USE OF MOBILE INFRASTRUCTURE IN DISASTER RECOVERY

1 Introduction

More Than 3 Million People Were Killed In Natural Disasters Worldwide During The 20-Year Period 1974-1994. Those Disasters Brought Injury, Homelessness And Misery To 1 Billion Others And Caused Many Billions Of Dollars Of Property Damage. In 1991 And 1992 Alone, Property Damage Amounted To 100 Billion United States Dollars. A Single Event, Hurricane Andrew, Caused US$ 25 Billion Of Damage In The Southern Part Of The United States Of America In 1992. On Average Each Year, Natural Disasters Around The World Leave 4 Million People Homeless, Injure Another 900,000 People And Kill 128,000 People.

Highlighting The Role Of Telecommunications For Humanitarian Assistance, United Nations Secretary General, Kofi Annan Said:

Humanitarian Work Is One Of The Most Important, But Also One Of The Most Difficult Tasks Of The United Nations. Human Suffering Cannot Be Measured In Figures, And Its Dimensions Often Surpass Our Imagination, Even At A Time When News About Natural And Other Disasters Reaches Every Corner Of The Globe In Next To Real Time. An Appropriate Response Depends Upon The Timely Availability Of Accurate Data From The Often Remote And Inaccessible Sites Of Crises. From The Mobilization Of Assistance To The Logistics Chain, Which Will Carry Assistance To the Intended Beneficiaries, Reliable Telecommunication Links Are Indispensable.

2 How Telecommunications Fails During Disasters

During Disasters, Telecommunications Infrastructure Failures Occur Through A Variety Of Mechanisms. Investigation Of Communications Failures During Large Urban Disasters In The Past Fifteen Years Reveals Three Primary Categories Of Causes:

- Physical Destruction of Network Components
- Disruption In Supporting Network Infrastructure
- Network Congestion

This Section Of The Report Analyzes Each Of These Three Causes Of Network Failure, Using Historical Examples From Major Urban Disasters During The 1990s And 2000s.

3 Physical Destruction of Network Infrastructure

The Most Common and Well-Documented Cause Of Telecommunications Failures In Recent Disasters Has Been The Physical Destruction Of Network Infrastructure. Because Of The Time And Funding Needed To Repair Or Replace Systems, Service Disruptions Caused By Physical Destruction Also Tend To Be More Severe And Last Longer Than Those Caused By Disconnection Or Congestion. As "The Most Complicated Machine Ever Constructed By Human Beings," Historically The Telephone System Has Been Highly Vulnerable To Physical Destruction During Disaster. Earthquakes And Severe Weather Can Sever Cables And Flood Reground Equipment. During Wars, These Systems Are Usually The First Sites To Be Targeted. The Destruction Of Telecommunications Networks As A Battlefield Tactic Dates Back To The First Use Of The Telegraph In The U.S. Civil War. The Fragility Of Telecommunications Networks Is Due To The Fact That Historically, These Systems Have Not Had A High Degree Of Redundancy. The Telephone Network, For Example, Utilizes A Branching Structure In Which Destruction Of A Single Network Segment Can Disconnect Entire Neighborhoods Instantaneously. Cities Rarely Escape Even Highly Localized Disasters Without At Least Some Physical Damage To The Telephone Network. The September 11 Attacks Caused Collateral Damage To An Important Telephone Routing Hub Near The World Trade Center, Disconnecting Large Portions Of Lower Manhattan From The Telephone Network. High Winds In Hurricanes And Tornadoes, Icing In Snowstorms, And Motion From Seismic Events All Wreak Havoc On Fragile Overhead Telephone Lines. Underground Fires Crippled Internet Communications On The East Coast After The 2001 Rail Tunnel Fire In Baltimore[9], And Severely Disrupted Signaling In The New York City Subway System

4 Supporting Infrastructure Disruption

While less Common than outages caused By physical Damage, Outages Caused By Disruption In Supporting Infrastructure Tend To Be Far More Widespread And Damaging To Response And Recovery Efforts.

Telecommunications Networks Rely Upon Many Other Local And Regional Technical Systems To Ensure Their Proper Operation. These Supporting Infrastructures Often Date From An Earlier Era And Lack Resiliency To Physical Damage. Electrical Distribution Systems Are By Far The Most Important Supporting Infrastructure For Telecommunications Networks. Electrical Power Is Required To Operate All Modern Telecommunications Equipment, Often In Large Amounts. Yet Electric Power Distribution Systems Lack The "Self-Healing" Capabilities Of Telecommunications Networks, Although Future Improvements Are Expected To Give Power Networks Greater Capabilities In This Area. In The 1989 Loma Prieta Earthquake, 154 Of 160 Central Offices In Northern California Lost Power. Even Worse, Back-Up Power Systems At 6 Of Those 154 Failed. During The 2003 Blackout In The Northeastern United States, Cellular Services Were Severely Disrupted Because Most Antenna Sites Were Only Provisioned With Four To Six Hours Of Emergency Battery Power.
While Electrical Power Systems Remain The Most Important Supporting Infrastructure For Telecommunications Facilities, Cooling Systems Are Critical And Can Fail Independently Of Power Supply. For Example, In The Aftermath Of Northridge, "Interruption Of City Water Service Caused Some Disruption To Central Office Cooling Functions." Finally, Failures In Transportation Disruptions Can Also Impact The Supply Of Fuel For Electric Power Generation. After September 11, A Key Hub For Transatlantic Telecommunications - The Telehouse At 25 Broadway - Which Had Already Lost Its Main Power Supply, Was Knocked Offline Due To Failures In Its Backup Generators Caused By Tainted Diesel Fuel.

During The 2003 Blackout, The State Of Michigan Scrambled To Locate Additional Fuel Supplies For Telephone Central Office Backup Generators In Anticipation Of An Extended Loss Of Power. Finally, The Widespread Power Failures Following The 2004 Tsunami Crippled Communications Throughout The Devastated Areas. Ironically, One Of The Oldest Technologies For Telecommunications - Amateur Radio -Remains The Only Communications Infrastructure That Has Repeatedly Demonstrated Its Ability To Operate Effectively When Electrical Power Supplies Fail. Following Major Disasters, Amateur Radio Teams Working In Conjunction With Governments And The International Red Cross Are Rapidly Deployed To Restore Critical Basic Communications

5 Network Congestion

The Final Major Cause Of Telecommunications Failures During Disasters Is Network Congestion Or Overload. Crises Generate Intense Human Need For Communication – To Coordinate Response Activities, To Convey News And Information About Affected Groups And Individuals, And As A Panic Reaction To Crisis. Historically, Major Disasters Are The Most Intense Generators Of Telecommunications Traffic, And The Resulting Surge Of Demand Can Clog Even The Most Well-Managed Networks. Under This Strain, Calls Are Blocked And Messages Are Lost.

The Worst Case Of Modern Network Congestion Occurred In The Aftermath The 1994 Northridge Earthquake. Early Morning Wire Reports In The Immediate Aftermath Stated That “Los Angeles Apparently Is Cut Off From Rest Of World As Massive Equipment Failures And Overloaded Lines Make It Nearly Impossible To Reach Area By Phone Following Massive Earthquake”. Some 204.7 Million Phone Calls Were Connected Nationwide That Day By AT&T, Making January 17, 1994 The Single Largest Telecommunications Event In Human History.

Companies Such As AT&T Dramatically Improved Their Disaster Management Performance In Light Of The Northridge Experience. By Prioritizing The Use Of Circuits For Outbound Calls, Long-Distance Carriers Were Able To Provide Residents Of Affected Areas With The Ability To Notify Loved Ones Of Their Whereabouts And Status. This Information Could Then Be Distributed Among Concerned Parties In Other Parts Of The Country Without Creating Additional Congestion Through Inbound Calls To The Affected Region. New Programs Such As The Government Emergency Telecommunications Service “Provides Emergency Access And Priority Processing In The Local And Long Distance Segments” Of The Telephone Network During Disasters. These Preparations Greatly Smoothed Congestion Bottlenecks In The Landline Network When The Northridge Call Volumes Were Smashed On September 11, 2001.

6 Telecommunications Infrastructure in Disaster Recovery

The First Part Of This Report Described Three Types Of Telecommunications Infrastructure Failures During Disasters. This Section Highlights The Consequences Of These Failures By Analyzing The Role Of Telecommunications Networks In Four Phases Of Disaster Recovery. This Chronology Of Disaster Recovery Is Based On A System Proposed In The 1970s By The NSF-Funded Research Effort On “Reconstruction Following Disaster”

This “Model Of Recovery Activity” Is Organized Into Three Phases Common Across Disasters In Different Regions And Historical Settings:

1. Emergency Responses
2. Restoration and Repair
3. Reconstruction Of The Destroyed For Functional Replacement infrastructure In Supporting Recovery Efforts, Potential Failures Of Telecommunications Networks, And How Communications Patterns And Needs Change During Transition To The Next Phase

7 TELECOMMUNICATIONS DURING EMERGENCY RESPONSE

Once A Disaster Has Begun, Emergency Response Activities Commence Almost Immediately Through The Efforts Of Bystanders. This Period Is Characterized By "Coping Actions" Stemming From Death, Destruction, And Evacuation. "The Emergency Period May Be Very Short In Societies With A Great Capacity To Cope... Lasting Only Days Or A Few Weeks, Or It May Drag On For Much Longer Periods Of Time In Societies With A Limited Coping Capacity.

8 The Role of Civil Telecommunications Infrastructure

The Most Important Telecommunications Networks During An Emergency Are Official Public Safety Systems. These Networks Provide Skilled Emergency Responders With The Capacity To Gather Casualty And Damage Assessment Information And Coordinate Their Life-Saving And Containment Activities To The Highest Degree Possible. While Prone To Failure In Extreme Circumstances, Public Safety Networks Are Engineered To Provide Basic Voice Communications To Support Intra-Organizational Communications During Disasters

Because Of The Pace Of Innovation And Investment That Has Occurred Since The Mid-1990s, Increasingly The Capabilities Of Public Telecommunications Networks Match Or Exceed That Of Government-Administered Emergency Communications Systems. In Many Cases, Such As Inter-Agency Emergency Communications, Civil Networks Are The Only Readily Available Channels. Particularly In Very Large Disasters That Involve Official Response From Multiple Government Agencies And Multiple Jurisdictions, The Public Switched Telephone Network - Both Wired And Wireless - Has Become A Primary Medium For Emergency Communications. This Is Because The Wide Variety Of Radio Equipment Used By Various Public Safety Organizations Is Frequently Incompatible, Preventing Communications Between Responders From Neighboring Jurisdictions. Civil Networks Also Often Provide Greater Capability For Data Communications Than Their Public Safety Counterparts. Mobile Data Communications With Emergency And Law Enforcement Vehicles, For Instance, Is Often Provided Over High-Frequency Bands. New Uses For telecommunications Infrastructure Often Emerge in the Heated Moments of the Emergency Response Phase. This Is Particularly True In Recent Disasters, As Rapid Innovation In Infrastructure Has Created New, Untested Communications Capabilities. The Pressure And Urgency Of These Events Has Produced Ad Hoc Implementations Of New Emergency Communications Schemes. For Example, During September 11, Personal Messaging Devices Such As The RIM Blackberry Were Widely Used To Transmit Messages From Inside The World Trade Center. An Information Technology Executive At Lehman Brothers, A Major Investment Bank, Even Activated His Company's Disaster Recovery Plan by Text Message While Descending the Stairwell of the North Tower.

9 The Consequences of Failure

The Emergency Phase Occurs When The Integrity Of Communications Is At The Greatest Risk. Physical Damage Is Difficult To Accurately Assess And Repair, Electrical Power Is Likely To Be Disrupted, And Congestion Overwhelms Systems Optimized For More Predictable Usage Patterns. With Lives At Risk, It Is Also The Phase Where The Consequences Of Failure Are The Greatest. We Can Identify Three Main Consequences Of Telecommunications Breakdowns In Disaster: Paralyzing Official Responses, Challenging Containment, And Delaying Mobilization Of Broader Relief Efforts. In The Earliest Phases Of Disaster The Focus Of Official Response Is On Preventing Loss Of Life And, If Possible, Damage To Property.

In These Urgent Moments, Any Communications Failure Has The Potential To Paralyze These Efforts, And This Scenario Has Been Repeated In Disaster After Disaster.
Congestion Is Perhaps The Most Difficult Threat To Official Responders, Because Its Transient Nature Defies Diagnosis. As One Analysis Argued, "The Earthquakes Of Kobe, Mexico City (1985), San Francisco (1989), And Los Angeles (1994) [Indicate That] Telephone Networks Are Not So Much Destroyed As Congested Into Uselessness." Insufficient Capacity In The New York City Fire Departments Radio Network Led To A Breakdown Of Communications At The World Trade Center Site During The First Attack In 1993. In The 2001 Terror Attacks, The Radio System Used By The New York City Emergency Medical Service Was Severely Degraded By Congestion Caused By Panicked Operators Making Unnecessary Transmissions.

10 Transitioning To Restoration and Repair

The Emergency Response Phase Ends With The Termination Of Search-And-Rescue Operations And The Clearance Of Debris From Major Streets. As A Civil Defense Manual On Restoring Transportation Stated In 1954, Communications Plays A Critical Role: Advance Planning Should Prepare The Restoration Group To Function With Minimum Supervision From The Main Control Center. This Is specially Important When There Is The Possibility Of A Breakdown In Communications... Each Operating Base Should Have Telephone And Two-Way Radio Communications With The Chief Of The Roads And Bridges Branch At The Main Control Center... The Chief Of Engineering Services Should Work With Local Telephone Companies To Insure That In Time Of Emergency These Companies Can Provide Essential Communications. In A Major Disaster, Many Telephone Communications Facilities Would Probably Be Destroyed; Therefore, Radio Communications Should Also Be Made Available. While The Critical Work Of Debris Clearance And Restoration Of Streets For Basic Access Can Be Conducted Using Messengers And Face To Face Instruction, Telecommunications Allows Greater Control, More Accurate Status Reporting, And Better Integration With Other Efforts. For Telecommunications Infrastructure Itself, The Transition To The Next Phase, Restoration, Generally Occurs Quite Quickly. The Temporary Loss Of Performance Caused By Congestion Generally Subsides As Order Is Restored, And Demands For Communications Are Reduced. Telecommunications Providers Also Have Become Highly Agile In Responding To Physical Destruction. After A Major Switching Facility Was Destroyed In The World Trade Center On September 11, AT&T's Response Was So Rapid That Many Of Its Vehicles Were Detained At Entry Points To Manhattan - The Firm Was Ready But Public Officials Were Not. Finally, Many Newer Telecommunications Networks Are Designed To Be "Self-Healing", And Can Begin Restoring Themselves Almost Immediately After Links Are Broken.

11 Telecommunications During Restoration and Repair

The Second Phase Of Disaster Recovery "Is Characterized By The Patching Up Of The Utility, Commercial And Industrial Structures" That Can Be Repaired And The Resumption Of Normal Social And Economic Activities. This Restoration Phase Begins When Search And Rescue Operations Have Been Concluded, And Basic Transportation And Communications Capabilities Have Been Re-Established.
In Recent Disasters, Especially In Developed Nations That Have High Rates Of Personal Ownership Of Computers And Mobile Phones, Telecommunications Has Been A Powerful Tool In Helping Rapidly Resume Normal Social And Economic Activities. While "Tele-Working" Or "Telecommuting" Received Considerable Attention From Pundits And Futurists In The 1980s As A Means Of Reducing Congestion And Commute Times, It Was The Two California Earthquakes (1989, 1994) That That First Provided The Impetus For Large-Scale Implementation.

Because Of Extensive Damage To Regional Freeway Networks, Many Firms Quickly Established Telecommuting Centers That Helped Workers Return To Work While Many More Worked From Home Using Personal Computers And Modems. While Widely Believed To Be A Temporary Measure, Approximately Eight Months After The Northridge Earthquake Reports Indicated That 9 Out Of 10 Post Disaster Telecommuters In The Los Angeles Area Were Continuing To Do. Telecommuting By Displaced Workers From Lower Manhattan, Such As The 334 Employees Of The Securities And Exchange Commission In Lower Manhattan, Were Also Largely Temporary. However, Many Private Firms Began To Rely On Telecommuting After September 11 And This Practice Has Continued Long After The Event.

Mobile Phones Have Become Increasingly Important In Post-Disaster Resumption Of Normal Life. Used In Peacetime To Organize Complex Daily Activity Patterns Across Sprawling Cities, Mobile Phones Provided A Flexibility And Feeling Of Security And Connectedness Vital To Survival In Unpredictable Post-Disaster Urban Landscapes. “After The 1989 Loma Prieta Earthquake, Cellular One Experienced An Immediate 20 Percent Jump In Minutes Of Air Time Used In The Greater Bay Area. The Higher Usage Never Decreased, Apparently Because So Many People Purchased Cellular Phones To Bolster Communications After The Quake. Mccaw Cellular Communications Said Sales Of Cellular Phones In Its Bay Area Territory Jumped 43 Percent Over Projected Growth In November 1989, The Month After The Loma Prieta Quake.

12 Transitioning To Reconstruction

The Return Of Refugees, Complete Clearance Of Debris, And The Functioning Of Major Urban Services And Utilities Such As Transportation Mark The End Of The Restoration Phase. This Phase Is Generally Concluded Within Several Months. For Example, The Massive Operation To Clear Debris From The World Trade Center Collapse Was Completed In Approximately 9 Months, Well Ahead Of The Schedule Initially Anticipated.

13 TELECOMMUNICATIONS DURING RECONSTRUCTION

The Reconstruction Phase Is Characterized By A Return Of Population, Capital Stocks And Economic Activity To Its Pre-Disaster Levels Or Greater, Which Generally Occurs Within A Few Years. The Replacement Of Telecommunications Infrastructure Is A High Priority During This Phase, And Contributes Significantly To Supporting Other Reconstruction Efforts. The Reconstructions Of Landline Telecommunications Networks Can Be A Time-Consuming And Expensive Process. For Example, The Telephone Company Verizon Projected The Cost Of Rebuilding Its Infrastructure In And Around Its 140 West Street Hub At Between $1.1 And 1.4 Billion. However, In Recent Disasters, Wireless Technology Is Providing More Rapid And Flexible Options For Reconstructing Telecommunications Networks. The Post-War Reconstruction Of Iraq’s Devastated Telecommunications Infrastructure Highlights The Way In Which Wireless Technologies Are Being Used To Shorten The Time Needed For Replacement, As Well As To Provide Flexible Tools Supporting A Return To Pre-Disaster Levels Of Social And Economic Activity. One Of The First Major Set Of Reconstruction Contracts Issued By The Occupation Authorities Were For Mobile Cellular Telephone Services. “The Speed With Which Mobile Networks Can Be Established Compared To Landlines Makes These Wireless Contracts Far More Valuable In Developing States And Post-Conflict Situations.” Similarly, In Kosovo, Following The Ethnic Conflict And NATO Intervention, A GSM Mobile Cellular Network Was Deployed In The Capital City Of Pristina To “Provide Essential Communications Pending Full Reinstatement Of The Fixed Network.

14 Disaster Mitigation via Telecommunications

A Sudden And Towering Tsunami Inundated A Coastal Country, Resulting In Huge Casualties And Loss Of Shelters. Communications With The Rest Of The World Were Totally Severed. Within Hours, International Search And Rescue Teams Rushed To The Capital, As Requested By The National Government. The Team Leaders Were Stunned Beyond Belief When Warned By The Custom Officials That Hefty Import Duties Must Be Paid For Their Telecommunication Equipment, While Their Telecom Operators Must Obtain Operating Licenses Before Commencing Sorely Needed Telecommunication With The Outside World. Consequently, Precious Time Vital For Saving Human Lives Was Wasted In The Ensuing Bureaucratic Haggling.

Scenarios Such As That Described Above Are Encountered Time And Again By Various Humanitarian Relief Agencies, Both Public And Private, Around The World. This Is Most Unfortunate In View Of The Fact That Modern Telecommunication Equipment Has Roved Itself Indispensable In Humanitarian Relief And Disaster Mitigation. In Fact, Mobile And Satellite Technology Has Found Usage In A Wide Variety Of Humanitarian-Related Fields, Ranging From Remote Sensing For Disaster Mapping To Global Positioning System (GPS) For Exact Positioning Of Relief Operations To Real-Time Voice And Text Relays Between Headquarters And Fields.

15 How Telecommunication Helps in Disaster Management Lifecycle

The Disaster Management Lifecycle Has 4 Phases: **Preparedness, Mitigation, Relief And Recovery**.

The Availability And Use Of Adequate Telecommunication Resources Are Indispensable Tools For Humanitarian Relief And Disaster Mitigation. Public And Private Humanitarian Relief Agencies Are Often Stunned To Learn That **Hefty Import Duties Must Be Paid For Their Telecommunications Equipment**, That They Have Serious Problems To Import And Operate Telecommunication Equipment And That **Operators Must Obtain Operating Licenses** Before Communicating Within The Area Of Disaster Relief Operations And With The Outside Word. The Tampere Convention Is A Targeted Effort To Facilitate The Provision Of Timely And Effective Telecommunication Resources And Of Rapid, Efficient Information Flows For Disaster Prevention And Response.

In Another Interesting Development, A Petition Has Been Put Forth In The USA To Deal With Emergency Communication Issues As Faced By Victims Of Katrina Hurricane.

The Petition Asks That Carriers Should Be Required To Set Up Alternative Communications Service For Customers Affected By Disaster-Related Outages. Carriers Would Be Given A Choice:

- They Could **Activate A Voice Mail Service** That Could Be Accessed By Incoming Callers Dialing The Customer's Phone Number. This Would Enable Customers Who Don't Have Any Outgoing Phone Service To Receive Incoming Calls Or Record An Outgoing Voicemail Message Providing Information About Their Status And Location.

- Or, The Carriers Could Provide **Expedited Local Number Portability** To Customers Whose Service Has Been Knocked Out. This Would Enable Customers To Quickly Port Their Phone Numbers To Alternative Providers (Including IP-Based Providers And Providers Outside The Affected Area) And Thereby Reestablish Communications Links With Their Families And Friends.

16 Disaster Threats in Egypt (Role of Mobinil During Disasters)

February 17, 2006, The World Health Organization Officially Declared Presence Of The H5N1 Strain Of The Avian Flu Virus In Egypt. Prior To This News, Risk Management Department In Mobinil Has Called For A Working Group Which Includes Selected Managers From Specific Departments To Take The Necessary Needed Actions To Deal Properly With This Severe Risk. The Following Actions Were Taken:

- Detailed Emergency Plan (Based On WHO Phases) Has Been Created By The Working Group And Approved From The Company Executive Committee With Required Action Points For Each Phase.
- Cooperation With Authorities (Ministry Of Health) Through Dedicating An Emergency Line Free Of Charge To Enable Customers To Know All Related Information Regarding Avian Flu Through Calling This Number.

17 Case Studies

As A Case In Example, After The Earthquake In Pakistan Inmarsat-Sponsored Télécoms Sans Frontières(TSF) Responded Immediately To The Disaster. TSF Created Emergency Mobile Satellite Telecoms Centres - Using Inmarsat Equipment - For Rescue Teams, Local Authorities And Other Emergency Relief Efforts. After The Quake Cellular Mobile Operators In Pakistan Were Also Allowed To Offer Their Services In Kashmir. Even So, According To ITU, Rescue And Relief Operations In Pakistan Were Drastically Hampered Because Telecommunication Infrastructure Was Severely Damaged And Distribution Networks Almost Perished

In Response To The Tsunami That Hit Asia On Boxing Day 2004, Telecom Waived Call Charges To Affected Areas To Make It Easier For New Zealanders To Contact Their Loved Ones In The Region. Working With The Red Cross, Caritas, UNICEF, World Vision And Other Aid Agencies, Telecom Also Waived Charges To All Donations Made Via 0800 And 0900 Aid Organisation Numbers To Ensure That All The Money Donated Went Directly To Relief Efforts.
In Addition, Telecom Provided Direct Assistance To The Immediate Families Of New Zealanders Who Had Been Affected By The Tsunami Or Had Loved Ones Unaccounted For.
Telecom's Total Contribution Was NZ $1.25 Million, Including Contributions From Australian Subsidiary AAPT.

New Zealand Has Had Severe Flooding Incidents In Recent Years (Lower North Island In February 2004, Central North Island In July 2004 And The Bay Of Plenty In May 2005). In All These Disasters Telecom Has Provided Support To Those Communities, Making Resources And Expertise Available To Civil Defence Teams On The Ground And Working 24/7 To Restore Communications To Homes And Businesses, Often In Challenging Conditions.
Telecom Has Provided Mobile Phones To Local Relief Units Including Civil Defence And The Federated Farmers, Made Significant Donations To Mayoral Relief Funds For Rebuilding Efforts And Offered Flood-Affected Customers A Wide Range Of Assistance. This Included Calling Cards, A Free Diversion Service for Those Who Had to Evacuate Their Homes and Waiving One Month's Line Rental For Those Customers Who's Phone Lines Were Down.

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