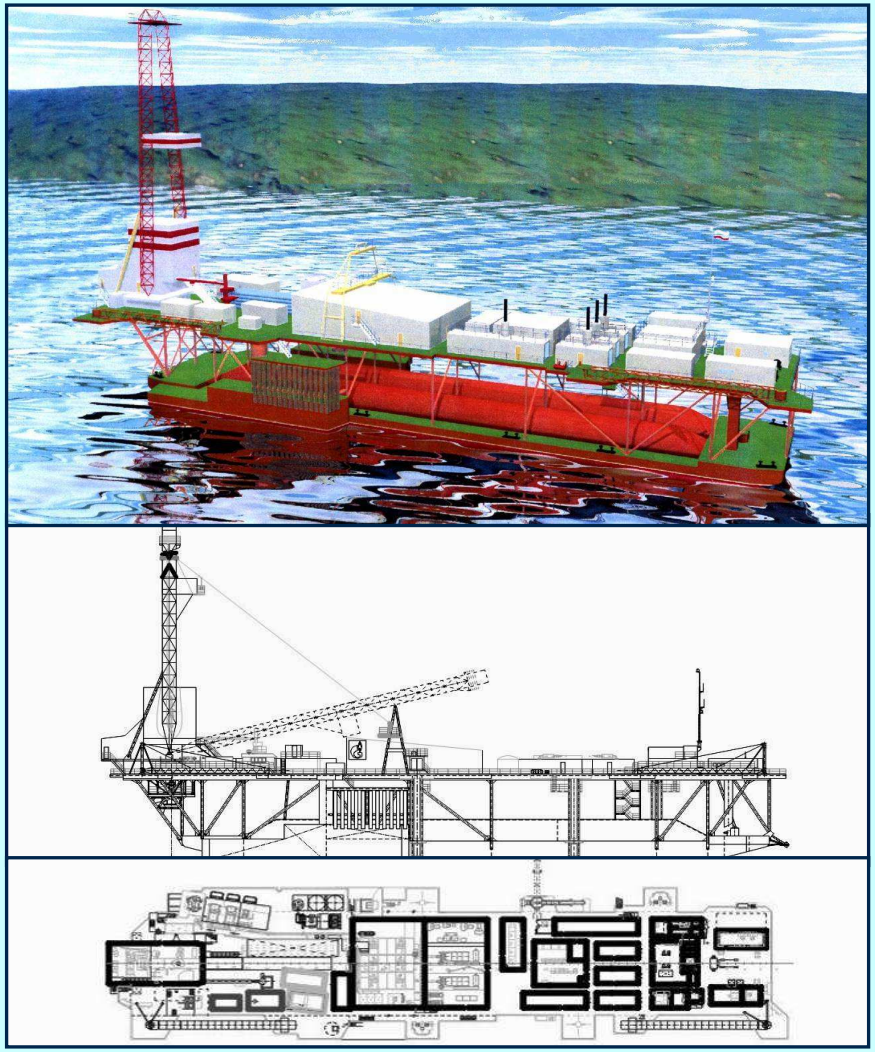
The main peculiarities of the Ob and Taz region that influence on field development approach

- proximity of the Yamburg gas and condensate field production structure (less than 150 km);
- a short distance from the shore (maximum distance is less than 40 km);
- shallow waters of the water body (water depth is 8-12 m);
- no permafrost;
- a short inter-ice period (about 3 months);
- complicated natural and climatic conditions;
- complicated environmental conditions.



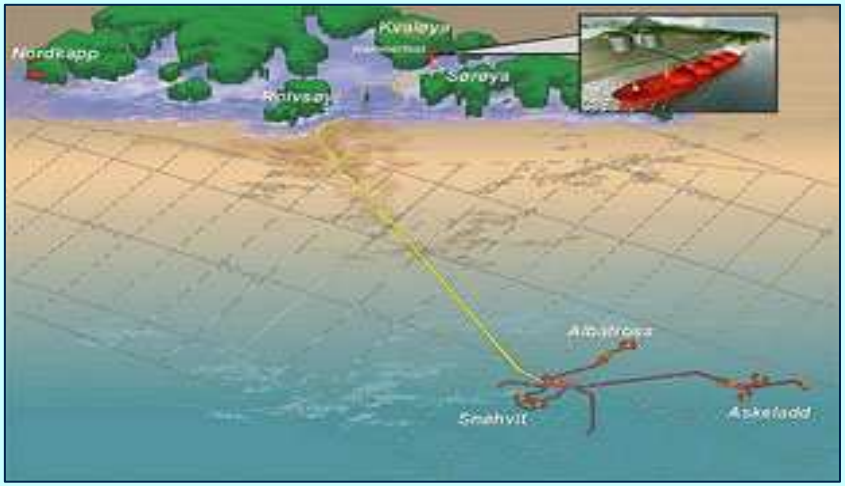
"Amazone" Jack-up

"Obsky-1" floating rig

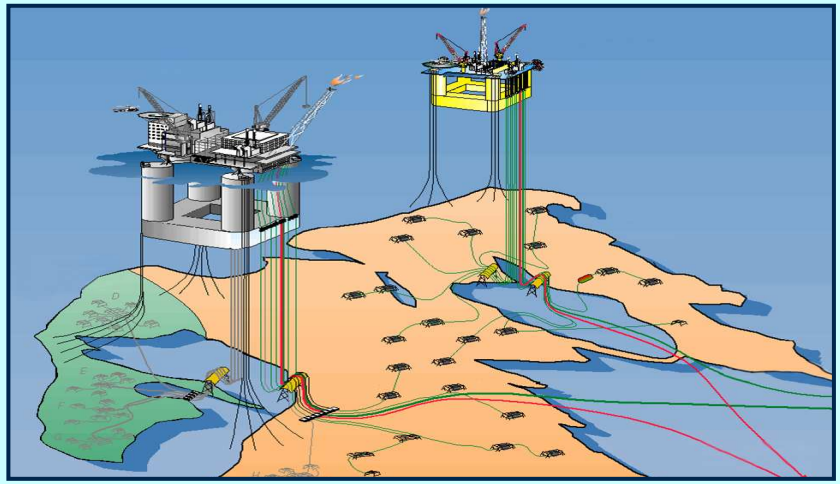


EXPERIENCE OF SUBSEA PRODUCTION

Snovit field, Barents sea

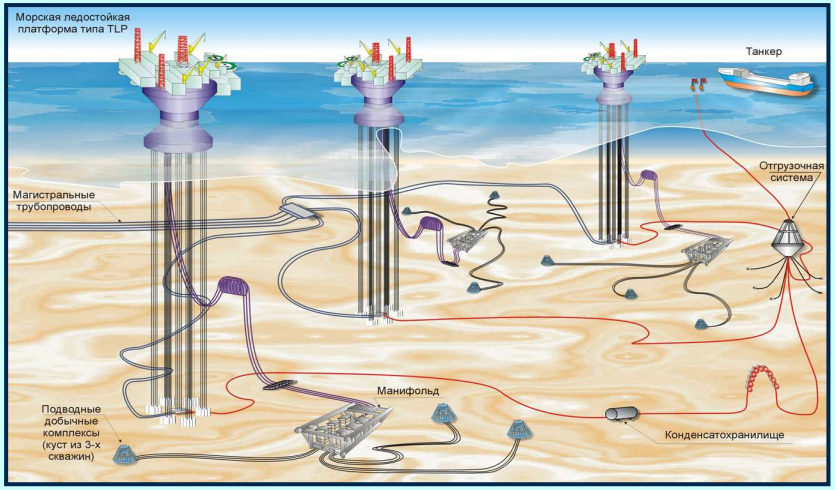


Trol field, North sea



Ormen Lange field, Norwegian sea

Shtokman field, Barents sea



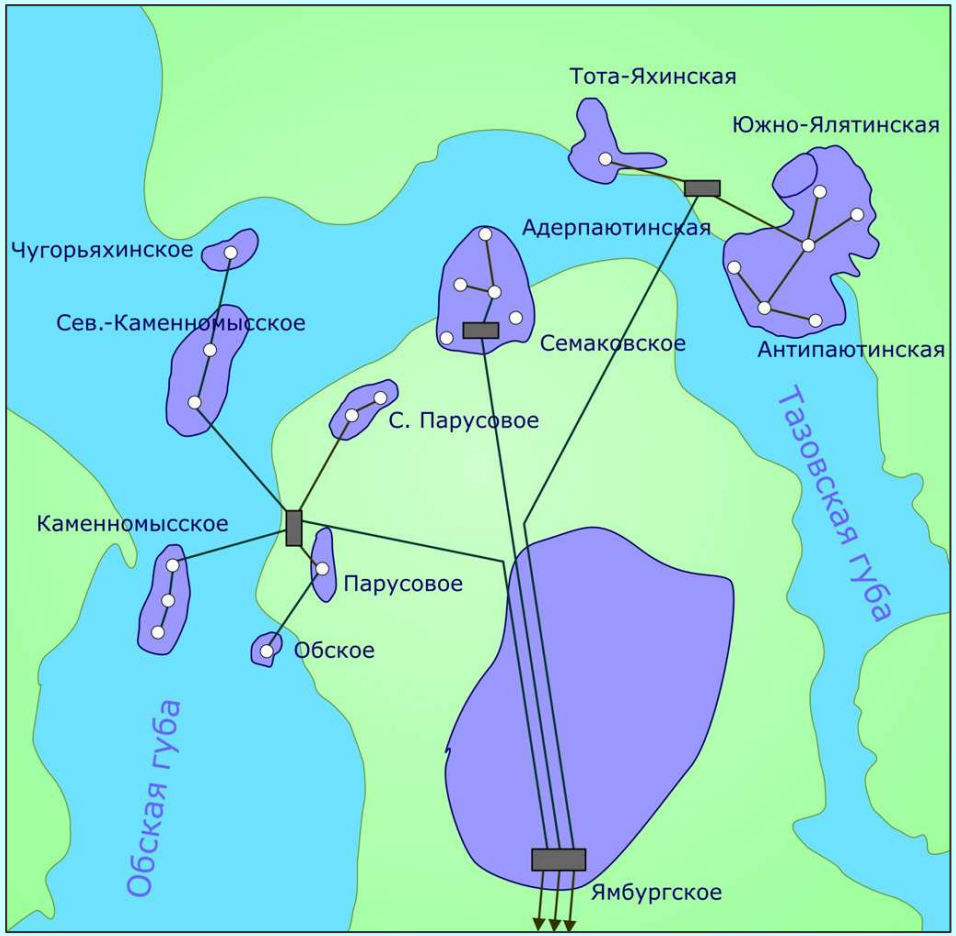
THE WORLD EXPERIENCE ANALYSIS SHOWED THAT:

1. There is no experience of developing fields in the conditions of the Arctic seas shallow waters.
2. The offshore oil and gas industry widely uses subsea production technologies.
3. There are no technical means for drilling a cluster of the production wells with subsea completion in the Arctic seas conditions.
4. The use of the subsea production technology substantially reduces capital investments for the hydrocarbon resources development

DECISIONS TO DEVELOP GAS FIELDS THE OB AND TAZ BAYS SHOULD TAKE INTO ACCOUNT THE FOLLOWING:

1. advanced technologies of drilling and operating wells;
2. using subsea production complexes;
3. creating structures for locating and protecting subsea complexes from ice influence;
4. creating mobile ice-resistant platforms or their purchase and further upgrading of the existing platform of the SDC type to drill wells with subsea completion;
5. transportation of the well products without their preliminary preparation at sea;
6. field arrangement integration.

COMPLEX OB AND TAZ BAY FIELDS ARRANGEMENT

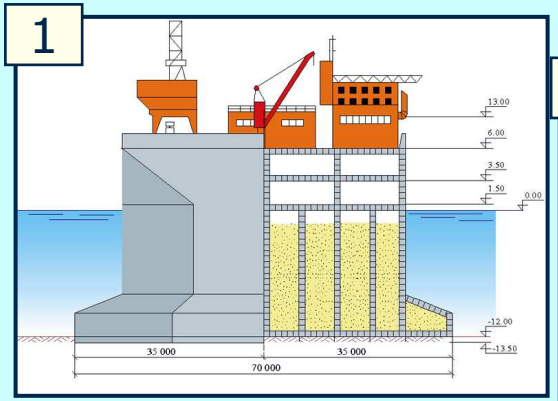


COMPLEX METHOD OF ARRANGEMENT PROVIDE:

- cooperation with the existing onshore objects of gas production;
- creation of the unified system of collection, preparation and transport for a group of fields;
- creation a unified system of remote controlling subsea production complexes for a group of fields.

Variants of platforms for production wells drilling on the Severo-Kamennomyskoe field

1



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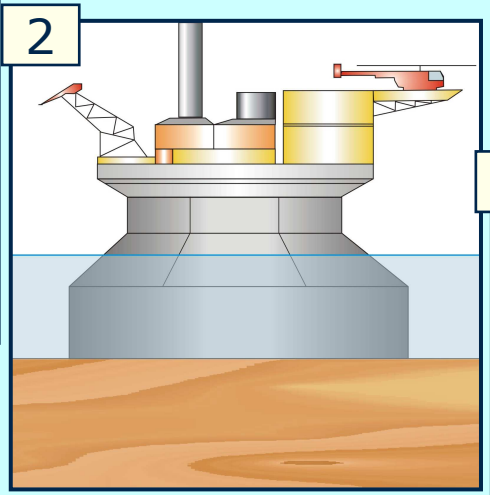

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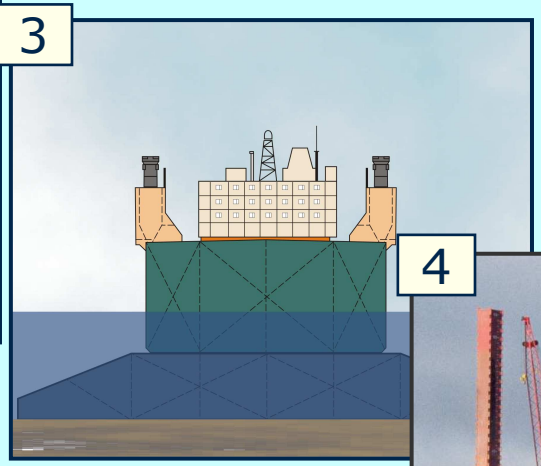
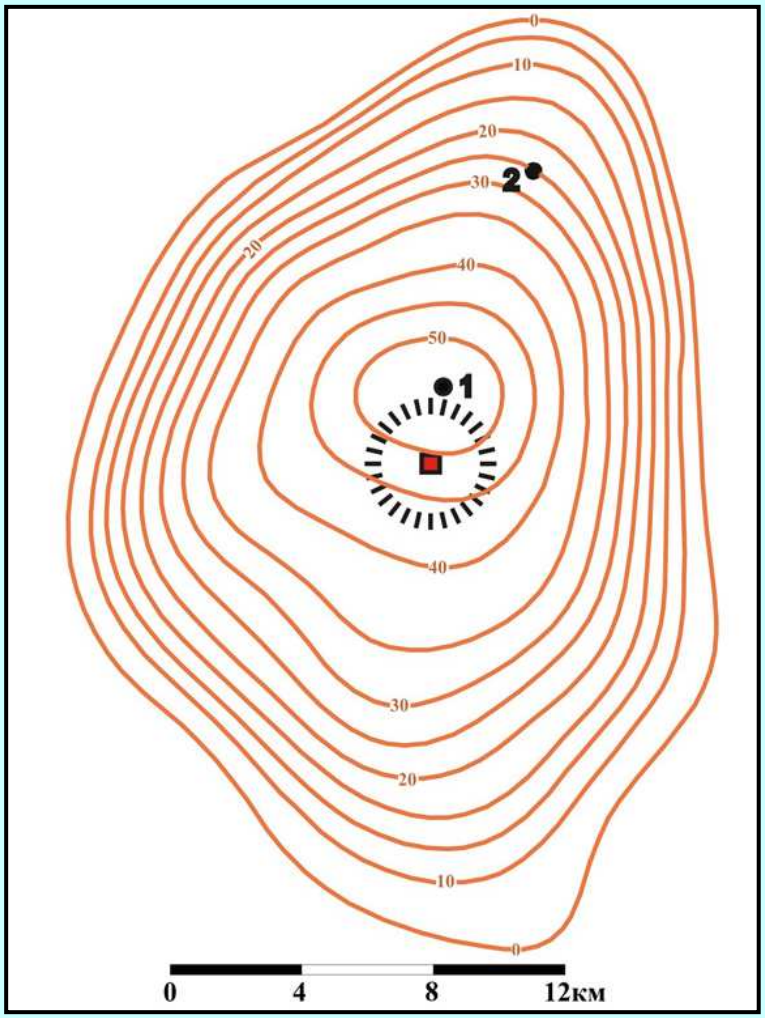
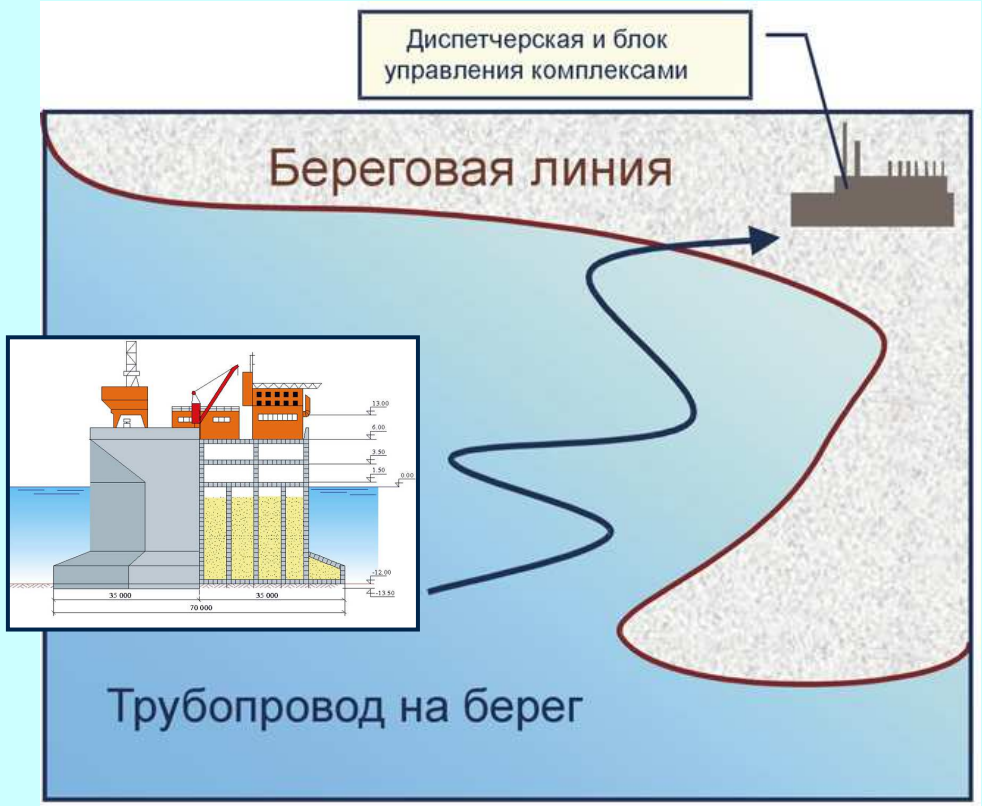


4

1. Ice-resistant gravitational platform
2. Mobile ise-resistant platform
3. “SDC” mobile platform
4. “Amazon” Jack-up

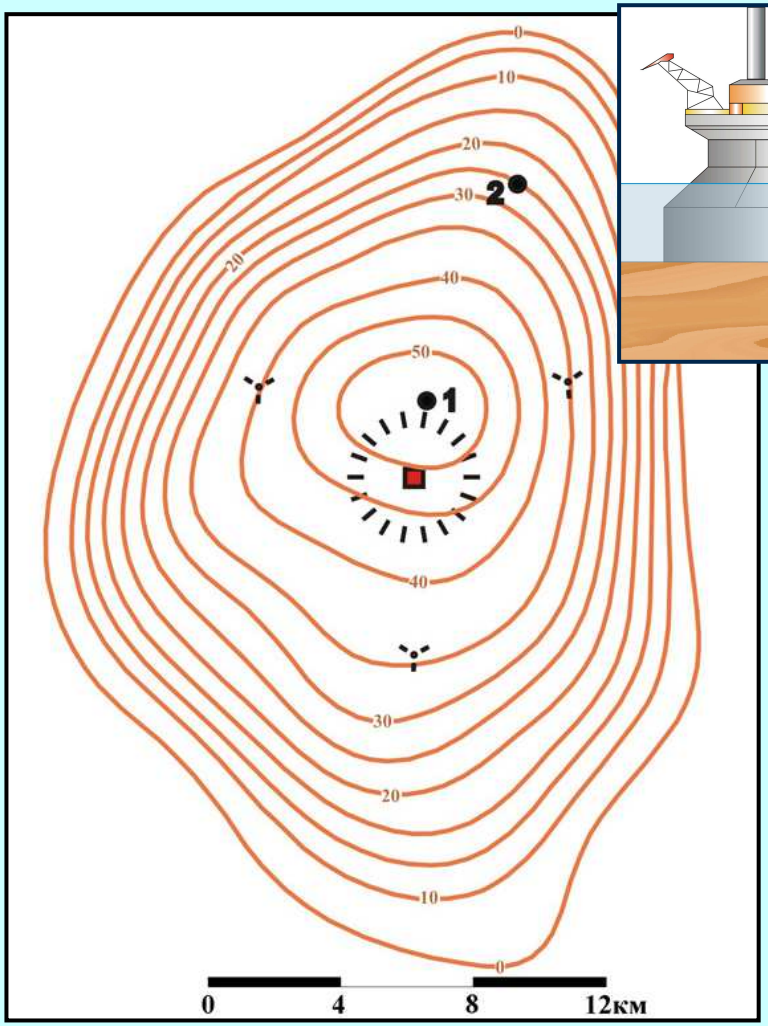
LAYOUT OF PLATFORM AND DOWNHOLES. VARIANT I

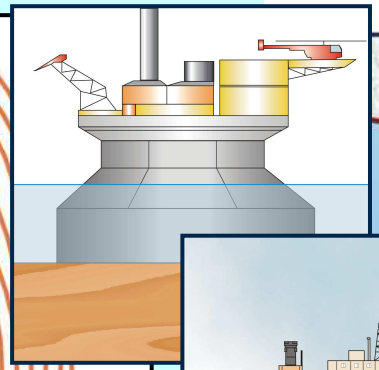


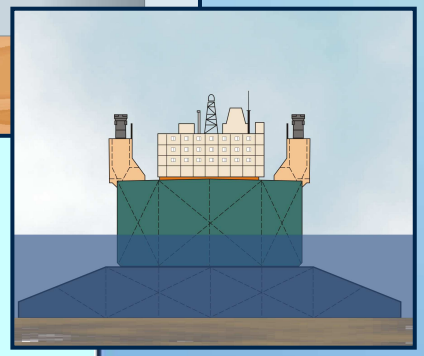


Фонд скважин	28
Отход забоя скважины	2000 м
Длина ГС	500 м
Проектный уровень добычи	8,4 млрд.м^3/год

LAYOUT OF PLATFORM, DOWNHOLES AND SUBSEA WELL CLUSTERS. VARIANT II

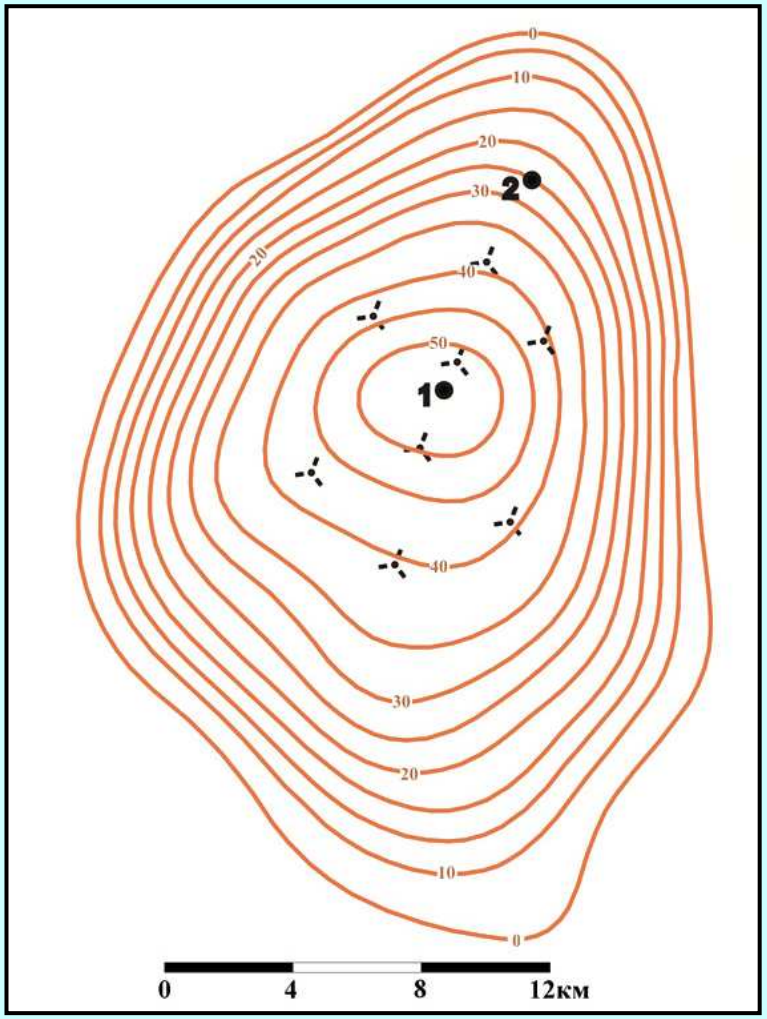


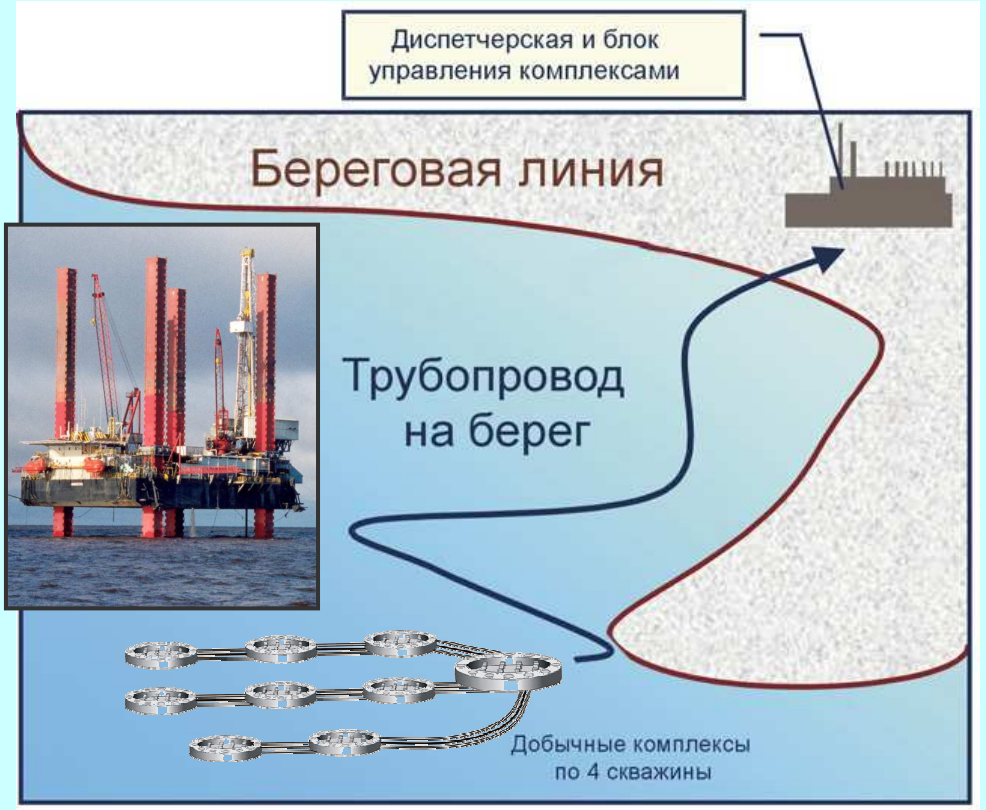




Фонд скважин	30 (18 + 12)
Отход забоя скважины на МП	2000 м
скважин в кусте	500 м
Длина ГС скважин на МП	500 м
скважин в кусте	273 м
Проектный уровень добычи	10,1 млрд.м^3/год

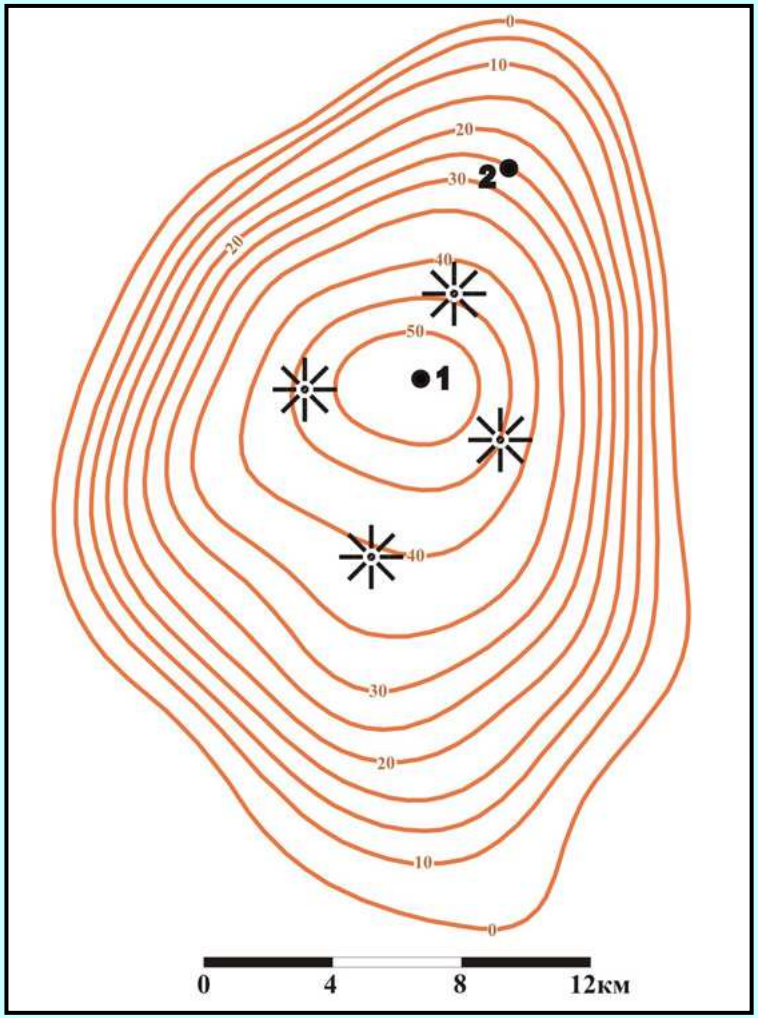
LAYOUT OF DOWNHOLES AND SUBSEA WELL CLUSTERS. VARIANT III

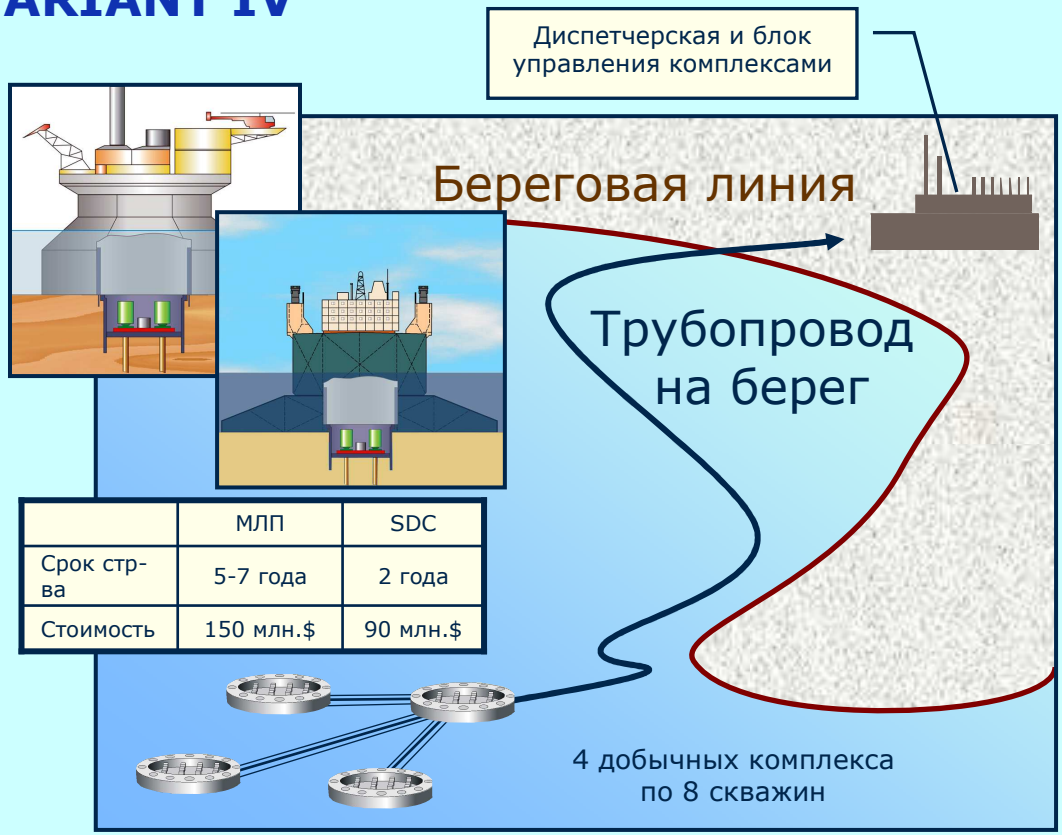




Фонд скважин	32 (8 кустов по 4 скв.)
Отход забоя скважин в кусте	500 м
Длина ГС скважин	273 м
Проектный уровень добычи	10,0 млрд.м^3/год

LAYOUT OF DOWNHOLES AND SUBSEA WELL CLUSTERS. VARIANT IV

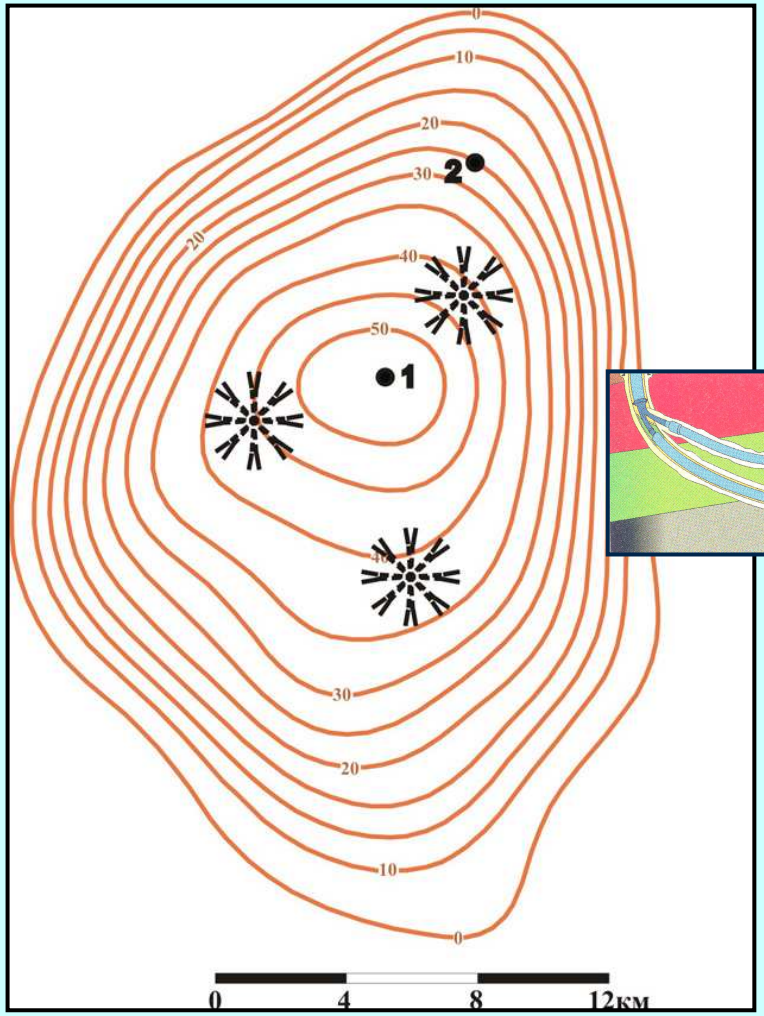


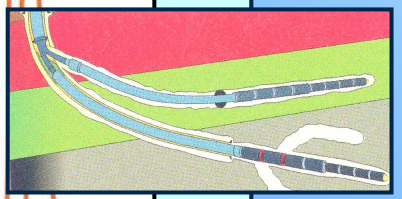


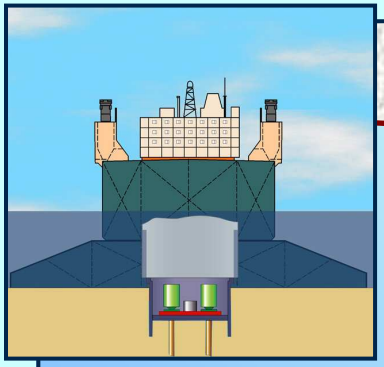
	МЛП	SDC
Срок стр-ва	5-7 года	2 года
Стоимость	150 млн.$	90 млн.$

Фонд скважин	32 (4 куста по 8 скв.)
Отход забоя скважин в кусте	1000 м
Длина ГС скважин	500 м
Проектный уровень добычи	10,4 млрд.м^3/год

LAYOUT OF DOWNHOLES AND SUBSEA WELL CLUSTERS. ВАРИАНТ V

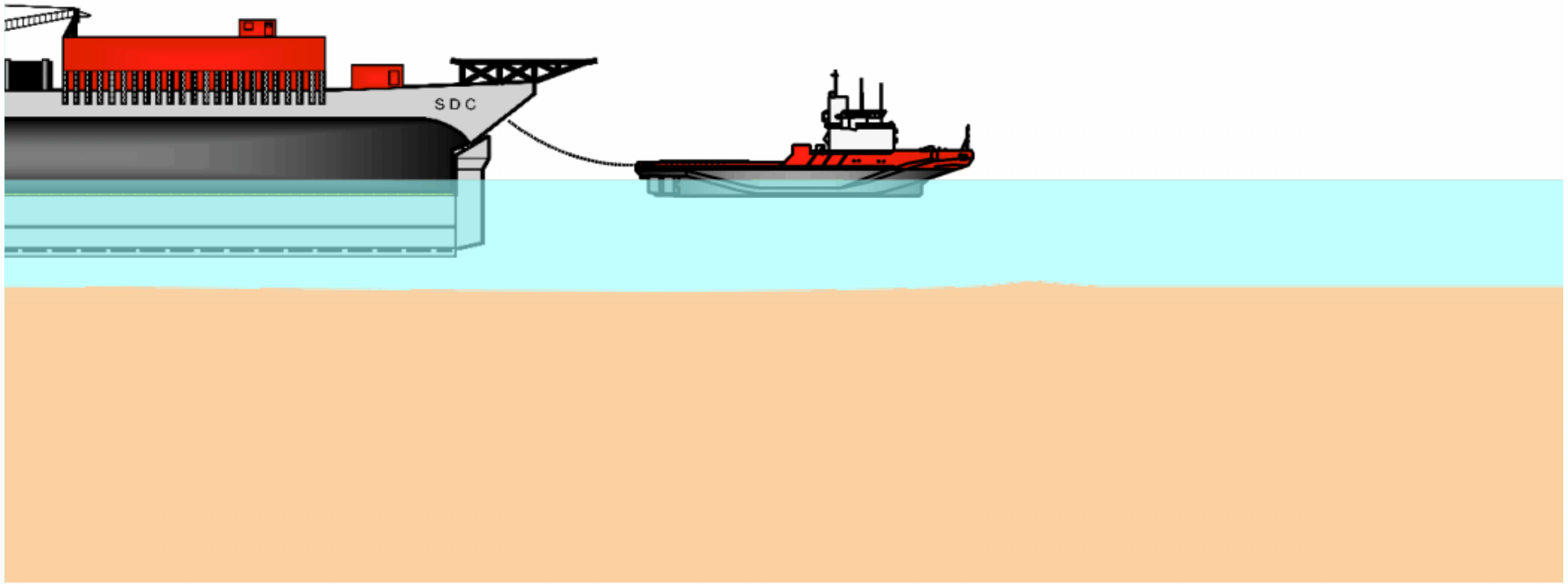




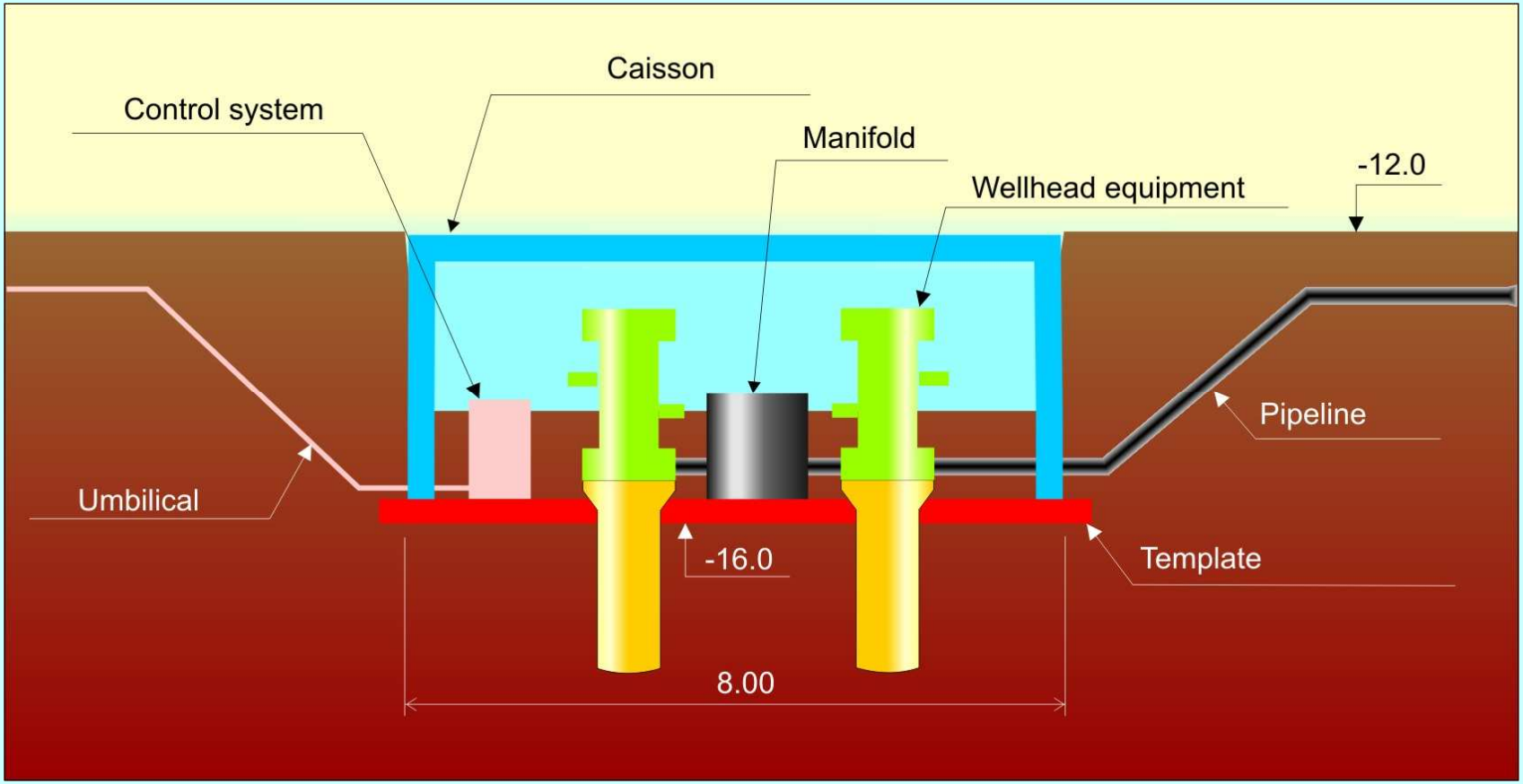


Фонд скважин	24 (3 куста по 8 скв.)
Отход забоя скважин в кусте	1500 м
Длина ГС скважин	500 м
Проектный уровень добычи	15,3 млрд.м^3/год

DRILLING OF PRODUCTION WELLS AND INSTALLATION OF SUBSEA PRODUCTION COMPLEXES



GENERAL SCHEME OF SUBSEA PRODUCTION COMPLEX



Technological Characteristics Of Development Variants

Characteristics	Units	Variants				
		I	II	III	IV	V
Maximum level of annual gas production	bln.m3	8,4	10,1	10,0	10,5	15,3
Maximum rate of initial gas reserves recovery	%	2,8	3,4	3,4	3,5	5,3
Well stock	qty	28	30	32	32	24
Gas debit of 1 well - initial - during first ten years	thous.m3/day	950 730	960 900	960 890	970 907	1850 1707
Duration of constant production period	years	2	7	7	7	6
Gas recovery during 30 years	bln.m3	138	196	202	202	244
The same in % from gas reserves	%	46,1	65,3	67,3	67,3	84,2
Minimum pressure at well head	atm.	10	10	10	10	10

THE CONCEPTUAL CALENDAR SCHEDULE OF THE SEVERO-KAMENNOMYSS OFFSHORE GAS FIELD DEVELOPMENT (VARIANT V)

№	DESCRIPTION OF THE MAIN OPERATIONS	DURATION OF OPERATIONS
		1 (I II III IV) · 2 (I II III IV) · 3 (I II III IV) · 4 (I II III IV) · 5 (I II III IV) · 6 (I II III IV) · 7 (I II III IV)
1	**PREINVESTMENT STAGE OF THE PROJECT INCLUDING:**	
1.1	Technologic scheme of the field development	
1.2	Investments grounding	
2	**INVESTMENT STAGE OF THE PROJECT INCLUDING:**	
2.1	Engineering surveys	
2.2	Field arrangement project	
2.3	Design and work documentation	
3	**CONSTRUCTION, UPGRADING**	
3.1	Platforms	
3.2	Objects for gas collection and its inter field transportation	
3.3	Onshore objects of arrangement and infrastructure	
4	**COMMENCEMENT OF DRILLING**	
5	**COMMENCEMENT OF PRODUCTION**	

CONCLUSIONS

1 The offers show only a possibility to commence the development of the Ob and Taz Bays and the adjacent onshore fields from the seventh year from the commencement of the project development.

2. Arrangement of the field is offered to be performed using the advanced technical and technologic decisions including the following:
   - ☐ using directional, horizontal and multi-hole wells that provide high productivity;
   - ☐ creating subsea production complexes and structures to protect them from the ice influence using onshore systems of remote control;
   - ☐ using mobile ice-resistant platforms of the SDC type to drill all year round production wells that accelerate putting the fields into operation;
   - ☐ transportation of the product without its preparation at sea.

3. The technical offers provide the necessary level of the environmental safety.

4. The Severo-Kamennomyss field is a pioneer object of the Ob and Taz Bays water body gas resources development, it is expedient to consider it as a testing area to test new technical and technologic decisions in the area of the field development and arrangement using a complex method of its arrangement.