



UBHN Disaster Scenario Briefing Memorandum

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Main Author: James Connelly
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Submitted by: EPRC Project/Chemonics International Inc., Tavan Bogd Plaza, Second Floor,
Eronhii Said Amar Street, Sukhbaatar District, Ulaanbaatar, Mongolia
Telephone and fax: (976-11) 32 13 75 Fax: (976-11) 32 78 25
Contact: Fernando Bertoli, Chief of Party
E-mail address: fbertoli@eprc-chemonics.biz

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
APCSS	Asia-Pacific Center for Security Studies
CHP	Combined Heat and Power Plants
CIA	Central Intelligence Agency
DH	District Heating
DHW	District Hot Water
EC	Emergency Commission
EPRC	Economic Policy Reform and Competitiveness Project
ERP	Emergency Response Plan
HDP	Headquarters for Disaster Protection
MD	Micro District
MoFE	Ministry of Fuel and Energy
NDC	National Dispatch Center
NEMA	National Emergency Management Agency
PS	Pumping Station
SH	Space Heat
UB	Ulaanbaatar
UBHN	Ulaanbaatar Heat Network
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics

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SECTION I: INTRODUCTION

The Economic Policy Reform and Competitiveness Project (EPRC), funded by United States Agency for International Development (USAID) and managed by Chemonics International in Ulaanbaatar, Mongolia, has been tasked to gather background material on the energy sector (particularly, on the municipal space heating and hot water sector) of the Mongolian capital. The goal of this effort is to assemble up-to-date information on the sector and relay it to the Asia-Pacific Center for Security Studies (APCSS) before APCSS staff's TDY travel to Ulaanbaatar, reportedly in December 2007 and March 2008. That travel is to design and test an Emergency Response Plan (ERP) modeled on a winter-outage disaster in the UB heat sector.

To prepare for the TDY and to make APCSS staff's time in-country more productive, EPRC identified local officials (identified below) deemed most knowledgeable about the heat sector. EPRC then scheduled and conducted interviews with them over the period 8-27 October 2007. The interviews focused on two principal points: (1) the condition and vulnerabilities of the Ulaanbaatar Heat Network (UBHN, the system run by the Ulaanbaatar District Heating Company"), and (2) the existence, adequacy, and inter-agency coordination level of existing plans for responding to a winter disaster. This memorandum summarizes the results of those interviews. To maximize its utility, the memorandum assumes little or no background information about the UB heat sector on the part of its readers and so begins with a basic description of the UBHN.

The officials interviewed were, on the whole, frank about system vulnerabilities and about inadequacies in current, emergency- or disaster-response planning. To prepare for the interviews, EPRC conducted a short-term review of best practices in utility emergency response planning in the United States. The generic checklist of common features of U.S. utility practice informed the approach to the in-country interviews and shaped the questions posed to Mongolian officials. That checklist, which lists the elements the interviews were looking for, follows:

A. Common Elements of an Emergency Response Plan (ERP)

ERP Element 1: Summary descriptions of Emergency Procedures for executive review;

ERP Element 2: ERP Organization Charts depicting command structure and identifying responsible officials for emergency response in designated functional areas such as (i) operations, (ii) logistics, and (iii) customer care and communications;

ERP Element 3: Response Matrix identifying various levels of emergency and staffing levels appropriate to each level of emergency;

ERP Element 4: Actions to be taken in response to identified incident(s) that has (have) adversely affected or likely may adversely affect the system and its assets;

ERP Element 5: Post-incident debriefing steps for an internal review the adequacy of ERP procedures following response to an incident ("lesson-learned" exercise);

ERP Element 6: ERP training and exercise plan to identify and commit resources and to establish schedules for delivering training (both tabletop and field) to persons with ERP assignments;

ERP Element 7: Procedures for on-going ERP plan review and maintenance to ensure plan's currency with company policies, procedures, and available technology;

ERP Element 8: Identification of company policies and procedures applicable to ERP; and

ERP Element 9: ERP demobilization procedures to terminate response to ERP event and resume normal operations.

A “best practices” baseline served only as a structure for the interviews and was not chosen as a standard known to be impossible for the UB heat sector to meet.

One *caveat* must be stated: Though the EPRC effort benefitted from very able translation assistance throughout the interviews, there is probably some irreducible risk that occasional misunderstandings may have been recorded, despite a strong effort to record and recount fairly and accurately what was stated. *But, given the general concurrence of opinion* on the two principal focal points described above, these misunderstandings, if any, are believed to be few and of limited importance.

That general concurrence portrays a sobering picture: The UBHN has for long been under-maintained and presently labors under serious operational vulnerabilities in the stressful, winter-weather conditions that characterize the Mongolian capital, subjecting the population served to serious risk in the event of an extended winter outage. Although its system is pregnant with serious risk, UBHN may continue to muddle through for several years to come, or a crippling problem may arise quite unexpectedly. Most cognizant agencies’ plans for dealing with the consequences of these vulnerabilities (whether plans for heat and hot water service restoration or plans for meeting emergency housing, health, food, and potable water needs) are prepared in isolation from one another, are often light in scope and content, are not well coordinated after preparation, and, if tested at all, are generally tested in only occasional table-top exercises of unestablished thoroughness and value.

As a result, space heat and hot water service to hundreds of thousands of residential and commercial customers in UB is at risk; and despite their obligation to public safety, there is no credible assurance that responsible agencies have credibly diagnosed likely areas of risk and planned for a coordinated response—or that the materiel and personnel wherewithal can actually be mustered to operationalize plans. If a system failure were to occur, extending over several days of the winter (especially, but by no means exclusively, in January or February), grave harm of unknown scope to the public health and welfare would result. Inadequate funding, planning, investment, and maintenance in the UB heat sector, together with untrammelled overtaxing of its capabilities, reportedly have increased the risk of failure each year. Nothing in the interviews suggests the trend is abating. In the face of high risk of failure and serious consequence to the public, unless the adequacy of emergency preparedness is demonstrated, the prudent course must be to assume inadequacy and to adopt and execute a plan of correction. That adequacy remains *undemonstrated* in the UB heat sector.

SECTION II: BACKGROUND TO ULAANBAATAR’S DISTRICT HEATING SYSTEM (DH)—GENERATION, TRANSMISSION, AND DISTRIBUTION

A. The UBHN in Brief

The basic energy needs (apart from transportation) of Ulaanbaatar (UB) are met by an interconnected cogeneration system, producing electricity and using byproduct heat, normally wasted to a sink, to serve the space heating and commercial/domestic hot water needs of the capital city. Such systems are commonly referred to as District Heating (DH), because they supply the energy needs of large urban districts in many cities around the globe. UB is Mongolia’s largest population concentration: 994,000 according to the official view¹ (some estimates run to 1.2 million) out of a national population officially reported to be 2.58 million.² The CIA World Factbook puts the national total considerably higher at 2.95 million³.

Using official Mongolian figures, then, nearly 40 percent of the national population lives in the capital. UB is probably the coldest capital city on Earth, and the majority of its residents and the bulk of its commercial activity rely on UBHN for space heat and hot water. The table and graph below indicate the severity of UB’s winter temperatures. Winters show average monthly lows of - 32° C. and - 29° C. in January and February, respectively, and historic lows of - 44° C. in those same months. The criticality of a properly functioning DH system on which hundreds of thousands of residents have no alternative but to depend for life and health needs no more vivid illustration.

Table 1: Ulaanbaatar Weather, Historic Monthly Statistics

(Source: www.bbc.co.uk/weather/world/city_guides/results.shtml?tt+TT002630 [24 October 2007])

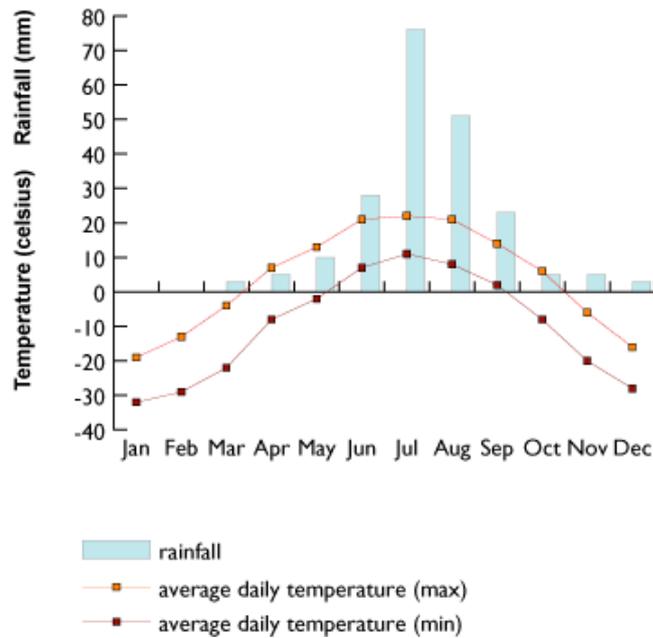
Average Conditions										
Ulaanbaatar, Mongolia										
Month	Average Sunlight (hours)	Temperature				Discomfort from heat and humidity	Relative humidity		Average Precipitation (mm)	Wet Days (+0.25 mm)
		Average	Record	Min	Max		am	pm		
Jan	3	-32	-19	-44	-6	-	81	73	0	1
Feb	4	-29	-13	-44	2	-	78	66	0	1
March	5	-22	-4	-39	18	-	78	61	3	2
April	6	-8	7	-24	24	-	64	42	5	2
May	8	-2	13	-12	30	-	64	40	10	4
June	7	7	21	-4	36	-	68	44	28	5
July	7	11	22	1	33	-	77	54	76	10
Aug	7	8	21	-7	33	-	76	49	51	8
Sept	6	2	14	-11	28	-	78	43	23	3
Oct	5	-8	6	-27	23	-	77	48	5	2
Nov	3	-20	-6	-36	11	-	82	57	5	2
Dec	2	-28	-16	-43	0	-	88	75	3	1

The following bar chart for **Ulaanbaatar, Mongolia** shows the years average weather condition readings covering rain, average maximum daily temperature and average minimum temperature.

¹ National Statistical Office of Mongolia. *Mongolian Statistical Yearbook 2006* (Ulaanbaatar, 2007), p. 76.

² *Id.*

³ www.cia.gov/library/publications/the-world-factbook/geos/mg.html (24 October 2007).



Generating energy (electricity, heat, and hot water) suitable for UB end-users' needs is fueled principally by dedicated mines whose coal is brought by dedicated rail lines and rolling stock to three large Combined Heat and Power (CHP) or cogeneration plants located in the far western, industrial sector of the capital. The integrated DH system of transmission mains and distribution piping operates through a system of heat exchangers in coordination with private heating supply companies and the municipal water supply system to bring space heating and hot water to businesses and apartments across UB. In addition, two of the CHPs produce steam for industrial customers located nearby in the eastern part of the capital. (CHPs can also provide District Cooling by use of absorption chillers, but, unlike other parts of the world, there is no market for that service in UB.) Electricity production is directly tied to DH energy production: Thus, during hours when electricity demand is low but DH demand is high (e.g., the middle of a winter night), electricity production that exceeds local need may have to be fed into a wider grid or even dumped, and in UB's case is dumped to Russia. Figure 1 below illustrates the cogeneration process.

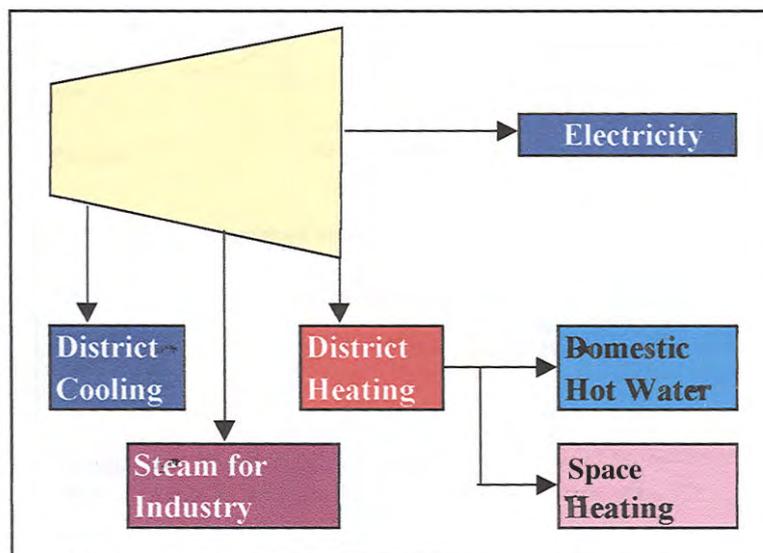


Figure 1: Possible Products of a Combined Heat and Power Plant (trapezoid) ⁴

The CHP/DH model employed makes economic sense for a densely populated area such as Ulaanbaatar for several reasons. Coal is the only native fuel in abundance in Mongolia. CHP production of electricity and heat together from coal is more efficient than separate production of the products. Scrubbing of flue gases in coal combustion is efficient only where economies of scale typical of large power plants exist. DH load or large industrial load of similar scale is an economic precondition of CHP operation.

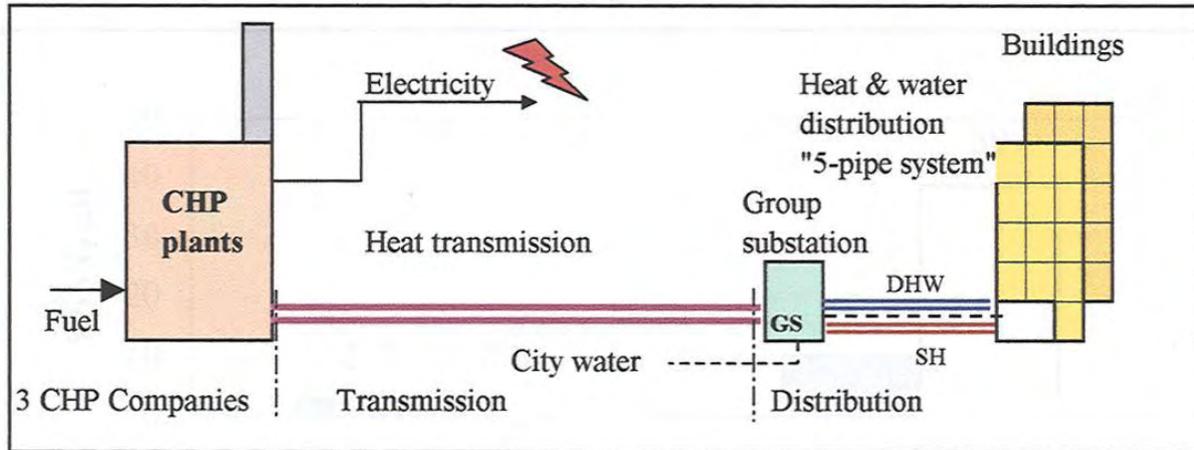
UB is not the only city in Mongolia with CHP/DH infrastructure: Darkhan, Erdenet, Choibalsan, and Dalanzadgad are the others. Built in the 1960s and 1970s, these systems are operating beyond their economic life. Recent decades have seen insufficient renewal of system assets with the result that energy losses and maintenance costs (production, transmission, and distribution) have driven up the cost of supplying heat. Passing increased costs on through consequent price increases has been problematic because of inability and unwillingness of customers to pay. System losses, affordability, and lack of incentives for both conservation and efficiency represent serious commercial and economic challenges to UB's DH system. Maintenance of the DH system, at least as present means and practices permit, cannot fully offset the increasing risk of serious disruption in heat supply during the extreme winter weather in Mongolia. The consequent threat to human life and health must be rated very serious, for in densely populated urban areas like UB there is no alternative to the DH system.

Figure 2 below illustrates the layout of UB's DH system (the other four cities' systems differ). Three CHPs provide the input to the DH system, which, in turn, carries energy for space heat (SH) and district hot water (DHW) to end-users through systems of transmission mains and distribution lines and associated pumping stations (seven of them) and substations (about 80 altogether), operated by UBHN. The UBHN transmission system carries hot water through primary mains ("primary" is the term used by UBHN to designate its own transmission pipes of any diameter), ranging in diameter from 200 to 1200 mm. and totaling 286 km. altogether. Larger branches from these mains (in the 50 to 200 mm. range) collectively amount to 560 km. in length. These larger branches are a combination of smaller transmission lines and what UBHN terms "secondary" lines owned and operated by the private supply companies that are the link between UBHN and end-users such as apartment complexes and their tenants. Most of these branch lines terminate in heat exchangers that transfer the energy in UBHN's send-out to the space heating and hot water loop serving the end user. About 90 percent of UBHN's customers are served by these terminal heat exchangers.

As Figure 2 indicates, there are several operational interfaces within the overall DH system: CHP to UBHN (which has both transmission and wholesale functions); UBHN (in its transmission/wholesale role) to supply companies (which typically serve end-users by direct distribution to a single building or complex); and the municipal water works (a part of UB's Housing Service Authority) to others at the distribution/supply end of the pipeline. All of these would need to be coordinated in any disaster planning exercise. In a related but separate effort, work is underway at the Mongolian Economic Regulatory Authority (ERA, the public utility commission) to rationalize the economic efficiency of tariffs in both the electricity and heat sectors. Further detail on the UBHN system is given in Section B below.

⁴ Source of both figures: *ati Consortium. Mongolia: Energy Sector Privatization Advisory Study, Market Study and Company Analysis Report, Part III: CHP Company Analysis* (October 2003), pp. 9, 11. This multi-volume report, though now five years old, is a valuable and thorough source of information on Mongolia's energy sector.

Basic scheme of CHP/DH system in Ulaanbaatar.



The UBHN was established in 1959. Apart from 20 to 30 stand-alone boilers (each serving typically some two or three office or apartment buildings), UB's heat and hot water demand is served by UBHN. (In the early 1980s, some 150 stand-alone boilers served local load on-site in UB; but most of these—often government buildings—have since connected to UBHN, leaving only the 20-30 units just mentioned.)

B. The Combined Heat and Power Plants (CHPs)

UBHN has three main sources of heat supply: the Combined Heat and Power Plants (CHPs). These three CHPs are coal- (lignite or brown coal) and mazut- (residual oil) fired, electric generation plants that also produce steam for certain commercial/industrial customers nearby and heat and hot water for the district heating system and hot-water needs of UB. (While lignite's low calorific value and resultant inefficiency to transport any significant distance ordinarily confines its use in other parts of the world to electric generation stations proximate to the mine, serving UB's DH need necessitates plant siting proximate to load, and hence rail transport of the lignite.)

The oldest plant is CHP-2, commissioned in two phases in 1961 and 1970, with assistance from China and the USSR, respectively. (Its predecessor, CHP-1, was located to the southeast of UB, but was decommissioned in 1984.) From 1980 to 2001, CHP-2 was subjected periodic design modification, mostly to boilers and steam lines. CHP-2 supplies about 3.5 percent of UBHN's current heat and hot water load.

CHP-3 consists of two, Soviet-designed and -supplied units, each with four turbines: a high-pressure steam unit, commissioned in 1976-79; and a medium-pressure (sometimes called a low-pressure) steam unit, commissioned in the 1976. In 1985, the CHP-3 units had to switch from their design fuel to lower grade lignite, with consequent reduction in efficiency and increase in operational and maintenance problems. From the mid-1980s to 2000, four of seven high-pressure boilers were rehabilitated (the remaining three have aged prematurely and probably cannot be economically rehabilitated); but no work beyond routine maintenance has been done on the medium-pressure units, which have exceeded their design life and probably cannot be economically rehabilitated. CHP-3 supplies about 32.5 percent of UBHN's needs. The units at CHP-2 and -3 are all either 30 or 40 years old.

The remaining CHP of the three presently in service is the largest: CHP-4, the flagship facility with 75 percent of the total installed capacity of the capital city's energy system. In 2002,

CHP-4 supplied the bulk of UB's electricity (76 percent) and of UBHN's heat and hot water load (64 percent), and more than half of the industrial steam need in the city; and those proportions evidently hold true today, some five years later. Of Soviet design, CHP-4 has eight boilers and six turbo-generator. It was commissioned between 1983 and 1991. Premature aging resulted from the collapse of Soviet support after 1989; and major life extension work had to be carried out from 1997 onward—with the result that CHP-4 was deemed in good condition by the *ati*-Consortium study of 2003. In addition to serving UBHN's heating load, CHP-3 and -4 also supply steam for nearby industrial load, as noted. CHP-2 has the capability to do so also, but presently serves no industrial steam load. The *ati* study found that with its excess capacity, CHP-4 could cover all the power and DH needs of Ulaanbaatar with the exception of the industrial steam load served by CHP-3. Recent rehabilitation of plant equipment increased the remnant life of CHP-4 by 15 years (out to about 2018, assuming a load factor of 70 percent and proper maintenance). CHP-4 is thus positioned to increase its share in meeting UB energy demand and is expected to do so. A recent Asian Development Bank (ADB) program to install heat exchangers and water temperature controls in 90 percent of UBHN's buildings was intended to convert the DH system to a single, demand-driven system (rather than three separate hydraulic systems in a Soviet-style production-driven mode). If accomplished, that change would competitively advantage CHP-4, with its lowest variable costs among the three CHPs, in capturing market share and increasing revenues. But apparently, the success of the ADB program has fallen short of some expectations; and the three CHPs are deployed with an eye more to sustaining their respective revenue needs than to the competitive efficiencies of economic dispatch.

Heating demand on the UBHN system has grown by about 5 percent annually in recent years. New construction in UB has been adding heating and hot water load in a way that, if not unplanned, then is at least not well planned. Permitting for new construction is done by city agencies. How much systematic attention may be given to urban land use planning, sewerage, traffic congestion, and other problems associated with over-building in districts deemed most desirable by developers—not to mention attention to strains on system-wide and loop-local UBHN capacity and to effects new load may have on existing UBHN customers—is far from clear; but the adequacy of that attention may reasonably be doubted until proven. Future economic growth in the UB metropolis and in particular, high-growth neighborhoods (e.g., the areas in the general vicinity of Sukhbaatar Square and Government House, where the Mongolian Parliament sits) may be seriously constrained or even stymied, if certain upgrades to the UBHN system are not expedited (see Sections E and F below). Worse, the potential for adverse effects during a disaster might be especially acute in districts where the supply situation is or soon may become marginal. It appears that current construction and planning could lead to the addition of some 40,000 apartment units in UB, the overwhelming majority of which will require connection to UBHN's already taxed capacity. To give the point context, one source⁵ cited some approximate figures: In 2007, new connections to UBHN represented and added load of some 1000 tons of water per hour on a system designed for 10,000 tons with present load of 9000 tons. So, it soon may be the case that new service connections to UBHN either must be better planned or will face unavoidable curtailments and delays. Otherwise, UBHN service may be generally degraded citywide or severely impaired in particular neighborhoods. (Certain physical upgrades to the UBHN can make the system more robust and augment its capacity to deal with both new growth and possible disruptions in supply, caused by disastrous breakdown. These are discussed below in this Section and in Sections E and F.)

⁵ Jigmed Landannorov, see Section A below. (More precise, but broadly consistent, figures are set out in Section F.)

Separate from the municipal land-use permitting process, UBHN has its own system for evaluating connection applications and issuing permits. The heat network was a working group that analyzes the system's capacity to serve the proposed load and may impose conditions on approving the application (e.g., reduction in the proposed number of floors in the structure and thus the potential load) or, on occasion, refuse approval (the latter course appears uncommon, given the prominence and influence of the backers of some projects, but reportedly does occur from time to time).

Attachments:

Certain documents related to UBHN planning and preparedness were received, or promised, during the interviews described below. Three are attached hereto. Others (some yet to be received) will be maintained in EPRC's files for reference when APCSS's team arrives in-country.⁶

Attachment A: UBHN Service Connection Regulation.

Attachment B: The Law of Mongolia on Disaster Protection (20 June 2003).

Attachment C: Ordinance of Executive Director of Power Plant No. 4, Establishment of a part time headquarters and a professional unit in charge of disaster protection (13 January 2006)

C. Meeting with Jigmed Landannorov, M.Sc., District Heating Expert, National Dispatch Center (NDC)

EPRC personnel met at NDC's offices with Jigmed Landannorov, NDC's District Heating Expert (his title), on 12 October 2007. Mr. Landannorov is reputed to be very knowledgeable about the workings of the UBHN; and the meeting seemed to bear that out that reputation.

The purpose of the meeting was to gather background on the status and characteristics of the UBHNH for assessment of its current disaster planning effort. Discussion covered two principal areas, which Mr. Landannorov described at some length : (1) Major features of the UBHN (some of that information appears in the background material above); and (2) selected reform priorities for strengthening the system in ways that would serve both normal operations and disaster response.

The interview with Mr. Landannorov helped define a half-dozen priority actions that, in his view, would render the existing district heating system more robust and less at risk for catastrophic failure. These measures would improve service to present customer load, preserve future economic-growth potential, and augment the system's capability to deal with potentially disastrous breakdowns. These suggested actions appear plausible, even persuasive and perhaps convincing, and, in any event, enjoy the authority of a technician who knows the system in detail. Whether, short of some disaster, they are politically feasible, is a question on which those familiar with the UB situation may differ.

First, a moratorium on new connections, until a system-capacity increase is effected, could reduce the severity of any potential disaster. The UBHN is near capacity, yet connections to it continue apace. Both CHP-3 (though only in its high-pressure unit) and CHP-4 have presently untapped capacity to produce energy for UBHN. Using that capacity requires new mains out of the plants to make its output available to the heat network. Whether a moratorium, pending such upgrades, may be politically feasible is a matter of some doubt. Even so, the matter must at least be raised, for it lies at the root of present and threatened difficulties.

⁶ Three items of particular interest on file are "emergency regimes" (approved by Sh. Monkjargal, UBHN's General Engineer) for failure of CHP-3's high and medium pressure units and of CHP-4 to generate and deliver energy to UBHN during winter 2005-06 peak months. These describe configuration changes in the event of modeled outages.

Second, the northeast sector of UBHN has a low-pressure problem that must be addressed by strengthening supply capacity in that quadrant of the city to prevent a future supply disaster from being particularly acute in that area. A low-pressure problem in the northeastern part of UBHN's system is chronic and promises to worsen unless steps are taken to augment supply in the area. Stretching from Micro District (MD) 7 in the north and extending south- and eastward into MDs 12, 13, and out to MD 16 in the far east, this area of UBHN is fed, like all MDs, by the three CHPs in the far west of the city. Hence, even despite the number of pumping stations throughout the system (seven altogether, although the numbering system suggests eight), a pressure gradient across the system can result—and with that gradient, the potential for a drop-off in service. The easternmost pumping station (PS-1) is located south and slightly west of Sukhbaatar Square; and those nearest to PS-1 (i.e., PS-2, -3, and -4) lie slightly to the east of PS-1. In some of the disaster scenarios that have been posited (i.e., loss or degradation of supply capacity at a CHP, or a significant loss of transmission mains capacity in the intervening distance from the three CHPs), the results of a disastrous loss of energy supply to end-use customers would apparently be particularly acute in the eastern part of the UBHN.

Reduction, if not elimination, of potential disaster consequences in eastern UB may be achieved by local augmentation of supply. A new CHP-5, located just north of MD 7, has evidently been discussed for some time to achieve just that. It would feed the underserved northeastern sector of UBHN and also the undeveloped area to the southeast of the city. The earlier discussion of affected MDs did not mention MD 14, because, as of now, MD 14 is merely a planned extension of UB into the peri-urban, ger district to the southeast. But as recently as August 2007, UB asked for tenders from developers of the planned MD 14. Present development costs, judging from the tender solicitation, are small at 170 million Togrogs (MNT 170,000,000) or about US\$ 160,000; and some of the land in the ger district has been privatized in recent years, suggesting land acquisition or even eminent domain work may be protracted. But by decade's end, there may be significant additional load on the already taxed, eastern part of UBHN. A new CHP-5 of significant additional capacity (a 300-500 MW plant, perhaps fuelled by methane gasified from coal, cogenerating heat and hot water) would hedge against outage at the already aged CHPs on the western edge of UB. If and when CHP-5 is constructed (a feasibility study was announced in 2006), a rail spur would have to be constructed from the nearby main stem to the CHP-5 site. Reportedly, operating mines that supply the three existing CHPs have enough capacity to supply CHP-5.

Third, a relatively simple equipment-fix to CHP-3 can increase mains pressure leaving the plant and thereby augment CHP-3's ability to serve UBHN in both normal circumstances and in disaster conditions. CHP-3 is responsible for serving almost a third of UBHN's heat and hot water load. A pressure drop is now experienced between the vintage-1960s, medium-pressure part of the plant and the mains it serves, because of the present inadequacy of CHP-3's heat exchangers. Moving from a single-stage to a second-stage design in the heat exchangers would increase the mains pressure leaving the plant and provide an added margin to compensate for shortfalls in the event of disastrous curtailment of the output of the other two CHPs.

Fourth, CHP-4 currently has less than optimum pumping capacity, a shortcoming that adversely affects UBHN system capacity. CHP-4 presently had two arrays of four District Heating (DH) pumps. Inadequate inlet pressure to the pumps risks cavitation problems (i.e., pitting damage to pump blades with consequent need for replacement). Increasing the inlet pressure to the pumps can improve their efficiency and lower that risk. Achieving this increase would require additional 800-1000 mm. pipes to the pump inlet of up to a kilometer in length. Solving the pumping problem would improve circulation throughout the UBHN system and make better use of CHP-4's key capacity both in normal and in disaster conditions. Thus,

potential disaster problems with capacity at the other two CHPs could be mitigated by pump upgrades at CHP-4. The potential for “workarounds” would be increased. Technical/operational flexibility would enhance disaster-response capability.

Fifth, the UBHN system of transmission mains is constrained by encroachment of adjacent building and development at certain points, thereby diminishing both the system’s ability to serve present load and its flexibility as a means to effect “workarounds” in disaster circumstances. Duct size is a limiter of the capacity of the transmission piping housed in the duct; and so is the size of the land corridor in which ducting is located. Some sectors of the UBHN system could be better served, and potential disasters better provided for, if the number and carry-capacity of mains could be increased. In certain places in the city, however, building has encroached on UBHN ducting or on rights-of-way in which ducting and mains are located. Reportedly, the problem can be solved at particular points only by taking and razing of structures.

Sixth, reform of the current process of land-use planning and development permit issuance is directly tied to UBHN system integrity. A disciplined process of land-use permitting that is rational and transparent from top to bottom would prevent increasing jeopardy to UBHN’s ability to serve existing customers (especially in certain urban neighborhoods) and would safeguard the future economic growth of UB. A failure of land-use planning can lead to excessive development in a particular neighborhood and consequently to impairing UBHN’s ability to serve that neighborhood. For example, development in the vicinity of Sukhbaatar Square may overtax the ability of UBHN’s heat and hot water loops serving adjacent neighborhoods.

D. Meeting with D. Battsend, First Deputy Director and Chief Engineer, and Natsagdorj, Head of Engineering Department, Combined Heating and Power Plant 4

EPRCP personnel went to Bayangol District to meet at CHP-4 with D. Battsend, First Deputy Director and Chief Engineer of the thermal power plant, and with his subordinate Natsagdorj, Head of the Engineering Department, on 16 October 2007. The purpose of the meeting was to discuss disaster or emergency recovery planning with cognizant personnel at the plant responsible for the bulk of UB’s and UBHN’s energy. The basis for the questions posed at the meeting was a checklist developed from a review of U.S. utility emergency recovery plans undertaken in September/October. The conversation disclosed the following information.

CHP-4 has no disaster recovery plan document in place. It does have a plan of seven pages length, dated 12 January 2006, only for problems arising within and confined to CHP-4’s operations alone, that is, the plan is unrelated to problems arising within UBHN operations or to an area-wide disaster that might affect the capital beyond CHP-4’s boundaries. (See Attachment C.) If a problem were to arise within CHP-4’s operation, management would inform the National Dispatch Center (NDC), whose task then would be carry the message to UBHN. If any coordination is required between CHP-4 and UBHN, that function is performed by NDC.

Some training and disaster simulation exercise is conducted each year on the basis of a prearranged scenario of damage or threat to CHP-4’s operations. The exercise is usually in May or June when load is low and the exercise can be conducted with minimum disruption of operations and service. In 2007, the scenario tested CHP-4’s response to a major flood. In May or June of 2008, CHP-4 will conduct a disaster-response exercise jointly with the emergency authority of the capital city. The topic has yet to be chosen. Whether UBHN will be involved is the decision of the emergency authority; and that decision will rest on what area of the capital is chosen for the focus of the exercise. Apart from this *possibility*, disaster gaming

appears not to have been jointly conducted by the several agencies and companies that would have to respond to a serious, widespread emergency. So, how well these several entities (i.e., CHPs, NDC, UBHN, the municipal emergency authority, army, police, et al.) would cooperate and mesh their operations cannot be answered on the basis of actual, recent joint training and exercises. Absent such a basis, the prudent expectation (given the dire consequences of a prolonged and widespread winter outage in UB) must be one of unpreparedness.

Although, as reported, no winter scenario has been gamed involving a major UBHN heat loss resulting from an outage or large shortfall in CHP-4's output, there did take place, three years ago, a limited sort of disaster-response testing during an actual -40° C. day. But the exercise was confined to CHP-4. It was not a scenario exercise, as the term would be commonly understood, but an *ad hoc* convening of CHP-4 plant management and other personnel to check on the sound operation of plant system during the challenging weather. This call-in was at the direction of the Chief Engineer and followed a pre-established protocol. All reportedly went well, but as noted, no other entity, apart from CHP-4, was involved in the *ad hoc* exercise.

When CHP-4 conducts any such exercise, whether the annual scenario game or an *ad hoc* call-in, personnel undertake a "lessons-learned" review after the fact to see how well (or poorly) the system responded: (a) how orderly CHP-4 personnel mustered; (b) how satisfactorily necessary information flowed to the correct personnel; and (c) how reliably teams worked together in accomplishing their assigned tasks. Information thus gained informs the next revision of CHP-4's plans and procedures going forward.

As to the question of CHP-4's role in compensating for a loss of service at either CHP-2 or CHP-3, as such a loss might affect UBHN's ability to serve load, NDC is the authority with responsibility for maintaining plans for such an eventuality. But it appears that CHP-4's relationship with NDC on this point is a command-control relationship, and NDC has not shared the particulars of its plans for what might be expected of CHP-4 under such a scenario. In any event, Mr. Battsend has not been provided a copy of this NDC document. This remarkable fact does not augur well for the free flow of critical information during any future emergency.

CHP-4's potential for helping out in the event of a disaster that threatened UBHN's ability to serve load could be strengthened by a few straight-forward engineering fixes. Mr. Battsend's comments square with observations by Mr. Landannorov discussed earlier and with the views expressed by senior UBHN personnel discussed in Sections E and F below.

In order to replace CHP-3's output in the event of failure, CHP-4 could more readily do so if two additional DH pumps were installed. Current installed pumping capacity at CHP-4 is about 13,000 tons/hr. CHP-4 already pumps over 9000 tons/hr. CHP-3's capacity is about 6000 tons/hr. So a complete failure of CHP-3's output could not be fully compensated by CHP-4, because of the limitation on its current pumping capacity: An unmade-up shortfall of 2000-3000 tons/hr. would result. Growth in district heating load monthly exacerbates this risk. Augmenting CHP-4's pumping capacity, while an important step, is only a short-term fix, however.

The long-term answer on the supply side would be the construction of the planned—or at least much-discussed—CHP-5 station at the eastern end of UB to back-feed that end of the UBHN system. It appears that, even if the go-ahead for construction were given in early 2008, the four to five year construction period required would mean the plant could not be fully operational till 2011 or 2012. Mr. Battsend touched on but did not discuss at length the questions of coal

transportation and cooling water for CHP-5, although he did agree that arranging for coal delivery would not be the most difficult part of getting CHP-5 on line.

In addition to augmenting CHP-4's pumping capacity (discussed above) as an interim fix while CHP-5 awaits construction, Mr. Battsend advocated constructing a fourth feed out of CHP-4 to serve UBHN. A 700 mm. pipeline to UBHN would increase capacity by 200 Gigacalories/hr. and be a second interim fix until CHP-5 is constructed. On the whole, however, absent a new CHP-5, Mr. Battsend agreed with a characterization of solving UBHN's problem by just adding new pumps and a new 700-mm. line, while UBHN load continues its unplanned growth but CHP-5 remains under yet-longer consideration: that is, as running ever faster on a treadmill while someone else keeps increasing the speed, though sooner or later even the fastest runner with the greatest stamina will fall off the back end.

E. Meeting with General Purev Dash, Ph.D., Chief and High Commissioner, Mongolia National Emergency Management Agency (NEMA)

EPRC personnel met with General Purev Dash, head of NEMA, on 22 October 2007 to discuss his agency's role in preparing for and responding to potential disasters in the UB energy network. NEMA was founded in January 2004. Before then, three agencies had authority over emergency response: civil defense, fire department, and state reserves (the last one, the agency that stockpiles fuel, food, medicines, etc.). Gen. Dash described the UB heat and power outage potential from failure of one of UB's CHPs as "one of the sensitive issues" facing Mongolia. He cautioned that widely different consequences would ensue depending on which plant experienced outage: an outage at CHP-2 resulting in small and tractable problems; but an outage of any significant duration at CHP-4 being very serious. He described a recent (Spring 2006) outage at CHP-4 that lasted nine hours overnight and indicated it would have led to serious difficulties had it lasted longer or occurred earlier in the year.

The General explained how NEMA fits in the state structure of disaster response and distinguished between its roles in responding to smaller, localized emergencies and to widespread, severe disasters with serious national, economic consequence. NEMA has daily responsibility for monitoring any emergent situation throughout the country, whether it be in energy, agriculture, health, mining, etc. NEMA has authority in law to call in officials from any of these disparate fields and direct the resolution of smaller emergencies; and the officials have a corresponding obligation to obey NEMA's directives.

For much larger emergencies, NEMA functions as part of a standing Emergency Commission (EC). The EC's chairman has his commission from Mongolia's President; and NEMA's chief has a standing role as *ex officio* Deputy Commissioner in response to disasters of any kind. Depending on the nature of the disaster or emergency, a second, *ad hoc* Deputy Commission is appointed. In the case of an energy emergency, the *ad hoc* deputy would be the Minister of Fuel and Energy (MoFE). Various ministers and deputy ministers are also standing members of the EC. Emergency matters of the highest importance will necessitate EC consultation with the Mongolian President.

NEMA would be the headquarters for any major emergency or disaster response. While some ten emergency situations in various economic sectors are said to have been modeled by NEMA, there is no written plan for responding to an emergency in the heating sector, whether in the capital or elsewhere. Reportedly, a generic plan to muster emergency personnel exists; but exercises involving this plan are not field exercises, only tabletop exercises at most. If necessary, NEMA could muster as many as 48,000 personnel (fire, police, mining, and other government agencies) to deal with an actual emergency. But it is not clear how coordinated such a muster in UB itself might be without benefit of preliminary field exercises; but one

must suspect (indeed, prudently conclude) that, unless successful exercises promise probable success, such a muster would not be successful. NEMA does conduct annual exercise of some kind in three or four provincial aimags and one or two municipal districts. The General felt that the supply of communications equipment would be inadequate, as there has not been sufficient funding to attend to this need. Despite a recent, Asia-Pacific Center earthquake exercise, the General felt, Mongolian responders would need to rely on international help in communications. The General expressed his view that emergency equipment should be tested annually and that rescue teams should conduct exercises throughout the year—giving rise to the inference that presently neither such testing nor such exercises are at the level he may regard as essential.

As noted there is no written plan for a widespread heat outage in UB. Whether the absence of a written plan is a sign that, in effect, there is no plan at all was a question it seemed impolitic to pose to the head of NEMA. It appears that some systematic effort is made to ensure that “1st Grade Consumers”—a category that includes hospitals, government buildings, laboratories, certain industries, etc.—maintain back-up diesel generators to supply their power needs. NEMA and another state agency are said to conduct annual checks of how well these 1st Grade Consumers adhere to their obligations, and NEMA can fine noncompliance. These back-up generators would produce electricity and presumably would need complementary electric space heaters to compensate, insofar as that could be accomplished, for a UBHN heating failure.

As to residences, no plan exists to relocate people during an emergency in the heat sector. If an extended outage in winter occurs and threatens to freeze domestic water and sewer pipes within apartment buildings, the expected procedure would be to drain these before they froze to prevent permanent and lasting damage that would render structures uninhabitable in the long term. It is not clear how heat exchangers would be protected, however. Whether all these sites and their piping have been mapped and whether personnel have been assigned and trained to ensure that this expected procedure is followed are questions whose answers are far from clear. The likely answer is that no such follow-up has been conducted. Incidentally, as the answer to a direct question during the interview indicates, no plan is in place to distribute potable water or food to apartment dwellers thus affected by an outage.

Some emergency materials are said to have been stockpiled: 2007 saw the quadrennial submission to the national Cabinet of an inventory of stocks for use in an emergency. Each year some economic sector is the focus of this inventory exercise. The focus in 2007 was the energy sector. According to Gen. Dash, part of this effort is to refresh state reserves by weeding out obsolete equipment and supplies and, overall, the effort would require the expenditure of MNT 100 million (US \$ 100,000).

F. Meeting with D. Byamba-Ochir, Ph.D., Executive Director, Ulaanbaatar District Heating Company

EPRC personnel met with Director Byamba-Ochir of UBHN on 22 October 2007 in his offices. The picture he laid out of the status and future of UBHN was grave and daunting. He began by pointing out that winter temperature at UB makes it the coldest national capital in the world. A disaster involving UBHN’s inability to serve a significant part of its load in the capital city for a prolonged period would be catastrophic. Some 50 to 60 percent of the mains and distribution lines are obsolete, having been installed in the 1960s and 1970s and having been under-maintained since installation. This chronic shortage of funding for maintenance means, in his informed opinion, that by 2010 (two years from now), the twin strains of equipment deterioration and demand growth are expected to lead to piping failures (“bursting” was the term he used) that could cut off service to entire micro-districts (MDs are the principle

subdivision of UB). While some US \$ 4 – 5 million would be required annually for normal operations and maintenance, only some US \$ 800,000 is presently spent each year.

Uncontrolled leakage in mains and distribution piping is clear sign of the deterioration that has resulted from inadequate funding and maintenance. Some 90 percent of the UBHN system's 280 kilometers of piping is underground. It is therefore difficult to locate, much less remedy, underground leakage. As more and more underground cracks develop and leakage worsens, service will suffer. Having only one piece of such equipment, UBHN lacks enough underground-leak detection equipment (said by the Director to cost as little as US \$ 60,000, concerning which he made a frank and direct appeal for USAID funding); and while the municipal sewer works has such equipment, it is not always available for loan to UBHN. UBHN's water loss through leakage each hour is 800 tons—this in a system whose send-out capacity is 13,000 tons/hr. Colder temperature worsens the rate of water loss. In consequence, excessive volumes of make-up water have to be added to the depleted volume of water already in the system, now returned for reheating and recirculation. In winter, send-out water must be sustained at very high temperature just to stay ahead of outdoor temperatures that can sink as low as or lower than - 35° C.⁷ (The challenge to keeping up with ambient conditions is only exacerbated by UBHN's lack of hot water pumps for circulation; it presently has only cold water pumps.) Excessive injection of make-up water has several adverse effects, both economic and environmental: (1) extra strain on the metropolitan water resource; (2) extra cost for water treatment (the naturally occurring oxygen level in the ground water source is corrosive to already tenuous piping); and (3) mining, transportation, and combustion of additional volumes of coal with consequent environmental effects. These, then, are the annually worsening, knock-on effects of under-funding, under-maintenance, and the lack of equipment and other means to detect and correct chronic, serious leakage.

UBHN has a staff of 300 persons, distributed across all categories from engineers to accountants to janitors. Annually, some of these employees engage in emergency response exercises in accordance with a plan that is supposed to be made available to EPRC. The annual exercise is limited to the tabletop variety, however. Apart from UBHN's own plan, the Director said there was no overall plan to "harmonize" UBHN's activities and role with those of other government agencies and thus no realistic expectation that the several agencies would mesh well in responding to a serious emergency. He agreed with or raised on his own several of the urgent priorities voiced by others interviewed (see above): Upgrading pumping capability and adding piping input and output to CHP-4 would, he concurred, strengthen the overall system both in normal operations and in emergency conditions. Moving forward with CHP-5 is very important, but there seems no current sense of urgency to do so. The Director also discussed a present moratorium (to take effect from 25 October 2007 for some two or three months) on new, as yet un-permitted connections to UBHN to allow for an analysis of the system's winter capabilities. He expressed a strong interest in tapping into "best practices" in American DH systems and asked for the names of cities whose systems might be profitably visited and studied. A list was left with him. He also set up a meeting with his engineering staff for 23 October to discuss the situation in further detail.

Throughout the interview, the Director spoke with a blunt frankness about UBHN's situation. He minced no words. He said UBHN is in urgent need of assistance, for it "already faces" an emergent "disaster situation." His basic message: The need for funds to detect leaks and replace aged piping is urgent, and the consequences of not meeting that need are grave and not far off, possibly imminent. It was a sobering conversation with a man in a position to know.

⁷ The data in the weather table in Section A above supports this statement.

G. Meeting with T. Altangerel, Head of Engineering Department, Ulaanbaatar District Heating Company

EPRC personnel met with Mr. Altangerel on 23 October 2007 at Mr. Byamba-Ochir's suggestion. Discussion focused on what Mr. Altangerel regards as the three main issues of UBHN's immediate future. His remarks were consistent with information earlier received. *First*, 60 percent of the piping in the primary system (i.e., the network of large mains out from the CHPs [about 1000 to 1200 mm. in diameter] and main branches [400 to 1000 mm.]) has exceeded its useful life of 25-35 years, according to original Soviet design criteria, which may have been optimistic in the first place. Corrosion and cracking have particularly beset the branch primary mains. *Second*, a serious pressure gradient across UB means that certain neighborhoods experience chronically poor service and will continue to do so until larger diameter mains are installed in certain areas to replace the old and inadequate lines now serving those areas. *Third*, UBHN is nearing the limits of its overall capacity to supply the capital. Based on an assumed peak demand on a - 39° C. winter day (an important design assumption, for such a temperature, while known, would be seldom experienced and then not for very long), the three CHPs have a collective heat generating capacity of 1558 Gigacalories/hr. Demand in 2007 reached 1448 Gigacalories/hr., but that figure does not include potential load from new buildings presently under construction and due for completion in 2008 or 2009. That anticipated new load will amount to 170 Gigacalories/hr. The UBHN system is thus poised to exceed its peak capacity in the near future, and if severe weather is experienced, serious service problems appear likely, perhaps even inevitable.

Mr. Altangerel identified several matters that in his view were priorities for improving the service capability of UBHN. *First*, constructing the planned CHP-5 in the western part of the capital topped his list. Growth at both the eastern and western ends of the city is impeded by failure to add this new generating capacity. CHP-5 could improve system flow in the east and free up capacity at CHP-4 to serve now-constrained growth in the west. *Second*, increasing the carrying capacity of primary mains would improve service and permit greater flexibility in emergencies. Some 20 to 30 percent of the 286 km. of primary lines should, if funding were available, be replaced in the next year. Of critical importance is Peace Avenue (a main thoroughfare running east-west just south of Sukhbaatar Square), a high-growth area presently served by a 300-mm. main, but where a 500-mm. main is needed to match the 500-mm. capacity both upstream and downstream of the 300 mm. main. The Outer Ring Road running through Micro Districts 6, 11, and 12 to the north of the capital is another area of high growth where service is at risk. The area is served Main #6. Although this main exhibits some corrosion and cracking problems, its principal problem is inadequate capacity. Because of piecemeal replacement over the years, Main #6 varies in diameter along its length—from 600 mm. down to 500 mm., back up to 600 mm. and down to 400 mm. Main #2, running from the National Library (just northeast of Peace Bridge) westward to the Palace of Military Officers, suffers from corrosion and cracking and exhibits similar variability in capacity along its length (varying up and down from 300 mm. to 200 mm.). *Fourth*, leakage is a manifold problem. UBHN system's water send-out capacity is 16,858 tons/hr. Upon return for reheating, fresh make-up water has to be injected to compensate for ordinary operational consumption and a high level of leakage. This make-up volume varies with the season, from a low of 300 tons/hr. off-peak to 500 tons/hr. during a typical winter day when greater load means more send-out. In times of extraordinary leakage, the make-up volume can range from 800 to 900 tons/hr. Most of the leakage loss is through cracks in the primary system lines; but some comes from outmoded, Soviet-era valve seals at pumping stations and heat exchangers (with the incidental, potential health problem of commingling of UBHN water with potable, domestic hot water on its way to apartment and office taps). *Fourth*, heat-tariff reform would rectify UBHN's present

revenue bind, caused by buying energy from the CHPs under a single tariff but having to sell to end-users under ten separate and different tariffs (based on widely disparate measures such as floor area, living space volume, number of occupants, actual metering in some cases, etc.). Current tariffs do not, in Mr. Altangerel's view, recover UBHN's cost of service, nor do they send rational and consistent price signals to end-users. *Fifth*, UBHN needs to install variable speed pumps at its pumping stations to be able to respond to changes in end-user demand. The Asian Development Bank project successfully installed temperature control devices and variable speed pumps in the secondary (distribution-level) system that permit response to changes in end-user demand.

Mr. Altangerel agreed to provide the most up-to-date version of the UBHN system plan, which shows the length, diameter, and gauge of all mains in UB. When received, this plan will be available in EPRC files for APCSS use.

H. Meeting with Shadar Boldbaatar, Project Coordinator, United Nations Development Program (UNDP)

EPRC personnel met with Mr. Shadar Boldbaatar, Project Coordinator of UNDP, on 24 October 2007. UNDP has just completed the second phase of a three-phase project on disaster planning in Mongolia. The UN project, assisted in part by the United States Government, arose from the period of unusually harsh winters that struck Mongolia from the 1990s till 2002—particularly in 1994 when UB experienced a near failure of output at CHP-2 and CHP-3. Since 2002, UNDP has shifted its efforts to rural and away from urban areas, focusing on the needs of herders and nomads. UNDP participated in the work that led to legislation consolidating disaster-response authority in NEMA (formerly such authority resided in three separate organs of national government); and NEMA's network now covers both urban and rural areas.

UNDP is just now entering the third phase of its disaster-response project. This phase will have a more urban focus. There are four candidate, disaster-response subjects under consideration: earthquakes, major industrial accidents, floods and flash floods, and landslides. Only the first of these is likely to have significant implications for potential disaster in the UB heat sector (although it should be noted that a major flood was the topic of the 2007 annual disaster scenario exercise at CHP-4). With European Union funding of US \$ 1.2 million from Luxemburg, UNDP plans to assemble a team of scientists to review these scenarios with particular reference to UB's westward-lying Bayangol district, where the three CHPs are located.

On the whole, however, UNDP's approach to potential disaster in the heat sector appears very different from what EPRC understands to be APCSS's intended focus on a disaster affecting UB's district heating system—although for the sake of a fuller picture the interview with UNDP was still useful. UNDP appears more concerned with UB's peri-urban ger-districts where rural-to-urban migration has exacerbated poverty and environmental problems. Ger energy costs are of especial concern, because ger-dwellers have no access to UBHN service, which has many hidden subsidies, but must absorb whatever increases there may be in price of coal without cushioning from subsidies (apart from what may be attributable to official regulations that force coal to be sold below its true market value, of course). Though UNDP's third phase may get into disaster training for UB's heat sector if it seems warranted, the interview makes it appear unlikely that UNDP will actually do so.

SECTION III: CONCLUSION

Interviews over three weeks with knowledgeable and experienced local experts depict a troubled UB heat sector. The present picture of UBHN is one (a) where a DH system is in decline from (or barely holding its own against) inadequately planned additions to load and investment starvation, (b) where there seems to be no systematic effort to arrest that decline and to put system back on a sound economic and operational footing, and (c) where actions are uncoordinated and insufficient to prepare for emergency response and disaster recovery against the day when unarrested decline may result in serious and prolonged system failure and public jeopardy. The public in UB has no choice but to rely on UBHN, whatever its weaknesses. To use a well known analogy, all the public's eggs are in a single basket. That basket needs near-term, widespread reinforcement and long-term reconstruction. In the interim and on a sustained basis thereafter, protecting the public will require reform to put in place serious and systematic planning, equipping, training, and exercises in emergency response and disaster recovery—and, moreover, a level of sustained, rather than desultory and sporadic, interagency coordination that does not appear to exist today.

ANNEX A: UBHN SERVICE CONNECTION REGULATION

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Connection Instruction of Ulaanbaatar central heating supply

One. General provision

1.1. This rule shall be a subject to connect Ulaanbaatar central heating supply to the building, equipment and facilities (hereinafter refers "Facility") of the individuals and the legal body.

Two. Financial condition

- 2.1. In case of heating consumption through the temporary connection until the complete commissioning of the construction the individuals and legal body shall make payment to the technical condition holder.
- 2.2. The individuals and legal body shall include the expenses for crossing the underground network, damage of road, bushes, trees and lawns and it's rehabilitation and recultivation in the project and design of connection.
- 2.3. In case of requirement of renovation and expanding of some part of heating pipe line and capacity of equipment of the heating distribution center, the required expenses shall be paid by both parties .mutually agreed.
- 2.4. The technical condition holder shall have the responsibility for any damages caused to the individuals and legal body because of incorrect or incomplete technical condition.

Three. Activities for issuing the technical condition

- 3.1. The technical condition shall be issued considering the connection ability of the heating distribution network and the forecast by the "Ulaanbaatar heating distribution network" company (hereinafter refers "technical condition holder").
- 3.2. The technical condition holder shall issue the technical condition for heating, change of the load, technological renovation of new construction and extending of the facilities.
- 3.3. The individuals and the legal body shall prepare the following materials for getting the technical condition:
 - 3.3.1. Application;
 - 3.3.2. Decision of the Governor on land ownership;
 - 3.3.3. Heating load
- 3.4. The technical condition holder shall issue the technical condition of apartment districts and large
- 3.5. Depending on the scope of work the validity of the technical condition shall be between one and three years. In case the construction has not been started the request for extending the technical condition shall be put to the technical condition holder within two months of completion of the validity date of the technical condition.
- 3.6. In case the technical condition holder shall issue the technical condition for several facilities according to the executive order of the Governor of the city on landownership, searching the possibility of construction of heating network and the heating station.
- 3.7. In case the heating load has been increased in 50 per cent as stated in the first technical condition the individuals and the legal body shall get again the technical condition.
- 3.8. The validity of the technical condition depending on the executed scope of work shall be 1-3 years. In case of non-commissioning of the facilities, which require the heating consumption, the technical condition shall be extended within two months of validity period of the technical condition.

- 3.9. The commission issuing the technical condition shall be appointed by the decree of the General Director of the technical condition holder. The commission shall consist of 6 people representing the Governor of the city, Authority for construction, urban development and public utility as well as the representatives of distribution licensees.
- 3.10. The above mentioned commission shall decide the issuance of the technical condition within 14 days upon receive the application from the individuals and legal body.
- 3.11. The General Director shall approve the decision of the commission issuing the technical condition.

Four. The content of technical condition

- 4.1. The technical condition shall include the following issues:
 - 4.1.1. connection point, the static and return pressure of the network in the connection point, estimating temperature;
 - 4.1.2. requirement for expanding of heating line, well and other equipment in relation to new connection and increase of consumption;
 - 4.1.3. maximum load of estimated heating;
 - 4.1.4. Heating meters and quality stabilization equipment;
 - 4.1.5. The individuals and the legal body shall clarify the connection point and the period of the heating consumption in case of heating requirement during the construction.

Five. Activities for connection of the facilities to the heating network

- 5.1. The facilities, which satisfy the financial and technical condition shall be connected to the heating supply network.
- 5.2. The individuals and legal body shall have the following items completed and inform the technical condition holder on preparation for connection:
 - 5.2.1. to create the documentation on washing, compulsion, filling, regulation, rectification after the completion of installation of network in representation of the technical condition holder;
 - 5.2.2. to install the certified inspecting and measuring equipment and automatic regulation on the on the point indicated in the design and plan;
 - 5.2.3. to complete the act on commissioning the heating pipeline and equipment, act for welding and underground work, technical certification and manual for operation;
 - 5.2.4. to provide the technical condition holder with one copy of execution plan of the installation of heating line and equipment.
- 5.3. The individuals and legal body shall connect the new facilities in representation of the technical condition holder.
- 5.4. The connection of facilities, which completed the materials indicated in the provision 5.2. of this Rule shall be made within March 1 and November 15 of each year.

In case of requirement of connection of new line, equipment and facilities to the heating network in the period otherwise specified above / in case the ambient temperature is more that minus 15 C/ the technical condition commission shall issue the connection plan.

ANNEX B: LAW OF MONGOLIA ON DISASTER PROTECTION (20 JUNE 2003)

ANNEX B: LAW OF MONGOLIA ON DISASTER PROTECTION (20 JUNE 2003)

CHAPTER ONE

General Provisions

Article 1. Purpose of the Law

1.1. The purpose of the present law is to regulate matters relating to the principles and full powers of disaster protection organizations and agencies, their organization and activities, as well as the rights and duties of the State, local authorities, enterprises, entities and individuals in relation to disaster protection.

Article 2. Legislation on Disaster Protection

2.1 The legislation on disaster protection shall consist of the Constitution of Mongolia, the present Law, and other laws and regulations enacted in accordance with the above legislation.

Article 3. Framework of the Law

3.1 The present law shall authorize the framework of implementing disaster prevention, rescue, response and recovery measures except matters relating to war circumstances or to the impact of mass destruction weapons.

Article 4. Definitions

4.1 Terms used in the present Law shall be understood as following:

- 4.1.1 "**Disaster protection**" means the set of measures to prevent, protect and rescue people, livestock, properties and environment from the impact of disasters and to limit their consequences, to facilitate rapid recovery and to train the public for these activities;
- 4.1.2 "Disaster" means loss of many human lives and livestock, immense damage to property and environment caused by hazardous phenomena, major technological accident, terrorist acts or explosion;
- 4.1.3 "**Hazardous phenomena**" means severe snow, dust storm, drought, dzud, flood, earthquake, desertification, fire, epidemic, epizootic, hazardous vegetative disease or spreading of detrimental rodents;
- 4.1.4 "**Major technological accident**" means destruction of factories, buildings, communication or roads, or wreckage of means of transportation or leakage of radioactive and hazardous chemical substances caused by violation of technological procedure;
- 4.1.5 "**Risk of disaster**" means risk of possible damage to population, livestock, property or environment posed by disaster;
- 4.1.6 "**Disaster vulnerability**" means susceptibility of population, livestock, property or environment to disasters;
- 4.1.7 "**Resources for disaster protection**" means necessary food, clothing, materials, machinery, equipment and funds to be used by the disaster protection services of the State, aimag, capital and all other levels, their Staff, rescue units, teams, branches and specialized units in order to deliver disaster protection measures;
- 4.1.8 "**Disaster protection mobilization**" means the activities involving manpower, machinery or equipment, necessary objects, facilities and territories in order to carry out disaster prevention, rescue, response or recovery measures;
- 4.1.9 "**Prevention**" means carrying out measures aimed at mitigation of disaster and possible damage;

- 4.1.10 "**Damage caused by disaster**" means the total loss the country, local area, enterprises, organizations and population, caused by suffering people's health, lives, the loss of livestock, animals, property and the environmental pollution in disaster;
- 4.1.11 "**Disaster site**" means the territory where limitations are imposed because of a disaster, and wherein the rescue and response activities are undertaken;
- 4.1.12 "**Disaster warning**" means the dissemination of signals and warning information regarding the danger of a disaster to the population;
- 4.1.13 "**Victims**" means the people, whose life, health or property have suffered from a disaster;

Article 5. Main Principles of Disaster Protection Activities

5.1 The next principles shall be followed in disaster protection activities:

- 5.1.1 Timely execution of measures aimed at disaster prevention, rescue, response or recovery;
- 5.1.2 In planning and carrying out disaster protection measures, to take into consideration population and industrial location, their density and concentration, weather conditions, industrial and technological specifics, scale of real threat posed by the disaster;
- 5.1.3 To execute comprehensively the measures aimed at ensuring disaster preparedness;
- 5.1.4 Organization of disaster protection activities regardless ownership;
- 5.1.5 To coordinate the collaboration of governmental organizations, NGOs and the general public;

Article 6. Ensuring Transparency in Disaster Protection Activities

- 6.1 Information on the activities of the disaster protection organizations any threat, damage and consequence of disasters shall be open and transparent to the public if the law does not stipulate otherwise.
- 6.2 The disaster protection organizations and services shall provide the population timely and true information through the media and other means on the activities undertaken for disaster prevention, rescue, response and recovery or their results.

Article 7. Disaster Protection Training

- 7.1 The goal of the disaster protection training is to train and retrain relating organizations, services, officials and citizens in disaster prevention, rescue, response and recovery.
- 7.2 The disaster protection training shall be classified as training for senior officials; rescue units, teams and branches; specialized units; students and pupils; employed and unemployed citizens.
- 7.3 The disaster protection training shall be organized by the following organizations and officials:
 - 7.3.1 The state administrative organization in charge of disaster protection shall organize training for its officials, managers of the state, aimag and capital disaster protection services;
 - 7.3.2 Heads and Staffs of the aimag and capital disaster protection services shall organize training for the managers of soum, district, entities and enterprises disaster protection services, heads of specialized units and citizens occupying positions similar to them;
 - 7.3.3 Governors of soum, district, bag and khoroo and heads of enterprises and organizations shall organize the training for the disaster protection personnel of

- the soum, district, bag and khoroo, entities and enterprises;
- 7.3.4 Heads of corresponding rescue units, teams and branches, as well as specialized units shall organize training for the personnel of rescue units, teams and branches;
- 7.3.5 The training of students and pupils shall be organized by the State Administrative Central Agency in charge of education based on the lesson plans of the corresponding school.
- 7.3.6 The training for other people shall be organized by governors of bag and khoroo.
- 7.4 The training for personnel of the state administrative organization in charge of disaster protection, rescue units, teams, branches, specialized units, students, pupils, employed and unemployed citizens shall be provided once a year; the training for senior officials of the state, aimag, soum, district, bag and khoroo disaster protection services shall be held once every 2 years.

CHAPTER TWO

Disaster Protection Readiness

Article 8. Levels of Disaster Protection Readiness

- 8.1 The disaster protection organizations, services, state and local administrations, entities and enterprises have the following levels of readiness:
- 8.1.1 Everyday readiness;
- 8.1.2 High level of readiness;
- 8.1.3 All-out readiness;
- 8.2 The following measures shall be carried out at the level of everyday readiness:
- 8.2.1 To develop and follow a disaster protection plan, taking into consideration the territorial and technological specifics;
- 8.2.2 Keep the means of communication and information dissemination ready to work, to train the population to act according to predetermined signals;
- 8.2.3 Promote the disaster prevention measures;
- 8.2.4 Re-equip the disaster protection rescue units, teams, branches and specialized units with manpower, machinery and equipment and step up their preparedness;
- 8.2.5 Improve the disaster protection training and exercises;
- 8.2.6 Form disaster protection reserves;
- 8.2.7 In everyday readiness the state, local administrations, entities and enterprises could be shifted to a special work regime during a disaster situation or a possible disaster. The procedure of special work regime should be established by the state administrative organization in charge of disaster protection
- 8.3 The following measures shall be carried out at the level of high level of readiness:
- 8.3.1 Introduction of clarifications in the disaster protection plan and dissemination of the warning signals to the population;
- 8.3.2 Shift the administrative-territorial management, and staff personnel to their disaster time duties;
- 8.3.3 Shift the headquarters, information and communication facilities to the state of everyday readiness;
- 8.3.4 Raise public awareness, receive and transmit any information directly, and disseminate the warning signals and information to organizations and the population permanently;

- 8.3.5 Mobilize manpower, machinery and materials and carry out joint exercises and training for supervisors, disaster protection staffs and search and rescue units, teams, branches and specialized units;
- 8.3.6 Impose quarantine;
- 8.3.7 Increase the reserves of materials and equipment;
- 8.4 During the all-out readiness level the following measures shall be carried out:
 - 8.4.1 limit, for the period of time, the activities of the industry and service organizations other than nationwide and local communications, energy, public utilities, petrol stations and strategic organizations;
 - 8.4.2 Authorities of the disaster protection organizations and services, their Staff, rescue units, teams, branches and specialized units as well as respective administrative-territorial units shall fully implement the planned measures for rescue of the population from disaster and its mitigation;
- 8.5 In case of shifting to all-out readiness level directly, the activities that should be undertaken during high level of readiness shall be undertaken simultaneously with other activities.

Article 9. Shifting to the Disaster Protection Readiness Level

- 9.1 Disaster protection readiness level shall be implemented in order to step-by-step organization and implementation of disaster prevention, rescue, response and recovery measures.
- 9.2 Movement to the high level of disaster protection readiness is in order to carry out the disaster prevention, rescue, response and recovery measures in some areas and units.
- 9.3 In order to carry out the disaster prevention, rescue, response and recovery measures in disaster sites of several administrative-territorial units the level of readiness shall be shifted to the disaster protection all-out readiness level;
- 9.4 State and local authorities, entities and enterprises shall be shifted entirely or partially to a disaster protection readiness level directly or gradually step-by-step.
- 9.5 The decisions to shift to the disaster protection high and all-out readiness levels shall be made by the following:
 - 9.5.1 in a disaster or possible disaster in some areas of the territory of a soum or a district, the Governor of the respective soum or district
 - 9.5.2 in a disaster or possible disaster on the territory of 2 soums or districts or more, the Governor of the respective aimag or capital
 - 9.5.3 in a disaster or possible disaster on the territory of several aimags, the Government
- 9.6 The decisions indicated in the articles 9.5.2, 9.5.3 should be made on the basis of a proposal, by Governor of the respective level or the state administrative organization in charge of disaster protection.
- 9.7 The proposals and conclusions shall have attached a draft decision containing the grounds for shifting to a disaster protection readiness level and the assessment of the disaster situation or possible disaster that covers a region or is spreading across a territory.
- 9.8 During the organization of disaster prevention, rescue, response and recovery measures mobilization of resources and evacuation of people and property will be allowed. The Government shall determine the procedures for conducting such the mobilization and evacuation.

- 9.9 The mobilization of armed forces into rescuing and mitigating activities when it is necessary should be decided on the basis of the Government proposal by the President, of Mongolia as a General Commander of armed forces;
- 9.10 It is possible for the Governor of the respective level to shift the local administrative organizations, professional services, entities and enterprises temporarily to a disaster protection readiness level during the disaster protection exercises and training;
- 9.11 The declaration of a state of emergency aimed at a prompt mitigation of damages incurred through disaster that has become impossible to regulate by this law, shall be regulated by the "Law on emergency situation";

Article 10. Determining the Area of the Territory Affected by a Disaster

- 10.1 The disaster affected area shall be determined as following:
- 10.1.1 The boundaries for the disaster affected area in the territory of soums and districts should be determined by the governor of the respective soums and districts;
- 10.1.2 The boundaries of the disaster affected area covering territory in more than 2 soums or districts should be determined by the Governor of the respective aimag Or capital;
- 10.1.3 The boundaries of the disaster affected area in territories of aimag, capital and several aimags, should be determined by the Government based on a request from the Governor of the respective aimag, capital and the conclusion of the state administrative organization in charge of disaster protection;

Article 11. Communications and Warning System of the Disaster Protection

- 11.1 The state administrative organization in charge of disaster protection shall organize a special use communications network for the nation-wide implementation of disaster protection measures on the nation-wide, aimag, capital, soum, district, branch and unit to bag and community level. When it is required the inter-state communications network shall be used for this purpose.
- 11.2 The communications network shall be used for the collection of information on the disaster, for dissemination of the decisions of the authorities to the state and local administrative organizations, branches and units as well as for the inter-state mutual exchange of information.
- 11.3 The news, information, warning signals and warning information regarding the disaster shall be transmitted through a special use and communication, information organization's network.
- 11.4 The communication, information organizations are obliged to transmit the disaster warning signals and warning information free of charge regardless of the form of ownership and their types.
- 11.5 The Government shall determine the procedures involved in the transmission of disaster warning signals and warning information.
- 11.6 The state administrative organization in charge of disaster protection shall organize the contact and exchange of information with the Staff working at the disaster site

Article 12. Disaster Assessment

- 12.1 The working group appointed by the state administrative organization in charge of disaster protection shall assess disaster risk and vulnerability.
- 12.2 The Government shall determine the procedure and methodology of conducting the

assessment.

CHAPTER THREE

Structure and Management of the Disaster Protection Organizations

Article 13. Structure of Disaster Protection Organizations

- 13.1 The structure of disaster protection organizations is composed on the territorial-industrial principle regardless of the ownership in the state, aimag, capital city, soum, district, bag, khoroo , entities and enterprises.
- 13.2 The state administrative organization in charge of disaster protection and their units, teams, branches and staffs in aimags, capital cities and districts are responsible for the nation wide implementation of the disaster protection activities.
- 13.3 The unofficial services and specialized units are in administrative and territorial units.
- 13.4 The entities, enterprises, bags and khoros are responsible for disaster protection at the grassroots level.

Article 14. Structure of Disaster Protection Management

- 14.1 The Prime Minister of Mongolia shall direct the disaster protection activities at the state level. The head of the state administrative organization in charge of disaster protection and the Governors of the territorial units shall organize and manage the disaster protection activities in their respective aimag, capital city, soum, district and khoroo.
- 14.2 Heads of the entities and enterprises shall organize and manage the disaster protection activities in their respective units and organizations.

Article 15. The State Administrative Organization in Charge of disaster Protection

- 15.1 The state administrative organization in charge of disaster protection is the organization responsible for the implementation of the state disaster protection policy and the legislation on disaster protection and the organization of nation-wide disaster protection activities and is provided with professional management.
- 15.2 The state administrative organization in charge of disaster protection is set up and dissolved by the Government on the basis of the scheme approved by the Parliament.
- 15.3 The strategy of activities and organizational structure of the state administrative organization in charge of disaster protection shall be adopted by the Prime Minister.
- 15.4 The head of the state administrative organization in charge of disaster protection shall be appointed and dismissed by the Government upon the proposal of the Prime Minister.
- 15.5 The branches and units subordinate to the state administrative organization in charge of disaster protection shall be set up by the decision of the Government taking into account the territorial, natural and meteorological conditions.
- 15.6 The state administrative organization in charge of disaster protection shall have a symbol. The design of the symbol as well as the rules of their application shall be adopted by the Government.
- 15.7 The state administrative organization in charge of disaster protection shall use its own seal, logo, and letterhead in accord with the related regulations.

Article 16. Disaster Protection Service and Its Management

- 16.1 Disaster protection non-official services of State, aimag, capital city, soum, district bag and khoroo shall be established with their goal to implement disaster protection

duties.

16.2 The Prime Minister shall establish the State Disaster Protection Services supported by the related state administrative organization. The Governors of the respective level shall establish the disaster protection services of aimag, capital city, soum, district, bag and khoroo on related entities and enterprises.

16.3 The heads of the State Disaster Protection Services are the heads of the respective state administrative organization. The heads of the disaster protection services of aimag, capital city, soum, district, bag and khoroo are the heads of the entities and enterprises.

Article 17. State Disaster Protection Service

17.1 In order to coordinate the activities of disaster prevention, rescue, response and recovery the following disaster protection non-official state services supported by related state administrative organization shall be created

17.1.1 Natural and chemical danger assessment and information service;

17.1.2 Health protection service;

17.1.3 Food and agriculture service;

17.1.4 Infrastructure service;

17.1.5 Order service;

17.1.6 Public awareness and information service;

17.1.7 Fire fighting service;

17.1.8 Radiation protection service.

17.2 New state disaster protection services shall be created and disbanded by the decision of Prime Minister in necessary case.

Article 18. General Directives and Duties of the State Disaster Protection Service

18.1 The State Disaster Protection Service shall implement the following general directives and duties:

18.1.1 To plan and organize the implementation of the disaster protection activities within the framework of the engaged section;

18.1.2 To ensure the execution of laws and resolutions of higher authorities related to the disaster protection;

18.1.3 To establish the management for disaster protection service, staff and specialized unit according to the specifics of the engaged section and to organize their training and preparedness;

18.1.4 To ensure unaltered essential services of engaged section during the disaster situation:

18.1.5 To keep the warning information systems of the engaged section constantly ready;

18.1.6 To **form** the reserves of the machinery, equipment and tools for preventing and responding to damages caused by a disaster situation and keep them ready;

18.1.7 To provide disaster protection services in Aimags and capital city with the professional management of engaged section;

18.1.8 TO immediately inform state administrative organization in charge of disaster protection on disaster situation and get their professional support;

- 18.1.9 To involve the professionals and machinery, equipment and tools of the engaged section in the; operational staff dispatching to disaster site;
- 18.1.10 To dispose of funds allocated for a disaster according to the purpose;
- 18.1.11 To assess the damages caused by the disaster and to detail accordingly the proposals on measures to be taken;
- 18.1.12 To provide information and reports on the disaster situation

Article 19. Disaster Protection Operational Staff

- 19.1 The disaster protection operational staff shall fulfill such special duties as organizing and managing of disaster prevention, rescue, response and recovery measures in the disaster sites and coordinate the activities of involving entities and enterprises.
- 19.2 The operational staff working in time of the disaster situation shall be designated by the decision of the Prime Minister.
- 19.3 The main type of the activity of the operational staff shall be its meeting. The head of staff shall issue a decision on the basis of member's majority opinion.
- 19.4 The local administrative authorities, entities and citizens shall follow the decisions issued by the operational staff.
- 19.5 The activities of disaster protection operational staff shall be allocated from the Government reserve foundation.

Article 20. Disaster Protection Resources

- 20.1 The disaster protection resources shall be rescue units, teams, and branches, non-official specialized services and specialized units of the entities and enterprises in charge of the disaster protection.
- 20.2 The specialized units shall be formed from the citizens of Mongolia, who are able to work males of 16-60 years of age and females of 16-55 years of age. This contingent excludes people serving in the army, disabled, pregnant women and people with young children who can't be left without care.

Article 21. Rescue units, Teams and Branches

- 21.1 The rescue unit shall be responsible for disaster prevention at the state and local level, dislocating rapidly and searching and rescuing according to the technical requirements in case of insufficient local resources in disaster sites, providing all kind of emergency aid to the victims, evacuating them to secure places and protecting their properties.
- 21.2 The rescue team and branches shall be responsible for disaster prevention and rescue in the disaster site according to the technical requirements in local area.
- 21.3 The Head of the state administrative organization in charge of disaster protection shall approve the structure, availability and organization of the rescue units, teams and branches and the regulations of their activities.

CHAPTER 4

Powers of the State Administrative Organization and Officials on Disaster Protection

Article 22. The Powers of the Government

- 22.1 The Government of Mongolia shall exercise the following powers on disaster protection that are not provided in other legislation:

- 22.1.1 To submit the draft of disaster protection program of Mongolia for the consideration of the Parliament, to take the measures in order to implement it.
- 22.1.2 To adopt the regulation on forming and disposing of disaster reserves.

Article 23. The Powers of the Prime Minister

23.1 The Prime Minister shall exercise the following powers:

- 23.1.1 To develop the state policy on the disaster protection and direct disaster protection nationwide activities;
- 23.1.2 To submit to the Government the plans on disaster prevention, rescue of human lives and properties, response and recovery measures, and impose monitoring on the implementation of them;
- 23.1.3 To provide state disaster protection mobilization and to propose to the Government the grounds for shifting to the disaster protection readiness in accord with the article 9.5.3 of this law;
- 23.1.4 To propose to the Government the issue on allocating additional expenditures from Government Reserves and some material and equipment from the State Reserves for the measures of disaster prevention, rescue of human lives and properties, response and recovery;
- 23.1.5 To make the decision on disposing of disaster protection reserves.

23.2 The Consulting Commission for coordinating and organizing the measures of disaster prevention, rescue, response and recovery shall operate next to the Prime Minister. The Government shall adopt its composition and regulations.

Article 24. The Full Power of State Administrative Organization in Charge of Disaster Protection

24.1 The state administrative organization in charge of civil protection shall exercise the following full powers:

- 24.1.1 To organize activities to implement the state policy, legislation and Governmental decisions on disaster protection, and to monitor the implementation of it;
- 24.1.2 To coordinate the state and local executive body's activities in the frame of organizing and taking measures for disaster prevention, rescue, response and recovery;
- 24.1.3 To support the activities of the disaster protection services and specialized units of state and local administrative authorities, economical units and organizations according to the regulations adopted by the Government;
- 24.1.4 To organize the formation of disaster reserves in state and local administrative authorities, related entities and enterprises and branches and restore it;
- 24.1.5 To organize disaster protection training at the national level;
- 24.1.6 To implement of disaster protection activities with the methodological management at national level;
- 24.1.7 To get the information and reports necessary for executing the disaster protection activities from state and local administrative authorities and disaster protection services of state, aimag and capital city, to create a disaster database;
- 24.1.8 To manage the activities of distributing disaster reserves released by the decision of the Prime Minister and the humanitarian aid provided by other countries,

- international organizations, foreign and local organizations, legal entities and individuals within the framework of civil protection to the victims;
- 24.1.9 To cause an authorized body to do the vulnerability and risk assessment for entities and enterprises;
- 24.1.10 To monitor the execution process of disaster protection activities taken by state and local authorities;
- 24.1.11 To analyze the practices of using the legislation on disaster protection and accordingly to present to the authorized body its improved version of the proposal;
- 24.1.12 To communicate with the related foreign and international companies on disaster protection matters and to develop the cooperation;
- 24.1.13 To communicate with the non governmental organizations on disaster protection matters;
- 24.1.14 Other powers given by the legislation and government.

Article 25. The Full Power of the Head of State Administrative Organization in Charge of Disaster Protection

- 25.1 The head of State Administrative Organization in charge of disaster protection shall exercise the following full powers:
- 25.1.1 To determine the structure and the organization of the disaster protection services of the State, aimag, capital city, district, bag, khoroo, entities and enterprises, the operational staff, resources and dislocate them and to plan and carry out the measures providing their preparedness;
- 25.1.2 To provide the President of Mongolia, the Speaker of the Great Khural and the Prime Minister with information on the disaster situation;
- 25.1.3 To define the obligations of disaster protection services of State, aimag, capital city, district, bag and khoroo if the legislation does not stipulate otherwise;
- 25.1.4 To mobilize from the local area the manpower, machinery and material necessary for providing the activities of disaster prevention, rescue, response and recovery at the disaster site according to the decision of the Prime Minister;
- 25.1.5 To inform the population on the hazards of the disaster, to create a common information system of disaster protection management;
- 25.1.6 To train the population for disaster protection measures, to form disaster reserves and to monitor its restoring;
- 25.1.7 To dispose the approved budget of the State Administrative Organization in charge of disaster protection according to the related procedure;
- 25.1.8 To represent the organization in local and foreign relations;
- 25.1.9 To approve the structure, organization and vacancy for subordinating branches of State Administrative Organization in charge of disaster protection;
- 25.1.10 To approve the regulations and guidance related to the disaster protection;
- 25.1.11 To designate, dismiss and promote the heads and officers of divisions and subordinating branches of State Administrative Organization in charge of disaster protection;
- 25.1.12 Other full powers given by the legislation and government.

25.2 The head of the State Administrative Organization in charge of disaster protection shall issue orders in the framework of the given full power and in accordance with the legislation.

Article 26. The Full Power of Governors of Aimag, Capital City, Soum, District, Bag and Khoroo

26.1 The governors of aimag, capital city, soum, district, bag and khoroo shall exercise the following full powers:

26.1.1 To plan, finance, manage and carry out the disaster protection activities at the administrative and territorial level;

26.1.2 To shift to the disaster readiness level according to the Law;

26.1.3 To create the disaster protection service, staff and specialized units according to the specifics of the related areas and to train them to be competent to fulfill their duties during the disaster situation;

26.1.4 To create a source of budget essential during the disaster situation and to dispose it;

26.1.5 To provide the higher authorities and the State Administrative Organization in charge of the disaster protection with the information on the disaster situation and carry out activities and to get professional consultation, instruction and support;

26.1.6 To insure the implementation of the disaster protection legislation and higher authority decisions;

26.1.7 To mobilize the manpower and machinery at the administration and territory level during the disaster situation;

26.1.8 To insure normal activities of the rescue teams, units, branches, services and specialized units;

26.1.9 To keep the communication and warning information systems constantly ready;

26.1.10 To assess the damages caused by the disaster and to elaborate accordingly the proposals on measures to be taken;

26.1.11 To urgently inform the higher authority of the information on the disaster situation;

26.1.12 Other full powers given by the legislation.

26.2 The Governors of bags and khoroo shall implement the powers related to him from powers referred to in point 1 of this article.

CHAPTER 5

The Duties of Entity, Enterprise and Citizens on Disaster Protection

Article 27. The Duties of Entities and Enterprises

27.1 Entities and enterprises shall be responsible for following the disaster protection activities regardless of their jurisdiction, kind of property and type:

27.1.1 To elaborate, approve and implement a disaster protection plan;

27.1.2 To create the disaster protection non-official staff, service, and specialized units according to the specifics of own activity;

27.1.3 To supply the specialized units with necessary machinery and materials;

- 27.1.4 To train the specialized units and the personnel in the disaster protection activities in order to make them competent to work in the disaster site and to be prepared;
- 27.1.5 To execute and implement laws and regulations related to disaster protection issued by the authorized organization;
- 27.1.6 To render the vulnerability and risk assessment of disaster;
- 27.1.7 To create a source of budget necessary in time of a disaster and to dispose it according to the purpose;
- 27.1.8 To adjust the duties of the Disaster Protection Staff and specialized units to the needs of disaster time;
- 27.1.9 To provide the related higher authorities with the urgent information regarding the disaster

Article 28. The Duties of Citizen

28.1 The citizen of Mongolia shall be responsible for following on disaster protection:

- 28.1.1 To execute and implement the laws and regulations on the disaster protection issued by the authorized body;
- 28.1.2 To participate in the disaster protection training and other organized measures;
- 28.1.3 To respect and follow the safety requirements in private life and everyday activities, the industrial, technological discipline and ecological safety requirements;
- 28.1.4 To recognize the disaster protection warning and information signals and be aware to act accordingly, possess the self-protection skills;
- 28.1.5 To assist people who have suffered by the disaster and participate in activities to protect properties;
- 28.1.6 To learn the use of personal and public protection tools designed to protect from disaster;
- 28.1.7 To participate in the disaster prevention, rescue, response and recovery activities according to the approved procedure;
- 28.1.8 To provide the related executive body with the urgent information on the disaster situation.

CHAPTER 6

The Disaster Protection Serviceman, and Its Legal Status

Article 29. The Disaster Protection Serviceman

- 29.1 The citizen satisfying the requirements indicated in the Law on State Service and the regulation approved by the state administrative organization in charge of disaster protection and health, physiological, professional, educational and moral requirements and criteria shall be allowed to work as a serviceman of the state administrative organization in charge of disaster protection, its branches, units and disaster protection organizations of aimag, capital city and districts.
- 29.2 The position of the disaster protection serviceman is related to the state special service.

Article 30. The Rights of the Disaster Protection Serviceman

- 30.1 The disaster protection serviceman shall exercise the following rights aside from the general rights of a state serviceman indicated in the Law on State Service:

- 30.1.1 To receive food, staff, special purpose clothing and rescue material, equipment and tools, self-protection means during the disaster work time participation in training and the implementation of duty.
 - 30.1.2 To proceed freely to the related object for the disaster response activities;
 - 30.1.3 To get free medical services and treatment for injuries and disabilities received while carrying out disaster prevention, rescue, response and recovery activities,
- 30.2 The disaster protection serviceman shall have a certificate made in accordance with established regulations.

Article 31. The Duties of the Disaster Protection Serviceman

- 31.1 The disaster protection serviceman shall be responsible for following duties aside from the general duties of state serviceman indicated in the law on State Service:
- 31.1.1 To be ready for disaster prevention, rescue, response and recovery activities,
 - 31.1.2 To execute the disaster prevention, rescue, response and recovery activities in accordance with the technical specifications and safety requirements;
 - 31.1.3 To give instructions and to provide professional support to the organizations, officers and citizens participating in disaster prevention, rescue, response and recovery activities at the disaster site;
 - 31.1.4 To follow the discipline regulations of a disaster protection serviceman
- 31.2 The Government shall approve the discipline regulations of a disaster protection serviceman.

Article 32. The rank, uniform and insignias of the disaster protection serviceman

- 32.1 The disaster protection serviceman shall wear the uniform with the rank and insignias according to its official position.
- 32.2 The regulation on awarding the ranks and design of uniform in accordance with point 1 of this article shall be approved by the President and the duration of uniform exploitation by the Government.

Article 33. Guarantee for Discharging of Duties of Disaster Protection Organization and Its Serviceman

- 33.1 If the disaster protection serviceman carried out legally approved activities during the disaster according to the desire of citizens and organizations, at non-working time, on the other territory, these activities shall be considered as discharge of his/her duties.
- 33.2 Individuals and officials shall be obliged to fulfill the legal demands of Disaster Protection organization and its serviceman.
- 33.3 The disaster protection serviceman and citizen shall receive the regular expenses for assignment in triple size for their work in the disaster site.
- 33.4 The expenses of food and materials used by the disaster protection serviceman during their implementing of duty, working in night, participating in disaster training and retraining and shifting to the readiness level shall be provided by the state.
- 33.5 Disaster protection serviceman shall have a qualification level. The regulation of conferring the qualification level shall be approved by the head of the state administrative organization in charge of disaster protection.
- 33.6 The Government shall be responsible for the damage to property of disaster protection serviceman caused by the implementation of duties in accordance with the regulations.

33.7 The pension and benefits paying to the disaster protection serviceman or his/her family in case of harming the health or loss of life whilst discharging their duties shall be regulated by the law.

Article 34. The Pension and Benefits of the Disaster Protection Serviceman

34.1 The pensions and benefits of the disaster protection servicemen shall be regulated in accordance with the law.

34.2 The benefits shall be paid to the citizen or to his/her family the same as to disaster protection serviceman in case of temporary or permanent disability or loss of life during the participation in the activities for disaster prevention, rescue, response and recovery and training.

CHAPTER 7

Miscellaneous

Article 35. Financing of Disaster Protection Activity

35.1. Centralized disaster protection activities carried out at state level shall be financed from the State budget; disaster protection activities of the aimag, capital city, soum, district, bag, and khoroo from local budget. Entities and enterprises shall be liable for expenses by own fund.

35.2. The Government shall be responsible for expenses related to the organization of disaster prevention, rescue, response and recovery activities at the disaster site for state owned entities and enterprises; other entities and enterprises shall be responsible for expenses related to disaster by their own fund.

35.3. The regular salary shall be paid to employees for their work in the disaster site and the benefits equal to the minimum salary of the employment to the other citizens.

Article 36. Penalties for Breach of Disaster Protection Legislation

36.1 Elements breached disaster protection legislation shall be liable to the following administrative penalties, if the breach does not constitute a criminal offence:

36.1.1 Entities and enterprises breaching the Articles 7.3.2-7.3.6 of this law shall be imposed fines of up to 150000-250000 tugrugs and officials up to 40000-60000 tugrugs;

36.1.2 Entities and enterprises breaching the Articles 11.3 and 11.4 of this law shall be imposed fines of up to 150000-250000 tugrugs, officials up to 30000- 60000 tugrugs and individuals up to 5000-25000;

36.1.3 Entities and enterprises breaching the articles 18, 26, 27, 28 of this law shall be imposed fines of up to 100000-250000 tugrugs, officials up to 30000- 60000 tugrugs and individuals up to 10000-25000 tugrugs.

36.2 The officials guilty of causing damage to health and life of people, property, livestock, animal and environment during the disaster response activity shall be liable according to the legislation.

The administrative penalties referred in the point 1 of this article shall be imposed by the authorized officials.

**ANNEX C: ORDINANCE OF EXECUTIVE DIRECTOR OF POWER PLANT NO.4
(13 JANUARY 2006)**

ANNEX C: ORDINANCE OF EXECUTIVE DIRECTOR OF POWER PLANT NO.4 (13 JANUARY 2006)

**Establishment of a part time headquarters and a professional unit
in charge of disaster protection**

Date: January 13, 2006

Ref. no: 04

Subject: Establishment of a part time headquarters and a professional unit in charge of disaster protection

With the view of paragraph 27 of the Law of Mongolia on Disaster Protection, it is ORDERED:

One. Re-establish the part-time Headquarters for Disaster Protection (HDP) with tasks to prevent disasters, rescue, eliminate consequences of disasters and carry out restoration activities by assigning the following employees:

1. Deputy Director and General Engineer as a Chief of HDP,
2. Deputy Director as a Deputy Chief of HDP,
3. Deputy General Engineer as an Assistant in charge of disaster protection,
4. Head of Operations as an Assistant in charge of communication, announcement and gathering,
5. Head of Administration as an Assistant in charge of training and professional unit,
6. Head of Supply Unit as an Assistant in charge of supplies,
7. Head of Engineering Unit as a Head of Emergency Management Room, and
8. Fire Inspector as an Assistant in charge of fire projection and prevention.

Two. Oblige staff of the headquarters participate effectively in respective activities of the headquarters complying with requirements of the ordinance no. 46 of Chief of the General Emergency Authority issued in 2004.

Three. Endorse the organizational structure of the HDP as Annex A, action plans of HDP for 2006-2007 as Annex B and structure of a professional unit for general purposes as Annex C.

Four. Delegate the following to D. Battsend, Chief of HDP and A. Amgalan, Deputy Chief of HDP:

- Organize trainings for members of a professional unit, and practice duties of the professional unit,
- Build capability of acting in emergency situations using non-verbal communication forms, and
- Redevelop schemes of gathering of headquarters staff and professional unit, furnish watchmen and duty officers with the schemes providing necessary instructions to them,

Five. Delegate a Head of Administration to monitor implementation of this ordinance.

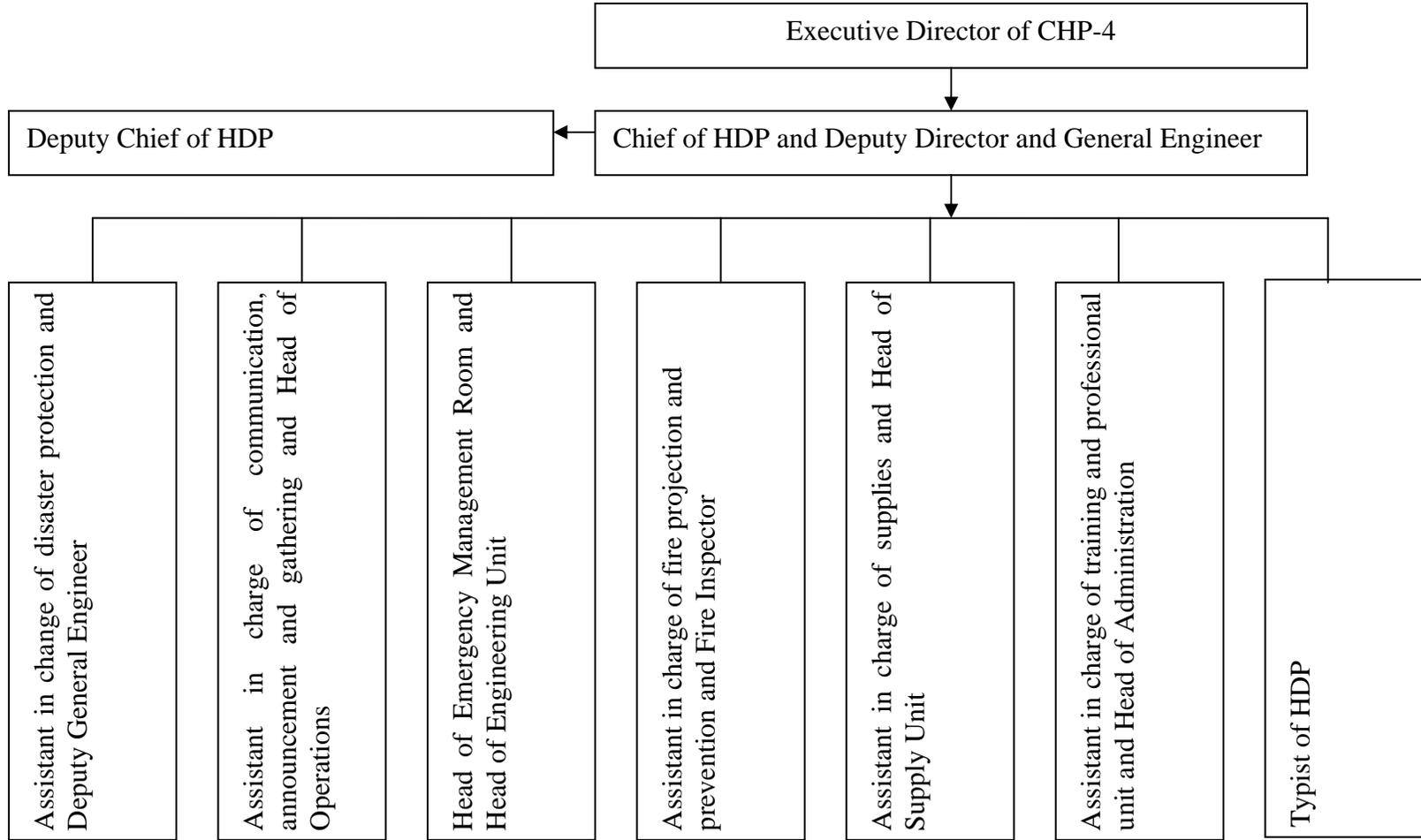
Six. Annul the ordinance no. 70 of the Executive Director of 2002 due to issuance of the current ordinance.

Signed by:

Ts. Bayarbaatar, Executive Director

**ANNEX D: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR,
ORGANIZATIONAL STRUCTURE OF THE PART TIME HEADQUARTERS FOR
DISASTER PROTECTION**

ANNEX D: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR, ORGANIZATIONAL STRUCTURE OF THE PART TIME HEADQUARTERS FOR DISASTER PROTECTION



**ANNEX E: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR,
ACTION PLAN OF HDP FOR 2006-2007**

ANNEX E: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR, ACTION PLAN OF HDP FOR 2006-2007

No	Actions	Timeframe	Responsible unit or employee
1	Train members of the professional unit and consolidate results of the training by group teams	2Q 2006, 2Q 2007	D. Bataa, Assistant in charge of training and professional unit
2	Review and improve schemes of gathering of staff of headquarters and professional unit, furnish watchmen and duty officers with the schemes providing necessary instructions to them	Jun and Oct of every year	D. Purevsuren, Assistant in charge of disaster protection
3	Introduce members of HDP and professional unit to heads of departments and units	Feb 2006	D. Battsend, Chief of HDP
4	Provide information on equipment for disaster protection, sustain the readiness of machineries, hospital and communication devices and carry out physical counting of those equipment	Mar of every year	A. Amgalan, Deputy Chief of HDP, J. Osgonbaatar, Assistant in charge of supplies
5	Carry out an exercise of HDP	Jun of every year	Ts. Bayarbaatar, Executive Director, D. Battsend, Chief of HDP
6	Introduce the Mongolian Law on Disaster Protection	Mar 2006	D. Gan-Erdene
7	Train the company management and HDP	May of every year	Ts. Bayarbaatar, Executive Director, D. Battsend, Chief of HDP
8	Assign certain budgets required for disaster protection and eliminating consequences of disasters in compliance with the Mongolian Law on Disaster Protection and create reserves of equipment, instruments, spare parts and machinery and other reserves	Jun and Dec of every year	A. Amgalan, Deputy Chief of HDP, Ts.Tserendorj, Head of Planning Unit
9	Sustain sterilization substances, medicine and medical equipment's supply	Always	A. Amgalan, Deputy Chief of HDP, S. Udval, Senior Physician
10	Carry out an exercise of HDP aimed at sustaining operation of the plant under emergency situations and assess the results	Jun Jul, 2006	Ts. Bayarbaatar, Executive Director
11	Carry out disaster vulnerability risk assessment	Nov 2006	A. Amgalan, Deputy Chief of HDP,
12	Organize sterilization of passes for employees and transport means in case of severe contagious diseases; inform respective authorities in order to prevent spread and collaborate with them	In due time	S. Udval, Senior Physician
13	Announce emergency situations to employees	In due time	D. Battsend, Chief of

	and turn on respective signals in case of earth quake, flood and fire; evacuate them from premises of the plant to safer areas; distance combustible and explosive substances from premises and protect them; identify and inform respective authorities about equipment damaged by flood, fire, wreckage; appoint emergency management team to work at the disaster site; and provide the professional unit with guidance.		HDP A. Amgalan, Deputy Chief of HDP,
14	Report respective authorities in case of losing toxic substances, inform employees about the substances and ways of identification and prevention harms to them, protect containers and warehouses, where the substances were kept	In due time	Enkhbold, Head of Chemical Unit
15	In case of large scale accidents that stopped operation of the plant, shift engineers shall act in accordance with emergency procedure and HDP shall carry out the following activities: <ol style="list-style-type: none"> 1. prevent more and severe accidents, 2. eliminate adverse impacts on humans and equipment, 3. restore quality (frequency, voltage level, pressure and temperature indices) of electricity and heat supply, and 4. identify equipment being disconnected as a result of accidents and possibilities of reconnecting them, promptly organize repair of damaged but most needed equipment 	In due time	Ya. Monkhjargal, Head of Operation

**ANNEX F: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR,
STRUCTURE OF A PROFESSIONAL UNIT FOR GENERAL PURPOSES**

**ANNEX F: TO THE ORDINANCE NO.4 OF THE EXECUTIVE DIRECTOR,
STRUCTURE OF A PROFESSIONAL UNIT FOR GENERAL PURPOSES**

