SANOFI SYNTHELABO SA
Form 20-F
June 23, 2003
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As filed with the Securities and Exchange Commission on June 23, 2003

SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

FORM 20-F

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)

OF THE SECURITIES EXCHANGE ACT OF 1934

For the Fiscal Year ended December 31, 2002

Commission File Number: 001-31368

Sanofi-Synthélabo

(exact name of registrant as specified in its charter)

N/A

(translation of registrant s name into English)

France

(jurisdiction of incorporation)

174, avenue de France, 75013 Paris, France

(address of principal executive offices)

Securities registered pursuant to Section 12(b) of the Act:

Title of Securities:	**Name of each exchange on which registered:**
American Depositary Shares, each representing one-half of one ordinary share, nominal value 2 per share	New York Stock Exchange
Ordinary shares, nominal value 2 per share	New York Stock Exchange (for listing purposes only)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None

The number of outstanding shares of each of the issuer s classes of capital or common stock as of December 31, 2002 was:

ordinary shares: 732,367,507

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Yes x No

Indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 Item 18 x

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PART I

Item 1. Identity of Directors, Senior Management and Advisers

Not applicable.

Item 2. Offer Statistics and Expected Timetable

Not applicable.

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Item 3. Key Information

A. Selected Financial Data

Introduction

Our company is the result of the 1999 merger of two French companies, Sanofi and Synthélabo. While we have prepared consolidated financial statements for 2000, 2001 and 2002 and a consolidated balance sheet as of December 31, 1999, we did not prepare a consolidated statement of income or statement of cash flows for 1999, the year of the merger. Instead, each of Sanofi and Synthélabo prepared consolidated statements of income and cash flows for the first half of 1999, and we prepared consolidated statements of income and cash flows for the second half of 1999. We have presented those statements of income and cash flows below, but they do not provide information that is comparable to the information in our 2000, 2001 and 2002 statements of income and cash flows.

We have also prepared a pro forma income statement for the year ended December 31, 1999, based on the assumption that the merger of Sanofi and Synthélabo occurred on January 1, 1999 and that the sale of Sanofi s beauty division occurred on December 31, 1998. The pro forma income statement data was prepared under French accounting rules applicable to pro forma financial information, and not in accordance with the regulations of the Securities and Exchange Commission applicable to pro forma financial statements. We have included certain data from the pro forma information below in order to reflect trends in our business during the period from 1999 to 2002. The methodology used to calculate our pro forma financial information is described in our registration statement on Form 20-F dated June 25, 2002 (SEC File No. 001-31368).

Our consolidated financial statements and those of our predecessor companies have been prepared in accordance with French generally accepted accounting principles, or French GAAP, and applicable French laws, which differ in certain significant respects from generally accepted accounting principles in the United States, or U.S. GAAP. These differences include, among other things:

- the treatment of the merger under U.S. GAAP as a purchase of Synthélabo by Sanofi and related subsequent accounting consequences;
- the treatment of certain provisions for restructuring;
- revenue recognition of a U.S. alliance under the operational management of Bristol-Myers Squibb; and
- the deferred income tax effect of our U.S. GAAP adjustments.

We have reconciled our net income and shareholders equity to U.S. GAAP. You should read Note F to our consolidated financial statements, which sets out the details of the reconciliation.

Unless otherwise indicated, U.S. dollar amounts in this annual report are translated using the December 31, 2002 Noon Buying Rate of $1.00 = 0.95.

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Selected Financial Data

The selected financial data set forth below have been derived from:

- our audited consolidated financial statements as of and for the years ended December 31, 2000, 2001 and 2002;
- our audited consolidated statement of income for the second half of 1999;
- our unaudited pro forma statement of income for the year ended December 31, 1999;
- the audited consolidated financial statements of Sanofi for the year ended December 31, 1998 and the six months ended June 30, 1999; and
- the audited consolidated financial statements of Synthélabo for the year ended December 31, 1998 and the six months ended June 30, 1999 (gross profit and operating profit data are unaudited as they are derived from management accounts and reflect classification differences to conform to the presentation of selected financial data for Sanofi for such periods).

The data derived from our pro forma statement of income are presented for illustration only, and do not necessarily reflect the actual results that would have been realized had Sanofi and Synthélabo operated on a combined basis for all of 1999. Due to the merger, the selected financial data for Sanofi and Synthélabo, as well as our selected financial data for the second half of 1999, are not comparable to our selected financial data for 2000, 2001 and 2002.

The first table below presents selected financial data for our company for the second half of 1999, and all of 2000, 2001 and 2002, as well as selected pro forma financial data for 1999. The second table presents selected financial data for Sanofi and Synthélabo for 1998 and the first half of 1999.

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	Six months ended December 31, 1999	As of and for the year ended December 31, 1999 (pro forma unaudited)	2000	2001	2002	2002 U.S. $
		(millions of , except per share data)				
Income statement data:						
French GAAP						
Net sales	2,658	5,350	5,963	6,488	7,448	7,840
Gross profit	1,889	3,744	4,521	5,235	6,070	6,389
Operating profit	531	971	1,577	2,106	2,614	2,752
Net income	342	625	985	1,585	1,759	1,852
Earnings per share (basic and diluted)[a]	0.47	0.85	1.35	2.17	2.42	2.55
Balance sheet data:[c]						
French GAAP						
Property, plant and equipment, net	1,143		1,217	1,229	1,395	1,468
Total assets	6,824		7,845	9,967	9,459	9,957
Long-term debt	137		121	119	65	68
Total shareholders equity	3,578		4,304	5,768	6,035	6,353
U.S. GAAP Data:[d]						
French GAAP Net income			985	1,585	1,759	1,852
Purchase accounting adjustments			(606)	(445)	(311)	(327)
Provisions and other liabilities			(99)	(23)		
Revenue recognition U.S. BMS alliance[b]			(8)	(136)	117	123
Other			99	(50)	23	24
Income tax effects			221	167	52	54
U.S. GAAP Net income[b]			592	1,098	1,640	1,726
French GAAP Shareholders equity			4,304	5,768	6,035	6,353
Purchase accounting adjustments			9,479	8,927	8,576	9,027
Provisions and other liabilities			110	35		
Revenue recognition U.S. BMS alliance[b]			(21)	(160)	(35)	(37)
Other			(168)	(456)	(695)	(732)
Income tax effects			(1,563)	(1,365)	(1,282)	(1,349)
U.S. GAAP Shareholders equity[b]			12,141	12,749	12,599	13,262
U.S. GAAP Earnings per share[b]						
basic[a]			0.82	1.52	2.30	2.42
diluted[a]			0.82	1.51	2.28	2.40

(a) Based on the weighted average number of shares outstanding in each year, equal to 731,143,218 shares in 1999, 731,441,746 shares in 2000, 732,005,084 shares in 2001 and 732,367,507 shares in 2002. Each ADS represents one-half of one share.

(b) The columns for 2000 and 2001 are restated to reflect our U.S. GAAP net income and shareholders equity taking into account the restatements of the financial statements of certain alliance entities under the operational management of Bristol-Myers Squibb. The restatements, which are set forth under the heading revenue recognition U.S. BMS alliance, for U.S. GAAP net income and shareholders equity, respectively, affected our share of the operating profits relating to the alliance entities. For additional information regarding these restatements, see Item 5 Operating and Financial Review and Prospects Overview Alliances Bristol-Myers Squibb.

(c) As discussed in Note B.2 to our consolidated financial statements included under Item 18, we changed our method of accounting for liabilities as of January 1, 2002. The impact of this change on shareholders equity was 24 million.

(d) As discussed in Note F.3.1 to our consolidated financial statements included under Item 18, we applied Statement of Financial Accounting Standard 142, Goodwill and Other Intangible Assets, as of January 1, 2002.

Sanofi **Synthélabo**

	Year ended December 31, 1998[b]	Six months ended June 30, 1999	Year ended December 31, 1998[b]	Six months ended June 30, 1999
			(unaudited)[c]	
	(millions of , except per share data)			
Income statement data:				
French GAAP				
Net sales	3,936	1,880	1,914	995
Gross profit	2,774	1,264	1,406	734
Operating profit	597	272	336	180
Net income	323	146	193	109
Earnings per share (basic and diluted)[a]	2.88	0.30	4.04	2.26
Balance sheet data:				
French GAAP				
Property, plant and equipment, net	759	753	282	281
Total assets	6,136	6,197	1,870	2,021
Long-term debt	402	39	61	58
Total shareholders equity	3,822	4,331	1,095	1,155

(a) Due to the merger, per share data for Sanofi and Synthélabo are not meaningful.
(b) Originally in French francs; amounts converted at the official rate of exchange, 1.00 = FF6.55957.
(c) Gross profit and operating profit data are unaudited. All other data is audited.

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DIVIDENDS

We paid annual dividends for the years ended December 31, 1999, 2000, 2001 and 2002. Sanofi paid annual dividends for the year ended December 31, 1998. We expect that we will continue to pay regular dividends based on our financial condition and results of operations.

The following table sets forth information with respect to the dividends paid by Sanofi in respect of the year 1998 and by our company in respect of the years 1999, 2000, 2001 and 2002.

	1998	1999[2]	2000	2001	2002
Net Dividend per Share (in euro)	1.12[1]	0.32	0.44	0.66	0.84
Net Dividend per Share (in U.S. $)	1.00	0.28	0.39	0.59	0.88

(1) The net dividend per share was converted into euro using the rate of exchange of 1.00 = FF 6.55957 fixed on December 31, 1998.

(2) The lower dividend per share is a direct result of the increase in the number of shares outstanding as a result of the merger.

The declaration, amount and payment of any future dividends will be determined by majority vote of the holders of our shares at an ordinary general meeting, following the recommendation of our board of directors. Any declaration will depend on our results of operations, financial condition, cash requirements, future prospects and other factors deemed relevant by our shareholders. Accordingly, we cannot assure you that we will pay dividends in the future on a continuous and regular basis. Under French law, we are required to pay dividends approved by an ordinary general meeting of shareholders within nine months following the meeting where they are approved. The shares registered hereby are eligible for all dividends (if any) declared and approved.

In France, dividends are paid out of after-tax income. However, subject to possible changes in French law that are described in Item 10 under Additional Information Taxation, French residents are entitled to a tax credit, known as the *avoir fiscal*, in respect of dividends they receive from French companies. Individuals are entitled to an *avoir fiscal* equal to 50% of the dividend. The *avoir fiscal* applicable to corporate investors generally is equal to 10% of the dividend. Dividends paid to non-residents normally are subject to a 25% French withholding tax and are not eligible for the benefit of the *avoir fiscal*. However, non-resident holders that are entitled to and comply with the procedures for claiming benefits under an applicable tax treaty may be subject to a reduced rate of withholding tax, and may be entitled to benefit from a refund of the *avoir fiscal*. See Item 10 Additional Information Taxation. The information in the table above represents the net dividend paid, without regard to the *avoir fiscal*.

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EXCHANGE RATE INFORMATION

AND THE EUROPEAN MONETARY SYSTEM

The European Monetary System

Under the provisions of the Treaty on European Union negotiated at Maastricht in 1991 and signed by the then 11 member states of the European Union in early 1992, a European Monetary Union, known as EMU, was implemented on January 1, 1999 and a single European currency, known as the euro, was introduced. As of December 31, 2002, the following 12 member states have adopted the euro as their national currency: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. The legal rate of conversion between the French franc and the euro was fixed on December 31, 1998 at 1.00 = FF 6.55957, and we have translated French francs into euros at that rate for periods before we adopted the euro for purposes of preparing our consolidated financial statements.

Exchange Rates

The following table sets forth, for the periods and dates indicated, certain information concerning the exchange rates for the French franc in 1998, expressed in French francs per U.S. dollar, and for the euro from 1999 through June 13, 2003, expressed in U.S. dollar per euro. The information concerning the U.S. dollar exchange rate is based on the noon buying rate in New York City for cable transfers in foreign currencies as certified for customs purposes by the Federal Reserve Bank of New York (the Noon Buying Rate). We provide the exchange rates below solely for your convenience. We do not represent that French francs or euros were, could have been, or could be, converted into U.S. dollars at these rates or at any other rate. The Federal Reserve Bank of New York has ceased publishing the Noon Buying Rates for French francs and other constituent currencies of the euro. For information regarding the effect of currency fluctuations on our results of operations, see Item 5 Operating and Financial Review and Prospects.

	Period-end Rate	Average Rate[1]	High	Low
	(French francs per U.S. dollar)			
1998	5.59	5.90	6.21	5.39

(1) The average of the Noon Buying Rates on the last business day of each month (or portion thereof) during the relevant period.

	Period-end Rate	Average Rate[1]	High	Low
	(U.S. dollar per euro)			
1999	1.01	1.06	1.18	1.00
2000	0.94	0.92	1.03	0.83
2001	0.89	0.89	0.95	0.84
2002	1.05	0.95	1.05	0.86
2003 (through June 13, 2003)	1.18	1.11	1.19	1.04
2002				
December	1.05	1.02	1.05	0.99
2003				

January	1.07	1.06	1.09	1.04
February	1.08	1.08	1.09	1.07
March	1.09	1.08	1.10	1.05
April	1.12	1.09	1.12	1.06
May	1.18	1.15	1.18	1.12
June (through June 13, 2003)	1.18	1.18	1.19	1.17

(1) The average of the Noon Buying Rates on the last business day of each month (or portion thereof) during the relevant period for year average; on each business day of the month (or portion thereof) for monthly average. On June 13, 2003, the Noon Buying Rate was $1 = 0.85 ($1.18 per 1).

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B. Capitalization and Indebtedness

Not applicable.

C. Reasons for the Offer and Use of Proceeds

Not applicable.

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D. Risk Factors

Risks Relating to Our Company

We may not be able to expand our presence profitably in the United States, a market that is a key to our growth strategy, and where we are investing substantial resources.

We may not achieve our growth strategy if we do not profitably expand our presence in the United States, the world s largest pharmaceuticals market. We have identified the United States, which accounted for 22.7% of our consolidated sales in 2002, as a potential major source of future growth and plan to expand significantly our direct presence in the United States in the coming years. For example, in April 2002, we purchased Pharmacia s interest in the joint venture that sold Stilnox® (under the name Ambien®) and Kerlone® in the United States. We face a number of potential obstacles to profitable growth in the United States, including:

A need to structure effectively our U.S. organization in relation to the size of the market.

The targeting of new markets.

The fact that the United States market is dominated by major U.S. pharmaceutical companies.

Potential changes in health care reimbursement policies and possible cost control regulations in the United States.

We depend on third parties for the marketing of some of our products outside Europe. These third parties may act in ways that could harm our business.

We commercialize some of our products outside Europe in collaboration with other pharmaceutical companies. We currently have major collaborative arrangements with Bristol-Myers Squibb for the marketing of Plavix® and Aprovel® and with Organon, a subsidiary of Akzo Nobel, for the marketing of Arixtra®. We also have alliances with several Japanese companies for the marketing of our products in Japan. See Item 4 Information on the Company Business Overview Marketing and Distribution. When we commercialize our products through collaboration arrangements, we are subject to the risks that certain decisions, such as the establishment of budgets and promotion strategies, are subject to the control of our collaboration partners, and that deadlocks may adversely affect the activities conducted through the collaboration arrangements. For example, our alliances with Bristol-Myers Squibb are subject to the operational management of Bristol-Myers Squibb in some countries, including the United States. In March 2002, Bristol-Myers Squibb began a program to reduce inventory levels of Plavix® and Aprovel® at wholesalers in the United States, which had a negative impact on U.S. sales of Plavix® and Aprovel®. For additional information regarding the impact of the inventory reduction program on our results of operations, see Item 5 Operating and Financial Review and Prospects. In addition to these types of actions, we cannot be certain that our partners will perform their obligations as expected. Further, our partners might pursue their own existing or alternative technologies or product candidates in preference to those being developed or marketed in collaboration with us.

We depend on third parties for the manufacturing of the active ingredients for some of our products, including Stilnox®, Eloxatin® and Xatral®, three of our strategic products.

Although our general policy is to manufacture the active ingredients for our products ourselves, we subcontract the manufacture of some of our active ingredients to third parties, which exposes us to the risk of a supply interruption in the event that our suppliers experience financial difficulties or are unable to manufacture a sufficient supply of our products. The manufacture of the active ingredients for Stilnox®, Eloxatin® and Xatral®, which are three of our six strategic products, is currently done by third parties. See Item 4 Information on the Company Business Overview Production and Raw Materials for a description of these outsourcing arrangements. Although we have not experienced any problems in the past, if disruptions were to arise from problems with our manufacturers, this would impact our ability to sell our products in the quantities demanded by the market, and could damage our reputation and relationships with our customers. Even though we try to have backup sources of supply whenever possible, including by manufacturing backup supplies of our principle active ingredients at a second or third facility, we cannot be certain they will be sufficient if our principal sources become unavailable.

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Our collaborations with third parties expose us to risks that they will assert intellectual property rights on our inventions or fail to keep our unpatented technology confidential.

We occasionally provide information and materials to research collaborators in academic institutions or other public or private entities, or request them to conduct tests to investigate certain materials. In all cases we enter into appropriate confidentiality agreements with such entities. However, those entities might assert intellectual property rights with regard to the results of the tests conducted by their collaborators, and might not grant licenses to us regarding their intellectual property rights on acceptable terms.

We also rely upon unpatented proprietary technology, processes, know-how and data that we regard as trade secrets and protect them in part by entering into confidentiality agreements with our employees, consultants and certain contractors. We cannot be sure that these agreements or other trade secret protection will provide meaningful protection, or if they are breached, that we will have adequate remedies. You should read Item 4 Information on the Company Business Overview Patents and Intellectual Property Rights for more information about our patents and licenses.

We have two principal shareholders who continue to maintain a significant degree of influence.

Our two principal shareholders, L Oréal and Total, owned 19.5% and 24.5% of our share capital, respectively, as of April 30, 2003. Our bylaws provide that our fully paid up shares that have been held in registered form for at least two years under the name of the same shareholder acquire double voting rights. As a result, as of April 30, 2003, L Oréal and Total held shares representing 27.9% and 35.0%, respectively, of our voting rights, and are in a position to exert significant influence in the election of our directors and officers and other corporate actions that require shareholder approval. The ownership of a large percentage of our capital and voting rights by our two principal shareholders, who are also members of our board of directors, may have the effect of delaying, deferring or preventing a change in our control and may discourage bids for our shares.

Fluctuations in currency exchange rates could adversely affect our financial condition and results of operations.

Because we sell our products in numerous countries, our results of operations and financial condition could be adversely affected by fluctuations in currency exchange rates. We are particularly sensitive to movements in exchange rates between the euro and the U.S. dollar and, to a lesser extent, the Japanese yen. In 2002, approximately 22.7% of our consolidated sales were realized in the United States, and 4.2% were realized in Japan (the United States also represented 45.2% of our 2002 operating profit excluding unallocated costs). While we incur expenses in those currencies, the impact of these expenses does not fully offset the impact of currency exchange rates on our revenues. As a result, currency exchange rate movements can have a considerable impact on our earnings. When deemed appropriate, we enter into transactions to hedge our exposure to foreign exchange risks. These efforts, when undertaken, may fail to offset the effect of adverse currency exchange rate fluctuations on our results of operations. For more information concerning our exchange rate exposure, see Item 11 Quantitative and Qualitative Disclosures About Market Risk.

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Risks Relating to Our Industry

We invest substantial sums in research and development in order to remain competitive, and we may not recover these sums if our products are unsuccessful in clinical trials or fail to receive regulatory approval.

We need to invest heavily in research and development to remain competitive.

To be successful in the highly competitive pharmaceutical industry, we must commit substantial resources each year to research and development in order to develop new products. Even if our research and development efforts are fruitful, our competitors may develop more effective products or a greater number of successful new products. In 2002, we spent 1,218 million on research and development, amounting to approximately 16.4% of our consolidated net sales. Our ongoing investments in new product launches and research and development for future products could produce higher costs without a proportionate increase in revenues.

The research and development process is lengthy and carries a substantial risk of product failure.

The research and development process typically takes from 10 to 15 years from discovery to commercial product launch. This process is conducted in various stages, and during each stage there is a substantial risk that we will not achieve our goals and will have to abandon a product in which we have invested substantial amounts. For example, in order to develop a commercially viable product, we must demonstrate, through extensive pre-clinical and human clinical trials, that the compounds are safe and effective for use in humans. There is also no assurance that favorable results obtained in pre-clinical trials will be confirmed by later clinical trials, or that the clinical trials will establish sufficient safety and efficacy data necessary for regulatory approval. As of January 31, 2003, we had 52 compounds in pre-clinical and clinical development in our four targeted therapeutic areas, of which 23 were in phase II or phase III clinical trials. For additional information regarding clinical trials and the definition of the phases of clinical trials, see Item 4 Information on the Company Business Overview Research and Development. There can be no guarantee that any of these compounds will be proven safe or effective, or that they will produce commercially successful products.

After completing the research and development process, we must invest substantial additional resources seeking to obtain government approval in multiple jurisdictions, with no guarantee that approval will be obtained.

We must obtain and maintain regulatory approval for our pharmaceutical products from the European Union, United States and other regulatory authorities before the product may be sold in its markets. The submission of an application to a regulatory authority in a particular country or the European Union does not guarantee that it will grant a license to market the product. Each authority may impose its own requirements, including requiring local clinical studies, and may delay or refuse to grant approval, even though a product has already been approved in another country.

In our principal markets, the approval process for one or more indications of a new product is complex and lengthy, and typically takes from six months to two years from the date of application depending on the country. Moreover, if regulatory approval of a product is granted, the approval entails limitations on the indicated uses for which it may be marketed. A marketed product is also subject to continual review even after regulatory approval. Later discovery of previously unknown problems or failure to comply with the applicable regulatory requirements may result in marketing restrictions or withdrawal of the product, as well as possible legal sanctions. In addition, we are subject to strict government controls on the manufacture, labeling, distribution and marketing of our products. All of these factors can increase our costs of developing new

products and the risk that we will not succeed in selling them successfully.

If we are unable to protect our proprietary rights, we may not compete effectively or operate profitably.

It is important for our success that we be able effectively to obtain, maintain and enforce our patents and other proprietary rights. Patent law relating to the scope of claims in the pharmaceutical field in which we

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operate is a continually evolving field of law and can be subject to some uncertainty. Accordingly, we cannot be sure that:

- new additional inventions will be patentable,
- patents for which applications are now pending will be issued to us, or
- the scope of any patent protection will be sufficiently broad to exclude competitors.

Additionally, third parties may challenge the validity of the patents issued or licensed to us, which may result in the invalidation of these rights. We currently have over 9,000 patents and patent applications worldwide, and we license-in more than 30 additional patents. We cannot be sure how much protection, if any, will be given to our patents if we attempt to enforce them and they are challenged in court or in other proceedings.

In the first half of 2002, two pharmaceutical companies, Apotex and Dr. Reddy s Laboratories, each filed an Abbreviated New Drug Application, or ANDA, with the U.S. Food and Drug Administration, or FDA, seeking to market a generic form of Plavix® in the United States and challenging certain U.S. patents relating to Plavix®. In March 2003, Apotex instituted a similar challenge in Canada. For additional information regarding ANDAs, see Item 4 Information on the Company Business Overview Regulation. We have filed suit against Apotex and against Dr. Reddy s Laboratories for infringement of our patent rights. See Item 8 Financial Information Legal Proceedings. The Plavix® patent rights are material to our company s business, and if we were unsuccessful in asserting them or they were deemed invalid, any resulting introduction of a generic prescription version of Plavix® in the U.S. would reduce the price that we receive for this product and the volume of the product that we would be able to sell.

In recent years, governments faced with national crises have used pressure to obtain substantial concessions from pharmaceutical companies, including threatening compulsory licensing of products that they consider essential. While we support the efforts of national governments to combat major health care crises, if those efforts come at the expense of effective patent protection, the ability of our company and other pharmaceutical manufacturers to recover amounts spent on research and development will be adversely affected. In such event, we and other manufacturers might curtail our research and development expenditures, and as a result might not develop as many new products.

Our patents may be infringed, or we may infringe the patents of others.

Our competitors may infringe our patents or successfully avoid them through design innovation. To prevent infringement, we may file infringement claims, which are expensive and time consuming. Policing unauthorized use of our intellectual property is difficult, and we may not be able to prevent misappropriation of our proprietary rights. This risk is increased by the growth in the number of patent applications filed and patents granted in the pharmaceutical industry.

Product liability claims could adversely affect our business and results of operations.

Product liability is a significant commercial risk for us, and could become a more significant risk as we expand in the United States (where product liability claims can be particularly costly). Substantial damage awards have been made in certain jurisdictions against pharmaceutical

companies based upon claims for injuries allegedly caused by the use of their products. In addition, some pharmaceutical companies have recently withdrawn products from the market in the wake of significant product liability claims. Although we are not currently involved in any significant product liability cases claiming damages as a result of the use of our products, it is possible that such cases will be brought in the future. Further, there is a general trend in the insurance industry to exclude certain products from coverage. Although we maintain insurance to cover this risk, we cannot be certain that our insurance will be sufficient to cover all potential liabilities.

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We face uncertainties over pricing of pharmaceutical products.

The commercial success of our products depends in part on the extent to which the cost of our products are reimbursed. Price pressure is strong due to:

- a tendency of governments and private health care providers to favor generic pharmaceuticals;
- price controls imposed by governments in many countries; and
- parallel imports, in particular in the European Economic Area, a practice by which traders exploit price differentials among markets by purchasing in lower-priced markets for resale in higher-priced markets.

Price pressure is considerable in our two largest markets, Europe and the United States, which represented 57.7% and 22.7%, respectively, of our consolidated sales in 2002 (the United States also accounted for 45.2% of our 2002 operating profit excluding unallocated costs). Changes in the pricing environments in the United States or Europe (on an individual country basis) could have a significant impact on our revenues and operating profits. See Item 4 Information on the Company Business Overview Pricing for a description of certain regulatory pricing systems that impact our company.

Risks from the handling of hazardous materials could harm our operating results.

Pharmaceutical manufacturing activities, such as the chemical manufacturing of the active ingredients in our products and the related storage and transportation of raw materials, products and wastes exposes us to various risks, including:

- fires from inflammable substances;
- storage tank leaks and ruptures; and
- discharges or releases of toxic or hazardous substances.

These operating risks can cause personal injury, property damage and environmental contamination, and may result in:

- the shutdown of affected facilities and
- the imposition of civil or criminal penalties.

The occurrence of any of these events may significantly reduce the productivity and profitability of a particular manufacturing facility and harm our operating results.

Although we maintain property, business interruption and casualty insurance that we believe is in accordance with customary industry practices, we cannot assure you that this insurance will be adequate to cover fully all potential hazards incident to our business. For more detailed information on environmental issues, see Item 4 Information on the Company Business Overview Health, Safety and Environment.

Environmental liabilities and compliance costs may have a significant negative effect on our operating results.

The environmental laws of various jurisdictions impose actual and potential obligations on our company to remediate contaminated sites. These obligations may relate to sites:

that we currently own or operate,

that we formerly owned or operated, or

where waste from our operations was disposed.

These environmental remediation obligations could significantly reduce our operating results. In particular, our accruals for these obligations may be insufficient if the assumptions underlying these accruals prove incorrect or if we are held responsible for additional, currently undiscovered contamination. Any shortfalls could have a material impact on our operating profits. See Item 4 Information on the Company Business Overview Health, Safety and Environment and Regulation for additional information regarding our environmental policies.

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Furthermore, we are or may become involved in claims, lawsuits and administrative proceedings relating to environmental matters. An adverse outcome in any of these might have a significant negative impact on our operating results. Stricter environmental, safety and health laws and enforcement policies could result in substantial costs and liabilities to our company and could subject our handling, manufacture, use, reuse or disposal of substances or pollutants to more rigorous scrutiny than is currently the case. Consequently, compliance with these laws could result in significant capital expenditures as well as other costs and liabilities, thereby harming our business and operating results.

Risks Relating to an Investment in our Shares or ADSs

Foreign exchange fluctuations may adversely affect the U.S. dollar value of our ADSs and dividends (if any).

As a holder of ADSs, you may face some exchange rate risk. Our ADSs will trade in U.S. dollars and our shares will trade in euro. The value of the ADSs and our shares could fluctuate as the exchange rates between these currencies fluctuate. If and when we do pay dividends, they would be denominated in euro. Fluctuations in the exchange rate between the euro and the U.S. dollar will affect the U.S. dollar amounts received by owners of ADSs upon conversion by the depositary of cash dividends, if any. Moreover, these fluctuations may affect the U.S. dollar price of the ADSs on the New York Stock Exchange, whether or not we pay dividends in addition to the amounts, if any, that you would receive upon our liquidation or upon the sale of assets, merger, tender offer or similar transactions denominated in euro or any other foreign currency other than U.S. dollars.

If you hold ADSs rather than shares it may be difficult for you to exercise some of your rights as a shareholder.

As a holder of ADSs, it may be more difficult for you to exercise your rights as a shareholder than it would be if you directly held shares. For example, if we offer new shares and you have the right to subscribe for a portion of them, the depositary is allowed, in its own discretion, to sell for your benefit that right to subscribe for new shares instead of making it available to you. Also, to exercise your voting rights, ADS holders must instruct the depositary how to vote their shares. Because of this extra procedural step involving the depositary, the process for exercising voting rights will take longer for you, as a holder of ADSs, than for holders of shares. ADSs for which the depositary does not receive timely voting instructions will not be voted at any meeting. For a detailed description of your rights as a holder of ADSs, you should read Item 12 Description of Securities other than Equity Securities Description of American Depositary Shares.

Sales of our shares that will be eligible for sale in the near future may cause the market price of our shares or ADSs to decline.

At April 30, 2003, we had 732,450,981shares outstanding, approximately 44.05% of which are held by our two largest shareholders, Total and L Oréal. Of the shares held by these shareholders on April 30, 2003, 38,157,539 shares are available for sale in the public market, and the remainder will become available for sale in the public market on December 1, 2004 when the shareholders agreement between those shareholders expires. Since the merger, and including in 2002, Total has gradually been reducing its shareholding in our company.

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Sales of a substantial number of our shares, or a perception that such sales may occur, could adversely affect the market price for our shares and ADSs. See Item 10 Additional Information Share Capital Shares Eligible for Future Sale for a more detailed description of the eligibility of our shares for future sale.

Because all of our directors and officers reside outside of the United States and a substantial portion of our assets are located in France, you may have difficulty enforcing certain rights.

All of our directors and officers reside outside the United States and a substantial portion of our assets is located in France. As a result, it may be difficult for you to effect service of process within the United States on such persons and to enforce against them, either inside or outside the United States, judgments obtained against them in U.S. courts, or to enforce in U.S. courts, judgments obtained against them in courts in jurisdictions outside the United States, in any action based on civil liabilities under the U.S. federal securities laws. Additionally, awards of punitive damages in actions brought in the United States or elsewhere may be unenforceable in France. For additional information see Item 10 Additional Information Memorandum and Articles of Association Enforceability of Civil Liabilities.

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FORWARD-LOOKING STATEMENTS

This annual report contains forward-looking statements. We may also make written or oral forward-looking statements in our periodic reports to the Securities and Exchange Commission on Form 6-K, in our annual report to shareholders, in our proxy statements, in our offering circulars and prospectuses, in press releases and other written materials and in oral statements made by our officers, directors or employees to third parties. Examples of such forward-looking statements include:

- projections of operating revenues, net income, net earnings per share, capital expenditures, dividends, capital structure or other financial items or ratios;
- statements of our plans, objectives or goals, including those relating to products, clinical trials, regulatory approvals and competition;
- statements about our future economic performance or that of France, the United States or any other countries in which we operate; and
- statements of assumptions underlying such statements.

Words such as believe, anticipate, plan, expect, intend, target, estimate, project, predict, forecast, guideline, should and intended to identify forward-looking statements but are not the exclusive means of identifying such statements.

Forward-looking statements involve inherent risks and uncertainties. We caution you that a number of important factors could cause actual results to differ materially from those contained in any forward-looking statements. Such factors, some of which are discussed under Item 3 Key Information Risk Factors beginning on page 10, include but are not limited to:

- our ability to continue to expand our presence profitably in the United States;
- the success of our research and development programs;
- our ability to protect our intellectual property rights; and
- the risks associated with reimbursement of healthcare costs and pricing reforms, particularly in the United States and Europe.

We caution you that the foregoing list of factors is not exclusive and that other risks and uncertainties may cause actual results to differ materially from those in forward-looking statements.

Forward-looking statements speak only as of the date they are made. We do not undertake any obligation to update them in light of new information or future developments.

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Item 4. Information on the Company

Introduction

We are an international pharmaceutical group engaged in the research, development, manufacture and marketing of pharmaceutical products for sale principally in the prescription market. In 2002, our consolidated net sales were 7,448 million ($7,840 million), our operating profit was 2,614 million ($2,752 million) and our net income was 1,759 million ($1,852 million). On the basis of 2002 sales, we are the second largest pharmaceutical group in France, the seventh largest pharmaceutical group in Europe and among the twenty largest pharmaceutical groups in the world (IMS data).

In our prescription pharmaceuticals business, we specialize in four therapeutic areas:

Cardiovascular/Thrombosis. Our Cardiovascular/Thrombosis products include two of the fastest-growing products on the Cardiovascular/Thrombosis market today: the blood pressure medication Aprovel® and the anti-clotting agent Plavix®, as well as one of our newest products, the anti-thrombotic Arixtra®.

Central Nervous System, or CNS. Our CNS medicines include Stilnox®, the world s leading prescription insomnia medication, and Depakine®, one of the leading treatments for epilepsy.

Internal Medicine. Our Internal Medicine products include Xatral®, a leading treatment for benign prostatic hypertrophy.

Oncology. Our lead product in this strategic market is the cancer drug Eloxatin®, which is marketed in Europe as a first-line treatment against colorectal cancer and, since August 2002, in the United States as a second line treatment in combination with 5-FU/LV.

Our three leading products are Aprovel®, Plavix® and Stilnox®, which together accounted for 39.9% of our total consolidated net sales, or 2,973 million, in 2002.

We have a strong commitment to research and development. We have 14 research centers and have over 6,700 employees devoted to research and development. At January 31, 2003, we had 52 compounds in development in the four therapeutic areas, 23 of which were in phase II or phase III clinical trials.

The legal and commercial name of our company is Sanofi-Synthélabo. We are a French *société anonyme*, a form of limited liability stock company, formed in 1994 pursuant to the French commercial code for a term of 99 years. Our registered office is located at 174, avenue de France, 75013 Paris, France. Our telephone number is +33 (0)1 53 77 40 00.

A. History and Development of the Company

Our company is the result of the 1999 merger of Sanofi and Synthélabo, two major French pharmaceutical companies. Since the merger, we have combined the resources of the two companies to expand our global presence, particularly in the United States, and to increase our focus on research and development for products with strong future potential. This year we are celebrating the thirtieth anniversary of our group worldwide.

Sanofi was founded in 1973 by Elf Aquitaine, a French oil company, when it took control of the Labaz Group (a pharmaceutical company) for diversification purposes. Sanofi launched its first major product on the market, Ticlid®, in 1978. At the time of the merger in 1999, Sanofi was the second largest pharmaceutical group in France in terms of sales. A majority of its share capital was owned by Elf Aquitaine, which was acquired by Total. Sanofi made a significant venture into the United States market in 1994, when it acquired the prescription pharmaceuticals business of Sterling Winthrop, an affiliate of Eastman Kodak.

Sanofi launched its first major product on the U.S. market, Aprovel®, in 1997, followed by Plavix® in 1998.

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Synthélabo was founded in 1970 through the merger of two French pharmaceutical laboratories, Laboratoires Dausse (founded in 1834) and Laboratoires Robert & Carrière (founded in 1899). In 1973, L Oréal acquired the majority of its share capital and in 1988, Synthélabo launched two major products on the French market: Stilnox® and Xatral®. At the time of the merger, Synthélabo was the third largest pharmaceutical group in France in terms of sales. A majority of its share capital was still owned by the French cosmetics group L Oréal. In 1993, Synthélabo launched Stilnox® in the United States under the brand name Ambien®. By 1994, Stilnox® had become the leading insomnia prescription medication worldwide according to IMS data.

Sanofi and Synthélabo agreed to merge at the end of 1998, and the merger became effective in the second quarter of 1999. Following the merger, Total and L Oréal were the largest shareholders of the new group, although neither held a majority of the share capital. The two principal shareholders entered into a shareholders agreement that lasts until 2004. The terms of the shareholders agreement are described under Item 7 Major Shareholders and Related Party Transactions Major Shareholders.

Part of our strategy following the merger was to concentrate on our core prescription pharmaceuticals business. To implement this strategy, we divested non-core businesses, including:

- in 1999, Sanofi s beauty business, our diagnostics business, our animal health and nutrition business and an equity affiliate in the cheese business; and
- in 2001, our custom chemicals business and two medical equipment businesses, as well as our direct shareholding in Laboratoires de Biologie Végétale Yves Rocher.

For a description of our principal capital expenditures and divestitures since 1999, our expectations as to future capital expenditures and divestitures and the impact of the merger and these divestitures on our results of operations and financial condition, see Item 5 Operating and Financial Review and Prospects. We currently have no material capital expenditures or divestitures in progress.

B. Business Overview

Strategy

We believe we have the potential to grow profitably by taking advantage of our focused portfolio of current and potential drugs centered around four targeted therapeutic areas. The key elements of our strategy to achieve these goals are to:

- *Capitalize on our direct presence in the United States.* We intend to continue to capitalize on our potential for growth in the U.S. market. We have increased our interest in the promotional activities and profitability of our alliance with Bristol-Myers Squibb that markets Aprovel® (under the name Avapro®) in the United States, and in April 2002 we purchased Pharmacia s interest in the joint venture that markets Stilnox® (under the name Ambien®) in the U.S. and regained full U.S. marketing rights to Ambien®. We have also more than doubled our U.S. sales force in the past three years to 2,259 employees as at December 31, 2002, reducing our need to use third parties to market our products in the United States. We intend to use our increased sales force as a platform for the introduction and promotion of additional products in the U.S. market, such as oxaliplatin, which we have marketed under the brand name Eloxatin® since August 2002, and alfuzosin, which we expect to begin marketing in the second half of 2003.

Capitalize on the sales potential of our six strategic products. We believe that each of Aprovel®, Plavix®, Stilnox® and Eloxatin® will continue to have strong growth potential and that Xatral® and Arixtra® have the potential to become leading products. We intend to make the necessary investment of marketing and other resources to fully promote these six strategic products.

Continue our strong commitment to research and development. As at January 31, 2003, we had 52 compounds in our research and development pipeline, of which 23 were in phase II or III clinical trials. We believe that the number of compounds in later stage development in our pipeline, together with our

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capabilities in the high technology areas of genomics, proteomics, high throughput screening, combinatorial chemistry and bioinformatics, gives us a solid foundation for developing future products. We intend to continue to focus our efforts on developing products to meet unmet medical needs in our four targeted therapeutic areas and to maintain our current high level of research and development spending as a percentage of revenues.

Continue to improve operating margins. Since the merger in 1999, we have streamlined operations by divesting non-core businesses such as our beauty, diagnostics and animal health divisions. We believe that our new, focused structure gives us the opportunity to improve our profitability, and we intend to take advantage of this opportunity by targeting our promotional efforts on our higher margin products.

Continue to enhance our presence worldwide. Over time, we intend to build progressively our presence in Japan and other targeted countries. Our strategy is to establish local subsidiaries and a local sales force, when possible. In Japan, due to market particularities, we may increase our marketing presence either through external growth or by transforming certain of our drug-specific joint ventures into broader partnership relationships for a variety of products.

Seize appropriate opportunities for growth through selective mergers, acquisitions and strategic alliances. Where appropriate, we intend to continue to seize appropriate external growth opportunities for growth through selective mergers, acquisitions and strategic alliances.

Principal Products

Our principal products are prescription pharmaceuticals, which we group into four main therapeutic categories: Cardiovascular/Thrombosis, Central Nervous System, Internal Medicine and Oncology. The following table outlines our consolidated net sales by therapeutic area for the year ended December 31, 2002.

Consolidated Sales by Therapeutic Area

	Year Ended December 31, 2002	
	(millions of)	*% of Net Sales*
Prescription Pharmaceuticals*		
Cardiovascular/Thrombosis		
Aprovel®	562	7.5%
Plavix®	987	13.3%
Other	1,355	18.2%
Total	2,904	39.0%
Central Nervous System		
Stilnox®/Ambien®/Myslee®	1,424	19.1%
Other	985	13.2%

Total	2,409	32.3%
Internal Medicine		
Xatral®	182	2.4%
Other	1,245	16.7%
Total	1,427	19.1%
Oncology		
Eloxatin®	389	5.2%
Other	15	0.2%
Total	404	5.4%
Other Pharmaceuticals	304	4.2%
Total consolidated net sales	**7,448**	**100.0%**

* Our products include over 160 Cardiovascular/Thrombosis products, over 130 Central Nervous System products, over 500 Internal Medicine products and over 15 Oncology products worldwide. Other Pharmaceuticals includes all of our other pharmaceutical products that cannot be classified in our main therapeutic areas, such as our dental hygiene products.

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A number of our products, including four of our six strategic products (Plavix®, Aprovel®, Stilnox® and Arixtra®), are sold in certain countries through alliances that we have entered into with other pharmaceutical companies, or through licensees. Our consolidated revenues only reflect a portion of the total revenues realized by the alliances and licensees. In some cases, our revenue shares from the alliances are based on formulas that make our consolidated revenues grow at a different rate than the overall growth in sales of the products. In this annual report, we present both our consolidated revenues from products sold through alliances, and developed sales, which represent the overall sales of these products, including sales by our alliance partners and licensees. We believe that developed sales are a useful measurement tool because they demonstrate trends in the overall sales of our products in the market, without regard to the formulas under which our revenue shares are determined.

A drug can be referred to either by its international non-proprietary name, or INN, or by its brand name, which is normally exclusive to the company that markets it. In most cases, our brand names, which may vary from country to country, are protected by trademark registrations. In the description that follows, our products are generally referred to by the brand names that we use in France.

Prescription Pharmaceuticals

Our portfolio of prescription pharmaceuticals includes a range of innovative products with strong market positions in our four targeted therapeutic areas. In Thrombosis, we are the leader in the European and U.S. markets for anti-platelet agents based on total consolidated sales of our anti-atherothrombotic agent Plavix® (clopidogrel) and rank second in the European market for heparins with products including Fraxiparine® and Arixtra® (IMS data). In the Cardiovascular market, we rank second in the European market and third in the U.S. market for angiotensin II receptor antagonists based on annual sales of Aprovel® (IMS data). In the area of central nervous system disorders, according to IMS data, we are the leader in Europe and the U.S. and rank second in Japan based on total consolidated net sales of our product Stilnox® (zolpidem), the treatment of choice for sleep disorders.

In our prescription pharmaceuticals business, we specialize in four therapeutic areas: Cardiovascular/Thrombosis, Central Nervous System, Internal Medicine and Oncology. On an industry-wide basis, these four therapeutic areas account for more than half of worldwide pharmaceutical sales, according to IMS data. Certain of our products are sold both by us and, in selected markets, by our alliance partners and licensees, giving these products a broad, worldwide market presence. For a discussion of these arrangements, see Item 4 Information on the Company Business Overview Marketing and Distribution Alliances. The following table outlines our leading prescription pharmaceuticals based on consolidated net sales for the year ended December 31, 2002. In some countries, our products have only been approved (or approval has only been sought) for a portion of the areas of use indicated in the table.

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Principal Prescription Pharmaceuticals

Therapeutic Area / Product Name	Year Ended December 31, 2002 Consolidated Net Sales (millions of)	Drug Category/ Main Areas of Use
Cardiovascular/Thrombosis		
Cardiovascular Products		
Aprovel® (irbesartan)	562	Angiotensin II receptor antagonist
		Hypertension
Cordarone® (amiodarone)	162	Anti-arrhythmic agent
		Treatment / prevention of cardiac arrhythmia (irregular heartbeat)
Tildiem® (diltiazem)	141	Calcium antagonist
		Angina Pectoris
		Hypertension
Corotrope® (milrinone)	127	Inotropic / vasodilator agent
		Treatment of acute congestive heart failure
Kerlone® (betaxolol)	77	Beta-blocker
		HypertensionAngina
		Pectoris
Thrombosis Products		
Plavix® (clopidogrel)	987	ADP receptor antagonist
		Atherothrombosis
Fraxiparine® (nadroparin calcium)	324	Low molecular weight heparin
		Venous thromboembolism (VTE)
Ticlid® (ticlopidine)	137	Platelet aggregation inhibitor
		Thrombosis
Central Nervous System		
Stilnox®(zolpidem)	1,424	Hypnotic
		Sleep disorders
Depakine® (sodium valproate)	267	Anti-epileptic
		Epilepsy
Solian® (amisulpride)	135	Neuroleptic
		Schizophrenia
		Dysthymia

Aspégic® (lysine acetylsalicylate)*	108	Antalgic/Antipyretic
		Pain/Fever Relief
Dogmatil® (sulpiride)	78	Neuroleptic
		Neurotic disorders
		Psychosomatic disorders
		Schizophrenia
Internal Medicine		
Xatral® (alfuzosin)	182	Uroselective alpha1 blocker
		Benign prostatic hypertrophy
Oncology		
Eloxatin® (oxaliplatin)	389	Cytotoxic agent
		Colorectal cancer

* Includes sales of a different formulation of Aspégic® that is sold under the brand name Kardégic®, which is classified by IMS as a cardiovascular product.

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Four of our six strategic products are sold directly by us and through alliances. The figures above reflect only sales included in our consolidated net sales. In 2002, total worldwide developed sales of Plavix®, Aprovel®, Stilnox® and Arixtra® were 2,587 million, 1,068 million, 1,455 million and 10 million respectively.

Cardiovascular/Thrombosis

The Cardiovascular/Thrombosis market as a whole is the largest therapeutic area in the worldwide pharmaceutical market. According to IMS data, in the cardiovascular market, we rank second in the European market and third in the U.S. market for angiotensin II receptor antagonists with Aprovel® in terms of annual sales. We are number three in the European market for calcium antagonists with Tildiem® and are the leader in the European market for anti-arrhythmics with Cordarone® (IMS data). In Thrombosis, we rank first in the European and U.S. markets for anti-platelet agents with Plavix® and we are number two in the European market for heparins with Fraxiparine® according to IMS data.

Cardiovascular. Our main products for the treatment of cardiovascular disease are:

> *Aprovel®/Avapro®(irbesartan; hypertension).* Aprovel® belongs to the most recent class of anti-hypertensives, angiotensin II receptor antagonists, and is indicated as a first line treatment for hypertension, or high blood pressure. Angiotensin II receptor antagonists, which are highly potent and generally well tolerated, act by blocking the effect of angiotensin, the hormone responsible for blood vessel contraction, thereby enabling blood pressure to return to normal. In addition to Aprovel®, we market CoAprovel®/Avalide® a combination of irbesartan and hydrochlorothiazide, a diuretic that increases the excretion of water by the kidneys. These products achieve control of blood pressure in close to 90% of patients and with a very good safety profile.

Aprovel® was launched in 1997 and is now marketed in more than 80 countries, including the United States, through an alliance with Bristol-Myers Squibb, or BMS (under the brand name Avapro®). In Japan, where the product is licensed to BMS and Shionogi, an application for marketing authorization for the treatment of hypertension was submitted in October 2002.

In 2002, Aprovel® was approved for a new indication, the treatment of diabetic nephropathy, in both Europe (June 2002) and the United States (September 2002). These approvals were based on the results of the PRIME program, a clinical program that demonstrated that irbesartan protects type-2 diabetic hypertensive patients from the progression of renal impairment, at both early and more advanced stages of the disease. Following the announcement of the PRIME results, the American Diabetes Association (ADA) recommended the use of angiotensin receptor antagonists as a first-line treatment for renal disease in patients with type 2 diabetes.

We recently initiated two large-scale clinical programs, part of our life cycle management program for Aprovel®, that will enroll a total of 14,000 patients and that we expect to complete in 2006:

> I-PRESERVE, to evaluate the benefit of irbesartan in the treatment of a specific but common form of heart failure, heart failure with preserved systolic function or diastolic heart failure. In this type of heart failure, the contractile capacity of the ventricles is preserved, but ventricular filling is disturbed. This study was initiated in 2002 and is currently in the active stage of patient enrollment. We believe it is the largest clinical trial conducted in this specific disease to date.

ACTIVE-I, to evaluate the efficacy of irbesartan, combined with clopidogrel (the active ingredient in Plavix®), in preventing complications in patients suffering from atrial fibrillation. We began this clinical program in April 2003.

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Cordarone®/Ancaron® (amiodarone; cardiac rhythm disorders). Thirty-six years after its first marketing authorization was granted, Cordarone® remains a leading anti-arrhythmic drug for the treatment and prevention of cardiac rhythm disorders such as cardiac arrhythmia, or irregular heart beat. Cordarone® is also effective against potentially life-threatening supraventricular rhythm disorders, the most common of these being atrial fibrillation. Two clinical studies published in 2002, AMIOVIRT and CAT, demonstrated that Cordarone® is as effective as the implantation of a defibrillator in preventing sudden cardiac death in patients with idiopathic dilated cardiomyopathy, a rare disease that attacks the heart muscle. Cordarone® has a good cardiac safety profile and only exceptionally induces complications potentially associated with the use of anti-arrhythmics, such as Torsades de Pointe (a serious and potentially fatal ventricular rhythm disorder) or ventricular insufficiency. However, its effects on thyroid function limit its use. Cordarone® is available in more than 126 countries, including the United States where it is licensed to Wyeth (formerly American Home Products), and Japan where it is marketed under the brand name Ancaron® through joint venture with Taisho.

Tildiem® (diltiazem; angina, hypertension). Among calcium antagonists, Tildiem® is considered a reference treatment for angina. Tildiem® works by increasing oxygen supply to the myocardium (the muscle surrounding the heart) through coronary vasodilatation, while simultaneously reducing oxygen needs by decreasing the heart rate and lowering peripheral artery resistance. Tildiem® thereby exhibits good anti-anginal efficacy, combined with a good safety profile. Our sustained release formulations of Tildiem® LP 200/300 mg provide 24-hour protection against ischemia with a single daily dose. This convenience of use improves both compliance and tolerability. Furthermore, a meta-analysis (a statistical analysis) showed that these formulations permit consistent regulation of heart rate: the faster the heart rate initially, the more it is slowed by Tildiem®. Additionally, the NORDIL study of morbidity and mortality associated with hypertension showed that Tildiem® was as effective as diuretics and beta-blockers (the reference treatment) in reducing cardiovascular complications. These results emphasize the value of treating hypertension with Tildiem® LP 200/300 mg. Tildiem® LP 200/300 mg is marketed in most European countries.

Kerlone®/Kerlong® (betaxolol; hypertension, angina). Kerlone® is a cardioselective beta-blocker indicated for the treatment of hypertension and angina pectoris. A recent clinical trial, BETACAR, showed the ease of administration of Kerlone® in the treatment of patients with an altered cardiac function. Kerlone® is marketed in numerous European countries, in the United States and in Japan (under the brand name Kerlong®) by our joint venture with Mitsubishi.

Corotrope®/Primacor®/Milrila® (milrinone; heart failure). Corotrope® combines positive inotropic properties (increasing the contractile force of the heart) with a vasodilatory action. Corotrope® is an effective treatment for advanced forms of heart failure as well as for certain less advanced forms that have been abruptly decompensated by a dietary change or intercurrent disease. Corotrope® is marketed in several European countries, in the United States (under the brand name Primacor®), where its patent came into the public domain in May 2002, and in Japan (under the brand name Milrila®) by our joint venture with Yamanouchi.

Thrombosis. Thrombosis occurs when a thrombus, or blood clot, forms inside a blood vessel. Left unchecked, a thrombus within a blood vessel can eventually grow large enough to block the blood vessel, preventing blood and oxygen from reaching the organ being supplied. Our principal products for the treatment of thrombosis are:

Plavix® (clopidogrel; atherothrombosis). Plavix®, a platelet adenosine diphosphate receptor antagonist, is indicated for the prevention of atherothrombotic events in patients with a history of recent myocardial infarction, recent ischemic stroke or documented peripheral arterial disease. Plavix® is currently the only drug indicated for the secondary prevention of atherothrombosis regardless of the location of the arteries initially affected (heart, brain, lower limbs). This broad indication is supported by the results of

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the CAPRIE study, the largest phase III study ever conducted with almost 20,000 patients enrolled. CAPRIE demonstrated the superior efficacy of Plavix® to acetylsalicylic acid, with a safety profile at least equally good.

Plavix® was launched in 1998, and is now marketed in over 75 countries, including the United States, through our alliance with BMS. In Japan, where it is being developed in partnership with Daiichi, we plan to submit an application for marketing authorization at the end of 2003.

The year 2002 was marked by three major events for Plavix®:

U.S. and European health authorities approved an extension of indication to acute coronary syndrome. The approvals, based on the results obtained in the CURE clinical trial, were received in February 2002 (after a priority review procedure at the FDA) in the United States, and in September 2002 in Europe. This new indication was incorporated into the guidelines of the American Heart Association and the American College of Cardiology in March 2002, and in those of the European Society of Cardiology in September 2002. The CURE trial demonstrated that clopidogrel, when added to a standard therapy including or comprising acetylsalicylic acid, reduced the risk of atherothrombotic events (myocardial infarction, stroke and death from cardiovascular cause) by 20% with only a 1% increase in the rate of major hemorrhages and provided significant short- and long-term benefit in patients presenting an acute coronary syndrome. With more than 12,000 patients enrolled, CURE is the largest clinical trial ever conducted with patients presenting unstable angina or non-Q-wave myocardial infarction.

The results of the CREDO clinical trial, announced in November 2002, confirmed the therapeutic value of Plavix® in the short- and long-term prevention of atherothrombotic events in patients having undergone coronary angioplasty, either with or without stenting. The CREDO trial, conducted in more than 2,000 patients, demonstrated the benefit of prolonged use of clopidogrel and showed that the risk of atherothrombotic events (myocardial infarction, stroke and death by cardiovascular cause) was reduced by 27% after one year.

In September 2002, the CHARISMA trial began enrolling patients, and is expected to include a total of 15,000 patients. The objective of the CHARISMA trial is to demonstrate the value of using Plavix® when added to existing treatments in the primary prevention of cardiovascular events in patients at risk.

We have other major on-going clinical studies that are designed to support the long-term use of Plavix® by providing complementary data. These include:

MATCH, assessing the benefit of clopidogrel combined with acetylsalicylic acid in the prevention of serious ischemic events in high-risk patients who have recently experienced a stroke or transient ischemic attack. Enrollment of the planned 7,600 patients was completed in the second half of 2002;

CLARITY and COMMIT, evaluating the benefit of clopidogrel combined with acetylsalicylic acid in acute myocardial infarction;

CAMPER, assessing the benefit of clopidogrel in patients with peripheral arterial disease who have undergone angioplasty or bypass surgery; and

ACTIVE (A & W), assessing the value of clopidogrel in patients in the prophylactic treatment of thromboembolic events in patients with atrial fibrillation.

Our previously announced patient recruitment for the WATCH study, which is assessing the value of clopidogrel in patients suffering from heart failure, was stopped. The study is currently being performed on

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a smaller number of patients than initially expected due to a slow inclusion rate. The extensive core clinical program for Plavix®, including all completed, ongoing and planned studies, will enroll more than 100,000 patients.

Arixtra® (fondaparinux sodium; venous thrombosis). Arixtra®, fondaparinux sodium, is a totally synthetic compound that has recently entered the low molecular weight heparin market, whose other products are generally animal sourced. Arixtra® is currently indicated for the prevention of venous thromboembolism, including deep vein thrombosis and pulmonary embolism, in patients who have undergone major orthopedic surgery of the lower limbs (a high risk situation). We co-developed Arixtra® with Organon (a subsidiary of Akzo Nobel), and believe that it represents a major advance in the prevention of venous thromboembolism. It is the first agent in a new class of anti-thrombotics, selective synthetic inhibitors of coagulation factor Xa, and works by interrupting a key step in the coagulation cascade, thereby preventing the formation of blood clots. Further, Arixtra® is obtained by chemical synthesis, which leads to a high level of purity. For both of these reasons, we believe Arixtra® constitutes a major technological and therapeutic advance.

We believe its development potential is substantial. Phase III studies, which included over 7,000 patients, demonstrated a major clinical benefit relative to the reference low molecular weight heparin. Irrespective of the orthopedic surgical procedure (hip replacement, hip fracture or knee surgery) and the characteristics of the patient, Arixtra® reduced the risk of a thromboembolic event by 55% without increasing the risk of clinically important bleeding. For patients undergoing surgery for hip fracture, the risk of deep-vein thrombosis was reduced to 8% with Arixtra® compared to around 20% with the reference treatment. The safety profile of the two treatments is similar.

We launched Arixtra® in February 2002 in the United States, where it was approved for the prevention of venous thromboembolic events after orthopedic surgery in December 2001 following a priority review. In March 2002, Arixtra® received its European marketing authorization for the same indication and launch has been rolling out in various countries since that time. In December 2002, the FDA modified the summary product characteristics for Arixtra® to provide an improved description of its profile, and approved Arixtra® for a new indication, extended prophylaxis of deep vein thrombosis, in June 2003. Arixtra® is currently the only anti-thrombotic agent indicated in the United States for the extended prophylaxis of deep vein thrombosis in patients undergoing hip fracture surgery. In Japan, the product is in phase IIb/III clinical development, and we currently plan to submit an application for marketing authorization in early 2004.

Because of the development potential of Arixtra®, we have implemented a life cycle management program to cover all segments of the thrombosis market:

Extended prophylaxis. The results of the Pentifra Plus study demonstrated that Arixtra® administered for 28 days could significantly reduce the rate of venous thromboembolic events after surgery for hip fracture, the orthopedic surgery carrying the highest risk of such event. Based on these results, we submitted an application in December 2002 in both the United States and Europe for approval of Arixtra® for this new indication. In March 2003, U.S. authorities granted priority review to our application for this indication.

Treatment of Venous Thromboembolism. In 2002, the completed MATISSE study, which enrolled over 4,000 patients, demonstrated that Arixtra® is as well-tolerated and at least as effective as the existing standard therapies for the treatment of deep vein thrombosis and pulmonary embolism (when compared to low weight molecular heparin and unfractionated heparin, respectively).

Prevention of Venous Thrombosis. Our APOLLO and PEGASUS programs are currently studying Arixtra® in the prevention of venous thrombosis in other types of surgery, such as abdominal surgery. We are also studying Arixtra® for the prevention of venous thrombosis in medical patients at high risk of venous thromboembolic events who have not undergone surgery (our ARTEMIS program).

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Acute Coronary Disease. We are studying Arixtra® s effectiveness in acute coronary disease (unstable angina, coronary angioplasty, myocardial infarction). The initial efficacy results were confirmed by the Phase IIb Pentua trial, which were presented at the November 2001 scientific sessions of the American Heart Association. We believe that these studies provide a basis for expecting a good benefit to risk ratio when compared to existing therapies for acute coronary disease. A phase III clinical program that began in April 2003 (the Michelangelo program), will enroll 26,000 patients.

In the United States, Canada and Mexico, we market Arixtra® through our joint venture with Organon. In the rest of the world (apart from Japan), we market Arixtra® on our own.

Ticlid® (ticlopidine; thrombosis). Ticlid® is indicated for the prevention of coronary or cerebrovascular ischemic events in patients at risk (following an initial ischemic stroke or transient ischemic attack, or symptomatic peripheral arterial disease). In combination with acetylsalicylic acid, Ticlid® is used as a standard prophylactic treatment against the risk of thrombosis (reocclusion of the dilated artery) in patients who have undergone coronary angioplasty with insertion of a stent. Ticlid® is marketed in over 75 countries, including the United States, where it is licensed to Roche, and in Japan (under the brand name Panaldine®), where it is licensed to Daiichi.

Fraxiparine® (nadroparin calcium; venous and arterial thrombosis). Fraxiparine® is an injectable low-molecular-weight heparin. Launched in 1986, it is currently marketed in over 100 countries (excluding the United States and Japan). Fraxiparine ® s approved indications have expanded over the years. Initially indicated for the prevention of venous thromboembolic disease, Fraxiparine® is currently indicated for the treatment of this disease as well, and the treatment of acute coronary syndromes. We launched Fraxodi®, a curative treatment for venous thromboembolic disease administered as a once-a-day injection, in France in 1998. Fraxodi® is now marketed in most countries in Europe and Latin America. The once-a-day regimen permits shorter hospital stays, facilitates outpatient treatment and enhances overall patient recovery. A new indication of Fraxiparine® for the treatment of the acute phase of unstable angina in association with acetylsalicylic acid is now successfully registered in many countries, including the principal European markets, but excluding Japan and the United States.

Central Nervous System

In the Central Nervous System market, according to IMS data, we rank first in the European and U.S. markets for hypnotics with Stilnox® and are number three in Europe in the market for anti-epileptics, with drugs including Depakine®. In the market for neuroleptics, we rank third in Europe and fifth in Japan with drugs such as Dogmatil® and Solian® (IMS data). Key products in this therapeutic area include:

Stilnox®/Ambien®/Myslee® (zolpidem; insomnia). Stilnox® is the leading hypnotic in the United States and Europe and is the second leading hypnotic in Japan (based on IMS data), and is sold in over 100 countries worldwide. Stilnox® is both chemically and pharmacologically distinct from benzodiazepines, and is distinguished by its selective binding exclusively to receptors that mediate hypnotic activity. Due to this characteristic, Stilnox® rapidly induces sleep that is qualitatively close to natural sleep and devoid of certain side effects that are characteristic of the benzodiazepine class as a whole. Its action lasts for 6 to 8 hours, and is generally well-tolerated, allowing the patient to awake with a reduced risk of impaired attention, decreased alertness or memory lapses throughout the day. The risk of dependence is minimal when Stilnox® is used at the recommended dosage and duration of use. Based on the results of an extensive program of eight clinical trials, which together enrolled over 6,000 patients, Stilnox® is currently the only hypnotic demonstrated to be suitable for use on an as needed basis depending upon each patient s individual requirements. This mode of administration avoids the systematic intake of a hypnotic for patients who suffer only occasionally from insomnia.

We believe that Stilnox® is also one of the leading studied hypnotics in the world as data on its efficacy and safety have been generated from 140 clinical trials that included 80,000 patients worldwide.

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The year 2002 was marked by two key events for Stilnox®:

In 2002, we acquired all of the rights to market Stilnox® in the United States when we acquired our interest in our former joint venture with Pharmacia, which previously marketed the product in the United States. Aggregate sales of Stilnox® in the United States (where it is sold under the brand name Ambien®) since its launch reached 1.2 billion by the end of 2002.

Although launched only in December 2000, by March 2003, Stilnox® had achieved high market penetration in Japan, becoming the second leading hypnotic on the Japanese market (according to IMS data) where it is sold under the brand name Myslee® through our joint venture with Fujisawa. With a market share of 19.9% in March 2003 (according to IMS data), Japan is now the second-largest market for sales of Stilnox® (where it is sold under the brand name Myslee®).

Depakine® (sodium valproate; epilepsy). Depakine® is a broad-spectrum anti-epileptic that has been prescribed for over 30 years. Numerous clinical trials, as well as long years of experience have shown that it is effective for all types of epileptic seizures and epileptic syndromes, and is generally well tolerated. Consequently, Depakine® remains a reference treatment for epilepsy worldwide. Furthermore, in contrast to findings sometimes reported with other anti-epileptic agents, Depakine® does not induce paradoxical aggravation of seizures. The Chrono® form (our prolonged release formulation) permits once-a-day administration in most cases, thereby improving compliance with treatment and overall patient care. We produce a wide range of formulations of Depakine®, permitting its adaptation to all types of patients. A new formulation of Depakine®, Chronospheres®, facilitating its use by children and the elderly, has already been approved in several European countries, and we plan to launch it gradually over the next few years as we register the product and reach agreement on pricing in those countries. Depakine® is marketed in over 100 countries, including the United States where it is licensed to Abbott. In 2002, we filed an application for marketing approval in Europe for Depakine Chrono® for use in the treatment of bipolar disorders.

Dogmatil®/Dogmatyl® (sulpiride; neurotic and psychosomatic disorders). At low doses, Dogmatil® 50 mg, is used in numerous countries for the symptomatic treatment of neurotic and/or psychosomatic disorders. Its specific mechanism of action on central and peripheral dopaminergic receptors permits rapid improvement of the psychic state of the patient as well as relief of functional symptoms in patients who are difficult to treat. At higher doses, Dogmatil® 200/400 mg is also used for the treatment of psychotic states. Its good cardiovascular and neurological safety profile makes it particularly suitable for the treatment of elderly patients. Dogmatil® is available in over 90 countries, including Japan (marketed under the brand name Dogmatyl®) through a joint venture with Fujisawa.

Solian® (amisulpride; schizophrenia). Solian® is an anti-psychotic with an atypical pharmacological profile. Its originality consists of its capacity to act selectively on D3/D2 dopaminergic receptors and its dual pre- and post-synaptic activity. Furthermore, its preferential action on the limbic system confers excellent neurological safety. Solian® is effective on all symptoms of schizophrenia, both positive and negative, irrespective of the phase of the disease, whether acute or chronic. At doses of 400 mg to 800 mg per day in patients with positive symptoms and associated depressive symptoms, and at the optimal daily dose of 100 mg in patients with dominant negative symptoms, the efficacy of Solian® is accompanied by a good safety profile. In 2002, we launched Solian® in a total of 12 countries, including Australia, Belgium and Spain. Solian® is available in over 50 countries worldwide, including the principal European markets.

Aspégic® (lysine acetylsalicylate; fever, pain). Aspégic® is a salicylate with the original property of total and immediate solubility. This characteristic confers both very rapid efficacy as an analgesic, anti-pyretic and anti-inflammatory agent. We market Aspégic® in certain countries in Europe, Africa and the Middle East.

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In addition to these products, we also market products for the treatment of anxiety, and agitation and aggressiveness.

Internal Medicine

Our principal fields in this therapeutic area are urology, gastroenterology, respiratory disease, and the musculoskeletal system. Our leading product in this field is Xatral® (alfuzosin).

Xatral® (alfuzosin; benign prostatic hyperplasia). Our research efforts resulted in the discovery of alfuzosin, the active ingredient in Xatral®, which we first launched in France in 1988. Xatral® belongs to the alpha$_1$-blocker class, and was the first product of the class to be indicated uniquely and specifically for the treatment of the symptoms of benign prostatic hyperplasia, as well as the first marketed product capable of acting selectively on the urinary system. Due to this clinical uroselectivity, Xatral® is immediately effective, with no need for dose titration and shows good tolerability, particularly cardiovascular. Active from the first dose, it provides rapid and lasting symptom relief and improves patient quality of life.

Besides this symptomatic action, the results of major clinical trials completed in 2002 have demonstrated the original contribution of Xatral® to the treatment of benign prostatic hyperplasia, and the prevention of its complications.

The results of the first phase of the ALFAUR trial showed that Xatral® doubles the probability of restored capacity to urinate normally after an episode of acute urine retention in conjunction with catheter insertion. These are the first published results that demonstrate the capacity of Xatral® to prevent acute urinary retention, the principal complication of benign prostatic hyperplasia. We have filed preliminary applications for extension to this indication in the principal European countries.

The results of another large international trial with over 800 patients have shown that Xatral® preserves sexual function in patients suffering from benign prostatic hyperplasia.

Since its launch in 1988 in France, we have constantly worked on developing improvements to optimize the formulation of Xatral®. The new once-daily formulation of Xatral® has now been registered in over 70 countries and is currently marketed in 14 European countries and in more than 35 other countries worldwide. As of March 2003, we ranked fourth on the European market for prostatic diseases with our product Xatral® (IMS data). In June 2003, we received FDA approval for alfuzosin, and we expect to begin to market the product in the United States in the second half of 2003.

Our main products in gastroenterology are Primpéran® (metoclopramide), a leading treatment for nausea and vomiting, Ercefuryl® (nifuroxazide), an intestinal antiseptic with a broad anti-bacterial spectrum and Inipomp® (pantoprazole), a potent inhibitor of gastric acid secretion. We also market Mizollen® (mizolastine) and Virlix® (cetirizine), for the treatment of allergic reactions, and Myolastan® (tetrazepam), a muscle relaxant.

Oncology

Oncology is a new therapeutic area for our company, and one in which we expect to concentrate significant efforts in the future. Our first product in this therapeutic area is Eloxatin®.

Eloxatin® (oxaliplatin; colorectal cancer). Eloxatin® is an innovative platinum agent, and is currently the only one to have demonstrated activity in colorectal cancer. Its recent introduction in the treatment of metastatic colorectal cancer has led to major progress, including both the prolongation of the median survival to 20 months when used as a first-line treatment in connection with 5-fluorouracil, or 5-FU, and enabling a significant proportion of patients with isolated hepatic metastases to undergo surgical resection due to the rapid and substantial reduction in the size of these metastases. Consequently, Eloxatin® gives these patients the hope of substantially prolonged survival.

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In the United States, the FDA granted approval in August 2002 following a 46-day priority review for registration. This rapid review was on the basis of the results of a large U.S. trial conducted on patients in relapse after an initial treatment, which showed that treatment with oxaliplatin in combination with infusional 5-fluorouracil/leucovorin, or 5-FU/LV, succeeded in delaying disease progression and demonstrated a clinical benefit in terms of pain reduction, weight gain and improvement of general status.

In data presented at the May 2002 meeting of American Society of Clinical Oncology, or ASCO, the N-9741 study, one of the largest randomized trials ever conducted in metastatic colorectal cancer, demonstrated survival benefit with first-line treatment with oxaliplatin. Conducted with the support of the U.S. National Cancer Institute, the study showed that the combination of oxaliplatin, the active ingredient in Eloxatin®, with 5-FU (the Folfox regimen) was more effective and better tolerated than irinotecan in combination with 5-FU (the IFL regimen, and current reference first-line treatment). Because of the prolongation of median survival of patients receiving oxaliplatin, the trial was prematurely discontinued, and all patients still enrolled in the trial were then treated with the oxaliplatin-based regimen. The final results of the N-9741 study were presented at the May 2003 meeting of the ASCO. We currently plan to submit an application for approval of Eloxatin® in combination with 5-FU as a first line treatment in the U.S. in 2003.

Due to its tolerability, Eloxatin® is also being developed as an adjuvant treatment for non-metastatic colorectal cancer, to prevent relapse in patients whose recovery has not been achieved through surgery alone. The results of the Mosaic study, which studied the efficacy of Eloxatin® as an adjuvant, were presented at the May 2003 meeting of the ASCO. The study showed that the addition of oxaliplatin to the current post-surgery standard chemotherapy of 5-FU/LV for colon cancer reduces the risk of recurrence by 23% when compared to the standard treatment alone. We believe that this important result, coming 15 years after 5-FU/LV was established as the standard adjuvant treatment, is a major step towards curing more patients and was obtained without dramatically impacting safety. We currently plan to file an application for approval of oxaliplatin as an adjuvant treatment for colorectal cancer in the United States at the end of 2003, and in Europe in the second half of 2003.

Its activity in colorectal cancer has also encouraged specialists to explore the value of Eloxatin® in the treatment of other tumors, particularly tumors of the digestive system, such as pancreatic cancer, but also ovarian and breast cancers, as well as certain hematological cancers.

We in-license Eloxatin® from Debiopharm, and market it primarily as a first-line treatment in 60 countries in Europe, Asia and Latin America. We also market it as a second-line treatment in the United States.

Fasturtec®/Elitek® (rasburicase; tumor lysis syndrome). Fasturtec® is a recombinant enzyme produced through genetic engineering and is the first biotechnology product discovered and developed entirely by our company. Fasturtec® works by converting uric acid, which is poorly soluble and nephrotoxic, into allantoin, a highly soluble compound that is readily eliminated through urination, thereby avoiding tumor lysis syndrome. Administered at the same time as chemotherapy, Fasturtec® allows clinicians to administer anti-cancer treatment in optimal conditions without delays or dose reductions that are often required due to tumor lysis syndrome. In February 2001, we obtained a European marketing authorization for Fasturtec®, and have launched it in several European countries, including Germany and the United Kingdom, beginning in May 2001. In April 2002, we received European authorization for an additional formulation of Fasturtec®, and in July 2002, Fasturtec® received FDA approval and was made commercially available in August 2002 under the brand name Elitek®. Fasturtec® is currently in clinical development in Japan.

Eligard® (leuprolide acetate; prostate cancer). Eligard® is a luteinizing hormone releasing hormone (LHRH) agonist indicated in the treatment of advanced prostate cancer that we in-license from Atrix. In

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January 2002, the FDA granted marketing approval for the one-month formulation in the treatment of prostate cancer. In July 2002, the three-month formulation received marketing approval from the FDA, and in February 2003, the four-month formulation received marketing approval from the FDA. We market Eligard® in the United States and Canada.

Generics

We also manufacture and market a variety of generics in France, Germany and the United Kingdom. These products cover various therapeutic classes, and are typically sold under their international non-proprietary names, or INNs, although in some cases they have a specific brand name. For example, we market Dialgirex®, a generic product used for aches and pains, in France and Monoflam®, an anti-inflammatory, in Germany.

Research and Development

We have a long tradition of commitment to research and development and many of our products have resulted from our own research and development activities. In 2002, we spent 1,218 million (16.4% of total consolidated net sales) on research and development.

We often enter into collaborative research and development arrangements with other pharmaceutical or biotechnology companies under which we fund research expenses in exchange for a right to use and market the products upon regulatory approval. Some of our collaboration agreements include those with Organon, Mitsubishi-Pharma Corp., Cephalon and IDM.

Our joint project with Organon, a subsidiary of Akzo Nobel, for the development of anti-thrombotic oligosaccharides is continuing. This collaboration has already led to the development of Arixtra®.

In 1998, we entered into an agreement with Mitsubishi-Pharma Corp. to identify new neuroprotective agents for use in the treatment of neurogenerative disorders. This agreement was recently renewed thorough the end of 2003.

In December 2001, we entered into an agreement with Cephalon to have access to specific angiogenesis inhibitors that are potential anti-cancer agents, as well as to a research program aimed at identifying new compounds with a similar mechanism of action. Angiogenesis inhibitors are molecules that act by preventing the development of blood vessels in tumors. We have agreed to co-promote any drugs that are successfully developed in the United States, Canada and Mexico with Cephalon, and we have exclusive marketing rights to such drugs in Europe and the rest of the world (excluding Japan). Under the agreement, we made an upfront payment to Cephalon, share in the costs of development, will make milestone payments during the development process and pay royalties on sales of drugs that are successfully developed.

In 2001, we signed a ten-year agreement with IDM to cooperate in cellular immunotherapy research for the development and marketing of immunologic treatments for cancers. Under this agreement, we have a right of first refusal to select up to twenty cell drugs from IDM s line of products. IDM will undertake the preclinical development, and if we exercise our option, we will finance the clinical development and have worldwide marketing rights for the selected drugs if the clinical trials are successful. A first product under this agreement, Uvidem®, which targets melanoma, is currently in Phase II clinical development.

We have entered into collaborative agreements for data-base sharing in the field of genomics with Human Genome Sciences and Genset as well as agreements with research centers specialized in combinatorial chemistry, high throughput screening and structural analysis and proteomics. In

the field of functional genomics, we have entered into joint projects with Genfit, Genoway and Lifespan. We also have a joint project with CEREP for compound screening, as well as capabilities in bioinformatics.

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In 2002, we also began three cooperative research and development programs for Impact Malaria. Impact Malaria is a program created by a dedicated team within our company in order to develop and design new drugs for malaria that conform to WHO recommendations, and which are at prices adapted to the population for which they are intended. Impact Malaria also includes a follow-up aspect both to guarantee that the new drugs are used appropriately (through educational programs), and to ensure that the drugs are used by the populations for which they are intended.

We employ over 6,700 personnel in research and development and have 14 research facilities in 6 countries. At January 31, 2003, we had 52 compounds in our research and development pipeline, of which 23 were in phase II or III clinical trials. These 52 compounds include 49 projects for new chemical entities, 2 projects for additional indications for 2 of those new chemical entities (rimonabant and saredutant), and 1 project for an additional formulation of an existing product (Stilnox®).

We focus our research and development efforts on our four targeted therapeutic areas. The composition of our research and development pipeline by therapeutic area as of January 31, 2003 is outlined in the following table.

Cardiovascular/ Thrombosis	Central Nervous System	Internal Medicine	Oncology	TOTAL

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
		East Field cont d						
NS-10	685480.8	4763639.7	1537.6	10	1010	60.9	65.0	4.1
					1000	65.2	71.8	6.6
				9	900	128.0	160.2	32.2
				8	800	184.1	188.2	4.1
NS-12	684846.6	4763209.9	1528.9	10	1010	70.9	74.5	3.6
					1000	76.0	78.3	2.3
				9	900	125.8	135.8	10.0
				8	800	145.2	147.2	2.0
NS-14	685708.4	4763676.2	1540.0	9	900	0.0	15.1	15.1
				8	800	47.1	50.0	2.9
NS-24	684781.0	4763203.0	1532.0	10	1010	59.6	62.4	2.8
					1000	65.0	69.0	4.0
				9	800	98.0	116.4	18.4
NS-27R	685832.0	4763838.0	1537.0	9	900	12.4	25.6	13.2
				8	810	27.6	29.8	2.2
					800	33.3	36.2	2.9
NS-28R	686043.0	4763890.0	1538.0	9	900	0.0	12.7	12.7
				8	800	103.0	110.8	7.8

NS-30R	686017.0	4763928.0	1535.0	8	800	17.9	19.6	1.7
NS-31R	686246.0	4763989.0	1539.0	9	900	34.4	51.6	17.2
NS-32	686250.0	4763976.0	1533.0	9	900	33.0	49.4	16.4
NS-33	685843.0	4763825.0	1534.0	9	900	10.8	20.8	10.0
				8	810	30.1	31.4	1.3
					800	35.4	40.8	5.4
NS-34	685710.0	4763675.0	1539.0	10	1010	81.2	84.2	3.0
					1000	85.6	89.2	3.6
				9	900	89.8	148.3	58.5
NS-35	685522.0	4763609.0	1538.0	10	1020	85.0	93.0	8.0
					1010	96.4	99.5	3.1
					1000	100.8	115.7	14.9
NS-50R	686087.0	4763856.0	1545.0	10	1010	63.4	67.1	3.7
					1000	71.2	73.7	2.5
				9	900	87.0	135.3	48.3
				8	810	147.0	158.7	11.7
					800	167.0	176.2	9.2
NS-51R	685895.0	4763768.0	1542.0	10	1010	71.9	73.8	1.9
					1000	75.0	77.4	2.4
				9	900	105.4	175.6	70.2
				8	810	176.6	184.0	7.4
					800	185.0	198.5	13.5
NS-53R	685142.0	4763191.0	1532.0	10	1010	35.6	43.9	8.3
					1000	47.5	109.7	62.2
				9	900	180.0	246.0	66.0

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Table 13.2
Drill Hole Summary for
South, East, and West Fields

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
East Field cont d								
NS-54R	685155.0	4763166.0	1533.0	10	1020	36.6	38.4	1.8
					1010	39.6	43.8	4.2
					1000	72.0	123.2	51.2
				9	900	200.4	213.6	13.2
NS-56R	685045.0	4763180.0	1520.0	10	1000	25.0	121.4	96.4
				9	900	127.2	210.4	83.2
NS-57R	685119.0	4763229.0	1522.0	10	1010	9.6	12.7	3.1
					1000	16.6	59.4	42.8
NS-58R	685173.0	4763115.0	1525.0	10	1020	92.0	96.0	4.0
NS-59R	685923.0	4763746.0	1536.0	9	900	181.2	197.8	16.6
				8	810	206.8	215.6	8.8
					800	220.8	225.6	4.8
NS-60R	686106.0	4763820.0	1534.0	10	1010	119.4	120.1	0.7
					1000	122.2	125.2	3.0
				9	900	135.6	188.2	52.6
NS-61R	686261.0	4763950.0	1539.0	9	900	75.6	96.4	20.8
NS-62R	685616.0	4763621.0	1531.0	10	1000	17.0	48.0	31.0
				9	900	110.0	160.0	50.0
					900	49.0	106.0	57.0
				8	810	162.0	178.0	16.0
					800	179.0	200.0	21.0
NS-63R	685639.0	4763572.0	1528.0	9	900	91.0	174.0	83.0
					900	176.0	242.0	66.0
NS-64R	684951.0	4763170.0	1521.0	10	1000	3.4	15.8	12.4
				9	900	139.6	166.0	26.4
NS-65R	685040.0	4763080.0	1518.0	10	1000	98.8	216.6	117.8
				9	900	222.2	235.8	13.6
NS-66R	685627.0	4763503.0	1535.0	10	1000	191.6	223.0	31.4

NS-70	684834.0	4763058.0	1524.0	10	1000	0.0	70.0	70.0
NS-71	684868.0	4763016.0	1524.0	0	1000	24.4	39.0	14.6
NS-72	686426.0	4764010.0	1541.0	8	810	37.3	40.0	2.7
					800	55.0	58.2	3.2
NS-73	686431.0	4763952.0	1554.0	8	810	105.3	106.7	1.4
					800	110.6	112.0	1.4
NS-74	685578.0	4763529.0	1533.0	10	1020	145.0	160.0	15.0
					1010	166.6	174.7	8.1
					1000	177.0	195.0	18.0

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Table 13.2
Drill Hole Summary for
South, East, and West Fields

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field								
NSW-01	676121.8	4762939.1	1524.8	5		28.9	119.4	90.5
NSW-02	676147.8	4762895.5	1524.6	5		110.7	204.0	93.3
NSW-03	675926.0	4762871.0	1526.0	5		15.0	77.4	62.4
NSW-04	675797.0	4762885.0	1513.0	5		3.0	23.0	20.0
NSW-05	675904.0	4762917.0	1522.0	5		2.5	40.7	38.2
NSW-06	675700.0	4762863.0	1518.0	6	620	132.8	138.3	5.5
NSW-07	675867.0	4762961.0	1525.0	6	620	114.1	130.0	15.9
NSW-08	675822.0	4762961.0	1526.0	6	620	149.2	157.5	8.3
NSW-10	676307.0	4763011.0	1552.0	5	5	28.2	115.6	87.4
NSW-12	676472.0	4762834.0	1531.0	9	990	30.5	35.0	4.5
					980	37.2	43.3	6.1
					970	44.1	46.7	2.6
					960	47.6	50.0	2.4
					950	51.6	53.3	1.7
					940	61.2	73.1	11.9
				8	810	110.0	112.4	2.5
					800	114.4	119.5	5.1
				7	790	120.5	121.8	1.3
NSW-13R	676434.0	4763081.0	1522.0	6	620	62.2	76.1	13.9
					600	94.0	99.8	5.8
NSW-14R	676327.0	4762972.0	1523.0	6	620	104.4	118.8	14.4
					600	126.1	137.6	11.5
NSW-15	676457.0	4762877.0	1526.0	9	950	7.7	8.9	1.2
					940	19.5	29.0	9.5
				8	810	46.2	47.9	1.7
					800	48.9	54.8	5.9
NSW-16R	676216.0	4762749.0	1535.0	9	990	27.2	28.9	1.7
					980	40.0	45.8	5.8
					970	57.6	59.6	2.0
					960	62.4	68.8	6.4

	950	71.2	74.0	2.8
	942	75.9	77.9	2.0
	940	80.6	85.8	5.2
8	810	99.4	101.2	1.8
	800	101.7	107.6	5.9
7	790	107.6	109.2	1.6

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-17R	676241.0	4762719.0	1532.0	10	1030	32.2	41.8	9.6
					1010	49.2	51.1	1.9
					1000	52.8	62.3	9.5
				9	990	85.2	86.0	0.8
					980	94.9	100.4	5.5
					970	105.8	109.0	3.2
					960	115.0	118.8	3.8
					950	119.8	121.8	2.0
					942	126.0	127.2	1.2
					940	130.4	138.0	7.6
				8	800	154.8	162.8	8.0
NSW-18R	675856.0	4762560.0	1516.0	10	1030	14.0	18.0	4.0
					1020	31.3	38.6	7.3
					1010	39.3	40.8	1.5
					1000	41.4	53.0	11.6
				9	990	80.0	81.2	1.2
					980	84.4	90.5	6.1
					970	91.4	105.6	14.2
					960	112.0	115.0	3.0
					950	120.0	124.0	4.0
					942	133.3	134.6	1.3
					940	139.4	161.3	21.9
					900	170.2	172.6	2.4
NSW-19R	675878.0	4762520.0	1516.0	10	1030	59.0	68.0	9.0
					1000	82.0	100.0	18.0
				9	990	135.0	137.5	2.5
					960	164.0	167.0	3.0
					950	171.0	180.0	9.0
					942	184.0	187.0	3.0
					940	197.0	210.0	13.0

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-20R	675487.0	4762454.0	1506.0	10	1030	17.0	18.0	1.0
					1020	36.0	38.0	2.0
					1010	39.0	40.0	1.0
					1000	43.0	53.0	10.0
				9	998	59.0	60.0	1.0
					996	63.0	67.0	4.0
					990	93.0	94.0	1.0
					980	98.0	107.0	9.0
					970	113.0	114.0	1.0
					960	116.0	118.0	2.0
					950	123.0	124.0	1.0
					940	132.0	144.0	12.0
					900	153.0	156.0	3.0
				8	810	165.0	167.0	2.0
					800	172.0	179.0	7.0
NSW-21	676457.0	4762877.0	1526.0	10	1010	59.0	63.5	4.5
					1000	64.5	75.5	11.0
				9	980	106.3	112.6	6.3
					970	113.6	117.4	3.8
					960	118.5	120.4	1.9
					950	121.4	122.3	0.9
					940	127.8	136.6	8.8
				8	800	164.5	174.7	10.2
NSW-22	676814.0	4762992.0	1556.0	9	940	16.2	33.2	17.0
				8	810	55.8	57.4	1.6
					800	57.8	64.4	6.6
				7	790	65.3	69.4	4.1
NSW-23	676841.0	4763058.0	1556.0	10	1030	12.4	15.5	3.1
					1020	18.0	18.6	0.6
					1010	21.4	27.8	6.4
					1000	28.3	34.4	6.1
				9	990	47.0	48.1	1.1
					980	48.6	56.0	7.4
NSW-24R	676498.0	4762810.0	1525.0	10	1030	34.5	35.5	1.0
					1010	56.4	61.0	4.6
					1000	63.0	73.4	10.4
				9	980	101.4	107.0	5.6
					970	109.0	111.8	2.8
					960	112.6	114.0	1.4

950	115.0	116.2	1.2

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-25R	675514.0	4762426.0	1507.0	11	1100	11.8	13.0	1.2
				10	1030	57.4	58.8	1.4
					1000	72.2	75.8	3.6
				9	998	84.8	86.0	1.2
					996	89.8	93.8	4.0
					980	122.4	127.6	5.2
					970	128.6	135.4	6.8
					940	147.5	160.0	12.5
				8	810	166.7	169.4	2.7
					800	170.5	178.8	8.3
NSW-26R	675092.0	4762330.0	1514.0	10	1040	42.6	45.7	3.1
					1030	53.0	55.3	2.3
NSW-28R	675112.0	4762422.0	1519.0	10	1050	15.2	17.4	2.2
					1040	25.4	27.5	2.1
					1030	33.6	37.0	3.4
					1020	64.1	65.1	1.0
					1010	68.8	70.2	1.4
					1000	71.1	76.4	5.3
				9	998	78.3	81.4	3.1
					996	87.6	89.6	2.0
					990	91.2	93.4	2.2
					980	102.0	113.9	11.9
					970	114.5	119.0	4.5
					960	121.0	123.0	2.0
					950	125.0	125.9	0.9
					940	135.0	156.5	21.5
					900	158.7	159.3	0.6
				8	810	160.6	163.0	2.4
					800	167.8	170.7	2.9
				7	790	171.6	172.2	0.6
NSW-29R	675114.0	4762477.0	1520.0	10	1030	4.4	7.7	3.3
					1020	31.1	31.9	0.8
					1000	42.9	52.9	10.0
				9	998	54.5	58.5	4.0
					996	64.6	69.5	4.9
					980	82.6	89.7	7.1
					970	91.0	97.4	6.4
					960	101.6	103.6	2.0
					950	105.8	107.1	1.3
					942	113.4	114.8	1.4

	940	123.6	131.4	7.8
8	800	140.5	145.9	5.4

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-31R	676043.0	4762580.0	1506.0	10	1030	75.0	82.4	7.4
					1020	83.4	92.0	8.6
					1010	92.4	93.4	1.0
					1000	94.2	100.8	6.6
				9	990	140.6	142.6	2.0
					980	149.8	151.2	1.4
					970	157.0	159.9	2.9
					960	162.9	168.4	5.5
					950	173.8	176.6	2.8
					942	184.6	186.8	2.2
					940	192.6	200.8	8.2
NSW-32R	675701.0	4762496.0	1509.0	10	1040	16.0	17.2	1.2
					1030	48.5	53.3	4.8
					1020	67.0	70.7	3.7
					1010	73.0	73.8	0.8
					1000	75.4	82.7	7.3
				9	980	113.0	120.3	7.3
					970	123.3	124.9	1.6
					960	128.0	129.7	1.7
					950	134.8	136.5	1.7
					942	140.5	141.8	1.3
					940	150.1	169.6	19.5
				8	810	178.5	181.5	3.0
					800	182.4	187.7	5.3
				7	790	188.3	191.0	2.7
NSW-33R	676828.0	4763022.0	1526.0	9	990	19.0	20.2	1.2
					980	21.2	29.8	8.6
					970	31.0	37.4	6.4
					960	38.4	40.6	2.2
					940	47.8	62.0	14.2
				8	810	82.0	83.0	1.0
					800	84.0	88.2	4.2
				7	790	89.4	92.0	2.6
NSW-34R	674917.0	4762598.0	1562.0	9	990	53.0	55.0	2.0
					980	80.0	91.0	11.0
					940	135.0	140.0	5.0
NSW-35	676147.0	4762900.0	1508.0	5		116.4	228.4	112.0
NSW-36	676318.0	4762969.0	1500.0	6	620	115.0	126.2	11.2

					6	133.8	141.0	7.2
NSW-37	675927.0	4762865.0	1494.0	5	5	26.2	93.0	66.8
NSW-38	675730.0	4762799.0	1525.0	5	5	40.2	75.4	35.2

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-39	675285.0	4762459.0	1518.0	10	1030	3.3	9.0	5.7
					1020	44.8	49.7	4.9
					1000	55.4	63.8	8.4
				9	998	66.0	69.2	3.2
					996	74.2	75.6	1.4
					990	87.9	89.4	1.5
					980	102.0	104.8	2.8
					970	105.2	109.9	4.7
					950	111.2	112.8	1.6
					940	113.3	126.4	13.1
					900	136.3	139.9	3.6
NSW-40	676250.0	4762716.0	1500.0	10	1030	24.0	29.6	5.6
					1010	42.7	45.8	3.1
					1000	46.6	55.2	8.6
				9	998	58.6	59.4	0.8
					990	79.4	80.6	1.2
					980	90.1	95.2	5.1
					970	104.0	112.0	8.0
					960	112.6	115.0	2.4
					950	117.0	118.0	1.0
					942	119.6	120.0	0.4
					940	125.4	132.0	6.6
				8	810	152.4	154.4	2.0
					800	155.8	162.0	6.2
NSW-41	675877.0	4762541.0	1515.0	10	1030	20.8	23.7	2.9
					1000	56.2	64.4	8.2
				9	990	134.4	136.0	1.6
					980	141.4	147.0	5.6
					970	149.4	153.0	3.6
					960	159.0	161.4	2.4
					950	167.6	169.0	1.4
					942	180.7	181.7	1.0
					940	187.2	202.0	14.8
NSW-44	675402.0	4762656.0	1514.0	11	1170	6.0	13.2	7.2
					1160	15.0	17.6	2.6
					1150	19.4	21.1	1.7
					1140	22.4	23.6	1.2
					1130	27.8	38.6	10.8
					1120	42.8	44.9	2.1
					1100	47.7	52.0	4.3

NSW-45R	675764.0	4762771.0	1526.0	5		90.0	118.0	28.0

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-46R	675629.0	4763004.0	1529.0	10	1020	6.0	21.0	15.0
					1010	22.8	24.4	1.6
					1000	25.4	45.4	20.0
				9	990	76.4	78.6	2.2
					980	90.5	99.0	8.5
					970	101.0	102.8	1.8
					960	122.4	124.5	2.1
					950	129.7	135.0	5.3
					942	136.7	142.2	5.5
					940	143.3	162.4	19.1
					900	164.8	166.2	1.4
				8	810	171.6	174.4	2.8
NSW-47R	675647.0	4762960.0	1550.0	10	1030	34.9	44.1	9.2
					1020	62.2	68.0	5.8
					1010	72.7	74.7	2.0
					1000	77.4	92.0	14.6
				9	990	126.0	130.8	4.8
					980	142.0	147.5	5.5
					970	148.3	154.0	5.7
					960	156.0	161.5	5.5
					950	162.3	166.0	3.7
					942	170.8	173.6	2.8
NSW-47R	675647.0	4762960.0	1550.0	9	940	175.2	194.9	19.7
					900	201.2	203.0	1.8
				8	810	208.5	211.0	2.5
					800	219.4	222.2	2.8
				7	790	223.0	224.6	1.6
NSW-49R	675481.0	4762918.0	1513.0	10	1050	60.0	63.6	3.6
					1040	66.0	70.7	4.7
					1030	81.2	85.7	4.5
					1020	105.0	107.5	2.5
					1010	108.4	109.4	1.0
					1000	110.5	125.8	15.3
				9	990	142.6	144.0	1.4
					980	148.7	155.0	6.3
					970	157.0	159.0	2.0
					960	160.0	160.9	0.9
					950	161.8	162.6	0.8
					940	164.0	173.6	9.6
					900	181.6	184.0	2.4

8	800	190.0	203.0	13.0

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-50	675496.0	475496.0	1516.0	10	1050	63.1	64.3	1.2
					1030	84.4	90.1	5.7
					1020	103.9	106.8	2.9
					1010	113.6	114.5	0.9
					1000	120.3	125.6	5.3
				9	990	160.0	161.2	1.2
					980	166.9	178.3	11.4
					970	179.1	181.2	2.1
					960	183.5	186.3	2.8
					950	187.9	190.2	2.3
					942	193.0	194.5	1.5
					940	196.3	211.0	14.7
					900	214.6	217.7	3.1
				8	810	225.6	227.7	2.1
					800	230.0	234.7	4.7
NSW-51R	675327.0	4762786.0	1513.0	11	1120	9.6	12.6	3.0
					1100	18.3	20.0	1.7
				10	1040	136.2	137.7	1.5
					1030	142.0	143.0	1.0
				10	1020	149.6	151.3	1.7
					1010	160.9	164.0	3.1
					1000	165.0	170.4	5.4
				9	990	199.6	201.6	2.0
					980	208.4	215.4	7.0
					970	217.0	220.4	3.4
					960	221.0	224.0	3.0
					950	224.6	225.5	0.9
					940	227.0	235.6	8.6
					900	237.9	238.9	1.0
				8	800	245.6	249.0	3.4

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-52R	675301.0	4762840.0	1528.0	11	1120	11.0	14.1	3.1
					1110	21.3	24.5	3.2
					1100	25.2	26.5	1.3
				10	1030	144.8	146.8	2.0
					1020	167.0	168.2	1.2
					1010	174.6	177.1	2.5
					1000	178.1	184.0	5.9
				9	990	200.0	202.4	2.4
					980	208.9	214.0	5.1
					970	214.7	216.3	1.6
					960	216.9	217.5	0.6
					950	218.5	219.3	0.8
					940	220.4	225.5	5.1
					900	228.2	231.6	3.4
				8	810	235.8	236.5	0.7
					800	240.4	244.0	3.6
NSW-53R	675129.0	4762723.0	1551.0	11	1170	27.4	34.2	6.8
					1160	35.2	37.3	2.1
					1150	38.6	40.0	1.4
					1140	42.9	43.9	1.0
					1130	45.0	55.3	10.3
					1120	62.0	64.8	2.8
					1110	71.0	76.5	5.5
					1100	77.2	80.9	3.7
				10	1050	153.6	154.9	1.3
					1040	158.8	160.0	1.2
NSW-54R	675034.0	4762671.0	1518.0	5		137.4	196.2	58.8
NSW-55	675134.0	4762437.0	1522.0	10	1050	8.2	10.0	1.8
					1040	19.6	22.4	2.8
					1030	27.0	31.4	4.4
					1020	55.4	56.2	0.8
					1000	62.0	67.0	5.0
				9	998	69.8	70.9	1.1
					996	75.8	79.0	3.2
					990	82.8	84.0	1.2
					980	91.8	99.0	7.2
					970	103.4	104.3	0.9
					960	111.2	112.6	1.4
					950	116.2	117.4	1.2
					942	119.2	121.4	2.2

940	126.4	139.6	13.2
900	140.2	143.4	3.2

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Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
West Field cont d								
NSW-56	675498.0	4762426.0	1516.0	10	1030	42.0	43.5	1.5
					1000	62.0	66.2	4.2
				9	998	79.0	81.7	2.7
					996	81.7	84.2	2.5
					990	113.8	115.7	1.9
					980	121.0	127.3	6.3
					970	128.6	137.0	8.4
					960	139.4	140.8	1.4
					950	145.2	146.2	1.0
					942	151.0	152.8	1.8
					940	154.3	174.2	19.9
NSW-57	676485.0	4762813.0	1524.0	10	1010	49.0	52.8	3.8
					1000	57.8	61.6	3.8
				9	990	90.6	92.2	1.6
					980	93.2	100.6	7.4
					970	102.2	105.8	3.6
					960	107.4	108.0	0.6
					950	109.4	110.6	1.2
					940	115.4	125.0	9.6
				8	810	157.2	158.6	1.4
					800	159.7	165.0	5.3
				7	790	167.0	168.2	1.2
NSW-58R	675212.0	4762760.0	1523.0	11	1160	4.6	7.0	2.4
					1150	8.8	11.2	2.4
					1140	14.4	16.9	2.5
					1130	19.6	35.3	15.7
					1120	38.0	41.2	3.2
					1100	45.5	52.2	6.7
				10	1050	114.9	116.5	1.6
					1040	140.7	142.6	1.9
					1030	144.3	145.1	0.8
					1020	151.1	155.6	4.5
					1010	170.6	176.4	5.8
					1000	191.9	199.8	7.9

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Table 13.2
Drill Hole Summary for
South, East, and West Fields

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
				West Field cont d				
NSW-59R	675256.0	4762712.0	1526.0	11	1170	5.3	13.7	8.4
					1160	16.1	18.3	2.2
					1150	20.2	22.0	1.8
					1140	24.6	25.5	0.9
					1130	27.2	39.2	12.0
					1120	43.6	46.5	2.9
					1110	54.4	58.3	3.9
					1100	58.8	60.2	1.4
				10	1040	142.0	144.0	2.0
					1030	147.0	149.3	2.3
					1020	163.3	166.7	3.4
					1010	181.4	186.2	4.8
					1000	187.2	196.6	9.4
NSW-60R	675267.0	4762675.0	1522.0	11	1170	13.6	34.5	20.9
					1160	38.7	42.2	3.5
					1150	43.2	44.5	1.3
					1140	45.9	46.9	1.0
					1130	51.7	66.0	14.3
					1120	71.5	74.2	2.7
					1110	78.6	82.1	3.5
					1100	86.5	91.2	4.7
				10	1040	180.6	185.1	4.5
					1030	188.6	190.4	1.8
					1020	193.3	197.5	4.2

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Table 13.2
Drill Hole Summary for
South, East, and West Fields

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
				West Field cont d				
NSW-61R	675348.0	4762721.0	1517.0	11	1170	5.2	14.7	9.5
					1130	16.4	27.2	10.8
					1120	30.8	32.4	1.6
					1100	36.3	39.6	3.3
				10	1020	162.0	163.9	1.9
					1010	185.6	190.7	5.1
					1000	191.8	206.0	14.2
NSW-62R	675153.0	4762667.0	1514.0	11	1170	24.3	34.0	9.7
					1160	36.0	39.4	3.4
					1150	41.2	43.2	2.0
					1140	45.8	47.1	1.3
					1130	54.3	70.8	16.5
					1120	74.6	76.8	2.2
					1110	85.8	87.4	1.6
				10	1050	145.6	146.7	1.1
					1040	156.5	158.0	1.5
					1030	161.3	162.5	1.2
					1020	167.0	168.4	1.4
					1010	178.6	182.6	4.0
					1000	187.2	196.9	9.7
NSW-63R	675182.0	4762625.0	1513.0	11	1170	51.4	61.1	9.7
					1160	64.4	66.6	2.2
					1150	68.2	69.3	1.1
					1140	70.9	71.9	1.0
					1130	73.7	85.6	11.9
					1120	90.1	93.0	2.9
					1110	96.9	101.0	4.1
					1100	101.5	102.7	1.2
NSW-64R	675724.0	4762826.0	1527.0	5		20.5	47.4	26.9
NSW-65R	675040.0	4762662.0	1518.0	11	1170	24.6	35.8	11.2
					1160	51.4	55.0	3.6
					1150	56.6	58.8	2.2
					1140	60.0	62.0	2.0
					1130	65.0	96.0	31.0
					1120	106.4	109.4	3.0
					1100	112.4	116.0	3.6

NSW-66R	675065.0	4762617.0	1513.0	11	1170	26.4	37.2	10.8
					1160	38.5	42.4	3.9
					1150	46.0	49.6	3.6
					1140	52.6	54.0	1.4
					1130	59.0	75.2	16.2
					1120	81.0	82.8	1.8
					1100	86.6	90.0	3.4

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Table 13.2
Drill Hole Summary for
South, East, and West Fields

Drill Hole I	Easting	Northing	Elevation	Seam	Sub-seam	From	To	Thickness
				West Field cont d				
NSW-67R	675088.0	4732576.0	1514.0	11	1170	69.0	73.0	4.0
					1160	74.8	76.7	1.9
					1150	78.6	79.6	1.0
					1130	87.2	98.5	11.3
					1120	108.0	110.5	2.5
NSW-68R	674994.0	4762576.0	1526.0	11	1170	49.3	58.6	9.3
					1160	66.5	70.8	4.3
					1150	88.2	92.0	3.8
					1130	100.0	119.4	19.4
					1120	130.1	134.5	4.4
					1110	144.0	146.0	2.0
					1100	147.4	149.4	2.0
NSW-70R	675021.0	4762532.0	1519.0	11	1170	74.0	77.6	3.6
					1160	78.8	80.4	1.6
					1150	82.8	83.7	0.9
					1140	89.0	90.0	1.0
					1130	94.5	109.6	15.1
					1120	118.4	120.4	2.0
NSW-71R	675237.0	4762520.0	1524.0	10	1000	27.4	31.4	4.0
				9	998	33.4	36.0	2.6
					996	40.0	42.4	2.4
					990	54.3	56.0	1.7
					980	63.5	73.4	9.9
					960	75.4	76.2	0.8
					950	80.4	81.4	1.0
					940	89.0	97.0	8.0
					900	101.6	103.5	1.9
				8	800	107.0	111.3	4.3

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14 SAMPLING METHOD AND APPROACH

IMMI has employed two types of drilling to investigate coal-bearing strata and collect representative samples of the coal.

Core drilling has been used where it is desirable to collect complete representative samples of the coal seams, observe structural details, and to accurately measure the depths of lithologic contacts. The wireline method has been used with all core drilling in the current exploration program. Wireline core drilling produces a continuous retrieval of core for the entire drill hole. The five core holes drilled in 2004 were combination rotary/core holes. These holes were drilled using standard rotary methods to a projected target depth, then switched to a core barrel to retrieve cored sections of the No.5 seam.

Core from the drill hole is logged (i.e., measured and described) by a geologist using standard geological terms to document various attributes including lithology, physical characteristics, color, hardness and grain size. Coal intervals are collected in either split or solid tube core barrels. The core is promptly logged at the drill site by a geologist. The geologist s core log consists of the measured thickness and description of the coal, inter-seam partings, adjacent roof and floor rock, and details of any sample intervals removed for analysis. All core is then photographed at 0.5m increments.

Core size was HQ (63.5mm), with a triple tube barrel system used. The innermost barrel with this system was pumped out and the tube split. The rock core was placed in boxes, photographed, logged, and then placed on the ground in sequence. The coal is logged directly from the split barrel. The geologist s core log recorded the measured thickness and description of the coal, inter-seam partings, adjacent roof and floor rock, and details of any sample intervals removed for analysis. Each core run was measured for core cut and recovered. Photographs were taken at 0.5m intervals and the core logged.

Sampling was performed according to Norwest conventions. Coal showing distinct lithologic variation was sampled separately, as were partings over 0.05 meters. Otherwise, in units of coal with a uniform appearance, samples were bagged in 0.6 meter sample increments as per the capacity of the core box length. When zones of core loss greater than 0.1 meter were encountered, separate samples were collected both above and below the zone.

Coal samples were placed in polyethelene sleeves and taped shut. Each sample was assigned a discreet number, and this information and the sample depth interval was recorded in Norwest Laboratory Instruction Forms. The sample number and depth interval were written on the sample sleeves and core boxes.

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Reverse circulation drilling has been used as the primary exploratory method to locate and intersect coal-bearing strata. This method allows for rapid penetration at lower drilling costs. Reverse circulation does not afford the ability to measure depths of lithologic contacts with the same level of accuracy as core drilling. With reverse circulation it is difficult to observe structural details, or geologic changes such as thin rock parting units within a coal seam. The reverse circulation drill string utilized dual wall 102mm drill pipe and a 140mm hammer. Cuttings were directed up the inner tube of the drill pipe to a cyclone. The cuttings collected inside the cyclone against a trapdoor. The door was released after every 1 meter of drilling, the samples dropped into a bucket, and the cuttings were laid out in rows on the ground. The site geologist would then examine the cuttings and produce a geologic log. Intervals with coal were sampled and sealed in plastic bags. These samples were then sent off for proximate and thermal analyses.

A number of holes were drilled with a conventional air-rotary system. The drill used 114mm single wall drill pipe and a 152mm hammer bit. Cuttings with this system were directed up the anulus of the borehole and spilled on the ground surface. The drillers took notes on the types of materials encountered, and estimates of depth. No effort was made to systematically sample the cuttings, and the geophysical logs were used to determine formation depths.

Following the completion of all drill holes, a down-hole geophysical logging program was conducted. The logging program produces a geophysical log suite consisting of caliper, density (gamma-gamma), natural gamma and resistivity trace. The geophysical logs are used to identify rock types, including coal intersected in the hole and to accurately measure the depths of lithologic contacts. The geophysical log is used in conjunction with the geologic log to accurately interpret and measure the coal-bearing strata as well as providing a second source of information.

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15 SAMPLE PREPARATION, ANALYSES AND SECURITY

Samples are collected from drill core and reverse circulation cuttings. Samples are collected and submitted for analysis using methods that are standard for the coal industry. The specific process used by Norwest for the Nariin Sukhait drilling program is described below:

Core Drilling Samples

1. Recovered core is measured to determine an overall recovery (reported in percent) by comparing the recovered core length with the coring run length recorded by the driller. Recovered core is measured and compared to the coal interval thickness determined from the geophysical log suite.

2. Recovered coal intervals are sampled using the following criteria:
   i. Coal samples were broken out based on lithologic changes. In zones of uniform coal appearance, samples were bagged about every 0.60m as per the capacity of the core boxes.

   ii. In-seam partings, to a maximum thickness of 0.10m, will be included in a coal sample, where the thickness of the adjacent coal beds above and below the parting are both a minimum of twice the parting thickness.

   iii. A parting will be sampled separately if it is
   >0.10m thick,

   Carbonaceous shale, bone or interbedded coal/mudstone

   Deemed to be >50% coal.
3. Collected samples are cleaned of any mud contamination and placed in individual, core-sleeve style, plastic bags. The bags are labelled on the outside with both the core hole and sample number and sealed with plastic tape to prevent excessive moisture loss. Samples are then placed in sequence into waxed-cardboard core boxes. Core boxes are sealed with fibreglass reinforced tape. Core boxes are then packaged on palletized containers and shipped to SGS Mineral Labs in Denver, Colorado.

4. At the time of shipment, scanned geologic and geophysical logs, laboratory instructions and shipment manifest are forwarded to Norwest s Salt Lake City office. Laboratory instructions and the shipment manifest are forwarded to IMMI in Ulaanbaatar, and to SGS in Denver. All records are compared with contents upon arrival to the SGS Mineral Labs in Denver. To date, there has been no loss or compromise of samples during shipment. Core samples undergo a full suite of coal quality testing including short proximate, full proximate, thermal tests, ash analysis, washability testing, and metallurgical testing.

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Reverse Circulation Samples

Samples are collected at 1.0m intervals into plastic bags. The bags are labelled on the outside with both the drill hole and sample number and sealed with plastic tape to prevent excessive moisture loss. Samples are then grouped by hole into larger bags, packaged onto palletized containers and shipped to the Mining Institute in Ulaanbaatar, Mongolia where they undergo proximate and thermal analysis.

In coal work additional special security methods for the shipping and storage of samples are not commonly employed, as coal is a relatively low-value bulk commodity.

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16 DATA VERIFICATION

Data control and verification is an important element in Norwest s management of the exploration program at Nariin Sukhait. Norwest has directly managed the exploration program from conceptual planning of exploration targets, through data collection, to interpretation and analysis. Norwest has provided on-site management throughout the great majority of the exploration project with only very short periods of absence.

Upon completion of a drill hole, the geologic and geophysical logs are reviewed by a Norwest geologist. Following review of the logs, the hardcopy originals are scanned into an electronic format. All geologic, geophysical, and sampling data is entered and maintained in an electronic database. All mapping is entered and maintained in electronic format on a CAD-based system. Data entry of all geologic data is managed by Norwest at the project site. All electronic data is forwarded on a routine basis to Norwest s office in Salt Lake City. Results from the coal quality testing is added into the database in the Salt Lake office.

All data collection is done under a defined set of protocols established by Norwest. Norwest geologists are responsible for the training and administration of data collection procedures and are responsible for reviewing all data. Norwest has maintained control of all data collection throughout the exploration program.

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17 ADJACENT PROPERTIES

Ivanhoe s Nariin Sukhait Property surrounds and is adjacent to the MAK Nariin Sukhait Mine, owned and operated by the Mak Qin Hua Mongolian/Chinese Joint Venture. Operations began at the Nariin Sukhait Mine in 2003. The operation currently mines coal from the No. 5 Seam from two open-pit mines. Annual production is estimated to be approximately 2M tpy of both thermal and coking blend coal, which is trucked to a Chinese steel mill some 400km away. Reported reserves for the MAK operation are stated as 125.5 Mt. of coal. Information regarding the MAK operation has been provided by Ivanhoe to Norwest . Norwest has been unable to verify this information and the information is not necessarily indicative of the coal resource potential on the IMMI controlled licenses.

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18 MINERAL PROCESSING AND METALLURGICAL TESTING

The equivalent terminology, which will be used in this report on coal at Nariin Sukhait, is Coal Quality and Processing . Core samples were subjected to a number of analyses, with the most common analyses described below:

Proximate Analysis: Determination of moisture, ash, volatile matter and fixed carbon in a sample. The fixed carbon is determined by difference and the four components total 100%.

Sulphur: Determination of the percent sulphur in a sample. Coal seams at Nariin Sukhait have low sulphur contents ranging from 0.73 to 1.37%.

Thermal Value: A measure of the heat producing capability of coal measured in Kcal/kg or BTU/lb. Thermal content for coals at Nariin Sukhait (as-received basis) range from approximately 5,800 to 7,000 Kcal/kg.

Washability Tests: A series of tests to determine the proximate and thermal qualities of coal after being washed at set specific gravities to remove ash, sulphur, and non-coal constituents. Tests are designed to simulate preparation plant throughput at set specific gravities to determine expected yields and quality of a saleable product.

Metallurgical Testing: A series of tests to evaluate the coking characteristics of coal. Tests include the Gieseler Plastometer, Audibert Arnu Dilatometer, Reactive Maceral Analysis, Phosphorous content (P%), and Free Swelling Index (FSI).

18.1 Raw Coal Quality

At Nariin Sukhait the coals are ranked as high volatile bituminous. Short proximate analysis (moisture, ash, sulphur, and caloricity) has been completed on all core and numerous reverse circulation drill holes. Core holes with coal quality data are highlighted on Figures 18.1 and 18.2. Full proximate analyses, thermal, washability and metallurgical testing have been completed for 21% of the core samples. All core samples from the 2005 exploration program have been tested at SGS Mineral Labs in Denver, Colorado.

Raw coal quality results for the South Field are presented in Table 18.1 on a full-seam composite basis. Average qualities for the No. 5 Seam are 12.3% Ash, 1.2% Sulphur, and a heat content of 6,391 Kcal/kg. Similar results are seen in drill holes completed in 2004 and are presented in Table 18.2.

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Table 18.1
Raw Coal Quality, South Field, No. 5 Seam

		As Received Quality Basis					
Hole Id	Thick (m)	Moisture (%)	Ash (%)	Sulfur (%)	Kcal/kg	BTU/lb	MAFBTU
NS-29	53.5	10.67	10.51	0.85	6,395	11,510	14,566
NS-16	22.6	13.40	15.17	0.84	5,751	10,350	14,480
NS-18	125.9	9.92	14.37	1.25	6,155	11,076	14,612
NS-23	61.3	6.21	9.84	1.66	6,820	12,273	14,613
NS-22	56.3	6.70	10.75	1.29	6,706	12,068	14,611
Wtd. Avg.	**63.9**	**9.01**	**12.27**	**1.24**	**6,391**	**11,502**	**14,595**

Table 18.2
***2004 Raw Coal Quality, South Field, No. 5 Seam**

		AR Basis				Air Dry Basis		
Hole Id	Thick (m)	Moisture (%)	Ash (%)	Kcal/kg	BTU/lb	Moisture (%)	Volatiles (%)	Sulfur (%)
H-1	74.1	5.23	13.04	6,438	11,586	1.12	34.85	1.02
H-2	34.0	3.58	16.31	6,273	11,290	0.81	34.75	0.53
H-3	51.4	2.17	10.08	6,972	12,547	1.02	33.61	0.59
H-4	42.3	5.73	8.93	6,760	12,165	1.14	30.94	1.19
H-5	40.1	6.87	7.80	6,753	12,152	0.91	34.03	0.58
Wtd. Avg.	**48.4**	**4.72**	**11.23**	**6,639**	**11,948**	**1.00**	**33.64**	**0.78**

A summary of coal quality for the upper seams (Nos. 8, 9, and 10) in the East Field is presented is presented in Table 18.3. The upper seams exhibit higher ash, lower sulphur, and lower heating content than seen in the No. 5 Seam. Ash values range from 13.2 to 27.3% in the upper seams, reflecting the multiple benches and in-seam dilution of thin rock partings. Likewise, heating content in the upper seams has a lower average heating content of 5,831 Kcal/kg.

Table 18.3
Raw Coal Quality, East Field, Upper Seams

		As Received Quality Basis					
Hole Id	Thick (m)	Moisture (%)	Ash (%)	Sulfur (%)	Kcal/kg	BTU/lb	MAFBTU
NS-09	15.8	12.34	19.53	0.58	5,493	9,886	14,486
NS-12	3.3	17.21	17.62	0.67	5,137	9,244	14,184
NS-13	4.8	10.54	13.22	0.60	6,095	10,968	14,385
NS-14	8.9	21.94	27.31	0.41	3,726	6,705	13,168
NS-32	26.3	8.01	14.92	1.28	6,114	11,002	14,176
NS-33	10.0	5.76	20.06	0.76	5,851	10,530	14,056
NS-34	51.4	8.19	15.87	0.98	6,013	10,822	14,160
NS-35	24.5	9.53	13.77	1.38	6,159	11,084	14,442
Wtd. Avg.	**18.1**	**9.79**	**16.68**	**0.99**	**5,831**	**10,494**	**14,186**

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A summary of raw coal quality for the No. 5 Seam in the West Field is presented in Table 18.4. Ash content for No. 5 Seam coal in the West Field is significantly lower from other coals at Nariin Sukhait. Ash content ranges from 6.1 to 11.1%, averaging 7.3%. Likewise sulphur content, averaging 0.73%, is significantly lower than other coals tested to date at Nariin Sukhait. Heating content is significantly improved at an average value of 7,003 Kcal/kg compared to the average heating values for No. 5 Seam coals in the South Field.

Table 18.4
Raw Coal Quality, West Field, No. 5 Seam

		As Received Quality Basis					
Hole Id	Thick (m)	Moisture (%)	Ash (%)	Sulfur (%)	Kcal/kg	BTU/lb	MAFBTU
NSW-37	66.5	6.35	7.39	0.90	6,927	12,466	14,446
NSW-36	17.5	4.90	7.90	0.82	7,037	12,663	14,520
NSW-35	107.8	5.36	6.13	0.59	7,222	12,997	14,682
NSW-38	30.9	9.66	11.13	0.81	6,388	11,496	14,499
Wtd. Avg.	**55.7**	**6.22**	**7.34**	**0.73**	**7,003**	**12,604**	**14,574**

A summary of the upper seam coals for the West Field is presented in Table 18.5. The upper seam coals in the West Field have ash values comparable to the upper seams in the East Field. Sulphur content is higher in the West Field at 1.37% compared to 1.0% sulphur for upper seams in the East Field. Heating values for the upper seams are significantly higher compared to the East Field at 6,266 Kcal/kg, an increase of approximately 400 Kcal/kg.

Table 18.5
Raw Coal Quality, West Field, Upper Seams

		As Received Quality Basis					
Hole Id	Thick (m)	Moisture (%)	Ash (%)	Sulfur (%)	Kcal/kg	BTU/lb	MAFBTU
NSW-40	50.5	5.85	16.62	1.53	6,242	11,233	14,477
NSW-41	49.9	5.68	20.01	1.24	5,960	10,726	14,288
NSW-44	31.0	7.30	14.58	1.52	6,262	11,270	14,413
NSW-50	65.1	5.21	14.19	0.99	6,578	11,838	14,667
NSW-55	60.4	5.61	16.63	1.42	6,244	11,238	14,420
NSW-56	55.1	6.22	16.00	1.54	6,252	11,251	14,445
NSW-57	37.8	6.26	16.23	1.50	6,219	11,193	14,424
Wtd. Avg.	**50.0**	**5.90**	**16.34**	**1.37**	**6,266**	**11,276**	**14,459**

Proximate analyses of cuttings from 15 reverse circulation holes have been performed by the Mining Institute in Ulaanbaatar and are presented in Table 18.6. The nature and method of collecting coal samples from reverse circulation drilling typically results in a lower quality sample. Cuttings typically are subjected to moisture loss and out-of-seam dilution.

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Table 18.6
Nariin Sukhait Property
Raw Coal Quality Reverse Circulation Drilling

						PROXIMATE ANALYSIS						
						Wetness AP	Wetness ADB	Ash DB	Volatility ADB	Sulfur ADB	Caloricity POB	SPECIFIC GRAVITY
Hole #	From	To	Thickness	Seam #	Sub-seam #							
NS -21	147.0	153.3	6.3	5	5	17.80	1.00	9.90	37.10	0.99	5505	0.90
	154.5	164.3	9.8	5	5	14.20	1.00	12.80	35.70	1.03	5666	1.04
NS -24	62.7	64.9	2.2	10	1010	10.90	1.10	12.40	38.00	0.95	6116	1.25
	64.9	70.4	5.5	10	10	14.90	1.20	11.40	36.10	0.65	5807	1.07
	99.8	102.9	3.1	9	9	5.70	0.70	29.00	31.40	0.35	6169	0.89
	103.1	107.2	4.1	9	9	13.80	1.00	14.90	33.60	0.40	5589	1.09
NS-30R	18.0	20.0	2.0	8	8	7.00	1.20	20.20	38.60	0.53	5684	1.29
NSW-19R	82.0	96.0	14.0	10	10	3.90	1.70	18.60	40.30	1.15	5960	1.26
	135.0	137.0	2.0	9	990	2.80	1.80	11.80	38.30	1.05	6732	1.21
	164.0	180.0	16.0	9	950	3.90	1.70	16.50	38.40	1.18	6267	1.22
	184.0	210.0	26.0	9	940	2.80	1.50	15.70	38.70	1.09	6253	1.27
	17.0	26.0	9.0	10	1030	5.40	1.90	42.00	49.50	1.24	3626	1.66
	36.0	40.0	4.0	10	1020	5.10	2.00	32.90	43.80	0.93	4455	1.47
	43.0	53.0	10.0	10	10	3.80	2.00	24.70	41.90	0.81	5477	1.38
	59.0	60.0	1.0	9	998	3.90	1.80	44.40	46.60	0.95	3464	1.64
	63.0	67.0	4.0	9	996	3.70	1.70	27.60	34.30	1.28	5060	1.19
	93.0	94.0	1.0	9	990	3.20	1.80	19.30	36.80	1.47	5842	1.29
NSW-20R	98.0	107.0	9.0	9	980	3.80	1.90	12.50	40.10	1.98	6272	1.30
	113.0	114.0	1.0	9	970	3.00	1.70	17.00	40.40	1.63	6078	1.28
	116.0	118.0	2.0	9	960	3.70	1.70	13.10	39.80	1.48	6365	1.26
	123.0	124.0	1.0	9	950	4.90	1.90	15.40	38.30	1.84	6023	1.28
	132.0	144.0	12.0	9	940	3.50	1.90	9.50	39.80	1.36	6826	1.09
	153.0	156.0	3.0	9	9	3.20	1.80	21.50	38.80	1.32	5579	1.32
	172.0	179.0	7.0	8	8	5.40	1.80	10.30	37.70	1.53	6568	1.23
	57.0	60.0	3.0	10	1030	3.20	1.10	52.40	48.90	1.32	3070	1.78
	63.0	72.0	9.0	10	10	3.20	1.40	29.00	40.80	1.12	5018	1.51
NSW-24	101.0	107.0	6.0	9	980	4.40	1.60	16.10	39.00	1.44	6026	1.36
	109.0	112.0	3.0	9	970	3.20	1.60	16.20	39.30	2.04	6102	1.11
	112.0	113.0	1.0	9	960	2.90	0.90	28.60	43.30	1.37	5071	1.51
	11.0	14.0	3.0	11	11	5.20	1.80	53.40	46.20	0.73	2816	1.68
	58.0	59.0	1.0	10	1030	3.80	2.00	32.80	42.60	1.20	5096	1.46
	72.0	75.0	3.0	10	10	2.90	1.60	32.70	43.30	0.88	5026	1.52
	75.0	78.0	3.0	10	10	2.80	1.70	30.80	43.60	0.64	4850	1.20
NSW-25R	84.0	86.0	2.0	9	998	3.50	1.50	40.90	45.90	0.85	3871	1.48
	89.0	94.0	5.0	9	996	3.50	1.60	18.00	41.50	1.19	5905	1.31

122.0	127.0	5.0	9	980	4.70	1.80	18.30	39.30	1.37	5790	1.29
129.0	136.0	7.0	9	970	3.60	1.80	15.10	38.50	0.15	6369	1.33

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Table 18.6
Nariin Sukhait Property
Raw Coal Quality Reverse Circulation Drilling

						PROXIMATE ANALYSIS						
						Wetness	Wetness	Ash	Volatility	Sulfur	Caloricity	SPECIFIC
				Seam	Sub-seam							
Hole #	From	To	Thickness	#	#	AP	ADB	DB	ADB	ADB	POB	GRAVITY
	42.0	46.0	4.0	10	1040	4.40	1.80	17.30	42.30	1.23	5781	1.35
NSW-26R	54.0	55.0	1.0	10	1030	7.90	1.50	30.30	45.90	2.12	4193	1.45
	15.0	20.0	5.0	10	1050	5.40	1.60	40.70	42.60	1.23	3767	1.61
	26.0	29.0	3.0	10	1040	4.30	1.70	41.00	44.30	1.10	3903	1.33
	31.0	33.0	2.0	10	1030	5.20	2.00	39.60	42.90	1.43	3928	1.51
	34.0	38.0	4.0	10	1030	5.90	2.10	25.70	41.70	0.63	4954	1.45
	65.0	66.0	1.0	10	1020	3.70	1.70	55.70	55.30	1.06	2771	1.62
	69.0	74.0	5.0	10	10	6.30	1.90	24.00	42.00	0.95	5214	1.40
NSW-28R	74.0	76.0	2.0	10	10	6.80	1.90	21.30	39.50	1.18	5416	1.36
	79.0	82.0	3.0	9	998	6.00	2.00	12.20	37.90	1.04	6264	1.10
	88.0	89.0	1.0	9	996	3.50	1.90	22.90	43.80	1.49	5594	1.29
	93.0	94.0	1.0	9	990	5.20	1.90	23.00	40.20	1.33	5471	1.37
	102.0	111.0	9.0	9	980	4.00	2.00	12.20	39.60	1.08	6487	1.26
	111.0	115.0	4.0	9	980	3.90	2.00	12.10	39.00	1.07	6536	1.24
	3.0	4.0	1.0	10	1030	23.20	6.00	27.40	44.20	0.48	2728.0	1.52
	5.0	8.0	3.0	10	1030	6.00	2.70	17.60	40.00	0.52	5931	1.13
	31.0	32.0	1.0	10	1020	3.40	2.20	14.70	42.10	1.29	6243	1.23
	44.0	53.0	9.0	10	10	4.20	2.20	12.10	38.00	1.32	6416	1.24
	55.0	58.0	3.0	9	998	3.70	2.20	13.00	39.30	1.11	6284	1.28
NSW-29R	65.0	69.0	4.0	9	996	4.20	2.20	9.20	38.30	1.05	6731	1.23
	84.0	90.0	6.0	9	980	3.90	2.00	7.90	38.90	0.75	6783	1.18
	92.0	96.0	4.0	9	970	3.60	2.00	11.40	37.70	1.25	6519	1.09
	102.0	104.0	2.0	9	960	4.20	2.30	6.40	34.80	1.03	7068	1.23
	106.0	107.0	1.0	9	950	3.20	1.80	26.40	38.40	0.97	5415	1.32
	114.0	115.0	1.0	9	942	3.80	2.00	15.80	39.40	1.25	6304	1.33
	20.0	40.0	20.0	11	11	5.10	1.90	27.40	42.00	1.04	4906	1.39
	67.0	68.0	1.0	10	1040	3.70	2.00	16.80	36.80	0.67	6060	1.10
	72.0	76.0	4.0	10	1030	3.20	1.60	22.30	40.10	0.59	5447	1.32
	76.0	82.0	6.0	10	1030	3.50	1.80	11.30	39.50	0.67	6544	1.20
NSW-31R	84.0	87.0	3.0	10	1020	2.90	1.60	27.80	41.00	0.51	5167	1.33
	87.0	91.0	4.0	10	1020	3.30	1.90	15.70	41.10	0.80	6099	1.29
	91.0	94.0	3.0	10	1010	3.10	1.70	19.50	42.50	1.01	5827	1.37
	95.0	101.0	6.0	10	10	4.30	1.60	14.10	39.10	0.78	6192	1.11
	140.0	143.0	3.0	9	990	3.20	1.50	25.40	39.20	0.83	5688	1.34

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Table 18.6
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						PROXIMATE ANALYSIS						
						Wetness	Wetness	Ash	Volatility	Sulfur	Caloricity	SPECIFIC
				Seam	Sub-seam							
Hole #	From	To	Thickness	#	#	AP	ADB	DB	ADB	ADB	POB	GRAVITY
	150.0	152.0	2.0	9	980	3.30	1.40	21.80	35.60	1.36	5782	1.37
	156.0	160.0	4.0	9	970	2.80	1.60	20.20	38.60	0.97	5890	1.31
	163.0	168.0	5.0	9	960	4.60	1.60	12.30	36.50	1.19	6422	1.07
NSW-31R	174.0	177.0	3.0	9	950	5.20	1.40	17.20	38.40	1.03	6217	1.26
	180.0	182.0	2.0	9	950	2.60	1.30	22.70	38.60	0.53	5919	1.25
	186.0	188.0	2.0	9	942	3.60	1.30	40.90	40.20	0.81	4529	1.43
	192.0	201.0	9.0	9	940	3.90	1.70	11.70	38.20	0.37	6523	1.27
	16.0	17.0	1.0	10	1040	3.30	1.20	48.40	56.30	0.57	2980	1.87
	48.0	52.0	4.0	10	1030	4.40	1.80	23.10	41.00	0.51	5349	1.41
	56.0	62.0	6.0	10	1030	3.50	1.80	33.70	42.90	0.71	4634	1.25
	69.0	74.0	5.0	10	1020	3.50	1.70	34.40	42.90	0.86	4646	1.49
	76.0	83.0	7.0	10	10	4.10	2.00	14.60	39.40	1.10	6332	1.32
	114.0	120.0	6.0	9	980	3.50	1.80	11.80	38.00	1.26	6588	1.28
NSW-32R	124.0	142.0	18.0	9	960	3.40	1.80	18.20	38.60	0.80	6214	1.11
	150.0	155.0	5.0	9	940	4.90	1.80	23.80	40.10	1.22	5362	1.45
	156.0	165.0	9.0	9	940	3.30	1.80	11.30	37.90	1.09	6608	1.33
	165.0	170.0	5.0	9	940	2.90	1.90	9.90	38.20	1.10	6822	1.27
	180.0	188.0	8.0	8	8	2.60	1.70	19.80	38.70	1.22	5943	1.39
	189.0	192.0	3.0	7	7	2.20	1.40	28.80	40.00	0.69	5193	1.38
	19.0	21.0	2.0	9	990	5.70	1.90	27.80	39.00	1.26	4999	1.40
	24.0	30.0	6.0	9	980	6.50	2.00	10.60	38.80	0.97	6267	1.11
NSW-33R	30.0	41.0	11.0	9	970	4.50	1.70	22.80	40.70	1.01	5519	1.34
	48.0	62.0	14.0	9	940	3.90	1.90	13.10	34.60	1.09	6563	1.20
	83.0	88.0	5.0	8	8	4.30	1.80	16.90	37.50	1.16	6263	1.28
	6.0	8.0	2.0	10	10	9.50	4.40	13.00	36.90	1.05	5940	1.17
	54.0	55.0	1.0	9	990	4.80	2.20	5.90	39.60	0.71	6897	1.28
	70.0	74.0	4.0	9	980	2.60	2.10	10.30	38.70	0.71	6634	1.29
NSW-34R	81.0	84.0	3.0	9	980	3.80	1.90	20.50	40.40	0.48	5748	1.16
	87.0	90.0	3.0	9	980	4.00	1.90	7.50	37.90	1.00	6821	1.42
	113.0	136.0	23.0	9	940	4.30	1.60	22.60	46.40	0.65	5360	1.23
	36.0	41.0	5.0	10	1030	3.42	1.81	9.62	39.64	0.48	6765	1.11
	41.0	45.0	4.0	10	1030	6.75	1.71	16.57	41.76	0.41	5925	1.26
	46.0	47.0	1.0	10	1030	2.74	1.56	23.61	47.02	0.77	5414	1.38
	48.0	54.0	6.0	10	1030	3.06	1.76	16.62	39.62	0.34	6252	1.35
NSW-47R	54.0	60.0	6.0	10	1030	3.16	1.75	17.09	39.92	0.78	6181	1.28
	63.0	69.0	6.0	10	1020	4.23	1.55	20.74	41.89	0.78	5835	1.31
	70.0	72.0	2.0	10	1010	3.21	1.65	11.67	41.31	0.81	6806	1.25

72.0	76.0	4.0	10	1010	2.87	1.61	39.92	44.07	0.38	4418	1.52

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Table 18.6
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Raw Coal Quality Reverse Circulation Drilling

						PROXIMATE ANALYSIS						
						Wetness	Wetness	Ash	Volatility	Sulfur	Caloricity	SPECIFIC
				Seam	Sub-seam							
Hole #	From	To	Thickness	#	#	AP	ADB	DB	ADB	ADB	POB	GRAVITY
	78.0	81.0	3.0	10	10	4.46	1.67	19.84	40.37	1.01	5906	1.09
	81.0	89.0	8.0	10	10	5.14	1.60	15.73	40.44	0.77	6278	1.29
	89.0	92.0	3.0	10	10	8.26	1.78	10.89	40.64	0.68	6336	1.26
	126.0	131.0	5.0	9	990	2.93	1.63	9.65	37.11	1.15	6862	1.19
	138.0	141.0	3.0	9	980	2.50	1.33	23.52	41.69	0.65	5734	1.34
	142.0	147.0	5.0	9	980	3.18	1.49	7.31	35.28	1.22	7092	1.24
	147.0	155.0	8.0	9	970	3.09	1.44	10.15	38.94	0.79	6860	1.25
	156.0	162.0	6.0	9	960	2.70	1.70	7.82	37.33	0.89	7247	1.19
	163.0	166.0	3.0	9	950	2.61	1.51	15.94	40.37	0.65	6465	1.13
NSW-47R	168.0	169.0	1.0	9	950	5.65	1.44	20.18	43.91	0.72	5854	1.02
	172.0	175.0	3.0	9	942	4.13	1.62	16.33	40.25	0.55	6275	1.14
	175.0	184.0	9.0	9	940	2.86	1.65	7.41	37.43	1.67	7087	1.24
	184.0	186.0	2.0	9	940	2.39	1.59	11.13	37.90	0.57	6998	1.15
	186.0	190.0	4.0	9	940	2.64	2.12	7.38	36.12	0.58	7176	1.32
	190.0	195.0	5.0	9	940	3.38	1.90	8.04	39.11	0.52	7245	1.26
	202.0	203.0	1.0	9	9	2.32	2.02	19.48	37.58	0.47	6166	1.30
	205.0	208.0	3.0	8	810	2.35	1.60	27.17	37.18	0.65	5418	1.31
	210.0	212.0	2.0	8	810	3.34	1.53	20.42	38.70	0.41	5927	1.11
	220.0	225.0	5.0	8	8	2.47	1.39	30.43	38.97	0.90	5254	1.38

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For this reason, quality results from reverse circulation drilling have not been incorporated with the quality analyses from core drilling. These reverse circulation data are collected and tested primarily to be used as a guide in a reconnaissance program, to target areas for core drilling.

18.2 Optimized Qualities

In a likely mining scenario, portions of the coal seams may be selectively mined to achieve an improved overall coal product. Table 18.7 presents coal quality of core hole data, optimized to a logical mineable horizon to improve coal quality characteristics.

The optimized quality presented in Table 18.7 demonstrates that potential improvements can be realized on the upper seams by selective mining that will yield a high quality thermal coal. Several drill hole intercepts in the No. 5 Seam display low ash, low sulphur, and high caloric content that may be suitable for coking coal.

18.3 Washability and Metallurgical Testing

To date, washability and metallurgical tests have been completed for samples from eight core holes. Washability results are presented in Table 18.8. Based on the initial tests, upper seam coals show significant improvements with decreased ash content, decreased sulphur content and increased heating values at specific gravities of 1.4 and 1.5 g/cm^3 with product yields in the range 65 to 70%.

Metallurgical tests and rank calculations are presented in Tables 18.9 and 18.10. For comparison, a grab sample collected from the MAK East Pit, NS-BS-01, is presented with the core hole samples. Initial metallurgical tests are disappointing in that only one sample, NS-13, exhibits characteristics that may be suitable for coke. These results are influenced by sample composite intervals being selected before proximate and thermal characteristics had been determined. Ash content on the 1.4 float fraction is excessive in all but one sample (NS-BS-1), ranging from approximately 9.7 to 17.6%. The Free Swelling Index numbers vary from 1 to 2 with the core hole samples, with the exception of NS-13 that has a FSI index of 7.5. Rank calculations show all the samples with the exception of NS-14 to be high volatile bituminous coal. NS-14 represents a sample interval located close to the surface and is largely affected by oxidation.

In addition to the above described metallurgical testing that was conducted on composite intervals, several incremental samples were tested for FSI. Data from these tests are presented as graphs in the following Figures 18.3 and 18.4. Though these data are not definitive, the higher values in the 5 Seam South Field do represent the potential for identifying some coal benches with coking properties.

There are currently samples from 23 core holes still undergoing washability and metallurgical tests.

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Table 18.7
Nariin Sukhait Property,Mongolia
Optimized Coal Quality

Drill Hole	Seam	In-Place Optimized	Thickness	Moisture	Ash	Sulfur	Kcal/kg	ASG	MMF* Kcal/kg	MAF** Kcal/kg
NS-09	10	In-Place	6.20	12.93	20.38	0.66	5360	1.42	6711	8023
		Optimized	4.00	13.57	13.42	0.68	5923	1.36	6834	8108
NS-09	9	In-Place	6.30	11.26	20.71	0.45	5418	1.46	6818	7947
		Optimized	4.40	11.89	17.83	0.45	5760	1.42	7008	8194
NS-09	8	In-Place	3.50	12.98	17.44	0.64	5738	1.42	6951	8247
		Optimized	3.50	12.98	17.44	0.64	5738	1.42	6951	8247
NS-12	10	In-Place	3.30	17.21	17.62	0.67	5140	1.41	6239	7886
		Optimized	3.30	17.21	17.62	0.67	5140	1.41	6239	7886
NS-14	9	In-Place	11.85	21.81	27.04	0.43	3773	1.49	5157	7353
		Optimized	8.95	21.09	25.61	0.51	4006	1.47	5383	7510
NS-16	5	In-Place	24.10	12.76	19.80	1.10	5372	1.43	6545	7788
		Optimized	22.90	13.33	15.39	0.83	5740	1.38	6783	8047
NS-18	5	In-Place	128.60	9.86	15.04	1.32	6100	1.38	7155	8101
		Optimized	116.50	9.96	12.95	1.26	6281	1.36	7206	8140
NS-21	5	In-Place	16.10	15.49	9.97	0.87	4789	0.99	5323	6295
		Optimized	16.10	15.49	9.97	0.87	4789	0.99	5323	6295
NS-22	5	In-Place	61.65	6.85	11.15	1.29	6662	1.37	7489	8120
		Optimized	48.03	6.83	9.26	1.08	6826	1.35	7517	8132
NS-23	5	In-Place	84.10	6.78	14.58	1.83	6311	1.53	7288	7935
		Optimized	66.70	6.48	9.03	1.55	6873	1.36	7554	8134
NS-29	5	In-Place	60.35	10.82	10.64	0.85	6372	1.41	7105	8015
		Optimized	56.60	10.68	9.45	0.85	6493	1.41	7163	8002
NS-32	5	In-Place	28.35	7.86	18.50	1.23	5820	1.44	6956	7733
		Optimized	24.55	8.27	12.36	1.21	6321	1.38	7213	7963
NS-33	9	In-Place	6.90	6.85	20.71	0.63	5753	1.42	7127	7824
		Optimized	2.35	7.78	9.22	0.50	6707	1.35	7383	8077
NS-33	8	In-Place	4.80	4.72	19.81	0.83	5919	1.47	7367	7821
		Optimized	3.60	5.26	13.57	0.88	6434	1.41	7447	7926
NS-34	9	In-Place	57.60	8.36	20.33	0.94	5640	1.44	6988	7828

		Optimized	38.05	8.48	11.31	0.84	6420	1.36	7239	8004
NS-34	10	In-Place	6.30	5.15	19.37	1.54	5807	1.47	7205	7693
		Optimized	5.40	5.48	17.54	1.64	5924	1.45	7185	7696
NS-35	10	In-Place	27.27	9.59	14.27	1.37	6110	1.38	7128	8021
		Optimized	19.70	10.26	11.55	1.48	6315	1.36	7138	8077
NSW-35	5	In-Place	112.30	5.41	6.17	0.59	7218	1.33	7693	8162
		Optimized	110.60	5.45	6.08	0.59	7223	1.33	7691	8164
NSW-36	8	In-Place	18.05	4.82	8.18	0.81	7022	1.35	7644	8069
		Optimized	17.95	4.83	7.88	0.81	7046	1.35	7647	8072

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Table 18.7
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Optimized Coal Quality

Drill Hole	Seam	In-Place Optimized	Thickness	Moisture	Ash	Sulfur	Kcal/kg	ASG	MMF* Kcal/kg	MAF** Kcal/kg
NSW-37	5	In-Place	66.60	6.37	7.49	0.91	6919	1.34	7475	8029
		Optimized	61.15	6.27	6.65	0.85	6993	1.33	7489	8028
NSW-38	5	In-Place	35.50	9.60	11.98	0.84	6322	1.36	7171	8052
		Optimized	29.60	9.99	8.23	0.70	6622	1.33	7215	8096
NSW-40	8	In-Place	9.10	4.48	22.44	1.16	5912	1.47	7615	8083
		Optimized	6.10	4.41	22.05	1.26	5964	1.48	7641	8102
NSW-40	9	In-Place	28.50	4.90	16.31	1.57	6372	1.41	7607	8079
		Optimized	21.30	5.39	12.82	1.63	6636	1.29	7610	8109
NSW-40	10	In-Place	15.25	8.36	15.38	1.64	6071	1.37	7169	7957
		Optimized	12.70	8.04	14.00	1.62	6226	1.36	7240	7985
NSW-41	9	In-Place	34.40	5.05	20.36	1.35	8016	1.44	10355	7859
		Optimized	20.05	5.50	11.32	1.48	8205	1.35	9269	7842
NSW-41	10	In-Place	20.90	7.16	34.01	0.88	7278	1.58	11895	7872
		Optimized	9.00	5.70	12.53	0.83	8055	1.36	9247	7834
NSW-44	11	In-Place	31.40	7.30	14.81	1.52	6202	1.39	7323	6245
		Optimized	25.20	7.36	12.25	1.47	6248	1.38	7137	6468
NSW-50	8	In-Place	3.30	5.54	19.65	1.17	6193	1.44	7704	8277
		Optimized	0.60	4.44	12.91	1.53	6828	1.34	7840	8261
NSW-50	9	In-Place	41.50	4.79	13.45	0.91	6680	1.37	7699	8152
		Optimized	33.30	4.86	10.13	0.91	6996	1.33	7778	8225
NSW-50	10	In-Place	20.80	6.00	16.40	1.10	6291	1.40	7510	8100
		Optimized	16.50	5.82	12.70	1.15	6623	1.36	7581	8125
NSW-55	9	In-Place	27.80	4.97	17.32	1.46	6258	1.41	7539	8031
		Optimized	16.50	4.80	11.80	1.43	6772	1.36	7677	8119
NSW-55	10	In-Place	21.00	6.27	20.09	1.49	5814	1.46	7257	7882
		Optimized	12.60	5.99	14.81	1.43	6306	1.42	7397	7958
NSW-56	9	In-Place	49.95	5.94	15.80	1.59	6300	1.40	7468	8041
		Optimized	41.70	5.88	13.19	1.61	6538	1.37	7527	8075
NSW-56	10	In-Place	6.90	8.53	20.05	1.19	5672	1.45	7067	7922

		Optimized	3.50	8.67	10.88	0.94	6510	1.35	7308	8091
NSW-57	8	In-Place	7.90	5.24	15.49	1.22	6496	1.38	7684	8193
		Optimized	5.20	5.23	12.08	1.29	6793	1.35	7727	8216
NSW-57	9	In-Place	22.80	5.72	16.08	1.69	6271	1.41	7466	8014
		Optimized	17.45	5.76	13.61	1.80	6493	1.39	7514	8050
NSW-57	10	In-Place	9.60	8.32	17.74	1.39	5820	1.41	7059	7857
		Optimized	7.20	7.68	15.23	1.41	6149	1.38	7254	7976

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Table 18.8
Nariin Sukhait Property, Mongolia
Float & Sink Analysis (Dry Basis)

e	Interval	Specific Gravity Sink	Float	Fraction Analysis (Dry Basis) %Wt.	%Ash	%Sul	Btu/lb	Cumulative Recovery (Float) %Wt.	%Ash	%Sul	Btu/lb	Cumulative Reject (Si %Wt.	%Ash	%Sul	B
			1.4	45.30	11.43	0.60	13,090	45.30	11.43	0.60	13,090	100.00	22.13	0.68	1
	74.6-80.0,87.7-	1.4	1.5	23.40	16.69	0.67	12,198	68.70	13.22	0.62	12,786	54.70	31.00	0.75	
	94.0&124.1-127.6	1.5	1.6	14.60	23.48	0.77	11,068	83.30	15.02	0.65	12,485	31.30	41.69	0.80	
		1.6		16.70	57.61	0.83	5,063	100.00	22.13	0.68	11,246	16.70	57.61	0.83	
			1.4	77.20	15.65	0.72	12,164	77.20	15.65	0.72	12,164	100.00	22.79	0.79	1
		1.4	1.5	5.30	23.74	0.88	10,726	82.50	16.17	0.73	12,072	22.80	46.98	1.03	
	70.0 - 73.3	1.5	1.6	3.30	33.71	1.05	8,983	85.80	16.84	0.74	11,953	17.50	54.01	1.07	
		1.6		14.20	58.73	1.08	4,747	100.00	22.79	0.79	10,930	14.20	58.73	1.08	
			1.4	80.70	10.38	0.57	13,133	80.70	10.38	0.57	13,133	100.00	13.41	0.70	1
		1.4	1.5	6.00	17.11	0.79	11,516	86.70	10.85	0.59	13,021	19.30	26.08	1.23	
	128.6 - 132.8	1.5	1.6	4.50	21.99	0.87	10,243	91.20	11.40	0.60	12,884	13.30	30.12	1.43	
		1.6		8.80	34.28	1.71	6,856	100.00	13.41	0.70	12,354	8.80	34.28	1.71	
			1.4	54.10	15.80	0.56	11,095	54.10	15.80	0.56	11,095	100.00	34.79	0.52	
		1.4	1.5	8.70	25.44	0.72	9,817	62.80	17.14	0.58	10,918	45.90	57.17	0.48	
	0.50 - 12.35	1.5	1.6	7.60	34.18	0.53	8,488	70.40	18.98	0.58	10,656	37.20	64.59	0.43	
		1.6		29.60	72.40	0.40	3,093	100.00	34.79	0.52	8,417	29.60	72.40	0.40	
			1.4	93.20	9.71	0.92	13,336	93.20	9.71	0.92	13,336	100.00	11.18	1.01	1
		1.4	1.5	2.80	21.69	1.47	11,242	96.00	10.06	0.94	13,275	6.80	31.37	2.27	
	99.1 - 108.8	1.5	1.6	1.70	31.39	2.45	9,150	97.70	10.43	0.96	13,203	4.00	38.14	2.84	
		1.6		2.30	43.13	3.12	6,698	100.00	11.18	1.01	13,054	2.30	43.13	3.12	
			1.4	71.00	14.76	0.83	12,478	71.00	14.76	0.83	12,478	100.00	21.40	1.03	1
	109.4 - 117.7; 118.6 -	1.4	1.5	9	24.13	0.94	10,727	80.00	15.81	0.84	12,281	29.00	37.67	1.51	
	123.2	1.5	1.6	8.3	33.04	0.93	9,143	88.30	17.43	0.85	11,986	20.00	43.76	1.77	
		1.6		11.7	51.37	2.36	5,731	100.00	21.40	1.03	11,254	11.70	51.37	2.36	

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Table 18.8
Nariin Sukhait Property, Mongolia
Float & Sink Analysis (Dry Basis)

ample	Interval	Specific Gravity		Fraction Analysis (Dry Basis)				Cumulative Recovery (Float)				Cumulative Reject (Sink)			
		Sink	Float	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/l
S-18	48.6 - 67.0		1.4	54.50	17.57	1.52	11,895	54.50	17.57	1.52	11,895	100.00	26.02	1.90	10,43
		1.4	1.5	23.80	26.41	1.98	10,463	78.30	20.26	1.66	11,460	45.50	36.14	2.37	8,67
		1.5	1.6	7.90	37.63	2.28	8,473	86.20	21.85	1.72	11,185	21.70	46.82	2.79	6,71
		1.6		13.80	52.08	3.08	5,713	100.00	26.02	1.90	10,431	13.80	52.08	3.08	5,71
S-18	67.7 - 121.0		1.4	83.80	12.11	1.25	12,913	83.80	12.11	1.25	12,913	100.00	15.57	1.52	12,29
		1.4	1.5	8.30	24.85	1.89	10,608	92.10	13.26	1.31	12,705	16.20	33.47	2.92	9,08
		1.5	1.6	3.10	28.42	2.53	10,027	95.20	13.75	1.35	12,618	7.90	42.53	3.99	7,49
		1.6		4.80	51.65	4.94	5,856	100.00	15.57	1.52	12,293	4.80	51.65	4.94	5,85
S-18	121.0 - 177.2		1.4	90.50	10.61	0.97	13,187	90.50	10.61	0.97	13,187	100.00	12.27	1.13	12,85
		1.4	1.5	4.70	19.05	1.53	11,466	95.20	11.03	1.00	13,102	9.50	28.08	2.61	9,64
		1.5	1.6	1.70	26.61	1.97	9,618	96.90	11.30	1.01	13,041	4.80	36.93	3.68	7,86
		1.6		3.10	42.59	4.61	6,900	100.00	12.27	1.13	12,851	3.10	42.59	4.61	6,90
S-20	191.2 - 196.6		1.4	64.20	15.85	0.94	12,168	64.20	15.85	0.94	12,168	100.00	22.06	1.12	11,07
		1.4	1.5	11.20	18.21	0.99	11,596	75.40	16.20	0.95	12,083	35.80	33.21	1.44	9,12
		1.5	1.6	3.40	25.37	1.40	10,346	78.80	16.60	0.97	12,008	24.60	40.04	1.65	7,99
		1.6		21.20	42.39	1.69	7,619	100.00	22.06	1.12	11,078	21.20	42.39	1.69	7,61
S-22	166.0 - 178.6		1.4	78.50	8.24	1.68	13,612	78.50	8.24	1.68	13,612	100.00	11.24	2.36	13,01
		1.4	1.5	9.30	14.24	2.95	12,414	87.80	8.88	1.81	13,485	21.50	22.21	4.84	10,83
		1.5	1.6	5.10	21.29	4.56	10,923	92.90	9.56	1.97	13,344	12.20	28.29	6.28	9,62
		1.6		7.10	33.31	7.51	8,699	100.00	11.24	2.36	13,015	7.10	33.31	7.51	8,69
S-22	166.0 - 202.6		1.4	84.00	6.12	1.21	13,971	84.00	6.12	1.21	13,971	100.00	8.69	1.57	13,39
		1.4	1.5	7.30	17.74	2.53	11,517	91.30	7.05	1.32	13,775	16.00	22.17	3.49	10,38
		1.5	1.6	3.20	17.72	3.19	11,429	94.50	7.41	1.38	13,695	8.70	25.88	4.29	9,43
		1.6		5.50	30.63	4.93	8,279	100.00	8.69	1.57	13,397	5.50	30.63	4.93	8,27

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Table 18.8
Nariin Sukhait Property, Mongolia
Float & Sink Analysis (Dry Basis)

ample	Interval	Specific Gravity		Fraction Analysis (Dry Basis)				Cumulative Recovery (Float)				Cumulative Reject (Sink)			
		Sink	Float	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/l
S-22	133.4 - 143.9		1.4	72.50	7.42	0.78	13,502	72.50	7.42	0.78	13,502	100.00	15.20	0.84	12,19
		1.4	1.5	11.20	17.55	0.97	11,598	83.70	8.78	0.81	13,247	27.50	35.71	0.99	8,73
		1.5	1.6	3.60	26.99	1.40	9,913	87.30	9.53	0.83	13,110	16.30	48.18	1.00	6,76
		1.6		12.70	54.19	0.89	5,869	100.00	15.20	0.84	12,190	12.70	54.19	0.89	5,86
S-22	144.8 - 165.8		1.4	81.20	8.90	1.11	13,447	81.20	8.90	1.11	13,447	100.00	13.11	1.19	12,69
		1.4	1.5	5.80	14.83	1.28	12,442	87.00	9.30	1.12	13,380	18.80	31.28	1.53	9,42
		1.5	1.6	3.30	17.41	1.25	11,636	90.30	9.59	1.13	13,316	13.00	38.62	1.65	8,07
		1.6		9.70	45.83	1.78	6,867	100.00	13.11	1.19	12,691	9.70	45.83	1.78	6,86
S-23	141.3 - 155.8		1.4	69.40	11.00	1.76	13,082	69.40	11.00	1.76	13,082	100.00	16.66	2.34	11,97
		1.4	1.5	9.60	12.40	2.08	12,713	79.00	11.17	1.80	13,037	30.60	29.51	3.64	9,45
		1.5	1.6	7.50	21.55	2.90	10,931	86.50	12.07	1.89	12,855	21.00	37.33	4.36	7,96
		1.6		13.50	46.10	5.17	6,319	100.00	16.66	2.34	11,972	13.50	46.10	5.17	6,31
S-23	156.7 - 204.5		1.4	93.10	8.75	1.39	13,346	93.10	8.75	1.39	13,346	100.00	9.62	1.47	13,16
		1.4	1.5	1.70	12.32	1.64	12,655	94.80	8.81	1.39	13,334	6.90	21.29	2.50	10,65
		1.5	1.6	2.30	18.09	2.25	11,287	97.10	9.03	1.41	13,285	5.20	24.22	2.79	9,99
		1.6		2.90	29.09	3.21	8,977	100.00	9.62	1.47	13,160	2.90	29.09	3.21	8,97
S-29	145.6 - 169.7		1.4	86.40	9.13	0.94	13,349	86.40	9.13	0.94	13,349	100.00	10.85	1.07	13,00
		1.4	1.5	6.50	15.49	1.69	12,162	92.90	9.57	0.99	13,266	13.60	21.75	1.92	10,84
		1.5	1.6	4.50	22.22	1.53	10,721	97.40	10.16	1.02	13,148	7.10	27.48	2.12	9,63
		1.6		2.60	36.58	3.15	7,747	100.00	10.85	1.07	13,008	2.60	36.58	3.15	7,74
S-29	118.6 - 145.1		1.4	84.70	8.98	0.93	13,258	84.70	8.98	0.93	13,258	100.00	11.17	1.09	12,85
		1.4	1.5	4.60	14.86	1.30	12,211	89.30	9.28	0.95	13,204	15.30	23.28	1.95	10,61
		1.5	1.6	6.40	19.34	1.44	11,234	95.70	9.96	0.98	13,072	10.70	26.90	2.23	9,93
		1.6		4.30	38.15	3.40	7,990	100.00	11.17	1.09	12,854	4.30	38.15	3.40	7,99

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Table 18.8
Nariin Sukhait Property, Mongolia
Float & Sink Analysis (Dry Basis)

mple	Interval	Specific Gravity		Fraction Analysis (Dry Basis)				Cumulative Recovery (Float)				Cumulative Reject (Sink)			
		Sink	Float	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/lb	%Wt.	%Ash	%Sul	Btu/
-32	34.0 - 50.1		1.4	77.30	11.17	0.94	12,869	77.30	11.17	0.94	12,869	100.00	15.12	1.28	12,1
		1.4	1.5	11.30	15.59	1.76	11,789	88.60	11.73	1.04	12,731	22.70	28.59	2.44	9,6
		1.5	1.6	4.50	23.70	2.77	10,391	93.10	12.31	1.13	12,618	11.40	41.47	3.12	7,4
		1.6		6.90	53.06	3.34	5,552	100.00	15.12	1.28	12,131	6.90	53.06	3.34	5,5
-32	50.1 - 53.9		1.4	44.90	9.00	1.33	13,345	44.90	9.00	1.33	13,345	100.00	27.01	1.80	10,3
		1.4	1.5	17.10	13.69	2.12	12,494	62.00	10.29	1.55	13,110	55.10	41.69	2.18	7,8
		1.5	1.6	8.30	17.90	2.86	11,640	70.30	11.19	1.70	12,937	38.00	54.29	2.20	5,7
		1.6		29.70	64.46	2.02	4,124	100.00	27.01	1.80	10,319	29.70	64.46	2.02	4,1
-32	54.75 - 62.4		1.4	42.10	9.76	0.70	13,055	42.10	9.76	0.70	13,055	100.00	17.31	2.07	11,8
		1.4	1.5	35.30	15.64	1.04	12,126	77.40	12.44	0.86	12,631	57.90	22.81	3.07	10,8
		1.5	1.6	12.80	23.10	3.03	10,726	90.20	13.95	1.16	12,361	22.60	34.00	6.23	8,9
		1.6		9.80	48.24	10.41	6,641	100.00	17.31	2.07	11,800	9.80	48.24	10.41	6,6
-33	36.0 - 40.95		1.4	47.80	8.39	0.73	13,389	47.80	8.39	0.73	13,389	100.00	25.00	0.92	10,4
		1.4	1.5	12.50	12.27	1.17	12,649	60.30	9.19	0.82	13,236	52.20	40.22	1.09	7,8
		1.5	1.6	5.00	20.33	1.32	11,053	65.30	10.05	0.86	13,068	39.70	49.02	1.07	6,3
		1.6		34.70	53.15	1.03	5,616	100.00	25.00	0.92	10,482	34.70	53.15	1.03	5,6
-34	109.6 - 141.6		1.4	83.60	9.92	0.75	13,192	83.60	9.92	0.75	13,192	100.00	15.28	0.92	12,1
		1.4	1.5	2.10	13.14	0.78	12,460	85.70	10.00	0.75	13,174	16.40	42.59	1.78	6,6
		1.5	1.6	3.40	21.43	1.39	10,597	89.10	10.44	0.78	13,076	14.30	46.92	1.93	5,7
		1.6		10.90	54.87	2.10	4,297	100.00	15.28	0.92	12,119	10.90	54.87	2.10	4,2
-34	142.7 - 149.0		1.4	67.20	9.92	0.69	13,266	67.20	9.92	0.69	13,266	100.00	19.77	1.08	11,4
		1.4	1.5	8.10	19.98	1.25	11,705	75.30	11.00	0.75	13,098	32.80	39.94	1.88	7,7
		1.5	1.6	6.40	30.70	1.37	9,577	81.70	12.55	0.80	12,822	24.70	46.49	2.08	6,3
		1.6		18.30	52.01	2.33	5,273	100.00	19.77	1.08	11,441	18.30	52.01	2.33	5,2
-34	81.7 - 84.7		1.4	42.30	9.07	0.98	13,009	42.30	9.07	0.98	13,009	100.00	19.49	1.22	10,9
		1.4	1.5	19.80	11.88	0.93	12,359	62.10	9.97	0.96	12,802	57.70	27.12	1.40	9,4
		1.5	1.6	15.20	19.84	1.10	10,325	77.30	11.91	0.99	12,315	37.90	35.08	1.65	7,9
		1.6		22.70	45.29	2.01	6,363	100.00	19.49	1.22	10,964	22.70	45.29	2.01	6,3
-34	86.3 - 107.0		1.4	27.70	11.45	0.78	12,912	27.70	11.45	0.78	12,912	100.00	30.59	1.58	9,5
		1.4	1.5	20.50	12.93	0.82	12,582	48.20	12.08	0.80	12,772	72.30	37.92	1.89	8,3
		1.5	1.6	17.10	24.14	1.19	10,555	65.30	15.24	0.90	12,191	51.80	47.81	2.31	6,6
		1.6		34.70	59.47	2.86	4,714	100.00	30.59	1.58	9,597	34.70	59.47	2.86	4,7

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Table 18.9
Narain Sukhait Key Metallurgical Properties

	Seam Interval (m)		Unwashed Composite			Washability at 1.4 Float				Metallurgical Properties		
			Btu/lb Moist, mm-free	Volatiles (MAF)	Rank	Cumulative Recovery	Ash Content	Sulphur Content	Btu/lb		Plasticity	Dilatometer	Mean
er	From	To	(ASTM) Min	(ASTM)	(ASTM) hvB	(%)	(Dry)[1]	(Dry)	(MAF)	FSI	Gieseler DDPM	Dilation (% Max)	Reflec (% O
Range, Min, Max			13,000	20-35	b-lvb	50+	Max-12	Max-1.0	12,600-15,500	4-8	100-10,000	50-200	0.7
	NA	NA	14,255	36.26	hvAb	90.5	5.16	0.61	14,712	4.5	2	-28	
enches)	74.60	127.60	13,721	37.12	hvBb	45.3	11.43	0.60	14,779	1.5	2	-28	
	70.00	73.30	13,456	38.08	hvBb	77.2	15.65	0.72	14,421	1.0	0	-29	
	128.60	**132.80**	**13,778**	**39.43**	**hvBb**	**80.7**	**10.38**	**0.57**	**14,654**	**7.0**	**517**	**+49**	**0**
	0.50	12.35	10,585	41.37	Wxd	54.1	15.80	0.56	13,177			No Test	
	99.10	108.80	13,871	36.53	hvBb	93.2	9.71	0.92	14,770	1.0	4	0.35	
	109.40	123.20	13,551	38.48	hvBb	71.0	14.76	0.83	14,639			Pending	
	48.60	67.00	13,468	40.58	hvBb	54.5	17.57	1.52	14,430	1.0	2	-29	
	67.70	121.00	13,678	37.21	hvBb	83.8	12.11	1.25	14,692	2.0	1	-33	
	121.00	177.20	13,955	35.99	hvBb	90.5	10.61	0.97	14,752	2.0	2	-29	

[1] Ash content may be improved through selective mining techniques and the removal of inferior quality horizons

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Table 18.10
Naraiin Suikhait Coal Quality with Rank Calculations
Actual Data July 14, 2005

Total	EQ	EQ Moisture Basis					Dry Basis					Dmmf	Dmmf			SO3 in
oisture	Moisture	Ash	Volatile	FC	Sulphur	Btu/lb	Ash	Volatile	FC	Sulphur	Btu/lb	FC	Volatiles	MmmF Btu/lb	SO3 in Ash	co (A
2.37	3.80	6.90	33.25	56.06	0.77	13348	7.17	34.56	58.27	0.80	13875	63.74	36.26	**14255**	16.64	1.
12.27	5.14	19.63	23.99	51.23	0.53	9269	20.70	25.29	54.01	0.56	9772	70.07	29.93	**11608**	5.30	1.
17.21	4.50	20.32	30.19	44.99	0.77	10664	21.28	31.61	47.11	0.81	11166	61.92	38.08	**13456**	6.08	1.
10.03	3.90	13.42	33.70	48.98	0.62	11912	13.96	35.07	50.97	0.65	12395	60.57	39.43	**13778**	7.31	0.
21.58	15.10	30.15	24.39	30.36	0.45	7211	35.51	28.73	35.76	0.53	8494	58.63	41.37	**10585**	2.23	0.
14.54	4.00	9.84	32.62	53.54	0.99	12585	10.25	33.98	55.77	1.03	13109	63.47	36.53	**13871**	14.48	1.
12.31	4.40	21.28	30.28	44.03	0.89	10617	22.26	31.67	46.06	0.93	11106	61.52	38.48	**13551**	6.54	1.
9.34	4.49	26.75	30.22	38.54	1.71	9837	28.01	31.64	40.35	1.79	10299	59.42	40.58	**13468**	7.74	2.
10.00	5.05	14.29	31.56	49.11	1.33	11792	15.05	33.23	51.72	1.40	12419	62.79	37.21	**13678**	12.22	1.
10.66	4.17	11.48	31.64	52.70	1.07	12431	11.98	33.02	55.00	1.12	12972	64.01	35.99	**13955**	13.59	1.

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19 MINERAL RESOURCE ESTIMATES

The following is a discussion of the criteria and results obtained for coal resource estimation for the Nariin Sukhait Property. In accordance with NI 43-101 and the CIM Definition Standards, one or more Qualified Persons, employees of Norwest, supervised the data validation and the resource estimation and classification work. The certifications for the Qualified Person(s) are provided in Section 24 of this report.

19.1 Approach

In accordance with National Instrument 43-101, Norwest has used the referenced document, the Canadian Institute of Mining, Metallurgy and Petroleum s CIM Definition Standards on Mineral Resources and Reserves adopted by the CIM Council on November 14, 2004 and referenced the Geological Survey of Canada Paper 88-21 A Standardized Coal Resource/Reserve Reporting System for Canada (GSC Paper 88-21) during the classification, estimation and reporting of coal resources for the Nariin Sukhait Property.

To facilitate the estimation of resources in the Nariin Sukhait Property, Norwest developed geological models for the property using *Minex*® software. The geological models are built from drill hole data as a series of three-dimensional grids or surfaces representing the top and bottom surfaces of the coal seams and interburden layers within a defined area. Key horizons or surfaces were modeled to provide the required inputs for volume estimation. Volumes were converted to tonnage by the application of density values representative of each coal seam to be mined. *Minex* software is developed and marketed by the Surpac Minex Group headquarterd in Perth, W.A. Australia. *Minex* is an internationally recognized geological and mine modeling software system.

19.2 Geologic Modeling Parameters

Gridding Method: Growth Technique Method surrounds real data with local grid nodes and infills the node values by growing out (estimating) from the initial (real) values.

Grid Cell Size: 10 by 10m.

Search Distance: 2,500m.

Grids were calculated to fill the areas of investigation from selected x-y origins and extents. No default or dummy values were used in building grid surfaces.

Topographic grids were developed from drill hole collar elevations.

19.3 Coal Resource Estimation

The term resource is utilized to quantify coal contained in seams occurring within specified limits of thickness and depth from surface. The term resource refers to the in-place inventory of coal that has reasonable prospects for economic extraction . Coal resources are always reported

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as in-place tonnage and not adjusted for mining losses or recovery. However, minimum mineable seam thickness and maximum removable parting thickness are considered.

GSC Paper 88-21 provides two feasibility classes for resources: immediate interest and future interest. Resources of immediate interest are contained in coal seams that have a favourable combination of characteristics and are considered to be of immediate interest for possible exploitation. These resources would not have been the subject of a feasibility study required to classify them as reserves. Resources of future interest are contained in seams which are not of immediate interest for possible exploitation but which could become of interest in the foreseeable future.

Resources are classified as to the assurance of their existence into one of three categories, Measured, Indicated, or Inferred. The category to which a resource is assigned depends on the level of confidence in the geological information available (CIM Definition Standards). GSC Paper 88-21 provides guidance for categorizing various types of coal deposits by levels of assurance. These were considered by the Qualified Persons during the classification of the resources.

The in-place resource within the Nariin Sukhait Property, summarized in Table 19.1, covers three areas within the property for a combined area of 1.8km^2. The in-place resource areas are shown on Figure(s) 19.1, 19.2, and 19.3. These resources include all coal seams intended for mining within the South, East, and West Fields that have been defined to a reasonable level of geologic assurance and with minimum thicknesses consistent with the recommendations of GSC 88-21.

Table 19.1
In-Place Coal Resources Summary
As of August 9, 2005

		In-Place Resources (Tonnes)		
Area	**ASTM Group**	**Measured**	**Indicated**	**Inferred**
South Field	High Volatile Bituminous	9,771,000	8,704,000	9,870,000
East Field		20,007,000	10,862,000	5,086,000
West Field		33,277,000	33,545,000	26,806,000
Total		**116,166,000**		**41,762,000**

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19.4 Quantification Parameters

Minimum seam thickness: 0.6m

Maximum rock parting included: 0.6m

Weathered Zone Exclusion: 5.0m (topography minus 5 meters)

Assurance of Existence (Distance Between Data Points)
Measured Resources: 0-75m
Indicated Resources: 75-150m
Inferred Resources: 150-300m
Speculative Resources: not considered
Maximum Depth: 250m or less than 20:1 ratio

19.5 South Field Resources

All resources identified in the South Field are in the No. 5 Seam. Thirty drill holes define the resource area. Measured plus indicated resources encompass an area of 0.27km^2 (Figure 19.1). Average seam thickness for the No. 5 seam within the resource area is 58.16m. A total of 18.5 Mt of measured and indicated resources have been identified in the South Field.

Table 19.2
South Field In-Place Coal Resources Summary
as Of August 9, 2005

Seam	Seam Thickness (m)	Coal Area (m2)	Specific Gravity (g/cm3)	In-Place Tonnes	Waste Thickness (m)	Waste Volume (m3)	In-place (BCM/Tonne) Incremental	In-place (BCM/Tonne) Cumulative
				Measured				
5	60.80	118,000	1.36	9,771,000	90.40	10,669,000	1.09	1.09
				Indicated				
5	55.20	115,000	1.37	8,704,000	135.80	15,613,000	1.79	1.79
				Inferred				
5	43.30	166,000	1.38	9,870,000	203.00	37,466,000	3.80	3.80
Total Measured plus Indicated				**18,475,000**		**63,748,000**		**3.45**
Total Inferred				**9,870,000**		**37,466,000**		**3.80**

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19.6 East Field Resources

Resources identified in the East Field are contained in the Nos. 8, 9, and 10 Seams. Resources occur in two distinct area having a combined aerial extent of 0.52km^2 (Figure 19.2). Combined coal thickness for the three seams is approximately 15.8m. A total of 30.8 Mt of measured and indicated resources have been identified in the East Field.

19.7 West Field Resources

Resources identified in the West Field are contained in the Nos. 5, 8, 9, 10, and 11 Seams. Resources in the No. 5 Seam occur over an area of approximately 0.3km^2 with an average thickness of 52.5m (Figure 19.3). Upper seams (Nos. 8, 9, and 10) on the southeast limb of the antiform have a combined coal thickness of 4.3m, extending over an area of approximately 0.5km^2 . Upper seams (nos. 8, 9, 10, and 11) on the northwest limb of the antiform have a combined coal thickness of 4.2m, extending over an area of approximately 0.2km^2 . A total of 66.8 Mt of measured and indicated resources have been identified in the West Field.

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Table 19.3
East Field In-Place Coal Resources Summary (000 Tonnes)
as Of August 9, 2005

Seam	SubSeam	Seam Thickness (m)	Coal Area (m2)	Specific Gravity (g/cm3)	In-Place Tonnes	Waste Thickness (m)	Waste Volume (m3)	In-place (BCM/Tonne) Incremental	In-place (BCM/Tonne) Cumulative
				Measured	**Northeast Block**				
10	1020	7.6	25,000	1.41	267,000	99.30	3,193,000	11.96	11.96
10	1010	2.6	79,000	1.49	308,000	4.60	430,000	1.40	6.30
10	10	9.7	100,000	1.40	1,355,000	7.40	783,000	0.58	2.28
9	9	34.4	140,000	1.47	7,086,000	23.00	3,363,000	0.47	0.86
8	810	6.3	61,000	1.41	543,000	15.10	1,017,000	1.87	0.92
8	8	6.8	99,000	1.42	955,000	9.20	964,000	1.01	0.93
SubTotal			**504,000**		**10,514,000**		**9,750,000**		**0.93**
				Indicated	**Northeast Block**				
10	1020	5.1	12,000	1.37	84,000	108.00	3,638,000	43.31	43.31
10	1010	1.9	41,000	1.48	114,000	6.80	706,000	6.19	21.94
10	10	5.5	90,000	1.43	704,000	11.20	1,111,000	1.58	6.05
9	9	31.0	100,000	1.43	4,440,000	18.50	2,121,000	0.48	1.42
8	810	3.2	93,000	1.41	421,000	19.50	2,304,000	5.47	1.71
8	8	5.9	88,000	1.41	733,000	10.10	947,000	1.29	1.67
SubTotal			**424,000**		**6,496,000**		**10,827,000**		**1.67**
				Inferred	**Northeast Block**				
10	1020	1.9	6,000	1.40	16,000	161.00	12,122,000	757.63	757.63
10	1010	0.8	3,000	1.47	4,000	8.00	1,151,000	287.75	663.65
10	10	5.5	83,000	1.45	663,000	17.20	2,212,000	3.34	22.67
9	9	22.6	32,000	1.40	1,015,000	16.30	889,000	0.88	9.64
8	810	1.9	33,000	1.42	89,000	22.00	1,367,000	15.36	9.93
8	8	5.6	33,000	1.42	263,000	16.10	575,000	2.19	8.93
SubTotal			**190,000**		**2,050,000**		**18,316,000**		**8.93**
				Measured	**Southwest Block**				
10	1020	2.8	18,000	1.41	71,000	71.00	1,661,000	23.39	23.39
10	1010	3.5	38,000	1.57	207,000	2.70	116,000	0.56	6.39
10	10	41.4	102,000	1.37	5,771,000	16.40	1,685,000	0.29	0.57
9	9	26.4	80,000	1.59	3,364,000	53.80	4,549,000	1.35	0.85
8	810								0.85
8	8	2.6	22,000		80,000	1.30	29,000	0.36	0.85
SubTotal			**260,000**		**9,493,000**		**8,040,000**		**0.85**
				Indicated	**Southwest Block**				
10	1020	2.2	23,000	1.46	74,000	93.00	3,590,000	48.51	48.51
10	1010	2.8	21,000	1.56	94,000	4.70	228,000	2.43	22.73

10	10	37.0	47,000	1.37	2,381,000	48.10	2,565,000	1.08	2.50
9	9	24.9	44,000	1.59	1,720,000	50.90	3,101,000	1.80	2.22
8	810								2.22
8	8	2.5	27,000	1.44	97,000	0.90	25,000	0.26	2.18
SubTotal			**162,000**		**4,366,000**		**9,509,000**		**2.18**
				Inferred	**Southwest Block**				
10	1020	1.8	67,000	1.42	171,000	115.80	12,132,000	70.95	70.95
10	1010	1.5	9,000	1.56	21,000	7.10	620,000	29.52	66.42
10	10	34.7	39,000	1.35	1,830,000	61.80	4,728,000	2.58	8.64
9	9	18.0	28,000	1.51	762,000	37.10	1,183,000	1.55	6.70
8	810								6.70
8	8	3.2	56,000	1.41	252,000	1.40	77,000	0.31	6.17
SubTotal			**199,000**		**3,036,000**		**18,740,000**		**6.17**
Total	**Measured plus Indicated**				**30,869,000**		**38,126,000**		**1.24**
Total	**Inferred**				**5,086,000**		**37,056,000**		**7.29**

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Table 19.4
Nariin Sukhait Property
West Field In-Place Coal Resources Summary

Seam	SubSeam	Seam Thickness (m)	Coal Area (m2)	Specific Gravity (g/cm3)	In-Place Tonnes	Waste Thickness (m)	Waste Volume (m3)	In-place (BCM/Tonne) Incremental	In-place (BCM/Tonne) Cumulative
				Measured	**Southeast Block**				
10	1050	2.0	11,000	1.40	32,000	32.30	410,000	12.81	12.81
10	1040	1.7	25,000	1.43	61,000	8.10	223,000	3.64	6.79
10	1030	4.6	118,000	1.42	770,000	21.10	2,789,000	3.62	3.97
10	1020	3.6	95,000	1.41	485,000	15.90	1,729,000	3.57	3.82
10	1010	2.1	94,000	1.40	276,000	2.10	252,000	0.91	3.33
10	10	7.8	162,000	1.41	1,784,000	1.50	253,000	0.14	1.66
9	998	2.2	74,000	1.44	235,000	4.20	358,000	1.53	1.65
9	996	2.8	71,000	1.41	280,000	4.40	319,000	1.14	1.61
9	990	1.6	143,000	1.42	325,000	16.40	2,614,000	8.04	2.11
9	980	6.2	183,000	1.41	1,601,000	5.90	1,120,000	0.70	1.72
9	970	4.4	174,000	1.40	1,074,000	3.30	594,000	0.55	1.54
9	960	2.5	171,000	1.43	609,000	3.00	537,000	0.88	1.49
9	950	2.1	173,000	1.40	508,000	3.40	602,000	1.18	1.47
9	942	1.6	96,000	1.42	220,000	5.20	635,000	2.89	1.51
9	940	12.6	198,000	1.41	3,506,000	4.40	885,000	0.25	1.13
9	9	2.2	69,000	1.42	215,000	7.90	797,000	3.71	1.18
8	810	1.9	114,000	1.42	306,000	6.50	825,000	2.70	1.22
8	8	5.7	150,000	1.40	1,199,000	2.00	301,000	0.25	1.13
8	790	2.1	69,000	1.39	201,000	1.30	117,000	0.58	1.12
5	5	54.1	105,000	1.35	7,667,000	69.70	7,910,000	1.03	1.09
SubTotal					**21,354,000**		**23,271,000**		**1.09**
				Indicated	**Southeast Block**				
10	1050	1.9	27,000	1.43	73,000	70.00	1,949,000	26.63	26.63
10	1040	1.5	47,000	1.45	103,000	8.80	518,000	5.04	14.01
10	1030	4.4	192,000	1.42	1,194,000	24.40	5,110,000	4.28	5.53
10	1020	3.0	137,000	1.40	574,000	13.60	2,281,000	3.97	5.07
10	1010	2.9	148,000	1.41	607,000	2.30	514,000	0.85	4.06
10	10	7.6	228,000	1.41	2,440,000	1.30	307,000	0.13	2.14
9	998	2.1	79,000	1.42	237,000	5.20	597,000	2.52	2.16
9	996	2.0	81,000	1.43	232,000	4.40	365,000	1.58	2.13
9	990	1.6	195,000	1.40	436,000	15.90	3,949,000	9.06	2.64
9	980	5.9	241,000	1.41	2,008,000	5.60	1,375,000	0.68	2.15
9	970	4.3	240,000	1.41	1,458,000	3.10	804,000	0.55	1.90
9	960	2.4	225,000	1.42	769,000	2.30	578,000	0.75	1.81
9	950	1.7	200,000	1.42	483,000	3.00	644,000	1.33	1.79
9	942	1.4	91,000	1.44	184,000	4.70	809,000	4.39	1.83
9	940	12.3	233,000	1.41	4,036,000	4.00	972,000	0.24	1.40

9	9	2.0	89,000	1.38	246,000	8.30	1,365,000	5.55	1.47
8	810	1.7	161,000	1.41	385,000	6.70	1,359,000	3.53	1.52
8	8	5.4	193,000	1.40	1,460,000	2.30	457,000	0.31	1.42
8	790	1.8	119,000	1.43	306,000	1.40	253,000	0.83	1.40
5	5	50.9	109,000	1.35	7,492,000	135.90	19,318,000	2.58	1.76
SubTotal					**24,723,000**		**43,524,000**		**1.76**
				Inferred	**Southeast Block**				
10	1050	1.7	99,000	1.44	243,000	131.40	13,727,000	56.38	56.38
10	1040	1.6	113,000	1.43	259,000	9.20	1,827,000	7.07	30.98
10	1030	3.0	263,000	1.40	1,106,000	22.10	7,178,000	6.49	14.13
10	1020	1.5	161,000	1.40	338,000	12.30	3,379,000	9.99	13.41
10	1010	4.0	191,000	1.41	1,076,000	2.70	729,000	0.68	8.88
10	10	6.4	219,000	1.41	1,985,000	1.00	197,000	0.10	5.40
9	998	2.5	65,000	1.40	227,000	5.10	970,000	4.27	5.35
9	996	1.5	66,000	1.42	140,000	5.40	536,000	3.83	5.31
9	990	1.5	141,000	1.40	296,000	9.80	2,125,000	7.18	5.41
9	980	7.7	147,000	1.40	1,584,000	4.60	517,000	0.33	4.30
9	970	5.4	142,000	1.40	1,076,000	1.10	133,000	0.12	3.76
9	960	2.2	139,000	1.41	429,000	1.10	139,000	0.32	3.59
9	950	1.0	72,000	1.37	99,000	1.70	131,000	1.32	3.57
9	942	1.3	1,000	1.37	1,000	3.50	346,000	253.13	3.60
9	940	13.7	126,000	1.41	2,437,000	3.70	495,000	0.20	2.87
9	9	1.5	95,000	1.40	200,000	8.20	1,300,000	6.51	2.93
8	810	1.5	148,000	1.38	306,000	6.70	1,337,000	4.37	2.97
8	8	4.7	157,000	1.41	1,046,000	2.20	362,000	0.35	2.76
8	790	1.9	166,000	1.41	445,000	1.40	320,000	0.72	2.69
5	5	44.3	30,000	1.35	1,797,000	115.90	25,389,000	14.13	4.05
SubTotal					**15,091,000**		**61,140,000**		**4.05**

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Table 19.4
Nariin Sukhait Property
West Field In-Place Coal Resources Summary

Seam	SubSeam	Seam Thickness (m)	Coal Area (m2)	Specific Gravity (g/cm3)	In-Place Tonnes	Waste Thickness (m)	Waste Volume (m3)	In-place (BCM/Tonne) Incremental	In-place (BCM/Tonne) Cumulative
				Measured	**Northwest Block**				
11	1170	8.2	90,000	1.40	1,031,000	32.60	3,210,000	3.11	3.11
11	1160	2.5	94,000	1.42	334,000	4.20	416,000	1.24	2.66
11	1150	1.8	90,000	1.40	226,000	3.20	321,000	1.42	2.48
11	1140	1.2	82,000	1.43	141,000	2.70	264,000	1.87	2.43
11	1130	14.0	113,000	1.41	2,216,000	4.10	466,000	0.21	1.18
11	1120	2.6	124,000	1.43	461,000	6.00	778,000	1.69	1.24
11	1110	2.4	77,000	1.41	262,000	6.40	549,000	2.10	1.29
11	1100	2.9	113,000	1.39	458,000	1.20	136,000	0.30	1.20
10	1050	1.5	59,000	1.39	122,000	64.00	3,988,000	32.74	1.93
10	1040	2.0	76,000	1.39	213,000	14.40	1,197,000	5.63	2.07
10	1030	2.4	95,000	1.44	328,000	6.30	627,000	1.91	2.06
10	1020	3.7	116,000	1.42	613,000	12.10	1,417,000	2.31	2.09
10	1010	2.5	112,000	1.41	394,000	9.70	1,065,000	2.71	2.12
10	10	10.8	112,000	1.41	1,710,000	3.80	429,000	0.25	1.75
9	990	2.2	69,000	1.40	213,000	25.20	1,745,000	8.19	1.90
9	980	7.1	69,000	1.41	689,000	7.50	523,000	0.76	1.82
9	970	2.5	68,000	1.44	244,000	1.30	88,000	0.36	1.78
9	960	2.2	60,000	1.42	189,000	5.10	314,000	1.67	1.78
9	950	2.1	66,000	1.43	199,000	1.90	122,000	0.62	1.76
9	942	2.9	31,000	1.43	129,000	2.80	94,000	0.73	1.75
9	940	11.4	65,000	1.40	1,040,000	1.70	87,000	0.08	1.59
9	9	2.3	62,000	1.42	202,000	4.40	277,000	1.37	1.59
8	810	1.9	38,000	1.43	103,000	5.30	268,000	2.60	1.60
8	8	5.6	50,000	1.40	391,000	4.50	241,000	0.61	1.56
8	790	1.2	9,000	1.39	16,000	1.60	21,000	1.36	1.56
SubTotal					**11,923,000**		**18,645,000**		**1.56**
				Indicated	**Northwest Block**				
11	1170	8.3	32,000	1.41	374,000	33.80	1,205,000	3.22	3.22
11	1160	3.0	37,000	1.42	159,000	7.40	328,000	2.07	2.88
11	1150	2.3	40,000	1.40	128,000	6.50	310,000	2.41	2.79
11	1140	1.3	35,000	1.45	66,000	3.10	163,000	2.46	2.76
11	1130	15.8	57,000	1.41	1,275,000	4.60	315,000	0.25	1.16
11	1120	3.0	60,000	1.39	250,000	7.70	514,000	2.06	1.26
11	1110	2.0	69,000	1.40	195,000	6.20	639,000	3.28	1.42
11	1100	2.9	69,000	1.41	282,000	1.50	103,000	0.37	1.31
10	1050	1.3	79,000	1.44	148,000	68.90	7,154,000	48.30	3.73
10	1040	1.8	92,000	1.43	238,000	13.00	1,388,000	5.82	3.89
10	1030	1.8	82,000	1.42	208,000	5.70	586,000	2.81	3.82

10	1020	4.1	98,000	1.41	571,000	13.20	1,321,000	2.31	3.60
10	1010	2.5	102,000	1.43	366,000	9.00	905,000	2.47	3.50
10	10	10.7	101,000	1.42	1,532,000	4.90	512,000	0.33	2.67
9	990	2.1	78,000	1.40	228,000	20.10	1,613,000	7.08	2.83
9	980	6.7	75,000	1.41	706,000	6.40	499,000	0.71	2.61
9	970	2.2	71,000	1.38	215,000	0.90	61,000	0.28	2.54
9	960	1.7	54,000	1.45	133,000	5.50	337,000	2.55	2.54
9	950	1.9	67,000	1.44	183,000	1.90	129,000	0.70	2.49
9	942	2.5	31,000	1.42	109,000	1.70	69,000	0.63	2.46
9	940	8.7	63,000	1.41	770,000	1.40	52,000	0.07	2.24
9	9	2.5	56,000	1.43	201,000	3.90	227,000	1.13	2.21
8	810	1.5	34,000	1.38	70,000	4.70	282,000	4.02	2.23
8	8	5.1	56,000	1.40	401,000	5.40	319,000	0.80	2.16
8	790	1.0	8,000	1.44	12,000	2.00	47,000	4.07	2.16
SubTotal					**8,822,000**		**19,081,000**		**2.16**

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Table 19.4
Nariin Sukhait Property
West Field In-Place Coal Resources Summary

Seam	SubSeam	Seam Thickness (m)	Coal Area (m2)	Specific Gravity (g/cm3)	In-Place Tonnes	Waste Thickness (m)	Waste Volume (m3)	In-place (BCM/Tonne) Incremental	In-place (BCM/Tonne) Cumulative
				Inferred	**Northwest Block**				
11	1170	9.2	68,000	1.41	879,000	30.70	2,198,000	2.50	2.50
11	1160	3.4	74,000	1.40	353,000	10.20	802,000	2.27	2.43
11	1150	2.5	81,000	1.43	292,000	9.20	791,000	2.71	2.49
11	1140	1.2	76,000	1.44	131,000	3.40	299,000	2.28	2.47
11	1130	18.2	110,000	1.41	2,810,000	5.50	624,000	0.22	1.06
11	1120	3.3	115,000	1.42	538,000	9.50	1,119,000	2.08	1.17
11	1110	1.9	120,000	1.38	314,000	6.50	890,000	2.83	1.26
11	1100	3.1	121,000	1.43	538,000	0.90	102,000	0.19	1.17
10	1050	1.8	148,000	1.43	381,000	72.50	10,956,000	28.77	2.85
10	1040	2.1	131,000	1.42	390,000	11.90	1,577,000	4.04	2.92
10	1030	1.2	97,000	1.46	171,000	3.10	360,000	2.11	2.90
10	1020	3.2	113,000	1.40	506,000	8.90	1,015,000	2.01	2.84
10	1010	2.6	113,000	1.43	419,000	9.90	1,120,000	2.68	2.83
10	10	9.7	93,000	1.41	1,277,000	7.20	810,000	0.63	2.52
9	990	2.2	86,000	1.42	268,000	14.00	1,400,000	5.23	2.60
9	980	6.0	81,000	1.42	687,000	5.10	440,000	0.64	2.46
9	970	1.8	73,000	1.44	190,000	0.70	45,000	0.24	2.42
9	960	1.3	46,000	1.45	87,000	3.60	222,000	2.56	2.42
9	950	1.5	73,000	1.36	149,000	1.40	95,000	0.64	2.40
9	942	2.0	34,000	1.39	95,000	0.80	32,000	0.33	2.38
9	940	5.9	65,000	1.40	537,000	1.00	33,000	0.06	2.26
9	9	2.7	62,000	1.42	237,000	3.20	194,000	0.82	2.23
8	810	1.3	40,000	1.45	75,000	4.50	310,000	4.13	2.25
8	8	5.6	49,000	1.41	390,000	3.90	219,000	0.56	2.19
8	790	1.0	1,000	1.44	2,000	2.30	87,000	49.13	2.20
SubTotal					**11,715,000**		**25,739,000**		**2.20**
Total	**Measured plus Indicated**				**66,822,000**		**104,520,000**		**1.56**
Total	**Inferred**				**26,806,000**		**86,879,000**		**3.24**

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20 OTHER RELEVANT DATA AND INFORMATION

There are no other relevant data and information applicable to this report.

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21 INTERPRETATION AND CONCLUSIONS

The exploration program initiated in February, 2005 and currently ongoing, has been successful in delineating an initial 116 million tonnes of coal classified as measured and indicated resources. Norwest has managed and provided direct supervision of the program from its inception. Norwest has maintained complete control on the data collection, construction of the geologic model, and resource calculation. The geology type for the three resource areas at the Nariin Sukhait Property, the South, East, and West Fields, has been determined to be complex based on criteria set forth in the Geological Survey of Canada Paper 88-21. Resource calculations and classification have been done in accordance with National Instrument 43-101.

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22 RECOMMENDATIONS

Current exploration on the three resource areas is focused on delineating additional measured and indicated resources, and to gain a better understanding of certain structural features. Key areas of interest currently being addressed in exploration are:

Identify and delineate coal resources in the Nos. 8, 9, and 10 Seams in the South Field

Complete additional drilling in the East Field to further delineate resources and gain a better understanding of structural relationships affecting the coal-bearing sequence Several drill holes in the East Field have had unusually thick coal intercepts in the upper seams believed to be due to tectonic deformation

Complete additional mapping, trenching, and drilling in the West Field to gain a better understanding of the structural setting of the northwest limb of the antiform

Collect additional coal quality data from core drilling in all three resource areas to further characterize the coal resources.

Exploration is expected to continue through the end of October, 2005. An additional 90 drill holes are expected to be completed by the end of the exploration program. Following the completion of the exploration program, Norwest will prepare a second technical report on the coal resources at Ivanhoe s Nariin Sukhait Property. It is anticipated that additional resources will be delineated in the South, East, and West Fields. It is also anticipated that coal resources will be identified in other areas of the Nariin Sukhait property. Following the second technical report on resources at Nariin Sukhait, Norwest will prepare a pre-feasibility study for IMMI for the development of a surface mining operation.

Preliminary budgets for the above recommended field and geologic technical reporting through October, 2005 are presented in the following Table 22.1 below.

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Table 22.1
Estimated Expenditures, September through October, 2005

Exploration Component	Cost per Unit	Units	Total $USD
Drilling			
UDR 650 (primary coring rig, per day)	$ 4,320	60	$ 259,000
UDR 1000 (r.c.-open hole drilling, per day)	$ 4,320	60	$ 259,000
Russian drilling unit (open hole drilling, per day)	$ 1,000	60	$ 60,000
Drill Support			
Bulldozer support (per day)	$ 1,560	60	$ 94,000
Excavator trenching (per day)	$ 1,920	60	$ 115,000
Labor core logging, sampling, and field supervision (per day)	$ 4,000	60	$ 240,000
Analytical Testing			
Proximate analysis (per core hole)	$,1750	14	$ 25,000
Detailed Full Suite Coal Analysis (per core hole)	$ 2,000	14	$ 28,000
Washability and Metallurgical (per core hole)	$ 2,000	14	$ 28,000
Downhole geophysics (per day)	$ 1,000	60	$ 60,000
Survey			
Drill collar survey (all holes)	$ 10,000	1	$ 10,000
Geologic Modeling			
Geological modeling and compilation	$ 3,5000	1	$ 35,000
Report preparation	$ 25,000	1	$ 25,000
Camp Support			
Camp personnel and supplies (per day)	$,2000	60	$ 120,000
Expediting, transportation and communication (5%)			$ 68,000
Subtotal			**$ 1,426,000**
Contingency (15%)			$ 214,000
Total Budget Estimate			**$ 1,639,000**

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23 REFERENCES

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24 DATE

The following comprises signed and dated Certificate of Qualifications of the persons who prepared this report.

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CERTIFICATE OF QUALIFICATIONS

I, Steven B. Kerr, of Salt Lake City, Utah, do hereby certify that:

1. I am a Senior Geologist with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah 84111 USA.

2. I am a Certified Professional Geologist and a member of the American Institute of Professional Geologists Registration Number CPG-10352.

3. I am a licensed Professional Geologist in the states of Alaska License Number 512, Utah License Number 5557442-2250, and Wyoming License Number PG-2756.

4. I am a graduate of Utah State University (Bachelor of Science, Geology, 1981 and Master of Science, Geology, 1987).

5. I have practiced my profession as a geologist for 22 years. I have worked on coal properties in the United States of America, Canada, Republic of South Africa, China (PRC), and Mongolia. I have completed investigations on coal properties on behalf of private and public companies. I am a qualified person for the purposes of National Instrument 43-101.

6. I personally have reviewed or supervised the review of the data collected and provided by Norwest Corporation and IMMI. for the Nariin Sukhait property. I participated in the preparation of a technical report concerning the coal geology and coal resources for the area. I am responsible for all sections of this report, except Section 25.

7. I have no direct or indirect interest in IMMI or any affiliates of it, nor do I expect to acquire any such interest. I am independent of the Company in accordance with the requirements of NI 43-101, Section 1.5.

8. I have not been restricted in any way in my access to information, data or documents that I consider relevant to this report.

9. As at the date of this certificate, I am not aware of any material fact or material change, the omission to disclose which would make this report misleading with respect to coal resource estimates and coal ownership.

10. I have read NI43-101 and Form 43-101F1. The Technical Report is in compliance with NI43-101 and Form 43-101F1.

Dated at Salt Lake City, Utah this 13th day of October, 2005.

/s/ Steven B. Kerr

Steven B. Kerr, CPG
Senior Geologist
IMMI. 04-3117
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CONSENT of AUTHOR

TO: The Securities Commission or similar authority in each of the Provinces of Canada

I, Steven B. Kerr, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Technical Report Nariin Sukhait Property, Mongolia and dated October 13, 2005 (the Technical Report) and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report in the news release and material change report filed by Ivanhoe Mines Ltd. with the Technical Report.

I also certify that I have read the news release and material change report being filed and I do not have any reason to believe that there are any misrepresentations in the information derived from the Technical Report or the written disclosure in the new release and the material change report of Ivanhoe Mines Ltd. contains any misrepresentation of the information contained in the Technical Report.

Dated this 13th Day of October, 2005.

/s/ Steven B. Kerr

Signature of Qualified Person

Steven B. Kerr, CPG

Print name of Qualified Person

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CERTIFICATE OF QUALIFICATIONS

I, Richard D. Tifft, III, of Salt Lake City, Utah, do hereby certify that:

1. I am Vice President; Geologic Services with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah 84111 USA.

2. I am a licensed Professional Geologist in the state of Utah License Number 5190241-2250.

3. I am a graduate of Utah State University (Bachelor of Science, 1978, Geology).

4. I have practiced my profession as a geologist for 26 years. I have worked on coal properties in the United States of America, Canada, India, China (PRC), and Mongolia. I have completed investigations on coal properties on behalf of private and public companies. I am a qualified person for the purposes of National Instrument 43-101.

5. I personally have reviewed or supervised the review of the data collected and provided by Norwest Corporation and IMMI. for the Nariin Sukhait property. I participated in the preparation of a technical report concerning the coal geology and coal resource tonnage for the area. I have conducted several site visits, most recently in August of 2005, and have personally witnessed the exploration activities. I am responsible for all sections of this report, except Section 25.

6. I have no direct or indirect interest in IMMI or any affiliates of it, nor do I expect to acquire any such interest. I am independent of the Company in accordance with the requirements of NI 43-101, Section 1.5.

7. I have not been restricted in any way in my access to information, data or documents that I consider relevant to this report.

8. As at the date of this certificate, I am not aware of any material fact or material change, the omission to disclose which would make this report misleading with respect to coal resource estimates and coal ownership.

9. I have read NI43-101 and Form 43-101F1. The Technical Report is in compliance with NI43-101 and Form 43-101F1.

Dated at Salt Lake City, Utah this 13th day of October, 2005.

/s/ Richard D. Tifft III

Richard D. Tifft III, PG
Vice President Geologic Services
IMMI. 04-3117
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CONSENT of AUTHOR

TO: The Securities Commission or similar authority in each of the Provinces of Canada

I, Richard D. Tifft III, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Technical Report Nariin Sukhait Property, Mongolia and dated October 13, 2005 (the Technical Report) and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report in the news release and material change report filed by Ivanhoe Mines Ltd. with the Technical Report.

I also certify that I have read the news release and material change report being filed and I do not have any reason to believe that there are any misrepresentations in the information derived from the Technical Report or the written disclosure in the new release and the material change report of Ivanhoe Mines Ltd. contains any misrepresentation of the information contained in the Technical Report.

Dated this 13th Day of October, 2005.

/s/ Richard D. Tifft III

Signature of Qualified Person

Richard D. Tifft III, PG

Print name of Qualified Person

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CERTIFICATE OF QUALIFICATIONS

I, Patrick P. Riley of Lakewood, Colorado, do hereby certify that:

1. I am a Senior Associate Geologist with Norwest Corporation, 136 East South Temple, 12th Floor, Salt Lake City, Utah 84111 USA.

2. I am a Certified Professional Geologist and a member of the American Institute of Professional Geologists Registration Number CPG-7031.

3. I am a licensed Professional Geologist in the states of Kentucky License Number KY-0854, Pennsylvania Licence Number PG-003078-G, and Wyoming License Number CPG-7031.

4. I am a graduate of Marshall University (Bachelor of Science, Geology, 1977).

5. I have practiced my profession as a geologist for 28 years. I have worked on coal properties in the United States of America, Australia, Canada, Colombia, Chile, China (PRC), Mexico, Venezuela, Philippines, and Mongolia. I have completed investigations on coal properties on behalf of private and public companies. I am a qualified person for the purposes of National Instrument 43-101.

6. I personally have reviewed or supervised the review of the data collected and provided by Norwest Corporation and IMMI for the Nariin Sukhait property. I participated in the preparation of a technical report concerning the coal geology and coal resource tonnage for the area. I am responsible for all sections of this report, except Section 25.

7. I have no direct or indirect interest in IMMI or any affiliates of it, nor do I expect to acquire any such interest. I am independent of the Company in accordance with the requirements of NI 43-101, Section 1.5.

8. I have not been restricted in any way in my access to information, data or documents that I consider relevant to this report.

9. As at the date of this certificate, I am not aware of any material fact or material change, the omission to disclose which would make this report misleading with respect to coal resource estimates and coal ownership.

10. I have read NI43-101 and Form 43-101F1. The Technical Report is in compliance with NI43-101 and Form 43-101F1.

Dated at Salt Lake City, Utah this 13th day of October, 2005.

/s/ Patrick P. Riley

Patrick P. Riley,
CPG
Senior Geologist
IMMI. 04-3117
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CONSENT of AUTHOR

TO: The Securities Commission or similar authority in each of the Provinces of Canada

I, Patrick P. Riley, do hereby consent to the filing, with the regulatory authorities referred to above, of the technical report titled Technical Report Nariin Sukhait Property, Mongolia and dated October 13, 2005 (the Technical Report) and to the written disclosure of the Technical Report and of extracts from or a summary of the Technical Report in the news release and material change report filed by Ivanhoe Mines Ltd. with the Technical Report.

I also certify that I have read the news release and material change report being filed and I do not have any reason to believe that there are any misrepresentations in the information derived from the Technical Report or the written disclosure in the new release and the material change report of Ivanhoe Mines Ltd. contains any misrepresentation of the information contained in the Technical Report.

Dated this 13th Day of October, 2005.

/s/ Patrick P. Riley

Signature of Qualified Person

Patrick P. Riley, CPG

Print name of Qualified Person

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25 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES

The Nariin Sukhait Property is currently an undeveloped property with no production.

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26 ILLUSTRATIONS

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