



April 21st, 2005

Canadian
Association of
Broadcasters

Via Email

L'Association
canadienne des
radiodiffuseurs

Ms. Diane Rhéaume
Secretary General
Canadian Radio-television and
Telecommunications Commission
Ottawa, Ontario
K1A 0N2

Dear Ms. Rhéaume:

RE: Public Notice CRTC 2005-1 (Call for proposals for a digital migration framework) and Public Notice CRTC 2004-58 (Call for comments on a proposal framework for high definition pay and specialty services)

The Canadian Association of Broadcasters (CAB), the national voice of Canada's private broadcasters, representing the vast majority of Canadian programming services - including private television and radio stations, networks, and specialty and pay and pay-per-view television services – is pleased to submit its comments with respect to the two above-noted proceedings.

Please note that the CAB's comments are contained in a single submission, including three Appendices, that pertains to both proceedings.

Sincerely,

Glenn O'Farrell
President and CEO

Attachments

**A Submission to the Canadian Radio-television and
Telecommunications Commission**

With respect to

**Public Notice CRTC 2005-1
(Call for proposals for a digital migration framework)**

and

**Public Notice CRTC 2004-58
(Call for comments on a proposed framework for
high definition pay and specialty services)**

Prepared by



**L'Association canadienne des radiodiffuseurs
Canadian Association of Broadcasters**

April 21, 2005

EXECUTIVE SUMMARY

1. The Canadian Association of Broadcasters (CAB) strongly believes that the transition to high-definition (HD) services and the simultaneous migration to all-digital distribution are essential strategies to maintain and grow the Canadian specialty and pay sector in the years to come. It is not a question of choice – services must be prepared to meet the needs of viewers, and it is our belief that viewers will increasingly show their preference for the higher image and sound quality that new technologies make possible. If Canadian services are to succeed in their domestic markets, the adoption of these technologies is both desirable and necessary.
2. That said, it would be foolish to gloss over the very serious challenges presented by the transition. HD overlays a demand for quality on a system that has been created to meet the demand for choice. To provide both choice and quality at the same time will be difficult: the system's technical capacity is limited, and so is its economic capacity. To be practical, specialty services are looking at a very large increase in technical costs: the challenge will be to find a way to recover these costs through expanded revenue.
3. The CAB submission to the digital migration and HD framework proceedings describes a regulatory framework that is designed to meet that challenge, but one that is driven by a vision, a vision of a future in which HD plays a fundamental supporting role. We must be clear on this: HD is an enabling technology, but its deployment is not an end in itself. The goals of the system of the future are the goals of the *Broadcasting Act* (the Act) of today: to attract Canadian audiences to Canadian programming and services. The CAB believes the framework must therefore be built on principles which arise from the Act.
4. The three Appendices to this submission analyze the challenges in some detail. The analysis is not intended to discourage, but simply to establish a basis of fact on which we can build the framework and the vision. What are these challenges? In the CAB's view, they include:
 - (i) **Revenue uncertainty arising from digital migration.** The increased flexibility desired by digital cable broadcasting distribution undertakings (BDUs) means more churn – instability – and generally lower subscriber numbers for each service.
 - (ii) **Public interest issues raised by *à la carte* or “mini-tier” packaging.** Not only do these packaging methods create extreme instability, the Federal Communications Commission in the U.S. has concluded that they are contrary to the public interest because they result in higher subscriber fees and an overall loss of diversity in the system.
 - (iii) **The HD transition: higher costs.** There are programming cost increases for HD, and satellite distribution capacity requirements in particular will be significant and potentially very damaging to smaller services.
 - (iv) **The migration/HD business plan: difficult at best.** The economic impact study (Appendix 1) demonstrates that even with reasonable guidelines for migration and a degree of flexibility with respect to the provision of HD programming, the business model for post-transition services will be very difficult.

Overall, the impact may have strong unintended negative consequences for Canadian programming.

- (v) **HD programming supply: limited.** A study of the availability of HD programming in the U.S. (Appendix 2) demonstrates that the foreign HD programming supply is insufficient to allow services to meet the proposed 50% threshold to guarantee BDU carriage.
- (vi) **Technical capacity to deliver an all-HD system: unclear.** While the CAB agrees with the Commission's replacement model for the specialty and pay sector, distribution bottlenecks in satellite capacity (Appendix 3) mean that we cannot implement this model in the medium term future. At least 2 new satellites, and quite possibly 3 or 4, will be required.
- (vii) **Consumer acceptance of HD: uncertain.** The unanswered question is whether the majority of consumers will pay for the costs of true HD in all services. It may be that less expensive, but high quality wide-screen standard definition (SD) signals are an attractive alternative for some services, given costs, capacity limitations and availability of programming.

Principles

5. The CAB believes that these challenges can be met, and the transition can work to the benefit of Canadian viewers and the Canadian broadcasting system, if the framework is based on the following key principles derived from the goals of the Act:
 - (i) **Regulatory certainty**, with clear rules respecting the interests of all parties, is essential. Movement will be inhibited by uncertainty if the terms of migration are left to negotiations between programmers and BDUs with no guiding framework.
 - (ii) **Genre protection.** With the uncertainty of the revenue/cost equation, the Commission must maintain the principle of genre protection in order not to further undermine the fragile economics of the transition.
 - (iii) **Flexibility.** A degree of flexibility is essential in the application of the HD framework, in recognition of the uncertainties of the transition. Specifically, a graduated and flexible approach to the HD "threshold" is essential if services are to start the transition while program supply is limited.
 - (iv) **Incentives.** To help stimulate a more rapid move to HD, the CAB urges the Commission to consider incentives for programming services to undertake this transition.
 - (v) **Revenue stability.** The framework must include respect for program services' need for revenue stability, in light of the projected impact of migration on both subscription and advertising revenues.

The Post-Transition Regulatory Framework

6. The CAB proposes the following regulatory framework that should apply in a post-transition environment, as an essential first step in guiding the migration of analog service to digital and the conversion to HD programming formats.

7. **Digital basic service.** For cable BDUs, there should be a digital basic service, equivalent to the current analog basic service, provided to all subscribers for the basic monthly fee. For DTH BDUs, the basic service should, at a minimum, be as currently required plus those specialty services entitled to digital basic service distribution.
8. **Access rules.** Current access rules should continue to apply throughout digital migration and the transition to HD. In a post-transition environment, access should no longer be subject to “available channel capacity”, but should be guaranteed without exception.
9. **Distribution status.** The existing dual status and modified dual status designations for cable should continue to apply when analog specialty services are migrated to digital. Furthermore, those designations should apply to all types of BDUs, including DTH.
10. **Wholesale fees.** The Commission should continue to set the wholesale fee for a dual status or modified dual status service that is distributed as part of the digital basic service.
11. **Dispute resolution.** The Commission must be prepared to resolve disputes re the terms of discretionary digital distribution through expedited dispute resolution.
12. **Linkage rules.** Current linkage rules should be continued in a digital environment. Non-Canadian HD services should be linked only with Canadian HD, not SD, services.
13. **Genre protection.** Current genre protection policies should continue to apply to the licensing new Canadian services and to proposals for new non-Canadian services.
14. **Authorization of additional non-Canadian services.** Any non-Canadian service that is wholly or partially competitive with a Canadian specialty or pay service should not be authorized. This should explicitly apply to new non-Canadian HD services, since the HD version of a non-Canadian service in an existing genre does not represent a new genre.
15. **Predominance.** Distinguish between SD and HD services; i.e. require a predominance of Canadian SD services vs. non-Canadian SD services and a predominance of Canadian HD services vs. non-Canadian HD services.

Guiding the Digital Migration/HD Transition

16. The following transitional guidelines pertain to (1) the digital migration of specialty services, and (2) the licensing and distribution framework for HD-transitional services.
17. **Prior consent before migration/duplication.** A cable BDU must obtain the prior written consent of a programming service before duplication or migration. This should apply in all circumstances except the complete duplication of an existing analog tier on digital, without offering any of the services in that tier in other digital packages, and while leaving the analog tier intact for analog-only subscribers.

18. **Circumstances where a programmer’s consent can reasonably be expected.** A programmer can reasonably be expected to consent to the digital distribution of its service provided that: (1) the programmer will be substantially no worse off, in terms of wholesale fees received, than it was in the analog-only environment; and (2) the proposed terms of digital distribution adhere to the following principles:
- (i) Tier migration may occur when 95% of the tier subscribers have one or more digital boxes, and the cable BDU provides at least 120 days prior notice.
 - (ii) Each analog tier is migrated in its entirety and should continue to be offered in digital on a permanent basis.
 - (iii) The cable system may offer thematic packages provided that each package contains at least eight services, including at least four services that were previously authorized for analog distribution and of which at least two must be Canadian.
 - (iv) A programmer would not be expected to agree to *à la carte*, pick pack or small theme pack distribution of its service.
 - (v) BDUs should promote the value of all-in and large packages to their subscribers, in priority to thematic packages and any smaller, customized packages.
 - (vi) A sliding scale for the wholesale fee based on penetration or volume to ensure that the programmer is substantially no worse off in terms of subscription revenues.
 - (vii) Unaffiliated specialty services should be treated no less favourably than BDU-affiliated specialty services, exempt services and non-Canadian services.
19. **Licensing framework for HD-transitional services.** A simple licence amendment only should be required to authorize the provision of an HD-transitional service associated with an SD service. The CAB agrees with the Commission’s proposal (1) to allow up to 14 hours weekly of unduplicated programming on the upgraded version of a specialty or pay service; and (2) to require all unduplicated programming to be in HD, to conform to the service’s nature of service definition and conditions of licence, and to be at least 50% Canadian in origin.
20. **Genre protection.** Genre protection vis-à-vis the licensing of new Canadian services should be maintained throughout the transition to HD. The Commission’s proposed “use it or lose it” approach for HD-transitional services is unwarranted.
21. **HD threshold for guaranteed BDU access of an HD-transitional service.** The Commission’s proposed threshold respecting the amount of HD content that would be required to grant an HD-transitional service mandatory BDU carriage is unrealistic. The CAB proposes the following thresholds re the amount of HD programming an HD-transitional service must provide in order to guarantee BDU carriage.
- **English language services:**
 - in the first year, 25% HD content during the evening broadcast period;
 - in years two, three, four and five, a graduated scale from 30% to 45% for HD content during the evening broadcast period;
 - by the sixth year, 50% HD content during the evening broadcast period.
 - **French-language services:**
 - in the first year, 15% HD content during the evening broadcast period;

- in years two, three, four and five, a graduated scale from 18% to 27% for HD content during the evening broadcast period; and
 - by the sixth year, 30% HD content during the evening broadcast period.
 - **Ethnic services:**
 - separate thresholds determined on a case-by-case basis for each service.
 - Any service for which such generally applicable thresholds might not be appropriate should have the right to apply for a threshold tailored to its particular circumstances.
22. For any programming service that meets its HD threshold requirement, access to BDU distribution should be guaranteed subject only to “available channel capacity”, as defined in the *Broadcasting Distribution Regulations*, and including any capacity occupied by non-Canadian HD channels.
23. **Distribution status for HD-transitional services.** HD-transitional services should retain the distribution status of the service with which they are associated.
24. **Predominance rule.** The Commission should require all BDUs to distribute a predominance of Canadian SD services vs. non-Canadian SD services, and a predominance of Canadian HD services vs. non-Canadian HD services. In the early stages of the HD transition, however, if the number of non-Canadian HD services currently distributed exceeds the number of Canadian HD-transitional services, a BDU would be permitted to continue with that imbalance provided that:
- no new non-Canadian HD service is distributed until there is a predominance of Canadian HD services; and,
 - the BDU carries all Canadian HD-transitional services as they become available, irrespective of the mandated HD threshold, until predominance is re-established.
25. **Authorization of non-Canadian HD services.** The Commission should consider authorizing non-Canadian HD services based on its current genre protection policy, but only after the migration/HD framework is finalized. There should be no automatic authorization of the upgraded HD version of a non-Canadian service currently authorized.
26. **Promoting the HD transition.** Additional regulatory measures should be considered to encourage and speed the transition to HD, in view of the significant costs and risks.
- **Treat HD costs as eligible Canadian programming expenditures.** Allow a portion (e.g., 50%) of the costs of providing an upgraded HD service to be counted as eligible Canadian programming expenditures, and allow corporate groups to average HD program expenditures across all their services.
 - **Wholesale fees.** The Commission should be prepared to entertain an application from the licensee of a dual status or modified dual status specialty service to increase its regulated wholesale fee, applicable when the service is distributed as part of the basic service, in recognition of the increased costs of HD.

INTRODUCTION

1. The Canadian Association of Broadcasters (CAB) – the national voice of Canada’s private broadcasters, representing the vast majority of Canadian programming services, including private television and radio stations, networks and specialty, pay and pay-per-view television services – is pleased to submit these comments in response to Broadcasting Public Notice CRTC 2005-1 *Call for proposals for a framework to guide the migration of pay and specialty services from analog to a digital distribution environment* (PN 2005-1, the “digital migration framework proceeding”) and Broadcasting Public Notice CRTC 2004-58 *Call for comments on a proposed framework for the licensing and distribution of high definition pay and specialty services* (PN 2004-58, the “HD framework proceeding”).

Goals for the digital/HD broadcasting system

2. Digital migration and the transition from standard definition (SD) to high definition (HD) formats will fundamentally affect the way in which television programming is produced, transmitted, distributed and viewed. While the impact of such changes can never be fully anticipated, experience teaches us to expect large-scale alterations to the business model of both programming services and broadcasting distribution undertakings (BDUs), and consequently to the balance of the entire Canadian broadcasting system.
3. Canada’s private broadcasters believe strongly in the promise of the new technologies available to them and fully intend to make use of all of their benefits. Successful adaptation of the different features made possible by the digital platform will be crucial to the success of Canadian pay and specialty services in attracting audiences and keeping Canadian viewers in the Canadian system. The CAB therefore welcomes this opportunity to participate in the establishment of a regulatory framework that will encourage pay and specialty services to successfully implement their new digital and HD programming streams.
4. As a starting point, the CAB submits that the digital migration and HD framework should be guided by a vision of a successful future whose fundamental objective is the success of Canadian programming and Canadian services. Technology is a means to this end, not an end in itself.
5. A change in the technology that determines how programming is delivered to Canadian viewers (whether from analog to digital distribution or from SD to HD programming formats) does not automatically mean that the current regulatory framework should now be abandoned. Instead, going forward the regulatory framework must reconcile the opportunities for additional flexibility created by new technology with the key elements of the current framework that have contributed to today’s successes, to ensure that those successes can continue in the all-digital environment.

6. The Commission previously met the challenge of choice while keeping fundamental principles intact – favouring Canadian services and maintaining business rules that allow those services to flourish and make a contribution. The Commission can do the same with the challenge of quality brought on by digital migration and the transition to HD.

The principles of the *Broadcasting Act* remain the guide

7. The CAB believes that the transition to a fully digital broadcasting system can be successfully managed, notwithstanding the challenges that must be overcome, if the transition is firmly guided by the policy objectives of the *Broadcasting Act* (the Act). This will foster the achievement of several goals:
 - a vibrant, diverse and technically advanced broadcasting system;
 - strong Canadian programming choices in English, French, and third languages, complemented by non-Canadian programming services from around the world;
 - appealing programming content, utilizing the capabilities of digital technology, including HD and interactivity;
 - programming that meets the demands and needs of Canadian consumers, and keeps them connected to the Canadian broadcasting system;
 - an appropriate balance between the regulatory obligations and protections applicable to programming services; and,
 - an appropriate balance in the business relationship between programming services and BDUs.
8. The CAB is enthusiastic about the promise and potential of a digital, HD broadcasting universe and looks forward to working with the Commission and other players in the Canadian broadcasting system to resolve the many regulatory, business and technology challenges that must be addressed.

Three digital transitions

9. Digital television is not a single technology. It is rather a platform that offers its users many opportunities – expanded choice, higher picture and sound quality, interactivity, and so on. The current proceedings initiated by PNs 2004-58 and 2005-1 directly address two of the digital transitions that are now beginning to impact the broadcasting industry and will do so for several years, namely, digital migration and the transition to HD. The first transition, expansion of choice, began in the 1990s and has accelerated in recent years due to the capacity benefits of digital compression, and will continue to be a factor throughout the development of the other two transitions.

(1) Expansion of choice

10. If we are confident about our ability to shape our future, it is in part because the system has responded well to the first transitional opportunity presented by digital technology – that of choice. In the mid 1990s, it had become evident that digital

compression technologies would make it possible to provide viewers with hundreds of new services. The question at that time was how to absorb such a large-scale change.

11. In the end, the Commission chose to promote Canadian choices and the broadcasting system in place today reflects that determination, with hundreds of new Canadian channels authorized and scores launched. The Commission met the challenge within the objectives of the Act, using digital technology to better serve the public interest with strong Canadian services.

(2) Migration of analog services to digital

12. Even before the system has fully absorbed the impact of expanded choice, however, the industry is now entering the second part of the digital transition, the migration of all analog services on cable BDUs to digital-only distribution.
13. The first part of the digital transition has facilitated choice as an additional feature overlaid on the analog cable distribution system. To a great extent, the stability of the analog business model has allowed program groups to maintain the overall revenue base that has permitted expansion.
14. Fully digital BDUs, however, do not necessarily provide that stable model, as programming services are exposed to the uncertainty that accompanies the potential for smaller packages and more customized choices. Digital choice means that BDUs have the ability to maximize their revenue by creating new combinations of service offerings. Subscribers can then choose among these more flexible offerings and tailor their subscriptions to their taste. More flexible authorization schemes may allow them to change their minds frequently, creating the potential for much greater “churn” and revenue instability.
15. The Commission is faced with the task of establishing the guidelines that will govern the migration of analog services from the more stable and predictable analog cable environment to the uncertainty and potential disruption associated with digital distribution. Once again, it will be important for the Commission to be guided by the underlying broadcasting policy goals of the Act to ensure this second part of the digital transition supports, not undermines, Canadian programming choices.

(3) The transition to HD

16. While the broadcasting system continues to absorb the first part of the digital transition, expanded choice, and at the same time embarks on the second part of the digital transition, migration, the third aspect of the digital transition is also underway, namely, the transition to HDTV.
17. Up to now, expanded consumer choice has been the preferred use of digital technology, but the advent of HD presents the second option – using digital technology to improve the image and sound offered to viewers. To a great extent,

this choice is a trade-off. If distribution capacity is used to deliver higher quality, it reduces the ability to provide choice, and vice-versa. There is also the question of economic capacity to consider: will subscribers simply add HD services to their existing menu of choice, or will they trade quality for choice within the limits of their current expenditures?

18. The transition to HD presents many new challenges – additional costs, uncertain consumer demand, technical capacity issues and availability of HD programming – all of which must be considered in the current proceedings. Nevertheless, it is possible to be optimistic about the future if the Commission approaches it prudently and remains guided by the Act.

Challenges for digital migration and the transition to HD

19. When provision of choice was simply a matter of adding new services to a stable analog system, it raised the issue of audience and revenue fragmentation. At the same time it offered an attractive business model based on the historic benefits of packaging, with new subscriber fees attached to the new services. Digital migration, however, has the potential to undo the benefits of analog packaging. Migration and the transition to HD thus offer new challenges, and do so without the stability of the current business model.

Digital migration: uncertainty and instability

20. For programming services, the increased flexibility desired by digital cable BDUs means more churn – instability – and generally lower subscriber numbers. This is demonstrable in our current environment: most analog specialty and pay services achieve a lower penetration on the fully digital DTH systems than they do on cable. So migration presents programming services with two major issues – instability and the potential of lower revenue.
21. The ultimate degree of instability in a fully digital distribution environment is the offering of services on an *à la carte* basis or in small, themed “mini-tiers”. Some observers see such individually customizable packaging options as an inevitable and desirable consequence of digital technology. Indeed, the Commission’s proposed migration framework contemplates elimination of the dual status/modified dual status regime and a reliance on negotiated distribution arrangements, seemingly paving the way for the offering of smaller, more customized packages to subscribers.

***A la carte* and small themed tiers: contrary to the public interest**

22. It is instructive to consider the findings of a study of *à la carte* and themed-tier proposals conducted last year by the Federal Communications Commission (FCC) in the United States. After an extensive inquiry involving numerous written comments and reply comments, as well as a symposium to further examine *à la carte* and

themed-tier proposals, the FCC issued a detailed report¹ (the Report) which reached a number of conclusions that are directly relevant to the Commission's current consideration of the digital migration framework.

23. Specifically, in the "Introduction and Summary" section of the Report, the FCC summarized key conclusions as follows:
- "Bundling" or "tiering" [i.e. the offering of larger tiers equivalent to the analog tiers currently offered by Canadian cable BDUs] "...produces several benefits for cable and satellite households. For example, commenters suggest that the bundling of distinct program networks lowers transaction costs, helps programmers reach economies of scale and enhances the attractiveness or convenience of the product to consumers. Indeed, the Report discusses how tiering allows a video programmer to recover a larger percentage of its costs from consumers that value its programming highly and a smaller percentage from consumers that value its programming less highly. In this way, consumers of different program networks are able to, in a sense, cross-subsidize each others' viewing habits, allowing new and diverse programming to exist in the marketplace. Additionally, bundling may actually enhance consumer sovereignty by creating a mechanism for consumers to have access to a wide variety of viewing choices serving many diverse, niche viewer interests."
 - "The Report concludes that *à la carte* regulation² will likely increase operational expenses for MVPDs³ in three main areas: (1) equipment and infrastructure; (2) customer service operations; and (3) billing and back office support. Unless constrained by regulation, many of these increased costs would likely be passed on to subscribers, resulting in higher subscriber fees."
 - "The Report also finds legitimacy to programmers' concerns about an *à la carte* regime... [N]etworks formerly sold in tiers would need to significantly increase their marketing expenses to induce consumers to affirmatively select the network. Moreover, any type of *à la carte* requirement would have a significant negative effect on a program network's advertising revenues and licence fee structure. The loss of cost savings, combined with the loss in advertising revenue and the likely rise in licence fees to compensate such losses, may cause many program networks to fail, thus adversely affecting diversity."
24. The CAB submits that the concerns identified by the FCC with respect to the offering of services on an *à la carte* or mini-tier basis are even more serious in Canada with its smaller subscriber base. The potential impact on both subscription and

¹ *Report on the Packaging and Sale of Video Programming Services to the Public*, Federal Communications Commission, November 18, 2004.

² The scope of the FCC inquiry includes both *à la carte* and themed-tier proposals, and the use of the terms such as "*à la carte* regulation" and "*à la carte* regime" in the Report is understood to apply to small themed tiers or "mini-tiers" as well.

³ Multichannel video programming distributor, equivalent to Canadian BDUs.

advertising revenues resulting from the repackaging of services, in either an analog-digital duplication scenario or a full digital migration scenario, would be damaging to the economic viability of many specialty services.

25. In short, *à la carte* and mini-tier offerings are contrary to the public interest because they result in higher subscriber fees and an overall loss of diversity in the system.

The HD transition: higher costs

26. At the same time as the revenues of specialty services could be drastically reduced by the impact of digital migration, those same services will be undergoing a transition to HD formats, with attendant higher costs for capital equipment, for program production and acquisition, and for the delivery of additional and more expensive HD signals.
27. These costs, and the reasons for them, are described in detail in a study prepared by Wall Communications Inc., Appendix 1 of this submission, and in Appendix 3 describing the satellite distribution capacity requirements of the HD transition. Distribution capacity requirements will be significant, since these are fixed costs applicable to all services that must be recovered, one way or another, from the fees paid by BDU subscribers.
28. These costs should not be borne in their entirety by program services, whose responsibility should be limited to making their signals available to BDUs. They are, however, a factor that must be considered in assessing the overall economics of providing and paying for program services. Depending on the technology deployed, technical costs could increase the cost of the delivery system by \$1.25 million to \$2.25 million on average for each HD service in the system.
29. In general, we should be aware that the cost of providing HD quality must come from somewhere. A full system transition would require two or more satellites, even assuming major compression efficiency improvements, and satellites are expensive.

The migration/HD business plan: difficult at best

30. As specialty and pay services make the transition to a fully digital, HD environment, their business plans will be affected in a number of ways.
31. First, more flexible packaging would mean lower penetration of programming services that are currently carried in analog tiers or in some cases as part of the basic service, resulting in lower subscription revenues and advertising revenues.
32. Second, specialty and pay services have high annual costs for the distribution of their signals. These would multiply by a factor of five or more, as noted above.
33. Third, significant cost increases to implement and deliver HD programming, combined with a substantial reduction in revenues resulting from migration and

- repackaging, would result in a squeeze on those costs that are variable – programming costs and staff salaries.
34. The costs of foreign programming will not be reduced as a result of these changes, but Canadian programming expenditures in particular may be forced into decline. If revenues decrease, expenditures on Canadian programming required of the licensee will also decrease in proportion to revenues. Furthermore, licensees might have no choice but to apply for a reduction in the obligatory percentage of revenues they are required to be spent on Canadian programming, since the margins that support these obligations would be squeezed substantially. In cases where a smaller service does not have the subscriber revenue to sustain high fixed distribution costs, they could be driven into a loss situation unless they drastically reduce programming costs.
35. The inevitable result would be a downward spiral in the economics of the service – less money for programming means lower quality, which leads to fewer subscribers, which results in further reductions in both subscription and advertising revenues, which results in even less money for programming, and so on.
36. The Wall Communications study in Appendix 1 analyzes the economic impacts of migrating analog specialty and pay services to a digital environment as well as transitioning all pay and specialty services from SD to HD formats. The objective of the analysis is to examine the expected impacts of these two factors on the revenues and costs of the Canadian pay and specialty sector.
37. The key conclusions of the Wall Communications study are as follows:
- The combined impact of digital migration and the transition to HD results in a significant decline in revenues for analog services, offset in part by gains made by Category 1 and Category 2 digital services, and a substantial increase in costs for all pay and specialty services.
 - Industry-wide net revenue reductions resulting from migration are estimated to be \$80 million, based on the assumption that cable packaging and penetration of specialty services in a digital-only cable environment will be comparable to that experienced for DTH distribution.
 - Total industry operating expenses due to the HD transition are estimated to increase by between \$193 million (Scenario 1) and \$429 million (Scenario 2), depending on the precise capital cost requirements, incremental programming costs and satellite distribution costs.
 - Industry pre-tax profits decline from 18% in 2004 to between 1% (Scenario 1) and -14% (Scenario 2).
 - Levels of spending on Canadian programming, required by condition of licence as a percentage of revenues, could decline by up to \$83 million annually in the

case of the analog services. In addition, some services may be forced to seek reductions in their percentage requirements in order to restore an acceptable level of profitability.

- Some pay and specialty services would not have the financial resources to convert to HD.
38. These results demonstrate that, at best, with reasonable guidelines for migration and a degree of flexibility with respect to the provision of HD programming, the business plan for a post-migration, fully HD universe is difficult for broadcasters and may have strong unintended negative consequences for Canadian programming.
39. This is not to say that the transition should not be undertaken. In the CAB's view, the HD transition is not optional, it is a necessity. But it is evident that there will be no viable business case for a number of services to successfully complete the migration/HD transition if the terms of digital carriage are left solely to negotiation between BDUs and programmers, with no guidelines respecting carriage, packaging, or wholesale rates for programming services.
40. It is on this basis that the CAB proposes in this submission that (1) a programmer's prior consent to migration to mitigate potential revenue damage, and (2) flexibility and incentives during the HD transition must be a part of the regulatory framework going forward.

HD programming supply: limited

41. Apart from the higher costs associated with the production of original HD programming, specialty and pay services face a considerable amount of uncertainty with respect to the amount of third-party HD programming available for broadcast on any given service, and the rate at which the supply of such HD programming will increase over time.
42. The Canadian Television Fund (CTF) has provided data to the CAB on the amount of HD and HD-compatible programming⁴ supported by the CTF in the last two years. This data shows that the volume of HD productions supported by the CTF is modest, but growing, with 150 hours of new HD productions made possible with CTF support in 2004-2004, up from about 92 hours of HD productions in 2002-2003. In the past year, HD or HD-convertible programming represented 7% of all hours supported by the CTF.
43. A study of the availability of HD programming on selected television programming services in the U.S. prepared by Armstrong Consulting is included as Appendix 2 of this submission. It provides the following conclusions:

⁴ Hours of programming either shot by the producer or delivered to the broadcaster in HD or 35 mm.

- There was only about 110 hours of new HD programming broadcast in a typical week over the 33 services examined in the study. The majority of this new programming was broadcast on the seven major broadcast networks.
 - Those U.S. services that are actively trying to make a full transition to HD (i.e., the major commercial networks) are currently at only about 13% HD relative to their entire broadcast schedules, and about 37% of their prime time schedules.
 - HD content is generally not established across a wide spectrum of programming. Currently HD is predominantly found in sports and movies.
 - U.S. cable operators are carrying all HD network services in any event, even though they are well below the CRTC's proposed 50% threshold.
44. These results demonstrate that, at present, the amount of HD programming broadcast in the United States is limited and insufficient to meet the ongoing needs of Canadian services in most genres attempting the HD transition. Clearly, the amount of programming available would be insufficient to meet the Commission's proposed 50% threshold to guarantee BDU carriage.

Technical capacity to deliver an all-HD system: unclear

45. The transition to HD requires an evaluation of the ongoing technical capacity of the system at several points in time – now, during the next years of the transition, and at some unspecified point in the future when the transition may be considered substantially complete. This is a difficult task and not without uncertainty – the promise of future technological advances that improve the capacity of the entire system are a key consideration. It is conceivable that the system may ultimately be able to provide both better quality and the huge choice in services it currently provides. The current projections for technical advances, however, put real limits on how much quality we will be able to offer in a system founded on the provision of greater choice.
46. Cable BDUs will be able to develop the capacity needed to carry all HD services. The CAB notes there are continuing developments with respect to cable network architectures and modulation techniques that, along with further advances in compression technology, could provide for much more efficient use of BDU bandwidth. The real bottleneck is likely to occur with respect to satellite capacity, both for delivery of HD signals to BDUs and for DTH distribution.
47. What can be anticipated, therefore, is that the system will not be able to absorb a true “replacement” model in the medium-term future – all current services moving to HD at the same time – because there simply will not be sufficient satellite capacity to deliver such a model. Nor is it clear that sufficient capacity will be created. Even if there were enough orbital positions to accommodate the new satellites, it would have

to be paid for, and it is not clear that the market has the capacity to absorb those costs.

48. Appendix 3 provides further background on issue as it relates to the capacity to deliver HD specialty and pay services to cable and DTH BDUs. Specifically, the conclusions of Appendix 3 are:
- At least two new satellites, and quite possibly three or four, will be required to provide sufficient capacity to carry the HD signals of the Canadian broadcasting system through the HD transition.
 - Without substantial sources of new revenue, it will very difficult if not impossible to recover the costs of the new facilities required to distribute the HD versions of Canadian pay and specialty services.
 - It will be essential to secure sufficient orbital slots for the Canadian requirement.
49. Other parties may adopt more optimistic assumptions about the impact of new technology to lower the capacity requirement. Based on what is in evidence so far, the CAB submits that these conclusions will continue to be valid even under more optimistic scenarios.

Consumer acceptance of HD: uncertain

50. One of the great uncertainties in the transition is the question of whether the majority of consumers want, and will pay for, true HD in all services, or whether they will accept less expensive picture formats for much of their television viewing. In short, is wide-screen SD a more realistic alternative for some services and their audiences?
51. It is easy to be persuaded by the expanding sales of HD sets that HD formats are the only future. But before accepting this as fact, one must account for the startling fact that the clear majority of consumers who are buying wide-screen HD receivers are not hooking them up to any source of HD programming. According to a national survey of 2,002 adult Canadians conducted by Decima Research Inc. in May and June of 2004⁵, only 29% of the respondents who claimed to have an HD display reported that they have their HD display connected to an HD set-top box provided by a cable or DTH BDU. Even in the United States, just over one-third of HD-capable households actually subscribe to HD programming⁶.
52. This phenomenon is not completely studied and explained, but one can conclude, at a minimum, that most owners of expensive HD sets are content to use them to watch wide-screen SD images, that is, wide-screen movies from SD DVD sources.

⁵ THE DIGITAL DOMAIN: Consumer Attitudes on Digital Television services, Benefits, and Features in Canada, Decima Research Inc., 2004.

⁶ Presentation by HDNet to the Canadian Satellite Users Association Conference, February 1-2, 2005, Toronto.

These are in fact very high quality images and the great majority of HD screen owners appear to find them sufficient for their needs.

53. It is important that we understand this phenomenon before committing ourselves to a framework that may force all services will ultimately be in HD. The system may be better served by acknowledging that some services may wish to provide wide-screen SD signals as an attractive alternative, given costs, capacity limitations and availability of programming.

Principles for the digital migration/HD frameworks

54. Although there are many uncertainties and risks associated with digital migration and the transition to HD, the CAB remains confident that the next steps of the digital transition can be navigated as successfully as the steps already undertaken. The key to success is to be guided by the principles of the Act and to create a regulatory framework that encourages the provision of strong competitive Canadian programming services.
55. To this end, the CAB proposes that the Commission endorse certain principles that, if adopted, would provide the best chance for success – for programmers, for consumers, for BDUs and for the attainment of the objectives of the Act. They are: (1) regulatory certainty, (2) genre protection, (3) flexibility, (4) incentives, and (5) revenue stability. The CAB's specific proposals, outlined in the balance of this submission, are consistent with these principles.

(1) Regulatory certainty

56. Regulatory certainty, with clear rules balancing the interests of all parties, is an essential pre-condition to the digital and HD transitions. As discussed above, digital migration is weighted with uncertainty if the terms of migration are unknown, or if they are left to case-by-case negotiations between programmers and BDUs without a framework within such negotiations can be conducted.
57. Elimination of the dual status/modified dual status regime and discontinuance of the regulation of wholesale fees, both of which are contemplated in the digital migration and HD framework proceedings, along with an absence of clear guidelines respecting packaging and pricing in a digital environment, would worsen an existing negotiating system that is already unbalanced in favour of BDUs. It would create a totally untenable situation where BDUs would be able to essentially dictate terms of digital distribution to programmers, to the detriment of individual services and to the diversity of the broadcasting system as a whole.
58. A regulatory framework that is realistic and fair to all parties, while still leaving room for negotiations between programmers and BDUs, will best serve the objectives of the Act. In particular, the CAB submits that the fundamental principle of prior

written consent on the part of a programming service before migration of the service must be the cornerstone of any regulatory framework for digital migration.

59. In turn, programmers confirm that such consent would not unreasonably be withheld, provided that the proposed terms for digital distribution are such that the service is substantially no worse off than it was in an analog-only environment. In the next section, the CAB proposes specific guidelines respecting the carriage, packaging, pricing and promotion of services in a digital environment to achieve this goal.

(2) Genre protection

60. The principle of genre protection has been fundamental to the many successes to date of the Canadian specialty and pay services sector. At a time when specialty and pay services are now attempting to develop workable business plans to support their migration to fully digital distribution and the provision of HD programming, it is more important than ever for the Commission to maintain the principle of genre protection in order not to further undermine the already fragile economics of the digital/HD transition.
61. Continuance of genre protection is crucial with respect to both the licensing of new Canadian specialty and pay services, and to the potential authorization of new non-Canadian services for distribution in Canada.
62. With regard to the licensing of new Canadian specialty and pay services, the CAB submits that the Commission must continue to take into account the extent to which proposed new Canadian specialty and pay services, whether SD or HD, would be competitive with existing analog and Category 1 services.
63. Specifically, the CAB urges the Commission to review its proposed HD-transitional licensing policy whereby it would entertain an application for a new Canadian service in a genre competitive with that of an existing Canadian specialty or pay service, if the existing service did not apply for an HD-transitional licence within a “reasonable” period of time. For the reasons detailed later in this submission, the CAB submits that the policy of genre protection should continue to apply relative to the licensing of new Canadian specialty and pay services throughout the transition to HD.
64. Maintenance of the genre protection principle is of even greater importance vis-à-vis the consideration of proposals to authorize new non-Canadian services for distribution in Canada. The CAB submits that the Commission must continue to reject any proposal to add a new non-Canadian service to the lists of eligible satellite services if that service competes in whole or in part with an existing Canadian specialty or pay service. Furthermore, in applying this principle, the Commission must assess any proposal to add a new HD non-Canadian service in terms of the genre of its programming, not its underlying technology.

65. To authorize BDUs to distribute a non-Canadian HD service with programming in a genre that is wholly or partially competitive with a Canadian SD service could pre-empt the ability of the Canadian service to acquire the HD version of programming needed for the Canadian HD-transitional service, slowing or precluding the transition to HD in Canada.
66. HD programming is not a genre in and of itself, and the potential availability of non-Canadian HD services must not be used as an excuse to dilute the principle of genre protection.
67. Finally, the CAB is particularly concerned with regard to the growing trend in the U.S. towards HD services that are essentially omnibus or compilation channels, with HD programming from a number of different genres. HDNet and Discovery HD Theatre, the two services proposed by the Canadian Cable Telecommunications Association (CCTA) in a separate proceeding, are typical examples of such compilation channels.
68. Services such as HDNet and Discovery HD Theatre are in fact services in transition, and eventually are likely to split into several more focused channels in specific genres as the supply of HD programming increases. The Commission must exert extreme caution when considering proposals to authorize such channels for distribution in Canada, because they will be competitive with a number of Canadian specialty and/or pay channels in several different genres.

(3) Flexibility

69. Along with regulatory certainty, there must be a recognition that the HD transition is characterized by uncertainty in a number of areas – costs, consumer demand and take-up, and program supply to name a few – and that a degree of flexibility is essential in the application of the HD transition framework.
70. For example, certain types of programming – sports, drama, motion pictures, documentaries and other film-based content – lend themselves well to HD and viewers benefit greatly from the HD viewing experience. Other types of programming – news and information formats, “how-to” shows and reality programming are examples – might be more suited to wide-screen SD production providing an enhanced viewing experience entirely satisfactory to viewers with HD and SD displays.
71. Since that is the case, the approach to the transition should recognize that the use of formats other than strict 720p or 1080i HD sources may be appropriate for some services, since they appear to satisfy most viewers, occupy much less capacity, and represent a quality improvement that those services can afford to implement and that BDU capacity can absorb.

72. The uncertainties associated with the supply of HD programming and the costs of producing HD content also argue for flexibility in the imposition of any thresholds of HD programming required to assure BDU carriage of a given service.

(4) Incentives

73. As discussed above, there is a danger that the regulatory framework accompanying the digital and HD transitions will compound the risks for program services if it abandons the fundamental principles that support their core businesses and allow them to contribute. If so, it will in effect create disincentives to the change, which would be contrary to the goal of the Act that the Canadian broadcasting system be readily adaptable to scientific and technological change.
74. The migration of specialty services from analog to digital distribution, if not properly managed, could undermine both subscription and advertising revenues. At the same time, the conversion to HD requires additional capital costs and incremental programming expenses, without the prospect of incremental advertising revenues to help offset those increased costs.
75. Although the economics are at best uncertain, the specialty and pay sector understands the importance of moving forward with the digital/HD transition within a time frame that meets the needs of Canadians and allows the industry to compete effectively with non-Canadian alternatives. To help stimulate a more rapid transition, the CAB therefore urges the Commission to consider certain incentives for programming services to undertake the transition.
76. If the digital and HD transitions are to succeed, the adoption of targeted incentives, to prompt services to move rapidly of their own accord, is highly desirable.

(5) Revenue stability

77. The regulatory framework adopted by the Commission for digital migration must address the issue of revenue stability, in light of the serious impact on both subscription revenues and advertising revenues that could otherwise result.
78. This issue is addressed primarily through the guidelines for digital migration that are proposed by the CAB in the context of the provision of prior consent to migration proposals.
79. It may seem, after this long list of challenges, that Canada's pay and specialty services are not optimistic about the prospects for a digital future. This is not the case. As noted earlier, Canada's broadcasters believe that the transition can be made to work, and to work to the benefit of the Canadian broadcasting system. To do so, however, the regulatory framework must provide a degree of flexibility, incentive and stability that will permit services to move forward through an environment of greater risk and uncertainty, but with the prospect of using their investment in the future to build viable and attractive services for Canadians.

THE POST-TRANSITION REGULATORY FRAMEWORK

80. In PN 2004-58, the Commission identifies three stages in the transition to digital and HD. Cable BDUs are currently in the first stage of this transition, with a mix of analog and digital services distributed to subscribers.
81. In Stage 2, the Commission anticipates that cable BDUs will have migrated all analog programming services to digital and will have discontinued all analog service offerings, thereby providing additional bandwidth for Canadian programming services to access cable distribution capacity. Subscribers would therefore receive all programming services in digital format, but the programming would constitute a mix of SD and HD formats, varying from service to service and from program to program within individual services. DTH undertakings are currently in this second stage.
82. The Commission describes the third and final stage of the transition as one in which all BDUs are fully digital, no longer distributing services in analog format. Furthermore, the Commission anticipates that SD services will have been phased out and all services will be produced and distributed in HD. The Commission acknowledges that, even when the transition is complete, some programs in HD services may remain in SD format, and some television displays may not show the full resolution of HD signals.
83. The Commission's third stage, therefore, is intended to represent the ultimate goal in the conversion of the Canadian broadcasting system to digital broadcasting. As such, the CAB submits that a clear understanding of the regulatory framework that should apply to BDUs in the post-transition environment is an essential first step in guiding the migration of analog services to digital and the provision of HD programming.

Assumptions

84. The CAB's proposed post-transition regulatory framework is based on a view of the environment after the digital/HD transition that is similar to the third stage envisaged by the Commission, but with certain important differences. Specifically, the CAB has made the following assumptions about the post-transition environment:
85. All subscribers will be capable of receiving HD signals. BDUs will distribute all signals in digital and programming services will generally only have to make available a single digital feed to each BDU.
86. The majority of Canadian specialty and pay services will provide their programming schedules in HD formats. As noted by the Commission, however, individual programs might still be produced in SD wide-screen formats. In addition, the CAB submits that there may be certain services that, due to the nature of their programming and audience appeal, remain in SD wide-screen format.

87. Capacity constraints will have been reduced, such that most cable BDUs will have the technical capacity to carry all Canadian programming services in the format delivered by each service, whether SD, HD or some combination of the two⁷. The system will be increasingly diverse and, at the same time, increasingly fragmented.
88. With appropriate support mechanisms and a regulatory framework that builds on past successes, Canadian programs in all genres will be able to thrive in a digital environment. Programmers will be able to leverage the technical quality enhancements inherent in digital and HD transmissions to create and broadcast Canadian programming that appeals to viewers and is able to attract an increasing share of the audience.
89. At the same time, it is acknowledged that digital and HD technologies are simply tools that offer choice and quality and the ability to attract Canadian audiences to Canadian programs. Such tools are important factors, but it is also true that good scripts, good acting and compelling content remain the essential drivers.
90. Programmers will be able to exploit other attributes of digital technology, such as interactivity, direct links to companion web sites and PVR/VOD functionality, to further enhance the viewing experience.
91. A digital basic service, equivalent to the current cable analog service, will be provided to all subscribers.
92. BDUs will provide a variety of packaging options to subscribers, ranging from larger, all-inclusive tiers to smaller theme packs, similar to the DTH options currently provided.
93. Pick pack and à la carte options will generally not be offered. Cable will have achieved competitive equity with DTH through the ability to offer theme packs similar to DTH offerings. As noted previously, *à la carte*, “mini-tier” and pick pack offerings would result in higher subscriber fees, lower penetration for individual services and ultimately an overall loss of diversity in the system.
94. Distribution rules will generally be equivalent for all distributors, whether cable, DTH, telco-owned or other.
95. These assumptions recognize the reality that current policies and regulations have been instrumental in fostering a very successful Canadian broadcasting system within the analog and hybrid analog-digital distribution environment. A multitude of

⁷ The CAB recognizes that capacity constraints currently exist with respect to DTH distributors but they are expected to be alleviated as new DTH satellite facilities are made available in the future. The Commission has announced that it will undertake a separate proceeding with respect to the obligations that should pertain to DTH carriage of HD services, at which time any potential capacity issues relevant to DTH can be more fully examined.

Canadian and non-Canadian services provide choice and diversity to viewers, while also providing strong support for the production and distribution of Canadian programming.

96. In this context, the CAB submits that the regulatory framework that should govern after the digital/HD transition is complete should be consistent with the following key provisions, all of which support fundamental broadcasting policy objectives set out in the Act.

Digital basic service

97. For cable BDUs, there should be a digital basic service, equivalent to the current analog basic service, provided to all subscribers for the basic monthly fee. The digital basic service should include the following services:

- all priority services required to be carried by regulation (generally, local, regional, unduplicated extra-regional digital stations plus any such analog stations (converted to digital by the BDU) that have not yet implemented their over-the-air digital service;
- section 9(1)(h) services;
- those specialty services entitled to digital basic service distribution, as a result of a continuance of the dual status/modified dual status regime in a digital environment.

98. Should a cable BDU have sufficient capacity to allow it to continue to provide an analog version of the basic service in the post-transition environment, both the analog and digital version of the basic service would be provided for the single basic monthly fee. There would be no additional charge for the reception of either the analog or digital version of the basic service over and above the basic monthly fee, other than a one-time purchase fee or cost-based monthly service charge for the set-top digital decoder for those digital subscribers who require a decoder provided by the BDU.

99. For DTH BDUs, the basic service should, at a minimum, be as presently required by regulation, plus those specialty services entitled to digital basic service distribution.

Access rules

100. The access rules that currently govern the carriage of specialty and pay services in anglophone and francophone markets should continue to apply throughout digital migration and the transition to HD. Furthermore, since capacity constraints should no longer be a significant factor in a post-transition environment, access of Canadian services to BDU distribution should no longer be subject to “available channel capacity”, but should be guaranteed without exception.

Distribution status

101. The CAB submits that the existing dual status and modified dual status designations should continue to apply when analog specialty services are migrated to digital distribution. As noted above, a change in technology should not result in a change to the fundamental terms of licensing and distribution on which business plans have been based and contributions made to the Canadian broadcasting system.
102. The potential loss of distribution status in a digital cable environment is of particular concern to the existing dual status services. The CAB submits that the underlying rationale for granting dual status to certain services in an analog environment is not affected by a change to digital distribution technology; if anything there is an even greater need to retain that status in a digital environment because to do otherwise could make it more difficult and costly for subscribers to access such services, and could jeopardize the level of contributions that those services make to the Canadian broadcasting system.
103. The potential economic impact of a loss of dual status on digital cable BDUs is likely to be significant. Under current rules, such services can opt for distribution as part of the basic service at a regulated rate, assuring them of maximum penetration, stable and predictable subscription revenues and an opportunity to maximize advertising revenues. This in turn results in a high level of contributions with respect to Canadian programming expenditures.
104. Without dual status designation for digital distributors, these services would be subject to unilateral repackaging without their consent in discretionary tiers, yielding reduced penetration even in highly popular tiers and potentially drastically reduced penetration in less popular tiers. Even if the loss of subscription revenues were limited as a result of penetration-dependant pricing, the potential loss of advertising revenues for former dual status services, as a direct result of reduced penetration, could be critical. The original rationale for licensing these services with high levels of contributions would be compromised in such a situation.
105. For these reasons, the CAB submits that former dual status services should continue to have the right to distribution as part of the digital basic service, at a wholesale fee regulated by the Commission. With the consent of the service, it could be distributed on a discretionary digital basis at a negotiated wholesale fee.
106. Similarly, the CAB is of the view that former modified dual status services should retain the benefits of the modified dual status regime when they are migrated to digital distribution. The key benefit is a Commission-authorized wholesale fee that would apply when a modified dual status service is distributed as part of the basic service, and the implicit endorsement of a business plan based on that regulated fee. This is discussed further below.

107. In a digital environment, modified dual status services would continue to have the right to distribution on a discretionary basis at a negotiated wholesale fee. With the agreement of both the BDU and the service, a former modified dual status service could be distributed on the digital basic service at the wholesale fee regulated by the Commission.
108. In addition, a former modified dual status service should have the right to apply to the Commission for digital dual status, based on relevant circumstances applicable to that service, for example, exceptionally high Cancon commitments or plans for a high level of HD content. Such applications would be assessed on a case-by-case basis.
109. It is equally important that, as the Commission confirms the rules for digital distribution, it also ensure that they are applied fairly to all distributors. Thus, any service that has dual status for cable should also have dual status for all other distributors, including DTH, and similarly any service that has modified dual status for cable should be granted a similar status for DTH.
110. The CAB notes that if the dual status/modified dual status regime were applied to DTH, in practice there would be little impact on existing DTH packages. It would serve, however, as an important safeguard against arbitrary and potentially damaging repackaging of dual status services in the future and would facilitate successful negotiations of wholesale fees when dual status and modified dual status services are distributed in discretionary packages. Accordingly, the CAB firmly believes that retention of the dual status/modified dual status regime must be a key element of the regulatory framework for all digital BDUs.

Wholesale fees

111. For all services granted digital dual status and modified dual status, the Commission should continue to set the wholesale fee that would apply when the service is distributed as part of the digital basic service.
112. A regulated digital basic service wholesale fee is a key component of the regulatory framework for digital migration, as it provides a reference point in terms of a service's overall business plan when it negotiates the wholesale fee for distribution on a discretionary digital tier.
113. For such services, where wholesale fees are determined through negotiation, there must be recognition of the relationship between wholesale fees, packaging and penetration.
114. Repackaging that leads to lower penetration with no offsetting adjustment in wholesale fees results in a service being substantially worse off in terms of economic viability. This not acceptable and, under the CAB's proposed transition framework re prior consent that will be discussed in the next section, would be reasonable grounds

for a specialty service to refuse to provide consent for digital duplication or migration.

115. Continued regulation of the wholesale fee for distribution as part of the digital basic service, combined with a requirement for programmer consent prior to duplication or migration, would provide a degree of balance with respect to the ability of a programmer to negotiate an appropriate wholesale fee for discretionary digital distribution.

Dispute resolution

116. Ultimately, where appropriate terms of discretionary digital distribution (packaging, wholesale fee) cannot be successfully negotiated, the Commission must be prepared to resolve the matter through expedited dispute resolution, with due regard to the service's ability to meet its business plan.

Linkage rules

117. The principle of linking non-Canadian services with Canadian services on a one-to-one basis in discretionary tiers should be continued in a digital environment. Non-Canadian HD services should be linked only with Canadian HD, not SD, services.

Genre protection

118. Existing policies with respect to genre protection should continue to apply in the post-transition environment to all specialty and pay services, other than Category 2 services, vis-à-vis the potential licensing of new Canadian specialty and pay services. The principle of genre protection should also continue to apply to the assessment of proposals to authorize the distribution of new non-Canadian services in Canada.
119. Genre protection policies have been the foundation on which the specialty and pay sector built its successes for the past 25 years, yielding a broadcasting system of tremendous diversity in both Canadian and non-Canadian services. These policies should be continued in a post transition environment to ensure those successes continue.

Authorization of additional non-Canadian services

120. There should be no change to existing policies pertaining to the authorization of additional non-Canadian services. Any non-Canadian service that is wholly or partially competitive with a Canadian specialty or pay service should not be authorized.
121. All proposals to add new non-Canadian services to the lists of eligible satellite services should continue to be subject to case-by-case consideration, with a public process, in light of existing policies.

122. Furthermore, the Commission should confirm that those current policies apply to the authorization of new HD foreign services. The HD version of a foreign service in an existing genre is not a new genre.
123. As noted previously, there is a particular concern about non-Canadian omnibus or compilation HD channels. The CAB urges the Commission to proceed cautiously with respect to the possible authorization of such channels for distribution in Canada, because they will compete with Canadian services in a number of different genres.

Predominance

124. A requirement for the overall predominance of Canadian vs. non-Canadian services should be maintained. Furthermore, the predominance provision should distinguish between SD and HD services; i.e. the Commission should require a predominance of Canadian SD services vs. non-Canadian SD services, and a predominance of Canadian HD services vs. non-Canadian HD services.

GUIDING THE DIGITAL MIGRATION/HD TRANSITION

125. The CAB submits that clear rules and guidelines are essential to an orderly transition from today's hybrid analog/SD digital environment to the post transition environment described in the previous section. The following guidelines pertain to (1) the migration of specialty services from analog to digital distribution, and (2) the licensing and distribution framework for HD-transitional services.

Digital duplication and migration of specialty services

126. The digital migration framework proceeding is intended to address the key issues surrounding the migration of analog specialty and pay services to digital-only distribution. The CAB notes, however, that the first steps towards the eventual full migration of programming services are already underway in several major markets, involving the duplication of analog services in digital, while retaining the analog tiers as presently constituted.
127. Digital distribution can involve the repackaging of services into small theme packs, or even their offering on a pick pack or *à la carte* basis. In such cases, there is a potential for significant negative impact on the business plans of affected services, even if the existing analog tiers remain intact.
128. For that reason, the CAB submits that the digital migration framework being developed by the Commission should apply to the both the duplication and migration of specialty and pay services.

Prior consent before migration/duplication

129. The most important element of the duplication/migration transitional framework is a requirement that a cable BDU obtain the prior written consent of the licensee of a Canadian specialty service before duplicating or migrating that service on the BDU's digital service offering.
130. Such a requirement would provide programmers with the ability to negotiate fair and equitable terms for the digital distribution of their services and is fundamental to the orderly transition to a digital distribution environment. Otherwise, BDUs would have the power to control and dictate the terms of access to digital distribution, to the detriment of Canadian services.
131. Experience has shown that some BDUs will take advantage of the absence of clear rules relating to distribution and packaging to make unilateral changes that seriously disadvantage programming services and undermine their continuing ability to fulfill regulatory obligations. Star Choice's intentions a year ago to unilaterally repackage a number of specialty services into lower penetration tiers, without providing reasonable advance notice or opportunity to negotiate appropriate terms, is an example of the type of disadvantage that programming services can be subject to in the absence of clear guidelines.
132. In the absence of the safeguard of the prior written consent of the programmer, repackaging of an analog service in digital may dramatically reduce subscription revenues or advertising revenues or both.
133. Accordingly, the CAB submits that the prior agreement of a programmer for digital duplication and/or migration must be obtained by a cable BDU as a safeguard against unilateral, arbitrary actions that would otherwise compromise the business plan on which the programming service relies. Such consent would normally take the form of an affiliation agreement or term sheet respecting the terms and conditions of digital distribution, including packaging and wholesale fees.
134. The requirement for prior consent should apply to all migration and duplication proposals, with the sole exception of the complete duplication of an existing analog tier on digital, without offering any of the services in that tier in other digital packages, and while leaving the analog tier intact for analog-only subscribers.

Circumstances where a programmer's consent can reasonably be expected

135. A programmer can reasonably be expected to consent to the digital distribution of its service where the proposed terms for digital distribution meet two essential conditions.
136. First, the programmer should be substantially no worse off, in terms of wholesale fees received, than it was in the analog-only environment. This fundamental requirement mirrors the current framework for digital duplication and migration for

small cable systems (Public Notice CRTC 2001-130), and should now be extended to apply to all cable systems.

137. Second, the CAB submits that it is also necessary to adopt principles respecting the packaging, pricing and promotion of programming services in a digital environment, so that their ability to maintain a reasonable level of advertising revenues is not unduly compromised.
138. This second condition is equally important because, even if wholesale fees are protected, repackaging of a specialty service in a digital environment can also greatly affect advertising revenues where exposure to potential viewers is reduced. The offering of specialty services on an *à la carte* basis or in small “mini-tiers” would be particularly harmful to the advertising revenue potential of specialty services formerly packaged in broadly distributed tiers.
139. It is evident that reduced penetration resulting from such digital repackaging would directly affect advertising revenues due to decreased audience. There are additional factors, however, that would also affect advertising revenues.
140. The amount that an advertiser is willing to pay for advertising time on a specialty service is dependent on the number of potential viewers to that service, as well as the actual measured audience. Widespread distribution in a high penetration tier provides a critical mass of potential viewers for a given service that makes it a more attractive buy for national advertisers, allowing the service to maximize its advertising revenues.
141. Seasonal viewing patterns and churn become a more significant issue affecting advertising revenues when specialty services are offered on an *à la carte* basis or in “mini-tiers”. Digital technology allows subscribers to more easily opt in and out of small packages or *à la carte* offerings, and the resulting churn on individual services would make it more difficult to establish reliable viewer ratings for the purpose of establishing appropriate advertising rates. This factor could also act as a deterrent to potential national advertisers.
142. In light of the potential impact of digital repackaging on both subscription and advertising revenues of a programming service, the CAB proposes the following principles respecting the packaging, pricing and promotion of services in a digital environment:
 - i. Tier migration may take place when at least 95% of the tier subscribers have at least one digital box, provided that the cable BDU provides at least 120 days prior notice to all Canadian programming services in the tier to be migrated.
 - ii. Each previous analog tier should be migrated in its entirety and should continue to be offered in digital on a permanent basis. This is first and foremost a matter of consumer-friendly packaging, to give analog subscribers the option to continue receiving the identical level of service in a digital format

that they previously received in an analog format. It will prevent confusion in the marketplace and allow historical packaging arrangements to be maintained without fear of preference for certain foreign or BDU-affiliated services.

- iii. In addition to offering the reconstituted analog tiers, the cable system may offer thematic packages, provided that each package contains at least eight services in total to ensure maximum value to consumers. Furthermore, any theme package must contain at least four services previously authorized for analog distribution, of which at least two must be Canadian.
 - iv. A programmer would not be expected to agree to *à la carte*, pick pack or small theme pack distribution of its service. From a competitive equity standpoint, allowing cable to duplicate its tiers and at the same time offer larger theme packs would in fact provide them with competitive equity vis-à-vis the DTH operators, since DTH does not carry the “analog” specialty services in pick-packs or *à la carte*. Furthermore, as discussed in the FCC Report, this type of packaging is not in the interests of consumers, programmers or BDUs.
 - v. BDUs should promote the value of all-in and large packages to their subscribers, in priority to thematic packages and any smaller, customized packages. While there may be a variety of packaging and pricing options available, subscribers should have incentives for the take-up of a greater number of services.
 - vi. Wholesale pricing for digital distribution must balance the penetration rates achievable in particular packaging arrangements and wholesale rates, in order that the program service will continue to receive the revenue that makes its obligations achievable. Accordingly, the mechanism of a sliding scale wholesale fee based on penetration or volume is fundamental to ensuring programmers are substantially no worse off from a subscription revenue standpoint.
 - vii. Unaffiliated specialty services should be treated no less favourably with respect to terms of duplication and/or migration than BDU-affiliated specialty services, exempt programming services and non-Canadian services, to address any concerns about the potential conferring of undue preferences or disadvantages by BDUs.
143. Within the framework of prior programmer consent, distributors would have packaging flexibility and programmers would have the ability to consider the impacts of proposed new distribution arrangements on their revenue base, both wholesale fees and advertising revenues.
144. In the event that, after good faith negotiations, the parties are unable to reach agreement on the terms of digital distribution, they would have the right to request dispute resolution by the CRTC.

Licensing and distribution of HD services

Licensing framework for HD-transitional services

145. The CAB is of the view that the Commission's proposal that existing specialty and pay services must obtain a new licence to authorize the provision of HD programming is unnecessary and achieves no regulatory purpose.
146. A simple licence amendment should be sufficient to authorize the provision of HD programming that duplicates SD programming, while a specific condition of licence could authorize the provision of unduplicated HD programming, within the overall 14 hour allowance.
147. A licence amendment is a more streamlined and efficient procedure for both the Commission and licensees, and still provides the Commission with the necessary tools to oversee the HD component of a licensee's service.
148. The HD licensing framework for specialty and pay services does not necessarily have to mirror the framework for conventional television because, unlike television, HD specialty and pay services do not require new over-the-air technical facilities and do not occupy additional broadcast spectrum.
149. The CAB agrees with the Commission's proposal to allow up to 14 hours weekly of unduplicated programming on the upgraded version of a specialty or pay service, subject to the provision that all HD programming on the upgraded service, including unduplicated programming, should be authorized by a condition of licence on the existing specialty or pay licence, rather than through the issuance of a new HD-transitional licence. The CAB also agrees with the Commission's proposal that all unduplicated programming be in HD, that it conform to the service's nature of service definition and conditions of licence, and that it be at least 50% Canadian in origin.

Genre protection

150. The Commission has proposed that, if an existing specialty or pay service licensee fails to apply for an HD-transitional licence within a "reasonable" period of time, or fails to demonstrate that it is prepared to submit such an application on a timely basis, the Commission would entertain an application from a new entrant for an HD-transitional licence in the same programming genre as the existing service.
151. The CAB submits that this "use it or lose it" approach is unwarranted and would serve only to further destabilize the specialty and pay sector at a time when it is already facing considerable uncertainty related to the digital transition and conversion to HD. In the CAB's view, it is essential to maintain genre protection vis-à-vis the potential licensing of new Canadian services throughout the transition to HD.

152. The Commission itself has acknowledged that some specialty services will take longer to convert to HD than others, due to the nature of their genre, availability of HD programming, etc. In these circumstances, it would clearly be inappropriate to remove genre protection from such a service.
153. The CAB also notes that, at present, BDUs do not have the capacity to distribute all Canadian services in HD, so a phased approach without mandated deadlines for full conversion to HD is consistent with the reality of available capacity.
154. For all these reasons, there should be a presumption that the policy of genre protection will continue to apply indefinitely for existing specialty and pay services.

HD threshold for guaranteed BDU access of an HD-transitional service

155. The CAB strongly opposes the Commission's proposed thresholds respecting the amount of HD content that would be required to grant an HD-transitional service mandatory BDU carriage. The proposed thresholds are unrealistic and their adoption would effectively mean that few, if any, Canadian HD specialty services would be entitled to BDU carriage for the foreseeable future. This would hinder, not stimulate the conversion to HD in Canada.
156. The CAB conducted a survey of its specialty and pay members to assess their ability to acquire, produce and broadcast HD content over the next several years. It is clear that only the pay television services will be in a position to broadcast a significant amount of HD content, and even then not the 50% proposed by the Commission for English services.
157. Furthermore, as discussed previously, the analysis in Appendix 2 shows that, at present, the amount of HD programming broadcast in the United States is clearly insufficient to support the Commission's proposed 50% threshold to guarantee BDU carriage. Those U.S. services which are attempting a true transition in the Commission's sense (that is, the conventional services) are managing to provide only 13% of their overall schedules in HD, and even in prime time their schedules are only about 37% in HD.
158. The CAB therefore submits that a far more realistic and effective threshold for most services would be one that is linked to the broadcast of HD programming during the evening broadcast period (i.e., 6 pm to 12 pm), when the largest audiences are watching, and that would be gradually increased year over year. Guaranteed BDU access for those services that meet such a threshold for HD would encourage the delivery of HD content at a time when the largest audiences are available, and would provide a meaningful incentive for individual specialty services to continue increasing their HD content during the evening broadcast period over time.
159. Specifically, the CAB proposes the following threshold for HD-transitional services, in order to guarantee BDU carriage:

- For English language services:
 - in the first year, 25% HD content during the evening broadcast period from 6 pm to 12 pm;
 - a graduated scale from 30% to 45% for HD content during the evening broadcast period in years two, three, four and five; and
 - by the sixth year, 50% HD content during the evening broadcast period.
 - For French language services:
 - in the first year, 15% HD content during the evening broadcast period;
 - a graduated scale from 18% to 27% for HD content in years two, three, four and five; and
 - by the sixth year, 30% HD content during the evening broadcast period.
 - For ethnic services:
 - separate thresholds determined on a case-by-case basis for each service.
160. It should be recognized that the CAB's proposal to link an HD threshold to the evening broadcast period may not be appropriate for all services. In light of that fact, the CAB further proposes that a service for which such a generally applicable threshold might not be appropriate should have the right to apply for a threshold tailored to its particular circumstances. Such an application would be assessed on a case-by-case basis, taking into account all relevant factors, including those suggested by the Commission; i.e.:
- guaranteed carriage of an HD-transitional service at a different threshold is essential to continued viability of the service;
 - the service makes an important contribution to the Canadian broadcasting system; or
 - the service would have difficulty acquiring and producing HD programming in the early years of the transition.
161. The threshold for a given service could be expressed as a percentage of total hours broadcast, a minimum number of hours of original hours broadcast over a year, or some other measure relevant to that service.
162. For the purpose of determining such a service-specific threshold, the Commission could also, on an exceptional basis, consider an application by a programming service to treat wide-screen programming that is not 720p or 1080i as HD. The use of such programming could be justified, for example, by the nature or genre of the service or by dependence on non-Canadian programming from sources (e.g. Europe) that do not typically produce wide-screen programming in HD formats.
163. Permitting such flexibility would also have other advantages. It would allow a specialty service to use existing plant and produce wide-screen digital pictures without the conversion costs of the higher-resolution formats. It would also avoid debate about the acceptability of different film formats when converted to HD for output purposes.

164. No matter what specific format is used by a given specialty or pay service, the Commission must ensure that each BDU delivers that service to its subscribers in the same or better quality and format.
165. Finally, for any programming service that meets its HD threshold requirement, access to BDU distribution should be guaranteed subject only to “available channel capacity”, as defined in the *Broadcasting Distribution Regulations*, and including any capacity occupied by non-Canadian HD channels. In a post-transition environment, where capacity restrictions are no longer a significant factor, the right to access BDU distribution would no longer be subject to “available channel capacity”.

Distribution status for HD-transitional services

166. In its proposed post-transition framework, the CAB has argued that analog specialty services should retain their existing dual status and modified dual status designations as they migrate to digital-only distribution.
167. The CAB believes that the same approach should also apply to HD-transitional services, because those services will become the migrated, fully digital versions of the existing analog services in the post-transition environment.
168. Analog services must assume considerable risk and investment in producing and acquiring HD versions of programs they broadcast, and to compound this risk with the further uncertainty associated with loss of dual status or modified dual status designations would unduly penalize those services and inhibit, rather than encourage, the transition to HD.
169. In the CAB’s view, the upgraded HD version of a specialty or pay service should be seen as an integral part of the same service, authorized on the same licence, and entitled to the same carriage status. To treat the HD version of the service as something else would be unfair to Canadian specialty and pay licensees and inconsistent with the assumptions they have made in developing their business plans.

Predominance rule

170. The predominance provision should distinguish between SD and HD services; i.e. the Commission should require a predominance of Canadian SD services vs. non-Canadian SD services, and a predominance of Canadian HD services vs. non-Canadian HD services.
171. In the early stages of the HD transition, however, if the number of non-Canadian HD services currently distributed exceeds the number of Canadian HD-transitional services, a BDU would be permitted to continue with that imbalance provided that:
- no new non-Canadian HD service is distributed until there is a predominance of Canadian HD services; and,

- the BDU commits to carry all Canadian HD-transitional services as they become available, irrespective of the mandated HD threshold for guaranteed carriage, until predominance is re-established.

172. This flexibility in the application of the predominance rule would reserve space for Canadian HD services and provide an incentive for BDUs to carry new Canadian HD services even if they don't initially meet the HD threshold criterion.

Authorization of non-Canadian HD services

173. The CAB submits that the Commission should impose a moratorium on the authorization of new non-Canadian HD services until after the migration/HD framework is finalized. As discussed in more detail in the CAB's submission concerning the CCTA application to add HD Net and Discovery HD Theater to the lists of eligible satellite services, Canadian service should have an opportunity to avail themselves of the new HD framework before the Commission considers authorizing new non-Canadian HD services.

174. Once it has finalized the HD framework, the Commission should proceed carefully with the consideration of new non-Canadian HD services. Fundamentally, the Commission must maintain current policies re the authorization of new non-Canadian HD services – the HD version of a non-Canadian service in an existing genre is not a new genre. In addition, a number of additional factors should be considered.

175. First, for any non-Canadian service currently on the lists, there should be no automatic authorization of any upgraded HD version. All such services, once they provide HD programming, whether unduplicated or not, should be subject to a public process to determine whether the upgraded version should be eligible for distribution in Canada.

176. In this regard, it would be unfair to require an upgraded Canadian service to apply for CRTC authorization to provide HD content, when a non-Canadian service under similar circumstances would not be subject to a new authorization.

177. The Commission's proposed licensing policy for HD-transitional licences would provide an allowance for 14 hours of unduplicated HD programming, of which at least 50% would have to be of Canadian origin. As the Commission notes in paragraph 18 of PN 2004-58, the purpose of this allowance is to provide programmers with some flexibility to innovate and experiment. This rationale clearly does not apply to the Commission's proposal to extend the 14-hour allowance to non-Canadian services.

178. Furthermore, to allow up to 14 hours of unduplicated programming on the upgraded version of a non-Canadian service currently on the lists is inappropriate, since this unduplicated programming could create an effective change of format.

179. In short, providing a 14-hour allowance for unduplicated HD programming on a non-Canadian satellite service, without requiring a new authorization, would achieve no public policy objective and would be potentially damaging to Canadian programming services.
180. Accordingly, the CAB submits that any non-Canadian service offering any amount of HD programming must receive separate authorization after appropriate due process before it can be distributed.
181. Second, as the recent Spike TV decision has demonstrated, once a non-Canadian service is authorized for distribution in Canada it is difficult to remove it. In the future, the CRTC must proceed very cautiously with respect to additional authorizations, and this caution should apply to the upgraded HD versions of existing services as well as to new services.
182. Finally, the fact that some Canadian services may proceed at a slower pace to HD than others must not be seen as a legitimate reason to consider the importation of non-Canadian HD services in the same genres as those services.

Promoting the HD transition

183. As well as establishing a fair licensing and BDU carriage regime for HD-transitional services, the CAB submits that additional regulatory measures should be considered to encourage and speed the transition to HD, in view of the significant costs and risks associated with HD.
184. The CAB therefore urges the Commission to adopt two specific measures that would be of considerable value in promoting the HD transition in furtherance of the objectives established by the Commission for the HD framework.

HD costs treated as eligible Canadian programming expenditures

185. The CAB submits that the Commission should allow a portion (e.g. 50%) of the costs of providing an upgraded HD service (both capital costs and incremental programming costs) to be counted as eligible Canadian programming expenditures. This would encourage all specialty and services to undertake the transition to HD more quickly than they otherwise would be able to, benefiting viewers and program producers, and fostering the ability of Canadian programming services to compete with non-Canadian services.
186. As an additional element of flexibility within this revised approach, the Commission should allow corporate groups operating two or more specialty services to average HD program expenditures across all their services.

Wholesale fee for an HD-transitional service

187. In its proposed post-transition regulatory framework the CAB has argued that, for all specialty services granted digital dual status and modified dual status, the Commission should continue to regulate the wholesale fee that would apply when the service is distributed as part of the digital basic service.
188. With respect to HD-transitional services, however, the CAB acknowledges that any separate fee for such services would not be regulated by the Commission. Any compensation for an HD-transitional service would be negotiated with each BDU, taking into account the increased value to subscribers associated with the HD version of an otherwise SD service.
189. As a further incentive to promote the transition to HD, the CAB submits that the Commission should be prepared to entertain an application from the licensee of a dual status or modified dual status specialty service to increase its regulated wholesale fee in recognition of the increased capital and operating costs of producing, acquiring and/or delivering the content in its HD-transitional service.

CONCLUSION

190. Canadian specialty and pay services intend to be active and early participants in the transition of the Canadian broadcasting system to a digital, largely HD environment. While such a transition has many uncertainties and risks – significant costs, uncertain consumer demand and potential instability to the business plans of individual services – the industry supports the Commission’s initiatives in the digital migration and HD framework proceedings to establish the rules needed to ensure a successful transition.
191. The CAB submits that an appropriate framework is one that recognizes that advances in technology must continue to be used to support the objectives of the *Broadcasting Act*, and not undermine the foundation of a broadcasting system that has been so successful to date in supporting those objectives. A proactive regulatory framework that meets this test will provide stability throughout the digital and HD transitions through a combination of regulatory certainty, reasonable flexibility and carefully targeted incentives, as outlined in this submission.
192. The CAB appreciates the opportunity to participate in these important proceedings.

*****End of document*****

APPENDIX 1

The Economic Impact of Pay and Specialty Service Migration from Analog to Digital to High Definition

**The Economic Impact of Pay and Specialty
Service Migration from Analog to Digital
to High Definition**

**Prepared for the
Canadian Association of Broadcasters**

April 21, 2005

Wall Communications Inc.

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Executive Summary

The Canadian Association of Broadcasters asked Wall Communications to undertake an analysis of the economic impacts of migrating analog specialty services to a fully digital environment as well as transitioning all pay and specialty services from a standard definition to high definition (HD) environment. The objective of the analysis is to examine the expected impacts of these two factors on average Canadian pay and specialty service revenues and costs, as well as the Canadian pay and specialty services industry as a whole.

First, we calculated “average” revenue, cost and earnings levels individually for analog specialty, category 1 & 2 digital specialty and pay/PPV programming services based on the most recently available actual financial and statistical data. Average pay and specialty service revenues and costs are used as a “base case” for the economic impact analysis, reflecting the impact of the current regulatory framework on the finances of specialty and pay services.

Second, we developed alternative “post-transition” estimates of average revenue and cost impacts associated with the migration to a fully digital distribution, HD environment. These alternative revenue and cost estimates are used to measure the economic impacts associated with the post-transition regulatory framework relative to the current framework or base case. Under this approach, the impacts of digital migration and HD conversion are estimated in a purely “static” fashion – i.e., reflecting the differences between post-transition and base case revenues, costs and earnings for specialty and pay services. Transitional considerations and impacts are excluded to avoid unnecessarily complicating the analysis.

The first component of the economic impact modeling involves the migration of all existing analog pay and specialty services to a fully digital distribution environment. Once this migration process is complete, all broadcast distribution undertaking service subscribers (whether cable, DTH, MDS or DSL) would receive programming services in fully digital format.

To model the effects of digital migration we take into account, among other things, the following factors:

- i) expected reductions in average subscriber levels for analog specialty services among cable subscribers;
- ii) expected offsetting changes to average subscriber levels for category 1 & 2 digital specialty service among the same cable subscriber base;
- iii) budget constraints for programming service subscribers;
- iv) potential changes in wholesale or advertising rates; and
- v) potential impacts on pay and specialty service operating expenses (specifically Canadian programming expenditure levels).

The second component of the economic impact modeling involves estimating the likely incremental costs of converting pay and specialty services to HD format. For this purpose, we conducted a number of interviews with senior executives in the Canadian pay and specialty industry in order to collect estimates of the likely incremental capital costs, and incremental technical and programming operating expenses, resulting from the conversion from standard definition to HD programming format for an average pay and specialty service. Based on the input received through this interview process, we developed two sets of incremental cost impacts that we expect “base-case” pay or specialty services to incur, on average, as they convert to HD programming formats.

The first set (Scenario 1) is based on more optimistic estimates of likely capital cost requirements and incremental programming costs, including the lowest possible satellite distribution cost estimates currently available (i.e., using MPEG4 transmission rates). The second set (Scenario 2) is based on more conservative (i.e., higher) incremental capital requirements and programming costs, together with the satellite distribution costs based on a mix of compression technologies (i.e., MPEG2 and MPEG4). Based on these two scenarios, we estimate that HD-related capital costs would likely range between \$2 and \$4 million, while technical operating costs would be expected to increase by \$1.2 to \$2.25 million annually, and incremental programming costs would increase by 5% to 15% annually, relative to the base case.

In summary, our analysis reveals that the combined impact of digital migration and the transition to high definition results in a significant decline in revenues for analog services. While these losses are expected to be offset in part by gains made by category 1 & 2 digital services, substantial increases in operating costs for all pay and specialty services, due to the conversion to HD, are expected to reduce if not eliminate industry earnings altogether.

More specifically, we estimate that the specialty and pay sector will see an annual \$80 million net reduction in revenues. At the same time, total annual operating expenses for the sector is estimated to increase by \$193 million to \$429 million under Scenarios 1 and 2, respectively. Consequently, industry earnings are estimated to decline sharply – i.e., industry pre-tax profits decline from 18% in the base case to 1% under Scenario 1 and to -14% under Scenario 2.

While the study does not attempt to model all of the possible reactions that services may undertake in response to this financial pressure, we note that while technical and distribution costs tend to be largely fixed under the scenarios modeled, overall programming spending is variable. Therefore, not only would absolute programming spending commitments fall by up to \$83 million annually in the case of analog specialty services (as they are calculated as a percentage of revenue), but in some cases, services may be forced to seek reductions in

their percentage commitments in order to restore acceptable levels of profitability.

Moreover, it also appears that some pay and specialty services would simply not have the financial resources to convert to HD format. This is particularly evident in the case of category 1 & 2 digital specialty services, many of which have yet to break even since their launch three years ago. The same may also be true in the case of some analog specialty services. We also consider, therefore, an alternative scenario where some services (i.e., all category 1 & 2 digital specialty services for simplicity) are assumed not to upgrade to HD format. Even under this scenario, however, the negative impact on industry earnings as a result of digital migration and HD conversion is significant, leaving the industry in a loss position.

Lastly, it should be noted that potential costs for set-top boxes have not been included in the analysis. Including potential set-top box costs (e.g., for cable customers migrating to a digital environment or for HD programming services more generally) would have the effect of reducing, on average, subscribers' expenditures on programming services. If this were the case, the revenue impacts in our analysis would be understated as would be the declines in industry earnings.

1.0 Introduction

The Canadian Radio-television and Telecommunications Commission (Commission) recently launched two closely inter-related proceedings. One deals with the framework for the migration of pay and specialty services from an analog to digital distribution environment.¹ The second deals with the framework for the licensing and distribution of high definition (HD) pay and specialty services.² Alternative frameworks considered by the Commission in the context of these proceedings could have significant implications for Canadian pay and specialty services' financial viability as well as their ability to meet their existing licence conditions relating to, among other things, Canadian programming commitments. The alternative frameworks could also have important implications for broadcast distribution undertakings (BDUs) as well as programming services subscribers.

The Canadian Association of Broadcasters asked Wall Communications to undertake an analysis of the economic impacts of migrating analog specialty services to digital environment as well as transitioning all pay and specialty services from a standard definition to HD environment. The objective of the analysis is to examine the expected impacts of digital migration and conversion to HD on average Canadian pay and specialty service revenues and costs as well as the Canadian pay and specialty services industry as a whole. The analysis does not extend however to the consideration of the potential impacts on BDUs.

For the purpose of the analysis, we rely on average revenues and costs for Canadian pay and specialty services, calculated using the most recently available financial information collected by the Commission and corresponding service subscriber level statistics as measured by Mediastats.³ This information, which reflects the current regulatory framework for the licensing and distribution of analog and digital pay and specialty services, is used to model the "base case" or reference point for the economic impact analysis.

Alternative "post-transition" estimates of average revenues and costs impacts associated with the migration to a fully digital distribution, HD environment are also developed. These alternative revenue and cost estimates are used to measure the economic impacts associated with the post-transition regulatory framework relative to the current framework or base case. Under this approach,

¹ Broadcasting Public Notice 2005-1, *Determinations with respect to the establishment of rules to govern the distribution of specialty services on the basic service of fully digital cable undertakings; and call for proposals for a framework to guide the migration of pay and specialty services from analog to a digital distribution environment*, 7 January 2005.

² Broadcasting Public Notice 2004-58, *Call for comments on a proposed framework for the licensing and distribution of high definition pay and specialty services*, 6 August 2004.

³ Sourced from the Commissions' annual Pay and Specialty Statistical and Financial Summaries (i.e., covering the one-year period September 2003 to August 2004) and Mediastats pay & specialty subscriber data for the same period.

the impacts of digital migration and HD conversion are measured in a purely “static” fashion. Transitional considerations and impacts are excluded to avoid unnecessarily complicating the analysis.

Consideration of the subscriber level, wholesale rate and advertising rate impacts as well as incremental technical and programming cost impacts, among other considerations, are taken into account in modeling the likely effects of moving to a fully digital programming service distribution environment and transitioning all pay and specialty services to HD programming format. In addition, we also highlight the resulting potential impacts on Canadian programming expenditures.

Information used to determine alternative cost impacts associated with the conversion from standard to HD programming format was collected through interviews with a number of senior executives in the pay and specialty services industry responsible for technology and programming related matters. In addition, satellite-based distribution cost information provided by Telesat was also taken into account.

The balance of this report is set out as follows. Section 2 provides a brief overview of the Canadian pay and specialty services sector, with a focus on the analog specialty services which are the subject of the digital migration proceeding. It also includes an overview of digital programming service subscriber levels and HDTV-ready television set and HD programming service penetration levels. Section 3 describes how the base case “average” analog specialty, category 1 & 2 digital and pay/PPV services are developed, and the associated underlying assumptions. Section 4 describes the methodology used and underlying assumptions to estimate the likely economic impacts associated with the migration to a fully digital environment and the transition to HD programming. This section also includes a summary of the economic impact results along with important caveats that should be borne in mind in interpreting the results. Conclusions are summarized in section 5.

2.0 The Canadian Pay and Specialty Services Industry

2.1 Overview

The Canadian pay and specialty programming services sector has grown rapidly since its launch some 20 years ago. As of August 2004, there were 115 Canadian pay and specialty services in operation.

Of this total, 49 are Canadian “analog” specialty services, consisting of 28 English-language services, 14 French-language services, 2 bilingual services and 5 ethnic services. Most analog specialty services have been available to analog as well as digital programming service subscribers in Canada for many years. Consequently, they are all generally well established in the marketplace.

It should be emphasized from the outset that “analog” specialty services are provided to subscribers in both analog and digital format depending on the subscriber’s television programming service provider -- e.g., analog cable versus DTH or digital cable. Regardless of whether such services are distributed in analog or digital format, they are referred to as analog specialty services throughout this report.

In addition to the analog specialty services, there were 52 category 1 & 2 digital specialty services in operation as of August 2004, consisting of 16 category 1 and 36 category 2 services. The vast majority of these are English-language services, with the exception of several third-language services. The number of category 2 services has increased only marginally since their launch in the fall of 2001.⁴ Due largely to the more limited base of digital programming service subscribers at this time, category 1 & 2 digital specialty services are still effectively in the start-up phase of their operations.

Finally, there were also six Canadian pay and eight PPV services in operation as of August 2004. In the latter case, terrestrial and DTH versions of PPV services provided by a single programming service provider are included in the total. Some Pay and PPV services are available to both analog and digital programming service subscribers, although increasingly they are available only as digital services, particularly in the case of PPV services.

2.2 Digital Programming Service Subscriber Levels

The number of “digital” programming service subscribers has grown quickly since their initial launch in the late 1990s. As of August 2004, the total number of digital programming service subscribers reached roughly 4.2 million.⁵ At the same time, the total number of analog and digital programming service subscribers (including residential and commercial customers) was just over 10 million. Consequently, the share of digital subscribers relative to total subscribers reached roughly 42% as of August 2004.

Much of the initial growth in digital subscribers was driven by the growth in DTH subscribers. As of August 2004, there were roughly 2.3 million DTH subscribers. The year-over-year growth in DTH subscribers has started to slow in the last two years as the service has matured.

⁴ Several new category 2 services have launched in the current broadcast year, including several French-language digital services.

⁵ All programming service subscriber data presented in this section is based on information drawn from the Commission’s Broadcasting Policy Monitoring Reports, Mediastats and Decima Research Inc.’s Digital Domain Report: Tracking the Growth and Development of the Canadian Digital TV Distribution Market, prepared November/December 2004.

The growth in digital cable subscribers has also been rapid since the service's launch in 2001. The number of digital cable subscribers reached a level of roughly 1.8 million as of August 2004.

In contrast, the number of MDS digital programming service subscribers is very limited. As of August 2004, there were less than 50,000 MDS programming service subscribers, and their numbers have generally been declining over the last several years.

In addition, several telephone companies have launched or plan to launch DSL-based digital programming services. While the number of such subscribers was limited as of August 2004 -- i.e., roughly 50,000 in total -- there is considerable potential for growth in DSL subscribers in the next few years, although it is likely that many of these subscribers will migrate from a cable or DTH service.

While there is every reason to believe that digital programming service penetration should continue to grow steadily in the coming years,⁶ without fundamental changes in cable marketing strategies, overall digital subscriber penetration may grow by no more than 10% per year. If this is the case, it would take more than another five years just to reach a digital service penetration level of over 60% of total programming service subscribers.

2.3 HD Programming Service Penetration

The adoption of HD technology in Canadian households is in the early stages of development at this time. A recent survey conducted by Decima Research found that just under two-thirds of Canadians are aware of HD technology.⁷ However, the results indicated that only 16% of survey respondents have a HDTV-ready set in their households.

Moreover, the survey also found that ownership of a HDTV-ready set did not necessarily translate into the ability to watch HD television programming. Only 42% of the survey respondents with HDTV-sets indicated that they also subscribe to HD television programming services through their cable or DTH programming service provider.

In any event, it is difficult to accurately determine the penetration level for HD television programming services based on survey results given potential misunderstandings in respondent's minds about the nature of HD technology and programming. Assuming that all respondents reported accurately, the Decima survey results suggest that, at most, 7% of cable/DTH service customers subscribed to HD programming services as of early 2005.

⁶ See Decima Research Inc., *The Digital Domain: Consumer Attitudes on Digital Television services, Benefits, and Features in Canada*, 2004.

⁷ Decima, *Canadian Communications Report*, Volume 31, Issue 5, 11 March 2005.

Penetration of HDTV-ready sets in Canadian households can be expected to grow significantly in the coming years, especially as the cost of the HDTV-ready sets decline and the range of available HD television programming grows. However, at this time, it is difficult to predict at what point at least one HDTV-ready set will be found in most Canadian households and the majority of households will be subscribed to some form of HD programming services.

3.0 The Base Case for Pay and Specialty Services

For the purpose of modeling the economic impacts of digital migration and HD conversion, we calculated “average” revenue, expense and earnings levels individually for analog specialty, category 1 & 2 digital specialty and pay/PPV programming services. In each of the three cases, the respective averages are based on the most recently available actual financial and statistical data -- i.e., data for the year ending August 2004 -- and the corresponding number of reporting units in each of the three respective programming service categories.

The calculated averages by type of pay and specialty service are used as a “base case” scenario reflecting the current regulatory framework. The estimated average revenues and costs resulting from digital migration and HD conversion, which are discussed in detail in Section 4 below, are compared to the base case scenario in order to depict the likely economic impacts arising under alternative post-transition scenarios. In this respect, we measure economic impacts relative to the derived “average” pay and specialty service revenues and costs as well as at the level of the Canadian pay and specialty industry as a whole.

It should be noted, however, that average pay or specialty service revenues and costs, as derived for the purpose of this analysis, are not intended to represent an “average” or “typical” pay or specialty service. Individual services can vary significantly given the substantial variations in penetration and wholesale rates among services, especially when taking into account service language and genre differences. For instance, some services may enjoy penetration rates of close to 100% in their respective markets and, as a result, enjoy revenues well above an industry average. In contrast, third-language services typically have much lower subscriber levels and revenues compared to an industry average. As a result, deviations from the average can be very large not only in terms of subscribers and revenues, but all aspects of aspects of a service’s operations.

3.1 Financial Assumptions

As noted, base case average revenues, expenses and earnings have been derived by dividing the aggregate 2004 financial data for each sub-sector of the Canadian pay and service sector by the corresponding number of programming services operating in each sub-sector in the same year. Table 1 below provides a summary of the base case averages for analog specialty, category 1 & 2 digital specialty and pay/PPV services.

Table 1
CANADIAN PAY & SPECIALTY SERVICES
BASE CASE AVERAGE REVENUES AND COSTS
(\$000 unless otherwise indicated)

	Analog Specialty	Category 1 & 2 Digital Specialty	Pay & PPV
REVENUE			
Residence/Bulk/SMATV	13,379	641	14,519
DTH	3,887	1,334	12,029
Advertising	14,158	259	0
Other	429	30	23
TOTAL REVENUE	31,852	2,264	26,571
EXPENSES			
Program expenditures	16,826	1,599	15,735
Technical	1,336	642	779
Sales and Promotion	2,611	264	1,777
Administration & General	2,893	554	1,695
TOTAL EXPENSES	23,666	3,059	19,987
Operating Income	8,186	-794	6,584
Less: Depreciation	423	168	317
P.B.I.T.	7,763	-962	6,267
Less: Interest	1,390	244	221
Adjustments	-542	90	-566
PRE-TAX PROFIT	6,915	-1,296	6,612
CANADIAN PROGRAM AMORTIZATION			
<i>Acquisition of rights</i>	6,862	338	2,707
<i>Filler Programming/Program Production</i>	6,362	405	598
<i>Other</i>	146	4	1,180
Total Canadian Programming	13,370	747	4,485
<i>Canadian Programming/Revenue (%)</i>	42%	33%	17%
PROFITABILITY			
Operating Margin (%)	26%	-35%	25%
P.B.I.T. Margin (%)	24%	-42%	24%
Pre-tax Margin (%)	22%	-57%	25%

Derived from the CRTC's 2000-2004 Pay and Specialty Statistical and Financial Summaries.

As can be seen from Table 1, average revenues and costs for the category 1 & 2 digital service sub-sector are much smaller in scale compared to the analog specialty service and average pay/PPV service sub-sectors, reflecting the fact that category 1 & 2 digital services generally have a much smaller subscriber bases. Furthermore, while average earnings in the analog and pay/PPV service sub-sectors are strong, the category 1 & 2 digital specialty service sub-sector is experiencing very large losses, reflecting the fact that these service is still in the start-up phase of operation.

In many respects average revenues, expenses and earnings for the analog specialty and pay/PPV service sub-sectors are very similar with two notable exceptions. Pay/PPV services have no advertising revenues and, on average, far less is spent on Canadian program content in the pay/PPV sub-sector

(measured as a percentage of revenues) compared to both analog and digital specialty service sub-sectors.

For the purpose of modeling the economic impacts of digital migration and HD conversion relative to the base case, several other industry characteristics are taken into account. These include:

- i) average subscriber levels,
- ii) average wholesale or affiliation rates (or in the case of pay/PPV monthly revenues per subscriber), and
- iii) average monthly advertising rates per subscriber in the case of analog and digital specialty service sub-sectors.

3.2 Average Subscriber Levels

To model the impact of alternative post-transition scenarios on average pay and specialty service revenues we require estimates of the average number of cable and DTH subscribers for analog specialty, category 1 & 2 digital specialty and pay/PPV services, respectively, for the 2004 base case period. To develop these estimates, we used Mediastats pay and specialty service subscriber data for 2004 to calculate average "subscriber share" estimates for pay and specialty services separately for cable and DTH subscribers.

More specifically, cable and DTH customer-specific subscriber share estimates were measured on the basis of the total number of cable and DTH subscribers for individual pay and specialty services relative to the total number of national cable and DTH programming service subscribers. Subscriber shares for individual pay and specialty services can vary considerably -- e.g., from well below 5% in the case of some digital specialty and ethnic services to over 90% in the case of CBC Newsworld and RDI. Subscriber share levels depend on many factors, including the nature of the service (e.g., sports, lifestyle, documentary versus drama and entertainment), the format of the service (digital only versus analog/digital) and the language of the service, not to mention the pricing and packaging. Average cable and DTH customer-specific subscriber shares were then separately derived for analog specialty, category 1 & 2 digital specialty and pay/PPV services.

It should be emphasized that "subscriber share" estimates, as calculated for the purpose of this study, do not represent service "penetration" rates as that term is normally used within the pay and specialty services industry. Penetration rates also vary widely. Some services, those with dual status, experience 100% penetration of systems in their language area where they are carried. Services carried on a higher analog tier may experience penetration rates within their language market of between 70 and 80%. However, the ratio of the total number of subscribers for an individual analog service relative to the total national

number of programming service subscribers, including both official languages, is generally considerably lower than the service's "penetration" rate. The difference between service subscriber shares and penetration rates results from the significant differences in the subscriber base used for the two calculations. The subscriber share estimates used in this study differ further still since they are measured among cable and DTH subscribers separately.

Average Analog Specialty Service Subscriber Levels

While there are exceptions, in general, the subscriber share levels of Canadian analog specialty services are higher among cable subscribers compared to DTH subscribers. On average, as of August 2004, we estimate that the average share of total programming subscribers held by analog specialty service among cable subscribers is roughly 8% higher than that among DTH subscribers -- i.e., 49% versus 41%, respectively.⁸ The lower average subscriber share levels of analog services among DTH subscribers likely reflects the greater flexibility DTH subscribers have in choosing discretionary services above the basic service tier.

These average subscriber share levels for cable and DTH subscribers have been used to determine the base case average number of analog specialty service subscribers. Consequently, in the base 2004 period, 49% of cable subscribers are assumed to subscribe, on average, to analog specialty services -- i.e., roughly 3.9 million subscribers -- and 41% of DTH subscribers are assumed to subscribe to analog specialty services -- representing a further 0.9 million subscribers. Consequently, in total, we estimate that, on average, there are roughly 4.8 million analog specialty service subscribers during the 2004 base period.⁹

Average Category 1 & 2 Digital Specialty Service Subscriber Levels

The situation is reversed in the case of category 1 & 2 digital specialty services. Subscriber share levels for these services are generally much higher among DTH subscribers relative to "digital" cable subscribers. On average, we estimate that the average subscriber share level of category 1 & 2 digital specialty services among DTH customers is roughly 19%. It is only 8% on average in the

⁸ These average subscriber share estimates were derived using Mediastats programming service subscriber data for the month of August 2004. The total number of cable subscribers used in the calculation is 7.9 million, which includes both residential and commercial subscribers. The total number of DTH subscribers is 2.3 million. The relative average penetration rates are based on English- and French-language analog services only. Ethnic analog specialty services were excluded since in most cases they have very low penetration rates. In any event, like their English- and French-language counterparts, ethnic service penetration is higher among cable subscribers relative to DTH subscribers.

⁹ Note that in this and the subscriber estimates that follow, cable subscribers are also assumed to include MDS and DSL subscribers during the base year period.

case of digital cable subscribers,¹⁰ which translates into a cable penetration rate of 1.7% overall when calculated on the base of all cable subscribers (analog and digital).

These average subscriber share levels have been used to determine the base case average number of category 1 & 2 digital specialty service subscribers. They yield a total of 432,000 DTH subscribers and 135,000 digital cable subscribers. The total average number of subscribers is, therefore, estimated to be 566,000 for the 2004 base period.

Average Pay/PPV Service Subscriber Levels

Determining average subscriber share levels in the case of Canadian pay and PPV services is complicated by the fact that pay and PPV services are marketed in fundamentally different ways. Nevertheless, to simplify the analysis, the average subscriber share level for Canadian pay services has been used to approximate subscriber levels for the base case average pay/PPV service.

As in the case of category 1 & 2 digital services, subscriber share levels for Canadian pay services are generally higher among DTH subscribers compared to cable, with one notable exception being the Family Channel. On average, the average subscriber share level for Canadian pay services is 19% among DTH customers and 11% among cable customers.¹¹

These subscriber share levels have been used to determine the base case average number of pay/PPV service subscribers. They yield an estimate of roughly 432,000 DTH subscribers and 869,000 cable subscribers. The total subscriber count therefore is roughly 1.3 million for the 2004 base period.

Table 2 provides a summary of the estimated subscriber shares and resulting subscriber levels by industry sub-sector.

¹⁰ These estimates are derived using Mediastats subscriber data for the month of August 2004. Note that several very low-penetration, third-language category 2 digital services were excluded from the calculations

¹¹ These estimates are derived using Mediastats subscriber data for August 2004.

Table 2
CANADIAN PAY & SPECIALTY SERVICES
Base Case Subscriber Shares and Levels
2004 Base Period

	Analog Specialty	Category 1 & 2 Digital Specialty	Pay & PPV
Subscriber Shares (%)			
Analog & Digital Cable	49%	1.7%	11%
Digital Cable		8%	
DTH	41%	19%	19%
Subscriber Levels (000s)			
Cable	3,873	135	869
DTH	931	432	432
TOTAL	4,804	566	1,301

Note: Total base case cable and DTH subscribers are 7.9 M and 2.3 M, respectively.

3.3 Implied Wholesale Rates

Based on the estimated base case average number of cable and DTH subscribers by type of pay and specialty services, implicit average wholesale rates can be derived separately for DTH and cable operators. These rates are required to determine the impact on average subscription-related revenues, under alternative post-transition framework scenarios, of assumed changes in the average number of subscribers to analog, category 1 & 2 digital and pay/PPV services. Note that the derived implicit average wholesale rates are simply a product of the estimated base case average subscriber levels discussed in the previous section.

For analog specialty services, the implicit base case cable wholesale rate is \$0.29 per month per subscriber whereas the implicit base case DTH wholesale rate is slightly higher at \$0.35.

For category 1 & 2 digital specialty services, the relationship between cable and DTH wholesale rates is reversed, the implicit base case cable wholesale rate is \$0.40 per month per subscriber whereas the implicit base case DTH wholesale rate is lower, at \$0.26.

Lastly, for pay/PPV services, deriving an implicit wholesale rate is not entirely appropriate given the differences in marketing approaches between pay and PPV services. Nevertheless, for the purposes of this analysis, an implicit base case average "revenue" per subscriber has been calculated. For the 2004 base period, the average base case revenue per month per cable pay/PPV subscriber is \$1.39, whereas the figure is considerably higher in the case of DTH subscribers, \$2.32.

Table 3 provides a summary of base case wholesale rates revenues per subscriber by type of programming service.

Table 3
CANADIAN PAY & SPECIALTY SERVICES
Base Case Implicit Wholesale Rates/Revenues per Subscriber
2004 Base Period

	Analog Specialty	Category 1 & 2 Digital Specialty	Pay & PPV
Subscriber Revenues (000s)			
Cable	\$ 13,379	\$ 641	\$ 14,519
DTH	\$ 3,887	\$ 1,334	\$ 12,029
Subscriber Levels (000s)			
Cable	3,873	135	869
DTH	931	432	432
Implied Wholesale Rates (\$/mth/sub)			
Cable	\$ 0.29	\$ 0.40	\$ 1.39
DTH	\$ 0.35	\$ 0.26	\$ 2.32

3.4 Implied Advertising Rates

Just as implicit average wholesale rates can be derived for pay and specialty services, so can implicit per subscriber advertising rates. These rates are required to determine the impact on average advertising-related revenues, under alternative post-transition framework scenarios, resulting from assumed changes in subscriber levels. As in the case of the base case wholesale rates, the derived average implicit per subscriber advertising rates are simply a product of the estimated base case average subscriber levels discussed in Section 3.2.

For analog specialty service, the implicit monthly advertising rate per subscriber is \$0.25, whereas the advertising rate for the base case category 1 & 2 digital specialty service is much lower, \$0.04. The lower advertising rates for category 1 & 2 digital specialty services reflects their far lower subscriber levels and, more generally, far lower viewing shares.

Pay/PPV services do not generate any advertising revenues; consequently, the calculation is not relevant in their case.

Table 4 provides a summary of the data used to derive base case average implicit advertising rates for analog and digital specialty services.

Table 4
CANADIAN PAY & SPECIALTY SERVICES
Base Case Implicit Advertising Rates per Subscriber
2004 Base Period

	Analog Specialty	Category 1 & 2 Digital Specialty	Pay & PPV
Advertising Revenues (000s)	\$ 14,158	\$ 259	\$ -
Subscriber Levels (000s)	4,804	566	1,301
Implied Advertising Rates (\$/mth/sub)	\$ 0.25	\$ 0.04	\$ -

4.0 Economic Impacts of Digital Migration and HD Conversion

4.1 Methodology

The first component of the economic impact modeling undertaken for this study involves the migration of all existing analog pay and specialty services to a fully digital distribution environment. For this purpose, we have not attempted to model the transition period from today's mixed analog/digital to a future fully digital environment, but rather to simply estimate the economic impacts associated with alternative "post-transition" framework scenarios where all pay and specialty services are distributed in a fully digital environment versus the base case or current programming distribution environment.

Under the base case, as described in the previous section, only 21% of cable subscribers receive digital cable services. In other words, out of the approximate 8 million residential and commercial cable subscribers in total during the 2004 base period, roughly 1.8 million subscribed to digital programming services. The balance -- roughly 6.2 million in total -- subscribed strictly to analog programming services. In the post-transition framework scenarios considered below, we assume that all cable subscribers receive digital programming services. Consequently, in conjunction with already fully digital DTH, MDS and DSL services, all television programming services would be delivered in a fully digital environment under alternative post-transition scenarios.

The second component of the economic impact modeling undertaken for this study involves the conversion of all pay and specialty services to HD format. Again, we have not attempted to model the transition process from today's limited HD format pay and specialty services to a future fully HD format environment. In the alternative post-transition framework scenarios considered below, we estimate a range of cost impacts associated with conversion of all pay and specialty services to HD format relative to the base case.

In order to develop plausible alternative post-transition framework scenarios, we conducted a number of interviews with senior executives in the Canadian pay

and specialty industry in order to collect estimates of the likely incremental capital costs and incremental technical and programming operating expenses resulting from the conversion from standard to HD programming format for an average pay and specialty service. Based on the input received through this process, we developed two sets of incremental cost impacts that base case average pay or specialty services could reasonably be expected to incur to convert to HD programming format.

The migration to a fully digital environment and the conversion from standard definition to HD programming formats are occurring simultaneously. Consequently, the economic impacts of these two events are analyzed jointly in what follows. The following two sections discuss the assumptions and considerations underlying, first, the transition to a fully digital environment and, second, the conversion from standard definition to HD.

4.2 Digital Migration – Assumptions

There are several factors that are taken into account in modeling the economic impact of digital migration. These include:

- i) analog specialty service subscriber impacts (which will ultimately depend on service packaging arrangements);
- ii) wholesale rate changes (if any);
- iii) per-subscriber advertising rate changes (if any);
- iv) indirect effects on other “non-analog” pay and specialty services;
- v) subscriber budget constraints (including consideration of digital set-top box costs, if any); and
- vi) potential operating cost changes.

Subscriber Share Impacts

The key factor that will ultimately affect subscriber share levels for analog pay and specialty services in a fully digital environment is their pricing and packaging. Currently analog pay and specialty services are generally made available to cable subscribers in a tiered fashion over and above the basic tier programming services. Separate prices apply to each available discretionary service tier, with discounts typically applying when all tiers are purchased jointly by a subscriber. This approach has resulted in generally high subscriber share levels for analog specialty services among cable subscribers. However, in a fully digital environment, subscriber share levels would likely decline as is the case for DTH, where subscribers tend to have more flexibility in terms of choosing programming services.

In a fully digital environment, cable companies would have a range of service pricing and packaging options at their disposal. In general, the greater the degree of packaging flexibility cable companies provide to their subscribers

relative to their current packaging arrangements, the greater the potential declines in cable subscriber levels for analog specialty services.

For the purpose of this study, we have chosen to focus our analysis on a single digital migration scenario -- i.e., the case where the average subscriber share level among cable subscribers of analog specialty services drops by 8% from 49%, the base case level, to 41%. In other words, for the post-transition scenarios considered, we assume that the average subscriber share level for analog specialty services is the same among cable and DTH subscribers, reflecting the view that cable and DTH subscribers' flexibility to choose programming services in a fully digital environment would likely be similar.

Note that the 8% subscriber share decline is the assumed average impact of moving from analog to fully digital distribution environment. Individual analog services may experience different impacts, some more pronounced, some less.

Wholesale Rates

Moving analog specialty services into smaller service or theme packages compared to existing analog cable tiering arrangements could justify an increase in the average wholesale rates. Indeed, at one extreme, the wholesale rate for a given analog specialty service could be increased to a degree necessary to make the service "whole" at least with respect to subscriber revenues. However, to avoid arbitrary rate changes, average wholesale rates are assumed to remain unchanged in the post-transition scenarios examined in this study.

Per Subscriber Advertising Rates

Similarly, while changes in subscriber share levels can be expected to impact viewing shares for individual specialty services, in the post-transition scenarios that follow, monthly advertising rates per subscriber are assumed to remain fixed. To the extent that subscriber share levels change relative to the base case, however, advertising revenue changes are taken into account as a result of changes in the average number of subscribers.

Indirect Effects on Other Services

As noted, repackaging analog specialty services in a fully digital environment is expected to have a negative effect on the subscriber share levels of analog specialty services. On the other hand, in a fully digital environment, there is a greater likelihood that subscriber share rates for category 1 & 2 digital specialty services would increase since all cable subscribers would be able to receive analog as well as digital services. Therefore, any analog services that are dropped by subscribers may be replaced entirely or, at least, in some measure by existing digital specialty services (including category 1 & 2 digital specialty services or pay/PPV services).

In the post-transition scenarios that follow, the average subscriber share of digital category 1 & 2 digital specialty services is assumed to increase in response to decreases in the subscriber share of average analog specialty services. As described further below, the key factor limiting subscriber share increases in category 1 & 2 digital specialty services is the subscriber's budget constraint.

As to pay/PPV services, their pricing and packaging may not differ to any significant degree in either a mixed analog/digital or fully digital environment. Pay services have largely already migrated to digital at this time.¹² Moreover, they are typically offered on a stand-alone or smaller pay package basis. Migration to a fully digital environment could have a positive affect on PPV services given that all programming subscribers would have access to PPV content. For simplicity, however, no subscriber share or revenue per subscriber changes are assumed to occur in the case of pay/PPV services under the post-transition scenarios examined in this study.

Subscriber Budget Constraint

According to Statistics Canada household spending survey data, the average Canadian household spent \$460 on rental of cable and DTH services in 2003. This amounts to roughly \$38 per month per household. Excluding households which do not subscribe to any form of television programming service (i.e., about 19% of all Canadian households), the average monthly expenditure for households subscribing to television programming services increases to roughly \$47 per month.

There are a number of factors that could potentially alter an average household's expenditures on television programming services in a fully digital distribution environment. For example, to the extent that migration requires subscribers to incur costs for a digital set-top box (i.e., either on a one time or a recurring rental charge basis), the percentage of a subscriber's average monthly expenditures devoted to discretionary programming services could decrease as a result. In fact, it is possible that some subscribers may drop their television programming service entirely if they were required to purchase directly or indirectly one or more digital set-top boxes. A further possibility is that those households that see overall expenditures for programming services initially reduced (because they can drop certain analog services in a digital world that were previously mandatory) may choose to use their "savings" on other forms of electronic information and entertainment. That is, they would spend any such savings outside of the programming services basket.

¹² This is supported by Mediastats subscriber data for Canadian pay services measured in August 2004, although there are exceptions to as in the case of the Family Channel.

On the other hand, while likely less probable, attractive changes in packaging and pricing in a fully digital environment could increase subscribers' average expenditures on programming services increases.

Although these impacts could have either a positive or negative impact on the financial performance of programming services, there is no good data available to construct quantitative assumptions. For the purpose of the post-transition scenarios that follow, therefore, it is assumed that total expenditures on television programming services remain unchanged (measured purely in terms of wholesale subscriber revenues received by the programming services themselves).¹³ Consequently, in our analysis, reduced analog specialty service subscriber-related revenues are assumed to be offset by increased category 1 & 2 digital specialty service subscriber-related revenues.

Operating Expenses

It should also be borne in mind that any analog service experiencing a decline in subscribers and, as a result, operating revenues is likely to cut costs in response. One area that is susceptible to immediate cost-cutting is programming and, more specifically, Canadian programming expenditures. For instance, as revenues decline, so would expenditures on Canadian programming, at least to the extent that a programming service's Canadian programming commitments are linked to its revenues.

In the post-transition scenarios that follow, the potential impacts on Canadian programming expenditures are highlighted.

4.3 HD Conversion – Assumptions & Cost Estimates

There are several areas where the conversion from standard definition to HD format can impact pay and specialty services. These include:

- i) broadcast centre and/or production studio upgrades (HD capital costs);
- ii) technical operating cost increases (e.g., signal distribution expenses, both terrestrial and satellite);
- iii) programming expenditure increases (for acquired programming and/or in-house production);
- iv) revenue impacts (due to subscriber level, wholesale rate or advertising rate changes, if any); and
- v) subscriber budget constraints (affected by potential HD set-top box costs).

Capital Costs

¹³ In effect, this assumes that the retail mark-up on analog and digital programming services are, on average, equal.

In broad terms, the costs required to convert to HD format include broadcast centre upgrades (i.e., master control, editing equipment, servers and other facilities) and production studio upgrades (i.e., control room, HD cameras, audio equipment and other facilities). HD conversion requirements, however, can vary widely depending on the nature of the service and the state of its existing facilities. For instance, many pay and specialty services may not require production studios given the nature of their programming. As well, broadcast centre and production studio facilities can be potentially shared among pay and specialty services. These considerations mitigate HD-related cost increases incurred by the average pay and specialty service.

Based on the capital cost estimates provided by the individuals interviewed for this study, incremental HD-related capital costs to upgrade broadcast centre facilities generally range from \$1 to \$2 million. Over and above these costs, incremental HD production studio related costs can range up to another \$1 to \$2 million. Longer term capital cost requirements could potentially be higher still if the existing facilities need to be replaced outright.

Mobile HD production units to cover live events can generate significant additional costs. However, live event coverage is not the norm for the vast majority of existing pay and specialty services, with the exception of, for instance, sports or news specialty services.

Given the range of likely incremental capital costs, we have established two alternative post-transition scenarios for this study. Under the first scenario, incremental capital costs, on average, are assumed to be \$2 million, reflecting the lower end of the cost estimate range. Under this scenario, it is assumed that more modest HD upgrades are undertaken on average. Under the second scenario, incremental capital costs, on average, are assumed to be \$4 million, reflecting the alternative case where more extensive HD upgrades are undertaken.

Technical Operating Costs

Given the higher bandwidth requirements associated with a HD programming service signal (i.e., anywhere from 5 to 6 times the bit rate of a standard definition signal), HD-related incremental signal distribution costs can be significant. These costs include both terrestrial distribution costs (i.e., to a local head-end or satellite uplink facility) as well as the uplink and space segment costs to distribute the signal more widely. There are of course alternative technologies (such as MPEG4) which could be used by pay and specialty services to improve efficiencies and lower distribution costs.

Based on information collected through the interview process along with information provided by Telesat, we have developed two alternative technical

operating expense estimates.¹⁴ First, assuming the pay and specialty services are able to fully take advantage of the most efficient known technology (i.e., MPEG4), we estimate that incremental satellite distribution costs would be \$1.15 million per year. Second, assuming the services are able to partially take advantage of the most efficient current technology, we estimate that incremental satellite distribution costs would be of \$2.2 million per year (i.e., using a mix of compression technologies, MPEG2 and MPEG4).

In addition, we have included a further \$50,000 for increased terrestrial distribution and other technical operating costs associated with conversion to HD format.

In sum, for the two post-transition scenarios we consider, incremental technical operating expenses are estimated to be \$1.2 million per year under the first scenario and \$2.25 million per year under the second.

HD Programming Costs

Based on input from the interview process, there is general agreement that the cost of producing HD programming is higher than standard definition, especially so in the case of live events. At this very early stage of development of HD programming for pay and specialty services, however, interviewees noted that there is little information to determine the premium, if any, that would apply to acquired HD versus standard definition programming. In fact, the general view was that the rights for the two should not be separated and, therefore, disentangling the incremental costs of HD versus standard definition program costs would be very difficult if not impossible at this time.

While little in the way of hard evidence is currently available, most interviewees were of the view that any incremental HD-related programming costs for acquired and production programming combined would be “modest” at best. Therefore, for the purpose of this analysis, we have assumed that a pay or specialty service converting to HD format would incur incremental programming expenses of between 5% and 15%.

For analog specialty and pay/PPV services, this amounts to an average increase in programming costs of \$0.8 million to \$2.5 million annually. In the case of a category 1 & 2 digital specialty services, this amounts to an average increase of \$80,000 to \$250,000 per year given their much smaller base case expenditures on programming.

¹⁴ In both cases, incremental HD distribution costs apply over and above existing standard definition distribution costs which are assumed to continue. The incremental HD distribution costs include two satellite distribution cost components: (i) uplink/space segment charges to ExpressVu subscribers and (ii) uplink/space segment charges to cable/Star Choice subscribers.

Revenue Impacts

Conversion to HD format could have some revenue increasing potential for pay and specialty services, especially for first-mover programming services. As noted, we have not attempted to model temporary impacts during the transition period. Post transition, when all pay and specialty services are assumed to be available in HD format, it is unclear whether there would be any gain in subscribers, on balance, or any changes in wholesale or advertising rates arising purely from a change in format. For this reason, we have assumed that there are no additional revenues associated with the conversion to HD format.

Subscriber Budget Constraint

Currently subscribers require a HDTV-ready set and HD digital set-top box to receive HD programming services. The cost of this equipment can be expected to reduce the average subscriber's ability to purchase HD pay and specialty programming services in the short to medium term. This would clearly be the case if the HD set-top box were to represent a significant share of a subscriber's monthly recurring charges for television programming services (i.e., in the case where the HD set-top box is rented rather than purchased outright).

As in the case of digital migration, we have assumed that the cost of the HD set-top box or any similar equipment does not affect the average subscriber's budget for programming services. Consequently, average pay and specialty services subscriber levels are assumed to be unaffected by the conversion of pay and specialty services to HD format. In effect, this assumes that at the point in time when all pay and specialty service are available in HD format, the cost of HD signal decoding equipment will be negligible.

4.4 Post-Transition Scenario Analysis – Industry Sub-Sector Impacts

Based on the assumptions, cost estimates and considerations discussed in the two preceding sections, the economic impacts of two post-transition scenarios are analyzed relative to the base case scenario.

The assumptions relevant to the migration of analog specialty services to a fully digital distribution environment include the following:

- i) the average subscriber share of analog specialty services among cable subscribers declines by 8%, falling from 49% to 41%;
- ii) at the same time, the average subscriber share of the average category 1 & 2 digital specialty service among cable subscribers increases by 5.5%, from 1.7% to 7.2% (note that this increase was established based on the assumption that the subscriber-related revenue losses of analog services roughly equal the gain in

- category 1 & 2 digital specialty service subscriber-related revenues);
- iii) no net impact on average pay/PPV service revenues;
 - iv) no change in wholesale or advertising rates;
 - v) no impact on pay and specialty service operating expenses

The alternative cost and revenue impacts of transitioning pay and specialty services from standard definition to HD format are summarized in Table 5 below.

Table 5
HD Conversion Cost and Revenue Impact Assumptions

Incremental Cost Items	SCENARIO 1 (‘000s)	SCENARIO 2 (‘000s)
Capital Costs (broadcast centre and production studio)	\$2,000	\$4,000
Technical Operating Expenses (satellite, terrestrial and other)	\$1,200	\$2,250
Programming Expenses (acquired and produced programming)	~ 5% increase	~ 15% increase
Average Analog	\$800	\$2,500
Average Cat 1 & 2 Digital	\$80	\$250
Average Pay & PPV	\$800	\$2,500
Revenues	\$0	\$0

Note that in the case of capital cost impacts, the depreciation rate on the capital expenditures is assumed to be 20% (i.e., a 5 year amortization period) and the interest rate on funds is assumed to be 8%.

4.4.1 Impact on Analog Specialty Services

We first estimated the combined economic impacts of digital migration and HD conversion on analog specialty service average revenues and costs using the assumptions listed above. For both HD cost scenarios, the average cable subscriber share for analog specialty services is assumed to have declined by 8% to a level of 41%.

Table 6 summarizes the results of the two scenarios.

The revenue impacts are the same under both scenarios, since they involve the same digital migration cable subscriber share assumptions. Relative to the base case, average analog specialty service revenues decline by just over \$4 million (or 12.5%) as a result of the fall in subscribers. Subscription revenue losses

account for roughly 55% of the total revenue reduction, with advertising revenue losses accounting for the balance.

Consistent with the HD cost assumptions set out in Table 5, under Scenario 1, programming and technical expenses increase by \$0.8 million and \$1.2 million, respectively. These expense impacts increase to \$2.5 million and \$2.25 million, respectively, under Scenario 2.

The combined effect of the estimated revenue losses and additional expenses lower operating revenues by roughly \$6.0 million under Scenario 1 and \$8.8 million under Scenario 2. The additional incremental depreciation costs lower profits before interest and taxes (PBIT) further still by \$6.4 million and \$9.6 million under Scenarios 1 and 2, respectively. As well, the additional interest costs result in a reduction of pre-tax profits by \$6.6 million and almost \$10 million under the two respective post-transition scenarios.

Under both scenarios, average earnings margins for analog specialty services decline sharply, with pre-tax earnings dropping from 22% to just 1% under the Scenario 1 and to loss position of -11% under Scenario 2.

Table 6
CANADIAN ANALOG SPECIALTY SERVICES
AVERAGE REVENUES AND COSTS
Digital Migration & Transition to HD Format

	BASE CASE (2004)	POST-TRANSITION FRAMEWORK			
		Scenario 1	Scenario 2		
			Difference		Difference
REVENUE (\$000)					
Cable	13,379	11,194	-2,185	11,194	-2,185
DTH	3,887	3,887	0	3,887	0
Advertising	14,158	12,295	-1,863	12,295	-1,863
Other	429	429	0	429	0
TOTAL	31,852	27,805	-4,047	27,805	-4,047
EXPENSES (\$000)					
Programming	16,826	17,626	800	19,326	2,500
Technical	1,336	2,536	1,200	3,586	2,250
Other	5,505	5,505	0	5,505	0
TOTAL	23,666	25,667	2,001	28,417	4,751
Operating Income	8,186	2,138	-6,048	-612	-8,798
Depreciation	423	823	400	1,223	800
PBIT	7,763	1,315	-6,448	-1,835	-9,598
Interest	1,390	1,550	160	1,710	320
Adjustments	-542	-542	0	-542	0
Pre-tax Profit	6,915	307	-6,608	-3,003	-9,918
PBIT Margin	24%	5%	-20%	-7%	-31%
Pre-tax Profit Margin	22%	1%	-21%	-11%	-33%

With such significant negative impacts arising from the combined effects of digital migration and HD conversion, analog specialty services would need to boost revenues and/or rein in costs in any way they could to help mitigate these effects. One option in this respect would be to attempt to increase wholesale rates. To make the average analog specialty service “whole” relative to the base case, in terms of subscription revenues, would require an average cable wholesale rate increase of roughly 16%. However, even if this were possible, there would be further losses in advertising revenues to make up.

In addition, in view of the estimated reduction in analog specialty service revenues, Canadian programming expenditures could be reduced at least up to the point where the base case ratio between these expenditures and total revenues would be reestablished. Consequently, while overall programming expenditures would have increased due to incremental HD programming costs, the percentage of Canadian programming expenses to overall programming expenditures could be reduced.

In fact, given the estimated reduction in average revenues, Canadian programming expenditures could be reduced, on average, by up to \$1.7 million per year. If all analog services reduced their Canadian programming expenditures to this degree, the total analog sector-wide impact would be a reduction in Canadian programming expenditures of roughly \$83 million.

Aggregate economic impacts for all analog specialty services combined are summarized in Table 7. Under the two scenarios considered, total revenues decline in total by \$198 million. At the same time, total operating expenses increase by \$98 to \$233 million and capital expenditures by \$98 to \$196 million under Scenarios 1 and 2, respectively.

Table 7
ALL CANADIAN ANALOG SPECIALTY SERVICES
AGGREGATE ECONOMIC IMPACTS
Digital Migration & Transition to HD Format

(\$ 000)	POST-TRANSITION FRAMEWORK	
	<u>Scenario 1</u>	<u>Scenario 2</u>
REVENUES	-198,336	-198,336
EXPENSES		
Technical	58,800	110,250
Programming	39,200	122,500
Total	98,000	232,750
CAPITAL EXPENDITURES	98,000	196,000

4.4.2 Impact on Category 1 & 2 Digital Specialty Services

As noted, the migration of analog services to a fully digital environment is assumed to have a positive effect on category 1 & 2 digital specialty services. The population of subscribers that are able to receive these services would increase dramatically in a fully digital environment. However, any increase in subscribership to these services as analog cable subscribers become digital cable subscribers would be limited by the average subscriber's programming services budget constraint. Consequently, for the purpose of this modeling analysis, it is assumed that increases in category 1 & 2 digital service subscriber-related revenues would be roughly equal to subscriber-related revenue losses incurred by analog specialty services.

Given the assumed 8% reduction in the proportion of cable subscribers receiving the average analog specialty service, we estimate that the corresponding increase in the proportion of cable subscribers receiving the average category 1 & 2 digital specialty service would increase from 1.7% to 7.2%. At this level of penetration, the increase in subscription revenues for all category 1 & 2 digital specialty services roughly equals the reduction in subscription revenues for analog services.

Table 8 summarizes the economic impacts of the joint effects of digital migration and the conversion to HD programming format on average revenues and costs for category 1 & 2 digital specialty services.

The revenue impacts are again the same under scenarios 1 and 2 since the increase in subscriber shares is the same in both cases. In total, average revenues for category 1 & 2 digital specialty services are estimated to increase roughly \$2.3 million. Most of the revenue increase comes from subscription revenues since implicit per subscriber advertising rates are very low for category 1 & 2 digital specialty services given their relatively low base case subscriber levels.

Total operating expenses increase substantially under Scenarios 1 and 2 relative to the base case. Programming expenditure increases are limited since they are assumed to increase on a percentage basis relative to the base case; however, the technical expenses, which are driven by satellite distribution costs, increase dramatically. Under Scenario 1, operating expenses rise by \$1.3 million (an increase of over 40%) and, under Scenario 2, operating expenses rise by \$2.5 million (an increase of roughly 80%). The increases in HD capital related costs, depreciation and interest expenses, add a further cost of \$0.6 million roughly \$1.1 million under Scenario 1 versus Scenario 2.

Table 8
CATEGORY 1 & 2 DIGITAL SPECIALTY SERVICES
AVERAGE REVENUES AND COSTS
Digital Migration & Transition to HD Format

	BASE CASE (2004)	POST-TRANSITION FRAMEWORK			
		Scenario 1	Difference	Scenario 2	Difference
REVENUE (\$000)					
Cable	641	2,710	2,069	2,710	2,069
DTH	1,334	1,334	0	1,334	0
Advertising	259	457	198	457	198
Other	30	30	0	30	0
TOTAL	2,264	4,531	2,267	4,531	2,267
EXPENSES (\$000)					
Programming	1,599	1,679	80	1,849	250
Technical	642	1,842	1,200	2,892	2,250
Other	818	818	0	818	0
TOTAL	3,059	4,339	1,280	5,559	2,500
Operating Income	-794	192	986	-1,028	-234
Depreciation	168	568	400	968	800
PBIT	-962	-376	586	-1,996	-1,034
Interest	244	404	160	564	320
Adjustments	90	90	0	90	0
Pre-tax Profit	-1,296	-870	426	-2,650	-1,354
PBIT Margin	-42%	-8%	34%	-44%	-2%
Pre-tax Profit Margin	-57%	-19%	38%	-58%	-1%

On balance, gains in subscriber-related revenues more than offset the estimated incremental HD conversion costs under Scenario 1. In this case earnings (measured in terms of PBIT or pre-tax profit margins) increase sharply, but nevertheless remain well below zero. Under Scenario 2, the revenue gains just fail to cover the higher alternative HD conversion related costs. As a consequence, average category 1 & 2 digital specialty service earnings fall marginally relative to their already extreme base case loss position.

It should also be noted that, under the post-transition scenarios, the ratio of Canadian programming expenditures to total revenues would virtually be cut in half as a result of the increase in average category 1 & 2 digital specialty service revenues. To maintain the base case ratio of Canadian programming expenditures to revenues, Canadian programming services would have to be increased, on average, by roughly \$750,000 per service. However, in view of the continued substantial losses incurred by the category 1 & 2 digital specialty services under both scenarios, increasing Canadian programming expenditures would be extremely difficult if not impossible.

Aggregate economic impacts for all category 1 & 2 digital specialty services combined are summarized in Table 9. Under both scenarios, total revenues increase in total by \$118 million. As well, total operating expenses increase by

\$67 to \$130 million and capital expenditures by \$104 to \$208 million under Scenarios 1 and 2 respectively.

Table 9
ALL CATEGORY 1 & 2 DIGITAL SPECIALTY SERVICES
AGGREGATE ECONOMIC IMPACTS
Digital Migration & Transition to HD Format

(\$ 000)	POST-TRANSITION FRAMEWORK	
	Scenario 1	Scenario 2
REVENUES	117,899	117,899
EXPENSES		
Technical	62,400	117,000
Programming	4,160	13,000
Total	66,560	130,000
CAPITAL EXPENDITURES	104,000	208,000

4.4.3 Impact on Pay/PPV Services

In the case of average pay/PPV services, we only consider the impact of the HD conversion costs. No revenue impacts are assumed to result from the migration of analog services to a fully digital environment.

Table 10 provides a summary of the economic impacts of HD conversion on average pay/PPV service expenses and earnings.

The incremental impacts on average pay/PPV service operating expenses are identical to those of the average analog specialty service -- i.e., total operating expenses increase by \$2.0 million under Scenario 1 and \$4.8 million under Scenario 2. Equivalent impacts also apply in the case of depreciation and interest expenses relative to those of the average analog specialty service. -- i.e., roughly \$0.6 to \$1.1 million, combined, under Scenarios 1 and 2, respectively.

With significantly increased costs and no offsetting revenues, average pay/PPV service earnings decline sharply. Earnings are cut in half under Scenario 1 and are almost eliminated under Scenario 2.

Table 10
CANADIAN PAY & PPV SERVICES
AVERAGE REVENUES AND COSTS
Digital Migration & Transition to HD Format

	BASE CASE (2004)	POST-TRANSITION FRAMEWORK			
		Scenario 1	Difference	Scenario 2	Difference
REVENUE (\$000)					
Cable	14,519	14,519	0	14,519	0
DTH	12,029	12,029	0	12,029	0
Advertising	0	0	0	0	0
Other	23	23	0	23	0
TOTAL	26,571	26,571	0	26,571	0
EXPENSES (\$000)					
Programming	15,735	16,535	800	18,235	2,500
Technical	779	1,979	1,200	3,029	2,250
Other	3,472	3,472	0	3,472	0
TOTAL	19,987	21,986	1,999	24,736	4,749
Operating Income	6,584	4,585	-1,999	1,835	-4,749
Depreciation	317	717	400	1,117	800
PBIT	6,267	3,868	-2,399	718	-5,549
Interest	221	381	160	541	320
Adjustments	-566	-566	0	-566	0
Pre-tax Profit	6,612	4,053	-2,559	743	-5,869
PBIT Margin	24%	15%	-9%	3%	-21%
Pre-tax Profit Margin	25%	15%	-10%	3%	-22%

Aggregate economic impacts for all pay/PPV services combined are summarized in Table 11. Under the two scenarios considered, total operating expenses increase by \$28 to \$67 million and capital expenditures by \$28 to \$56 million under Scenarios 1 and 2 respectively.

Table 11
ALL CANADIAN PAY & PPV SERVICES
AGGREGATE ECONOMIC IMPACTS
Digital Migration & Transition to HD Format

(\$ 000)	POST-TRANSITION FRAMEWORK	
	Scenario 1	Scenario 2
REVENUES	0	0
EXPENSES		
Technical	16,800	31,500
Programming	11,200	35,000
Total	28,000	66,500
CAPITAL EXPENDITURES	28,000	56,000

4.5 Post-Transition Scenario Analysis – Industry-Wide Impacts

The aggregate impacts of digital migration and the conversion to HD on the Canadian pay and specialty services sector as a whole for the two post-transition scenarios are presented in Table 12. The industry wide results reflect the net effect of the revenue losses to analog specialty services and the revenue gains to category 1 & 2 digital specialty services due to digital migration. As well, the results reflect the costs of the conversion from standard definition to HD for analog specialty, digital specialty and pay/PPV services combined.

Overall, Industry revenues decline by \$80 million given that the revenue losses to analog services exceed the gains made by category 1 & 2 digital specialty services. This is explained by the fact that the advertising revenue gains made by digital specialty services fall well short of the advertising revenue losses to analog services, given the much lower average per subscriber advertising rates currently earned by category 1 & 2 digital specialty services.

Industry wide HD-related operating expense impacts range from \$193 million under Scenario 1 to \$429 million under Scenario 2. Depreciation costs also rise significantly under both scenarios due to incremental HD-related capital costs -- i.e., by \$46 million under Scenario 1 and \$92 million under Scenario 2. Interest costs increase as well -- i.e., by \$18.4 million under Scenario 1 and \$36.8 million under Scenario 2.

Table 12
CANADIAN PAY & SPECIALTY SERVICE INDUSTRY
Digital Migration & Transition to HD Format

	BASE CASE (2004)	POST-TRANSITION FRAMEWORK			
		Scenario 1	Difference	Scenario 2	Difference
REVENUE (\$000)					
Cable	892,172	892,720	548	892,720	548
DTH	428,264	428,264	0	428,264	0
Advertising	707,195	626,209	-80,986	626,209	-80,986
Other	22,874	22,874	0	22,874	0
TOTAL	2,050,504	1,970,067	-80,437	1,970,067	-80,437
EXPENSES (\$000)					
Programming	1,127,880	1,182,440	54,560	1,298,380	170,500
Technical	109,748	247,748	138,000	368,498	258,750
Other	360,880	360,880	0	360,880	0
TOTAL	1,598,508	1,791,068	192,560	2,027,758	429,250
Operating Income	451,996	178,999	-272,997	-57,691	-509,687
Depreciation	33,896	79,896	46,000	125,896	92,000
PBIT	418,100	99,103	-318,997	-183,587	-601,687
Interest	83,879	102,279	18,400	120,679	36,800
Adjustments	-29,787	-29,787	0	-29,787	0
Pre-tax Profit	364,009	26,611	-337,398	-274,479	-638,488
PBIT Margin	20%	5%	-15%	-9%	-30%
Pre-tax Profit Margin	18%	1%	-16%	-14%	-32%

All told, Canadian pay and specialty service industry earnings drop sharply under both post-transition scenarios. Industry earnings, measured in terms of PBIT margin, drop from 18% under the base case to 5% under Scenario 1 and further still to -9% under Scenario 2. A similar picture applies when considering pre-tax profits/losses, which drop from 18% under the base case to 1% under Scenario 1 and to -14% under Scenario 2. Consequently, under the two scenarios considered in this analysis, the combined impacts of digital migration and HD conversion have the effect of either largely eliminating industry profitability under or pushing the industry well into an overall loss position.

4.6 Post-Transition Scenario Analysis – Caveats

There are several caveats that should be borne in mind when considering the estimated economic impacts set out above. These involve the impact of potential set-top box costs, pressures to reduce costs (including Canadian programming expenditures) in response to earnings reductions and, in this same respect, the lack of financial resources to undertake HD upgrades as in the case of many if not most category 1 & 2 digital specialty services.

First, the issue of the potential costs of set-top devices comes up in the context of both the digital migration and HD conversion scenarios. In either case, if subscribers are required to absorb the cost of a digital or HD set-top box directly or indirectly, subscriber expenditures on Canadian pay and specialty services can be expected to decline. In this respect, the economic impact results shown in both post-transition scenarios above would be understated.

Under the digital migration scenario assumptions, for instance, some 6.2 million analog cable subscribers would be migrated over to digital service. If the average monthly rental rate of a digital set-top box were \$5.00 (below typical existing rates), these migrated subscribers would collectively be required to pay roughly \$373 million annually in equipment rental fees (assuming no disconnections). If migrated cable subscribers were required to pay this amount, whether explicitly or implicitly in their monthly cable service charges, expenditures on pay and specialty service would undoubtedly decline.

If, for example, the added cost of a set-top box caused a further 10% reduction in subscriber share levels among cable subscribers for analog specialty services, average analog specialty service revenues would decline by roughly \$5 million over and above the losses described under the post-transition scenarios discussed in the previous sections. At the analog specialty service sub-sector as a whole, this would amount to a further loss of roughly \$240 million. Even at this assumed penetration rate reduction level, the increase set-top box costs would not be fully offset by analog service subscription revenue reductions (although it

should be noted that we have not taken into account the mark-up on wholesale rates applied by the BDU which subscribers would be required to pay).

The cost of rolling out HD set-top boxes could even be greater given that the vast majority of subscribers do not currently subscribe to HD programming services and the cost of HD set-top boxes currently exceed the cost of standard definition digital set-top boxes.

Second, absorbing the cost of the conversion to HD programming format places significant pressure on industry earnings under the first post-transition scenario and even more so under the second scenario. In order to justify moving to HD format, operating costs would need to be reduced given that there appears to be little hope at this time of generating additional revenues from transitioning to HD format. One area where cost could potentially be cut is in the area of Canadian programming expenditures. Reductions in this respect are limited by existing Canadian programming obligations; however, some services may be forced to seek reductions in their percentage commitments in order to restore an acceptable level of profitability.

Lastly, it appears that some pay and specialty services would simply not have the financial resources to convert to HD format. This is particularly evident in the case of category 1 & 2 digital specialty services given the fact that they are yet to breakeven since their launch over three years ago. The same may also be true in the case of some analog specialty services. Given the nature of some specialty programming services, it is possible that they may choose to simply upgrade to a standard definition wide-screen format to avoid or delay incurring the costs of converting to HD format.

To provide an estimate of likely economic impacts associated with such a scenario, we re-estimated industry-wide impacts of digital migration and HD conversion under the assumption that category 1 & 2 digital specialty services do not convert to HD format. It should be noted that while we could have considered an alternative scenario in this respect where a mix of analog and digital were assumed not to upgrade to HD at this time, we have chosen to focus purely on category 1 & 2 digital specialty services in this scenario to simplify the analysis.

Table 13 provides a summary of the revised industry-wide economic impact results.

Table 13
CANADIAN PAY & SPECIALTY SERVICE INDUSTRY
Digital Migration & Transition to HD Format
Assuming Category 1 & 2 Digital Specialty Service do not Transition to HD

	BASE CASE (2004)	POST-TRANSITION FRAMEWORK			
		Scenario 1	Difference	Scenario 2	Difference
REVENUE (\$000)					
Cable	892,172	892,720	548	892,720	548
DTH	428,264	428,264	0	428,264	0
Advertising	707,195	626,209	-80,986	626,209	-80,986
Other	22,874	22,874	0	22,874	0
TOTAL	2,050,504	1,970,067	-80,437	1,970,067	-80,437
EXPENSES (\$000)					
Programming	1,127,880	1,178,280	50,400	1,285,380	157,500
Technical	109,748	185,348	75,600	251,498	141,750
Other	360,880	360,880	0	360,880	0
TOTAL	1,598,508	1,724,508	126,000	1,897,758	299,250
Operating Income	451,996	245,559	-206,437	72,309	-379,687
Depreciation	33,896	59,096	25,200	84,296	50,400
PBIT	418,100	186,463	-231,637	-11,987	-430,087
Interest	83,879	93,959	10,080	104,039	20,160
Adjustments	-29,787	-29,787	0	-29,787	0
Pre-tax Profit	364,009	122,291	-241,718	-86,239	-450,248
PBIT Margin	20%	9%	-11%	-1%	-21%
Pre-tax Profit Margin	18%	6%	-12%	-4%	-22%

Under this alternative partial HD conversion scenario, there is no change in the industry wide revenue losses associated with digital migration. However, the industry-wide HD cost impacts are mitigated significantly since we are now assuming that all 52 category 1 & 2 digital specialty services do not upgrade to HD format.

Even still, industry wide earnings drop considerably under both scenarios. Under the first scenario, the industry PBIT margin drops to 9% and under the second scenario it falls below zero, to -1%. A similar pattern is observed in the case of the industry's pre-tax profit margin. It drops to 6% under the first scenario and to a loss position of -4% under the second scenario. Consequently, even under this partial HD conversion scenario Canadian pay and specialty service earnings are reduced significantly.

Had one or more analog specialty services been substituted for category 1 & 2 digital services in this alternative scenario, the decline in industry-wide earnings, under both scenarios, would have been mitigated somewhat given the much larger incremental HD-related programming expenditures incurred by analog versus digital services.

5.0 Conclusions

In sum, our analysis reveals that the combined impact of digital migration and the transition to high definition results in a significant decline in revenues for analog services, offset in part by gains made by category 1 & 2 digital services, and a substantial increase in costs for all pay and specialty services. Consequently, industry earnings are reduced significantly if not eliminated altogether.

While the study does not attempt to model all of the possible reactions that services may undertake in response to this financial pressure, we note that while technical and distribution costs tend to be largely fixed under the scenarios modeled, overall programming spending is variable. Therefore, not only would absolute programming spending commitments fall since they are a percentage of revenue (i.e., by up to \$83 million annually in the case of analog specialty services), but in some cases services may be forced to seek reductions in their percentage commitments in order to restore an acceptable level of profitability.

In addition, the fact that potential costs for set-top boxes have not been included in the analysis is an important caveat that suggests that our estimated economic impacts on the Canadian pay and specialty industry may be understated.

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APPENDIX 2

The Availability of High Definition Television Programming in the US: Broadcast Network, Pay and Specialty Services

April 20, 2005

A. Background

The Canadian Association of Broadcasters (“CAB”) is preparing a response on behalf of its members to Broadcasting Public Notice CRTC 2004-58: Call for comments on a proposed framework for the licensing and distribution of high definition pay and specialty services.

As part of that response, the CAB intends to address a proposal by the Commission that an HD-transitional specialty or pay service would be entitled to distribution under the carriage rules if, in the case of an English-language service, at least 50% of the programming on that service is in high definition format.

The CAB believes that an empirical assessment of the availability of high definition (HDTV) programming on different types of programming services in the US would assist it in preparing its response to the Public Notice.

B. Research Objectives and Design

This study is designed to provide the CAB with a measurement of the number of hours of HDTV programming offered by broadcast networks, movie pay services, non-sports, non-movie-based specialty services, and sports specialty services in the US during two recent broadcast weeks.¹ The study includes:

- i. the HDTV feeds for the 7 major US television networks (ABC, CBS, NBC, PBS, Fox, WB and UPN);
- ii. the HDTV versions of the 3 largest US pay services (HBO Digital, Showtime Digital, STARZ! High Definition);
- iii. the HDTV versions of 16 US non-sports, non-movie-based specialty services (Discovery HD Theater, Monsters, Rave, ANiMANia, Wealth TV, Ultra HD, RUSH, Auction, HDNet, iN Demand High Definition, iN Demand High Definition 2, Universal HD, TNTHD, Equator, Gallery, MOOV); and
- iv. the HDTV versions of 7 US sports specialty services (ESPNHD, ESPN2HD, Fox Sports New York HD, Madison Square Gardens, NBAHD, NBATV, World Sport).

¹ The broadcast schedules for 23 of these services were examined for the week of March 28 to April 3 2005. The broadcast schedules for an additional 10 services were examined for the week of April 11 to April 17 2005.

The findings are presented in the report in summary tables for each of the four types of service in the following categories:

- i. new HDTV hours: the total number of hours of original HDTV programs (i.e. the first play of a newly created program), including new episodes of series and new movies, concerts or other programs;
- ii. first play hours: includes the first play of any HDTV program in the broadcast week, excluding subsequent repeat plays of that program during the broadcast week;
- iii. total HDTV hours: includes all HDTV programming broadcast in the week (original, first play and repeats);
- iv. total broadcast hours: the total number of hours (HDTV and non-HDTV) in the broadcast week (24 x 7 x the number of services);
- v. new HDTV prime time hours: the number of new HDTV hours in prime time (7:00 pm to 11:00 pm);
- vi. first play prime time hours: includes the first play of any HDTV program in the broadcast week in prime time, excluding subsequent repeat plays of that program during the broadcast week;
- vii. total HDTV prime time hours: includes all HDTV programming broadcast in prime time (7:00 pm to 11:00 pm); and
- viii. total prime time broadcast hours: the total number of hours (HDTV and non-HDTV) in the broadcast week in prime time (4 x 7 x the number of services).

A fifth table summarizes and compares the amount of new HDTV programming by group.

The raw data for all services are presented in appendices to the study.

C. Methodology

The raw data for the study were drawn from the on-line *HDTV Magazine* program guide for broadcast weeks Monday March 28 to Sunday April 3 and Monday April 11 to Sunday April 17. The data were aggregated by date, service and type of programming.

The *HDTV Magazine* program guide does not distinguish between true HDTV programming, as that programming has been defined by the Commission in Public Notices CRTC 2003-61 and CRTC 2004-58, and low definition programming that has been up-converted to the HDTV format. As such, it was not possible to distinguish between these two types of HDTV programming in the data collection and therefore, the results presented in this study may over-state the actual amount of true HDTV programming based on the CRTC definition.

D. Broadcast Networks

Table 1 sets out the number of new HDTV hours, first play HDTV hours, total HDTV hours and total hours in the broadcast week and in prime time for the 7 major US broadcast networks (ABC, CBS, NBC, PBS, Fox, WB and UPN).² HDTV programming on the major networks includes primarily prime time dramatic series programming, late night talk programming and sports.

Table 1: HDTV Hours, Full Schedule and Prime Time, Broadcast Networks, Hours and % of Total Broadcast Hours								
FULL SCHEDULE	Mon	Tues	Wed	Thurs	Fri	Sat.	Sun	Total
New HDTV Hours:	6.5	9.5	9.5	6.0	9.0	8.0	16.0	64.5
%	3.9%	5.7%	5.7%	3.6%	5.4%	4.8%	9.5%	5.5%
First Play Hours:	20.5	11.5	14.5	12.0	13.0	13.5	19.0	104.0
%	12.2%	6.8%	8.6%	7.1%	7.7%	8.0%	11.3%	8.8%
Total HDTV Hours:	22.5	22.0	27.5	22.5	23.0	19.5	21.0	158.0
%	13.4%	13.1%	16.4%	13.4%	13.7%	11.6%	12.5%	13.4%
Total Hours:	168.0	168.0	168.0	168.0	168.0	168.0	168.0	1176.0
PRIME TIME	Mon	Tues	Wed	Thurs	Fri	Sat.	Sun	Total
New HDTV Hours:	6.0	8.5	8.5	5.0	8.0	4.0	6.0	46.0
%	21.4%	30.4%	30.4%	17.9%	28.6%	14.3%	21.4%	23.5%
First Play Hours:	11	9.5	12.5	6.5	11	7	6	63.5
%	39.3%	33.9%	44.6%	23.2%	39.3%	25.0%	21.4%	32.4%
Total HDTV Hours:	12.0	11.0	16.5	7.5	12.5	7.0	6.0	72.5
%	42.9%	39.3%	58.9%	26.8%	44.6%	25.0%	21.4%	37.0%
Total Hours:	28	28	28	28	28	28	28	196

Source: *HDTV Magazine*, Armstrong Consulting

² Data for ABC, CBS, NBC, PBS, UPN and WB are for the week of March 28 to April 3. Data for Fox are for the week of April 11 to April 17.

As this table shows, new HDTV programming totaled 64.5 hours, constituting 5.5% of the full broadcast week schedule. First play HDTV hours and total HDTV hours equaled 104 and 158 hours respectively, constituting 8.8% and 13.4% of the full broadcast week schedule.

In prime time, new HDTV programming totaled 46 hours, or 23.5% of the schedule. All HDTV programming totaled 72.5 hours, or 37% of the prime time schedule.

E. Pay Services

Table 2 sets out comparable data for the three major US movie pay services (HBO, Showtime and Starz!).³ HDTV programming on the movie pay services includes primarily movies with some continuing drama series programming.

Table 2: HDTV Hours, Full Schedule and Prime Time, Movie Pay Services, Hours and % of Total Broadcast Hours								
	Mon	Tues	Wed	Thurs	Fri	Sat.	Sun	Total
FULL SCHEDULE								
New HDTV Hours:	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.8%	0.4%
First Play Hours:	37.3	40.3	32.5	36.5	22.0	38.3	28.5	235.3
%	51.7%	55.9%	45.1%	50.7%	30.6%	53.1%	39.6%	46.7%
Total HDTV Hours:	39.0	45.3	40.5	41.3	29.5	46.8	39.3	281.5
%	54.2%	62.8%	56.3%	57.3%	41.0%	64.9%	54.5%	55.9%
Total Hours:	72.0	72.0	72.0	72.0	72.0	72.0	72.0	504.0
PRIME TIME								
New HDTV Hours:	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	2.4%
First Play Hours:	3.3	9.0	5.5	8.0	5.0	2.5	3.5	36.8
%	27.1%	75.0%	45.8%	66.7%	41.7%	20.8%	29.2%	43.8%
Total HDTV Hours:	5.3	10.8	6.5	9.0	6.0	7.3	7.8	52.5
%	43.8%	89.6%	54.2%	75.0%	50.0%	60.4%	64.6%	62.5%
Total Hours:	12	12	12	12	12	12	12	84

Source: *HDTV Magazine*, Armstrong Consulting

³ Data for HBO, Showtime and Starz! are for the week of March 28 to April 3.

As this table shows, the movie pay services offered almost no new HDTV programming, at only 2 hours or 0.4% of the full broadcast week schedule. First play HDTV programming constituted slightly less than one half of the schedule (46.7%) and slightly more than half (55.9%) of all programming was HDTV programming.

Both of the new HDTV hours were offered in prime time and these two hours accounted for 2.4% of the prime time schedule. First play hours constituted 43.8% of the prime time schedule. Total HDTV hours, at 52.5 hours, accounted for 62.5% of the prime time schedule.

F. Non-Sports Specialty Services

Table 3 sets out comparable data for 16 US non-sports specialty services, including: Discovery HD Theater; Monsters; Rave; ANiMANia; Wealth TV; Ultra HD; HDNet; iN Demand High Definition; iN Demand High Definition 2; Universal HD; TNTHD; Equator; Gallery; RUSH, Auction; and MOOV.⁴ HDTV programming on these services includes some original HDTV programming produced specifically for the service, a variety of older or non-current movies, some live sports programming and a substantial amount of older or non-current syndicated television programming.

As the table shows, new HDTV programs constituted a small part of the total broadcast week for these 16 non-sports specialty services, at a total of 23.8 hours or 0.9% of the broadcast schedule. First play HDTV hours constituted approximately one third of the schedule, at 34.8%, with all HDTV programs accounting for 94.4% of the broadcast week.

There were 11.3 hours of new HDTV programming in prime time, accounting for 2.5% of the prime time schedule. First play and total HDTV hours accounted for 36.1% and 92.7% of the prime time schedule.

⁴ Data for MOOV, RUSH, Auction and HDNet are for the broadcast week of April 11 to April 17. Data for the remaining 12 non-sports specialty services are for the broadcast week of March 28 to April 3.

Table 3: HDTV Hours, Full Schedule and Prime Time, Non-Sports Specialty, Hours and % of Total Broadcast Hours								
FULL SCHEDULE	Mon	Tues	Wed	Thurs	Fri	Sat.	Sun	Total
New HDTV Hours:	3.0	3.5	1.0	1.8	4.0	4.0	6.5	23.8
%	0.8%	0.9%	0.3%	0.5%	1.0%	1.0%	1.7%	0.9%
First Play Hours:	212.8	150.8	120.5	133.3	125.0	100.3	94.3	936.8
%	55.4%	39.3%	31.4%	34.7%	32.6%	26.1%	24.5%	34.8%
Total HDTV Hours:	363.5	365.5	365.5	362.5	362.5	360.5	358.5	2538.5
%	94.7%	95.2%	95.2%	94.4%	94.4%	93.9%	93.4%	94.4%
Total Hours:	384.0	384.0	384.0	384.0	384.0	384.0	384.0	2688.0
PRIME TIME	Mon	Tues	Wed	Thurs	Fri	Sat.	Sun	Total
New HDTV Hours:	2.0	2.5	0.0	1.3	1.0	1.0	3.5	11.3
%	3.1%	3.9%	0.0%	2.0%	1.6%	1.6%	5.5%	2.5%
First Play Hours:	27.8	27.5	21.3	22.8	24.8	20.3	17.5	161.8
%	43.4%	43.0%	33.2%	35.5%	38.7%	31.6%	27.3%	36.1%
Total HDTV Hours:	60.5	61.0	61.0	60.0	61.0	52.0	60.0	415.5
%	94.5%	95.3%	95.3%	93.8%	95.3%	81.3%	93.8%	92.7%
Total Hours:	64	64	64	64	64	64	64	448

Source: *HDTV Magazine*, Armstrong Consulting

G. Sports Specialty Services

Table 4 sets out comparable data for 7 sports specialty services: ESPNHD, ESPNHD 2, Fox Sports New York HD, Madison Square Garden, NBAHD, NBA TV and World Sport.⁵ HDTV programming on these services includes primarily live action sports events and news programming.⁶

⁵ Data for ESPNHD and ESPNHD 2 are for the broadcast week of March 28 to April 3. Data for Fox Sports New York HD, Madison Square Garden, NBAHD, NBA TV and World Sport are for the week of April 11 to April 17.

⁶ ESPNHD offers a substantial amount of sports news programming in HDTV format, ranging from 9 to 14 hours per day. The *HDTV Magazine* program guide does not distinguish between original and repeat broadcasts of this news programming. As such, sports news programming on ESPNHD is included in the total HDTV hours but is not included in the new or first play categories. Table 4 therefore may significantly understate the total amount of new and first play HDTV programming on the sports specialty services.

Table 4: HDTV Hours, Full Schedule and Prime Time, Sports Specialty, Hours and % of Total Broadcast Hours								
	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	Total
FULL SCHEDULE								
New HDTV Hours:	7.0	6.0	0.0	2.0	0.0	0.0	4.5	19.5
%	4.2%	3.6%	0.0%	1.2%	0.0%	0.0%	2.7%	1.7%
First Play Hours:	23.0	13.0	3.0	6.0	18.5	2.5	9.5	75.5
%	13.7%	7.7%	1.8%	3.6%	11.0%	1.5%	5.7%	6.4%
Total HDTV Hours:	49.0	44.8	39.8	41.5	48.8	33.5	46.0	303.3
%	29.2%	26.6%	23.7%	24.7%	29.0%	19.9%	27.4%	25.8%
Total Hours:	168.0	168.0	168.0	168.0	168.0	168.0	168.0	1176.0
PRIME TIME								
New HDTV Hours:	4.0	6.0	0.0	2.0	0.0	0.0	3.5	15.5
%	14.3%	21.4%	0.0%	7.1%	0.0%	0.0%	12.5%	7.9%
First Play Hours:	7.5	9.0	0.0	2.0	3.5	0.0	6.5	28.5
%	26.8%	32.1%	0.0%	7.1%	12.5%	0.0%	23.2%	14.5%
Total HDTV Hours:	10.5	13.0	7.0	8.0	11.5	4.0	14.0	68.0
%	37.5%	46.4%	25.0%	28.6%	41.1%	14.3%	50.0%	34.7%
Total Hours:	28.0	28.0	28.0	28.0	28.0	28.0	28.0	196.0

Source: *HDTV Magazine*, Armstrong Consulting

As this table shows, the 7 sports specialty services offered 19.5 hours of new HDTV programming over the week, representing 1.7% of the total broadcast schedule. They offered 75.5 first play hours of HDTV programming, accounting for 6.4% of the broadcast schedule, and a total of 303.3 hours of HDTV programming over the course of the broadcast week, representing 25.8% of the schedule.

There were 15.5 hours of new HDTV programming in prime time, accounting for 7.9% of the prime time schedule, 28.5 hours of first play HDTV programming representing 14.5% of the prime time schedule, and a total of 68 hours of HDTV in prime time representing 34.7% of the prime time schedule.

H. New HDTV Hours

Table 5 compares the amount of new HDTV programming on services in each of the four groups over the full broadcast week and in prime time and calculates the average number of hours of new HDTV programming offered by each service in each group.

Table 5: Source of New HDTV Hours, Networks, Pay, Non-Sports Specialty, Sports Specialty, % of Total New HDTV Hours, Average per Service, Full Schedule and Prime Time									
FULL SCHED	<u>Mon</u>	<u>Tues</u>	<u>Wed</u>	<u>Thurs</u>	<u>Fri</u>	<u>Sat.</u>	<u>Sun</u>	<u>Total</u>	<u>Average</u>
Networks:	6.5	9.5	9.5	6.0	9.0	8.0	16.0	64.5	9.2
%	39.4%	50.0%	90.5%	61.5%	69.2%	66.7%	55.2%	58.8%	
Pay:	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.7
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.9%	1.8%	
Non-Sport:	3.0	3.5	1.0	1.8	4.0	4.0	6.5	23.8	1.5
%	18.2%	18.4%	9.5%	17.9%	30.8%	33.3%	22.4%	21.6%	
Sport:	7.0	6.0	0.0	2.0	0.0	0.0	4.5	19.5	2.8
%	42.4%	31.6%	0.0%	20.5%	0.0%	0.0%	15.5%	17.8%	
Total:	16.5	19.0	10.5	9.8	13.0	12.0	29.0	109.8	3.3
PRIME TIME	<u>Mon</u>	<u>Tues</u>	<u>Wed</u>	<u>Thurs</u>	<u>Fri</u>	<u>Sat.</u>	<u>Sun</u>	<u>Total</u>	<u>Average</u>
Networks:	6.0	8.5	8.5	5.0	8.0	4.0	6.0	46.0	6.6
%	50.0%	50.0%	100.0%	60.6%	88.9%	80.0%	40.0%	61.5%	
Pay:	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.7
%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.3%	2.7%	
Non-Sport:	2.0	2.5	0.0	1.3	1.0	1.0	3.5	11.3	0.7
%	16.7%	14.7%	0.0%	15.2%	11.1%	20.0%	23.3%	15.1%	
Sport:	4.0	6.0	0.0	2.0	0.0	0.0	3.5	15.5	2.2
%	33.3%	35.3%	0.0%	24.2%	0.0%	0.0%	23.3%	20.7%	
Total:	12.0	17.0	8.5	8.3	9.0	5.0	15.0	74.8	2.3

Source: *HDTV Magazine*, Armstrong Consulting

As Table 5 shows, the broadcast networks accounted for almost 58.8% of all new HDTV programming over the full broadcast week, with the greatest number of new HDTV programming hours per service. The non-sports specialty services and the movie pay services accounted for only a very small amount of new HDTV programming on a per service basis, at 1.5 and 0.7 hours respectively.

A similar pattern is evident in prime time, with the broadcast networks accounting for 61.5% of all new HDTV hours.

I. Principal Findings and Conclusions

New HDTV Programming

- There was a relatively small amount of new HDTV programming available on the 33 services examined in this study, at just 109.8 hours over the full broadcast week.
- The majority of this new HDTV programming was on the 7 major broadcast networks.
- The non-sports specialty services and the movie pay services had the least new HDTV programming per service over the full broadcast week and in prime time.

First Play HDTV Programming

- The non-sports specialty and movie pay services are much more heavily reliant on the broadcast of older HDTV programming.
- The amount of first play HDTV programming on the non-sports specialty and pay services as a percentage of both the full schedule and in prime time significantly exceeded the comparable percentages for the new HDTV programming that they offer, in contrast to the broadcast networks and the sports specialty services.

Total Hours of HDTV Programming

- A high repeat factor appears to be required to achieve a high percentage of HDTV programming over the full broadcast schedule and in prime time.
- HDTV programming represented 13.4% of the full broadcast schedule for the major broadcast networks and almost 37% of the prime time schedule. The repeat factor in prime time (total HDTV hours/first play hours) was 1.1.
- In contrast, HDTV programming represented 62.5% of the movie pay service prime time schedule, but with a repeat factor of 1.4.
- HDTV programming represented 92.7% of the prime time schedule for the non-sports specialty services, but with a repeat factor of 2.6.⁷

⁷ HDTV programming represented 34.7% of the prime time schedule for the sports specialty services, with a repeat factor of 2.38. However, as was noted in footnote 6, the data in this study may understate the amount of new HDTV programming on ESPN and therefore, the repeat factor of 2.38 may not be accurate.

Appendix A: Raw Totals, Full Schedule HDTV Hours by Service

		Mon. March 28	Tues. March 29	Wed. March 30	Thurs. March 31	Fri. April 1	Sat. April 2	Sun. April 3	Row Totals
ABC Digital	HDTV	0	3	3	1	2	1.5	2	12.5
	New Show/Episodes	0	3	3	1	2	0	2	11
	First Run	0	3	3	1	2	1.5	2	12.5
Animania	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	0	0	0	0.25	0	0	0	0.25
	First Run	16.25	6	6	5.25	6	6	6	51.5
CBS Digital	HDTV	4	2	3	3	4	5	1	22
	New Show/Episodes	0	1	1	2	3	5	1	13
	First Run	4	2	3	3	4	5	1	22
Discovery/HD Theater	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	20	15	14	12	12.5	14	9	96.5
Equator	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	1	1	0	1	1	0	0	4
	First Run	10	6	6	6.5	6	1	1	36.5
ESPN 2	HDTV	0	6.75	1	0	4	0.5	4	16.25
	New Show/Episodes	0	4	0	0	0	0	0	4
	First Run	0	4	1	0	2	0.5	0	7.5
ESPN HD	HDTV	14.5	11	11.75	14	14.75	9	15	90
	New Show/Episodes	4	2	0	2	0	0	4.5	12.5
	First Run	4	2	0	2	0	0	4.5	12.5
Gallery	HDTV	23	24	24	18	22	23	17	151
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	9.5	5	2.5	4	2	0	0	23
HBO Digital	HDTV	18	20	23	15.5	17.75	18.5	21	133.75
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	16.25	18.5	19	12.75	14	16	15.75	112.25
IN Demand HD	HDTV	24	24	24	24	23	24	24	167
	New Show/Episodes	0	0	0	0	0	0	0.5	0.5
	First Run	18	10	8	12	9	10	12	79
IN Demand HD 2	HDTV	23.5	24	24	23.5	23	23	24	165
	New Show/Episodes	0.5	0	0	0.5	1	0	1.5	3.5
	First Run	11.5	11.5	3.5	8.5	8	6.5	9.5	59

		Mon. March 28	Tues. March 29	Wed. March 30	Thurs. March 31	Fri. April 1	Sat. April 2	Sun. April 3	Row Totals
Monsters	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	13.5	17.25	6	15	15	15.75	11.25	93.75
NBC Digital	HDTV	2.5	2.5	4	2.5	2	3.5	2	19
	New Show/Episodes	2.5	2.5	4	1	2	0.5	2	14.5
	First Run	2.5	2.5	4	2.5	2	3.5	2	19
PBS	HDTV	12	10.5	13	14	10	7	8	74.5
	New Show/Episodes	0	0	0	0	0	0	5	5
	First Run	10	0	0	3.5	0	1	7	21.5
Rave	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	23	9	12	3	3	8	2	60
Showtime Dig.	HDTV	11	14.25	7	18.5	5.5	11	15.75	83
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	11	12.5	5	16.5	4	11	10.5	70.5
Starz! HD	HDTV	10	11	10.5	7.25	6.25	17.25	2.5	64.75
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	10	9.25	8.5	7.25	4	11.25	2.25	52.5
TNT HD	HDTV	24	24	24	24	24	24	24	168
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	24	22	19.5	22	22.5	13.5	19	142.5
Ultra HD	HDTV	24	24	24	24	24	23	24	167
	New Show/Episodes	1	1	0	0	0	0	0	2
	First Run	7.5	4	4	4	3	4	3.5	30
Universal HD	HDTV	24	23.5	24	24	24	23	24	166.5
	New Show/Episodes	0	0	1	0	0	0	0	1
	First Run	15.5	12	14	14	10	2	7.5	75
UPN	HDTV	2	1	1	0	1	0	0	5
	New Show/Episodes	2	1	0	0	0	0	0	3
	First Run	2	1	1	0	1	0	0	5
WB	HDTV	1	1	2	0	2	0	2	8
	New Show/Episodes	1	0	0	0	0	0	0	1
	First Run	1	1	2	0	2	0	1	7
Wealth	HDTV	6	6	5.5	9	6.5	9.5	8.5	51
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	3.5	1.5	1	2.5	1.5	2.5	1.5	14

		Mon. Apr. 11	Tues. Apr. 12	Wed. Apr 13	Thurs. Apr 14	Fri. Apr 15	Sat. Apr 16	Sun. Apr. 17	Raw Totals
FOX Digital	Program	1	2	1.5	2	2	2.5	6	17
	New Ep/Show	1	2	1.5	2	2	2.5	6	17
	First Run	1	2	1.5	2	2	2.5	6	17
Fox Sports New York HD	HDTV	4	0	0	3.5	3.5	0	0	11
	New Show/Episodes	3	0	0	0	0	0	0	3
	First Run	4	0	0	0	0	0	0	4
MOOV	HDTV	23	24	24	24	24	24	23	166
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
RUSH	HDTV	24	24	24	24	24	24	23	167
	New Show/Episodes	0	0	0	0	0	0	0.5	0.5
	First Run	7.5	6	5.5	1.5	5.5	2	4	32
Auction	HDTV	24	24	24	24	24	24	23	167
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	12	5	4	6	5	0	1	33
Madison Square Gardens	HDTV	4	3	3	0	0	0	3	13
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	4	3	0	0	0	0	3	10
NBA HD	HDTV	2.5	0	0	0	2.5	0	0	5
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	2.5	0	0	0	2.5	0	0	5
NBA TV	HDTV	0	0	0	0	0	0	0	0
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
World Sport	HDTV	24	24	24	24	24	24	24	168
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	8.5	4	2	4	14	2	2	36.5
HD NET	HDTV	24	24	24	24	24	24	24	168
	New Show/Episodes	0.5	1.5	0	0	2	4	2	10
	First Run	21	20.5	14.5	17	16	15	7	111

Appendix B: Raw Totals, Prime Time HDTV Hours by Service

		28-Mar Total Primetime	29-Mar Total Primetime	30-Mar Total Primetime	31-Mar Total Primetime	1-Apr Total Primetime	2-Apr Total Primetime	3-Apr Total Primetime	Total
ABC Digital	HDTV	0	3	3	1	2	1	2	12
	New Show/Episodes	0	3	3	1	2	0	2	11
	First Run	0	3	3	1	2	1	2	12
Animania	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0.25	0	0	0	0.25
	First Run	1.75	2	2	1.25	2	1.5	1.5	12
CBS Digital	HDTV	3	1	2	2	3	4	1	16
	New Show/Episodes	0	1	1	2	3	4	1	12
	First Run	3	1	2	2	3	4	1	16
DiscoveryHD Theater	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	4	4	4	4	2.5	3	3	24.5
Equator	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	1	1	0	1	1	0	0	4
	First Run	2	2	2	1.5	2	0	0	9.5
ESPN 2	HDTV	0	4	0	0	0	0	3	7
	New Show/Episodes	0	4	0	0	0	0	0	4
	First Run	0	4	0	0	0	0	0	4
ESPN HD	HDTV	4	2	0	2	3	0	4	15
	New Show/Episodes	4	2	0	2	0	0	3.5	11.5
	First Run	4	2	0	2	0	0	3.5	11.5
Gallery	HDTV	4	4	4	2	4	3	2.5	23.5
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	2.5	2	0	2	0	0	0	6.5
HBO Digital	HDTV	3	3	3.5	1	3	3.5	3.75	20.75
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	1	3	2.5	0	2	1.5	1	11
iN Demand HD	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	2.5	2.5	1	3	3	3	2	17
iN Demand HD 2	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0.5	0	0	0	0	0	0	0.5
	First Run	1	1	0	0.5	2	1	1.5	7
Monsters	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	4	3.25	2	1.75	2.75	0	13.75
NBC Digital	HDTV	2	1.5	3	1.5	1	2	2	13
	New Show/Episodes	2	1.5	3	0	1	0	2	9.5
	First Run	2	1.5	3	1.5	1	2	2	13
PBS	HDTV	3	1.5	4	1	1.5	0	0	11
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	2	0	0	0	0	0	0	2
Rave	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	4	0	1	0	1	3	2	11
Showtime Dig.	HDTV	2	4	3	4	3	1	4	21
	New Show/Episodes	0	0	0	0	0	0	1	1
	First Run	2	4	3	4	3	1	2.5	19.5
Starz! HD	HDTV	0.25	3.75	0	4	0	2.75	0	10.75
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0.25	2	0	4	0	0	0	6.25
TNT HD	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	4	4	3.5	4	4	2	2	23.5

Ultra HD	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
Universal HD	HDTV	4	4	4	4	4	3	4	27
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	1	1	1	1	2	1.5	3	10.5
UPN	HDTV	2	1	1	0	1	0	0	5
	New Show/Episodes	2	1	0	0	0	0	0	3
	First Run	2	1	1	0	1	0	0	5
WB	HDTV	1	1	2	0	2	0	0	6
	New Show/Episodes	1	0	0	0	0	0	0	1
	First Run	1	1	2	0	2	0	0	6
Wealth	HDTV	0.5	1	1	2	1	1	1.5	8
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0.5	0	0	0	1	0.5	0	2
		11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	
Fox Sports New York HD	HDTV	0	0	0	2	2	0	0	4
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
MOOV	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
RUSH	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0.5	0.5
	First Run	1	1	0.5	0.5	0.5	0	0.5	4
Auction	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
Madison Square Gardens	HDTV	0	3	3	0	0	0	3	9
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	3	0	0	0	0	3	6
NBA HD	HDTV	2.5	0	0	0	2.5	0	0	5
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	2.5	0	0	0	2.5	0	0	5
NBA TV	HDTV	0	0	0	0	0	0	0	0
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	0	0	0	0	0	0	0	0
World Sport	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0	0	0	0	0	0	0	0
	First Run	1	0	0	0	1	0	0	2
Fox Digital	HDTV	1	2	1.5	2	2	0	1	9.5
	New Show/Episodes	1	2	1.5	2	2	0	1	9.5
	First Run	1	2	1.5	2	2	0	1	9.5
HD NET	HDTV	4	4	4	4	4	4	4	28
	New Show/Episodes	0.5	1.5	0	0	0	1	2	5
	First Run	3.5	4	3	3	3	2	2	20.5

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APPENDIX 3

The Capacity Question

In general, the CAB accepts the Commission's premise that the transition to HD will eventually involve all specialty and pay services, and that capacity must be found in the system to accommodate this new demand.

This is an important question, and the Commission's draft framework places great emphasis on it, since the whole requirement for a "threshold" of HD programming that would trigger the right to carriage (during the transitional phase), is based on the Commission's conclusion that capacity will be in short supply. After all, access to carriage is the first and most essential element in the regulation of the relationship between programming services and BDUs, and it would not be placed in question without serious concern over this issue.

The actual capacity that will be required is still, however, a moving target. Potential technology advances that will reduce the capacity demand are possible, and may under some circumstances be affordable. In making its estimates, the CAB has attempted to find a realistic balance between the overly conservative – accepting only those technologies that are proven and in deployment – and the overly optimistic – accepting a "wish list" for an achievable reality.

The CAB submits therefore that the capacity question will be governed by the following factors:

1. The continued requirement for two separate satellite feeds to reach customers of different BDUs.
2. During the transition, the requirement to feed both SD and HD signals, and in many cases on cable systems, analog signals as well.
3. The requirement for full HD bandwidth even when only SD programming is being transmitted on an HD service.
4. Limited deployment of more efficient compression schemes where they require that distributors "swap out" subscriber set-top boxes.

The requirement for two separate satellite feeds

It would clearly be more spectrum- and cost-efficient if both DTH operators and cable systems were able to use the same satellite signal to serve their customers – while deploying separate authorization and conditional access systems to permit each service to control its own subscribers. It would, quite literally, cut distribution costs in half.

However, it is highly unlikely that this will happen. The technologies deployed by cable, StarChoice, and ExpressVu are quite different and require different receivers. There is no indication that this situation will change. Therefore the cost of two separate HD signal feeds must be part of the economic equation.

The requirement for SD, HD, and analog signals

Viewers who have rented or purchased HD set-top boxes can receive HD, SD, and analog services on the same box. However, those who have only the usual digital box can receive only SD and analog signals – the HD feed is invisible to them. To serve these viewers, specialty services must provide an SD feed as well as the HD feed.

And of course, the majority of viewers are still in a purely analog universe. Those specialty services that have analog distribution on cable must continue to be distributed in analog until all viewers have migrated to digital. This does not represent an additional cost for the system, however, since the SD feed can be converted to analog by the cable BDU.

The implication, however, is that where it took two satellite feeds to distribute a specialty service (one for StarChoice and cable, one for ExpressVu), it will now take four, and two of them will require up to five times the capacity of current digital signals.

The requirement for full HD capacity, even of SD programming

One of the promises of digital television technology was that it would be possible to adjust the capacity of the signal feed to match the program it contained. That is, at one moment one could use a “pipe” of set bandwidth to feed five SD signals or a single HD feed. In this way, capacity would not be wasted.

In reality, however, distributors inform us that the HD set-top boxes they have deployed experience problems when the bit-rate transmitted undergoes large changes. Therefore it is necessary to use the full HD capacity – up to 19 megabits per second (Mbps), even when SD programming is being distributed.

Limited deployment of more efficient compression schemes.

There are several new technologies which promise more efficient use of capacity – Mpeg4, for example, promises to deliver pictures of comparable quality for approximately half of the capacity required by Mpeg2 compression. Where an HD signal required 19 Mbps if encoded and decoded in Mpeg2, it may require only 8-9 Mbps in Mpeg4.

Some believe that Mpeg4 can achieve even greater compression ratios, but one must bear in mind that extreme compression produces a degradation in signal quality that may be irritating to the viewer. Since the whole point of HD is to provide a very high quality signal, over-compression would be self-defeating.

Moreover, the Mpeg4 signal requires more processing power at the set-top box. As each day goes by, distributors deploy to their customers more and more boxes which will not be able to use this new technology. All of these will have to be replaced, at considerable cost – since the Mpeg4 capable receiver is more expensive – when and if the switch to Mpeg4 is made.

In a similar development, new modulation technologies are being tested that can increase the capacity of satellite channels. These also would require distributors to swap out set-top boxes since the current receivers are unable to demodulate HD signals that have been modulated with the new schemes.

The distributor will then have to judge whether the additional capacity is worth the cost of the box-swap. In some cases, and DTH is a likely example, the cost of creating new satellite capacity is severe, and a box swap may make sense. In the case of cable, the possibility of “harvesting” capacity used for analog distribution creates a different equation. Satellite capacity that is used primarily to serve cable represents a third situation.

The CAB therefore takes a middle position on this, and suggests that it would be optimistic to expect massive reductions in capacity requirements throughout the system, but that some degree of box swapping is a realistic expectation.

Satellite – the bottleneck

In general, the CAB accepts the Commission’s expectation that cable will be able, by redeploying analog channels, to create sufficient capacity to carry all HD signals offered by the Canadian system – always assuming that this capacity is used for broadcasting, and not redeployed to telecommunications uses.

Therefore the part of the system that is worrisome is satellite capacity. Satellites are already all-digital systems and have no “harvestable” capacity. Ku-band transponders are in extremely short supply – therefore any new services will require the creation of new capacity through the launch of new satellites.

Calculating the new capacity demand on satellite

The capacity requirement of an average SD digital signal is variable – some program material requires more, some requires less. And the use of statistical multiplexing by distributors permits the use of flexible pipes for each service that expand and contract as required. A working industry average in the Mpeg2 world is usually around 3 Mbps.

When one distributes these via satellite, this working average permits the distribution of about 9 services in a satellite transponder.

If one takes the number of 115 Canadian specialty services used in the Wall Communications study as the base (acknowledging that the authorization of new Category 2 services is likely to continue) then the “base case” for capacity is that Canadian services require 13 Ku-band transponders for their distribution. And they require this twice – once for ExpressVu customers and once for StarChoice and cable customers.

Adding HD to the equation, one might envisage two scenarios:

- An optimistic scenario, in which each HD signal would require only 8.5 Mbps for Mpeg4 distribution to all customers. This scenario assumes that all BDUs swap all Mpeg2 HD boxes for Mpeg4 capable boxes.
- A more realistic scenario, in which Mpeg4 could be used for one set of signals, but not the other, which would still require Mpeg2 at 19 Mbps.

At Mpeg4, one might fit three services into a single satellite transponder, with some small compromises. At Mpeg2, two can be carried but with significant additional compression, risking quality. A mix of SD and one HD service in each transponder might be a better option.

At three services per transponder, 37 transponders would be required to carry all 115 Canadian HD specialty services. Anik F3 is planned to carry 32 Ku-band transponders. So, using these calculations, more than one new satellite would be required simply to carry all Canadian pay and specialty HD services to one set of DTH customers. And more than one satellite – using the alternate technology – would be required to serve the second set.

Canadian conventional broadcasters, with their regional variants, and U.S. HD signals would be an additional and quite large load – and all of this capacity requirement would be incremental to the current capacity required for SD signals, which would still be necessary.

Under the second, more realistic scenario, one service would still be using Mpeg2 compression where the most that can be hoped for is two signals per transponder. If the first set, at Mpeg4, require 37 transponders, then this second set would require 58, for a total of 95 transponders. Adding conventional and U.S. signals to that load creates a very substantial new demand.

A final scenario is one in which both new modulation schemes and the Mpeg4 compression technique would be used universally, permitting each satellite transponder to carry four services. A single satellite with 32 transponders could then carry 128 HD services. This scenario places the cost burden on BDUs and existing HD subscribers, because it will require a universal box swap. But even in this most optimistic case, two new satellites and more would still be required to carry the 115 specialty services, the HD versions of local conventional stations and such U.S. services as are on the lists of eligible satellite services.

Once the transition is complete – and all BDU customers have an HD box – the SD signals can be dropped from the equation. This will help to ease the demand for capacity, but it can only occur when the millions of SD set-top boxes are also replaced.

Conclusions

- At least two new satellites, and quite probably three or four, will be required to provide sufficient capacity to carry the HD signals of the Canadian broadcasting system through the HD transition.
- Without substantial sources of new revenue, it will very difficult if not impossible to recover the costs of the new facilities required to distribute the HD versions of Canadian pay and specialty services.
- It will be essential to secure sufficient orbital slots for the Canadian requirement.

Other parties may adopt more optimistic assumptions about the impact of new technology to lower the capacity requirement. Based on what is in evidence so far, the CAB submits that these conclusions will continue to be valid even under most optimistic scenarios.

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