Impacts of petroleum activities for the Achuar people of the Peruvian Amazon: summary of existing evidence and research gaps

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Abstract
Petrol has been extracted from Achuar territory in the Northern Peruvian Amazon since the 1970s. In spite of early identification of negative impacts on the environment and repeated attempts by the Achuar to improve conditions, very little research has been done on specific environmental and health impacts. Some recent governmental studies have shown extremely high blood lead and cadmium levels in Achuar communities. In this paper we apply an environmental justice framework to review the evidence of pollution and health status available in existing studies, as well as government and operating company actions over the last 30 years. We identify gaps in our knowledge which hamper efforts to respond to the environmental and health situation, as well as negligent actions on the part of the State and petrol companies.

Keywords: Achuar, health, petroleum pollution, environmental justice, Amazon, Peru, social and environmental responsibility (accountability), ecological conflicts, ecological economics, indigenous, native

1. Introduction

The way of life of contemporary Euroamerican society is built on the consumption of fossil fuels; much of the economic growth and the main social and technological changes of the last 100 years are associated with the consumption of oil or petroleum (Giampetro and Mayumi 1998). Yet most exploration and production of petroleum takes place in areas far away from ‘Western society’ (Warden-Fernandez 2001) where it often promotes the growth of other industries, such as mining, agriculture and logging, along the remote ‘petrol frontier’ (Viña et al 2004). Our society seeks more and more often to distance the centres of production from the centres of consumption and thus avoid the impacts and residues of production at the point of consumption (Martínez-Alier 2005). The environmental problems this presents also raise concerns...
about justice, equity and human rights, since the centres of production are not ‘empty’.

A number of authors have highlighted how economic growth has in many countries led to widening disparities not only in wealth but also in well-being for different sectors within countries (Heggenhougen 1999), and that ‘societal factors’ are among the major determinants of health, observations that have led to the incorporation of a rights based approach to health and public health (Mann 1997, Hunt 2004). An ‘environmental justice’ framework has emerged to examine the links between environmental problems and social injustices (Stephens et al 2001, O’Rourke and Connolly 2003). In addition, contrary to the theory of the Environmental Kuznets curve (Panayotou 1993) which claims that pollution increases with economic growth to a certain threshold of income, after which it begins to decline, some economic ecologists claim that if the flow of materials and energy associated with consumption goods is factored into the analysis there is no evidence of a decline in the indicators of pollution (Martínez-Alier and Roca 2000).

Typically it is groups with the lowest incomes, most dependent on their immediate environment, that generate and develop environmental defense movements, the so-called ‘ecologism of the poor’ (Martínez-Alier 2005).

The case described here is the longest running petroleum production project in the Peruvian rainforest and the Achuar report substantial declines in health and well-being over the same period. The authors of this paper have been working with the Achuar people of the Corrientes River for several years in an effort to achieve recognition of the pollution and health problems they live with (see, for example, La Torre López 1998). This review seeks to examine the Achuar’s situation today using the theoretical framework of environmental justice. We present first the available evidence of environmental and health impacts of petroleum extraction for remote Achuar communities in the Peruvian rainforest, followed by examples of company and government actions that constitute the enabling context in which rights violations have been allowed to occur unchecked.

At the end of 2006 more than 56% of the Peruvian Amazon (the largest land area of Amazonian rainforest after Brazil) was under concession for petroleum and gas exploration and exploitation (our calculation, based on data from Perúpetro and INRENA) and more concessions continue to be offered for foreign investment each year. In this context a thorough evaluation of the impact of existing petroleum projects is fundamental to protecting hundreds of thousands of people throughout Peruvian Amazonia.

2. Known impacts of petroleum extraction

There are some studies, although few in number, which describe links between extractive petroleum activities in remote areas and health problems for local indigenous peoples, such as: elevated rates of spontaneous abortion, cancer and a deterioration of other indices of health in the Ecuadorian Amazon (San Sebastián et al 2001a, 2001b, 2002, Hurtig and San Sebastián 2002, 2004). Testimonies suggest similar effects in other oil producing regions such as Alaska (Wernham 2007) and there are also reports of the social inequities created by major oil projects, and the disregard for expert advice on best practice in carrying them out (Jobin 2003).

3. The Achuar and the arrival of the petrol companies

The Achuar are one of the Jivaro peoples of the Amazon and live on both sides of the border between Ecuador and Peru in small communities which depend on their territory to hunt, fish and plant small gardens for daily subsistence. Figures are uncertain, but the total population is estimated at close to 20,000 in both countries (DGE 2006: 67).

The Achuar in Peru have been in contact with Western society since the 16th century and have endured waves of evangelizers, violent attacks from slave raiders and invasions by treasure seekers attracted first to the gold deposits in the area and later by the rubber boom (approximately 1880–1915). It was only in the second half of the 20th century, however, after the 1941 war between Ecuador and Peru, that some outsiders began to settle in Achuar territory, associated with mission organizations and petrol companies. The discovery of the first oil fields in the Peruvian Amazon under the Achuar’s ancestral territory marked the beginning of a new wave of exploitation of natural resources on their lands.

In recent years all of Achuar territory in Peru has been overlapped by petroleum and gas concessions, created by the state oil and gas company Perúpetro. Achuar territory on the Corrientes River, however, has been in production since the early 1970s. More than 4000 Achuar live in this river basin, in 32 communities along the river, affiliated to the Federation of Native Communities of the Corrientes (FECONACO 2007). The concessions known as Blocks 1AB and 8 were drawn over their ancestral territories: their homes and their hunting grounds (see figure 1 for the location of these concessions in relation to others in the Peruvian Amazon).

In 1969 the state company Petroperu started exploring for petroleum in the Corrientes watershed, in the area that would become Block 8[8]. In 1971 the Peruvian government and the American company Occidental Petroleum Corporation of Peru (Oxy) signed the contract for Block 1AB. It was the first contract for hydrocarbon operations in Peru. In 1972 Oxy drilled the first productive well and shortly thereafter Blocks 1AB and 8, which together occupied the whole of the Corrientes basin, became the most productive in the country, at their peak accounting for 65% of national petroleum production (calculation based on data from DGH 1999).

At first, the crude petroleum was transported by cargo ship to Iquitos, but from the late 1970s onwards has been
pumped directly from the wells to the Bayovar refinery on the Pacific coast along the North Peruvian Oil Pipeline. A series of smaller pipelines, connecting producing wells and storage sites to the major pipelines, criss-cross Achuar lands. Of the crude oil extracted from these two blocks, 45.9% is sold on the international market to clients such as Shell, Enap, Chevron-Texaco, Glencore and Trafigura (Apoyos and asociados 2006).

In 1996 and 2001 blocks 8/8x and 1AB respectively were transferred to Pluspetrol Corporation S.A.\textsuperscript{11} (later Pluspetrol Norte S.A.\textsuperscript{12}) which took on all existing problems, including earlier pollution and the poor disposal practices of production waters\textsuperscript{13}. The original period of exploitation for Block 1AB was extended by the Peruvian state in 2001 until 2015, while the concession for Block 8 expires in 2026 (Apoyos and asociados 2006).

The objectives of this study are to:
(a) evaluate the current status of knowledge on historical and current environmental liabilities generated by the hydrocarbon activities and the current health status of the indigenous population of the area,
(b) review actions taken by public bodies and companies in relation to their awareness of environmental contamination and other impacts generated by the industry.

4. Methods

In order to respond to the research objectives three approaches were employed, as detailed below.

4.1. Literature review

An extensive literature review was conducted on all available bibliography on the oil industry in the Corrientes river basin. This includes reports by

- Official sources, principally the Ministry of Energy and Mines and related energy sector bodies such as OSINERG
A total of 3 months in the communities.

best practice standards or applied incorrectly. Timelines were as possible, in order to identify places that were not mentioned gathering as much information about impacts and their location community as the interviewee. All interviews were aimed at were assisted by Spanish-Achuar translators from the same variable age range from 17 years upwards. The interviewers in situ A number of walks were carried out to identify impacts of the relative time of various impact events.

14 These interviews were carried out by MOM, GJM, CO, SMC and XF during a total of 3 months in the communities.

15 Peruvian legislation does not establish a difference between a ‘normal leak’ and a spill, whether they are temporary or permanent. The legislation only defines those spills or leaks of more than one barrel of liquid hydrocarbons as a ‘loss requiring report’, according to Supreme Decree N° 015-2006-EM. Until this decree replaced the previous one (N° 055-93-EM, superseded in 2006) the volume of crude lost that was judged ‘reportable’ was 10 barrels.

16 While this section refers to values for contaminants found in soils and sediments in the Corrientes area, Peruvian legislation lacks official standards for contaminants in soil and sediments. Table 1 lists soil and sediment standards used in the United States as a reference for these values.

17 The overexploitation of faunal resources is the result of a high demand for bushmeat from company workers in and around communities. It was one of the very few sources of income for families who did not have a relative working for the company. Until 1996 the operating companies did not employ any Achuar to work at the installations. Since then the trade in bushmeat has declined but continues.
Table 1. Soil and sediment standards used by EPA in the United States.

| Substance       | Soil—agricultural use (µg g⁻¹) | Sediments use (µg g⁻¹) |
|-----------------|---------------------------------|------------------------|
| Barium          | 1000 (750)                      | NV                     |
| Lead            | 200                             | 3.1                    |
| Mercury         | 10                              | 0.2                    |
| Petroleum hydrocarbons in potable ground water conditions¹ | (6830) 3380⁷ | NV                     |
| Petroleum hydrocarbons in non-potable ground water conditions² | (7560) 3380⁷ | NV                     |
| Chloride        | NV                              | NV                     |
| Cadmium         | 12                              | 0.6                    |

Compiled from data found in EPA (2004). Values noted as ‘NV’ indicate no value for the parameter.

¹ Petroleum hydrocarbons is a general term used to describe mixtures of organic compounds found in or derived from geological substances such as oil, bitumen and coal. Petroleum hydrocarbons are comprised of 4 fractions: F1 (C6–C10), F2 (>C10–C16), F3 (>C16–34), and F4 (>34). For the purpose of this study, the four fractions have been added to give a composite value for petroleum hydrocarbons, comparable to ‘total petroleum hydrocarbons’ used by Peruvian legislation.

² The number in parentheses is the maximum concentration of the contaminant for medium and fine textured soil, and the other number is the maximum concentration in coarse textured soil.

In this paper we summarize the environmental exposures reported in official documents by the Peruvian authorities. Some of the studies presented below were carried out in part due to application of current legislation and as part of state supervision activities; others were the result of actions of resistance and denunciation by the native communities and their federation FECONACO (2007). They include results from tests of surface water, water for human consumption, sediments and some biological samples of fish tissue and human blood.

In 1984 ONERN (previous government agency for natural resources) drew attention to the intense deterioration of the region, describing it as ‘one of the most damaged critical environmental areas in the country’ (ONERN 1984).

In 1998 the Ministry of Energy and Mines itself, as part of the World Bank’s Technical Assistance Program for Energy and Mines, published a Territorial Environmental Evaluation of the Tigre-Pastaza basin (including the Corrientes River) presenting certain conclusions about the historical environmental damage caused by petroleum exploitation in the region (MEM 1998). This report recorded high concentrations of contaminants such as oils and fats and mercury in all the rivers receiving production waters, even in the larger ones (such as the Corrientes, Tigre and Pastaza) despite their capacity for dilution. High concentrations of hydrocarbons, barium, lead and chlorides were also found in samples of surface water from tributary streams. Petroleum spills of varying sizes were identified on the surface of rivers and on land and the results of river sediment analysis showed contamination by heavy metals and chlorides, hydrocarbon concentrations of 54.5 mg kg⁻¹ P.S. with some as high as 43 595.5 mg kg⁻¹ P.S., and oil and fat concentrations of more than 21 mg kg⁻¹ P.S. with a maximum of 7378 mg kg⁻¹ P.S. Analysis of air quality around production installations, (which aims to quantify pollution from gas flaring) revealed hydrogen sulfide concentrations that were four times the maximum permissible levels (MEM 1998).

Calculations of affected areas around the production installations, evaluated on the basis of barium analyses, found that 34 ha were seriously polluted, 95 ha moderately polluted and 292 ha had slight pollution (MEM 1998). Evaluations of deforestation and other kinds of impacts classified 427 ha as ‘seriously to moderately affected’ in Block 8 (Pluspetrol).

In 2004 OSINERG (the regulatory body for energy investment) records the presence ‘of areas saturated by contamination due to old and recent hydrocarbon activities’ (OSINERG 2004: 19) and the existence of ‘extensive areas of cleared and deforested rainforest, presence of visible petroleum spills in rivers, soils and around all production installations’ (OSINERG 2004: 16). Analysing environmental samples, OSINERG reported that: ‘of 46 samples taken of natural soils and river water, streams, areas of soil restoration and others ... 36 present levels of contamination above maximum permissible limits’ (OSINERG 2004: 16) due to high temperatures, presence of total hydrocarbons, chlorides and barium. In addition they find that production water monitoring by the company is carried out at points that do not correspond to actual outlets of production water, and thus monitoring reports by Pluspetrol Norte S.A. are not valid. Also

¹⁸ Peruvian legislation gives no maximum permissible limit for total petroleum hydrocarbons in water or sediment. It does provide a parameter for oils and fats, defined according to the ‘Standard Methods’ as ‘any material recovered in the form of a soluble substance in the solvent’; trichlorofluoroethane is the recommended solvent (MEM (nd), DGAA, 1996).

¹⁹ The presence of chlorides in waterways is probably due to the extremely high salt content of Corrientes production waters.

²⁰ According to the definition given in Peruvian legislation, drilling muds are ‘the fluid circulated during operations inside the well, with special characteristics to keep it clean and controlled’ (DS 055-93-EM). E&P Forum/UNEP is more specific, describing these muds as the ‘specialized fluid made up of a mixture of clays, water (sometimes oil) and chemicals, which, once drilling commences, is continuously cycled down the drill pipe and back to the surface equipment. Its purpose is to balance underground hydrostatic pressure, cool the bit and flush out rock cuttings’ (E&P Forum/UNEP 1997: 7). The specific composition of drilling muds varies at each oil field. E&P Forum/UNEP suggests that ‘water-based drilling fluids have been demonstrated to have only limited effect on the environment. The major components are clay and bentonite which are chemically inert and non-toxic. Some other components are biodegradable, whilst others are slightly toxic after dilution. The effects of heavy metals associated with drilling fluids (Ba, Cu, Zn, Pb) have been shown to be minimal, because the metals are bound in minerals and hence have limited bioavailability. Oil-based drilling fluids and oily cuttings, on the other hand, have an increased effect due to toxicity and redox potential. The oil content of the discharge is probably the main factor governing these effects’ (E&P Forum/UNEP 1997: 13). They affirm that major risks arise from spills and leakage of chemicals and oil, and that simple preventative techniques such as segregated and contained drainage systems should be incorporated into facility design and maintenance. Other authors estimate the risk to be considerable since ‘common components of drilling fluids can solubilize the barium, creating hazardous waste’ (Doyle 1994).
documented is the fact that ‘Pluspetrol Norte S.A. only does a very inefficient separation of hydrocarbons and fats before dumping the production waters on the ground or into streams. The effluent contains high concentrations of chlorides, oils and fats, as well as high ‘temperatures’ (OSINERG 2004: 5) and that the method of remediation of soils used by Pluspetrol Norte S.A. is deficient, since high levels of total hydrocarbons have been identified that exceed the maximum permissible limits established by existing legislation (OSINERG 2004: 18).

Although the monitoring points do not correspond to the places where production waters are really being dumped into water ways, as OSINERG reports, the company’s monthly monitoring reports to MEM show annual average levels of contaminants that exceed acceptable limits: more than 250 mg l\(^{-1}\) of chlorides in 9 out of 25 monitoring points and barium and lead concentrations over maximum permissible levels at two monitoring stations, one for each parameter. Thirteen monitoring stations show specific monthly readings for barium, lead or pH levels over maximum permissible levels (Pluspetrol Norte S.A. 1997–2006).

The waters of the Corrientes River have been classified (for application of the Water Law) as ‘Waters of areas for the preservation of aquatic fauna and recreational or commercial fishing’ with the acceptable lead levels set at 0.03 mg l\(^{-1}\). In analyses undertaken by the Regional Health Department (Dirección Regional de Salud) in Loreto in 2005, lead levels exceeded acceptable limits according to the General Water Law (Ley General de Aguas) in two of 37 samples analysed (DESA 2005). The Corrientes and tributaries are not considered waters (for application of the Water Law) as ‘Waters of areas for the preservation of aquatic fauna and recreational or commercial fishing.’

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Table 2. Results of analyses of lead in blood. (Source: table created with data from DIGESA (2006).) Note: acceptable blood lead levels according to the WHO, ACGIH, Deutsche Forschungsgemeinschaft and Lauwersy and Hoet are: 10 µg Pb dl\(^{-1}\) (children), 20 µg Pb dl\(^{-1}\) (adults not occupationally exposed to lead) and the biological tolerance limit is 40 µg Pb dl\(^{-1}\).

| Concentration (Pb µg/dl) | Age 0–17 years | Age 18–60 years |
|--------------------------|----------------|-----------------|
|                          | N (%)          | N (%)           |
| <10                      | 25 33.78       | 26 20.80        |
| 10–19.9                  | 39 52.70       | 99 79.20        |
| 20–44.9                  | 10 13.51       | 0 0.00          |
| 45–69.9                  | 0 0.00         | 0 0.00          |
| >70                      | 0 0.00         | 0 0.00          |
| Total                    | 74 100.00      | 125 100.00      |

The same study presents the results of 74 blood samples taken from 2 to 17 year olds in six native communities and in Villa Trompeteros, the District capital, in 2005 (table 2). Acceptable WHO blood lead levels (BBL, maximum permissible limit = 10 µg Pb dl\(^{-1}\)) were exceed in 66.21% of the samples. In the same study, of 125 adult blood samples (aged 18–60 years) 79.20% have levels of 10–19.9 µg Pb dl\(^{-1}\) (DIGESA 2006). All fall below 20 µg Pb dl\(^{-1}\), the absorption limit for people not occupationally exposed to lead, according to the American Conference of Governmental Industrial Hygienists (ACGIH), Deutsche Forschungsgemeinschaft and Lauwersy and Hoet. USAID indicates that no safe BLL is known and that even BLLs of less than 10 µg dl\(^{-1}\) have adverse health effects in children. In adults, high BLLs are related to hypertension and cardiovascular disease. Lead can be carried from maternal to foetal circulation through the placenta and exposure of the foetus to lead, even at maternal blood levels of less than 10 µg dl\(^{-1}\), adversely affects foetal brain development (USAID 2005).

Blood samples in this study were also tested for cadmium (table 3) which led to the finding that 98.65% of 2–17 year olds exceeded acceptable limits for people not occupationally exposed (<0.1 µg Cd dl\(^{-1}\)), 37.84% were classified as at risk with 0.21–0.5 µg Cd dl\(^{-1}\) and 59.46% exceeded the biological tolerance limits (BTL\(^{22}\)) for cadmium (>0.5 µg Cd dl\(^{-1}\)). Of the adult samples 99.20% were over established permissible limits and 68% were over BTL\(^{22}\). Both cadmium and lead are considered to be among the six most toxic metals for humans (Spadaro and Rabl 2004).

In addition to these documents and reports prepared by public bodies, the authorities have also been notified of the results of several studies carried out by other institutions. Reports published by the Research Institute of the Peruvian Amazon IIAIP between 1983 and 1987 found high concentrations of lead and copper in the Corrientes

22 BTL: maximum permissible amount of a chemical compound or its metabolites in a worker, or the maximum permissible deviation from the norm of a given biological parameter, induced by these substances in human beings.

23 For the interpretation of adult results, DIGESA used references and BTL values proposed by the American Conference of Governmental Industrial Hygienists (ACGIH), Deutsche Forschungsgemeinschaft (DFG) and Lauwersy and Hoet. For children, DIGESA applied the maximum permissible levels recommended by the WHO and the scheme for follow up of lead intoxication proposed by the Center for Disease Control (CDC) in Atlanta, Georgia (USA).
in Achuar territory. However, as we have shown, successive activities of Occidental Petroleum, Petroperu and Pluspetrol have produced official reports —dating as far back as the 1980s—drawing attention to the serious pollution of the Corrientes basin and recommending intervention to design and carry out containment, remediation and mitigation measures.

5.2. Sources of contamination: company operating policy and remediation

Official documents identify the following as potential sources of contamination related to the petroleum activity in the area:

- the dumping of
  - solid domestic waste, calculated at 3.85 tonnes/day for both lots (MEM 1998);
  - drilling muds; according to MEM, in 1998, ‘348 wells have been perforated in the watershed, so approximately 52.2 ha are estimated to be contaminated by drilling muds’ (MEM 1998). In addition, ‘during the drilling of a typical well in the region of 3000 m in depth, some 300–600 tonnes of mud may be used, and 1000–1500 tonnes of cuttings produced’ (E&P Forum/UNEP 1997: 15). Given that the depth of the productive wells in the Corrientes basin is between 9000 and 13000 ft (2500–4000 m) (MEM 1998: section 5.3) we can estimate a total production of drilling muds from 398 wells (in 2006) at 676,600 tonnes;
  - petroleum spills (from broken pipes, wells and storage tanks): ‘the area deforested (in Block 1AB), the areas altered by discharges of produced water and the areas covered by petroleum spills total 10,538 ha’ (MEM 1998). Meanwhile in Block 8 an estimated 427 ha were affected (MEM 1998). In addition, according to the record of spills reported to OSINERG between 1998 and 2006, a total of 6619.7 barrels of crude oil have been lost (OSINERG 2007). This record underestimates the real volume of spills since it does not consider hydrocarbons discharged into the environment in production waters, nor spills of less than 10 barrels (minimum spill size reported until 2006);
  - daily (continuous) production waters: from 1972 to 1997, the extractive process in Block 1AB alone produced a daily average of 762,000 barrels of production water (compared to a daily average of 52,286 barrels of petroleum, MEM 1998). Although the historical average is not known for Block 8, in 1997 a daily average of 183,000 barrels of production waters were dumped into local waterways (MEM 1998). This waste water has high concentrations of chlorides, heavy metals, metalloids and total petroleum hydrocarbons on the surface and in emulsion;
  - gaseous emissions from:
    - petroleum storage tanks;
    - gas venting;
    - gas flaring;
    - electric generators and petroleum burners (incinerators) in the camps.

The PAMA (Programme of adaptation and environmental management) gives the total annual emissions of Block 1AB in 1996 as 6050 tons of nitrogen oxides, 1443 tonnes of carbon monoxide, 442 tonnes of non-methane hydrocarbons, 435 tonnes of particulate matter and 304.9 tonnes of sulfur dioxide (Occidental Peruana Inc 1996). In reaching these figures, Oxy only considered gas flaring at the central production facilities, but not emissions from petroleum tanks, gas venting, generators or incinerators.

There are undoubtedly more sources of contamination than those identified by the government inspectors to date. In December 2006, we (MOM, GJM, CO, SC and XF) witnessed and documented some of Pluspetrol Norte’s poor procedures for elimination of spills, including burning them (and nearby vegetation) and burying them without adequate sealing measures (one of the ways in which the company attempts to ‘clean up’ spills). The company appears to have no efficient systems to mitigate or contain spills early on or to respond rapidly and restore areas affected by spills. In addition we have documented and gathered testimonies of the following practices—many of which are still in use:

- Abandonment of open waste pits (for drilling muds and petroleum) without proofing, or discharge of drilling muds and production tests straight into the nearest water bodies.

| Concentration Cd µg/dl | Age 0–17 years N | % | Age 18–60 years N | % |
|-------------------------|-----------------|---|-----------------|---|
| <0.10                   | 1               | 1.35 | 1               | 0.80 |
| 0.11–0.20               | 1               | 1.35 | 2               | 1.60 |
| 0.21–0.50               | 28              | 37.84 | 37              | 29.60 |
| >0.50                   | 44              | 59.46 | 85              | 68.00 |
| Total                   | 74              | 100.00 | 125             | 100.00 |

Table 3. Results of analyses of cadmium in blood. (Source: table created with data from DIGESA (2006).) Note: acceptable blood cadmium levels according to the ACGIH, Deutsche Forschungsgemeinschaft and Lauwerys and Hoet are: 0.1 µg Cd dl⁻¹ (non-smoking adults not occupationally exposed to cadmium), 0.2 µg Cd dl⁻¹ (adults who smoke but are not occupationally exposed to cadmium) and the biological tolerance limit is 0.5 µg Cd dl⁻¹.
• Absence of drainage systems at well sites and waste pits (containing drilling muds, split hydrocarbons or production waters) to cope with run-off due to heavy rains or excessive dumping.
• Inefficient separation systems discharging production waters at high temperature and with high content of oil and fats.
• Spills of between 2 and 6 barrels per week at each well due to maintenance and pressure control activities (‘operational leaks’).
• Unreported leakages and spills throughout the system of pipelines (including some abandoned ones).
• Completion of control and recovery actions after spills, without any action being taken with regard to oil products that could not be recovered.
• Use of obsolete technology to contain and recover spills. Examples include:
  * manual recovery of crude with buckets tied to sticks with lianas;
  * recovery containers with holes in them;
  * use of tree trunks and palm leaves as containment barriers;
  * use of buoys without appropriate methods for fixing them in place;
  * absorbents24 abandoned in the waterways where they are applied.
• Periodic cleaning of pipelines takes place in open areas and without systems of recovery or drainage. Residues removed from the pipeline are abandoned in situ.
• The use of untreated hydrocarbon residues from the bottom of storage tanks for company road maintenance.
• Burning of petroleum spills: crude oil from spills is collected in metal barrels and burnt or alternatively an entire area affected by a spill is burnt without any action to restore the area.
• All kinds of solid waste are abandoned on the land and sometimes sold by workers to indigenous communities: e.g. old containers previously used for toxic wastes are sold to the communities where they are commonly used to store food.

Other documented practices that are not related to waste management but with clear negative health consequences for the local indigenous population are the demand for prostitution in communities and sexual abuse of Achuar women, with additional potential for the transmission of sexually transmitted diseases. Foreign workers may also bring new diseases to the area which the Achuar have not encountered before. In addition, alterations caused to the natural drainage system also present a risk, for example the creation of large areas of standing water are conducive to the proliferation of the mosquito Anopheles sp., the principal vector for malaria—a significant health problem along the Corrientes.

5.3. Company and state actions

It seems clear that either through negligence or cost-cutting, the operating companies (currently Pluspetrol Norte S.A. but previously Petroperu and Oxy) do not and have not taken adequate steps to mitigate the environmental and health impacts of their activities, including poor daily practice in waste management, the quality and security of their installations and infrastructure and the non-implementation of contingency plans. The dumping of untreated production waters into freshwater streams and waterways is a clear example: when operations began on the Corrientes in the 1970s, such practices had been illegal or severely restricted for decades in most oil producing states in the USA (ERI et al. 2007). We consider of particular concern the companies’ repeated denials to the Achuar communities of the existence of pollution in their territories and of the risk to these communities in case of exposure, as well as the absence of channels of communication to warn, inform and help protect communities in case of spills or where effluents are discharged into the rivers.

The health situation in the Achuar communities is further aggravated because the concessionary company appears to be covering up the impacts of its activities. As previously cited, ‘the real production water outlets are not at the points declared by the company’ (OSINERG 2004) in the monthly monitoring reports to MEM, thus invalidating the company’s water monitoring results and casting doubt on other data provided by the company. Such practices make it impossible for the authorities to initiate appropriate mechanisms on behalf of local communities. This has led the communities to sue Oxy, as an American corporation, in the United States and the case is currently before a Los Angeles Superior Court (New Scientist 2007).

However, the responsibility for the current ‘health emergency’ (PECONACO 2007) in the Achuar communities of the Corrientes River does not fall exclusively on the operating companies but also on the State. The absence of a public authority in this remote area of rainforest means that the health service is practically nonexistent, without any direct role or intervention to affect health status. The first general evaluation of Achuar health has only recently been published by the MoH’s Epidemiology Division (DGE 2006) and many communities have no access to health care.

In addition, regulatory or supervisory bodies have failed to apply any significant sanctions to any of the companies that have operated in these concessions. Pluspetrol Norte S.A. has been fined by OSINERG several times for contamination, but has appealed all of these resolutions and is often exempted, for example in May 2005 the Fiscal Tribunal found in favour of Pluspetrol Perú Corporation, annulling fines in excess of $5m US (Resolución del Tribunal Fiscal N° 02197-5-2005, cited in Pacific Credit Rating 2005). Local, regional and national governments have not responded to repeated requests by the communities and their federation, nor to the now numerous technical reports described above that highlight the very real possibility of an environmental and human disaster along the Corrientes River.

24 Absorbents are water-repelling cleanup agents for industrial and marine oil spills that absorb most types of oils. They contain cellulose, lignin, protein, starch and calcium.
The authorities’ inaction has been in evidence for some time. In a recent example, even after completing the blood tests that showed alarmingly high blood lead and cadmium levels, the Ministry of Health took no action. Nearly a year passed from the time the samples were collected, in June 2005, until their publication and delivery to the communities in May 2006. Even achieving this apparently simple and ethical response required the presentation of notarized letters to the Minister of Health, Dr Pilar Mazetti Soler. No health action plan had been designed or considered during the intervening 11 months.

Another complication of evaluating the contamination on the Corrientes relates to the lack of technical legislation in Peru on permissible levels of many pollutants in water or sediments, which means that results are considered merely informative and led to no action (OSINERG 2004, DESA 2005, DIGESA 2006). In addition, the limits of detection of the methods used by government bodies in analysis of samples are often higher than the permissible limits established by law (or international precedent) and cannot therefore discern violations of existing legislation or best practice.

The government of Peru, the President and Congressmen, all know ‘that the communities living along the banks of the rivers inspected rely on the water sources in Block 1AB mainly to satisfy basic nutritional needs’ (OSINERG 2004) and yet no action has been taken. Hardy any of the numerous recommendations made in the various reports had been implemented before the indigenous communities paralyzed oil production in both blocks for 2 weeks in October 2006 (La Torre López and Napolitano 2007). A few days after agreement was reached and the Achuar lifted their strike, an engineer at the Environmental Health Agency (DIGESA) claimed that there was no evidence of health impacts caused by petroleum activities among the Achuar: ‘up to the present time there is no medical study with regard to the impact the petroleum activity has caused to the Achuar. What has been found are the remains of lead and cadmium in the blood of a group of inhabitants […] neither of these heavy metals are originated by the petroleum activity’ (Peralta Li˜n´an 2006).

6. Conclusion

In sum, both the operating companies and the State have been highly negligent or incompetent in their approach to exploitation of the Corrientes oil fields and the impacts on the Achuar communities who live there and depend on the health of their territories for their survival and well-being.

The few exposure and human health parameters studied so far in the Achuar communities along the Corrientes reveal an extremely serious situation and highlight the need for an in-depth evaluation of the health status of all the region’s inhabitants. Accurate baseline information is lacking for the appropriate design of a health plan to respond to communities’ needs. Similarly, a study in environmental epidemiology is urgently needed to better establish the relations between petroleum contamination detected in surface water, sediments and soils, the presence of these substances in the human population, and possible long term effects on the health of the Achuar. Without such a study any action plan to address health impacts will fall short of the objective.

An in-depth analysis of the culture of the companies and the government oil sector would also be illuminating and perhaps suggest better ways of ensuring efficient supervision of activities, thus mitigating impacts.

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