

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Amendment of Parts 2.106, 25.143,)
and 25.202 of the Commission's Rules)
to Require Operation of LEO MSS)
Systems Using TDMA/FDMA Techniques)
in the 1615.5-1626.5 MHz)
Frequency Bands)

RM No. _____

To: The Commission

PETITION FOR RULEMAKING

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July 26, 2002

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TABLE OF CONTENTS

SUMMARY..... i

I. BACKGROUND2

II. THE NEW TDMA/FDMA – CDMA SPECTRUM BALANCE.....4

III. NEW DEMAND FOR IRIDIUM SERVICES7

 A. A Grant of This Petition Would Allow Iridium to Meet Growing Demand
 for Service to Both Rural and Urban Areas Within the United States.7

 B. A Grant of This Petition Would Allow Iridium to Expand Its “Instant
 Infrastructure” Services9

 C. A Grant of This Petition Would Allow Iridium to Expand Its Provision
 Critical Services to the U.S. Military in Regions of Conflict11

IV. CONCLUSION12

SUMMARY

Iridium requests that the Commission expeditiously amend Sections 2.106, 25.143, and 25.202 of its rules to require entities operating Big LEO systems in the 1615.5-1626.5 MHz frequency band to employ TDMA/FDMA techniques rather than CDMA techniques.

Adopting these changes would be consistent with the Commission's original plans for the Big LEO spectrum. When the Commission first contemplated the authorization of Big LEO systems in the 1.6/2.4 GHz band, it proposed that certain frequencies authorized for use by CDMA operators would be reallocated to TDMA/FDMA operators in the event that none or only one of the CDMA systems actually deployed. Ultimately, the Commission declined to adopt a specific reallocation scheme, due to a variety of concerns. Seven years later, only one CDMA system has entered service and the concerns that previously led the Commission to decline to adopt an "automatic" redistribution of the 1.6 GHz band have been rendered moot by the passage of time. Thus, the redistribution of a significant portion of the Big LEO spectrum from CDMA operators to TDMA/FDMA operators is in order.

Expedited grant of this Petition would permit Iridium to meet the current and increasing demand for existing and new communications services in both the United States and abroad, including voice and data services to rural areas and secure, real-time communications services to the U.S. military in remote areas of conflict.

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PETITION FOR RULEMAKING

Iridium Constellation LLC ("Iridium") hereby submits a petition for rulemaking ("Petition"), pursuant to Section 1.401 of the Commission's Rules,¹ requesting an amendment to Sections 2.106, 25.143, and 25.202 of the Rules to require low-earth orbit ("LEO") Mobile Satellite Systems ("MSS") operating in the 1615.5-1626.5 MHz frequency band to employ time division/frequency division multiple access ("TDMA/FDMA") techniques rather than code division multiple access ("CDMA") techniques.² Iridium also requests that the Commission initiate proceedings to grant the relief requested herein on an expedited basis.

This redistribution of spectrum between TDMA/FDMA and CDMA-based MSS systems operating in the 1.6 MHz portion of the "Big LEO" band will enable Iridium to meet the growing demand for its services, particularly the provision of voice and data services to rural

¹ 47 C.F.R. §1.401.

² The Commission's rules do not currently specify whether a Big LEO MSS system must use CDMA or TDMA/FDMA techniques. However, in Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, *Report and Order*, 9 FCC Rcd. 5936 (1994) ("Big LEO Order"), the Commission specified the frequency bands available to CDMA and TDMA/FDMA systems, indicated that each system's operating authority would be subject to these specifications, and contemplated that a future rulemaking would be necessary to effect any changes. *Id.* at 5954-5960.

areas (both in the United States and abroad) and mission-critical services to the U.S. military. Moreover, this redistribution can be accomplished without material harm to any other Big LEO system.

Indeed, as will be discussed more fully below, the Commission previously contemplated a redistribution of spectrum among TDMA/FDMA and CDMA-based Big LEO systems, should several conditions be met. At this point in time, each of those conditions either has been met, or will be met in the near future, and, therefore, the Commission should grant the instant Petition.

I. BACKGROUND

In 1994, the Commission had before it five applicants seeking to provide MSS service in the 1610-1626.5 MHz and 2483.5-2500 MHz frequency bands: TRW, Inc. (“TRW”), Constellation Communications, Inc. (“Constellation”), Mobile Communications Holdings, Inc. (“MCHI”), Loral/Qualcomm Partnership, L.P. (“Globalstar”), and Iridium’s predecessor, Motorola Satellite Communications, Inc. (“Motorola”). The Commission proposed to assign 11.35 MHz of shared bandwidth at 1610-1621.35 MHz to the four CDMA systems for their uplinks, reasoning that “11.5 MHz is sufficient to accommodate up to four operational CDMA systems.”³ For downlink purposes, the four CDMA systems were to be assigned another shared 16.5 MHz in the 2.4 MHz band. By comparison, Motorola’s Iridium system was to be assigned only 5.15 MHz in the 1621.35-1626.5 MHz band, for both uplink and downlink purposes.⁴

It was further proposed in the NPRM that if only one CDMA system ultimately was deployed, the Commission would automatically reduce the 1.6 GHz bandwidth assigned to

³ *Id.*

⁴ See Amendment of the Commission’s Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, *Notice of Proposed Rulemaking*, 9 FCC Rcd. 1094, 1111 (1994) (“NPRM”).

that system from 11.35 MHz to 8.25 MHz,⁵ and then assign the 3.1 MHz of spectrum made available at 1618.25-1621.35 MHz to the FDMA/TDMA system “upon a showing of need.”⁶

After receiving comments from interested parties, the Commission adopted its proposed spectrum-sharing plan with little modification.⁷ However, the Commission declined to make a final determination regarding the proposed reassignment of the 3.1 MHz of spectrum between 1618.25 MHz and 1621.35 MHz, citing concerns regarding possible coordination with the radioastronomy service (“RAS”), the Russian Global Navigation Satellite System (“GLONASS”), and possible foreign-licensed MSS systems.⁸ Instead, the Commission concluded that a decision regarding a redistribution of a portion of the 1.6 GHz band would be made, if necessary, “in the context of a rulemaking, based on the circumstances that have developed at that time.”⁹

In 1995, the five Big LEO applications were granted.¹⁰ Seven years later, only the Iridium and Globalstar systems have entered service. TRW and MCHI no longer hold Big

⁵ *See id.* at 1112.

⁶ *See id.*

⁷ *See* Big LEO Order.

⁸ *See id.* at 5959-60.

⁹ *Id.* at 5960.

¹⁰ *See* Application of Motorola Satellite Communications, Inc. for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band, *Order and Authorization*, 10 FCC Rcd. 2268 (1995); Application of Constellation Communications, Inc. for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band, *Order and Authorization*, 12 FCC Rcd. 9651 (1995); Application of Mobile Communications Holdings, Inc. for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band, *Order and Authorization*, 12 FCC Rcd. 9663 (1995); Application of Loral/Qualcomm Partnership, L.P. for Authority to Construct, Launch, and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band, *Order and Authorization*, 10 FCC Rcd. 2333 (1995); Application of TRW, Inc. for Authority to Construct, Launch, and Operate a Low Earth Orbit

LEO licenses.¹¹ Although the Commission has not yet announced the cancellation of the Constellation license, it appears that little, if any, progress has been made during the past seven years in the construction of that system, as Constellation has twice requested that its construction milestones be postponed.¹² Under these circumstances, it would appear that the “unlikely event” that only one CDMA system will be implemented has, for all practical purposes, become a reality.¹³

II. THE NEW TDMA/FDMA – CDMA SPECTRUM BALANCE

Because the Iridium system has been authorized to operate only within a 5.15 MHz band -- and must operate both its uplinks and downlinks in that narrow band -- it faces significant spectrum constraints. By contrast, Globalstar may utilize more than five times the amount of spectrum currently available to Iridium, and will continue to be, for the foreseeable future, the only MSS system operating in the 1610-1621.35 MHz (uplink) and 2483.5-2500 MHz (downlink) CDMA bands.¹⁴

In an effort to meet current critical customer needs and near-term future demand, it is essential that Iridium be permitted to expand its operations into the 1615.5-1621.35 MHz frequency band. As demonstrated below, this can be done without undue constraint on

Satellite System in the 1616-1626.5 MHz Band, *Order and Authorization*, 10 FCC Rcd. 2263 (1995).

¹¹ See *Public Notice*, Report No. SPB-114, at 3 (rel. January 15, 1998); *Mobile Communications Holdings, Inc., Memorandum Opinion and Order*, 16 FCC Rcd. 11766 (2001), *reconsideration denied* *Mobile Communications Holdings, Inc., Memorandum Opinion and Order*, DA 02-1468, rel. June 24, 2002.

¹² See *Public Notice*, Report No. SAT-00055, 2000 FCC LEXIS 5283 (September 28, 2000); *Public Notice*, Report No. SAT-00085, 2001 FCC LEXIS 4977 (September 19, 2001); see *Letter to Ms. Magalie Roman Salas from Robert A. Mazer*, dated August 29, 2001, File Nos. 17-DSS-P-91 (48), CSS-91-013, 10-SAT-AMEND-95, 159-SAT-AMEND-96.

¹³ NPRM at 1112.

¹⁴ Big LEO Order at 5956.

Globalstar, which would retain access to a total of 22 MHz: 5.5 MHz in the 1.6 GHz band and 16.5 MHz in the 2.4 GHz band, or twice as much as the 11 MHz in the 1.6 GHz band that would be available to Iridium if the relief sought in the instant Petition ultimately is granted. If the 11.5 MHz initially allocated for CDMA system uplinks in the 1.6 GHz band was sufficient to accommodate four CDMA systems,¹⁵ certainly 5.5 MHz is sufficient to accommodate the uplink requirements of a single CDMA system, particularly where its downlink band (2.4 GHz) is well separated from the uplink. A total of 22 MHz should be more than adequate to enable Globalstar to expand its existing satellite services, as well as provide any ancillary terrestrial services that may eventually be authorized by the Commission.¹⁶

Obviously, the instant request for a reallocation of 5.85 MHz exceeds the 3.1 MHz originally contemplated in the NPRM. However, as Iridium demonstrates below, events of the past seven years have overtaken the Commission's original rationale. First, the contingencies that dissuaded the Commission from adopting its original proposal to shift 3.1 MHz of spectrum to the TDMA/FDMA system -- (1) the possibility that GLONASS would not be timely reassigned; (2) the possibility of burdensome sharing issues with RAS; and (3) the potentially negative impact of then-unknown foreign-licensed MSS systems -- have not materialized.¹⁷ GLONASS has not been incorporated into global navigation systems and requires no protection from Big LEO systems.¹⁸ RAS sharing issues have not proven overly burdensome, and no

¹⁵ *Id.* at 1111.

¹⁶ *See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band, Notice of Proposed Rulemaking*, 16 FCC Rcd. 15532 (2001).

¹⁷ *See Big LEO Order* at 5960.

¹⁸ *See Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5/2483.5-2500 MHz Frequency Bands, Memorandum Opinion and Order*, 11 FCC Rcd. 12861, 12865 (1996).

foreign system of the sort hypothesized by the Commission in the Big LEO Order¹⁹ has been deployed.

Second, the Commission's additional prior concern -- that, in the event that many of the Big LEO systems licensed in 1997 did not deploy, some spectrum be available for new MSS systems -- is no longer valid.²⁰ In 1997, subsequent to the Commission's action in the Big LEO Order, the Commission reallocated a portion of the 2 GHz band (1990-2025 MHz for uplink and 2165-2200 MHz for downlink) for new MSS systems,²¹ and in July 2001 it awarded licenses for eight new MSS systems in that band.²² Put simply, there is no reason to believe that spectrum in the Big LEO band still needs to be reserved for potential new MSS entrants. Rather,

¹⁹ See Big LEO Order at 5960.

²⁰ See, e.g., NPRM at 1112.

²¹ See Amendment of Section 2.106 of the Commission's rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, *First Report and Order and Third Notice of Proposed Rule Making*, 12 FCC Rcd. 7388, 7393-95 (1997), *on recon.*, *Memorandum Opinion and Order and Third Notice of Proposed Rule Making and Order*, 13 FCC Rcd. 23949 (1998).

²² See Application of The Boeing Company Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System, *Order and Authorization*, 16 FCC Rcd. 13691; Application of Celsat America, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System, *Order and Authorization*, 16 FCC Rcd. 13712; Application of Constellation Communications Holdings, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System, *Order and Authorization*, 16 FCC Rcd. 13724; Application of Globalstar, L.P. for Authority to Launch and Operate a Mobile-Satellite Service System in the 2 GHz Band, *Order and Authorization*, 16 FCC Rcd. 13739; ICO Services Limited Letter of Intent to Provide Mobile-Satellite Service in the 2 GHz Bands, *Order and Authorization*, 16 FCC Rcd. 13762; Application of Iridium LLC Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System, *Order and Authorization*, 16 FCC Rcd. 13778; Application of Mobile Communications Holdings, Inc. Concerning Use of the 1990-2025/2165-2200 MHz and Associated Frequency Bands for a Mobile-Satellite System, *Order and Authorization*, 16 FCC Rcd. 13794; TMI Communications & Co., L.P. Letter of Intent to Provide Mobile-Satellite Service in the 2 GHz Bands, *Order and Authorization*, 16 FCC Rcd. 13808.

the 1.6 GHz portion of that band should be redistributed more equitably among the only two Big LEO systems that have entered service.

III. NEW DEMAND FOR IRIDIUM SERVICES

The Iridium system originally was conceived as providing “a global roaming complement to terrestrial wireless services.”²³ The primary users of such a system were expected to be business travelers who desired the ability to make and receive calls on a worldwide basis from a single phone.²⁴ Obviously, by the time that the system entered operation, many of the marketplace assumptions that underpinned this strategy had been overtaken by events.

The new Iridium has significantly revamped its business model. Of course, Iridium still provides service to individual users needing communications services where landline or terrestrial wireless service is unavailable. Additionally, however, Iridium is meeting the growing demand for “instant infrastructure” in rural areas -- in both developed and developing nations -- and is providing critical communications services to the U.S. government, including for use by the U.S. military in remote areas of conflict. As discussed more fully below, near-term demand for these services requires that Iridium have access to additional spectrum.

A. A Grant of This Petition Would Allow Iridium to Meet Growing Demand for Service to Both Rural and Urban Areas Within the United States.

The Commission has stated unequivocally that it is “committed to policies promoting the provision of broadband communications services to rural, unserved and

²³ Iridium, Inc. Form S-1 at 6, filed July 14, 1995.

²⁴ *See id.* at 13.

underserved areas of the country.”²⁵ Even under its current spectrum constraints, Iridium is providing invaluable services in the most remote portions of the nation, while also offering innovative solutions in some of the most populous regions. Should the Commission grant this Petition, Iridium will be able to meet the rapidly increasing demand for the wide array of innovative services described below.

Currently, Iridium is providing a number of critical communications services to users in remote portions of Alaska, including to several commercial fishing operations, which use the Iridium service as their primary means of communication for vessels at sea. Additionally, Iridium services now allow general aviation aircraft and air-taxis in Alaska to communicate while in transit. Because most of these flights are conducted under visual flight rules, the pilots are without the guidance of any air traffic control system. As a result, Iridium provides the only means of critical operational communication.

With the spectrum requested in this Petition, Iridium could expand substantially the services it offers these residents of rural Alaska, including devising a solution to the inadequacies of the Alaskan air traffic control system. The FAA, under its Capstone program, is exploring alternatives to improve aviation safety by supplementing its VHF communications. The Iridium system is an ideal answer, given its ability to provide not only a means of communication, but also tracking and positioning information.

Even in urban areas, Iridium is providing a host of novel services. For example, under an agreement with the California State Power Authority and a number of large retail shopping centers, the Iridium system provides load curtailment services to reduce the demands on California’s power grid. In brief, in times of peak power demand, this service automatically

²⁵ See, e.g., Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band, *Notice of Proposed Rulemaking*, 16 FCC Rcd. 15532, 15543 (2001). See generally 47 U.S.C. §706.

will shut down the cooling systems for the common areas of the shopping centers, reducing considerably the load on the power grid with no noticeable effect on the temperature in the shopping centers. In return, the participating shopping centers receive an exemption from rolling blackouts.

Grant of the instant Petition would enable Iridium to expand considerably the scope of this low cost service to include numerous industrial and other commercial facilities in the area. The additional spectrum also would allow Iridium to offer a wider variety of different monitoring and control services within the same service area, including, *inter alia*, remote monitoring and control of oil wells, oil and gas pipelines and the like.

Finally, as described in greater detail below, Iridium has developed a suite of new “instant infrastructure” services for rural areas, which can be deployed both in the United States and elsewhere.

B. A Grant of This Petition Would Allow Iridium to Expand Its “Instant Infrastructure” Services

As the Commission has noted, LEO systems can “provide those countries that have not been able to develop a nationwide communication service an ‘instant’ global telecommunications infrastructure at minimal cost.”²⁶ This capability “offers the potential for revolutionary advances in all areas supported by communications. These areas include, but are not limited to, health care, education, emergency communications from small villages, public safety, routine governmental and civic exchanges, industrial communications and monitoring, and manufacturing.”²⁷

²⁶ NPRM at 1095.

²⁷ *Id.* at 1105-06. The Commission has repeatedly recognized the benefits of providing services via MSS to rural or remote areas that are not readily or economically served by existing terrestrial services. *See, e.g.,* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Band, *Notice of Proposed Rulemaking*, 16 FCC Rcd. 15532 (2001) (*citing* Amendment of the Commission’s

In addition to the traditional rural telephony concept, in which individual users purchase a handset and enter into a service contract, Iridium has developed and begun to deploy Teleboutiques, which provide a full array of telecommunications services for areas in which the local population generally does not have the resources to afford individual service. The Teleboutique is based on an Iridium handset providing both voice and data capability. Individual users access these services with a prepaid calling card.

Iridium is currently providing these and similar services throughout Central and Western Africa, Latin America, and the Middle East, and is experiencing a substantial growth in demand. These services are fast becoming a vital component of the economic fabric of these regions.

For example, in Senegal, Iridium has been licensed to provide community phone services to 1,000 villages in the initial phase of a nationwide “instant infrastructure” program. In Australia, Iridium has become a major communications provider, offering services otherwise unavailable to residents of the Outback.

Unfortunately, Iridium’s ability to meet growing demand for expansion of these and related services is increasingly constrained, because many of these rural areas are within the same satellite footprint. Iridium already faces high levels of capacity utilization for some spot beams during peak demand hours. As Iridium continues to expand into new markets within a given satellite’s footprint, these capacity constraints will become increasingly burdensome.

Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, *Memorandum Opinion and Order*, 9 FCC Rcd. 4957, 4995-96 (1994); Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, IB Docket No. 99-81, *Notice of Proposed Rulemaking*, 14 FCC Rcd. 4843, 4846 (1999); Amendment of Section 2.106 of the Commission’s Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service, ET Docket No. 95-18, *First Report and Order and Further Notice of Proposed Rulemaking*, 12 FCC Rcd. 7388, 7389 (1997)).

For example, it is projected that, over the course of the next nine months, the Senegal services noted above will, standing alone, absorb over 50% of the system's capacity in that region. This demand will severely limit the expansion of these services, not only in Senegal, but in neighboring countries such as Guinea and Sierra Leone, which also currently are being served by Iridium. The anticipated localized demand within various spot beams also will limit the effective reuse of frequencies to serve neighboring regions, which have similar growing demand for service. A grant of this Petition would allow Iridium to continue its efforts to expand further the availability of an affordable, nationwide, telecommunications infrastructure to rural areas throughout the world.

C. A Grant of This Petition Would Allow Iridium to Expand Its Provision Critical Services to the U.S. Military in Regions of Conflict

The U.S. military requires a wide array of secure, instantaneous communications services in remote regions of conflict. Navy Rear Admiral Robert Nutwell, the Deputy Assistant Secretary of Defense for command, control, communications, intelligence, surveillance, reconnaissance and space, recently noted that “[o]ur dependence on spectrum is growing because our operation is becoming increasingly mobile.”²⁸ Rear Admiral Ken Slaght, U.S. Navy, vice commander, SPAWAR, has also noted the military's dire communications needs, recalling that “[i]n Desert Storm, orders and communications between the Air Force and Navy ships had to be printed out and then flown in on a helicopter to waiting commanders due to a lack of available space segment on proprietary military satellite communications systems.”²⁹ The events of September 11, and the subsequent focus on smaller conflicts in remote areas, have further demonstrated the military's need for expanded communications capabilities.

²⁸ Dawn S. Olney, *Defense in Tug-of-War Over Wireless Spectrum*, Newsbytes News Network, June 18, 2001, at 10.

²⁹ *DoD and Satellites: The Commercial Ties That Bind*, Satellite Today, March 29, 2001, at 15.

As the Commission is aware, even with its existing spectrum constraints, Iridium is providing essential, low-cost, portable, and secure communications services to various U.S. government users, including the U.S. military. As Colonel Barry Patterson, chief of the Satellite Communications Division, United States Space Command, U.S. Air Force, put it: “We have some forces that can’t get along today without [the] Iridium system.”³⁰

While Iridium has been able to provide these crucial communications services to the military in support of numerous ongoing operations, its ability to meet the ever increasing demand for secure, mobile communications in several contiguous regions may be significantly constrained by a lack of spectrum. With the additional spectrum sought herein, Iridium could provide the increased capacity and enhanced capabilities required by the U.S. military. Moreover, as discussed above, access to the additional spectrum requested herein would ensure that increased demand within one region would not threaten the efficiency or availability of services to neighboring regions.

IV. CONCLUSION

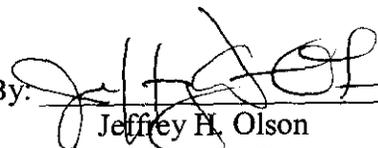
As demonstrated above, events of the past seven years have undermined the rationale for the Commission’s original division of the Big LEO band among TDMA/FDMA and CDMA systems. It is time to revisit that decision, and to do so on an expedited basis. Granting Iridium access to the 1615.5-1621.35 MHz band will enable it to meet present and demonstrable future increases in customer demand and to expand its service offerings into new markets,

³⁰ *Id.*

without any material adverse impact on Globalstar's current or future prospects. Thus, Iridium requests that the Commission act swiftly to grant the relief requested herein.

Respectfully submitted,

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July 26, 2002