areas, however, that PAH believes deserve comment relative to regulatory compliance or mining best management practices.

The first relates to water quality monitoring. Currently, groundwater quality is only monitored at selected locations around the Itabira Complex. Typical practice would be to monitor groundwater quality up gradient and down gradient of the mining operations to have documentation of any impacts of the mining operations. It is understood the regulatory agencies do not require groundwater quality monitoring as a matter of courses in iron ore mining operations. Considering the inert nature of the mine waste and tailings as well as the relatively benign reagents used in mineral processing, it would appear the lack of groundwater monitoring is a reflection of the limited potential for significant groundwater quality impacts.

The second area relates to surface water quality monitoring results. PAH understands the discharge water quality standards that the Southern System operates under are Federal standards that apply to all of Brazil and do not consider the specific background water quality of the receiving waters or regional waters. CVRD routinely exceeds these standards relative to parameters such as soluble iron, phenols, oil and grease, and in some areas, total and fecal coliform. Exceedances occur in the background monitoring locations as well as monitoring locations downstream of the mining operations. CVRD reports and explains these exceedances to FEAM along with an analysis of the water quality upstream and downstream of the mining operations. From PAH's review CVRD makes a well documented case that these exceedances do not indicate a water quality impact due to mining operations as the background and downstream water quality is similar. Rather the exceedances of the uniform standards are a function of the standards not reflecting the baseline water quality of the region.

The third area relates to topsoil recovery and stockpiling practices. Currently, CVRD recovers limited amounts of available topsoil for use in reclamation work. This would not be in keeping with generally accepted mine reclamation practices as most other types of mining require placement of topsoil over mine waste and tailings to facilitate sustainable revegetation. The nature of the mine waste and tailings at the Southern System mines, however, is very amenable to direct revegetation. CVRD has demonstrated success in direct revegetation of mine waste and tailings with sustainable, native vegetation. Accordingly, while CVRD's lack of topsoil recovery is not in keeping with accepted practices, it is not impacting the ability to reclaim disturbed mine lands.

7.3 Closure and Reclamation Planning

CVRD's Southern System mines present a very favorable condition relative to reclamation and closure. The mine wastes (tailings and non-economic mineralized waste) are relatively benign from a geochemistry standpoint and do not exhibit typical hard rock mining issues such as acid rock drainage generation potential or toxic metal mobility. Direct revegetation of the mine waste and tailings is routinely and successfully done. A standardized approach to mine waste reclamation has been established that consists of constructing mine waste dumps at 2 to 1 (horizontal to vertical) slopes with intermediate benches at 10-meter vertical intervals to provide an overall slope of 2.75 to 1.

Surface water collection ditches are constructed on the benches which are graded to drain to down-drop structures at either certain points on the dump face or at the outer edges of the dumps. The down-drop structures are typically reinforced concrete channels that lead to natural drainages.

Reclamation of the dump faces and top surfaces is done in two steps, with the first step consisting of planting grasses for surface stabilization and erosion protection as well as nitrogen fixation in the soils. The second phase consists of planting native grasses, shrubs and trees as the permanent revegetation. Topsoil is placed in 0.5-meter layers when available, however CVRD's experience is that permanent reclamation objectives can be achieved using direct revegetation of the mine wastes.

Waste dumps are constructed from the bottom upward such that the lower slopes are built out to the ultimate configuration. This allows concurrent reclamation of the lower portion of the slopes as the dump is constructed, thereby reducing the amount of reclamation required at the end of mine life or at the time the dump is filled to capacity.

Current reclamation planning calls for a number of the existing tailings and sediment containment ponds to remain as permanent lakes after the end of mine life. This is an accepted mine closure practice, providing the lakes are ecologically viable, in conformance with acceptable post-closure land use and have adequate safety margins for both the dams and the spillways to be permanent lakes. PAH did observe that voluntary revegetation occurs on the tailings with little effort providing the free water is removed. It appears that if revegetation of the tailings surface is required, it can be readily achieved in the same manner as the waste dumps are reclaimed.

The annual budget for each mining operation includes operating costs for annual reclamation work. The annual reclamation plan is prepared by the mine planning staff and submitted to FEAM for review and approval and then implemented as part of the routine mining work. These costs are carried as mine operating costs.

CVRD carries final reclamation and closure costs as a corporate financial liability. Therefore, these would be considered "sunk costs" and would not impact the mine economics that define mineable reserves for ongoing mining operations.

7.4 *Health and Safety*

CVRD has an established health and safety program that was significantly revised and refocused in the last few years. During PAH's safety orientation, the CVRD safety manager for the Itabira Complex noted that the overall focus on safety has greatly changed since 2003, with the focus changing from production at the cost of safety to safety at the cost of production. Workers have an established right to refuse to work if conditions are considered unsafe. The safety program follows typical protocol of:

- Employee safety orientation through the Safety Department with job specific safety training as part of the overall job training.
- Risk identification and classification
- Analysis of activities, risks and preventative measures
- Emphasis on prevention of accidents through risk awareness
- Providing at least 10 minutes of safety review every day
- Auditing of implementation of safety programs with focus of auditing being on managers being responsible for the safety of the workers reporting to them.

Frequency of Lost Time Accidents has been reduced from 3.44 per million hours worked in 2003 to 2.5 per million hours in 2004.

From PAH's review, the basics of the program are in place relative to worker training, job site risks and hazards awareness and utilization of personal protective equipment. However, there is additional work to be accomplished in uniform implementation across all the complexes of the Southern System.

7.5 *Summary*

The purpose of the EHS component of the reserve audit was to identify environmental or health and safety issues that could affect the Southern System's ability to mine their declared reserve, or EHS issues which represent a significant liability and risk to the continued viability of the operation. Having completed a review of CVRD's EHS permits, management plans, and compliance and monitoring data, which included a review of documents and field observations during the site visits, it is PAH's opinion that there are no major EHS issues that would prevent the Southern System of CVRD from mining their stated reserves.

As with most other areas of the world, ongoing mining will involve a changing regulatory framework and the proximity of the city of Itabira to the major mining operations of the Itabira Complex will result in a continually increasing level of environmental sensitivities to mining and associated requirements for good environmental management practices. CVRD's planning and management of environment, health and safety aspects of their business at the Southern System, in PAH's opinion, meets or exceeds internationally accepted mining standards and practices and provides a basis to meet these future challenges.

8.0 DISCUSSION OF MINING COMPLEXES

The Southern System mines and mineral processing plants operate as an integrated unit. As discussed in previous sections, there are commonalities in the overall approach taken to geostatisitics and resource modeling, mine planning and operations, metallurgy and mineral processing, infrastructure and environmental aspects. These are discussed in the previous sections. The following presents a discussion of the specific aspects of each operating Complex.

8.1 *Itabira Complex*

The Itabira Complex includes the Caue, Minas do Meio, and Conceicao pits. Caue is the oldest operation in the region, having begun in 1942 on the northeast portion of an extensive iron outcrop. The mine produced a minor amount of ore last year, and there is a small reserve remaining on the records, but it currently is serving as a repository for mine waste and tailings disposal. Minas do Meio (middle mines) lies between Caue and Conceicao and provide ore material to the processing facilities located at the extreme ends of the iron trend. Ore is processed through the Caué and Conceicào process plants. Collectively, the mines of the Itabira Complex produce the most ore of any complex in the Southern System. Production in 2004 was just under 60-million ore tonnes.

8.1.1 Geology

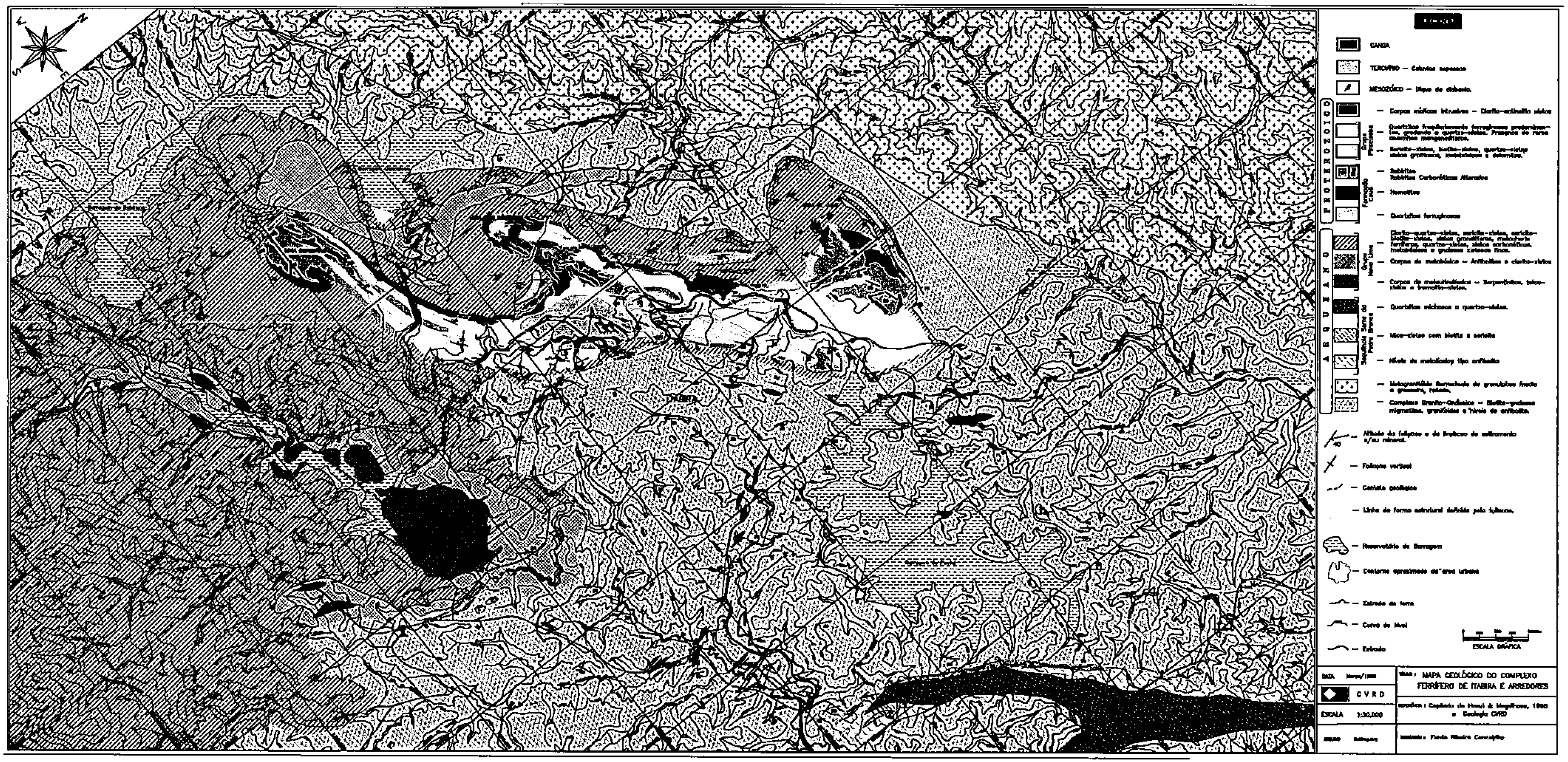
The Itabira complex is located in the northeastern corner of the Quadrilátero Ferrífero. It is enclosed by a local geologic structure that appears separated from the regional Iron Formation. The geologic structure consists of a 14-kilometer long, NE-trending range that shows three main synclines at both extremes (Conceicão and Caué) and middle (Minas do Meio) sections. The synclines branch out to the west from the general structure, and have created appropriate conditions to hold massive concentrations of the iron mineralization.

High-grade ores of Hematite and Itabirite, in continuous occurrence, are extracted along the structure, from the Conceicão mine at the southwest end to the Caué mine in the NE side of the range. The ore reserves at the Caué have been depleted. The Minas do Meio mine consists of numerous deposits located along the geologic structure, such as the Corpo D, Periquito, Dois Córregos, Onça, and Chacrinha.

Figure 8-1 shows the regional geologic map of the Itabira Complex.

Three main iron deposits in the Itabira Complex are Conceicão and Minas do Meio, which are in production, and Caué, whose reserves have been exhausted.

The Conceicão mine resources were modeled in 2003 with data from 260 drillholes and a total of 64,161 meters of core, out of 275 holes and 67,271 meters drilled. In the period of 2003/04



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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	Companhia Vale do Rio Doce	FIGURE 8-1 SOUTH SYSTEM - ITABIRA COMPLEX REGIONAL GEOLOGIC MAP	April/2005
Project No. 9416.00	Project Name 2004 Reserve Audits		Drawing Name Fig8-1.dwg

another 15 holes were drilled in the deposit, adding 3,110 meters of core, while the 2005 drill program will add 226 holes and 20,340 meters to investigate depth, grade control and geotechnical studies to update the geologic model.

Figure 8-2 shows a typical geologic section of the Conceicão deposit and a representation of the ore enrichment.

In 2004, the Conceicão mine produced 48 percent of the iron reported for the Itabira Complex. The Conceicão mine holds approximately 10 percent of the Southern System reserves with a high content of hematitic ore (ratio hematite to itabirite ore of 0.66).

The Minas do Meio mine includes a synclinal and a large portion of the Itabira structure between the Conceicão and Cauê mines. The geologic model was designed with data obtained from 424 drill holes and a total of 69,784 meters of core, of a total of 78,878 meters of 495 drill holes. Since its last review in 2003, the deposit has been drilled with 71 holes and 9,094 meters of core to update the resource estimate.

In 2004 Minas do Meio produced 52 percent of the reported iron ore for the Itabira Complex. Minas do Meio holds approximately 13 percent of the Southern System estimated reserves, with high-grade ore (ratio of 0.53 for hematite to itabirite).

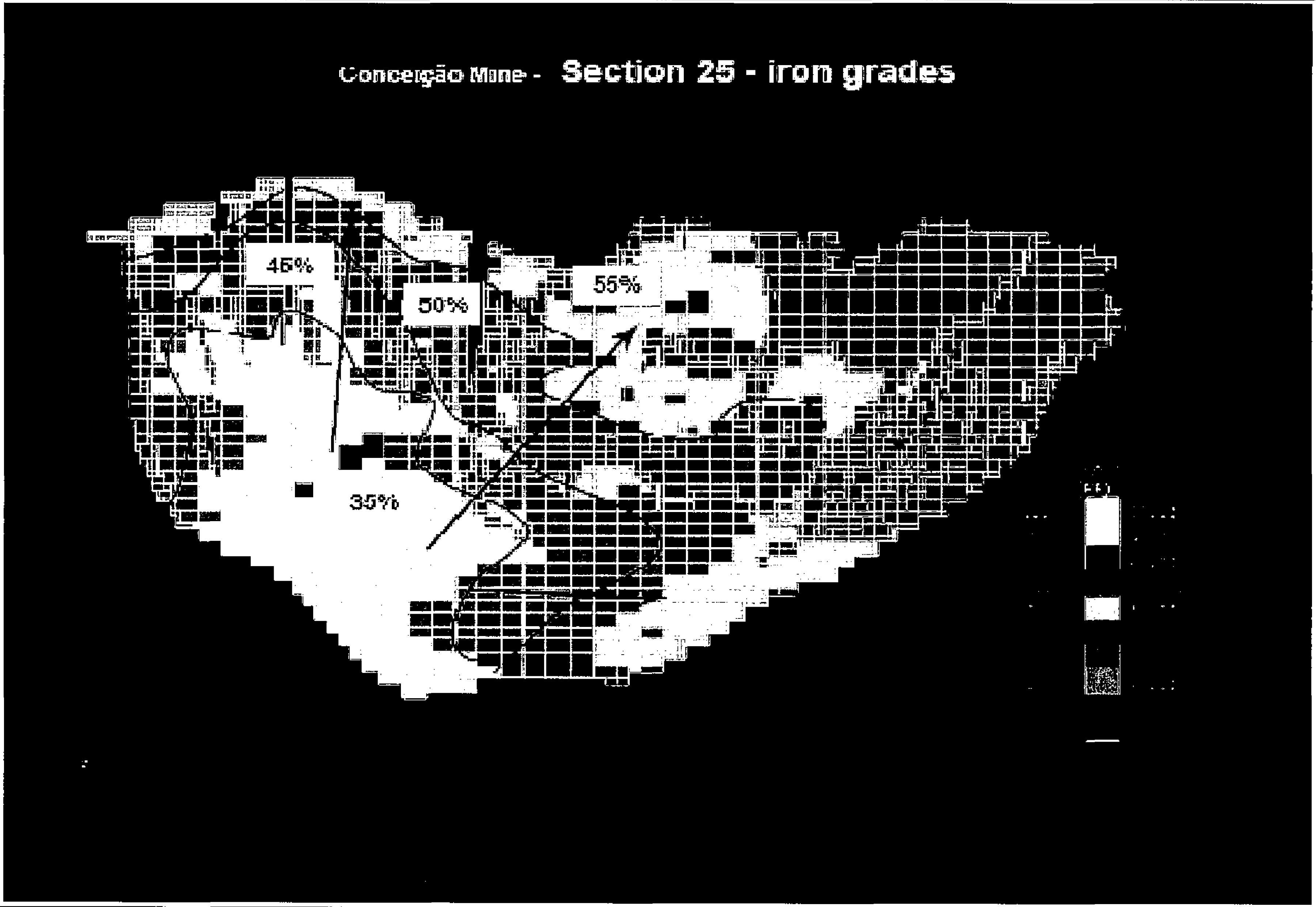
8.1.2 Geostatistics and Resource Modeling

The Itabira complex consists of two producing mines, Conceição and Minas do Meio. These two operations required Level 1 review. The last reserve audit on these mines was carried out in 2003. Since then new drilling has been done but CVRD has not updated it's reserve and resource models. PAH reviewed some of the 2003 model data, and new exploration raw data.

The Conceição and Minas do Meio mines are located very close together, hence the lithology used in the geologic modeling is the same for both deposits. The rock codes used in the modeling are discussed in Section 3.3 of this report.

PAH reviewed the data on assay, drillhole location, and digital data entry that form the basis of the geological modeling, and found them acceptable. PAH performed random checks on some basic univariate statistical data, histograms, and box-plots. The data reproduced by PAH were very close to CVRD's data. No major errors were found.

The compositing of drillhole assays was done using Vulcan® software. A 15-meter composite length was used instead of normal 10-meter length. A total of 3,623 composites were generated for modeling the deposit. Of 3,623 composites, only 438 composites were discarded because they had less than 5m length. For modeling, the lithological units were divided into three separate domains: Domain 1 composed of the main Hematite; Domain 2, represented by the soft itabirite;



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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	*Companhia Vale do Rio Doce*	**FIGURE 8-2** **SOUTH SYSTEM - CONCEICAO MINE** **SECTION, IRON ORE GRADE DISTRIBUTION**	**April/2005**
Project No. **9416.00**	Project Name 2004 Reserve Audits		Drawing Name **Fig8-2.cdr**

and Domain 3, by the hard itabirite. These three domains represent 93 percent of the composites. PAH performed random checks on a number of composites and found that they were calculated correctly.

The geological models for Conceição and Minas do Meio deposits were developed using the vertical section to plan view technique. The deposits were modeled with blocks ranging in size from 6.25 to 25 meters in the horizontal and 7.5 to 15 meters in the vertical direction. The block model was created with Vulcan software using solids constructed by extrusion of the polygons in the plan views.

The variogram analyses were done using the correlogram methods. The experimental correlograms were constructed for the accumulated values and granulometric fractions. Lag distance was set at 50m, and correlograms were run using a 30-degree increment from 0-degree starting azimuth to 150-degree final azimuth. The plunge varies between 90-degree (up) to - 45-degree (down) using - 45-degree increments. A total of 24 directional correlograms were generated for each of the variables. The nugget constant was derived from downhole correlograms. The correlograms were interpreted for each of the three lithological domains.

CVRD has established procedures for grade estimation which includes block estimation by ordinary kriging using all geological domains, generation of octant based search ellipsoid, parent cell size estimation, and composite length weighted kriging process. The geological contacts were used as hard boundaries for kriging estimation. The main hematitic types of lithological units were estimated using a dip-search ellipsoid, while the itabirite types used a horizontal search ellipsoid.

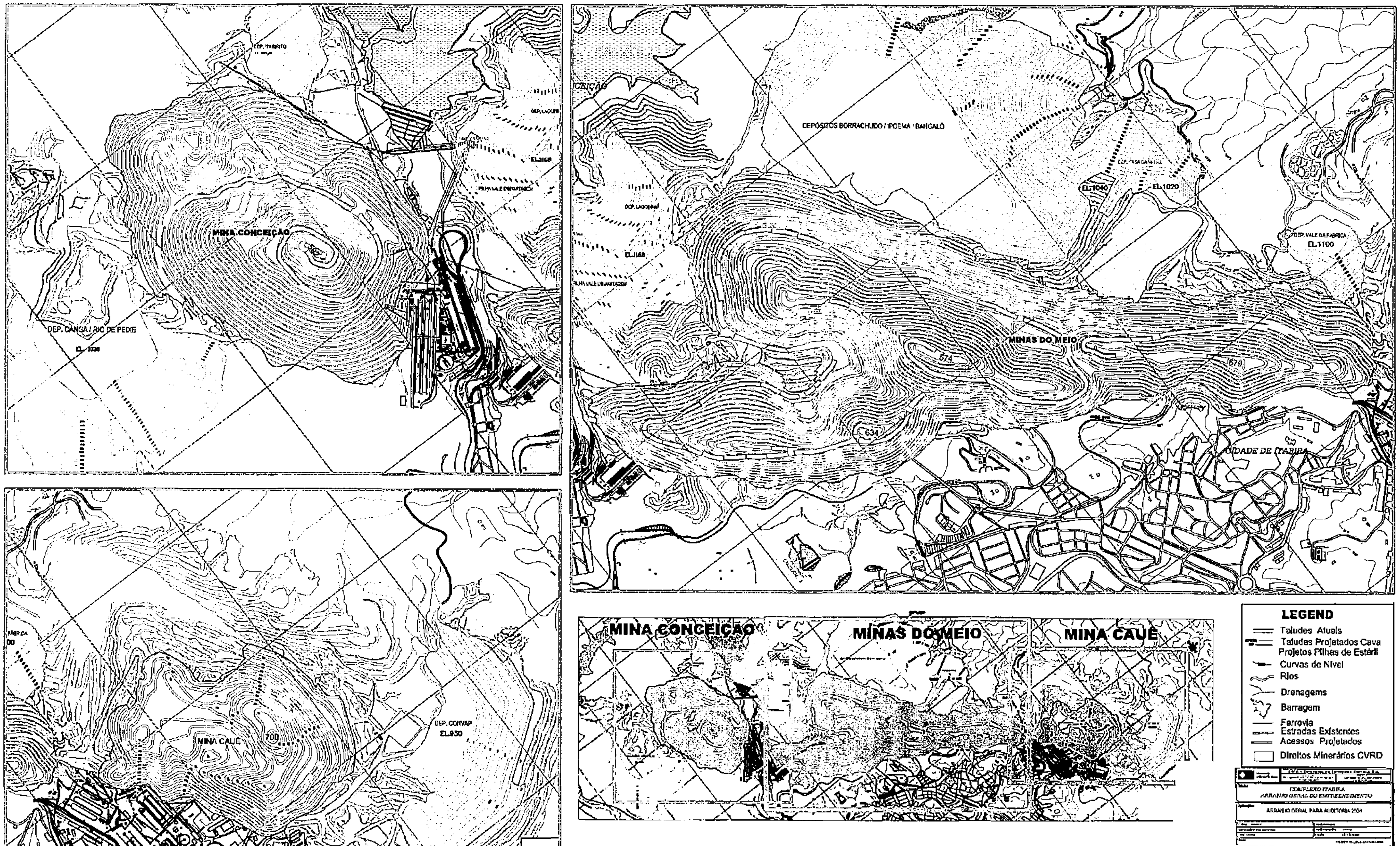
The block model used for resource estimation consists of 1,244,151 blocks. The parent block size is 25 x 25 x 15m, while the sub-block is 6.25 x 6.25 x 7.5m. The block model has the long axis oriented at 60-degrees, parallel to the strike of the deposit.

PAH performed limited validation checks against the final block model including statistical comparison between estimated model averages and declustered composite statistics using the nearest neighbor approach. The difference between the block model estimates and declustered composites was in the range of 3 to 5 percent. In PAH's opinion these results are within acceptable range.

8.1.3 Mining Operations

The Itabira Complex includes the Cauê, Minas do Meio, and Conceicao pits. Figure 8-3 presents a site plan of the Itabira Complex showing the approximate limits of the ultimate mine pits.

Cauê is the oldest operation in the region, having begun in 1942 on the northeast portion of an extensive iron outcrop. The mine produced a minor amount of ore last year, and there is a small reserve remaining on the records, but it currently is serving as a repository for mine waste and tailings disposal. Minas do Meio (middle mines) lies between Cauê and Conceicao and provides



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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	Companhia Vale do Rio Doce	FIGURE 8-3 ITABIRA - ULTIMATE PIT	April/2005
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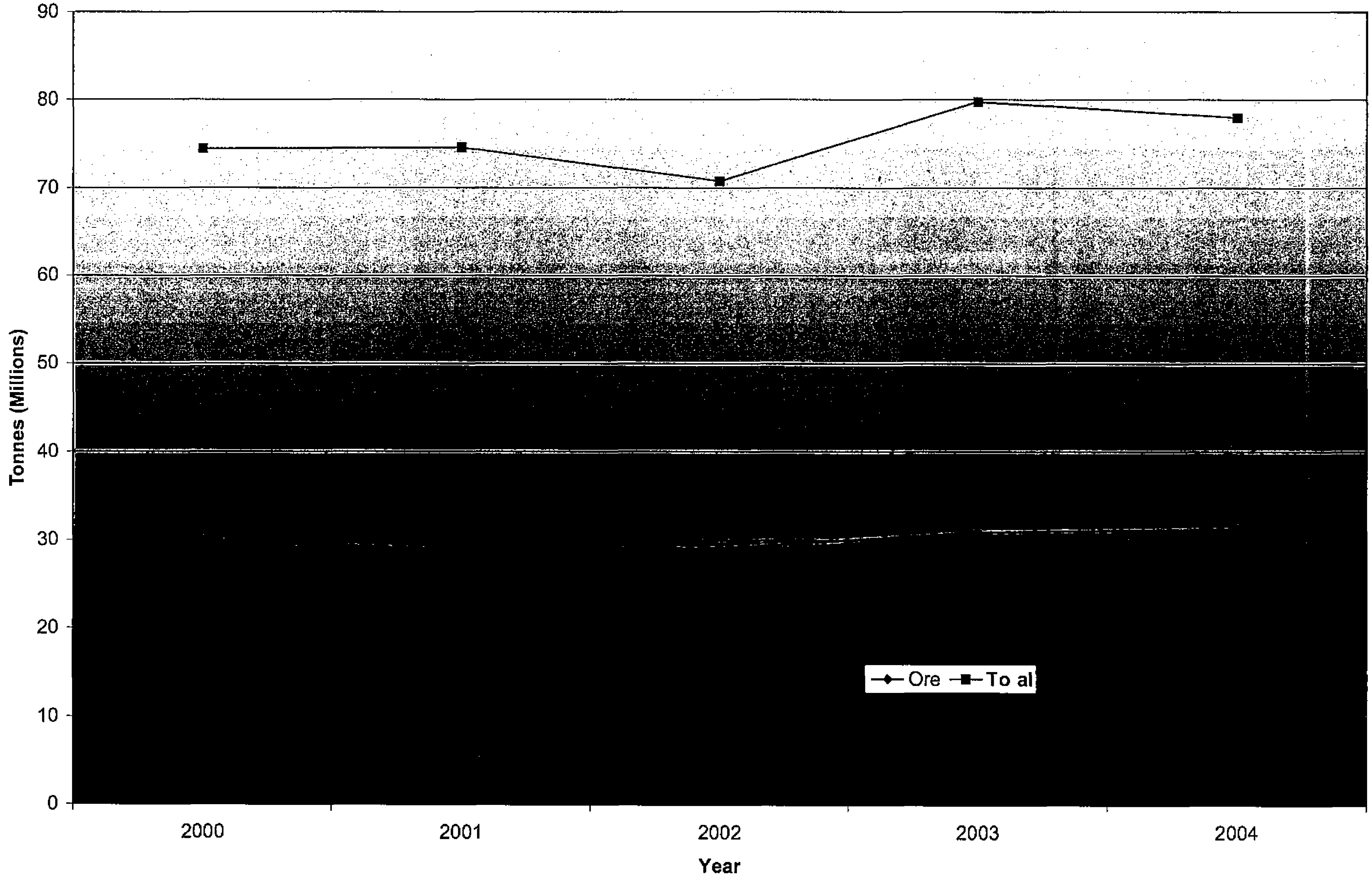
ore material to the processing facilities located at the extreme ends of the iron trend. Conceicao is a separate pit on the southwest end of the trend that was started in 1957.

Collectively, the mines of Itabira produce the most ore of any complex in the Southern System. Production in 2004 was just under 60-million ore tonnes, with another 95 million tonnes of waste removed. Table 8-1provides production data for the past five-year period (see also Figures 8-4 and 8-5). CVRD tracks overall mine output on the basis of deliveries to the two processing plants for the Itabira Complex. Therefore, the tabulated production for Caué and Conceicao is derived from the respective mines plus the output from Minas do Meio.

TABLE 8-1
Companhia Vale do Rio Doce
December 2004 Reserve Audit
Summary of Material Mined
Itabira Complex

	2000 (Mt)	2001 (Mt)	2002 (Mt)	2003 (Mt)	2004 (Mt)
Ore					
Mine Area					
Caué	29.885	28.815	29.033	30.887	31.279
Conceição	26.646	25.752	26.794	27.471	28.466
Waste					
Mine Area					
Caué	44.501	45.696	41.685	48.831	46.652
Conceição	26.396	31.129	30.699	36.198	48.688
TOTAL					
Mine Area					
Caué	74.386	74.511	70.718	79.718	77.931
Conceição	53.042	56.881	57.493	63.669	77.154

The Conceicao mine operates in the lower benches during the dry season from June to October, then in the upper benches during the rainy season that extends from November to April or later. The pit bottom serves as a sump during the rainy season, which is cleaned annually in June. Pit-side berms on the haul road are two to three meters high; there is right-hand traffic in the pits, with trucks traveling uphill loaded on the pit side. Water trucks are used with large graders to assist in maintaining haul road serviceability, but there could be an operational improvement in haul road design and construction as rolling resistance is believed to be quite high. Certain equipment at this site appears to be beyond its normal replacement age, and again an operational improvement could be achieved by timely retirement.



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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	*Companhia Vale do Rio Doce*	**FIGURE 8-4** **SOUTH SYSTEM - CAUE MINE PRODUCTION**	**April/2005**
Project No. **9416.00**	Project Name 2004 Reserve Audits		Drawing Name **Fig8-4.cdr**

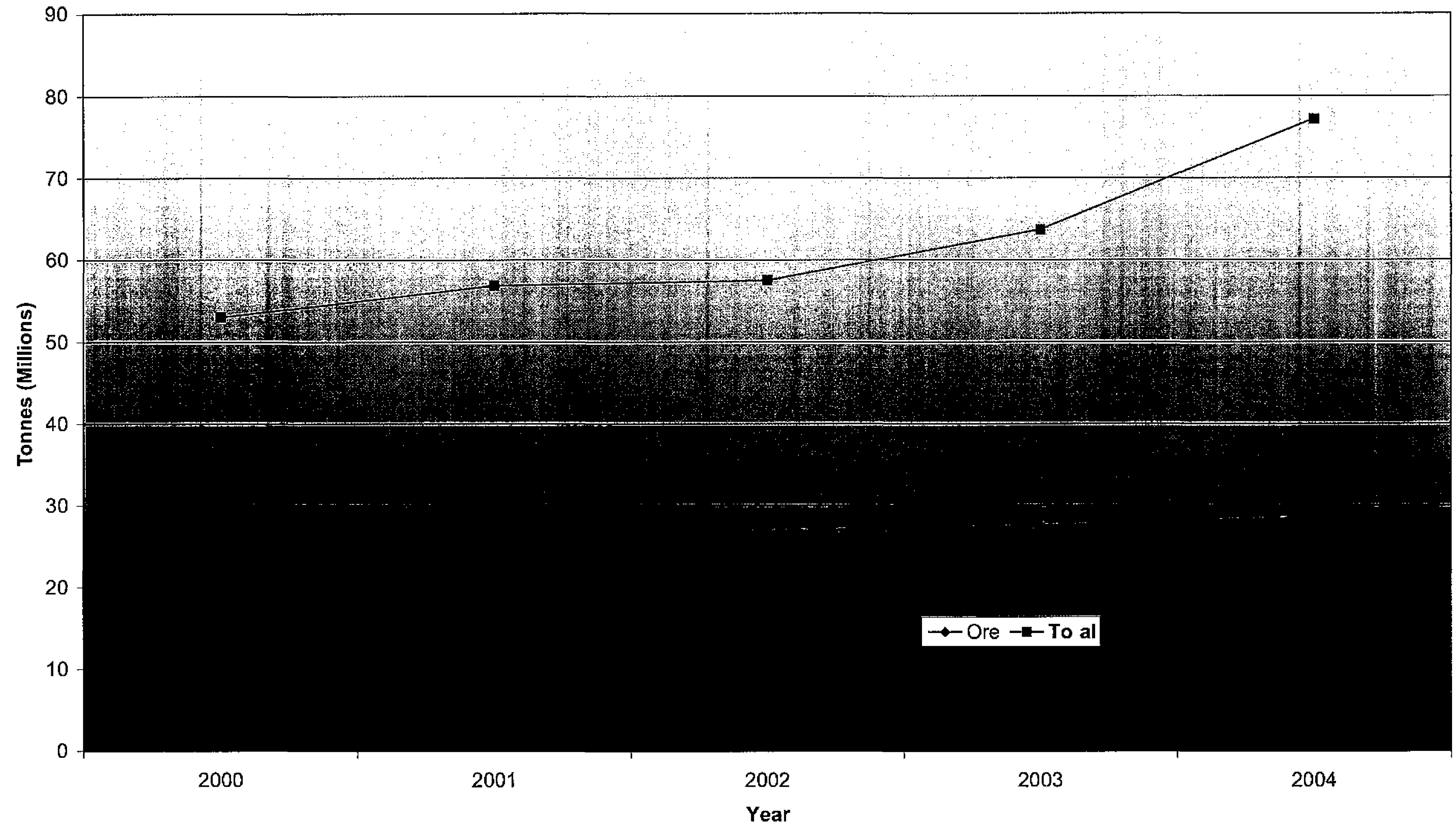

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FIGURE 8-5
SOUTH SYSTEM - CONCEICAO MINE PRODUCTION

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A detailed examination was conducted by PAH on the mining equipment at Itabira, as an example, in order to gain an understanding of the fleet ages, availabilities, utilization, and operating costs. This is a large operation by any standards which has a total of:

Primary Equipment

7	drills	250 mm diam
13	excavators	38 tonne – 48 tonne capacity
10	front loaders	36 tonne – 45 tonne capacity
50	trucks	172 tonne – 230 tonne capacity

Secondary Equipment

14	track dozers, up to Cat D11 size
12	rubber-tired dozers, up to Cat 854 size

Various support equipment including small loaders, water trucks, maintainers, etc.

Costs for each item had been recorded by CVRD in US$/operating hour for the first six months of 2004 and then combined into fleet totals. Components such as operating and maintenance labor, fuel, power, parts, tires, lubricants, and contractor support were identified, representing costs associated with 67 million tonnes of ore and waste production during this period. PAH believes this to be a representative sample for mining operating cost analysis.

Table 8-2 presents costing data for the different equipment fleets, which can be summarized on a cost/tonne basis as follows:

Drilling	$0.03/tonne of material moved
Loading	$0.11
Hauling	$0.27
Support	$0.19
TOTAL	$0.60/tonne of material moved

Operating and maintenance labor represent $0.14/tonne of the costs summarized above, or 23 percent of the total, with materials and supplies constituting the remainder. Overall mining costs can be expected to be somewhat higher than this amount, as certain non-equipment related costs (such as contractors, and explosives for example), direct supervision, and administrative charges are allocated to the complex. These costs agree closely with overall costs provided by CVRD and are accepted as indicative of the efficiency with which the company operates its mines.

Capital cost forecasts for mining equipment have been reviewed by PAH and are believed to be sufficient to accomplish the production levels expected at Itabira. Primary equipment replacements for 2005 include two new drills and five 240-tonne trucks (substituting for 170-tonne units); total

TABLE 8-2
ITABIRA COMPLEX
PRIMARY EQUIPMENT COSTS, US$/hour
(first six months, 2004)

	DRILLS				EXCAVATORS				
Fleet No	1	2	3	7	21	23	24	27	28
	BE 45R	Tamrock 660	IngersollRand	Tamrock T60	DeMag H485	BE 295B	Kom. PC8000	PH 2100	DeMag H485
Maintence									
Labor	6.95	19.32	7.32	6.33	11.22	6.37	0.47	10.07	14.06
Fuel/Electricity	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Lubricants	3.87	1.83	7.42	13.54	16.92	4.15	2.40	1.63	18.75
Parts	15.57	90.87	42.43	63.57	65.29	42.40	1.92	6.76	68.28
Tires	0.01	0.00	0.48	0.34	0.00	0.00	0.00	0.00	0.00
Other	21.34	83.84	17.15	42.95	10.39	31.66	2.93	13.08	37.70
Contractor	8.25	1.65	0.66	6.14	4.19	7.66	0.88	1.55	11.27
Subtotal	55.99	197.31	75.47	132.87	108.01	94.25	8.60	33.09	171.06
Operation									
Labor	14.76	32.08	18.03	16.02	10.22	10.08	10.03	11.49	10.16
Fuel/Electricity	0.73	7.30	23.80	27.17	0.00	9.48	0.00	11.65	57.07
Lubricants	0.53	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00
Parts	20.69	0.00	75.54	42.08	2.53	4.25	16.18	1.18	6.05
Tires	0.00	0.00	0.33	1.50	0.00	0.00	0.00	0.00	0.00
Other	0.02	0.00	1.20	0.10	0.00	0.00	0.00	0.00	0.00
Contractor	0.13	0.00	1.40	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	36.85	39.38	121.17	86.85	12.75	23.81	26.21	24.32	73.28
TOTAL	92.84	236.69	196.64	219.72	120.76	118.06	34.81	57.41	244.34
No. Machines	3	1	1	2	1	5	2	1	4
Hours/Machine	2273	151	1987	2257	1780	1860	2188	1034	1700
Total Hours	6819	151	1987	4514	1780	9300	4378	1344	6800
TOTAL COST	633,076	35,740	390,724	991,818	214,953	1,097,958	152,398	77,171	1,661,512
Tonnes					3,231,000	12,415,100	10,314,200	1,181,700	11,064,000
COST/TONNE					0.07	0.09	0.01	0.07	0.16

Wtd Ave Unit Cost	Total US$/tonne	Labor US$/tonne	Matr & Suppl US$/tonne
Drilling	0.03	0.01	0.02
Loading	0.11	0.03	0.09
Hauling	0.27	0.08	0.21
TOTAL	0.40	0.10	0.31

SECONDARY EQUIPMENT COSTS, US$/hour
(first six months, 2004)

	TRACK DOZERS				RUBBER TIRE DOZERS			
Fleet No	40	41	42	43	44	45	49	11
	Cat D8L	Cat D10N	Cat D11R	Cat D11R	Cat 854-G	Cat IT 275	Cat 834	Cat 16G
Maintence								
Labor	0.51	0.41	0.17	0.16	0.10	0.10	0.44	0.25
Fuel/Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lubricants	2.07	1.58	1.53	0.81	0.84	0.36	1.23	0.90
Parts	38.60	24.91	12.29	1.93	2.53	1.85	22.29	28.58
Tires	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Other	2.28	2.27	0.74	0.25	0.11	1.03	2.27	2.28
Contractor	1.41	3.13	2.83	4.10	3.84	0.14	2.77	0.89
Subtotal	42.87	32.31	17.56	7.26	7.62	3.28	29.00	32.92
Operation								
Labor	5.34	9.80	11.20	10.72	10.13	9.04	10.56	10.49
Fuel/Electricity	10.83	17.39	28.41	27.11	22.27	14.14	12.37	7.29
Lubricants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parts	13.14	27.54	60.28	33.08	5.11	4.30	2.38	4.68
Tires	0.00	0.00	0.00	0.00	1.80	0.00	2.19	1.48
Other	0.20	0.31	0.00	0.08	0.21	26.90	0.00	0.04
Contractor	0.00	0.13	0.00	0.09	0.00	0.00	1.06	0.83
Subtotal	29.51	55.17	97.87	71.08	39.52	54.38	28.58	24.81
TOTAL	72.38	87.48	115.43	78.34	47.14	57.68	57.58	57.73
No. Machines	1	9	1	3	3	3	6	4
Hours/Machine	2496	3234	3520	4996	7300	3155	2908	3346
Total Hours	2496	29106	3520	14988	21900	9465	17448	13384
TOTAL COST	180,660	2,546,193	406,314	1,174,160	1,032,366	545,752	1,004,307	772,658

Wtd Ave Unit Cost	Total US$/tonne	Labor US$/tonne	Matr & Suppl US$/tonne
Track Dozer	0.06	0.01	0.05
RT Dozer	0.04	0.01	0.03
Roads & Other	0.09	0.02	0.07
TOTAL	0.19	0.04	0.15

FRONT END LOADERS		
31	32	37
Cat 994	BE 295B	LT 1800
5 36	20.63	5.88
0.00	0.00	0.00
12.84	1.46	10.29
32 33	149.58	40.91
0.00	0 00	0.00
9.86	179.75	39.82
2.13	7.78	3.35
62.52	358.70	100 25
10.31	10 76	10 27
54.36	13 18	65 80
0.00	0 00	0 24
8.61	15 37	5.65
0.00	0 00	0 00
0 07	0 00	0 00
0.67	0 00	0 00
74.02	39 32	82 06
136.54	398 02	182.31
4	2	4
2555	1277	2364
9198	2554	8747
1,255,895	1,018,543	1,594,629
11,383,400	4,204,900	13,250,400
0 11	0.24	0 12

TRUCKS						
50	52	54	55	56	57	58
Cat 789-1	Cat 789-2	Cat 789B	Cat 793	Cat 793-C	Unit Rig	Cat 793-C
2.36	2.72	1.88	2 08	2.17	1 60	0.06
0 00	0.00	0.00	0 06	0.00	0.00	0.00
4.70	6.86	5 13	4 87	5.04	3.07	2 49
76 74	121.66	61.51	31 16	79.64	19.42	32.22
0 00	0.00	0.00	0.00	0.00	0 00	0.00
10 32	15.88	6.17	4.85	21 14	41.93	3.50
13.12	13.85	2.41	3.18	3.46	7 47	7 16
107 24	161.07	77.10	46.30	111 45	73 49	45.43
8.65	9.11	9 09	9.13	9.11	9 17	8 80
37.92	38.48	37 60	42.91	45 39	41.67	50.64
0.00	0.00	0 00	0.00	0.00	0.00	0.00
0.00	0.00	0 00	0.00	0 00	0 00	0.00
0.00	0.00	0 00	0.00	0.00	0.00	0 00
0.00	0 31	0 00	0.00	0.53	0 71	0 38
0.00	0 00	0 00	0.00	0.00	0 00	0 00
46.47	47 90	46 69	52.04	55.03	51.55	59 83
153.71	208 97	123 79	98.34	166.48	125 04	105 36
2	2	3	3	11	12	17
2187	2109	2292	2856	2687	2423	3315
4374	5082	6876	8568	29557	29076	56355
872,328	1,057,733	851,180	842,577	4,920,849	3,635,663	5,937,563
1,788,500	2,084,300	2,982,100	4,412,400	15,583,200	14,219,800	26,110,200
0.38	0.51	0.28	0 19	0.32	0.26	0.23

ROAD MAINTENANCE AND SERVICE VEHICLES							
12	13	61	62	63	34	38	39
Cat 24H	Cat 24H	Haulpak 120	Cat 631E	Misc.	FiatA 200	Cat 988B	Cat 988F
1 12	0.12	13 91	0.48	5.53	2.11	0.86	0 31
0.00	0.00	0.00	0.00	0 00	0 00	2.18	0.00
1.47	0.86	7.37	1.04	1.48	5.93	2.12	1.12
61 86	4 30	79.21	27.41	27.72	42.64	55 83	16.89
0.00	0.00	0.00	0 00	0.52	0.00	0.00	0.00
3 60	0.16	31.36	1.65	8.60	29.48	3 48	2 40
3.69	4.13	24 75	1 18	2.60	7.70	6.52	0.95
71 76	9.69	156.60	31.75	48.45	87.87	71.00	21.67
9.66	10 15	8.93	8.49	10 33	7 89	11.03	9.16
19.70	18 62	32.23	11.25	11.72	12 14	20.74	13.70
0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.01
16.74	9.13	0.00	7 61	0.00	3.33	0.53	2.75
0.00	0.00	0.00	3.12	0 74	0 21	10.91	3.99
0.01	0.00	0 00	0 01	0.28	11.71	0.45	0 14
0.00	0.00	0 55	0 00	2.48	0.00	0 00	0 00
46.11	37 90	41 71	31.48	25.55	35.28	43.66	29 75
117 87	47.59	198 31	63.23	72.00	123.15	114 66	51 42
2	2	7	5	4	2	2	3
2598	6428	1265	1775	745	1757	1309	4033
5196	12856	8223	8875	2980	3514	2618	12099
612,453	611,817	1,630,604	561,166	214,560	432,749	300,180	622,131

budgeted mine capital will be over $18 million for the year, and will average $23.5 million annually over the next five years.

Production forecasts for the Itabira Complex are quite constant at approximately 160 million tonnes of material moved annually through 2008, an increase to 180 million tonnes per year through 2019, and then decreasing rapidly to closure in 2022. Run-of-mine (ROM) ore tonnes will average about 63 million tonnes per year, and expected product sales will be roughly 46 million annual tonnes.

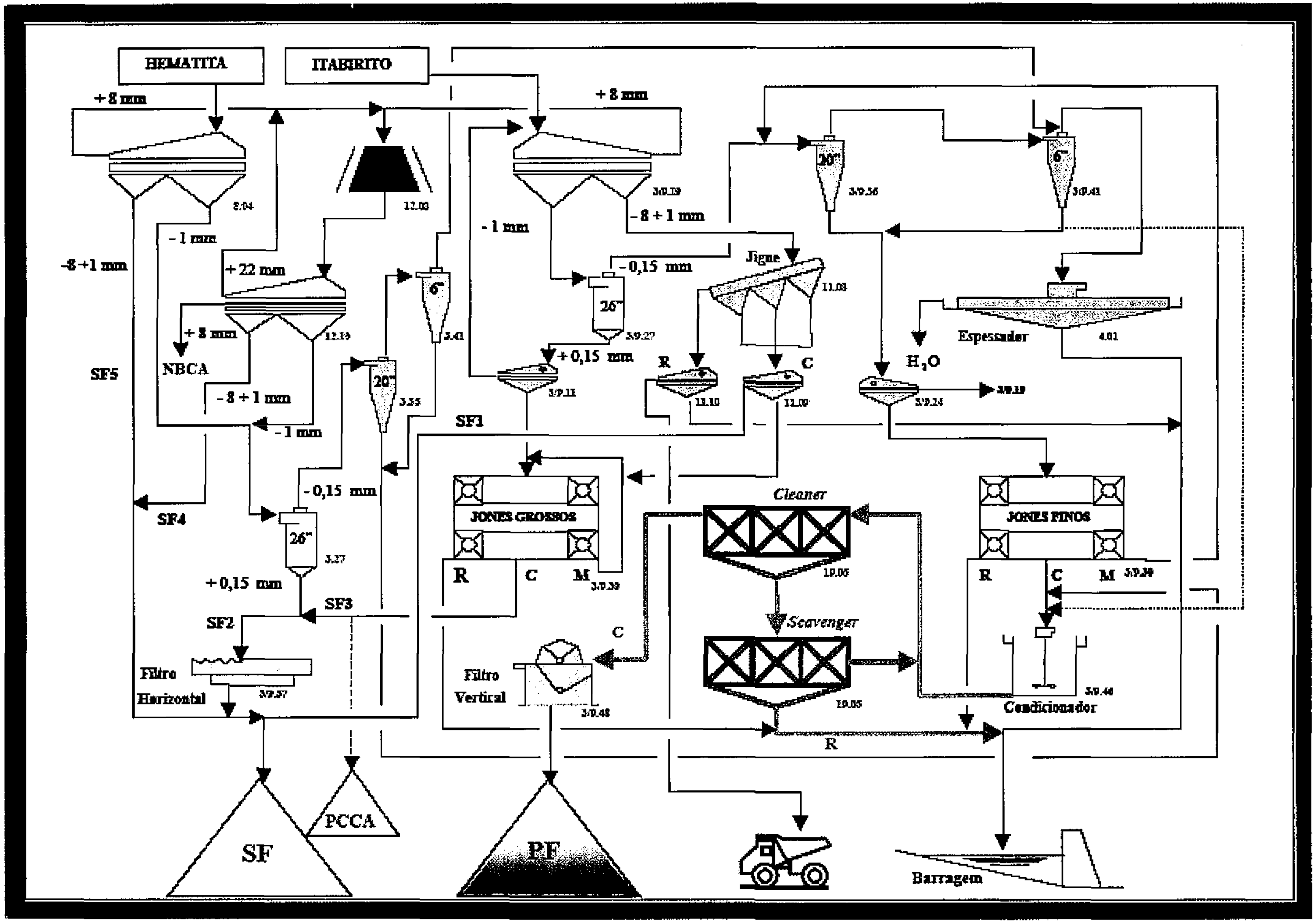
8.1.4 Processing

The Itabira Complex produced approximately 45.5 million tonnes in 2004 in two plants Cauê and Conceicao. A little under half of this came from the Cauê Mine that was subsequently shut down. The pit is being reclaimed and is currently being used a water reservoir. The lost production is made up by the Minas do Meio operations. Minas do Meio will supply all the feed to the Cauê Plant and approximately 20 percent of that for Conceicao Plant.

The Cauê Plant flowsheet is very similar to that of Conceicao. Natural Pellet Ore (NPO) is recovered by crushing and screening. Sinter Feed (SF) is produced by classification, jigging and magnetic separation using Jones separators. Pellet Feed (PF) is also produced by flotation. The major differences in the plant are those of equipment selection and size. The Cauê plant has fourteen processing lines for each ore, hematite and itabirite. Conceicao has four lines for each ore. Consequently, the equipment in Conceicao is generally larger, particularly in the front end of the process. In addition, Cauê utilizes mechanically agitated flotation cells as opposed to the column cells at Conceicao. Conceicao also practices fine screening of the flotation concentrate. That approach has not yet been applied at Cauê. A simplified process flowsheet is presented in Figure 8-6.

In 2004 the Cauê Plant produced 1.0 million tonnes of NPO, 7.5 million tonnes of SF and 13.5 million tonnes of PF. The overall weight recovery was 70.2 percent and the iron recovery was 85.2 percent.

The Conceicao Plant has been discussed in detail in Section 6.0 as it presents the typical process technologies used throughout the Southern System and will not be addressed further here. In 2004 the Conceicao Plant produced 45 thousand tonnes of NPO, 10.3 million tonnes of SF and 11.2 million tonnes of PF. The overall weight recovery was 74.5 percent and the iron recovery was 91.1 percent.



TRANSLATIONS

PORTUGUESE	ENGLISH
Alimentador	Feeder
Amido	Starch
Amina	Amine
Barragem	Dam
Beneficiamento	Beneficiation
Britagem	Crusher
Cal	Lime
Clasificador	Classifier
Coluna	Column
Concentrao	Concentration
Concentrado	Concentrate
Condicionador	Conditioner
Convencional	Conventional
Deslamagem	Deslime
Espesador	Thickener
Espiras	Spirals
Estacogem	Storage
Filtro vertical	Disc filter
Finos	Fines
Floculante	Flocculent
Flotacao	Flotation
Fluxograma	Flow diagram
Fracao	Fraction
Grossos	Coarse
Heamatita	Hematite
Itabirito	Itabirite
Jones	Jones separator
Lama	Slime
Magnetica	Magnetic
Maogem	Grinding
Minerio	Ore
Peneiras	Screen
Pila pulmao	Surge pile
Primaria	Primary
Rejeito	Reject (tails)
Rota alternativa	Alternative route
Secundaria	Secondary
Soda	Soda ash
Tanque	Tank
Tercaria	Tertiary
Tratamento	Treatment
Vibratrorio	Vibrating

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FIGURE 8-6
SOUTH SYSTEM - CAUE PLANT FLOWSHEET

Date of Issue
April/2005

Drawing Name
Fig8-6.cdr

8.2 *Minas Centrais Complex*

The Minas Centrais Complex includes the Gongo Soco, Agua Limpa, and Brucutu mines, as well as the idle Bau mine and the to-be-developed Maquine operation. Brucutu came under CVRD control in 1990, Gongo Soco in 1999, Agua Limpa in 2000, and Maquine in 2003. CVRD's interest is 100 percent in all of the properties except for Agua Limpa wherein the Chinese steel company, Bao Steel, has a 50-percent ownership. This latter property saw initial production in 1962, and the others came on-line at intervals thereafter. Maquine is expected to be in operation by 2010. Corrego Meio ceased operation in 2004.

8.2.1 Geology

The Minas Centrais Complex includes the northern portion of the Quadrilátero Ferrífero (Iron Quadrangle), due east from the city of Belo Horizonte. It includes three NE-SW trending branches of the Formación Ferrífera outcroppings, with a projected total extension of approximately 115 kilometers. The main branch, over 60 kilometers long, holds the deposits of Brucutu in the northern portion, Gongo Soco in the central part, and the Maquiné project in the southern extension. The Baú deposit is located in the middle branch of the Formación Ferrífera outcroppings, which represents a folded extension of the main branch. The Agua Limpa / Cururu mine is enclosed by an independent branch of the Formación Ferrífera outcroppings, to the east of the Complex area.

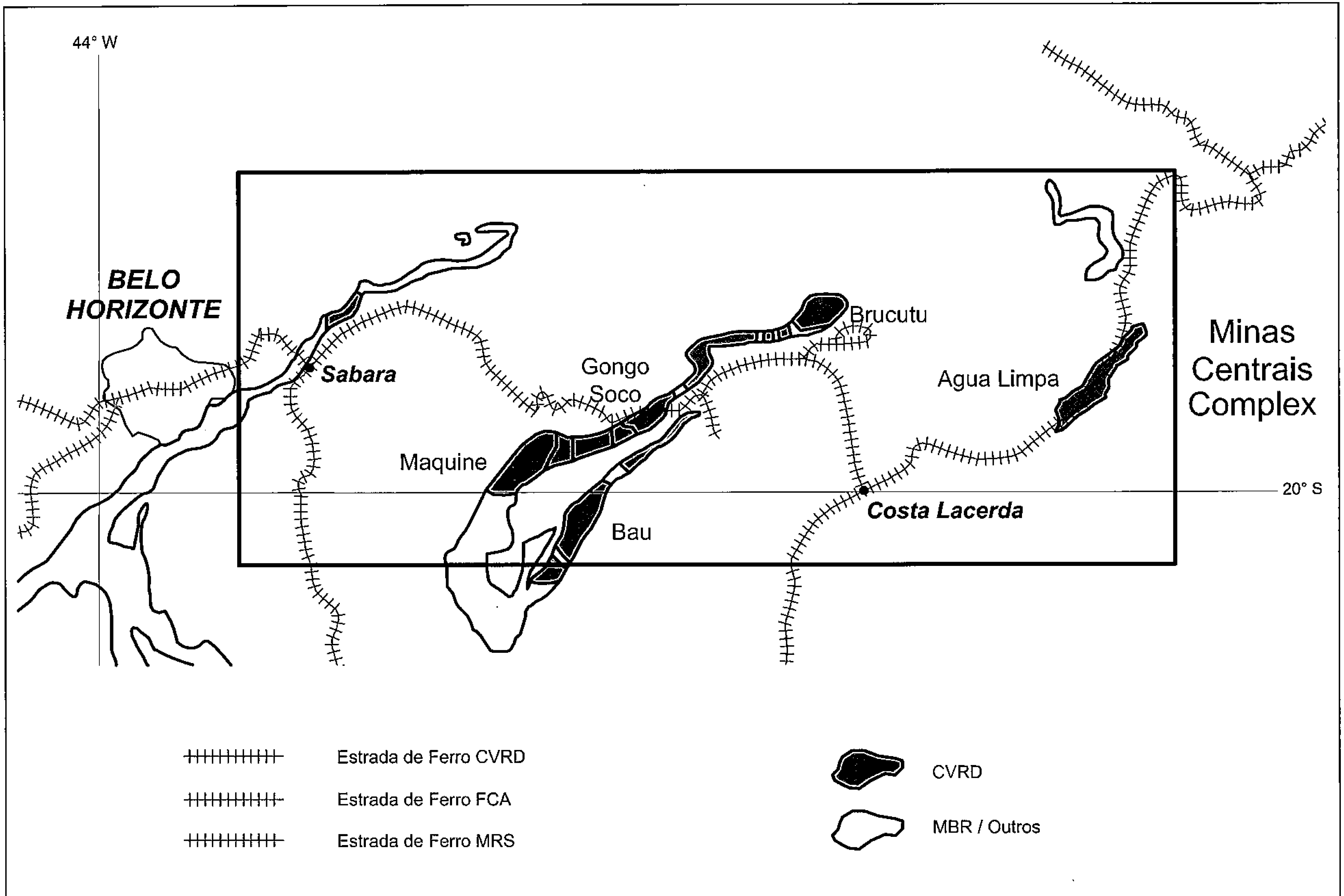
The Minas Centrais Complex includes the Agua Limpa / Cururu, Baú, Brucutu, Gongo Soco mines, and the Maquiné project, with an accumulated production for 2004 of 25 million tonnes of ores with a quality ratio of 1.2 for hematite to itabirite. It holds approximately 28 percent of the Southern System reserves. Projected output for Brucutu and Maquiné will cause a significant positive impact in the iron production for the Complex in future years.

Figure 8-7 shows a general arrangement of the Minas Centrais Complex area.

Agua Limpa / Cururu Mine

The Agua Limpa mine has been in operation since 1961; it was acquired by CVRD in 1998 from SAMITRI; currently CVRD operates it as a joint venture in 50 / 50 ownership with Bao Steel. The mine is located along an independent 8-kilometer long mineralized branch of the Formación Ferrífera. It includes the Morro Agudo and Cururu deposits in the southern extension, and the Zones A, B, and C towards the main pit development. The Agua Limpa deposit was modeled and audited in March of 2003, from a database that included 291 drill holes, out of a total of 459, with 13,341 meters of core, from a total of 27,078 meters. The geologic model is under review to update resource estimates.

During 2004 the Agua Limpa mine produced 34 percent of the Minas Centrais output. Agua Limpa reserves include only itabirite ores, and they represent approximately 1.6 percent of the Southern Systems reserves.



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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	*Companhia Vale do Rio Doce*	FIGURE 8-7 SOUTH SYSTEM - MINAS CENTRAIS COMPLEX GENERAL ARRANGEMENT	April/2005
Project No. 9416.00	Project Name 2004 Reserve Audits		Drawing Name Fig8-7.dwg

Baú Mine

The Baú mine is enclosed by a parallel extension of the main branch of the Minas Centrais outcroppings of the Formación Ferrífera that folds to the east and extends to the northeast on a projected section of over 15 kilometers in length. It is currently inactive with minimum reported reserves that were estimated from a database that included 9,263 meters of core drilled by 116 holes, out of a total of 134 holes and 10,406 meters of core. The 2005 drill program includes 31 additional holes with 3,860 meters to update the geologic model and resource estimates.

Brucutu Mine

This deposit is located in the northeastern extension of the Gongo Soco geologic structure along the main branch of Formación Ferrífera outcropping, in the Gandarela Syncline. It was investigated and partially developed by Mineração Igaporã S.A. since 1985. CVRD acquired the property in 1992 and drilled 327 holes with 37,852 meters of core, including 270 holes and 25,048 meters in the geologic model. CVRD has programmed 31 drill holes with 6,805 meters of core for 2005, to update the resource estimates.

Currently the mine is in expansion development towards a rated capacity of 27 million tonnes of ore per year. In 2004, Brucutu produced 24 percent of the Minas Centrais output, and it represents approximately 16 percent of the Southern System reserves. Brucutu ore averages a quality ratio of 0.30 for hematite to itabirite ores.

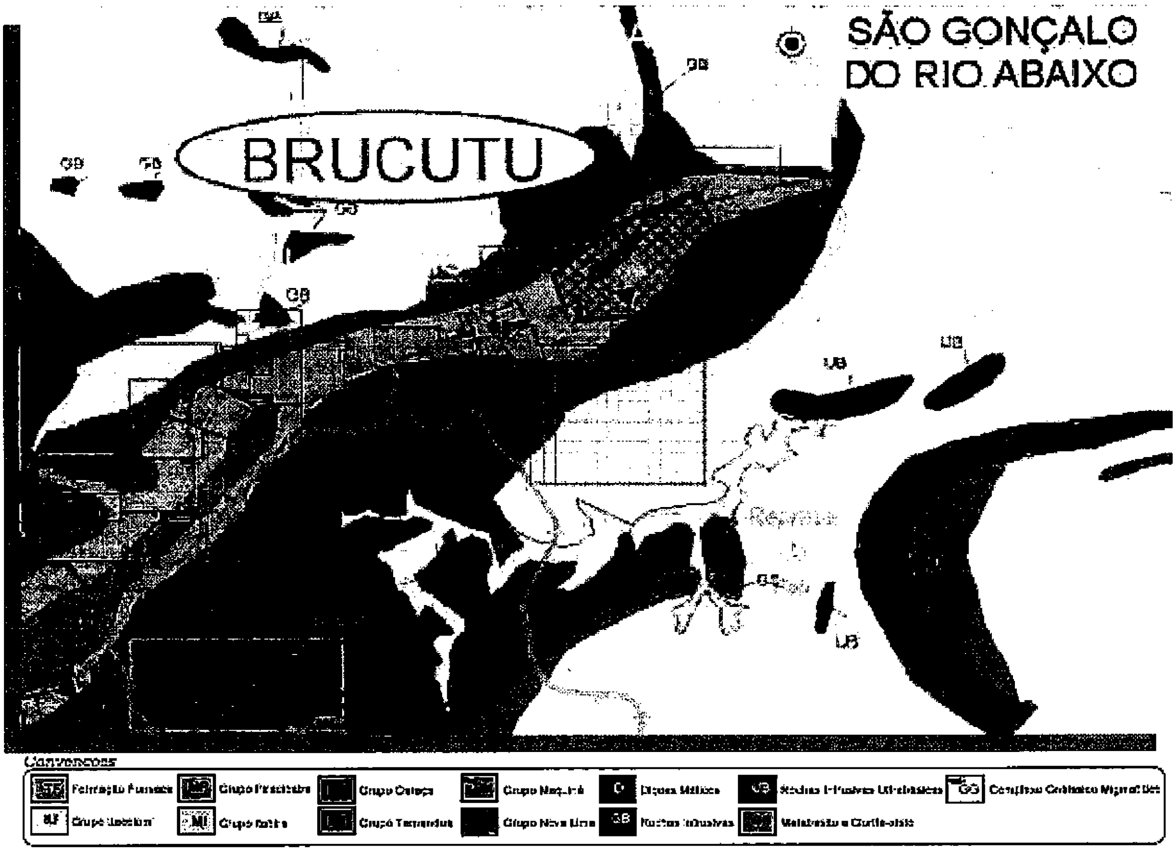
Figure 8-8 shows the geologic map of the Guardarela Syncline and typical section of the Brucutu deposit.

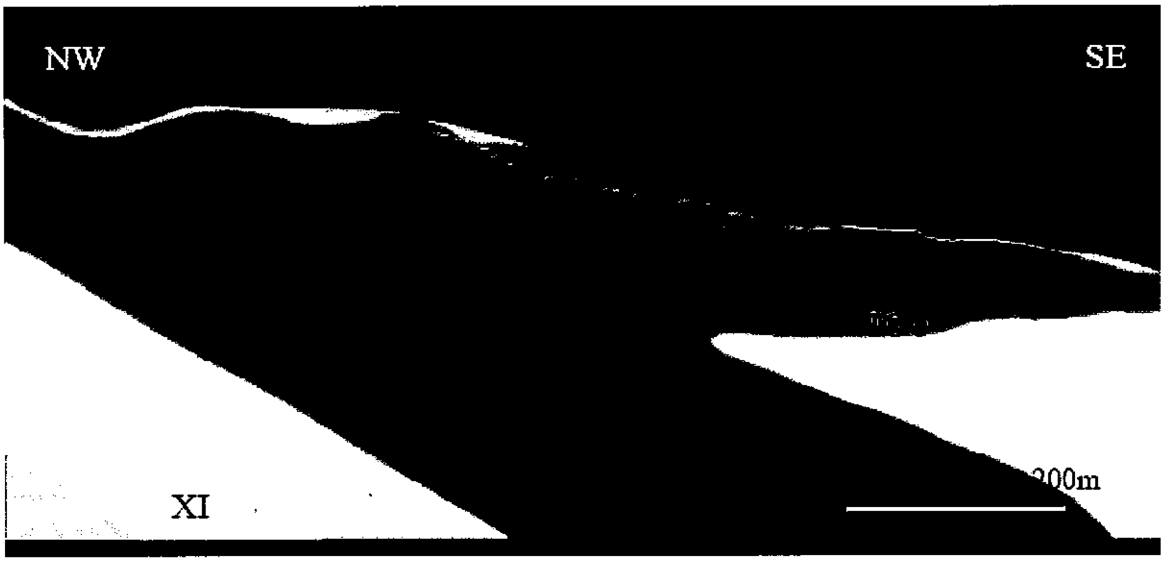
The Brucutu deposit is comprised of approximately 75 percent of soft itabirite ore. The current geologic model was audited in 2004; therefore, the current level of audit was a Level 1.

Gongo Soco Mine

The Gongo Soco mine was first investigated for gold in the1800 by British miners. W. J. Henwood describes the iron ore for the first time in 1871. CVRD acquired the property in 2000 as an operating mine. It is located in the middle of a 60-km long structural outcropping of the Formación Ferrífera in the northern section of the Quadrilátero Ferrífero. The deposit was modeled for resource estimates in 2002 and has been previously audited from a database that included 132 drill holes, out of a total of 250, and 14,992 meters of core, of a total of 34,699 meters.

The Gongo Soco mine produced approximately 34 percent of the ore extracted from the Minas Centrais Complex mines, and it represents 2.4 percent of the Southern System reserves. Its production is scheduled for depletion by the years 2,013 or 2,023 depending on development of areas inaccessible at this time, due to infrastructure. Its iron ore is of high quality ratio (1.86) for hematite to itabirite minerals.





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PINCOCK, ALLEN & HOLT 274 Union Boulevard, Suite 200 Lakewood, Colorado 80228 Phone (303) 986-6950	*Companhia Vale do Rio Doce*	FIGURE 8-8 GEOLOGICAL MAP OF THE GANDARELA SYNCLINE AND TYPICAL SECTION OF THE BRUCUTU DEPOSIT	April/2005
Project No. 9416.00	Project Name 2004 Reserve Audits		Drawing Name Fig8-8.cdr