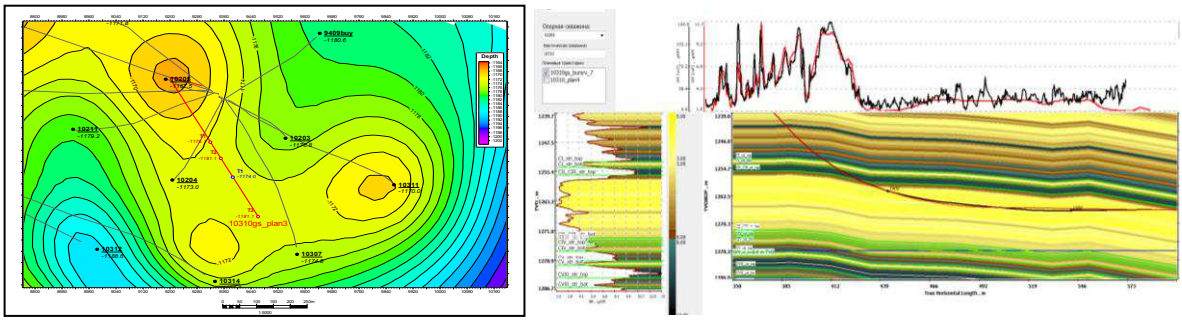


Fig. 3 Drilling of horizontal well 10310g

Average oil flow rate of nearby wells is about 5 ton/day, water cut is more than 95%. Arlanskoe oil field is explored in mature development stage. Well 10310g has horizontal effective length 183 m, total well length is 200 m, and initial oil flow rate was 160 ton/day. Another example is drilling of horizontal well 7024g in Ilishevskoe oil field. Initial oil flow rate of well 7024g was more than 500 ton/day. So high flow rates were not achieved in mature oil fields in Bashkiria last 20 years.

Due to improvement of well planning process, creation of Drilling Support Centre Bashneft Oil Company achieved good results in horizontal well drilling. Initial oil flow rates of new wells increased many times. Geosteering application in DSC allows to drill horizontal wells in very thin reservoirs which considered as inaccessible before. Successful drilling will provide stable oil production in company.

COMPLEX PROCESSING OF ASH AND SLAG MATERIALS

Y.V. Khlupin, P.V. Menshov
Scientific advisors associate professor O.I. Nalesnik, senior teacher A.V. Makarovskikh
National Research Tomsk Polytechnic University, Tomsk, Russia

In the process of some corporations activities a lot of ash waste, which pollutes the atmosphere, is generated. This project is aimed at these wastes processing. In Russian ash disposal areas of thermal power-stations there are about 1.3 billion tons of ash stored. Annually power stations produce up to 30 million tons but only 3 million tons (10%) are used. The production of building materials (3-5%) is included. Tomsk is not an exception. According to the open Internet resources, there are two ash dumps in Tomsk:

Old ash dumps at “PS”-2 that was put into operation in 1973 and located in the Ushaika valley. Currently it doesn’t operate. There are about 450 tons of ash waste collected on 35.8 hectares.

A new ash dump located in the valley of Malaya Kirgizska (Tomsk Severny station) was put into operation in 1986 and now in its area of 60.9 hectares there are about 1251 tons of ash waste collected (the information dated to 2003).

Also there are about 8 billion tons of ash wastes of Siberian chemical combine thermal power-station.

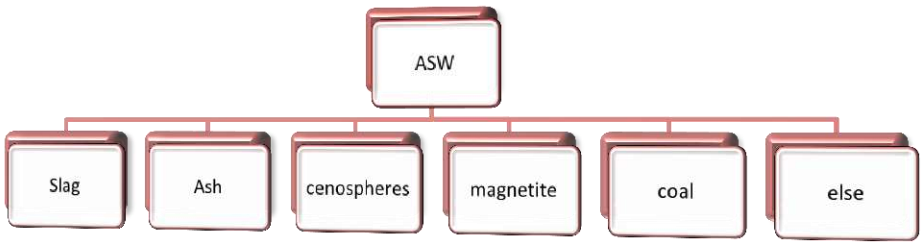


Fig. 1 Scheme of ash composition (1)

At the moment our main aim of research is creating a complex scheme of ash wastes processing. Not only environment suffers from emissions, but residents of Tomsk as well. Therefore, the problem of reducing emissions of ash into the atmosphere is extremely crucial. But the goal of our project is not only to recycle harmful wastes that pollute the environment, but also to start processing products in the right direction. For example in the production of ash-ceramic bricks that can be used in construction. We covered the most favorable processes of ash slag waste direct recycling products to construction. The following equipment and facilities used that we need to build the factory, which would be producing the bricks: 1) Box-type feeder 2) Normalizer of ash 3) Granulator 4) Drying cylinder 5) Mill 6) Press 7) Kiln

The general information about calculation methods of ash dumps formation and placement is presented below. Determination of the amount of ash waste formation and placement can be done by the following methods:

- Method of calculation for material and raw material balance;

- Method of calculation on specific indexes of waste (this method is realized by calculating the average of specific indicators based on the analysis of accounting information for specific period, highlighting the most important standard-setting factors and determining their impact on the value of specific indicators);
- Method of calculation used with the design documentation (flow charts, formulations, regulations, drawings) for production in which the waste is generated. On the basis of this documentation in accordance with the established regulations of raw materials consumption the standard waste as the difference between the rate of raw materials consumption per unit and their net consumption in view of inevitable irretrievable losses of raw materials is calculated.

In Seversk an effective method of power station coal disposal (production of wall materials with high consumer properties: brick, road stone, bloating clay aggregate, etc. with the initial ash content of 99.9 %) was developed by "SYTECO" and TPU specialists. This technology has been tested using the ash from coal combustion of the Kuznetsk Basin in Seversk (TPS-1), Tomsk (PS-2), Ust-Kamenogorsk (HEPS-1) and the ash from coal combustion in Ekibastuz Basin in Yekaterinburg ("Reftinskaya" PS).

Table 1

Comparative characteristics of brick

Showing	units	Base technology	New technology
Weight	Gram	2 900-3 200	2 100-2 600
Molding humidity mixture	weigt.%	18-22	4-7
Closenes of product	g/см³	1,6-2,0	1,18-1,40
The presence in the charge of fuel or combustible substances	weight.%	0, therefore injected ground coal or sawdust	9-11 residual fuel
The rate of heating products	°C/min.	1,0 -1,5	Not limited
Bake, air	hour.	Least 48	absent
Drying of the product in the drying chamber	hour.	least 24	absent
Firing time products	hour.	least 36	max 6
strength of products	kgf / cm ² (MPa)	75-150 (7,5-15)	150-300 (15-30)
frost-resistance	Cycles	15-50	more 50
Fuel consumption on firing 1000 pcs. conventional brick	Kg	235 (Factory №2 c. Tomsk)	93-160
Water absorption	Weight %	9-11	5-22
thermal conductivity	w/м·K	0,45 – 0,5	0,3 – 0,34

The benefits of this technology are the following: (Table 1)

- Simplified firing conditions of the products due to the addition of an inexpensive binder to the charge; no drying;
- Reduced duration of the heat cycle of an ash-ceramic brick from 36 to 6 hours;
- Reduced fuel consumption for firing one unit of ash ceramic bricks (in 1.5-2.5 times less than firing clay bricks).

Ash-ceramic brick exceeds clay brick by such parameters as strength, frost resistance, chemical resistance, etc. That's why we created the purpose of processing this kind of waste.

Table 2

Properties of aggloporites (expanded clay) and ashblocks

Agloporit		Ashblock	
Fraction, mm	4 - 10	Dimensions in mm	400x200x300
Bulk density, kg/m³	335	Volumetric weight, м3	1 000-2 000
Volumetric weight kg/m³	550...800	Compressive strength, kg/cm²	50-150.
Compressive strength, MPa	1,2...1,4	Thermal conductivity w /mgon	0,3-0,8
Water content % by weight	0,5	Frost resistance of cycles	50
thermal conductivity, Вт/мК.	0,11	Water absorption, %	40
Water absorption less than	25%	Shrinkage % мм/м	0
Fire resistance	Fireproof building material.	Fire resistance	fireproof building material.

There is complex processing of ash waste of Siberian chemical combine thermal power station in Seversk presented.

The purpose of the proposal is full utilization of current ash wastes discharges and gradual elimination of the accumulated ash dumps as well as creating serial ash wastes processing plants.

The first phase (124.5 million roubles) is testing ash dumps and taking them into operation, transferring ash waste in a technological form, processing easily extracted products.

The second stage (465.2 million roubles) is producing baked aggloporite (expanded clay), blocks, and fillers.

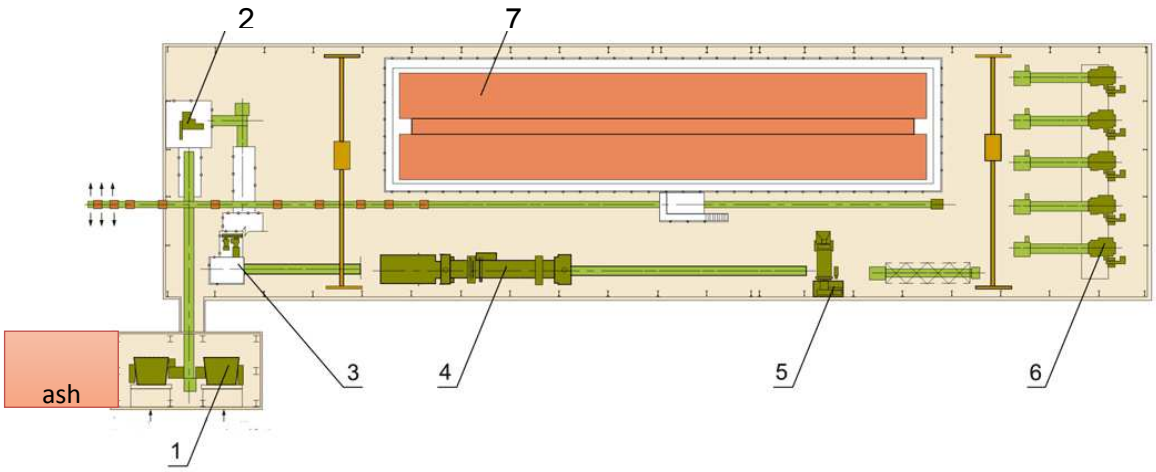
The third stage (822.0 million roubles) is producing ash-ceramic bricks, ferroalloy and alumina.

The total cost of the project is 1411.7 mln roubles.

Full volume of ash wastes processing is 560 thousand tons per year.

The proposal is formulated for Siberian Chemical Combine thermal power-station in Seversk, but can also be used for other heat electropower stations.

In the paper the stages of the investment as well as the tables and charts of the obtaining ash-ceramic bricks plant are given in Fig. 2.



1) Box-type feeder 2) Normalizer of ash 3) Granulator 4) Drying cylinder 5) Mill 6) Press 7) Kiln

Fig. 2 Block diagram of an ash-ceramic bricks production plant

Conclusion

With a huge creative and technological potential, with innovative opportunities Tomsk region can and should turn this anthropogenic raw material in kind of ash wastes, collected for many decades from heat electropower stations, into the high-performance products. By this it will provide restoration of land, filled with ash dumps, expanding urban areas and creating new jobs in manufacturing and construction areas, taking a coordinating role and using available institutional and financial arrangements in this direction.

References

1. Ash and slag components of heat electropower stations /L.Y. Kizelshteyn. – Moscow, 1995.
2. Liner U.A. Complex processing of aluminum containing raw materials by acid ways. – Moscow, 1982.
3. Order 115. Guidelines on developing projects of waste generation and disposal limits / Ed. Company "Integral". № 2002. [Электронный ресурс] – Режим доступа URL: http://snipov.net/c_4654_snip_109946.html.
4. Soil-silicates /Glukhovsky V.D., State Publishing House for Construction and Architecture. – Kiev, 1959.
5. Steam-free constructive ash foam concrete/Rosenfeld L.M., USSR Academy of Sciences, Institute of technical and economic information. - Moscow, 1956.
6. Technology of aggregates for concrete: Textbook for Civil Engineering "Building Products and constructions"/S.M. Itskovich, L.D. Chumakov, U.M. Bazhenov. – Moscow, 1991.

THE STUDY OF LOCAL FAILURE TEST RESULTS FOR PIPELINES REPAIRED USING VARIOUS TECHNOLOGIES

N.S. Kudelin, T.A. Ubaidulayev, P.V. Burkov
Scientific advisor professor P.V. Burkov
National Research Tomsk Polytechnic University, Tomsk, Russia

The problem of safeguarding is gaining high importance in the terms of long-distance oil pipelines network development. A considerable success is achieved in design, construction and usage of the long-distance pipelines as well as their safety and reliability assurance. However, a probability of an emergency is still possible. Problems of safety assurance are aggravated by pipeline age hardening and by increasing impact of the natural and artificial breaking factors. Technical malfunction of oil pipelines leads to material, ecological damage and raises fire risks.

A selective maintenance is one of the most frequently used methods and is applied in a range of technologies. The research of the reliability of these technologies is a top-priority objective. In 2006 Korea Gas Corporation (KOGAS) performed a comparative analysis of the various technologies of pipeline maintenance using local failure test [3].