

FACT FINDING REPORT OF NALCO

**Based on our visit to the Refinery Plant of NALCO, Damanjodi
& Panchapattmali Bauxite Mines**

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INTRODUCTION

The National Aluminium Company Limited (NALCO) was promoted by the government of India in technical collaboration with Aluminium Pechiney, France, Europe's largest metal products company. The company was incorporated in 1987 with the objective of meeting the domestic demand for aluminium and for exporting Alumina. The project included a 2,400,000 TPA bauxite mine at Panchpatmali, Orissa; 800,000 TPA Alumina refinery at Damanjodi, Orissa; 218,000 TPA aluminium smelter at Angul, Orissa; 600 MW coal fired captive thermal power plant at Angul, Orissa and port facilities at Vishakapatnam, Andhra Pradesh.

SPECTRUM OF OPERATIONS

Bauxite mines: On Panchpatmali Hills in Koraput District of Orissa, a fully mechanized opencast mine of 24 lakh TPY capacity is under operation since 1985, serving feedstock to Alumina Refinery located in the foothills. The capacity has now been expanded to 48 lakh TPY. Presently, the capacity is being expanded to 6.3 million tpa. Panchpatmali Bauxite Ore comes to Damanjodi by a transportation system 'flight cable belt conveyor' spanning 14.6 km. over the hills and valleys.

Alumina Refinery: Located in the picturesque valley of Damanjodi, operating since 1986 with capacity of 8 lakh TPY. The capacity is now expanded to 15.75 lakh TPY. Three production streams each of 5.25 lakh TPY based on Bayer's process with atmospheric digestion and 3X18.5 MW co-generation of power from process steam are the main systems of this large refinery.

Aluminium Smelter: 2.30 lakh TPY aluminium smelter located at Angul is based on energy efficient, state of the art technology is in operation since 1987. The capacity is being expanded to 345,000 TPY. Three pot lines of 1.15 lakh TPY capacity based on 180 KA Cell Technology from Aluminium Pechiney, France with large Carbon Plants for anode production and large metal casting facilities are the main systems of this giant aluminium smelting plant. At present 600 pots are already in operation for aluminium metal production. In near future 120 new pots will be put to operation.

Captive Power Plant: Close to the Aluminium Smelter, a captive power plant of 840 MW (7X120) capacity has been established to feed power to the Smelter. The capacity is being expanded to 960 MW (8X120). Coal fired thermal power plant with captive rail system for transportation of coal from Mahanandi Coal Fields(Talcher coal fields) is main feature of this plant.

CLAIMS OF NALCO AND OUR FINDINGS

On clicking upon the official web site of NALCO, i.e www.nalcoindia.com, we come across the claims about the efforts of NALCO for environmental management, afforestation and other social responsibility in Damanjodi. This study was aimed at verifying the authenticity of these proclamations. Various compliance reports and annual reports of NALCO have been studied in order to ascertain the basis for ISO certification conferred upon it. Then, a fact finding team visited the Panchpatmali bauxite mines and its Alumina refinery at Damanjodi. Water samples were collected for testing. This report has been prepared based on our findings.

CLAIMS MADE BY NALCO	STATUS OF THE CLAIM.
A periphery barrier around mines of 15m width having green cover	No such periphery barrier of 15m width exists in this area.
Garland drains and drainage control within the mines	No such garland drains and drainage system exists in the mines area to check soil erosion.
The Company received Indira priyadarshini Vrikshamitra Award from Govt. of India for its contribution in the field of afforestation and wasteland development.	Plantation has been undertaken only in and around NALCO colony. No plantations are visible in mining area
Multistage washing of red mud and its storage in specially designed pond	There is massive violation of the norms specified for red mud storage.
Highly Efficient ESPs at Calciners & Steam Generation Plant	The ESP is found to be closed during night time and during rainy season.
Ash pond with zero discharge & recycling of waste water	Highly doubtful claim.

AIR POLLUTION

The refinery plant located at Damanjodi along with the bauxite mines at Panchapattmali seems to be significantly contributing towards air pollution. The captive power plant (coal based) is located at Damanjodi which is mainly responsible for dust pollution. Similarly due to very low density of trees around the mining site, locals allege that 5 Gram Panchayats located near it are being affected. The pollutants that are being emitted from the refinery plant are alleged to affect some 13 Gram Panchayat of Damanjodi area.

POLLUTION AT MINING SITE

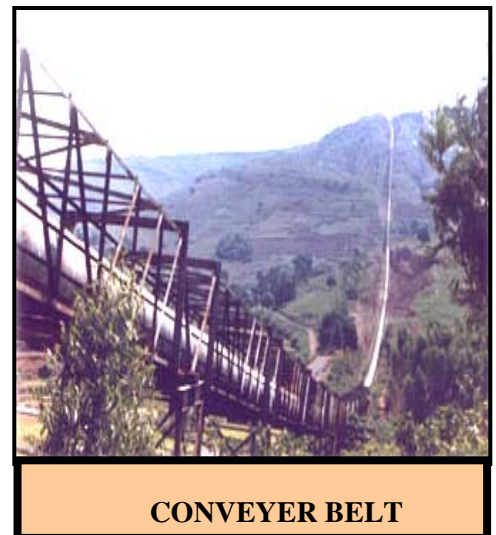
Villages like Kaspiput, Kutudi, Karadiguda, Bhitarguda are being affected due to air pollution from the mining site. Due to insufficient sprinkling of water at the blasting and loading sites, huge amount of dust flies up resulting in heavy dust pollution. This problem becomes all the more serious during winters and results in thick smog like situation. The local villagers complain that broken pebbles, chips, boulders and stones frequently fall on the villages during blasting, resulting in injury or the death of cattle and human beings alike. Due to dust pollution, there is an increasing trend in the number of respiratory diseases in the surrounding villages. Apart from this, in Kaspiput & Kutudi villages, there have been 2 instances of accidents during blasting operation wherein 12 people had been severely injured.

POLLUTION AT THE REFINERY SITE

During the visit, it was found that, the captive power plant at Damanjodi causes air pollution by emitting various types of gaseous pollutants along with fine dust and particulate matter. The situation is further aggravated due to closing down of ESP during the nights. One can clearly observe a fine layer of dust particles deposited on the surface of leaves in the early mornings in the nearby areas.

NOISE POLLUTION

Noise pollution is found to be a major problem around the mining area. There are numerous sources of noise pollution. The functioning of conveyer belt causes lot of noise pollution in villages like Kargiguda. This problem is found to be more prominent during the silent hours of night. The villagers complain that due to noise, the animals are showing a different type of behavior. Similarly small children, old men are losing hearing power due to noise. In villages close to the conveyer belt and according to villagers it is even very difficult to sleep in nights. Plantation around the conveyer belt can effectively reduce the noise pollution but during their visit, the fact finding team found no plantation or green belt exists around the conveyer belt. Other sources of noise pollution include blasting operations at the mine site and the frequent movement of vehicles. Villages like Bhejput, Oriputra and Kandhaput, which are close to the mines are severely affected by noise pollution.



WATER SCARCITY

Due to rampant mining, blasting & other related activities, a number of natural streams originating from the rich Panchapatmali hills have gone dry. In villages like Kutudi and Kaspiput, a number of perennial streams have completely dried up. Streams like Parujala, Bagmanijala, Popjala, which used to flow from these mountains through the villages. These villages located in the slope were the major beneficiary as they used the water from these streams for cultivation purposes. The water level of the well was normal before mining. But at present, drying up of these streams has led to reduction in water level of wells & ponds in these villages and created severe water scarcity problems. During interaction with the villagers it was found out that due to drying of the wells and ponds, the cattle's of the villages sometimes even drink the red water coming from the mines and die within a few days.

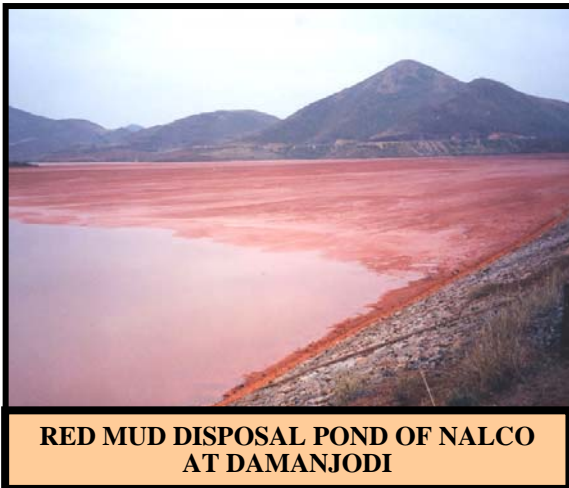
WATER POLLUTION

The villages located at the downstream to the refinery plant have been severely affected due to the pollution of their water bodies and streams by the effluents from the refinery plant. Even though the NALCO factory has ash pond and red-mud ponds, effluents are being discharged into the river regularly, causing cattle deaths and crop loss. The provision of parapet wall division to check the spillage and leakage is found to be inadequate thus leading to leakage and overflow of slurry from the precipitation chamber of alumina hydrate. The leakage from the effluent treatment plant is passed through the Sabari Lake & mixed with the natural nallah down stream, i.e Rajamunda River. This has also been mentioned in the Compliance Report dated 5.08.2005 of the Regional Environmental Pollution Control Board, Raygada.

During our visit, we found that moderate quantity of the liquor along with the hydrate comes out through the storm drain and spreads over the adjacent land and enters into the local stream. This has diverse impacts on the chemical composition of stream water in downstream villages like Mathapur, Vejput, Gumalguda and Goudaguda. The sewage water generated from the NALCO colony is also discharged through the Rajamunda River. Villagers from Goudaguda are mostly affected due to the discharge of effluent from the effluent treatment plant (ETP). The domestic animals as well as human beings exposed to such polluted water are severely affected with various types of skin diseases due to high pH of the water.

GROUNDWATER POLLUTION DUE TO LEAKAGE FROM FLYASH POND & RED MUD POND

During the visit to the NALCO ash pond and red mud disposal site (GPS location 18° 46' 26" N 082° 53' 37" E) it was found that the mandatory impervious polythene lining protecting the toxic red mud from leakage to the ground water is

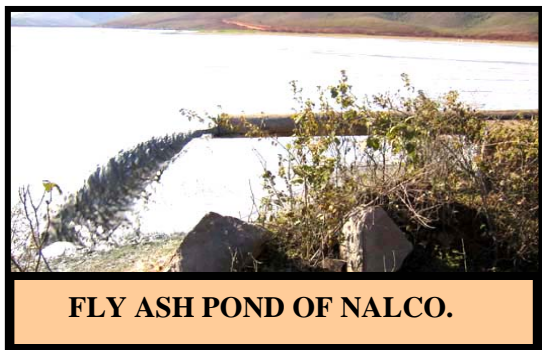


absent. Earlier the NALCO officials had assured the existence of such a lining. Absence of proper lining means that contamination of ground water is unavoidable. This indicates that the company pays too little attention towards the protection of ground water. The power requirement of the refinery plant of NALCO generates a huge amount of fly ash which is ultimately dumped into a separate ash pond (location 18° 46' 22 "N 082° 53' 23"E.). During our visit, the complaints received from villages surrounding flyash pond and red mud pond indicated that whenever it rains both ponds overflow and their toxic material is spilled into the nearer stream and river. This is in sharp contrast to the statements of state pollution control board authorities that even a heavy monsoon will not lead to an overflow of the ponds.

WATER POLLUTION DUE TO MINING ACTIVITY IN PANCHAPATTMALI

During visit to the mining site, following lacunas were observed in proper management of waste water of the mines:

- The waste water generated from workshop and garage which contains high percentage of oils and grease materials is being discharged to the adjacent hill slope without proper treatment. The oil and grease trap and other units are not found to be working properly due to siltation. The waste water finds its way to hill slope which ultimately gets mixed with the stream near Jholaguda.
- The waste water from canteen and other establishments situated in the mines directly discharge their wastes which ultimately gets mixed with the stream near Jholaguda.
- According to Sri Damodar Jani, sarpanch of Litiguda G.P, due to mining activity in the Panchpattmali mines, the villages located in the slope like Kutudi, Jaliamba and Gadati faces acute water pollution. He complained that during rainy season the well water becomes red due to seepage of red mine water into the ground water level. Similarly the suspended particulate matter content of the well and tube well water is found to be quite high.
- Discharge of mine water to the hill slope especially during monsoon leads to contamination of surrounding streams.



FLY ASH POND OF NALCO.

The aluminum refinery has created areas contaminated by heavy metals and alkaline rich effluent from the use of caustic soda in the refinement process. The refinement process involves the use of caustic soda. Open manmade reservoirs of high-alkalinity waste water from the refinery contaminate adjacent natural waters during large precipitation events, when overflowing of dykes occurs. The alkaline pollution is present in fresh water lakes near the refinery, and it may extend to nearby streams. The physiochemical characteristics of water collected from the agricultural fields of Goudaguda (where the effluent water from the refinery unit and colony sewage gets mixed) as tested in the Environmental lab of Vasundhara is provided in the table below:

DEDUCTION OF THE ANALYSIS RESULT

From the analysis of the samples it was found that the value of certain parameter like PH, Turbidity is found to be greater than the standards framed by BIS. Similarly the dissolved oxygen content of the water is found to be much below the prescribed standards. The other parameters are found to be within the prescribed limits. The high PH content of water may be due to the presence of excess caustic effluents discharged from the industrial operations. Using water (having high PH content) for domestic purposes causes a number of skin diseases such as rashes and inflammations on the skin and wounds which finally leads to formation of ulcers. High PH content of water affects the fish population directly. Similarly high PH content of water affects the normal growth of paddy, thus resulting in to low productivity. The turbidity content of the water is high due to the discharge of untreated sewage from NALCO employee's colony and the muddy effluents from the effluent treatment plant of the refinery plant. This high turbidity is harmful for the aquatic animals as it reduces the DO of water, and transparency of water. High turbidity levels are often associated with higher levels of disease causing micro-organisms such as viruses, parasites, and some bacteria. These organisms cause symptoms such as nausea, cramps, diarrhea, and headaches. The very low DO content of water (the optimum DO should be 5 mg/l) is due to high organic load found in the water. As the untreated sewage from the colony is directly discharged into the nearby stream, it leads to high biological load in the water thereby depleting the oxygen content of water. This will result in death of aquatic animals like fish.

Parameters	Value
TDS	27.7 mg/L
pH	9.5
Hardness (as CaCO ₃)	8.95 mg/L
Chloride	103 mg/L
DO	2.36 mg/L
Turbidity	12.8 NTU
Conductivity	340µS

No, it is not the fear of Tiger, it is the mine water

It is a common practice among the tribal people to let free their cattle during morning hours. The cattle go to the nearby forests in search of food, graze whole day long and return back in the evenings. However the villagers of Kutudi and Kaspiput are now-a-days not allowing their cattle to roam about freely. This is not due to the fear of tigers or other predators; but it is due to the fear of exposing their cattle to the caustic water from Panchapattmali mines. Shri.Damodar Jani, Sarpanch of Litiguda G.P, narrated this interesting story to us -

There were a number of natural streams flowing through this village area. But after commencement of mining activities in this area, these natural streams (Pop Jala, Parua Jala, Bagmani Jala, etc) have dried up. However, even a short shower results in filling up of these streams with mine water. When the cattle drink such concentrated toxic water, they immediately fall ill and succumb to different kinds of diseases within a month or so. Finally, as a last option, the villagers take such sick cattle to the animal haat and sell them off. In the last few years a number of villagers have lost their cattle and domestic animals.

The Aluminum Hydrates Leakage Incident

July 27, 2005, was like any other normal day except that an accident occurred at NALCO that affected hundreds of people.....

There was an accidental overflow of the precipitate slurry tank in to the storm drain and also over the main road of the plant during de-choking process of the drain valve of precipitation tank no180. About 80% of the overflow found its way towards west side where rest 20% towards east as per the slope of that area. All these finally flowed to the Sabari lake and mixed with the natural local nallah in down stream i.e Rajamunda river. The nallah water contaminated with the chemical effluent caused damage in down stream area like Mathalput, Vejaput, Gumalguda. Due to high alkaline nature of this water, all aquatic animals died. Similarly a number of buffaloes and cows of Goudaguda village died by consuming water from the nallah. In last December, another such incident occur when 4 buffaloes from Goudaguda died by consuming the water of the local nallah. The crops of the village were also damaged and later it was found out that alkaline effluent has been discharged from the ETP. The villagers have gheraoed the corporate office of NALCO many times but the authorities do not pay heed to their demands as per Chitta gouda, ex-councilor of Damanjodi NAC. The villagers complain that when their cattle enter in to this water, their fur falls off and when human beings baths in this water or use for other purposes, the skin becomes red and ulcers are formed on the skin.

'I feel I am being burnt alive...'

Suraj Gouda is a 9 year old child of Goudaguda village with tear stained eyes, a painful expression on his face and a lean built. His persona nowhere matches with that of the chubby and hyperactive counterparts of his age living under better hygienic conditions. His father Ravi Gouda removed the kid's shirt and pointed towards the ulcerations on his neck, chest and limbs. He complains of burning sensation in his eyes, stomach as well as all over his body. His legs were covered with large ugly patches of inflamed rashes and ulcers. The teacher in his school forbids him from attending classes lest other children of the school contact these rashes. This is not the story of only Suraj Gouda. The entire village is afflicted with the same problem due to exposure to the toxic caustic water of the refinery plant and the domestic effluents of township. Application of superficial creams and ointments is of no use. Even the medicines prescribed by doctors are of no help. The local villagers have put forth their problem during Nalco's health related awareness programmes but no one cares for their complaints - alleges Chitta Gouda, the village leader.

AFFORESTATION PROGRAMME UNDERTAKEN BY NALCO AT DAMANJODI



Conveyor Belt of NALCO. Damaniodi

The official web site of NALCO, proclaims the practice of "a tree for a tonne". It has claimed that the company has adopted all the tenets of statutory regulations in its care for ecology. It has got Indira Priyadarshini Virkshamitra Award, the highest national honor in the field of afforestation and wasteland development. The company claims to have developed plantation around the conveyer belt as a control measure for Noise Pollution. However, the photograph clearly depicts the absence of any such afforestation measures around the conveyer belt.

PLANTATION AT MINE SITE



Connecting Road to Panchapattmali Mine Site.
(No Plantation on both sides of road)

NALCO is claiming that it has developed a 15 m wide green barrier surrounding the mine site located at Panchapattmali. However no such plantation was found during the field study. During the visit, some patches of plantation were found in villages like Kudamal, Lachmani, Mathalput. But these patches of plantation consist of only exotic species like the eucalyptus and acacia. The village Sarpanch of Litiguda Shri Damodar Jani told that he is challenging the authority to give the details of the place where mass afforestation programme has been conducted. It has been presumed that the NALCO

authority might have made plantation on both the sides of the road to mines and conveyor belt. But no such plantation was found during the visit.

PLANTATION DEVELOPED AROUND THE REFINERY PLANT AT DAMANJODI

By assessing the plantation programme carried out by NALCO around the refinery site at Damanjodi, it can be concluded that the plantation around the refinery is not at all sufficient to check the pollution impact of the captive power plant and refinery unit. The plantation is confined to a few varieties of exotic species like the eucalyptus and acacia. Though the plantation in Damanjodi town is found to be quite good but it is only confined to the colony inhabited by NALCO employees. Even areas located near the refinery plant have no plantation at all.

LAND & SOCIAL ISSUES

1. **PROBLEMS IN THE REFINERY AREA:** In 1981 NALCO (National Aluminum Company Ltd.) started with bauxite mining and established an alumina plant. About 10058 acres of land were acquired for building the "red-mud pond" and the "ash pond". Fifteen villages with about 597 families had been displaced. NALCO built a rehabilitation colony far away from their former farmland. The affected villages could broadly be compartmentalized in three categories. The first category contains villages, which have been fully displaced and rehabilitated in Analbadi resettlement colony located at a distance of 7 kms from Damanjodi. NALCO authorities on payment of Rs. 1.20 lakhs

acquired Private land measuring 43.75 acres in this region. Four hundred and ninety eight 'Pacca' dwellings were constructed here for the displaced Tribal at a cost of Rs. 68 lakhs. Out of a total of 440 resettled families in this village 199 belong to the scheduled Tribes. It is apparent from the above table that majority of the displaced households from villages like Damanjodi and Sukriguda were Tribal. Every family consisting of 5-15 members got a compensation of about 3000 INR/acre, one house (one and a half rooms) but no farmland. To each displaced family NALCO had offered one job, especially in a lower paid position (drivers, diggers). If a family consists of 4 sons, only 1 son gets employed. The rest of the 3 sons could have worked in the farm and earned a good decent living. But with no farmland left in their possession, they are left with no other means of livelihood and source of living. No jobs were offered to women; all family members had to depend totally on the one male who got the job. The status of women has changed rapidly. Having lost their sources of income after displacement and resettlement they now depend on the men for their daily needs. Before displacement they sold produce from the farm for their own requirements and to support the family. Now without that they have lost their independence and dignity. Women were also complaining about an increased work burden. Men are frequently drunk and the families are faced with the fear of what will befall them when the single earning family member dies. With no farmland and with the company snatching away their quarter in the rehabilitation colony, where would they go? The local people are constantly haunted with these thoughts of insecurity and uncertainty.

2. **PROBLEMS IN THE REHABILITATION COLONY:** At the rehabilitation colony it was observed that there was an inadequate supply of drinking water. NALCO had only provided 3 wells for the more than 500 families, which was found to be largely insufficient. People managed to build two more wells out of their own resources. They complained that in the dry season the water situation is worsening, as the water in the wells dry up. Before their displacement the people used the spring water in their villages freely. It was enough to satisfy their daily requirements of water for both domestic and agricultural purposes. They have lost their land as a source of livelihood, but did not receive compensation in terms of new land or adequate human resource development measures. Similarly due to lack of school in the rehabilitation colony, the children have to cover long distance for reaching the nearest school. It is often difficult for them to afford the costs involved in the long distance travel. This means that the chances of the children of securing good jobs in future are limited.

3. **PROBLEMS FOUND IN THE MINES AREA:** NALCO has a mechanized bauxite mine at Panchapattmali hilltop in Koraput district with an annual capacity of 2,400,000 tones. The Aluminum refinery located at Damanjodi is situated at a distance of 14 km from the mines and it extracts 800,000 tones of alumina per annum. This is supported by an aluminum smelter unit which produces 218,000 tones of aluminum per year and is located at Angul district. The mining activities at Panchapattmali have affected 40,760 acres of land area. Total number of villages in the vicinity of Damanjodi, which were affected by NALCO mines, is 26 and spread over 5 blocks of Koraput district. During the study it was found that no Garland drains and drainage system have been used control the water pollution within the mines. So big boulders generated from the mining blast were carried away by the rain water during monsoon and deposited on the fertile plains thus rendering a lot of precious fertile land of tribal people uncultivable. A number of villages located on the side of effluent drain are facing drop in crop production. As the caustic water is being discharged into the nearby drain, it affects the nearby paddy field due to absence of dyke on both the sides of the drain. Due to highly alkaline nature of the water, it damages the paddy. The paddy is found to be more susceptible to different type of diseases, which requires a through investigation by an agriculture expert. Villages like Goudaguda, Gumalguda are the most affected villages due to this problem. During the visit, the villagers of Goudaguda complained that due to the impact of effluents, the yield in paddy has significantly decreased. Previously 50 bags of rice were grown in one acre of land which has reduced to only 40 bags right now. What is more surprising is that many paddy grains have no seed within. About 40% of the paddy production is seedless, which fetch no price in the market, nor can they be consumed by the farmers themselves. During the visit, the villagers show paddy having very less grain content. The villagers had no other sources of employment rather than agriculture practice and cattle rearing. But at present due to the effluents released from the refinery plant their source of livelihood has been drastically affected.

HEALTH IMPACTS

BACKGROUND

A number of concerns about the Alumina refinery at Damanjodi had been brought to our attention by members of the villages in the vicinity of the refinery. They reported significant health and environmental impacts in and around the refinery plant, despite the official recorded ambient levels of individual chemicals not exceeding permissible levels (as indicated in the compliance report of Nalco, Damanjodi).

Their main concerns related to:

- Adverse health effects;
- Excessive noise;
- Unpleasant odour; and
- Displacement and Livelihood problems.

There has been growing community concern about potential health impacts to workers and local communities of a wide range of industrial emissions and disposal of waste from the refinery complexes. In particular concerns have emerged from people who are presently working in the refinery plant and residing close to the plant site. These issues and problems are highly complex, emotive and divisive. Our team got to hear evidences from many villagers who shared their personal experiences. Despite the weight of concerns expressed to our team by many witnesses, the cause or causes of the health impacts has not been scientifically identified. This does not in any way, however, undermine the recognition and significance of the very real impacts experienced by many people.

INTERACTION WITH HEALTH OFFICIALS OF NALCO, DAMANJODI

The interaction with two Doctors of that area (who agreed to speak to us only on strict conditions of anonymity) revealed that there were two categories of patients – The villagers who resided close to the refinery and were experiencing adverse health impacts; and the workers experiencing occupational health impacts. When we explained to the doctors about the motive of our study, they advices us that rather than just have an Environmental Impact Assessment, there needs to be an Impact Study of Public Health before serious adverse events occur and it becomes too late to do anything.

1. **Workers** with exposures to liquor fumes (nearer to the digestive unit) are found to be mostly affected. Most of the workers presented with a multitude of symptoms, including –
 - Lethargy,
 - Fatigue,
 - Headaches,
 - Epistaxis (bleeding from the nose),
 - Sore eyes, nose and throat,
 - Breathing difficulties,
 - Abdominal discomfort,
 - Urinary frequency,
 - Nocturia
 - Myalgia and
 - Cognitive dysfunction (difficulty with mental function) and
 - sensitivity to various chemicals
2. The common symptoms experienced by the **villagers** residing close to the refinery (falling under the annual wind- rose direction) include:
 - Painful, burning and inflamed joints;
 - Burning under the skin;
 - Frequent urination and constant thirst;
 - Burning airways and upper respiratory complaints such as tightness and burning in the chest and breathing difficulties;
 - Continual fatigue, lethargy & poor sleep patterns;
 - Short-term memory loss and poor concentration;
 - Itchy scalp and hair loss;
 - Nausea
 - Diarrhoea;
 - Mucous membrane, skin and eye irritations;
 - Chronic headaches, chronic digestive upsets, chronic pain (particularly in the joints), burning in the stomach and throat, throat ulceration, and a general feeling of lethargy and being unwell;
 - Asthma;

CONCLUSION

1. There are absolutely no research studies to ascertain the cumulative impacts of the high number of chemicals mixed together in the refinery emissions.
2. Air Quality studies do not take into consideration the percentage of volatile organic compounds (VOCs) present in the emissions.
3. Dust suppression program are inadequate.
4. Water Pollution is a major problem in villages adjoining the refinery and mines site.
5. Dearth of hygienic drinking water in villages adjoining the refinery and mines site.
6. The existing noise levels are beyond the permissible limits.
7. The supply of drinking water to the villages in the impact zone (excluding the adopted villages) is ignored.
8. Peripheral development programs especially plantation and afforestation measures are more publicized than actually practiced.
9. Inadequate health surveillance program initiated by NALCO
10. Access to appropriate medical expertise and diagnostic health services unavailable.

One of our most significant findings is with regard to the company's efforts to establish an informal buffer zone around the refinery. Although we recognize NALCO's good intentions, we are dissatisfied with its current land management and peripheral development strategy which is sadly inequitable. Therefore, we see the need to resolve this issue in a manner which is perceived to be fair to everyone involved. Therefore, we have come up with a few recommendations and suggestions. All the above problems are being faced by the local people, mostly tribals. It is inexplicable that a Public Sector Company like NALCO, which makes huge profits by exploiting what is morally the ancestral property of the local tribal communities, finds it so difficult to take care of these same people.

The Reasons for Complaints from Communities

Air & dust pollution: Air pollution was high due to suspended particulate matter during loading, unloading, blasting, and other mining operations.

Noise emissions: Our team received serious complaints that the noise emissions from the refinery and conveyer belt were excessive.

Unpleasant odour: During our inquiry our team received many complaints regarding unpleasant odours from the refinery very frequently.

Discharging of effluent without treatment: It was found that the un-treated effluent sewage from the NALCO township along with partially treated caustic water was being directly discharged into the nearby drains which finally flows into the nearby river. The villages coming under the catchments area are the most adversely affected.

RECOMMENDATIONS & SUGGESTIONS

Based on our study findings and observations, we have a few recommendations to make. It is not difficult for a Public Sector Undertaking like NALCO to adopt and implement these recommendations and suggestions. It can chalk out the immediate, short term and long term efforts to be put in after due prioritization of these recommendations.

- ❖ A long-term health surveillance program must be initiated;
- ❖ A health audit of the total population must be conducted which should be repeated every five years;
- ❖ Counseling and referral to appropriate health services must be made available not only to patients from villages adopted by NALCO but also to those villages which are experiencing a certain degree of negative environmental and health impacts.
- ❖ Immediate priority must be given to the establishment and long-term funding of an Environmental Health Foundation, to be initiated and all reports received from the Environmental Health Foundation to be tabled before each House of the Parliament. The membership of the Environmental Health Foundation must include community representation for greater transparency and adequate say in decision making process.
- ❖ The Department of Health of NALCO should ensure access to appropriate medical expertise and diagnostic health and support services for people with multiple chemical sensitivities and other chemical injuries.
- ❖ Similarly, Air Quality Research Program must also be undertaken as a top most priority and that these should include volatile organic compounds (VOCs) and standards for multiple chemical exposure.
- ❖ The Department of Environment of NALCO, as a matter of priority, must initiate an effective dust suppression program to be implemented at the residue disposal areas.
- ❖ The State Government should take critical note of the current breach of the existing noise limits in the area.
- ❖ The Department of Health of NALCO, as a matter of priority, should also derive a hazard index in order to assess the health risks caused by the cumulative impact of the very high number of chemicals mixed together in the emissions from the mine site and from the NALCO plant.

Table 1: Total number of Villages affected = 26

Sl.No	Block wise distribution & No of villages affected	Total land area
1	Koraput – 12	40,760 acres
2	Laxmipur -4	Cultivated area= 1,813acres [53.5%]
3	Dasmathpur – 2	Land acquired by NALCO = 6853 acres [16.8%]
4	Sunabeda – 3	Govt. land acquired =3976 acres [58.1%]
5	Dasmanthpur-5	Tribal land acquired=2093 acres [30.5%] Non-Tribal land acquired= 784 acres [11.5 %]

About 30% of the Tribal population in this area had been affected due to this mining activity.

Table 2: Affected Villages and their specific environmental problems

Sl. No	G.P(Location With Respect To Refinery)	Block	Villages	Problems
1	Litiguda	Koraput	1- Karadiguda 2- Bhejaput 3- Bhaluguda	1- Noise pollution due to conveyer belt. 2- Rapid soil erosion due to blasting.
2	Bhitarguda	Laxmipur	1- Bhitarguda 2- Marichamati 3- Kasput	1-air pollution 2-water pollution
3	Tentulipada	Narayana patna	1- Metang 2- Taliamba 3- Sanogodti 4- Badgoti	1-water pollution 2- water depletion
4	Bijakati	Narayana patna	1- Kuttudi 2- Jaliamba	1-water pollution 2- soil erosion. 3- Blasting rocks are being felled.