IN THE HIGH COURT OF SOUTH AFRICA

(TRANSVAAL PROVINCIAL DIVISION)

THE STATE

versus

1. DANIEL GEIGES

2. GERHARD WISSER

3. DANIEL GEIGES and GERHARD WISSER
Directors of KRISCH ENGINEERING CO (PROPRIETARY) LIMITED
(Registration number 1971/001/681/07),
cited as representatives of the said body in terms of section 332(2) of Act 51 of 1977

SUMMARY OF SUBSTANTIAL FACTS

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1. TECHNOLOGY RELATING TO COUNTS 1 - 5

1.1 Counts 1 – 5 relate to centrifuge uranium enrichment plants.

1.2 In nature uranium mainly comprises of two isotopes in the proportions 0.7% U-235 and 99.3% U-238. The U-235 is the active isotope of uranium. Its proportion must be increased for the uranium to be used in either a domestic power station or a nuclear weapon.

1.3 Centrifuge enrichment plants are dedicated to the enrichment of uranium from 0.7% U-235 to approximately 4% U-235 for power stations and approximately 90% for a weapon. They utilize uranium in the form of uranium hexafluoride (UF6) when undertaking this enrichment.

1.4 The first stage of uranium processing starts from a purified form of uranium known as "yellow cake". "Yellow cake" is simply the uranium compound sorted from the uranium bearing rock and other debris. The "yellow cake" is processed through an extensive "conversion" process in which fluorine is added to form UF6. The UF6 is stored in transportable cylinders ready for connection to an enrichment plant. No enrichment of the uranium has yet been undertaken. UF6 has no other application other than for use in uranium enrichment.

1.5 The equipment referred to in Count 2 is used from this point onward. UF6 exists as a solid at normal temperatures and pressures. It is necessary to place the UF6 cylinders in an oven to heat the solid material until it can be extracted as a gas. This is done in an especially designed or prepared autoclave to produce gaseous UF6. Once in the gaseous stage, the UF6 is fed under vacuum (this is the reason for the vacuum pumps) to the centrifuges through a series of pipes known as cascade headers (technically defined as machine header piping systems).

1.6 Individually centrifuges only enrich the UF6 by a small amount each time the UF6 is fed through them, hence the UF6 must be fed through many centrifuges for the desired enrichment to take place. Consequently, in order to produce a useful quantity of uranium with a desired amount of enrichment of U-235 and depletion of U-238, it is necessary to use a large number of centrifuges arranged in cascades. The cascade headers are a fundamental part of the enrichment process and are specifically designed to direct the proper amounts of UF6 flow of slowly enriching (in U-235) product and slowly depleting UF6 (in U-238) repeatedly through targeted centrifuges.

1.7 It is also through these cascade headers that the enriched product and depleted tails are ultimately directed to UF6 product and tails removal stations. These stations must ultimately have the ability to re-solidify the UF6 gas into cylinders before removal from the enrichment plant. Technically the equipment, excluding

the cascade headers, is defined as feed systems and product and tails withdrawal systems. These are specially designed process systems, including:

- feed autoclaves (or systems) used for passing UF6 to the gaseous centrifuge cascades;
- desublimers (or cold traps) used to remove UF6 from centrifuge cascades;
- "product" or "tails" stations used for transferring UF6 into containers.

1.8 UF6 Centrifuges are cylindrical vessels into which UF6 is fed and product and tails extracted. Each centrifuge is designed such that the lighter U-235 isotope is separated from the heavier U-238 isotope. This is achieved in very small increments. In broad terms the centrifuge comprises several main components. An outer casing designed to retain suitable vacuum pressures and a rotor capable of spinning at very high speeds without maintenance for several years. Amongst other things the rotor is largely made from a thin wall cylinder made from a high strength material such as aluminium alloys or maraging steel or composite fibres. It is the metal cylinders that the flow forming machine referred to in Count 1 would be used to produce.

2. SOUTH AFRICAN PRELUDE TO THE OFFENCES

2.1 During the Apartheid Era, the South African government conducted certain nuclear activities in contravention of international sanctions.

2.2 This programme led, *inter alia,* to the construction of a small number of nuclear weapons.

2.3 However, South Africa ratified the Nuclear Non-Proliferation Treaty on 10 July 1991 and entered into the Safeguards Agreement with the International Atomic Energy Agency (IAEA) on 16 September 1991 in

order to timeously detect and deter the diversion of nuclear material intended to be used for peaceful nuclear activities, to the manufacture of nuclear weapons or of other nuclear explosive devices or for any other unknown purposes.

2.4 South Africa subscribes to the policies of the Nuclear Suppliers' Group and the Zangger Committee. As a consequence, South Africa has adopted a policy of non-proliferation and has become an active participant in non-proliferation regimes and suppliers' groups. South Africa adopts positions supporting the non-proliferation of nuclear technology and weapons of mass destruction with the goal of promoting international peace and security. South Africa utilizes its position as a member of the suppliers' regimes and of the Africa Group to promote the importance of non-proliferation.

2.5 In order to honour the above international obligations and policy, the South African Government enacted the following legislation:

2.5.1 Nuclear Energy Act No 131 of 1993, which came into effect on 1 March 1994 in order to provide for the implementation of the Nuclear Non-Proliferation Treaty and the Safeguards Agreement and to regulate the licensing of nuclear activities;

2.5.2 Non-Proliferation of Weapons of Mass Destruction Act No 87 of 1993, which came into effect on 16 August 1993 to provide for control over weapons of mass destruction and the establishment of a council to control and manage matters relating to the proliferation of such weapons in the Republic. The regulations relating to the flow forming machine referred to in Count 1 are derived from an IAEA control list.

2.5.3 Nuclear Energy Act No 46 of 1999 which came into effect on 24 February 2000 to provide for responsibilities for the implementation and application of the Safeguards Agreement and any additional protocols entered into by the Republic and the International Atomic Energy Agency in support of the Nuclear Non-Proliferation Treaty acceded to by the Republic and to regulate the acquisition and possession of nuclear fuel, certain nuclear and related material and certain related equipment, as well as the importation and exportation of, and certain other acts and activities relating to that fuel, material and equipment in order to comply with the international obligations of the Republic.

3. THE INTERNATIONAL PRELUDE TO THE OFFENCES

3.1 In 1975 Libya ratified the Non-Proliferation Treaty (NPT) and a Safeguards Agreement with the International Atomic Energy Agency (IAEA). As a result thereof, Libya undertook not to manufacture or acquire nuclear weapons and was obliged to place all its nuclear materials and activities under safeguard requiring regular reporting to and inspections by the IAEA.

3.2 Due to regional conflicts, both India and Pakistan developed their own nuclear weapons programmes.

3.3 The uranium enrichment component of Pakistan's programme was developed under the leadership of Pakistani scientist, Dr Abdul Qadeer Khan, who established a research laboratory. By 1998 Pakistan had successfully developed and tested several nuclear devices. In recognition for his achievements, Dr AQ Khan was elevated to a high position within the Pakistani government.

3.4 In October 2003, a German registered ship, the BBC China, was intercepted in an Italian port *en route* from Dubai to Tripoli, Libya. The cargo contained parts of a centrifuge enrichment plant.

3.5 As a result of this interception, on 19 December 2003, Libya admitted that it had been involved in undeclared nuclear activities, aimed at acquiring a nuclear weapons capability in contravention of the NPT as well as the Safeguards undertakings referred to above.

3.6 Libya furthermore undertook *"to eliminate ... materials, equipments and programmes which lead to the production of internationally proscribed weapons"*. In this regard, Libya undertook to cooperate with the United Nations Security Council and the IAEA.

3.7 Libya admitted that it had engaged for more than a decade in undeclared uranium enrichment activities and provided information on the clandestine nuclear cooperation with other countries, as well as information on the sources of sensitive nuclear technology.

3.8 As a result of various agreements, Libya allowed the removal of all key nuclear materials and equipment relating to the clandestine programme to the United States of America. Included in the equipment handed over was the flow forming machine referred to in Count 1 and components relevant to Count 2.

3.9 Dr AQ Khan was implicated as a major source of nuclear technology supplied clandestinely to Libya.

3.10 In early 2004, the Pakistani government stripped Khan of his cabinet rank and dismissed him from his position as Senior Advisor to the Chief Executive. Khan made a public apology on television before the Pakistani nation in which he admitted to personal failings, accepted responsibility for all past

proliferation activities and absolved the past and present Pakistani State authorities of any complicity in his acts.

3.11 The Malaysian police investigated the origin of the centrifuge equipment found on the BBC China. It was established that these components had been manufactured by a Malaysian company. The manufacture had been facilitated by Buhary Seyed Abu Tahir (hereinafter referred to as "Tahir"), a Sri Lankan citizen and businessman based in the United Arab Emirates (Dubai). Tahir used the alias "Mr Junior"/"Junior".

3.12 In the course of this investigation it was established that Tahir had become acquainted with AQ Khan and had assisted in the clandestine acquisition of nuclear technology, both for Pakistan and Libya. In this regard, a network referred to as the AQ Khan network had been set up, operating in Europe, the Middle East and Asia.

3.13 The Malaysian police released a report, detailing the scope of its investigation and in the course thereof, implicated Gotthard Lerch (hereinafter referred to as "Lerch"), a German citizen, residing in Switzerland as having attempted to obtain supplies of pipes from South Africa for the clandestine Libyan nuclear weapons programme.

3.14 Up until 31 December 1985, Lerch, a nuclear expert, was Manager of the Vacuum Division of Leybold Heraeus GmbH. As such, he was involved in a number of activities relating to nuclear technology.

4. THE ACCUSED

4.1 Accused No 2 is a German citizen. He is a mechanical engineer and has a diploma in engineering. In 1971 he established a company which is now known as Krisch Engineering Co (Pty) Ltd in Randburg (hereinafter referred to as "Krisch Engineering"). On 12 March 1971, he became a director of the

company and at the time of the commission of these offences, he had become its managing director. For many years Krisch Engineering has been the local agent for Leybold Heraeus.

4.2 Accused No 1 is a Swiss citizen and is also a mechanical engineer. In the 1970's, he joined Krisch Engineering and became a director on 10 July 1981. At the time of the commission of these offences, he was a project manager in the company, working on the instructions of Accused No 2 in his capacity as managing director.

4.3 Accused No 3 is a company incorporated and registered in terms of the Companies' Act, No 61 of 1973. At all times relevant to the offences, Accused Nos 1 and 2 were two of its directors.

5. NUCLEAR-RELATED ACTIVITIES OF THE ACCUSED IN SOUTH AFRICA PRIOR TO 16 APRIL 1994

5.1 Prior to South Africa signing the NPT, Accused No 3 was a major supplier of systems, components and technology to its nuclear programme, including its uranium enrichment activities.

5.2 As such, both Accused Nos 1 and 2 became involved in a number of projects relating to UF6.

5.3 Since Accused No 3 was the agent for Leybold, the systems and components supplied by it were mainly of Leybold origin.

5.4 By virtue of his position within Leybold, Lerch became acquainted with both Accused Nos 1 and 2. Accused No 1 travelled to Germany and worked at the Leybold factory with its engineers on certain projects.

5.5 Since the supply of sensitive nuclear equipment to South Africa was at that stage prohibited by German export law, the three accused, Lerch and Leybold developed a number of strategies to prevent the supply of such equipment being detected by the German authorities.

5.6 In the case of Accused No 2, this led to the establishment of a company in Germany called "*GEWI Planung-Technischer Vertrieb GmbH*" (hereinafter referred to as "GEWI") with himself as its managing director.

5.7 One of the projects involving the above parties was the design, development and construction of two research valves for use in an aerodynamic uranium enrichment application. Lerch signed the contract on behalf of Leybold. Because the export of such valves was prohibited according to German export law, Accused Nos 2 and 3 and Leybold agreed that the valves should be taken apart and then declared as being "*some other components that are not restricted in terms of the German Export Regulations*". The value of the valves was under-declared in the import/export documentation to further enhance this deception.

5.8 Accused No 1 was in charge of the project in South Africa on behalf of Accused No 3. During the course of the above project, the three accused became acquainted with JAM Meyer (hereinafter referred to as "Meyer"), a South African engineer, employed by the programme, who was also working on the project. A friendship and association developed between Meyer and Accused Nos 1 and 2. Accused No 2's association with Lerch also developed to the extent that he came to administer private properties owned by Lerch in South Africa. These properties are however registered as private companies. In the case of one of them, Accused No 2 is listed as a local manager in the company's registration documentation. Leonard Jack Harvey (hereinafter referred to as "Harvey") was employed by Accused No 3 and was also involved in the valve project.

5.9 In the early 1980's, Meyer established Roxound Engineering Works, a business situated at Vanderbijlpark.

5.10 As part of a clamp-down on German companies supplying nuclear technology to South Africa, Accused No 2's company, GEWI, was searched. Accused No 2 however was confident that the investigation would fail, because "*we did not channel any sensitive business through Messrs GEWI*".

5.11 After Lerch had left Leybold, the three accused, Tahir and others decided to supply gas centrifuge uranium enrichment technology to countries developing nuclear weapons programmes in contravention of international non-proliferation regimes. Their motivation for so doing was purely financial enrichment. Their previous experiences as outlined above stood them in good stead to do so. Accused No 2 decided to use GEWI also for these activities. Lerch moved to Switzerland and established at Buchs a business styled "*AVE APPARATE, VERFAHREN UND ENGINEERING AG*" (hereinafter referred to as "AVE").

5.12 In January 1988, Accused Nos 2 and 3 offered for sale to a client, the "*purchase of know how for ultra centrifuge and system engineering for complete enrichment plant*" for USD13.8 million, excluding the "*electro/electronic drive*".

5.13 In March 1989, Accused Nos 2 and 3 offered the same client a complete set of drawings for "*electro motoric drives for ultra centrifuges and double-stage ultracentrifuges*" for 6 million CHF. The contact of the two accused was a person "*operating an engineering office in Switzerland*". The centrifuges to which the drawings related were in "*operation* in *a plant in the Middle East.*"

5.14 In September 1990, the original package was re-offered to the same client, but now including the "*electro/electronic drive*". The client's request to view the equipment which had been built according to the know-how parcel was

refused because "*the know-how will not be acquired via official channels*". The plant had however been inspected by the "*Swiss negotiating agent*" who had been deeply involved in its construction from the beginning. In order to make the offer more attractive to the client, samples of the data offered for sale were attached. These documents correspond identically to those given by Accused No 1 to Meyer when both were involved in the activities relating to count 2.

5.15 The client however established that the plans had been unlawfully obtained by a former Leybold employee who had resettled in Switzerland. The offer was declined because the client was not prepared to accept stolen property.

5.16 Other countries however did not display the same moral scruples. The three accused, Lerch, Tahir and others became a major supplier of gas centrifuge uranium enrichment technology to Pakistani's nuclear weapons programme. Although prior to 16 April 1994, Government Notice R740 had not been promulgated, Accused Nos 1 and 2 were, by virtue of their nationalities, subject to Swiss and German law and adopted a number of strategies to prevent these governments' law enforcement agencies from detecting their activities. Once the Government Notice had come into effect, similar strategies were adopted to deceive the South African authorities.

5.17 The *modus operandi* adopted was that orders would be placed by AVE/Lerch or GEWI with Accused No 3. Both Accused Nos 1 and 2 were actively involved in executing the orders. The components were either manufactured locally or otherwise procured. They were then exported to various business entities in the United Arab Emirates (hereinafter referred to as "UAE") which were connected to Tahir and others. Ultimately, they were delivered to Pakistan. Accused No 3 charged AVE for all expenses incurred. Nowhere in any of the official export and other related documentation was the nuclear nature of the components declared.

5.18 Activities included:

(i) the fabrication, procurement and delivery of components for a large UF6 feed and withdrawal system from 1986 to 1989. The equipment was supplied in four distinct phases, namely:

(a) the manufacture of three autoclaves capable of heating up to a 48 inch diameter cylinder of UF6.

(b) the manufacture of a piping system for the feed and collection of UF6. This constituted a substantial portion of a complete large scale UF6 feed and withdrawal system. This system was substantially larger than the system referred to in count 2. Certain of the plans for the system were supplied by AVE to Accused No 3, described as "*detail calculations and design of plant, supply of layout for Freon system, schemes of refrigeration/pipe-work, material lists etc.*" This description is technically correct, since the UF6 feed and withdrawal system uses a large refrigeration system to cool the gaseous UF6 to collect the material as a solid. However, a non-nuclear expert such as a Customs official would not make such a connection. The plans formed part of Accused No 1's reference material relating to count 2. Certain of the plans had the logo, "CB".

(c) the supply of a large refrigeration system for the collection of UF6.

(d) the supply of four hot boxes and piping for use in the UF6 feed system.

Meyer's company, Roxound Engineering, was contracted by the Accused to fabricate major components for this plant.

(ii) In 1990, GEWI placed an order with Accused No 3 for 100 3/4" UF6 cylinder valves. Accused No 3 appointed a local contractor to manufacture them. In 1991, they were exported to a business in the UAE for the attention of "*Mr Junior*". In the shipping documentation they were described as "*shut off valves*". In Accused No 3's order book, the client was described as "*GEWI (GL)*". "GL" are Lerch's initials.

(iii) In 1993, Accused No 2 received an order from AVE/Lerch for 30 x 30B UF6 cylinders. The cylinders were manufactured by Meyer's company, Roxound Engineering. Accused No 1 completed a detailed bill of materials for this construction. Another supplier was appointed to manufacture 1" cylinder valves which had also been ordered by AVE.

(iv) In January 1994, Accused No 3 received an order from AVE for 100 3/4" UF6 valve body forgings and 100 1" valve body forgings. A local supplier was contracted to manufacture them. They were exported in two batches to the same business entity referred to in paragraph 5.18(ii). No reference to UF6 was made in the shipping and other related documentation.

(v) In the 1970's and 1980's, Leybold developed a "*UF6 feeding and take off system*", called the V3A vacuum plant. The plant used a cooling system developed by a company in Switzerland. This system was offered for sale to Pakistan. At a certain stage, the accused came into possession of extensive technical documentation relating to this plant. In some of the documentation relating thereto, the plant was described as a sterilization plant.

(vi) In 1992, GEWI placed an order for a complete refrigeration plant and compressors made by the same manufacturer which had supplied the cooling system for the V3A plant. These were again shipped to the UAE. Accused No 2 made a note to the effect that "*GL had confirmed today that the assignment had arrived.*" The V3A plant's technical documentation

formed part of Accused No 1's reference material relating to count 2 and several of the components manufactured were given V3A component numbers.

(vii) In 1994, AVE placed an order for 2 compressors made by the same cooling company and accessories for "*one of its clients in the Middle East*". Accused No 3 obtained the compressors from the manufacturer and they were shipped to a business entity in the UAE. The accessories were shipped to another entity also in the UAE.

5.19 In the late 1980's and early 1990's, Accused No 2 commissioned one of his employees to produce flow meter units which were specifically designed for a UF6 application. These systems were delivered to India. Due to problems which the client encountered with the units, the employee and another person were sent by Accused No 2 to India itself to make adjustments to the instruments.

6. <u>THE COMMISSION OF THE OFFENCES REFERRED TO IN COUNTS 7 & 8:</u>

6.1 On 15 July 1994, AVE placed an order with the accused for the manufacture and export of three autoclaves and accessories intended to be used as part of the auxiliary system of a gas centrifuge uranium enrichment plant. The accused were in possession of a drawing for such autoclaves.

6.2 The accused subcontracted Meyer's company, J Design Engineering CC, to design the autoclaves according to specifications supplied by the accused.

6.3 The accused subcontracted Meyer's other company, Roxound Engineering Co (Pty) Ltd, to manufacture the autoclaves and jacking trolleys.

6.4 The accused also subcontracted with other companies to obtain other accessories necessary for the construction.

6.5 Once the autoclaves were complete, the accused contracted for their packing and shipment to BB Enterprises, UAE for the attention of "*Mr Junior*". The autoclaves and accessories left the country in January 1995. Nowhere in any of the shipping and other export related documentation was reference made to the fact that they were nuclear components.

6.6 Accused No 3 billed AVE for the manufacture of the autoclaves and accessories and their export.

6.7 Under circumstances unknown to the State, the autoclaves were subsequently shipped to Pakistan.

6.8 At no stage did the accused apply for the prerequisite manufacturing or export permits provided for in the legislation and consequently, no such permits were issued.

7. <u>THE COMMISSION OF THE OFFENCES SET OUT IN COUNTS 9 & 10</u>

7.1 As a consequence of the previous nuclear proliferation activities of the accused, Lerch and Tahir, a meeting was held at Krisch Engineering in February 1995. The purpose of the meeting was to discuss Pakistan's further requirements and Dr Hashmi, a senior Pakistani nuclear expert, was also invited to attend.

7.2 Tahir and Dr Hashmi travelled from the Middle East and Lerch travelled from Germany to Johannesburg.

7.3 Accused Nos 1 and 2 took part in all the discussions with Hashmi, Lerch and Tahir. An attempt was made to recruit an employee of the Atomic Energy

Corporation to travel to Pakistan to start a training programme for the manufacturing of maraging steel and rotors for gas centrifuges. Maraging steel is used to form centrifuge rotors. This person was shown a set of drawings of centrifuge rotors. This meeting was chaired by Accused No 2. The employee informed Accused No 2 that this activity was controlled and required permission from the Atomic Energy Corporation. This brought the discussions to a close.

7.4 Harvey and another person were required to provide a presentation on flow-meters which are also used in gas centrifuge enrichment plants, as well as on "other engineering possibilities of Krisch Engineering". Discussions were also held concerning a visit to "Krisch's subcontractor, Roxound's, manufacturing facility".

7.5 This was followed up by further activities at the Kruger National Park. Lerch, Tahir and Hashmi then left the country.

7.6 In order for Pakistan to sustain its nuclear weapons programme, based on gas centrifuge enrichment plants, it was necessary to procure Leybold equipment, suitable for such use. At that stage, Leybold had adopted a strict non-proliferation policy (the "*Leybold Charta*") and would not allow the sale of its equipment which was suitable for nuclear applications to take place in the absence of proper end user certificates. The company would obviously not do business involving Lerch, due to the activities he engaged in after leaving the company. The company would also not supply such equipment to Pakistan and would have been suspicious of any Middle East purchaser.

7.7 Tahir and Lerch required the accused to purchase the equipment as Leybold Heraeus would not be suspicious if it was destined for a customer in South Africa and being used in a non-nuclear application.

7.8 On 20 May 1995, AVE placed an order with the accused for the equipment referred to in count 9. The detectors are used to detect leaks in the pipes through which the UF6 passes. The vacuum pumps form an integral part of the feed and withdrawal systems and already as early as the 1970's, the accused had acquired the technology to modify Leybold vacuum pumps to operate with UF6. In order to circumvent Leybold's non-proliferation policy, Accused No 2 instructed Cecile Hoeller, a director of Accused No 3, to forge an order form from the Electric Lamp Manufacturers of Southern Africa so that it would appear that the equipment was being ordered by this company and not AVE. This was done by taking a legitimate earlier order placed by the company with Accused No 3 and changing the equipment ordered so as to reflect the equipment specified by AVE.

7.9 This forged document was submitted to Leybold together with a declaration that the equipment was intended to be used by this company in the manufacture of incandescent lamps. Accused No 3 undertook that the equipment would not be used in any activity related to nuclear weapons.

7.10 On the strength of the forged document and undertaking, Leybold supplied the equipment to Accused No 3.

7.11 Upon arrival in South Africa, the equipment was exported to Al Hadwa Gen. Trading, Dubai.

7.12 Under circumstances unknown to the State, the equipment was finally delivered to Pakistan.

7.13 Accused No 3 billed AVE for all the costs incurred.

8. THE COMMISSION OF THE OFFENCE SET OUT IN COUNT 10

8.1 Later in 1995, AVE ordered further Leybold equipment from Accused No 3. Accused No 3 processed the order in three separate batches under its order numbers B5531, B5533 and B5552.

8.2 In order to again circumvent the Leybold Charta referred to in count 9, Accused Nos 2 and 3 decided to adopt the same *modus operandi* as had been used in count 9.

8.3 Integrators of System Technology (IST) had conducted legitimate business with Accused No 3.

8.4 Accused Nos 2 and 3 obtained a previous official letter from the company which contained all its relative contact details as well as the signature of its Executive Director. The two accused caused the contents of this letter to be deleted. The letter was then photocopied and the components required by AVE were then typed in. Two copies of this document were made so that there would be a supporting document for each of the three orders.

8.5 These documents were submitted to Leybold together with orders for the components.

8.6 Leybold however refused to execute the orders as the provisions of its Charta had not been complied with.

8.7 In order to prevent Leybold from discovering the identity of Accused No 3's real client, Accused Nos 2 and 3 caused a letter to be drafted to a Mr G de Lange, informing him that his orders had been cancelled, because his company was not prepared to disclose where his plants were being exported to. This letter was signed by Accused No 2 and one of his employees. The letter was however neither addressed to IST, nor was any reference made to

its contact details. The letter was never sent to Mr de Lange. It was however forwarded to Leybold in order to mislead it into believing that Accused No 3 was complying with its Charta. In order to further reassure Leybold of Accused No 3's *bona fides*, Accused No 2 furnished Leybold with a copy of Government Notice No 740 of 16 April 1994.

9. THE COMMISSION OF THE OFFENCES SET OUT IN COUNTS 1 – 6

9.1 At a stage currently unknown to the State, Lerch, AQ Khan, BSA Tahir and others (hereinafter referred to as "the conspirators") entered into a conspiracy to supply Libya with a complete gas centrifuge uranium enrichment plant, dedicated to the production of highly enriched uranium for nuclear weapons production. This conspiracy was entered into in contravention of several governments' legislation and international non-proliferation regimes. The conspirators decided to appoint Accused No 2 and/or Accused No 3 to be responsible for the manufacture and/or procurement of key systems and components of the plant, namely feed systems and product and tails withdrawal systems, machine header and sub-header piping systems and centrifuge rotors. Accused No 2's motive was again purely financial enrichment.

9.2 In pursuance of this conspiracy, Accused No 2 met with Lerch and another conspirator on 27 May 1999 in Zürich, Switzerland. As a follow-up of this meeting, on 17 July 1999, Accused No 2 travelled to Dubai and on 18 July 1999, he met Lerch and his conspirators and held technical discussions with them until 24 July 1999. Accused Nos 2 and 3 became parties to the conspiracy and undertook to manufacture or procure the systems and components referred to in par 9.1 *supra*. The two accused were also responsible for arranging the export of the systems and components together with certain technology to a destination outside the country. The conspirators would then arrange ultimately for everything to be delivered to Libya.

9.3 As such, Accused No 2 was the Project Director and responsible for the design, development, production, manufacture and component procurement of all the systems manufactured and intended to be manufactured in South Africa. In addition, he was responsible for obtaining any special machinery and design data and drawings which would be required for any of the manufacturing processes. He was also responsible for all the financial aspects of the project. He was in turn accountable to the conspirators and was required to attend regular coordinating meetings with them.

9.4 Accused No 2 in turn appointed Accused No 1 as the Chief Engineer for the project and as such, Accused No 1 was responsible for numerous key technical aspects relating to the project. This would include design work, the appointment of subcontractors, the evaluation of quotations, the direction of sub-contractors' activities and the identification and sourcing of components. Accused No 1 would periodically update and advise Accused No 2 so that he could provide proper feedback to the conspirators.

9.5 All the accused were fully aware of the fact that the execution of the project would amount to a contravention of relevant South African nuclear non-proliferation legislation and that consequently, a number of steps would have to be taken to prevent the crimes being detected by the authorities. It is for this reason *inter alia* that the offence referred to in count 6 was committed.

9.6 In order to launch the project in South Africa, at the end of 1999, Accused No 1 approached Meyer (who at that stage had a 25% share in Tradefin Engineering, Vanderbijlpark) and requested a quotation from him for the manufacture of certain of the components for the project. Thereafter Meyer held discussions with both accused, concerning the project. Accused No 1 showed him sketches and drawings containing the specifications according to which he would be required to manufacture as his part of the project. The components were required for the systems referred to in Count 2. In

January 2000, quotations were compiled and submitted to Accused Nos 1 and 2. Subsequently, further additional quotations were also prepared and submitted. At that stage, Accused Nos 1 and 2 intended that Meyer would only be responsible for the mechanical side of the project and that the electrical and vacuum equipment would be supplied by Accused No 3.

9.7 In mid-2000, Accused No 2 approached Harvey, who at that stage, was a consultant to Accused No 3, to prepare a quotation for a centralised control system for a number of Skid-mounted units, which formed the product feed and withdrawal systems of a uranium enrichment system, based on the centrifugal principle. This equipment was also intended for the unlawful project referred to above. Accused No 2 informed Harvey that the project was one with which he and Lerch were involved in. Consequently, Harvey referred to the project as the "Mr Lerch Project". Accused No 1 showed Harvey plans which were going to be used as the basis for the construction of the plant. Certain of these were old Leybold Heraeus drawings, while others were sketches which had been drawn by Accused No 1 to simplify certain of the layout details.

9.8 As a result of the previous nuclear proliferation activities of the accused, they had acquired considerable reference material on which to base the design, manufacture and production of the systems and equipment necessary for the project. At stages unknown to the State, the conspirators also supplied the accused with additional documentation and other data. The reference material acquired by the accused included:

- Designs and drawings relating to a wide variety of components and equipment for centrifuge enrichment plants, mainly of Leybold origin and dated from the mid-1970's through to the mid-1980's;

- Parts lists and isometric drawings of centrifuges and header and valve connections;

- Proposals including cascade calculations for a gas centrifuge enrichment plant to produce weapons grade uranium;

- Information and various calculations and centrifuge test results of Pakistani origin, indicating *inter alia* quantities of feed required and time necessary to produce the nuclear material for a specified number of nuclear weapons. This material related to the Pakistani centrifuges which are designated P1 and P2;

- Information describing the conversion of highly enriched uranium into nuclear weapons parts;

- Various brochures and instructions for electric and electronic process control equipment;

- Cascade building design and layout drawings;

- Various process and instrumentation (P&ID) diagrams relating to centrifuge enrichment and associated ancillary equipment;

9.9 As a result of his appointment as the Chief Engineer of the project, Accused No 1 directed the design and control of the manufacturing process. Accused No 1 was involved in this capacity from the commencement of the project until its conclusion. Meyer and other persons who, at various stages were utilised as sub-contractors, worked according to the process defined by Accused No 1. As a consequence of this appointment, relying on the documentation referred to in paragraph 9.8 *supra* and on his experience gained in previous uranium enrichment projects, Accused No 1 himself generated several technical designs and drawings for components necessary for the project. These drawings were marked "DG" (his initials). At a certain stage, Accused No 1 made calculations of feed product and tail flows and enrichments

produced, indicating that the intention was that the plant to be constructed would produce weapons grade uranium. He also produced the design layout of the plant with all the systems and cascades which had been manufactured. He contacted foreign manufacturers or suppliers of components required for the project. He provided periodic updates and technical specifications to Accused No 2.

9.10 After Harvey and Meyer submitted the quotations referred to *supra*, Accused No 1 and 2 decided that Meyer would be solely responsible for all the components which they required for the plant. In this regard, it was specified that he should avoid acquiring equipment via Accused No 3.

9.11 Attempts were made by Accused Nos 1 and 2 to acquire imported flow meters. This equipment is essential for monitoring and controlling the feed, withdrawal and cascade sections of uranium enrichment plants. In this regard, Accused No 1 had dealings with a British company, which specialised in making equipment for use with UF6 in a gas centrifuge plant. This company however indicated that such equipment was subject to nuclear export control. Accused No 2 also made attempts, but on 14 December 2001, notified Meyer in writing that he could find no safe or secure solution. As a result of this dilemma, Accused No 2 requested Harvey to assist manufacturing these devices and Pirani gauges locally. After a discussion with Meyer, Harvey agreed. Accused No 1 supplied Harvey with the specifications for and the numbers of the devices required and performed engineering calculations related to the design of these units. The devices which Harvey constructed were specifically designed for UF6 application in a gas centrifuge plant. Due to the involvement of Harvey, a limited amount of equipment had to be purchased through Accused No 3. The flow-meters were based on the ones which had been supplied to India referred to in paragraph 5.19 *supra*.

9.12 For the duration of the project, Accused No 2 remained overall in charge of all the activities which took place in South Africa in connection with the project. In this regard, he met with Lerch and his other associates in *inter alia* Dubai and other countries and also gave instructions to Meyer and Accused No 1 from Germany.

9.13 On 20 April 2001, Accused No 2 proceeded to Dubai and on 21 April 2001, met with Lerch. He had arranged for Meyer to join him in Dubai, which he did on 22 April 2001. On this date and on 23 April 2001, Accused No 2 attended to "project planning" relating to the project. Meyer however did not attend this planning. Accused No 2 however made arrangements for funds which Meyer would require to fulfil his obligations in terms of the project. The first proposal was to give Meyer a massive cash payment in a foreign currency. He refused to accept such a large amount, but took a smaller cash payment from Accused No 2.

9.14 Prior to travelling to Dubai, Meyer had opened a Swiss bank account and gave the account number to Accused No 2. Accused No 2 was to arrange for his conspirators to deposit money into this bank account, so as to enable Meyer to purchase the necessary equipment and to compensate him. For the purpose of this bank account, Meyer named the project "E PROJECTS". Locally, Meyer referred to the project as "Project X". The conspirators paid into the Swiss bank account over a period of time via front companies and individuals. At one stage, a deposit into the account was made from "National for Industrial Safety, Libya". Accused No 2 was responsible for arranging all payments into this account and in this regard, had worked out a payment schedule based on the costs incurred in the various stages of the manufacturing and purchase of equipment for the project. On two occasions in his own personal capacity, Accused No 2 deposited money into this account.

9.15 Meyer also arranged for the payment of various sub-contractors, also into various foreign bank accounts. This was also to prevent the project being detected by the authorities. In this regard, he paid Accused No 1 €50 000 and 74 255 Swiss Franks (CHF).

9.16 Meyer arranged for some of the design work and construction to be done by local contractors. In addition, the vacuum pumps were acquired from a Spanish company and valves and pressure sensors were obtained from companies in Germany. In this regard, he established a front company in Switzerland in order to purchase equipment from companies situated outside South Africa. Accused No 1 played a key role in contacting certain of these companies, providing them with specifications and conducting other negotiations with them. In several instances, he communicated with them, using Tradefin letterheads.

9.17 Meyer contracted André Smit, a local engineer, to manufacture the programmable logic controllers (PLC's) to enable the computerised control of the plant. In February 2002, Accused No 2 arranged for Smit and Accused No 1 to travel to Turkey to inspect critical electrical equipment which was linked to the gas centrifuge component portion of the project. Specifically the purpose was to clarify the interface between the South African process equipment and the electrical equipment for the centrifuge cascade produced in Turkey. Turkish firms manufactured P2 centrifuge motors and high frequency power inverters needed to operate these motors. All of this Turkish equipment was handed over by Libya to the US government.

9.18 The majority of the construction work for the plant took place at Tradefin Engineering. Meyer furnished Accused No 2 with regular progress reports on the progress being made. On occasions, Accused No 2 visited Tradefin Engineering to examine the project. Accused No 1 worked for a considerable period with Meyer on the project at Tradefin Engineering. On the instructions of Accused No 2, Meyer arranged for photographs to be taken of the plant

during its various stages of construction. Accused No 2 himself took photographs of Harvey manufacturing the Pirani gauges at Krisch Engineering. An employee of Accused No 3 also proceeded to Tradefin Engineering to conduct various leak tests necessary for certain of the equipment.

9.19 In June 2002, Accused No 2 arranged for two Libyans to visit Tradefin Engineering to inspect the plant. These persons identified themselves only as Abdul and Ali. These persons displayed a comprehensive knowledge of uranium enrichment processes.

9.20 The equipment constructed comprised of the following:

- Five complete units (named MINI, 3 units and MICRO, 2 units) for feeding uranium hexafluoride into uranium enrichment cascades and collecting the enriched product and the depleted tails (waste);

- Associated vacuum stations and chemical traps, both mobile and stationary, necessary for operating and maintaining the enrichment plant;

- Cascade header piping for connecting the feed/product/tails stations to the cascades consisting of many thousands of centrifuges and for interconnecting the centrifuges;

- Process equipment including pressure, temperature and flow measuring and regulating instruments and valves;

- Programmable logic controllers (PLC's) to enable the computerized control of the plant;

- Structural steel sections, railings and gratings required to support and provide access to the equipment and instrumentation;

- The above units were complete with the exception of control and isolation valves. Only one control valve was delivered which had been acquired from a Swiss company. In a fax sent from Germany, Accused No 2 instructed Accused No 1 and Meyer not to proceed with these valves, but to use temporary spool pieces instead. A substantial number of the valves intended to be inserted into the spool piece positions were surrendered by Libya and are currently in the United States of America.

9.21 The gas centrifuge plant was based on a combination of Leybold Heraeus and Pakistani drawings and descriptions as well as Pakistani test results, experience and reference calculations. The design, based on the Pakistani designs and cascades, was, like the Pakistani originals, intended to produce highly enriched weapons grade uranium. The plant was designed to produce this uranium in four levels of cascades:

- Two blocks of cascades, C1 and C2, each consisting of 12 cascades of 164 centrifuges, would in parallel enrich natural uranium to 3,5%;

- One block of eight cascades, HC-01, consisting of 164 centrifuges each, would enrich the 3,5% uranium to 20%;

- One block of four cascades, HC-02, consisting of 114 centrifuges each, would enrich the 20% uranium to 60% enrichment;

- One block of two cascades, HC-03, consisting of 64 centrifuges each, would enrich the final product, i.e. 90% weapons grade uranium;

- The total number of centrifuges for the plant would be 5832.

9.22 The three MINI feed and withdrawal stations built by Meyer were intended for the C1, C2 and HC-01 cascade groups. The two MICRO feed and withdrawal stations were intended for the HC-02 and HC-03 cascade groups. Also included were parts for 38 valve block stations which were the physical interface between each of 38 cascades and their respective feed and withdrawal stations.

9.23 At a certain stage, Accused No 2 informed Harvey that Dr AQ Khan was a consultant on the project. Accused No 2 also produced a video, depicting the Khan Research Laboratory. This video depicted Khan's achievements in giving Pakistan a nuclear weapons capability. Certain of the equipment shown in the video of the Khan Research Laboratory corresponds with the equipment made by Meyer as designed by Accused No 1. At a certain stage, Accused No 1 acquired a brochure of the Khan Research Laboratory. On Tradefin letterheads, he drafted an enquiry to the laboratory, requesting the laboratory to supply vacuum pressure measuring equipment. This equipment was needed for the project. The one letter was signed by Meyer and the other by another member of Tradefin. No equipment was however purchased from the laboratory.

9.24 It was Accused No 2's wont to refer to Lerch as "GL". In this regard, in giving written instructions and in other documentation relating to the project, he made reference to "Project GL". Accused No 1 informed Harvey at a certain stage that Lerch was giving him technical guidance on the project. In a fax sent on 14 June 2000 from Germany, Accused No 2 informed Accused No 1 that Lerch would be visiting Randburg from 20 July 2000 for a week. In this regard, he instructed Accused No 1 to prepare himself for "*questions/advice*" relating to "*pipe work valve stations, machine piping, 3 LN_2 vessels*". In this regard, he wanted Accused No 1 to prepare an offer on an "*encrypted data carrier (for example CD with password?)*". During discussions with Meyer relating to the project, Accused No 2 would phone Lerch directly to address

technical and financial issues. In another fax communication, Accused No 1 requested Accused No 2 to arrange for Lerch to look at certain web addresses and provide him with his comments. Accused No 2 replied as follows:

> *"Full house" configuration must be obtained. GL comes about 30.8 – 1.9.2001"*

This fax related directly to the project.

9.25 The key missing component of the plant was the centrifuge rotors. In late 2000, Accused No 2 informed Meyer that his client had encountered difficulties in arranging the supply of these items. Accused No 2 requested Meyer to consider manufacturing the thin wall cylinders (i.e. rotors) necessary for centrifuges. Due to technical considerations, metal centrifuge rotors must be made on specialised flow-forming machines whose imports and exports are controlled by South African non-proliferation legislation and by the International Nuclear Suppliers Group. Accused No 2 arranged for the flow-forming machine referred to in Count 1 to be imported from Dubai and delivered to Tradefin Engineering. The machine in question had been purchased from a Spanish manufacturer by Gulf Technical Industries, United Arab Emirates. The value of the machine was assessed as being USD 300 000. A permit from the Council established under Act No 87 of 1993 was necessary for its import. The Council would never have issued a permit for the use of such a machine to manufacture components for centrifuges for a clandestine nuclear weapons programme. In order to facilitate its import into South Africa therefore, a commercial invoice was generated, describing the machine as a lathe machine (which would not require any permit) and in order to reduce the Customs duty payable, the value of the machine was deflated to USD 23 500. This was exactly the same *modus operandi* adopted when two research valves were imported from Leybold by Accused Nos 2 and 3 in 1979. The commercial invoice and other

relevant documentation were forwarded to Accused No 3. Accused No 1 faxed this and other documentation to Röhlig Grindrod which was responsible for facilitating the import of the machine and its clearance through Customs. The machine was subsequently delivered to Tradefin Engineering after plans to deliver it to another business premises did not come to fruition. Accused No 2 arranged for Meyer to acquire a data pack for the machine which included the machine manual and documentation relating to centrifuge components. Meyer approached another engineering business to explore the possibility of manufacturing these components. He furnished this firm with all the relevant documentation, including a document, describing the machine as a "*Denn model RL400/2 flow forming lathe*" with serial number 6319. Accused No 1 also furnished Meyer with the hard drive of a computer, which Accused No 1 stated was relevant to the proposed rotor production. Meyer prepared a detailed quotation for the development and manufacture of the thin walled rotor tubes, which was submitted to Accused No 2. The proposal was however, for reasons unknown to the State, not approved by Accused No 2's conspirators and arrangements had to be made by Accused No 2 to return the machine to Gulf Technical Industries. In this regard, in a fax dated 14 December 2001, Accused No 2 instructed Meyer to prepare an invoice, declaring the machine a "*used lathe machine to the value of USD53 000*" and to forward this invoice and other documentation to Ali Reza of Gulf Technical Industries. Meyer returned the original manual for the machine to "Junior" at an address supplied by Accused No 2. "Junior" is the name which Accused No 2 used when referring to Tahir. Accused No 2 also forwarded other documentation to Gulf Technical Industries per DHL. Before despatch he arranged that Tahir be contacted and informed as follows:

"The gift has been despatched with DHL."

The machine was exported to Gulf Technical Industries and under circumstances unknown to the State, forwarded to Libya. It was

surrendered by the Libyans and transported to the United States of America.

9.26 In 2002, Accused No 2 gave Meyer a contract, purporting to be between Tradefin Engineering and *"Messrs Contracting and Trade Organisation of Amman in Jordan"*. The contract date had been backdated to 20 May 2001. Accused No 2 took the contract and later returned with it. It had now been signed by Professor Tahir, purportedly in his capacity as the president of the above company. Previously, Accused No 2 had supplied Meyer with a business card for "*BSA Tahir, Managing Director, SMB Computers, Dubai.*" The name "Junior" had been written on this card. The contract related to the equipment referred to in Count 2, but purported to be for "*The design, construction, works testing, packing, delivery and supply to Jordan of five (5) high purification water treatment plants*". This was a false contract to conceal the true nature of the equipment and to allow it to leave the Republic without being detected as nuclear related equipment. Had the equipment been properly declared, its export from the country could not have taken place without an authorisation by the Minister of Minerals and Energy. The Minister would never have granted a permit for the export of equipment intended to be used for a clandestine nuclear weapons programme. In order to further prevent the true nature of the equipment being detected, Accused No 2 had instructed Meyer not to ship it in the normal mode, but to break it down and pack it into eleven sea freight containers. He also instructed Meyer to remove all the manufacturing marks and labels on the equipment. The technical drawings and other documentations which would be supplied to the client and used to erect and maintain the plant once it had arrived in Libya, contained no reference to the authors of such documentation. Accused No 2 did not want to export the goods directly from South Africa and traveled to Mozambique to explore the opportunity of exporting the goods via that country. Quotations were also obtained from Röhlig Grindrod to ship the equipment to Jordan and the United Arab Emirates. In this documentation, the equipment was also falsely described to conceal its true identity.

9.27 On three occasions it became necessary for Accused Nos 1 and 2 or both of them, to communicate directly with Tahir, concerning specifications relating to the components for the project. Three faxes were prepared and addressed to Junior, but to prevent the two accused from being linked to the transactions, the sender was reflected as "JAM-Fintrade" and no company letterhead was placed on the faxes. The faxes were sent either from a Krisch Engineering fax or a Postnet office in close proximity to Krisch Engineering's business premises.

9.28 It had at all times been the intention of the three accused and the conspirators to export the equipment and technology referred to in counts 2 to 5 to Libya via a clandestine route. However, the public disclosure of Libya's clandestine nuclear weapons programme came to the attention of Accused No 2 and made the export impossible. Since he knew that all the activities in relation to the project were illegal, he arranged for all the documentation relating to the project, stored at Krisch Engineering, to be destroyed. He had the hard drives of three computers which contained data relating to the project removed and destroyed. He also instructed Accused No 1 to destroy the data on his computer. Accused No 2 proceeded to Dubai in order to obtain instructions from his conspirators outside the country as to what was to be done with the plant and a final outstanding payment. He sent Meyer an SMS to the following effect: "*The bird must be destroyed, feathers and all*" and "*They have fed us to the dogs*." For various reasons, Meyer was not prepared to destroy the plant or his documentation relating thereto. At a certain stage, Accused No 1 took all the documentation which he had used as his reference points for designing the equipment referred to in Count 2 to Tradefin Engineering. Meyer placed this documentation in a steel trunk, which he labelled "old documentation". Meyer also placed the documentation which he and Accused No 1 had used for the manufacture of the equipment in a steel trunk, which he marked "TF current documentation". He also placed therein the video of Khan's laboratory. Finally, had the export been

proceeded with, the Libyan government would have received the relevant technical drawings and documentation containing the technology for the equipment. This would have been used to erect the plant and to operate and maintain it. This Meyer placed in a steel trunk, which he labelled "client documentation".

9.29 The equipment referred to in Count 2 was left in its sea freight containers in the factory section of Tradefin Engineering behind a corrugated iron wall. Meyer took the three trunks referred to *supra*, as well as the equipment manufactured by Harvey and Smit to a private storage facility in Pretoria where it was stored.

9.30 On 1 September 2004, the South African Police Service recovered the equipment referred to in Count 2 at Tradefin Engineering together with documents relating thereto which Meyer had not taken to Pretoria. Later, Meyer handed over the equipment referred to in paragraph 9.29 *supra* to members of the South African Police Service.

9.31 At no stage during the commission of the offences did the three accused or any of their conspirators have the permits and authorisations required in terms of the relevant legislation to perform any of the activities referred to in Counts 1 – 5.

10. BASIS OF LIABILITY: COUNTS 1 - 10

At all relevant times, in addition to their individual acts, Accused Nos 1 and 2 and their conspirators acted in pursuance of a common purpose to commit all the offences. At all times relevant to this common purpose, Accused Nos 1 and 2 were directors of Accused No 3. In the commission of the offences, use was made of Accused No 3's property, resources and personnel. Certain activities were conducted in the name of Accused No 3 and certain payments linked to the offences were made to Accused No 3. All these latter activities

were determined by Accused No 3's directors, namely Accused Nos 1 and 2. On this basis, Accused No 3 is also liable.