ACHIEVED FILL FACTORS[1]

	VzCost	Verizon CA Support	JC Opposition
Copper Distribution	38.76%[2]	Verizon CA does not rely on embedded fill factors in VzLoop. Indeed, copper distribution fill factors are not inputs in VzLoop, but rather are outputs that result from VzLoop's sizing calculations and the available discrete cable sizes (i.e., "breakage").[3] The primary input driving the fill factor achieved is the sizing factor. For copper distribution, VzLoop uses a sizing factor of 2.16,[4] which is derived by dividing the midpoint of the number of pairs called for in Verizon CA's engineering guidelines (2.5) by the average number of working residential lines per customer in Verizon CA's network (1.16).[5] The record evidence demonstrates that, in a forward-looking network, it will continue to be most efficient to install 2-3 working pairs per residential customer in order to minimize costly and disruptive augments in established neighborhoods. Verizon CA thus sizes copper distribution based on "reasonably foreseeable demand." This approach has been endorsed by the FCC (and by Mr. Donovan, who has characterized it as building to "ultimate demand" in a way that is consistent with "generally accepted engineering practice"). The FCC has rejected claims that TELRIC principles necessarily require higher fills; Verizon CA's fills have been stable over time even though the firm has been subject to price cap regulation for well over 13 years.	Overall: JC [6] note that Verizon's reported achieved fills are, in general, substantially inconsistent with the forward-looking fill levels that the Commission recently adopted for SBC-CA (D.04-09-063, pp. 124-125). For example, the Commission adopted a 51.6% copper distribution fill, which is 33% higher than Verizon's reported 38.76% Verizon uses two cable sizing factors plus breakage in arriving at its effective fill factors. The cable sizing factor proposed by Verizon is 2.16 plus an administrative spare factor of 0.02, for a total sizing factor of 2.2032. (Donovan/Pitkin/Turner Declaration 8/6/04, pp. 108-110.) Verizon's input values (its cable sizing factor and its administrative spare factor) equate to a *maximum* distribution fill factor of 45.39%, so that cables are always less than half full -- even assuming no breakage. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 110.) Fills this low are simply inefficient and very likely reflect a historical practice of substantially overbuilding route capacity. (Donovan Declaration, 11/9/04, pp. 92-93.)

ATTACHMENT 1

[1] Neither party agrees that the other party's text is an accurate representation of what is actually in the record.

	VzCost	Verizon CA Support	JC Opposition
		See Verizon CA Panel Testimony on Recurring Costs at 43-46; Tardiff Reply Testimony at 10-11, 13-16; Tucek Reply Testimony at 3-4; Richter Reply Testimony at 68-73; Rebuttal Panel Testimony on VzCost and VzLoop at 130-35; Jan. 13, 2004 technical workshop transcript at 3265-67 (Tucek). *See also* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.	A separate administrative spare factor does not make any sense because an engineer would consider the breakage in his analysis. (Donovan/Pitkin/Turner Declaration 8/6/04, pp. 109-110.) Consistent with the FCC's determinations in the Virginia Arbitration Order, the appropriate cable sizing factor should be 68.96% or 1.4502. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 112.) The problems are that Verizon's current filing in California: 1) continues to suffer from the use of ultimate demand, which has been explicitly rejected by the FCC, in the development of its fill factors or cable sizing factors; and 2) fails to properly consider how spare capacity due to breakage is used to increase plant flexibility in the real world. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 113 and Donovan Declaration, 11/9/04, p. 94.) Moreover, it makes no sense to plan for 2-3 working pairs per residential unit when demand levels never reached 2-pair at their peak and are stable or declining (when not being replaced by

[2] The copper distribution, fiber feeder, and copper feeder achieved fill factors shown on this matrix are "head-of-route" calculations. That is, copper distribution calculations measure utilization at the SAI and feeder calculations measure utilization at the main distribution frame (copper feeder) or fiber distribution frame (fiber feeder). Distribution and feeder fill factors calculated by segment can be found in VzLoop's Loop Fill and Statistics Report by Density Cell. *See* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.

[3] The minimum size for all cable is 25 pairs. The maximum size varies by plant type—aerial (900 pairs), buried (1200 pairs), and underground (1800 pairs). These inputs are in VzLoop's Options Table (ca_options_f_012804). The breakage assumptions used by VzLoop are presented on pages 5-7 of Attachment VZ-1. JCs make different breakage assumptions, as they note below, which make it difficult to compare the parties' various achieved fills.

[4] Verizon CA's administrative spare factor of 0.02 is necessary to allow for defective cable pairs, and its investment impact is virtually nil in any case.

[5] Attachment VZ-1 provides step-by-step instructions for reproducing from VzLoop the achieved fill factors shown in this matrix for copper distribution, fiber feeder, copper feeder, and DLC equipment.

[6] The term Joint Commentors or JC in this matrix is generally used as a convenient reference to identify the record evidence referred to in the text. JC originally consisted of MCI and AT&T. In some instances, however, JC is used to refer to the current position of MCI, Covad, Mpower, Navigator and XO, who now constitute the JC. AT&T no longer participates in this proceeding.

	VzCost	Verizon CA Support	JC Opposition
			fiber). (E.g., Pitts Declaration, 11/3/03, p. 11, fn. 20.)
Fiber Feeder	95.50%	Fiber feeder fill factors are not inputs in VzLoop, but rather are outputs derived by dividing the number of fiber strands in use by the number of fiber strands available. Verizon CA does not use any fiber feeder sizing factor; rather, the achieved fill factors are slightly less than 100% solely due to breakage. The dispute between the parties here is how many fiber strands are in use, i.e., whether each remote terminal generally requires six fibers or four.[7] As Verizon CA has explained, each remote terminal requires six fibers: two hot, two "warm spare," and two "cold spare." The two "warm spare" fibers are needed so that service can be instantly and seamlessly restored should the two hot fibers fail. The two "cold spare" fibers are needed to ensure that service is maintained in the event that a problem develops with the electronics at either end that requires installation of a new DLC. Because the cold spares are dedicated to the same DLC as the hot fibers and the warm spares, they cannot be reused by other DLCs and thus should not be considered as conventional spare capacity for a fill calculation. The cold spares also are not available for DSL or other advanced services. *See* VzLoop Cost Manual (Exhibit 3 to Verizon CA Testimony on Recurring Costs) at § 5.2; Richter Reply at 73-74; Rebuttal Panel Testimony on VzCost and VzLoop at 118-20. *See also* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.	Verizon includes 6 fibers per DLC system. There is no justification for additional fibers, beyond four, unless Verizon California wishes to provide extra fibers for DSL, or for advanced broadband services or fiber to the home technologies, which are not part of this docket. Since such other services should have incremental costs associated with them, and the services covered in this docket should not be forced to subsidize such services, four fibers is appropriate for this input. (Donovan/Pitkin/Turner Declaration 8/6/04, 160-161 and 164-166) DLC systems can be maintained and even upgraded working with 4 fiber strands. (Donovan Declaration, 11/9/04, p. 97.)

[7] JCs model only *two* strands for **[BEGIN PROPRIETARY]** **[END PROPRIETARY]** DLCs.

	VzCost	Verizon CA Support	JC Opposition
Copper Feeder	65.99%[8]	Like copper distribution and fiber feeder fill factors, copper feeder fill factors are not inputs in VzLoop, but rather are outputs that result from VzLoop's sizing calculations and the available discrete cable sizes (i.e., "breakage").[9] For copper feeder, VzLoop uses a sizing factor of 1.2 plus an administrative spare factor of 0.02 for bad or broken pairs, for a total sizing factor of 1.224. Joint Commentors use a slightly *higher* total sizing factor of 1.25, so there is no real dispute on this point. Rather, as explained below, JCs' somewhat higher fill factor may be the result of modeling additional cable sizes and/or unrealistically large distribution areas. *See* Verizon CA Panel Testimony on Recurring Costs at 43-44; Tucek Reply Testimony at 2-3; Rebuttal Panel Testimony on VzCost and VzLoop at 134-35, 205-10; Jan. 13, 2004 technical workshop transcript at 3267 (Tucek); Donovan Pitkin Turner Reply at ¶ 171. *See also* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.	JC did not significantly disagree with the inputs used by Verizon. Verizon's combined inputs (its cable sizing factor plus its administrative fill factor) result in an overall cable sizing factor of 1.2240. The JC proposed combined feeder cable sizing factor is 1.25. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 114.) JC have not investigated why the Verizon achieved fill result is so different from HM 5.3. In response to Verizon's extra record speculation, JCs' submit Verizon's somewhat lower fill factor may be the result of modeling inefficiently small and/or overlapping distribution areas or other modeling errors.
DLC Equipment 1) Hard-Wired Equipment	83.04%	1) DLC Equipment achieved fill factors also are outputs in VzLoop, not inputs. They are calculated by dividing the working line demand by the capacity of the DLCs designated to serve the demand. COTs and RTs are	JC did not address Verizon DLC equipment (hard-wires or plug-in) fill assumptions.

[8] This head-of-route calculation actually understates the copper feeder fill factor that VzLoop achieves because it includes those local loops (generally for customers located very close to the central office) that terminate directly on the main distribution frame. The achieved fill factor for copper feeder based on a segment calculation that measures only true feeder is 72.95%.
[9] *See supra* note 3.

	VzCost	Verizon CA Support	JC Opposition
2) Plug-In Equipment	100%	sized on total bandwidth demand: the sum of residential and business lines, plus 24 times the number of DS1s. For an explanation of why the bandwidth multiplier (24) is the correct multiplier to use, even under the JCs' model, see VzLoop Cost Manual (Exhibit 3 to Verizon CA Testimony on Recurring Costs) at § 5.8; Murphy Reply at 48-51; and Rebuttal Panel Testimony on VzCost and VzLoop at 116-18. 2) Even though it would have been appropriate to do so, Verizon CA did not use fill factors or breakage assumptions to adjust its plug-in equipment investment in its cost model. (Had Verizon CA used fill factors or breakage assumptions for plug-in equipment, its achieved fill for hard-wired equipment also would have been lower.) *See* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.	

	VzCost	Verizon CA Support	JC Opposition
SAIs	42.3%	SAI achieved fill factors are also outputs, not inputs. They are derived by dividing the number of working feeder pairs by the number of available feeder pairs, dividing the number of working distribution pairs by the number of available distribution pairs, and weighting the quotients two-to-one toward the distribution pairs.[10] Verizon CA models SAIs with one feeder pair for each two distribution pairs, based on engineering considerations as well as practical commercial availability constraints, including how SAIs are generally manufactured (with two "out" pairs for each one "in" pair). VzCost also models efficient and realistic distribution areas. *See* Rebuttal Panel Testimony on VzCost and VzLoop at 158-59, 205-10.	Verizon's SAI fill factors are based on an assumption that is applied to the number of lines in the feeder cable to determine the overall size of the SAI. However, generally accepted engineering practice and Verizon's own guidelines call for only 1.5 feeder pairs per 2 distribution pairs. Verizon's approach oversizes its SAIs. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 157.)

[10] VzCost does not calculate SAI fill factors in a standard report, but those figures can be generated from the numbers of the working lines, SAI capacities, and SAI quantities contained in the Inventory table, as shown in Attachment VZ-2.

	VzCost	Verizon CA Support	JC Opposition
Premises Termination 1) Business 2) Residence	 30.2%[11] 25.2%	NID achieved fill factors are also outputs, not inputs. The quantity of NIDs is determined by the number of drops required—the two are equal. NID size is based on demand at each end-user location. NID sizes modeled are 6, 12, 25, and 50 pairs. Using six-pair or larger NIDs to model residential needs is appropriate because it is impossible to discern in advance which residential customers will demand more than two pairs, and thus cannot be supported by the two-pair NIDs that JCs model. As noted on page 14 below, JCs now recommend assuming a 6-pair NID for residential locations in the errata model. With respect to Living Unit IDs, such information could not be located for only 7% of total lines, most of which were non-switched lines; thus, these lines would have a minimal effect on residential NIDs. JCs have also failed to demonstrate that all lines behind a distribution terminal go to a single customer location. VzLoop does not model "duplicate" terminals. *See* Rebuttal Panel Testimony on VzCost and VzLoop at 73, 166-76, 202-05.	The most significant concern is related to the quantity of NIDs and drops in Verizon's studies, which results in inefficiently low overall utilization just as if Verizon used (an appropriately) lower number of NIDs and drops but an unreasonably low fill factor. The problem is that Verizon's demand data is not sufficiently accurate, resulting in artificial Living Unit IDs ("LUIDs"). (Donovan/Pitkin/Turner Declaration 8/6/04, pp. 70-72.) Because of this, Verizon creates too many locations, ultimately creating far too many individual drops and NIDs, each with too little demand. (Donovan/Pitkin/Turner Declaration 8/6/04, pp. 72-73.) Also, duplicate distribution terminals impact the number of drops and NIDs by having two distribution areas serving the exact same LUID. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 80.) Moreover, Verizon fails to include smaller NIDs (such as 2-pair NIDs). Thus, Verizon is including a minimum size of a 2-pair NID even when a customer only has one line. (Donovan/Pitkin/Turner Declaration 8/6/04, p. 95.) Thus, Verizon's calculated effective fill is significantly too low because the NID sizes include too much breakage.

[11] VzCost does not calculate NID fill factors in a standard report, but those figures can be generated from the numbers of the working lines, NID capacities, and NID quantities contained in the Inventory and Loop Demand tables, as shown in Attachment VZ-2.

ACHIEVED FILL FACTORS

	HM	JC Support	Verizon CA Opposition[12]
Copper Distribution	JC Direct (errata) 51.7% JC Rebuttal 51.3%	Overview: Fill should be forward-looking (which is likely to increase), as endorsed in OANAD, the CPUC SBC UNE decision (D.04-09-063, p. 188) and by the FCC. HM 5.3 adopts a very conservative approach to fill as it includes sufficient spare to meet future growth, which is a cost that should be assigned to future customers. (Joint Commentors Opening Comments, 11/3/03, pp. 16 and 29. Joint Commentors Rebuttal Comments, 11/9/04, pp. 56-57.) As filed, HM 5.3 explicitly reports overall achieved fills for copper distribution and copper feeder. (Donovan Declaration, 11/3/03, p. 21) HM 5.3's inclusion of spare for growth overstates TELRIC by assigning costs caused by future customers to current customers. (Murray Declaration, 11/3/03, pp 24-25. Donovan Declaration, 11/9/04, pp. 88-89. Murray Declaration, 11/9/04, p. 29.) Joint Applicants apply a .75 "sizing factor" to distribution cable. The achieved distribution fill is	Overview: As a threshold matter, the overall fill factors that JCs present in this table are line-weighted averages of the achieved fills they estimate for each cluster. Such line-weighting is unnecessary and distorts JCs' results.[13] In contrast, Verizon CA simply divides the total relevant units in use by the total relevant units available, which provides an exact measure of the total capacity that is being used, and avoids overweighting highly filled clusters.[14] In calculating their copper distribution fill factor, for example, JCs first calculate the average fill for each cluster (in-use lines divided by cable capacity) and then weight those clusters by the number of in-use lines they contain (rather than by their cable capacity), which skews their results toward high fill factor clusters. Had JCs simply divided total state-wide working lines by the total state-wide capacity (as shown in their model), as Verizon CA has done, they would have calculated a copper distribution achieved fill factor of 48.4% (errata) or 49.2% (Rebuttal). In addition, as noted above, JCs' higher achieved fill factor here may be the result of modeling unconventional cable sizes (JCs model half again as many cable sizes as does

[12] Verizon CA has pending a challenge to JCs' wholesale revisions to HM 5.3 in their rebuttal filing. These revisions, which produce, among other things, a two-thirds drop in DS-3 costs, include significant input as well as model changes, the vast majority of which were never disclosed and/or failed to respond to Verizon CA's criticisms. Indeed, the scope of such changes remains unclear given JCs' refusal to identify each and every change, describe how the change was implemented, and specify where in the model the change is located. *See* Motion of Verizon California Inc. (U 1002 C) for Leave to File Surrebuttal Testimony, and Request for Order Shortening Time to Respond (Dec. 3, 2004) at 1-3; Motion of Verizon California Inc. (U 1002 C) Requesting Hearings (April 29, 2005) at 2-3.

[13] Because VzLoop does not model the clusters used by HM 5.3, Verizon CA could not adjust its own achieved fill factors to reflect these distortions.

[14] As a simple example, consider two 100-pair cables terminating on an MDF, one with 20 working pairs and the other with 80 working pairs. Verizon CA would calculate a fill factor of 50%: (20+80)/(100+100). JCs would calculate a fill factor of 68%: (20%*.2)+(80%*.8). The test to see if the fills are calculated properly is to divide the working units by the fill factor, which should yield the total capacity. In this example, Verizon CA's method would yield 200 pairs (100/.5); JC's method would yield 147 pairs (100/.68).

	HM	JC Support	Verizon CA Opposition
		significantly less than the raw cable sizing factor. (Mercer Declaration, 11/3/03, Exhibit RAM-4, Model Description, p. 44 and 49 and Exhibit RAM-5, pp. 32-34. Donovan Declaration, 11/3/03, pp. 19-21. 11/9/04, p. 88, fn 170.) Joint Applicants' approach tends to result in an achieved fill of about 50%, which is low enough to provide sufficient facilities for almost twice the current demand, which is enough to last for the economic life of the plant. Donovan Declaration, 11/3/03, p. 23. 11/9/04, pp. 88-89) The HM 5.3 weighted fill calculation is the method that was used in the SBC UNE case. Hence, it is the method that allows an "apples-to-apples" comparison with fills adopted in D.04-09-063. On the other hand, as Verizon has apparently calculated fills for HM 5.3 using the straight average approach that it prefers (and will presumably supply supporting workpapers showing those calculations), JC would not object to the use of those results should the Commission prefer that approach.	Verizon CA), and thus is not directly comparable with Verizon CA's achieved fill factor. JCs' achieved fill factor for copper distribution also is driven primarily by a sizing factor of 1.33. This sizing factor, in turn, is merely Mr. Donovan's unsupported estimate of the "cushion" required for an efficient copper distribution network. As Verizon CA has explained, using such a minimal "cushion" in laying copper distribution plant would inevitably lead to both longer downtimes and higher total costs. *See* Tucek Reply Testimony at 3-4; Richter Reply Testimony at 13-17, 68-73; Rebuttal Panel Testimony on VzCost and VzLoop at 130-34; Jan. 13, 2004 technical workshop transcript at 3265-67 (Tucek).
Fiber Feeder	JC Direct (errata) 79.6%[15]	HM 5.3 uses 4 fibers per DLC RT site, which equates to a 50% cable sizing factor, since two redundant fibers are provided for each two service fibers.[16] HM 5.3 then selects the next largest cable, which results in substantial additional "breakage" spare since HM 5.3 models fiber cables in fixed sizes of 6, 12, 24, 26, 48, 72, 96, 144, 216 and 288 Strands—directly out of	In addition to the errors noted above, the JCs' line-weighting here is based on only ordinary DLC line requirements rather than strands assigned to POTs *and* high-capacity services—this exacerbates the line-weighing distortion described above.[18]

[15] As explained in the Joint Fill Matrix developed in the SBC UNE docket, HM 5.3 provides full strand redundancy to each DLC (*i.e.*, for every 2 fiber strands provisioned to meet existing service demand, HM 5.3 also places 2 lit strands that are reserved as back-ups to the strands actually in use). These figures reflect the percentage of (a) fiber strands in use plus redundant backup fiber strands to (b) all fiber strands placed. If one considered the redundant back-up as spare the resulting fill would be 50% of the numbers shown here.
[16] One exception is the smallest size, ACF-24 DLC, which requires only one strand to operate and is thus provided with full redundancy using two strands.

	JC Rebuttal 76.0%	Verizon's own equipment contracts. This is consistent with the approach that the FCC adopted in its Synthesis Model (Donovan Declaration, 11/3/03, pp. 27-28; 11/9/04, pp. 96-98; Mercer Declaration, 11/3/03, Exhibit RAM-4, Model Description, pp. 49-52 and Exhibit RAM-5, pp. 13 and 62-63.[17]) Ironically, Verizon	JCs' achieved fill factor for fiber feeder is lower than VzLoop's in part because JCs count as "utilized" as few as *two* strands to each DLC RT site. As noted above, each remote terminal requires at least six strands: two hot, two "warm spare," and two "cold spare." *See supra*

[17] Although RAM-5 was updated to reflect the use of 6-strand cable, RAM-4 was not.
[18] In addition, JCs' subfeeder fiber fill workpapers reveal that HM 5.3 uses fewer strands associated with HiCap services when sizing subfeeder cable than when sizing the main feeder.

	HM	JC Support	Verizon CA Opposition
		criticizes HM 5.3 for producing too high a fiber fill but its own study (as shown below in the reported results for VzLoop) produced a far higher fiber fill result. (Donovan Declaration, 11/9/04, pp. 95-96 and Verizon result.) HM 5.3 properly recognizes that one does not need significant spare fiber as fiber strands have nearly unlimited capacity. (Donovan Declaration, 11/9/04, p. 97.) HM 5.3 places one or more separate 24-fiber cable for interoffice facilities on separate cables and places an additional four strands as required in clusters with optical high capacity services. (Mercer Declaration, 11/3/03, Exhibit RAM-5, pp. 45 and 107. Mercer/Ptikin/Turner Declaration, 11/9/04, pp. 125-128 and 152-158.)	page 2.[19] Moreover, JCs model six-strand fiber feeder, which could support an RT only if IOF and HiCap services were carried on a separate cable. Verizon CA avoids this result by modeling 12-strand fibers to RTs, but assigning only half the costs to fiber feeder (and the other half to IOF and HiCap). This methodological difference between the parties' models materially contributes to Verizon CA's higher achieved fill factors. *See* VzLoop Cost Manual (Exhibit 3 to Verizon CA Testimony on Recurring Costs) at § 5.2; Richter Reply at 73-74; Rebuttal Panel Testimony on VzCost and VzLoop at 118-20. *See also* 4.1 Loop Fill and Statistics Report by Density Cell, CA Rev Loop Doc Set, CD# 2, DOCKET NO. CA R 93-04-003, April 2, 2004.

[19] JCs argue in this matrix that Verizon CA's fiber feeder achieved fill factor is higher than theirs, and thus theirs cannot possibly be too high. This is an apples-to-oranges comparison. JCs suggest in footnote 11 that counting only the "hot" strands would reduce their (errata) achieved fill factor to 40.6%. Doing the same with VzLoop would reduce Verizon CA's achieved fill factor to 31.8%—very close to the theoretical maximum of 33.3% (assuming each hot pair requires a warm pair and a cold pair to support it), but well shy of JCs' impossibly high 40.6%.

	HM	JC Support	Verizon CA Opposition
Copper Feeder	JC Direct (errata) 77.3% JC Rebuttal 77.8%	Joint Applicants' achieved copper feeder fill is similar to the OANAD-adopted value of 76%. This achieved fill results from applying a sizing factor input, which is similar to the factor applied to copper distribution cable but can be varied by customer density. (Donovan Declaration, 11/3/03, p. 22. Mercer Declaration, 11/3/03, Exhibit RAM-4, Model Description, pp 49; Exhibit RAM-5, pp. 11 and 61-62.) Verizon did not address or rebut the HM 5.3 copper feeder sizing factor. Donovan Declaration. 11/9/04, p. 95.	As noted above, the parties propose almost identical copper feeder sizing factors. *See supra* page 3. JCs' achieved fill factor for copper feeder likely is somewhat higher than VzLoop's because they assume that significantly more sizes of cable are available than does VzLoop and they model inappropriately large distribution areas.[20] Verizon CA's cable size (i.e., "breakage") assumptions are presented on pages 5-7 of Attachment VZ-1. Any efficiencies that might be gained by laying even more sizes of feeder plant would be more than offset by the higher unit costs of: (i) purchasing smaller volumes of a wider range of plant; and (ii) maintaining and tracking more, and more various, inventory. *See* Tucek Reply Testimony at 2-3; Rebuttal Panel Testimony on VzCost and VzLoop at 134-35, 205-10; Jan. 13, 2004 technical workshop transcript at 3267 (Tucek); Donovan Pitkin Turner Reply at ¶ 171.

[20] As explained above, Verizon CA's achieved fill factor for copper feeder based on a *segment* calculation is 72.95%. *See supra* n.6.

	HM	JC Support	Verizon CA Opposition
DLC Equipment 1) Hard-Wired Equipment	JC Direct (errata) 78.8% JC Rebuttal 74.3%	1) <u>Hard-wired Equipment</u>: HM 5.3 recognizes that, due to the significant capacity changes in going from one cabinet and/or CEV unit size to the next largest available unit, utilization of the common equipment in cabinets and CEVs is relatively low. Moreover, redundant, back-up fibers to each DLC allow for quick common equipment upgrades if required so that there is no need for large spare capacity. (Donovan Declaration, 11/3/03, pp. 11-12 and 41-42. Mercer Declaration, 11/3/03, Exhibit RAM-5, p. 64 and 86-87.) Notably, in the SBC UNE docket, Mr. McNeill states that SBC's achieved fill is in fact over 70%. (McNeill Declaration, 2/7/03, ¶ 39.) Verizon's claim that JC's results are "unrealistic" is a reference to an error JC made in rolling up data for main and related outlier clusters, which leads to some overstatement of JC's reported fill result.	JCs' hard-wired achieved fill factors (based on line-weighted averages) are higher than what true averages would produce: With the precise averaging that Verizon CA uses, JCs' achieved fill factors would be 76.4% (errata) and 71.4% (Rebuttal). Their workpapers also contain unrealistic results (such as channel units supporting more than six lines, *see* Line 380 in "dlc fill 11 7 rebuttal.xls") for which Verizon CA cannot correct. Apart from these calculation problems, the issue here, as JCs note, is whether DLC exhaust and utilization rates should be calculated based on bandwidth or card slots. For Verizon CA's explanation of why bandwidth is the proper determinant, even under the JCs' model, see VzLoop Cost Manual (Exhibit 3 to Verizon CA Testimony on Recurring Costs) at § 5.8; Murphy Reply at 48-51; Rebuttal Panel Testimony on VzCost and VzLoop at 116-18.
2) Plug-In Equipment	JC Direct (errata) 89.9% JC Rebuttal 89.9%	2) <u>Plug-in Equipment</u>: Plug-ins can achieve much higher fill rates than copper feeder because additional service requirements can be very efficiently addressed by simply installing additional channel units at the RT site. Thus relief can be accomplished in a matter of minutes instead of the several months required to reinforce copper feeder facilities. Plug-in DLC channel unit cards weigh less than a pound and can be installed any time a technician is on the feeder route, or on an annual routine maintenance visit basis. Although HM 5.3 could reasonably model a forward-looking network that operates at close to 100% less one year's growth rate, we have conservatively used a 90% utilization sizing factor for the plug-in line cards. (Donovan Declaration, 11/3/03, pp. 11-12 and 41-42. Mercer	It is inappropriate to rely at this point on the testimony of Mr. McNeill, who is not a witness in this case.

	HM	JC Support	Verizon CA Opposition
		Declaration, 11/3/03, Exhibit RAM-5, p. 87.) Verizon's arguments concerning the cause of DLC exhaust are both incorrect and inconsistent. (Mercer/Pitkin/Turner Declaration, 11/9/04, pp. 138-142.)	

	HM	JC Support	Verizon CA Opposition
SAIs	JC Direct (errata) 90.3% JC Rebuttal 55.9%	In the JC Direct (errata) filing, HM 5.3 sizes SAIs based on 3.5 pairs per living unit (2 distribution terminations + 1.5 feeder terminations), plus 2 pairs per business line plus special services requirements. As with many other types of telecommunications equipment, SAIs are generally manufactured in a limited range of standard sizes. (Mercer Declaration, 11/3/03, Exhibit RAM-4, p. 41; Exhibit RAM-5, p. 38-40. In response to Verizon criticism and in order to be conservative (while not in complete agreement), JC modified the SAI sizing calculation in rebuttal so that SAI's are sized to allow the connection of all working and non-working cable pairs that connect at the SAI. (Mercer/Pitkin/Turner Declaration, 11/9/04, pp. 118-119.) JC also explained that SAI fill can be modified in HM 5.3 by varying the range of SAI sizes and/or costs, in addition to the option of changing model formulas. (*Ibid.*) JC note that, SAI investment is of relatively minor significance. For example, even at the 55.9% fill in the rebuttal round, the SAI in HM 5.3 represents only $0.14 of the total loop cost. (HM 5.3 expense module, "Unit Cost" Tab, cell L29.) JCs SAI fill calculation includes only fill measurements at the SAI. It does not include building terminal fill. It is possible to determine if clusters in HM with no SAI are instead served by a building terminal. In 476 of the 499 cases that Verizon reports, the lines are served by building terminals. As the remaining 23 clusters serve a total of 104 lines, JC have not investigated further.	JC SAI calculations are distorted by the use of a line-weighting scheme akin to that described in Verizon CA's opposition to JCs' copper distribution achieved fill factors, above. SAI achieved fill factors can and should be calculated by dividing the total number of required pairs by the total SAI capacity installed. Doing so yields JC achieved fill factors of 86.6% (errata) and 57.0% (Rebuttal). In addition, as JCs note, neither their SAI achieved fill factors nor their NID achieved fill factors capture their utilization of "building terminals," a category that Verizon CA's achieved fill factors do not exclude. This is important because JCs' achieved fill factors for their building terminals are significantly lower than their claimed achieved fill factors for both SAIs and NIDs. JCs' SAI workpapers also contain other errors. For example, their errata worksheet includes 305 clusters with a fill factor greater than 100%, providing a total of only two million units of installed SAI capacity to support the 2.3 million SAI connections needed to connect the working lines in those clusters. At the same time, the worksheet includes at least two clusters with *no* SAI (or building terminal) capacity despite the presence of active pairs. Similarly, the Rebuttal worksheet includes 499 clusters with *no* SAI capacity, leaving 220,000 working lineswith no SAI to which to connect (it is difficult to ascertain precisely how many of these clusters contain building terminals, but it appears that 54 do *not*). Finally, JCs model SAI sizes from 50 lines to 7200 lines, while Verizon CA limits its SAI sizes to the regular 100-line to 5400-line range.

	HM	JC Support	Verizon CA Opposition
			JCs originally modeled SAI capacity by a formula that assigned: (i) 1.5 feeder pairs and two distribution pairs to each household, and (ii) one distribution pair and one feeder pair to each business line. This model provided insufficient capacity to accommodate all of the distribution and feeder cables that the model determined should terminate at the SAI. (*See* Tardiff Reply at 77-80.) JCs' revised model purports to provide enough capacity to accommodate the feeder and distribution cables that are supposed to terminate at the SAI. However, JCs' proposed correction does not work as intended when used in conjunction with the option to limit the maximum size of the SAI. Specifically, the manner in which HM 5.3Rev. calculates the required SAI size capacity introduces faulty calculation logic when the maximum SAI size option is invoked, and, as described in Verizon CA's response to JCs' filing of the summary table, thereby produces implausible results. Response of Verizon California Inc. (U 1002 C) to Joint Commentors' Filing of Summary Table Pursuant to Administrative Law Judge's Ruling (Mar. 15, 2005) at 14-16. *See also* Richter Reply Testimony at 16; Rebuttal Panel Testimony on VzCost and VzLoop at 158-59, 205-10.

	HM	JC Support	Verizon CA Opposition
Premises Termination 1) Business 2) Residence	JC Direct (errata) 64.4% JC Rebuttal 68.4% JC Direct (errata) 53.2% JC Rebuttal 59.3%	In the JC Direct (errata) filing, HM 5.3 assumes a 2-pair termination for each (non-Multiple Dwelling Unit "MDU") residence and a 6-pair termination for each (non-MDU) business location. (Mercer Declaration, 10/18/02, Exhibit RAM-5, p. 16.) To achieve similar residential NID fill as in the (more precise) JC rebuttal filing for the residential NID, JC recommend assuming a 6-pair NID for residential locations by using the same NID price input as for business. In rebuttal, JC modified HM 5.3 to utilize Verizon's input data to specifically size NIDs based on the requirements of each customer location. HM 5.3 uses a 2-pair or 6-pair NID or larger building terminal based on the requirements of the specific location. (Donovan Declaration, 11/9/04, pp. 100-103 (specific line size to NID size definitions are provided at p. 103); Mercer/Pitkin/Turner Declaration, pp. 32-33 and 62-63.) Because the appropriate NID size is determined based on the actual number of lines per location it was not relevant to determine if a location was residential or business. Because a residential versus business distinction was not included in the model, it was necessary to make an assumption to estimate distinct business and residential fill results for the rebuttal filing.	JCs' NID fill factor workpapers do not match their model. For example, their errata Residential NID workpapers assume six-pair NIDs for all customers, while their errata model assumes two-pair NIDs for all Residential customers.[21] Aligning JCs' workpapers with their model produces an impossibly high 159.6% achieved fill factor for Residential NIDs (errata).[22] Contributing to this result are data errors. For example, many of JCs' individual Residential NID calculations yield utilization rates significantly greater than 100%, the highest being 12,900% (errata worksheet, cell AG2625). Furthermore, JCs did not compute utilization rates for NIDs larger than six pairs for either Residential or Business, instead excluding those NIDs as "building terminals." The Rebuttal achieved fill factors that JCs present also are not derived from their model. In their Rebuttal model, it is impossible to distinguish between Residential customers and Business customers, thus, for purposes of this matrix, JCs simply assume that Residential customers and Business customers will require two- and six-pair NIDs in the same proportions. That is, for each cluster, Residential customers are assigned the same two-pair/six-pair mix as are Business customers. There is no record support for this counterintuitive assumption.

[21] JCs' material cost inputs reflect two-pair NIDs for Residential customers rather than the six-pair NIDs they use in their workpapers to achieve the fill factors that they present here.
[22] Conversely, correcting for the line-weighting error described above (but not for the model misalignment issue) produces a Residential NID fill factor of 26.8%.

	HM	JC Support	Verizon CA Opposition
			Finally, JCs' model (which diverges from their fill factor calculations as noted above) includes unrealistic NID sizing assumptions. For example, JCs' errata model provides two-pair NIDs for all residential customers (and their Rebuttal model, for the vast majority of residential customers), even though many of those customers ultimately will demand more than two lines (and it is impossible to determine in advance *which* of those customers will demand more than two lines). Nonetheless, the JCs' proposed rates do not reflect the field visits or materials that inevitably would be required to replace those two-pair NIDs with larger NIDs when customer demand exceeded two lines. *See* Rebuttal Panel Testimony on VzCost and VzLoop at 73.

California Fill Table Queries – Loop Fill and Statistics Report

Achieved fill factors generated by Verizon CA's Loop Study are reported in CD#02_PROPRIETARY\4.VzCost Document Sets\UNE Document Sets\CA Rev UNE Doc set.pdf, Loop Fill and Statistics Report by Density Cell. In each case, achieved fill factors are calculated by dividing a component's utilization by its capacity. The specific algorithms are:

Average Segment Fill:

Copper Feeder	FDRUTL/FDRCAP
Copper Distribution	DISTUTL/DISTCAP
Fiber Cable	FDRFIUTL/FDRFICAP

Head of Route Fill:

Copper Feeder	FILL_FDR_U/ FILL_FDR_C
Copper Distribution	FILL_DIST_U/ FILL_DIST_C
DLC	FDRDLCUTL/ FDRDLCCAP
Fiber Strands	FILL_FDR_FI_U/ FILL_FDR_FI_C

These utilization and capacity variables are found in the Fill Table, which can be viewed on CD#04_VzCost Loop Files\Une\Output\fill_ca_07calc2_020404.csv, as well as online in VzCost. They are defined as follows:

FDRCAP	Sum of the Total Copper Feeder and Copper Span Line Feeder pairs multiplied by the arc length reported as accumulated pair feet.
FDRUTL	Sum of the demand on Total Copper Feeder and Copper Span Line Feeder multiplied by the arc length reported as accumulated pair feet.
DISTCAP	Sum of the Total Copper Distribution pairs multiplied by the arc length reported as accumulated pair feet.
DISTUTL	Sum of the demand on Total Copper Distribution multiplied by the arc length reported as accumulated pair feet.
FILL_FDR_C	Available pairs at the wire center, including Copper Feeder, Copper DCP Feeder and local Copper Distribution served directly from the mainframe.
FILL_FDR_U	Demand at the wire center, including Copper Feeder, Copper DCP Feeder and local Copper Distribution demand served directly from the mainframe.
FILL_DIST_C	Copper Distribution pairs on the field side of the cross connects.
FILL_DIST_U	Copper Distribution demand on the field side of the cross connects.
FDRDLCCAP	Capacity of all DLC systems, both field and fiber to building.
FDRDLCUTL	Demand of all DLC systems (fiber feeder and distribution demand).
FDRFICAP	Sum of the fiber feeder cable size multiplied by the arc length; reported as accumulated pair feet.
FDRFIUTL	Sum of the fiber feeder cable working strands multiplied by the arc length; reported as accumulated pair feet.
FILL_FDR_FI_C	Fiber feeder cable size at the wire center.
FILL_FDR_FI_U	Fiber feeder required strands at the wire center.

Although it is not necessary to do so to calculate the achieved fill factors described above, one can review the VzLoop code that calculates these components on CD#03_VzCost Data & Code\VzCost Code\Loop\CodeListing\listing_v7.pdf. Through this code, one can derive each of the components listed above as follows:

FDRCAP (i.e., "FeederCap") and FDRUTL (i.e., "FeederUtl") are assigned by the Fill_Copper_Feed procedure in Fill_Funct.pas at lines 139-157. The Fill_Copper_Feed procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	1372	OSPInvestment function	1357-1370
	1475		1453-1473
	1780		1765-1778
	1903		1879-1901
	2269		2254-2267
	2375		2354-2373

DistCap and DistUtl are assigned by the Fill_Distribution procedure in Fill_Funct.pas at lines 99-117. The Fill_Distribution procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	1386	OSPInvestment function	1375-1383
	1420		1406-1418
	1794		1783-1791
	1830		1816-1828
	2062		2049-2060
	2099		2086-2097
	2147		2134-2145
	2283		2272-2280
	2319		2305-2317

BusPF and ResPF are assigned by the Fill_PairFeet procedure in Fill_Funct.pas at lines 79-97. The Fill_PairFeet procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	1264	OSPInvestment function	

BusLps and ResLps are assigned by the Fill_Loops procedure in Fill_Funct.pas at lines 59-77. The Fill_Loops procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvCalc.dpr	509	ProcessNetwork proc.	

FILL_FDR_C and FILL_FDR_U are assigned by the Fill_Copper_Feed_WC procedure in Fill_Funct.pas at lines 199-217. The Fill_Copper_Feed_WC procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	1371	OSPInvestment function	1357-1370
	1385		1375-1383
	1419		1406-1418
	1474		1453-1473
	1779		1765-1778
	1793		1783-1791
	1829		1816-1828
	1902		1879-1901
	2268		2254-2267
	2282		2272-2280
	2318		2305-2317
	2374		2354-2373

FILL_DIST_C and FILL_DIST_U are assigned by the Fill_Dist_Term procedure in Fill_Funct.pas at lines 119-137. The Fill_Dist_Term procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	1390	OSPInvestment function	1375-1383
	1426		1406-1418
	1798		1783-1791
	1835		1816-1828
	2287		2272-2280

	2324		2305-2317

FDRDLCCAP and FDRDLCUTL are assigned by the Fill_DLC procedure in Fill_Funct.pas from lines 159-177. The Fill_DLC procedure, in turn, is called by the following:

Source File	Line Number	Section	Calculation Line Numbers
LoopInvest.pas	2661	CalcDLC procedure in DLCInvestment procedure	2656, 2802-2803

FDRFICAP and FDRFIUTL are assigned by the Fill_Fiber_Strand procedure in Fill_Funct.pas at lines 179-197. The Fill_Fiber_Strand procedure, in turn, is called by the following:

Source File	Line Number	Section	Calc Line Numbers
LoopInvest.pas	1018	AerialFiberInvestment	975
	1022		975
	1087	BuriedFiberInvestment	1043
	1091		1043
	1151	UndergroundFiberInvestment	1113
	1155		1113

FILL_FDR_FI_C and FILL_FDR_FI_U are assigned by the Fill_Fiber_Feed_WC procedure in Fill_Funct.pas at lines 219-237. The Fill_Fiber_Feed_WC procedure, in turn, is called by the following:

Source File	Line Number	Section	Calc Line Numbers
LoopInvest.pas	1019	AerialFiberInvestment	975
	1023		975
	1088	BuriedFiberInvestment	1043
	1092		1043
	1152	UndergroundFiberInvestment	1113
	1156		1113

FEEDPF and DISTPF are assigned by the Fill_FdrDstPF procedure in Fill_Funct.pas at lines 300-318. The Fill_ FdrDstPF procedure, in turn, is called by the following:

Source File	Line Number	Section	Calc Line Numbers
LoopInvest.pas	1350	WriteArc in OutputArcs	

DLCLOOPS is assigned by the Fill_DLCLoops procedure in Fill_Funct.pas at lines 321-337. The Fill_ DLCLoops procedure, in turn, is called by the following:

Source File	Line Number	Section	Calc Line Numbers
LoopInvest.pas	2830	DLCInvestment	2802-2803

CULOOPS is assigned by the Fill_CULoops procedure in Fill_Funct.pas at lines 340-356. The Fill_ CULoops procedure, in turn, is called by the following:

Source File	Line Number	Section	Calc Line Numbers
LoopInvest.pas	1320	WriteArc in OutputArcs	

"Breakage" assumptions are also an important component in determining achieved fill factors. The table below was extracted from ca_material_020404 to show the discrete sizes of copper and fiber cable, and NID and SAI material used by VzLoop for the purpose of calculating achieved fill factors.

JURISDICTION	MATERIAL_TYPE	SIZE_PR_UNIT	DESCRIPTION
CA	CUAER24	25	Copper 25 pair Aerial
CA	CUAER24	50	Copper 50 pair Aerial
CA	CUAER24	100	Copper 100 pair Aerial
CA	CUAER24	200	Copper 200 pair Aerial
CA	CUAER24	300	Copper 300 pair Aerial
CA	CUAER24	400	Copper 400 pair Aerial
CA	CUAER24	600	Copper 600 pair Aerial
CA	CUAER24	900	Copper 900 pair Aerial
CA	CUAER24	1200	Copper 1200 pair Aerial
CA	CUBUR24	25	Copper 25 pair Buried
CA	CUBUR24	50	Copper 50 pair Buried
CA	CUBUR24	100	Copper 100 pair Buried
CA	CUBUR24	200	Copper 200 pair Buried
CA	CUBUR24	300	Copper 300 pair Buried
CA	CUBUR24	400	Copper 400 pair Buried
CA	CUBUR24	600	Copper 600 pair Buried
CA	CUBUR24	900	Copper 900 pair Buried

CA	CUBUR24	1200	Copper 1200 pair Buried
CA	CUUND24	50	Copper 50 pair Undgnd
CA	CUUND24	100	Copper 100 pair Undgnd
CA	CUUND24	200	Copper 200 pair Undgnd
CA	CUUND24	300	Copper 300 pair Undgnd
CA	CUUND24	400	Copper 400 pair Undgnd
CA	CUUND24	600	Copper 600 pair Undgnd
CA	CUUND24	900	Copper 900 pair Undgnd
CA	CUUND24	1200	Copper 1200 pair Undgnd
CA	CUUND24	1500	Copper 1500 pair Undgnd
CA	CUUND24	1800	Copper 1800 pair Undgnd
CA	CUUND24	2100	Copper 2100 pair Undgnd
CA	FIAER	12	Fiber 12 Strand Aerial
CA	FIAER	24	Fiber 24 Strand Aerial
CA	FIAER	48	Fiber 48 Strand Aerial
CA	FIAER	72	Fiber 72 Strand Aerial
CA	FIAER	96	Fiber 96 Strand Aerial
CA	FIAER	144	Fiber 144 Strand Aerial
CA	FIAER	216	Fiber 216 Strand Aerial
CA	FIAER	288	Fiber 288 Strand Aerial
CA	FIAER	360	Fiber 360 Strand Aerial
CA	FIAER	432	Fiber 432 Strand Aerial
CA	FIBUR	12	Fiber 12 Strand Buried
CA	FIBUR	24	Fiber 24 Strand Buried
CA	FIBUR	48	Fiber 48 Strand Buried
CA	FIBUR	72	Fiber 72 Strand Buried
CA	FIBUR	96	Fiber 96 Strand Buried
CA	FIBUR	144	Fiber 144 Strand Buried
CA	FIBUR	216	Fiber 216 Strand Buried
CA	FIBUR	288	Fiber 288 Strand Buried
CA	FIBUR	360	Fiber 360 Strand Buried
CA	FIBUR	432	Fiber 432 Strand Buried
CA	FIUND	12	Fiber 12 Strand Undgnd
CA	FIUND	24	Fiber 24 Strand Undgnd
CA	FIUND	48	Fiber 48 Strand Undgrd
CA	FIUND	72	Fiber 72 Strand Undgrd
CA	FIUND	96	Fiber 96 Strand Undgrd
CA	FIUND	144	Fiber 144 Strand Undgrd
CA	FIUND	216	Fiber 216 Strand Undgrd
CA	FIUND	288	Fiber 288 Strand Undgrd
CA	FIUND	360	Fiber 360 Strand Undgrd
CA	FIUND	432	Fiber 432 Strand Undgrd
CA	NID	6	6 Pair NID
CA	NID	12	12 Pair NID
CA	NID	25	25 Pair NID
CA	NID	50	50 Pair NID

CA	TERMA	25	Terminal Aerial 25
CA	TERMA	50	Terminal Aerial 50
CA	TERMB	25	Terminal (Pedestal)Buried 25
CA	TERMB	50	Terminal (Pedestal)Buried 50
CA	TERMR	25	Building terminal 25
CA	TERMR	50	Building terminal 50
CA	TERMR	100	Building terminal 100
CA	TERMR	200	Building terminal 200
CA	TERMR	300	Building terminal 300
CA	TERMR	400	Building terminal 400
CA	TERMR	600	Building terminal 600
CA	TERMR	900	Building terminal 900
CA	TERMR	1500	Building terminal 1500
CA	TERMU	1	Underground sealed terminal

SAI Fills -- Inventory table from Revised Filing 04/04

Achieved Fill Results:	Feeder Side	Average
	63.4%	42.3%

The following SQL query was used to extract SAI units, sizes, and loops from the Inventory table (INVENTORY_07CALC2_020404):

```
select component, compsize, sum(units), sum(loops),
sum(floor(compsize / 3) * units) feeder_side,
sum((compsize - floor(compsize / 3)) * units) dist_side,
sum(compsize * units) capacity
from INVENTORY_07CALC2_020404
where component like 'XCONN%'
group by component, compsize
```

Query Results (Statewide):

	COMPONENT	COMPSIZE	SUM(UNITS)	SUM(LOOPS)	FEEDER_SIDE	DIST_SIDE	CAPACITY
	XCONNA	100	548	6028	18084	36716	54800
	XCONNA	200	222	8786	14652	29748	44400
	XCONNA	400	361	29386	48013	96387	144400
	XCONNA	600	440	60366	88000	176000	264000
	XCONNA	900	611	123428	183300	366600	549900
	XCONNA	1200	333	93395	133200	266400	399600
	XCONNB	600	3991	257984	798200	1596400	2394600
	XCONNB	900	1458	296320	437400	874800	1312200
	XCONNB	1200	1115	318078	446000	892000	1338000
	XCONNB	1800	2211	891852	1326600	2653200	3979800
	XCONNB	2700	2056	1232109	1850400	3700800	5551200
	XCONNB	3600	939	788187	1126800	2253600	3380400
	XCONNB	5400	619	706293	1114200	2228400	3342600
	Total Capacity				7584849	15171051	22755900
	Total Demand			4812212			
Fill Calculation:	Ratios				63.4%	31.7%	42.3%

CERTIFICATE OF SERVICE

I hereby certify that: I am over the age of eighteen years and not a party to the within entitled action; my business address is 711 Van Ness Ave., Ste. 300, San Francisco, CA 94102; I caused the following to be served:

JOINT ACHIEVED FILL FACTORS MATRIX

via electronic service to all persons with email addresses shown on the official service list noted below, as well as via paper copy enclosed in a sealed envelope, by United States mail with first-class postage prepaid thereon, to those that did not provide an e-mail address on the appearance section on the official service list.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed this 20th day of September, 2005 at San Francisco, California.

/s/ Sonja Killingsworth
SONJA KILLINGSWORTH

Service List:
R.93-04-003
I.93-04-002

(END OF ATTACHMENT 1)