BEFORE THE
DEPARTMENT OF ENERGY
WASHINGTON, D.C. 20585

In the Matter of	**)**
	)
Implementing the National Broadband Plan by	**)**
Studying the Communications Requirements of	**)**
Electric Utilities to Inform Federal Smart Grid Policy	**)**

To: The Department of Energy

COMMENTS OF THE AMERICAN PETROLEUM INSTITUTE

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July 12, 2010

SUMMARY

Similar to the electric utility industry's implementation of smart grid, oil and natural gas companies are in the midst of transitioning to next generation communications technology that will provide significant benefits in terms of safety, incident response, effectiveness and efficiency that are critical to United States energy independence. At the same time, however, API's members find themselves increasingly constrained by the lack of exclusive, licensed spectrum available for higher-speed applications.

While new technology has steadily increased the need for effective, interference-free communications, the FCC has actually reduced the amount of spectrum available to private wireless licensees in favor of commercial operators and unlicensed uses. While both of these are important tools to API's members, each has significant drawbacks and neither option is appropriate in all instances. For example, commercial systems are designed for the consumer market and not the highly specialized uses of the oil and gas industry, in which communications are often in remote areas and must always be secure, robust and reliable. Unlicensed spectrum, while satisfactory in many instances, is not a cure-all and is not appropriate for mission-critical applications for which guarantees of interference free operation must be rock solid.

For this reason, internal, private, licensed communications systems will continue to be central to successful energy industry operations. The industry requires access to exclusive, licensed, broadband spectrum and API recommends up to 30 MHz of spectrum be made available to the energy industry.

API urges the Department of Energy to support the energy industry's unique communications requirements by recommending that the FCC create an exclusive private wireless broadband allocation consistent with these comments.

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AMERICAN PETROLEUM INSTITUTE

The Telecommunications Subcommittee of the American Petroleum Institute ("API") is pleased to submit these Comments to the Department of Energy ("DOE" or "Department") in response to the May 11, 2010 Request for Information ("RFI") seeking input from interested parties regarding the communications requirements of utilities. API appreciates the Department's efforts to further inform the implementation of the Federal Communications Commission's ("FCC" or "Commission") National Broadband Plan. API urges the Department to support the energy industry's repeated requests to the Commission to address the unique communications needs of private broadband users, particularly with respect to the creation of an exclusive private wireless broadband allocation sufficient to satisfy the pressing requirements of the nation's energy companies.

I. BACKGROUND

API is a national trade association representing more than 400 companies involved in all phases of the petroleum and natural gas industries, including exploration, production, refining, marketing and transportation of petroleum, petroleum products and natural gas. Among its many activities, API acts on behalf of its members before federal and state regulatory agencies. The

API Telecommunications Subcommittee evaluates and develops responses to state and federal proposals affecting telecommunications facilities used in the oil and gas industries.

API is supported and sustained by companies that make use of a wide variety of wireline, wireless and satellite communications services on both a private and commercial basis. API member companies are authorized by the Commission to operate facilities in the Private Land Mobile Radio ("PLMR") service and Private Operational-Fixed Microwave Services ("POFS"), among other telecommunications systems.

API's members utilize PLMR systems, for example, to support the search for and production of oil and natural gas, to ensure the safe pipeline transmission of natural gas, crude oil and refined petroleum products, to process and refine these energy sources and to facilitate their ultimate delivery to industrial, commercial and residential customers. Among other things, POFS is used for communications with remote oil and gas exploration and production sites for voice and data applications, communications with refineries, the extension of circuits to remote pipeline pump and compressor stations, and supervisory control and data acquisition systems ("SCADA") that remotely monitor and control oil and gas wells, pipeline operations and other facilities.

Many API member companies are keenly interested in moving quickly to implement IP-based technology in mission-critical operation and process control systems. IP-based technology represents a major advance in the disaster response capability of oil and natural gas companies and promises to increase efficiency and promote safety and environmental protection now and in the years ahead. In addition, like many other industries, API's members are seeking to extend the reach of communications capabilities as far as possible in support of workers in the field. In the oil and gas industry, this means ensuring access to communications capabilities on platforms, in land-based exploration and production fields, along pipelines and in other remote and rural areas often unserved by commercial providers.

The continued operation of reliable and efficient communications systems by petroleum and natural gas companies is essential to protecting lives, health and property, both in connection with the day-to-day operations of these companies, as well as during responses to emergency incidents. These systems are integral to the production and delivery of our nation's energy resources to the public, as well as its economic well being.

II. THE DEPARTMENT'S INFORMATION COLLECTION SHOULD ADDRESS THE UNIQUE REQUIREMENTS OF THE OIL AND NATURAL GAS INDUSTRY

At the outset, API notes that the American Recovery and Reinvestment Act of 2009 required the Commission to develop a "plan for the use of broadband infrastructure and services in advancing … *energy independence and efficiency*."[1] API participated extensively in the FCC's proceeding to develop the National Broadband Plan, submitting numerous sets of comments and conducting various ex parte meetings.

The Commission ultimately recognized several of API's recommendations addressing industry communications requirements, including allowing critical infrastructure companies to access the 700 MHz Band D Block and Public Safety Broadband Spectrum and promoting secondary market access to spectrum particularly in unserved or underserved areas.

The Commission, however, focused in the section of the National Broadband Plan devoted to "Energy and the Environment" exclusively on a discussion of the communications needs of *Smart Grid*. While the Department's RFI is somewhat broader and seeks information regarding the deployment of applications other than smart grid, the Department must ensure that

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[1] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009) ("Recovery Act").

its report to the Commission does not artificially pertain to a single industry segment but reflects the communications needs of the energy industry as a whole, including energy exploration, production, refining, transportation, as well as distribution. As important as smart grid issues are to the development of energy communications policies, they are only a part of the picture.

Like electric utilities, API's members are in the midst of migrating to IP-enabled technology much in the same way that utilities are seeking new efficiencies through smart grid deployment. New communications technologies will advance two key aspects of President Obama’s energy platform, 1) “getting more from our existing oil fields”, and 2) “promoting the responsible *domestic* production of oil and natural gas.” President Obama noted that “up to 85 billion barrels of technically recoverable oil remains stranded in existing fields” and undertook to set up “a process for early identification of any infrastructure obstacles/shortages” to energy production. The digital oil field of the future will bring increased environmental protection, promote safety of life and property, improve efficiency, and support disaster response efforts. In that regard, it is a clear “win-win” for American energy consumers.

Despite these benefits, the oil and natural gas industry is “hitting the wall” when it comes to identifying broadband communications options, wireless or wireline, necessary to implement its plans.

Rather than allocating additional spectrum to the oil and gas industry, the FCC for years has routinely required private radio users – such as oil and gas companies and electric utilities – to *vacate* spectrum as a means of accommodating the entry of new commercial providers serving mass markets. For example:

- Private microwave operators were required to vacate the 1850-1990 MHz band to accommodate new Personal Communications Services;

- Private microwave operators were required to vacate portions of the 2 GHz band to accommodate new Advanced Wireless Services;
- Private microwave operators were required to vacate the 12.2-12.7 GHz band to accommodate the introduction of Direct Broadcast Satellite Services; and
- Private mobile radio operators in the 800 MHz band were required to relocate to different frequencies in order to reduce interference caused by nearby commercial radio operators to public safety systems and licensing at 900 MHz was frozen.

The result is that as the oil and gas industry and electric utilities move towards next generation applications to increase efficiency, effectiveness and safety, they are left without the necessary spectrum tools to do so. Additional spectrum is urgently needed to advance energy independence and efficiency.

III. RESPONSES TO SPECIFIC RFI QUESTIONS

The following are API's responses to the specific questions posed in the RFI.

(1) What are the current and future communications needs of utilities, including for the deployment of new Smart Grid applications, and how are these needs being met?

The current and future communications needs of the oil and gas industry are largely analogous to those of electric utilities. The Department notes that utilities are seeking communications for Home Area Networks; Phasor Measurements and wide area situational awareness; Substation SCADA; Distributed Generation Monitoring and Control; Protective Relaying; Demand Response and Pricing; and Plug-in Electric Vehicles.

The oil and natural gas industry is seeking to adopt technologies to enhance flexibility and response capability in disaster situations, to make expanded use of video for site-security, and to provide more effective remote diagnostic and troubleshooting capability among other purposes. The industry's application list includes advanced SCADA, efficient voice communication, remote enterprise IP networking, production automation, leak detection and remote video security monitoring.[2]

Communications are used in the industry to remotely operate large production fields, sometimes comprised of thousands of oil and/or natural gas wells. Such systems collect and transmit to a central automation center a wide variety of critical data regarding well pressures, temperature, and rates of flow that are essential to the coordinated and safe operation of a production facility. Communications systems are used to transmit alarms in the event of a leak or other emergency.

Communications applications are used in pipeline and natural gathering systems to support measurement of pipeline pressure and flow rates, detect leaks, and open and close valves. These types of functions are critical to safe and efficient operations and to the public health, particularly in the event of a leak or other disaster. Communications systems are also used for certain wholesale and retail business applications (referred to as "cash register" data).

Best practice, and a Department of Transportation requirement for pipelines, is to have two reliable forms of communications that are not dependent upon each other. For redundancy, this usually requires the use of "dissimilar" technologies – *e.g.*, private licensed microwave and satellite, leased lines and satellite, or private licensed microwave and wireless Ethernet radio.

Every major private-sector oil and natural gas company already has a "digital oil field" initiative in place. The industry is expected to expend upwards of $1 billion dollars to upgrade communications hardware, software and services in the not-too-distant future. Without access to sufficient spectrum, this substantial challenge will become a virtual impossibility.

[2] These applications require medium to high speed communications links with low latency. As a rule, broadband applications within the petroleum and natural gas industries operate most efficiently with a maximum latency of 20 milliseconds. Latency approximating 100 milliseconds typically will unacceptably impact these applications.

The availability of wireless broadband spectrum will allow oil and gas companies to begin the adoption of technologies to support critical applications and operations in remote areas where communication is vital to safe operation. For example, broadband speed programmable logic controllers ("PLCs") provide monitoring and automation capabilities to geographically dispersed well heads or along thousands of miles of pipeline. End-to-end IP architecture affords the ability to quickly resume operations after a natural disaster. High-speed, secure data services provided to sparsely populated areas where wireline service is not an option, allows worker connectivity to be extended into the field.

This evolution will provide tangible benefits in the public interest, including tighter SCADA control, flexibility to relocate instantly from one control center to another in the event of disaster situations, enhanced cyber security, more efficient remote troubleshooting, and expanded use of video for security and other purposes. Analogous to utility smart grids in many ways, these improvements in turn will lower exploration, production and transportation costs, decrease energy consumption, improve safety of industry personnel and the public, and strengthen environmental protections.

Advanced communications systems promise direct and tangible benefits in advancing energy independence and efficiency. Recent reports estimate that digital oil fields will add 125 billion barrels to global reserves by 2013 – more than the proven reserves in Iraq.[3]

(2) What are the basic requirements, such as security, bandwidth, reliability, coverage, latency, and backup, for smart grid communications and electric utility communications systems in general— today and tomorrow? How do these requirements impact the utilities' communication needs?

Each of the requirements the Department identifies is significant not just to smart grid communications in particular and electric utility communications systems in general, but to the

[3] See Spencer Reiss, The Data Pipeline, Wired, available online at http://www.wired.com/wired/archive/13.12/digitaloil.html.

exploration, production, refining, marketing and transportation of petroleum, petroleum products and natural gas in particular and to the energy industry in general. All of these issues need to be addressed comprehensively in order to advance energy independence and efficiency.

Due to the lack of current options, bandwidth and throughput will be the driving concerns in energy communications for the foreseeable future. Energy industry access of up to 30 MHz of exclusive, licensed spectrum is required to support currently required applications. While this amount of spectrum is available in point-to-point microwave allocations and unlicensed bands, it does not exist for private licensed mobile or point-to-multipoint solutions – exactly the applications that the oil and gas industry needs to deploy. In addition, the unlicensed bands are increasingly congested and the ability to provide point-to-multipoint service effectively is constrained in many areas. API member companies are frequently forced to move higher and higher in the unlicensed bands (*e.g*, from 900 MHz to 2.4 GHz to 5.8 GHz) in a quest to find suitable inference free channels.[4] Eventually, alternative options will run out unless FCC spectrum policy adjusts accordingly.

In the oil and gas industry, coverage requirements vary dramatically depending on the type of application. Coverage for a refinery may be limited to a radius of a few miles or less, whereas pipeline coverage may extend in a ribbon configuration through a network of sites for hundreds of miles or more. Often the areas where service is required are rural or remote, well beyond the reach of commercial providers. Due to these kinds of unique coverage requirements, spectrum below 2 GHz is preferred due to favorable propagation characteristics.

The critical nature of energy communications dictates that security is a chief concern. Oil and gas companies spend no small amount of effort ensuring that systems are not vulnerable

[4] The attached Exhibit “Factors Affecting Interference Risks” shows that not all techniques for controlling inter-user interference are created equal. And only a handful of techniques are available to users in the unlicensed bands.

to attack or unauthorized access. Solutions that do not incorporate end-to-end security potentially jeopardize safety and security and are fundamentally unacceptable for mission critical operations.

Communications system reliability also is a primary consideration. Mission critical applications require, and are currently designed for, five-nines, *i.e.*, 99.999%, reliability.[5] This level of reliability equates to a total of approximately 6 minutes of annual down time. While the 98% or 99% reliability of commercial systems may at first glance appear noteworthy, such reliability results in the loss of coverage for several days over the course of a year.[6] This is unacceptable in many instances in the energy industry.

Reliability, moreover, has several facets. Back-up power is often necessary in oil and gas industry communications networks. Equipment reliability is a separate concern. Equipment must be "ruggedized" for industrial use. Due to the hazardous substances present in many operating environments, the National Electric Code and insurance underwriters such as Factory Mutual also frequently require deployed communications devices to be "intrinsically safe." satisfying manufacturing and design requirements for operation of electronic equipment in explosive atmospheres. Further, equipment by necessity must have a long and reliable service life. Whereas commercial users may expect to replace communications devices such as Blackberrys and iPhones every 2-3 years, oil and gas companies typically expect equipment service life to extend 15 years or more. Equipment longevity is due not only to cost concerns but to time constraints associated with deploying and replacing hundreds or thousands of pieces of communications gear every few years. Whereas commercial carriers are in the business of

[5] Some polling applications may not be significantly impacted by short duration, intermittent signal loss.

[6] Even these figures are estimates. Wireless carriers typically refuse to grant customers service level agreements guaranteeing reliability.

producing the "next big thing" to drive new markets, the oil and gas industry is concerned with reliably and safely meeting the needs of its industry.

(3) What are other additional considerations (*e.g.* terrain, foliage, customer density and size of service territory)?

In addition to the considerations mentioned in the RFI (terrain, foliage, customer density, size of service territory), it is critical that any spectrum allocation also take into account the compatibility of users sharing use of the spectrum band.

For example, on October 15, 2007, API joined with the Utilities Telecom Council to urge the Commission to adopt Spectrum Etiquette requirements for unlicensed Digitally Modulated transmitters operating in the 902-928 MHz band in order to maximize the utility of the band for all operators, including those employing Frequency Hopping Spread Spectrum ("FHSS") systems.[7] FHSS-to-FHSS interference mitigation techniques, such as hopping pattern modification, are ineffective methods of avoiding interference from Digitally Modulated devices, particularly those Digitally Modulated devices which operate continuously. The Commission has attempted a solution in the 3.65 GHz band, by adopting a hybrid licensing approach and requiring the use of contention based protocols. Such issues must be considered in any future spectrum allocation.

(4) What are the use cases for various smart grid applications and other communications needs?

See the response to Items 1 and 2 above.

(5) What are the technology options for smart grid and other utility communications?

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[7] *See* Modifications of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval, *Notice of Proposed Rulemaking*, ET Docket No. 03-201, Joint Comments of API and the Utilities Telecom Council (2003). Although the problem is most acute in the 902-928 MHz band, spectrum etiquette should be considered for other Part 15 bands as well.

Many of the communications and networking technologies used in smart grid applications are also used by the oil and natural gas industry including, but not limited to fiber optic, microwave, copper lines, satellite, broadband wireless, unlicensed wireless mesh, licensed point-to-point and point-to-multipoint, low latency wireless, Internet and wired broadband. In many instances, for the same reasons, the same make and model of radio equipment is shared by the oil and natural gas industry and electric utilities.

That said, the technology options for next generation IP-enabled point-to-multipoint communications systems are severely constrained. The attached matrix depicts the communications tools available to the industry.[8] As is evident from the matrix, there is no private, exclusive, point-to-multipoint spectrum option currently available at the Commission. As explained below, all of the currently available alternatives, commercial wireline, commercial wireless, satellite, unlicensed, carry severe drawbacks.

While commercial wireline service has a long, successful track record in many respects, their expansion in rural areas is occurring at a snail's pace. There is little or no economic push from the carriers to extend wireline to remote locations lacking multitudes of potential subscribers. In limited instances in which carriers have offered to deploy wireline networks to locations requested by the oil and gas industry, the costs of doing so have often been prohibitive. Further, the focus on wireless networks is redirecting funding from wireline capital projects. API does not believe that the current trend of favoring wireless deployments in remote areas is likely to reverse course any time soon.

In that regard, commercial wireless networks are often a poor strategic fit for the industry. As explained herein, the rapid pace of technology change renders those networks

[8] See Exhibit "Critical Infrastructure/Business, Industrial/Land Transportation Data Transmission Options".

unstable for long-term industry applications, particularly where many thousands of devices may be impacted. The needs of private wireless licensees differ dramatically from the consumer market that commercial carriers typically serve. Whereas the energy industry seeks to deploy service over specific areas, commercial carriers consistently seek to serve high population density mass markets with their offerings. Even in the past several years are 3G and now 4G services have been announced, coverage continues to be made to areas that make sense from a consumer mass market -- not energy-centric -- perspective. The use of low cell sites for increased frequency reuse ensures that signal strength falls off rapidly even modest distances from population centers or highways. Often one hill removed from a nearby tower will result in the total loss of usable signal. API expects this will be worse for newer high-bandwidth broadband offerings since fewer carrier channels will be available in light of demand and frequency reuse will become even more critical.

Satellite has many applications in the oil and gas industry both on and offshore, and VSAT networks are prevalent. In theory, satellite would appear to be a good tool to satisfy wide area applications in remote areas. In fact, however, satellite already is largely deployed in areas where it is a viable option. In many instances, latency is simply too high for pipeline leak detection and other applications that require frequent polling for optimal performance.

Due to the lack of a private, exclusive point-to-multipoint spectrum allocation, and severe limitations associated with other options, the energy industry has been forced in many cases to rely on the Part 15 license-exempt bands to satisfy requirements for higher bandwidth applications. Although successful at first, the increasing congestion in these bands has resulted in significantly increased interference risk, especially with the proliferation of digitally modulated transmitters with no maximum bandwidth limit or duty cycle. This threatens to preclude the use of unlicensed bands in certain instances, which would be devastating to the industry due to the lack of any fall-back option.

(6) What are the recommendations for meeting current and future utility requirements, based on each use case, the technology options that are available, and other considerations?

API recommends that any effort to satisfy the broadband spectrum requirements of the energy industry draw largely from the success that the FCC has experienced in meeting the wireless requirements of private users in the site-based Part 90 land mobile and Part 101 point-to-point microwave allocations. These allocations, which offer exclusivity where necessary and shared spectrum in other instances, offer the opportunity for many different users to coexist in near proximity. Assignments typically are managed by frequency coordination, which greatly enhances the strategic fit of these bands. Licensed service territories may be designed to fit the applicants' specific geographic requirements, as opposed to artificially created economic areas necessary for purposes of auctioning spectrum. As opposed to auctioned spectrum, the site-based allocations in Part 90 and Part 101 also are much more flexible from a practical licensing standpoint. Unlike the unlicensed bands, each proposed user is evaluated in advance for its effect on other users. As a result, dissimilar technologies may be deployed in the same geographic area or spectrum band. This could be implemented in a new band or incorporated into an existing allocation, such as a portion of the FCC's TV White Space allocation.

API recommends up to 30 MHz of spectrum be allocated for exclusive private use below 2 GHz. For example, a typical carrier grade WiMAX radio operating in the 700 MHz band using a 12+12 MHz (24 MHz total) assignment can be reasonably expected to provide an average download capacity per sector of 10.4 Mbps download and 2.4 Mbps upload. Actual throughput will vary depending on the equipment used. The equipment used by the oil and gas industry may differ significantly from that used by commercial carriers. Using the above figures as a general reference, however, 30 MHz of bandwidth is a realistic target.

(7) To what extent can existing commercial networks satisfy the utilities' communications needs?

The oil and natural gas industry does rely extensively on commercial networks. However, in many instances, commercial networks are ill-suited to meet the industry's needs, particularly as they often lack one or more of the following necessary attributes:

> **Reliable –** Oil and natural gas exploration, production, refining, transportation and distribution occurs 24 hours a day, 7 days a week, 365 days a year. Industry communications systems are developed to "five-nines" reliability (i.e., available 99.999% of the time) ensuring availability on the same 24/7/365 schedule. Communications cannot rely on network infrastructure built to lesser standards or networks where CII communications are required to compete for bandwidth access with consumer applications.
>
> **Robust –** The harsh environments oil and natural gas companies operate in require the use of rugged devices and hardened infrastructure. In 2005, hurricane Katrina knocked-out wireline service to more than 3 million customers in Louisiana, Mississippi, and Alabama.[9] The Commission found that nearly 1000 cellular and PCS base stations were impacted. Yet carriers remain resistant to implementing measures such as backup power for cell sites. The oil and natural gas industry must be assured that communications are available during disaster relief and emergency response, despite extreme operating conditions.
>
> **Secure –** CII communications systems and the applications deployed on such systems must be secure from intrusions from outside sources. The public Internet simply does not offer the required level of threat security for mission critical industrial use. Indeed, although CII systems utilize encryption and other advanced security features, the first line of defense is separation from the public Internet itself. Because compromised CII communications networks can, in turn, compromise safety of life and property, security is a key consideration for CII systems.
>
> **Specialized –** Oil and natural gas communications applications and equipment are highly specialized. Beyond business network applications, communications are used for monitoring and control of production wells, pipelines, and refinery operations. These systems often are comprised of customized software and devices built to perform specific functions. On the other hand, major carriers are in the business of selling mass-produced,

[9] Frances Fragos Townsend, Assistance to the President for Homeland Security and Terrorism, The Federal Response to Hurricane Katrina: Lessons Learned, Page 8 (February 23, 2006).

"off the rack" devices such as consumer cell phones and appear largely disinterested in meeting the needs of niche markets such as CII. Further, the oil and gas industry cannot afford to become involved in a "Carterfone" battle each time a new device is to be deployed on a carrier's network.

Remote – From hundreds of miles offshore in the Gulf of Mexico to hundreds of miles north of the Arctic Circle in Prudhoe Bay, Alaska, from across deserts to over mountain ranges and every where in between, the oil and natural gas industry operates in the harshest and most remote areas in the United States. These are areas where oftentimes wireline facilities do not reach. Nevertheless, these areas are not high-density commercial markets and commercial wireless providers often do not have a presence. Using the example of Sprint recent 4G roll-out, the locations where service is a carrier priority -- Atlanta, Charlotte, Chicago, Dallas, Ft. Worth, Honolulu, Las Vegas, Philadelphia and Seattle – are typical and do not include many regions central to the energy industry. While satellite is an option in some cases, the data speed and latency requirements of modern communications systems preclude satellite as a viable service alternative in many instances.

In addition, the very qualities that make the commercial networks attractive to consumers, often are problematic for the oil and gas industry. The life cycle of communications equipment used in the oil and natural gas industry may be a decade or more. Contrast this with the constant churn of commercial network technologies, whereby each carrier seeks to upgrade its network for the "next big thing." Such invariable change detracts from the ability of private users to rely on the commercial networks for many critical applications. As just one example, any critical system relying on the Advanced Mobile Phone System ("AMPS") standard would have had to switch to a new service when the major carriers discontinued offering the service in 2008.

(8) What, if any, improvements to the commercial networks can be made to satisfy the utilities' communications needs?

Several changes can be made to federal policy to increase the usefulness of commercial networks to the oil and natural gas industry.

With regard to spectrum, the FCC can increase the functionality of its secondary markets to move unused spectrum into the hands of entities that seek to deploy it. The Commission has noted concern that the secondary markets policies have not "been consistently successful in promoting […] broadband deployments" stating that "[i]n particular, parties have noted that there remains a lack of available, affordable, and suitable spectrum for rural wireless broadband; [and] that our secondary market rules do not always promote spectrum trading and re-use."[10]

For the most part, licensees lack incentives to enter into spectrum leases or transactions to partition or disaggregate their spectrum. Many licensees have no interest whatsoever in creating "swiss cheese" holes in their licensed footprints. Broadband spectrum in particular is difficult or impossible to obtain via the secondary markets. The Commission should adopt additional incentives to encourage licensees to engage in secondary markets activity.

Spectrum auctions have become the Commission's primary method of assigning new exclusive licenses. Auctions significantly disadvantage private licensees, since they rarely are in a position to compete with commercial providers when geographic license areas, construction rules, technical rules, etc., are structured first and foremost with commercial service providers in mind. Nevertheless, there are a few steps that the Commission could take to improve the auction process itself, most notably in crafting rules that would allow private entities to acquire spectrum within their own service areas.

The Commission should continue to adopt rules to encourage broadband deployment in rural areas. With regard to spectrum auctions, these policies have included adopting smaller license sizes when creating band plans and more stringent buildout requirements for licensees. For example, in the 700 MHz Band, the Commission adopted "keep-what-you-use" rules which

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[10] Rural Broadband Report at para 149.

provide that if a licensee fails to meet its end of term benchmark, its authorization to operate will terminate automatically for those geographic areas of its license authorization in which it is not providing service, and those unserved areas will become available for reassignment.[11]

Verizon Wireless, for its part, recently announced that it would partner with rural commercial operators, tower owners and backhaul providers to collaboratively build and operate a 4G network in rural areas. Such efforts are welcome and should be promoted by the Commission.

With regard to wireline deployment, the Commission should use some portion of its Universal Service Fund ("USF") to proactively drive investment in rural areas. Currently, the Commission's role in USF spending is passive, and market based mechanisms determine where USF resources are delivered. Adjustments to focus funding on areas of need, or in areas in which rate-payers could realize the most "band for the buck" (for example, where an anchor tenant is willing to co-build facilities) should be encouraged much in the way that loans in the Rural Health Care Pilot Program or broadband stimulus funding was allocated.

IV. CONCLUSION

In advancing energy independence and efficiency, API urges the Department to consider the communications requirements of the entire energy industry. In particular, API urges the Department to address the unsatisfied communications requirements of the petroleum and natural gas industries, including exploration, production, refining, marketing and transportation of petroleum, petroleum products and natural gas.

To that end, API urges the Department to support the energy industry's repeated requests to the Commission to address the unique communications needs of private broadband users with

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[11] *See 700 MHz Second Report and Order*, 22 FCC Rcd at 15353–54, paras. 170–74.

respect to the creation of an exclusive private wireless broadband allocation sufficient to satisfy the pressing requirements of the nation's energy companies.

Respectfully submitted,

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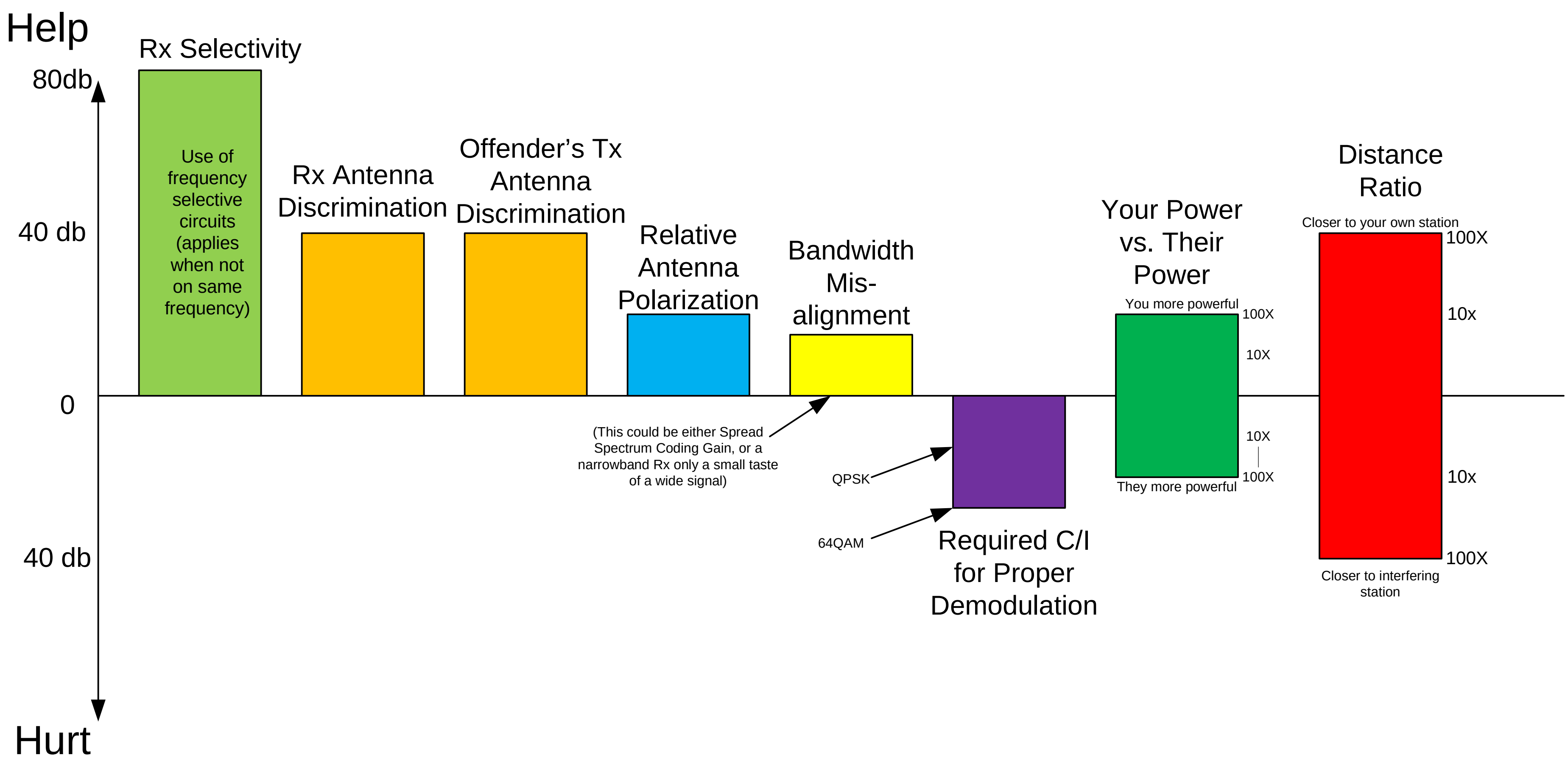
Date: July 12, 2010

Factors Affecting Interference Risks



CRITICAL INFRASTRUCTURE/BUSINESS, INDUSTRIAL/LAND TRANSPORTATION DATA TRANSMISSION OPTIONS

Class	Opportunity	Capabilities										
		Bandwidth	Distance	Reliability	Duplex	Latency	QOS	Point to Multipoint	Mobile	Rural Applicatbility	Install Effort	Equip. Life Cycle
Public Wireline												
	3002 Analog Data Circuit	VL	H	H	Y	L	H	Y	N	M	M	H
	56K DDS Circuit	L	H	H	Y	L	H	Y	N	M	M	H
	56K Frame Relay	L	H	H	Y	L	H	Y	N	M	M	H
	T1 Frame Relay	M	H	H	Y	L	H	Y	N	M	M	H
	T1 MPLS	M	H	H	Y	L	H	Y	N	M	M	H
	T1 Point to point	M	H	H	Y	L	H	N	N	M	M	H
	Cable Modems	M	H	M	Y	L	M	Y	N	L	L	H
	DS3 Point to point	H	H	H	Y	L	H	N	N	L	H	H
	DS3 MPLS	H	H	H	Y	L	H	Y	N	L	H	H
	OC-3 Point to point	VH	H	H	Y	L	H	N	N	L	H	H
	High Speed POS & GigaBit Transport	VH	H	H	Y	L	H	N	N	L	H	H
Public Wireless												
	CDPD	VL	H	H	Y	M	L	Y	Y	M	L	L
	2G	L	H	M	Y	M	L	Y	Y	M	L	L
	3G	M	H	M	Y	M	L	Y	Y	L	L	L
	2.5 GHz WiMax	H	H	H	Y	L	H	Y	Maybe	L	L	M
	L Band Inmarsat	L	H	H	Y	H	M	Y	Y	H	L	M
	Ku Band VSAT Commercial	M	H	H	Y	H	M	Y	N	H	L	H
	Ku or C Band Earthstation Satellite	H	H	H	Y	H	H	Y	N	H	M	H
	Ku or Ka Band Consumer VSAT	L	H	H	Y	H	VL	Y	N	H	L	M
Unlicensed Private Wireless												
	902-928 MHz Narrow Band FHSS	L	H	M	N	L	L	Y	Y	Y	L	H
	902-928 MHz Broadband or DSSS	M	M	L	N	L	M	Y	Y	Y	L	H
	2.4 GHz 802.11B/G/N Wi Fi	H	L	L	N	L	M	Y	Y	Y	L	H
	2.4 GHz T1 Microwave	M	M	M	Y	L	H	N	N	Y	L	H
	5 GHz 802.11A	H	L	L	N	L	M	Y	Y	Y	L	H
	5 GHz Broadband or DSSS	H	M	M	N	L	M	Y	N	Y	L	H
	5 GHz T1 Microwave	M	H	H	Y	L	H	N	N	Y	L	H
	60 GHz High Speed Microwave	VH	L	H	Y	L	H	N	N	Y	L	H
Licensed (Shared) Private Wireless												
	173 MHz VHF Splinter Frequencies	VL	H	H	N	L	H	Y	N	Y	L	H
	450 to 470 MHz Low Power Channels	VL	M	M	Y	L	H	Y	Y	Y	L	H
	1427 to 1432 MHz Telemetry Channels	VL	M	H	N	L	H	Y	Y	Y	L	H
	3.65 GHz Private WiMax	H	M	H	N	L	M	Y	N	Y	L	H
	80 GHz High Speed Microwave	VH	M	H	Y	L	H	N	N	Y	M	H
Licensed (Coordinated/ExclusiveProtected) Private Wireless												
	450 to 470 Mhz T Band Channels	VL	H	H	Y	L	H	Y	N	Y	L	H
	928/952MHz & 932/941MHz MAS CH	VL	H	H	Y	L	H	Y	Y	Y	L	H
	960 MHz Microwave	M	H	H	Y	L	H	N	N	Y	M	H
	Lower 6 GHz Microwave	VH	H	H	Y	L	H	N	N	Y	M	H
	Upper 6 GHz Micrwave	H	H	H	Y	L	H	N	N	Y	M	H
	11 GHz Microwave	VH	H	H	Y	L	H	N	N	Y	M	H
	18 GHz Microwave	VH	H	H	Y	L	H	N	N	Y	M	H
	23 GHz Microwave	VH	H	H	Y	L	H	N	N	Y	M	H

BANDWIDTH VL=0 TO 50K, L=50K TO 500K, M=500K TO 5M, H=5M TO 50M, VH=50M TO 1000M; DISTANCE L=0 TO 1 MI, M=1 TO 10M, H=10 MILE+; LATENCY= L=0 TO 25MS, M=25 TO 150MS, H=150MS TO 1 SEC