BULLETIN OF THE MINERAL RESEARCH AND EXPLORATION INSTITUTE OF TURKEY

Foreign Edition April 1973 Number : 80

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Bu nüshada yazı işlerini fiilen idare edenler - Editors :
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GENERAL DIRECTOR'S SPEECH FOR OPENING THE 1973 FIELD SEASON

«Distinguished Professors and dear Colleagues.

I want to give you an outline of our activities before entering the 1973 field season.

1972 was markedly active with the iron project. Work taken up at Hasançelebi continued in that year and with new discoveries reserves in the region increased to about 142 million tons of ore, at an equivalent grade of 52 percent Fe. Drilling was conducted at Yenice, between Divriği and Hasançelebi, bringing in a further 20 million tons of iron, of same grade.

Geological and geophysical studies for iron ore were likewise carried out in other places, while airborne survey over the Bolu massif continued, indicating presence of some anomalies. These are being verified. Although follow up results are not yet known, geophysical studies do seem promising. Beside these some ore deposits (complex ore of iron and aluminium) are known to exist in the Taurus region, such as the one at Payas. Meanwhile, a small iron-aluminum deposit was also discovered at Yalvaç-Akşehir area in the Taurus mountains and samples brought in.

In our own laboratories, however, a series of tests run on these samples did have successful results so as to indicate that a separation of aluminum from iron might after all be possible. This hopeful new development has a far reaching meaning for us, as the type of ore in question is believed to occur widespred over large areas in the Taurus district. If then iron and aluminum in those deposits can be separated it means a substantial increase of our aluminum and iron ore reserves.

Our prospection work running parallel to these activities, have continued in 1972, with some gratifying results in the provinces of Yozgat, Malatya and Elazığ. Coupled with occasional drilling, geophysical survey was conducted both on land and by air.

As for the lead-zinc-copper project in Murgul, the drilling program carried out in the region has brought the figure for proved reserves in the district up to 32 million tons of ore, assaying above 2 % Cu.

In addition, at a locality called Çakmakkaya, very near the main deposit, an other mineralized zone has recently been found, with reserves estimated at 100 million tons and average grade at about 0.8 percent copper.

Besides those already mentioned, work taken up in the Çayeli region has shown to date 20 million tons of ore reserves with a copper content running up to 2.5 percent. Here also studies continue as they do in various places along our Black Sea coast, in the north; for example in Trabzon and Rize regions. By the way, a new locality in Sürmene, within Trabzon district, was of late named rather promising.

Drilling conducted this year in the Sürmene-Kutlular region brought in additional reserves of about 1 million tons of ore, where incidentally work will again be resumed.

An other interesting zone of mineralization was discovered in the course of studies conducted at Tuncadere (Ardeşen-Rize), but, for a number of reasons, no drilling was taken up there this year to verify the discovery.

Studies were likewise carried on at Köprübaşı (Tirebolu-Giresun). Here, as is known, lead-zinc ore occurrences are more common and the reserve so far determined is approximately 6 million tons. The mine currently operated on a small scale is near the highway and the shoreline.

One of our projects involving the United Nations is the lead-zinc-copper project of İspir. A type of ore which is referred to as porphyritic occurs in the vicinity of Ulutaş, containing copper and molybdenum. A single exploratory well was drilled there, but the investigation will shortly be resumed. In case the deposits definitely prove to be of porphyritic type and ore grade reasonably high, then the area will attract greater interest and attention, as this kind of ores form, as a rule, extensive deposits. An other point worth noting about the area is that it is located to the south of the granite massif. North of the same massif near the Black Sea shores having given very strong copper indications, the entire periphery of it calls for a careful examination. New copper deposits may very well be discovered here as well. We are indeed pleased on this account.

Mines were operated south of the Black Sea belt along Ergani for many years now. It is often claimed that Ergani's copper reserves are doomed to depletion as those of Murgul.

Studies conducted by us in the area called for an exploratory well which we drilled near Hacan, about 5-6 km from the main deposit. The fact that a vein of ore 40 m thick was cut during this drilling and the grade of ore was quite high (3 percent copper) led us to believe a new and possibly important deposit may very well be found in Ergani, just as it did in Murgul. Also encountered in the Ergani's vicinity are other interesting anomalies and occurrences which give rise to optimistic expectations and call for further investigation and additional drilling on our part, thus putting an end to the feeling of hopelessness occasionally prevailing in this connection. We therefore are convinced the life of Ergani is not running any risk of ending in the near future. Far form it, it is more likely that nearby deposits be uncovered and eventually brought in to feed the present smelting plants.

Search for lead-zinc-copper deposits is likewise carried on in the Western Anatolia. On a number of spots, especially in Balıkesir vicinity, Edremit, Yenice and other places, we have gone into drilling. Though reserves thus far determined add up to only a few hundred thousand tons of ore, major exploration programs are yet to follow. This is no more than a reconnaissance work. Whenever possible new drilling rigs will take over and probably some important deposits will shortly be brought to light. It must however be noted that drilling carried out for the last few years in Dursunbey region of Balıkesir was continued this year too, resulting in the discovery of 1.8 million tons of lead-zinc ore reserves at 10 %. In my opinion, the most important of the new finds is the lead-zinc mine at Bayındır Sarıyurt, which is lodged in a deep valley and seems to be suited to further development.

Few drill holes put in at the site showed to date reserves adding up to 240,000 tons of ore with indications of much more in store. The Sarıyurt deposit may well be developed to become the richest lead-zinc mine in Turkey. More drilling is anticipated in 1973.

As for coal, drilling programs were undertaken in Thrace, as part of our coal project. Various coal (lignite) deposits were encountered near Edirne and Tekirdağ. Beside these, several other deposits have been found earlier in Eastern Anatolia. Speaking of Western Turkey, a 35 million ton deposit was found at Demirhanlı (Edirne) and again a 13 million ton deposit at Bingöl, Karlıova. The work will be followed up on these deposits. The study of the Zonguldak district carries the greater weight

in our project. We are, as you know, already familiar with the Zonguldak area, the Institute having conducted for good many years all kinds of studies which we called «Carboniferous Studies». Our present intention is to take up these studies on a larger scale and area than before, pushing back the old boundaries, spreading southward and possibly reaching up to Bolu. A more detailed geological and geophysical investigation thus launched is hoped to ensure a truly full study of the district and detect any remaining coal possibilities so far left hidden.

This is going to be a mammoth project and will probably take a few years before a systematic drilling program is started. While telling you about our Zonguldak project, I like to mention the second side of it, dealing with methane, as the first covered only the coal. The idea is to extract the methane gas present in these deposits a) to eliminate to a great extent the hazard of mine explosions and b) to be used as fuel, that is to say natural gas.

In connection with this big project, the M.T.A. Institute is to carry out all necessary studies prior to actual production which in turn will be handled jointly by both the M.T.A. Institute and the T.K.İ. (State Coal Enterprises Administration).

Oil shale and asphaltite studies were carried on in Niğde and Ulukışla regions, where the known reserves amount to billions of tons. An estimate of roughly 600-650 million tons was made including the grade with a calorific value below 1000. Some 70-80 million tons of this has a calorific value above 1000 or contains more than 10 % asphaltite. As it stands, this deposit with a rather low calorific value does not constitute an important first-hand fuel source for immediate use, but may possibly be turned to at a later date. A few years back, work was carried out on the Şırnak asphaltites and reserves were estimated to be in the neighborhood of 10-12 million tons. With drilling resumed this year the figure has gone up to 18 million tons. Asphaltite may be of use as a fuel. It may also serve as a raw material in a chemical industry or the like where, as in case of petroleum, its by-products will be needed. In the U.S.A. special refineries are set up treating what they call gilsonite—which is really asphaltite—and producing even petroleum, with a suitable petro-chemical industry of their own completing the picture. If the 18 million ton reserves which we have already proved could be increased to, say, 25 millions, then a modest size petro-chemical industry here might be considered. Otherwise this asphaltite deposit constitutes, as it is, a good source of fuel for the Eastern Anatolia.

Along with petroleum, phosphates rank first on the list of industrial raw materials which we need and import. A 200 million ton deposit discovered in Mardin some time ago graded around 10-11 % $P2O_5$, in other words was of considerably low grade, a subsequent discovery made in an area lying west of Kasrık is estimated to hold phosphate reserves aggregating roughly 110 million tons, inclusive of visible as well as probable and possible ore, with a grade better than 20 % P_2O_5. Laboratory tests having been fairly successful, feasibility studies were started which we hope to conclude this year (1973). Therefore, we are pleased to note that in the next few years, this deposit of around 100 million tons, grading 20-25 P_2O_5, can and will offset the consumption deficit, check the importation and thus considerably help Turkish economy.

Among other industrial raw materials such as marble, graphite, perlite, etc., the latter is the most important. Suited to be used as a good insulation material, perlite has had our attention during the last few years. We have found and outlined perlite deposits adding up to about 2 millon tons in the vicinity of Nevşehir in addittion to other appreciable ones discovered in Ağrı, Ankara and İzmir provinces. With yet unforeseen new applications perlite may soon start enjoying a greater demand than ever before. It has possibilities to be marketed abroad, while within the country it may very nicely be chosen as an ideal material with which to build village homes.

As for radioactive minerals, aside from some old deposits we had previously found in Salihli, a new one is reported again from Salihli (Köprübaşı) with reserves corresponding to 200 tons of uranium metal. In addition to these, drilling showed other ore reserves with uranium metal equivalent of 200-300 tons. Work is continued and according to indications the actual reserves may turn out to be many times this amount.

We are equally hopeful and expectant for Salihli and we feel we would encounter there more extensive deposits, had the region been given the proper treatment.

The increase in our uranium ore reserves is particularly significant for us at this time, for a decision is about to be reached on the setting up of a first power reactor of 600 megawatts. And if a decision were reached now and necessary steps taken, this project could be realised by about 1980-82.

I like to say a few words in regards the geothermal energy before passing on to the subject of petroleum. As you know we have succeeded to locate and capture the natural steam at Kızıldere (Kuyucak-Denizli) following a series of drillings in the locality. Feasibility studies having likewise been completed, setting up of a 10 megawatt pilot size power station is suggested, while awaiting U.N.'s final report on the said studies. As soon as we have it our ministry and the T.E.K (The Turkish Energy Board) will be notified and the ball will be rolling. The geothermal power plant henceforth built is going to be very small but the first of its kind in Turkey.

During a geological survey, mainly for water in the Seferihisar region, a well drilled a little south of Izmir revealed the presence of steam at a depth of 80 m. This, of course, gave us hope and I am almost certain we would find steam at higher temperatures, should we drill deeper. It may also be remembered that natural steam was readily encountered in the drill holes in Afyon area while trying to locate new hot water feeding sources for hot baths in Afyon.

This discovery having been made at a distance of only 12-13 km from the town of Afyon, it was particularly interesting as it suggested the possibility of laying of a pipeline to flow the natural superheated steam in and to help heat the town inexpensively. With this in mind, an elaborate study of the natural steam possibilities in the Afyon region is called for and is due to start this year.

A project will then be prepared for the actual construction of a suitable piping system and miscellaneous facilities to make use of this heating potential for the town of Afyon. This project as it was described may well be realized in the span of a few years to the satisfaction of one community. The infinitely more important aspect of it is however that it may serve as a good example and guide us in making similar projects for our other towns and bigger cities with captable natural energy potentials lying untapped within reach. In the form of geological and geophysical surveys, superheated steam studies are already underway in various regions such as Bolu, Manisa, Izmir, Çanakkale, etc. With particular interest, we have planned a revision of the geology in the area encircling the city of Ankara using all three of the geological, geophysical and geochemical methods in an effort to locate the most suitable spot where a deep well may be drilled, within two months, this summer, in search of hot steam or water. M.T.A. experts working under my instructions do seem quite hopeful and look forward to a successful strike expeditiously to be crowned with a cheers-worthy development in the form of natural hot water being supplied to our beloved Ankara.

The other one of the two most critical industrial raw materials is no doubt petroleum. If, in view of recent discoveries, the phosphates problem might at least temporarily be considered solved, there remains petroleum as one of our chief concerns.

The Institute will continue searching for oil. Exploratory drilling started at Celalli (Sivas) had 'as you know' reached a depth of 2000 m before it was temporarily stopped. We aim to pick it

up where we left and deepen this well further; we have also conducted geological studies in Çankırı, just north of Ankara. Very hopeful views expressed by our geologists working in that area prompted my personal visit of their camp and a decision was reached there to follow up this investigation using geophysical and seismic methods as well. Till now our seismic teems were busy in Kars, near Russian border, where the overlying basaltic mantle makes seismic operations exeedingly difficult and interpretations rather unreliable. Reasonably reliable results have nevertheless been obtained in the area by our geophycists who worked very carefully making use of some newly devised methods.

Our present intention is, for a short while, to discontinue studies in Kars region and shift the personnel and equipment to Çankırı to see what the score really is. After completing our survey in Çankırı, if the final reports call for it, we will go ahead and put in our first wildcat well. Turkey's oil imports already cost 100 million dollars a year. This figure is likely to go up to 400-500 million dollars in 10 years. The urgency of the matter being clearly undisputable, not only us but also all the other government offices in Turkey which can take a hand in the effort should be doing all in their power to find the oil, while we as the Institute will keep trying as best we can.

Geologial map-making is of course one of our major activities preceding any geological study whether it be for economic or purely scientific reasons. Numerous maps in various scales have been prepared. Work was carried out on about 100 map-sheets (scale: 1:25,000). The job of printing some 1:50,000 scale geological maps is currently worked on and we have taken steps toward their printing. Soon some of the 1:100,000 and 1:50,000 scale geological maps will be ready to go under press and then on it will be more or less routine work and smooth running. These geologic maps are made because they are needed to help get the answers to some of the scientific questions, to be used in mineral surveys or petroleum studies.

Our activities are not only the ones in the field... We do have general chemical analysis and technological laboratories as well. Every piece of rock or ore brought in by our field personnel brings along a series of questions to be answered. How can our country benefit from it? What kind of an industry may be set up using it as its raw material? Can we use it in any way and how? Can it have any by-products or not? On all these samples technological work must be carried out, at times pilot scale ore beneficiation tests must be devised and conducted. Thus occasionally some rather interesting and engaging technological problems are tackled in our laboratories. One example is the set of benefication tests we successfully carried out on the Hasançelebi iron ore grading 20-40 % Fe. It was shown that this ore could be concentrated and from this pellets could be made. It was further shown that Hasançelebi ore and the ore from Divriği could be treated together at the same place and still a good quality pellet obtained. We certainly do hope to see the Hasan9elebi deposits start producing soon.

One other example is the so much talked-about smokeless fuel. Tests run in our laboratories have been completed. We have finally succeeded to obtain the end product, the so-called smokeless fuel, in the form of a bricket. To be taken up next, is the economic aspect of it, beginning with the cost production which we hope to determine in the course of a few months. This indeed has been a noteworthy achievement. Our personnel are getting more and more efficient in handling technological problems. In fact our work in connection with smokeless fuel could have been concluded much earlier. What kept us from completing it sooner was the difficulties we ran into while trying to obtain a suitable press. The press was finally found and the work promptly ended.

Likewise tests carried out in our laboratpries have shown that perlite could be used as an insulation material.

Still an other interesting example of our Technological Laboratory activities was the «yellow cake» which we obtained from Salihli uranium ores, by first concentrating this latter. As mentioned above, this ore came from the deposit at Köprübaşı ,in Salihli, not far from the Demirköprü. Now we want to try doing the same in a pilot plant to be set up in Salihli, right at the location of the deposit. The plant will treat about 2 tons of ores per day. First steps have already been taken toward this end. The plant should be up in 1973 and start producing by early 1974, with a continuous stream of yellow cakes running our way then on. In addition to studies mentioned above and those conducted on phosphates, lead-zinc ores, etc., our technological activities also include carrying out examinations and, at times, lengthy tests on ore samples brought in by the outsiders, which now and then are rewarded with most enchanting results of far-reaching importance.

I thank every one of you very kindly for being here today and wish you all the success in 1973 field season.»

Dr. Sadrettin ALPAN
General Director