

# Final Report

## Delivery Order #21

### *Privatization and Technical Assistance Program for the Kardzhali Region of Bulgaria*

(Project No. 180-0014, Enterprise Restructuring and Privatization Project for Central and Eastern Europe)

Prepared for  
**U.S. Treasury, U.S. Agency for International Development**  
**(USAID)** by:

**BARENTS**  
GROUP • LLC

*A KPMG Company*

**August, 1996**

**BARENTS**  
GROUP • LLC

Policy Economics Practice

August 1, 1996

Mr. James Watson  
USAID  
Europe and NIS, Office of Privatization  
1800 N. Kent Street  
Arlington VA, 22209

Sub: Completion Report, Delivery Order #21- Privatization and Technical Assistance  
Program for the Kardzhali Region of Bulgaria

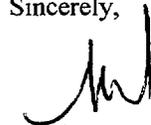
Dear Mr. Watson,

As per the terms of Barents' contract with USAID under this delivery order, we respectfully submit the completion report for Delivery Order #21. The report summarizes the accomplishments of the contract and includes an overall description of the project itself, including individuals involved over the life of the contract and the significance of these activities to AID and other targeted beneficiary organizations. Moreover, the methods of work employed as well as conclusions and recommendations have been provided in this final report.

We sincerely believe that this contract, due to its length and broad scope of work, has provided significant stimulus to Bulgaria's privatization efforts over the last two years. The results of our work show that USAID and Barents have made a positive impact towards Bulgaria's transition to a market based economy.

It has been a pleasure to work with and an honor to be supported by USAID during this very important period in Bulgaria's economic history. We look forward to having the opportunity to work with USAID on future projects.

Sincerely,



Zhivko Nenov  
Bulgaria Project Manager  
Manager, Barents Group

cc: John Tennant, USAID Sofia  
Lada Stoyanova, USAID Sofia

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## A. Background

### *The Privatization Program*

In 1992, when the Government of Bulgaria passed its country's first privatization laws, it had already achieved initial successes in the privatization process. The Agency for Privatization (referred to as "the Agency" throughout this document), was made responsible for the privatization of all state-owned enterprises with book value in excess of 70 million leva. Up until the passage of the laws, the Agency had been actively co-ordinating all of the privatization activities with the relevant Ministries of Construction, Industry, Trade, Transport, and Tourism.

An initial 56 enterprises were identified by the Government of Bulgaria (referred to at times as "the GOB" throughout this document) for privatization. However, the potential existed for additional enterprises to be selected and prepared. During that year, the Agency and the Ministries worked closely to co-ordinate activities amongst themselves as well as with the Donor agencies. By all early indications, it seemed that the Government of Bulgaria was committed to moving forward with private sector development and the eventual transition to a market-based economy.

In 1993, anxious to continue the momentum of their privatization activities, the Government of Bulgaria, along with the Agency and relevant Ministries, went on to prioritize specific regions, sectors, and enterprises towards the development of the private sector.

### *The Kardzhali Region*

The Kardzhali region is located in south-central Bulgaria, 70 km from the Greek border and the Aegean Sea. The region is home to a population of primarily Turkish descent. Although the Kardzhali region has the potential for a competitively based economy in agribusiness, building materials, mining and light industry, it was negatively affected by Bulgaria's liberalization programs. These programs included the lifting of price support for agricultural products, an increase in interest rates, the disintegration of previous markets, and the halt of guaranteed employment. Viewed as an economically disadvantaged region, by 1992, Kardzhali had unemployment figures which exceeded 15%.

In 1993, the Government of Bulgaria, hoping to decrease the region's unemployment figures, called for the revitalization of this area. The Government requested a project to include privatization and technical assistance. Because this area was of strategic and political importance to Bulgaria, a successful regional program was expected to benefit several strategic sectors while contributing to the political stability within the country.

Specific assistance was requested by the Government and was based on a review of the region's competitive potential. The request for assistance called for the identification and analysis of industrial sectors, the privatization of five medium-large key enterprises, and the design of a small-scale privatization program to include the smaller, local businesses within the region. The small-scale privatization program would also require identifying the credit facilities necessary to ensure adequate financial support for the local entrepreneurs.

Barents<sup>1</sup> was chosen to undertake the assessment of this critical region and to identify the key competitive sectors within the region as well as the enterprises most suitable for privatization. Barents had been actively involved in the 1992 Bulgarian privatization program and had provided extensive consultations to the Bulgarian government as well as to regional officials.

Undertaking to categorize those businesses most suitable for privatization and privatize them through a small-scale privatization program, Barents designed a straightforward means of sale to the general public through an open, competitive auction process. This process became the backbone of this project and went on to be replicated in ten major cities throughout Bulgaria.

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<sup>1</sup> Previously called the Policy Economics Group (PEG) of KPMG, Barents Group - KPMG will be referred to as "Barents" throughout this document.

## B. Objectives

Overall, the goal of the small-scale privatization program was to ensure the rapid transfer of small business entities, such as small shops, stores, retail outlets, and commercial-type services, into private hands. Up until this point, Barents staff were actively involved with the design of similar programs throughout the former CIS and Poland. By 1992, throughout Central and Eastern Europe, the small-scale privatization approach was typically carried out by the regional authorities under the general direction of a country's national privatization agency. However, Barents chose a decentralized approach because it resulted in the rapid privatization of small enterprises.

The objectives of the USAID assistance, as described in the original terms of reference dated April, 1993, can be divided into the following four areas:

### 1) *Regional Overview*

To review the economic components of the Kardzhali region and assess those areas suitable for further private sector development and future economic growth. The tasks included:

- Identify and catalogue components in key economic sectors which could include:
  - Agriculture
  - Construction
  - Energy
  - Light industry
  - Mining
  - Tourism
  - Transport.
- Evaluate key sectors and determine their relative competitive advantages by:
  - Size (GDP), employment, fiscal contribution/cost
  - Market and product matrix
  - Global competitiveness
  - Financial indicators (prices, production, etc.)

### 2) *Sector Mapping*

To identify and evaluate industrial sectors that demonstrate a potential competitive advantage and provide a mapping of those sectors that identify the enterprises most suitable for privatization. More specifically:

- Identify privatization issues for each selected key sector;
- Assess enterprise candidates within each key sector, taking into account the following:
  - current operating and legal status;
  - privatization requirements;
  - competitive advantage;
  - key financial indicators; and
  - future economic potential (employment, growth, stability).

3) *Privatization Preparation*

To select and prepare three to five key medium/large enterprises for privatization. This objective included:

- Select three to five enterprises for immediate privatization preparation;
- Conduct enterprise assessment for each of the three to five enterprises including:
  - product/customer analysis
  - competitive analysis
  - production capability analysis
  - international comparative analysis
  - organization/management evaluation
  - financial restatement
  - business valuation;
- Prepare investment documentation;
  - privatization plans
  - investment memoranda
  - tender documents;
- Initiate sales and marketing process;
  - identify potential investors and create a "highest potential" investor list
  - develop a sales strategy.

4) *Small Business Privatization and Liquidity Support*

To design an open, public auction program to sell and privatize small local businesses and identify the financial institutions required to provide credit facilities to those privately-held enterprises in order to ensure their future liquidity. This objective includes:

- Define those regionally and locally-owned enterprises suitable for small-scale privatization:
  - Size (number of employees, book value)

- Type of activity (retail, distribution services- including agricultural, commercial, construction, and transport);
- Develop a framework with the regional authorities for small-scale privatization including designing administrative bodies to implement the privatization process;
- Design a small-scale privatization program through the mechanism of an open, public auction including:
  - ⇒ A method for gathering and publishing information on each enterprise
  - ⇒ Preparing enterprises for privatization, including method for calculating open bid price
  - ⇒ Determining qualified sellers and buyers
  - ⇒ Establishing sales conditions (land, fixed assets, inventory, equipment)
  - ⇒ Establishing payment methods for purchase
  - ⇒ Defining necessary documentation and responsibility of parties
  - ⇒ Defining distribution of auction proceeds.
- Define credit facilities required to support long-term viability of private-sector enterprises:
  - Define potential credit demand
  - Evaluate potential credit funds available to regional, privatized enterprises (including World Bank, EBRD, commercial banks, credit agencies, etc.)
  - Define credit facilities needed to support individual entrepreneurs, private enterprises, and eligible co-operatives.

In summary, the principal objective of the Kardzhali project was:

To implement grass roots privatization quickly which would be transparent and fair and carry a clear demonstration message to other municipalities.

We hoped the program would overcome the scepticism about the benefits of privatization on the part of the Bulgarian public.

### C. Accomplishments of the Delivery Order

Based on the objectives of the task order outlined previously, the objectives were achieved and delivered to the Government of Bulgaria and copied to USAID. Monthly and quarterly progress reports summarized the delivery order's ongoing activities, identifying critical issues and recommending solutions.

Specifically, the delivery order accomplished the following:

1) *Regional Overview:*

In July, 1993, Barents met with key figures in industry, finance and politics in the eight municipalities of the Kardzhali region. Initially, substantial amounts of statistical and anecdotal information on the regional economy were collected and Barents achieved the co-operation of the regional and municipal statistical boards. We documented the results of the regional economic overview, including identification of key sectors, cataloguing of sector components, and mapping of enterprises, and presented the results to USAID and the Government of Bulgaria.

2) *Sector Mapping:*

The objective here was to prepare privatization documents, including all investor documentation, for the three to five selected enterprises. For this part of the project, Barents produced documents<sup>2</sup> which included the following:

- ⇒ privatization plan
- ⇒ information memorandum
- ⇒ tender documents
- ⇒ list of "highest potential" investors
- ⇒ business valuation.

Initially, we visited over 15 enterprises in the region. To determine which candidates were the most attractive candidates for privatization, we collected operational, legal, and financial information on these enterprises. Based on our results, we thought some of these companies were large enough to qualify for our privatization preparation program.

We conducted thorough investigations of the investment climate in order to target the most promising enterprises in the region. Analysis showed these enterprises to be in the following industries:

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<sup>2</sup> For an example, please see Appendix III- Kardzhali Lead and Zinc.

Kardzhali's largest daily newspaper. This recognition facilitated the new focus of our work under this delivery order, in particular, the preparation of small enterprises and properties throughout a targeted 12 cities.

3) *Privatization Preparation:*

Due to early developments in the project, we saw the small-scale component of our outlined objectives to be far more promising for several reasons. Among them was that up until this point privatization was still largely misunderstood or regarded as "a bad thing". As a result, many municipalities had not even attempted privatization at the local level. What Barents wanted to accomplish was the design, implementation, and execution of a small-scale privatization effort conducted through an open, public tender process. In order to do this the following requirements had to be determined first:

- enterprise categorization;
- an implementation plan;
- regulatory requirements (bid, purchase, payment); and
- buyer/seller qualifications.

We saw that with the design of a small-scale program, a more focused set of objectives was required, namely:

- 1) to assist the targeted municipalities technically and financially;
- 2) to provide the municipalities with positive reassurance about their initial privatization work;
- 3) to start the privatization process and ensure that it progressed as rapidly as possible; and
- 4) to develop public support and demonstrate that economic development could be achieved through privatization.

4) *Small Business Privatization and Liquidity Support:*

In line with Barents' objectives and concentrated efforts over the small-scale portion of this delivery order, we designed a process by which we could quickly and efficiently implement, and more importantly replicate, our privatization efforts throughout the municipalities. For each municipality, this series of steps was as follows:

- 1) Select the sites to be privatized
- 2) Obtain approval of the sites selected by the Municipal Council
- 3) Conduct legal analyses

- 4) Conduct a valuation of the sites
- 5) Review of the reports
- 6) Prepare auction documentation
- 7) Obtain approval of the proposed auction documentation by the municipal councils
- 8) Publish a notice in the State Gazette about the auctions
- 9) Launch a marketing and advertising effort to gain interest for an upcoming auction
- 10) Conduct the auctions and sell the properties.

In order to evaluate credit facility requirements and recommended a program for credit availability, Barents worked closely with the Bulgarian American Enterprise Fund (BAEF) to determine, for each enterprise,:

- liquidity requirements;
- global credit funds available; and
- a suggested mechanism for disbursement.

#### Key Results of Kardzhali Phase I

The **key results**<sup>4</sup> which were achieved by this first phase of the Kardzhali project were as follows:

- In less than one year since the commencement of the project, 1,120,000 citizens in 12 cities were introduced to our program (13% of the total population)
- 275 properties were sold, raising US \$7 million in the first quarter of 1994 alone
- Barents was able to have approved and to privatize successfully, approximately 30 sites per city
- The properties were sold at open, public auctions
- Barents provided on-the-job training to local valuers and legal advisors so that subsequent phases could be handled locally
- Barents designed and implemented a simple lease purchase model for the auctions in poorer regions such as Kardzhali
- Barents developed procedures for all preparatory work and the related documentation such as legal analyses, valuation reports, appraisal reviews, and auction documentation
- Our total sales were for 128 properties with a total gross area of 22,910 sq.m. for US \$ 1,881,161.

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<sup>4</sup> Please see Appendix IV (Chronology of Phase I) for a more detailed profile of results over the life of this project.

**D. Individuals and Level of Effort**

The advisory team was under the overall direction of the Senior Project Co-ordinator and the Regional Project Manager. The Senior Project Co-ordinator was the Partner-In-Charge of the project for Barents Group of the KPMG Peat Marwick office in Washington, DC. The Regional Project Manager acted as a liaison with the USAID representatives in Sofia, Bulgaria and Washington, DC.

**I. Individuals**

The project began in March, 1993 with the following team:

Barents:

Attorneys: Squire Saunders & Dempsey

Economists: Robyn Davis  
Jeffrey Grady  
Todd Thomson

## Financial Planners and Managers:

Attila Gazdag  
Xavier Jordan  
John Lonquist  
Brett Paschke  
Mark Slavonia

Industrial Engineers: to be determined (4)

## Accountants/Auditors:

Michael Reddrop  
Deborah Schloss  
to be determined (1)

## Capital/ Money Market Specialist:

James Kester  
Jennifer McFarland

Over time, as the project progressed and we were granted a no-cost extension, some members of the core team left and new members, including newly-hired local staff were came on to the project. In order of coming onto the project these were:

Church Lewis  
Philippe LeRoux  
Kristina Tzaneff  
Zhivko Nenov  
Vladimir Karoleff  
Vanyo Ourouchev  
Emilia Grigorova  
Maria Tchakarova  
Alexander Gebov, KPMG- Sofia accountant

Separately, for the initial phases of this delivery order, we had the following list of outside advisors<sup>5</sup> for the Kardzhali Project:

- 1-2. 3 Banks
  - 2 CEOs- largest banks
- 3-4. 2 large enterprise CEOs
  1. Tobacco- Harvesting/ processing
  2. Metal Extraction- Lead and Zinc
5. Chief of Bentonite
6. Chief of Garanstroyinvest
  - construction investment company
  - Secretary of Kardzhali Union of Scientists
7. Chief of Observatory (scientist)
  - astronomy
  - President of Kardzhali Union of Scientists
8. Director of Technical School for constructors
  - Construction
9. Bulgarian Sculptor
10. Chief of Privatization of Municipalities
  - all of Kardzhali
  - 8 municipalities

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<sup>5</sup> Barents met with this group of advisors in May, 1994. This group was regarded as important to our project success and among them were potential privatization candidates.

**II. Level of Effort**

For the total level of effort of each USAID funded individual over the life of the project, please see Appendix I, Budget and Level of Effort.

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priority of the purchase of these sites. Thus, they did not have to compete with other bidders at auctions. Because the Council of Ministers was responsible for the adoption of specific rules and procedures regulating such transactions (Art. 42), we informally proposed to the Council's Legal Department to assist their experts in developing the Draft Regulations for these eventual transactions involving tenants and employees. This was accepted and the draft, prepared by our consultants, was presented and circulated by the office of the Deputy Prime Minister on July 18, 1994. Barents' efforts resulted in a new scope of work with small-scale privatization and a subsequent contract which allowed us to fully develop, implement and execute our efforts in this nascent program.

## F. Conclusions and Recommendations

Conclusions and recommendations are based on Barents' efforts over the life of the project. The following general categories group broadly some of the main issues which arose as well as respective outcomes.

### Environment

*Problem:* Though we initially had success with the preparation and marketing of Kardzhali Lead and Zinc, environmental reasons and the problems of dealing with the Agency, caused us to halt privatization preparations with the company. The region's largest industrial concern had a multi-million dollar capital expenditure requirement (estimated between \$50 million - \$200 million) to modernize production and improve environmental conditions.

*Solution:* Although the enterprise was not a particularly strong candidate for privatization, a joint venture or other method of attracting substantial capital commitments was initially thought possible. However, due to all of these factors, we did not pursue this avenue either.

### Legislation

*Problem:* Also, at the same time, our progress on preparing for privatization two other medium-large candidates was stalled. With regard to Bentonite and Marmex (marble), both interesting candidates for privatization, it was legislation that halted our efforts. More specifically, Bulgarian Law on land use prevented private companies from owning and extracting minerals. Moreover, no progress was expected on resolving the issue in the near future.

*Solution:* Considering the large number of small metalworking operations in the Kardzhali region, we then considered arranging a smaller privatization preparation program for several of the enterprises which we had sought out, to take the place of the larger-scale preparations. Coupled with the fact that the Bulgarian Government was reluctant to privatize enterprises, the outcome of these efforts changed our entire strategy to focus on stimulating privatization overall. Thus, in 1993, we began to focus USAID funded technical assistance at the municipal level, or what came to be known as "small-scale privatization".

Under Church Lewis, the initial project director of this delivery order, Barents succeeded in developing an approach to the implementation of this project. With well-defined objectives, suitable Bulgarian staff were hired, with USAID approval, to execute

particular parts of this project. Philippe LeRoux, who had worked for the World Bank, took over Church Lewis' responsibilities when Church Lewis left to take up a position in the United States in March, 1993.

#### Revenue Distribution

*Problem:* Refocusing our efforts completely on municipal privatization, one major disincentive immediately emerged. According to the Privatization Law, 1993-1994, sales proceeds were shared between the Central Government (50%) and the municipality (50%). In Bulgaria, municipalities had wide-ranging responsibilities for the delivery of local public services and for providing local finance. Faced with huge investment requirements and large budget deficits, municipalities were strongly opposed to a revenue distribution scheme whereby the central government received half of the revenues from municipal privatization. This made the municipal councils unwilling to sell municipal property. Instead, renting retail and service outlets to private parties, including former employees, was common practice.

*Solution:* This situation changed in June, 1994 when the Parliament amended the Privatization Law (State Gazette of June 24, 1994) with the purpose of facilitating small-scale privatization.

Specifically:

- 1) the first of these amendments gave the municipalities a new incentive to begin, and then proceed quickly, with small-scale privatization. This amendment allowed the municipalities to retain all of the revenues generated from the sale of municipally owned properties rather than submitting half of them to the Central government, as before.
- 2) the second, Art. 35, while delaying the process somewhat, allowed for the greater interest and participation from citizens through its provisions. Under these provisions, tenants and employees willing to participate in the privatization process went through a direct purchase by paying the price of the property, as defined by the appraiser, without having to compete with other bidders at any auctions. Furthermore, buyers were allowed to pay their bid value in instalments over a period of five to six years, with a one year grace period. More specifically, buyers would pay 30% of the price (as determined by an independent appraiser) in downpayment and 70% in five annual instalments.

Due to these changes, the municipal councils were required to approve the privatization sales initiated by tenants or employees in no more than 30 days. According to the amended law, such proposals for purchase could only be rejected in exceptional cases.

### Amendments

*Problem:* Initially, because the Government was late in approving necessary enabling regulations with regard to Article 35, implementation of the auction process was delayed in some cities where the program had already commenced. Municipalities to which this amendment applied were pressured to cancel auctions and sell directly to tenants or employees on the instalment basis.

*Solution:* Though the combination of these two elements initially delayed our implementation schedule, our quick adaptation to the legislative changes resulted in the development of a serious and wide-spread, successful privatization program.

### Recommendations for the continued success of privatization

To build on the success of this program, and therefore to ensure its continuation, the following steps were foreseen, at the time this delivery order was completed, as a starting point and goals to a Phase II of this project:

- The total number of cities covered would increase from 12 to 22;
- Larger assets and municipal enterprises would be included for the first time in all of the targeted 22 cities;
- Sale of an additional 100-120 properties in the first quarter of 1995;
- Kardzhali Phase II would raise approximately US \$10 million more for the local municipalities which are participants in the program;
- Post-privatization surveys of all buyers would be conducted to evaluate the results from the privatization within six months;
- Information brochures, "how-to" handbooks, etc. would be developed and distributed to all municipalities as a way of educating citizens and advertising the small-scale privatization program;
- A mass media campaign would be launched on the benefits of privatization to the Bulgarian public, including a conference/ seminar for municipal officials;
- An action program would be developed and new sites under the Kardzhali extension would be selected; and
- Draft contracts for Kardzhali II, including new contracts for the original 10 cities for medium and large-scale privatization would be developed.

**Appendix I: Budget and Level of Effort**

estimated completion date, the contractor shall provide a copy of the Project Officer's written approval for any extension of the term of this delivery order to the Contracting Officer; in addition, the contractor shall attach a copy of the Project Officer's approval to the final voucher submitted for payment.

C. It is the contractor's responsibility to ensure that the Project Officer-approved adjustments to the original estimated completion date do not result in costs incurred that exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the contractor to be paid any sum in excess of the delivery order.

D. Adjustments that will cause the elapsed time for completion of the work to exceed the original estimated completion date by more than 30 calendar days must be approved in advance by the Contracting Officer. REQUESTS FOR SUCH APPROVALS MUST BE SUBMITTED IN WRITING TO THE CONTRACTING OFFICER WITHIN 15 CALENDAR DAYS AFTER THE ORIGINAL ESTIMATED COMPLETION DATE OF THE DELIVERY ORDER.

ARTICLE VII - WORKDAYS ORDERED

A. Functional Labor Category & Specialist	Workdays Ordered	Burdened Fixed Daily Rate	Total
<b>Attorneys</b>			
Squire & Saunders	200	\$1,350	\$270,000
<b>Economists</b>			
Robyn Davis	50	\$975	\$48,750
Jeffrey Grady	50	\$975	\$48,750
Todd Thomson	40	\$975	\$39,000
<b>Financial Planners and Managers</b>			
Attila Gazdag	90	\$800	\$72,000
Xavier Jordan	120	\$800	\$96,000
John Lonquist	90	\$800	\$72,000
Brett Paschke	90	\$800	\$72,000
Mark Slavonia	90	\$800	\$72,000
<b>Industrial Engineers</b>			
To be determined	45	\$900	\$40,500
To be determined	45	\$900	\$40,500
To be determined	45	\$900	\$40,500
To be determined	45	\$900	\$40,500

Accountants/Auditors

Michael Reddrop	60	\$450	\$27,000
Deborah Schloss	60	\$450	\$27,000
To be determined	60	\$450	\$27,000

Capital/Money Market Specialists

James Kester	60	\$975	\$58,500
Jennifer McFarland	60	\$975	\$58,500
			<u>\$1,150,500</u>

B. The individuals identified above are designated as key personnel pursuant to Section F.12 of the contract. "To be determined" individuals require Project Officer and Contracting Officer approval prior to their use.

C. Subject to the ceiling price of this delivery order and the prior written approval of the Project Officer, the contractor may adjust the number of workdays actually employed in the performance of the work by each position specified in this order. The contractor shall attach a copy of the Project Officer's approval to the final voucher submitted for payment.

D. It is the contractor's responsibility to ensure that the Project Officer-approved adjustments to the workdays ordered for each functional labor specialist do not result in costs incurred that exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the contractor to be paid any sum in excess of the ceiling price.

ARTICLE VIII - CEILING PRICE

For Workdays Ordered	\$1,150,500
For Other Direct Costs	<u>317,468</u>
Ceiling Price	\$1,467,968

The contractor will not be paid any sum in excess of the ceiling price.

ARTICLE IX - USE OF GOVERNMENT FACILITIES AND PERSONNEL

The contractor and its employees or consultants are prohibited from using U.S. Government facilities (such as office space or equipment), or U.S. Government clerical or technical personnel in the performance of the services specified in the delivery order, unless the use of Government facilities or personnel is authorized in advance, in writing, by the Contracting Officer. This delivery order does not authorize the use of such facilities or personnel.

ARTICLE X - DUTY POST

The Duty Post for this delivery order is Bulgaria and Washington, D.C.

ARTICLE XI - LANGUAGE REQUIREMENTS

The contractor's personnel shall write and speak English fluently. Familiarity with Bulgarian or Russian would be useful.

ARTICLE XII - ACCESS TO CLASSIFIED INFORMATION

The contractor will not have access to classified information.

ARTICLE XIII - LOGISTIC SUPPORT

The contractor is responsible for providing logistic support.

ARTICLE XIV - WORKWEEK

The contractor is authorized up to a six-day workweek with no premium pay.

KPMG Peat Marwick  
Policy Economics Group

Bulgaria Privatization: KARDZHALI

PROFESSIONAL LABOR	DAILY RATE	BUDGETED DAYS	ACTUAL DAYS		BUDGETED COST	ACTUAL COST \$		Estimated Spending	
			TO 11/18	Remaining		TO 11/18	Remaining		
<b>Economists</b>									
Phillippe LeRoux	975	180	1.00	179.00	175,500	975	174,525	0	0
Todd Thomson	975	9	0.00	9.00	8,775	0	8,775	0	0
TBA, Public Awareness	975	100	0.00	100.00	97,500	0	97,500	0	0
<b>SUBTOTAL</b>		<b>289</b>	<b>1.00</b>	<b>288.00</b>	<b>281,775</b>	<b>975</b>	<b>280,800</b>	<b>0</b>	<b>0</b>
<b>Financial Planners/MGRS</b>									
Georgi Petrov	800	40	4.00	36.00	32,000	3,200	28,800	0	0
Carolyn Winn	800	30	0.00	30.00	24,000	0	24,000	0	0
<b>SUBTOTAL</b>	<b>800</b>	<b>70</b>	<b>4.00</b>	<b>66.00</b>	<b>56,000</b>	<b>3,200</b>	<b>52,800</b>	<b>0</b>	<b>0</b>
<b>Accountants/Auditors</b>									
Kristina Tzanef	450	120	0.00	120.00	54,000	0	54,000	0	0
<b>SUBTOTAL</b>		<b>120</b>	<b>0.00</b>	<b>120.00</b>	<b>54,000</b>	<b>0</b>	<b>54,000</b>	<b>0</b>	<b>0</b>
<b>Local Hire Financial Planner I</b>									
A Gebov	335	260	13.00	247.00	87,100	4,355	82,745	0	0
V Karoleff	335	0	0.00	0.00	0	0	0	0	0
S Tassev	335	36	0.00	36.00	12,060	0	12,060	0	0
Z Nenov	335	260	23.00	237.00	87,100	7,705	79,395	0	0
I Dimov	335	260	21.00	239.00	87,100	7,035	80,065	0	0
N Lukov	335	260	21.00	239.00	87,100	7,035	80,065	0	0
T Velev	335	260	21.00	239.00	87,100	7,035	80,065	0	0
V Ourouchev	335		8.00	-8.00	0	2,680	(2,680)	0	0
M Tchakarova	335	36	0.00	36.00	12,060	0	12,060	0	0
E Grigorova	335	36	0.00	36.00	12,060	0	12,060	0	0
D Stefanova	335	0	1.00	-1.00	0	335	(335)	37	12,395
<b>SUBTOTAL</b>		<b>1,408</b>	<b>108</b>	<b>1,300</b>	<b>471,880</b>	<b>36,180</b>	<b>435,500</b>	<b>37</b>	<b>12,395</b>
<b>TOTAL PROFESSIONALS Kardzhali</b>		<b>1,887</b>	<b>113</b>	<b>1,774</b>	<b>863,455</b>	<b>40,355</b>	<b>823,100</b>	<b>37</b>	<b>12,395</b>

BEST AVAILABLE COPY

EXPENSES	COST	QUANTITY			BUDGETED COST	ACTUAL COST TO 11/18	Remaining	Estimated Spend
<b>Travel &amp; Trans</b>								
Int Airfare	2,800	24			67,200	838	66,362	
Local Travel Airfare	500	12			6,000		6,000	
Car Rental	3,000	12			36,000	638	35,362	
<b>TOTAL TRAVEL &amp; TRANS</b>		<b>48</b>			<b>109,200</b>	<b>1,475</b>	<b>107,725</b>	<b>0</b>
<b>Other Direct Cost</b>								
Public Awareness	150,000	1			150,000	1,067	148,933	
Legal Analysis	8,000	12			96,000	17,222	78,778	
Valuation	8,000	12			96,000	8,611	87,389	
Auction Documentation	5,000	12			60,000		60,000	
Mktng/Advertising	4,000	12			48,000		48,000	
Translation Services	1	10,000			10,000	510	9,490	
Project Equipment	1	10,000			10,000		10,000	
Communication	1,000	12			12,000	288	11,712	
Office Rental	500	12			6,000	750	5,250	
Stationeries	200	12			2,400		2,400	
Report Production Cost	600	12			7,200	37	7,163	
<b>TOTAL OTHER DIRECT COSTS</b>					<b>497,600</b>	<b>28,485</b>	<b>469,115</b>	<b>0</b>
<b>TOTAL EXPENSES</b>					<b>606,800</b>	<b>29,960</b>	<b>576,840</b>	<b>0</b>
<b>GRAND TOTAL</b>					<b>1,470,255</b>	<b>70,315</b>	<b>1,399,940</b>	<b>12,395</b>

b:bulgid

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1000-021

# Peat Marwick LLP

*most recent  
on file*

2001 M Street, N.W.  
Washington, D.C. 20036

Telephone 202 467 3000

Telefax 202 833 1350

July 21, 1995

Agency for International Development  
EUR/PER/EP  
1800 N Kent Street  
Rm 3202  
Arlington, VA 22209

Attention: Mr. Mark Abramovitz:

Subject: Technical Assistance in Enterprise Restructuring and Privatization for Central and Eastern Europe - Contract Number EUR-0014-I-00-1057-00

Dear Mr. Abramovitz:

Pursuant to subject contract Delivery Order No. 21 (Privatization and Technical Assistance for the Kardzhali Region of Bulgaria), ARTICLE VII C. - WORK DAYS ORDERED, this letter respectfully requests Project Officer approval to change the work day mix as per the attached, revised, budget proposal. As the (attached) current and revised budgets indicate, the revised budget does not result in an increase to the ceiling price.

This change to our Delivery Order No. 21 budget reflects our best estimate, at this time, as to what effort will be required to successfully perform and complete this phase of the delivery order. Accordingly, please signify your approval of this budget change request by signing below and returning a copy of this document via facsimile to (202) 728-0546.

If you have any questions, please do not hesitate to contact me or Mr. Jack Summers, our Director of Contracts, at (202) 467-3433. I very much appreciate your attention to this matter.

Very truly yours,  
KPMG Peat Marwick



Gary R. Hauler  
Project Administrator

APPROVED BY:

  
USAID Project Officer

Date

07/24/95



Member Firm of  
KPMG Peat Marwick Coedeler

	Budget	Days ITD	Days		Amount		Proposed Modification		Days		Amount	
			Remaining	Budgeted	Amount Spent	Days	Amount	Remaining	Remaining			
<b>TOTALS</b>	1801.74	2052.41	-250.67	\$ 1,154,825.00	\$ 1,133,020.06	119.74	\$ (0.00)	22.37	\$ 21,806.45			
<b>Economists</b>												
R Davis	50.00	50.00	0.00	\$ 48,750.00	\$ 48,750.00		\$ -	0.00	\$ -			
R Glasspool	8.00	0.00	8.00	\$ 7,800.00	\$ -	(8.00)	\$ (7,800.00)	0.00	\$ -			
J Grady	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
R Leeds	10.00	0.00	10.00	\$ 9,750.00	\$ -	(10.00)	\$ (9,750.00)	0.00	\$ -			
C Lewis **	120.00	120.00	0.00	\$ 117,000.00	\$ 117,000.00		\$ -	0.00	\$ -			
T Thomson	41.00	31.00	10.00	\$ 39,975.00	\$ 30,225.00	(10.00)	\$ (9,750.00)	0.00	\$ -			
<b>TOTAL</b>	227.00	201.00	26.00	\$ 221,325.00	\$ 195,975.00	(28.00)	\$ (27,300.00)	0.00	\$ -			
<b>Financial Planner/Managers</b>												
A Gazdag	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
X Jordan	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
C Winn	37.37	17.00	20.37	\$ 29,896.00	\$ 13,600.00	(20.37)	\$ (16,296.00)	(0.00)	\$ -			
M Kurtz	29.00	29.00	0.00	\$ 23,200.00	\$ 23,200.00		\$ -	0.00	\$ -			
J Lonquist	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
B Paschke	23.50	23.50	0.00	\$ 18,800.00	\$ 18,800.00		\$ -	0.00	\$ -			
G Petrov	57.00	52.00	5.00	\$ 45,600.00	\$ 41,600.00	(5.00)	\$ (4,000.00)	0.00	\$ -			
A Simunovic	1.00	1.00	0.00	\$ 800.00	\$ 800.00		\$ -	0.00	\$ -			
M Slavonia	154.50	144.50	10.00	\$ 123,600.00	\$ 115,600.00	(10.00)	\$ (8,000.00)	0.00	\$ -			
D Szwarczewicz	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
T	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
<b>TOTAL</b>	320.63	267.00	53.63	\$ 256,504.00	\$ 213,600.00	(35.37)	\$ (28,296.00)	(0.00)	\$ -			
<b>Attorneys</b>												
D Benatova	123.00	123.00	0.00	\$ 166,050.00	\$ 166,050.00		\$ -	0.00	\$ -			
Squire & Sanders	0.04	0.00	0.04	\$ 54.00	\$ -	(0.04)	\$ (54.00)	0.00	\$ -			
<b>TOTAL</b>	134.96	123.00	11.96	\$ 182,196.00	\$ 166,050.00	(0.04)	\$ (54.00)	0.00	\$ -			
<b>Industrial Engineers</b>												
E Ozberk	15.00	15.00	0.00	\$ 13,500.00	\$ 13,500.00		\$ -	0.00	\$ -			
TBD	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
<b>TOTAL</b>	40.00	15.00	25.00	\$ 36,000.00	\$ 13,500.00	0.00	\$ -	0.00	\$ -			
<b>Accountants</b>												
D Schloss	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
M Reddrop	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
A Riley	2.37	2.38	0.00	\$ 1,066.50	\$ 1,068.75	0.00	\$ 2.25	(0.00)	\$ (0.00)			
M Murray	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
K Tzaneff	60.25	64.25	-4.00	\$ 27,112.50	\$ 28,912.50	4.00	\$ 1,800.00	0.00	\$ -			
TBD	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
<b>TOTAL</b>	54.00	66.63	-12.62	\$ 24,302.25	\$ 29,981.25	4.00	\$ 1,802.25	(0.00)	\$ (0.00)			
<b>Capital/Money Market Specialists</b>												
P LeRoux ** transfer of Lewis' hours	107.00	75.00	32.00	\$ 104,325.00	\$ 73,125.00	(9.63)	\$ (9,393.55)	22.37	\$ 21,806.45			
J McFarlane	0.00	0.00	0.00	\$ -	\$ -		\$ -	0.00	\$ -			
<b>TOTAL</b>	121.37	75.00	46.37	\$ 118,331.45	\$ 73,125.00	(9.63)	\$ (9,393.55)	22.37	\$ 21,806.45			
<b>Local Hire Financial</b>												
I Dimov	100.00	126.00	-26.00	\$ 33,500.00	\$ 42,210.00	26.00	\$ 8,710.00	\$ -	\$ -			
T Velev	100.00	161.00	-61.00	\$ 33,500.00	\$ 53,935.00	61.00	\$ 20,435.00	\$ -	\$ -			
M Charakova	80.00	71.00	9.00	\$ 26,800.00	\$ 23,785.00	(9.00)	\$ (3,015.00)	\$ -	\$ -			
A Gebov	140.00	121.00	19.00	\$ 46,900.00	\$ 40,535.00	(19.00)	\$ (6,365.00)	\$ -	\$ -			
E Grigorova	100.00	75.08	24.93	\$ 33,500.00	\$ 25,150.13	(24.93)	\$ (8,351.55)	\$ -	\$ -			
V Karoleff	120.00	111.71	8.29	\$ 40,200.00	\$ 37,423.69	(8.29)	\$ (2,777.15)	\$ -	\$ -			
N Lukov	180.00	256.00	-76.00	\$ 60,300.00	\$ 85,760.00	76.00	\$ 25,460.00	\$ -	\$ -			
G Mantarkova	18.00	11.00	7.00	\$ 6,030.00	\$ 3,685.00	(7.00)	\$ (2,345.00)	\$ -	\$ -			
V Ourouchev	32.00	32.00	0.00	\$ 10,720.00	\$ 10,720.00		\$ -	\$ -	\$ -			
Z Nenov	235.00	329.00	-94.00	\$ 78,725.00	\$ 110,215.00	94.00	\$ 31,490.00	\$ -	\$ -			
TBD	0.00	0.00	0.00	\$ -	\$ -		\$ -	\$ -	\$ -			
<b>TOTAL</b>	863.78	1293.79	-430.01	\$ 289,366.30	\$ 433,410.81	188.78	\$ 53,241.30	0.00	\$ -			
<b>Local Hire Accountant II</b>												
B Milev	11.00	11.00	0.00	\$ 7,370.00	\$ 7,370.00		\$ -	\$ -	\$ -			
TBD	0.00	0.00	0.00	\$ -	\$ -		\$ -	\$ -	\$ -			
<b>TOTAL</b>	40.00	11.00	29.00	\$ 26,800.00	\$ 7,370.00	0.00	\$ -	0.00	\$ -			

	Amount Budgeted	Amount Spent	Amount Remaining
<b>TOTALS</b>	<b>\$ 317,465.00</b>	<b>\$ 268,565.27</b>	<b>\$ 48,899.73</b>

<b>TRAVEL</b>			
Int'l. Airfare	69,878.00		
Local Travel	35,703.00		
	<b>\$ 145,581.00</b>	<b>\$ 113,091.81</b>	<b>\$ 32,489.19</b>

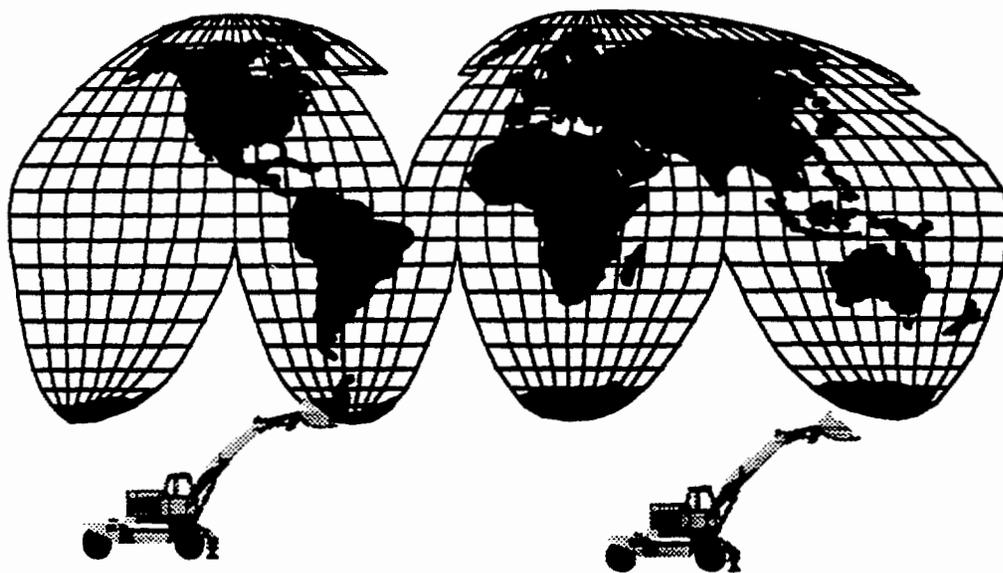
<b>ODCs</b>			
Translation Services	156,416.00		
SOS Medical Evac. Ins	768.00		
Communication	12,000.00		
Medical Exam	700.00		
Office Rental	35,000.00		
Secretarial Support	4,000.00		
Report Production Costs	3,000.00		
	<b>\$ 171,884.00</b>	<b>\$ 155,473.46</b>	<b>\$ 16,410.54</b>

Privatization and Technical Assistance Program for the Kardzhali Region of Bulgaria															
PROJECT ASSETS INVENTORY															
Delivery Order #21															
Bulgaria-BG		Country: Code		Country: Code		Country: Code									
Contract No.:		EUR-0014-I-00-1057-00													
Type of Equip	Inventory #	Contract #	Owner	Approval Date (date recy'd from US gov't)	Purchase Date	Description	Serial / Registration #	Cost/ unit	Total Cost	City/Cntry	Location	User / Recipient	Turned over to In-Country Counterpart: Y/N		
Address: Vellko Turnovo St., #1, Apt. #3, Sofia 1504 Bulgaria															
Center for Mass Privatization- Dondukov Street, Sofia 1000 Bulgaria															
Laptops															
A-1	1	1000-021	USAID	1995	1995	1 Compaq 4/25	8331HER10005	\$1,300	\$1,300	Sofia, BG	Office	Accounting	No		
Subtotal A - Computer Equipment									\$1,300						
B-1	2	1000-021	USAID	1995	1995	1 HP 5L	YPBJ 014352	\$226	\$226	Sofia, BG	Office	All Staff	No		
Subtotal B- Printers									\$226						
C-2	3	1000-021	USAID	1994	1994	1 Nokia 250	12994	\$1,711	\$1,711	Sofia, BG	Office	G. Petrov	No		
Subtotal C - Other Equipment									\$1,711						
Total A+B+C									\$3,237						

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**Appendix II:      Sector Analysis and Company Valuations/  
Marketing Documentation**

# Overview of the Bulgarian Dredging and Insulation Industries



**KPMG Peat Marwick  
Policy Economics Group**

**September 26, 1993**

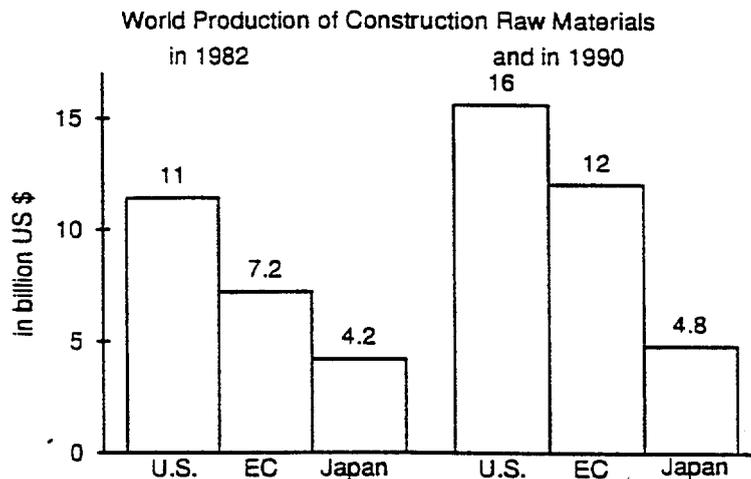
## Overview of the Bulgarian Dredging and Insulation Industries

This industry overview serves as supplement to the Discussion Reports on Dredging and Insulation Enterprises, submitted to the Bulgarian Ministry of Construction by KPMG Peat Marwick. The overview is divided into three sections. Section one describes the international and Bulgarian quarry industry. Section two is an overview of the worldwide and Bulgarian insulation industry. Section three contains the explanation for the enterprise selection criteria and brief discussions on the enterprises not selected for inclusion in the privatization program.

### I. Overview of the Quarry Industry

#### 1. The Global Industry Background

The worldwide market for construction raw materials, sands and clays amount to approximately U.S. \$32 billion. The largest producers are the EC countries, the United States, and Japan. Production levels increased gradually throughout the 1980s but fell in 1990-92. The European volume of production remained fairly constant during the 1980s compared to strong growth in the U.S.



Source: Burnines, Eurostat, B.M. Coope, KPMG

Though the extraction of sand and gravel is cyclical, as it is tied to the growth of the construction industry, looking at long term growth rates it reveals that it is a slow growth, mature industry. The sand and gravel industry grows roughly at the same pace as population growth or by 4.5 tons per person per year. Total U.S. demand for construction sand and gravel in the year 2000 is forecast to be between 0.7 and 1.2 bn tons, representing an annual growth rate of 2.9% between 1982 and 2000. Estimated

demand for the rest of the world is estimated to be 12 bn tons in the year 2000, representing an average annual growth rate of 2.8%. Total annual demand in the UK for sand and gravel is 100 m tons. A factor that could further affect supply and demand of sand and gravel is the possible increase in use of substitutes such as crushed stone, recycled road materials, and crushed glass

Due to the high transportation costs, sand and gravel is produced near the point of use, for example road constructions or major building projects (ten miles of highway uses one million tons of sand and gravel and an average home consumes 55 tons). Because of the high cost of transportation, moving sand and gravel 30 to 35 miles becomes unprofitable. Truck haulage is the main form of transportation used, rail and water transportation account for less than 5 percent of total construction sand and gravel shipments. The cost of transporting a load of gravel almost doubles over 30 miles. Transportation is also the factor which normally rules out foreign competition in bulk construction raw materials on cost grounds. In the West, producers often operate their own trucks and sell on a delivered basis and in many cases sell semi-finished products such as ready mixed concrete. Sales of these value added products plus the strong element of service offered to the customer often combine to give attractive operating margins.

The industry is very competitive with thousands of companies serving markets. There are quite a few multinational companies in the industry. Each country has a few major operations. Construction raw materials extraction is often in the hands of large construction groups whose activities may range from cement and plaster products manufacture to civil engineering. The leading producers are located in the U.S., the UK, and Australia. Many of the producers are in the business of sand and gravel exclusively, but there is a trend to diversify into the production of other mineral raw materials, products such as ready-mix concrete, concrete blocks, or the construction of buildings, roads, and other structures. The quarrying divisions of such groups tend to be large scale, highly mechanized operations with quality control well in evidence to cover what in essence is a crushing and grading exercise. The 18 operations in the U.S. reporting more than 2.5 million tons each in 1990 represented only 0.3% of the total number of operations but produced 8 percent of the total tonnage. Most of the construction of sand and gravel was produced by operations reporting between 200,000 and 1 million tons each which represented 49.2% of the total tonnage. However, these large operations co-exist alongside smaller, less sophisticated operations which can play an important role in localized markets.

The majority of sand and gravel dredged is used for construction as aggregate in concrete, as road base material, and as fill. About 45 percent of sand and gravel is used for concrete aggregates and products, 20 percent for road bases, 20 percent for fill, and 15 percent for asphalt concrete aggregates. Other smaller markets include the glassmaking, foundry, and abrasives industries. Currently, annual sand and gravel production tonnage ranks second in the non fuel minerals industry. Construction sand and gravel has one of the lowest average per ton values of all mineral commodities.

The major factors impacting the international quarry industry are:

- i.) Operating costs and quality
- ii.) Land use and environmental regulations
- iii.) Construction activity
- iv.) Reserves
- v.) Technology

i.) Increased operating costs have been partially offset by automation and other means of increasing efficiency. Demand pressures, land use regulations, and the cost of meeting environmental requirements are factors that will cause a rising price trend. Larger operations with more efficient equipment, more automation, and better planning and design will be the trend of the industry in the future. This will permit increased use of less accessible and lower quality deposits and will keep prices at competitive levels. Because of the low unit value, production of sand and gravel is located near the point of use and concentrated in large, rapidly expanding urban areas, and on a project basis, in areas where highways, dams, and other large scale works are under construction. Specifications for sand and gravel used in road building and concrete construction is often rigid regarding particle size and shape as well as some chemical properties.

ii.) Land use conflicts and environmental problems associated with rapid urban expansion are major factors contributing to local shortages. This, combined with the prohibitive transportation costs can cause regional material prices to increase.

iii.) Many producers are in the sand and gravel business exclusively, but others have diversified into related industries such as ready-mixed concrete, concrete blocks, construction of buildings, roads, and other structures. At the same time more construction companies are entering into the sand and gravel industries to integrate their operations.

iv.) World reserves of sand and gravel are sufficient to meet demands, although not necessarily at the location where needed. The amounts able to be produced profitably depend on land use and environmental constraints. Existing operations in expanding communities face increasing costs because of increasing land values and increasing restrictions on operations as suburban development comes closer. Marine or offshore deposits could become more important as inland deposits become depleted or environmentally less desirable to extract. Much of the commercial production is from stream deposits. Other sources include glacial, marine, and lake. Marine and lake deposits exhibit the best sorting with coarse and fine particles often well separated.

v.) The two basic sand and gravel mining techniques are open pit excavation and dredging. Mining equipment ranges from small, simple units such as tractor-mounted high loaders and dump trucks to more sophisticated systems involving large power shovels, graglines, and belt conveyors. Major technological developments include the use of larger operating units, more efficient portable plants, new prospecting methods utilizing aerial and geophysical surveying methods, and increased rehabilitation and resale of mined areas.

Automated controls and improved equipment have permitted recovery of deposits previously considered too low in quality to be profitable.

## *2. The Bulgarian Dredging Industry*

### *Overview*

The Bulgarian dredging industry, as represented by the sample of companies visited, has faced shrinking markets and decreased demand in the 1990-1992 period. The output of the industry has been sharply down from the mid-1980's when the total Bulgarian sand production was approximately 30 million tons. In some enterprises output is less than 50% of the comparable figure in 1980s. The construction industry, and building materials in particular, is cyclical and it is greatly elastic with respect to the growth of the underlying economy. According to World Bank estimates, the Bulgarian economy shrunk by approximately 10% annually between 1990-92. Construction was one of the hard hit sectors as state funds allocated for new construction activity have decreased significantly. The resulting drop in demand for building materials was detrimental for the quarry companies. However, this tendency seemed to have stopped and reversed in 1993 as most enterprises predict an upturn in the volume of output for 1993 and beyond. A large proportion of the recent growth in demand stems from residential construction and home remodeling activity. At this point, the sustainability of this growth is unclear especially without the appropriate restructuring of the domestic construction industry, which is not the subject of this report.

### *The Bulgarian Dredging Industry Today*

In order to assess the competitiveness of the dredging enterprises, besides the supply and demand factors outlined above, four areas have to be considered. These are: i.) the amount and quality of reserves ii.) the dredging sites iii.) the dredging process iv.) the processing operations. The KPMG team has reviewed the visited enterprises in this framework.

i.) The amount and quality of reserves affect the sustainability of production and ability to plan production. None of the enterprises visited appeared to have major problems with the reserves on hand. Bisritsa Quarry reported to have reserves for approximately 7 years in some locations and as long as 20 years in other locations. One concern with this enterprises is the law that limits the depth of dredging, according to management. However, in management's view, the construction of a dam would help overcome this problem by raising the water levels. Kariemi Materiali reported reserves at its two largest sites to last for decades. In terms of the quality of reserves, Kariemi's reserves are not of the highest quality in the sense that clay deposits are present in the dredging areas. Istar Dredging did not report problems regarding the availability of the reserves. The concern of the Istar Management was somewhat similar to that of Bisritsa and was related to issues raised by the Government regulations regarding the allowable depth of river dredging.

Russe Dredging is producing significantly under what its reserves would permit and has major problems other than the availability of reserves. To summarize, the quarry companies visited all have sufficient reserves, reflecting in general the richness of Bulgarian natural resources.

ii.) Sand and gravel is taken either from river beds or the bottom of man made lakes. Of the enterprises visited, Bisritsa extracts quarry material from both river bank reserves and from arable lands. Istar dredges at two sites on the Danube. Karierni Materiali creates man made lakes of approximately 40 meters in depth on river terraces. Russe Dredging is extracting from the Danube. The distance and the amount of transfer equipment necessary to move the quarry material from the dredging site to the processing facility is a key cost component. The transfer equipment usually includes cranes, barges, trucks, conveyers, tug boats, etc. The amount of transfer equipment used varies site by site. In general, all sites visited were relatively close to the process plant except for the Russe enterprise, whose gravel source is a long distance away on the river from the processing facility. Bisritsa Quarry's processing plant is situated about 9 km from the main dredging site. However, if the enterprise constructed a dam, that would enable them to use a different extraction technique at a site closer to the processing facility and this distance would be reduced to one km. Karierni Materiali uses its own barges to contain the costs of transporting the extract to the processing site and their processing is relatively close to the dredging site. The transfer of the extract involved the least amount of equipment is at Bisritsa Quarry and they had the simplest operations as well. All other plants involved a larger amount of equipment which in turn increases the cost of operations.

iii.) The dredging process is done with continuous motor scoops or barge mounted cranes. The efficiency of each is comparable but the size varies depending upon the volume and the depth of the site. The process is very equipment intensive and there is a need for good maintenance in order to ensure efficient and continuous operations. The equipment looked well maintained at all sites except for the Russe enterprise equipment. The number of steps involved varied by enterprise. The Bisritsa site dredges from the shore and loads in one continuous operation, while all other sites double or in some cases triple handle the dredged material. Karierni Materiali uses barges then trucks to transport the extract. Istar Dredging also uses barges to transport the quarry to shore but its efficiency is greatly constrained by the operations of the Port. The barges of the enterprise have to wait at the port to have the extract unloaded. The enterprise considers installing cranes on barges to eliminate this dependency. There is room for improvement in managing the product flow in each enterprise. Designing a continuous product flow would reduce cost and would greatly enhance the efficiency of these companies.

iv.) In all enterprises visited, the material is moved to the process plant via conveyers. In the processing facility the extract gets washed, sorted and stored. All enterprises classify gravel into three size categories. The processing facilities of Bisritsa and Istar are the simplest and appear the most efficient. Inventories of finished product vary by facility. The Russe enterprise had excessive inventories compared to the others and was operating in crowded quarters. Karierni Materiali had a very active processing site and there is

significant working room to handle the high level of shipment. As discussed before the main processing constraint for Istar is the constraints associated with unloading the extract from the barges.

### *Legal Framework for Privatization*

The Bulgarian Law on Mines and Quarries governs activities in the dredging sector and, to the extent that the activity relies on mineral extract, the insulation sector. In essence, this Law may potentially serve as one obstacle to the privatization of enterprises in the sector, or reduce the price the government will receive in the sale of dredging enterprises. The current law grants exclusive ownership of all mineral reserves to the state and authorizes the issuance of revocable extraction permits to state or municipal enterprises or agencies. However, the law does not provide for either the granting of concessions to mineral reserves or the issuance of irrevocable long-term mining permits. In addition, the Mining Law does not explicitly authorize the issuance of mining permits to private parties.

In early August 1993, the Bulgarian Council of Ministers solved the problem of mineral extraction on a case by case basis for the cement industry. An amendment to the Mining Law pertaining to the cement industry was passed which grants private parties the right to extract through a contract with the State. This amendment will serve as a useful precedent for the dredging sector with regard to the sector's privatization program.

In terms of attracting international investors, the value of the quarry enterprises will depend greatly on whether a suitable amendment as the one which was recently passed for the cement industry will be granted to potential quarry investors. If no amendment is passed which grants private parties the right to extract, and provides for concessions to mineral reserves or the issuance of irrevocable long-term mining permits, the value of potential privatization candidates in the industry will decrease significantly.

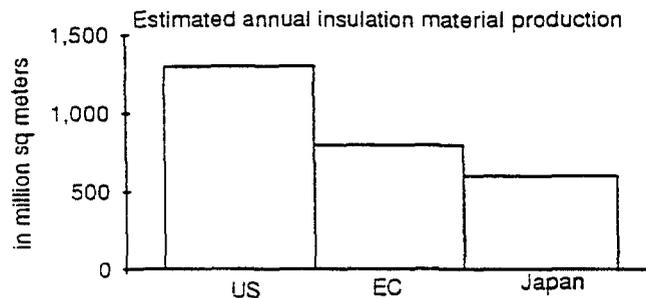
### *Conclusion*

The future prospects of the Bulgarian quarry enterprises will be greatly affected by the growth and future direction of the domestic construction industry. On the one hand, as the Bulgarian infrastructure will continue to develop, road constructions and repairs will create further demand for quarry products. On the other hand, if the local construction practices start to adopt more lightweight, less concrete based building techniques, the demand for dredging output could decline in the medium term. The overall demand will be affected by the interplay of these two trends.

## **II. Overview of the Insulation Industry**

### *1. The Global Industry Background*

The total world consumption of insulation products is estimated at approximately 2.5 billion square meters a year. The main insulation material used worldwide is fiberglass. Historically, the international insulation industry exhibited significant growth after the oil crisis of 1974, when the economies became increasingly sensitive to the increasing cost of energy loss due to improper insulation. The OECD glass industry, which is defined as both glass and glass derivatives, is dominated by the major OECD countries, the U.S., Japan, Germany, Italy, France, and the U.K.



Source: EC Panorama. KPMG

From a trade and investment perspective, the European industry is the most relevant for Bulgaria's insulation companies. In 1990, the total glass fiber market in Europe was about 410,000 tons and 1989 European production was 415,000 tons. The growth of the industry is driven by the activity in construction industries. In 1990, fiberglass demand in Italy grew about 10% to 105,029 tons from 95,313 tons in 1989. The fastest growth in demand for fiber glass is in the U.S. and the Far East. In Germany, mineral fiber output grew by 6% from DM 1.778 bn in 1989 to DM 1.885 bn in 1990 because of growth in the construction industry. However, production volumes fell in the 1990s, reflecting the downturn in construction activity.

Materials used for insulation worldwide include fiber glass, glass wool, calcium silicate, silica powder, urethane foams, and cellulose insulation. New product developments include mixing polymers with asphalt. Various types of binders are used to better hold the insulation together. The binders are made mainly of phenol formaldehyde resins. Other agents can be added, such as melamine resins, silicones, soluble or emulsified oils, wetting agents, anti static agents, and stabilizers. The major factor in fiber glass quality is the length, diameter, and distribution of the fibers. Performance of insulation material is measured by R-per-inch, measuring the ability to keep temperatures at a certain level.

The principal application of insulation materials includes residential and commercial buildings, the automotive industry, ships, power plants, oil refineries, furnaces, refrigerators, freezers, ovens, storage tanks, pipelines, and, refrigerated trucks. The largest single market for fiberglass is for insulation of houses in the ceilings, sidewalls, and floors. For the purposes of this report we focus on the application of fiberglass in building insulation. Fiberglass can also be used as a sound reducer and absorber; its use on sheet metal ducts uses both its thermal and acoustic insulating properties, though as discussed

later, thermal wool is the product of choice for this purpose. Calcium silicate insulation is used primarily in industrial construction and power plants.

The major factors affecting the international insulation industry are i.) developments in the residential and commercial construction industries ii.) research and development and new technology iii.) governmental energy efficiency requirements iv.) actions of major insulation manufacturers.

i.) The insulation market is directly linked to the construction industry. With the slowing of economies internationally, there was a substantial decrease in the construction of residential and commercial building from the period 1990 to 1992 resulting in a decrease in the demand for insulation materials. The outlook for 1993 seems more promising with a modest improvement of the economies in the U.S. and Europe. Residential construction is growing slowly while that of the commercial building construction industry continues to lag. Consumers are feeling the improvement of the economy while companies continue their efforts to keep expenditures down.

ii.) Companies continue to research new processes and new components to cut the cost of production while increasing the energy efficiency of the insulation. Fiber glass is still the major material used in insulation. Most developments have been made in the binders that cover the insulation and in the increase in space efficiency.

iii.) A recent mandate by the U.S. Energy Department stating that refrigerators and freezer manufacturers reduce the total energy consumption of their units by 25 percent in 1993, with possible additional reductions of 25 to 50 percent by 1988 is an example of the kinds of developments that will spur new innovations in insulation materials. The U.S. and Western Europe are leaders in these energy requirements, but this trend can be expected to include Eastern Europe in the near future.

iv.) As the insulation industry is fairly concentrated with large players dominating the national and international markets, the actions of these market leaders can have substantial impact on the marketplace. The world's largest insulation enterprise is Imperial Chemical and Saint-Gobain and the world's number one manufacturer of fiberglass is Owens-Corning with 80 facilities worldwide. The second largest manufacturer is PPG industries. Other significant manufacturers in the flat glass sector include Rockwool International, and Pilkington Brothers. In response to the increase in housing starts, Owens-Corning has expanded their residential roofing business, has introduced a new do-it-yourself home insulation product, and has developed a new insulation material for refrigerators. The insulation panels for refrigerators, called Aura panels are twice as energy efficient as silica powder vacuum panels and six times that of urethane foams. The company's Chairman and Chief Executive Officer announced that "...we are exploring promising growth opportunities, including potential acquisitions outside the U.S. that would enable us to increase capacity and expand market share on a non-dilutive basis." Judged by the recent actions and statements, further international consolidation can be expected through mergers and acquisitions and other means.

## *2. The Bulgarian Insulation Industry*

### *Overview*

The traditional Bulgarian construction methods gave limited opportunities so far for the development of a world-class insulation products industry. Though commercial structures are usually cement based, most residential buildings are built in the traditional way, not unlike other less developed European countries. The traditional method uses a concrete frame and fills the wall panels with clay bricks, without the application of insulation materials. The application where insulation materials were used the most is roof insulation, which is in the West is considered more weather proofing than insulation. Therefore, distinction has to be made between the two main areas of the insulation industry. One segment is referred to as building insulation industry. The products manufactured in this segment are essentially designed to insulate the building. The second segment is referred to as hydroinsulation in Bulgaria though in Western industries it is simply called roof insulation. The production of this segment is essentially applied on top of the roof structure and is covered with asphalt. It is considered insulation in the technical sense though in reality it is weather protection.

In the Western construction industries, more sophisticated markets have developed substitutes, in most cases cement based, for clay products. The next level of development has been the application of composite materials with a concrete base and the inclusion of polystyrene inserts and panels. These methods place greater emphasis on better insulating capabilities and thus represent market opportunities for insulation products enterprises. It is likely that in the medium future these application will make a headway into the Bulgarian construction industry especially as foreign investment in real estate and buildings construction will increase. That implies not only improved market opportunities but also stiffer competition for Bulgarian insulation products enterprises as Western builders and suppliers will appear in the domestic market.

### *The Bulgarian Insulation Industry Today*

KPMG visited four insulation companies, Stroitelni Izolatsii, Hydroinsulation Sofia, Strandza Insulation, and Simat, and a roofing products enterprise, SIM 91. The insulation companies visited by KPMG can be further divided into two category: i.) building insulation ii.) roofing insulation.

i.) Simat Insulation is involved with the production of building insulation products, specifically a range of fiberglass based insulation products, such as fiberglass cloth, ropes, mats, and sheets or membranes. The output of Simat has a worldwide acceptance as the insulation material of choice. Fiberglass is made of glass through a process that involves heating the material to high temperature and then spinning it. The result is a filament type material which after it cools has considerable resilience and is easily transportable. In Europe for example, the building materials and construction industry is an important end

user of glass products, taking up approximately 15% of the European Community's annual glass production of 20 million tons. As the fiberglass membranes produced by Simat are the essential component of the roof insulation production at Hydroinsulation in Sofia (mentioned in the second category, merging the two operations would offer operating synergies as the two businesses serve the same market). The enterprise also produces mirrors as auxiliary product. Simat has the know-how to potentially serve a Western customer base.

Strandza Insulation serves a second distinct segment of the building insulation market, namely heat and sound insulation. As mentioned before, fiberglass is the internationally accepted insulation products and it accounts for approximately 95% of the worldwide insulation market. The remaining 5% is accounted for by mineral wool insulation materials, which is what Strandza is producing. This type of insulation material, due to its stiffness and rigidity, is used as fireproofing and sound protection material. (A further application is a product used for acoustic insulation.) Strandza produces clay based mineral wool or thermafiber for heat insulation purposes. In Western Europe, the application of thermafiber as a ceiling insulation material is widely used and Standza could consider expanding into this product category. However, Strandza is in need of a major technological overhaul which would require significant capital investment.

ii.) Two enterprises, Hydroinsulation in Sofia and Stroitelni Izolatsii have been involved with the production, and in case of Stroitelni, the installation of roofing insulation materials. Hydroinsulation produces a roofing insulation product which is a polyester and fiberglass membrane that is encased in bitumen for use on flat roofs and underground installations. The technology used is outdated and the equipment is poorly maintained. The other company, Stroitelni Izolatsii used to be a full service general building contractor. Recently the enterprise has become a specialty subcontractor, acting as construction manager for the manufacturing and installation of roof and heat insulation systems.

### *The Impact of Industrial Policy*

In KPMG's assessment, the outlook for building insulation enterprises can be positive if the necessary restructuring takes place and sufficient amount of capital is invested in the businesses. Given the capital intensive nature of the production process, it is recommended that the Government involves foreign investment in the insulation companies. The roof insulation and roofing products sector is highly competitive at the moment in Bulgaria with many small, private producers manufacturing roofing insulation products. Many of these products do not have fiberglass membranes but rather feldpaper is encased in bitumen which does not provide high quality weather protection properties. However, presently these producers are able to undercut the state owned companies in price. KPMG's assessment is that the market is in temporary disequilibrium and therefore a shakeout will follow. In order for the state owned enterprises to be competitive in the face of competition from private, and potentially foreign, companies, significant operating improvements and capital expenditures must take place.

Unlike brick and clay products which could decline in use if construction practices were Westernized, fiberglass insulation would increase. The industrial policy pursued by the Government regarding construction technology will have great influence on this process. In KPMG's assessment, the industrial policy will have the biggest impact on demand for insulation product. The current building practices construct heavy weight, sturdy but less comfortable structures with extended use of reinforced concrete. In the United States and increasingly in Western Europe, the application of steel members is the common practice. In those countries construction produces light weight structures that can be completed in a short amount of time. In these buildings, fireproofing and insulating must be applied. In addition to that, there is a heightened awareness of the importance of controlling energy especially in air conditioned buildings. For example, a current problem in Bulgaria is the moisture that permeates cement and makes inside walls moist. The Bulgarian practice is to apply wood pieces on the outside of the building, attach insulation material to it, then cover that with finishing material. Another option would be to insulate the building from inside. This is to underscore the point that the Government's industrial policy will greatly impact the supply demand conditions in the industry. The tools of this policy would include building codes, such as fire codes, sound proofing codes, etc.

### *Conclusion*

KPMG's assessment is that some of the Bulgarian insulation enterprises can be successful in the competitive international market. Simat can be a good example of a successful insulation company, given the favorable demand conditions. If possible, a U.S. or European fiberglass manufacturer should be found who would be willing to provide technology transfer for a fee or the opportunity to buy into the Bulgarian insulation market. The possible partners would be large enterprises, such as Owens Corning, Johns Manville, Certainteed, etc. However, Simat could be made competitive with relatively little capital investment. The current Bulgarian insulation market seems weak and fragmented. Besides the merging of Simat's fiberglass sheeting division with Hydrinsulation's roof products line another possibility for some consolidation would be to add the mineral insulation fibers to the Fiberglas building insulation division of Simat. These are not explicit recommendations but rather examples of how the industry could be restructured to be more competitive. Typically, in Western Europe the strong, successful fiberglass insulation companies are the ones with significant asset base and resources for research and modernization of production facilities. On an industrial policy level, the restructuring of the industry may be necessary in order to develop the Bulgarian insulation products segment into a globally competitive industry.

### **III. Selection of the Enterprises**

As a result of the enterprise visits, KPMG was able to assess the long term viability of the companies visited in a competitive environment and based on financial, operational, and marketing criteria, created three tiers of enterprises. The objective was to select

enterprises which will be able to capitalize on their existing successes in production and marketing, are in relatively strong cash flow position, have effective financial management, and, with the right partner, markets, and capital expenditures would be able to become world class competitors. The first tier includes the selected the six candidates that seem suitable for successful privatization transactions. These companies are discussed in the report submitted to the Ministry on September 5. The second tier includes two enterprises, which at this time, do not appear good candidates but warrant a further review and consideration. The third tier were the rejects. Second tier enterprises are the following:

Strandza Insulation- Polsky Trembesh

The enterprise used to be part of larger group that also included a clay deposit and a brick company. This enterprise uses a rather outdated technology that makes thermafiber wool from clay. The main equipment is an old Russian furnace and a Swedish forming line that was built in the early 1970s. In the medium term the existing furnace needs to be rebuilt or replaced. The estimated cost of replacing the furnace is U.S. \$15 million. In addition to that, the forming equipment would also have to be upgraded.

As discussed in the insulation section of the overview, the end product, thermafiber wool is an internationally accepted insulation product, especially in Western Europe where it is used as ceiling insulation material. However, the Government would have to make significant amount of capital investments in technology to make this enterprise more competitive. For example, currently it requires ten days to start up the furnace. In addition to the technology, there are several other problems which adversely impact the enterprise. The planned is significantly overstaffed and management is unable to reduce excess personnel. Management stated that the strong local union prevented them reduce personnel. In addition, the plant is currently not running due to the lack of orders. While in the long run the demand may increase as a result of the Government's industrial policy, currently the enterprise is operating at a loss. Though the enterprise has good clay reserves that is estimated to last 30 years, it is shared with the neighboring brick plant and presently the ownership of the clay reserves is not clarified. While this enterprise may have long term potential under certain market conditions and given sufficient capital expenditures, at present it does not appear to be a good candidate for any privatization effort.

Strandza Brick - Polsky Trembesh:

This company used to be part of conglomerate which included Strandza Insulation as well. The enterprise produces bricks in an automated an cost efficient plant. The production line is 125 feet long and the manufacturing process for each brick is less than 48 hours. The kiln can hold 48 wagons of brick. Though somewhat

overstaffed, this facility compares favorably with Western European brick producers.

Management stated that waste and delays are about 4%. The enterprise has opportunities for further process improvements at minimal cost which would favorably affect efficiency and profitability. As the enterprise sells its brick products in most major Bulgarian markets, inventories are kept minimal. The company has a good maintenance program and all equipment is kept in good working order. Management is knowledgeable and would be an asset to any privatization efforts. The enterprise have some hazardous working conditions and unsafe working practices which will have to be addressed.

Overall this enterprise appeared to be a good candidate for privatization, however, brick being its main product. KPMG will compare it with other brick enterprises visited before making a final recommendation on this company.

The third group of companies, which includes three enterprises, was deemed unsuitable for privatization at this time based on the criteria system developed by KPMG for different reasons. These enterprises include:

#### Hydroinsulation - Sofia

Hydroinsulation produces roof insulation products for use on flat roofs in below grade installations such as pipes. It manufactures sheets of polyester and fiberglass membranes encased in bitumen. The enterprise has four production lines the age of which is 18-23 years. At the time of the KPMG visit, only one line was operating and it was also down due to a temporary problem. Three lines are of Polish design while the fourth is German made. The equipment is questionable when compared to what might be in use in a world class operation. Though the rated speed of the newest line is 80 feet per minute, with a textile membrane product they only achieve 25 and with fiberglass approximately 45. The enterprise also experiences 20% downtime. Though maximum capacity is 6 million square meters a year, current production is said to be around 2 million square meters.

The enterprise is staffed with 145 people and there is a serious turnover problem due to a severe dust problem. The plant maintenance is poor and that contributes to the adverse dust problems. Management stated that the enterprise faces very stiff competition from private producers. According to management the competitors produce inferior quality products with feldpaper membrane. However, the competitors are able to significantly undercut the company in price. As a result of cost problems and the adverse market position, it operates only at 25% of capacity. In its current state the long term viability of this enterprise is questionable. The enterprise would need major improvements on the existing machinery to correct downtime. Management estimated the cost of renovating the existing product lines at DM 35 million. The hazardous working conditions

caused by the dust must be addressed and building maintenance have to be improved. Production costs also must be trimmed in order for this enterprise to be able to compete with other local manufacturers. Due to these reasons, we do not recommend the inclusion of this enterprise in the privatization program at this time.

#### Technoprocess Engineering - Sofia

This company is a small piece of former building contracting large conglomerate. Technoprocess in essence is a broker and contractor for various construction assignments in Bulgaria and abroad. Though it has its own in-house design capability the enterprise is currently purely intermediating cheap Bulgarian labor for foreign construction projects. Currently, the enterprise has several on-going contracts in Germany. In Wuppertahl, Technoprocess has been contracted for the construction of a supermarket. Germany is a major market for the company. However, its activity is simply intermediate relatively cheap Bulgarian labor for German construction projects. On the average, Bulgarian workers receive approximately DM 1,500-1,800 per month. Recently the intermediating activity has been constrained by legal problems, and Technoprocess has to pay DM 1,200 per worker to obtain a work permit.

Management stated that competition is fierce in the contracting business. Most of the Company's competitors are relatively small private enterprises. Developing Bulgarian business opportunities is proving to be an increasingly difficult task as a result of competition. Management stated that keeping the old company structure together would allow the enterprise to compete more effectively. Currently, it does not possess any competitive advantages and has no long term, viable strategy to compete. At this point, the enterprise does not appear a suitable candidate for privatization

#### Russe Quarry - Russe:

The Company is engaged in the extraction of sand and gravel from the Danube. In addition, it has an unfinished shipyard facility and its own port. The Company is a large operation located on a 200 hectare property. Heavy equipment includes seven rock sorters, several cranes, and 11 barges. It has a large inventory of spare parts as well. The sand source is about 100 meters away from the main facility in the river. However, the gravel source is a long distance to the east down the river. The Company's maximum capacity is approximately 1.5 million cubic meter. Total 1992 extraction was 210,000 cubic meter of which 70% was sand and the rest was gravel.

Despite of the extensive fixed asset base this enterprise is in a dire position and is virtually bankrupt. Competition from the Istar Dredging Company has squeezed

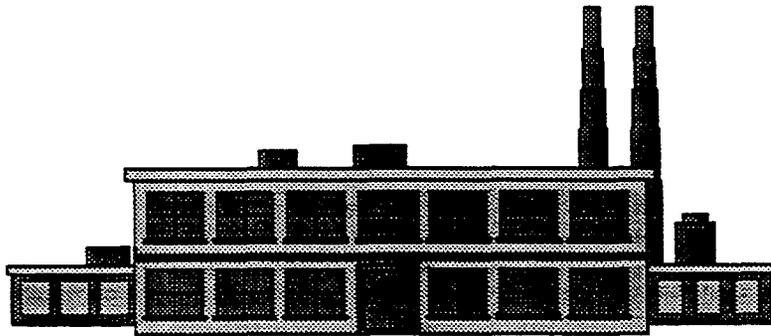
the margins of Russe enterprise. Currently, the Company charges 46 leva/ton for gravel, 42 leva/ton for sand, and 101 leva/ton for pebbles. However, its extraction costs are near or exceed the price it is able to charge on its products. According to management, the last time the Company was profitable was in the 1980s. A few years ago the enterprise embarked on an investment program to build a major ship repair facility and a ferry ship service for Danube crossings. These two facilities are partially completed and have been stopped. In management's estimate, it would require 80 million leva to finish construction. The business is carrying the investment and it is intermixed with the dredging activity which adversely affects its operation.

Though the facility has its own port as well as extensive fixed assets, it is non-viable enterprise at this point. In 1992, the Company lost 16 million leva. After some its debt was written-off, it still carries a debt load of 24 million leva in principal and capitalized interest. The Company was put into bankruptcy in 1991. Though technically it emerged from bankruptcy proceedings this year, it can barely make wage payments to its remaining workers and is unable to repay its debt obligations. The company has no future viability in its current form. At this point the strategy that would maximize the value of the company would be to auction off its fixed assets. For the obvious reasons stated above, this enterprise is not a suitable candidate for a privatization program.

Pending on the designation of privatization candidates by the Construction Ministry, KPMG as a next step would identify and contact potential investors to market the selected quarry and insulation enterprises. The primary target list of potential international investors KPMG intends to contact is included in Appendix 1 and 2.

No.	Ceramic Enterprise	Capacity Per Year	Employees	Clay Reserve Cubic Meters	Quarry Distance to Enterprise	Energy Type	Kiln Type	Area of Enterprise
12	Leinitsa Enterprise Leinitsa, Bulgaria	5 million double frame bricks (Planned Fuchs system; construction ceased in 1990 due to lack of capital to complete; new Fuchs system would have 30 million capacity.) (There is a 3 km distance between the clay processing workshop and the workshop engaged in the drying and firing of bricks)	Approximately 100 total	Estimated reserves at 60 years	2 km from site	Diesel	Ring kiln; (planned Fuchs system to have tunnel kiln)	
13	Rahovets 91 Nova Shipca, Bulgaria	30 million BE; 20 million Roof Tiles	Approximately 100 total	Two quarries - each with minimum 10-year reserve Other larger quarries are located 8 km from enterprise	Each quarry is 6 km from the enterprise	Diesel	Tunnel kiln	
14	Xan Omyaht Shoumen, Bulgaria (Ceramic Wall Tile Enterprise - also makes small amount of concrete roof tiles)	There are two workshops for ceramic wall tiles: A) New Shop (1993) has a capacity of 660,000 square meters B) Old Shop (1975) has a capacity of 1.2 million square meters. Concrete Roof tile shop has a capacity of 8.5 million units	428 total; 377 involved in direct manufacturing	Enterprise purchases clay and other reserves from several deposits within 40 km.	40 km from enterprise	Gas	Tunnel kilns	250,000 square meters

**INVESTMENT OPPORTUNITIES  
IN THE BULGARIAN  
CERAMICS INDUSTRY**



**December 1993**

*KPMG Peat Marwick - Policy Economics Group*

## **Silicatceram - Plovdiv, Bulgaria**

The joint stock company Silicatceram is headquartered in Plovdiv, with three main workshops or subsidiaries to the west, northwest, and northeast. The Enterprise is an integrated producer of red bricks at each site, in addition to calcium silicate bricks at the Plovdiv site only. In 1992, total brick production of the Enterprise totaled 52 million BE. Production capacity at the Enterprise is 150 million BE per year. Clay is extracted from reserves situated 16 km from the Plovdiv site. The reserves are estimated to be sufficient for 25-30 years at the present rate of extraction, with further reserves available at the subsidiaries. The Enterprise is ideally situated in the Plovdiv area, the second largest city in Bulgaria, at 120 km from Sofia. The Enterprise employs 350 people, with 330 involved in direct manufacturing production. The main Enterprise site in Plovdiv consists of a 5-story administration building and two production workshops: one for red brick production, and one for calcium silicate production. In addition, there is a general repair shop, storage for transportation equipment, and a facility for steam production. The origin of this equipment is 60% Bulgarian, 20% Russian and 20% Polish. All subsidiaries are seasonal operations, utilizing air drying technology and ring kilns. A new Fuchs line with a capacity of 30 million BE is planned for the Chernogorat facility. Production of this new line has commenced, but a lack of capital is delaying the completion of the installation.

## **Straljaceramic - Stralja, Bulgaria**

Straljaceramic, located in Stralja, in south east Bulgaria, was established in 1985 as part of an overall investment plan designed by the Ministry of Construction, which included the construction of 10 modern ceramic making facilities in Bulgaria for the production of roof tiles of the type "Mizia" and bricks. The same line can be used interchangeably for the production of roof tiles and of bricks. The Enterprise is a very modern and efficient operation. Straljaceramic is an integrated producer of ceramic roof tiles, with a market region which covers southern Bulgaria and recently northern Bulgaria as well. According to Enterprise management, the Enterprise is the largest producer of roof tiles in the country. Based on management estimates, the market potential of Bulgaria for roof tiles is 60 million units per year. At full operational capacity, Straljaceramic is able to produce 25 million units. In 1992, Straljaceramic produced 10,000,000 roof tiles, up from 9,800,000 roof tiles in 1991. The Enterprise is sourcing its clay from two deposits located in Stralja: one is 13 km. from the Enterprise, the other is 15 km. from the Enterprise. Each deposit is estimated to have a 60 year reserve. The technology at Straljaceramic is sophisticated, fully mechanized and of Italian origin (Morando). The Enterprise has a total of 113 employees, 105 of whom are involved in direct manufacturing production. Straljaceramic is a joint stock company prepared for privatization. The state is the sole shareholder of the company. There are no restitution problems at the moment.

## **Ceramic GT - General Toshevo, Bulgaria**

Ceramic GT, located in General Toshevo in the northeastern corner of Bulgaria, was established in 1969 for the production of ceramic bricks. The enterprise serves primarily the Dobric region, with a smaller market share in Varna. Production capacity at the enterprise is 30 million BE/year. Peak production years for the plant were from 1990 to 1992. In 1990, the enterprise produced 28 million BE; in 1991, Ceramic GT produced nearly 25 million BE/year. Production continued to shrink slightly in 1992, for a production level of 24.5 million BE/year. The enterprise's clay reserve approximately 1 km from the enterprise is estimated to be sufficient for 150 years at present extraction levels. A second deposit is located 20 km from the enterprise site. Equipment in the main production workshop at Ceramic GT is in good operational order and well maintained, and the enterprise produces a good quality brick. Enterprise management predicts that Ceramic GT is situated in a growing market region, near Dobric and the northeastern coast of Bulgaria, which is beginning to be developed as a prime tourist location. The enterprise consists of 92 employees, 77 of which are involved in direct manufacturing production.

### **Xan Omypaht - Shoumen, Bulgaria**

Xan Omypaht is an integrated producer of ceramic wall tiles and concrete roof tiles, located in Shoumen, in north eastern Bulgaria. The Enterprise is equipped with state-of-the-art technology for both ceramic tiles and concrete roof tiles and intends to begin producing ceramic floor tiles in the near future. The new ceramic tile workshop is equipped with Italian (Kast Company) equipment. The Enterprise focuses predominantly on the production of ceramic tiles and exports over 90% of its ceramic tiles to European countries, including France, Germany and Italy, as well as to Australia, Saudi Arabia and Lebanon. Concrete roof tile production is sold primarily within the domestic market. The projected capacity of the ceramic tile workshop built in 1975 is 1.2 million square meters. The new production line for decorated ceramic tiles has recently commenced production. The capacity of the line is 660,000 square meters. The Enterprise expects to export over 90% to Italy, where demand for ceramic tiles is particularly high. The workshop for concrete roof tile production has a projected capacity of 8.5 million units. The Enterprise purchases clay and other materials, such as kaolin, feldspar, quartz and cement, from several deposits located within 40 km of the Enterprise. The Enterprise imports certain materials from Australia, such as boric acid and zirconium silicate, zinc oxide and borax, for glazing the tiles. The Enterprise has a total of 428 employees, 377 of which are involved in direct manufacturing production. At present, Xan Omypaht is a 100% State-Owned Enterprise. There are no restitution issues at present.

### **Napredak - Sevlievo, Bulgaria**

Napredak Brick Company is located in Sevlievo, in north/central Bulgaria, approximately 200 km from Sofia. The Enterprise became a joint stock company in May 1993, 100% owned by the Government of Bulgaria. Napredak is an integrated producer of single frame (BE) and double frame (BH-2) bricks and is one of the leading and largest brick producers in Bulgaria, with a capacity of 60 m BE. In 1992, the Enterprise produced nearly 28 million BE. Production has significantly increased in 1993; in the first half of 1993, the Enterprise produced more than 19 million BE. Napredak was included in the Ministry of Construction's investment plan for modernization of 10 Enterprises in the ceramic sector formulated in the mid-1980's. As a result, the Enterprise is one of two Enterprises which have been fully equipped with modern ceramic technology and "Fuchs" system equipment from Austria. Napredak is supported by a large clay quarry on the Enterprise site. The Enterprise owns a portion of the clay deposit which will supply the raw material for approximately 15 more years. However, the clay deposit is much greater and will be able to supply the Enterprise for over 100 years. There are presently some restitution issues with this clay quarry. The Enterprise has a total of 138 employees, 130 involved in direct manufacturing.

### **Ceramic Bourgas - Bourgas, Bulgaria**

Ceramic Bourgas, located on the eastern coast of Bulgaria in Bourgas, is engaged in the production of ceramic bricks. The enterprise is located in one of the most attractive regions in Bulgaria, estimated at 120 million BE/year. The enterprise also operates one subsidiary located near Bourgas. The main production facility in Bourgas has a capacity of 30,000,000 BE/year; the subsidiary has a capacity of approximately 10,000,000 BE/year. In 1991, the enterprise was producing 30.3 million BE; in 1992, production increased to 35 million BE; production figures for 1993 are forecast at 35.5 million BE. Enterprise facilities and equipment are extremely old, but in good operational order. In addition, the enterprise appears to be well-maintained and well-managed. In essence, the Bourgas region is an extremely attractive market, but significant capital investment would be required at the Ceramic Bourgas for replacement/modernization of existing machinery. The enterprise employs 278 people, 252 involved in direct manufacturing production. Ceramic Bourgas is 100% state-owned by the Government of Bulgaria. The land on which the production facilities are built is property of the municipality. There

may be a potential restitution problem with the quarry, in that there is a previous owner for the land at the quarry.

### **Zvezda Enterprise - Caspichan, Bulgaria**

Zvezda Enterprise, located in Caspichan, is situated in the Varna market. The enterprise is an integrated producer of bricks for the Varna, Bourgas and Shoumen regions. This market regions is extremely competitive, with brick producers from outside these regions attempting to enter the market. One of Caspichan's main advantages is the low cost of raw materials, primarily because the clay deposit is on the premises of the enterprise. Clay reserves consist of two types of mergyl clay, blue and yellow. These are mixed in the proportion of 1:2 to obtain the correct plasticity. For brick production, Zvezda Enterprise has a total combined capacity for the two workshops of 40 million BE/year. The subsidiary with the ring kiln technology is located in a neighboring village. In 1991, the enterprise produced 34 million BE/year; in 1992, production volume declined to 25 million BE/year, due to the contraction of the construction industry. According to enterprise management, projected production for 1993 is 25.7 million BE. The enterprise employs 189 people, 167 involved in direct manufacturing production. Zvezda Enterprise is a joint stock company, 100% owned by the Government of Bulgaria. According to enterprise management, there were previous owners for a small area of the plant facilities. At this point, however, there have been no claims by previous owners.

### **Uspeh Enterprise - Lukovit, Bulgaria**

Uspeh Enterprise is located in Lukovit, approximately 100 km from capital city of Sofia. The Enterprise is comprised of four workshops: Two workshops are on-site in Lukovit; two workshops are remote at 15 km and 25 km from the Enterprise (closer to Sofia), with seasonal air-drying processes. The Enterprise is situated in an attractive market location and has no significant competitors in the region. An investor would be interested in this Enterprise for its market location and its large "gray mergyl" clay deposit with a 100-year reserve on-site, which is rated as one of the best in Bulgaria and is suitable for producing both roof tiles and bricks. Total production capacity of the four workshops at Uspeh Ceramics is 60 million BE/year. The Enterprise is currently producing approximately 50 million BE/year. It is one of the largest plants located in the Sofia and Pernik region, south of Sofia. Enterprise equipment and facilities, however, would have to be replaced in the mid-term, and financial cost accounting issues need to be discussed at the managerial level. The Enterprise employs approximately 300 people.

### **Mizia Enterprise - Gorna Orjahovica**

Established 100 years ago, Mizia Enterprise, located in Gorna Orjahovica, is an integrated producer of ceramic bricks, roof tiles and floor tiles. The Enterprise has four workshops on the premises for production. Mizia Enterprise is engaged in the production of three separate product lines: ceramic bricks, ceramic roof tiles and floor tiles. The different workshops for the production of these products are located at the main Enterprise plant in Gorna Orjahovica. Projected capacity for the different product lines are: 100 million BE/year; 5 million roof tiles/year; 180,000 square meters of floor tiles/year; 300 tons of milled sand/year. The clay deposit for brick production is located approximately 4 km from the Enterprise site. The reserve should last for 100 years. The clay is "mergyl" type and is of high quality for brick production. Clay for roof tiles is also located approximately 4 km from the main Enterprise site. Equipment and technology at the plant is primarily outdated, and the production processes are very labor-intensive. The Enterprise has a good market position for the production of roof tiles and ceramic floor tiles; however, there are several other competitors in the region for brick production. The main market for the Enterprise's products include Sofia, Plovdiv, Veliko Tarnovo, Stara Zagora, and Lovec. In addition, the Enterprise has a workshop for milling sand, which is in use only when customers place orders. The Enterprise has a total of 400 employees. Mizia Enterprise is a joint stock company, 100% owned by the

Government of Bulgaria. There may be some restitution issues in the future regarding some of the land and buildings at the enterprise.

### **Ceramic Razdelna - Varna, Bulgaria**

Ceramica Razdelna, located approximately 20 km. from Varna, is situated in one of the most attractive and growing market regions of Bulgaria. The plant is very old and the equipment for the production of bricks is obsolete by today's standards. However, one advantage is that the plant has a large clay deposit on site. In addition, the Enterprise was included in the investment program for ceramic plants completed by the Ministry of Construction in the late 1980's. The plan called for the construction of an entirely new production facility closer to the clay deposit on site, using modern German "Fuchs" equipment. Today, the infrastructure for the plant has been built, but no equipment has been ordered or delivered for this new facility. As a result, production continues to take place in the old facility, with an extremely labor-intensive production process. At full operational capacity, the Enterprise is able to produce 35 million bricks (BE) per year in the old facility. The new production workshop, when completed, will have a capacity of at least 30 million BE per year. In essence, Enterprise management's objective is to procure the required capital and foreign investment to complete construction of the new building and to purchase state-of-the-art equipment for production. At present, the Enterprise has no restitution problems for the Enterprise plant and facilities and the clay deposit.

### **Ceramic Sliven - Sliven, Bulgaria**

The state-owned enterprise, Ceramic-Sliven, is located in the city of Sliven in southeast Bulgaria. The enterprise has one subsidiary located approximately 12 km from the main plant site in Sliven. The enterprise is engaged in the production of ceramic bricks. The capacity of the Sliven plant is 40 million bricks per year. At present, the Sliven enterprise is producing 26.5 million BE/year, down from 29.6 million in 1991. Out of this total, the subsidiary is producing approximately 5-6 million BE/year. Clay is situated at 21 km from the plant, with present annual usage estimated at 97,000 tonnes. The reserve is sufficient for 45-50 years. Enterprise management did not indicate any consistency problems with the reserve; however, product quality is not consistent, which is either the result of the production process or the clay itself. Future reserves are located 45 km, 25 km and 8 km from the enterprise. The enterprise's main market area is in the regions of Bourgas and Haskovo, extending to the east and south of Sliven. The enterprise also has the facilities to produce glue and accelerator substances for concrete, but is presently not engaged in the production of these materials. The enterprise is in the middle of two regions - Plovdiv and Bourgas - and is aggressively trying to penetrate these markets to increase sales. The enterprise has a total of 204 employees, with 173 direct manufacturing workers. Ceramic - Sliven is a state-owned enterprise, 100% owned by the Government of Bulgaria. At present, there are no restitution claims for the enterprise or the clay deposits.

### **Rahovets 91 - Nova Shipca**

Rahovets 91, located in Nova Shipca, is situated in eastern Bulgaria, approximately 60 km from Varna. Rahovets is an integrated producer of ceramic bricks and roof tiles. Rahovets 91 has a projected capacity of 30 million BE/year and 20 million roof tiles/year. In 1992, the enterprise produced 6,608,000 bricks and 1,752,000 roof tiles. The enterprise is using two clay quarries for production - one quarry is located approximately 6 km to the south, and the other quarry is located approximately 6 km to the southwest of the enterprise. One of the two quarries is of the "mergyl" type of clay. Each quarry has a 10-year reserve at the minimum. Other deposits are located about 8 km from the enterprise and have a much larger reserve. The equipment and technology at the enterprise is quite old, and the company faces significant competition from other brick and roof tile producers in the region. The bottleneck at the enterprise concerns the inefficient use of technology, in that the enterprise is producing bricks on a

reconstructed roof tile line. The labor force totals 118 employees, 105 engaged in direct manufacturing production and 13 engaged in administration. In 1991, the enterprise was established as an independent joint stock company, 100% owned by the Government of Bulgaria. There are currently no restitution issues pending at the enterprise.

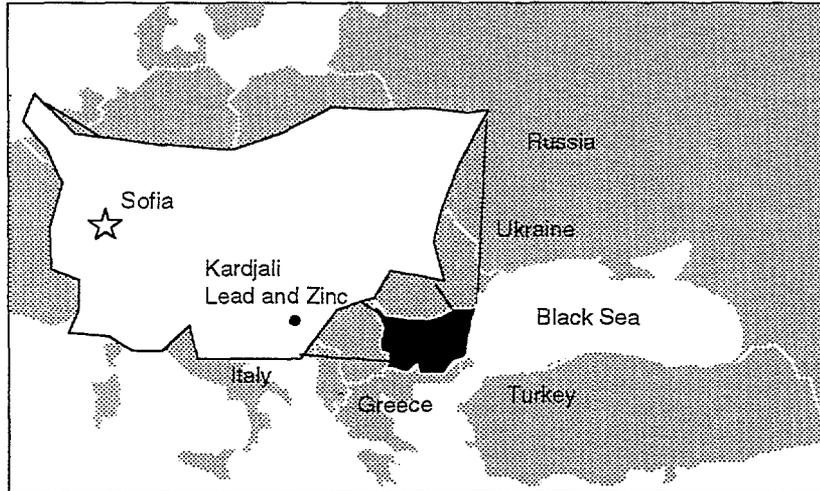
### **Badeshte Enterprise - Boutovo, Bulgaria**

Badeshte Enterprise is located in Boutovo, in the north/central Bulgarian ceramic market. The enterprise is an integrated producer of single frame and double frame bricks, floor bricks, and facing bricks. The present capacity of the enterprise is 60 million BE/year. The enterprise at present is producing significantly less than the capacity level, due to the contraction of the construction market. According to enterprise management, the workshops are working at a current efficiency rate of less than 50%. The clay reserve is on-site, with approximately 80 years supply. The enterprise consists of five workshops - two are located on the main plant site in Boutovo, and three are located in surrounding areas and were established in 1900. The enterprise is the only producer of facing brick in the region. Overall, the plant is very old with obsolete technology. Significant investment would be required at the main plant site alone. At present, there are no restitution claims for the equipment or facilities at the main site in Boutovo. There are a few restitution claims for two of the workshops located outside of Boutovo. Enterprise management expects these issues to be resolved in the near future.

### **Letnitsa Enterprise - Letnitsa, Bulgaria**

Letnitsa Ceramica, located in the north central Bulgarian town of Letnitsa, is a ceramic brick manufacturer. The enterprise was included as part of an overall investment plan developed by the Ministry of Construction for the modernization of the ceramic sector in Bulgaria. This investment plan envisioned the construction of a new production facility equipped with Fuchs technology at Letnitsa. In 1990, however, the plant had to halt production indefinitely due to lack of capital to finish the installation. At this point, some equipment had already been delivered. In 1992, the enterprise was engaged in the production of roof tiles, as well as single frame (BE) and double frame (BH-2) bricks at its current operating facilities. After 1992, the roof tile workshop was given back to the previous owners of the land, and the enterprise is primarily engaged in the production of bricks at present. In 1992, Letnitsa Ceramica produced approximately 1,800,000 BH-2. Total production capacity is approximately 5,000,000 million BH-2. The clay deposit which the enterprise uses is located about 2 km from the plant. Reserves from the deposit should be available for 60 years. The enterprise has inherited an unfavorable capital structure which is responsible for the current shaky financial situation of the enterprise. A new young General Director was appointed in mid-1993. The General Director, an economist, appears very bright and will be an asset in terms of the future direction of Letnitsa Ceramica. Letnitsa Ceramic is a 100% state-owned company. There are some restitution issues which may become more serious in the near future. The new division, if ever completed, is being constructed on land for which there is a previous owner.

**Appendix III: Kardzhali Lead and Zinc Information Memorandum**



# **Lead and Zinc Complex Ltd. Kardjali**

**A State - Owned Metallurgical Enterprise**

**Offered for foreign investment**

**by the  
Government of Bulgaria**

December 1993

Neither KPMG nor the Government of Bulgaria makes any representations, express or implied, as to the completeness or accuracy of the information or statements contained herein or made otherwise available to interested parties in connection with the sale of shares of Lead and Zinc Complex, Kardjali . Neither KPMG nor the Government of Bulgaria makes any statement about the impact of changes in the supplied information after the date the information was compiled.

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Neither the delivery of this Memorandum nor the sale of any shares of Lead and Zinc Complex, Kardjali shall under any circumstances create any implication that there has been no change in the affairs of Lead and Zinc Complex, Kardjali since the date hereof.

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### Appendices

Financial Statements  
Facilities List  
Map of Plant Facilities  
Flow Charts and Process Diagrams (attached)

## I. EXECUTIVE SUMMARY

Lead and Zinc Complex Ltd., Kardjali ("Lead and Zinc" or the "Enterprise") is a state-owned enterprise of the Government of Bulgaria, located in Kardjali, Bulgaria.

- Lead and Zinc is one of two lead and zinc producers in Bulgaria. The plant reached a peak production level of over 30,000 tonnes zinc and over 30,000 tonnes lead in 1982. The plant produces a wide range of lead and zinc products including lead brands, lead-antimony alloys, rolled lead, lead-tin soldiers, tin babbits, lead glaze and minium, zinc metal, zinc alloys, sulfuric acid and a range of chemical by-products.
- Lead and Zinc is 100% state-owned and is under the jurisdiction of the Ministry of Industry. Since the abolition of the central planning system, management has direct day-to-day decision making authority. The enterprise is free to set its prices, export its products, import raw materials, or hire and dismiss employees as necessary.
- Lead and Zinc has embarked on an ambitious program of capital expenditures designed to improve the ecological and environmental impact of production. Recent investments include an off-gas filtration system to capture dust from lead production and a wastewater treatment plant. These projects have been funded by the positive cash flow of the enterprise and are supported by the Government in the form of tax concessions.
- The enterprise enjoys a reputation for producing and delivering international quality products according to the specifications of the customer. The enterprise's primary products are listed on the London Metals Exchange.
- Lead and Zinc's management and workforce have extensive experience in metallurgy and a history of successful and innovative operation. The Kardjali region is a center for metallurgical expertise in Bulgaria.
- Lead and Zinc has few credit obligations, is highly liquid and is generating a significant operating profit.
- Lead and Zinc is strategically located with respect to attractive foreign markets and raw material suppliers, and is well connected to international rail and seaway transportation networks.
- Lead and Zinc has advanced analytical and physical laboratory facilities which enhance quality control, process control and ability to carry out research and development.
- Lead and Zinc's well-equipped machine shop provides strong support to the maintenance of the complex.

## II. FINANCIAL SUMMARY

Except where otherwise noted, the financial information contained in this Confidential Information Memorandum is based on financial reports provided by management. It has been presented in a format which seeks to reflect international accounting standards [See Section VIII: Financial Statements.] The data, however, has not been audited or reviewed. Investors are responsible for their own assessments and adjustments as deemed appropriate.

### Selected Restated Financial Data

(000's Leva)	YTD 6/30,1993	1992
<i>Income Statement Data:</i>		
Net Sales	624,302	1,038,586
Cost of Sales	492,883	807,841
Gross Profit	131,419	230,745
Gross Margin	21%	22%
Genl/Admin Expense	82,761	159,242
Other Expenses	36,714	31,315
Taxes	9,559	31,750
Net Income	2,385	8,438
Net Margin	0.4%	0.8%
Tonnes Sold (metric tonnes)		
Lead	10,840	20,832
Zinc	12,995	20,558
<i>Balance Sheet Data:</i>		
	6/30/93	12/31/92
Accounts Receivable	96,629	12,326
Inventories	164,113	217,459
Total Assets	570,319	462,314
Bank loans payable*	160,152	95,618
Capital	310,997	301,339

*source: financial statements supplied by management.*

For further information, refer to the financial statements in the appendix.

### III. THE INVESTMENT OPPORTUNITY

Kardjali Lead and Zinc is among the first enterprises selected for privatization by the Ministry of Industry and the Bulgarian Agency of Privatization. The Agency of Privatization is responsible for the privatization of the enterprise. The enterprise is currently 100% owned by the Government of Bulgaria. The Agency of Privatization intends to offer an investor a majority share in the company. According to Bulgarian law, the Agency of Privatization must allow the employees of the Enterprise the opportunity to purchase up to 20% of the shares at a preferential rate, prior to any purchases by a foreign investor.

According to Bulgarian law, the government must provide restitution for descendants of former owners of property currently being held by state-owned enterprises. No major restitution claims are expected at Kardjali Lead and Zinc. A full legal analysis of any possible restitution claims at the enterprise is underway.

The Government of Bulgaria and enterprise management seek an investor to provide:

- **Equity investment** for the ownership of the existing company
- **Investment capital:** Kardjali Lead and Zinc is seeking upgrades and renovations of several production lines which would require capital expenditures.
- **Technical expertise:** The enterprise hopes to attract an investor that can add experience and technology to the current production processes.
- **Linkage to international markets:** Kardjali Lead and Zinc seeks to increase its presence in the international markets in obtaining raw materials and exporting products.

In return, an investment in Kardjali Lead and Zinc offers:

- **Below-average production costs:** Kardjali Lead and Zinc's sound balance sheet, established sources of supply and reasonable energy rates give it a favorable cost profile.
- **A skilled, low cost workforce:** Kardjali Lead and Zinc has a stable, educated and experienced workforce. As of August, 1993 the average worker received 5,308 leva (approx. \$196.00) per month in direct wages. Over 52% of the workforce has graduated from a technical secondary or two-year, post-secondary program, many specializing in metallurgy. Kardjali's managers and engineers are highly trained specialists.
- **Established trade relationships:** Kardjali Lead and Zinc is well positioned with several international and domestic customers and suppliers.
- **Presence in Southeast Europe:** Kardjali Lead and Zinc's strategic location and access to railways and seaways positions it well to compete in the Middle East, Northern Africa, Central Europe, and the Balkan peninsula.

#### IV. COMPANY HISTORY

Lead and Zinc Complex Ltd., Kardjali was founded as a state-owned enterprise in 1953 as part of the Gilrotzvetme - Moscow Project and placed under the direction of the Bulgarian Ministry of Metallurgy, a unit of the Ministry of Industry. Construction began on May 11, 1953 on the plant's current site, selected due to its proximity to Bulgaria's primary lead and zinc mines. Zinc production began on July 17, 1955 with the official grand opening held on September 5, 1955. Lead production began in 1956.

The original design capacity of the plant yielded production levels of 10,000 tonnes for both lead and zinc. The original products were lead, zinc and sulfuric acid without the extensive by-product line that is currently sold. The capacity was increased to 25,000 tonnes for zinc and 40,000 tonnes for lead in the mid-1960s through employment of additional roasters. The plant reached a peak production level of 67,000 combined tonnes in 1982. The additional roasters that were employed to reach this production level were not environmentally sound, however, and were shut down after 1982 and lead production was dropped back to the 20,000 tonne level. In addition to the increase in capacity over the years, the product line was expanded to include lead and zinc alloys, solder, lead glaze and minium, and a variety of chemical products.

The corporate organization of the enterprise has gone through several significant changes since the founding in 1953. Prior to 1972, the plant operated as an individual enterprise under the direction of the Ministry of Metallurgy, and maintained operating relationships with the national mines and other metallurgical facilities. Between 1972 and 1979, the Ministry organized a national corporation consisting of the Kardjali plant, the Plovdiv Metallurgical Plant, which was established in 1965, and the national mines. In 1980, this national corporation was again reorganized to include all non-ferrous metals producers and a copper plant, an aluminum plant and several small non-ferrous metal producers were added to the group.

In conjunction with the move toward Bulgarian independence, the enterprise was again reorganized in 1989. Under this version, only the Kardjali and Plovdiv lead and zinc plants and several small machine shops were included. This arrangement lasted less than one year and since that time, the Kardjali plant has operated as Lead and Zinc Complex Limited, Kardjali, as an individual enterprise under the direction of the Metallurgy Department of the Ministry of Industry.

#### V. PRODUCTS AND PRICING

Kardjali's products can be divided into three broad categories:

- Lead and Lead-Based Products
- Zinc and Zinc-Based Products

• By-products

The following table lists Kardjali's current products.

**Product List**

Lead Products	Zinc Products	By-Products
Lead, 99.99% and 99.97%	Zinc, 99.975%	Sulfuric Acid
Lead-Antimony Alloys	Zinc Alloys	Sodium Bisulfate
Lead-Tin Solders	Zinc Sulfate	Cadmium
Tin Babbits	Zinc Oxide	Bismuth
Rolled Lead	Zinc Dichloride	Misc. extracted metals
Lead Minium	Printing Zinc	
Lead Glaze	Chemical Current Zinc	

*source: enterprise management*

Although Kardjali has the capability to produce 99.99% zinc, at current prices the additional cost of the chemical process needed to attain this purity makes it unprofitable to produce this product. Management plans major upgrades to the zinc plant which would allow the production of zinc in purity grades of 99.99% and higher at a lower cost.

Most of Kardjali's products are commodities and are priced according the established free-market trading prices at the time of the sale. The following table shows the quantities sold and total revenues from Kardjali's major products.

**Enterprise Sales By Product**

Product	Six months, 1993		1992		1991	
	tonnes	leva (000)	tonnes	leva (000)	tonnes	leva (000)
Zinc	12,916	314,600	18,344	457,800	12,842	128,100
Lead	3,367	38,200	19,708	123,200	5061	43,600
Sulfuric Acid	36,229	14,600	11,660	24,000	24,383	4,200
Zinc Oxide	836	22,100	3,805	92,000	3,759	42,700
Copper Sulfide	121	1,500	111	1,600	12	200
Cadmium	34	500	31	1,500	17	400
Bismuth	15	1,500	32	3,000	23	1,000
Lead-Antimony	1,274	21,900	5,500	93,600	8,769	79,400
Lead-Antimony-Selenium	3,198	49,400	3,604	55,500	159	1,500
Lead Minium	393	6,000	355	4,700	887	6,000

*note: sales may not total restated financial sales due to differences in accounting procedures and the exclusion of product groups and service revenues*

*source: enterprise management*

## VI. CUSTOMERS, MARKETS AND COMPETITORS

### Customers and Markets

The primary end users for Kardjali Lead and Zinc's products vary by the product type. For zinc products, including alloys and chemical products, the primary end users include the galvanizing and corrosion protection industries, construction industry (doors and roofs), and rubber, pharmaceutical and paint industries (chemical products). The lead product end users include the battery industry, construction industry, military and paint industry. Fertilizer is the primary end use for the sulfuric acid produced as part of the production process.

In 1992, the enterprise sold its products to over 40 domestic and international customers. Until 1991, the enterprise sold all of its final products to state-run, centralized trading distributors. The state-run distributors have virtually collapsed since that time as many of the traders have formed their own private distributorships, which have become the primary means of selling final products. The enterprise has also developed a marketing department which is executing direct sales and working to develop new markets and customer relationships.

The table below lists the breakdown between domestic and export sales for the major product groups.

**Enterprise Sales (Domestic vs. Export)**

Product	Six months, 1993		1992		1991	
	tonnes	leva (000)	tonnes	leva (000)	tonnes	leva (000)
<b>Lead Products</b>						
Domestic	7,325	n/a	13,820	175,514	15,782	126,256
Export	3,515	n/a	7,012	68,542	3,490	35,640
<b>Zinc Products</b>						
Domestic	995	n/a	7,600	176,898	5,462	151,002
Export	12,000	n/a	12,958	379,669	16,522	246,673
<b>Sulfuric Acid</b>						
Domestic	6,304	n/a	22,440	5,386	33,543	10,063
Export	14,000	n/a	14,157	6,838	--	--

*source: enterprise management*

In addition to countries within the former Soviet Union, the export sales include customers in Germany, India, Pakistan, Iran, Romania, Turkey, Greece, Czech Republic, Hungary, Holland and England.

Zinc and zinc products were sold to 22 primary customers in 1992. The domestic zinc sales are widely disbursed among customers with the largest single customer accounting

for only 15% of total domestic sales. The purchases of the two largest export customers comprised over 66% of total 1992 export sales.

Lead products were sold to 16 primary customers in 1992. The three largest domestic customers comprised 92% of total domestic sales. The largest export customer accounted for 73% of total export sales.

The following table lists Kardjali Lead and Zinc's primary customers for 1992.

<b>Primary 1992 Customers</b>		
Customer	Tonnes	% of Total
<b>Domestic Lead Sales</b>	13,820	100%
Elhim Iskra	4,897	35%
Akumikar	4,020	29%
Start	3,838	28%
All Others	1,065	8%
<b>Lead Export Sales</b>	7,012	100%
Metkom	5,101	73%
All Others	1,911	27%
<b>Domestic Zinc Sales</b>	7,600	100%
Diamex	1,109	15%
Kremikovtzi	877	12%
All Others	5,614	73%
<b>Zinc Export Sales</b>	12,600	100%
Metkom	5,215	41%
Zomet	3,003	24%
Comex	1,212	10%
All Others	3,170	25%

*source: enterprise management*

Historically, the enterprise focused primarily on the domestic market and been served by domestic suppliers while the Plovdiv plant focused on exports. In recent years, while maintaining its domestic position, the Kardjali plant has significantly expanded its level of export sales and sourced a growing level of its materials through international suppliers.

The collapse of defense-related demand for sulfuric acid has limited Kardjali's customers for this product. Kardjali Lead and Zinc currently depends on one major customer, a Romanian fertilizer company, to purchase much of its sulfuric acid. Management is seeking ways to reduce this dependence. An absence of customers for sulfuric acid could limit zinc production if Kardjali was unable to channel sulfur emissions into the sulfuric acid process due to excess acid inventory.

### **Distribution**

The enterprise's products are sold through four different channels -- direct marketing, state-owned agencies, private domestic sales agents and international distributors. As indicated above, the enterprise historically sold all of its products through state run trade agencies. With the transition to a more market based economy, these agencies have

virtually collapsed with many of the traders forming their own private companies. Management states that they work primarily with three or four private Bulgarian trade agencies who specialize by product type. These traders are paid a commission, again based on product type, 0.5-0.8% for metals and 1.0-1.5% for chemical products. The private Bulgarian trade agencies do not purchase the products from the enterprise and resell them at a higher price but instead function as a commission based sales force.

Sales made through international distributors are treated as final sales. The international distributors purchase the products from the enterprise and then resell them.

Since the end of 1992, the enterprise has been building an internal marketing department which includes in-house traders developing customer relationships. This has allowed the enterprise to develop direct export relationships.

### **Terms of Payment**

Kardjali Lead and Zinc requires that all new customers pay by letter of credit payable upon delivery of the products purchased. Many of the export sales are made with an 80% pre-payment arrangement which serves to finance working capital needs related to the sale with the remaining 20% payable upon delivery. Some of the customers have a 10-15 day delay payment arrangement to allow for documentation and money transfer. Other customers have up to 30 day delay arrangements subsequent to delivery.

Due to low concentrate costs and sufficient liquidity, the enterprise produces relatively little lead or zinc on the basis of a processing-only contract, wherein the processor does not take ownership of concentrate used in production. In the first six months of 1993, management reports 972 tonnes of lead and 124 tonnes of zinc were produced under processing contracts.

### **Competitors**

Kardjali Lead and Zinc is one of three producers of non-ferrous metals on the Balkan Peninsula. The other two are in Plovdiv, Bulgaria and the former Yugoslavia. The civil unrest in the former Yugoslavia has severely limited the production and distribution capabilities of that enterprise. The Kardjali facility has a much more extensive product line than Plovdiv as Plovdiv does not produce the chemical and sub-product lines produced at Kardjali.

The fact that lead and zinc prices, for both concentrate and final products, are driven by the prices set at the London Metal Exchange, leads to competition, primarily in the export market, from international producers. The Metal Exchange creates an international market differentiated primarily by quality and transportation costs. There is currently no distribution branch of the London Metal Exchange in the Balkan region although there was a conference of regional ferrous and non-ferrous metal producers in 1992 to discuss setting up an LME branch. The discussions are ongoing.

There is currently no import tariff on the products that the enterprise produces. There have been discussions at the Ministry of Trade, however, regarding implementing a 3-5% import tariff to protect domestic metal producers from imports, primarily from Russian producers who are currently benefiting from favorable exchange rates. Despite the lack of import protection, the domestic plants in Kardjali and Plovdiv have historically provided virtually all of Bulgaria's domestically consumed lead and zinc.

Kardjali Lead and Zinc is responsible for paying a 22% turnover tax on any products sold domestically to the end user. Management reports that only a very small amount of Kardjali's sales meet this requirement and are thus subject to this tax.

## VII. OPERATIONS

### Overview

The Lead and Zinc Complex was built by Bulgarian and U.S.S.R. engineering companies during the first half of the 1950's and started operating in September 1955. The major products were zinc, lead and sulfuric acid. Over the years, the product mix was expanded to include various alloys and compounds of zinc and lead, and other metals such as cadmium and bismuth.

The processing technologies were provided by the companies in Bulgaria and U.S.S.R. The processes are similar to the ones used in the rest of the World -- roast-leach-electrowin process for zinc production, contact process for sulfuric acid production from zinc concentrate roaster off-gases, and sintering, smelting and a pyrometallurgical refining process for lead production.

The equipment was supplied from Bulgaria, U.S.S.R. and East Germany. However, since the beginning of economic reforms, the maintenance and modernization activities included transfer of technologies and equipment from other countries. A good example for this development is the project that was carried out over the last two years to reduce particulates emission from the lead plant which was designed and built by Betz of Germany using equipment supplied from Germany.

A plot plan (Drawing 1, dated June 1988) of the Lead and Zinc Complex Ltd. of Kardjali enterprise together with an enlarged building layout drawing (Drawing 40-00-00-240) are included in the Appendix.

### ZINC PLANT

The zinc plant is comprised of feed preparation, roasting, leaching, electrowinning, and melting and casting facilities. The sulfuric acid, sodium bisulfate, bismuth, cadmium and copper sulfate production facilities are also included in this area. The intermediate products zinc sulfate, zinc oxide and zinc chloride are also produced at the zinc plant facilities as byproducts.

The production capacity of the zinc plant is 28,000 metric tonnes of zinc per year in various shapes and alloys. The production started in 1955. The processes and equipment are illustrated in the following drawings which are included in the Appendix.

Drawing	40-00-00-124	Flow Diagram of Roast-Acid Plant
Drawing	40-00-00-223	Flow Diagram of Zinc Plant
Drawing	2	Equipment Diagram of Roast-Acid Plant
Drawing	40-00-00-222	Equipment Diagram of Zinc Production

### **Feed Preparation Facilities**

Zinc concentrates are received by trucks, train cars, or an overhead bucket system and stored in the concentrates storage building where the blending is also carried out. Low and normal grade zinc concentrates are blended and screened, and conveyed into the roaster feed bins. The feed to the roasters also include the recycle residues from other parts of the plant. The normal grade zinc concentrates contain 48% to 52% zinc and low grade concentrates contain less than 48% zinc.

### **Roasting Facilities**

There are two single layer roasters with reaction surface area of 30 m<sup>2</sup>. These roasters were built as multiple layer roasters in 1955 and changed into single layer in 1965. Each roaster has roasting capacity of 30,000 t/y zinc-containing concentrates. One roaster operates at all times. Air is blown through the tuyeres placed at the bottom of the roasters. Calcine is discharged through a side opening into an air-blown calcine cooler.

The roaster gases and calcine particulates carried over in the gas are discharged through the opening at the top into a two stage dust dropout chamber where heavier and coarse calcine particulates are separated. Calcine particulates collected through the two stage drop out chamber are mixed with the calcine discharged from the calcine cooler in the screw feeder which feeds into a particle size classifying system. The finer fraction of the calcine, passing through 0.5 mm, is fed into the leach plant. The coarser fraction, larger than 0.5 mm, goes through a ball mill for grinding which discharges into a screw feeder feeding into the particle size classifying system.

The roaster off-gas contains about 5% sulfur dioxide (SO<sub>2</sub>). After the two stage dropout chamber, the off-gas is fed into dry electrostatic precipitators followed by wet electrostatic precipitators where fine particulates (dust) are separated and fed to the leach plant. After the electrostatic precipitators, the particulate free off-gas is fed into the sulfuric acid plant.

The roasters are repaired every five years. The number one roaster was repaired in 1991 and the number two roaster was repaired in 1988 and is due for repair in 1994.

### **Sulfuric Acid Plant**

The dust-free gas is dried with sulfuric acid and passed through the contact tower where SO<sub>2</sub> is converted to SO<sub>3</sub> then it is absorbed into sulfuric acid in oleum. The sulfuric acid plant is a single contact type with a capacity to produce 120 t/d sulfuric acid at technical grade quality with 95% or better purity. About 97% of SO<sub>2</sub> contained in the feed gas is converted to sulfuric acid. This results in the acid plant tail gas to contain about 0.15% SO<sub>2</sub> which is vented to the atmosphere. The acid plant produces and markets oleum as well.

The acid plant started operating in 1955, at the same time as the roasters. The last major repair to the acid plant was carried out in 1986. A minor repair was carried out in 1992.

### **Leaching Plant**

The neutral leaching of calcine is carried out at 65 to 70°C and pH of 4.8 to 5.0 using the spent electrolyte from the electrowinning and filtrate solution from the cadmium plant. Manganese dioxide is also added. The slurry is thickened. The thickener underflow is further leached at 75 to 80°C in spent electrolyte solution, maintaining acid levels of 2 to 3 g/L H<sub>2</sub>SO<sub>4</sub> in the reaction tanks. The thickener underflow contains lead, zinc and iron residue which is washed, filtered at vacuum disk filters, dried in rotary drum dryers to less than 20% moisture and stock piled or sold to a another smelter.

The residue production rate is 10,000 to 12,000 t/y. Its composition is 14 to 16% Zn, 6 to 9% Pb, 20 to 25% Fe, 3 to 5% S, 1.5 to 2% Cu, 0.2 to 0.3% Cd, 8 to 10% SiO<sub>2</sub>, 0.03 to 0.05% Ag, 2% CaO and 1% MgO.

The neutral leach solution (neutral leach thickener overflow) goes through the purification steps where copper and cadmium are removed by zinc dust addition. Then, cobalt is removed by adding copper sulfate and heating the solution to 60°C and filtration of the precipitate. The purified solution contains less than 0.1 mg/L copper, 2.0 mg/L cadmium and 0.8 mg/L cobalt. The solution is transferred to the electrowinning plant. The cobalt cake is washed, filtered and disposed.

### **Cadmium and Copper Sulfate Plant**

The cadmium/copper cake is repulped and leached. The slurry is filtered for the copper sulfate precipitate. The copper sulfate (copper vitriol) precipitate composition is 40% to 50% Cu, 3% to 4% Zn, 20% to 30% S, 1% to 2% Fe, 0.5% Cd, 8% to 10% SiO<sub>2</sub> and 5% to 6% Pb. It is sold to copper smelters or stored. The annual production is about 120 tonnes.

The cadmium is precipitated from the cadmium copper cake leach solution by zinc dust addition and cadmium sponge is formed. The cadmium sponge is filtered and contains 50% to 60% cadmium. The solution is recycled to the neutral leaching of calcine. The cadmium sponge is dissolved in sulfuric acid and filtered. The cake is recycled back to the cadmium-copper leach tanks. Cadmium is electrowon as cadmium cathodes from the solution. Cadmium cathodes are melted and cast into various shapes for sale. The dross is washed and the metallic portion is recycled to the melting furnace.

The cadmium and copper sulfate plants started operating in 1955. The cadmium purity is 99.95% and the annual production is about 96 tonnes.

### **Zinc Electrowinning and Cathode Melting and Casting**

The zinc electrowinning plant has 224 cells, in each cell there are 20 aluminum cathodes and 21 lead 1% silver alloy cathodes. The anode thickness is 8 mm. The cathode dimensions are 1,050 x 660 x 4 mm. The power density is 500 Amp/dm<sup>2</sup>. The deposition time is 24 hours and zinc cathodes weigh about 15 to 18 kg each. The temperature of the solution in the cells is maintained at 38° to 40°C. The feed solution contains 130 to 150 g/L zinc. The spent electrolyte contains 45 to 50 g/L zinc and 130 to 150 g/L H<sub>2</sub>SO<sub>4</sub>.

From the electrowinning, the spent electrolyte solution is recycled to the neutral leach and other leaching operations. The zinc cathode sheets are manually stripped and melted in induction furnaces, and cast into various shapes and alloys for shipment. The casting line is a chain drag conveyor.

Overall zinc recovery in the zinc plant is about 85%. About 100 to 200 tonnes per month of special high grade (SHG) zinc can be produced. The purity of the rest of the zinc production is about 99.975%.

The lead content in the product zinc is about 100 to 120 g/t. Management believes that the distance of 72 mm between the lead anodes has to be larger and the electrolyte circulation and cooling capacity has to be increased to better control the impurity levels in the solution and produce SHG zinc more consistently. The ventilation in the building is currently not comparable to international standards. Under the current maintenance schedule, 28 cells are repaired or renewed each year.

### **Sodium Bisulfate Plant**

The off gas from the sinter machine in the lead smelter and waste gases from the roasters in the zinc plant are mixed and treated in the sodium bisulfate plant. The feed gas to the sodium bisulfate plant contains about 0.8% sulfur dioxide (SO<sub>2</sub>).

The blended feed gas first goes through Venturi wet scrubber (two in parallel) followed by a cyclone (two in parallel) for removal of particulates. The slurry collected at the bottom of the Venturi scrubbers and cyclones is thickened. The thickener underflow is filtered at a vacuum drum filter and the cake is recycled back to the lead smelter. The thickener overflow and filtrate from the vacuum drum filter are mixed and recycled to the Venturi scrubbers.

The off gas free from particulates is fed to the two stage absorption unit where it is contacted with caustic soda. The off gas containing less than 0.013% SO<sub>2</sub> is vented to the atmosphere through the stack. The solution from the absorption tower is filtered and marketed as sodium bisulfate (NaHSO<sub>3</sub>), crystallized and marketed as sodium bisulfate crystals (NaSO<sub>3</sub>H<sub>2</sub>O) or dried and marketed as sodium sulfate powder.

The sodium bisulfate plant started operating in 1967 and the production rate is about 70 to 80 tonnes per year. It is currently operating approximately 50% of the time. The last major maintenance was carried out in 1992.

### **Bismuth Plant**

The bismuth-lead alloy anodes from the lead refining is separated into lead cathodes and bismuth slime by electrolysis. Lead cathodes are recycled back to the lead refinery. The slime is washed, dried at 120°C and melted under reducing conditions. The molten bismuth is cast into anodes shape and transferred to the bismuth electrolysis section.

Similarly, metallic bismuth produced at the refinery is dissolved in nitric acid (HNO<sub>3</sub>) and neutralized with NaOH. Bismuth hydroxide (Bi(OH)<sub>3</sub>) is further treated with H<sub>2</sub>SiFe. The precipitate is removed from the solution by filtration. The bismuth electrolyte is fed to the electrolysis section. Pure bismuth cathodes are produced through the electrorefining of bismuth anodes in bismuth electrolyte.

The bismuth cathodes are melted at 400°C in induction furnaces and cast into bismuth ingots ready to be shipped to markets. The bismuth plant started operating in 1990. The production capacity is 7 t/month.

## LEAD PLANT

The lead plant is comprised of feed preparation, sintering, reduction smelting furnace, off gas handling and dust removal system, and pyrometallurgical refining and casting facilities. The lead plant produces lead metal, various alloys, lead glaze and lead minium. The lead battery recycle facility is also included in this area.

The production capacity of the lead plant is 42,000 t/y of lead. However, the production rate has been about 20,000 t/y of lead over the recent years, due to limitations imposed by environmental regulations. Recent improvements in emissions treatment are expected to allow increased production. Lead production began in 1956. The processes and equipment are illustrated in the following drawings, which are included in the Appendix:

Drawing	40-00-00-221	Flow Diagram of Lead Plant; and
Drawing	40-00-00-220	Equipment Diagram of Lead Plant.

### Feed Preparation Facilities

Lead concentrates are received by trucks, train cars or an overhead bucket conveyor and stored in the concentrate storage building. Lead dust, Harris oxides (arsenic, antimony and zinc oxides) and granulated slag from the reduction smelting furnace are also received in the concentrate storage building where they are all blended. A typical lead concentrate contains 65% lead, 10-15% sulfur, 4-5% iron, 4-5% zinc and 2-3% copper.

The blend, containing concentrates and recycled materials, is fed into one of the three sinter machine feed silos. The other two silos are fed with flux, a blend of lime, iron oxide (dross) and silica (sand), and recycling sinter fines. From each silo concentrate blend, flux, and sinter fines are fed into a conveyor which feeds into a rotary drum mixer.

A typical sinter feed consists of 20% lead concentrates blend, 10% dust captured from the sinter and reduction smelting furnace off gas handling system, 5% Harris oxides, 10% granulated slag from the reduction smelting furnace, 10% flux and 45% sinter fines.

### Sinter Machine

The feed blend is fed into the sinter machine from the drum mixer. The original Dwight Lloyd type sinter machine is still in operation. It has a capacity of 9 t/m<sup>2</sup>/day with total reaction area of 18 m<sup>2</sup>. The sinter machine discharge is fed into a hopper which feeds on to a screen. The fines fraction (-40 mm), is ground and conveyed back to the sinter feed silo. The coarse fraction (+40 mm) sinter is fed into the reduction smelting furnace. There are five chambers in the sinter machine to collect the process gases. Gases collected through chambers No. 2 and 3 (about 25 000 Nm<sup>3</sup>/h) feed the sodium bisulfate plant. Gases collected through chambers No. 1, 4 and 5 are treated at the dust removal system and vented into the atmosphere.

### Reduction Smelting Furnace

There are two coke-fired shaft type reduction smelting furnaces operating in parallel, mostly one at a time. Coke and sinter are fed from the top and air is blown into the hearth of the furnace through the tuyeres at the bottom of the furnace. Gases exit the furnace through the opening at the top and are ducted into the dust removal system.

The molten lead and slag are collected at the bottom in the settler and by gravity separation, tapped out through separate openings. Slag is granulated and separated according to density. The heavier portion containing 1.5% or more lead is recycled back to the sinter machine. The lighter portion containing less than 1.5% lead is discarded. The reduction smelting furnace capacity is 22 t/m<sup>2</sup>/day with total reaction area of 5 m<sup>2</sup>. The original furnace had a reaction area of 2.5 m<sup>2</sup>, which has been enlarged to 4 m<sup>2</sup> and finally to 5 m<sup>2</sup>.

### Dust Removal System

Process gases from the sinter machine, reduction smelting furnace, speiss furnace and rotary furnaces are ducted into the new particulates (dust) removal system. Dust carried over in the off gas is removed in the filtering system designed, supplied and constructed by Betz of Germany. It started operating in 1993 after two years of engineering and construction. The cost of the system was US \$3 million and it was paid by operating earnings of Lead and Zinc Complex Ltd. Government regulations require dust content to be less than 10 mg/Nm<sup>3</sup>. Betz process guarantees less than 5 mg/Nm<sup>3</sup> dust content. Management asserts that in operation less than 3 mg/Nm<sup>3</sup> is achieved consistently.

### Lead Refinery

Molten lead is purified through pyrometallurgical refining processes in eight fuel oil-fired kettle furnaces. There are five kettle furnaces for drossing and three kettle furnaces for treatment with soda and antimony.

Kettle furnaces No. 3, 5, 6, 7, and 8 have melting capacity of 150 t each. In the kettle furnaces No. 6, 7 and 8, copper is removed by drossing. In the kettle furnace No. 5 sulfur is added, which produces sulfide dross. Sulfide dross and copper dross are further treated in a coal fired rotary furnace to produce a copper lead matte containing 20-25% copper and impure Speiss. Impure Speiss is further treated in a Speiss furnace which produces pure Speiss and lead with impurities. Impure lead is returned to the drossing kettle furnaces. Speiss and copper lead matte are sent to storage for shipment to markets.

Decopperized lead is treated in the kettle furnace No. 4 with soda ash (NaOH) and sodium nitrate (NaNO<sub>3</sub>) (also known as Harris Process) to remove arsenic, tin and antimony. The kettle furnace No. 4 has a melting capacity of 180 t. The slag is discarded or recycled to the sinter machine.

Molten lead is further refined in the kettle furnace No. 3 with addition of zinc to remove silver and other precious metals. Silver crust is transferred to the precious metals refinery. The molten lead, free from silver, is transferred to the kettle furnace No. 2 for bismuth removal with magnesium and antimony addition. After separating the oxides portion from the bismuth dross, bismuth metal is cast into bismuth anodes and transferred to the bismuth plant. Molten lead, free from bismuth, is transferred to the kettle furnace No. 1 for further treatment with Harris Process. The kettle furnaces No. 1 and 2 have melting capacity of 260 t each.

Harris oxides from the kettle furnaces No. 1, 2 and 4 are recycled to the sinter feed preparation. The molten refined lead from the kettle furnace No. 1 is transferred to the casting machine, which has capacity of 25 t/h, and pure lead ingots are cast, ready to be shipped to market. Another kettle furnace is used for preparing lead alloys, depending on the market requirements.

Part of the refined lead is also used for glaze ( $PbO$ ) and minium ( $Pb_3O_4$ ) production. There are eight oxidizing furnaces for glaze production. Glaze is ground and bagged ready to be shipped to market. Glaze production capacity is 3,000 t/y. Glaze is further oxidized to minium in four round oxidizing furnaces. Minium is ground and bagged. Minium production capacity is 7,000 t/y. There are two grinding mills, one for glaze and one for minium production. They both were supplied from Austria and each has grinding capacity of 9 t/h.

Lead-silver foam from the kettle furnace No. 3 contains 5% silver, 12% to 15% zinc and 70% lead. It is further treated in a fuel oil fired drum furnace where a silver crust is formed and separated from lead. The furnace treats charges of 1.5 to 2 tonnes at a time and it is operated 20 days per month. Molten lead is recycled back to the lead refining. The silver crust is further refined in a fuel oil-fired distillation furnace where zinc is removed and a lead silver alloy is produced. The distillation furnace treats charges of 700 kg at a time and it is operated 15 days per month. Zinc oxide is recycled to the zinc plant.

The lead silver alloy is treated in an oil-fired cupola furnace. The cupola furnace treats charges of 2 tonnes at a time and it is operated 9 days per month. Lead is oxidized to glaze which is recycled to the glaze production circuit. A silver, gold and lead alloy (Dore) is produced which contains 97.8% silver, 0.5% gold and less than 2% lead. Dore production capacity is 10-12 t/y.

#### **Battery Recycling Plant**

Batteries are wet crushed in a rotary drum crusher at a rate of 30 t/h and fed into a separator. At the separator, plastic containing less than 1% Pb is separated by gravity. Lead is collected at the bottom which contains less than 3% plastic. Lead is recycled back to the reduction smelting furnace and treated in the reduction smelting furnace separately. One of the reduction smelting furnaces is operated 5 to 10 days per year for this purpose. The production capacity is 150 t/d.

### **Environmental Issues**

Kardjali Lead and Zinc works to comply with regulations set by the Ministry of Environment and enforced through random testing by regional inspectors. Currently, the enterprise is in a transition period. New environmental limits were passed in 1991. The new legislation allows for a transition period for enterprises to make changes necessary to comply with the new limits. The transition period for compliance expires at the end of 1993 for many of the limits. Penalties for failure to comply with environmental regulations include fines and limitations on production levels. Management states that the enterprise has faced production limits in the past due to failure to meet environmental regulations.

Dust emissions are currently limited to a maximum concentration of 50 mg per cubic meter. According to the new legislation, the limit for all installations will be reduced to 10 mg per cubic meter on January 1, 1994. Sulfur oxide emissions is currently limited to 3,000 mg per cubic meter and will drop to 800 mg per cubic meter with the new legislation. Management states that the plant is in compliance with these regulations although they have experienced isolated violations in the past. A recently installed filter system has greatly enhanced capture of the plant's particulate emissions, generally keeping emissions below 3 mg per cubic meter.

The plant is currently installing a comprehensive waste water treatment and recycling facility to meet liquid effluent disposal requirements. The plant currently has a waiver period on liquid effluent disposal regulations until the new treatment facility has been completed. Management expects that the new facility will allow the plant to meet all wastewater quality regulations upon its completion, scheduled for the end of 1993.

At present, there are no Bulgarian regulations regarding solid residue storage and disposal. Enterprise management does, however, expect such regulations to be instituted in the near term and will take steps necessary for compliance. Similarly, a study is currently being conducted to determine a starting point for meeting potential requirements of ground accumulation and soil deterioration regulations.

### **PRODUCTION INPUTS AND COSTS**

#### **Suppliers**

Kardjali Lead and Zinc's primary raw materials are lead and zinc concentrates. Together, the lead and zinc concentrates constituted 81% of the total direct materials costs (including oil and coke but excluding electricity) in 1992. Until 1991, the plant received all lead and zinc concentrates from Bulgarian mines and suppliers. Due primarily to a decrease in the production of the Bulgarian state-run mines, the enterprise has diversified its concentrate lines of supply to include international producers and trading firms.

For the first half of 1993, over 45% of zinc concentrate was supplied by international suppliers. The remaining 55% is still supplied by domestic mines. Approximately 100 tonnes of domestic zinc concentrate is brought in daily by truck, rail and an overhead bucket conveyor system. The international zinc concentrate is brought to Bulgaria by sea and delivered to the enterprise by rail generally in 3,000 to 5,000 tonne lots on a quarterly basis. All of the internationally-supplied zinc concentrate is contracted through trading firms and not by direct arrangement with the producers. Management reports that prices for Bulgarian zinc concentrate of 52% purity ranged from 9,665 to 11,825 leva per tonne.

For the first half of 1993, over 81% of the lead concentrate was supplied by domestic producers. A Macedonian supplier provided the remaining concentrate. The company reports that prices for Bulgarian lead concentrate of 70% purity ranged from 2,800 to 3,315 leva per tonne.

The enterprise pays at the end of each month for the amount of domestic concentrate delivered daily throughout the previous month. The international contracts are generally met through letters of credit.

The following table lists recent prices negotiated for sample orders of zinc concentrate.

**Recent Zinc Concentrate Prices**

Purchase Date	Zinc Purity	Price (\$/tonne)
March '92	54%	\$442.15
July '92	51.6%	396.04
September '92	51.6%	341.40
September '92	58.48%	392.82
January '93	57.7%	327.99
March/April '93	57.31%	305.58
February '93	50%	256.21
August '93	57.7%	320.44
October '93	53%	240.55

*source: enterprise management*

In addition to concentrates, Kardjali Lead and Zinc purchases chemicals and reagents used in the production process from Bulgarian and foreign suppliers. The following table summarizes materials purchases and costs.

### Raw Materials Supply

Material	Primary Country of Origin	Approx. Price Per Tonne
<b>Lead Production</b>		
Lead Concentrate	Bulgaria	2,800 to 3,315 leva
Antimony Ingots	Russia, China	\$1,600
Magnesium Ingots	Russia, Norway	\$2,400
Arsenic	U.S.A.	\$1,400
Tin Ingots	Turkey	\$4,500 to \$6,000
Calcium	Russia	\$4,900
Caustic Soda	Romania	\$430
Coke	Bulgaria	2,260 leva
Masout	Bulgaria	2,500 leva
Pyrite Calcine	Bulgaria	85 leva
Lime Ash	Bulgaria	300 leva
Battery Scrap	Bulgaria	2750 leva
<b>Zinc Production</b>		
Zinc Concentrate	Bulgaria	9,665 to 11,825 leva
Aluminum Sheets	Germany	4,000 DM
Strontium Carbonate	China	\$900
Coagulant	U.K.	£2,100
Manganese Ore	Greece	\$43
Ammonium Chloride	Bulgaria	4950 leva
Activated Carbon	Bulgaria	30,000 leva

*source: enterprise management*

### Energy and Electricity

Electricity is a prime cost driver in the production of non-ferrous metals. Kardjali Lead and Zinc recognizes the importance of this area and manages its electricity usage carefully. Kardjali Lead and Zinc draws electricity off of the main Bulgarian power grid and pays a standard industrial rate set by the central, state-owned power authority. Kardjali Lead and Zinc has no special contracts, prices or arrangements with the power authority.

Electricity prices in Bulgaria have not kept pace with the country's rapid inflation, estimated at 80% in 1992 and an annual rate of approx. 45% in 1993. In 1992, the central power authority increased energy prices three times, each time for a 5% increase. As of August, 1993, no additional price adjustments had been made. Management expects rate increases in the near future.

Energy prices are divided into three time periods - peak, day, and night. The table below shows the price in leva per kilowatt hour of electricity of the voltage used by Kardjali Lead and Zinc.

**Electricity Prices (leva/kilowatt hour)**

	Winter Months	Summer Months
Peak	1.527	1.324
Day	0.826	0.716
Night	0.407	0.351

source: enterprise management

Usage of electricity by product, average price per kilowatt, and tonnes produced are shown on the following table.

**Electricity Usage**

	Average leva/kwhr	Total Kilowatts	Zinc Kilowatts	Zinc Tonnes	Lead Kilowatts	Lead Tonnes
1992	0.599	116,250,720	83,961,904	21,956	32,288,816	20,970
Jan., 1993	0.784	9,888,000	7,047,000	1,864	2,841,000	1,789
Feb.	0.793	9,824,000	6,705,000	1,876	3,119,000	2,193
March.	0.793	10,242,000	7,150,000	2,121	3,092,000	2,127
April	0.693	9,850,000	6,983,000	2,001	2,867,000	2,486
May	0.740	10,649,000	7,323,000	2,258	3,326,000	2,537
June	0.738	8,653,000	5,994,000	1,815	2,659,000	2,704

source: enterprise management

In addition to electricity, Kardjali Lead and Zinc uses substantial amounts of oil and coke in production processes, particularly in lead production. In 1992 the company reported total expenditures on oil and coke of 50,344,863 leva, of which 24,181,850 were used directly in lead production and 21,060,608 were used for the production of steam. In the first six months of 1993, total oil and coke expenditures were 32,115,198 leva, with 14,942,804 leva spent in lead production and 13,460,319 in steam generation. Excess oil and coke expenditures were used for ancillary products and services.

**Labor Force and Wages**

Kardjali Lead and Zinc employed 1,501 workers as of October 1993. This figure is up from an average of 1,417 employees during 1991. The workers can be categorized into direct labor, indirect labor, management/administration and miscellaneous workers. The workforce is well educated with over 74% of the employees having completed secondary school. The plant is located in a region with a long tradition in mining, mineral processing and metallurgy education. Over 52% of the workforce has graduated from a technical secondary or two-year, post-secondary program, many specializing in metallurgy.

Employees are paid a base wage plus adjustments or bonuses for experience and hazardous duty. Employee compensation is not contingent upon production levels. In an effort to limit inflation, the Council of Ministers has imposed a salary cap on state-owned enterprises in Bulgaria. The cap limits total quarterly spending on wages and salaries to a multiple of the wages for the same quarter in the previous year. The multiple was 1.457 (or a 45.7% increase) for the first quarter of 1993. This allowable increase was insufficient with respect to Bulgaria's 80% inflation rate in 1992. Enterprises are

permitted to exceed the indexing rate by 2% but any wage and salary expense above the allowable range results in a prohibitive tax. The table below lists the amount paid in wages, salaries and bonuses and {social benefits} at Kardjali Lead and Zinc. Average monthly wages are given for 1991 and 1992 along with actual August 1993 figures.

#### Employee Profile and Wages\*

Category	1993**			1992		1991	
	Workers	Monthly Wage (Leva)	Equivalent Wage in US Dollars	Workers	Monthly Wage (Leva)	Workers	Monthly Wage (Leva)
Direct Labor	791	5,312	\$197	743	3,306	771	1,368
Indirect Labor	479	5,114	189	476	3,130	475	1,211
Managers/Admin.	121	6,050	224	112	3,542	145	1,421
Miscellaneous Staff	110	3,521	130	86	2,243	94	1,031
Total/Average	1,501	5,308	\$196	1,417	3,263	1,485	1,320

\*Not including social benefit costs

\*\*Actual August 1993 salaries.

# Assuming an average leva/\$ exchange rate of 27 to 1 in August 1993.

source: enterprise management

Management estimates that over 85% of the workforce is represented by one of two labor unions. The unions represent workers on a wide range of issues including wages, safety and enterprise imposed fines. The union members vote for their union representatives who then speak on behalf of the membership with enterprise management as appropriate. The enterprise is currently operating under the Bulgarian Code of Labor and a new collective labor contract is expected to be signed and take effect shortly.

#### VIII. ORGANIZATION AND MANAGEMENT STRUCTURE

Lead and Zinc Complex Ltd. is 100% owned by the Government of Bulgaria. The enterprise has operated as a state-owned enterprise since its founding in 1953. Mr. Russi Davinof is currently the General Director of the enterprise. He has served in that position for over two years and has been at the plant for over 16 years.

Although the enterprise is owned by the state, enterprise management has full responsibility and decision making authority for the operations and personnel decisions at the plant. An appointee from the Ministry represents the interests of the government on major strategic issues. The management team at Kardjali Lead and Zinc view privatization very positively.

The top management group, headed by the General Director, is comprised of twelve positions with specific functions including the Chief of Labor, Chief Legal Advisor, Director of Lead Production, Director of Finance, Chief of Technology, Director of Investments, Director of Marketing, Director of Zinc Production, Chief Accountant, Benefits Director and Personnel Director. The individuals filling these posts, listed below, represent a very experienced group with an average tenure at the enterprise of over 18

18

years. Eleven of the twelve individuals are university trained, primarily in specialized programs for metallurgy and non-ferrous metals.

#### Background of Top Management

Name	Position	Years at Company	Education	Age
Mr. Davinof	General Director	16	Univ. - Mining/ Engineering	55
Mr. Slavov	Director of Labor	33	Univ. - Chemistry	53
Mr. Mitev	Legal Director	38	Univ. - Law	68
Mr. Myultiev	Director of Lead Production	27	Univ. - Chemistry	63
Mr. Paskalev	Director of Finance	7	Univ. - Electronics	29
Ms. Hadjipanteleva	Technology Director	9	Univ. - Chemistry	48
Mr. Primov	Director of Investments	27	Univ. - Non-ferrous Metals	51
Mrs. Volcheva	Marketing Director	2	Univ. - Computers	29
Mr. Apostolov	Director of Zinc Production	20	Univ. - Non-ferrous Metals	49
Mr. Kirilovo	Chief Accountant	1	Univ. - Accounting	30
Mr. Filev	Personnel Director	37	Technical School - Non-ferrous Metal	61

## Appendix -- Facility List

Facility	Area (Square Meters)	Year Built
<b><u>Zinc Plant</u></b>		
Roaster	851	1955
Sodium Bisulphate Plant	1,650	1968
Sulphuric Acid Plant	2,700	1955
Sulphuric Acid Storage	400	1955
Compressor	620	1959
Trestle	120	1955
Agglotaun	267	1956
Electro-filter	198	1955
Leeching Facility	2,411	1955
Bismuth Section	1,602	1964
Electrolytic Plant	3,184	1955
Filter-Drying Section	693	1962
Trestles	654	1955
Fans	1,520	1955
Zinc Dust Facility	324	1977
Zinc-colite facility	834	1979
Zinc-colite Storage	300	1981
Zinc Dichloride Section	530	1980
Cobalt Salt Facility	540	1986
<b><u>Lead Plant</u></b>		
Refinery	1,780	1957
Glaze and Minium facility	907	1964
Glaze Minium Storage	396	1964
Finished Product Storage	103	1965
Melting Facility	841	1957
Dust Collection	935	1956
Caking Facility	687	1956
Trestles	736	1957
Ligature	190	1962
Compressor	184	1957
Chimney	138	1957
Furnace	274	1966
Concentrate Storage Area	1,826	1955
Battery Scrap Facility	2,460	1981

<b>Secondary Areas</b>		
Administration	630	1955
Machine Station	560	1955
Library	390	1955
Bath Facility	820	1969
Pavilion	150	1970
Dining Room	1,050	1967
Central Laboratory	616	1965
Garage	927	1956
Auto-Wash	338	1960
Residue Storage	950	1955
Rail Station	223	1960
Substation	56	1955
Substation	150	1956
Storage	1,633	1959
Spare Parts Storage	559	1959
Milk Pavilion	300	1971
Melting Furnace	1,190	1957
Oil Storage	560	1955
Fire Equipment Storage	375	1969
Woodworking Facility	225	1955
Storage for Models	450	1962
Repair Shop	1,080	1955
Casting Section	532	1955
Repair Shop	935	1981
Storage - Workshop	105	1981
Tin Workshop	175	1955
Steam Plant	640	1955
Filter Drainage System	1,200	1962
Design Building	360	1955
Sulphuric Acid Workshop	70	1967
Cinema	752	1964
Substation	900	1960
Electrolytic Bridge Crane	400	1955
Garage	500	1968
Storage	297	1980
Shaft Furnace	2.3	-
Lead Scrap Facility	2,162	1981
Greenhouses	3,500	1982
Farm	250	1985
<b>Total Land Area</b>	<b>350,000</b>	
<b>Total Developed Area</b>	<b>136,000</b>	

## Appendix IV: Chronology of Phase I Kardzhali Project: Small-Scale Privatization

Period of Time	Key Issues/ Successes (Kardzhali)
January- March, 1993	Project begins; in consultation with USAID we began focusing efforts on small-scale privatization; due to lack of receptivity of the Agency for Privatization, postponed prior work on all large companies; Church Lewis, project director resigns and Philippe LeRoux takes over project with Zhivko Nenov heading up local team; after months of preparation of procedures in Kardzhali, feel confident of roll-out of this program to other cities and expansion of municipal coverage; local approvals of Plovdiv and Blagoevgrad extend our program to total of three cities initially
April, 1993	First auctions for 30 shops in Kardzhali held; success in Kardzhali allows us to expand program to other cities
July, 1993	Continue review of the economics of the Kardzhali region and the sector mapping for privatization; met key figures in industry, finance, and politics in the eight municipalities of the Kardzhali region; collected substantial amounts of statistical and anecdotal information on the regional economy; achieved co-operation of regional and municipal statistical boards, allowing us to proceed with the regional overview and sector mapping; visited over 15 enterprises in region; most promising enterprises seem to be in lead and zinc, bentonite, pneumatics and hydraulics, marble, general metalworking and knitwear; our presence is favorably noted in the local press
June, 1994	Expansion of the number of cities covered- program now covers 10 cities- Kardzhali, Plovdiv, Blagoevgrad, Bourgas, Pleven, Dimitrovgrad, Haskovo, Petrich, Smolyan and Gotze Delchev; contracts for technical assistance for the privatization of municipally owned assets were signed with the mayors of Gotze Deltchev, Petrich and Smolyan; we received an invitation letter from the Mayor of Kazanluk to start the program there;
March-June, 1994	Kardzhali auctions took place and an average price per square mile achieved at the auctions was BGL 9,502.86 or US \$177.10 i.e., 73.68% above the starting price; because this region was expected to bring in relatively smaller prices, Kardzhali auctions are an indication as to how well the rest of the municipalities are expected to do at their respective auctions; local staff successfully led the municipalities through the process;
July, 1994	According to Article 35 of the Privatization Law (as amended in June), tenants and employees or retail outlets and other small-scale entities were given the right to acquire ownership of the sites through a direct purchase, by paying the price of the property as defined by the appraiser. They do not have to compete with other bidders at auctions.; the Council of Ministers is responsible for the adoption of specific rules and procedures regulating such transactions (art. 42).; we informally proposed to the Legal Department of the Council of Ministers to assist their experts in developing the Draft Regulations with regard to transactions involving tenants and employees- this was accepted and the draft prepared by our consultants was presented and circulated by the office of the Deputy Prime Minister on July 18; we asked for and were granted a no-cost extension of the project by USAID

### Chronology of Phase I Kardzhali Project: Small-Scale Privatization

Period of Time	Key Issues/ Successes (Kardzhali)
August, 1994	The implementation schedule in some of the cities was affected by the amendments to the Privatization Law. The changes, especially Article 35, favor tenants and employees willing to participate in the privatization of small-scale state or municipally owned properties; the government was late in approving the necessary enabling regulations with regard to Article 35. Those are now in preparation and are expected to be approved in early September
III Quarter, 1994	We have been asked to expand the program beyond ten cities and have already signed on an 11th municipality- Baltchik; Kardzhali, Plovdiv, and Dimitrovgrad auctions took place and sites sold for an average price per square meter of BGL 11,347 or US \$195.64 on average, i.e., 168% above the starting price- success and auctions went well beyond expectations; local staff has successfully led the municipalities through the process, dealing quickly with issues which arose, especially with regards to Article 35; standard forms necessary for participation in the privatization process were developed and distributed to municipalities; we prepared and presented a review of the project, and the Bulgaria projects in general, to date to USAID-Sofia to the new Private Sector Official, John Tennant and the new head of Private Sector Work, Skip Kissinger; we were also awarded an extension of the project over the quarter
October, 1994	We have sold 41 properties for US \$1,307,248 in October. A total of 78 properties have been sold in four cities so far for US \$2.141 million; we are now extending the Project to new cities and larger municipal assets under Kardzhali II.
December, 1994	We sold 46 properties for US \$2,542,261 in December. A total of 128 properties have been sold in six cities so far for US \$4,881,464; our project extended to three additional cities- Kazanluk, Assenovgrad, and Gabrovo; we concluded the first sales to tenants/ employees for the country so far using the provisions of Art. 35 of the Privatization Law in both Kardzhali and Plovdiv; training seminars for local appraisers were held in Plovdiv, Kazanluk, and Gabrovo; additionally, we commenced the implementation of our Phase II contract in Plovdiv; also under Phase II, we began our training efforts
Quarter IV, 1994	With the extension of our program to three additional cities- Kazanluk, Gabrovo, and Assenovgrad, we have covered 12 cities with a total population of 1.16 million (13.7% of the Bulgarian population); we have sold 91 properties for US \$4,047,790 during the quarter; to date 128 retail and service outlets with a total gross area of 22,910 sq.m.. were sold under the project raising US \$1,881,161; our pilot privatization projects in Plovdiv and Kardzhali have been completed and new contracts for 1995 have been signed; in Plovdiv we concluded the first 12 sales to tenants/ employees under Art. 35 of the Privatization Law. We have developed uniform procedures and draft instalment payment contracts for use in such sales; we have provided professional counsel to local appraisers throughout their assignments; three one-day seminars were also held in Plovdiv, Kazanluk, and Gabrovo