FERTILIZERS IN ALBANIA
SITUATION, ANALYSIS, AND RECOMMENDATIONS

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EXECUTIVE SUMMARY

Introduction

The economy of Albania has been in a serious decline during the past 2 years, and the agricultural sector is in as bad condition as the energy and industrial sectors. Mine and factory closures, because of worker discontent and lack of imported and domestically produced raw materials, have taken their toll.

The dissolution of the collective farms and the beginning of land distribution to their constituents have disrupted the flow of inputs and agricultural production during this period of transition. Fertilizer consumption during 1991 was about 33% of that during 1985-90. The lack of land ownership and uncertainties resulted in wheat cultivation (1991/92) on only about 50% of the area which was normally seeded. Considerable area was seeded late, and little fertilizer has been applied on wheat. Current estimates indicate that wheat production for 1992 will be no more than 200,000 mt, down from 600,000 mtpy in the past. A University of Florida study indicated that urea topdressing of 50 kg/ha for wheat by mid-April would likely produce an additional 150-250 kg/ha of wheat.

There was no fertilizer in Albania at the end of January 1992, and none of the fertilizer factories were operating. During the late 1980s, the equivalent of 80,000 mt of urea and 46,000 mt of SSP was used during the period April, May, and June. There is an urgent need to import fertilizer to be sold to the Albanian farmers.

Fertilizer Marketing

The land privatization process has resulted in thousands of independent agricultural input customers where only a few hundred collective and state farms were supplied previously according to an annual plan. Now there is a need for a marketing system rather than simply a supply system which functioned in the past. There is evidence of a rudimentary retail system starting to develop. Primarily, it consists of excollective specialists opening shops to sell agricultural inputs to the new private farmers.

Presently, those retailers are dependent upon the Agro-Commercial Enterprises (ACEs--old parastatal district agricultural input suppliers) to supply fertilizers at the government-mandated ceiling price. The retailers add transport cost plus a small profit and sell to farmers. The result is an illegal selling price to farmers and essentially no marketing effort. It is only a modified supply system. Additionally, the ACEs are risking nonpayment of the subsidy by the government. The ACEs' buying price (although that is still a book transfer) for urea delivered to the nearest railway station is Lek 4,500/mt, and the ceiling retail price to private farmers is Lek 2,000/mt. Another hindrance to private sector entrance into the wholesale market is the fear that the government will continue to write off debts incurred by the ACEs.

However, some interest is evident from private individuals in starting distributor/wholesaler businesses to market to retail shops and to farmers. The IFDC team interviewed 35 potential fertilizer business concerns during January 1992. The beginning of those businesses has been hindered to date by the government establishing ceiling retail prices for fertilizers to private farmers at levels less than the distributor/wholesaler purchase price.

Another possible constraint to developing an open, free competitive marketing system for agricultural inputs includes the possible low purchasing power of the new private farmer. Collective farm assets were disbursed to the farmers but we have not defined the extent of those received by farmers nor the disposition of the funds at this time. The Bank of Agriculture and Development was established in October 1991 as a commercial bank to provide credit to the agriculture sector. Capitalization was low and funds were depleted by December 1991. Interest rates are low considering the estimated annual inflation rate to be 100+%. This will deplete funds further.

Availability of adequate transport is another serious constraint to developing a competitive marketing system. Trucks are old and 90% still are held by state transport enterprises. Railway movement has been sporadic and subject to pilferage.

Domestic Fertilizer Supply

Nitrogen and phosphate fertilizer supply was rather uniform during the period 1985-90. Production of single superphosphate (SSP) began to decline in 1990 and production of both nitrogen products and SSP declined dramatically in 1991 as did other industrial production.

The main constraint at both complexes is the lack of raw materials. Natural gas supplies are being depleted and being used for purposes other than nitrogen fertilizer production. It is anticipated that with the arrival of warmer weather, one ammonia/urea facility will be started by April. Closure of the pyrite mine and the copper smelter has eliminated the critical raw material for the production of sulfuric acid for the phosphate complex, while the lack of foreign exchange prevents the import of phosphate rock.

The technical competence of staff at both complexes is good, and process designs are proven and reliable except for the newest sulfur dioxide production facility (pyrite roaster) at the phosphate complex which has severe design deficiencies. Both complexes suffer from lack of adequate maintenance due to the shortage of spare parts for the older facilities.

The two ammonia-urea production facilities could resume operation with no plant modifications if natural gas were available. However, these units should have minimal modifications to reduce the pollution problems; they also need spare parts to assure extended operation.

The No. 1 sulfuric acid production unit could resume operation within a short time if raw materials were available. However, for extended operation, a total investment of about $3.0 million is needed for the No. 1 and No. 2 sulfuric acid plants, the No. 1 SSP plant, the granulation and bagging facilities, and for procurement of spare parts. This investment must be considered along with the fact that suitable grades of mineral pyrites will be exhausted within 3-5 years. Thus, it may not be economically feasible to invest in the rebuilding of the existing units. The No. 2 sulfuric acid unit is required to operate from an environmental viewpoint if the copper smelter is operated. In that case, one SSP plant probably should operate, even if at less than design capacity, in order to utilize the sulfur dioxide from the copper smelter. A detailed economic analysis is needed to determine the

the feasibility of replacing the sulfur dioxide production unit which supports sulfuric acid production for the No. 2 SSP plant. The economics of sulfuric acid production from these units will be highly dependent upon pyrite mining and copper production.

Recommendations

Emergency Procurement of Urea

Although the potential need for fertilizer is much greater, it is recommended that at least 20,000 mt of urea be imported as quickly as possible (about April 1-15, 1992). The urea should be sold at an auction to any buyer who qualifies. IFDC should manage the importation and selling (auctioning) of the urea to distributors. IFDC should also monitor the physical distribution, resale, and use of the urea. Additionally, IFDC should import and manage the operation and maintenance of 20-30 trucks to assist in the distribution of the fertilizer. The trucks should be sold to private sector businesses as soon as practical. This emergency procurement program would help to ensure at least a minimum supply of nitrogen fertilizer for the spring 1992 planting season.

Prices and Subsidy

1. Retail prices must be liberalized, i.e., set free from any government control so that private marketing firms can fully recover costs and make a profit on sales.

2. Any subsidy must be applied at source. This is required to avoid marketing firms from having to recover the subsidy directly from the government; a process that is fraught with the possibility of failure.

3. Prices for cereals must either be liberalized or their procurement rates increased so they reflect the cost impact of the recent 50% devaluation of the Lek.

Transport

1. The Ministry of Transportation (MOT) and the District Transport Enterprises must move faster to privatize their trucks. Such trucks that remain with these organizations during the period of the project must be made freely available to all. New private marketing firms must have access to them on an equal basis with the state enterprises such as the ACEs.

2. Fertilizer must be given priority status at the ports, equal to that of food imports.

Fertilizer Production

1. Government efforts to revive its fertilizer plants should focus on urea production at Fier. Fertilizer production should receive priority in the allocation of natural gas.

2. Importation of gasoline for fuel and feedstock for the nitrate plant should receive priority.

Agricultural Exports

Exports of certain agricultural products should be allowed, particularly vegetables and fruits. This would avoid local market gluts for these products and sustain product prices sufficient to make fertilizer attractive to farmers. Exports would also provide foreign exchange presently needed in the economy.

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I. Historical

A. Albanian Agriculture

The population of Albania is about 3.3 million of which 65% live in rural areas. During the late 1980s agriculture accounted for 34% of the gross domestic product (GDP).

The GDP is estimated to have declined by 15% in 1990 and by 30%-40% in 1991. Agricultural GDP declined by 27% in 1990 and is estimated to have declined by 20%-30% in 1991. Lack of raw materials for manufacturing, general work stoppages, breakup of collective farms, the slow pace of redistribution of land to private farmers, and inappropriate pricing policies have contributed to the rapidly deteriorating economic situation.

The major portion of agricultural land is on lowlands in the western part of the country. The eight coastal districts plus Tirana, Elbasan, and Berat contain 64% of the approximately 700,000 ha of agricultural land used for annual and permanent crops. Additionally, Korce District in the southeast is a major cropping area accounting for about 9% of the agricultural land.

Nationally, state farms occupy 23% of the agricultural land but in the above 12 districts with the best land, state farms occupy 27% (Table I-1). State farms occupy 40% or more of agricultural land in Tirana and Saranda Districts and more than 30% in Vlora, Lezha, and Kruja.

Historically, many state farms have contained more than 2,000 ha. Recently the government has started fragmenting them into smaller, more specialized units. In January 1992, the Ministry of Agriculture (MOA) reported that there were 164 state farms with an average of 950 ha each. However, the average farm area in Berat, Fier, Lushnje, and Saranda remains in excess of 1,600 ha. The trend toward smaller specialized farms might provide opportunities to develop more economically viable units. Farm directors will need to have greater authority and responsibilities for this to happen. In particular, authority is needed to control the number of employees and other inputs and to choose cropping patterns based upon potential markets and profits.

Table I-1. Agricultural Land (Annual and Permanent Crops) Under Collective and State Farms by District, 1989

District	Collectives	State Farms	Total
	- - - - - - - - - - - - - - -	-(ha)- - - - - - - - - - - - - -	
Shkodra	33,863	08,449	42,312
Tropoja	5,416	1,333	6,749
Puke	4,283	462	4,745
Kukes	12,359	4,545	16,904
Lezha	11,544	5,732	17,276
Mat	12,097	1,007	13,104
Mirdita	4,902	828	5,730
Diber	22,446	3,625	26,071
Kruja	15,717	8,473	24,190
Durres	39,184	10,645	49,829
Tirana	18,577	12,939	31,516
Elbasan	35,828	10,588	46,416
Librazhd	12,773	1,055	13,828
Gramsh	9,199	771	9,970
Pogradec	16,133	854	16,987
Korce	46,529	14,245	60,774
Lushnje	33,972	14,000	47,972
Fier	48,423	19,810	68,233
Skrapar	10,536	1,182	11,718
Berat	34,255	5,205	39,460
Vlora	25,425	11,082	36,507
Kolonja	10,114	1,085	11,199
Permet	13,131	1,151	14,282
Tepelena	11,456	838	12,294
Gjirokaster	12,173	4,796	16,969
Saranda	14,816	9,866	24,682
Total	515,151	154,566	669,717

Source: Ministry of Economy.

Most state farm land was reclaimed from former wetlands owned by the state. Some farms consist, at least in part, of former privately owned land. In the latter cases, it appears that under pressure from individuals, the land of those state farms will soon be redistributed to private farmers.

Recently, about 600,000 mt of wheat was harvested from 200,000-210,000 ha of land and about 300,000 mt of maize (corn) on 60,000-70,000 ha (Table I-2). Collectives cultivated 84%-81% of each cereal, respectively. About 100,000 ha of forage crops were grown; 66% on collectives. Vegetables/melon, dry beans, tobacco, and sunflower were grown on 20,000-25,000 ha of land. About two-thirds of the vegetable area, 84% of sunflower, and 95% of beans and tobacco were on collective farms. About 60% of the 14,000 ha of soybean and 89% of the 12,000 ha of cotton were grown on collective farms. Of the annual cropped area 79% was on collective farms while 66% of permanent crops (fruits, grapes, and olives) were cultivated on collective farms.

Wheat and maize (corn) are major annual crops in all districts (Tables I-3 and I-4). About 30% of the potatoes are grown in Korce, Diber, and Kukes while sunflower cultivation is concentrated in Durres, Fier, and Berat. Soybeans are grown principally in Kruja, Durres, Lushnje, and Fier. Elbasan and Korce are the principal tobacco growing areas. Most olives are grown in Tirana, Elbasan, Fier, Berat, and Vlora. Fruits are more widely grown in Shkodra, Diber, Korce, Fier, Berat, and Saranda. Major grape growing districts include Shkodra, Durres, Tirana, Elbasan, and Fier.

Reported data indicate relatively low crop yields (Table I-5). Especially, wheat with about 75% grown in the districts with large amounts of rather level land, should yield more than 3.0 mt/ha. Potato yields of only 6.0 mt/ha are very poor. Sugar beet yield of 25 mt/ha are low considering that most are grown in Korce District.

B. Past Patterns of Fertilizer Use

The principal fertilizers available were ammonium nitrate (33.5% N), urea (46% N), and single superphosphate (15% P_2O_5). Almost all of these fertilizers were produced domestically (Table I-6). Potassium fertilizers are used in small quantities and are supplied entirely by imports.

Table I-2. Areas in Various Crops Under Collective and State Farms, 1989

Crop	Collectives	State Farms	Total
		(ha)	
Wheat	173,294	32,829	206,123
Corn (maize)	48,733	11,790	60,523
Barley	2,585	1,053	3,638
Rye	11,671	652	12,323
Oats	8,442	3,217	11,659
Potato	5,185	1,296	6,481
Vegetables	11,997	5,732	17,729
Bean	11,558	400	11,958
Sunflower	17,998	3,544	21,542
Soybean	8,394	5,585	13,979
Sugarbeet	4,519	2,078	6,597
Tobacco	25,942	1,512	27,454
Cotton	10,801	1,332	12,133
Eteroil	1,992	135	2,127
Lucerne	31,766	14,719	46,485
Corn fodder	20,056	9,857	29,913
Other fodders	14,359	10,731	25,090
Olives	27,587	16,800	44,387
Fruit	42,147	16,731	58,878
Grapes	11,480	8,647	20,127
Others	24,645	5,926	30,571
TOTAL	515,151	154,566	669,717

Source: Ministry of Economy.

Table I-3. Area Under Cooperatives (1989)

Crop	Shkodra	Trop	Puke	Kukes	Lezha	Mat	Mird	Diber	Kruja	Durres	Tiran	Elbas	Libr	Gram	Pogr
	District (ha)														
Wheat	9,073	1,198	1,017	2,883	4,090	4,747	1,652	7,135	3,927	13,816	4,310	12,503	5,033	4,131	5,447
Corn (maize)	5,036	882	1,360	1,306	1,801	2,033	1,056	3,350	1,837	2,605	1,881	3,446	2,023	1,049	1,132
Barley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	365
Rye	722	365	280	1,892	-	455	221	1,416	36	-	54	3	631	159	1,553
Oats	62	77	66	570	34	38	56	378	143	420	415	347	112	344	347
Potato	461	60	75	1,165	17	48	46	1,185	60	118	214	56	131	23	61
Vegetable	1,024	107	141	167	207	158	98	140	365	1,467	1,690	869	170	101	187
Bean	375	74	104	272	246	416	140	371	321	802	285	651	441	284	585
Sunflower	312	-	-	-	797	529	-	-	365	2,916	-	947	-	-	-
Soybean	598	11	-	28	237	35	27	130	2,011	1,653	109	187	41	20	10
Sugarbeet	-	-	-	-	-	-	-	-	-	-	-	908	-	-	-
Tobacco	4,537	-	-	-	480	-	-	537	304	565	17	5,810	976	672	1,155
Cotton	-	-	-	-	-	-	-	-	-	1,185	-	-	-	-	-
Eteroil	854	-	-	-	-	-	-	-	366	121	361	71	-	6	-
Lucerne	2,775	554	255	794	869	880	268	1,574	1,028	2,525	1,739	1,790	683	462	992
Corn fodder	1,383	214	227	639	515	403	214	715	808	1,890	819	1,118	643	278	679
Other fodder	386	322	166	800	97	622	203	582	162	434	1,278	334	78	327	336
Annual	30,157	4,163	3,701	10,950	10,195	10,805	4,231	19,481	13,608	32,712	13,940	30,345	11,389	8,198	13,598
Olives	462	-	-	-	205	-	-	-	530	2,536	2,719	1,969	-	9	-
Fruit	2,397	1,132	470	1,176	793	1,105	434	2,783	1,410	2,938	1,419	2,721	1,221	744	2,274
Grapes	847	121	112	233	351	187	237	182	169	998	493	793	163	248	261
Permanent crops	3,706	1,253	582	1,409	1,349	1,292	671	2,965	2,109	6,472	4,631	5,483	1,384	1,001	2,535
TOTAL[a]	33,863	5,416	4,283	12,359	11,544	12,097	4,902	22,446	15,717	39,184	18,571	35,828	12,773	9,199	16,133

(Continued)

Table I-3. Area Under Cooperatives (1989) (Continued)

Crop	District Korce	Lush	Fier	Skra	Berat	Vlora	Kolo	Perm	Tepe	Gjiro	Saran
	(ha)										
Wheat	16,371	12,899	16,046	4,016	12,009	8,415	5,171	5,083	4,133	4,041	4,148
Corn (maize)	764	2,585	3,260	656	1,961	2,212	957	1,243	942	1,470	1,886
Barley	2,198	17	-	-	5	-	-	-	-	-	-
Rye	1,934	-	-	177	15	1	1,248	206	165	75	63
Oats	1,187	114	498	549	439	427	218	651	387	361	202
Potato	710	139	158	42	165	178	15	4	19	12	23
Vegetables	324	764	1,058	127	937	821	54	158	233	213	417
Bean	1,177	660	1,759	195	674	542	200	242	326	300	116
Sunflower	-	2,475	3,028	580	2,803	572	-	740	1,165	-	769
Soybean	59	878	1,355	10	190	238	10	25	52	115	365
Sugarbeet	3,611	-	-	-	-	-	-	-	-	-	-
Tobacco	2,572	1,037	1,945	-	2,085	931	-	741	213	1,120	245
Cotton	-	4,674	3,535	-	1,407	-	-	-	-	-	-
Eteroil	-	-	-	-	2	132	-	-	17	62	-
Lucerne	3,444	2,092	2,193	1,081	1,453	1,046	649	600	572	935	513
Corn fodder	2,268	1,151	1,958	531	1,041	685	433	282	274	446	442
Other fodder	2,217	474	625	575	284	937	152	343	808	1,031	786
Annual	42,008	30,852	38,673	8,989	26,661	17,921	9,505	11,025	9,667	10,580	10,579
Olives	-	1,723	5,402	17	4,154	4,818	-	8	487	73	2,475
Fruit	3,461	1,004	3,067	1,131	2,545	1,745	538	1,858	1,106	1,023	1,652
Grapes	1,060	393	1,281	399	895	941	71	242	196	497	110
Permanent crops	4,521	3,120	9,750	1,547	7,594	7,504	609	2,106	1,789	1,593	4,237
TOTAL[a]	46,529	33,972	48,423	10,536	34,255	25,425	10,114	13,131	11,456	12,173	14,816

a. Sum of annual and permanent crops; values may differ from the sum of individual crops within each category.

Source: Ministry of Economy.

Table I-4. Area Under State Farms (1989)

Crop	Shkodra	Trop	Puke	Kukes	Lezha	Mat	Mird	Diber	Kruja	Durres	Tiran	Elbas	Libr	Gram	Pogr
	District (ha)														
Wheat	1,153	112	-	1,370	1,996	220	212	219	2,245	2,630	357	2,809	200	80	59
Corn (maize)	954	46	20	488	674	50	56	141	775	977	601	503	100	-	2
Barley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rye	-	27	62	264	-	-	20	35	-	-	-	-	-	-	46
Oats	123	-	-	35	120	40	-	116	87	310	184	206	18	42	36
Potato	25	-	-	34	127	-	-	40	84	69	102	-	-	-	-
Vegetable	367	95	20	187	221	90	69	151	208	402	1,045	409	50	61	26
Bean	-	2	-	-	95	-	-	9	-	-	-	41	5	-	-
Sunflower	-	-	-	-	522	-	-	-	110	137	-	535	-	-	-
Soybean	225	10	-	67	228	30	10	40	1,096	572	101	134	24	5	-
Sugarbeet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tobacco	31	-	-	-	-	-	-	-	55	-	-	317	-	-	-
Cotton	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eteroil	-	-	-	-	-	-	-	-	50	-	-	24	-	-	-
Lucerne	1,471	139	40	303	962	70	60	255	739	1,237	1,881	834	85	53	28
Corn fodder	854	105	80	329	459	50	121	174	554	972	1,258	423	80	79	53
Other fodder	167	150	62	473	-	118	87	255	164	1,297	2,043	569	43	82	86
Annual	5,531	761	294	3,683	5,429	735	674	1,530	6,526	9,137	7,964	7,058	655	440	362
Olives	815	-	-	-	64	-	-	-	948	534	1,722	2,336	-	32	-
Fruit	1,101	504	168	713	197	194	111	1,963	510	276	1,669	696	226	235	363
Grapes	1,002	68	-	149	42	78	43	132	489	698	1,584	498	163	64	129
Permanent crops	2,918	572	168	862	303	272	154	2,095	1,947	1,508	4,975	3,530	389	331	492
TOTAL[a]	8,449	1,333	462	4,545	5,732	1,007	828	3,625	8,473	10,645	12,939	10,588	1,044	771	854

(Continued)

Table I-4. Area Under State Farms (1989) (Continued)

Crop	Korce	Lush	Fier	Skra	Berat	Vlora	Kolo	Perm	Tepe	Gjiro	Saran
	District (ha)										
Wheat	3,443	4,981	5,232	146	479	1,795	53	142	100	1,251	1,545
Corn (maize)	503	1,807	1,741	-	81	499	58	45	-	659	1,010
Barley	587	50	416	-	-	-	-	-	-	-	-
Rye	98	-	-	-	-	-	40	-	-	60	-
Oats	408	151	476	60	79	374	40	90	30	115	77
Potato	641	-	64	-	-	41	-	-	-	22	47
Vegetable	303	207	625	107	69	371	33	49	100	210	257
Bean	-	13	-	-	-	-	15	10	-	40	170
Sunflower	-	330	1,107	13	130	230	-	-	-	50	380
Soybean	111	1,403	818	10	37	180	7	13	10	144	310
Sugarbeet	2,078	-	-	-	-	-	-	-	-	-	-
Tobacco	409	60	211	-	50	189	-	-	-	150	40
Cotton	-	660	672	-	-	-	-	-	-	-	-
Eteroil	-	-	-	-	-	-	-	-	-	61	-
Lucerne	1,699	958	1,461	135	317	763	50	117	82	381	599
Corn fodder	1,111	460	935	51	269	539	78	50	60	264	449
Other fodder	522	529	1,443	85	138	1,537	96	87	100	149	449
Annual	12,287	12,372	16,886	635	1,711	6,911	489	666	495	3,665	5,481
Olives	-	1,174	2,207	27	1,781	2,699	-	33	82	16	2,330
Fruit	1,625	120	193	410	1,149	890	465	261	218	910	1,564
Grapes	333	334	524	110	564	582	131	191	43	205	491
Permanent crops	1,958	1,628	2,924	547	3,494	4,171	596	485	343	1,131	4,385
TOTAL[a]	14,245	14,000	19,810	1,182	5,205	11,082	1,085	1,151	838	4,796	9,866

a. Sum of annual and permanent crops; values may differ from the sum of individual crops within each category.

Source: Ministry of Economy.

Table I-5. Average Crop Yields, 1988-90

Crop	1988	1989	1990	Average
	- - - - - - - - - - - - - (mt/ha) - - - - - - - - - - - - -			
Wheat	3.2	2.9	3.0	3.0
Corn (maize)	3.3	4.8	3.4	3.8
Rice	2.7	3.1	2.3	2.7
Potato	5.4	10.0	6.4	7.3
Dried beans	1.0	1.0	0.6	0.9
Tobacco	0.5	0.7	0.6	0.6
Sunflower	0.7	1.1	0.8	0.9
Cotton	1.0	1.5	1.0	1.2
Sugarbeet	17.2	39.7	26.7	27.9

Source: State Planning Commission.

Table I-6. Available Fertilizer, 1985-91

Fertilizer/Source	Quantity						
	1985	1986	1987	1988	1989	1990	1991
	(mt of product)						
Urea (46% N)							
Domestic	77,750	91,650	72,160	74,730	90,530	90,090	28,805
Imported	-	-	-	-	-	3,200	-
Ammonium nitrate (33% N)							
Domestic	94,630	104,190	97,000	90,500	102,401	93,420	25,573
Imported	-	-	-	12,200	-	-	-
Superphosphate							
Domestic (15% P_2O_5)	156,980	164,700	174,325	160,600	161,811	151,000	40,778
Imported (45% P_2O_5)	-	-	-	1,930	-	-	-
Potassium (50%-60% K_2O)							
Domestic	-	-	-	-	-	-	-
Imported	2,040	-	-	-	-	6,000	2,100

Source: Ministry of Agriculture.

Nationally, the annual fertilizer consumption was rather constant from 1985 to 1990. Ammonium nitrate consumption ranged from 90,000-104,000 mtpy, urea from 72,000-92,000 mtpy, and SSP from 158,000-166,000 mtpy (Table I-7). This averaged about 71,000 mt of N/year and 24,000 mt of P_2O_5/year. Thus, an average of about 103 kg of N and 35 kg of P_2O_5 were used per ha of cropped (annual plus permanent) land.

Fertilizer use decreased in 1991 to about 33% of the previous 6-year average use. The lower level of use was a result of several factors, including the breakdown of collectives and disturbances. Collectives have historically used 76% of the fertilizers and have been a primary link to the systematic delivery and use of fertilizers in the centrally-planned economy. With the removal of this link, the distribution of fertilizers to villages has been disrupted. Compounding this problem, the government established in November 1991 ceiling prices to private farmers which are equivalent to about 50% of the cost to fertilizer dealers. Although the government stated that a subsidy would be paid to dealers after proof of sale to private farmers, this policy is a definite disincentive for dealers to sell to private farmers. Also, reports indicate that the new private farmers may not have sufficient funds to purchase fertilizers and bank funds for credit have been extremely short of those needed to fund inputs for crop production. Additionally, redistribution of collective land to private farmers has proceeded slowly (63% of the land had been distributed by mid-January 1992); this has prevented seeding of crops on much of the land.

Although domestic production of nitrogen and phosphate fertilizers was stopped before the end of 1991, this was not a constraint to consumption during the year. Both production complexes had products in storage at the end of the year. The lack of production no doubt will adversely impact fertilizer consumption during 1992.

About 29% of the national fertilizer consumption was in the Lushnje, Fier, and Korce Districts (Tables I-8 through I-10). The 8 western districts which border the sea consume 49% of the national usage. Add to this the 3 districts of Tirana, Elbasan, and Korce, and the 11 districts consume 67% of the fertilizer.

Typically, about 40% of the total nitrogen and phosphate fertilizers have been applied to wheat which occupies about 200,000 ha or about 28% of cropped land (Tables I-11 through I-14). About 23% of the nitrogen and 20% of the phosphate fertilizers were used for maize (grain and forage) production,

Table I-7. Fertilizer Usage by State Farms and Collectives, 1985-90

Year	Urea (46% N)	Ammonium Nitrate (33% N)	Single Superphosphate (15% P_2O_5)	Potassium Fertilizer (50%-60% K_2O)
	- - - - - - - - - -	- - - - - - - - - (mt)	- - - - - - - - - -	- - - - - - - - - -
		State Farms		
1985	18,351	24,260	42,136	793
1986	25,600	32,700	44,900	2,400
1987	17,366	29,183	42,432	1,375
1988	16,843	28,678	42,258	1,165
1989	18,380	28,858	38,570	921
1990	22,709	25,423	38,985	992
		Collectives		
1985	54,524	66,149	118,117	2,665
1986	66,004	71,607	119,852	3,001
1987	62,413	70,855	124,039	4,375
1988	55,928	73,150	122,469	3,285
1989	61,995	72,258	119,780	3,005
1990	67,571	71,508	120,700	2,654
		Total		
1985	72,875	90,409	160,253	3,458
1986	91,604	104,307	164,752	5,401
1987	79,779	100,038	166,471	5,750
1988	72,771	101,828	164,727	4,450
1989	80,375	101,116	158,350	3,926
1990	90,280	96,931	159,685	3,646
1991	28,805	25,573	41,778	[a]

a. Data not available.

Source: Ministry of Economy.

Table I-8. Monthly Sales of Urea by DFB in Districts, 1991

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL
	(mt)												
Shkodra	116	11	316	84	364	-	19	326	298	-	189	-	1,723
Tropoja	10	-	-	52	106	-	-	63	22	-	-	-	253
Puke	5	-	45	23	25	-	-	35	10	-	-	-	143
Kukes	86	6	109	50	68	-	-	137	108	-	40	-	604
Lezha	128	10	127	-	110	-	34	104	175	-	190	-	878
Mat	45	-	40	111	69	-	-	139	41	-	-	-	445
Mirdita	54	-	54	-	77	-	-	27	31	-	-	-	243
Diber	131	34	134	280	62	-	-	330	136	-	52	-	1,159
Kruja	80	-	209	187	179	-	-	283	138	62	58	-	1,196
Durres	425	147	666	291	223	-	-	383	293	-	191	16	2,635
Tirana	157	147	257	138	222	-	9	227	225	-	123	-	1,505
Elbasan	246	130	326	313	366	-	-	295	288	-	161	-	2,125
Librazhd	41	47	89	50	95	-	-	78	89	-	40	-	529
Gramsh	63	-	104	73	14	-	-	90	66	-	39	-	449
Pogradec	52	29	22	109	100	-	-	86	75	-	-	-	473
Korce	140	78	230	253	643	-	-	448	258	-	-	-	2,050
Lushnje	400	249	541	224	452	-	125	536	61	-	243	114	2,945
Fier	573	325	688	219	114	-	37	194	271	-	117	270	2,808
Skrapar	9	47	169	7	4	-	-	19	-	-	62	16	333
Berat	321	242	377	58	144	-	36	203	96	-	87	103	1,667
Vlora	141	142	184	284	304	-	-	210	186	-	-	-	1,451
Kolonja	46	-	46	52	93	-	-	45	26	-	-	-	308
Permet	84	1	249	-	22	-	-	93	-	-	-	57	506
Tepelena	92	-	223	-	-	-	-	77	-	-	-	-	392
Gjirokaster	4	1	702	-	5	-	50	57	12	-	16	-	847
Saranda	345	25	594	18	-	-	89	45	22	-	-	-	1,138
TOTAL	3,794	1,671	6,501	2,876	3,861	0	399	4,530	2,927	62	1,608	576	28,805

Source: Ministry of Agriculture.

Table I-9. Monthly Sales of Ammonium Nitrate by DFB in Districts, 1991

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL
	-(mt)-												
Shkodra	-	109	452	275	-	-	173	117	165	291	-	-	1,582
Tropoja	-	21	42	58	47	-	10	16	-	-	-	-	194
Puke	-	21	20	45	-	-	43	20	-	-	-	-	149
Kukes	-	50	106	141	-	-	96	127	43	95	64	7	729
Lezha	21	46	149	190	-	-	213	15	85	-	43	-	762
Mat	-	21	105	112	-	-	-	-	78	88	35	4	443
Mirdita	-	-	64	65	-	-	-	12	50	109	-	-	300
Diber	-	93	171	198	71	-	127	58	190	143	65	36	1,152
Kruja	24	24	283	130	-	-	64	175	-	151	50	43	944
Durres	-	263	339	261	3	-	104	103	313	312	257	105	2,060
Tirana	-	136	323	212	18	-	145	139	222	314	359	-	1,868
Elbasan	-	189	227	242	13	-	86	102	297	220	445	113	1,934
Librazhd	-	45	14	167	-	-	47	45	87	2	41	7	455
Gramsh	-	35	93	136	-	-	20	111	42	97	65	-	599
Pogradec	-	57	103	150	-	-	51	43	90	46	-	-	540
Korce	-	225	396	594	-	-	48	366	172	270	-	-	2,071
Lushnje	46	473	360	230	88	-	60	166	256	141	113	478	2,411
Fier	58	412	651	277	15	-	68	271	153	439	318	731	3,393
Skrapar	-	39	117	-	-	-	28	-	-	56	37	36	313
Berat	39	202	352	135	10	-	86	69	48	71	105	204	1,321
Vlora	-	201	164	197	-	-	7	-	-	117	-	-	686
Kolonja	-	30	50	53	-	-	45	41	43	-	-	-	262
Permet	-	26	92	104	-	-	-	27	-	41	-	14	304
Tepelena	-	24	62	85	-	-	-	-	-	-	-	-	171
Gjirokaster	-	61	97	138	5	-	47	43	96	6	11	4	508
Saranda	-	-	45	226	-	-	-	5	49	-	97	-	422
TOTAL	188	2,803	4,877	4,421	270	0	1,568	2,071	2,479	3,009	2,105	1,782	25,573

Source: Ministry of Agriculture.

Table I-10. Monthly Sales of Single Superphosphate by DFB in Districts, 1991

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL
	(mt)												
Shkodra	15	344	1,082	1,063	10	-	12	7	171	-	103	-	2,807
Tropoja	17	50	63	104	5	-	-	-	-	136	91	-	466
Puke	-	-	111	90	4	-	-	-	-	155	61	-	421
Kukes	-	21	438	202	31	-	8	23	-	151	112	5	991
Lezha	23	398	511	403	-	-	-	7	186	366	7	-	1,901
Mat	7	13	159	141	16	-	-	-	-	39	35	-	410
Mirdita	-	15	194	54	6	-	-	-	8	89	51	-	417
Diber	-	88	481	844	12	-	-	-	-	137	43	8	1,613
Kruja	11	262	761	880	108	-	5	-	44	261	196	76	2,604
Durres	43	436	1,581	364	45	-	-	20	-	287	135	72	2,983
Tirana	7	425	665	843	76	-	-	-	120	-	151	41	2,328
Elbasan	6	561	688	212	17	-	-	-	5	981	185	63	2,718
Librazhd	-	85	130	143	-	-	-	8	-	223	162	-	751
Gramsh	-	79	174	92	5	-	-	-	-	153	212	39	754
Pogradec	10	-	320	10	101	-	12	-	-	173	72	100	798
Korce	464	443	1,053	164	23	-	43	-	-	241	622	-	3,053
Lushnje	53	331	1,983	755	35	-	-	10	335	269	393	100	4,264
Fier	-	403	1,660	498	7	-	-	-	118	666	387	81	3,820
Skrapar	-	-	156	195	5	-	6	11	-	162	100	-	635
Berat	-	35	1,220	449	18	-	-	16	-	246	228	216	2,428
Vlora	-	34	646	774	-	-	-	-	-	185	226	-	1,865
Kolonja	-	117	131	185	-	-	-	-	4	-	182	-	619
Permet	-	-	291	134	3	-	3	14	-	241	151	-	837
Tepelena	-	-	241	135	-	-	-	-	-	219	-	-	595
Gjirokaster	-	-	319	137	-	-	-	-	5	137	11	-	609
Saranda	-	-	377	481	-	-	-	5	8	-	176	44	1,091
TOTAL	656	4,140	15,435	9,352	527	0	89	121	1,004	5,517	4,092	845	41,778

Source: Ministry of Agriculture.

Table I-11. Estimated Nitrogen Use on Collectives, 1989

Crops	Area (ha)	Rate (kg/ha)	Jan	Feb	Mar	Apr	May	Jun (mt)	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	173,294	128.5	3,173	5,010	4,450	4,175	2,627	-	-	-	-	-	-	2,839	22,274
Corn (maize)	48,733	186.9	-	-	-	183	3,097	5,829	-	-	-	-	-	-	9,109
Barley	2,528	94.9	-	72	-	120	-	-	-	-	-	-	-	48	240
Rye	11,671	94.2	-	40	-	360	480	-	-	-	-	40	180	-	1,100
Oats	8,442	99.5	152	100	252	168	-	-	-	-	-	-	69	99	840
Potato	5,185	124.3	-	-	162	162	321	-	-	-	-	-	-	-	645
Vegetables	11,997	170.1	61	94	109	355	710	712	-	-	-	-	-	-	2,041
Bean	11,558	49.5	-	-	-	-	572	-	-	-	-	-	-	-	572
Sunflower	17,998	68.6	-	-	370	618	247	-	-	-	-	-	-	-	1,235
Soybean	8,394	29.8	-	-	-	-	250	-	-	-	-	-	-	-	250
Sugarbeet	4,519	150.2	-	86	345	50	198	-	-	-	-	-	-	-	679
Tobacco	25,942	39.0	-	-	-	891	122	-	-	-	-	-	-	-	1,013
Cotton	10,801	106.9	-	-	-	-	497	658	-	-	-	-	-	-	1,155
Eteroil	1,992	120.0	-	-	-	-	60	60	60	59	-	-	-	-	239
Lucerne	31,786	40.0	-	381	635	204	-	-	-	-	-	-	-	-	1,270
Corn fodder	20,056	129.6	-	-	-	-	924	1,676	-	-	-	-	-	-	2,600
Other fodder	14,359	60.1	-	-	533	-	-	-	-	-	330	-	-	-	863
Annual	433,933														50,794
Olives	27,587	35.6	-	-	150	209	139	-	-	-	-	-	98	387	983
Fruit	42,147	31.2	-	-	321	642	336	18	-	-	-	-	-	-	1,317
Grapes	11,480	55.1	-	-	70	141	210	211	-	-	-	-	-	-	632
Perm	81,214	36.1	-	-	541	992	685	229	-	-	-	-	98	387	2,932
TOTAL	515,147		3,386	5,783	7,397	8,278	10,790	9,164	60	59	330	40	347	3,373	53,726

Source: Ministry of Economy.

Table I-12. Estimated Nitrogen Use on State Farms, 1989

Crops	Area	Rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	(ha)	(kg/ha)							(mt)						
Wheat	32,829	157.1	890	1,160	1,031	967	451	-	-	-	-	-	-	658	5,157
Corn (maize)	11,790	253.9	-	-	-	60	1,018	1,916	-	-	-	-	-	-	2,994
Barley	1,053	114.0	-	36	-	60	-	-	-	-	-	-	-	24	120
Rye	652	84.4	-	2	-	18	24	-	-	-	-	2	9	-	55
Oats	3,217	110.0	64	42	106	71	-	-	-	-	-	-	29	42	354
Potato	1,296	122.7	-	-	40	40	79	-	-	-	-	-	-	-	159
Vegetables	5,732	195.9	13	20	23	213	426	428	-	-	-	-	-	-	1,123
Bean	400	60.0	-	-	-	-	24	-	-	-	-	-	-	-	24
Sunflower	3,544	83.0	-	-	88	147	59	-	-	-	-	-	-	-	294
Soybean	5,575	50.0	-	-	-	-	279	-	-	-	-	-	-	-	279
Sugarbeet	2,078	125.1	-	33	132	19	76	-	-	-	-	-	-	-	260
Tobacco	1,512	43.7	-	-	-	58	8	-	-	-	-	-	-	-	66
Cotton	1,332	116.4	-	-	-	-	61	94	-	-	-	-	-	-	155
Eteroil	135	140.7	-	-	-	-	4	4	5	6	-	-	-	-	19
Lucerne	14,719	38.0	-	168	280	112	-	-	-	-	-	-	-	-	560
Corn fodder	9,857	160.6	-	-	-	-	493	1,090	-	-	-	-	-	-	1,583
Other fodder	10,720	66.0	-	-	461	-	-	-	-	-	246	-	-	-	707
Annual	112,377														15,540
Olives	16,800	49.2	-	-	126	176	117	-	-	-	-	-	82	325	826
Fruit	16,731	61.1	-	-	233	466	288	36	-	-	-	-	-	-	1,023
Grapes	8,647	67.3	-	-	65	129	194	194	-	-	-	-	-	-	582
Perm	42,178	57.6	-	-	424	771	599	230	-	-	-	-	82	325	2,431
TOTAL	154,555		967	1,461	2,585	2,536	3,601	3,762	5	6	246	2	120	1,049	17,971

Source: Ministry of Economy.

Table I-13. Estimated P_2O_5 Use on Cooperatives, 1989

Crops	Area	Rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	(ha)	(kg/ha)	- - - - - - - - - - - - -						- (mt) -						- - - - - - - - - - - - -
Wheat	173,294	46.5	-	-	-	-	-	-	-	-	-	2,417	5,641	-	8,058
Corn (maize)	48,733	54.8	-	-	267	2,136	267	-	-	-	-	-	-	-	2,670
Barley	2,528	18.6	-	-	-	-	-	-	-	-	-	47	-	-	47
Rye	11,671	27.5	-	-	-	-	-	-	-	-	160	161	-	-	321
Oats	8,442	29.6	-	-	-	-	-	-	-	-	-	250	-	-	250
Potato	5,185	60	39	39	194	39	-	-	-	-	-	-	-	-	311
Vegetables	11,997	63.2	41	33	65	466	65	33	-	-	-	-	-	55	758
Bean	11,558	30	-	-	-	346	-	-	-	-	-	-	-	-	346
Sunflower	17,998	31.1	-	335	224	-	-	-	-	-	-	-	-	-	559
Soybean	8,394	36	-	-	-	242	60	-	-	-	-	-	-	-	302
Sugarbeet	4,519	64	-	58	231	-	-	-	-	-	-	-	-	-	289
Tobacco	25,942	20.7	-	-	161	355	21	-	-	-	-	-	-	-	537
Cotton	10,801	39.2	-	-	47	310	66	-	-	-	-	-	-	-	423
Eteroil	1,992	32.1	-	14	50	-	-	-	-	-	-	-	-	-	64
Lucerne	31,786	20.1	-	384	256	-	-	-	-	-	-	-	-	-	640
Corn fodder	20,056	40	-	-	-	561	241	-	-	-	-	-	-	-	802
Other fodder	14,359	6.7	-	-	-	-	-	-	-	-	96	-	-	-	96
Annual	433,933														16,857
Olives	27,587	12.8	141	-	-	-	-	-	-	-	-	-	-	211	352
Fruit	42,147	11.5	146	-	-	-	-	-	-	-	-	-	-	340	486
Grapes	11,480	23.6	71	119	47	-	-	-	-	-	-	-	-	34	271
Perm	81,214	13.7	358	119	47	-	-	-	-	-	-	-	-	585	1,109
TOTAL	515,147		438	982	1,542	4,455	720	33	-	-	256	2,875	5,641	640	17,966

Source: Ministry of Economy.

Table I-14. Estimated P_2O_5 Use on State Farms, 1989

Crops	Area	Rate	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	(ha)	(kg/ha)	- - -	- - -	- - -	- - -	- - -	- - -	-(mt)	- - -	- - -	- - -	- - -	- - -	- - -
Wheat	32,829	51.4	-	-	-	-	-	-	-	-	-	506	1,182	-	1,688
Corn (maize)	11,790	66.2	-	-	78	624	78	-	-	-	-	-	-	-	780
Barley	1,053	39.9	-	-	-	-	-	-	-	-	-	42	-	-	42
Rye	652	35.3	-	-	-	-	-	-	-	-	11	12	-	-	23
Oats	3,217	30.0	-	-	-	-	-	-	-	-	-	97	-	-	97
Potato	1,296	60.2	10	10	38	10	-	-	-	-	-	-	-	-	78
Vegetables	5,732	72.7	23	18	36	256	36	18	-	-	-	-	-	30	417
Bean	400	35.0	-	-	-	14	-	-	-	-	-	-	-	-	14
Sunflower	3,544	32.1	-	68	46	-	-	-	-	-	-	-	-	-	114
Soybean	5,575	39.5	-	-	-	176	44	-	-	-	-	-	-	-	220
Sugarbeet	2,078	62.1	-	26	103	-	-	-	-	-	-	-	-	-	129
Tobacco	1,512	28.4	-	-	13	85	2	-	-	-	-	-	-	-	43
Cotton	1,332	43.5	-	-	5	45	8	-	-	-	-	-	-	-	58
Eteroil	135	45.0	-	-	6	-	-	-	-	-	-	-	-	-	6
Lucerne	14,719	22.6	-	200	133	-	-	-	-	-	-	-	-	-	333
Corn fodder	9,857	45.3	-	-	-	313	134	-	-	-	-	-	-	-	447
Other fodder	10,720	6.5	-	-	-	-	-	-	-	-	70	-	-	-	70
Annual	112,377														4,784
Olives	16,800	18.9	128	-	-	-	-	-	-	-	-	-	-	190	318
Fruit	16,731	24.6	124	-	-	-	-	-	-	-	-	-	-	287	411
Grapes	8,647	31.6	74	124	49	-	-	-	-	-	-	-	-	26	273
Perm	42,178	23.8	326	124	49	-	-	-	-	-	-	-	-	503	1,002
TOTAL	154,555		359	446	507	1,523	302	18	-	-	81	657	1,182	533	5,786

Source: Ministry of Economy.

while about 4.5% of the nutrients were used for vegetables. Annual crops in total have received about 92% of all fertilizers. Nearly 8% of the total nitrogen and 9% of the total phosphate were used for perennial crop production.

About 74% of the nitrogen is used during March-June with most of the remainder (about 25%) being used during December-February. Phosphate fertilizer is principally used in October (15%), November (29%), and April (26%). In the past state farms have used about 24% of all fertilizers.

C. Past Patterns of Fertilizer Distribution

Each year plans were formulated by cooperatives and state farms and submitted to the MOA. They were reviewed and modified and submitted to the State Planning Commission for finalization. The plan included schedules for shipping designated quantities of specific fertilizers to the various destinations. After plans were approved they could not be modified. The approved plans were given to:

1. The MOA for distribution to the cooperatives, state farms, and Directorate Furnizimi Bujgesor (DFB) which was the parastatal agricultural input supply organization.
2. The Ministry of Mining and Mineral Resources for dispatch to the fertilizer factories.
3. The Ministry of Transport (MOT) for distribution to Directorates of Railway and Road Transport.

Fertilizer production schedules were made and transports were scheduled to move raw materials to factories and to move fertilizers to the districts soon after they were produced. About 90% of the fertilizers were transported from the factories by railway. That fertilizer was received by the DFB at 21 railway stations, and transshipped to state farms or cooperatives by state transport trucks or stored to await later transshipment. Fertilizer production and distribution was dictated by the "Plan," so far as possible, and apparently, was fairly well maintained from 1985 until 1990.

The actual shipments of fertilizers to the districts in relation to planned quantities were 30% for ammonium nitrate, 21% for urea, and 25% for SSP during 1991. There were several reasons for this indicated decrease in fertilizer use as previously discussed.

II. Existing Situation for Fertilizer Distribution as of January 1992

A. Transitional Period

When the IMF and IBRD recommended to Albania early in 1991 a "Core Program" of economic policies, it was envisioned that these policies--which reverse 40 years of collectivization--would be implemented within a very short period. The elements of this policy were: (1) suspension of all plan targets and dismantling of centrally planned administrative procedures, (2) removal of all barriers to internal trade, (3) removal, or substantial reduction, of barriers to international trade, and (4) liberalization of prices with the exception of a "consumption basket" of basic food items and other necessities which would decrease the impact of the reforms.

Though this program was interrupted by a change in government, policy reforms have been enacted rapidly. Many economic processes which were previously under control of central authorities now have been either passed to districts or autonomous institutions or passed directly to the private sector. Many prices have been liberalized and increased dramatically. Controls on internal trade have been relaxed and market forces have begun to take over the distribution of many of those remaining items still produced in the economy, including those which have been imported; import controls have been relaxed. A tariff-free period for many items has been enacted and the tariffs on others are kept extremely low.

Policy reform has in fact moved much faster than the government had initially envisioned and this has resulted in a shock to the economy. Albania, at the juncture of both political and economic reform is presently in crisis which manifests itself not only in a lack of goods and services, but also in a general breakdown of many basic economic processes. While international food aid lessens the impact of this shock, Albania is fully into this transition and there is uncertainty both within the government and the population of just when and how it will emerge from this transition.

The IMF and IBRD reforms were originally expected to be implemented on specific timetables such that their effects might be effectively managed. However, a divided parliament and competing political forces have prevented the coherent approach initially envisioned. While significant government assets and functions have been privatized (for example, the land of cooperative farms and small firms in the service sector), other functions have been held tenaciously to the government sector. This incomplete, and sometimes spotty, reform is found in agriculture and will have an impact on programs designed to create a privatized marketing system for agricultural inputs. Thus, while on the one hand, a significant proportion of cooperative land has been divested to farmers (63% as of the middle of January 1992), on the other hand the government has moved to prohibit agricultural exports. The government has additionally developed a dual price system for fertilizer which will inhibit, if not prevent altogether, movement to an efficient fertilizer marketing system.

B. Changes in Government Policy Impacting Marketing of Fertilizer

1. Reorganization of the DFB

The DFB, in its fertilizer operations, was primarily a planning and coordinating unit and effected fertilizer distribution through the facilities of other government institutions. The MOT (Railways and Trucks), and MTSs provided transport and the Railways and State and Cooperative Farms provided warehousing. Subsequent to the passage of the Law of Enterprises, the DFB has been broken up into 27 new units (28 now with the creation of Kavaja). The headquarters at Durres became Agroimport, which under the new scheme, will be responsible for import of agricultural inputs.

The staff in each district were converted into 27 Agricultural Commercial Enterprises (ACEs). All planning and coordination originally made at DFB headquarters regarding fertilizer distribution by district are now made by district ACEs.

As of January 1, 1992, all ACEs were theoretically given both operational autonomy and financial accountability. Government financial support has been terminated so ACEs are expected to be financially self-sufficient. Ownership of the ACEs however still rests with government. Thus these are still state owned enterprises managed by state appointed committees from old DFB staff. The ACEs interviewed have said that 30% of excess of revenue over costs will be returned to the government as its share, though it is not clear whether this is an expected tax (the Law of Taxation has not yet passed parliament) or a return on government assets. The residual income above this 30% is to be divided among ACEs employees.

The creation of the ACEs is an obstacle for any attempt to develop a privatized marketing system for agricultural inputs. ACEs have a significant advantage at this moment accruing from essentially free access to existing physical facilities such as warehousing as well as preferential treatment in the allocation of bank finance. Additionally, the ACEs' virtual monopoly on all non-fertilizer products going to the rural economy (produced by government bodies) assures them revenue in a time of extreme difficulty. Private marketing firms will have to undertake risks not faced by the ACEs.

2. Privatization of Cooperative Farm Land

The Land Law catalyzed the redistribution of land from cooperative farms to their constituent peasants. It was expected that all the land originally belonging to these cooperatives would be redistributed by the end of 1991. In the following table, the trend of the collectivization of peasant lands into cooperatives is illustrated.

Collectivization of Farm Land

Year	No Cooperatives	% Peasant Land	Average Size of Holding (ha)
1950	90	5	232
1960	1,487	85	244
1970	643	100	736
1980	423	100	1,257
1990	595	76	1,181

Distribution of land to private farmers was not completed during 1991 due to disagreements among former cooperatives and other administrative problems. One particularly difficult problem has been claims by former owners (from the pre-collectivization period). As of the middle of January 1992, 63% of all cooperative land had been redistributed (Table II-1). However, it is important that decollectivization has proceeded much faster in the most agriculturally productive areas. In the more productive Central West (Lushnje, Fier, Berat, Vlora, Elbasan, Tirana, and Durres) the average achievement of privatization by district was 80%. These districts consumed more than one-half (53%) of all fertilizer in 1990. In other important fertilizer consuming areas, land privatization has proceeded less quickly. In the North West (Shkodra, Lezha, and Kruja), redistribution was only 29%. The 1990 fertilizer consumption in this region accounted for 14% of the total.

Table II-1. Status of Redistribution of Collective Land to Private Farmers, January 18, 1992

District	Land Distributed	
	Hectares	% of Total
Shkodra	5,420	15.1
Tropoja	2,315	37.9
Puke	3,009	64.2
Kukes	4,500	34.3
Lezha	5,825	49.0
Mat	6,400	49.5
Mirdita	4,000	73.8
Diber	4,380	18.2
Kruja	3,965	24.0
Durres	13,400	69.2
Tirana	14,321	73.7
Elbasan	35,100	95.6
Librazhd	8,054	60.7
Gramsh	7,700	81.1
Pogradec	14,150	85.5
Korce	23,700	50.3
Lushnje	29,600	83.0
Fier	34,000	68.8
Skrapar	6,920	63.8
Berat	29,000	82.2
Vlora	18,900	73.6
Kolonja	6,600	68.5
Permet	13,032	96.7
Tepelena	8,100	66.7
Gjirokaster	8,200	64.5
Saranda	10,246	68.4

Source: Ministry of Agriculture.

Korce, a very important district at about 8% of total fertilizer consumption was also slow in land redistribution (50%).

The impact of this privatization process on fertilizer marketing is clear. While the DFB only had to arrange for distribution to the headquarters of a limited number of state farms and cooperatives, there are now thousands of newly independent fertilizer customers. An entirely new marketing system will be required to meet their needs.

3. Fragmentation of the State Farms

Government planning vis-a-vis SFs during the transition is designed to keep the SFs functioning to serve as a source of production stability while the land transfer from Cooperative Farms to peasants proceeds. Under the Law of Enterprises, SFs are allowed operational autonomy and have moved to production strategies based on market incentives. There are presently pressures by political forces to disband the SFs and redistribute the land in much the same manner as the cooperatives. A final decision on the status of the SFs will probably await the upcoming elections.

In the meantime, many SFs have been broken into smaller units based either on production specialization or geographical coherence. In the Lushnje District, the ACEs Director said that the two original SFs broke first into four, then ten, then finally 13 units. These smaller units were perceived by the ACEs to be unstable and more importantly probably incapable of paying for fertilizer and other supplies. As a result, all financial dealings with them were expected to be handled through the BAD, which could, because of Government guarantees, sustain them until the next budget cycle when their losses would be written off.

As SFs consume approximately 26% of all fertilizers, this instability makes for uncertainty about how much fertilizer they will be in a position to consume. The SFs will likely suffer much of the same problems all Albanian state industries are undergoing as a result of lack of necessary inputs and a general breakdown of discipline among workers. Importantly, the SFs and other state enterprises consume the bulk of financing made available for agriculture. Outstanding credits to state agricultural enterprises has reached 2.4 billion Leks, almost ten times more than the 250 million Leks capital that was made available to BAD for private agriculture. Financial resources that could catalyze private agriculture now merely add to the budget deficit.

4. Privatization of Ministry of Transport (MOT) Trucks

The initial reform in this area was to shift MOT assets from the national level Ministry to District Executive Councils. This was in keeping with early policy to decentralize functions to the district level. Subsequently, under the Law of Privatization, a series of Government orders were given to sell off transport assets. Three orders were given which were to result in the divestiture of most government buses and taxis as well as 80% of government trucks. This process moved at varying rates among the districts. In Saranda, the DFB said there were few if any MOT trucks for fertilizer distribution, while the Vlora and Lushnje districts reported that all of the fertilizer projected under the maximum import scenario could be moved with government transport equipment. The procedure used was to sell MOT trucks to their drivers for a nominal sum.

The Lushnje Executive Council member responsible for transport stated that 80% of his inventory of trucks, representing the oldest makes, were sold to drivers for as little as 5000 Leks each. The remaining number which were the best trucks (generally Czechoslovakia made and between 5 to 10 years old) were kept under the control of the district government. The Lushnje MOT had, as of early January, 25 trucks of between 12-13 mt capacity. It was reported that these trucks could transship about 200 mt/day from rail stations and could work seven days a week if necessary.

Data given by the MOT on trucks in each district (Table II-2), do not correspond with information given by District Transport Officials.

In addition to the MOT trucks now privatized, tractors owned by the Cooperatives' affiliated Machine Tractor Stations are also expected to be divested. Tractor-drawn trailers have been commonly used for fertilizer transport at the village level, many being able to carry 3 to 5 mt for short distances.

All the ACEs interviewed had little confidence in the newly privatized transport scheme. They felt that the new scheme could not be trusted for sustained transshipment from rail stations. It is not clear if this attitude comes from the fact that such transport is generally older and more apt to break down or is the result of simple bias. Everyone in the system wants new trucks. Lack of confidence in private transport also characterized discussions with potential wholesalers. Those private traders

Table II-2. Status of Ministry of Transport Trucks, January 1992

District	Number of Trucks in State Transport Fleet: Total	Operating
Shkodra	146	75
Tropoja	94	48
Puka	135	72
Kukes	129	65
Lezha	13	8
Mat	71	40
Mirdita	45	28
Diber	67	35
Kruja	170	87
Durres	183	98
Tirana	240	160
Elbasan	98	52
Librazhd	117	60
Gramsh	30	18
Pogradec	71	37
Korce	186	100
Lushnja	26	18
Fier	81	45
Skrapar	25	13
Berat	85	47
Vlora	95	50
Kolonja	22	13
Permet	42	28
Tepelena	56	30
Gjirokaster	46	28
Saranda	63	34
Total	2,336	1,289
Ports:		
Durres	90	45
Vlora	20	10
Saranda	6	4
Shengjin	6	4
Total	122	63

already selling fertilizer in the villages use privatized transport but the latter's performance has been very unreliable. Private transport rates vary from 2.5 to 20 Leks/mt/Km depending upon the condition of the road and local demand.

Any fertilizer import program must take into account the uncertainty of transport between the port and the railroad system serving the district and the villages. It is this link in the fertilizer transportation system (district and village level) that is most problematic and must be researched carefully to ensure that there is sufficient capacity. There is significant transport resources at this level, particularly if the horse drawn Karel (which according to farmers can carry up to 1 mt) are included. The question is whether it will be available.

5. Increase in Transport Rates

In keeping with its policy of increasing prices for state controlled goods, the government has instituted or is planning increases in transport rates. Additionally, trucks divested into the private sector now hire at much higher rates, up to, in extreme cases, as much as 10 times more than the official rate for similar transport in the MOT.

Structure of Transport Rates (Leks/mt/Km)

	Old	New	MOT Planned
	(Leks/mt/km)		
Rail	0.5	0.8	1.5
Truck MOT	0.35	1.7	-
Truck (private)	-	3-5[a]	-
Coastal (Durres to Vlora, Saranda, Shengjin)	0.2	-	0.6

a. Rates can go as high as 20 Leks/mt/km on bad mountain roads

6. Creation and Activities of the Bank of Agriculture and Development (BAD)

The BAD started functioning in November 1991 after having been created out of the agricultural section of the State Bank of Albania. It was created to provide financing to agriculture and was given an initial capital of 250 million Leks (for private farmers). This was soon depleted, 100 million going to construction of houses (transferred from the State Bank to BAD) and the rest was loaned to agriculture, 120 million for medium term loans and 30 million for short term loans. At present, BAD has no significant funds to loan either to farmers or private distributors of fertilizer.

While the BAD was created primarily to assist newly privatized agriculture, it lends to SFs on behalf of the government which guarantees such loans. Funds going to the state agricultural sector are still about ten times higher than what is going to private farms. One officer of BAD estimated that the SFs account for at least half of all bank managerial and clerical activity. Thus, much of its professional capacity is devoted to supporting continuing losses by the SFs rather than developing approaches for supporting private farms which are the countries future.

Given its low capital base, the BAD cannot generate necessary levels of finance for commercial activities in agriculture. Additionally, its low interest rates do not cover risk or systemic inflation.

In effect, the BAD is caught in the transition from government management of production to private enterprise working both as a state bank and a commercial bank.

Structure of BAD Short-Term Interest Rates

Loan Type	Annual Interest Rate (%)
Agricultural Production	8.4
Building	9.0
Commercial/Processing	20.0
Bread Making	12.0

7. Agricultural Export Policy

Albania has exported significant quantities of agricultural produce in the past. In 1988, it exported over 50,000 mt of produce, a large amount for a country of only 3.2 million people. In the past, the agricultural sector has accounted for a major portion of total exports. The bulk of these exports was vegetables and fruits. Tomatoes and watermelons, both requiring large amounts of fertilizer, were very important export crops.

The Government's policy on agricultural exports demonstrate how its various actions may be at cross purposes with each other. Recently, Eximagra, a government export agency, was created out of the old Agroexport to export produce from both private farms and SFs. It has an experienced staff, adequate communication facilities, and the physical facilities necessary to collect and prepare agricultural produce for export. It has offices and warehouses in 8 important districts and representatives in four more. It is positioned to seek markets and facilitate exports.

Any agricultural export must now be approved at two levels of government. It must first be approved by the Export Directorate of the Ministry of Agriculture and then subsequently by the Ministry of Foreign Relations. Unfortunately, it is now government policy that only tobacco and industrial herbs may be exported. All food exports, including such items as olives and oranges, may not be exported until further notice. Cotton is apparently also excluded from export. These government actions not only contradict its own actions in attempting to promote exports and exporters but undermine its own comparative advantage in the international marketplace.

Many of the new private farmers are presently planning to devote significant percentages of their small farms to watermelon. This is being done on the expectation of prices that were sustained in the past by the export market. Of the farmers interviewed, these new private farmers were those most committed to using fertilizer, stating their willingness to purchase it even if the price was as much as two or three times higher than the price presently fixed by the government. It seems likely that their expectations for good prices may be seriously jeopardized given the present government action regarding exports.

8. Prices

An important part of the economic reform program is the liberalization of prices within the agricultural sector. While many prices for agricultural goods have been liberalized, most notably vegetables, government has fixed procurement prices for certain cereals, wheat, corn, rice, and livestock products. These prices, though not liberalized, have been increased significantly and at the official exchange rate approach world market prices. However, there is market pricing of maize (corn) in the many rural markets that have sprung up over the country. Presently, yellow maize (corn) is being sold in these small markets at prices higher than that offered by the government.

Cereal Prices in Albania, January 1992

Cereal	Old Price	New Price	US $ @ 50 Leks/US $
	(Leks/mt)		(new price)
Wheat	2,700	3,500	70
Corn	2,200	3,200	64
Rice	4,200	5,200	104

Fertilizer prices have also been increased for the SFs but still reflect significant subsidies particularly considering the recent devaluation of the Lek (50 Leks/US $). Prices for the private farmer have remained the same as in the previous years. These subsidies are not yet an issue because there is very little fertilizer to be sold, the factories are idle, and no imports are coming through the ports. However, when fertilizer supplies become available, the necessary subsidization required to maintain product prices will become problematic. It is not clear whether the government has the resources to sustain the subsidies it has undertaken. There is a second problem with existing prices for fertilizer. Government has instituted a differentiated price scheme in which private farmers only have to pay about one-half the mandated price of fertilizers sold to the SFs. The ACEs are expected to recover the difference from the government based on a proof of sale. This provides a deterrent to private participation in that entrepreneurs may not have the financial capacity to wait until the government makes up the difference. Additionally, the incentive for all marketing firms will be to sell to the SFs (from whom there will be no need to recover subsidy, i.e., wait for full payment) rather than to the private farmers which are the intended beneficiary of this scheme.

Fertilizer Prices in Albania, January 1992

Product	Price to Farmers	Price to State Farms
	(Leks/mt)	
Ammonium nitrate	1,500	3,000
Urea	2,000	4,500
SSP (nongranular or semigranular)	500	2,000

Fertilizer would still be attractive to farmers at rates much higher than government mandated prices. At 4,500 Leks per mt, relative prices as measured by the quantity (kg) of wheat needed to buy 1 kg of nutrient are favorable. For nitrogen this ratio is 3.1. Comparative rates for other countries (1988) are: India 3.0, France 3.7, and the United States 5.8. However, with the new exchange rate, nitrogen is attractive only for vegetable production. The government needs to review its procurement prices for cereals, or even better, liberalize cereal prices.

9. Development of Commercial Practices

Commerce requires commercial law and custom. Presently, Albania, because of forty plus years of central planning, has neither existing legislation to enable much private sector activity nor customary practice to rely on, in lieu of formal laws. While much of the recent legislation such as the Law of Enterprises and the Law of Privatization helps, it does not provide the legal basis for financial transactions which is at the heart of business activity. A UNDP listing of legal reforms required to facilitate the economic reforms includes inter alia laws on: contracts, taxes and tariffs, ownership, anti-monopolistic practices, and protection of intellectual property. These laws have not yet been enacted. An EC team fielded by Coopers and Lybrand is in the process of recommending specific legislation but it is not clear when such laws will be passed. Much will have to remain until after the elections.

The current situation undermines development of a private marketing system in the following ways:

a. Agreements have no force. Contracts that might be drawn up by various parties within the marketing system have no legal recourse.

b. Payments against goods and services are difficult unless they are made in cash or are between government institutions who are able to settle accounts through bookkeeping techniques with the BAD.

c. Loans are unable to be made based on collateral because the issue of ownership of collateral is not completely defined.

d. While there are provisions under the Law of Enterprises to declare government enterprises insolvent, there has been no case brought to the courts and thus no experience regarding insolvency. Additionally, not many, including the BAD, know the provisions of this law (and many others) as copies have not been made available to them. Such laws, though having been announced in the media, apparently have not surfaced from the printing presses of parliament. Indebted firms, government or otherwise, will, at least for the short term, probably be able to continue to operate regardless of debts incurred.

All these problems have a negative effect on the process of privatization of the fertilizer sector. Private firms will have difficulty making payment unless such payments are made in cash. Private enterprises wanting to obtain finance will find that their property, not having clear ownership, will not serve as collateral for loans. The ACEs who fail to make payment for fertilizer or any other service will be allowed to continue to operate regardless of their financial position. The BAD, having no recourse against the ACEs should they default on loan repayment, will have no ability to take control of their assets in order to dispose of them to meet unpaid creditors. Less lending resources of the BAD will mean less credit to the privatization effort. Lack of clear commercial laws will thus inhibit, at least indirectly, privatization in the short term.

C. Patterns of Trade During the Transition Period

1. Domestic Trade

Forty years of strict government control over production has resulted in the limited availability of consumer goods for Albanians. Consumer durables were only available to a few and even then purchases of such items as refrigerators, stoves, television sets, and radios represented years of savings to the average consumer. The political and economic liberalization has released a tremendous amount of pent-up demand. Existing savings have gone not only to consumer durables but also to perceived luxuries such as imported spirits, chocolates, cigarettes, and clothes.

The government wage policy has added to this demand. Salaries in the past 6 months have been increased by 50%, even as prices for essentials, in the "consumption basket" have been kept low. This has, in the short term, increased disposable income for many. This money is now being used for purchases deferred for more than 40 years. A further impetus to this phenomena is the low tariff or tariff-free import of many goods. Available foreign exchange in the economy has gone to trade in goods which provide a very large return on a minimum investment. For example, it was reported that one individual was able to increase his initial capital of US $500 to

US $60,000 within a period of a few months. Entrepreneurs now often expect this kind of return.

Indications of this type of trade are everywhere. There is a large black market for currency immediately in front of the State Bank. Private trucks in the Saranda district are busy because of the import traffic at the Greek border. There is similar traffic across the Yugoslavian border. There are rumors that even government agencies have moved into this trade.

Savings and investment are also going into purchase of divested government property which is being sold at very low prices. Individuals in Lushnje were able to buy MOT trucks for about US $100. Shops in the service sector are also being sold off at concessional rates. In Shkodra, cooperative warehouses were sold off to their warehousemen who now rent them to the ACEs. In Kukes, three warehouses of 200 square meters were sold off for 20,000 Leks each.

Agricultural trade in certain items such as eggs, maize (corn), sunflower seeds, and vegetables has also become a thriving business in the private rural markets and cities.

The returns received on all of the above goods means that the return for marketing fertilizer, at least in the short term, may need to be much higher than it would be elsewhere. There is skepticism among many of those contacted about the profitability of the fertilizer business. However, most think that the current very profitable trade in consumer goods will probably not continue in the longer term and they are interested in the possibilities offered by fertilizer marketing as a business of the future.

2. Present Position of Entrepreneurs Entering the Fertilizer Market

Businessmen interested in entering this market face several obstacles. Some of these are as follows:

a. Very high returns elsewhere.
b. Unfamiliarity with fertilizer and its marketing.
c. Unfair advantage of the ACEs which have better access to bank finance as well as first claim on use of government physical assets such as transportation facilities.
d. Presently unable, under existing laws, to give trade credit.
e. Uncertainty as to future government policy in the many areas that impact fertilizer marketing.

f. Limited, or no organized assistance. Existing Chambers of Commerce have been created by government and are currently staffed by bureaucrats. These bureaucrats have little knowledge of business and often are more interested in how they or people they know might profit from the fertilizer business rather than helping the many others that might want to become involved in the business.

These circumstances mean that businessmen who want to get into the business of fertilizer marketing must assume more risk than they may be willing to undertake, at least in the short term.

D. Agricultural Commercial Enterprises (ACEs)

The ACEs function under the recently passed Law of Enterprises. Under this law, organizations such as the ACEs are expected to be operationally and financially autonomous. They have been required to institute a Board of Directors (in the ACE the Board of Directors is called the management council) and nominate a manager (Chairman) who is to make day to day operational decisions. The ACEs can now develop their own business plan without review by central governmental authorities and theoretically they have profit and loss responsibility. Revenue exceeding costs is to be subject to taxation but as yet The Law of Taxation has not been formalized. The characteristics of five ACEs are shown in Table II-3.

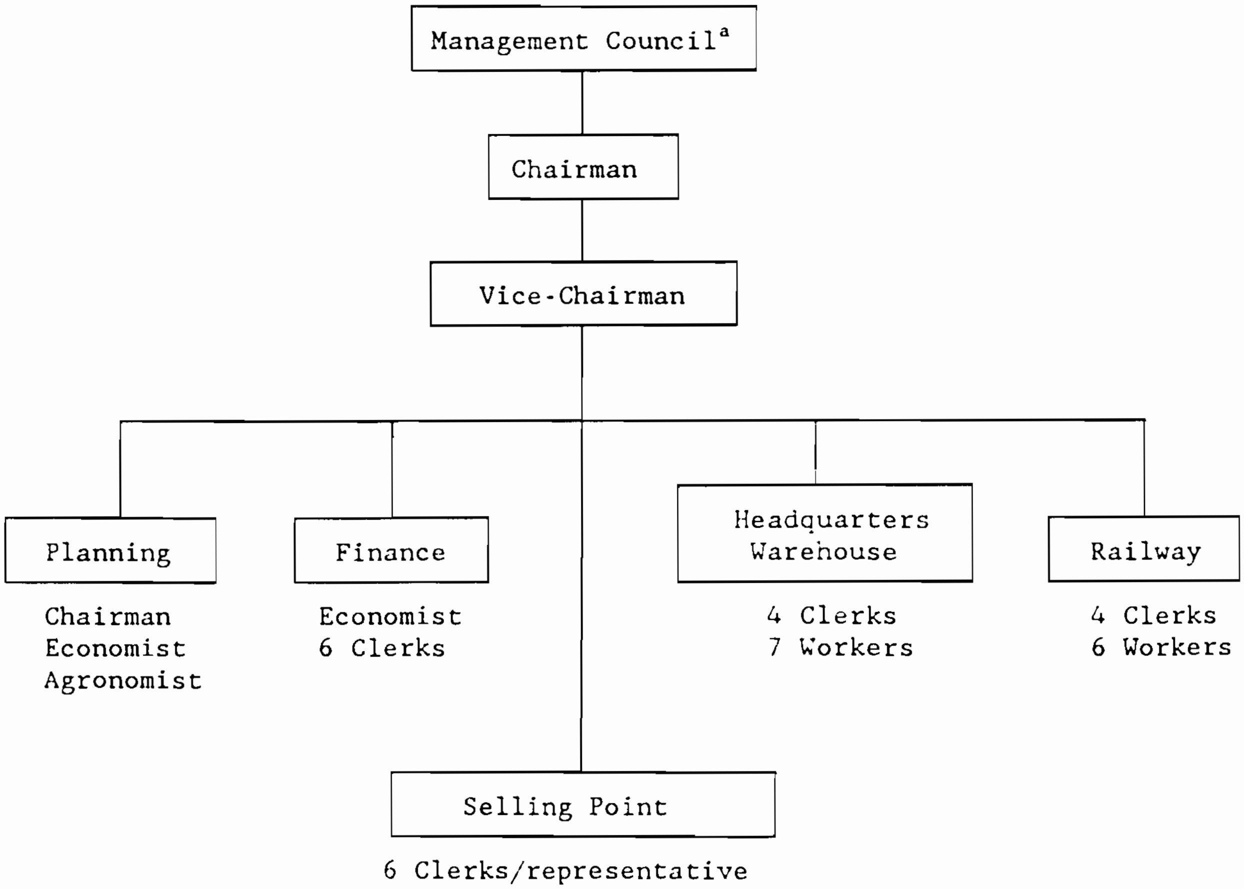
1. Organization and Staffing

The organization of the Shkodra ACE is given in Figure II-1 and reflects an orientation to bookkeeping and paperwork functions. This is in keeping with its former role as a planning and coordinating unit not having responsibility for direct sales to farmers. The six selling clerks are recent additions and probably are former Headquarters staff which will be posted out to locations of former cooperatives as soon as fertilizer distribution begins. Clerks and economists represent more than 40% of total staffing. The ACE labor force is permanent rather than being supplied from daily laborers on an as-needed basis. The Fier ACE staffing pattern is consistent with that of Shkodra:

Table II-3. Indicative Data on Five Agricultural Commercial Enterprises (ACEs)

	Shkodra	Berat	Fier	Lushnja	Saranda
1. Product distributed, (mt) Best Year	29,000 1988	25,600 1988	40,000 1989	26,800 1990	-
2. Product distributed in 1990, (mt)	18,156	15,440	27,292	-	10,610
3. Employees	37	25 down from 38	32	35	42
4. Selling points	6 actual 20 planned	10 large 80 small	40	12	10
5. Warehouse capacity at Headquarters, (mt)[a]	2,000	1,000	1,000	-	-
6. Avg. warehouse capacity at Selling points (mt)[a]	30-40	150-200 (large)	100	500-1,000	200-300
7. 1991 Carryover of Inventory, (mt)	0	30	0	0	0
8. Trucks	2 not operating	1	1	2 1 operating	0
9. Financial position at BAD	-	surplus	surplus	surplus	-
10. Nearest rail receiving point	Shkodra	Lushnja	Fier	Lushnja	Vlora
11. Distance from port (km)	115 (Durres)	54 (Durres to Lushnja)	86 (Durres) 34 (Vlora)	54 (Durres)	0 (Saranda)
12. Estimated Average Transshipment distances required from main district Rail Station	20 km	30 km	10 km	8 km	15 km
13. Credit line	-	Yes	Yes	Yes	-

a. Warehouses are recent ACE acquisitions from defunct cooperatives. Previously all warehousing was through other parties.



a. Comprised of:
Chairman
Vice-Chairman
Economist-Planning
Economist-Finance
Workers' Representative

Figure II-1. Organization of Shkodra Agricultural Commercial Enterprise (ACE)

Fier ACE Staffing, Categories and Number

Category	Number
Management	7
Professional	4
Finance	7
Warehouse Clerks	4
Railway Clerks	3
Laborers	7
Total	32

In all the ACEs contacted the staff has been shifted to develop a more appropriate organization given their new responsibilities which involve direct fertilizer sales. In at least two ACEs, the Chairmen said that they have decreased staff, though only in one did it seem to be a result of a desire to decrease costs. In Lushnje, the Chairman said he had decreased his staff by 13, but had hired 10 more. He said that the laws allow his organization to hire and fire. In Berat, the Chairman had allowed his staffing to decline from 38 to 25 through attrition.

According to the Chairman of the new Kavaja ACE, employees can be laid off if the ACE is willing to pay 80% of salary for 6 months and an unspecified amount for another 6 months. These parameters come from the Law of Assistance.

Metric Tonnes Fertilizer Per ACE Employee (1990)

ACE	Metric Tonnes Per Employee
Shkodra	490
Berat	406 (increased to 617 given 1992 staff cuts)
Fier	853
Lushnje	765
Saranda	252

The ACE staffing levels, if high, become more reasonable now that the ACEs are to sell directly to farmers rather than simply coordinating deliveries to between 10-20 institutional customers (SFs and Cooperatives).

As a comparison, a former IBRD project in West Africa only sold 10 mt for each employee. However, staff disposition needs to change significantly. There needs to be more field salesmen and less clerks. The Chairman should be sufficiently management and financially oriented to run the organization without additional "economists." Daily (contract) workers would be a less costly approach to providing labor during peak periods.

Finally, it should be remembered that these organizations remain "untested" in the new role given them. Their practical experience in managing transport, warehousing, and sales in a cost conscious way is very limited.

2. Product Line

The ACEs have a product line theoretically running into thousands of items. In the past, they had distribution responsibility for all items used in the agricultural economy. The Chairman at Lushnje said he was responsible for up to 7,500 items. Other items besides fertilizers and pesticides include: machinery, plastic sheets, hand implements, spare parts for trucks and tractors, cement, wood, bricks, paint, electrical goods, iron, coal, work clothes, and boots. This diversified product line is a source of confidence for the ACE. Their "profit" from non-fertilizer items for which they presently have a district monopoly gives them a significant financial cushion. The Vice Chairman of the Fier ACE estimated that fertilizer only accounted for 44% of sales revenue. Other ACEs said that up to 80% of their revenue is from fertilizer.

This diversified product line, over which the ACEs have a district monopoly, presents an unfair advantage in a situation where competition from the private sector is being encouraged.

3. Distribution Strategies

All the ACEs have increased their direct penetration into villages. Some, such as Shkodra and Saranda, are just in the process of posting ACE staff to rural areas. Others, such as Berat and Fier, have developed rural selling point strategies not dependent on ACE staff. In these two ACEs, there is a rudimentary concept of creating dealers. These ACEs plan to sell to farmers primarily through selected village agents or dealers. The major problem facing their effort is the fixed retail price which permits an inadequate marketing margin of only 2.5% allowed by the government. The Fier ACE allows its 40 dealers 1% of its margin. However, this is expected to cover local transshipment costs. Calculations showed that this amount would not be sufficient. The Berat ACE plans to sell to selected individuals in 80 villages who will out of "duty" (and perhaps some informal price increase) effect sales to farmers in their locality. At least in the case of the Fier ACE, there is some expectation that these selected dealers will pass on some of the costs to farmers and thus prices there will probably not conform to the rate fixed by government. In interviews with several prospective importers (private individuals) who are presently marketing fertilizer purchased from ACEs in several other districts, it was learned that the informal margin approaches 10% above the government fixed price.

These actions by the ACEs are the beginning of good ideas but they are hampered by the government's approach to subsidy and pricing. If there is to be subsidy, it should be provided at the source, either at the factory or at the port, and allow the marketing system to fully cost its activities in fertilizer distribution as well as provide a profit. Retail prices should be determined by competition.

4. Finance

Under the planned economy, the bulk of resource transfers were not financial. The DFB, its institutional customers, and agents (transport) worked under a centrally determined plan and all shortfalls from target were adjusted within the State annual budget. Failure of any enterprise to achieve a production or service target meant that it went into deficit, a situation that was rectified in the next annual budget cycle when the State formally absorbed the losses.

With the ACEs now separated from the central government, this procedure has, at least theoretically, changed. The ACEs will now have to make monetary payment for many services and will require credit to meet obligations when there is a shortage of cash. As of January 1, 1992, it became technically possible for an ACE to become insolvent though at present there is no formal procedure for determining what would be done with its assets in such a case. Thus, it is not clear what risks the ACEs are undertaking, if any. If the State is forced to absorb any of the ACEs losses, there is little incentive for the ACEs to be efficient.

All of the ACEs interviewed stated that they had bank accounts with the BAD and apparently they are in surplus at the present time. These accounts are not merely nominal; the ACEs when questioned said that they could withdraw cash as required to pay for services such as transport. The ACEs were also confident that they could obtain financing if needed. Such credit at a time when the BAD is depleted however indicates that book adjustments would be required. Therefore, it is not clear whether the ACEs understand that they will in the future have to pay for many services in cash.

The government's policy in this matter seems ambiguous. On one hand, these enterprises are supposed to be, according to the Law of Enterprises, financially self sufficient; but on the other, it is possible for loans to them to be guaranteed if such loans are required for them to operate. The BAD in this situation has in certain cases begun to ask for guarantee papers from District Executive Councils when they themselves are in doubt about the viability of the ACE activity. While this differs from the automatic guarantee given the SFs, the likelihood that the District Executive Councils will support the ACEs' activity means that any of their losses must be expected to be covered by financing from the State Bank of Albania as passed through BAD.

The ACEs' financial arrangements with their prospective customers, the private farmers and the SFs, are expected to differ. Farmers will have to pay cash unless there is a production credit scheme. The SFs will, on the other hand, be able to make use of the old system by making bookkeeping adjustments with the ACEs through the BAD. The BAD in this situation becomes responsible for making collection and takes any risk of nonpayment by the SFs. This situation will reinforce the tendency of the ACEs to prefer to deal with the SFs because of the ease of transaction. The ACEs will naturally prefer to deal with a few institutional customers than thousands of newly independent farmers. When it is also considered that sales to farmers will mean a laborious process of retrieving the 50% subsidy from government, it is easy to see how the ACEs may tend to concentrate on sales to the SFs. Importantly for the privatization process, private marketing firms will not be able to take advantage of the book adjustment process and thus have difficulty selling to the SFs which represent a significant portion (26%) of the fertilizer market.

5. Commercial Concepts in the ACEs

Some ACEs have "managers" with much knowledge and experience. Still, there is limited understanding of how they will proceed under the Law of Enterprises. It is not clear that they understand what is meant by financial self-sufficiency. The ACEs have gone from a situation in which all staff salaries and other costs have been guaranteed by the government to one in which theoretically it is possible that their jobs are at risk. Salaries under the new dispensation must be covered by revenues. The ACEs probably believe that if they are unable to meet salaries then the government will rescue them; this may be correct.

The ACE managers and professionals recognize clearly that they do not own their enterprise but are, in effect, an agent for the government. Many would like their organization to be privatized so they would become the owners, not the government.

In other areas, their understanding of commercial practices is quite limited. They do not understand how to build up a marketing margin. The government mandated price is their fundamental parameter and the concept of recovering costs plus a profit consistent with risk and expertise is alien. However, in fairness to the ACEs, this commercial practice is presently illegal in Albania.

In general, the ACEs were unable to accept the fact that services represent a cost to the enterprise. Their reluctance to even consider using private transport came from a belief that private transporters charged too much given that government rates were lower even if such transport were unavailable. In general, it was felt that the transport problem which is their major concern should be solved by the government buying them new trucks. Similarly, there was little value placed on the use of warehousing and loading and unloading facilities. One ACE had not even considered off-loading rail cars directly into trucks for transshipment. Instead they planned, as it had been done in the past, to unload into storage for later transport.

III. Project to Reform Albanian Agricultural Inputs Marketing System

A. Emergency Phase--Spring and Early Summer 1992

Albania faces two crises at this moment: one is institutional and the other is that of food supply.

The food supply crisis has, up until now, been met by importing food aid to meet demand not provided by Albanian agriculture. Another complementing approach is to support domestic food production through donations of agricultural inputs, especially fertilizer. Increasing local production of food through providing badly needed fertilizer is an efficient way of maximizing aid because aid administration is decreased.

The primary objective of this project is to assist Albania in making the transition to a privatized system for agricultural inputs and thus meet one aspect of the institutional crisis. However, given the beneficial impact of providing fertilizer to Albanian farmers immediately, the first phase of the project has an additional objective of helping to improve food availability in the short term.

1. Objectives

a. Provide fertilizer to farmers in sufficient time to topdress wheat and fertilize spring seeded crops.

b. Establish early private participation in fertilizer distribution.

2. Scope of the Effort

It is envisioned that 20,000 mt of urea fertilizer be provided during the month of April 1992. During the emergency phase, the key districts identified in Table III-1 would receive the greatest emphasis. Thus, imports would provide 9,200 mt of N. Apparent consumption during March-June 1991 was 9,300 mt of N. Assuming that one urea factory became operational by April 1, 1992, domestic supply of urea could provide an additional 9,200 mt of N for use before the end of June. Thus, nitrogen supply would be double that of the 1991 apparent consumption. Provision should be made for importing up to an additional 20,000 mt of urea in case domestic production falls short of expectations.

Table III-1. Fertilizer Consumption at Key Districts by Fertilizer Type (1990)

District	Urea	Ammonium Nitrate	SSP
	(% of total national consumption)		
Shkodra	7.1	6.9	7.2
Kruja	4.0	4.0	4.2
Durres	7.4	6.2	7.7
Tirana	3.5	6.2	3.1
Elbasan	6.8	5.5	6.4
Korce	7.5	9.1	9.0
Lushnje	9.3	9.8	8.6
Fier	12.8	10.0	10.6
Berat	8.5	5.2	5.5
Vlora	4.2	4.2	4.6
Saranda	4.3	4.8	4.2
Diber	3.2	6.6	4.3
TOTAL	78.6	78.5	75.4

3. Project Parameters of the Emergency Phase

The basic operational parameters of this phase are:

a. IFDC will procure the fertilizer with donor (USAID) funding, sell it at auction, support private enterprises, and assist them in distribution and marketing in Albania.

b. The fertilizer distributors will be financed (90% of cost of fertilizer) by the Bank of Agriculture and Development (BAD) or the Albanian Commercial Bank (ACB) on a commercial basis. Fund recovery is expected and IFDC will assist in monitoring to help assure recovery.

c. The cash receipts and the loan recovery (principal plus interest) will be deposited into a blocked joint (GOA/USAID) account. The use of those funds will be determined jointly by GOA/USAID at a later time.

d. A similar financing approach should be used for domestic production when applicable.

In view of the serious constraints within the GOA to procure fertilizers under cash foreign exchange and in consideration of Albania's need of immediate supply of fertilizer for wheat topdressing and for spring crops, the Albanian Government is expected to be dependent upon foreign donors, for example USAID, for funding.

4. Marketing Approach

The first step toward initiating the implementation of the fertilizer supply project will involve the identification of Albanian businessmen to participate in the marketing. IFDC will identify businessmen to assure a large enough group to begin the process of developing a competitive open market. The identification of these businessmen will take place through an open and competitive process.

IFDC has already begun this process by announcing in the Albanian media its desire to meet businessmen interested in the fertilizer business. Two television spots, one a news item which carried coverage of IFDC's meeting with the Director General of the State Bank and another, an extended interview by the Agricultural Program Director of Albanian television have announced IFDC's intentions to a large audience. Additionally, IFDC was interviewed by an Albanian newspaper having the largest circulation. In both the television and newspaper messages, IFDC's desire to meet potential private fertilizer distributors was given prominence. Additionally, IFDC has contacted the most active Albanian Chambers of Commerce (Tirana, Shkodra, and Saranda) for names of prominent businessmen that might want to engage in fertilizer marketing.

Several businessmen (35) from most of the geographical regions of Albania were interviewed. They were questioned with regard to their present business activities, assets available to support fertilizer marketing or that may be used as collateral for commercial loans, and their prospective business plans.

IFDC will begin assisting the potential private fertilizer distributors in various technical aspects of marketing when assurance is obtained for the import. IFDC has traveled extensively in country and has analyzed the distribution potential of various markets. Particularly promising are the distribution networks that might be developed around the new rural markets that have recently sprung up and the many rail stations that exist in heavy fertilizer consuming areas.

5. Financial Approach

The BAD has been established by the GOA as a commercial bank for distribution of agricultural credit in the country. The ACB may receive deposits and may provide credit for the conduct of business. Thus, the two banks may be competitors to provide loans to fertilizer dealers.

The BAD and the ACB will extend credit to private distributors either individually or juridically, if they need such credit to buy the fertilizer. These loans will be for 90% of the full cost of the purchase. The value of consignments of fertilizer will be registered in special accounts to be opened with the BAD or the ACB for depositing sales proceeds. Cash receipts will be deposited to those accounts and the BAD or the ACB will make a loan agreement with distributors for the remaining value of the consignment. The funds (principal and interest) generated by debt liquidation will be deposited in the same local currency accounts. This account will constitute the counterpart fund account which will be used as agreed by GOA and USAID.

6. Procurement Approach

IFDC will undertake the tender formalities and finalize awarding of tenders to place orders to the suppliers. The award of contracts would be subject to the terms and conditions of the donor's project administration instructions or guidelines, pre- and post-approval requirements, if any, applicable to the procurement of commodities.

All imported fertilizers will be liable to preshipment and loading inspection, including determination of weight and chemical analysis of the contents. Inspection will be carried out through one or two reputed international inspection firms specialized in the inspection of fertilizers at the supplier's cost in the port of loading and/or supplier/manufacturer's warehouses.

All clearing and bagging charges are to be paid by the foreign suppliers as shipment will be on a "liner out" basis.

A summary of general guidelines follows:

a. Importer: IFDC will import the fertilizer.

b. Guidelines for procurement: The procurement procedures of donor countries will be followed. Pursuant to these procedures, the procurement will be on the basis of International Competitive Bidding and/or negotiated purchases as situations warrant and to be determined on immediate existing situation.

c. Delivery and Shipment: Bulk shipment will be bagged on ship or wharf using portable bagging equipment supplied by shipper, c.i.f. Albanian ports, liner out delivery.

d. Restriction on Re-export: Fertilizers imported under the donor's funding cannot be re-exported.

e. Donors: Those international, multilateral, and bilateral organizations providing financial and other assistance for the project.

7. Logistics Strategy

The massive amounts of food aid coming into Albania are absorbing significant amounts of port capacity and transport resources. Therefore, the project must devote special care to ensuring that there are no logistical bottlenecks that might hamper fertilizer distribution. Three areas are important: port capacity, transport, and warehousing.

a. Ports

Discussions with the Durres port authorities including its Port Director underline the need for careful planning in this area. While a technical analysis indicates that Durres and Albania's other ports could handle an amount significantly more than the planned import of fertilizers, the Durres Port Director did not feel confident about imports of more than 15,000 mt over a 1-month period. A shipping coordinator that supervised bulk discharge of 20,000 mt of wheat felt that this amount erred on the conservative side. He had averaged 1,500 mtpd with a maximum of 2,500 mtpd in his own operations. He suggested that if there were serious worries about port discharge that the use of portable bagging operations should be considered.

While the port can technically handle 20,000-mt capacity ships, it was generally felt that it would be better to ship in smaller vessels having capacity between 10,000-14,000 mt. The port has the capacity to lighter off vessels into smaller MOT vessels (up to 3,500 mt capacity each) which could then be discharged at Albania's other ports (Table III-2).

The port authorities reluctance to consider receiving more than 15,000 mt in a 1-month period arose from their lack of confidence in performance of the transport sector.

IFDC plans to import urea in bulk in 10,000-mt vessels, use portable bagging equipment, transfer first bagged material to smaller vessels, and ship to Vlora and Saranda, and transport the remainder of the fertilizer to districts via rail and trucks.

b. Transport

The rail system can provide many stations for off-loading fertilizer within the key districts (Table III-3), but the system is currently virtually idle. The General Director of the Railways said that the rail system could handle up to 1,000 mtpd from the Durres port. The MOT in Tirana was less confident estimating that the rail system could only handle about 500 mtpd. A major problem with the rail system is security. Both the rail authorities and the ACE Directors were extremely concerned about theft from rail cars during the present crisis period. The project will need to work with the railways and perhaps help them think through any assigned transport tasks.

Given the uncertainty of adequate availability and security of transport for fertilizer from ports to the districts, it is advisable for IFDC to import trucks which can be dedicated to fertilizer transport during the emergency phase. The trucks should be operated on a commercial basis and later sold to private transport operators and/or private fertilizer dealers.

Table III-2. Port Characteristics: Saranda, Vlora, Shengjin

	Saranda	Vlora	Shengjin
Number of berths	2	4 (2 with crane)	2
Draft	6 m	7 m	7-8 m
Stated ship capacity	7-9,000 mt	6-7,000 mt	3,500 mt only ships with crane
Working cranes	Yes	Yes	No
Number of port trucks	4	10	8
Warehouse capacity	1,200 mt	none	1,800 mt
Off loading (per day):			
maximum	600 mt		
per ship	200 mt	500 mt (with crane)	-
Distance to rail	-	5 km	8 km
Telephone	Yes	Yes	Yes
Telex	No	No	No

Table III-3. Distances from DURRES Port to Rail Stations[a]

Station	District	km
Shkodra	Shkodra	115
Rreshen	Mirdita	82
Lezha	Lezha	74
Milot	Kruja	60
LAC	Kruja	53
Fushe-Kruja	Kruja	40
Vlora	Tirana	22
Kashar	Tirana	31
Kavaja	Durres	21
Rrogozhina	Durres	36
Elbasan	Elbasan	77
Librazhd	Elbasan	102
Prrenjas	Elbasan	129
Pogradec	Korce	150
Lushnja	Lushnja	54
Fier	Fier	86
Ballsh	Fier	112
Vlora	Vlora	120

a. Rail stations that can receive fertilizer.

Availability of trucks is problematic. No one seems to be able to quantify this resource. The MOT breakdown of government trucks given in Table II-2 seems to vary widely from information gathered at the District level.

The existing trucks are old and breakdown often. Many of the trucks formerly under the control of the MOT have been privatized to former drivers who may have difficulty in obtaining spare parts. There are still significant numbers of trucks under the control of some District Executive Councils. In the Vlora and Lushnje Districts there was confidence that the MOT trucks could handle all estimated transshipment requirements for their areas. In the Saranda District, the ACE Director was less confident. There private trucks have apparently been dedicated to the import traffic from Greece.

c. Warehousing

It is difficult to get overall capacity statistics in this area, but based on discussions with the ACEs, Railways, Eximagra, and District Executive officials and the 35 potential fertilizer dealers, there appears to be sufficient storage capacity for this phase of the project and probably for the long term effort as well. Evidence of field trips corroborate much of what officials in control of district level warehouse have said. There are many empty warehouses in Albania.

d. Distribution Costs

The estimated cost of distribution of fertilizer from the ports to the villages is generally less than Lek 260/mt to the key districts in which emphasis would be placed during the emergency phase (Table III-4).

8. Emergency Phase Policy Recommendations

For the project to succeed certain GOA policies need to be changed. Recommendations in various areas are given below.

Table III-4. Cost of Fertilizer Distribution to Selected Districts

District	Rail	Transshipment[a]	Off Loading[b]	Total
	- - - - - - - - - - - - - -(Leks/mt)	- - - - - - - - - - - - - -		
Shkodra	92	90	70	252
Korce	120	158	70	348
Lushnja	43	40	70	153
Berat	75	114	70	258
Vlora				
Rail	96	50	70	216
Sea	72	50	70	192

a. Based on estimated average transshipment in each district. This estimate is conservative and may be on the high side. This estimate does not factor in the possibility of rail shipment to stations other than those at the district headquarters.

b. Assumes two off loadings; in some cases, one off loading may be possible.

a. Prices and Subsidy

(1) Retail prices must be liberalized, i.e., set free from any government control so that private marketing firms can fully recover costs and make a profit on sales.

(2) Prices for crops must either be liberalized or their procurement rates increased so they reflect the recent 50% devaluation of the Lek.

b. Transport

(1) The MOT and District Transport Enterprises must move faster to privatize their trucks. Such trucks that remain with these organizations during the period of the project must be made freely available to all. New private marketing firms must have equal access to them along with the state enterprises such as the ACEs.

(2) Fertilizer must be given priority status, equal to that of food imports, at the ports.

(3) IFDC should be permitted to import trucks on a duty-free basis and operate the fleet on a commercial basis dedicated solely to fertilizer transport during the emergency phase.

c. Fertilizer Production

(1) Government efforts to revive its fertilizer plants should focus on the Fier urea production. Fertilizer production should receive priority in allocation of natural gas.

(2) Importation of gasoline needed to start the nitrate plant should receive priority.

d. Agricultural Exports

Exports of certain agricultural products should be allowed, particularly vegetables and fruits. This would avoid local market gluts for these items and sustain product prices sufficient to make the use of fertilizer attractive to farmers. The exports would also provide foreign exchange presently needed in the economy.

IV. Status of Fertilizer Plants

A. General

There are two fertilizer production complexes in Albania: the phosphate unit north of Tirana at Lac and the nitrogen unit south of Tirana at Fier. The phosphate complex consists of three sulfuric acid plants, two run-of-pile (ROP) single superphosphate (SSP) plants, and one SSP granulation plant. The nitrogen complex consists of one ammonia/nitric acid/ammonium nitrate train and two ammonia/urea trains. The first elements of these complexes were started about 26 years ago and have been in continuous production until mid-1991 when they were shut down due to a pyrite mine shutdown and a natural gas shortage.

A team of two fertilizer production specialists was assigned to visit the complexes at Lac and Fier to determine their status. This team received valuable assistance from the Albanian Chemical Institute of Study and Projection (ISPT KIMIKE) in orientation, transportation, and interpretation during the plant visits. The Vice Director of the Institute accompanied the team on its inspections and assisted in the collection of data. Discussions were held with plant managers and engineers, and inspections of the plant facilities were made. The results of these investigations are reported below.

B. The Single Superphosphate (SSP) Complex at Lac

The complex at Lac contains three sulfuric acid plants, two ROP SSP plants, and an SSP granulation plant (Table IV-1). There is also a unit that produces sodium fluosilicate (Na_2SiF_6) from hydrofluosilicic acid generated by the SSP process. All of the sulfuric acid plants use the outmoded single contact/single absorper (SC/SA) technology. The sulfur (S) feed to each plant, however, is processed differently; whereas from the contractor onward, the plants are essentially the same. Both SSP plants are of the same ROP design. The SSP granulation plant design is based on a rotary-drum granulator. These units range in age from 3 to 26 years.

1. General History of Lac Phosphate Complex

The Lac complex was originally known as the metallurgical and phosphate complex since copper as well as phosphate fertilizer is produced. About a year ago the GOA divided the management into a metallurgical complex (copper) and a phosphate complex (SSP). The team assessed the phosphate

Table IV-1. Single Superphosphate Complex at Lac

Plant	Production Capacity Design	Production Capacity Actual	Year Built	Sulfur Source	Phosphate Rock Source	Age of Plant
	- - - - - - - (mtpy)	- - - - - - -				(years)
No. 1 sulfuric acid	40,000	35,000 (27,000 for SSP)	1966	Mineral pyrites (FeS_2)		26
No. 2 sulfuric acid[a]	45,000	35,000	1979	SO_2 from copper plant		13
No. 3 sulfuric acid (Polish plant)	60,000	(?) No operation	1987	Iron pyrite concentrate		5
No. 1 SSP plant	110,000	150,000	1966		Egypt, Algeria, Jordan	26
No. 2 SSP plant (same design as No. 1 SSP)	110,000	150,000 (Production test only)	1989		Has not operated	3
SSP granulation	60,000	65,000	1966			26

a. No. 2 sulfuric acid plant now belongs to Metallurgical Complex (division occurred early 1991).

complex only (Figure IV-1). The No. 1 sulfuric acid plant, the No. 1 SSP plant, and the SSP granulation plant are the oldest plants in the phosphate complex. They were built as an integrated train 26 years ago (1966). The sulfuric acid plant was designed to operate using iron pyrite (FeS_2) as the sulfur source. The FeS_2 is mined at the Spac mine and is transported by truck directly to the Lac complex (40 km). The mines were shut down in August 1991, and the GOA reassigned the trucks used for transport to other projects. Also, the prisoners being used to operate the mine were released, creating a labor shortage.

The No. 2 sulfuric acid plant was built 13 years ago (1979). It was built to use sulfur dioxide (SO_2) gas from the copper sulfide blast furnace, which is part of the metallurgical plant located directly adjacent to the phosphate complex. The metallurgical plant operates on beneficiated ore from the Spac mine. This ore is transported (10 km) by trucks to the beneficiation plant where it is processed. The beneficiation process concentrates the copper (Cu) ore from 1% to 15% Cu and also produces an iron pyrite concentrate containing about 45% S. These ores are then loaded on rail cars for transport to Lac (30 km). The No. 1 SSP plant production capacity is adequate to use the total output of the No. 1 and No. 2 sulfuric acid plants (Table IV-2).

The No. 3 sulfuric acid plant was built to use the iron pyrite concentrate from the beneficiation plant as feed. The No. 2 SSP plant was built to use the output of this sulfuric acid plant. The No. 3 sulfuric acid plant was built 5 years ago (1987), and the No. 2 SSP plant was built 3 years ago (1989). Neither plant has been put into operation.

2. <u>Current Status of Phosphate Complex</u>

The phosphate and adjacent metallurgical complexes have been completely shut down since August 1991 because of a lack of raw materials. In order to resume operation at Lac, the mines at Spac, which furnish the raw materials, must be restarted. We were informed by the Lac complex management that in order to reopen the mines, buses must be provided to transport workers to the mines from nearby villages. The former labor force (general prisoners) has been released and is no longer available. Also, it is estimated by the plant management that about 15 trucks (10-ton capacity) are needed to haul the natural iron pyrite ore from the mine to the No. 1 sulfuric acid plant. The plant managers thought that

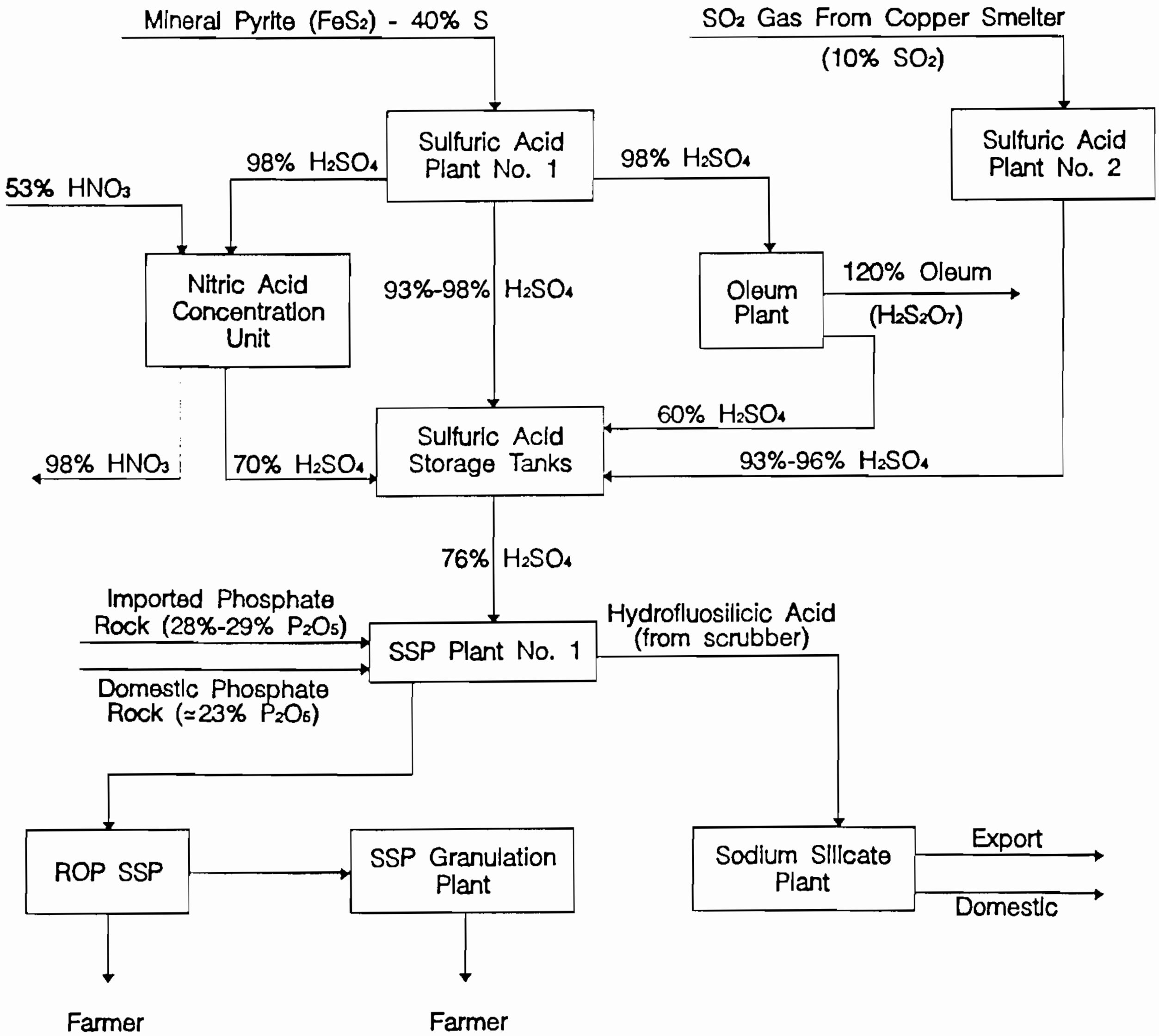


Figure IV-1. LAC Phosphate Complex Operating Scheme (does not include No. 3 H_2SO_4 or No. 2 SSP Plants).

Table IV-2. Production History of Lac Phosphate Complex

Plant	Production						
	1985	1986	1987	1988	1989	1990	1991
	(mtpy)						
No. 1 sulfuric acid	50,446	51,955	52,138	50,267	50,599	45,814	17,262
No. 2 sulfuric acid	22,623	33,949	28,195	31,014	31,618	22,163	3,658
No. 3 sulfuric acid	-	-	-	-	-	-	-
No. 1 SSP	156,980	167,479	174,772	165,000	164,187	141,525	43,067
No. 2 SSP	-	-	-	-	1,000	-	-
SSP granulation	69,459	68,909	60,531	60,888	55,035	42,178	1,073

Source: Lac phosphate complex.

it would result in confusion to attempt to transport this ore by rail from the rail head at the beneficiation plant along with the copper ore and iron pyrite concentrate. They feel that the natural iron pyrite ore should be carried by truck from the mine directly to the Lac complex. This is not logical. All of the ores should be transported by rail from the rail head. This would reduce the number of trucks needed to haul ore. Since all of the ore, copper as well as iron pyrite, must be transported 10 km to the beneficiation rail head by truck, it is important to decrease the number of trucks involved and use the existing rail facilities where possible.

a. The No. 1 sulfuric acid plant is reported ready to operate. This plant is quite old (26 years) and in poor condition, especially the pyrite furnace. The average life of a typical SC/SA sulfuric acid plant is 20-25 years.

b. The No. 2 sulfuric acid plant is reported ready to operate. This plant is 13 years old and is in fair condition. Both No. 1 and No. 2 plants could operate if raw materials were available.

c. The No. 3 sulfuric acid plant was designed to operate using iron pyrite concentrate from the copper ore beneficiation plant as a feed. This plant has serious design problems and has never operated successfully. It was built in 1987 and is 5 years old.

d. The No. 1 SSP plant is reported to be ready to operate. This plant has no flowmeters at present and has not had meters for many years. The plant feeds are manually adjusted using "operator experience." The remainder of the plant equipment is standard and in fairly good condition.

e. The No. 2 SSP plant has been operated only for a brief period during the acceptance test and is reported ready to operate. This plant was completed 3 years ago. It has a rock meter but no acid or water meters. This plant is a duplicate of the No. 2 SSP plant and should operate in about the same manner.

f. The SSP granulation plant is ready to operate and is in fairly good condition.

In summary, the No. 1 sulfuric acid plant is in marginal operating condition while the other plants, excluding the No. 3 sulfuric acid plant, are in fair condition and ready to operate.

3. Plant Problems

The No. 1 sulfuric acid plant is in poor condition due to age and corrosion. The pyrite roasting furnace is the most urgent problem on this plant. This furnace has been repaired and patched numerous times over the 26 years of its operating life. The shell of the furnace is completely covered with patches, and in some places the patches overlap. In addition, the furnace lining is in poor condition and bricks may drop from the dome at any time. The rest of the plant is in poor but operable condition. The plant management has developed a plan to completely replace this plant in two phases. In fact, they have contracted with the Chinese (who designed the plant) to replace the furnace and other equipment up to the SO_2 contractor unit (Phase 1). This equipment has been built and is on the dock in Shanghai awaiting payment and transport. The payment required is US $2,500,000 plus US $100,000 for transport. An additional US $500,000 would be required for assembly of the plant at Lac bringing the total to US $3,100,000. The plan calls for the rest of the plant to be replaced later at an estimated cost of US $4,000,000 (Phase 2). This ambitious scheme must be regarded in light of the existing ore reserves. The iron pyrite grade has declined from 45% S to 40% S at the present time and is expected to decline to 35% S in 3 years. It is predicted that this ore will continue to decline in grade and be depleted in 9 years. Replacement of the furnace with an Albanian-built copy that would cost an estimated US $500,000, together with continuing repairs to the rest of the plant as needed to maintain operation, is a possible alternative option to extend the life of the plant.

A plan has been developed by the plant management for blending pyrite concentrate (45% S) with natural pyrite ore for furnace feed when the grade of the natural ore declines to 35% S. The ores would be blended (30% concentrate and 70% natural ore) in order to maintain the SO_2 gas at a suitable concentration from the furnace and still continue to use some natural pyrite as feed. This would make operation of the waste heat boiler more difficult, but it should still be possible to operate.

Another problem with the No. 1 sulfuric acid plant is the high maintenance associated with the advanced age and general poor condition of the plant equipment. The downtime on this unit will remain high, but with continued effort by the plant staff production, it should be possible to operate the plant for several more years. The sulfur recovery on this plant, due to outmoded technology and age, is only 90%. A 10% sulfur loss as SO_2, SO_3, and acid mist is environmentally unacceptable.

The No. 2 sulfuric acid plant is dependent on the copper sulfide blast furnace for SO_2 gas feed. This plant cannot resume operation until the copper smelting operation resumes. Copper production is, of course, dependent on a steady flow of ore from the mine. The problem of obtaining production from the No. 2 sulfuric acid plant cannot be separated from the problems of restarting the mine and the copper smelter. The copper ore reserves at the mine are estimated to last 20-30 years at the present rate of consumption. The No. 2 sulfuric unit is in fair condition and can be ready to operate within 2 weeks. One section of the absorper unit is badly corroded but is still operable. The sulfur recovery on this plant is 96%, which is not unusual for the outmoded SC/SA type of sulfuric acid plant. While this loss is quite high, the real environmental problem is caused when the No. 2 sulfuric acid plant shuts down for repairs, and the copper smelter continues to operate and vents all the SO_2 gas generated directly into the atmosphere (Figure IV-2). This presents intolerable environmental conditions for the plant operating personnel and the surrounding countryside. This usually occurs for about 30 days per year. This practice should be stopped at once and operation allowed only when both plants can operate simultaneously. The sulfuric acid plant serves as a scrubber for the copper smelter off-gases and should therefore be considered an integral and critical part of the smelter operation.

Both the No. 1 and No. 2 sulfuric acid plants are a Chinese design and use Chinese equipment. This is true for all the plants in the phosphate complex except the No. 3 sulfuric acid unit which is a Polish design and uses Polish equipment.

The No. 3 sulfuric acid plant (the Polish-designed plant) was completed in 1987, but it has not been put into operation because of serious design errors. Some Polish specialists attempted to correct the problems during startup tests but were not successful. They returned to Poland several months ago and have not been heard from since that time.

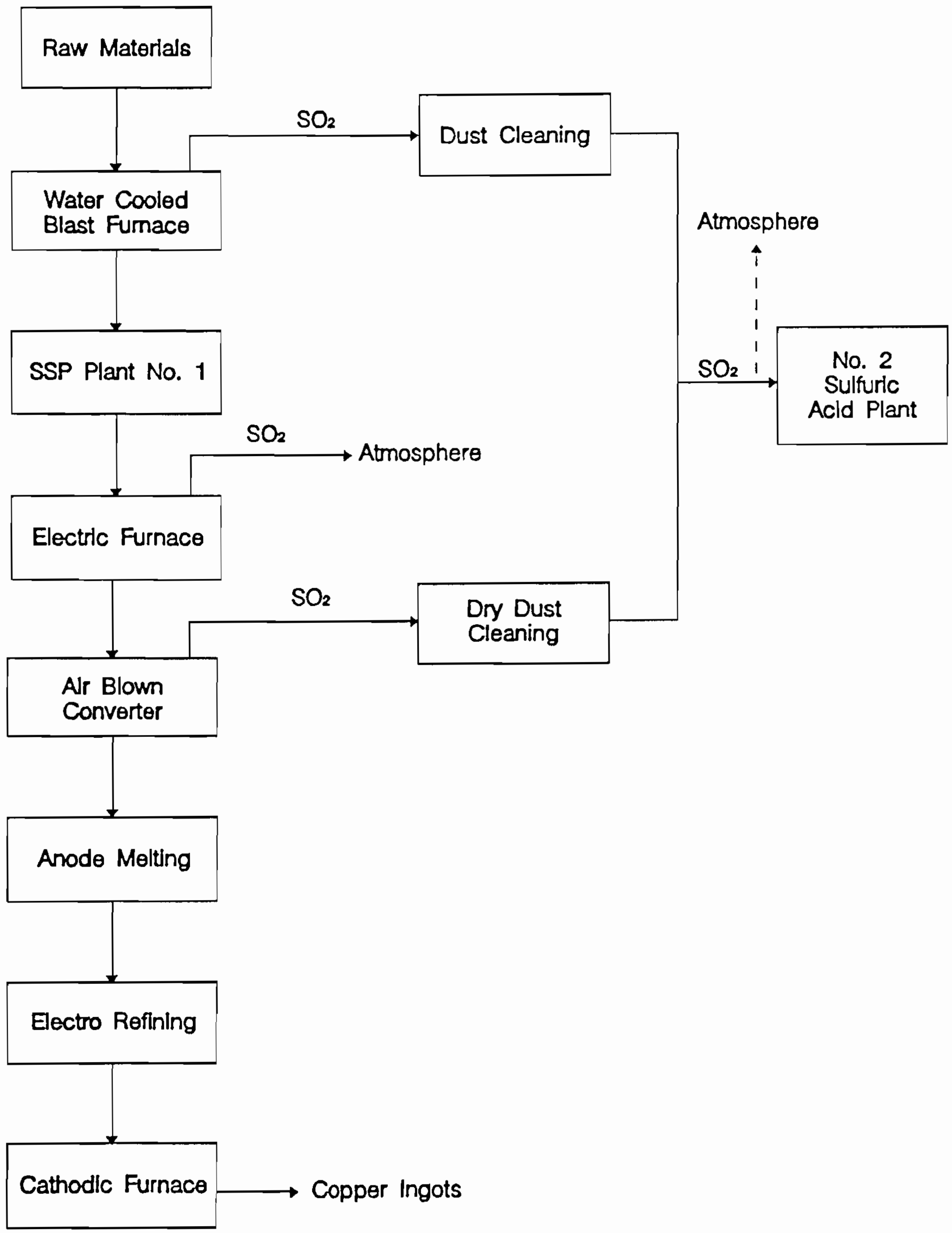


Figure IV-2. Copper Smelter–SO_2 Feed to No. 2 Sulfuric Acid Plant.

One of the main problems with the No. 3 acid plant is that it will not fluidize the furnace bed when a concentrate with the designed moisture content of 10%-12% is used as feed. Under these conditions agglomeration occurs at the feed inlet and causes a shutdown. To help correct this problem, the concentrate feed moisture content was lowered to 4%-5%. At this level some fluidization of the bed occurred and there was less agglomeration. Another problem is that the particle size of the concentrate feed is small (minus 74 microns) and when this material is fluidized, about 90% of the feed is carried by entrainment with the SO_2 gas to the waste heat boiler. By comparison, only about 10% of the natural pyrite ore feed to the No. 1 acid plant furnace is carried over to the boiler. The feed to the No. 1 plant is, however, much coarser. This problem is greatly compounded by the fact that in the No. 3 acid plant boiler, the dirty gas from the furnace is passed through the boiler tubes. Dust-laden air should never pass through boiler tubes but instead should contact only the outside of the tubes. This leads to tube fouling within a few hours and causes a shutdown of the plant. A plant similar to the No. 3 unit was built in Turkey by a Polish firm. The Turkish plant was reported to have the same problems as the No. 3 plant. The Polish firm claims that they have solved the problems in the Turkish plant. The Turkish plant is, in fact, shut down. This plant is located at Murgul, Turkey, and should be contacted for particulars before any further investment is made in the No. 3 acid unit. At this point the Polish firms is still contractually obligated to make the No. 3 acid plant operate.

The No. 1 SSP plant uses phosphate rock from several North African sources (Egypt, Jordan, and Algeria). The imported rock is blended with small amounts (about 25%) of low-grade Albanian phosphate rock. The phosphate rock is ground in an air-swept ball mill. The mill is equipped with a coal-fired furnace for drying in case the rock contains excess moisture. The wet rock is dried to 4.0%, or less, moisture. The rock is ground to 85% minus 100-mesh (0.15 mm). This is a slightly coarser grind than the design particle size (95% minus 100-mesh) from the mill. This larger particle size is due to exceeding the design feed rate to the mill. This is a minor deviation from normal and should not be considered a problem at this time. The ground rock is pneumatically conveyed to the SSP reactor feed hopper. The rock discharges from the hopper through a slide gate into a series of two screw conveyers which discharge into a bucket elevator that returns the rock to the hopper. An adjustable slide gate on one of the screw conveyers is used to bleed rock feed to the reactor. This slide gate is manually adjusted to control the amount of rock continuously fed to the reactor based on "operator experience". There is no rock flowmeter in the plant. The 76% sulfuric acid is fed to the reactor by manual adjustment of a valve on the acid feed tank discharge line. This adjustment is also made manually using "operator experience." Water is fed to the reactor by the same method. The water feed is supposed to yield an acid equivalent to 68% sulfuric acid in the reactor. While operator experience is a needed and valuable asset in fertilizer production, it is no substitute for proper metering devices. Efficient and economical use of valuable raw materials require accurate metering using reliable instruments to obtain proper reaction ratios.

The rock, acid, and water are mixed in an open-top oval reactor with three turbine agitators. After about a 1.5-min retention time in the reactor, the mix is discharged into a rotating, circular den containing a vertical cutter wheel. The SSP discharges after 2 h through a bottom chute onto a conveyor belt which transports it to the curing shed. The SSP cures for about 15 days and is turned and mixed every few days using an overhead crane. There is no bagging of any kind at the complex, and all of the SSP is shipped in bulk. The No. 1 SSP plant is in good condition and ready to operate except for the lack of meters.

The fluorine-laden off-gases from the rotary curing den are collected and water scrubbed using two cross-flow scrubbers in series and one spray tower scrubber before venting the gases into the atmosphere. There are four scrubber recirculation pumps, of which three are inoperative due to corrosion. Only one pump is still operating. This scrubber design is an adequate fluorine treatment system and presents no environmental problems. The scrubber solution (7%-9% hydrofluosilicic acid) is reacted with a sodium chloride (NaCl) solution to produce sodium fluosilicate which is crystallized, centrifuged, dried, and bagged in 40-kg paper bags with a polyethylene liner for export and domestic use. Mother liquor from the centrifuge is discharged into the sewer. This mother liquor is a weak hydrochloric (HCl) acid and should be treated with calcium carbonate (limestone) or some other neutralizing agent before discharge.

The No. 2 SSP plant is a duplicate of the No. 1 plant and should operate in the same manner. This plant has been operated for only a brief period (1,000 mt) for an acceptance test. It performed well and has not been operated since because of problems with the No. 3 sulfuric acid plant. The No. 2 SSP plant is also affected by the same lack of flow meters as is the No. 1 SSP plant. This plant is ready to operate when raw materials are available.

The SSP granulation plant consists of a rotary-drum granulator 6 ft (1.83 m) in diameter and 24 ft (7.32 m) long; a cocurrent, coal-fired rotary dryer 7 ft (2.13 m) in diameter and 46 ft (14.02 m) long; an ambient air rotary cooler; two parallel vibrating screens; a roll crusher (with manual blade cleaners); and several bucket elevators and conveyors. Granulation of the cured ROP SSP is accomplished by use of water sprays in the granulator. The moisture content of the granules at the inlet to the dryer is 10%-12% and at the outlet of the dryer, about 5%. The recycle-to-product ratio (kilograms recycle/kilogram product) is a minimum of 6:1. The use of steam under the bed instead of cold water sprays to granulate the material would decrease the recycle ratio to about 1:1 and decrease the load on the dryer and crusher. This would be accomplished because the use of steam to granulate the material would produce granules with a lower moisture content and higher temperature than those produced by the use of cold water. Steam for this purpose, however, is not currently available. The dryer is limited in capacity by the use of low-grade Albanian coal (about 2,000 kcal/kg) as opposed to a 4,000 kcal/kg coal used for the dryer design. If steam were used for granulation and the dryer was fired with a better grade of fuel, the production rate of the granulation plant could, at a minimum, be doubled. The screens are a double-deck, sloping, vibrating type. The top screen has a 4-mm opening, and the bottom screen is 1 mm. The oversize material is sent to the roll crusher and then returned to the screens.

This is a conventional design SSP granulation unit and it is in fairly good condition. As mentioned earlier, steam for the granulator and more heat for the dryer are urgently needed. Otherwise, the plant is ready to operate.

Bagging of the fertilizer was performed at the complex many years ago, but no equipment remains today.

4. Summary

The condition of the phosphate complex at Lac is affected by the advanced age of three of the plants and the long-standing neglect of all of the plants because of a lack of capital for maintenance. These plants were shut down in August 1991 when the mines at Spac ceased operation because there were no raw materials. The phosphate complex cannot resume operation until the mines are reopened and transport of ore to the complex is established. If transport to Lac by rail is used to the maximum, there will still be a need for at least 10 dump trucks (10-tonne capacity) to carry ore from the mines to the beneficiation plant and the rail head. Also, buses to transport workers to the mine will be needed. Unless other arrangements can be made, considerable expense will be added to the project (approximately US $1,000,000) for trucks and buses.

The phosphate complex would require an estimated US $3,400,000 (Table IV-3) to put all of the plants back into operation with environmental safeguards. This does not include the No. 3 sulfuric acid plant. This amount does not include vehicles, administrative costs, or contingency funds. These budget estimates are based on obtaining the maximum amount of production at the minimum cost and does not suggest that these plants would be improved to modern technical standards. It should be noted that this estimate is for budget purposes only and should not be considered as a detailed analysis.

In the case of the No. 1 sulfuric acid plant, approximately 1 year of production can be achieved without modification. The same is true for the No. 2 sulfuric acid plant. The No. 3 sulfuric acid plant cannot operate due to serious design defects. The contract with the Polish constructor is still open and should be allowed to settle before a decision is made about its fate. The No. 3 acid plant will require major modifications, or replacement, of the furnace and waste heat boiler before it can possibly operate. The cost of these modifications to the No. 3 plant will require a detailed study before a cost estimate can be prepared.

Both SSP plants (No. 1 and No. 2) and the granulation plant are ready to operate. All of the phosphate complex, excluding the No. 3 acid plant, is ready to operate, but certain repairs are urgently needed to maintain operation in a safe and environmentally acceptable manner.

Table IV-3. Estimated Cost of Resuming Operation at Phosphate Complex

Plant	Equipment Needed	Estimated Cost (US $)
No. 1 sulfuric acid	New furnace (Albanian manufacturer)	500,000
	Tail gas scrubber	300,000
No. 2 sulfuric acid	New absorper	1,000,000
	Tail gas scrubber	300,000
No. 3 sulfuric acid	Redesigned furnace and waste heat boiler	Unknown
No. 1 SSP	Rock, acid, and water meters	100,000
	Scrubber liquor pumps (4)	200,000
No. 2 SSP	Rock, acid, and water meters	100,000
SSP granulation	50-hp steam boiler	75,000
	Oil-fired burner for dryer	75,000
Bagging	One bagging line--150,000 mtpy	250,000
Spares	Spare parts (total all plants)	500,000
TOTAL[a]		3,400,000

a. Cost of restarting Spac mines and importation of phosphate rock not included.

These repairs can be scheduled for a convenient time and will require 3-6 months to complete.

5. Recommendations

There are two parts to the question of phosphate fertilizer production in Albania: First, should the plants be restarted? And second, what is required to resume production? The first question can again be divided into two parts regarding (1) the production of sulfuric acid from copper smelting and, (2) the production of sulfuric acid from iron pyrite. If copper production is to be resumed, then sulfuric acid must be produced from the smelter SO_2 gas. The logical use for this sulfuric acid is for the production of SSP. A full-scale economic analysis should be made of the metallurgical (copper) and phosphate complexes since they cannot operate separately. If an analysis indicates a net profit resulting from the operation of the copper smelter and the No. 2 sulfuric acid plant, this would indicate that these units should be put back into operation and that the No. 3 acid plant should be redesigned and started. The No. 3 acid plant is designed to use the pyrite concentrate from the copper ore beneficiation plant as feed. The second part of the first question regards the No. 1 sulfuric acid plant. This plant operates using the mineral iron pyrite as feed. This pyrite deposit has a practical life of 3-5 years, which is the expected life of the No. 1 sulfuric acid plant. The economics of operating this unit will obviously be different from that of the No. 2 and No. 3 plants. If it is deemed economically feasible to restart this unit, the operation should not extend beyond the expected life of the plant (3-5 years). For the recommendations given below, it has been assumed that all of the plants will be restarted at a minimum cost, be safe, and operate in an environmentally acceptable manner. Again, it is emphasized that the estimated costs for plant repairs and improvements shown in Table IV-3 are budget figures and should not be taken as a detailed, final cost analysis.

The No. 1 sulfuric acid plant is very old and in poor condition. The furnace must be replaced within 1 year if operation is to continue. Other parts of the plant will be high-maintenance items with increasing downtime for repair. The rapidly dwindling ore supply for this plant (maximum estimated life is 9 years with the grade constantly decreasing) indicates that within 3-4 years this plant may not be economically viable. For this reason, only replacement of the furnace with an Albanian-built unit and the addition of a tail gas scrubber to capture the 10% sulfur loss from this plant that is now escaping into the atmosphere are recommended. Both the No. 1 and No. 2 acid plants are old technology and have high SO_2 losses to the atmosphere. The Albanian plan to rebuild the No. 1 plant with Chinese parts (now awaiting shipment on the dock in Shanghai) should not be followed.

The No. 2 sulfuric acid plant serves as an SO_2 gas scrubber for the copper smelting operation on the metallurgical side of the complex. In the past the copper smelter continued to operate while the No. 2 acid plant was shut down and the SO_2 gas was vented directly into the atmosphere (Figure IV-2). This is a very serious violation of basic environmental ethics. The venting of SO_2 gas at these levels cannot be tolerated and, in fact, has caused labor problems at the complex in the past. The copper smelter should not be allowed to operate when the No. 2 acid plant is shut down. The use of a tail gas scrubber on the No. 2 acid plant is recommended and will decrease the SO_2 emission (4% of SO_2 feed to the plant is currently lost to the atmosphere) to an acceptable level during operation.

The No. 3 sulfuric acid plant is not operable and should be repaired by the Polish firm who built the unit (it has not yet been accepted by the Albanian Government). It is recommended that some relief be sought from the Polish firm before any action is taken by USAID.

The No. 1 SSP plant does not have any flowmeters and has only one out of four required scrubber pumps in operation. The plant is in operating condition except for these items. It is recommended that meters and pumps be supplied to this plant.

The No. 2 SSP plant is new (unused) and is not needed unless the No. 3 acid plant can be made operable. This plant is an exact copy of the No. 1 SSP plant and is in good condition except it also lacks flowmeters. It is recommended that flowmeters be provided for this plant as a backup for the No. 1 SSP plant. In the event the No. 3 acid plant can be made operable, this unit is ready to operate.

The SSP granulation plant has several problems but is ready to operate. The problems are simple but affect the quality and quantity of production. The use of cold-water sprays to granulate the material instead of injecting steam under the bed results in a higher moisture level to achieve granulation. This higher moisture level causes a higher recycle ratio (more recycle per kilogram of product) and a greater load on the dryer. Water is used because no plant steam is available for the granulation unit. The use of a 50-hp skid-mounted steam generator would provide an adequate amount of steam and optimize the granulation efficiency. The dryer is fired by a coal-burning furnace. The heat content of the Albanian coal is about half that of the furnace design so that heat to the dryer is greatly decreased. The installation of an oil burner in the furnace would allow the dryer to meet design specifications. The use of steam for granulation and an oil burner for the furnace would double the production rate of this plant. The SSP granules would also be stronger and smoother. It is recommended that the steam boiler and oil burner be added to this plant.

The original bagging equipment at the complex has long been inoperative. There is a need for bagging to protect the product and to ease handling in the distribution system. Small farmers can handle bags more easily than bulk. This bagging can be most efficiently done at the factory. For these reasons it is recommended that one bagging line be installed at the complex. One line with a 150,000-mtpy capacity will handle the output of the complex.

The spare parts inventory at the complex is very low and should be built up to a minimum level. A lack of spare parts can cause excessive downtime, especially when most of the parts are imported. It is recommended that spare parts be provided for the complex.

With the exception of 3,500 mt of pyrite, there are no raw materials available to the plant. Also, there is no product in storage. Importation of phosphate rock as well as restarting the mines at Spac will be required if operation is to be resumed.

The above recommendations will return the complex to its previous level of production with safe and more environmentally acceptable operation. The No. 1 sulfuric acid plant has an estimated life of about 5 years if the above recommendations are followed. The other plants, excluding No. 3 acid plant, are estimated to have a life of 10-15 years.

C. Nitrogen Fertilizer Production at Fier

1. Background

All indigenously produced nitrogen fertilizers are from a single site located at Fier, south of Tirana. Plant No. 1 is based upon gasoline and Plants No. 2 and 3 use natural gas from the nearby oil/gas fields. There are currently three plants at Fier as follows:

Production Unit	Annual Design Capacity (mtpy)	Year Commissioned	Design Fuel and Feedstock	Plant Designer
a. Plant No. 1: Partial Oxidation Ammonia Unit, Nitric Acid Unit, Prilled Ammonium Nitrate (High-Density) Unit	110,000 (Prilled ammonium nitrate)	1967	Straight-run Petroleum Naphtha. Changed to natural gas in 1971 and to NG and/or gasoline in 1991.	Montecatini
b. Plant No. 2: Steam Reforming Ammonia Unit, Total Recycle Urea (Prilled) Unit	85,000 (Prilled urea)	1976	Natural Gas	Chinese
c. Plant No. 3: Same as Plant No. 2	100,000 (Prilled urea)	1990	Natural Gas	Chinese

The final product from Plant No. 1 is prilled ammonium nitrate. Plant No. 1 was designed to use straight-run petroleum naphtha from Albania to produce ammonia in a partial oxidation ammonia unit of Montecatini design and supply. However, in 1971 the plant was changed-over to use of natural gas feedstock due to severe corrosion problems caused primarily by the high sulfur content in Albanian petroleum naphtha. During the period from 1967 to 1971 when naphtha was being used, there were also many problems with severe pollution and frequent replacement of catalysts due to sulfur poisoning. After switching to high-purity natural gas (98+% methane), the problems were decreased to acceptable levels. Because of shortage in the supply of natural gas, the plant was modified in 1991 to use NG and/or gasoline as feedstock and fuel.

Actual production tonnages for Plant No. 1 as compared to design have been good, even in recent years, as shown in Table IV-4. When adequate supplies of feedstock are available, the main limitation on production is from problems in the air separation unit.

Plant No. 2 was commissioned in 1976 and is designed to produce 85,000 mtpy of prilled urea using natural gas as feedstock. The plant was designed and supplied from China. While there are many mechanical problems due to the poor quality of the equipment supplied from China, plant personnel have been successful in operating the plant at reasonable production rates compared to design capacity as shown in Table IV-4. The average annual production tonnage for the period 1985 through 1989 was about 82,600 mt versus a design capacity of 85,000 mtpy.

When Plant No. 3 was commissioned in June 1990, the natural gas supply was not enough to operate both of the urea plants. Thus, Plant No. 3 was only in operation for part of the year.

Plant No. 3 was designed and supplied from China and is essentially the same as Plant No. 2 except that it is slightly larger with a design capacity of 100,000 mtpy. When the decision was made to build Plant No. 3, it was known that natural gas supplies would not be sufficient for the three nitrogen plants at Fier. Plant management objected to building the third plant, but their superiors instructed them to go ahead with the plant. Further, plant management investigated and recommended selection of process technologies which were further advanced and more reliable than what could be obtained from China. Again, they were overruled by higher officials. The decision was based on the much lower price for the Chinese plant.

Table IV-4. Fier Nitrogen Fertilizer Factory Production of Ammonium Nitrate and Urea

Year	Ammonium Nitrate Plant No. 1 (mtpy)	Urea Plant No. 2 (mtpy)	Urea Plant No. 3 (mtpy)
1985	94,630	77,750	-
1986	110,690	92,540	-
1987	102,610	73,510	-
1988	96,380	77,050	-
1989	104,140	92,420	-
1990	93,420	65,680[a]	24,410[a]

a. When Plant No. 3 was started up in 1990, Plant No. 2 had to be shut down because of insufficient natural gas for operation of both plants.

The Chinese plants are essentially duplications of other process designer's technologies. Thus, the process design is acceptable. However, the quality of the equipment and machinery is not good and, as a consequence, most of the critical equipment items have fully installed spares. This includes major compressors, primary reformer induced draft fans, high pressure ammonia, and carbamate pumps in the urea plants, and other critical equipment items.

In addition to the critical problem of the shortage of natural gas for feedstock and fuel, another major problem is that the general condition of the equipment and machinery in Plant No. 1, and to a lesser extent in Plant No. 2, has deteriorated due to lack of spare parts and failure of the past organization to allocate the funds needed for proper maintenance.

2. Description of Plants

a. Plant No. 1 Nitrogen Plant (Ammonium Nitrate)

The No. 1 nitrogen plant at the Fier complex is designed to produce high density ammonium nitrate prills based on Montecatini technology. The plant consists of the following major process units:

- Air Separation Unit of Linde (Germany) design.
- Ammonia Unit of Montecatini design based on partial oxidation of petroleum naphtha (changed in 1971 to natural gas and to gasoline in 1991) with a design capacity of 150 mtpd.
- Nitric Acid Unit of Montecatini design with an operating pressure of 3.5 kg/cm^2 and design capacity of 270 mtpd of 53% nitric acid.
- Ammonium Nitrate (AN) Solution and Prilling Unit of Montecatini design with a design capacity of 340 mtpd of high density ammonium nitrate prills.

The plant was commissioned in February 1967, and was designed and supplied by Montecatini of Italy. With the exception of the air separation unit using the Linde process, and the gasifier, all of the process technology is from Montecatini. The construction/ erection period was 2 years with supply of equipment, materials, and construction/erection by Montecatini.

The gasification section was originally designed to use straight-run naphtha from Albania for feedstock and fuel. During the early years of operation many problems were encountered due to the high sulfur content of the Albanian naphtha. The problems included severe corrosion of the equipment, excessive emission of pollutants, and frequent replacement of catalysts as a result of poisoning by sulfur and other chemicals.

The plant was changed in June 1971 to use natural gas as feedstock and fuel; and the problems were greatly decreased and/or eliminated. The natural gas from the oil/gas fields surrounding Fier was of high purity (98+% methane) and the plant continued operation with natural gas until May 1991. At that time, due to the shortage of natural gas, the plant was converted to use vaporized gasoline for feedstock and fuel. Operation was continued until October 1991 at which time the plant was shut down due to a short supply of gasoline and the lack of capital to continue operation. Use of gasoline as feedstock in ammonia plants is very unusual and the plant management and technicians have put forth a very commendable effort in learning how to use this technology.

Modifications have been made to the original plant design to allow first the use of natural gas and then the use of gasoline. Significant changes would be necessary to return to the use of refined naphtha. Therefore, the following brief description of the Plant No. 1 process is based on the use of natural gas for feedstock and fuel (Figure IV-3).

b. Plant No. 1 Ammonia Unit

Oxygen from the air separation plant (ASP) via two Sulzer compressors and steam are introduced into the gasifier along with the natural gas feedstock which is compressed to operating pressure and the reaction proceeds at high temperature. No catalyst is required. The hydrocarbons in the natural gas are partially oxidized to CO, CO_2, and H_2O, and these gases are partially converted by steam to CO_2 and hydrogen. The gases exiting the gasifier contain principally CO, H_2, and CO_2 with small percentages of sulfur compounds and carbon soot which is suspended in the gases.

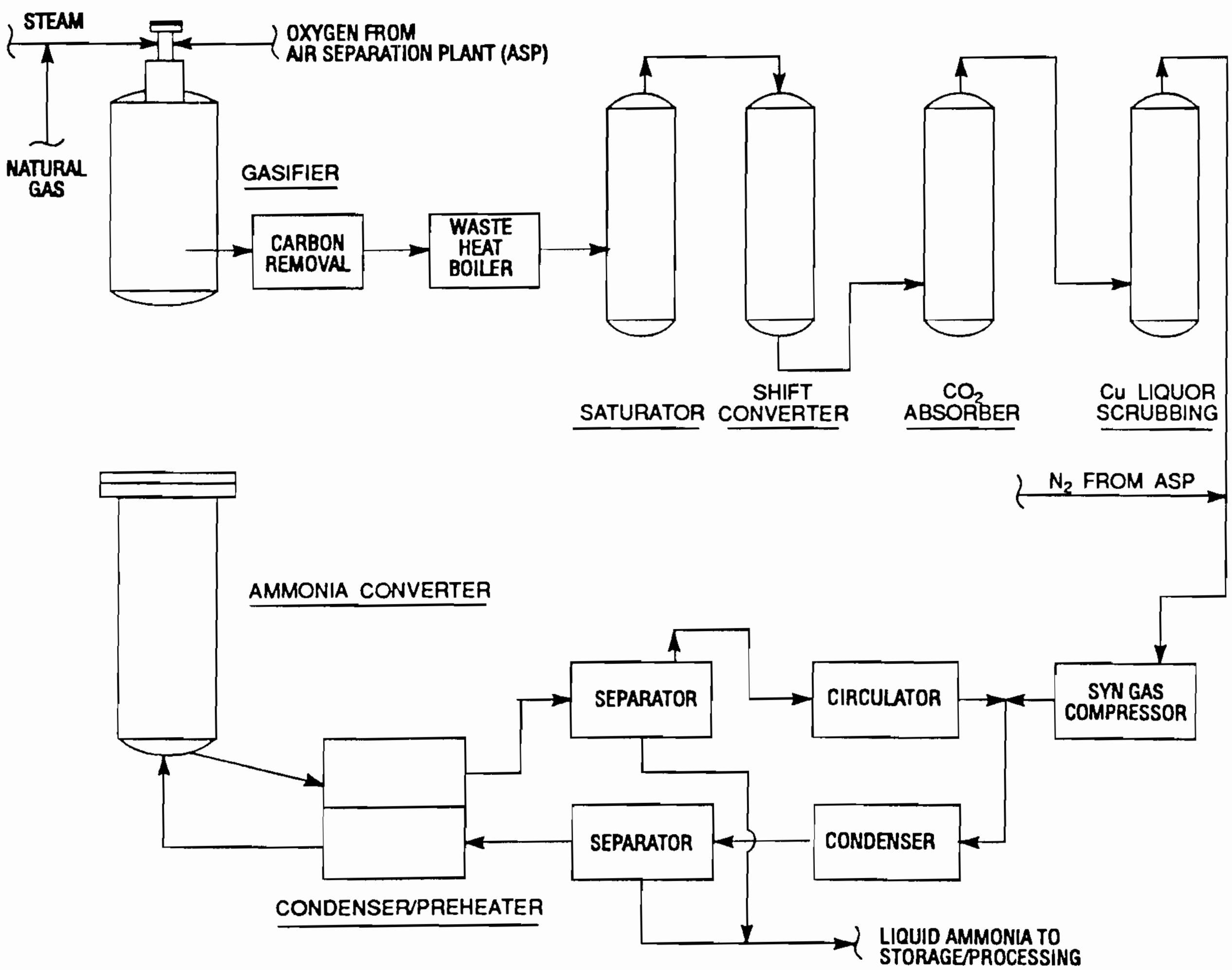


Figure IV-3. Plant No.1 partial oxidation ammonia unit (simplified schematic flow diagram).

After soot removal, the gases are cooled by heat exchange and pass to a sulfur removal unit. This is followed by a saturation step to increase the water content to that required for the following step of shift conversion. In shift conversion, most of the remaining CO is converted to CO_2. The gases from shift conversion are cooled by reboiling the CO_2 removal solvent, followed by water cooled exchangers.

The condensed water is separated and all but trace quantities of the CO_2 are removed in the CO_2 removal unit which uses an arsenic-promoted Vetrocoke process. Next, the remaining trace quantities of CO and CO_2 are removed by scrubbing with a copper liquor process. Nitrogen from the air separation unit is introduced in the proper amount for ammonia synthesis.

The ammonia synthesis unit is of the standard high pressure design (about 320 kg/cm^2). The ammonia unit is designed for a production rate of 150 mtpd which is stored in a spherical storage tank (Horton sphere).

When using natural gas feedstock, and with all equipment and machinery, including the air separation plant operating properly, the design rate can be achieved on a sustainable basis.

All the compressors in the ammonia unit are the reciprocating type and are mostly Pinone Compressors from Italy. Replacement spare parts can be purchased. However, there are essentially no spare parts in inventory. The reason for this, as stated by the plant personnel, is that the former government officials did not provide the necessary funds.

In the past, one of the Sulzer oxygen compressors in the ASP was completely destroyed by a fire caused by a rupture in the casing. For this reason, the ammonia production rate is now limited to only 60% of design.

c. <u>Plant No. 1 Nitric Acid Unit</u>

The nitric acid unit is of standard Montecatini design with an operating pressure of 3.5 kg/cm^2; this is referred to as a medium pressure plant. The design capacity is 270 mtpd of 53% nitric acid (143 mtpd of 100% HNO_3). Figure IV-4 is a schematic flow diagram of the plant.

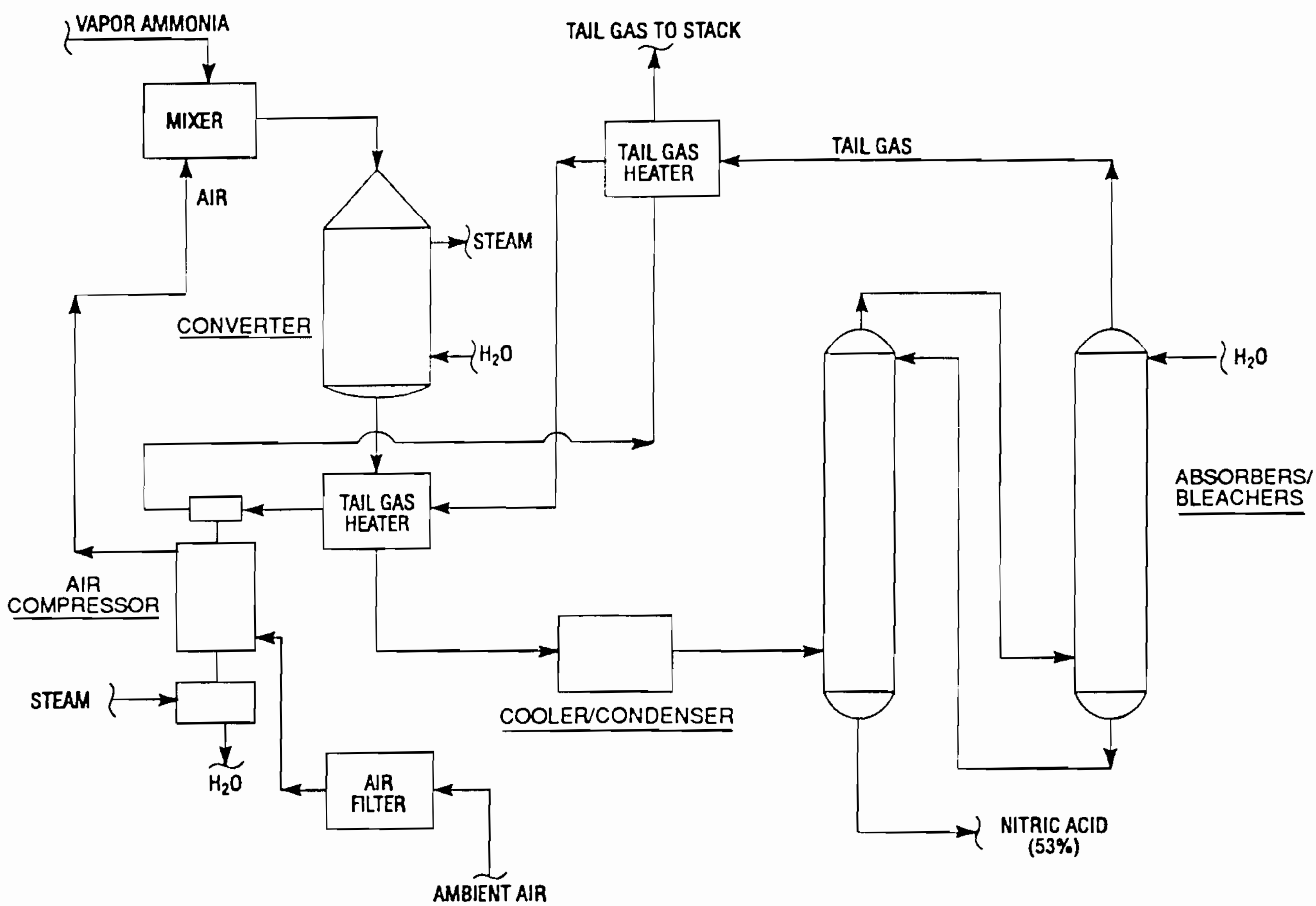


Figure IV-4. Plant No. 1 nitric acid unit (simplified schematic flow diagram).

Vaporized and filtered ammonia is introduced into the converter along with clean compressed air.

The air compressor is of the centrifugal type with a steam turbine driver and a tail-gas expander for power recovery. Steam for starting the compressor is brought in from off-site. After starting, the turbine uses the process steam generated within the nitric acid unit.

Considerable heat is generated from the ammonia oxidation reactions taking place in the converter. Gases from the converter are cooled by generating steam in a process waste heat boiler and by reheating the tail gas from the absorption section. The reheated tail gas passes without further treatment to the stack via the expander turbine of the process air compressor.

The process gases flow from the tail-gas reheater to the cooler/condenser and then to the absorption/bleaching section which consists of four towers.

Product nitric acid of about 53% concentration goes to the storage tanks and the scrubber tail gas is discharged to the atmosphere via the reheater and expander. The tail gas does not undergo any treatment to decrease the NOx content. In the original design, the tail gas was discharged into a short exhaust stack which caused problems with NOx in the working area around the plant. Plant management has since extended the stack to a high elevation which has eliminated the ground-level problem. However, atmospheric pollution caused by NOx is still a serious problem.

d. Plant No. 1 Ammonium Nitrate (AN) Unit

Figure IV-5 is a simplified schematic flow diagram of the Montecatini AN unit. The AN unit consists of two major sections; neutralization and concentration/prilling. Nitric acid (53% HNO_3) and anhydrous ammonia are reacted in the neutralizer to produce an AN solution of about 73% concentration. The 73% AN solution is concentrated to about 99.7+% using a two-stage vacuum concentrator and pumped to four spray heads located in the top of the rectangular prilling tower. The prill tower is based on a natural draft design.

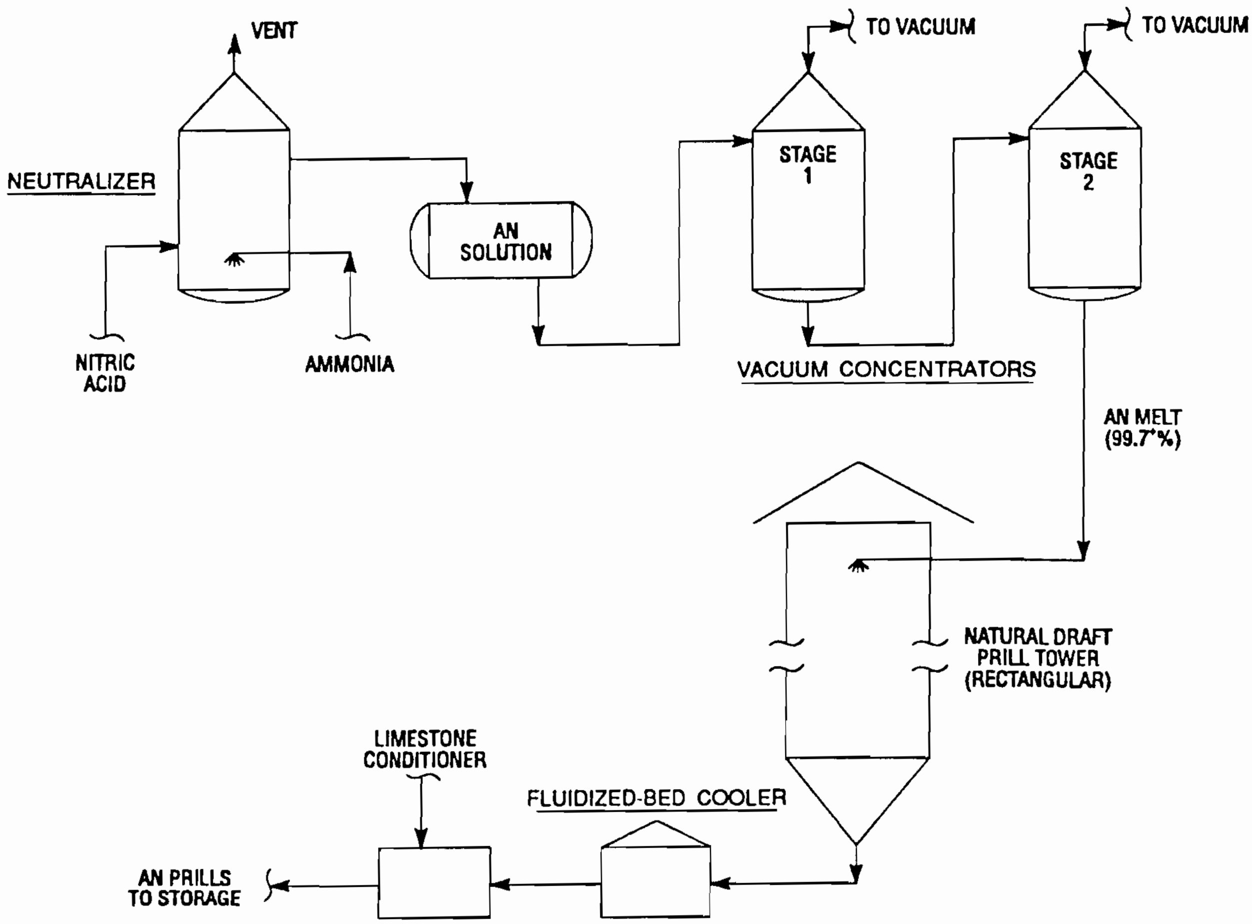


Figure IV-5. Plant No.1 ammonium nitrate (AN) unit (simplified schematic flow diagram).

The high density prills are collected at the bottom of the tower, cooled in a fluidized-bed cooler, coated with finely ground limestone (calcium carbonate), and sent to a bulk storage warehouse having a capacity of 1,000 mt.

The calcium carbonate conditioning agent is not very effective in preventing caking of the AN product and plant technical personnel have tested several additives which have not been successful. Also, leakage of air through the prill tower walls gives some problems with obtaining the proper distribution of cooling air in the natural draft prilling tower.

e. Plant No. 2 Nitrogen Plant (Urea Final Product)

The No. 2 nitrogen plant at the Fier Complex is designed to produce ammonia and urea based on steam reforming of natural gas in a plant imported from China. All of the design, engineering, materials, equipment, and construction/erection were supplied from China. However, it appears that the ammonia and urea processes are copies of well-known technologies of other engineering firms. The plant began operation in 1976 and consists of the following process units:

- Ammonia unit based on steam reforming of natural gas, high temperature shift conversion, low temperature shift conversion, CO_2 removal by hot potassium carbonate (vanadium pentoxide promoted), methanation, and ammonia synthesis in a high pressure loop (320 kg/cm^2). The capacity of the ammonia unit is 180 mtpd.
- Urea unit of 85,000 mtpy (300 mtpd) capacity of the nonstripping, total-recycle design. The urea unit consists of a stainless steel-lined urea reactor, two stages of carbamate decomposition, carbamate recovery/recycle, ammonia recovery/recycle, urea solution concentration, and urea prilling in a cylindrical, natural draft prilling tower.

f. Plant No. 2 Ammonia Unit

Compressed natural gas for the process is pretreated for sulfur removal in a hydrotreater (Co-Mo catalyst) and in zinc oxide vessels. Steam is mixed with the natural gas in a volumetric ratio of about 4-to-1 (steam to carbon) and the preheated mixture flows to the primary reformer which is a side-fired, radiant furnace containing catalyst tubes, and operating at a pressure of 27 kg/cm^2

and gas exit temperature of 790°C. Flue gases from the radiant box of the primary furnace are collected at the furnace bottom and flow through a series of heat exchange coils in a horizontal convection section and are discharged to the stack via an induced draft fan. The induced draft fan has an identical installed spare. The plant, as designed, can only accept natural gas as feedstock and fuel.

The design methane slip from the primary reformer is 9%-10%. Reforming of the natural gas is completed down to trace quantities in the secondary reformer where air is added as necessary to provide reforming heat and nitrogen for ammonia synthesis. After exiting from the secondary reformer catalyst, the reformed gases are quenched with water and cooled in a waste heat boiler which produces process steam. Following reforming are the standard steps of shift conversion (high and low temperature), CO_2 removal, methanation and ammonia synthesis. The CO_2 removal system is hot potassium carbonate promoted by vanadium pentoxide (V_2O_5). This is a copy of a well-known, patented process known as the Benfield process. Leakage of CO_2 from the removal unit is less than 0.2%.

Ammonia synthesis takes place in a standard synthesis loop operating at 320 kg/cm^2. All the compressors are the reciprocating type fabricated in China. Because of the inferior quality, all of the major compressors have fully installed spares. For example, there are three synthesis gas machines; two operating and one spare. The synthesis loop contains a prism separator unit for hydrogen recovery which appears to be a copy of a proprietary design by Monsanto. The tail gas from the unit is burned as fuel.

Original charges of all catalyst were supplied from China. However, the life of the Chinese catalysts was very short and all have since been replaced with BASF catalysts. Because of the lack of funds in the past for replacing catalysts, plant personnel have become very proficient at protecting catalyst and prolonging its life. For example, one charge of synthesis catalyst has been in service for 9 years and is still operable. The liquid anhydrous ammonia product is stored in two pressure spheres with a capacity of 304 mt each.

g. Plant No. 2 Urea Unit

The Plant No. 2 urea unit has a design capacity of 300 mtpd of urea (85,000 mtpy). The on-stream days are less than normal design of 330 days/year due to the use of less reliable Chinese equipment and materials.

Ammonia is supplied to the urea reactor by a set of three high pressure, horizontal reciprocating pumps with two operating, and one on standby. Carbon dioxide from the ammonia plant is compressed to operating pressure and fed to the reactor by a five-stage reciprocating compressor which has a fully installed spare.

The urea reactor is of laminated construction with a stainless steel liner. Oxygen is added to the CO_2 for corrosion passivation of the stainless steel. The original reactor supplied from China was plagued with corrosion/erosion problems and was replaced in 1987 with a new reactor designed and fabricated in Holland. There have not been any problems with the new reactor.

The urea reactor is designed for an operating pressure of 200 atmospheres at a temperature of 180°C.

The urea process appears to be a copy of the Stamicarbon nonstripping process. Process steps downstream of the reactor include two stages of carbamate decomposition with corresponding carbamate cooler/condenser steps and ammonia recovery. The ammonia tail gas scrubbers are not in operation due to a severe danger of explosion since there is no catalytic reactor step for removing the hydrogen from the tail gas. The tail gases are vented to the atmosphere which, in addition to creating an environmental problem, results in ammonia consumption at higher values than the design of 0.590 mt ammonia per mt of urea. The additional ammonia losses are equivalent to an annual loss of about 3,000 mt urea.

Carbamate solution from the carbamate cooler condensers is recycled to the reactor by a set of three high pressure, horizontal reciprocating pumps with two operating, and one installed spare.

Urea solution from the solution unit is sent to a two stage vacuum concentration unit producing urea melt which is pumped to the top of the prilling tower. The prilling device is a rotating, cone-shaped cylindrical bucket of the type used in a Stamicarbon plant. The prill tower is the natural draft cylindrical type constructed of concrete. Urea prills are collected onto a belt conveyer via a hopper arrangement at the tower bottom and transferred to a bulk storage building of about 2,500-mt capacity.

The original design was for about 2% biuret content in the product. However, in actual experience, the biuret ranged from 2% to 4%. The high biuret is the result of a "spreadout" plant layout and excessive holdup (retention) volumes in the vessels. The Albanians have been able to decrease the biuret level to about 1.8% mainly by making modifications to decrease holdup times in the system.

h. Plant No. 3 Nitrogen Plant (Urea Final Product)

The No. 3 nitrogen plant at Fier is essentially the same as the No. 2 nitrogen plant except that the sizes of all sections have been increased to the equivalent of a capacity of 100,000 mtpy urea. Also, some of the problems identified in the first urea plant were corrected in the new plant. For example, Albania insisted that design retention times in the urea plant be decreased and the layout be more compact. As a result, the biuret content of the urea product in the new plant is consistently less than 1%. The urea reactor is the same design as in Plant No. 2 and will no doubt require replacement after a few years of operation.

The plant produced 24,000 mt of urea during the first partial year of operation beginning in 1990 and continued to operate during 1991.

3. Current Status of Nitrogen Plants at Fier

When the team visited the nitrogen plants at Fier during the week of January 12, 1991, all three of the plants were shutdown. Therefore, judgments of the current status of the plant are limited to those made based on visual observations of the overall condition of the plants, inspections of the idle equipment, and interviews with technical and operations management personnel.

It was noted that there were only a small number of workers present in the plant facilities. It was stated that the plant management and work force were aware of the importance of the output of the plants to Albania's need to produce food in the approaching growing season. All of the operations personnel are ready to put the plants in operation after receiving salary increases and solving of the technical shortcomings such as lack of raw materials, feedstocks, spare parts, and operating chemicals/supplies.

Since beginning operation of Plant No. 1 in 1967, extensive efforts have been devoted to training of the technical and operating personnel; Plant No. 1 has been the training ground for the other two plants. The team found the technical and management personnel that were interviewed to be knowledgeable of the technology used in the plants and fairly well up-to-date on the more modern technologies currently available.

In addition to the nontechnical personnel problems with the work force, lack of sufficient feedstock to operate even one of the three plants at minimum rate is a serious problem. It is highly unlikely that nitrogen fertilizer can be produced in any significant amount for the coming crop season.

Currently, there is 200 mt of ammonium nitrate and 900 mt of urea in storage at the plant. Plant personnel wish to sell this product for U.S. dollars at world market prices in order to have some capital to purchase necessary supplies for restarting partial operation.

Another current problem is almost a complete lack of any spare parts except for some spare parts available for the new plant (Plant No. 3).

a. Current Status of Plant No. 1

Plant No. 1 appears to operable with difficulty provided that raw material is available. Some lubricating oils are also required for the machinery.

There is available 800 tonnes of gasoline which can be used to restart the plant and there is a plan to restart the plant during the week of January 19, 1991. However, this does not appear feasible since the operating personnel are few in number and the gasoline supply will only allow operation for a short time.

One of the Sulzer oxygen compressors has been completely destroyed which limits the plant rate to 60%. When chemical plants such as the nitrogen plants at Fier are shutdown for extended periods of time, it is standard practice to rotate all of the machinery daily for short periods of time. The purpose of this is to provide lubrication to all of the wear surfaces and prevent flattening of bearing surfaces and the development of point stresses in the rotating elements of the machinery. After discussions with plant personnel, it was established that they are aware of this need but it is not being done due to absence of the work force.

This could cause major problems unless a program of equipment rotation is begun soon.

b. Current Status of Plant No. 2

Plant No. 2 is capable of being returned to operation in a short period of time following re-establishing supplies of natural gas. As currently configured, the plant can only use natural gas and the minimum production rate is approximately 60% of design or about 51,000 mtpy (192 mtpd) of urea.

Currently, there is a serious shortage of spare parts for all the rotating equipment and some imported lubricating oils are not available.

As with Plant No. 1, the machinery is not being rotated on a daily basis. Further, the reforming section is not being kept hot due to lack of natural gas fuel. Extended shutdown under these conditions is certain to cause damage to the machinery and refractories.

c. Current Status of Plant No. 3

Plant No. 3 is essentially new and has been operated successfully for fairly extended periods. The current status is essentially the same as Plant No. 2 with the exception that the equipment is new which requires less spare parts; also, more spares are available than for Plant No. 2. However, spare parts are needed for some of the compressors, centrifugal pumps, and the high pressure ammonia and carbamate pumps.

4. Plant Problems

A discussion of many of the plant problems is included in the preceding sections of this report. In this section, the major problems will be highlighted for each plant unit.

During the limited time available to the team, attempts were made to identify and discuss as many of the problems as possible. However, it must be recognized that the plants were not operating during the visit of the team and, thus, there may be serious problems which could have been overlooked. The team was forced to rely on visual inspections, judgments based on experience, and the information received from the plant personnel. The impression of the team was that the plant personnel were very open and frank during the discussions and interviews. Further detailed study will be required to determinate the full extent of the problems, priorities, and the economics involved in solving the problems.

a. Feedstock and Fuel Problems

Although Plant No. 1 can run on gasoline, it is not the preferred source of hydrocarbon for economic reasons. Gasoline has been used in the past because it was the only alternative available.

Natural gas is the only hydrocarbon raw material which can currently be used in Plants No. 2 and No. 3. Natural gas requirements for the three plants are summarized below.

Plant	Natural Gas Requirement Minimum Rate	Maximum Rate
	- - - - - - - - (m^3/day)	- - - - - - -
No.1	80,000	130,000
No.2	130,000	202,000
No.3	150,000	220,000
TOTAL	360,000	552,000

Plant No. 2 was shutdown in December 1991 after the natural gas supply fell below the minimum requirement of 130,000 m^3/day. In fact, at the present time, the natural gas supply is zero. Plant personnel do not have any official knowledge of how much natural gas is currently available, the extent of reserves, or the prospects for developing the reserves. The plant management has asked the natural gas company for a contract for a supply of natural gas but have not been successful since the suppliers cannot assure a minimum quantity.

In 1990, there was enough natural gas supply for Plants No. 1 and No. 2 and when the third plant was put into operation, the No. 2 plant was shutdown.

Indications from personal contacts with the natural gas supply personnel are that the current total national available supply is 200,000 m^3/day. The reasons for the dwindling supply to the fertilizer complex, which caused the Plant No. 2 shutdown in

October, are use of natural gas by a soda plant which could no longer get coal and people taking (stealing) the natural gas because of shortages of wood and coal for winter heat.

The plant now has 800 mt of gasoline in stock which can be used to run Plant No. 1 for 11-12 days to produce ammonium nitrate.

Obviously, the plants cannot be run unless supplies of natural gas and gasoline are re-established. Assuming that at least 130,000 m^3/day of natural gas is available for Plant No. 2 and gasoline is imported for Plant No. 1, these two plants could resume operation quickly and run continuously, though under difficult conditions.

Plant No. 1 requires a minimum of 68 mtpd of gasoline to operate at about 60% of design rate.

b. Spare Parts Problem

Except for the lack of feedstock and raw materials, the most serious problem in the operating plants is the lack of spare parts. Spares are needed for almost all the rotating machinery. In addition, maintenance and replacement of other items such as process equipment, valves, instruments, piping, and electrical systems have been neglected for many years due to lack of funds.

In new plants similar to those at Fier, the spare parts inventory normally amounts to about 3% of the total investment of the plant. The total investment in the Fier plants is about US $100 million at today's value. Assuming that some spares are available, such that the spares needed would approximate 2.5% of the total investment, an investment of about US $2.5 million is needed for procurement of spares.

This investment is an absolute requirement if the plants are to be operated on a sustained basis. After this initial stock of spares is in hand, annual operating budgets should be established for maintaining spares stocks and an automated system setup to monitor stocks, usage, and alert the need for purchase of replacements.

It should be noted that the type of machinery and equipment used in the plants at Fier (for example, reciprocating compressors and pneumatic instruments) can be used for many years if spares are available for proper maintenance. There are many small nitrogen fertilizer plants around the world that have been in operation for more than 30 years and are still in operation.

The plants at Fier are of similar design to these plants and there can be many more years of useful life provided that spares are available for refurbishing the machinery and equipment. In addition to the machinery, the process equipment needs to be inspected on a case-by-case basis and repaired as necessary. For example, the ammonia storage sphere in Plant No. 1 is 26 years old and has never been thoroughly inspected beyond normal visual inspections.

c. Plant No. 1 Problems

In addition to the problems general to all plants such as lack of feedstock, fuel, raw materials, proper instrumentation, and spare parts. There are other problems in each of the units of Plant No. 1. These are outlined briefly as follows:

(1) Air Separation Plant (ASP)

The ASP is of Linde (Germany) design which is a low pressure plant (5 kg/cm^2). The following major problems exist:

(a) The two nitrogen regenerators have cracks in the shells which are difficult to repair since they are constructed of pure aluminum which requires argon welding. These units should be replaced with the mole sieve type.

(b) Nitrogen and oxygen purities are not good because of leaks at the cracks. Oxygen in the nitrogen is typically 40 to 60 ppm.

(c) Piping in the unit, particularly inside the cold box is eroded badly.

(d) There was an explosion in the past in the condenser.

About 4 years ago a Linde specialist inspected the ASP and recommended a complete revamp. The estimated cost in 1987/88 currency was about 3.0 million DM (about US $_________).

(2) Partial Oxidation Ammonia Unit

(a) The CO_2 removal unit is a GMV (Vetrocoke) design which uses arsenic as a promoter. Obviously, use of arsenic presents many environmental problems. The system should be changed to use a less hazardous potassium carbonate system like that used in the No. 2 and No. 3 ammonia units. The plant has recently tried use of amino acetic acid with positive results but unfortunately the shutdown of the plant precluded long-term testing.

(b) A copper liquor system is used for removal of trace quantities of oxides from the synthesis gas. The system is badly corroded and either should be renovated or replaced with a different system, such as methanation or nitrogen wash.

(c) A new Sulzer oxygen compressor is needed at a estimated cost of about US $600,000.

(3) <u>Nitric Acid Unit</u>

(a) A catalytic reduction unit is needed for abatement of pollution from NOx in the tail gas. The cost for such a unit of the small size required should be less than US $100,000.

(4) <u>Ammonium Nitrate Unit</u>

(a) Even though finely ground limestone is used as a conditioning agent, there is a serious problem with caking of the product. An internal additive should be used, such as magnesite (MgO) which will form magnesium nitrate, or "Permalene," patented by Mississippi Chemical Corporation (United States).

d. <u>Plant No. 2 Problems</u>

(1) <u>Plant No. 2 Ammonia Unit</u>

(a) About 25 spare primary reformer catalyst tubes are needed to replace corroded (outside) tubes.

(2) <u>Plant No. 2 Urea Unit</u>

(a) The tail-gas scrubber for ammonia recovery cannot be operated due to the extreme danger of explosion. This requires venting of the tail gases which results in a loss of ammonia equivalent to about 3,000 mtpy of urea and also is a pollution problem. This problem can be solved by the addition of a catalytic converter to remove hydrogen from the tail gas. The installed cost of the converter is estimated at about US $300,000. The extra 3,000 mtpy of urea production would pay for the converter installation in less than a year based on current world prices for urea.

e. Plant No. 3 Problems

(1) Plant No. 3 Ammonia Unit

(a) There is an elementary error in the Chinese design of the CO_2 removal system. Cooling and liquid separation (knockout drum) have not been provided at the absorber exit. As a consequence the equilibrium concentration of H_2O in the absorber overhead is too high due to the higher partial pressure of the water at the higher temperature. Therefore, there is a constant carryover of H_2O and carbamate to the methanator which results in poisoning of the methanator catalyst.

The Albanians have discussed this with the Chinese and the Chinese have accepted responsibility for the error and have agreed to add two coolers and a knockout drum. However, due to recent changes in the situation, nothing has been done.

(2) Plant No. 3 Urea Unit

(a) A catalytic converter to remove hydrogen from the tail gas is needed, the same as in the Plant No. 2 urea unit.

5. Estimate of Capital Requirements

A total of US $6.24 million is estimated as necessary to solve the major problems in the Fier plants and return them to a good state of repair. This estimate does not include purchase of gasoline as a temporary feedstock for Plant No. 1. Details of the estimate are given in Table IV-5. The estimates at this point should be considered as budget estimates only and will require detailed study and evaluation beyond the scope of this report to arrive at more definitive estimates.

Provided feedstocks and fuel can be made available, this expenditure would allow production of about 105,000 mtpy of ammonium nitrate and 185,000 mtpy of urea. These products would have a current annual market value of about US $38 million.

Table IV-5. Estimate of Capital Expenditures Required for Nitrogen Fertilizer Plants No. 1, No. 2, and No. 3 at Fier to Resume Operation and to Solve Major Problems

Item	Estimated Cost (US $)
1. Spare Parts For the Three Plants	2,500,000
2. Renovation of Linde Air Separation Plant Including Sulzer Compressor[a]	2,700,000
3. Charge Plant No. 1 CO_2 Removal Process	75,000
4. Renovate Plant No. 1 Copper Liquor Scrubbing Process	200,000
5. Catalytic Converter for NO_x Abatement in Nitric Acid Unit	100,000
6. Catalyst Tubes for Plant No. 2 Primary Reformer (25 tubes)	65,000
7. Catalytic Converter For Hydrogen Removal From Tail Gas in Urea Units, Plant No. 2 and Plant No. 3 (2 converters)	600,000
8. TOTAL	6,240,000

a. Estimation based on Linde estimate made in 1988, esclated to 1992 at 3%/year inflation and 1.65 DM/US $.

6. Future Plant Prospects

The plant descriptions and other discussions included herein probably contain more detail than is usually necessary in a report such as this. This was done to demonstrate that the three nitrogen plants at Fier are based on technically sound process design. The process designs, although outdated, are well-proven and reliable. Further, as compared to the more modern technology available today, the plants are relatively easy to operate and maintain. The plants do not have the degree of sophistication, high steam pressures, highly integrated process design, exotic metallurgy, and highly sophisticated centrifugal machinery typical of modern ammonia/urea plants. They are of the reciprocating compressor type which were constructed during the late 1950s and early 1960s. In many other countries such plants have been operated for more than 30 years and are still operating today.

The newest plant, Plant No. 3 which was started up in 1990, should be capable of many years of operation provided that feedstock, fuel, and spare parts are available. It should be possible to refurbish the No. 1 and No. 2 plants so that they will be capable of at least 10 years or more of additional operation.

The investments in the plants are already sunk which means that moderate investments to renovate the plants should be justifiable. In this case, costs of production for the ammonium nitrate and urea products should be less than the landed costs of imports, provided energy costs are reasonable. To illustrate, the current cost of energy to the plants is tabulated as follows:

Energy Source	Unit	Cost/Unit in Leks Before 1991	January 1991
Natural gas	m^3	0.129	0.645
Steam	tonne	65	290
Electricity	KwH	0.2	0.6
Gasoline	liter	0.6	6.0

These smaller, older vintage plants can be used as "embryos" for later development of a modern chemical industry including a fertilizer industry. Continued operation of the plants will provide a nucleus of trained people who can quickly adopt to the newer technologies.

For the immediate future, concerted efforts should be made to obtain sufficient supplies of gasoline to resume operation of Plant No. 1. The plant personnel estimate that the plant can be started up in 3 or 4 days. In addition, the natural gas supply should be re-established in sufficient quantities to restart Plant No. 2. Natural gas is available for minimum operation of Plant No. 2. However, illegal use of the gas upstream of the Fier factory should be stopped and the gas should be sent to the plant.

Because of the design, reforming plants require about 8 days for startup from a "cold," shutdown condition.

7. Conclusions and Recommendations

At this writing, the plants at Fier are shut down; no feedstock and fuel is available at the plants; and the work force is absent. This study was constrained by limited time and was made while such shutdown conditions existed at the plant. As a result, definitive detailed conclusions and recommendations cannot be made. In fact, no meaningful further recommendations can be made until such time that feedstock, raw materials, and a work force are available. However, some preliminary conclusions and recommendations can be made to provide a basis for planning future detailed study and work.

a. Conclusions

(1) The most immediate and highest priority need at the Fier Nitrogen Factory is to provide supplies of gasoline and natural gas for restarting Plant No. 1 and Plant No. 2.

(2) The work force must be restored at the plants.

(3) Sufficient spare parts must be purchased to allow continuous operation of Plant No. 1 and Plant No. 2.

(4) Further lengthy shutdown of the plants will result in accelerated deterioration in the mechanical condition of the plants.

b. Recommendations

It is recommended that:

(1) Plants No. 1 and No. 2 at the Fier Nitrogen Factory resume operation as soon as conditions permit.

(2) Technical Advisory services of a well-qualified ammonia/urea expert should be made available to work with the plant technicians for a period of 2 years. The technical advisor should begin work as soon as possible following resumption of continuous operation of Plants No. 1 and No. 2. The first 4 months of the technical assistance should be devoted to a detailed study of the plant problems in close relationship with the Albanian technical staff. Economic evaluations should be made of the various options for solving the problems and detailed planning should be completed to facilitate implementation. The remaining 20 months would be devoted to assisting the Albanians with implementation.

(3) Services of a foreign mechanical engineering expert should be made available for a period of 4 months to assist the plant maintenance technicians in determining spare parts requirements and establishing plans for effecting repairs of the plant machinery and equipment.

(4) Budgets should be established and funds made available, including foreign currency requirements, for implementing solutions to the problems identified in Table IV-5. Special emphasis should be given to the allocation of funds for the procurement of spare parts.

(5) A distributing/marketing system should be established for the plant products: ammonium nitrate and urea. The plant cannot operate successfully unless the products can be moved out of the plant on a regular basis and at a reasonable profit. Alternatively, the products could be stored at the complex in larger quantities than is now possible.

(6) In the event the supply of natural gas to the plants is significantly delayed, a detailed study should be made to determine the feasibility of converting all three of the plants at Fier to the use of refined naphtha.

APPENDIX I

REPORT ON OIL AND GAS SECTOR IN ALBANIA

Source: Ministry of Mining and Mineral Resources

January 1992

Questions and Answers for the Oil and Gas Sector

1. Question: How much oil and gas was produced over the last 5 years (including the estimated amount for 1991)? How much is expected to be produced in the next 5-10 years? What assumptions were used to make this estimate?

   Answer: The oil and gas produced during the last 5 years is given in the Table A-1. Predictions for the next 5 years are approximate and have been calculated on the basis of the existing oilfields up to 1994. In 1995, new reservoir is expected to be discovered in one of the offshore blocks. The same is expected for gas.

2. Question: In what year was the highest amount of oil and natural gas produced, and how much was produced in that year?

   Answer: The peak oil production years were 1974 with 2.2 million tonnes of oil, and 1982 with 977 million m^3 gas.

3. Question: How much oil and gas was used in the last 5 years (including estimates for 1991), and which sectors of the economy used the most? What is the overall level of expected oil and gas use for the next 5-10 years, and how much will each sector of the economy use?

   Answer: The gas and oil used within the country is given in Table A-1.

4. Question: What is the level of oil and gas imports and exports in the last 5 years, and what is the planned level of imports and exports in the next 5-10 years.

   Answer: For the last 5 years, no oil and gas was exported or imported. For the next years we expect to import gas and oil as shown in Table A-1.

5. Question: What kind of pollution problems are associated with oil production and refining? What is needed to correct the problems?

Answer: There are pollution problems in the oilfields and refineries, especially in the setting tanks and water separation plants. To solve the problem, technology updating is required.

6. Question: What is the level of investment needed to enhance recovery from existing onshore fields and to develop new onshore fields?

Answer: The investment level required for enhanced oil recovery (EOR) methods is about US $100 million. EOR application will increase production levels about 300,000 tpy and the recovery factor by 10%-15%.

7. Question: What is the current level of proven reserves for oil and gas? How much is accessible using existing technology, and how much more could be extracted using advanced technology?

Answer: Geological oil reserves are about 300 million tonnes. The recoverable reserves by existing technology are about 29 million tonnes. These can be doubled with the application of new technologies.

Gas reserves are about 8 billion m^3 as associated and cap gas in existing oilfields and 622 million m^3 as natural (nonassociated) gas.

8. Question: Please provide information on refineries, including the total capacity and present volume for each, the main products, and the level of desired investment to modernize/expand them.

Answer: The following information on the refineries is tabulated:

Name of Refinery	Capacity (million tpy)	Present Volume (%)	Main Products
1. Ballshi	1	70	Benzene, kerosene, diesel, solvent
2. Kuçova	0.5	20	Benzene, diesel, bitumen
3. Cërrik	0.5	20	Benzene, diesel, bitumen
4. Fieri	0.5	30	Benzene, diesel, bitumen

9. Question: What is the price of gasoline for Albanians and foreigners? How much below market levels are these prices? What plans exist to increase these prices?

Answer: The price of gasoline for Albanians is 6 lek/liter and for foreigners is US $1/liter (50 Lek/liter).

10. Question: What is the price of oil and gas for industrial users? How are prices expected to change? How much below market levels are these prices?

Answer: The price for industrial users of oil is 5.5 lek/liter.

11. Question: What kind of foreign assistance do you need? What foreign assistance has been discussed or provided for the oil and gas sector?

Answer: We need foreign assistance for EOR and new technology on existing oilfields, in refineries and other enterprises in the form of joint ventures. We already have five contracts for exploration of oil and we need to have the same for onshore.

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Table A-1. Oil and Gas Industry

	Year									
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Oil produced/estimated ('000 mtpy)	1,181.5	1,166.6	1,129.1	1,067.2	845.2	707	800	850	1,000	1,200
Gas produced/estimated (million m^3/year)	285.4	184.8	227.3	243.1	141.4	123	120	120	150	200
Oil used/expected ('000 mtpy)	1,181.5	1,166.6	1,129.1	1,067.2	845.2	1,200	1,200	1,300	1,350	1,400
Gas used/expected (million m^3/year)	285.4	184.8	227.3	243.1	141.4	123	1,000	1,000	1,000	1,000
Oil import (fuel oil) (mt)			86.5	55.8		500	400	350	350	200
Gas import (million m^3/year)							880	880	850	800

Proven reserves as of: January 1, 1991.

Oil: Recoverable: 29,200,390 tonnes
Geological: 300,000,000 tonnes

Gas: Associated: 8,720,777,000 m^3
Natural (Non-associated): 622,917,000 m^3