

Integrated Approach using Sociocultural Risk Assessment: A Case of Exploratory Drilling Project in Irian Jaya, Indonesia

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Conoco Activity in Irian Jaya

Conoco's exploration of Indonesia dates back to 1967 when the first production sharing contract (PSC) was signed covering the onshore Barito Block in South Kalimantan. Since then, Conoco has participated as operator in exploration of ten PSC's covering 77 MM acres or 312,519 square kilometers of Indonesia. Conoco also participated as non-operator in one PSC. Current Conoco holdings are two blocks, one offshore in the Natuna Sea and one onshore in Irian Jaya. Overall Conoco Indonesia has recorded 101,371 kilometers of seismic and drilled 200 exploratory wells in all eleven PSC's.

In October 1977, Conoco signed a PSC/Joint Venture Contract with Pertamina for the 2.3 MM acres or 9,200 square kilometers Kepala Burung Selatan Block A (KBSA) in Irian Jaya. The terrain in KBSA consists of mangrove swamps and rain forests. There are no roads in the area and all supplies were moved by boat and helicopter. The Wiriagar Field, located onshore Irian Jaya in the KBSA contract area, is the only discovery has been made outside the Block B area of the Natuna Sea. Wiriagar Field commenced production in July 1990, reached peak production rate of 8,400 BOPD average in December of the same year.

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The first phase of seismic acquisition was conducted during 1977-1979. It followed by the second phase in 1982 and the third in 1983/84. Total seismic data acquired amounted to 4,383 kilometers. The difficult terrain required a completely portable, dynamite source seismic crew. Exploration drilling began in 1981. In 1981 the Wiriagar-3 well was the first significant oil discovery in KBSA. Wiriagar-3 tested 6,000 BOPD from Miocene carbonates. The reservoir evaluation well, Wiriagar-4 was drilled from the same pad and tested over 4,000 BOPD of 39° API oil. The Wiriagar-5 delineation well was drilled in 1975 and flowed 3,411 BOPD through a production test.

Since 1981, Conoco drilled 20 exploration wells and two reservoir evaluation wells in KBSA. The last two wells drilled by Conoco in 1990 were Pre-Tertiary wells, Ayot-2 and Tarof-2. The wells penetrated a sequence of Pre-Tertiary horizons, and reached total depths of 9,400 feet and 7,225 feet, respectively. These wells were plugged and abandoned as dry holes. A regional geological study was undertaken after the drilling campaign. The Wiriagar Field commenced production in July 1990. The field initially was thought to contain about 5.5 million barrels recoverable and produced over 1.5 million barrels of oil when Conoco relinquished the KBSA PSC on 1 April 1992. Since the release, Arco has reportedly made Wiriagar a huge gas discovery after drilling deeper wells.

Conoco's involvement in the remote, densely forested Warim Block in eastern Irian Jaya dates back to 1971, Conoco was awarded this 11.5 MM acres or 45,096 square kilometers in May 1987, under the Warim PSC. In the same year, OPIC, Kyung In, Pedco, and TCR joined as former Nauka block partners. In 1988 Conoco farmed out interests to NMC and Du Pont. TCR withdrew from the group in 1990 and Esso farmed-in to the block. After two mandatory relinquishments the current acreage amounts to 5.5 MM acres or 22,102 square kilometers. In 1981, Conoco assumed operatorship for the group and shot 439 kilometers of seismic in 1981/82. In 1984 Conoco farmed out part of the Conoco and partnership interest to OPIC (Taiwan), TCPL (Canada), Daewoo and Kyung In (Korea). Total and Amoseas withdrew from the partnership at the end of 1985 during the drilling of the Noordwest-1 well.

In 1985, Conoco drilled an exploration well Noordwest-1 to a total depth of 14,800 feet in the mountain front area. The well tested Jura-Cretaceous sands in a giant asymmetric anticline. Good oil shows were observed in the Basal Upper Kembelangan sands and Brug Formation. However, hole problems prevented a log evaluation of the shows and the well was plugged and abandoned. The PSC was formally terminated in December 1985, but was allowed to continue under a "letter of understanding" until completion and evaluation of this well.

A renewed phase of exploration activity in the present Warim block has been stimulated by a series of discoveries, including the Juha and Iagifu fields, in neighboring Papua New Guinea. Similar geological conditions extend westward through the northern part of the Warim block, where terrain is extremely rugged and conventional exploration techniques are difficult to apply. Conoco has used high resolution radar maps as a primary exploration tool to compensate for the ground inaccessibility of the region. A seismic survey was done in 1988/89 and amounted to 400 kilometers followed by a 431 kilometers seismic acquisition in 1991.

In August 1990 Conoco commenced a two well drilling program in the north-western part of the Warim Block. The first well was Sande-1, drilled to test the Lower Cretaceous Woniwogi sandstone, in the Sande anticline which is in the forward part of the Central Range thrust belt. Sande-1 was drilled to a total depth of 11,205 feet in the Cretaceous Piniya Formation, and was plugged and abandoned in November 1990 after becoming stuck and losing the hole. The Lower Cretaceous Woniwogi sandstone was not reached. The second well Cross Catalina-1 was spudded in December 1990, located in the north-central part of the Warim Block, 50 km east of the Sande-1. Cross Catalina-1 was drilled on an overthrust anticline, the objectives were sandstone of Cretaceous Ekmai and Woniwogi Formations. Good oil shows were observed in cuttings and cores through the entire Woniwogi Formation and in a thin sand in the underlying Jurassic Kopai Formation. One open hole DST run in the Woniwogi Formation recovered mud and filtrate only. The well was plugged and abandoned in March 1991 with a total depth of 6,527 feet in the Paleozoic Brug Formation.

Conoco drilled the Digul-1 well in the eastern part of the block in 1993. This well offered encouragement for continued exploration in the Warim PSC as reservoir and source rocks with fair to good potential were encountered. Throughout the 1996-1998 period, three exploratory wells were drilled : Kau-1 and Kau-2, and Kariem-1 wells. Another 455 kilometer seismic and aeromagnetic survey data acquisition project are being scheduled at the time of this writing. Exhibit 1 shows the map of Warim Block's Exploration activities in Irian Jaya. The Warim block is in all aspects a frontier area. Despite the high exploration risks associated with such areas, its exploration potential remains huge.

Background on Irian Jaya sensitivity

To give more meaning to the various risks identified in this paper, it is necessary to discuss relevant historical and current events in Irian Jaya, and describe certain key "interfaces" that would be involved in Conoco Indonesia's plans to develop a project in the Warim block.

When Indonesia gained independence from the Dutch in 1945, the western half of the former island of New Guinea

known as Irian Jaya, was not conceded to Indonesia. Eighteen years later in 1963, Indonesia took control of Irian Jaya. In 1969, the issue of control of Irian Jaya was established under the Act of Free Choice supervised by the United Nations. To the outside world (United Nations), the vote for Irian Jaya to be brought into Indonesia appeared to follow the prescribed procedure and reach an acceptable result. However, many native Irian Jayans did not perceive the "one man, one vote" practice was fairly administered. This is a hotly contested political issue to this very day. There exists in Irian Jaya, a separatist sentiment, represented largely in part by what the Indonesian Armed Forces called "GPK". The organization was originally started during the Dutch administration in 1963 (Djopari, 1995). The eastern half of the island, now known as Papua New Guinea, was under the control of the British empire until after WW II when control was conceded to Australia. In 1975, Papua New Guinea was established as a free nation. The freedom enjoyed by PNG further fuels the independence sentiment among these Melanesian people of Irian Jaya (Djopari, 1995).

Over 250 individual tribes and an equal number of dialects are present in Irian Jaya (Mansoben, 1996). Many of these tribes still exist much as they did 1000 years ago. Perhaps nowhere else in the world can such diversity of cultures and politics be found. The tribes known to inhabit the East Warim area are as follows:
 Central: -Wanggom (200 people), -Wambon (3000), -Tsokwambo (500); Northern: - Murup (1000); West: -Kuruway and Kombai (est. 200 each); East: -Muyu (5000); South: -Mandobo and Jair (1500).

Kouh subdistrict, where the basecamp is located and practically where most of exploratory seismic and construction/ drilling activities are taking place, stretches out to around 6,600 square kilometers; of which 56% of such acreage is mudflats, swamps and wetlands. Access to the area can only be made through the Digul river and by air. The government is building a road parallel to the Indonesia-PNG borderline and one of the reasons for the current construction delays concerns security matters (Djopari, 1996). With a total population of 7,600 (54% are female), the number of potential source for labors reaches as many as 1,300 (30% are female). The predominant tribal groups are Muyu and Mandobo (40%) and Kombai-Koroway (20%), however judging from their exposures to outside world the people of Mandobo, Muyu and Jair provide a significant source of workforce during Conoco's seismic projects which recruited approximately 1,100 local labors.

Exhibit 2 shows the diversity of Indonesian population according to a social growth model developed by Mansoben and Selo Soemardjan (1995). As it is shown in exhibit, the gap of the society levels 4 and 1 is significant enough to address in the risk assessment. Reports from the local anthropologists hired early on for the geological mapping/

seismic projects suggest Conoco and its contractors' personnel to avoid introducing 'negative lifestyles' such as those involving drugs, alcoholic/liquors and pornographic materials into the area. Christianity has been brought in a hard way by the Dutch and German evangelists before the World War II, and the local people are now still very suspicious of foreigners who come for non-religious purpose. Ajamiseba (1991) and Djopari (1996) found out that it was a necessity to involve local church leaders and nonformal or tribal/village authorities in any interface and dealings pertaining to usage of traditional or tribal rights.

The Warim Block is surrounded by three protected areas. Exhibit 3 illustrates the boundaries of the protected zones. The Lorentz National Park is located on the far western border of the block. A small portion of this park overlaps the Warim concession area, but Conoco's exploration area of interest is not near this overlap area. The Jayawijaya Reserve, a proposed national park, lies to the north, and the Wasur reserve to the south. Conservation and protected areas cover approximately 22.3 million hectares in Irian Jaya. This represents about 22% of the protected areas in all of Indonesia. Our operations will not directly impact these areas. However, control of in- or spontaneous migration of transients could become an issue if the congregation of people or their subsistence activities, although remotely unlikely, ever extended into these protected areas.

The Indonesian government has never fully devoted the effort to develop Irian Jaya culturally or economically to the extent it has with most other areas. There are many reasons for this. The area is extremely remote and difficult to access logistically. Although Indonesia, in general, is a model for the rest of the world to follow in terms of peaceful integration of many religious beliefs, ethnic groups and cultures, a barrier between the Malay-Asians and indigenous Melanesians still exists and contributes to the gap between Irian Jaya and the central government in Java (Abbott, et.al, 1996).

Transmigration policies have been in place in Indonesia since the Dutch rule. The Indonesian government reinstated the policy in the 1950's and continues to move people off of the heavily populated island such as Java, onto the sparsely populated outer islands. The policy began in Irian Jaya in 1971. The World Bank has provided millions of dollars in support of this practice. Transmigration has been less successful than planned for a variety of reasons. One consequence that contributes to Conoco's risk in Irian Jaya is that the increased competition for resources and jobs brought on by the transmigration policy has further complicated the socio-economic/cultural situation. There are many, many instances where the transmigrants have displaced the indigenous people from their homeland. If this situation is allowed to occur in Warim, the consequences are sure to be dire. Conoco must provide assurances to the local people that their traditional homelands will not be

threatened or disturbed.

Several significant events in Irian Jaya have recently focused global attention on this heretofore largely unknown island. Freeport McMoran (FM), based in New Orleans, Louisiana, operates the Grasberg mine in Tembagapura Irian Jaya. FM has operated in Irian Jaya for 23 years. The Grasberg mine is the largest known gold deposit in the world. The allegations of human rights abuse by soldiers working at FM premises and environmental issues i.e. the direct discharge of over 100,000 tons per day of mine tailings into local river are currently undergoing international criticisms (Labat & Anderson, 1997).

In March, 1996, local tribal leaders in the Freeport McMoran area petitioned the State Minister of National Development and Planning to close down the mine on the grounds that the mine has been operating for 23 years and the local people have still not significantly benefitted. The petition was rejected, but the minister recognized legitimate concerns. These events have been the focus of international news.

Other instances of violence presumably involving a separatist movement called 'Free Papua Organization' include an instance no more than 10 kilometers from Conoco operations where the army came in and essentially burned a small village to the ground in retaliation for the murder of a government surveyor who had been sent in to survey a road route. He allegedly had been asked to re-route the road around a sacred area and refused to do so (AFP and The Jakarta Post, August 16, 1996). The other notable event was the kidnapping of 26 persons by an armed separatist faction. These persons included representatives from the World Wildlife Fund who were on a biological project in Irian Jaya (Petrominer No.07/July 1996, page 80-81).

Understanding the key interfaces that must be managed to operate in Irian Jaya is important if risks are to be minimize. Exhibit 5 summarizes the recent socioeconomic/cultural cases involving civil unrest occurring throughout Irian Jaya. A brief description of these interfaces and their relevance to socio-political, environmental and security risks is as follows.

Government w/ Pertamina - Pertamina, in effect, is the government in that it is the national oil company of Indonesia. This company is responsible for developing the oil and gas resources of the country.

Government w/ military - The military is very involved with the politics in Indonesia. The military is commonly used to police civil unrest in Irian Jaya, which has led to violent encounters subject to international publicity.

Government w/ local people - Government claims sovereignty of all Irian Jaya land, and considers inhabitants as subjects. Many Irian Jayans do not understand and/or recognize this claim, which leads to social unrests. As it was surveyed by Djopari (1996) and Ajamiseba (1991), the military's "security approach" is feared by local people.

Government w/ NGO's - Indonesian government is "wary" of many NGO's representing environmental and cultural rights issues. Pertamina must "approve" official meetings between Conoco and NGO's as they are accountable to the central government for any contact with third parties. Pertamina w/ Conoco - Conoco is accountable to Pertamina for most business decisions. Conoco effectively acts as a contractor to Pertamina to develop oil and gas reserves for an equity share of the production. Difficulties could arise if Pertamina and Conoco objectives are not aligned philosophically.

Conoco w/ local people - Conoco did not encounter any notable problems with the local people during the 1995 seismic operations. However, during seismic and drilling activities conducted in Irian Jaya in the 1980's, Conoco contractors were involved in alleged improprieties with the local people that garnered criticism by such organizations as the Jayapura Catholic Church and the World Wide Fund for Nature (Ajamiseba, 1991).

Transmigrants w/ local people - The transmigration of Javanese and other Indonesians into Irian Jaya has resulted in difficulty as these "outsiders" have created strong competition for work, land and other resources in the country, as well as introduced other customs, religion, culture etc.

Transmigrants w/ Conoco - This relationship interface is not particularly noteworthy. However, utilization of transmigrants in favor of native Irian Jayans potentially will affect how Irians view Conoco's presence.

NGO's w/ local people - It is difficult to generalize about the numerous NGO's and their interests with the different tribes in Irian Jaya. However, it is fair to state that the local people recognize that NGO's can represent a strong ally and means to voice their issues to both the Indonesian government and others that may be sympathetic to their positions.

Military w/ local people & NGO's - The Indonesian military has been a presence in Irian Jaya for many years. However, infrequent incidents of military arrests of local people and NGO members without following proper legal jurisdictional protocol (through justice and police organizational networking) have created tension and strained communications between these entities.

Risk identification from baseline environmental / sociocultural assessments

Socio-cultural risks

As stated above, the socio-cultural risks involved with the Warim project are the most likely to significantly impact its success or failure. There are five entities that have the authority to shut down or significantly delay production. These are (1) the Indonesian government, (2) the local Irian Jayan people, (3) DuPont, (4) the U.S. government, and (5) Conoco's partners or financiers. Each of these entities, and the issues that could influence them to

take such action, are discussed.

It is important to recognize that each facet of risk being assessed in this report (ie., socio-cultural, environmental and security) is, in fact, strongly interrelated. For example, in the Freeport-McMoran case, failure to identify and mitigate environmental risks associated with the operation contributed to the socio-cultural unrest of the local people.

The local Irian Jayan people

As Freeport-McMoran learned, failure to understand the culture of the local people and attempt to integrate them into the operations, can result in expensive lessons. The local communities located in proximity to an operation have the power to stop an operation should they so choose. This is true anywhere in the world. In fact, the success or failure of an operator's ability to win the approval of the local people determines how the other political entities will react toward that operation. DuPont, for example, is very unlikely to oppose a profitable venture that is operating in harmony with the local people and their environment.

Perhaps the most important issue that is influencing the attitudes of the local people toward foreign investors is the fact that historically, these investment projects have not benefitted them in a manner that they value. They perceive the foreign investors as coming onto their land as agents of the government [many don't recognize or understand Indonesia's claim to sovereignty over their land], taking its resources, and using the military force to keep them at bay. All of this occurs with nothing of value returned to them (Labat-Anderson, 1996).

Contributing to the local people's resentment is the influx of people from other Indonesian islands such as Java under the transmigration policy. These people are a different culture, and are often incorporated into the labor force much more readily than the local Melanesian Irian Jayans. In general, the Irian Jayan people are less skilled from a western perspective than many immigrants from Java and other transmigrants. This does not mean they are incapable of acquiring these skills if afforded the opportunity. With proper planning and forethought, Conoco Indonesia should be able to successfully bring them into the workforce over time. However the ability to accomplish this in on a short term project is greatly limited if not impossible.

Related to the transmigration issues is the in- or spontaneous migration of transient people into the immediate area of operations. Wherever there is a potential for employment, people will congregate. This was considered the single biggest environmental and cultural risk associated with Conoco's operations in Block 16 in the Ecuadorian rainforest. It is anticipated that controlling similar immigration of transients to the Warim operations will be a major challenge for the development plan to address (Hall et.al., 1992 and Abbott, et.al., 1996).

Insensitivity to the local people's values will undoubt-

edly lead to conflict. The 1996 incident where the government surveyor failed to understand the impact of the proposed road route through "sacred land" is an example. His insensitivity toward the local concerns resulted in a violent reaction. On the more positive side, Conoco's past seismic and drilling campaigns have been conducted using many locals. In 1995, the seismic campaign allowed certain personnel to spend every other two weeks at home tending their traditional livelihoods. This practice resulted in successful utilization of the workforce. However, certain personnel were kept in the field for up to six months. Failure to allow these men to get home more often led to some disruption and discontent. Conoco must continue to learn and understand these cultures and develop strategies that satisfy their needs in a cost effective manner (Ajamiseba, 1996).

The 'utilization' of the military for "project security" creates unwanted fear and anxiety among the local people. This presents a major risk to Conoco's operations. Conoco can only request that the Indonesian government refrain or minimize the military presence near our operations. The larger the oil discovery, the more inclined the Indonesian government will be to protect their resources from sabotage or other disruptions. If Conoco is forced to align with the military, our ability to win the trust of the locals will be significantly more difficult (Abbott and Djopari, 1996).

There is encouraging indication that the Indonesian government has recognized the error of past ways in allowing the military to deal with Irian Jayan civil unrest by using violence. On March 6, 1996, an article was published in the Jakarta Post that discussed, for the first time, a recognition by military and government leaders, that they were going to have to find a better, more peaceful way of maintaining military security in Irian Jaya. This may lead to significant changes in how the military "does business" there in the future. However, such change will take time and commitment to implement- and it will be a long time before the military's 'past sins' are forgotten by the local people, particularly since the society is one where 'revenge' was a way of life until recent years.

Conoco needs to take necessary steps to secure its operations by winning the trust of neighbors. If the locals see us as trusted friends from whom they are deriving benefits they value, they not only will support us themselves, but are likely to prohibit outside entities such as the GPK from disrupting our operations (Djopari, 1996).

There are indications that the GPK is not gaining in financial or political support. However, they will likely to remain at least a minor risk to Conoco operations in the near future. It is impossible to determine who comprise this underground separatist group. In the 1995 seismic campaign, the military removed a number of the persons our contractors had hired from the locals, claiming that they were members of GPK (Djopari, 1996).

The Indonesian government

Conoco is effectively a contractor for the government through its production sharing contract (PSC) with Pertamina. As such, the operations are at risk through a number of potential pathways.

Regulatory changes could create conditions that impact the profitability of projects. The government could decide that it needs to derive more revenue per barrel of oil produced by foreign companies. The trend now does not support this as terms, particularly in frontier areas, are very attractive when compared to other areas of the world. Economic conditions can change quickly, and eventualities such as Indonesia becoming a net importer of oil could affect the current trend. It is probable that the government would recognize the need for even more relaxed contract terms to stimulate investors to continue production in what are now marginal or non-economic fields.

Changes in environmental regulations could conceivably affect profitability of the project. There is little likelihood that Indonesia will adopt regulations that are more strict than globally accepted standards. If this holds true, any economic impact of regulatory change should not be sufficient to cause Conoco to abandon the project.

There are indications that the Indonesian government's approach to developing Irian Jaya may change in the next 1-5 years. Information sources indicate that the Coordinating Minister for Economic Planning, Saleh Afif, and Ginanjar Kartasmita, the chairman of the National Development Board (BAPPENAS) have been instructed to reallocate the distribution of the provincial income by minimizing the central government's take. Barnabas Suebu, the ex-governor of Irian Jaya, told the press that only 10% of the entire wealth generated by the province is returned, the rest going to the central government ('Gatra' Magazine, Jakarta, March 23, 1996). If the government's plans to rectify this situation are realized, this should reduce some of the tension harbored by the Irians.

The United States government

Global environmental issues such as protection of rainforest biodiversity and global warming have some low probability of becoming significant, especially in a U.S. election year where democrats such as Vice-president Gore are factors. Freeport-McMoran's mine in Irian Jaya has focused world attention on environmental issues here. Furthermore, certain provinces in Indonesia such as Kalimantan, are recognized by global NGO's as places where timber concessions and forestry practices have resulted in what some classify as irreparable devastation to pristine rainforests. Irian Jaya, being among the most remote Indonesian provinces, has avoided this attention to date, but it is a matter of time before these concessions are developed (Abbott, *et.al.*, 1996).

As the focus on Irian Jaya becomes more acute, it is

conceivable that the USG could take action to protest these activities. However, the authors are aware of no precedent where the USG has actually evoked economic sanctions on a country for perceived environmental indiscretions. In fact, on a global basis, the USG is perceived as being somewhat middle-of-the-road regarding progressive environmental policies. The USG's failure to sign the global warming agreements at the U.N.E.P.(United Nations' Environmental Programs) Conference in Rio de Janiero in 1992 is an example. Many countries interpreted this as a reluctance on behalf of the USG to balance global health and environmental protection with economic growth (Abbott, 1996).

The DuPont corporation

Aside from the local people, the most likely entity to shut down operations in Warim is DuPont. Any attention to Conoco activities in Irian Jaya that draws criticism to DuPont's global reputation for safety, health or ethical behavior will put the project at risk. All of the issues and activities discussed elsewhere in this assessment apply to DuPont's position relative to their own business code of ethics and reputation. Conoco's experience in Block 16 in Ecuador is an excellent example of DuPont's sincerity in this regard. Although Conoco developed and committed to an excellent plan of action to protect the environment and local indigenous people, the issues escalated to a degree of global attention that contributed to DuPont's decision to withdraw from Ecuador. This will be a valuable experience base from which to plan Warim development activities.

Partners and/or Financiers

The partnering, funding and insurance strategy for Warim has not been decided upon at the time of this writing. However, the risk assessment would not be complete without recognizing that either of these entities have the potential to significantly impact the Warim operation. The reasons a partner or bank would withdraw support are virtually the same as explained for the USG or DuPont; i.e., they would perceive unfavorable global attention as impacting their reputation and business to an unacceptable degree. Similarly, all of the mitigation strategies that minimize these risks are applicable to managing the partner or bank's concerns.

Environmental risks

The basic criteria for assessing risks to the Warim project is identifying what can shut-down or significantly delay the project such that the net present value of the project is affected. Environmental events that can do that fall into two basic categories, (1) catastrophic events, and (2) chronic pollution.

Oil spills represent the largest risk that are within the responsibility of Conoco to control. Such spills could oc-

cur during drilling, storage or transportation activities. Depending upon the size and location of the incident, such a spill could bring global attention to the operation and be a major drain on company resources. Our industry is well aware of the potential negative impacts of these events which stretch far beyond the simple costs of clean-up. Proper emphasis on engineering and training to prevent and respond to such incidents will mitigate these risks.

Irian Jaya is located in an area of tectonic activity. Volcanic activity is ancient, but earthquakes must be considered as risks to be accounted for in the engineering and operational plans. The Warim project includes an alternative to build a pipeline routed to the southern coast. Earthquakes could affect this equipment, but the southern coast is not affected by tsunamis. Well planned evacuation procedures will provide some means of protection to Conoco's workforce.

Epidemics are catastrophic events which could also seriously delay the project. These risks can be mitigated by providing the workforce with proper hygienic and prophylaxis. Training of the local people in proper health care will also contribute to lowering the risk of epidemics.

Chronic pollution can affect the quality of life for the local people by seriously degrading their environment. Emissions and effluents that do not meet acceptable limits can affect air, water and groundwater resources. The health of the local people can be affected either by direct exposure or indirectly by the impacts of such degradation on the environment on which the people depend for subsistence (E&P Forum, 1991).

Improper control of pollution can result in resentment by the local people, fines/penalties from the Indonesian Environmental Protection Agency:BAPEDAL and scrutiny by Indonesian and international NGO's. All of these risks are reduced to very low probabilities by meeting Indonesian and internationally recognized standards of performance with regard to EIA procedures and pollution control (UKL-UPL, 1997).

The risk assessment team identified a possible concern that should be considered in the Warim planning. Should the Warim exploration effort result in a discovery of giant reserves, Pertamina could pressure Conoco Indonesia to accelerate development, which could in turn compromise sound safety and environmental planning. However, this risk is very low, and should easily be mitigated by Conoco Indonesia following corporate policy and procedures. Exhibit 4 depicts the overall Conoco Warim's Environmental Policy and Commitments which cover the activities of seismic data acquisition, exploratory / wildcat drilling and construction, development and production operations. Further as illustrated by Brotoisworo et.al. (1992) and Ekariyono et.al.(1994), a series of comprehensive environmental impact monitoring and management plans approved by the local environmental protection agency (BAPEDAL) was

implemented in each drill site and basecamp locations.

Security risks

Security to Conoco employees and contractors is a first priority to a successful Warim operation. DuPont nor Conoco can accept putting people at an unacceptable risk. Protection of physical assets against sabotage and theft is also very important. The CII management team has already recognized the theft of explosives during the seismic campaign as a major event that would trigger evacuation of employees and contractors.

The short-term (1-5 yr) risks to security are considered as a medium risk because of the current state of socioeconomic /cultural unrest in Irian Jaya. Conoco has not yet established a trust on a longterm basis with the local people. If this trust is established through implementation of a well planned civic development strategy, risks should be mitigated through protection against actions by such entities as the GPK by the local people. However, well-planned security and evacuation strategies should be maintained at all times.

Management guiding principles

Early on, the team used Decision and Risk Analysis (D&RA) tools to assist in defining the range of possible outcomes associated with identified risks. The team then developed a comprehensive set of Guiding Principles to assist the Team in integrating all critical issues and Conoco/Du Pont Core values into the planning and implementation process. The 11 Guiding Principles provided the team with the ability to continually focus on the critical issues. The 11 principles are highlighted as follows:

1. Full play evaluation:

Pursue exploration approach that will fully evaluate East Warim from a "Play Concept" basis as opposed to a "Prospect-based Approach" within the existing time constraints. Process must utilize: - Regional geologic integration,- Play analysis evaluation (PAE),

2. Targeted information gathering:

Clearly define, early in the pre-planning phase of the project, the information that must be obtained in order to successfully fulfill Principle #1. Specific issues to be considered include, but are not limited to: -What logs are required, -Is coring necessary, -Will the wells be tested, - Is any of the wells expendable, -What is the minimum targeted depth, hole size etc. for effective data acquisition, -Should a sidetrack provision be included,

3. Manage Socioeconomic/cultural risks and issues and understand possible outcomes and alternatives.

Consider Conoco Ecuador experience in order to: -Integrate all appropriate Conoco Corporate and Du Pont resources into assessment, -Determine level of proactivity to be taken with relevant NGO (Non Governmental

Organizations)'s, -Develop a fully integrated implementation plan with respect to Conoco social development in the area, -Determine if full field development is in the best interest of indigenous people,

4. Use Multi-discipline Team approach throughout planning and implementation stages of the project. This approach should : -include contractors and service companies, as well as Conoco personnel, -assure adequate pre-planning of project with early removal of stove-piping,
5. Manage security risks of the seismic, drilling and development stages, fully evaluate and understand the risks, develop comprehensive plans to minimize unnecessary risks, develop contingency plans to protect personnel and pro-perty.
6. Cost/Benefit Analysis, Right size all costs and perform cost vs. benefit analysis on all major components. Team should evaluate : -incentive and shared risks contracts, -integrated service arrangements, -outsourced engineering and logistics support.
7. Work within PSC extension time frame while maintaining flexibility.
8. Partnership with corporate SHEA and Du Pont managements. Ensure that Conoco and Du Pont corporate values with respect to Safety, Health, Environment and Business Ethics are maintained. ensure no government regulatory violations, ensure that exposure and risks are within acceptable corporate tolerance / expectations, integrate corporate SHEA resources group into process early in project life cycle, especially in environmental management.
9. Ensure corporate buy-in. Ensure that Warim plans are consistent with, bought into, and supported by Conoco corporate groups in Houston. Including: -portfolio Management and Strategy, -SHEA,- Business Development Resources & Technology, -Legal, -Financial and Performance Analysis.
10. Identify critical milestone. Establish key decision dates and decision criteria emphasizing : -drop dead dates, -critical path items.
11. Use PNG (Papua New Guinea) analogies. Utilize analogous PNG experiences and data with regards to:-geology, -logistics and infrastructure, -drilling operations, -safety, health and environmental management aspects, -all related operations.

Putting guidelines into operations: mitigation plans and their implementation

Putting the mitigation plans developed from the guiding principles and earlier risk assessments into actual implementation has posed a challenge most field personnel have never experienced. The mitigation plans are equipped with the ob-

jectives of combining specific action items from risk assessment and communication plans into workable implementation for each major entity identified earlier, i.e. Local Irian Jaya People, Du Pont Corporation and the US Government. Local regulatory requirements in EIA specify the incorporation of socioeconomic and cultural elements in the environmental management and monitoring plans. Certainly, socioeconomic and cultural indicators are not easy to measure in such situations where 'indigenous' traditional values are significantly predominant like Irian Jaya. Mitigation plans focusing on the people of Irian Jaya which have been implemented include the following:

1. Communications and obtain buy-in of local people :

Throughout July, August and September 1997, a series of informal sessions and meetings with local villagers were held in Kouh, Jair, Walapkubun, Iwur and Kawai villages to communicate the approved drilling plans and highlight the need of employing non-local skills for the project. In some villages like Walapkubun and Kawai, the main targeted audience (i.e. the local tribal leaders who reportedly were having 'concerns' with local construction contractor and labor supplier) did not show up and went into the jungle. Continuous efforts, however, were made to smoothen the relationship with the local population. Cultural conflicts learned in this experience originate from a misunderstanding on the change of basics in leadership patterns in the area. Despite the facts that younger village leaders, with better exposure to formal education and business understanding etc., are active in decision making for the tribes, it is still a requirement that elder (non-formal) tribal chiefs are consulted with.

2. Respect of local rights and values:

Conoco hired two local Irian Jaya anthropologist and sociologist (Dr.Daniel Ajamiseba and Dr.Djon Djopari) to identify the local cultural and ethical values and to provide us with recommendations on how to communicate with the local population. In dealing with the Irianese tribes who have minimum exposure with outsiders, it is essential that one realizes most concepts governing our daily lives are totally unknown to them. This includes the concept of time, organization and work ethics. The local tribesmen are largely hunters but also see themselves as warriors and they are too literally ready to paint their bodies and go on a warpath against a neighboring tribe over some small conflict of interest. During the opening of Kouh Basecamp, Kau-1 and Kariem-1 locations, a series of 'warlike' ceremonies and dances were performed and Conoco had to support all expenses required by the performance. Mansoben and Mampiofer (The Jakarta Post, August 6, 1996) emphasize the need for outsiders to understand and respect the principle of "ulayat" rights to land among the Irianese under the collective ethnic systems which are not necessarily gov-

erned through formal laws of Republik Indonesia. The fact that finally, since 1995, the Ministry of Transmigration & Forestry's Regional Office involve all traditional tribal chiefs throughout Irian Jaya in the legal transfer of almost 2 million hectares of lands to the new settlements proves how the central government in Jakarta respect the traditional leadership systems. Conoco's best practices only to rent and temporarily exploit the land, as opposed to take ownership of the land also gain recognition and win respects from the local population (Ajamiseba, 1991 and Djopari, 1996).

3. Sincere efforts to benefit local people:

A weekly health and environmental civic missions have been organized with emphasis on community sanitary/health extension, training and curative/consultative actions. Site medical staff, community relations/environmental officers and trainees/ students sponsored by Conoco have regularly visited each neighboring 'shanty huts' built by many wandering tribal groups including those who opened new settlements near the project sites. Unofficial notes from the local health office reveals an estimate that over the last 6 months Conoco's fogging, prophylactics and curative medical support have played a significant role in suppression of at least 10-15% of deaths occurring from malaria and food-borne diseases (Dr.Sambuaga, personal communication, 1997).

4. Recognize informal and land ownership rights; respect people's dependence on land for survival;

The Irianese concept of land ownership and usage rights is complex and is rarely understood by outsiders, including the (central) government of Republik Indonesia. It is further complicated by the fact these now largely Christian population were originally animist and as a result there are areas of land which are considered sacred and which are believed to contain spirits either of a friendly or non friendly nature. Trespassing on these sacred land is, in the eyes of the Irianese tribesmen, a serious offence, which could lead to violence and even the death of the outside offender. Outsiders must studiously avoid handling land rights issues in a way that is likely to cause offence to the Irianese. Although the Irianese have no written titles to land there exists a general understanding as to which lands are owned by which tribe and who the people are in the tribe with a right to deal with transgressions affecting the land. This is common whichever tribal group one is dealing with and is certainly the tribes in Conoco's operations. Conoco has never purchased any piece of land in Irian Jaya, other than compensates the rights to use the land for a certain period. The ownership of land also extends to the trees growing upon that land and again this is an area which is likely to affect the whole Conoco's operations. Whether the arrangements for payment of compensation for land use or the use of trees on that land are dealt

with by Conoco or its local contractors it is essential that Conoco exercises supervision in these areas in order to avoid misunderstandings.

5. Community relations to balance security vs local fear of the military; It is common for security plans for strategic plant sites to concentrate on physical concepts such as perimeter fences, access control using security passes, uniformed guard patrol etc. However in Irian Jaya the primary and indeed the most important factor in security of installations is community relations. Given the extremely remote locations of the three Conoco sites and the fact that they are no more than clearings in a sea of jungle, it is difficult, if not impossible, to be aware of what is going on in the areas around the locations. The rainforest is so dense that it is difficult to see more than 10 meters into it from the perimeters of the sites and there is no way of knowing what or who might be lurking there. The local tribesmen, who still move from one place to another to gather 'sago', to hunt wildboars, crocodiles, snakes, birds, deer etc. from the jungle, are practically the only people who are always aware of what is happening in the area, and who is moving about there. Although they may appear primitive to Western eyes, they are in fact extremely skilled in matters pertaining to their forest environment. These expert trackers are acutely aware of the reaction of birds and animals in the forest to the presence of humans. They are therefore in a position to warn Conoco of any incomers to the area who may be out to cause us any security problems. It is therefore essential that Conoco implements a carefully planned program of community relations designed to ensure that the local tribesmen see it as being in the interests that Conoco's installations are secure and safe. The Basecamp and Wellsites had a compliment of up to 10 members of the Army's Strategic Command Unit (KOSTRAD) and 2 members of the local Police's intelligence corps. These soldiers and police usually patrol in civilian clothes and always maintain good relationships with the local tribesmen - who have accepted them as 'family members'.
6. Minimize local impact of non-local workforce; Ensure fair employment and sensible termination practices; Local employment practices are complicated by the fact that only these with tribal leadership influence are entitled to earn money whilst in most cases these 'elite' tribesmen prefer to organize traditional gatherings and hunting parties to learning about industrial work ethics and disciplines. Conoco has used a local labor supplier to assist in selecting, recruiting and securing short term employment contracts. Early on, the local labors had been informed of limited capacity this project has to absorb local employment. Conoco's initiative to organize an on-site physical screening and a basic industrial safety orientation to all potential local

resources had been appreciated by the local government and the local tribesmen as well. Pro-active extension, orientation and recruitment/selection organized at each neighboring village - and not on Conoco's sites - had been viewed as 'excellent practice' among the industry in Irian Jaya. In Kau-1 well site, for instance, although none of the 52 local casual labors put on 'standby' by the local contractor it was only 14 who finally recruited to work around the rig floor; as mud helpers/mixers, general roustabouts and the like. Over the stage of the project, more casual labors were shifted to cleanup and greening/reforestation workers. Upon termination, most of these local had been equipped with basic industrial work ethics, having some skills such as carpentry, brick makers, wood cutters, and even in establishing their own plant nursery, fruit gardening practices, animal husbandry, basic agricultural practices etc. In Kariem-1 well site, with a greater emphasis in basic trainings and health support to the local casual labors, almost all of the 41 casual labors we surveyed felt sure and prepared to survive after project termination. The local sawmill and other forest products industry near Tanah Merah and Kouh had recently contacted the local labor suppliers for a future take-over of these skilled labors developed by Conoco

7. Develop security and evacuation plans and conduct drills to ensure readiness, while remain neutral on sensitive government issues (separatism, transmigration etc.). A Multidiscipline Team was charged with establishing plans to evacuate key company and contract personnel, especially expatriates and government representatives, from the sites in case of emergencies. These plans and regular drills associated with the plans were in fact supported by the local government and local community leaders. Experience has proven that improved community relations through public health programs and other civic missions (local teachers' training, scholarships etc) really work very well in supporting projects' operations. Conoco never replaces the function of local government and local community leaders in developing the local community, therefore these local resources were heavily involved in planning and implementing the programs. The problems with communicating expectations of the local people were recognized early, and thus both parties: Conoco and the local population held regular 'openhouse' meetings in which many aspects could be addressed openly. The key toward the success in obtaining local support is to stay neutral on sensitive issues, and always commit and move social and community development programs outside of the corporate structure. Exhibits 6 and 7 show the summary of the Security Action and Employment Plans proposed for this project.

8. Maintain excellence in SHEMS (Safety, Health and Environmental Management Systems).
- Safety Directors of Conoco's drilling contractors from Jakarta, Houston and Dallas jointly visited wellsites conducted self-audits and a series of thorough hazard identification and risk reduction studies. Although Conoco had not received any official reports on the study, communications on safety hazards and risk mitigation plans were delivered on the site throughout the project. Safety alerts, pamphlets, posters, signs, bulletins and orientation booklets were issued on-site, both in English and in Bahasa Indonesia. Policy Statements on Zero Accident and Preventive Actions (such as Malaria prophylactics) of each contractor/ subcontractors were displayed and communicated throughout the project phase.
 - Drilling Management's initiatives to develop a series of drafts for Emergency Response Plans (which include : Significant Incident Plan, Oil Spill Contingency Plan, Medical Evacuation Plan, Security Evacuation Plan etc.) must be appraised highly. While the focus is on incident prevention, major emergency scenarios are defined, contingency plans drawn up and a Three Tier Response structure was set up at Corporate, Business Unit and Site Levels. The plans set up practical and effective methods for responding to all Tier I and some Tier II incidents, at site level. At least one drill (in July 1997) and three site exercises throughout the project were carried out that involved all levels from Jakarta to Kouh Basecamp and drill sites.
 - Conoco and drilling contractor's site management have maintained a basic standing procedure requiring all fatalities (and near miss life-threatening incidents), as well as any lost time accidents or lost workday cases, are reported to Operating and Business Units' Top Level Management. Environmental incidents with potentially significant impacts (i.e. oil spills exceeding 15 barrels, material losses exceeding Rp.1 billion, high potential incidents and adverse impacts and reactions of the local population, authorities, the local media, NGO and the general public near the site are also to be reported immediately to top management's attention. Averagely in each well, a number of 14 STOP cards, 2 high potential incidents, and two investigation reports (of near miss cases) based on the standard incident potential index were documented at site and in Drilling's Jakarta office. Drilling Contractors, Aviation Services Providers and other contractors actively conducted assessment on the rootcauses of each potential incident and measures were taken to prevent recurrence.
 - Conoco/Pertamina medical officers in the field were very active in providing medical and health services support throughout the project phase from the pre-employment screening, prophylactic malaria medication, on-site health and fitness management –as well as reactive or curative medication as necessity requires. Prior to employment, all contractors' employees had to pass a medical exam and be certified medically fit and healthy by each contractor. Conoco site doctors were involved in this process initially, however in the case of the construction and maintenance contractor, it was reported that almost 85% of their hundreds of employees (local hires and those experienced hired in Sorong and Merauke) could not meet this requirement. The site doctors then tactfully focused the requirement strictly to the Catering Contractor. Foodhandlers were given a more comprehensive medical exam prior to employment to ensure that they were free of communicable diseases that could be transmitted through the handling of food. The local caterers, according to the site doctors, maintained a high standard in this particular area – and the audit reports indicate at least two campbosses in well and basecamp sites have demonstrated a responsible sense during the observation period in July and October 1997.
 - Malaria continued to be a significantly symptomatic disease as the camp and well sites are located in a malaria-endemic area. Chemoprophylaxis prescribed per Corporate Medical Director's order is 2 tablets of Chloroquine Diphosphas 250 mg taken once weekly, beginning one week before arrival at endemic site and continuing for four(4) weeks after departure/ leaving the area. In addition, many expatriates eat Doxycycline 100 mg daily during their stay at the area. Statistics at the Kau-1, Kau-2 and Kouh clinics show a steady average of total 20-24 malaria cases per month, mainly they involve local Irian Jaya (Irianese and non-Irianese) employees.
 - Smoke Free environment was successfully supported and applied in Kouh Basecamp and throughout the rigsite location. Smoking was only permitted in specially designated areas. Reports from the site doctors on this initiative was always encouraging : only the members of local contract security guards and members of local army stationed near the sites were addicted to smoking – most contractors' personnel on-site either did not smoke or gave up smoking everywhere at rigsite. Traditional Irianese 'simplicity' and 'compliant attitude', plus continuous flow of information on forest fires, haze and local atmospheric pollution were suspected of producing such positive effects onsite.
 - Hearing conservation program was conducted by drilling contractors with support from the field doctors. For locally hired employees who had never exposed to the high noise areas, on- the -job training was conducted. Aviation providers : Gatari and Columbia helicopters provided training materials (videocassettes) that describe the health hazards of working closely to large helicopters – and at least a bi-weekly show to the local crew was conducted on Camp and well sites. A couple of unresolved important issues in the occupational health areas include

alternative safe haven for medivac of life-threatening cases (across the PNG border to Tabubil, which takes only 15-20 minute-flight); and the need of a medical/lab technician to identify/confirm a malaria-suspect status. These latter two items, of course, are associated with cost management - and therefore should only become points of future retention.

- Parker Drilling was outstanding in providing a-10-hour STOP training program for the local drilling and main tenance /construction workforce in Bahasa Indonesia. Conoco provided translated manuscripts and audiovisual training materials. During the period of July-September 1997, there were 6 classes organized at the Rigsites and one class initiated at the Kouh Basecamp. The site man agement personnel – including all contractors and sub contractors’ foremen – mostly completed the session with 100% of participation feedback rate.
- The following STOP principles have now been adopted by a high majority of site operating personnel of Warim project:
 1. All injuries and occupational illnesses can be prevented,
 2. Safety and health is everyone’s responsibility,
 3. Working safely is a condition of employment,
 4. Line Management has a responsibility to train all employees to work safely,
 5. Preventing injuries and incidents contributes to business success.

Exhibit 8 below shows achievements of overall project in the environmental, health and sociocultural/economic areas :

Parameters	Kouh-1 Base	Kau-1,-2, Kariem-1 Drill Sites
Infectious Disease(Malariae), Avg.% of pop./month	22%	20%
Forest Clearance, % total approved site opening.	25%	48%
Local Workforce, % total nearest villages’ population.	85%	24%

- The value of understanding the safety, occupational health and environmental aspects of Warim venture, together with sociocultural, security and socioeconomic elements in the project’s neighboring communities, is as important and critical as that of understanding the project’s commercial, technical and geological risks.

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Exhibit 6: Management of Local Employment Issues.

Employment Issues	Recommendations	Implementation
Local Content Priority	Maximized utilization of local Irianese workers	54% @ drill sites 85% @ basecamp
Local Recruitment /Selection Process	Communicate clearly the nature of 'temporary job vacancies' during exploratory projects. Apply 'non-centralized' hiring points & involve the local government agencies. Avoid promises and longterm commitments.	Locally hired PR officers spent days in traditional gatherings to explain the issues Local Employment Agencies were involved Communication Plans were carefully formulated and implemented with strictest control.
Regulatory Requirements Compliance	UMR/'Minimum Regional Wage Rates' must be complied with by local labor suppliers. Provide Personnel Protective Equipment & Clothing as required by local laws.	Each local contractors was audited periodically. PPE, Clothing and other regulatory requirements were specified in contracts and implementation was controlled.
Advance Hiring & Training	Pre-job safety & health screening & orientation sessions as required by local laws	Each contractor implemented at least 80-90% of all compliance items.
Socio-cultural Orientation	Local workforce should reflect positive image of Conoco/Pertamina's business in the area Orientation on locally sensitive issues is mandatory for visitors and 'guest workers'	Expatriate-National and local employees/ contractors' employees attended informal cross-cultural sessions provided by Field Safety & Envir.Training Coord.
Termination & Separation	Develop skill development programs for all local employees prior to project termination.	'BLK'/Vocational Training Centers were established. Transfer of skills was directed and measured by third party advisors.

Exhibit 7: Management of Security Issues

Key Security Issues	Recommendations	Implementation
Military Support	Must be viewed as 'requirements'	1 unit @ ea. drill site 1 unit @ basecamp
	No need for 'high profile' military exposure.	Minimum size of military support at each site, all with minimal exposure (non-uniformed). Maintain separate living quarters for military units, closer to Explosive Storage, Fuel Facilities (logically justify their presence). Maintain continuous contacts w/ Military Commanding Office in Jayapura/Jakarta and address concerns for 'no more security approaches'.
	Most Irianese tribesmen have a 'traumatic' history with past military offences in Irian Jaya / 'security approaches' by Dutch, Japanese and lately Indonesian soldiers. (Djopari, 1995).	
Employee & Asset Protection	Avoid conflict of interest between Conoco security unit and the military support units.	Address clear roles between Conoco's security unit (local police/ militiamen) and the military units. Maintain contacts with local tribespeople and 'community visits' to nearest villages involving medical civic missions and military representatives.
	Good neighborhood policies as guided under Conoco/DuPont's Business Core Values.	
	Pre-job security screening & orientation sessions as required by local laws	Each contractor implemented 100% security compliance items (SKJ clearance). Both Conoco security unit and Military Support Units absorbed/trained mostly local Irianese members.
	Local content preferences.	
Local Separatist Movements	Proactively maintain good contacts with local informal leaders, local governments.	Cross-cultural trainings for non Irianese employees/ contractors
	Stay neutral on sensitive issues such as 'separatist movements'	environmental awareness training are focused on socio-economic/ cultural sensitivities.
	Avoid local conflicts and gaps that potentially develop into sentiments for involving 'separatism' and 'ethnic/primordial fanatic'	Provide reminders to avoid dishonor, local conflicts, rights abuse, misunderstanding, cultural offence etc.