THE ENVIRONMENTAL CATASTROPHY IN KUWAIT

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IN THE NAME OF GOD THE
COMPASSIONATE, THE MERCIFUL

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INTRODUCTION

Since the dawn of history man has been living in a continuous status quo with the environment surrounding him. This is due to the fact that a very delicate symbiotic existence bounded man to his environment. In recent century this balance has been greatly disturbed due to the destructive power that man has attained. Such power gave man the ability to challenge the very delicate balance that prevailed all through history.

The first atomic explosion, more than fifty years ago, has drawn at a new era when unleashing such a destructive power could tip this delicate balance and might lead to the dooms day. Recently an international agreement, on controlling atomic race, has risen some hopes that may save the existence of life on this earth.

Other sources of mass destruction such as the biological and chemical warfare is another dangerous weapon that threatens life existence on this earth. Many other possibilities might arise from mastering these destructive weapons. It all depends on mans ability to restrain from being tempted to use this mass destructive weapon on his fellow men.

Such a lack of restrain was clearly shown when Saddam Hussain of Iraq had the chance to use chemical gases against the Kurds of Iraq and to set fire to the oil wells of Kuwait.

Such unprecedented action of malice is the story of the film "Fires of Kuwait". I shall introduce this great film that tells the story of the environmental damage, that means dooms day possibility, of the smoke of fumes which had fallen on the Kuwaiti population. It was only through God's protection and the sincere international cooperation to extinguish these inferno that saved the Kuwaiti population from similar fate as the Iraqi Kurds.

The extent of the damage can only be seen through these fires but the real damage to the environment is totally a different story and much more is to be done only to understand the extent of the damage.

It is the story of how far mans malice and hatred can endanger his life and existence on this earth.

I. ENVIRONMENTAL DAMAGE CAUSED BY THE IRAQI INVASION OF KUWAIT

After eight years of war between Iraq and Iran, the States of the Region were in the process of building on the peace attained through the United Nations, and slowly recovering economic stability, and the environment gradually absorbing the damage it suffered, another perilous whirlwind struck in the form of Iraqi invasion and occupation of a peaceful State, followed by unleashing atrocities against innocent and helpless human beings, the nature and methods of which the human mind is unable to comprehend. The invasion of Kuwait brought about a dramatic change. By the end of the Iraqi occupation (on 26 February 1991), the outlook had been radically transformed. Kuwait city, previously a modern,

urban centre with thriving bazaars and a busy commercial district, had become a ghost town. The same was true of other urban areas across the country, where major social dislocations had occurred during the occupation of the country: two thirds of Kuwaiti nationals had sought refuge abroad; three quarters of the labour force had been obliged to leave Kuwait; and the quality and availability of health services had been dramatically downgraded and education had come to a halt. The physical infrastructure supporting basic services - electricity, water, waste disposal - had been rendered inoperative; ports largely destroyed; oil production and refining and related off loading activities crippled; the financial system severely disrupted; foreign trade suspended; commerce considerably diminished; manufacturing paralyzed; and inventories plundered. Not only that but also Almighty's gift to the mankind - the environment - was taken hostage with the vicious declaration of total destruction.

a) Aggression on Environment

The Iraq-Kuwait conflict represented a direct, unprecedented assault on the environment and natural resources of Kuwait in particular and the Region in general. From an economic point of view, no less than from an environmental perspective, the greatest damage was that inflicted on the oil industry. The destruction of refineries and pipelines and storage systems and, above all, setting on fire 788 oil wells had brought unprecedented catastrophe to the economy and the environment of Kuwait. The largest oil spill in history, setting on fire oil wells, and military activities in a fragile and arid environment, all had a massive and potentially devastating effect on the environment of Kuwait and other States of the Region.

b) Marine

The northern part of Arabian/Persian Gulf is almost an enclosed body of water, approx. 1000 kms. long and 300 kms. wide, with an average depth of 35 metres. It is one of the most productive water bodies of the world, but it is also considered one of the most fragile and vulnerable marine ecosystems. Its low tidal displacement means that it has little discharge of its water into the Arabian Sea and to the Indian Ocean and thus little opportunity to flush out pollutants. The impacts on the marine environment of Kuwait was not limited to the pollution by oil. The Iraqis destroyed the sewage

treatment plants, as a result of which raw sewage was discharged into the Sea through a number of emergency outfalls that open directly on the beach. The exact amount of oil spilled into the Sea is unknown; however, it is estimated that between 6 to 8 million barrels of oil were spilled into the

Sea Area. Another source of pollution of the marine environment is the sunken ships. The ships will act as chronic sources of hydrocarbons and trace metals. The type of cargo that ships were carrying is another source of pollution of a greater dimension. The sunken ships range from gunboats, conventional vessels and oil tankers. The number is estimated to be more than 220 endangering the northern part of the sea of Shatt al-Arab. They are a continuous threat to navigation.

c) Atmosphere

Before the occupying forces were driven out of Kuwait, they put into effect the threat of blowing up the oil wells, tank farms, export facilities and the gathering centres. Explosives were placed around the wells, and a total of 1073 wells were wired in fifteen oilfields. Detonation of the explosives resulted in 613 wells on fire, 76 wells gushing crude oil and 99 wells damaged. In addition, 285 wells in the neutral zone were observed as damaged. Statistics show that 3-6 million

barrels of oil burned daily from 163 oil wells, resulting in injection into the atmosphere millions of tons of smoke containing sulphur dioxide, hydrogen sulphide, nitrogen oxides, carbon monoxide, carbon particles, heavy metals, etc. dangerous to humans, animals, plants, wildlife, etc. In addition, direct fallout of smoke particles and oil droplets destroyed the desert ecology of hundreds of kilometres in Kuwait and Saudi Arabia.

d) Terrestrial

The outbreak of hostilities in the Region had great effects on Kuwait's terrestrial environment. Oil spewed onto the desert land from burning oil wells and 76 gushing wells formed into lakes containing 70 to 90 million barrels of oil from which toxic gases continued to emit into the atmosphere. Oil lakes have covered more that 100 sq. kms. of desert area and completely destroyed the desert plant life and biological

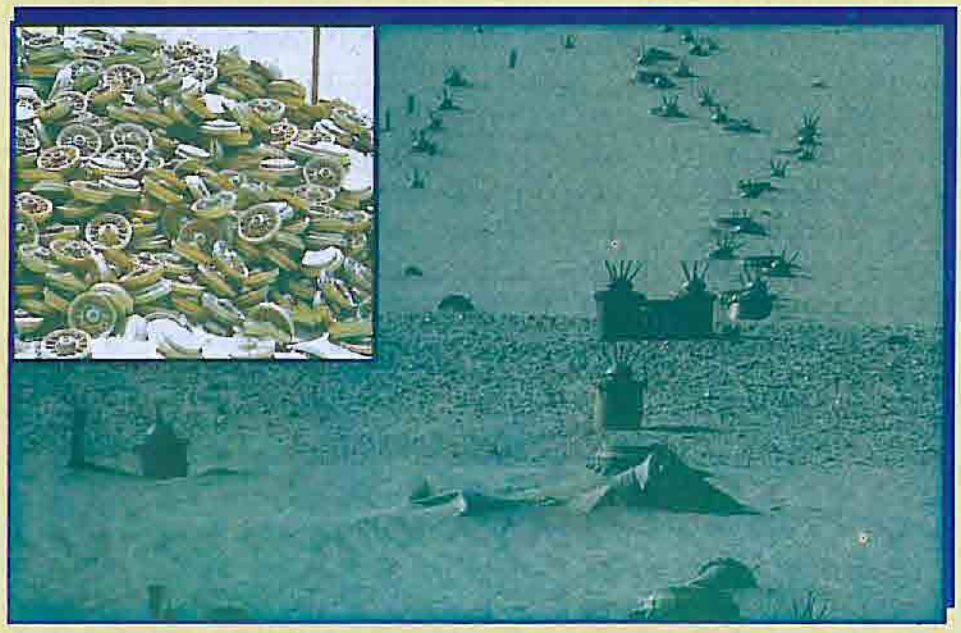
species in Kuwait. The occupying forces further destroyed the ecology of the land by digging bunkers and trenches across the land as well as along the coastal areas of Kuwait.

Effects of oil fires on the flora and fauna are adverse. Oil pollution can inhibit the growth and productivity of various mechanisms of plants and may destroy them. Oil spills near the wells have inevitably led to the eradication of all living organisms within a wide area of the wells. Field observations revealed the death of a large number of desert animals, birds and insects. It is considered that the animal population would change in terms of kind of species, number of individuals and activity. In general, oil well fires, hundreds of kilometres of trenches filled with crude oil, military manoeuvres, fallout of smoke particles and droplets, etc. have caused detrimental effects on Kuwait's terrestrial environment.

War activities, such as bombing, shelling, and military manoeuvres as well as planting of mines by the occupying forces have considerable direct and indirect effects on Kuwait's ecosystem. Iraq's mine planting was surprisingly deliberate and thorough. During its seven month occupation of Kuwait, the Iraqi military took steps to fortify the country against invasion by the allied forces. An important part of their fortification was the laying of minefields on land, the sea, across likely invasion routes and around installations and positions considered to be of strategic significance. Mines and other unexploded ordnances together constitute a major and perhaps long-lasting threat to the environment of Kuwait and to the security and well-being of its people. Since anti-personnel mines are constructed almost entirely of plastic with only the firing pin of metal, they are very difficult to locate with most mine-detecting equipment. Although international agreement calls for the mine-laying party to insert metal pellets in special pockets in the explosive mass as an aid in mine detection at the end of hostilities, metal pellets were not inserted by the Iraqi forces. Almost the entire coast

of Kuwait was sown with a combination of anti-tank and anti-personnel mines. The mines were laid both above high tide and in the inter-tidal zone. To avoid floating, mines placed in the inter-tidal zone were sometimes individually tied to a mesh net pegged to the ground. Such and other tethered mines tend to get loose as time passes by and, therefore, pose great danger to navigation and marine ecosystems such as coral reef, etc. The oilfields were sown with mines of different types and sizes which made the oil well fire putting out operations extremely difficult. As a matter of fact, unexploded ordnances can be found anywhere in Kuwait.

By end of march 1991, 3 million such devices, including mines, had been cleared from the Kuwait city and adjacent areas. Experts are of the opinion that more than 8 million mines were laid down and large areas of Kuwait have so many mines that it is impractical to remove them, particularly the vast minefields that cross the southern part of the country.



The beaches of Kuwait, which provide one of the main recreational areas for the people, pose the biggest hazard for

human beings due to unexploded ordnances. Landmines pose a threat to animal life and humans. According to a report from Ibn Sina Hospital during the period March to June 1991, the hospital received approx. 1275 cases most of which were related to mine explosions; which included 335 child victims of mine and ordnance explosions (these are cases reported at one hospital).

II. WHAT ACTIONS WERE TAKEN BY ROPME

a) Oil Pollution response operations

In view of the massive oil spills, and for lack of adequate response capabilities in the Region, assistance and technical support in pollution response operations were offered by various governments and international organizations. Individual Member States of ROPME, with the assistance of experts from within and outside the Region, mobilized pollution response equipment and personnel to combat the spills. The most affected shorelines were of Kuwait, particularly Saudi Arabia as the majority of the spilled oil moved south along the Saudi coast polluting to the extent of 460 kms.

In response to the ROPME Region's requests for assistance, a number of governments confirmed to the International Maritime Organization (IMO) that they would be ready to render assistance in dealing with the incident. It is worth mentioning that some seventeen governments offered assistance through IMO and a number of such offers were taken up by ROPME Member States. In addition, several countries assisted the ROPME Member States on a bilateral basis in clean-up efforts and protecting the coastal installations. With the assistance of IMO and other local and international experts, the pollution response teams were able to recover approx. 1.6 million barrels of spilled oil from the

sea area of Saudi Arabia. Moreover, through ROPME's efforts, approx. 10,500 barrels of emulsified oil were collected from the Shuaiba port and its vicinity.

b) UN Interagency Plan of Action (UNIPA)

Taking into account the catastrophic dimensions of the oil spills impacting the ROPME Sea Area, and the oil well fires causing detrimental effects on the environments of Kuwait in particular and the Region in general, it was considered extremely important for ROPME to take immediate action to assess the damage and adopt appropriate remedial measures to rehabilitate the environment. As such, a Meeting of Experts was convened by ROPME in Bahrain on 26-27 February 1991 with the objective to coordinate the efforts of the States of the Region as well as the Regional and International environmental agencies/governments towards oil pollution response operations, assessment of the marine, atmospheric and terrestrial environmental damage in order to develop remedial measures for environmental rehabilitation of the

environment. In addition to ROPME Member States, some of the leading international agencies such as UNEP, IMO, UNDP, IAEA, etc. participated in the Meeting which was attended by 62 experts from within and outside the Region.

The pollution aspects were thoroughly reviewed by the experts who recommended that ROPME in cooperation with UNEP develop a long-term Plan of Action addressing the environmental consequences of the oil pollution, smoke plumes injected into the atmosphere from the burning oil wells and terrestrial ecosystem destruction, as well as environmental rehabilitation programme.

The Iraqi invasion of Kuwait; the military activities; spilling of millions of barrels of oil into the Sea Area; setting on fire and damaging 788 oil wells, have all contributed to the unprecedented damage of the environment and natural resources of the ROPME Sea Area. The crisis provided the first major test of a new sense of global responsibility to the world's environment. Within a week of the initial oil spill, the international community had initiated activities which brought together the first major international coalition to address an environmental crisis. Based on the decisions of the UNEP Governing Council, and cognizant of the immediate and long-term environmental threats to an ecologically fragile region, UNEP called for a concerted UN Interagency effort commensurate with the nature and magnitude of the crisis. Thus, UNEP in cooperation with ROPME developed a UN Interagency Plan of Action (UNIPA) to assess, mitigate/ eliminate the environment effects of the catastrophe and to rehabilitate the environment of the Region. The UN Interagency Plan of Action covered three phases (the survey phase; the assessment phase and the plan design phase) and focused on four separate but interlinked areas (marine and coastal environment; atmosphere; inland terrestrial areas; and hazardous waste management).

III. PRIORITY REHABILITATION PROGRAMME (PRP)

In an effort to mobilize international resources for the above purpose, ROPME Secretariat had knocked at all doors i.e. United Nations, UN specialized agencies such as UNDP, UNEP; financial institutions such as the World Bank, ROPME Member States and Governments outside the Region.

Unfortunately, the international community's enthusiasm noted in the earlier days of the environmental disaster did not materialize into assistance of any sort. Opinions expressed by government representatives at the UNDP and UNEP meetings even reflected the unwillingness of the world community to assist the Region any further as they consider the Region is rich to financially sponsor the rehabilitation programme with technical assistance from outside the Region. This attitude necessitated ROPME to prepare in cooperation with UNEP, a Priority Rehabilitation Programme (PRP) with the hope of collecting seed funds from ROPME Member States to the tune of US$ 15 million to initiate at least some priority projects, and later to approach UN and other agencies to extend any possible assistance to implement the PRP.

Under these circumstances, it was impossible for ROPME to initiate CRP/PRP projects as we all expected at the time of preparing the Consolidated Rehabilitation Programme. This in turn has also affected ROPME's desire to take up to the terrestrial and atmospheric components of the environment.

In order to enable ROPME deal with all three components of the environment, it is vital that Member States should make substantial contributions to the ROPME Emergency Fund and extend all other technical and manpower assistance. Without solving these difficulties, it would be impossible for ROPME to embark on implementing the CRP or PRP projects.

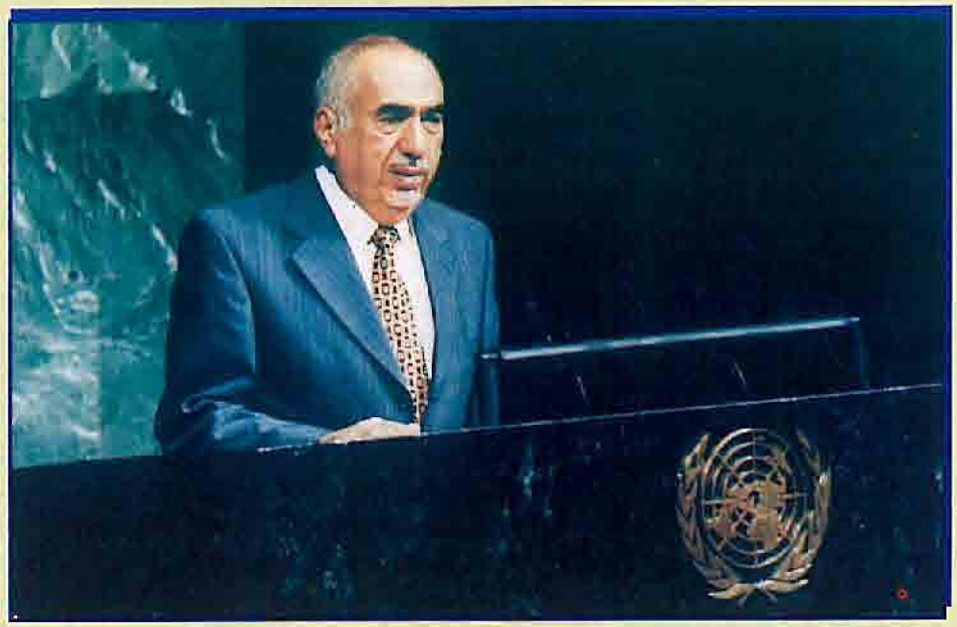
IV. ROPME SECRETARIAT'S EFFORTS TO MOBILIZE INTERNATIONAL SUPPORT FOR IMPLEMENTATION OF CONSOLIDATED REHABILITATION PROGRAMMES (CRP)

a) Visit of ROPME Delegation to Heads of ROPME Member States

Based on the decision of the Ministerial Executive Committee of ROPME, a higher level delegation consisting of the Executive Secretary of ROPME, H.E. Dr. Hadi Manafi, Vice-President of the Islamic Republic of Iran, and Dr. Abdulbar Al-Gain, President, Meteorology and Environment Protection Administration (MEPA) of the Kingdom of Saudi Arabia visited in the second half of February 1992 the Heads of States of ROPME Member States in order to present them the environment plight of the region as well as to request contribution to ROPME Emergency Fund for environmental rehabilitation. The visit was very successful in terms of commitments by Member States to step up their efforts to protect and conserve the environment, and to support ROPME in its endeavours to restore the environment of the Region. However, the ROPME Delegation was advised of the States feelings that the enthusiasm shown by the international community towards rehabilitation of the environment has disappeared, thus leaving the Region to face the consequences. It was further noted that the nations which were in the forefront of the campaign against Iraq should come forward with financial and technical support to restore the environment, rather than leaving the responsibility to be shouldered by the States of the Region alone.

b) Meeting with the United Nations Secretary-General

The Executive Secretary of ROPME met in Cairo in December 1991 with Mr. Boutros Boutros Ghali, UN Secretary-General, and discussed with him the role of UN in respect to the environmental crisis in the ROPME Region. During the meeting, the Secretary-General was apprised of the incalculable damage inflicted on the environment because of the oil spills, oil wells burning and military activities, and that the catastrophic event demands strong support of the UN and its member governments to rehabilitate the environment. The Secretary-General was found very supportive, and promised that he will give his special attention to the environmental problems.



c) Contacts with the United Nations Environment Programmes (UNEP)

During the UNEP Governing Council Meeting on 3-5 February 1992, H.E. the Executive Secretary of ROPME

discussed with Dr. Mostafa Tolba, the then UNEP Executive Director, the environmental plight of the Region and the need for UNEP to play a higher role in seeking international support for implementing the Consolidated Rehabilitation Programme. It was emphasized to him that he should exert all efforts to mobilize international support due to the fact that the environmental disaster is not only regional but international, and that the phenomenon is much bigger than the capabilities of the Region to cope with which demands a great deal of efforts by international bodies. Based on ROPME Executive Secretary's discussions, and in view of the lack of response from international bodies, Dr. Tolba suggested that it would

be appropriate to prepare a Priority Rehabilitation Programme (PRP) encompassing only those projects which need to be implemented on priority basis with less financil requirements e.g. to the tune of US$ 50 million which, in his opinion, was possible to be raised from ROPME Member States as well as the international community. He promised that he would make every possible effort to seek support from UN specialized agencies, such as those who co-operated with

UNEP in carrying out the survey and assessment components of the UN Interagency Plan of Action. Accordingly, to make the CRP more conducive as a realistic approach to encourage governments to extend financial assistance, a Priority Rehabilitation Programme was developed, with an estimated budget of US$47,750,000/-, part of which was to be contributed by the ROPME Member States.

In addition, the decision of the Executive Committee to explore the feasibility of organizing a pledging conference in the Region was also conveyed to Dr. Tolba and discussed with him the possibility of organizing the conference under the auspices of UNEP/ROPME. In spite of best efforts by ROPME Secretariat, UNEP could not organize such a pledging conference in the Region.

In addition to H.E. the Executive Secretary's personal contacts with Dr. Tolba, several letters were addressed by the ROPME Secretariat to UNEP OCA/PAC stressing the importance of UNEP's participation in implementing the CRP, as well as to extend financial assistance for ROPME's Database System. In spite of repeated requests, no positive response was received from UNEP. They suggested that a UNEP-ROPME joint meeting be held to find out ways to induce ROPME Member States make substantial contributions to the ROPME Emergency Fund for the purpose of implementing the CRP.

d) Contacts with the World Bank

Notwithstanding the disappointing responses, ROPME Secretariat continued exploring other ways and means to generate some funds to initiate the PRP. ROPME held discussions with the World Bank and proposed to them some short-term and long-term projects seeking funds to initiate them at national/regional level as the case maybe. Unfortunately, the Secretariat was informed by the World Bank that except I.R. Iran, none of the ROPME Member

States falls within the scope of WB funding policies for implementing environment-related programmes. In addition to the discussions in Kuwait, during the Executive Secretary's visit to New York, he met with officials of the World Bank in an effort to convince them of the importance of financial institutions such as the World Bank and its affiliates extending their arms of co-operation to ROPME Region to rehabilitate the environment. In spite of his best efforts, they have not come forward to support ROPME or its Member States for the reason given above.

e) Contacts with the United Nations Development Programmes (UNDP)

Based on the discussions between the Executive Secretary and Dr. Ali Attiga, Assistant Administrator, UNDP, during December 1991 in New York, further communications were exchanged between ROPME Secretariat and UNDP focusing on the possibilities of UNDP extending financial assistance from its Special Programme Resources (SPR). During the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, the Executive Secretary discussed with Dr. Ali Attiga the importance of funding organizations such as UNDP to shoulder some responsibilities in restoring the environment of the Region.

f) Contacts with the United Nations Conference on Environment and Development (UNCED)

During the UNCED in Brazil, June 1992, ROPME was represented by the Executive Secretary who presented to the Conference the environmental plight of the Region, requesting the international support for restoration of the environment. A detailed report on the environmental crisis in the Region was also distributed at the Conference. In addition, the Executive Secretary of ROPME met with senior officials of the UNCED and apprised them of the need for UN's strong support to alleviate the after-effects of the environmental disaster.

g) Contacts with the Desert Storm Allies

The Executive Committee Meeting was of the opinion that international support for rehabilitation of the environment was inevitable due to lack of the Region's technical and financial capabilities. Therefore, ROPME Secretariat should communicate with those nations which were in the forefront of the campaign against Iraq, that they should come forward with financial and technical support to restore the environment, and not leave the responsibility to be shouldered by ROPME Member States alone. Accordingly, a detailed letter along with a copy of the Consolidated Rehabilitation Programme was sent in January 1993 to the Ambassadors of Canada, France, Germany, Greece, Hungary, Japan, Netherlands, Norway, Poland, South Korea, Spain, Sweden, Switzerland, United Kingdom and the United States of America. Further contacts were made with some of the Embassies in this respect, and the Secretariat was informed that our request has been forwarded to their concerned authorities for consideration and response. Regrettably none of the governments came up with a positive response.

V. OCEANOGRAPHIC CRUIES

The Integrated Project Plan consists of three parts immediate, short-term and long-term. The Immediate and Short-term were two oceanographic cruises designed to collect marine samples and conduct studies to obtain detailed marine environment data. The first cruise was planned to be carried out by a research vessel owned by the University of Qatar, but for delays occurred in making the vessel seaworthy and for other technical difficulties encountered, the immediate cruise was canceled. The second cruise was by the US National Oceanic Atmospheric Administration (NOAA) vessel Mt. Mitchell which started the cruise programme on 26 February and completed the mission on 8 June 1992.

Mt. Mitchell Oceanographic Cruise

The Mt. Mitchell cruise was organized by ROPME with the assistance of the U.S. National Oceanic and Atmospheric Administration (NOAA) and in association with the United Nations Intergovernmental Oceanographic Commission (IOC), as part of the international response to study the effects of the massive oil spill which occurred as a result of the Iraqi

invasion of Kuwait and the subsequent military activities. The cruise provided considerable information on physical, chemical and biological oceanographic conditions in the ROPME Sea Area which was not studied since the early 1960s. The project was designed to produce information which will be of value in dealing with future oil spills both in the ROPME Sea Area and in other parts of the world. The Mt. Mitchell cruise was the first cruise organized at Regional level, and the ROPME Member States were fully committed to provide all logistic support and assistance to the vessel during her mission in the Sea Area. In addition, ROPME

Secretariat procured the necessary oceanographic instruments for the cruise, and arranged to supply with provisions.

Approximately 130 scientists from over 15 countries participated in the cruise. Primary representations were from

the ROPME Member States i.e. Bahrain, Iran, Kuwait, Oman, Qatar, Saudi Arabia and U.A.E. In order to accommodate the greatest number of scientists the scientific expedition was divided into six parts of varying lengths of time, with 18-22 scientists taking part in each aspect of the expedition. The expedition supported a broad range of investigations on the effects of the oil spill. This included shoreline and near-shore investigations along the heavily impacted areas of the Saudi Arabian coastline, regional circulation studies, examination of shrimp and fish nursery areas, studies of coral reefs and offshore island ecosystems, seafood quality and marine bird and mammal surveys.

The expedition was divided into six phases :

i) The first focused on an overview of the physical characteristics of the ROPME Sea Area, primarily studying currents and variations in the temperature and salinity. This will foster a better understanding of the circulation patterns of the RSA and help predict the movement of oil spills in the future.

ii) The second part examined the impact of the oil spill on the shoreline of Saudi Arabia, which suffered the heaviest concentrations of stranded oil in the Abu Ali area. Thirteen inter-related projects that dealt with near-shore biochemical and geological processes and community ecology were conducted. This work will lead to a better understanding of how marine environments respond naturally to oil spill damage, as well as identifying areas that will require some form of treatment. The NASA space shuttle ATLANTIS provided near real-time remote sensing oceanographic data to Mr. Mitchell during this part of the expedition, increasing the value of data collected at sea while providing calibration to the shuttle sensors. Much of the information gathered at ATLANTIS were used to guide later work of the expedition.

iii) The third part was an intensive study of the physical characteristics of the waters off the coast of Iran. This is an area where there are several freshwater sources that affect the salinities and temperature of the surrounding marine waters. This is important because many of these areas are nurseries for a variety of commercially valuable species of fish and shrimp. There are also other complexities to the circulation patterns along this coastline that have never been investigated and are thus very important to understanding complete circulation processes within the ROPME Sea Area.

iv) The fourth part focused specifically on fish and sea food safety questions. Several fishing sites located along the Western side of the ROPME Sea Area were sampled.

v) The fifth part focused on impacts to the coral reefs within the Region.

vi) While the last part repeats physical oceanographic measurements taken on previous legs in order to assess seasonal changes in the ROPME Sea Area.

These were in a very brief form of description of the damages that occurred to the environment in our Region. The

effort that was made to understand the degree of the damages is still very little compared to what is needed to be done. We have also seen how difficult it is for small nationsto meet the challenges of such environmental catastrophe. Despite the initial mobilization of the international attention, it became very difficult to find the proper mechanism that can respond to such emergencies. A great deal is still needed to produce a realistic and practical international response to environmental catastrophes. A lot is to be learned and humanity is still far from achieving very quick results when crisis really strike.

Table 1 : Sampling scheme of Mt.Mitchell oceanographic cruise

Legs	Duration From	Duration To	Country From	Country To	Criteria
I	26.2.92	11.3.92	Oman	Saudi Arabia	Physical oceanography
II	16.3.92	06.4.92	Saudi Arabia	Bahrain	Nearshore bio-geochemical processes
III	14.4.92	20.4.92	Bahrain	Kuwait	Physical oceanography
IV	20.4.92	03.5.92	Kuwait	Qatar	Impacts on fisheries & biological systems
V	07.5.92	16.5.92	Qatar	Kuwait	Kuwait Impacts on coral reefs & coral reef fisheries
VI-A	20.5.92	30.5.92	Kuwait	U.A.E.	Physical oceanography
VI-B	02.6.92	08.6.92	U.A.E.	Oman	Physical oceanography

Table 2 : Number of samples collected during the Mt.Mitchell cruise

Samples	Total	Criteria
Sediments	1,262	Pollutant, grain size, microbiology, meiofauna, etc.
Plankton	510	Population studies
Chlorophyll-a	80	Primary productivity
Algal mat	15	Population studies
Sea Grass/sea pens	61	Population studies & population indices
Benthos	37	Population studies & population indices
Water	263	Nutrients and pollutants
Corals	157	Pollution indices
Fish	625	Population studies and pollutants
Invertebrates	80	Population studies
Physical oceanography	647*	Measured through sensor of electronic equipment
	3,737	

*Represents locations only and not the parameters measured.

VI. THE FUTURE CHALLENGES

Nearly 10 years have passed since the catastrophe in Kuwait has taken place. A great deal has been done to rehabilitate the environment. The oil wells were put out within 7 months, the atmospheric pollution has disappeared and the sky has again become clear and taken its original blue colour as you can expect from any place in the desert where desert storms and suspension from dust particles still form some hazy views and all look so innocent as if nothing has happened 10 years ago. When these same skies were so dark and the sun could barely be seen because of the huge smoke cover from the burning oils. That smoke was so extensive that it had covered large areas of the Arabian Peninsula reaching to Yemen and even some have detected some contamination of the rain falling on the Himalayas.

On land, still you can observe the scorched areas of the desert, the remnant of very huge oil lakes which formed a very unique panorama across the desert. The beaches which were polluted by more than 10 million barrels of oil deliberately poured into the sea, are still suffering from the weathering oil mixed with sand and tar balls all of which are still causing a great source of pollution that is preventing all forms of life to re-inhabit those habitats which they have occupied since creation of our sea area.

To understand the extent of the damage which was created, the Government of Kuwait through the Public Authority for Assessment of Compensation for Damages Resulting from Iraqi Aggression on Kuwait, has mobilized both local and international capabilities to study the damages caused to the environment and has prepared a claim through the United Nations for compensating the State of Kuwait on the damages that were inflicted on Kuwait's environment. This has been

further developed to unify the claim process and environment damage assessment in a coordinated way between three countries of the Region i.e. I.R. Iran, Kuwait and Saudi Arabia. These three are the most affected countries of the region.

This claim has taken a form of retrospective studies from the evidence available in order that a plan for future activities rehabilitating the environment could be established.

Five major areas were identified :

1) The Human Health Risk Assessment

This takes the form of estimating the damages that occurred on human health during the Iraqi occupation of Kuwait and the oil fires. While the future risk assessment is so difficult to estimate because such an experience was never shared by other people. The model of Hiroshima health monitoring set up is to be established so that people can be followed on a cohort basis for the coming 25 years. This is going to be prepared by local authority with the help of WHO and some experts from academic centers such as Harvard School of Public Health.

Of course, no matter how much we can monitor the health of human being, the loss of satisfaction from joys of life and the fear of possible fresh hostilities is going to be always haunting the minds of every single person living in Kuwait.

2) Damages to Coastal Life

The extent of damages to more than 450 Kms. of shore line is still unknown to us. To study it thoroughly means a very challenging undertaking by the Governments of the Region. The reason for that is lack of expertise and lack of resources and above all lack of political will on behalf of the Governments of the Region to address the issue. The main

reason, ofcourse, is the lack of the importance given to environment in general not only in our Region but also in the whole world.

3) Damages to Sea Environment

This body of water that has suffered one of the great environmental shocks in the last 15 years starting from Iraqi/ Irani war and the Iraqi aggression on Kuwait together with the daily continuous pollution by oil through the huge oil traffic that passes through this body of water. The damage caused by oil pollution has taken the form of destroying a large amount of living creatures on the sea shore and deep on the sea bed because of the oil mats and oil tar which has destroyed so many forms of life.

The Mt. Mitchell Cruise has set the real phase that can be followed up and monitored. This was followed by three shorter cruises by the Japanese Umitaka-Maru ship which also

followed up the finding of Mt. Mitchell in the last three years.

All the results from all the cruises from the scientific point of view do not seem to be alarming. While on the other hand those involved in the fisheries are stating other stories.

They are claiming that fisheries have been affected and the catches have been scarce. This discrepancy between scientific finding and real life is something that we must pursue in order that the real facts can be established.

4) Underground Water Contamination

Kuwait being a desert country has limited resources for water. Some Aquafares of fresh water has been discovered but they are limited in size and they are used to a limited extent. They form a major water reservoir for the country.

Since all the drinking water we use is desalinated water from the sea, the damages to the Aquafares is therefore of utmost importance. This might have been caused by the gush of oil and brine water from the oil wells which have disturbed the structure of these Aquafares and at the same time the oil lakes can find passages through which they can reach these Aquafares and contaminate the very vital source of water reserves. To estimate the damage is one of the major challenges that Kuwait has to undertake.

5) Terrestrial Damages

As we know that the desert ecology is so fragile and the balance of life is barely held together by the very scarce elements of life, a few birds that just pass by Kuwait on their annual migration. The small amount of rain that does not exceed 6 inches per annum is barely enough to preserve this fragile ecosystem.

The moving sand dunes are a continuing threat to every living creature be it plant, insect or animal. Despite all the subtlety of this ecosystem, the oil fires and oil lakes together with all kinds of bunkers and huge military movements, has disturbed the ecosystem to the extent that repairing it to normal form can be considered beyond our capability. Some of the losses that occurred to life in this sparse area of desert is a loss to human heritage.

These are the major claims areas that Kuwait is pursuing and hoping that the UN Special Committee on Compensation will consider seriously. A great deal of resources are needed to handle these environmental issues. The world community is requested to take positive action that can rehabilitate the damages caused by this unprecedented Environmental Catastrophe created by Iraqi Aggression on Kuwait.

VI. CONCLUSION

Since the first oil spill on 19 January 1991 and setting on fire the first oil well on 13 February 1991, the State of Kuwait with the cooperation of the international community has been very successful in putting out the oil well fires in a shorter period than projected, and the ROPME Member States were able to combat the oil spills to a large extent with the international assistance. But, that was just the tip of the iceberg; the real challenge for us to confront with, which needs several years and billions of dollars, is the restoration of the environment. **A BRIEF ANALYSIS OF THE ENVIRONMENTAL PROBLEMS INDICATES THAT THE ROPME REGION IS PASSING THROUGH A PERIOD OF ENVIRONMENTAL DOOM NOT WITNESSED IN THE HISTORY OF MANKIND TO DATE.**

Restoring the environment is an enormous task which ROPME or its Member States will not be able to shoulder alone. The environmental problems facing the Region are indescribable that several years and cooperative efforts of Regional and International Organizations, Governments, UN and non-UN Agencies, non-Governmental Institutions, etc. are indispensable to reverse in part at least the adverse effects of the environmental disaster. Questions about the effects of environmental pollution and measures needed to be taken to rehabilitate the environment have become an everyday part of our life, but it is imperative that our common concern for environment should be translated into deeds to face the challenge. It is vital that numerous studies need to be carried out to understand the environmental phenomena and as to how this could be dealt with in order to mitigate/eliminate the adverse effects and to restore the environment. For this purpose, it is required that all possible international, regional and local resources are mobilized due to the fact that the environmental disaster is not only regional but international,

and that the phenomenon is much bigger than the capabilities of the Region which demands a great deal of efforts by international bodies. We in the ROPME Region have great confidence that our SOS call to save the environment is heard by the world community, and their strong hands of cooperation will be extended to rescue the environment from total disaster.

The question before us is how the world community plays its role to support the Region in rehabilitating the regional environment from total disaster ? It would be highly unrealistic if any one thinks that the environmental problems confronting the Region today will be solved by itself. The international community should not allow itself to be deceived of the true magnitude of environmental problems facing the Region by pretending as if they are not aware of it. The impacts of the 1991 environmental catastrophe have made it clear that comprehensive and effective regional and international co-operation is mandatory to mitigate the detrimental effects and rehabilitate the environment. The present environmental situation is very grave and ROPME Secretariat's efforts to obtain financial resources and technical support from the international community did not bring forth any results. The environmental plight of the Region deserves more and more scientific co-operation and technical/financial support to restore the damaged environment. Time has come for higher degree of positive and pragmatic regional and international co-operation so as to pursue together common goals for betterment of the environment lest we are victims of our acts. If we do not realize the gravity of the situation and take immediate measures, we risk undermining the present and future generations fundamental rights to a healthy and life enhancing environment. Any failure to do so will not be forgiven by future generations. The challenges are enormous, but with increased co-operation from the world community, regional governments, international/regional agencies, the private sectors, and even local communities, the

environmental rehabilitation programmes can be implemented successfully to the benefit of the regional and global environment.

Finally, I have to add that, the story of assault on the environment in our Region has not stopped. We have lived two drastic environmental damages. Both are the product of sick mind. A third damage is in the making by the same sick mind i.e. the Iraqi Regime. This one is more sinister as it is dealing with change in the ecosystem of the marsh lands of Southern Iraq. It is drying the land, filling in lakes, diverting tributaries, driving its people out and above all causing a change in the nature of the water that is flowing into the north of our Regional Sea. What this action is going to bring about is another Environmental Catastrophe. Immediate international action is called for. This action should be real and forceful with the backing of the whole international community. I hope it will happen soon.

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