

Decolonization of Petroleum Education and Training in the Indonesian Oil Industry, 1950-1968

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Abstract

The article explores the decolonization of education within the Indonesian petroleum industry. The Netherlands Indies had one of the largest petroleum industries in the world with many major petroleum players involved. Despite this there was a lack of investment in training and schooling of engineers and workers in the Netherlands Indies. The article showed that the development of training and tertiary education in the 1950s was conducted by both the major oil companies and Indonesian government which invested in creating vocational training schools and university departments to meet industry needs. This development allowed for the creation of a government-run national education and research institute based in Java. The article shows that the role of the oil companies was still indispensable for the decolonization gap before the development of state-owned education institutes and the inclusion of Indonesian participation in the industry during the 1950s and 1960s. The active participation of the foreign oil industry in the Indonesianization of the industry was part of its 'exceptionalism' and the specific role oil played in the Indonesian economy.

Keywords:
decolonization;
oil industry;
technical
training;
vocational
education

Abstrak

Artikel ini mengeksplorasi dekolonisasi pendidikan dalam industri perminyakan Indonesia. Hindia Belanda memiliki salah satu industri perminyakan terbesar di dunia dengan beberapa pemain besar industri minyak yang aktif. Walau demikian, investasi dalam pelatihan dan pendidikan ahli teknik dan pekerja di Hindia Belanda. Artikel ini menunjukkan bahwa perkembangan pendidikan pelatihan dan teknik pada tahun 1950an didorong oleh perusahaan-perusahaan minyak utama serta pemerintahan Indonesia yang telah berinvestasi pada pendirian sekolah-sekolah pendidikan vokasional dan departemen teknik dalam universitas untuk memenuhi kebutuhan industri tersebut. Perkembangan ini memungkinkan pembentukan sebuah sistem pendidikan dan penelitian nasional yang dikelola negara di Jawa. Artikel ini menunjukkan bahwa peranan perusahaan-perusahaan minyak sangat sentral dalam penghapusan gap dekolonisasi sebelum penciptaan lembaga-lembaga pendidikan milik negara dan dalam penyertaan partisipasi orang-orang Indonesia dalam industri ini selama tahun 1950an dan 1960an. Partisipasi aktif industri perminyakan dalam proses 'Indonesianisasi' industri ini merupakan bagian dari 'keunikan' posisi industri ini dalam ekonomi Indonesia.

Kata Kunci:
dekolonisasi;
industri
perminyakan;
pelatihan
teknis;
pendidikan
kejuruan

Introduction

The decolonization of the Indonesian petroleum sector was enabled by the development of a new relationship between national and foreign oil companies. This relationship allowed for greater participation of Indonesians as staff, managers and technicians within the oil industry. Jean Bush Aden pointed out that the late 1950s and 1960s “signaled the entry into the international oil industry of new sources of capital, technology, managerial competence and access to markets that were often more willing to bargain and strike deals favorable to the oil-producing countries than were the majors” (Aden, 1988: 2). Yet, even prior to this, the oil majors, that is, the multinational corporations that had controlled the oil sector since its inception in the early 20th century, had already committed to investing in the so-called ‘Indonesianization’ of the industry. Thomas Lindblad makes a distinction between the processes of ‘Indonesianization’ and ‘nationalization’ of industry as part of an economic decolonization effort. Indonesianization was the process through which Indonesian agents and agency is introduced and become core parts of the industry so as to ensure a certain level of ownership in the industry. While nationalization was the takeover of foreign ownership of a business, which for the Dutch businesses in Indonesia occurred in 1957 (Lindblad, 2008: 206). Localization was a policy that was implemented in many places around the globe. Shell called this process ‘regionalization’. Keetie Sluyterman has pointed out that the localization of subsidiaries of multinational firms allowed for a new relationship to be created between expatriates as ‘essential for creating a social network that enables knowledge transfer and control. For local subsidiaries, becoming part of that international network through exchange of staff could be more important than getting rid of all the staffs’ (Sluyterman, 2020: 1183)

As Lindblad has shown, Dutch companies were less willing to undergo Indonesianization than companies from other countries like the US and Britain (Lindblad, 2008: 175). Even then, most of the Indonesianization occurred at the lower levels, with upper management still in the hands of foreign expatriates; however, the petroleum industry was somewhat different in this regard. William Redfern has noted the ‘exceptionalism’ of oil companies as a result of their greater bargaining position vis-à-vis the Indonesian government. Oil companies were multinational corporations which had high levels of engineering and technological know-how thus posing a barrier to entry, while at the same time, it was the largest source of foreign investment and foreign exchange (Redfern, 2010: 154). It was not feasible for the Indonesian government, due to the lack of technical manpower and technological capabilities, to nationalize the industry. The process of oil exploration, refining and production all require significant scientific and technological inputs.

This strategic scientific and technological exceptionalism also made it unique in the investment and provision of education and training. While other industries provided scholarships for Indonesian students to national universities as part of their *Indonesianisasi* (Indonesianization) program, some of the oil majors like Shell put in millions of rupiahs developing training institutions, while others developed their in-house training and strengthened relationships with national universities and local society. This was particularly significant in light of the tiny colonial endowment in the education, research and training of the petroleum sector. Unlike the structural retrogression that is seen by Anne Booth in the economy during the end of the 1950s and early 1960s (Booth, 1998: 70-72), the oil sector has been investing in the legal, institutional and manpower needs that would become the foundation for its growth during the New Order period. Jean Bush Aden pointed out that by the 1980s, *Pertamina* and its foreign contractors spent 2.5 billion dollars on exploration and development through subcontractors, which included exploration, production, storage and transshipments. By 1987, there were ten Indonesian-owned drilling company subcontractors (Aden, 2018: 89-90). This is not only limited to the business sector. The Indonesian Petroleum Association founded in 1971, for instance, is a non-profit organization with the objective of increasing and sharing exploration, production and refining knowledge amongst people within the industry (Arne & Phoa, 1981: 1-2). It is composed of Indonesian and foreign petroleum experts.

The article will take a broad look at the development and expansion of both vocational training and tertiary education in post-colonial Indonesia in the context of the decolonization of the petroleum industry. In particular it looks at the actions of Indonesianization of the oil companies Shell, Stanvac and Caltex and the Indonesian government in the 1950s and how it came together during the 'integration' of the Indonesian petroleum industry under *Pertamina* since the early 1960s. What this shows is that it was in the interests of global oil companies to invest in training and education. To what extent this may have helped them stay on in Indonesia is difficult to gauge. Shell eventually left the country in 1965, but Stanvac and Caltex continue to operate until today. The legacy of their decolonization effort remains significant in understanding the present-day Indonesian petroleum industry. We will look first into colonial endowments in petroleum education, the effects of the Japanese occupation period and later on the introduction and expansion of the sector after the transfer of sovereignty at the end of 1949 which signified the end of the revolutionary war for independence and the start of the Indonesia as an independent Republic. We will show the extent toward which the oil majors played a pivotal part in understanding the decolonization of the petroleum education and how this 1950s endowment was pivotal for the legal and institutional buildup of the decolonized oil industry that emerged since the start of the 1960s.

Transnational Companies and the Lack of Colonial Vocational Funding

The Netherlands had by the early 20th century emerged as a major player in the global oil industry due to the dominance of the Royal Shell Corporations, one of the so-called ‘Seven Sisters’ of global petroleum companies. The Netherlands government, from the time of taking over control of the East Indies in the early 19th century, readily appreciated the potential profitability of the underdeveloped mining sector. In 1846, the Minister of the Colony, J.C. Baud directed the development of mining engineering education at the Delft Institute of Technology. The development of the petroleum industry in the United States from the mid-1850s had signaled the industry’s potential for development in the Indies. Amsterdam Professor E.H. von Baumhauer sent a letter in 1863 to the Minister of the Colony, J.J. Fransen van de Putte, pleading for him to initiate a scientific study of potential petroleum sites in the Indies. Under Governor General Sloet van de Beele later instructed the Head of the Mining Department to study oil seeps of the Indies and W.H. de Greve, an engineer obtained the assignment to write a report on possible petroleum deposits. He published his report in the journal *Tijdschrift voor Nijverheid en Landbouw in Nederlandsch Indie* in 1865 titled “Petroleum and oil (*aardolie*) and its appearances in Netherlands Indies.” Fifty-two locations were noted by him as having potential for petroleum exploration (de Ruiter, 2016: 68-69, 84-85).

In 1873 a mining law was promulgated to promote private investment in the Netherlands Indies’ mining sector. This law was amended in the 1901 and was designed to protect Dutch interests in the petroleum sector. New regulations were issued in 1918 which stipulated greater state involvement and the protection of Dutch and Indies workers in the petroleum sector (Gerretson, 1939: 440–447). By the early 20th century, three global oil companies were active in oil exploration and production in the Indies. Royal Shell oil company, a Dutch-British joint company, whose shares were owned by many leading families in the Netherlands including the Dutch royal family with its subsidiary *Bataafsche Petroleum Maatschappij* (BPM) and the American companies Stanvac (*Nederlandsche Koloniale Petroleum Maatschappij*–NKPM) and Caltex (*Nederlandsche Pacific Petroleum Maatschappij*–NPPM). There was also a Shell-government joint venture company, NIAM, which developed oil wells at Jambi. BPM was the largest with refineries in Balikpapan and Plaju and various oil sites in Sumatra, Borneo and further afield. Stanvac (part of what is now known as Exxon) had a refinery at Sungeigerong while Caltex (now known as Chevron Indonesia) did not have a working well by the end of the colonial period but had been developing the Rokan oil field in Sumatra (Lindblad, 1989: 53–77; Gerretson, 1936: 39).

The Netherlands Indies became a major global oil producer, becoming

the fifth largest producer by the early 1940s. The development of large installations and refineries, the largest of which was in Balikpapan, Dutch Borneo, was accompanied by the application of considerable engineering and technological know-how in the Indies. Balikpapan refined 65% of all the oil produced in the Indies. The Indies mining law required that 75% of the workers were Dutch or Indies citizens. Yet, it was clear that the majority of engineers, geologists and staff members were Europeans from Dutch, British, American, German, Romanian and other European countries. Even so, Balikpapan, for instance, had by 1921, some 15 thousand workers and personnel working for the BPM with around 500 European staffs and 14.7 thousand workers comprising 55% Javanese and 30% Chinese (Zondervan, 1924: 34). The large percentage of Javanese and Chinese-Indonesian workers indicates their importance to the industry. This also meant that Indonesians had been involved in the petroleum industry since the very beginning. Yet, there was a difference in the level of industry-related skills and knowledge for Indonesian compared to European workers. Europeans held managerial and field supervisory positions, while Indonesians did most of the manual work. By the end of the colonial period, there was a total of 733 'Europeans' and 1066 'others' working as field staff for the big three oil companies who were overseeing over 18 thousand field laborers (Sutter, 1959: 66). To what extent was these 'others' represented 'Indonesians' is not clear, but it is generally thought that very few Indonesians took on higher level staff position.

While the colonial education system did place an emphasis on engineering education in both vocational and tertiary levels, it was lacking for the petroleum industry. Vocational education had been developed since the late 19th and early 20th century. For Indonesians, an elementary level system of trade schools (*ambachtscholen* or *sekolah toekang*) were developed since 1909, to integrate more 'natives' into the industrial sector of the colony (Brugmans, 1938: 315).¹ At a higher level, a vocational school *Koningin Wilhelminaschool* was built providing courses in civil engineering, mechanical engineering, and mining engineering (*mijnbouwkundige*) (Brugmans, 1938: 342). In 1911, the Prins Hendrikschool was established in Yogyakarta and represented the first fully technical middle school in the Indies and this was followed by the establishment of *Koningin Emmaschool* in Surabaya in 1912. These middle-level schools were primarily built to cater for Indo-Europeans and European children, aside from well-to-do Indonesians. While the specific number of graduates who would enter into the petroleum industry is not known, they would have provided a significant number of oil workers especially as the majority of workers by law had to come from Dutch and Indies society.

At the tertiary level, the engineering school in Bandung, a sister institute to the Delft engineering school, was opened in 1920. While initially the

1) A two year *ambachtsleergang* and a three year *ambachtsscholen* were created.

curriculum was designed for civil and chemical engineering, it was decided to focus only on civil engineering (*de Technische Hoogeschool te Bandoeng*, 1920: 4). Clearly, civil engineering graduates were very important for the development of facilities at the boring sites, refineries and oil towns but their involvement in oil exploration and refining capabilities would have been limited. On-the-job training and learning by doing was obviously an important component of industry training, yet designing installations, reading field reports and other high level scientific analysis would likely not be covered.

Thus, while there were opportunities for less skilled Indonesian workers and staff to rise within their careers, it was going to be limited because of access to education and so confined to particular streams of work. Bartlett has noted that the Djohan, an Indonesian who had taken the lead in nationalizing the Pangkalan Brandan oil fields during the revolution, was himself a former BPM employee who had finished his education in a vocational school and joined the company as an apprentice laborer. He later became supervisor of the refinery repair and maintenance operations. By the 1930s, he had become Shell's head of maintenance and repair and was sent to the Netherlands for a six months technical training course (Bartlett et.al., 1972: 68). The Permiringan engineer J.M. Pattiasina also had a similar career progression. He would become one of the right-hand men of Ibnu Sutowo and thus a major figure in Pertamina later on (Bartlett et.al., 1972: 149-154).

Because of the multinational nature of the major oil companies in the Indies, many of the research and technical personnel were sent from other parts of world. By 1939, the Shell company had 2000 people working on scientific research for the company mostly at the Shell Laboratory built in 1914 in Amsterdam. A laboratory to research oil for automobiles was also established in Fulham, England employing 200 people. In the 1930s Shell (opened another laboratory in California and the Netherlands *NV Koninklijke Nederlandsch Petroleum Maatschappij*, 1950: 155-166). The Netherlands Indies itself thus never became a site for research and technology development. The oil companies were not integrated strongly to the scientific establishment of the Netherlands Indies, instead maintaining a line of contact with their institutions in other parts of the Western world. In the Indies, the oil industry staff and workers were mostly confined to the oil towns in Balikpapan, Pladjoe or Sungeigerong. These places were often carved out of the jungle and were thus isolated from other parts of the Netherlands Indies, in particular Java. Given this geographical remoteness, it is likely that the oil industry had weak linkages to the research and educational institutions in Java.

The limited scope of petroleum education and training in the Netherlands Indies limited the opportunities for greater inclusion of Indonesians. The lack of tertiary education and the focus on on-the-job training or provision of partial training abroad for a select few meant a

disparity in levels of skills and knowledge. There was a paucity of Indonesian graduates from the tertiary colonial education system, with only 400 engineers out of the 1000 professionally trained Indonesians by 1942 (Neff, 1961: 1). The shift towards greater Indonesian participation in the industry was felt as a result of the depression. BPM for instance reduced their European personnel by half from 3000 in 1929 to just 1500 by 1936, resulting in what was then termed as Indonesianization for some positions in the industry. (Derkson, 1938: 32-34). Yet, even then, this did not result in any major investments or overtures toward developing an independent educational system. It was only by 1941, just prior to the Japanese invasion, BPM did open a training school in Cepu in East Java and Balikpapan in Borneo where BPM refineries were located. This vocational school was named the Middelbare Petroleum School and was a two-year course teaching skills for various functions: assistant geologist, assistant exploitation engineers, assistant terrain machinist, assistant bore-specialist and factory assistant (*Bataviaasch Nieuwsblad*, 14-06-1941: 2). The war in Europe and the difficulty of sending engineers abroad prompted Shell to commence the petroleum education with government subsidies (*Soerabaijasch Handelsblad*, 31-10-1941: 4). The first course which started in September 1941 was one of the most significant developments in petroleum education in the colony; however, it would not run to completion for the first intake of students as Japan had taken control of the Netherlands Indies by March 1942.

The Effects of the Japanese Invasion

As Eric Dinmore has noted, the Japanese saw the oil of the Netherlands Indies as a crucial component of its war objectives. The Japanese need for Indonesian oil had developed since the 1930s. In October 1941, the Japanese had already mobilized civilian oil technicians and requisitioned various equipment such as rotary cable rigs and cable tool rigs to be deployed to the Indies. Japanese oil technicians and workers numbering 12 thousand or 70% of the total Japanese oil technicians were sent to Southeast Asia, mostly to Indonesia. The government backed the creation of the Teikoku Oil Company, who, along with the Nisseku and Mitsubishi oil companies invested manpower, time and money to re-establish oil production in the Indies (Dinmore, 2018: 117-118). This was called the *Nanpo Nen-ryosho Butai* (Detachment Commission for Southern Oil or NNB) (Djokopranoto et.al., 2009: 39). Many of the refineries of the BPM were destroyed under the Dutch scorched earth policy, including much of Balikpapan, to prevent them being taken over by the Japanese. Some refineries were relatively undamaged, in particular the Stanvac refinery in Sungeigerong. Most of the oil fields in Java and over 60% of those in South Sumatera had been taken over by the Japanese which had suffered minimal damage (Sutter, 1959: 134-135); however, around 70% of all installations

in the oil industry were damaged. The Japanese quickly re-established the industry and by 1943, the production of oil had risen to 50 million barrels annually, although this was still lower than the 1940 output of 65 million barrels.

In March 1943, the authorities advertised for former Shell and Stanvac employees to come back to work without regard of nationality. Few Dutch personnel answered the call (Sutter, 1959: 142). Japanese action was fundamental to changing the labor relationship and opening up opportunities for Indonesians to rise up the ranks. Another important change was in the field of education. The Japanese established an Oil and Gas Institute in Bandung and provided education for Indonesians in petroleum engineering and management. Some Indonesian may have received education at the Teikoku's education facilities in Akita and Niigata (Dinmore, 2018: 119). The Japanese thus started a shift toward petroleum education and eventual research on the island of Java.

In June 1942, the Japanese oil company, Ken Nen Ryosho sent Mr. Sima and Mr. Nakamura to Surabaya and Malang in East Java to conscript forced workers (*romusha*) for their oil operations. The workers were promised wages and education. Early July, one thousand youths divided into sections of 20 were sent by boat from Surabaya to Sanga-sanga in Borneo to work in the oil installations. In 1943, even larger batches of *romusha* were sent from Central Java to the oil installations of Sanga-sanga (Sainal, 2019: 35-37). This illustrates the shifting composition of workers during the Japanese occupation. While, there had been a large influx of Javanese workers during the colonial period, the addition of *romusha* would later on contribute to strengthen the Communist-affiliated oil workers union (Perbum) in many oil installations. One estimate in the post-war period calculated that former *romusha* workers comprised about a quarter of Caltex's total workforce in Minas which had been operational since 1951 (De Nieuwsgier, 18-10-1952: 3). They most likely had been the remnants of the Javanese *romushas* transported there for the Japanese successful drilling of the Minas field in 1944 (Dinmore, 2018: 118-119).

On 2 January 1943, a Japanese group of technicians and administrators of around 1500 arrived in Sanga-sanga. By February 1943, around three thousand forced laborers from Central Java arrived to strengthen the workforce and were divided into groups of fifty. The groups included machinery workshop group (*perbengkelan*), carpentry (*pertukangan*), welding and lathe (*las dan bubut*), road and bridge construction (*pembuatan jalan dan jembatan*). By 1943, there were around 613 wells that were producing oil in the area, with a total of ten thousand workers supporting oil production (Jasji & Soedradjat, 1985: 71-75). In Pangkalan Brandan, a training school called the Shonenko was created to train technicians or tradesmen (*tukang*). There

were four classes conducted during the war (Sapardiman, 1987: 21). Since 1944, the installation at Jambi had been holding courses on boring, petroleum geology and well maintenance taught by Japanese experts (Taufik Ismail, 1997: 113). The NNM started a petroleum school in Plaju named the Nanpo Sekyu Kagyo Gakko, where Indonesians were trained for one year, while another course was held at Pangkalan Susu (Djokopranoto et.al., 2009: 50). While the training school at Cepu which was a continuation of the Petroleum Middelbare School, was called Sokogakko.

These developments were also important in another respect. The Japanese supported Indonesian capability and, in some cases, pushed for Indonesians to take over the installations in the effort to deny the Allies access to these facilities. The inculcation of a fighting spirit through martial arts training and education that was integrated with their own technical training resulted in creating highly political groups within the various oil installations that were ready to take their part in the effort for independence.

The Postcolonial Landscape of the Petroleum Industry

We can divide the post-colonial development of the Indonesian petroleum industry into two periods. The first period occurred after the end of the Japanese occupation up to 1959 in which the sector was divided into two groups that is, nationalized and western oil companies. The second period covers 1959–1968 under Sukarno's Guided Democracy through which reorganization of the petroleum sector would result in the unification of the industry under the state-owned oil company, Pertamina. The conditions of these two periods determined the development of petroleum education.

The period after independence saw a split of the oil industry into national and western-owned components. Although Shell and Stanvac rode the wave of the Dutch advance to rehabilitate their former oil installations, the end of colonialism was already evident. and both companies took it upon themselves to promote policies of Indonesianization. Soon after the Syahrir government was appointed in 1946, the head of Stanvac Indonesia, Edward Leibacher along with the American consul, Walter Foote, approached the Prime Minister as to their intent on resuming operations of their plants in South Sumatra (Aden, 1988: 62). Throughout this period, the oil industry was actually in declining. During the colonial period, Indonesian oil production represented 75% of all oil produced in the Asia Pacific, while by the 1950s this shrunk to half of the total for the Asia Pacific (Bartlett et.al., 1972: 1-2).

The Republic had lost control of most of its major oil fields, with the exception of those in North Sumatra around Pangkalan Brandan, the Jambi fields in southern Sumatra and the Cepu fields in Central Java. While the Republic was reluctant to acknowledge the takeover of Indonesian workers so as not to alienate western nations in their diplomatic effort to gain recognition

for independence, much of the oil installations under non-Dutch hands had become independent companies. The communist unions created the Union of Oil Workers (*Persatuan Buruh Minyak*). They controlled half of the oil fields of Cepu in East Java, with the other half taken over by Shell (Bartlett et.al., 1972: 75-76).

In Northern Sumatra, the oil fields and refinery of Pangkalan Brandan were handed over to the Governor of Sumatra, Teuku Mohammad Hassan in late 1945. The role of Djohan as a former Shell employee was important in the formation of the oil company in North Sumatra. With the Governor's approval, *Perusahaan Tambang Minyak Negara Republik Indonesia* (the Republic of Indonesia Petroleum Mining Company, PTMNRI). When the Dutch attacked the area in 1947, the workers destroyed the facilities. As a result, Shell decided to postpone rehabilitating the refineries of Pangkalan Brandan (Bartlett et.al.: 106-107).

An organization called *Angkatan Pemuda Indonesia Minyak* (API Minyak or the Indonesian Oil Youth Brigade) was created by the oil workers in the Plaju and Sungeigerong under the leadership of *Insinyur* (Engineer) Johannes Marcus Pattiasina. Like Djohan, Pattiasina had worked at Shell during the colonial period when he joined the technical staff specializing in refinery maintenance and operations at Plaju in 1935. He was one of three senior Indonesian technicians at the BPM in South Sumatra and had contributed to the development of the technical school in Plaju (Bartlett, 1972: 73). He would be instrumental in the creation of the *Peroesahaan Minyak Republik Indonesia* (Republic of Indonesia Oil Company–*Permiri*) alongside Dr. Mohamad Isa, Chief of Mineral Affairs for the Palembang district (Sutter, 1959: 308). The coterie of leadership of the South Sumatra included Ibnu Sutowo, who was the military commander of Palembang at the time (Aden, 1988: 67-68). Both Sutowo and Pattiasina would become the senior managers of Pertamina later on.

Petroleum education development went along separate government and company lines. The government primarily developed education institutions in Java while western oil companies rehabilitated and expanded their education initiatives at oil towns outside of Java. Thus, there was a Java-based oil education system developed at the university level, while oil companies developed their educational facilities in the oil towns close to where they operated.

Development of National Oil Education in 1950s

By the end of the colonial period, it was estimated that the number of trained Indonesians working in the oil industry numbered one thousand, with 400 technical engineers. The government estimated that the number of engineers needed by the end of the 1960s was around 7500 people. This

would require graduating over a thousand engineers per year, a far cry from the ten Indonesian engineers that graduated each year during the colonial period (Neff, 1961: 1). The school of engineering, based in Bandung, was split during the revolutionary war for independence with the Republicans developing an engineering school at the Republican capital of Yogyakarta, which would later on become the Faculty of Engineering, Gadjah Mada University. The engineering faculty in Bandung was restarted in 1946 and added a Department of Chemistry in 1947, Department of Mining in 1949 and Department of Geology in 1949 (Sakri Adjat, 1979: 50). The Department of Petroleum Engineering would commence only in 1963, thus for the entirety of the 1950s, companies hired petroleum engineers graduating from the petroleum course of the Department of Mining (Soemarso, 1988: 311).

The Department of Petroleum Engineering would be headed by Dr J.H. Katili, a geologist who had obtained his PhD at the Faculty of Engineering in 1960. The Department of Geology was opened in 1949 under Prof. T.H.F. Klompe who had returned to Indonesia in 1947 to help rebuild the science and technical faculty of Universitas Indonesia in Dutch-controlled Bandung. The Department of Geology was divided into geology, petrology and paleontology with Prof. de Waard teaching petrology. The first geology course commenced in 1950 with four Indonesian students who had to finish their studies at the Delft Institute of Technology. The first intake of geology students went on to have important careers in Indonesia, Soetandyo Sigit would become Minister of Mining (Kadjat & Nusantara, 2007: 59-73), and Sartono Sastromidjojo obtained a scholarship from Stanvac (Ratih Poeradisastra et.al., 2016: 89).² In 1957, de Waard, Klompe and the rest of the Dutch professors were forced to leave Indonesia under a wave of anti-Dutch sentiments resulting from the abrogation of the Indo-Dutch Union. While the foundation for petroleum science had been initiated under Dutch professors, by the end of the 1950s, *Institut Teknologi Bandung* (Bandung Institute of Technology–ITB) had still not graduated any petroleum engineers. Of the 1611 ITB graduates between 1945-1963, only two had a degree in petroleum engineering (Maney, 1965: 298).

In the Republican heartland of Central Java, the mining and geology service based in Magelang, a town one hours distance from the capital of Yogyakarta, opened the Mining and Geology High School (*Sekolah Pertambangan dan Geologi Tinggi*, SPGT). In 1949, the school moved to Yogyakarta and was renamed as the Geological Mining Academy (*Akademi Geologi dan Pertambangan*–APG). In 1961, this academy would be moved to Bandung in order to be close to the geologists who teach at ITB (Ibrahim Hasyim and Arifin Maximon Shah, 2010: 83). There were thus efforts within

2) He opted to become a professor at ITB and work at the directorate of geology instead of entering Stanvac, conducting research on “Java Man” in Sangiran alongside Teuku Jacob and R.P. Soejono since the 1960s.

the state to develop tertiary education in both ITB and the mining academies. These efforts were also supported by the oil companies as confirmed in the scholarship that was awarded to Sartono, but also with increasing relationship between ITB and the Stanvac training institute at Sungeigerong.

In Republican held-oil facilities, training seemed to be based on apprenticeships and learning-on-the-job. The efforts by Djohan in North Sumatra and the Permiri people in South Sumatra probably used what had been retained from Japanese training during its occupation. The most significant development in petroleum education in the 1950s to be developed was not by the state and its education institutions in Java, instead it was developed under the aegis of the foreign oil companies particularly in the oil towns and areas of operations in the Outer Islands. These oil companies thus played an important role in bridging the gap of creating skilled workers that would later on be crucial players in the process of creating a national education for the petroleum sector. The next section looks at the activities of each of the oil companies in order to understand the extent of their activities in the 1950s.

BPM/Royal Shell

Significant changes and institution building and the Indonesianization of expert production occurred often with the close cooperation of the major oil companies. BPM's policy however, was not coherent and affected by increasing anxiety about the viability of its future in the country. Ironically, its role in the decolonization of the experts role in production was the most significant amongst the major oil producers. Perhaps because BPM had the strongest image linking it with the colonial past, it was also one that showed its strongest commitment to decolonize. By 1956, from the total 2140 employees, Indonesian account for 46.5% or 995 as staffs. 95.3% of the total workforce of 24.500 people were also Indonesians. Traditionally, workers have always been majority Indonesians, but staff members had initially been overwhelmingly foreigners, including Dutch and Chinese Indonesians (Javabode, 25-07-1956: 2).

Changing its name to Shell in 1956, the company had earmarked some 10 million rupiahs into various education investments, including allocating some 1 million rupiahs annually to send Indonesian abroad for study. At the Shell facility in Plaju, the same development occurred with the formation of various courses for Indonesian employees. A company vocational school (*bedrijfs vaksschool*, BVS) was opened for people who had completed their primary education. The course lasted for a year. This was the foundation of Permina's later Technical Education (*Pendidikan Kejuruan Teknik*) (Sapardiman, 1987: 21). Seven employees were made instructors. There were 260 students of between 17-22 years old getting pocket money

and studying on various skills such as mechanics, welders, locksmiths and refinery personnel, also topography and geological drawing (*Leven en werken in de bedrijven der NV de Bataatsche Petroleum Maatschappij (Koninklijke/Shell Groep) in Indonesie*: 4).

PAM

The Pendidikan Ahli Minyak (PAM) was perhaps the most important petroleum school in Indonesia and played a pivotal role in the decolonization of the petroleum industry in terms of increasing Indonesian participation. The school ran its course between 1950 until 1962, through which 260 petroleum engineers were trained. Data from the year 2000 showed that 163 (63%) went on to have a career at Pertamina, 17 people left to the Netherlands and other countries,³ 39 worked in various oil companies and 16 worked for the government, the rest had died before their pension (Djokopranoto et.al., 2009: 72). The PAM was initially opened in 31 October 1950 in Prabumulih as *Sekolah Menengah Minjak* or Petroleum High School and was renamed into PAM in 1955. The head of the BPM, Dr. Ir. K.P. Debrunner and a representative of the Ministry of Education and Culture, Mr. Hadi, ceremonially opened the school. A member of the Perbum union along with Resident Rosak filing in for the Governor of South Sumatra gave speeches. This school was related to the earlier Middelbare Petroleum School (MPS) that was opened less than half a year prior to the fall of the Netherlands Indies to the Japanese in October 1941 at Cepu and Balikpapan. The school was renamed into the Sokogakko by the Japanese and continued as a center for petroleum training. After independence, both Cepu and Balikpapan was effectively abandoned for the purpose of education. The facilities at Balikpapan were damaged under the scorched earth policy implemented by the company prior to the fall of its facilities in Japanese hands.

PAM had opened its doors to students in 1951 with its first intake comprising 24 students, with 12 Indonesians, 9 Indo-Europeans and 2 Chinese-Indonesians. Its aim was to produce professionals in drilling, production, petroleum engineering, refineries and topographies. (Djokopranoto et.al., 2009: 70-71.) The philosophy of the school was distilled in its motto “What I hear, I forget. What I see, I remember. What I do, I know.” (Djokopranoto et.al., 2009: 72). This motto emphasized a learning-by-doing approach as opposed to learning theory. The school was primarily vocational in nature. By 1960, it had produced some 260 expert oil workers from ten graduating classes. There were ten study courses from general geology (*algemeene geologie*), boring (*boormeester*), exploitation engineer (*exploitatie ingenieur*), processing (*fabriek*), material and logistics (*materiaal*), maintenance technique

3) 15 Indo-European students had returned to the Netherlands as they opted for Dutch citizenship.

(*technische afdeeling*), mechanical engineering maintenance and production technique (*terrein machinist*), production field/maintenance (*productie machinist*), and lastly topography (Djokopranoto et.al., 2009: 98-104).

Aside from the technical courses, the school itself inculcated modern values within students. They lived on the production site of Prabumulih in a hall with structured schedules and activities. Students from Javanese cities like Yogyakarta or Malang experienced a culture shock greater than their forebears that had entered colleges during the colonial period. These students had experienced almost a decade of war and deprivation in a country that had experienced significant economic and governmental disruption. Becoming a student of the PAM was to become a special member of a special society. Oil installations were located in remote inland areas that were microcosms of fully functional isolated societies. They had their own housing, medical system, grocery stores, internal policing, entertainment areas, movie theatres and other facilities. The personnel did not so much work, as participate in a sort of pageantry of mining modernity. In an article on the Caltex oil town of Rumbai, the journalist wrote "In truth: life in Rumbai has been made so comfortable, that the visitors from the big cities (of Java) wonders in his heart whether he is visiting the jungle or whether he is coming out of the bush himself!" (*De locomotief*, 20-10-1954: 6).⁴ Not only in oil installations, but various mining operations that existed in remote parts of far-flung islands; from the tin mines of Bangka, the copper mines of Sulawesi and the gold mines of Papua, these simulacra of technologically advanced societies, islands of modernity and a modern way of life was often contrasted to the very basic living conditions of the indigenous societies that surrounded them.

Aside from the petroleum colleges located in Prabumulih and Plaju, Shell had also developed education facilities in Java. An education center had been established in Bandung for a six-months course for its marketing division (*handelszaken*). They also developed company vocational schools in Plaju, Balikpapan and Surabaya. The courses offered included courses for laboratory personnel, factory supervisors, instrument repairers, radio engineers and various administrative courses and courses for marketing organizations. The company also gave scholarships to Indonesians to attend universities in Indonesia and the Netherlands. By 1956, there were 18 students at UI, 4 at UGM, 11 at the Academy of Trade (*Akademi Perniagaan*), 1 at the National University, 1 at Delft Engineering College and 1 at Rotterdam Business School. In total, 40 Indonesian students were sponsored by the BPM by 1956 to study at various universities and colleges in Indonesia and the Netherlands (*Java-bode*, 25-07-1956: 2). By 1957, BPM budgeted 2 million

4) 'The American Way of Life' doorgevoerd in the wildernis. "In ernst: het leven in Rumbai is zo comfortable gemaakt, dat de bezoeker uit de groote stad zich in gemoede afvraagt, of hij nu een visite in de rimboe brengt of dat hij misschen zelf uit de rimboe komt!"

rupiah annually for university education (*De Preangerbode*, 31-10-1957). As part of its commitment to the new government, Shell provided education to members of the national army who were called Oil Officers (*Perwira Perminjakan*). This occurred after the transfer of sovereignty at the end of 1949 through an agreement between the Ministry of Defense and the so-called Petroleum Board, which consisted of representatives of the three large oil companies. The curriculum included field training along with additional theoretical courses in Bandung.

Stanvac

By the end of the colonial period, Stanvac had made a capital investment of some 65 million dollars in Indonesia. Stanvac had personnel with decades of experience in Indonesian oil operations and in the well-established oil markets in Asia (Higgins, 1957: 2). Stanvac had promoted Indonesianization since its return to Indonesia in 1947. In 1948, a training director and two assistants were appointed to the training schools at Sungeigerong and Pendopo. By 1949 the training schools had 634 students enrolled in classes from basic and intermediate English, typewriting, shorthand and literacy to job training in the refinery and production areas. Starting from 1951, mid-level technician training was introduced. Technical training included pipe fitting, surveying laboratory, transportation and welding. A broader education plan included a four-year course for employees who wanted to work as tradesmen. Importantly, the fifteen groups of overseas employees undertook Bahasa Indonesia courses signifying their commitment to stay in independent Indonesia (Higgins, 1957: 26).

By 1955, around a thousand employees were attending classes provided by the company. Between 1949 to mid-1956, the proportion of Indonesians in technical, advisory and supervisory jobs had increased by 28% (Higgins, 1957: 51). Yet, this was not considered a marker of success as “vigorous recruitment efforts in Indonesia have not turned up the needed number of (Indonesian) nationals with requisite educational backgrounds to fill the large number of technical posts.” (Higgins, 1957: 77-78). Thus, aside from developing its own in-house training facilities, it also envisaged greater cooperation with the engineering faculty in Indonesia and sending their workers abroad for further education. This higher-level academic engineering development was conducted through increasing cooperation with the engineering faculties in Bandung and Yogyakarta, aside from sending its staff members abroad for further education.

Stanvac’s vocational training program in its Sungeigerong facility, was not developed into a full petroleum college. It did provide scholarship to Indonesian students (Ratih Poerwadisastra et.al., 2016: 89). After obtaining a ‘let free agreement’ in 1954, it began investing some 70-80 million dollars

to develop the new field in Lirik, laying down a pipeline and constructing a road connecting Lirik field to the bank of the Siak River. It also modernized its Sungeigerong refinery and conducted Indonesianization up to the highest management (Bartlett et.al., 1972: 107). Stanvac's *Indonesianisasi* program, dubbed the 'I-program' was considered an important policy. By 1955 around a thousand employees were being trained by the company. A training group in Sungeigerong had classrooms, lecture halls, libraries and learner shops, with education in welding, laboratory work, pipe fitting and layout, electrical work, petroleum analysis, motor vehicle driving and mechanics. The facilities at their Sungeigerong location were considered so state of the art that Stanvac business conference was held at its Club House where representatives of Stanvac from the US, Indonesia, Australia, South Africa, Singapore and India met in 1955 as part of its bi-annual company conference (*Javabode*, 21-04-1955: 2).

Instructors from the New York Trade School and the ITB were flown in. Employees were also sent to Bandung to receive training at ITB. By 1956, seventeen students had finished taking courses in chemical engineering, geology, civil engineering, electrical engineering and mining in Bandung. One student completed a course in the law faculty of University of Indonesia in Jakarta. Aside from technical training, Stanvac was the most enthusiastic amongst the oil companies in providing training for mid and upper level management (Higgins, 1957: 76). By 1953, several departments had achieved total *Indonesianisasi*, including the Refining department, the day foremen at the Process Division and drillers at the Producing Department. Three out of four people in supervisory and administrative positions of the Employee Relations department and four out of five people at the Financial Department had been filled by Indonesian by that year. Dutch supervisory posts went down from 68% to 40% of total supervisors, while Americans increased from 13% to 30% (Higgins, 1957: 77). Stanvac's training program following the Training Within Industry program (*bedrijfskader training* in the Netherlands) for the training of supervisors was considered such a success that the ILO requested it provide places for foreign students at their training facility in Sungeigerong. By 1957, there were 278 Indonesian staff employees. Stanvac had invested further during the year at its Sungeigerong facilities developing a catalytic cracking unit and polymerization plant with the plan that its cracking unit could be handled fully by Indonesians within a five year time frame (*Het Nieuwsblad voor Sumatra*, 26-10-1957: 2).

Stanvac general education (*Pendidikan Umum Stanvac*) courses were held the Stanvac (SVPM) boarding school (*internaat*) in Jakarta rather than at its Sungeigerong or Pendopo facilities. This boarding school started in 1951 and had by 1955 produced sixty-one trainees brought in from their facilities in Sungeigerong and Pendopo (*De Nieuwsgier*, 20-04-1955: 3). Stanvac also

actively recruited students. For instance, in March 1957, it sent a team to meet with students and professors at the engineering faculty in Bandung (*De Preangerbode*, 09-02-1957: 2). By the same year, the company had already sent some thirty students abroad since 1952 (*Java-bode*, 17-03-1957: 3). In the same year, Stanvac sent 15 people abroad for further study, including 11 staff to England with 9 of them going to a specialization course at the Fawley and Cadigan refineries, 3 to Belgium at the Antwerp refinery and 1 to the US (*Java-bode*, 18-05-1957: 3).

Caltex

Caltex had by 1958 become the largest corporation operating in Indonesia. Scoring big with the Minas and Rumbai fields in Riau, Caltex became the most ambitious amongst the three oil companies. It restarted their Indonesian operation in 1951 after developing a company town in Rumbai. The town was, like that of Plaju, Sungei Gerong or Balikpapan, a microcosm of the transnational oil industry, containing American, Dutch and Indonesian schools for the children of the employees and housing estates that more resembled suburban America than Indonesia (*Het Nieuwsblad voor Sumatra*, 27-10-1954: 2). Indonesian managers had been non-existent when they started in 1951; however, by 1955 there were 24 Indonesians out of 280 managers or 9% of the total. By 1958, this would rise to 140 out of 545 or a quarter of the total (Lindblad, 2008: 174). According to Julius Tahija, who was then Assistant to the Managing Director, the company had by the 1960s become one of Indonesia's largest employees, especially of university graduates (Tahija, 1996: 120).

Like the other oil companies, Caltex provided opportunities for education. Aside from its Indonesianization efforts, Caltex also formed division called the 'integration division' whose purpose was to increase the legitimacy of its operations at the local level. Its goal was to develop programs alongside the government for social development and encompassed social development for society around the Caltex concession areas, training and development of local businesses, and recruiting and training Indonesians. The integration division ran the training centers focusing on job-related training, on-the-job training and supervisory training. Implicitly this work was intended to increase the number of Indonesian workers at the higher levels of the company's operations (*Java-bode*, 18-10-1956: 2) and so integrate the company within wider Indonesian society. The school ran courses on engineering education, English and Indonesian language, administration and company management. The school had around 300 students, with a wait list of 500 just for its English course (*De Preangerbode*, 15-12-1953: 2). By 1954 alone, there were some 500 Indonesian workers trained in English, administration, and machine operations at the constantly expanding company school. Like

other oil companies, Caltex provided scholarship to Indonesians to study at the university level. By 1954, the company paid for the education of five Indonesians at the Engineering Faculty in Bandung and two students to study law in Jakarta. They were able to choose to pursue a career in government service or in Caltex (*Het Nieuwsblad voor Sumatra*, 27-10-1954: 2).

This meant developing working relationship at the local level, and making itself an integral part of Central Sumatran society. This included gifting medical instruments for the laboratory at Andalas University in Padang (*Java-bode*, 05-11-1956: 3) and also recruiting recently graduated high school students in this region for a one and a half-year long company training course (*De Preangerbode*, 15-12-1953: 2). These measures were made to strengthen the legitimacy of the company within the local society. Caltex would later on build Riau University and Polytechnics, one of the major higher educations in the region.

There was a significant expansion of company training courses and facilities during the 1950s. The integration of these training courses with ITB strengthened the relationship between foreign oil companies and their training centers and the emergent tertiary sector for the petroleum industry. From the discussion above, the commitment of oil companies to Indonesianization was quite significant. Indonesianization also resulted in the shift of employment from Chinese and Indo-Europeans to indigenous Indonesians. Some have shown this to be the case with companies in other sectors as well (Lindblad, 2008: 161-162; Sluyterman, 2020: 1192-1194). In his memoir, RIJ Soetopo, for instance, may have recorded this as a personal friction with his Chinese-Indonesian supervisors (Hanan Akib, 2012: 54-57). As discussed above, the expansion of training and education in the oil Caltex and Stanvac⁵ concession regions gradually increased the number of employee students at the local or regional level as well.

The development of these company-based education institutes was not only important in becoming centers of education in the islands outside Java, but also playing a role in in the transition to a national based education system in the production of oil engineers in the 1960s. While the new production sharing system initiated during the same period would increase the number of foreign oil companies or contractors working in Indonesia, the development of a national petroleum education sector ensured greater Indonesian participation.

Creation of a National Petroleum Sector under the Guided Democracy

The national petroleum sector would eventually culminate in the creation

5) Caltex, for instance, would develop the Polytechnic Riau in Rumbai which is a leading tertiary education center.

of a single, national petroleum company, Pertamina, as the sole entity through which foreign contractors worked. The development of petroleum education in the 1960s was part of this institution building for the petroleum sector. Like other sectors in the economy, the take-over of Dutch-owned companies in 1957 was a watershed year. Prior to 1957, as Lindblad has noted, nationalization was conducted through a legal process of stock buybacks (Lindblad, 2008: 103-124). Yet, the Communist-inspired, union takeovers of many Dutch companies in 1957 changed that dynamic. To prevent a shift of economic power subject to Indonesian Communist Party hands, the army took on a leading role in nationalization, creating a nationalization body using its martial law powers. While the oil companies was not nationalized, it ushered in significant changes to the sector. The Chief of Army, General A.H. Nasution, ordered the creation of a military-led, state-owned oil company and appointed the army medical doctor, Ibnu Sutowo, to head this new body. The company was named as *Perusahaan Minyak Nasional (Permina)* and took over the operations of the old *Permiri* oil company based in Palembang. Ibnu Sutowo had a connection with A.K. Gani, who had been appointed as Governor of South Sumatra during the revolution. He also had strong connections with people in *Permiri* including J.M. Pattiasina. *Permina* had a strong relationship with Shell and would jointly develop petroleum education. The Army's involvement into the oil sector was thus cemented through the Ibnu Sutowo and the *Permina* oil company (Bartlett et.al., 1972:).

Another important figure involved in integration of the oil sector during this period was Chaerul Saleh. Ibnu Sutowo's ability to being able to head a unified national oil sector by the 1970s was enabled in large measure by Saleh's contribution. Saleh was a Sukarnoist and anti-Communist. The Army thus preferably wanted to work with Saleh. He was the most important person in the oil and gas sector of Indonesia during the period of 1960–1965 (Bartlett et.al., 1972: 175-184). The publication of the Oil and Gas Mining Law No. 44 of 1960 was instrumental in giving the authority to Saleh for restructuring the industry. This law, which superseded the colonial mining law, changed the position of foreign oil companies from concessionaires to 'contractors' of the state through the state-owned companies. This meant that foreign companies could take out the oil and refine them, but the oil belonged to the Indonesian state. This proclamation of sovereignty over Indonesian natural resource meant that all foreign oil companies had to work with Indonesian oil companies and the oil and gas bureau, created by Saleh on 1 January 1960 under his Ministry of Mining.

The biggest reform to the oil sector was the restructuring of the three oil companies into state-owned companies under the Oil and Gas Office (*Kantor Migas*). As a concession to the Indonesian Communist Party (PKI) , Chaerul Saleh ordered the creation of *Permigan* oil company located at Cepu

and headed by the *Sentral Organisasi Buruh Seluruh Indonesia* (All-Indonesian Workers' Organisation Center–SOBSI) union leaders and engineers sent by the Ministry of Mining. This was the least developed amongst the three companies, holding marginal oil concessions in Java. The Army entered the petroleum sector under the instruction of General A.H. Nasution with Ibnu Sutowo as head of the *Permina*. *Permina* was a continuation of the *Permiri* oil company located in South Sumatra. While the third oil company, *Pertamin*, was a continuation of the partially state-owned oil company, NIAM, which had been renamed *Permindo*. *Pertamin* was the most developed amongst all three and had a strong relationship with Shell, while *Permina* had acquired credit from a Japanese consortium. *Pertamin* was controlled directly by the Ministry of Mining.

The restructuring also ushered in the development of national petroleum education and research institutions. The petroleum training school and courses were gradually taken under the wings of the state-owned oil companies in particular, under *Permina*. There was also development in tertiary education and research institutes in Java during this period. Both Chaerul Saleh and Ibnu Sutowo played an important part in the development process. By 1963, the Indonesian petroleum sector had developed training and research education at the university and lower levels as well as petroleum research centers. These developments were closely aligned within the national oil sector, in particular *Pertamin* and *Permina* and the Oil and Gas Office.

By the 1990s, there were three university level institutes that conducted courses for petroleum engineering. The first course had been run by the the Petroleum Engineering Department of ITB. As discussed above, the petroleum engineering department was set up in 1963. Between 1963–1987, ITB would produce some 911 petroleum engineers, with an average enrollment of 36 with a 52% graduation rate. As mentioned above, ITB worked closely with all three major oil companies and they provided scholarships for Indonesians to attend ITB courses in chemical and civil engineering. A second institute was the Veteran National Development University (*Perguruan Tinggi Pembangunan Nasional Veteran–PTPN*) located in Yogyakarta (Widodo & Sudiro, 1979:4-58). It would open up a petroleum engineering department by 1977. This university was developed in 1958 at the behest of Chaerul Saleh when he was Minister for Veterans Affairs. It conducted courses in mining geology, mining economy and industrial technology (Soemarso, 1998: 312) The third university-level petroleum engineering course was opened at Trisakti University in 1980. All three-university level institutions produced a total annual average number of graduates of 38 engineers; however, this fell well short of industry needs. Over half of the graduates by 1981 were employed either in *Pertamina* (18%) or in oil contracting companies (35%) (Soemarso, 1988: 313). These university

institutes then had been integrated with the petroleum sector since the 1960s.

At the company levels, the development of training and education occurred within the national oil companies and later on within Pertamina. *Permina*, *Pertamin* and *Permigan* provided training courses in particular, *Permina* under Ibnu Sutowo. The major difference between the education at the university level and these training facilities was that they emphasized on-the-job or practical training. This philosophy had been developed earlier in the curricula of the foreign oil companies like Shell.

Permigan, the Communist-dominated oil company, was located mainly in Cepu, which had hosted the Shell and Japanese petroleum schools during the colonial and Japanese periods. During the 1950s, the facility at Wonokromo hosted an Oil Lifting Course (*Pendidikan Opseter Minyak*–POM) by Shell with two classes, one in 1956 and one in 1957.

Pertamin was nationalized from the NIAM, a joint government–BPM company thus it had strong connections with Shell. In 1961, *Pertamin* staff were sent to Shell to learn on-the-job in both in the field and marketing departments. This included work safety, equipment, field construction, finance, electrical engineering, depot supervision, staff management and transport. Shell also provided a one-week course for gas lifting, while another American company, Schlumberger, held an elementary course on Schlumberger well logs for two weeks in 1963. *Pertamin's* extensive overseas relationships also enabled overseas training and education and included a Shell management course in Singapore, management training in the US, Mandrill perforating course in the US, ASTEF⁶ paid training in France, ECAFE training in Iran on management, Soviet Union training programs, and orientation study at Caltex Philippines. Some *Pertamin* staff were also sent to management courses that were held in Indonesia, including the KENSI management program and the Management Development Course (*Kursus Pembangunan Ketatalaksanaan*) conducted by the Faculty of Economics, University of Indonesia. *Pertamin* developed the Oil Cadre Education (*Pendidikan Kader Perminyakan*–PKP) in Bajubang, Jambi in 1965 (Pattypeilohi, 1966: 115-125).

The most important oil company to conduct oil training and education was *Permina*. The role of Ibnu Sutowo is central in developing training and education. For much of the 1950s, oil training was conducted through the Shell school or PAM in Prabumulih, until 1962. *Permina*, to fill this need, developed two large training schools which were both opened in 1963. The first was the Engineering Cadre School (*Sekolah Kader Teknik*) at Pangkalan Brandan. This vocational school educated, in the main, oil workers in line positions (Pattypeilohi, 1966: 115-125).

6) *Association pour l'organisation de stage de technicien en France* – a French-funded technical education training.

The second school opened in this year was *Permina* Petroleum Academy (*Akademi Perminyakan Permina*–APP). Both these academies took over the training and education of the petroleum workers from Shell. The academy was financed by the Kobayashi credit extension when *Permina* became the first national oil company to obtain a significant sum of credit to explore oil working with the Japanese under a joint-company called Nosodeco. The credit, which amounted to 50 million dollars, was instrumental in *Permina's* success in developing petroleum training. The academy catered to higher level vocational engineering education below the university level. Unlike the petroleum engineering department of ITB, the education of the APP was to link to and meet industry's needs in particular, *Permina's* need for skilled petroleum engineers. Located in Bandung, APP students had access to ITB's laboratory. Many of its lecturers were also ITB professors, including Prof. Kyai Moestopo, Prof. Dr. Moesadad, Prof. Dr. Moedomo, Prof. Ir. J.C. Kana, Ir. Gufron Achmad and Ir. Wiranto Arismunandar. The curriculum of APP was designed by Ibnu Sutowo, Prof. Moestopo and the rector of ITB, Colonel Kuntoaji (Ibrahim Hasyim & Maximon Shah Arifin. 2010: 78). With the development of Bandung, and later on Cepu as centers for oil education, training and education shifted from the oil towns, constructed by foreign oil companies located in remote areas in Sumatra and Borneo to Java. This represented a process of centralization of petroleum education and its increasing integration with the national oil companies.

The development of the Institute for Oil and Gas (*Lembaga Minyak dan Gas*–*Lemigas*) created on 26 October 1962 was key to developing research capacity. *Lemigas* was commissioned by Chaerul Saleh as a petroleum and gas research center. Its administration and laboratory building were completed in Jakarta in 1963. Syarif Loebis, a chemical engineer from ITB who had worked for Stanvac at the end of the 1950s, was recruited on 1 July 1961 by Saleh to run the institute. The planning for the institute involved representatives from the three state-owned oil companies being: Soediono and Soedarno Martosewojo from *Permina*; Zainal Rasjid and Omar Hassan Assaari from *Pertamin*, and; Soembarjono and Wahjudi Wisaksono from *Permigan*. *Lemigas's* duties were in three areas: research, education and documentation. After meeting with Chaerul Saleh, the ambassador of the Soviet Union promised to allocate 100 places for Indonesian to study engineering in the Soviet Union (Zaenal Abidin Eko Putro and Bismar Siregar, 2007: 11). *Lemigas* obtained an allocation of 55 students to study at the Baku Polytechnic in the Soviet Union. In May 1968, *Lemigas* signed a cooperation agreement with the French Petroleum Academy (*Academie du Petrole Francais*–IFP) (*Lembaran Lemigas*, 1968: 1-2). By 1977, *Akamigas* had produced some 728 petroleum baccalaureates. By 1994, the academy has produced some 8.099 graduates (*50 Tahun Pertambangan dan Energi dalam Pembangunan*, 1995: 332).

Since the fall of Sukarno in 1965, the oil and gas sector underwent another major overhaul, finishing the centralization process that had been undertaken during the Guided Democracy period. With the decease of Chaerul Saleh in 1966, the oil sector was controlled by Ibnu Sutowo. Sutowo would liquidate the Communist-dominated *Permigan* oil company and merged *Pertamin* and *Permina* into one national oil company, *Pertamina*, of which he was head. With the closing of *Permigan*, the facilities at Cepu were used by Sutowo to create an Oil and Gas Academy (*Akademi Minyak dan Gas-Akamigas*) in 1967. Both *Permina's* APP and *Pertamin's* PKP was to be merged into the *Akamigas* (Bulletin Pertamina, 1969: 1). Former Shell and Permigan warehouses were converted into a campus. It provided four education streams: geology, boring, production and processing. Later on, it would add topography, exploitation, technical sales, engineering, marketing, general engineering and logistics (Ibrahim Hasyim & Maximon Shah Arifin, 2010: 81), thus Pertamina would have an extensive training and education facility based in Cepu but with vocational schools located in Pangkalan Brandan, Plaju, Jambi and Balikpapan.

Conclusion

The decolonization of the Indonesian petroleum sector in the 1950s up to the early 1960s shows both the government's concern in developing a foundation for the postcolonial petroleum industry and the highly important role that the major oil companies played in this development. By the early 1960s, the development of research and education institutions on Java allowed for partial nationalization of the petroleum industry within a new form of contractual relationship between the national oil company, *Pertamina*, and foreign oil companies. Looking at the process from the colonial period up to the early 1960s, it appeared that the impetus for indigenization or Indonesianization of the industry had appeared even before the Japanese invasion when the Indies was cut-off from Europe. Japanese reorganization of the oil workforce and the provision of training and education in Java and the Outer Islands strengthened this process; allowing for Indonesian take-overs of the oil installations during the Revolution. Yet, it was the actions of the oil majors in the 1950s that pushed nationalization of the industry further. Shell, Stanvac and Caltex invested millions of rupiahs to train and develop education and training facilities at their installations in the islands outside of Java, when the government had to slowly develop from the ground up the education and research institutes during the 1950s. The shift toward nationalization in the 1960s, thus had to be understood within the developments of the 1940s–1950s in which foreign players, in particular the foreign oil companies, played a major part. This was considerably different from other sectors in which foreign investments were allowed (McVoy & Setijadi, 1971: 7-10) The

vast majority of those trained by these oil companies worked at *Pertamina*, the Indonesian government and foreign contractors and service companies by the 1960s. The involvement of oil and oil service companies like Schlumberger in training Indonesian oil workers were thus instrumental in not only providing the basis for Indonesian participation in the industry, but at the same time also developing strong relationships between the global and national oil industry that continues up to the present time.

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