Technological Task 23	**Research in the field of causes and conditions of the formation of difficult-to-break oil emulsions (TRNE) at the field and the search for technological solutions to prevent the formation of TRNE, as well as the development of solutions for its destruction and further disposal. Study the conditions for the formation of difficult-to-break oil emulsions at the field, methods to combat its formation, and develop recommendations for its destruction.**
Essence of the Problem:	During the process of oil extraction, transportation, and preparation at the field, oil emulsions are formed due to transitional dynamic processes in pipelines and transportation systems, chemical processes in all technological cycles of the oil field, including conflicts of residual doses of chemical reagents in various technological cycles, transitional thermodynamic processes of oil preparation, and changing parameters and composition of the extracted oil. The emulsion formed in different cycles, due to the peculiarities of the oil composition and the content of resins and asphaltenes, as well as high mineralization of formation water combined with mechanized extraction and other dynamic processes of the oil field, results in the formation of TRNE at the final stage of oil preparation in tanks. TRNE negatively affects the efficiency of the oil extraction and preparation process, as well as creates additional costs for disposal and environmental payments. Scientific research is required to identify the main factors influencing the formation of TRNE, select or develop technologies to prevent the formation of TRNE, and develop technologies for its destruction and further processing and disposal with reduced environmental impact.
Required Technological Parameters:	1. Collection of necessary information on the current state of the oil collection, transportation, and preparation system. 2. Sampling (GU, ZU, UPAN-12, BKNS-3, etc.). 3. Investigation of possible causes of emulsion formation and local technological areas where emulsions occur. 4. Modeling of emulsion formation processes in local areas using collected samples, finding methods to prevent or reduce emulsion formation. 5. Analysis of the intensity of TRNE accumulation at CPPN (winter and summer periods), identifying factors influencing peak (high and low) indicators compared to average parameters. 6. Conducting laboratory studies to study TRNE (interval samples from CPPN, UPAN, and BKNS-3 tanks). 7. Conducting laboratory studies to study the conditions for TRNE formation (in winter and summer periods) by objects. 8. Determining the composition of return emulsion from water tanks at CPPN and UPAN-12. 9. Laboratory studies of wastewater from different stages of separation at CPPN and from preliminary discharge lines OG-200 1/5. 10. Analysis for the selection of chemical reagents to combat TRNE in laboratory and field conditions on liquids, CPPN, and accumulated TRNE.

	11. Analysis for possible conflicts of chemical reagents (and their residual content) used in different technological cycles (from SRO and damping solutions, extraction to the final stages of oil preparation). 12. Analysis and processing of laboratory research results. 13. Investigation of the rheological characteristics of the emulsion layer and the resulting oil during the destruction of the emulsion layer. 14. Assessment of the negative economic impact of TRNE on the field. 15. Development of technologies for the destruction and disposal of TRNE with minimal environmental impact and best economic indicators. 16. Economic and environmental justification for the disposal of TRNE by injection into the formation of difficult-to-break water-oil emulsion. 17. Comprehensive technological solution, including: • Adjustment of technological processes regarding technological regimes. • Selection of chemical reagents and dosing technologies to prevent emulsion formation and conflicts of chemical reagents. • Adjustment of technological regulations (including temperature parameters at PTP) for oil preparation considering the peculiarities of TRNE formation processes. • Use of better-prepared water in preparation and desalting processes. • System for measuring (direct and indirect) technological process parameters affecting TRNE formation and algorithms for determining possible occurrence. 18. Conclusions and development of recommendations for its destruction and prevention of TRNE. 19. Development of feasibility studies for the implementation of technological solutions and selection of the most cost-effective solutions with justification of efficiency. 20. Formation of reports (semi-annual, annual).
Scale of the Problem	Formation of stable TRNE at the field leads to economic losses associated with its ballast pumping, and the presence and accumulation of the emulsion layer in oil preparation equipment (CPPN), tanks, results in failure to prepare oil to the required quality group. All this leads to more serious risks and economic costs for re-preparation.
Existing Methods for Solving the Problem:	Currently, the destruction and processing of TRNE at the field are mainly carried out at "Tricanter" installations. Processing is currently performed by a contracting organization – “BSG Technology”, which uses “Tricanter” installations. "BSG Technology" performs processing at the CPPN facility. The three-phase "Tricanter" separates the processed mixture into two phases: • Solid (sludges, mechanical impurities) contained in the processed medium.

	• Liquid (oil, water, other liquid media), providing simultaneous separation in the liquid phase stream into its two components (with different densities: oil + water, oil + water, etc.). Possible technologies: • Improved Tricanters with a set of chemical reagents. • Thermo-chemical (pyrolysis) processing of TRNE with the production of coking residues and hydrocarbon raw materials for subsequent enrichment of commercial oil. • Physical-chemical method using flotation and ultrasonic processes with the use of chemical reagents.
Contact Person , Full name, position, phone, email.	
Expert Notes:	