Table 2

Characteristics of patent fuel prepared on the basis of ARPD

Mixture	The composition of patent fuel, weight%		
	Briquette from bituminous binder	Briquette-based oil waste	Briquette is based on the ARPD
Coal	92–94	33–91	60–75
Binders	6–8	9–67	20–25
Rice husks	–	–	5–15

Based on the foregoing, the technology of recycling highly parafinny oil as a waterproofing material, organic-based asphalt-resin-paraffin deposits (ARPD) and rubber waste, as well as the technology of production and use of patent fuel, to enhance the possibilities of increasing fuel and raw materials industries using oil and vegetable waste (rice husk) as a secondary raw material supply. Prepared by a working model for the production of fuel briquettes from asphalt-resin-paraffin deposits and rice husks. Established the amount of heat of combustion concider patent fuel. To do this, the calculations made by changing the concentration of components briquettes possible band reception. To calculate compiled a computer program and the results are shown in Fig. 3.

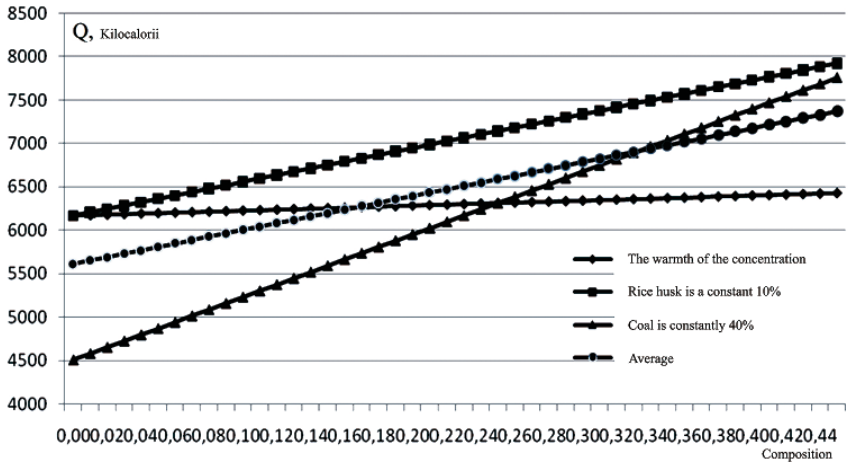

Fig. 3. The value of the heat of combustion of briquettes obtained at different concentrations

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THE DYNAMICS OF ACCUMULATION OF OIL WASTE AND METHODS OF THEIR RATIONAL USE

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Oily waste, depending on the process of education, industrial wastes are 2–3 classes of toxicity and the main sources of environmental releases a wide range of hydrocarbons: liquid, solid or gaseous. For contaminants (pollutants) present in oil wastes are characterized by high water solubility and volatility, in addition, they are solvent can concentrate other substances. All of this oily waste poses a risk of contact with the natural environment, particularly, with the ecosystem.

Oily waste have a negative impact on virtually all components of the environment: surface water and groundwater, soils, vegetation, air, biota.

Alarming increase of accumulated annual hazardous oil waste in the absence of steamed scale

recycling lead to the alienation of land for long periods, which can be calculated for decades. At the same time, oil wastes are secondary material resources and in their chemical composition can be used in the national economy instead of the primary raw material.

Given that the wastes of oil has a significant impact on the environment, an important task is the development and implementation of evidence-based standards of education oil waste at all stages of the cycle of oil production. Among all the problems in dealing with oil waste one of the primary advocates of optimal choice of recycling or disposal, providing a given level of environmental safety.

Thus, control of movement of waste oil by minimizing their education, environmentally sound management, involvement of resource management is an important task and requires the development of new conceptual approaches, and environmental technology solutions.

In this article we consider the use of oil waste as secondary material resources. For this purpose the analysis and compilation of scientific and technical literature in the studied direction, conducts experimental research in the laboratory, developed energy saving technologies.

In the first approximation in the study included:

1. Comprehensive analysis of the conditions of formation, composition and properties of oil waste generated as a result of emergency situations in the extraction and transportation of oil;

2. Classification of oil waste in order to assess the resource potential in the justification of the methods of disposal;

3. Recycling of solid oil waste to produce valuable commodity products, or less environmentally hazardous materials.

The objects of research were:

– Oil production enterprises, which produce oil waste;

– Oil waste as the main source of environmental contamination and as secondary resources;

– Materials derived from oil waste.

The technological processes of oil production are divided into a set of unit processes and their associated production facilities, such as maintenance, injection and disposal wells, group metering installation, metering installation, etc. For each type of activity characteristic of the environmental aspects to and associated impacts on the environment. Thus, oil sludge pits, tanks and processing tanks, pipelines are responsible for about 50% of the negative impacts on the environment caused by the formation of oil waste [1].

There are currently a priority to improve the environmental safety of oil-producing enterprises in the region of the complex is to reduce the volume and the number is not authorized by the storage of oil waste pits. In addition, the further accumulation of oil waste also leads to significant pollution due to the nature of emissions of harmful components. Thus the process of storing oil wastes will not automatically improve the environment, so the next step and not deferred to reduce development pressure on nature is reclaiming contaminated land management and restoration of soil fertility [2].

Most oil wastes generated during mining, preparation, commercial and highway transportation of oil and gas, as well as filling and cleaning of oil tank wagons for transportation of petroleum products in the oil waste oil terminalov. The resulting of oil waste conventionally divided states of aggregation: in liquid and solid.

The liquid oil waste formed as a result of processes:

– Pumping of oil-contaminated layer of water (effluent) in preparation for installation of oil pretreatment of oil (IOPO);

– Washing the oil railway tanks;

– Breakthrough with the hit oil pipelines in solid or water surfaces;

– Collection of oil-contaminated runoff from the territory of the CPF to the location of oil waste.

The liquid oil waste is a water-oil emulsion with the oil content of up to 90%.

The main sources of formation of solid oil waste are:

– Underground and capital repair of wells;

– Breaks of pipelines to hit oil in the open ground;

– Cleaning of oil storage tanks;

– Leakage of oil through the pump seals.

All solid oil waste formed at the stages of production, preparation and transportation of oil and gas, can be divided into three types: waste repair, asphalt-tar-paraffin deposits (ARPD), oil ground.

The composition of oil waste directly depends on a result of which operation it is formed. Moreover, oil waste formed in the repair of wells, contain up to 35% of heavy petroleum fractions (resins, waxes, asphaltenes), a significant amount of mechanical impurities and water. Thus except for ARPD in the general composition of the waste contained oil ground repair, which is formed in contact with oil on the open ground. Oil ground is formed at mopping sewer manholes and clean-up of oil contaminated soil from spills. It is characterized by relatively low organic matter content (20%) and plenty of solids (80%).

A special group of oil waste are asphalt resinous paraffin deposits (ARPD). They are formed during sweeps of technological equipment (oil storage tank, a shootout, wells, etc.), steam cleaning the tubing with the use of special units for dewaxing. Unlike other solid ARPD oil wastes represent a pure organic product, not mixed with the ground and containing only high molecular weight solid hydrocarbons (up to 95 wt.%).

Classification of waste oil drilling production helps to justify the need for their separate collection, warehousing, storage and disposal of the application of various technological methods. In practice,

these wastes are generally independent of the state of aggregation and composition, together are going to place objects (excluding the portion of liquid oil waste to be placed in special facilities). The greatest commercial interest are liquid oil waste containing up to 90% oil. The problem of their disposal is currently solved by recycling the existing scheme of preparation of commodity products. Full utilization of liquid oil waste, even on a single enterprise, reduces the total number of oil waste by 75% and a return of resource turnover in the commercial oil.

From the above it follows that measures aimed at minimizing the formation of oil waste should include:

– Introduction of modern equipment, excluding oil leaks during normal operation;

– Development and implementation of evidence-based norms and standards of technological losses of oil waste education;

– Creation of legal and regulatory framework at the federal, regional and sectoral levels, regulating different values of the specific losses of oil and stimulating products to reduce losses;

– Differentiation of oil waste streams at the stage of education, allowing to increase the degree of extraction of raw materials from waste for the maximum yield of finished products;

– Keep a regular job for the remediation of contaminated land (oil ground) and restore soil fertility;

– Continuously implement a program of scientific and experimental verification of recommended technologies that lead to the possibility of practical realization of technological methods of disposal of solid oil waste.

The problem of ecological safety in the treatment of solid waste of oil is a topical all over the world, but particularly acute in Kazakhstan, in virtually every oil-producing region.

As shown by our studies, treatment of oil waste should include the development of affordable and technically feasible technology to involve waste of resource turnover. Need for new methodological approaches to solve the problem of disposal of oil waste is not the traditional destructive methods, and techniques to improve the consumer properties, removal of impurities and excess components, concentration, dehydration and other methods of enrichment with the use of waste in the related areas of production. Such approaches to involve the waste of resource management should be the basis for strategies to deal with oil waste and the appropriate technical solutions.

One of the ways to address emerging environmental and economic problems is substandard in size briquetting of coal, which will translate it from the waste into the category of commodity products. Briquetted fuel is a mechanical and thermal solid billet product having a specific geometric shape, size and weight. It is obtained as a result of physico-chemical processes with the use of additives (binder) or without them. Briquettes shall meet the following requirements: have a weather resistance, mechanical strength, enough porosity, temperature resistance, maintain a minimum quality of water [3].

In Kazakhstan, was not and still do not, briquette factories that are in demand among consumers. Now, many private entrepreneurs are trying to manufacture bricks, but without the scientific – technical and system training. Therefore, all attempts fail, even though at first glance, the technology of production of briquettes seem simple.

Use of substandard coal briquetting technology will completely avoid the environmental benefits and also to profit from further manufactured commodity products – briquettes.

In this work proposed the introduction of charge formers fibrous structure-formative which are not binding. Assumed that these structure-formatives will play the role of a «rebar» reinforcement pellets. As we know from the coal can not get water-resistant bricks. However, the negative influence of this factor can be neutralized surface treatment of briquettes or packing them in plastic bags.

The calorific value of briquettes, if ash content is not increased by an inorganic binder, it is higher calorific value of raw coal by increasing their density in comparison with the original coal.

Thus, the main parameter optimization in this case is the strength of the briquettes obtained, that is a temporary resistance to compression (σ_{cp}).

Based on these analyzes, established technological regime briquetting process. The composition of the mixture, which are substandard coal, rice husk and asphalt – resinous paraffin deposits (ARPD).

Varieties of complex physical – chemical and structural – rheological processes that occur during the formation of a briquette of structural framework, due to the large number of independent factors. It is therefore necessary to identify the most significant factors that have a significant impact on the intensity of the adhesive, cohesive, and autohesive interactions, both during the preparation of briquette mixture, and when pressed. The analysis will minimize negative and maximize positive factors in the development of optimal fuel briquettes using ARPD, coal and rice husk.

Among the key factors that have a significant effect on the system structure-formatives «ARPD – coal – rice husk», above all, should indicate the nature of the chemical and physical characteristics of ARPD, coal and rice husk, and their ratio in the system and the condition of interaction.

The dominant role in the formation of a solid frame structure owned coal briquettes binder. Influence of the binder to identify a set of physical – chemical and structural – rheological properties, chief among them – adhesive ability and cohesion depends on chemical nature of the binder. In addition to the processes of structure formation have a temperature, humidity, thickness of the adhesive binder film.

For briquetting coal fines are intended to apply as a binder ARPD and rice husks, which are able to combine disparate solids and keep them strong contact in conditions of significant external influences, that is to provide a solid structure to obtain pellets [3, 4].

The structure of the coal briquettes can be viewed as a system composed of connecting elements and the elements at the location (dispersion medium – binding (ARPD) and the dispersed phase – coal and rice husk).

In the process of mechanical impact coal – ARPD – husks, under the influence of temperature between the solid particles is a process of binding. As a result, a connected firm mixture is formed. The mixture was then poured in some form, and pressed to a certain temperature.

As the result of experimental studies on the production of briquettes from the ARPD, set process parameters of briquetting process. The main important factor for briquetting is to establish quantitative and qualitative relations ARPD components, coal and rice husk.

Basically, the preparation of pellets cost of oil binder is 6–8 % of the total mass of the briquette. In the application of oil waste relative costs of 9–67 % (Table). In this regard, based on studies identified the optimal composition of the mixture: ARPD 20–25 %, carbon 60–75 %, 5–10 % rice husks;

In connection with the foregoing, validated and proved the possibility of utilization of ARPD and rice husk as a binder for coal briquettes. It sets the optimal technological parameters of briquetting of coal waste, rice husk with ARPD. It defined the optimal ratio of components in the new fuel briquettes. Developed a resource-saving technology for producing fuel briquettes from ARPD.

Characteristics of the fuel briquette prepared on the basis of ARPD

Composite	The composition of patent fuel, weight %		
	Briquette from bituminous binder	Briquette on the basis of oil waste	Briquette on the basis ARPD
Coal	92–94	33–91	60–75
The binders	6–8	9–67	20–25
Rice husks	–	–	5–15

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