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OFDA Mission Report

Findings and Recommendations for the 1994 - 1995 Heating Season Energy Crisis in Mongolia Preparedness and Response Strategies

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EXECUTIVE SUMMARY

Mongolia has faced degradation of its national infrastructure systems since the collapse of the Soviet Union in 1991 and the loss of Soviet support. One of the critical sectors affected has been the coal mining/energy production sector. In the larger cities, particularly Ulaanbaatar, this situation creates an extreme vulnerability on the part of manufacturing, government, and residents as the city's living and working spaces are centrally heated by hot water and steam produced by the three central hot water-electricity co-generation plants. Coal production has dropped every year since 1991 and accidents and breakdowns are becoming more common. Predictions for the winter heating season of 1994-1995 indicate a record shortage of coal availability for these power plants. The possibility exists for a winter season heating crisis in Ulaanbaatar this year.

An OFDA mission team visited Mongolia during the period Aug. 17-31 for the purpose of establishing the state of preparedness on the part of the Government of Mongolia to manage a crisis in the upcoming 1994-95 heating season. This preparedness falls into two general categories: that of the Ministry of Energy to manage available coal and equipment to mitigate the effects of a winter energy crisis, and that of the Civil Defense to respond to a crisis requiring evacuation and relocation of parts or all of the population who live in centrally heated spaces in Ulaanbaatar.

The principal findings are that:

The government of Mongolia is not presently taking active measures to reduce the impact of a 1994-1995 heating crisis.

Although the heating crisis will likely be the worst since 1990, the coal shortage alone does not represent a situation requiring large scale evacuation and relocation for the residents of Ulaanbaatar. However, this predicted shortage combined with the generalized state of obsolescence of the energy production system, and the risk of equipment failure may result in such a scenario.

Although some planning for winter evacuation and relocation does exist, the Civil Defense does not foresee that a winter heating emergency of this type represents a serious threat to life of the residents of Ulaanbaatar, and does not focus on this disaster type as a primary risk facing the country.

The team's primary recommendation is that the issue of the developing crisis should be raised to a higher level of consideration within the government planning bodies, particularly in the Ministry of Energy and in the Civil Defense. The team's findings and recommendations should be discussed with appropriate government counterparts as soon as possible, since several of the coal conservation strategies are more effective the sooner they are instituted. Additionally, support for training of the Civil Defense in disaster management is urged. A summary finding that, although emergency preparedness and focused management strategies in the coal and energy

sector are necessary to help mitigate this season's winter crisis, the problem will continue to worsen as the basic infrastructure continues to degenerate.

Mongolia needs development assistance on a long-term period if the cycle of debt, disrepair, and emergency is to be broken. This crisis is system wide, and will return every heating season until newer, more efficient, and maintainable infrastructure is developed. The findings in this report in many instances indicate actions that may not be easily attributed to any particular agency or office of AID. As such, an integrated approach to these actions must be taken in order to best define what actions can be taken by whom, and in what combination with other funding sources and ongoing programs. A follow up meeting to this report should be held to discuss the various recommendations made, prioritise them with other programs and take appropriate action. If possible this coordination of support and assistance programs should include all donors funding programs in Mongolia.

BACKGROUND

Mongolia is a large but sparsely populated country of 2.2 million people (1991 figures). Of these it is estimated that one third live in the four major cities of Ulaanbaatar, Darkhan, Erdenet, and Choir. By far the largest of these cities is the capital, Ulaanbaatar, with some 600,000 residents. The balance of the population live in small *aimag* (province) centers or in isolated rural areas. Many of these are nomadic herders who move from place to place in the summer months and then return to the *somons* or sub-district level centers during the winter.

The country has a harsh climate with only 100-130 frost free days per year for the greater part of the country. Typical January temperatures range from -35 degrees C in the north to -10 degrees C in the south. Approximately half of all urban dwellers live in centrally heated multi-story apartment blocks. The other half live in the *gers* (round Mongolian felt tents)in the peripheral communities surrounding the cities. These communities are comprised of small wooden structures and houses as well as *gers*. All of these are generally enclosed in square yards with a 2 meter high wood fence surrounding each yard.

The *ger* communities surrounding Ulaanbaatar are served by electricity in some cases, water distribution points for hand-carrying potable water, and police and fire service. The water distribution points are serviced by water tankers under the authority of the Ulaanbaatar Water Supply and Exploitation Board. Sewer services are not provided. *Gers* and other small residences have individual pit latrines in their yards.

Heat for warmth and cooking is supplied directly by the owners by burning coal, wood, and dung as available in the *gers* and houses. The *ger* community population has been steadily increasing in recent years and also fluctuates to some degree according to the season. Although the numbers have not been estimated, it is widely understood that the number of residents in the *ger* communities grows larger in the winter and falls off significantly in the summer season as people visit relatives, and tend animals farther away from the city.

Before 1989, Mongolia operated as a centrally planned economy, with all economic and service entities under direct control of the state. Eighty-five percent of all foreign trade was conducted with the former COMECON countries. Economic aid, amounting to as much as 35% of the government's annual budget, was provided by the Soviet Union. Along with this development aid, the Soviet Union also provided expertise in management level positions throughout the country's industries and service operations. All of this changed suddenly as of January 1991 with the collapse of the Soviet Union.

As support from the Soviet Union ended and the country began its transition to a market economy, several critical systems have failed or are failing. The economy is

in extremely bad condition. Inflation and debts are high, production and hard currency receipts are low. Many investment projects stopped abruptly although new ones are slowly beginning to take shape. Spare parts and equipment for all sectors and services are in short supply. The national transport fleet is being cannibalized daily to supply parts to keep an ever shrinking number of vehicles and equipment operational. Basic maintenance cannot be performed properly due to lack of lubricants and spare parts. Both food imports and the production of basic food products has fallen along with the general volume of all trade.

One of the most critical areas affected by the transition has been the power and heating generating sector. Particularly in Ulaanbaatar, where the greatest single concentration of Mongolians live, the central heating/power stations have suffered from growing obsolescence, accidents, increasing inefficiencies, and routine coal shortages (both in quantity as well as quality of coal). It has been generally perceived that the coal mining and heating/power production systems in the country have been steadily deteriorating, and are already dangerously vulnerable to failure.

Due to this situation, BHR/OFDA arranged for a three member assessment team to travel to Ulaanbaatar with the objective of establishing the state of preparedness of the Mongolian Government to deal with possible severe weather emergencies in the coming 1994-1995 winter months and beyond. This report is the result of that mission and represents the teams findings and recommendations. It is also a follow-up of a previous report written in January of 1992 for OFDA entitled "Disaster Preparedness in Mongolia and the Outlook for a Heating Emergency in 1992" which was prepared by James Good and Luigi LiFonti of Intertect with assistance from Juan Barnes of K&M Engineering and Consulting Corp.

FINDINGS AND RECOMMENDATIONS

Finding 1.

The Ministries and Agencies of the Government of Mongolia are not taking systematic pro-active measures to reduce the impact of the imminent 1994-1995 heating season energy crisis which will result from low levels of coal production in the country.

Discussion

There are 5 power/heating co-generation plants in the country which contribute to the national electrical grid. Three of these are in Ulaanbaatar and the other two at the cities of Erdenet and Darhan. All are coal burning stations which rely on production and delivery of coal from 4 mines; Baaga Nuur, Sharin Gol, Shivee Ovo, and Nailich (the Nailich mine has virtually stopped producing as of 1994). The increasingly poor overall condition of this system of mines and power plants along with the rail transportation of the coal is the primary cause of the predicted winter energy crisis.

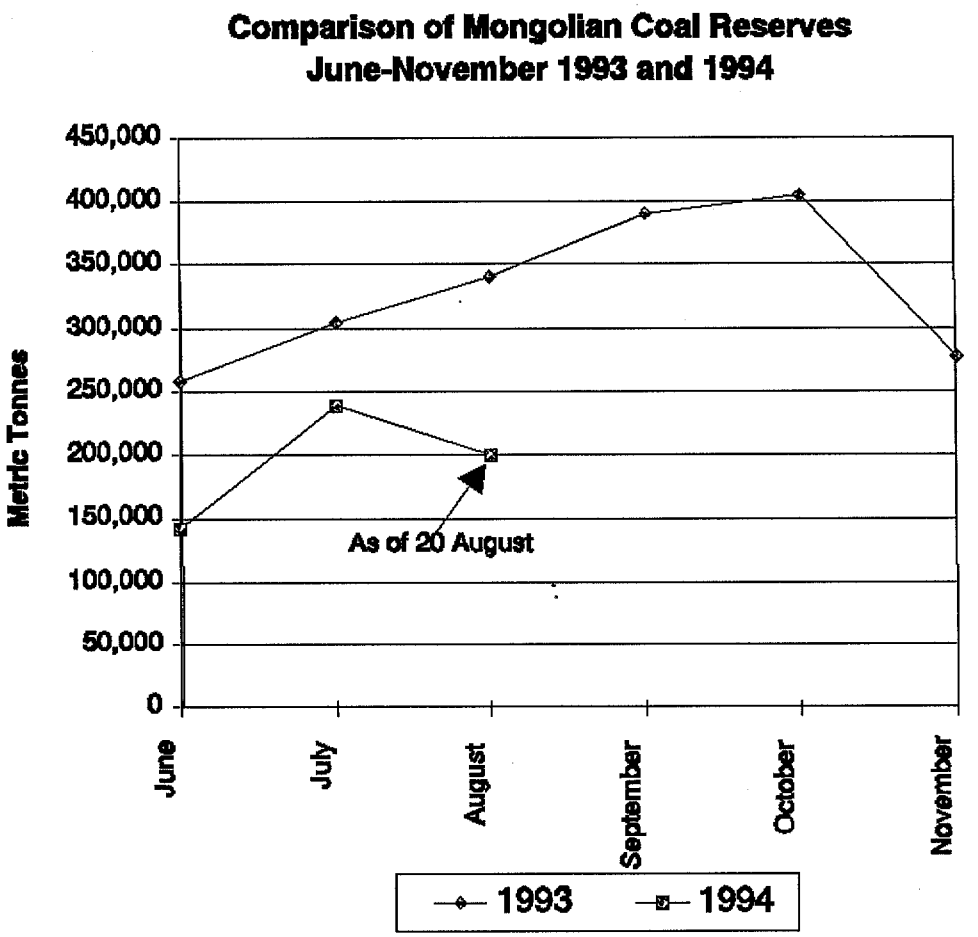
The team met with representatives of the Mongolian government from various levels involved with two major areas of concern; energy use planning and emergency preparedness. (Annex 1 lists all officials met by the team.) Data provided by the Ministry of Energy on total coal delivery and usage at the 5 main power plants in the country showed two clear warnings of inadequate coal supply and production in the country.

1. There is considerably less coal reserve at the power stations now than during the same time last year, and:
2. That reserve is grower smaller each day rather than larger as it should from June through October.

After a series of accidents and a landslide at the Baaga Nuur coal mine, production is drastically down. During the months of June through October, the mines should produce coal in excess of that consumed. Therefore, the summer and autumn reserve should be at its highest level just as the heating season begins (late September) in order to provide an adequate amount of coal for the heating season since winter usage rates often surpass production rates for coal. Additionally, coal must be bought by the small users (*ger* and other household owners in the peripheral *ger* communities) during the fall in order to have a supply in place in their own yards for use throughout the heating season.

This year the reserve grew through July 28, but has fallen steadily since that time instead of increasing as planned. The chart below shows total reserves (i.e., deliveries less consumption) at the five power plants serving the national power grid. It is obvious from the chart that coal reserves in early Summer 1994 were significantly less than at the same time in 1993 (a year in which coal production was already

inadequate) and that reserves began dwindling in late July, four months earlier than in 1993. All information was provided by the Ministry of Energy and was plotted from daily reports of the national coal production and usage. The Ministry has very up-to-date information of this type and the information "is on the Minister's desk every day before 9:00" reflecting the previous day's activity. In this case it would seem that policy and planning decisions are not constrained by a lack of timely information.



This shortage has been attributed to a number of causes -- all relating to the general poor state of the mining operations. Accidents at the mines have been directly responsible for the shortfall to date, and a Russian team is now in place at the Baaga Nuur mine to help restore full operation, but the date for completion of the repair work has not been scheduled.

To date there have been no preemptive power cuts or energy saving policies put into place by the Ministry of Energy. Repairs at the Baaga Nuur coal mine are being

started but lack of resources have seriously constrained the ability for the Government to repair damaged infrastructure quickly.

Of the four major mines operating in Mongolia for the production of coal only three are now operating. These are ; Baaga Nuur, Sharin Gol, and Shivee Ovo. Of these Baaga Nuur is the main producer, and is generally seen as the critical mine for production of power plant-quality coal. Annex 2 provides information on the type and amount of coal each of these mines produce.

The OFDA team's general finding is that Mongolia is likely to experience a heating crisis considerably worse than the 1991-1992 heating crisis that led to the first AID mission report and the 35 million dollar AID-funded spare parts project for the mining and power plant sector. It would seem that unless there is an immediate improvement in coal mining production of the better quality Baaga Nuur and Sharin Gol coals, that the government has only two viable options to respond to the crisis without additional borrowing. These are to take a series of energy saving measures immediately to reduce the overall consumption of coal for the heating season, or to wait and take much more drastic saving measures later.

Although senior officials in the Ministry of Energy are aware of the daily worsening situation of national coal production, no mitigation actions are being taken at this time at the Ministry level to reduce the impact of the coming crisis. This lack of specifically targeted action is based largely upon the hope that production of coal will increase in time to meet winter fuel needs. The present situation is one of "let's wait and see what happens in September".

The question of prediction of coal production rates compared to those of the previous several heating seasons was raised in several meetings with personnel from the Ministry of Energy, the Nuurs coal supply company, and personnel from the office of the USAID consultants Morrison and Knudsen. All agree that there will be a shortfall of coal this winter. Two of the Morrison Knudsen staff estimated an approximate 20% reduction in total supply of coal for the year as compared to last year's already less than optimal supply.

Given the uncertainties of the situation and the inherent vulnerabilities in the energy sector, it seems prudent to take conservation measures now. However, the strategy to date has been quite different. The very uncertainty of the situation has allowed the Ministry of Energy to delay action until further information is available. The problem with this approach is that waiting for more perfect information will limit alternatives as time passes until no good options remain.

Recommendation

The US Embassy in Ulaanbaatar should emphasize to the highest levels within the Government of Mongolia its concern that an energy crisis is imminent and should recommend that mitigation actions being taken by the GOM be regularised and increased.

Finding 2.

Even though a severe heating crisis is imminent for the city of Ulaanbaatar, large scale evacuation of the city apartment dwellers to the peripheral *ger* communities is not likely to be necessary if a coal shortage is the only issue.

Discussion

The Baaga Nuur coal mine which produces 62 % of the nation's coal (from 1993 data) has undergone a slow but steady decline in production from just over 4.05 million metric tonnes of coal in 1988 to 3.27 million tonnes in 1993. Aside from this gradual decline there has been a string of accidents that have seriously reduced output this year. A landslide has covered a large area of the coal mining operational site with additional overburden which must be removed before coal mining can resume previous capacity. Secondly, a fire on or about July 27 destroyed a conveyor belt and crusher which is used for the preparation and loading of coal for the Ulaanbaatar power plants. These accidents have not stopped production or delivery of coal completely, but they have contributed to greatly reduced outputs.(estimated at 70% loss in production during July and August). Adding to these other problems are the heavy rains of the summer season which have left standing water in the mines above normal amounts.

If Morrison and Knudsen staff estimates are correct that there will be a 20% reduction in coal in the coming heating season, the situation will be extremely severe for the city of Ulaanbaatar, but should not cause the cutting off of heat to residential buildings. The Ministry of Energy has already thought through the steps required to preserve residential building heat until the last possible moment. A coal reduction of 20 % for the entire heating season can be met with non-paralyzing energy cuts to the city of Ulaanbaatar if the steps are taken early enough. Annex 3 lists some energy saving measures and approximate savings in coal usage to be had for each measure.

Finding 3.

The coal production facilities and co-generation power plants are all extremely

vulnerable to accidents and breakdowns. Should a major accident or power plant failure occur, relocation of part of the population to the *ger* community may become a necessity.

Discussion

The threat of catastrophic failure of the heating system is tied more closely to the real possibility of an accident or other breakdown of critical equipment in the system of mining, transportation, and combustion of coal for the production of heating water and electricity for the city of Ulaanbaatar. There have been 2 separate fires in the Ulaanbaatar power stations in the past year. Accidents at the mines are frequent, and rail accidents, although not yet frequent, are certainly possible given the general degradation of the countryš infrastructure systems.

Low coal production levels coupled with the extreme vulnerability of the entire production-to-consumption system of energy in the country presents a major threat to the urban populations of Mongolia, particularly Ulaanbaatar. A serious accident at the main power plant in Ulaanbaatar (power plant #4), if occurring during extreme winter conditions, could create a situation where loss of heat to large areas of the city could become a reality.

Recommendation

The Government of Mongoliaš Ministry of Energy and the Civil Defense should immediately initiate a rigorous safety campaign which should include inspection and monitoring of all operations in the energy production chain (mining, transport, and power plant operations) to guard against accidents, fires, and equipment breakdown.

Measures to prevent a winter heating crisis such as conservation of coal <u>and</u> careful monitoring and protection of the energy system components from the mines to the power stations should be carried out by the Ministry of Energy now. Additionally, Civil Defense should incorporate plant safety and accident prevention training into their emergency preparedness trainings as soon as possible.

Civil Defense is required by the new law to provide training for personnel in state and private entities in emergency preparedness relating to their particular risks. In accordance with this mandate, the Civil Defense should prioritize mitigation and prevention training for staff at the mines, transport companies, and power plants. The Ministry of Energy should consider intensive training and awareness raising for all personnel in the energy sector. All operations should be on alert status regarding safety monitoring and fire prevention. Both fires at the Ulaanbaatar power plant and that which recently destroyed a conveyor belt at the Baaga Nuur mine were avoidable. All resulted in serious accidents which might have been only minor problems if the fires had been detected early.

The Ulaanbaatar fire brigade is reported to be efficient (within its means) in responding to fires when called, but is not involved in public safety awareness or education campaigns. Fire safety inspections should be stepped up and made more rigorous. To the extent possible, accidents in the energy sector must be seen as primary threats not only to the individual enterprise in which they occur but to the entire system and therefore to the city of Ulaanbaatar as well.

Finding 4.

Although no unified plan for a large-scale evacuation of the city of Ulaanbaatar in case of winter freeze-up has been prepared, some of the basic elements of such a plan do exist independently at the district level of the city.

Discussion

Visits to two of the district level Civil Defense offices revealed that there has been a very high level of data collection and basic planning for evacuation procedures from the city's centrally heated housing blocks. Tables have been drawn up at the district level indicating all of the various building types, (Annex 6 is a tabulation of all apartment buildings by type in Ulaanbaatar), the places for public assembly and stock of independently heated structures available for relocation including *gers*, and small public buildings such as clinics, kindergartens, and schools.

Repeated visits and discussion with the various levels of the Civil Defense organization indicate that the responsibility for evacuation planning of this type has been purposely delegated to the district level. There are merits to this approach, especially in light of the lack of basic resources of the higher levels of the organization with which to respond. Planning at the district levels involves the city administrative officials from the district levels as well. In every case it appears that on a district-by-district basis, there has been a professional level of data collection and analysis for evacuation planning. Additionally there are some plans which link these data together in a useful way.

The apparent problem with the work done at the district level is that there has not been any analysis of the disparity of resources or response alternatives between districts. For example, some districts have a much higher ratio of *ger* households to centrally heated households than do others. Some districts have high densities of manufacturing with relatively less housing in general. It is probable that due to these disparities, more appropriate evacuation and relocation plans could be devised if all of the city resources were considered together rather than district by district. Additionally, it would be beneficial for a city-wide level of planning to be put into place to judge preparedness levels in the various districts as a monitoring function.

Civil Defense, the Water Board, Ministry of Infrastructure, Trade and Industry, Red

Cross, Ministry of Health and the Police make up the core service providers who would be required both to understand and aid in the implementation of an evacuation if required. A general inadequacy of the Mongolian planning to date has been the fragmented nature of response planning by those who would most likely be involved. The transitional nature of the government and the series of reconfigurations of several of the ministries has made coordination more difficult for the time being even though long term improvements may be developing.

During this transitional period normal cooperative structures among the agencies themselves are more vulnerable than at other times as each vies to establish its territory and relative authority within the overall system. It is due to this vulnerability that coordination needs to be strengthened. Civil Defense, which by law is the responsible party for disaster preparation and response, should be the central coordinating agency. The other organizations involved also should be incorporated from the beginning of the formulation of any plan requiring their expertise, assistance or resources.

During a half-day planning exercise with the Civil Defense, organized by the OFDA mission team, it became clear that the basic elements of a plan and planning concepts were already in place. Further it was understood by the team that there was a degree of reservation about including outsiders too deeply in the planning process. There must be a felt-need on the part of the Civil Defense before such a consultancy could be useful.

Recommendations

A. - Civil Defense-- in close coordination with the Ulaanbaatar Water Board, Ministry of Infrastructure (Transport Department), Trade and Industry, Red Cross, Ministry of Health, and Police-- should prepare a coordinated plan for the evacuation, relocation, and essential support of the population which relies on the central power plants for residential heating.

B. - If requested by the Government of Mongolia, technical assistance to the Government of Mongolia pertinent agency planners should be provided to follow the planning process through to its completion by mid-December 1994 and to ensure thoroughness of an evacuation plan.

Finding 5.

Civil Defense staff, power plant and mine personnel, and public housing authorities need training both in technical as well as general management areas related to disaster preparedness and response measures.

Discussion

One aspect of the recently enacted Civil Defense Law in Mongolia is the added Civil Defense responsibility for widespread training in emergency preparedness and response. According to this law there are four groups which are to be targeted for this type of training:

1. Management level personnel from state and private entities
2. Full time staff working in state and private entities assigned to emergency groups (reservists)
3. Students
4. Permanent staff and career officers of the Civil Defense

The mandated training consists of general emergency first aid, and in some cases operation-specific training related to the type of work or factory operations involved at the reservists' place of employment. It was explained that some forest fire and flood fighting techniques were offered to those reservists scheduled to respond to these types of emergencies.

The team met with the Civil Defense staff on several occasions to determine training needs and resources and toured the Civil Defense Training Center facility in Ulaanbaatar. Although the facility is fairly complete (it has a hotel for guests, two classroom type training rooms, one larger room for movies accommodating 60 people, a library, and several support offices and secretarial staff), all of the equipment, materials, and resources are extremely out of date. The library consists of several old volumes of disaster journals from various countries and a few publications of the UN's IDNDR.

One of the senior officers of the Civil Defense attended a three week disaster management course in 1991 at ADPC in Bangkok and has translated the materials from that course into Mongolian. He is presently the senior training officer for the Civil Defense. These translated materials form the basis for the Training of the Civil Defense Staff.

The OFDA mission team conducted a short workshop for about 12 staff members of the Civil Defense. The workshop covered the elements of an evacuation plan for the city of Ulaanbaatar in case of a winter heating crisis resulting in the loss of heat to the centrally heated apartment buildings. The workshop revealed that the Civil Defense staff, particularly those at the district level of the city of Ulaanbaatar have done the basic research required for evacuation planning. Secondly, the workshop showed that the basic concepts of planning and the elements of a contingency plan are well known. Lastly, it indicated that the most basic principles of implementation of an emergency response were not well incorporated into the plan. Basic elements for the smooth functioning of a plan requiring cooperation of large numbers of the population as well as other government agencies, such as coordination, public education, and awareness campaigns, were not seen as routine parts of the planning process.
The Civil Defense staff indicated that they were skilled, well trained, and professional; but that their institutional basis was largely outdated. They feel a strong

need to become current with the state of the worlds other functioning Civil Defense organizations. They were extremely interested in the systems and organizational structures in use in other countries. There was particular interest in the relationship between the government, the Civil Defense, the army, and the general public.

Any training workshop of value for this group which would allow depth of conversation or discussion would have to be in either Mongolian or Russian. English proficiency is extremely low even among those with training in English. A regional workshop conducted in Russian, and serving several countries with very similar circumstances would be very helpful to the Mongolian Civil Defense.

The focus of such a workshop should be on the basic functions and operation of modern Civil Defense organizations and on the basic implementational concepts of disaster preparedness and response planning. Annex 4 proposes a training agenda for such a course.

Recommendation

A program of training should be designed and instituted for the Mongolian Civil Defense in disaster management. Options are; to bring Mongolian officers and planners to the US or other countries for training and exposure to the operations of other similar organizations in other countries, to prepare training in Mongolian either directly or via translators in Mongolia, or to provide training regionally in which other countries with similar disaster types and organization might compare strategies (if held regionallywith the Central Asian Republics, the training could be conducted in Russian).

Finding 6.

The root cause of the present emergency situation stems in part from the difficulties that Mongolia is experiencing in its transition from its previous system of government to a market economy and the end of Soviet aid.

Discussion

In virtually every meeting with every agency two themes were recurrent in the officials' description of their situation. The first is that the government, economy, and way of life in Mongolia is in transition. This transition has been very disruptive both in ministry structures as well as in the way in which ministries interact with one another. This transitional state causes real difficulties within the various organizations, especially as it coincides with widespread economic collapse as the system moves from a centrally supported state economy to a market economy.

No agency currently has the equipment it needs to perform its responsibilities in the way they have previously been accomplished. The collapse of the Soviet Union has left Mongolia, like many of the Former Soviet Union Republics without spare parts, fuel, and in some cases management level expertise. All agencies recall easier days when they knew how to get things done and understood the general operational system of the country.

The second issue is related to the first although it presents special problems. This is the ongoing privatization being carried out by the government. Since small "economic entities" have been privatized it is no longer clear how much control the government has over them and their resources even in times of emergency. Additionally, the privatization has increased the number of possible emergency responders many times over.

A particular problem raised by many senior officials has been the privatization of vehicles. The Ministry of Infrastructure, for example, must now work with a fleet of equipment and vehicles which is 90% privatized. Five years ago the State owned 80% of the vehicles operating in the country. The result is that now it is not sure at any given time whether or not vehicles will be available, and more importantly, it is not possible to use equipment and vehicles without compensation.

Still other non-mechanical problems are developing. Large debts are owed throughout the system. The Government is in arrears in its payments to Russia for fuel and electricity it now buys. Coal mines are in arrears to their workers and technicians. The power plants are in arrears to the coal mines for the coal they have consumed. And the users are in arrears to the power company due to unpaid utility bills. This circle of debt must ultimately be broken before development can proceed.

Although repairs and grants for sustaining critical sector activities, such as the 35 million dollar AID program, are helpful in avoiding catastrophe for the short term, there needs to be a longer term approach for the correction of the Mongolian national energy sector problems. Repair programs should be maintained on a longer term basis than currently offered as the syndrome of emergency repairs will likely continue until larger new facilities (both mines and power stations) are put into place to reduce the dependence and strain on the aging systems now operating.

Longer term development projects such as development of new mine sites and new or refurbished power plants are clearly needed. Until such system-wide development occurs, emergency management training and preparation of mitigation strategies will continue to be a critical area of concern.

Recommendation

Disaster preparedness and response assistance to the Government of Mongolia should be made available on a long-term basis in coordination with other donors and programs. The vulnerable situation of the central heating system is likely to continue for several years, at a minimum.

Finding 7.

The greatest risk to the people of Mongolia at the present time, from all disaster types, is from a winter crisis in the City of Ulaanbaatar due to its population density, the extreme vulnerability of its lifeline services and other infrastructure, and the potential for serious industrial accidents along with the developing energy crisis. The Civil Defense as now constituted does not focus its planning on the vulnerabilities of the urban infrastructure.

Discussion

The Mayor of Ulaanbaatar is the head of the City Central Civil Defense. In the city headquarters of the Civil Defense there are a staff of two full-time officers plus an additional 7 people who are non-uniformed civil servants. The office also maintains a Civil Defense training center for the training of the staff of all arms of government and the various economic entities of Ulaanbaatar, and is responsible for setting policy and carrying out planning activities for Civil Defense issues within the city.

The city is divided into 12 districts, 6 in the city proper and 6 surrounding the city, the farthest at a distance of about 100 kilometers from the city center. (Annex 5 is a map of Ulaanbaatar indicating the central districts and *ger* communities.) Each of these 12 districts has its own Civil Defense office and about 10 staff. These staff are in essence reservists, performing other functions on a daily basis and responding as Civil Defense operatives only when needed.

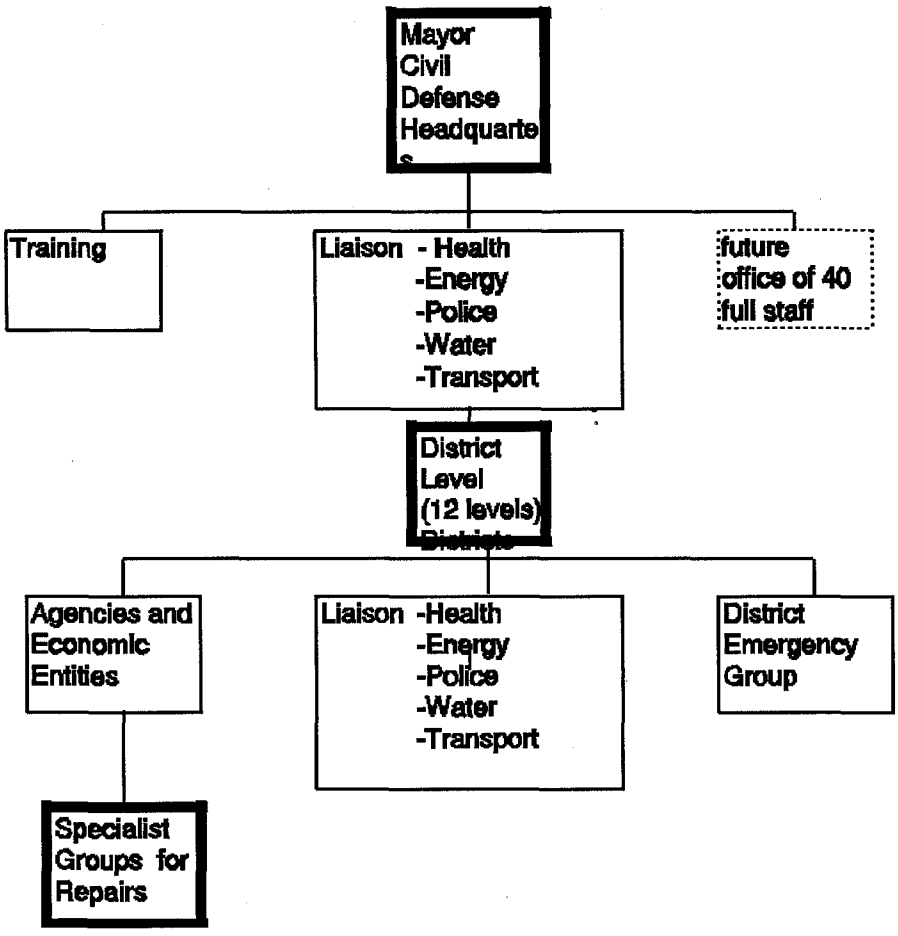
In the event of an emergency, the district level Civil Defense officers are instructed to respond to the best of their ability. Should they need additional help they may call for assistance via the Mayor's Office. The Mayor can call in assistance from other agencies as appropriate to assist in the emergency response. Even though the Civil Defense. officers will be aided by other entities, the Civil Defense personnel will remain in charge of the emergency operation. Should the emergency still be too large to handle, the State Standing Emergency Committee could be called upon through the Mayor's office. The Emergency Committee could then activate the National Civil Defense, the Army, and any appropriate line ministry personnel and equipment to aid in the response. It was noted that in essence the State Civil Defense organization and the State Emergency Committee may be considered an integral entity vis-à-vis disaster response. The General in charge of the State Civil Defense holds the position of

"Deputy Chairman of State Emergency Commission and Chief of Civil Defense Committee of Mongolia".

The main work of the City Civil Defense is planning and training in Civil Defense–related issues at the city level. This training is comprised of primarily non-technical, short refresher courses in disaster prevention and first steps in response. The training is divided into three types: training for department heads, training for personnel in the various state agencies, and training for university, college, and technical institute students. Training typically consists of a 4-5 hour session once per year on general pre
vention and initial response activities (first aid).

There are plans for evacuation of buildings for fire, earthquake, freezing and other causes. There is not, however, concise planning in place for the relocation of those evacuated. The district Civil Defense offices have lists of available heated public buildings such as hospitals and kindergartens where some people might be accommodated. But generally decisions are seen to be field-based on actual conditions and a knowledge of the possible options available at the time.

The following diagram was provided by Civil Defense staff depicting the organization of the City Central Civil Defense Organization



For the case of flooding and other emergencies there is a system of alert available (though seldom used) for the general public through the radio and television stations. Past alerts have been issued for dangers of particular animal disease outbreaks, and heavy rain fall predictions where flooding could be expected. There is generally not any system of regular warning or awareness raising for emergency response on the part of the general citizenry.

The Mongolian Civil Defense systematically defines its priority responsibilities as responding to:

- forest fires
- floods
- extreme winter conditions ("zud" in Mongolian)
- earthquakes
- drought
- plague outbreaks
- chemical and industrial accidents

Response to winter emergencies in the cities was also added to this list but only as a response to the specific question being put forward by the OFDA mission team. Until 1990 the historical focus of the Civil defense had been preparation and planning for response to nuclear attack. Their training center and training materials are all largely focused on this specific hazard.

Actual field training in the natural hazards listed above has been conducted, and Civil Defense has responded to each type of emergency. It should be noted that all of the natural hazards listed account for a combined average of approximately 10 fatalities

per year for the entire country. Although Civil Defense must continue its readiness for response to these events, there should be more consideration of urban disaster types possibly affecting the larger cities, particularly Ulaanbaatar.

Although urban evacuation plans for Ulaanbaatar exist, and basic research has been done at the district level, there does not seem to be an appreciation for the field operational realities or the logistical difficulties involved. A winter freezing emergency resulting from a widespread fuel shortage is not now a primary concern of the Mongolian Civil Defense.

It is true that winter exposure fatalities are few, and that treatment for frostbite, hypothermia and other cold weather related ills are reported to be extremely low by the Ministry of Health. The Civil Defense rightly assumes that most of those affected by a winter freeze-up will self-relocate and will rely on personal coping strategies rather than be assisted in large part by response agencies. Nonetheless, there is a large segment of the urban population of Ulaanbaatar without relatives in the outlying *ger* communities who will likely need decisive action on the part of Civil Defense for the implementation of any large scale evacuation and relocation plan.

Ulaanbaatar infrastructure, although relatively new, is in poor repair and, in some cases, poorly designed. Drainage canals and flood protection dams in the city, for example, are all in very poor condition now due to the recent rainy season flooding throughout the city. Drainage channels and culverts throughout the city are clogged with debris. After recent flooding some of these have been heavily silted-up to the extent that heavy equipment is required to clear the channels. This in turn presents an even greater flooding hazard for next year's rainy season. If the cycle is to be broken, clear lines of authority for disaster prevention must be put into place, and support must be given to those responsible. Many in the various offices and boards of the city realize that the poor maintenance is as much a cause as a result of the recent flooding, but none of them have clear authority or budgets for their upkeep. Similarly, the absence of protective dikes around some of the city's most important water wells makes these subject to flooding and prevents their regular maintenance and repair.

The Civil Defense is properly situated in the governmental organization of the country to play a key role in preparedness and response activities. They are in need, however, of material with which to work. Both training and basic materials for operational response are needed. The communications system of the Civil Defense is poor. All communications are routinely carried to distant aimags via telephone lines, which themselves are extremely vulnerable to damage. Their radio equipment is mainly old Soviet manufactured radios which are out of date and too few in number to be an effective back-up communication system. Response vehicles of the Civil Defense are not radio-equipped.

Presently a system of cooperatively borrowing equipment exists at the city level. The OFDA team saw crews at work clearing flood damage with private, city owned, and Civil Defense equipment. This type of cooperative work should be further

institutionalized although many line ministry staff the OFDA team met with were openly resistant to the idea of "sharing" equipment for this kind of work. It is also clear that the problems affecting Civil Defense are also affecting all other ministries, supplies and equipment. Fuel is lacking in all sectors.

Recommendations

A. - A winter heating system failure should be defined as a specific disaster type for the urban areas of Mongolia for the next several years. Due to the relative importance of this disaster type it should be made a high priority relative to earthquakes, winter storms, riverine flooding, and drought.

B. - Long-term support for infrastructure protection and disaster prevention measures for the city of Ulaanbaatar, and for the preparedness capability of the Civil Defense should be considered.

The recommendations above are primarily aimed at a re-prioritization of ongoing activities. The Mongolian Civil Defense is involved in planning for urban emergencies to a degree. This planning has been based on the threat of nuclear attack. Although the threats have changed, the planning for and prioritization of risk of existing threats has not. Although the Civil Defense is less concerned about military attack today, they have not increased the importance of urban disasters in keeping with the increased vulnerability of the cities' infrastructure and populations.

The natural hazards which have been considered their primary mandated areas of concern should be put into perspective with other hazard events now facing Mongolia. One approach would be to conduct a risk/loss projection study, focusing on the six central districts of Ulaanbaatar. Based on a projected scenario, such a study might estimate the impact of a power/heating failure, from both a loss of life as well as a loss of economic activity viewpoint. Such a study could be undertaken by the Civil Defense, probably with outside expertise, and would require extensive planning and informational assistance from the Ministry of Energy as well as the National Development Board and the Infrastructure Ministry.

Finding 8.

Although there are no <u>regularized</u> mitigation strategies now in effect to deal with the heating crisis, there are a number of mitigation as well as preparedness strategies that have been used in this situation which would produce positive results if judiciously applied.

During two meetings with senior staff of the Ministry of Energy, it was made clear that there are several effective strategies available for dealing with the coming energy crisis. Some of these are instituted on an iregular basis to respond to the ongoing

energy shortages. These steps and the approximate savings in coal usage that they reflect are listed in Annex 3. These are basically technical steps which can be taken to reduce overall fuel needs. One aspect of all of these measures is that they are as effective for prevention and mitigation as they are for response. Fuel saved now can be reserved to avoid deeper consumption cuts during the winter heating season.

This distinction is understood by the Ministry of Energy but is not acted upon. All of these measures were seen only as response measures to reduce energy consumption to the amount of coal available, not as methods to make more coal available later in the season. Set levels of operational coal reserves are required by Ministry policy to be maintained at the power plants at all times. The reserve amounts at the plants are set to represent an average 10 day reserve of coal for each plant for each quarter of the year depending on average coal needs for that quarter. If the pre-set reserve level is not maintained the Minister of Energy must be alerted. The Ministry is now on alert.

Although reserve levels have been set and alert status reached, there are not standard trigger levels at which energy shedding measures are instituted. The Ministry is still on a "wait-and-see" status. The critical point as identified by the Ministry of Energy for the determination of energy saving measures to be taken is in mid to late September. They hope to see increased output levels of coal at that time due to corrections and repairs at the mines. No one the OFDA team met with could set a schedule for completion of repairs now under way nor could they favorably predict satisfactory return to full operation at either the Baaga Nuur or the Sharin Gol Mines.

Recommendations

A. - The Government of Mongolia should consider the immediate and regular implementation of the following mitigation actions:

I. Extend the period of Daylight Saving Time to reduce electricity consumption during evening periods.

II. Schedule rolling blackouts to all residential districts of the city. This load shedding strategy should be put into effect now, in light of the projected shortfall in coal production.

III. Lower the temperature of heating system water temperature from the first day of the heating season.

IV. Delay the beginning of the heating season by two to four weeks if possible, especially if early winter weather is relatively mild.

V. Do not provide steam to hot air heating systems in public buildings at the start of the heating season.

VI. Institute a mass information, awareness, and education campaign for the general public regarding the energy crisis and conservation and preparedness strategies.

VII. Reallocate scarce resources to the energy sector - specifically for the purchase of mazut for augmentation of the lower quality coal produced by the Shivee Ovo mine.

VIII. Consider alternate fuels, such as firewood imported from Bulgan aimag, and where possible, increase production and availability of such fuels to the small buyers in the *ger* communities of Ulaanbaatar.

IX. Raise the price of coal to individual consumers to promote conservation of the fuel as well as to give incentive to better production by the mining companies.

X. Increase the purchase of electricity from Russia to reduce coal consumption as soon as possible.

XI. Review evacuation procedures. Coordinate and make these procedures known to Civil Defense reservists, building supervisors, and all staff involved with possible emergency evacuation operations.

B. - Technical assistance should be provided in non-capital intensive industrial energy conservation strategies to be made available to the operating concerns in light and heavy industry. This assistance should link with other ongoing programs to reduce inefficiency in the heat distribution system.

All of the load shedding steps listed above can be accomplished without foreign aid (with the possible exception of X). If taken together and early, these steps represent enough savings in coal usage to withstand a 20% coal shortfall without shutting down electricity to manufacturing concerns and other hard currency generating activities in Ulaanbaatar. Also, the relative sacrifice of energy cuts in the warmer summer and fall months will be less if taken now than if delayed until the coldest part of the winter heating season. At some point a decision must be made to take steps to conserve coal. The decision basically is one of a longer-term and less drastic measures or of shorter duration but deeper load shedding measures. If critical industries and lifeline industries are to be kept operational, the former is recommended.

Production of electricity accounts for 40% of the winter coal usage for Ulaanbaatar power/heating plants. If scheduled blackouts are instituted early, they can be scheduled for fewer hours of each day. If instituted, there should be a widespread public awareness/conservation component instituted as well. The Ministry of Energy presumes that the absolute minimum amount of electricity to be delivered to families

throughout the city would be 2 hours per day on a well publicized schedule. This emergency condition would allow for the preparation of 1 hot meal per day and the filling of thermos bottles with hot water. Since the cooking in the Ulaanbaatar centrally heated apartments is all electric, this is seen as the absolute minimum emergency condition allowable before apartment blocks must be evacuated.

One concern with this system of scheduled short periods of available electricity for the general community is the ability of the electrical distribution systems to handle short term intense loads. In other countries where this has been done, frequent failure of local distribution systems has occurred due to overloads as all consumers rush to use all available appliances at the same time. In any case, this option is seen as the last available option to be put into place before district heating to apartment blocks is turned off.

ANNEX 1 List of Interviewees

Davaagiin Battsend
Executive Director
Ministry of Energy, Geology & Mining

L. Battsooj
Engineer
Town Planning Department
Ulaanbaatar City Municipality

Tudevin Bilegt
Government Chairman
For Khun-Uul District

Damdinsurengiin Blambaa
Deputy Mayor
Ulaanbaatar

Gochoogin Bold
Architect
Chief of the Townplanning Department
Ulaanbaatar

Ben Boyd
Resident Manager
Morrison Knudsen Corporation

Dagvadorj Dairiijav, Ph. D.
President
Mongolian Marketing Association

Purevyn Damdin
Colonel
Chief of Staff of the Civil Defence MPR

Gombosurenglin Damdinsuren
Deputy Chairman of State
Emergency Commission
and Chief of Civil Defence
Committee of Mongolia

Tserendash Damiran
Deputy Minister
Ministry of Infrastructure
Development Mongolia

Dagva Dembereldash
Secretary General
Mongolian Red Cross Society

Lhamsurehgiin Dorjsureh
Colonel
Mongolian National Army and
Civic Defence Administration
Ulaanbaatar Municipal Government

B. Enebish
Senior Officer
Ministry of Infrastructure
Development Mongolia

Osoryn Erdenebaatar
Chairman
Water Supply and Exploitation Board

SH. Jargalsaichan
General Director
Ulaanbaatar Housing and Communal Services

Byambyn Jigjid
Minister
Ministry of Energy, Geology and
Mining of Mongolia

Tsedenbazaryn Natsag
Communication Engineer
State Civil Defence Committee

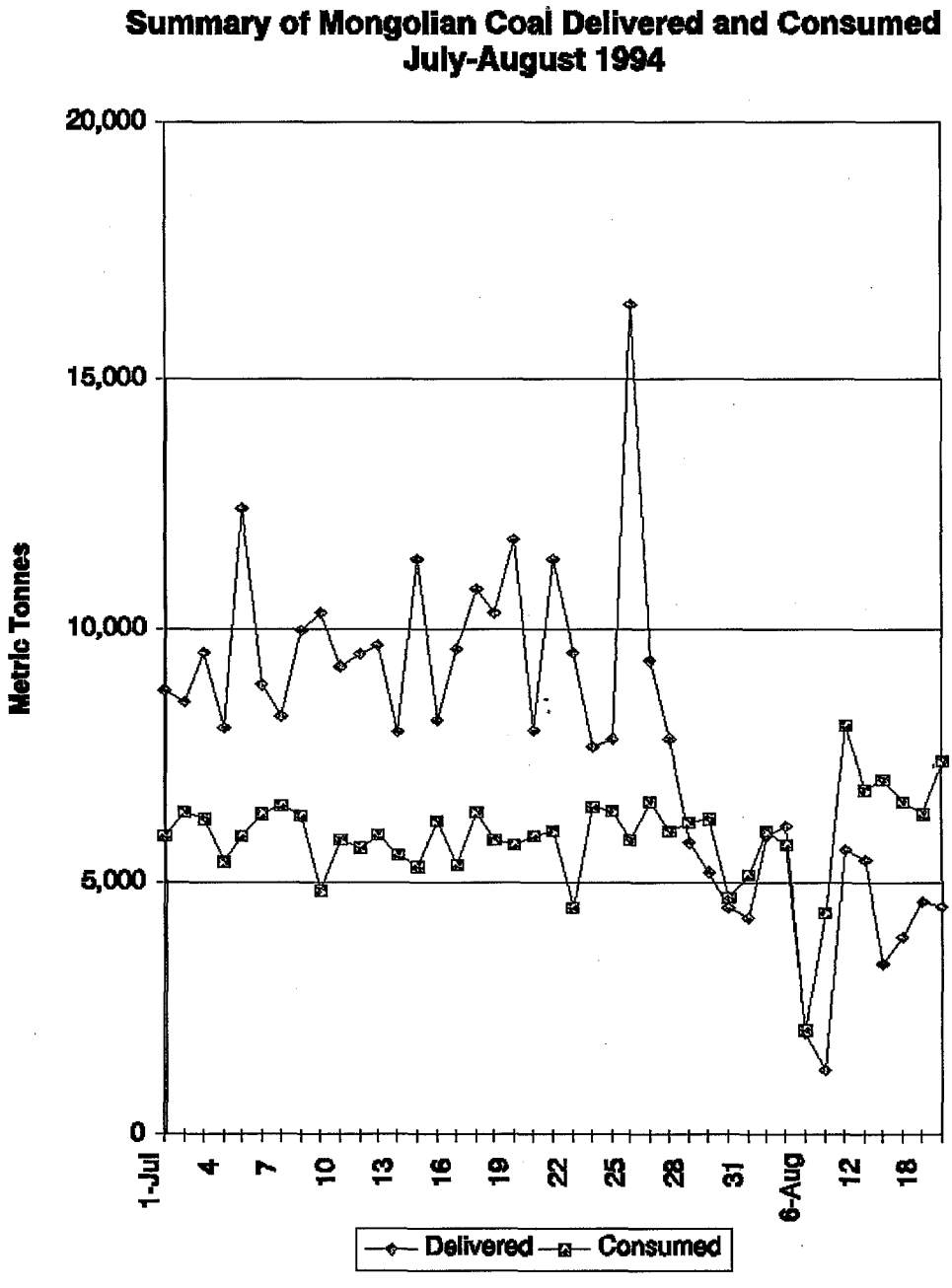
Dr. P. Nymadawa
Minister of Health
Government of Mongolia

Baataryn Ojun-Erdene
First Vice Director
((SOR)) Fur Company

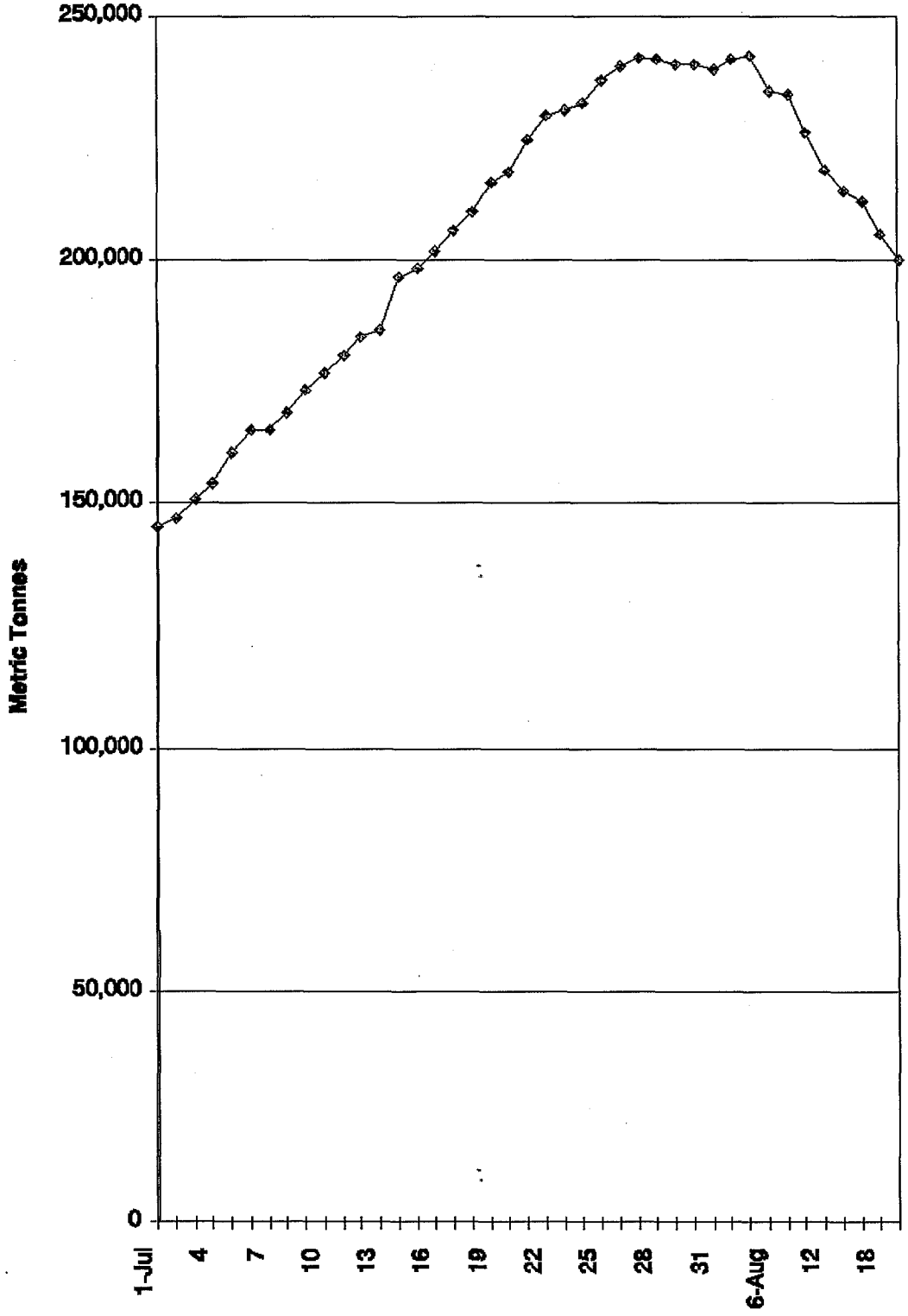
John J. ONeill
Procurement/Administration Manager
Morrison Knudsen Corporation

Agvaanzhambin Tserendorzh
General Director
"NUURS" Company

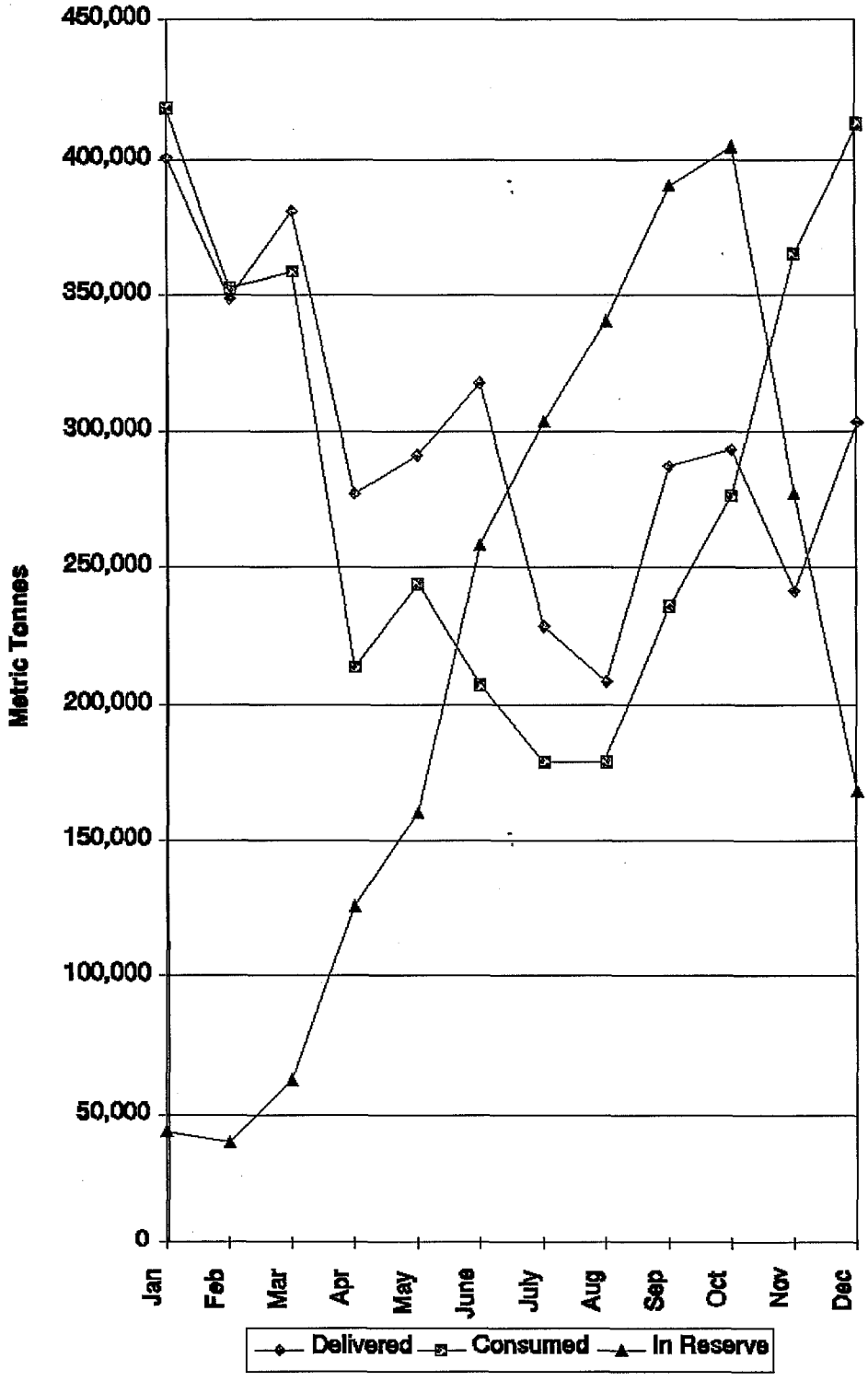
ANNEX 2 Coal Supply and Consumption



Summary of Mongolian Coal In Reserve at Power Stations
July-August 1994



Record of Mongolian Coal-Delivered, Consumed, In Reserve
1993



ANNEX 3 Energy Saving Measures Available to the Ministry of Energy

Step #	% Coal Saved	Emergency Action Required
1	5	Reduce operating temperature of water to distribution system from 120 C to 100 C. (Note that for design outdoor temperature of -39 C, system water @ 150 C provides heated room temperatures of 18 C for end users)
2	12.5	Reduce or stop production of steam used for hot air delivery systems at public buildings such as shops, offices, and hotels.
3	13.5*	Reduce electricity production through scheduled blackouts. (Approximately 8 hours/household/day)
4	13.5*	Increase supply of purchased electricity from Russian National System in Irkutsk (If money for purchase is available) (70 kw hours/day)
5	6	Cut off supply of electricity to small rural users and *ger* district communities (they can rely on other means of heat and cooking)
6	1	Cut off electricity to all agencies and concerns which can be stopped, such as schools and kindergartens. Suspend classes, and also reduce heating water supply to these facilities.
7	2	Cut off heating supply to non-essential offices and businesses. Drain water lines to protect against freezing damage.
8	2	Shut off some electrical pumps that provide pressure to heating system. This will reduce overall operating pressure of the system .
9	6	Stop work and shut down light industrial plants.
10	15	Retain power and heat only to critical sectors such as bakeries, coal mining operations, government operations and hospitals. Extend blackout periods for residential users to minimum 2 hour usage periods and deliver public announcements advising times of electricity availability.
11	75	Shut down plants to minimum operating temperatures to protect central plants from freezing damage. Shut down least efficient plants first. Shut-down sequence for Ulaanbaatar would be Plant #2, Plant #3, and Plant #4 would be retained as long as possible. At this point Civil Defense plans for evacuation of residents to *gers* and other self-heated places would begin. Advance notice should be given.

* Note that the percentages shown for coal usage reduction for steps 3 and 4 are not additive. It should be noted that from 53%-55% of the coal used is for the production of electricity as a yearly average and that during the winter heating season that 43%-46% is attributed to electricity production.

These steps, percentages of coal savings and prioritizations were all provided by the Ministry of Energy.

ANNEX 4 Training Proposal for Civil Defense Officers from the Central Asian Republics and Mongolia

Background

The role and structure of Mongolia's Civil Defense has changed considerably in recent years. New laws have redefined the role of these organizations and their primary focus has shifted. With the removal of the perceived risk from nuclear attack and biological warfare, the Civil Defense in Mongolia, and its counterparts in the Central Asian Republics of the former Soviet Union, is in a period of major transition.

New Government legislation in Mongolia reflects these changes and is designed to adapt the function of Civil Defense to general preparedness and coordination of emergencies related to natural disasters. Mongolia's Civil Defense members total about 700, the majority of whom are ex-military. Of that number, only a small percentage work in a full-time capacity, with some 20 full-time Officers assigned to the City of Ulaanbaatar.

The majority of Civil Defense's members work in a reservist capacity. These individuals are stationed throughout the country, and provide support for Civil Defense activities, relative to their expertise, i.e. doctors, nurses, engineers, and fire fighters.

Changes in the mandate and function of Mongolia's Civil Defense , however, have not been supported by any formal training in disaster management. Hence, staff are not well equipped to carry out their new roles. It is important that they receive training so that they can adequately do their jobs, which include the training of others. The same can be said for Civil Defense counterparts in the Central Asian Republics who are also in need of disaster management training.

Currently within Mongolia and the Central Asian Republics, the resources and expertise to organize such trainings do not exist. Interest in international training events and opportunities is great. A small number of individuals have attended the Disaster Management Training Course at the Asian Disaster Preparedness Center (ADPC) in Bangkok. Language difficulties, lack of job experience and differences in disaster management contexts, however, limit the extent to which these individuals can benefit from such training.

Proposed Program Description

To address the unique needs of these groups, ADPC or another disaster management training center, could be funded to develop and implement a regional training program in disaster management to include up to 10 senior officers from the Mongolian Civil Defense and counterparts from the 5 Central Asian Republics of the former Soviet Union, to be conducted in Russian in the first half of 1995, within the

region, possibly in Almaty. Training needs would be assessed by the training center to identify specific content areas, relevant to the functions and levels of those to be trained. Broad areas to be covered may include:

1. Making the transition from state to market driven economies and the implications for countries, including the role and function of Civil Defense agencies;

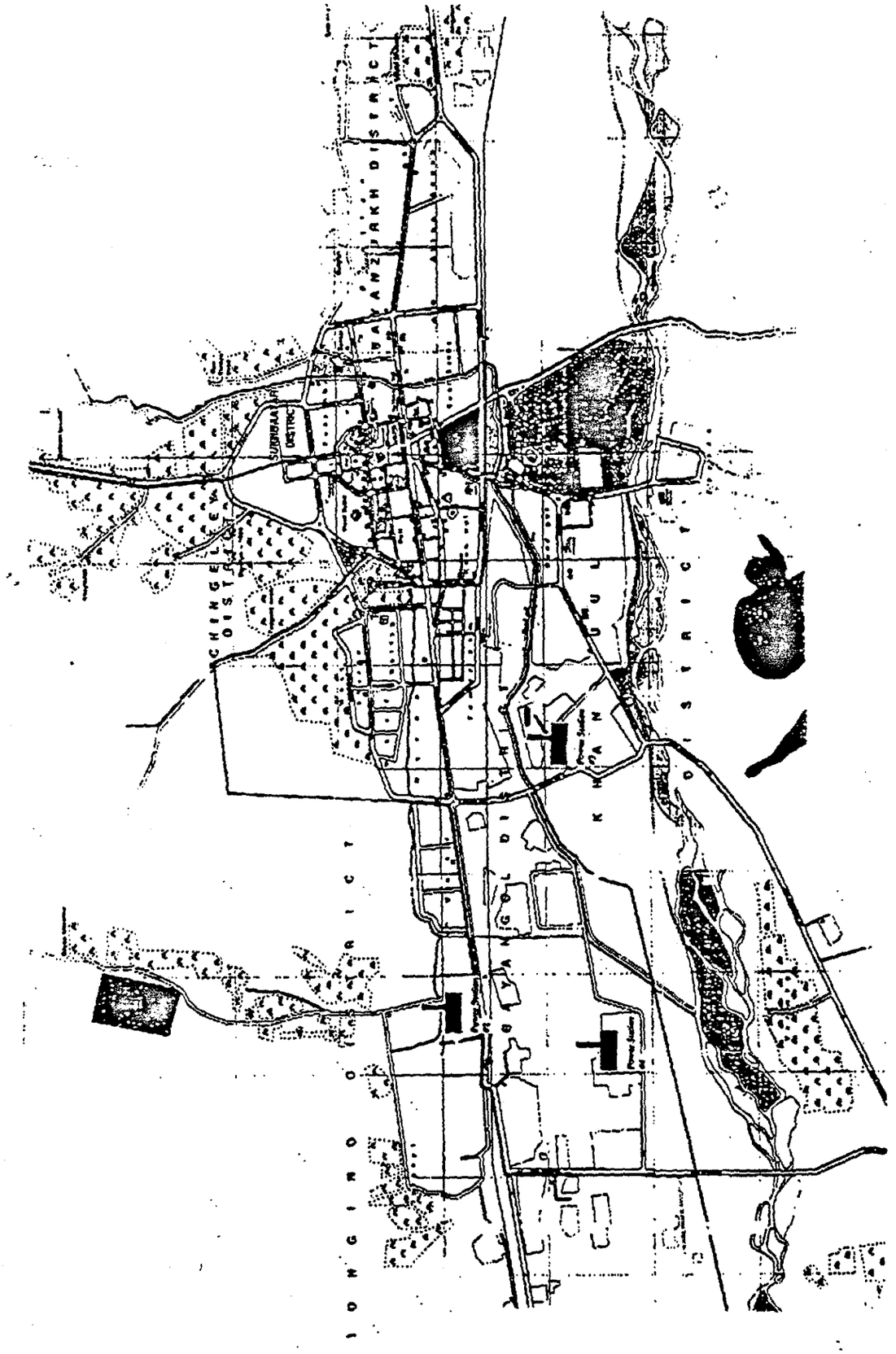
2. Hazard and risk assessment for different disaster types common to the participating countries, including urban disasters, i.e. heating system failures, industrial accidents, spills and leaks, and other environmental disasters;

3. Management training: planning, emergency response operations management, resource identification and mobilization, information management, problem solving, and inter-agency coordination;

4. Strategies and techniques for public education and awareness activities and for building community support.

Development and initiation of the course should be funded, including all participant costs. It is envisioned that once developed, the training center would continue to offer this course within the region, with other donor support, towards developing a critical mass of professionals in these countries who are knowledgeable and skilled in disaster management.

ANNEX 5 Map of Ulaanbaatar Districts Showing *Ger* Communities and Power Stations



ANNEX 6 Breakdown of Housing Types and Materials in Ulaanbaatar

TYPE	YEARS BUILT	# OF STORIES	MATERIAL	# OF BUILDINGS	TOTAL # OF FAMILY UNITS HOUSED
1	1930-1939	2	Brick	1	24
2	1940-1949	2-3	Brick	4	96
3	1950-1959	3-4	Brick	101	2,915
4	1960-1969	4-5	Brick	170	8,374
5	1970-1979	5-9	Concrete	203	11,646
6	1980-1989	9-12	Concrete	258	29,858
7	1990-1994	9	Concrete	27	3,154
Grand Total				764	56,067