STB DOCKET NO. 41185

ARIZONA PUBLIC SERVICE COMPANY AND PACIFICORP
v.
THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

Decided July 21, 1997

The Surface Transportation Board finds that the defendant railroad has market dominance over the transportation at issue and that the challenged rates are unreasonable. Maximum reasonable rates are prescribed and reparations are ordered.

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LIST OF ABBREVIATIONS

AAR	Association of American Railroads
AGRR	Arizona & Gallup Railroad
ALJ	administrative law judge
BN	Burlington Northern Railroad Company
BTU	British thermal unit
DCF	discounted cash flow
EOTD	end of train devices
Exh.	exhibit
GTM	gross ton-mile
ICC	Interstate Commerce Commission
ICCTA	ICC Termination Act of 1995
IDC	interest during construction
kWh	kilowatt-hour
L&D	loss and damage
LUM	locomotive unit-mile
MOW	maintenance-of-way
MP	milepost
OTM	other track material
P&M	Pittsburgh & Midway Coal Mining Company

PPI	Producers Price Index
RCAF-U	rail cost adjustment factor, unadjusted for productivity
RCAF-A	rail cost adjustment factor, adjusted for productivity
RCRI	railroad cost recovery indexes
ROI	return on investment
ROW	right-of-way
R/VC	revenue-to-variable cost
SAC	stand-alone cost
SARR	stand-alone railroad
SFGT	speed factored gross ton
URCS	Uniform Railroad Costing System
v.s.	verified statement

BY THE BOARD:[1]

The Arizona Public Service Company and PacifiCorp (jointly, Arizona) allege that the rates charged by The Atchison, Topeka and Santa Fe Railway Company (Santa Fe)[2] for the unit-train transportation of coal from a mine near Gallup, NM, to the Cholla Station generating plant at Joseph City, AZ, are unreasonable under 49 U.S.C. 10701a(b)(1). We find that we have jurisdiction over these rates and that the rates are unreasonably high. Accordingly, we award reparations for past movements and prescribe maximum reasonable rates for future movements.

[1] The *ICC Termination Act of 1995*, Pub. L. No. 104-88, 109 Stat. 803 (the *ICCTA*), abolished the Interstate Commerce Commission (ICC) and transferred certain functions to the Surface Transportation Board (Board or STB), effective January 1, 1996. Section 204(b)(1) of the *ICCTA* provides, in general, that proceedings pending before the ICC on that date shall be decided under the law in effect prior to January 1, 1996, insofar as they involve functions retained by the *ICCTA*. This decision relates to a proceeding that was pending with the ICC prior to January 1, 1996, and to functions that are subject to Board jurisdiction pursuant to new 49 U.S.C. 10701. Therefore, this decision applies the law in effect prior to the *ICCTA*, and citations are to the former sections of the statute, unless otherwise indicated.

[2] Santa Fe has now merged with Burlington Northern Railroad Company to form the Burlington Northern Santa Fe Railway Company. Because this controversy arose before the merger, we will continue to refer to defendant as Santa Fe.

I. BACKGROUND

There are four coal-fired units at Cholla Station.[3] The coal is supplied from the McKinley Mine of the Pittsburgh & Midway Coal Mining Company (P&M), located 19.6 rail miles northeast of Gallup and approximately 115 miles from the Cholla plant. The coal is supplied pursuant to a full-requirement coal supply agreement that currently extends to December 31, 2000. Santa Fe transports all of the coal burned at the plant.

Before 1978, Santa Fe provided service under single-car rates. When the Cholla plant was expanded in 1978, Santa Fe introduced the volume rates published in Tariff ICC ATSF 4009 (4009 tariff),[4] which contains a tier of rates that vary with annual volumes, with the lowest rate requiring a minimum annual volume of 1.5 million tons. The 4009 tariff rates were superseded on January 1, 1980, by unit-train rates published in Tariff ICC ATSF 4031 (4031 tariff), which provided a tier of further reduced rates for volumes of 1.7 million tons or more. The rates in the 4031 tariff were in turn superseded on January 1, 1982, by a rail transportation contract that Arizona executed with Santa Fe pursuant to 49 U.S.C. 10713. The 4031 tariff was canceled on March 15, 1982, but the 4009 tariff was never canceled. Santa Fe continued to maintain and update that tariff to provide fall-back rates in the event that tonnages dropped below the 1.7 million ton annual minimum volume required under the unit-train rates and then the contract rates. When the Arizona-Santa Fe contract expired on December 31, 1993, all movements became subject to the 4009 tariff.

As of January 1, 1994, the lowest rate available to Arizona under the 4009 tariff was $6.31 per ton, applicable to a minimum volume of 1.5 million tons.[5] That rate has since been indexed downward quarterly, using the Rail Cost Adjustment Factor adjusted for productivity (RCAF-A). On January 3, 1994, Arizona filed a complaint with the ICC alleging that the 4009 tariff rates are unreasonable under 49 U.S.C. 10701a(b)(1).[6] Arizona seeks damages for

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[3] Three of the units are owned by Arizona Public Service Company. The fourth is owned by PacifiCorp, but operated by Arizona Public Service Company.

[4] The volume rates were first published as Freight Tariff 9373-N. In 1979, this tariff series was renumbered as ICC ATSF 4009.

[5] ICC ATSF 4009-B series, supplement 14, item 1051-D, rate base 817-B.

[6] The complaint also alleges that Santa Fe's refusal to publish reasonable rates is an unreasonable practice under 49 U.S.C. 10701(a) and 11101. We need not separately consider that

(continued...)

unlawful charges incurred from January 1, 1994, and prescription of maximum reasonable rates for the future pursuant to 49 U.S.C. 10704(a)(1).

In a decision served March 17, 1995, the ICC denied a Santa Fe motion to dismiss the complaint, finding that the claim is not barred by section 229 of the Staggers Rail Act of 1980.[7] The ICC then established a procedural schedule for hearing the complaint and referred discovery issues to an administrative law judge (ALJ). The parties filed their opening evidence on August 1, 1995, their reply evidence on October 30, 1995, and their rebuttal submissions on December 13, 1995. They each filed opening briefs on April 15, 1996, and reply briefs on April 30, 1996.

II. PRELIMINARY MATTERS

A. Discovery Dispute

By motion filed July 17, 1995, Santa Fe appealed an ALJ order granting Arizona's motion to compel the carrier to produce an explanation of its internal system for costing movements and how that differs from our Uniform Railroad Costing System (URCS).[8] In the meantime, Santa Fe has not provided this

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[6](...continued)
claim, as it is not different from the unreasonable rate claim. *See, Union Pac. R.R. v. ICC*, 867 F.2d 646, 649 (D.C. Cir. 1989).

[7] Pub. L. No. 96-448, §229, 94 Stat. 1934. Section 229 of the Staggers Act appears as an historical note following 49 U.S.C.A. 10701a.

[8] Arizona's motion to compel, filed June 30, 1995, was technically untimely. Under 49 CFR 1114.31(a), such motions should be filed "within 10 days after the expiration of the period allowed for submission of answers to interrogatories." The motion was thus due by May 5, 1995, not the deadline for the close of discovery, as Arizona contends. However, we note that Arizona states that it "endeavored to avoid filing [its] motion to compel by attempting to resolve all discovery by agreement, thereby conserving the resources of the parties, ALJ Birchman, and the Commission." (Arizona reply filed July 25, 1995, at 20.) We will not penalize Arizona for attempting to negotiate the scope of discovery before seeking relief from the agency.

In a further pleading filed August 8, 1995, Santa Fe requested oral argument on its appeal and supplemented its discussion of the discovery issues. On August 15, 1995, Arizona filed a motion to strike the August 8th pleading. Because Santa Fe's request for oral argument contains extensive discussion of issues other than the need for oral argument, it constitutes a reply to a reply, which is prohibited absent special leave that was not requested here. 49 CFR 1104.13(c). Thus, we have not considered Santa Fe's August 8th pleading to the extent that it addresses any issue other than the

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information in view of the pending appeal. Because we would not use a carrier's internal costing system for any purpose in our analysis and decision here, we see no need for Santa Fe to produce the requested information. *See, Potomac Electric Power Co. v. CSX Transportation, Inc.*, 2 S.T.B. 290 (1997). Accordingly, we grant Santa Fe's appeal of the ALJ's ruling.

B. Confidentiality of Evidence

With its evidentiary submissions, Arizona included motions to place its filings under seal. Such motions were not necessary because paragraph 11 of the protective order issued in this proceeding requires that documents designated by a party as containing confidential information "shall be filed under seal and kept under seal until further order of the Commission."[9]

The protective order provides for removal of confidential status upon motion by an objecting party. By motion filed January 26, 1996, Santa Fe objects to the confidential designation of portions of Arizona's December 13, 1995, rebuttal submission. Santa Fe argues that, with "only minor exceptions," the designated material is not confidential. We resolve any doubts as to the need for confidentiality in favor of protecting the asserted confidentiality unless the opposing party can show that the removal of the designation is necessary for it to make its case, to argue an appeal adequately, or to satisfy a statutory goal. Santa Fe made no such showing here. Santa Fe's counsel should not ordinarily need to share such information with Santa Fe's management in order to make its case. Accordingly, we deny Santa Fe's motion.

III. MARKET DOMINANCE

A. Statutory Requirement

We may consider the reasonableness of a challenged rate only if the carrier has market dominance over the traffic at issue. 49 U.S.C. 10701a(b)(1), 10709. Market dominance is "an absence of effective competition from other carriers

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[8](...continued)
need for oral argument. Because the issues raised in this appeal can be expeditiously and fairly resolved on the present record, we deny the oral argument request.

[9] Order served May 12, 1995.

or modes of transportation for the transportation to which a rate applies." 49 U.S.C. 10709(a). The statute precludes a finding of market dominance where the carrier shows that the revenue produced by the movement is less than 180% of its variable cost of providing the service. 49 U.S.C. 10709(d)(2). Santa Fe does not dispute that this quantitative threshold is exceeded for the traffic at issue here.

We must therefore proceed to examine the circumstances surrounding the transportation to assess qualitatively whether "there are any alternatives sufficiently competitive (alone or in combination) to bring market discipline to [the railroad's] pricing." *Metropolitan Edison Co. v. Conrail et al.*, 5 I.C.C.2d 385, 410 (1989) (*Met-Ed*). We apply the evidentiary guidelines set forth in *Market Dominance Determinations*, 365 I.C.C. 118 (1981) (*MD Guidelines I*), *aff'd sub nom. Western Coal Traffic League v. United States*, 719 F.2d 772 (5th Cir. 1983) (*en banc*), *cert. denied*, 466 U.S. 953 (1984), *modified*, *Product and Geographic Competition*, 2 I.C.C.2d 1 (1985) (*MD Guidelines II*). Under those guidelines, we consider the competitive alternatives available to a shipper and the reasonableness of using each alternative, focusing primarily on four interrelated types of competition: intramodal, intermodal, geographic, and product competition. *MD Guidelines II*, 2 I.C.C.2d at 4. Intramodal competition refers to competition between two or more railroads transporting the same commodity between the same origin and destination. *MD Guidelines I*, 365 I.C.C. at 132. Intermodal competition refers to competition between rail carriers and other modes for the transportation of a particular product between the same origin and destination. *Id.* at 133. Whereas intramodal and intermodal competition involve direct, point-to-point competition, geographic and product competition are indirect. Geographic competition is the availability of the same product from alternate sources or the ability to ship the product to alternate destinations. *MD Guidelines II*, 2 I.C.C.2d at 3, 22. Product competition exists when a receiver or originator can substitute other products moving over a different route for the product covered by the rail rate at issue. *Id.* at 9, 22.

The complaining shipper must first establish that there are no direct transportation alternatives for the movements at issue (intramodal or intermodal competition) that effectively constrain the railroad's pricing. *MD Guidelines II*, 2 I.C.C.2d at 14-15. At that point, the evidentiary burden shifts to the defendant railroad to show indirect competitive alternatives (geographic and/or product competition) that serve as effective pricing constraints. *Id. See, Met-Ed*, 5 I.C.C.2d at 412 n.34. We base our analysis on the specific market(s) involved,

and not broad-brush generalities about competitive conditions in unspecified markets. *Arizona Public Service Co. v. United States*, 742 F.2d 644, 654-55 (D.C. Cir. 1984) (*Arizona*).

B. Analysis

1. Intramodal Competition

Arizona has shown that there is no intramodal competition for rail deliveries to Cholla Station. Santa Fe is the only carrier serving the plant. The nearest other railway, a line of the Southern Pacific Railway Company (now part of the Union Pacific Railroad Company), is located about 310 miles away. Given the distance involved, it would not be feasible to construct connecting track to that carrier.

2. Intermodal Competition

Santa Fe suggests that this coal could move by motor carriage over existing routes. We do not find the existing routes to be feasible, however. Santa Fe's lowest cost estimates are based on net payloads of 45 tons per truck. This would represent a substantial increase over the current maximum gross vehicle weight of 28 tons per truck in the states of Arizona and New Mexico. We have no reason to believe that those states would consent to such an increase,[10] given the environmental problems that would be associated with such movements.[11] But even if those states were to consent, they would probably require, as a condition to their consent, that the trucks pay for the increased road maintenance costs that would be necessitated, as well as the costs of rebuilding the section of Navajo Highway 12 that would be used by such coal trucks. This would increase Santa Fe's cost estimates substantially.

The other option suggested by Santa Fe--construction of a private haul road between the mine and Cholla--also does not appear to be feasible. While some of the haul road could be built over Arizona's existing right-of-way (ROW)

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[10] Arizona does not ordinarily issue overweight permits for loads that can easily be divided, such as coal.

[11] Arizona Rebuttal, Sandgren/Weishaar verified statement (v.s.) at 5 (traffic congestion and air and noise pollution would increase greatly on local roads because a movement of loaded or empty coal trucks would have to occur every 1.7 minutes on average). Arizona Rebuttal, Roberts v.s. at 5-6 (congestion would worsen at times due to weather, accidents, and breakdowns).

along its power transmission line, Arizona would need permission from the Navajo Nation for the ROW to cross its land. We do not know whether the Navajo Nation would allow such a crossing, and, if so, at what price. Moreover, Arizona's existing ROW is narrow and limited in places to a transmission line, and Arizona lacks the power of eminent domain to broaden the ROW in those areas.[12] If there were any gaps in the private road, coal trucks would have to operate over public roads for those segments, with the attendant problems discussed above. Finally, Santa Fe appears to have underestimated the construction costs that would be entailed, by not accounting for the fact that (1) the transmission line ROW is not level in many areas, traversing mountainous terrain and (2) the road might have to be paved to avoid fugitive dust problems.[13] When those additional costs are taken into account, Arizona estimates that the cost to construct a private road would increase from the $30 million estimated by Santa Fe to $49.5 million.[14]

Even if motor carriage were operationally feasible, we are not satisfied that the rates that would be charged for motor carriage place an effective competitive constraint on Santa Fe's rail rates.[15] Arizona maintains that Santa Fe's estimates of the rates that would have to be charged to recover the costs of trucking the coal under its alternative scenarios are understated.[16] Arizona points out that Santa Fe's figures do not allow for environmental problems and uncontrollable factors (such as weather, accidents, or breakdowns) that would prevent truckers from attaining the volumes upon which Santa Fe's cost estimates are based. Moreover, Arizona asserts that Santa Fe's estimates understate numerous cost components associated with any trucking operation, such as the number of tractor/trailer rigs required, their cost, the number of drivers required, the cost of training the drivers, the variable cost of loading and unloading coal by truck,[17]

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[12] Arizona Rebuttal, Gass v.s. at 12-14 (all but 11 miles of the transmission line route suggested for the private road traverse Navajo, Federal, or State land over which Arizona lacks the power of eminent domain).

[13] Arizona Rebuttal, Roberts v.s. at 5.

[14] Arizona Rebuttal, Roberts v.s. at 9; Arizona Rebuttal, Stedman v.s. at 15.

[15] The rates that would be charged by a competing mode are relevant to an evaluation of whether that mode provides effective intermodal competition. *Arizona*, 742 F.2d at 650; *Salt River Project Agric. Impr. & Power Dist. v. United States*, 762 F.2d 1053, 1060 (D.C. Cir. 1985).

[16] Under its most favorable scenario, Santa Fe estimates that the trucking rates would be $5.95 per ton.

[17] Arizona Rebuttal, Gray v.s. at 3; Arizona Rebuttal, Stedman v.s. at 9-10, 13-14.

the capital cost of truck loading and unloading equipment,[18] and the return on investment required by truckers.[19]

Arizona submitted actual rate quotations from two reputable trucking firms. These quotations are far higher than both the $6.31 per ton (as of January 1, 1994) challenged rail rate and the hypothetical trucking cost estimates offered by Santa Fe.[20] The level of these actual rate quotations would explain why neither party submitted evidence (such as contemporary internal studies) that the cost of trucking was ever regarded by either party as a factor in the selection of transportation options.

3. Product and Geographic Competition

Santa Fe asserts that it faces a hybrid form of geographic/product competition because Arizona can substitute power produced elsewhere on its system or purchased from other, interconnected utility systems. The power that is available from other sources does give Arizona some flexibility in the amount of coal that it consumes at the Cholla plant. (*See*, the testimony of Santa Fe witness McMahan.) However, Arizona could not reduce its coal production at Cholla below 2.4 million tons per year without breaking its long-term requirements contract with the coal mine and incurring substantial penalties under the liquidated damages provisions of that contract.[21] Moreover, to meet even part of its power needs through electrical generation at Cholla, Arizona

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[18] Arizona Rebuttal, Dix v.s. at 8-9; Arizona Rebuttal, Gass v.s. at 9-10.

[19] While both parties projected motor carrier rates based on a return on investment of 5%, Arizona maintains that the proper rate of return should be at least 11.5%. A return of 5% would compare unfavorably with the returns on financial instruments that are subject to little risk, such as bank certificates of deposit.

[20] The actual quotations range from $7.75 per ton to $9.50 per ton. (A low quote of $4.50 per ton was based on a truck payload of 90-100 tons, which, as indicated above, far exceeds the permitted legal payload.) Arizona Rebuttal, Gass v.s. at 7-8 and Exhibit (Exh.) CGB-1; Arizona Rebuttal, Gray v.s. at 4.

[21] Arizona Reply, Gass v.s. at 15-20; Arizona Reply, Bhatti v.s. at 7; Arizona Rebuttal, Hieronymus v.s. at 41-42. A significant idling of the Cholla plant would also jeopardize Arizona's ability to recover its substantial (exceeding $400 million book value) sunk investment cost in the plant.

would need to burn close to 2.4 million tons of coal to keep the plant operating.[22] This minimum base load tonnage can be obtained only from Santa Fe.[23]

Because the Cholla plant is an efficient "base load" plant, not a high-cost peak load plant,[24] the use of substitute power from other short-term sources would be more expensive or unreliable. The next cheapest source of power would be 60% more expensive than Cholla.[25] Gas-fired power is typically more expensive on a delivered BTU (British thermal unit) basis than coal-fired, and oil-fired is considerably more expensive.[26] Hydroelectric power is inexpensive but is subject to weather-related availability constraints.[27] The need for utilities to provide their low-cost power to their own (regulated-rate) customers and to sell their high cost power (at unregulated rates) to other utilities limits Arizona's

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[22] Santa Fe witness McMahan acknowledged that the Cholla plant would need to operate at at least 55% of capacity. At one point in his rebuttal testimony (page 17), McMahan seemed to admit that this would require consumption of 2.4 million tons annually; elsewhere (page 9), McMahan suggested that Cholla's minimum annual requirement is only 1.96 million tons. Arizona maintains that the latter figure is too low. Arizona Opening Brief, at 10 n.13.

[23] We note that Santa Fe varies its rates with volume, charging a higher unit rate for lower volumes and lower unit rate for higher volumes. (Arizona Reply, Gass v.s. at 5-8.) Thus, if Arizona were to reduce its volume at Cholla to pressure Santa Fe to reduce rates, the utility would likely face higher rates on the remaining volume transported by the carrier.

[24] In 1993, Cholla furnished approximately 22.3% of the total power generated by Arizona and was operating at an average capacity of about 82%. Base load plants are defined as having a nominal annual capacity factor of 65%, while intermediate and peaking plants have nominal annual capacity factors of 30% and 10%, respectively. (Arizona Reply, Hieronymous v.s. at 23 n.19.) In his reply v.s. at 3-4, Arizona witness Bayless explained that Cholla is a base load plant even though the PacifiCorp unit at Cholla is PacifiCorp's most expensive coal-fired plant.

[25] In the opening v.s. of witness McMahan at 39, Santa Fe presented a table ranking the average variable cost per kilowatt-hour (kWh) of power sources available to Arizona. The table shows that the variable cost of producing power at the three plants owned by Arizona at Cholla is $.0174 per kWh and that, if these plants were shut down, the next available sources of power would be: (1) purchase from the PacifiCorp unit at Cholla, at $.0211 per kWh; (2) purchase from the Salt River Project Agricultural Improvement and Power District (Salt River), at $.0279 per kWh; and (3) use of power from Arizona's West Phoenix plant, at $.0306 per kWh. A purchase from the PacifiCorp unit would be unavailing as it would not avoid use of the challenged rate. Thus, the cheapest next available source of power is from Salt River.

[26] Arizona Reply, Bhatti v.s. at 9, 16.

[27] Arizona Reply, Gass v.s. at 11; Arizona Reply, Bhatti v.s. Exh. APB-6. Santa Fe points to Arizona's substitution of hydroelectric power in 1995 for Cholla-produced power, but this substitution was weather-dependent and was limited to a few months. If ample low-cost hydroelectric power were readily available, the utility would have no reason to operate the Cholla plant.

use of spot power from the grid as a substitute for the Cholla-produced power.[28] Moreover, substitute power is especially difficult to obtain during the peak summer months.[29] Finally, if Arizona actually attempted to use the grid as a bargaining device to replace the large amount of Cholla power that Santa Fe claims the utility is capable of replacing, the increased demand on the grid could raise the grid prices. In short, there are significant costs and barriers to Arizona's obtaining substitute power. Thus, while the grid might provide a competitive option at times to more expensive gas- and oil-fired production, power from the grid is not a feasible competitive alternative to the large and steady amount of power produced by this base-load coal-fired plant.[30]

Santa Fe argues that the fact that its rates have remained the same in constant (inflation-adjusted) dollars indicates lack of market dominance. We disagree. The proper yardstick is the change in the relationship of rates to costs for the traffic, not the change in rate levels alone. Under Arizona's estimate of the revenue/variable cost (R/VC) percentages for 1982-1994, the percentages have steadily increased over this period, rising from approximately 290% in 1982 to 490% in 1994.[31] In other words, while the rates have decreased in real terms, costs have decreased in real terms by an even greater percentage. The

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[28] Arizona Reply, Bhatti v.s. at 16 n.13.

[29] *Id.* at 16 n.14.

[30] *Cf. Burlington N.R.R. v. Surface Transp. Bd.*, No. 96-1229, 114 F.3d 206, 212 (D.C. Cir. 1997) (*Burlington Northern*), *affirming West Texas Utilities Company v. Burlington Northern RR Co.*, 1 S.T.B. 638 (1996) (*West Texas*), *reopening denied* (STB served June 25, 1996). *See also, Arizona*, 742 F.2d at 650-51 (emphasis in original):

> At the core of the 'effective competition' standard is the idea that there are competitive, market pressures on the railroads deterring them from charging monopoly prices for transporting goods. *Of course, any such effective competition will always be relative to a particular price that the railroads charge.* At some point the availability of an alternative such as the horse and buggy or even people carrying oil in buckets theoretically prevents railroads from raising their rates beyond an outer bound. But the mere existence of some alternative does not in itself constrain the railroads from charging rates far in excess of the just and reasonable rates that Congress thought the existence of competitive pressures would ensure.

[31] Arizona Reply Vol. II, workpapers of Carroll, tables 1 and 2. Arizona's evidence is unrebutted for all of the years covered by witness Carroll except 1994. Our restatement for 1994 results in a lower ratio that year of 360%, but the methodological differences reflected in our restatement would also lower the ratios for the earlier years, leaving the trend the same.

continually increasing profits earned by Santa Fe over a 12-year interval do not reflect competitive constraints.[32]

In sum, we find that Santa Fe has market dominance over the transportation at issue.

IV. RATE REASONABLENESS

Our general standards for judging the reasonableness of rail freight rates are set forth in *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520 (1985) (*Coal Rate Guidelines*), *aff'd sub nom. Consolidated Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987). Those guidelines impose several constraints on the extent to which a railroad may charge differentially higher rates on captive traffic: revenue adequacy,[33] management efficiency,[34] stand-alone cost (SAC),[35] and phasing.[36] Arizona's evidence in this case is addressed to the SAC constraint.

A. SAC Generally

A SAC analysis seeks to determine the lowest cost at which a hypothetical, efficient carrier could provide the service at issue free from any costs associated with inefficiencies or cross-subsidization of other traffic. To avoid elements of monopoly pricing, a SAC analysis hypothesizes that this alternative service

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[32] We do not assess market dominance based on the level of the R/VC ratio of the traffic at issue, if it exceeds 180%. *See*, 49 U.S.C. 10709(d)(4). We have examined the general trend in the R/VC ratios for this traffic merely to assess Santa Fe's argument that the level of the rate here is pertinent to the market dominance inquiry.

[33] The revenue adequacy constraint ensures that a captive shipper will "not be required to continue to pay differentially higher rates than other shippers when some or all of that differential is no longer necessary to ensure a financially sound carrier capable of meeting its current and future service needs." *Coal Rate Guidelines*, 1 I.C.C.2d at 535-6.

[34] The management efficiency constraint protects captive shippers from paying for avoidable inefficiencies that are shown to increase a railroad's revenue need to a point where the shipper's rate is affected. The management efficiency constraint focuses on both short-run and long-run efficiency. *Coal Rate Guidelines*, 1 I.C.C.2d at 537-42.

[35] The SAC constraint measures efficiency, ensures that the captive shipper does not cross-subsidize other traffic, and protects the shipper from having to pay more than the revenue needed to replicate rail service in the absence of barriers to entry and exit. *Coal Rate Guidelines*, 1 I.C.C.2d at 542-46.

[36] The phasing constraint can be used to limit the introduction of otherwise-permissible rate increases if they would lead to undue inflation and dislocation of important economic resources. *Coal Rate Guidelines*, 1 I.C.C.2d at 546-47.

could be offered without the costs attributable to barriers to entry or exit. Under the SAC constraint, the rate at issue cannot be higher than what the hypothetical carrier would need to charge to serve the complaining shipper while fully covering all of its costs, including a reasonable return.

To make a SAC presentation, a shipper designs a hypothetical new carrier (a stand-alone railroad or SARR) that is specifically tailored to serve an optimum traffic group with the optimum physical plant or rail system needed for that traffic. Projected traffic volumes, operating speeds, and traffic densities must be calculated to determine the requirements for locomotives, cars, and train operating personnel. A detailed operating plan must be developed to define further the physical plant needed for the SARR.[37] The operating plan is used to compute the total investment and operating costs that would be incurred by the SARR and would need to be recovered by it. To be fully viable, a SARR would have to generate sufficient revenues to cover its investment costs, the cost of funds tied up during the construction period, operating expenses, tax liabilities, and a reasonable return on investment.[38]

The next step in the SAC analysis is to estimate the total revenues available to the SARR. Absent better evidence, we presume that the revenues available to the SARR would be those generated by the existing rates being paid by the traffic that is included in the SARR group.[39] Because costs would be incurred and revenues generated over many years, a present value analysis is required to take account of the time value of money, *i.e.*, to discount dollar amounts to a common point in time using an appropriate deflator. We use a computerized discounted cash flow (DCF) model to convert the stream of SARR revenues and costs over a specified time period. We discount the revenue streams to the time at which the SARR service would be (hypothetically) initiated (January 1, 1994).

If the revenues available from the traffic in the SARR shipper group exceed the revenues that would be needed to cover the costs of the SARR, we can conclude that the existing rate levels are too high. We then determine the extent

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[37] For example, roadway must be sufficient to permit the attainment of the speeds and density that are presumed. The length and frequency of passing sidings must be able to accommodate the specific train lengths and frequency of train meets that are assumed, and traffic control devices must be designed to allow trains traveling in opposite directions on the same track to be handled safely and efficiently based on the density and congestion assumed in the operating plan.

[38] *See, Bituminous Coal--Hiawatha, UT to Moapa, NV*, 10 I.C.C.2d 259, 274-79 (1994) (*Nevada Power II*).

[39] *See, e.g., Coal Rate Guidelines*, 1 I.C.C.2d at 544; *West Texas*, 1 S.T.B. at 661, 676-677.

conclude that the existing rate levels are too high. We then determine the extent to which the revenues attributable to the complaining shipper are excessive and prescribe a maximum reasonable rate based on what the SARR would need to charge that shipper.

B. AGRR System

Arizona has designed a SARR called the Arizona & Gallup Railroad (AGRR). The basic design of a SARR depends on the route system, the traffic selected to be included in the SARR traffic group, the volume of that traffic, and construction costs. The SAC analysis also is affected by the analysis period utilized. We discuss each of these elements below.

1. Route System

The parties generally agree on the routing for the AGRR, which is depicted in Appendix A. The AGRR would follow the existing Santa Fe line from the P&M McKinley Mine to the Cholla Station. The AGRR system would also connect to an existing 42-mile private spur line running from East Coronado Jct., AZ to serve the Salt River electrical generating plant at Coronado, AZ. The AGRR would maintain an interchange with Santa Fe at Defiance, NM, for exchange of empty cars owned by Salt River and utilized elsewhere on the Santa Fe system. In addition, the AGRR system would include tracks for bad order cars.

2. Traffic Group

In a SAC analysis, the complaining shipper may select any subset of available traffic to determine the least cost at which that subset of traffic could be served independently of other traffic. In this case, the traffic selected by Arizona for the AGRR group consists solely of coal moving to two plants: the Cholla plant at issue in this proceeding and the Salt River plant at Coronado.

3. Annual Traffic Volumes

a. Historic Volumes

Arizona's SAC calculation assumes that the AGRR would transport a total of 6.0 million tons of coal per year--2.5 million to Salt River and 3.5 million to Arizona-- in 1994 and 1995. According to Santa Fe's waybill records, 6.03 million tons were actually transported to the two shippers' plants in 1994. Therefore, we use the 6.03 million ton actual tonnage figure in our SAC analysis for 1994.

Santa Fe disputes the 3.5 million ton estimate for Arizona for 1995. The waybill data that was available for the first three quarters of that year showed that Arizona would receive significantly less than that amount in 1995. Indeed, in Arizona's rebuttal evidence (submitted in mid-December 1995) Arizona's manager of fuel supplies stated that the projections for the total coal to be delivered to Arizona in 1995 had been revised down to 2.475 million tons.[40] Accordingly, our SAC analysis uses a 1995 tonnage figure of 4.975 million tons (the sum of Salt River's 2.5 million tons and Arizona's final estimate of 2.475 tons).

b. Forecast Volumes

i. Shippers' Coal Requirements

Arizona's 1995 coal tonnage was depressed due to abnormally high rainfall that made cheap hydroelectric power available that year.[41] Arizona's average annual coal tonnage for the preceding 5 years (1990-1994) was 3.507 million

[40] Arizona Rebuttal, Gass v.s. at 17.
[41] Arizona Opening, Gass v.s. at 12.

tons.[42] On that basis, Arizona assumes that it would continue to need 3.5 million tons of coal per year delivered to the Cholla plant for the foreseeable future.

Santa Fe argues that Arizona's coal usage at Cholla will decline because the cost of producing power at Cholla will rise relative to the cost of obtaining power from other sources. Santa Fe has presented no evidence, however, to substantiate that claim.[43] The relative cost of coal-fired electric power can be affected by factors such as changes in coal prices, changes in fuel oil prices, new environmental costs, or the availability of hydroelectric power. The future availability of lower cost power sources will depend, in turn, on factors such as the weather, the cost of generating power from substitute sources, technological developments, and legal developments affecting the availability of substitute power from the grid. These various factors could have opposing effects on costs. We cannot speculate about factors that are inherently unpredictable,[44] and we will not impose on Arizona an impossible burden of proving that its current plant will not become obsolete. Therefore, we assume that recent historical

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[42] The coal tonnages for the Cholla plant for each of the years 1980-1994 were as follows (Arizona Opening, Gass v.s. at 12):

Year	Tonnage		Year	Tonnage
1980	2,268,963		1988	2,812,409
1981	3,019,282		1989	3,581,092
1982	3,549,530		1990	3,045,435
1983	3,297,258		1991	3,464,280
1984	3,357,293		1992	3,729,094
1985	3,397,186		1993	3,743,186
1986	2,772,045		1994	3,554,827
1987**	2,028,629			

** The 1987 figure does not include an additional 637,108 tons received at Cholla from other sources due to a strike at the McKinley Mine.

[43] In fact, Santa Fe's witness shows that Cholla is currently a low-cost plant. *See* n. 25, *supra*.

[44] Santa Fe has not presented definitive reasons why any of these factors will necessarily change significantly.

usage at Cholla will continue unabated. If that proves not to be the case, the parties may have this proceeding reopened to consider significant changes as they occur. *Burlington Northern*, 114 F.3d at 215.

Both parties assume that Salt River will continue to need 2.5 million tons of coal per year at Coronado. Accordingly, we accept Arizona's combined coal requirement figures for the two shippers of 6.0 million tons per year.[45]

ii. Available Coal Supplies

Arizona's short- and long-term coal supply contracts with P&M are scheduled to expire in 2000. Salt River's short-term coal supply contract is scheduled to expire in 1997, and its long-term contract in 2006. Moreover, the McKinley Mine has projected reserves of only 95 million tons. Based on current sales (approximately 8 million tons per year), the mineable coal reserves at McKinley are estimated to run out in 2007. However, P&M is engaged in contract negotiations to acquire new coal reserves on adjacent Navajo lands, which would effectively expand the reserves at the McKinley Mine. P&M expects these negotiations to be successful, in view of the royalties, taxes, and employment opportunities the additional mining would bring to the Navajo Nation.[46] Thus, it is quite likely that coal would continue to be available from P&M at the McKinley Mine site through 2013 (the extent of our SAC analysis here), making it unnecessary for Arizona and Salt River to switch to other coal sources.

Santa Fe argues that, when Salt River's contract with P&M expires in 2006, Salt River would switch to its own untapped coal reserves at Fence Lake.[47] However, Santa Fe has not shown that Salt River can mine coal at Fence Lake for less than it can purchase coal elsewhere.[48] Salt River would have to build yet another private rail line or a private truck road from its plant to access the Fence

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[45] We note that this figure may be conservative because it does not provide for population growth and growth in the regional economy. Such growth would increase the general demand for power from all sources, including Cholla and Salt River.

[46] Arizona Rebuttal, Dix v.s. at 4-5

[47] The Fence Lake mine is in New Mexico, approximately 45 miles due east of the Coronado generating station. *See,* the map in Santa Fe's Reply, Huish v.s. at 71. The Fence Lake mine contains approximately 80 million tons of coal. Santa Fe Reply, McMahan v.s. at 20.

[48] In evidence to the contrary, Arizona presented testimony from Salt River's manager of fuels that the bids received from P&M and Santa Fe make them a competitive option for all of Salt River's future coal needs. Arizona Rebuttal, Reeves v.s. at 3.

Lake mine[49] and forego the use of its existing rail spur despite its substantial sunk costs in that line. Under these circumstances, it is far from clear that it would be cost-effective for Salt River to switch to Fence Lake coal.[50]

In short, on this record we cannot determine with any confidence that these two shippers' traffic patterns would change (and, if they did, how they would change). Therefore, we believe that our regulatory responsibilities are best met by assuming a continuation of the status quo and determining the regulatory consequences of the present traffic patterns. If Arizona or Salt River should actually change coal suppliers in the future, we can reopen this proceeding at that time and, if necessary, determine what a reasonable rate would be under the changed circumstances.[51]

4. Construction and Other Capital Expenses

a. Barriers to Entry

The parties differ as to what constitutes a barrier to entry that should be eliminated from the SAC analysis in order to approximate the cost structure of a contestable market. Santa Fe argues that the SAC computation should include all costs that either the incumbent or new entrant would incur to construct a new line today. Under that approach, there would be essentially no barriers to entry

[49] Santa Fe presented evidence that Salt River has purchased some of the right-of-way necessary to connect Fence Lake to the generating plant. The purchase of the right-of-way was begun in 1984, however, and has not been completed. Santa Fe Reply, Huish v.s. at 73.

[50] If it were clear that Salt River could lower its delivered cost per BTU of coal to its plant by opening its Fence Lake reserves, then Salt River would be more active in developing its Fence Lake reserves than Santa Fe has shown.

[51] Our SAC constraint may be sufficiently flexible to accommodate a change in suppliers. Because coal from other origins might move over the same routes as the AGRR (except for the spur from the McKinley Mine to the mainline at Defiance) in order to reach new coal source(s), it is neither necessary nor appropriate, on the record before us, to assume (as Santa Fe does) that the entire AGRR system would be rendered obsolete if the P&M coal contracts were not renewed or if reserves at the McKinley Mine were exhausted. The reasonable rates to be charged under the new circumstances could be determined by examining any additional costs to the AGRR to serve the new movement(s). It would be better to make any necessary adjustments to the SAC analysis when we know how the shippers' traffic patterns will have changed, than to attempt to do so now, when any alternations in the design of the AGRR would be based on pure speculation.

into the railroad industry today [52]--a proposition that is inconsistent with the basic premise of the SAC constraint. If the threat of entry by a competitor were credible, it would be sufficient to constrain rates and there would be no need for a SAC analysis.

We have previously concluded, with judicial approval, that a SAC computation should exclude any sunk costs that were not incurred by the incumbent. *Burlington Northern*, 114 F.3d at 214; *West Texas*, 1 S.T.B. at 668-670. We apply this parity test to the various disputed expenses addressed below.

Land Assemblage. Santa Fe would have the sunk costs of assembling a contiguous corridor of land included in the AGRR's land acquisition costs. Arizona asserts that Santa Fe did not incur such assemblage costs but in fact acquired most (if not all) of this right-of-way through land grants.[53] Santa Fe has not rebutted the contention that it did not incur corresponding costs. Thus, an assemblage factor is not included for the AGRR.

Highway Overgrade Crossings. Santa Fe would include all grade-separation costs associated with constructing the AGRR across public highways. Santa Fe has not shown that it incurred these costs when the original right-of-way was constructed, however, and we therefore exclude such costs from the SAC computation.

Erosion Control Measures. Santa Fe asserts that current environmental standards dictate that erosion control measures be taken because the Rio Puerco River is adjacent to the AGRR for most of the railroad's length. As we noted in *West Texas*, 1 S.T.B. at 705-706, erosion control measures are a relatively recent requirement. There is no evidence that Santa Fe ever incurred any of these expenses for its line serving Cholla. Therefore, we exclude these costs as a barrier to entry.

Preliminary Engineering. Santa Fe argues that the preliminary engineering costs should be greater because of the increased effort necessary to meet the tight schedule assumed for construction of the AGRR line. However, there is no evidence that Santa Fe incurred additional costs of this nature. Moreover, in other SAC cases, we have assumed that a SARR could be constructed in the

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[52] Santa Fe asserts that the only impediment to entering the railroad market is the cost-of-capital risk premium that would be experienced by a new entrant. Santa Fe Reply, Willig v.s. at 3.

[53] The value of the underlying land is properly included in the SAC computation, because it is not a sunk (*i.e.*, irretrievable) cost. The sunk cost is the additional premium for assembling a contiguous corridor.

amount of time needed to finish the most complex subproject. *See, West Texas*, 1 S.T.B. at 674. Therefore, we do not increase these costs here.

Royalties for Earth Removal or Waste Deposit. Santa Fe would include a royalty paid to landowners for earth borrowed for the construction of the AGRR or deposited as waste material. Santa Fe asserts that, when a line is now constructed, such payments are usually made to compensate the landowner for the use of the property and for any remedial work done after the borrow pit activity ceases.[54] However, there is no evidence that Santa Fe incurred such costs when it constructed the existing line, and we do not include such payments for the AGRR.

Relocation of Utilities. Santa Fe argues that the costs of relocating utilities should be included. However, Santa Fe has not shown that these costs were incurred when the existing line was constructed, so we do not include these costs.

Permits, Licenses, and Compliance with Environmental Standards. Santa Fe argues that the capital costs of the AGRR should include the permit, licensing, and environmental regulatory expenses that are currently imposed upon all construction and land acquisition activities. We do not include these costs because we have no evidence that Santa Fe incurred these expenses for its line.

b. Road Property Investment

Having determined which expenses should be excluded, we proceed with an item-by-item valuation of the allowable individual components of total road property investment, utilizing accepted engineering and valuation principles.[55] Construction of the AGRR would entail costs for engineering and construction management, contingencies, mobilization, land, grading and roadbed preparation, bridges, track materials and labor, public improvements, fencing, signs, and signal and communications systems. These costs are discussed in *Appendix B* and summarized in *Table B-1* of that appendix. As set forth there, we conclude that the total cost of the road property investment that would be entailed would be $154,366,312 (in 1993 dollars).

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[54] Santa Fe Reply, Simons v.s. at 16 n.7.

[55] The SAC analysis assumes a 1-year construction period, a 100-foot right-of-way, and the road property asset lives agreed upon by the parties.

5. SAC Analysis Period

Arizona's SAC analysis is based upon a 20-year period (1994-2013). Santa Fe argues that the useful life of the AGRR would be less than 20 years, given the coal supply situation discussed above.[56] However, as discussed above, we conclude that it is not unreasonable to assume that the traffic would continue on the AGRR, as configured, for the full 20-year period.

The SAC analysis period represents the initial planning horizon. Recognizing that many rail assets are long-lived, Arizona assumes that the AGRR system would continue to be useful for transportation purposes well beyond that time. Using the modified perpetual DCF model developed in *Nevada Power II*, 10 I.C.C.2d at 274 (and judicially approved in *Burlington Northern*, 114 F.3d at 215), the SAC model allocates investment costs between the 20-year SAC analysis period and the post-analysis period.[57]

Santa Fe maintains that, if we assume that the AGRR would continue to operate for more than 20 years, we must project costs and revenues (and net overpayments and shortfalls) in perpetuity, not merely in the first 20 years. We disagree. Forecasting revenues and operating costs in perpetuity would be difficult and would add little value. *Burlington Northern*, 114 F.3d at 215, *affirming West Texas*, 1 S.T.B. at 715, .

In any event, we note that Santa Fe's procedure for perpetual netting is flawed, as it is inconsistent with its procedure for revenue projection in this case.

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[56] Santa Fe has suggested three alternative cost-recovery scenarios. The first assumes that the AGRR would provide service only through the end of Arizona's long-term contract in 2000, that Salt River would re-source its spot contract coal after 1997, and that the AGRR would not handle coal purchased from any other supplier. Under this scenario, AGRR would need to recover its entire investment in 7 years of operation.

Santa Fe's second (and preferred) scenario makes the same assumptions as to Arizona's traffic, but assumes that the AGRR would continue to serve Salt River for the duration of its long-term coal supply contract (*i.e.*, through 2006), that the McKinley Mine would exhaust its mineable coal at that point, and that the Salt River would replace the P&M coal with its Fence Lake reserves. Under this scenario, AGRR would need to recover its full investment in 13 years.

Santa Fe's third scenario assumes that Salt River would stop using the AGRR service at the end of Salt River's supply contract with P&M in 2006, but that Arizona would continue to receive 3.5 million tons of P&M coal annually through 2013. Under this scenario, AGRR would have 20 years to recover its investment, but from a smaller total traffic base than Arizona has assumed.

[57] Even if we knew for certain that the AGRR would cease to carry traffic after 20 years, residual assets could be sold at market prices and the proceeds disbursed to AGRR's investors at that time. Thus, it would be improper to hold shippers responsible for the recovery of AGRR's salvage value.

Santa Fe calculates a perpetual revenue stream based on the revenues and operating costs in 4th Quarter 2013. However, Santa Fe's perpetual netting approach would continue to use the RCAF-A as a downward adjustment in projecting the revenues that would be available from the Arizona traffic beyond that date.[58] If the Arizona rates were continually adjusted downward in perpetuity, Arizona's revenue contribution would eventually diminish to nothing--an absurd result.[59]

C. Operating Plan and Expenses

The parties agree on the basic features of the operating plan for the AGRR, including the cycle times of trains, locomotive consists, cars per train, tons per car, annual trips, and trips per day necessary to move the traffic involved. They do not agree on the costs associated with conducting these operations, however. The operating expenses are addressed in Appendix C and summarized in Table C-1 of that appendix. As explained in Appendix C, we estimate that the total operating expense for 3rd Quarter 1994 would be $1,041,531. The remaining quarterly operating expense estimates are derived by indexing that figure forward (through 4th Quarter 2013) and backward (through 1st Quarter 1994).[60]

D. Revenue Analysis

Both parties developed historical (1994 and first half of 1995) revenue figures based on the actual rates and tonnages of the two shippers in the AGRR traffic group.[61] Arizona did not project revenues for future periods, however.[62]

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[58] As explained below, we have accepted the RCAF-A downward adjustment to Arizona's rates only until they fall to the 180% R/VC threshold captive traffic pricing level. This would occur within the 20-year SAC analysis period.

[59] The RCAF-A has shown a declining trend in recent years because productivity increases have exceeded the rate of inflation in the costs measured by that benchmark. Santa Fe's revenue projections applying RCAF-A assume that this trend will continue indefinitely, an assumption that is not credible.

[60] The operating expenses in the 6th and 12th years also include a locomotive overhaul expense, as discussed in Appendix C. The complete quarterly operating expenses are shown in column 4 of Table E-2 of Appendix E.

[61] A comparison of the 1994 revenue figures used by Arizona (Arizona Rebuttal, v.s. of Crowley, Table 15) and Santa Fe (Santa Fe Reply Vol. I, Klick and Baranowski v.s. at Exh. 2A) shows a discrepancy of approximately $200,000. We use Santa Fe's figure, which was developed

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Because Santa Fe has been applying the RCAF-A to Arizona's rates since the expiration of its rail transportation contract, Santa Fe forecasted the future revenues from the Arizona traffic by multiplying the prior year's same-quarter rate by the calculated change in the RCAF-A for the forecast period times forecast tonnage. For Salt River traffic, Santa Fe projected revenues through 2006 using the escalation provision in Salt River's long-term contract with Santa Fe, which provides for the previous year's same-quarter rate to be multiplied by 90% of the unadjusted RCAF cost index (RCAF-U)[63] for that period times tonnage.[64]

In order to net the overpayments and shortfalls throughout the 20-year period in the DCF analysis,[65] we must include forecasted future revenues, developed by applying the forecasted tonnages to the rates projected to be paid by each utility. We accept Santa Fe's application of RCAF-A to Arizona's current rates to forecast the revenues from the Arizona traffic.[66] Although the use of RCAF-A as an adjustment is not without problems,[67] Arizona has not provided an alternative method.

Arizona has rightly questioned, however, whether Santa Fe would continue to apply the RCAF-A adjustment indefinitely.[68] We agree that at some point Santa Fe would likely cease to apply the RCAF-A adjustment because it would lower the rates below the level expected from captive traffic. Therefore, we assume that the minimum rate that Santa Fe (and hence the AGRR) would

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(...continued)
by multiplying the 1994 rate levels by the tonnage transported in each quarter, because we could not verify the revenue figures used by Arizona.

[62] Arizona's analysis did not include "netting," *i.e.*, the subtraction (from overpayments in the earlier periods) of revenue shortfalls that the stand-alone AGRR would otherwise incur in later periods due to rate declines.

[63] RCAF-U measures changes in railroad costs, without considering productivity. It is RCAF-A without the productivity adjustment.

[64] Santa Fe did not project any revenues from Salt River beyond 2006, when Salt River's long-term contract with P&M expires.

[65] Netting is an essential, established part of our DCF methodology. *See, Nevada Power II*, 10 I.C.C.2d at 278; *Coal Trading Corp. v. Baltimore & O.R.R.*, 6 I.C.C.2d 361, 380, 433-36 (1990) (*Coal Trading*).

[66] We have modified Santa Fe's calculation of the forecast of the RCAF-A after 3rd Quarter 1995 to include more recent data available since that evidence was filed.

[67] The RCAF-A has shown a downward trend in recent years because that index is adjusted for productivity and productivity has been increasing. We cannot be certain that past productivity trends will continue, however.

[68] Arizona Reply Brief at 9.

charge for this traffic is represented by the Congressionally determined 180% R/VC threshold level for captive traffic pricing.[69] We have computed the variable cost to Santa Fe of providing this service for the six quarters for which the data were available, as shown in Appendix D. Based on those computations, we have projected into the future the levels at which rates for the Arizona traffic would produce R/VC levels for Santa Fe of 180%, and we have adjusted the projected revenue figures for the Arizona traffic accordingly.

We have also adjusted Santa Fe's revenue figures for the Salt River traffic, because we reject Santa Fe's assumption that the Salt River traffic would terminate when Salt River's current coal supply contracts expire.

Our restated revenue figures are set forth in Table E-1 of Appendix E.

E. DCF Analysis

We apply the DCF model in the manner discussed in Appendix E. The numerical results of that computation are presented in Table E-2. As that table shows, we find that the projected revenue stream for the traffic included in the AGRR would exceed the costs of constructing and operating the AGRR over the 20-year SAC analysis period by $72,778,083 in constant (1994) dollars.

F. Rate Prescription and Reparations

The fact that the revenues produced by Santa Fe's rates exceed the revenues that would be required by the AGRR, in present value terms, indicates that the challenged rates are unreasonably high under the SAC constraint. Arizona is not entitled to the benefit of AGRR's entire revenue surplus, however, because the aggregate figures represent a revenue stream that would be received not just from the Arizona traffic but from the Salt River traffic as well. To measure the reasonableness of the challenged Arizona rates, therefore, we must determine what the AGRR would need to charge to Arizona individually.

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[69] Further, as explained below, while we can prescribe a rate down to the 180% R/VC level, if necessary, we cannot require that a rate be reduced below that level. Arizona should not have to pay higher rates today to make up for projected rate reductions that we cannot enforce and believe are unlikely to occur.

In its submissions, Arizona, without discussion, used two different methods for allocating what the AGRR would charge to each shipper.[70] For purposes of determining a rate prescription, Arizona computed a single per-ton-mile unit rate to be applied to both shippers.[71] Such a method would allocate the stand-alone costs of the SARR based solely on each shipper's usage of the SARR's service. This method gives no consideration to the actual rates of the non-complaining traffic and whether they are above or below the per-ton-mile unit rate that would be needed for the SARR to cover all its costs.[72] Moreover, as pointed out in *Coal Trading*, 6 I.C.C.2d at 380, this ton-mile allocation method does not take into account demand-based differential pricing.[73] For these reasons, a pro-rata allocation of a SARR's revenue needs on a ton-mile basis is not appropriate.

In calculating reparations, Arizona used a percentage rate reduction method that it asserts was endorsed by the ICC in *Coal Trading*.[74] This method would allocate the SARR's revenue surplus in proportion to the existing rates of the shippers in the traffic group, hypothetically reducing each shipper's rate by a uniform percentage. This method assumes that the comparative rate levels of the various shippers in the group reflect their relative levels of demand elasticity, so that maintaining the existing rate structure implicitly preserves the carrier's demand-based differential pricing.[75] Accordingly, we use a percentage rate

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[70] Santa Fe has not specifically addressed the choice of an allocation method.

[71] Arizona Rebuttal, Crowley v.s. at 44 & Exh. TDC-6.

[72] The ton-mile allocation method could potentially yield a rate for a non-complaining shipper that is higher than the rate actually paid by that shipper.

[73] Demand-based differential pricing refers to the assignment of differing markups over the long-run marginal costs of serving various shippers to reflect each shipper's elasticity of demand for the rail service involved. While there is no evidence in this case of significant qualitative differences in these two coal shippers' demand for rail service, the long-run marginal cost of serving these shippers would appear to differ significantly because the investment required to serve the Salt River traffic is less than that required to serve the Arizona traffic. Only 69 miles of the line would be a shared facility used for both shippers' traffic. The 42-mile line from Coronado Jct. would serve only the Salt River plant and would require no investment of capital (as opposed to operating expenses) by the AGRR, as it is owned by Salt River. In contrast, the 46-mile line from Coronado Jct. to Cholla would serve only Arizona and would be built with AGRR capital.

[74] Arizona Rebuttal, Crowley v.s. at 40 & Exh. TDC-7. Because Arizona did not use a netting procedure, its method does not comport with the procedure set out in *Coal Trading*.

[75] This method is consistent with *Coal Rate Guidelines*, 1 I.C.C.2d at 546 (ideally the comparative revenue contributions of the shippers in the traffic group should be based on Ramsey pricing principles).

reduction method for calculating the maximum reasonable rates for the Arizona traffic.[76]

We have made three modifications to the percentage rate reduction method used by Arizona, however. First, in its computations, Arizona did not provide for netting of revenue shortfalls and overpayments over the 20-year SAC analysis period. Netting is essential, however, because without it the railroad would have no means to recover the revenue shortfalls that would be incurred in certain periods. The netting procedure balances out overpayments and shortfalls so that the sum of the present value of all overpayments and shortfalls for the 20-year DCF period equals zero.

Second, because the SAC-based rates calculated under this method would, without further modification, increase (under the inflation indexes used by the parties) at a faster pace than Santa Fe's rates are projected to increase (applying the RCAF-U to the Salt River rate and the RCAF-A to the Arizona rate), we must limit the AGRR rates so that they would not exceed Santa Fe's rate levels during the 20-year period. In our SAC analysis, we cannot assume that the AGRR could collect a higher rate than Santa Fe charges for the same traffic.

Third, we must limit the SAC-based rate so that it does not fall below 180% of Santa Fe's R/VC level for the Arizona traffic. We cannot prescribe a rate below that threshold jurisdictional level. *See*, *West Texas*, 1 S.T.B. at 677-678.

Each of these three constraints (using a netting procedure, using Santa Fe's rates as rate ceilings, and using Santa Fe's 180% R/VC level as a rate floor for the Arizona traffic) is necessary. However, each of these constraints can affect the outcome in a way that affects the application of the other two constraints. In other words, the constraints are interdependent. To apply them in concert requires an iterative computational process encompassing both an initial calculation and a recalculation. This process is described in Appendix F and the results are summarized in Tables F-1 (initial computation) and F-2 (final computation). The resulting maximum reasonable SAC-based rates for the Arizona traffic on a quarterly basis are shown in column 15 of Table F-2.

Based on the maximum reasonable quarterly rates shown in Table F-2, we conclude that Arizona is entitled to reparations from Santa Fe for the unreasonable portion of the rates that it has paid. The reparations owed for 1994 and the first half of 1995 (the only periods for which we have actual tonnage and revenue data), rounded to the nearest $1,000, are set forth below. (The parties

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[76] We use the percentage rate reduction method for both prescription and reparations purposes, as we see no basis for using differing allocation methods.

may choose to calculate these figures to the nearest dollar.) Reparations for subsequent quarters through the end of 1996 may be computed independently by the parties, using the same method.

Reparations Calculations

Period (Qtr.)	Arizona Tonnage	Arizona Actual Rate	Actual Revenues (000)	Prescribed Rate	Maximum Revenues (000)	Reparations (000)
1/94	858,417	$6.31	$5,417	$3.41	$2,929	$2,488
2/94	799,622	$6.20	$4,958	3.40	2,722	2,236
3/94	1,014,795	$6.25	$6,342	3.51	3,558	2,784
4/94	862,550	$6.17	$5,322	3.79	3,267	2,055
1/95	613,581	$6.17	$3,786	3.48	2,135	1,651
2/95	447,143	$6.16	$2,754	3.60	1,611	1,143

Interest on the reparations should also be paid to compensate Arizona for Santa Fe's use of excess funds received as unreasonable charges for past shipments. Interest is to be calculated and paid at the rate prescribed in 49 CFR Part 1141.[77]

We note that the maximum quarterly SAC-based rates for the Arizona traffic (shown in column 15 of Table F-2) fluctuate, dipping in the early quarters of each year and rising in later quarters of the year. That is because of Salt River's rate structure. Under its contracts, Salt River pays significantly lower rates after it has met certain annual tonnage amounts. In order to be made whole on a quarterly basis using the percentage rate reduction method, the rates that AGRR would need to charge Arizona would be lower in the early part of a year (when Salt River pays its higher rates) than they would be in the latter part of the year (when Salt River pays its lower rates).

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[77] *See, Procedures to Calculate Interest Rates*, 9 I.C.C.2d 528 (1993); *Huron Valley Steel Corp. v. CSX Transp. Inc.*, No. 40385 (ICC served October 6, 1992).

We are reluctant to prescribe for future traffic quarterly rates that fluctuate so significantly. We do not wish to create any artificial, wholly regulatory incentive for either of the parties (Arizona or Santa Fe) to alter its (shipping or service) schedules to take advantage of such fluctuations (by steering movements to avoid or come within a higher-rated quarter). Therefore, for purposes of a rate prescription, we have restated the netted cumulative SAC results on an annual basis, in Table F-3 of Appendix F, and used that to compute annual (mid-year) rates, as shown in Tables F-4 (initial calculation), F-5 (intermediate calculation) and F-6 (final computation).[78] The maximum reasonable rates shown in column 15 of Table F-6 are the prescribed rates that are to be applied to the Arizona traffic from the beginning of 1997 forward.[79]

We recognize that changes in circumstances may necessitate changes in the rate prescription. If the calculations required to determine a revised prescription using our method are clear, the parties may calculate the necessary adjustment and implement it themselves by mutual agreement. In the absence of agreement, we will entertain petitions to reopen this proceeding to adjust the prescription.

V. CONCLUSION

Based on the record in this case, we find that the challenged rates are unreasonable. Reparations are awarded for past movements, and maximum reasonable rates are prescribed for future movements. Interest is also awarded, in accordance with 49 CFR part 1141. If the revenue and cost projections upon which these rate prescriptions are based become unrepresentative, the parties may either agree upon revisions to these prescriptions that are consistent with our method or petition this Board to reopen this proceeding.

This decision will not significantly affect the quality of the human environment or the conservation of energy resources.

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[78] Whether computed quarterly or annually, the percentage rate reduction method would preserve the two shippers' current comparative revenue contributions under Santa Fe's existing rate structure. That is, each shipper's revenue contribution would remain in the same proportion as Salt River and Arizona now pay for Santa Fe's service.

[79] Reparations for 1997 movements for which the challenged rates have been paid should be made based on the 1997 annual (mid-year) rate prescribed in this decision.

VICE-CHAIRMAN OWEN, *commenting*:

I would have preferred the parties to have reached a private solution to the complaint here. On the other hand, encouragement of market based solutions requires that reasonable incentives exist for parties to reach common ground through mutual accommodations of interests. Shippers and railroads should find it preferable to pursue the avenues of negotiation in search of a satisfactory result themselves, prior to bringing a matter to the Board.

Rail contracting, now and in the future, should be the predominate means of avoiding such disputes. Indeed, one might expect, that future contracts will provide for a mechanism to amicably resolve and or adjust contested rates.

On the other hand, legitimate intractable reasons may prevent private based solutions. This may be particularly so in situations where, as here, shippers and railroads alike find themselves with few competitive options in making adjustments to coal rates. I cannot help but think that Congress had such a case in mind, when it charged this agency with the responsibility to prevail upon its years of developed expertise, and settle such disputes.

The true challenge of Constrained Market Pricing is to fairly reward a railroad for the expenses, investment, and risks it undertakes in providing service, but protect captive shippers from paying unreasonably high rates. *Coal Rate Guidelines, supra*, 1 I.C.C. 2d at 549 (1985).

I realized that the result reached in this case may be viewed by some as harsh. However, the Board's (and its predecessor's) task in such cases has always been to strike a proper economic balance between the interest of carriers and captive shippers. It is expected in such cases that someone will be disappointed in the outcome. I believe that the Board has reached the correct result here.

This case should serve as an example of the application of Constrained Market Pricing and the Stand-Alone-Cost constraint, at their best. We should not lose sight of the fact that the result reached here is based on a neutral assessment of the SARR's route data, traffic volumes, and coal supplies. To that extent, total investment and operating costs were added. Finally, based on the incumbent's own data, we carefully considered all revenues available to the SARR in order to determine whether receipts unreasonably exceeded the revenues needed to cover costs and a reasonable return.

Here, the facts warrant reparations and a rate prescription. But, as aforementioned, another set of facts may have produced a different outcome. In proceedings such as this, however, rate reasonableness determinations will

always amount to judgment calls driven by the facts. *See, Coal Rate Guidelines, supra. See also, Nevada Power II, supra.*

It is ordered:

1. Defendant's interlocutory appeal of July 17, 1995, regarding discovery, is granted.

2. Defendant's motion of January 26, 1995, regarding confidentiality of evidence, is denied.

3. Defendant shall, within 60 days, establish and maintain rates for the issue traffic that do not exceed the maximum reasonable rates prescribed in this decision.

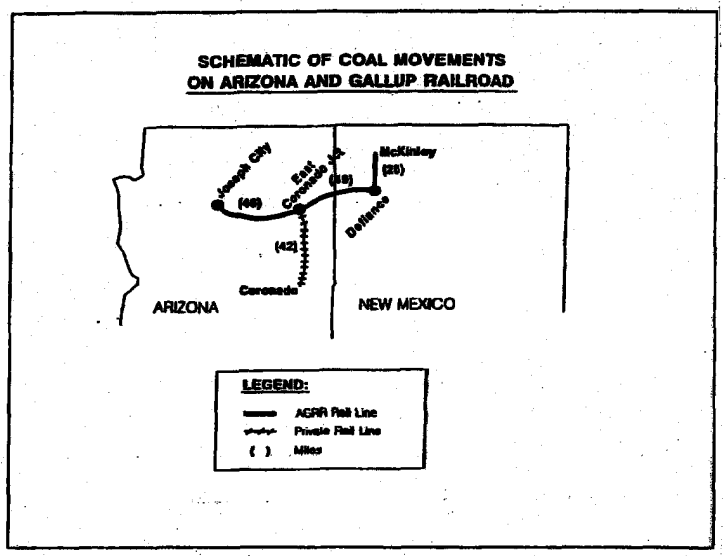
4. Defendant shall pay reparations and interest, in accordance with this decision, for all shipments moving after the expiration of the contract between the parties and prior to the establishment of reasonable rates pursuant to ordering paragraph 3.

5. This decision is effective August 28, 1997.

By the Board, Chairman Morgan and Vice Chairman Owen. Vice Chairman Owen commented with a separate expression.

APPENDIX A

AGRR CONFIGURATION



Arizona and Santa Fe included 115.4 and 115.5 mainline track miles, respectively, for the AGRR, as well as 0.8 mile of track for switching bad order cars. The 0.1 additional mile of mainline track suggested by Santa Fe would be used to reposition locomotives at Cholla for the return trip. Arizona maintains that track within the Cholla Plant can be used for this repositioning. There is no evidence in the record that this additional track is currently available, or that the AGRR operation at the Cholla Plant would be any different from current operations. Therefore, we accept Arizona's 115.4 mainline track figure. With the 0.8 miles of track for bad order cars added, the AGRR would have a total of 116.2 miles of track.

APPENDIX B

AGRR ROAD PROPERTY INVESTMENT

The various estimates of the initial road property investment of the AGRR appear in Table B-1. The component expenses are then discussed.

Table B-1
Road Property Investment

Component	Arizona	Santa Fe	STB
ENGINEERING	$8,160,662	$18,841,442	$11,855,252
MOBILIZATION	538,798	4,507,391	3,485,174
CONTINGENCIES	8,856,619	16,828,300	14,013,256
LAND	220,500	2,640,000	220,500
ROADBED PREPARATION	31,482,999	49,112,762	42,602,909
BRIDGES/CULVERTS	19,072,221	19,072,221	19,072,221
TRACK:			
Ties	11,679,866	12,706,275	12,696,308
Rail***	7,526,080	15,663,347	8,685,412
Turnouts	281,988	322,272	281,988
Other Track Materials***	7,238,759	5,484,723	5,479,085
Ballast	7,894,588	10,415,445	9,939,052
Track Labor	10,712,362	10,721,581	10,712,362
Transportation	2,794,868	7,667,966	7,294,444
FENCES	487,200	4,339,976	4,339,980
COMMUNICATIONS	1,700,000	2,656,085	2,656,085
PUBLIC IMPROVEMENT Grade Crossings Hwy Overgrade Crossings	 258,390 0	 267,300 5,624,712	 258,782 0
SIGNALS	869,000	869,000	763,000
SIGNS	9,957	10,502	10,502
TOTAL	$119,784,857	$187,751,300	$154,366,312

*** Santa Fe grouped weld and rail costs together, while Arizona included the cost for welds with other track material (OTM) costs. We include the cost for rail welds with the cost for rail, as is customary.

1. Engineering (Design) and Construction Management

Construction of the AGRR would require preliminary engineering and final design, as well as construction management. Preliminary engineering includes surveys, mapping, and geotechnical services to determine overall feasibility and routing options. Final design includes the engineering functions necessary to locate, design, and construct the railroad. Construction management includes field engineering and inspection functions necessary to monitor the construction process. The parties developed percentage markups for each of these categories based on other projects and generally accepted reference sources. These percentages are shown in Table B-2 and then discussed.

Table B-2

Engineering Expense Markups

Component	Arizona	Santa Fe	STB
Preliminary Engineering	1.0%	2.0%	1.0%
Final Design	4.5%	6.0%	6.0%
Construction Management	2.5%	5.0%	2.5%
TOTAL	8.0%	13.0%	9.5%

a. *Preliminary Engineering*

Arizona used cost data from R. S. Means, *Construction Cost* (1995) (*Means*) to develop unit costs for survey and geotechnical investigations. Santa Fe maintains that additional costs would be incurred because a short construction schedule would require more effort than usual.[80] Arizona argues that use of a higher markup based on a short construction schedule represents an entry barrier cost. We agree that any additive based on a shorter construction schedule than the one used to construct the existing line is inappropriate. *Nevada Power I*, 6 I.C.C.2d at 55. Accordingly, we accept Arizona's 1% markup, which is based on a generally accepted reference source.

b. *Final Design*

Both parties rely on the American Society of Civil Engineers *Manual and Reports on Engineering Practice No. 45* (*ASCE Manual 45*) to estimate basic engineering services. *ASCE Manual 45* estimates that the cost for basic engineering services generally ranges from 4.61% to 5.64% of total construction costs. Arizona argues that construction of the AGRR would be relatively simple and that basic engineering costs therefore should not exceed 4.5%. Santa Fe

[80] Santa Fe provided no other support or documentation for its 2% preliminary engineering estimate.

includes an allowance for special services[81] in addition to basic engineering services and argues that the total markup for these final design costs should be 6.0%. Arizona agrees that special engineering costs should be included, and asserts that it has included these costs elsewhere. However, Arizona did not specify where they were included and we have been unable to verify that such costs were included.

Both parties' estimates are close to the range that *ASCE Manual 45* indicates is reasonable. We accept Santa Fe's estimate for final design costs, to ensure that the special engineering costs that both parties acknowledge are appropriate are included in the SAC analysis.[82]

c. *Construction Management*

Santa Fe cited five projects in support of its construction management estimate: Singapore Mass Transit Project; Chicago Southwest Transit Project; San Francisco International Airport; Eurotunnel; and the Northeast Corridor Rail Passenger Improvement Project. However, none of these projects is comparable to construction of a short, light-density freight railroad in relatively unobstructed areas.[83] Therefore, we use Arizona's estimate, which is not out of line with *ASCE Manual 45*.[84]

2. Mobilization

Mobilization costs cover expenses associated with moving personnel, materials, supplies, and equipment to job sites and the establishment of offices and other facilities prior to commencement of a construction project. Santa Fe and Arizona used mobilization markups of 5.5% and 1.0%, respectively.[85] We use a mobilization markup factor of 5.0%, because it is the only railroad-related figure of record.[86]

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[81] Santa Fe described special services as soils investigation, land surveys, engineering surveys, photogrammetry, resident engineer and staff, additional reports, drawings, extra travel, investigations of other items, and environmental assessment statements.

[82] Santa Fe's estimate includes an unspecified amount for environmental factors, which we reject in principle as entry barrier costs. However, we are unable to restate its percentage markup to exclude this one item, and we do not believe its inclusion results in a measurable overstatement.

[83] Eurotunnel is a very specialized construction project. Construction of a subway system in a large city such as Singapore is not comparable to construction of a single-track railroad in the desert. Likewise, the Northeast Corridor improvements to a high-density electrified railroad, done under in-service conditions, is not comparable to this modest project. Nor are urban transit projects, whether at grade (Chicago) or on elevated structures (San Francisco), comparable. Indeed, construction of elevated roadways, which are comparable to a continuous bridge, is far more complicated than a railroad with only intermittent simple bridges.

[84] Arizona's original estimates for engineering services during construction (0.5%) and resident engineering (1.5%) were presented separately. Arizona combined these two figures and added another 0.5% to be conservative.

[85] While Arizona claims that it included mobilization costs in overhead and equipment costs, as well as its 1.0% mobilization factor, Arizona failed to support that claim.

[86] Santa Fe submitted a 5% mobilization factor developed for a 4-mile rail line. (Santa Fe Reply, Simons v.s. at 50.) Santa Fe also submitted a 10% figure for a road construction bid for the

(continued...)

3. Contingencies

A contingency factor is included to cover unexpected costs encountered during construction. Santa Fe and Arizona used contingency factors of 10% and 8%, respectively. While Arizona's 8% factor is unsupported,[87] Santa Fe's 10% factor is well supported. *Means* indicates that projects at the schematic level typically have a contingency factor of 10%.[88] The U.S. Army Corps of Engineers uses a 10% contingency factor for projects with a total direct construction cost of more than $10,000,000, and a 10% contingency factor has been accepted in other SAC cases.[89] Thus, we use Santa Fe's figure.

4. Land

While there is no dispute over the total acreage needed for the AGRR (1,470 acres), the parties dispute the basic, across-the-fence land value and whether this value must be augmented by an assemblage factor. Arizona used a unit cost of $150 per acre[90] and no assemblage cost. Santa Fe used a unit cost of $450 per acre[91] and included an assemblage cost of $1,980,000 to account for severance, damage to adjacent property, transaction costs, and assemblage of a contiguous right-of-way.

As discussed in the body of this decision, we find the addition of an assemblage cost to be improper. As for the per-acre value, we find that Arizona's $150 figure is within the range of values indicated by comparable sales or recent estimates for railroad purposes.[92] The premium values that Santa Fe estimated for various parcels are not acceptable because Santa Fe has not

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[86](...continued)
San Francisco International Airport, but that project is too unlike railroad construction to be useful.

[87] Arizona failed to disclose the source of any of the individual factors comprising its composite estimate.

[88] *Means* at 4.

[89] *Nevada Power II*, 10 I.C.C.2d at 311 (1994); *West Texas*, 1 S.T.B. at 709-710.

[90] Arizona valued the property as vacant land, without regard to ownership or boundaries, based on comparable sales. (Arizona Opening, Needham v.s. at 89.) Arizona presented detailed supporting information (county, location, buyer and seller, sale price, acreage, unit price, zoning, sources) for each comparable sale. Parcels range in size from 80 acres to 92,677 acres, with typical parcels ranging from 640 to 2,206 acres. Most of the parcels are grazing land.

[91] Santa Fe Reply, Huish v.s. Santa Fe used a sales comparison approach that involved researching recent property sales in the area, selecting properties similar to the subject property, and adjusting for time, physical, functional, or locational factors. Each of the 13 line segments was reviewed for property rights, financing, conditions, date, adjustments for size, utilities, topography, and use/zoning.

[92] In contrast, Santa Fe's value of $450 per acre is higher than the highest railroad corridor example ($300 per acre on the Coronado Spur). The lowest range of comparable sale values is the $50 per acre figure for the Star Lake corridor and the Lee Ranch Mine spur. The Star Lake corridor transaction, which occurred in 1994 and 1995, is a recent indicator of right-of-way value near the AGRR. The estimate for the Fence Lake railroad project was $80 to $90 per acre.

shown that the parcels are likely to attain the higher uses that would justify such values.[93] Santa Fe raised objections to the details of Arizona witness Needham's application of the comparable sales method,[94] but these differences alone would not account for its $300 per acre higher valuation. Therefore, we accept Arizona's unit value as the best evidence of record.

5. Roadbed Preparation

This category includes grading, clearing, grubbing, compacting earth, and general shaping of earth and rock materials. Ditches and other water control structures, slope protection, channelizing and embankment protection, and seeding are also included. The parties disagree on the quantities and unit costs for most of these activities, as discussed below.

a. *Grading*

(1) *Quantities*

The difference in the parties' grading quantities relates to Track 27, located near the McKinley Mine. While Santa Fe used actual grading quantities, Arizona applied a proportional allocation to distinguish between the railroad- and mine-owned portions of Track 27. Santa Fe has shown, however, that its grading quantities were properly limited to the 6.06-mile railroad-owned portion.[95] Thus, we accept Santa Fe's quantities.

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[93] For example, where Santa Fe's appraisal indicated the land use would be ranchettes and grazing, no evidence was presented to show that such activity exists in the immediate vicinity of the right-of-way segments.

[94] Santa Fe maintains that Arizona should not have valued the right-of-way as a single tract of land, but should have divided up the line into parcels similar to the sizes of the existing parcels in a given area and then estimated the value of each parcel according to the comparable sales method. (Santa Fe used parcels of 40 to 160 acres for right-of-way segments surrounded by grazing land and 1 to 10 acres for land surrounded by highway and town uses.) Santa Fe also argues that Arizona's comparable sales are generally larger than typical parcels in the area, and that Arizona's number of comparable sales is inadequate.

[95] According to track charts, Track 27 begins 2,784 feet from milepost (MP) 13.0 and continues into the area owned by the coal company. However, the designated miles on this section rarely equal exactly 5,280 feet. (For example the distance between MP 13 and MP 14 is 5,171.3 feet.) The total mileage for Track 27 can be computed as follows:

(continued...)

(2) *Unit Cost*

The unit cost of grading depends on the type of earth materials moved (rock, sand, clay). While Arizona did not challenge Santa Fe's grading costs, Arizona provided different unit costs in its rebuttal. Arizona did not explain why it waited until rebuttal to present these revised unit costs, nor did it provide the source for its new figures. Thus, Santa Fe's unit costs are the best evidence of record.

(3) *Indexing Grading Unit Cost*

The parties used different methods for indexing the grading unit cost to obtain consistent (1993 mid-year) dollars. Santa Fe developed its index using the Association of American Railroads (AAR) index for materials, wages, and prices, excluding fuel. Arizona used information from *Means*, applying a city-specific cost index computed using an average for Phoenix and Tucson. Santa Fe does not criticize use of a *Means*-based index, but argues that Arizona's local city adjustment is inappropriate because the AGRR would be constructed in rural areas, not near cities. We agree. Therefore, we accept Arizona's *Means*-based index without a city-specific index adjustment.

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[95](...continued)

Track owned by Santa Fe:	
MP 13.538 - MP 14	2,387.30
MP 14 - MP 15	5,273.89
MP 15 - MP 16	5,264.35
MP 16 - MP 17	5,290.00
MP 17 - MP 18	5,279.69
MP18 - MP 19(assumed)	5,280.00
MP 19 - MP 19.6114	3,228.30
Total ft. owned by Santa Fe	32,003.53
Mileage equivalent	6.06 mi
Track owned by P&M.:	
MP 19.6114 - MP 20	2,051.70
MP 20 - MP 21	5,280.00
MP 21 - MP 21.7402	3,804.00
Total ft. owned by P&M	11,135.70
Total feet, Track 27	43,139.23
Mileage equivalent	8.17 mi

(4) *Royalties*

Royalty costs consist of the payments that would be made to adjacent landowners for purchasing fill dirt and dumping excess earth. As discussed in the body of this decision, we exclude this cost as barrier to entry.

b. *Compaction*

A unit-cost additive for soil compaction is included in several grading categories.[96] Santa Fe used a unit cost for a sheepsfoot, while Arizona applied the average of the unit costs for a vibrating roller and sheepsfoot.[97] Although Santa Fe asserts that vibrating rollers are not used to compact earth fill, the manual of the American Railway Engineering Association (*AREA Manual*) includes vibrating rollers for compaction of fills.[98] Thus, we accept Arizona's figure.

c. *Rip Rap*

The parties agree on the unit cost for rip rap, but not on the quantity that would be required. Arizona used only half of the quantities reported in Santa Fe's main track records, because the existing line is double track whereas the AGRR line would be single track. However, rip rap typically is used only on the outside edges of a roadbed, for river bank or embankment stabilization, and thus would require the same for single or double track. Therefore, we accept Santa Fe's quantities.

d. *Clearing and Grubbing*

The parties agree that the unit cost for clearing and grubbing would be $1,250 per acre.[99] Arizona and Santa Fe estimate that 203 and 227 acres, respectively, would require clearing and grubbing. The 24-acre difference results from Arizona's reduction of (a) 15.5 acres to exclude the privately-owned portion of Track 27 and (b) another 8.5 acres to reflect the fact that the AGRR would have only a single-track line. We reject Arizona's exclusion for Track 27 because, as discussed above, Arizona has understated the amount of Track 27 that is railroad-owned. However, the 8.5-acre reduction is appropriate because clearing and grubbing is related to the total roadbed width. Our restatement therefore reflects clearing and grubbing for 218.5 acres.

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[96] Embankment Common--Borrow; Excavation to Embankment--Common; Excavation to Embankment--Loose Rock; and Excavation to Embankment--Solid Rock.

[97] A sheepsfoot is a large, spiked roller towed by a tractor over newly-dumped earth fill material for compaction purposes. A vibrating roller is used for similar purposes.

[98] *AREA Manual* (1990), Art.1.3.5.6.

[99] Santa Fe Opening Brief at 35, n.37.

e. *Geotextiles*

The parties agree on the unit costs for geotextiles,[100] which were developed from *Means*. Santa Fe included geotextiles under the entire line, arguing that use of geotextiles has been standard engineering/construction practice for approximately 15 years. Arizona only included geotextiles under grade crossings, turnouts, and two locations where subgrade drainage problems could lead to ballast fouling. We accept Arizona's limited approach. The *AREA Manual*, upon which both parties rely extensively in this proceeding, calls for the use of geotextiles only for specific soil conditions and specific track.[101] We note that neither party's normalized maintenance cost is predicated on construction techniques using geotextiles.

f. *Water for Compaction*

Santa Fe contends that water would be required for compaction to meet Arizona's roadbed specifications,[102] but Arizona disagrees. The addition of water to earth fill in order to achieve specific levels of compaction is a standard engineering practice,[103] and there is no reason to believe that the AGRR would depart from the standard practice. Arizona further argues that, in any event, the cost of water is included in the costs for common materials. Without a specific reference, however, there is no basis for assuming that water for compaction is included in the *Means* unit costs for common materials.[104] Therefore, we accept Santa Fe's costs for water used for compaction.

g. *Soil Stabilization*

Based on its own experience (from 1961 to 1978), Santa Fe included soil stabilization measures for 14.6 route miles, using the *Means* unit cost for soil stabilization. Arizona questions this expense, but we accept it.[105] Because the alignment of the AGRR would be the same as that of the existing line, the AGRR would presumably experience, and therefore have to address, the same subgrade problems. We cannot determine whether the use of different construction or maintenance techniques would avoid the soil stabilization expenditure that Santa Fe has incurred.

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[100] Geotextiles are a thin layer of fabric material placed on top of the roadbed in order to minimize subgrade moisture problems and prevent roadbed materials from seeping into the sub-ballast and ballast, thereby reducing maintenance costs.

[101] *AREA Manual* (1990), Part 10 (*Geosynthetics*), paragraphs 10.1.1.1 (*Application Uses*) and 10.1.1.2 (*Application Locations*). There is no indication that the existing line has any geotextile installation.

[102] Santa Fe bases the quantity on the amount used during the construction of the Orin Line of the Burlington Northern Railroad Company (BN) in the Powder River Basin of Wyoming.

[103] *See,* Hay, W.W., *Railroad Engineering* (2d ed. 1982), at 327. This is a generally accepted reference regarding railroad design and construction.

[104] Arizona merely pointed to specifications in the *AREA Manual*, Art.1.3.5.15.

[105] Arizona concedes that some future maintenance can be avoided by additional soil stabilization, but maintains that stabilization would not be required to meet AGRR's compaction requirements given the low traffic densities of the AGRR compared to the Santa Fe mainline. (Arizona Reply Brief at 17.) Arizona presented no evidence, however, that densities would have any impact on whether certain areas of the AGRR would require soil stabilization.

In the absence of reliable evidence that the expense could be avoided, a prudent AGRR would make this expenditure during construction.

h. *Jetties and Slope Paving*

The parties agree on the unit cost for jetties and slope paving,[106] but disagree on the number of units required for the AGRR. Santa Fe used the current numbers along its route. Arizona reduced these amounts by 10% because the AGRR main line would be only a single track. The need for these items does not depend on whether the line is single or double track, however, because jetties are constructed outside the width of the roadbed and slope paving is constructed on the outside edges of embankments. Thus, we accept Santa Fe's figure.

i. *Pipe Drains and Rock Drains*

The parties agree on the quantity and unit cost for pipe and rock drains.

j. *Retaining Walls*

The parties agree on the need for retaining walls and the unit cost,[107] but disagree on their height. Arizona reduced the existing average wall height because the AGRR would only have single track, but failed to explain why a lower retaining wall would thus be sufficient. We use the existing retaining wall height.

k. *Wood Piles*

While the parties agree on the unit cost for wood piles,[108] they disagree on the quantity required. Santa Fe used the number shown on its own track charts. Arizona reduced this amount where the Santa Fe line is currently double tracked. However, the quantity of wood piles would not be affected by the number of tracks because piles are installed on either side of the roadbed, not in the center. Therefore, we accept Santa Fe's figures.

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[106] Jetties are constructed in the vicinity of culverts and bridges and in other areas where additional erosion protection is required. Slope paving is required in areas of high runoff to prevent side slope erosion. Slope paving is generally accomplished with a concrete flume down the side slope.

[107] On rebuttal, Arizona witness Pattison added to the unit price a "local factor" that we rejected previously (*see, Indexing Grading Unit Cost, supra*).

[108] Wood piles are used to stabilize the embankment in specific locations along the right-of-way. Wood piles are driven adjacent and parallel to the track embankment at locations where additional slope stability is required.

1. *Excluded Entry Barrier Costs*

(1) *Utilities Relocation*

Santa Fe included a cost for utility relocation, based on the cost incurred in constructing BN's Powder River line.[109] As discussed in the body of this decision, this is an entry barrier cost that was not borne by Santa Fe for this line.

(2) *Erosion Control*

Santa Fe argues that, because the AGRR is adjacent to the Rio Puerco River for a large portion of its length, some erosion control measures would be required under the Clean Water Act. However, this regulatory cost was not borne by Santa Fe for this line and there is no indication that Santa Fe will be required to incur this expense for its line in the foreseeable future.

(3) *Seeding*

Santa Fe included a cost for seeding all side slope areas in cuts and fills, plus 5 feet beyond the side slope line, for erosion control. However, Santa Fe records do not show that any of the existing right-of-way was seeded, and the line is now covered only by natural growth.[110]

6. Bridges and Culverts

The parties agree on the quantity and unit costs for bridges and culverts.

7. Track

a. *Ties*

The parties agree on the number of wood ties required for the AGRR, but disagree on the cost per tie. In its opening statement, Arizona used a cost of $26.00 per tie, based on quotes from three companies (Kerr McGee, Koppers and Diversified Products). Santa Fe pointed out an arithmetical error in Arizona's calculation and showed that the composite price based on those three quotes would be $46.45 per tie. Santa Fe used Arizona's Kerr McGee price quote for 9' ties, and scaled back the price to $35.13 to match the shorter (8' 6") ties specified for the AGRR. On rebuttal, Arizona substituted a new cost estimate of $32.32 per tie, derived from a 17-year-old BN Authority for Expenditure. However, we cannot determine from Arizona's submission what type of tie would be provided for that price. We accept Santa Fe's cost, which is based on Arizona's own evidence and is tailored to the tie specifications for the AGRR, as the best evidence of record.

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[109] Santa Fe asserts that utilities cross the AGRR right-of-way, but does not specify where, and its track charts do not identify utilities.

[110] In Arizona's opening statement, witness Needham submitted pictures showing only naturally occurring native growth.

b. *Rail and Rail Welding*

Santa Fe grouped weld and rail costs together, whereas Arizona placed its cost for welds with its OTM cost. We will follow the standard practice of including the cost for rail welds with the cost for rail.

The parties agree on the use of relay-quality 115-lb. continuous welded rail for the AGRR, but disagree on the unit cost of that rail. Arizona initially attempted to adjust the cost of new 136-lb. rail of 39-foot lengths downward to estimate the cost of used 115-lb. rail, obtaining a cost of $525 per ton. Santa Fe corrected that adjustment, obtaining a cost of $590.49 per ton. On rebuttal, Arizona offered a revised cost of $320 per ton, based on the actual cost per foot for 115-lb. rail shown in Santa Fe's workpapers.[111] In its brief, Santa Fe objected to Arizona's revised cost because it is based on 20- and 30-foot lengths of rail, rather than the industry-standard 39-foot length. There is no evidence, however, to show that the cost per foot of rail would be different for 39-foot lengths. Thus, we accept Arizona's figure as the only evidence specific to the type of rail that would be used to construct the AGRR.

c. *Turnouts*

The parties agree on the unit cost for turnouts,[112] but Santa Fe would include two turnouts at Cholla in contrast to Arizona's one.[113] As discussed above, we do not believe that the AGRR would require more repositioning room at Cholla than Santa Fe now has. Therefore, we use Arizona's number.

d. *Other Track Material*

This category includes tie plates, spikes, anchors, and rail lubricators. The parties agree on the quantities per mile and unit costs. Their different estimates result from Arizona's inclusion of the cost of rail welds. Our restated figure (which does not include rail welds in this category) differs slightly from the properly compared estimates of the parties, because of the slight discrepancy in mileage figures for the AGRR.

e. *Ballast and Sub-ballast*

The slope of the subgrade affects the quantities of sub-ballast and ballast needed. Santa Fe's and Arizona's sub-ballast and ballast quantities were based on a subgrade slope of 24:1 and 48:1, respectively. We accept Arizona's quantities because the *AREA Manual* supports its slope,[114] while Santa Fe's slope is unsupported.

We accept Santa Fe's unit cost per cubic yard for ballast. Arizona's unit cost per cubic yard was developed from the cost reported in *Means* for resurfacing, which usually involves the placement of only 1 to 4 inches of ballast, rather than the 11-inch depth required to construct the

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[111] Santa Fe workpapers, at page JLS 00330. Arizona converted the cost per foot of rail to a cost per ton.

[112] Based on Santa Fe's criticism, Arizona amended its initial estimate to include the cost for switch ties and stands.

[113] The parties agree on the need and location for the remaining six turnouts.

[114] *AREA Manual*, at 1-2-7.

roadbed initially. Santa Fe more appropriately relied on the unit cost in *Means* for purchasing a cubic yard of ballast.

f. *Track Labor*

The parties agree on the unit cost for track labor.

g. *Transportation of Track Materials*

The parties agree that the transportation cost for track materials would be $0.035 per ton-mile, but disagree substantially on the mileages to be used. Many of Arizona's cost figures are for transportation only to Los Angeles, not to the construction site. Santa Fe computed the mileage from the origin to the nearest point on the AGRR. Arizona argues that Santa Fe's resulting costs are unreasonable because the AGRR would negotiate to obtain the lowest delivered cost. Arizona has failed to provide supported figures, however. Thus, Santa Fe's is the only evidence specific to the origin where the materials would be purchased.

8. Fences

The parties agree on the unit cost for fencing, but disagree on the amount of fencing required for the AGRR. Santa Fe's estimate, which is based on the fencing currently in place, is reasonable. Arizona's estimate is based on its unsupported assumption that only 10% of the right-of-way would be fenced.

9. Communications & Defective Equipment Detectors

The parties agree on the unit and total investment cost of defective equipment detectors. Moreover, both parties include a microwave-based communications system. Arizona's proposed communications system is based on the system used by the Monongahela Railway, a regional coal-hauling railroad in southwest PA. While its choice of a communications system appears reasonable, Arizona provided no support for the cost of procuring such a system. The total lack of support for its cost estimate is unacceptable and falls far short of satisfying its burden of proof as the proponent of the SAC analysis. Because of this deficiency in its evidentiary presentation, we have no choice but to accept the cost evidence submitted by Santa Fe.[115]

10. Public Improvements (At-Grade and Above-Grade Crossings)

The parties agree on the cost of constructing 10 at-grade crossings. In addition to these crossings, Santa Fe included costs for one more at-grade crossing (a new crossing at MP 167.2 that does not appear on Santa Fe's track charts but was observed during an inspection trip)[116] and 4

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[115] Arizona's estimate included $1,200,000 for a communication system of four towers and $500,000 for other unspecified equipment. Santa Fe included $1,378,799 for four microwave towers and $1,277,286 for data links, telephone, radios, and test equipment.

[116] We note that, while the crossing at MP 167.2 appears to be equipped with flashers and bells, Arizona deleted a crossing with crossbuck protection instead. This accounts for a $8,910 (continued...)

above-grade crossings. Santa Fe presented no evidence that it paid for these additional crossings. Rather, it argues that any railroad entering the market today would incur the costs to construct these additional crossings. However, as discussed in the body of this decision, we include sunk costs such as grade crossings only when the incumbent carrier has actually incurred the costs.

11. Signals

We reduced the parties' estimate for signal expense by $106,000, representing the cost of equipping one crossing with flashers and bells, because we have not included the cost of the crossing at MP 167.2 in the SAC analysis.

12. Signs (Grade Crossing and Roadway)

The parties agree on the quantity and unit cost for roadway signs, but not the number of crossings. Since we have accepted Arizona's number of grade crossings, we accept Arizona's roadway signs expenditure. We do not accept Arizona's number of grade crossings requiring crossbuck protection, however, as Arizona erroneously eliminated one of these crossings. Santa Fe's costs accurately reflect the cost of six crossings with crossbuck protection.[117] Our restatement includes 10 public crossings: 6 with crossbuck protection, 2 with flashers, and 2 with flashers and gates.

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[116](...continued)
difference in the at-grade crossing expenditures proposed by the parties. This difference also affects the signal and sign costs.

[117] The cost for one additional crossbuck is $545.

APPENDIX C

AGRR OPERATING EXPENSES

Operating expenses were first developed on an annualized basis (expressed in 3rd Quarter 1994 dollars). The cost categories are summarized in Table C-1 and then discussed individually.

Table C-1
AGRR Annual Operating Expenses

Component	Arizona	Santa Fe	STB
LOCOMOTIVE EXPENSE			
Lease Cost	$ 769,589	$ 769,589	$ 769,589
Maintenance	306,014	510,277	306,014
Fuel Cost	774,421	956,248	777,360
Servicing Cost	52,782	52,858	52,782
Total	$1,902,806	$2,288,972	$1,905,745
FREIGHT CAR EXPENSE	$ 398,520	$ 758,160	$ 758,160
PERSONNEL EXPENSE			
Personnel	$ 616,000	$ 851,612	$ 641,049
Taxi	0	2,032	2,032
Total	$ 616,000	$ 853,644	$ 643,081
GENERAL & ADMINISTRATIVE	$ 36,233	$ 45,105	$ 45,234
AD VALOREM TAXES	$ 258,576	$ 257,153	$ 258,576
INSURANCE	$ 119,395	$ 176,152	$ 138,159
LOSS & DAMAGE	$ 0	$ 22,200	$ 22,200
MAINT. OF WAY & STRUCTURES	$ 264,244	$ 953,209	$ 394,970
TOTAL	$3,595,774	$5,354,595	$4,166,125

1. Locomotive Expense[118]

a. *Lease Cost*

The parties agree on the locomotive lease cost, which is based on a fleet of eight locomotives,[119] a lease cost of $1.15 million per unit, and an annual lease rate of 8.375%.

b. *Locomotive Maintenance*

We use Arizona's estimate of locomotive maintenance expense. Arizona's $0.5102 per LUM expense is based on Santa Fe's 1994 actual contract maintenance cost for the specific type of locomotives that the parties have agreed AGRR would lease (model 8-40-CW, numbered 801A through 866A).[120] (Santa Fe used the cost per LUM of a different model, the GE C40-8W.) In addition, Arizona included an expense of $255,000 and $316,000 per locomotive to cover overhauling the locomotives in the 6th and 12th years. Santa Fe prorated the same 6th - and 12th -year overhaul costs on a LUM basis. Santa Fe's proration would overstate the overhaul expense by requiring the AGRR to recover expenses before they would be incurred.

c. *Fuel Cost*

Arizona and Santa Fe developed their fuel expense estimates based on 2.45 and 2.51 gallons per LUM and a price of $0.527 and $0.635 per gallon, respectively. We use Arizona's gallons-per-LUM figure, because it was derived from 1994 data supplied by Santa Fe for the specific type and numbers of locomotives that would be leased by the AGRR (8-40-CW model locomotives numbered 801A through 866A).[121] We use a price of $0.529 per gallon, which Santa Fe's workpapers show to be the average price of the fuel consumed by the locomotives currently operating between the McKinley Mine and Cholla.[122]

d. *Locomotive Servicing Cost (Lube Oil and Sand)*

Both parties used a cost per LUM of $0.088 for servicing locomotives with lube oil and sand. The parties differ only as to numbers of LUMs. Because we have accepted Arizona's LUMs, we accept its locomotive servicing expense estimate.

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[118] A difference in the locomotive unit-miles (LUMs) used by the parties causes differences in their locomotive maintenance, fuel, and servicing operating expenses calculations. We use Arizona's annual LUMs (321,104 for the Cholla traffic and 278,688 for the Coronado traffic, for a total of 599,792 LUMs) because we accept Arizona's route miles.

[119] The parties did not include a spare margin, because there is sufficient excess time associated with the five locomotives needed for the Coronado movement to provide substitute locomotives when necessary on the trains serving Cholla.

[120] *See,* Santa Fe Reply Volume IV, workpaper KKA 00006.

[121] Santa Fe's figure is based on all GE C40-8W locomotives numbered 868A through 949A.

[122] Santa Fe's unit cost of $0.635 per gallon is not route-specific. Rather, it is the system-average price of fuel over Santa Fe's entire system. Santa Fe's Annual Report Form R-1.

2. Freight Car Expense

The freight car expense consists of a monthly lease cost (of $405 per car) for the cars needed to serve the Cholla traffic.[123] Arizona asserts that 82 cars--a set of 78 cars plus a 5% (4-car) spare margin to allow for bad order cars--would be sufficient for the AGRR because Arizona would take delivery on a relatively consistent basis throughout the calendar year. Santa Fe argues that this is an unrealistically high level of utilization--a 78-car set would be in service 22.6 hours a day, 365 days a year-- and would not allow adequate time for the completion of normal car maintenance or for delays resulting from interruptions during normal train operations.[124] Santa Fe further objects that the assumption that Arizona's traffic flow would be evenly distributed over the entire year is inconsistent with Arizona's current service requirements, which are greater during the high-demand summer season.[125] We agree that it would not be proper to assess the reasonableness of the challenged rate based on different service requirements than those which Santa Fe must meet. Therefore, we accept Santa Fe's estimates (which are based on 156 cars) as the best evidence of record.

3. Personnel Expense

a. *Personnel Requirements*

The parties agree that the AGRR would require two non-operating supervisory personnel (a general manager and an operations/administration manager/dispatcher) and eight train operating personnel (four locomotive engineers and four trainmen, cross-trained to serve in either capacity). Santa Fe points out that the Coronado crew would have to stay with the train during the unloading process and, during normal operations, would be within 15 minutes of violating the hours-of-service limit. When that time limit is exceeded during the unloading process, a relief crew would have to be taxied to the Coronado spur. Santa Fe assumed that approximately 10% of the crews would exceed the time limit and included an allowance of $2,032 for such taxi service.[126] We accept this additional expense.

b. *Compensation*

Arizona used basic compensation levels of $60,000 per management employee and $40,000 per train crew member.[127] Arizona took these figures from Gohmann and Associates, Inc., *Regional and Shortline Wage and Salary Review and Summary* (1995) (*Gohmann Survey*), a publication based on railroads with mileages from 100 to 499 miles. Santa Fe objects that the *Gohmann Survey*

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[123] No freight car expense is included for the Salt River traffic because Salt River provides its own cars.

[124] Delays can and do occur during loading or unloading, switching out of bad order cars, track problems, or locomotive failure.

[125] Arizona suggests that, if additional cars were required during peak periods, they could be obtained easily under a short-term lease. However, Arizona has not included the cost for any such additional leases.

[126] Arizona agrees that the AGRR would incur some relief-crew taxi costs, but failed to adjust its figures.

[127] Both parties applied a 40% markup over basic wages for fringe benefits.

is based on only three responses. Based on its own 1994 Wage Forms A & B, Santa Fe suggests a basic compensation level of $66,746 for each management personnel, $59,392 for each locomotive engineer, and $59,309 for each trainman.

Although the *Gohmann Survey* is limited, it shows that trainmen can be obtained for the compensation levels suggested by Arizona. Indeed, the costs reflected in this survey provide a better indication of what a small railroad like the AGRR would have to pay than the wage levels of Santa Fe, a large class I railroad. Thus, we accept the compensation levels proposed by Arizona for operating personnel, but we correct its math, producing an average of $40,500 per employee.[128]

For managerial personnel, the *Gohmann Survey* contains salary data for a large number of categories, with significant salary ranges within each category. We cannot determine the source of Arizona's $60,000 figure. Therefore, we accept Santa Fe's $66,746 figure for the supervisory personnel, as the only substantiated figure for supervisory personnel.

4. General and Administrative Expense

The parties agree on general and administrative expenses except for two items. Arizona included an annual phone equipment expense of $129, which Santa Fe neither included nor rebutted. Thus, we accept it. We also accept Santa Fe's inclusion of $9,000 for a leased crew facility at Coronado. Arizona asserts that crew members based at Coronado could be accommodated with modest locker room facilities at the plant at no cost. Arizona has not shown, however, that crew facilities are available at the Salt River Plant or that Salt River would be willing to provide locker facilities for AGRR crews at no expense.

5. Ad Valorem Taxes

The ad valorem tax expense is based on the track miles and tax rates of the two states through which the AGRR would pass (Arizona and New Mexico). The parties use the same per-mile tax rates. Since we use Arizona's track miles, we use its calculation of the ad valorem tax expense.

6. Insurance Expense

The parties agreed on an insurance expense of 3.43% of total AGRR operating expenses. We apply this percentage to our restatement.

7. Loss and Damage Expense

Santa Fe included $0.0037 per ton for loss and damage (L&D) expenses. Arizona neither included L&D expenses nor offered any explanation for their exclusion. Therefore, we accept Santa Fe's figure.

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[128] Arizona obtained its $40,000 figure for Engineer/Trainmen by averaging the *Gohmann Survey* figures of $50,000 for a Conductor/Switch Foreman and $31,000 for an Engineman.

8. Maintenance of Way and Structures

Normalized maintenance for railroads consists of both "operating maintenance" (preventive maintenance and emergency repairs, expensed in the year incurred) and "program maintenance" (the planned replacement of assets at the end of their useful lives). Because the parties included in their investment cost calculations the cost of replacing assets after they have been retired or used up, only operating maintenance expenses are included in the annual operating expense calculations for the AGRR.

To compute operating maintenance expenses for the AGRR, Arizona developed normalized maintenance figures and then estimated the amount to be allocated to operating maintenance. Santa Fe calculated operating maintenance expenses independently, based on its own maintenance expenditures for two private spur lines that it maintains under contract for utilities--the Coronado spur (45.4 miles) and Springerville spur (29.7 miles). Those lines carry comparable traffic to what the AGRR would carry--2.5 million gross tons (MGT) per year on the Coronado spur and 2.8 MGT on the Springerville line--and Santa Fe asserts that its expenditures are all operating maintenance.

As Arizona points out, however, Santa Fe's expenditures for the two spurs include several activities that appear to be program maintenance, such as large amounts of ballast purchased in one billing period followed by higher labor during the next billing period, a major replacement of a set of crossing gates, and a possible turnout replacement. Moreover, Santa Fe's figures are based on a 3-year period. Because maintenance costs tend to vary, even over a period of several years, particularly on light-density lines, three years is not an adequate time to properly reflect seasonal or other cyclic variations. No evidence was presented demonstrating that this short sample period reflects typical maintenance costs or that the mixture of program and operating maintenance was representative.

In short, we are not persuaded that the maintenance expenditures for the Coronado and Springerville lines are representative of the maintenance costs that would be incurred by the AGRR. Thus, we conclude that the best available estimate of operating maintenance expenses for the AGRR is derived from normalized maintenance estimates.

a. *Normalized Maintenance Expense*

We note initially that the parties did not always use the same asset lives in their maintenance-of-way (MOW) estimates as in their investment estimates.[129] The MOW expense is overstated if it is based on the replacement of assets prior to the expiration of their useful lives. Therefore, we have restated the parties' MOW expense to reflect the same asset lives used in developing the construction costs for the AGRR. Each item of normalized MOW expense is shown in Table C-2 and then discussed separately.

[129] Santa Fe used different lives for bridges and culverts in its investment and MOW estimates (100 years and 55 years, respectively), without explanation. Moreover, the asset lives used by both parties in developing MOW expense for turnouts, roadway signs, and highway signals conflict with the service lives assigned to these assets in their investment costs.

Table C-2

Normalized Maintenance of Way Expense

Component	Arizona	Santa Fe	STB
MOW Personnel			
5 Contract	$371,488	$371,488	$371,488
Santa Fe-12 add'l contract	0	854,418	0
STB-add'l track inspector & Eqpt.	0	0	$70,850
Other Contract Work	$219,668	$207,317	$227,168
Ties	$292,011	$317,645	$317,395
Rail (program)	219,648	405,312	202,140
Rail (misc)	64,608	119,220	59,458
Tie Plates	81,382	81,455	81,382
Spikes	11,294	32,552	18,067
Anchors	13,316	13,343	13,316
Turnouts	18,933	20,142	5,640
Ballast	74,000	102,766	103,376
Small tools, supplies	57,650	57,750	57,700
Transportation	63,125	142,051	137,296
Subtotal, Material	$895,966	$1,292,237	$995,770
--Salvaged rail, t/o's	-88,830	-88,830	-88,830
--Salvaged OTM	-16,256	-19,224	-17,472
Net Track Material	$790,880	$1,184,183	$889,468
Bridges and Culverts	190,722	346,768	190,722
Other Maintenance Costs	125,612	219,146	216,975
Total Normalized Maint.	$1,698,370	$3,183,319	$1,966,672
Cost per route-mile	$14,717	$27,585	$17,042

(1) *MOW Personnel and Equipment Costs*

The parties assumed the use of contract personnel to perform normalized MOW on the AGRR. Arizona's estimate included sufficient hours and dollars for the equivalent of an average annual contract force of five persons plus a 25% allowance for equipment.[130] Santa Fe argues that Arizona's figures are understated, as they assume that maintenance work could accumulate until it would be efficient for contractors to perform the work, and as they fail to provide for a basic MOW force that would be available 24 hours a day. Santa Fe estimated that 12 additional contract MOW personnel would be required to handle daily MOW activities, including emergencies that threaten to interrupt train service and Federal Railroad Administration-required track inspections.[131] Arizona maintains that required track inspections could be performed by two qualified people using a hi-rail truck and that one crew could cover the AGRR mainline twice per week. These inspectors would make routine repairs during the course of their inspections.

We generally agree that Arizona's plan would be more appropriate for a light-density shortline railroad. We are not convinced, however, that the two non-operating personnel provided for by Arizona would have adequate time to inspect the track twice a week while simultaneously making some adjustments to the track structure and performing the administrative and supervisory duties already required by operations. If the AGRR's entire line were inspected twice a week at a speed of 5 mph, the equivalent of almost 6 days of inspection time would be necessary. Consequently, we have included $70,850 for one additional track inspector and hi-rail truck.

(2) *Other Contract Work*

Other contract work involves weed spraying, rail testing, geometry testing every other year, rail grinding every 100 MGT, and funding for miscellaneous outside contracts. Arizona inexplicably failed to include the mobilization/demobilization costs that were included in the quotation used to develop its unit cost for rail grinding. Our restatement includes $7,500 for this purpose. It also includes $20,000 that Arizona (but not Santa Fe) included for miscellaneous outside contract work, as we have no reason to believe that it is not appropriate.

(3) *Ties*

The difference in the parties' estimated tie maintenance costs is due to the difference in tie unit costs. Because we accepted Santa Fe's unit cost for investment purposes, we use it for the MOW expense as well.

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[130] The figures that Arizona initially associated with contract personnel (1,315 man-days and $273,125) translate into the equivalent of 5.1 persons full time per year for 260 workdays per year, in addition to a 25% allowance for equipment. Using *Means*, Santa Fe corrected Arizona's figures to reflect the appropriate year and labor rates, and to eliminate an arbitrary rounding down. Arizona accepted the corrections and included them in its $371,488 rebuttal estimate.

[131] Santa Fe asserts that the AGRR would need the following additional personnel: a maintenance manager; a track inspector; 2 track foremen; 4 track laborers; a welder; 2 bridge maintainers; and a communications and signal maintainer. We cannot determine the source for the costs Santa Fe assigned to these personnel, however, or how it developed its percentage for separating operating maintenance from normalized maintenance.

(4) *Rail (Program)* and (5) *Rail (Miscellaneous)*

The difference in the parties' rail maintenance costs is caused by differences in rail unit cost. Because we accepted a modified version of Arizona's unit cost in our investment restatement, we use the same cost here.[132]

(6) *Tie Plates*

The difference in the parties' estimated costs for tie plates results from their difference in system mileage figures. Because we are using 115.4 route miles and 116.2 track miles, our restatement reflects Arizona's estimate.

(7) *Spikes*

The difference in the parties' spike costs is due to their difference in spike replacement rates. Arizona used five spikes per replaced tie to compute its costs, while Santa Fe used eight spikes per replaced tie plus four spikes per replaced tie plate. We use eight spikes per replaced tie in our restatement, because Arizona's 5-spike per tie replacement rate is inconsistent with the spike installation rate it used for its investment cost. Because Santa Fe did not specifically support an additional cost for the number of spikes per replaced tie plate, we do not include that cost in our restatement.

(8) *Anchors*

The difference in the parties' estimated cost for anchors is caused by the difference in system mileage figures. Because we use 115.4 route miles and 116.2 track miles, our restatement mirrors Arizona's estimate.

(9) *Turnouts*

The difference between the parties' maintenance costs is attributable to the difference in the number of turnouts on the AGRR. Because we accepted Arizona's turnout quantity for investment, we use that quantity in our restatement. However, we have further reduced this expense by assuming a useful life of 50 years for these structures, which is consistent with the useful life presumed for our estimate of SAC investment cost, rather than the 15 years assumed by the parties.

(10) *Ballast*

The difference in the parties' ballast replacement costs results from the difference in unit cost. Because we accepted Santa Fe's unit cost for investment, our restatement is closer to Santa Fe's estimate. Our number differs slightly due to the effect of indexing (*see, Indexing Grading Unit Cost, supra*).

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[132] Our number is less than Arizona's because we removed the transportation cost component from the rail unit cost and included it separately under transportation cost.

(11) *Small Tools & Supplies*

The difference in the parties' estimated cost for small tools reflects the difference in system mileage figures. Arizona based this cost estimate on 115.3 route miles, however, instead of its final mileage estimate of 115.4 route miles. We use 115.4 route miles and 116.2 track miles in our restatement.

(12) *Transportation*

The difference in the parties' transportation costs for MOW materials is caused by the difference in the estimated mileage that various track materials must be shipped. In our consideration of road property investment, we accepted Santa Fe's mileage for transporting track materials. Therefore, we use its mileage for developing transportation cost for MOW materials.[133]

(13) *Salvaged Rail*

Both parties correctly credit the value of salvaged track materials to maintenance expense, because these materials have some residual value to the AGRR when sold for scrap or relay purposes following their removal from the track. The parties agree on the amount for salvaged rail and turnouts and we accept their figures.

(14) *Salvaged OTM*

The parties credited differing amounts of salvaged OTM to maintenance. We have restated the amount of this credit to correct for errors due to: (1) Arizona's use of inconsistent weights for tie plates, spikes, and rail anchors for its investment and maintenance estimates;[134] (2) the parties' replacement of different amounts of OTM each year; and (3) the use of different system mileage figures. We use weights consistent with those in the investment cost, quantities that are consistent with the number of replaced ties and OTM, and the proper system mileages.

(15) *Bridges and Culverts* and (16) *Other Maintenance Costs*

For both of these categories, the difference in the parties' estimates is due to their use of different asset lives for maintenance purposes. Because the parties agree on the asset lives used in developing road property investment, we use those lives.

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[133] Our number is slightly lower than Santa Fe's because of the difference in mileage and the difference in subgrade slope discussed above.

[134] Arizona and Santa Fe used the following weights for other track material:

OTM Component	Arizona *MOW*	Arizona/Santa Fe *Investment*
Tie Plates, lbs.	22.200	22.900
Spikes, lbs.	.787	.833
Anchors, lbs.	2.250	2.750

b. *Operating Maintenance Expense*

There is no disagreement between the parties as to the categories of maintenance expenses that contain operating maintenance. Operating maintenance encompasses property inspection, repair of broken material, and actions needed to maintain track at design level and maximize material life. The portion of estimated normalized maintenance estimates that should be considered as operating maintenance expenses is summarized in Table C-3 and then discussed.

Table C-3
Operating Maintenance Expense

Component	Arizona	Santa Fe	STB
Weed Spray	$49,159	$49,200	$49,160
Rail Testing	36,812	36,842	36,813
Rail Geometry Testing	66,354	66,408	66,355
Rail Grinding	47,340	54,840	54,840
Misc. Rail Replacement	0	0	59,458
Misc. Outside Contracts	20,000	0	20,000
Contract Personnel & Eqpt.	44,579	745,919	108,344
Total Operating Maintenance	$264,244	$953,209	$394,970

The parties agree that all of the costs for weed spray, rail testing, rail geometry testing, and rail grinding are properly assigned to operating maintenance.[135] In addition, although the parties agree on the amount of miscellaneous rail replacement (in contrast to specifically designated program rail replacement, which is a separate item in both parties' estimates), we believe they inadvertently omitted distributing this cost to operating maintenance expense. Thus, we include miscellaneous rail replacement as a separate item in our restatement of maintenance expense. We also include Arizona's cost figure for miscellaneous outside contracts.

The parties provided widely disparate estimates of the number of employees and equipment that would be needed to maintain the AGRR. Arizona argues that 5 man-years would be needed, while Santa Fe suggests that a staff of 17 would be needed. As discussed earlier, we conclude that the equivalent of 6 man-years would be needed to perform operating maintenance. Moreover, the AGRR would use maintenance practices similar to those of shortline railroads, not large Class 1 carriers such as Santa Fe. Therefore, we accept Arizona's allocation of these employee costs between operating and normalized maintenance.

[135] Santa Fe ignored miscellaneous outside contracts, neither discussing this item nor including any cost for it.

APPENDIX D

R/VC CALCULATIONS

I. OVERVIEW

To compute Santa Fe's variable cost of providing rail transportation from the McKinley mine to the Cholla plant, the parties started with Santa Fe's 1994 URCS system-average variable unit costs.[136] They then adjusted the system-average unit costs and service units for most cost categories, to more closely reflect the actual cost of providing the issue service. The parties' variable cost evidence and our restatement for each of the six quarters for which data were available are shown in Table D-1.

Table D-1
Total Variable Cost Per Ton

Time Frame	Arizona	Santa Fe	STB
1st Quarter 1994	$ 1.22	$ 1.62	$ 1.51
2nd Quarter 1994	$ 1.36	$ 1.71	$ 1.69
3rd Quarter 1994	$ 1.33	$ 1.82	$ 1.72
4th Quarter 1994	$ 1.37	$ 1.96	$ 1.86
1st Quarter 1995	$ 1.31	$ 1.94	$ 1.83
2nd Quarter 1995	$ 1.24	$ 1.81	$ 1.70

II. OPERATING STATISTICS AND TRAFFIC CHARACTERISTICS

To develop service units (*e.g.*, the average number of locomotives per train) for the transportation of Arizona's traffic, Santa Fe used its waybill data for January 1994 through June 1995. Arizona adopted most of Santa Fe's service units, but substituted data from its own freight log to calculate tons, number of trains, and total cars moving in each quarter. Arizona's use of a mixture of Santa Fe's waybill data and its freight log data, however, resulted in a mismatch of service units, *i.e.*, certain operating characteristics for one quarter were matched to trains that

[136] The parties used preliminary 1994 URCS system-average data. In our restatement, we use the final 1994 URCS data, which became available after the parties submitted their evidence. Our final Santa Fe 1994 URCS corrects several errors in the preliminary data. As a result of using final URCS data, our restatement sometimes differs from the evidence of the parties even where we accept their evidence.

moved in another quarter. To avoid this mismatch, we use Santa Fe's waybill data.[137] Table D-2 contains the primary statistical information we used in our restatement.

Table D-2

Operating Statistics

Statistical Category	1st Qtr. 1994	2nd Qtr. 1994	3rd Qtr. 1994	4th Qtr. 1994	1st Qtr. 1995	2ndQtr. 1995
No. of Trains	129	130	174	149	100	60
Cars Per Train	67.23	62.51	59.55	59.96	62.51	75.77
Avg. Tare Wt. (Tons)	33.00	33.22	33.22	33.22	33.22	33.22
Tons Per Car	98.99	98.40	97.93	96.55	98.16	98.36
Car Cycle Hours	40.34	34.32	26.88	31.20	43.44	60.48
Loco. Cycle Hours	16.31	17.27	23.29	26.56	29.46	32.67
Loco. Per Train	3.015	3.415	3.017	3.027	3.050	3.000
Loco. Unit Miles	717.57	812.77	718.05	720.43	726.21	714.30
Gross Ton-Miles	19,040	19,023	18,968	18,809	18,995	19,018
Round Trip Miles	230.8	230.8	230.8	230.8	230.8	230.8

III. VARIABLE EXPENSES

Table D-3 shows the parties' variable cost estimates and our restatement for 1st Quarter 1994.[138] A discussion of each of the variable cost elements follows.

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[137] Santa Fe developed variable costs for each train moving in each quarter, then summed the variable costs for the entire quarter and divided by the number of trains to develop quarterly average expenses per train. To substitute the final 1994 Santa Fe URCS data for the preliminary URCS data used by the parties, we needed information on the average number of service units per train used in each quarter, data not readily discernible from Santa Fe's variable cost evidence. Therefore, to restate the variable costs, we relied on service unit data from Santa Fe's waybills.

[138] The parties grouped some expense categories differently. For example, Arizona developed a separate expense category for locomotive fuel expense and excluded fuel expense from LUM and gross ton-mile (GTM) expenses. Santa Fe, on the other hand, included fuel expense (continued...)

Table D-3
Variable Cost Per Car - 1st Quarter 1994

Item	Arizona	Santa Fe	STB
1. Carloads O/T - Clerical	$ 11.13	$ 11.06	$ 11.06
2. Carload Handling - Other	0.00	0.74	0.74
3. Switch-Road Loco Non-Yard	0.05	0.19	0.16
4. Gross Ton-Mile Exp.	46.09	53.63	54.00
5. Train Mile Exp. Excl. Crew	0.30	0.29	0.30
6. Train Mile Crew Exp.	25.51	26.03	25.50
7. Loco Ownership Exp.	7.84	18.98	19.00
8. Loco Unit-Mile Exp.	9.58	17.32	14.56
9. Car Ownership Exp.	12.74	17.51	17.52
10. Car Operating Exp.	7.86	15.52	8.35
11. Loop Track Exp.	0.09	0.34	0.27
12. End of Train Device Exp.	0.07	0.05	0.03
13. Loss and Damage Exp.	0.26	0.26	0.26
TOTAL VC/CAR - UNINDEXED	N/A [139]	$ 161.93	$ 151.75
TOTAL VC/CAR INDEXED[140]	$ 121.52	$ 161.11	$ 150.95
AVERAGE TONS PER CAR	98.75	98.99	98.99
VARIABLE COST PER TON[141]	$ 1.22	$ 1.62	$ 1.51

[138](...continued)
in its LUM and GTM calculations. We have regrouped Arizona's evidence and placed its cost data in the most applicable expense category for comparison with Santa Fe's data and our restatement.

[139] Arizona did not provide an unindexed total variable cost level.

[140] Indexed to the first quarter of 1994.

[141] Variable cost per ton = (total variable cost per car/average tons per car) x .9934. The URCS/Rail Form A linking factor of .9934 is applied in order to bridge URCS results to Rail Form A results.

1. Carloads Originated or Terminated - Clerical Expense.

The parties agree on the per-carload cost for this item. The difference in their figures results from their different indexing procedures. Indexing is discussed in item 14 below.

2. Carload Handling - Other Expense.

In its rebuttal evidence, Arizona adopted Santa Fe's per-carload cost for this item.[142] Arizona inadvertently excluded this cost from its calculation of variable cost per carload, however.

3. Switching by Road Locomotives - Non-Yard.

This expense accounts for the cost of locomotive repairs and fuel incurred when road locomotives perform non-yard or line-haul switching, *i.e.*, switching of cars disabled during the line-haul movement.[143] The parties' adjustments for this expense category are discussed below.

a. Locomotive repair.[144]

Both parties adjusted the system-average locomotive repair expense to reflect Santa Fe's maintenance agreements covering the locomotives used to move the issue traffic. Arizona's adjustment included only the basic per-mile maintenance charge, while Santa Fe included the basic per-mile maintenance charge plus a pro-rata portion of the scheduled overhaul expenses. (The locomotive service contracts call for scheduled overhauls every 6th year.) Santa Fe argues that the overhaul expenses should be spread uniformly across all time periods. Arizona contends that overhaul expenses should be recorded in the time period incurred. We agree with Arizona that the variable cost associated with the overhaul of locomotives should only be included in the year the maintenance takes place. Santa Fe's procedure is contrary to the procedure used to develop URCS variable costs, which records expenses when they occur.

While we agree with Arizona on the assignment of repair expenses to particular time periods, we note that its adjustment to the basic per-mile maintenance cost is based on a straight ratio of the system-average maintenance cost per LUM to the cost per mile shown in Santa Fe's maintenance agreements. This adjustment fails to take into account the other factors, such as GTMs and switch engine minutes, used in URCS to calculate total locomotive repair expense for a specific movement. Thus, Arizona's adjustment understates basic maintenance costs. Santa Fe incorporated the appropriate elements in its adjustment, and our restatement takes account of those factors.[145]

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[142] Arizona Rebuttal Exh. CLC-21 at 16.

[143] Both parties assume that the average train will require road locomotives to perform 90 minutes of switching.

[144] This cost element is also used in the development of costs for GTM, Loop Track and LUM expenses.

[145] We developed the total URCS system-average locomotive repair cost for the average train in each quarter by dividing total repair costs per train by the number of LUMs per train. We then calculated the total basic locomotive repair cost per LUM for each group of locomotives. The number of locomotives used in each quarter from each group was weighted by the total number of (continued...)

b. Locomotive fuel.[146]

Both parties used the same general procedure to develop a per-train-mile fuel adjustment factor. This factor is used in conjunction with the distance the locomotives travel to develop fuel expense. In developing fuel expense, Arizona failed to account for the distance locomotives travel to and from fueling stations. We have restated the parties' evidence to reflect final 1994 URCS data and to include the mileage locomotives travel to and from refueling points.[147]

c. Locomotive maintenance overhead.

Santa Fe (but not Arizona) calculated a locomotive repair overhead adjustment factor. Santa Fe computed the dollar amount of the adjustment by multiplying the locomotive repair adjustment factors for each quarter by the adjusted system-average maintenance overhead expense. In order to reflect all the costs attributable to locomotive maintenance, we agree with Santa Fe that an overhead allowance is needed. Our restatement includes this allowance.

d. Fuel overhead.

Santa Fe (but not Arizona) also calculated a fuel overhead adjustment factor, using similar procedures to those used to compute maintenance overhead. Again, we agree with Santa Fe that an overhead factor must be included.

4. Gross Ton-Mile Expense.

Both parties developed the road track maintenance cost component of GTM expense using the speed factored gross tons (SFGT) formula.[148] Arizona also used the SFGT formula to develop depreciation expense for track accounts and equipment,[149] while Santa Fe computed those expenses

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[145](...continued)
locomotives used in that quarter to develop the percentage contribution of each group. The percentage for each group was multiplied by the total maintenance cost of that group to develop the weighted contract cost per LUM for the actual locomotives. This weighted average cost was divided by the system-average cost per LUM to calculate the adjustment factor for each quarter.

[146] This cost element is also used in the development of costs for GTM, Loop Track and LUM expenses.

[147] Information in Santa Fe's workpapers indicates that locomotives traveled 7.2 miles per train in 1994, and 7.3 miles per train in 1995, to and from fueling stations.

[148] For each mile of track with densities below 1.0 MGT, the SFGT tie equation assigns a fixed-cost component of $940 (in 1975 dollars), while densities above 1.0 MGT have a fixed-cost component of $1,880. Because the total tonnage for the line segments at issue range from 2.4 MGT to 3.5 MGT, $1,880 is the appropriate figure.

[149] Arizona's version of the SFGT includes overhead expenses, which we eliminate because they are included at a subsequent point in the costing process. For the same reason, we also eliminate the expenses associated with depreciation and joint facilities.

separately, based on URCS unit costs. We agree with Santa Fe's procedure. SFGT was not designed to include depreciation for track accounts and equipment.[150]

In developing the road operations expense component of GTM expense, Arizona excluded locomotive repair and fuel expenses, as well as an overhead factor, because it placed these expenses in a separate category. In developing the fuel expense to exclude from GTM expense, Arizona included the basic URCS fuel expense per GTM, a general overhead expense, and an additional unexplained overhead factor.[151] However, when Arizona calculated its fuel cost in a separate schedule, it included no overheads. Likewise, the amount that Arizona excluded from GTM expense for locomotive repairs exceeded the amount that it included in its separate schedule. These errors resulted in a substantial understatement of the total fuel and repair expenses and the resulting total variable cost expense computed by Arizona. We include locomotive repair and fuel expense, as well as associated overheads, in our GTM expense restatement rather than in a separate category.

Arizona (but not Santa Fe) appropriately applied an adjustment for the trailing weight of the trains. This adjustment is necessary to account for the weight of the locomotives in determining the total gross tons passing over the track at issue. We include this adjustment, but our figure differs slightly from Arizona's because the average tons per car from Santa Fe's waybill data differ from Arizona's.

Arizona inappropriately excluded all return on investment (ROI) expense assigned by URCS to road operations. (Santa Fe included these expenses.) Arizona's exclusion of ROI expense (defined by URCS as a variable cost) understated the total gross ton-mile expense attributable to Arizona's traffic. On the other hand, Santa Fe's inclusion of all URCS ROI expense from road operations overstated the variable cost because Santa Fe separately calculated the ROI expense associated with locomotives.[152] Our restatement excludes the portion of ROI in GTM cost that is applicable to locomotives.

5. Train-Mile Expense - Excluding Crew.

Both parties excluded caboose-related expenses, depreciation, and ROI from this train-mile expense.[153] In calculating total train miles, Arizona failed to include loop track mileage. We agree with Santa Fe that the loop track mileage must be included so that all train-mile based costs are accounted for.

6. Train-Mile Crew Expense.

Both parties used Santa Fe's actual wage data and service units to develop train-mile crew expense. The differences in the parties' expense resulted from (a) a Santa Fe computational error in the development of the direct overheads applied to crew wages and (b) Arizona's use of a

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[150] *Analysis of Track and Roadbed Maintenance Cost Variability*, 2nd ed., June 1977, L.E. Peabody & Associates at I-5.

[151] The overhead factors increased the basic fuel expense per GTM by 34%.

[152] The procedure that Santa Fe used to develop ROI for GTM cost is similar to what it used to determine the ROI included on a LUM basis. In developing its LUM calculation, Santa Fe properly eliminated the locomotive portion of the ROI unit cost before calculating the cost for the remaining expense.

[153] Arizona also removed train inspection expenses, which it treated as a separate cost category. Our restatement includes this expense in train-mile expense.

different number of cars per train. Our restatement reflects the proper application of direct overheads and the number of cars per train listed in Table D-2.

7. Locomotive Ownership Expense.

The annual locomotive ownership expense is composed of three elements--lease payments (for leased locomotives) and depreciation expense and capital costs (for locomotives that are purchased).[154] The values included in our restatement for lease cost, original cost, locomotive age, and cycle time are quarterly averages based on Santa Fe data.[155]

In calculating capital costs, the parties used a pre-tax cost of capital figure of 17.8%. After the record closed, however, we determined that the 1995 pre-tax cost of capital was 17.0%,[156] and we use that figure for the first two quarters of 1995.

8. Locomotive Unit-Mile Expense.

The parties generally agree on depreciation expense, lease costs and ROI. The major difference between their LUM costs is in the operating expense category. Arizona excluded fuel, locomotive repairs and related overheads from this operating expense, as it did from GTM cost. Arizona's separately stated locomotive repair expense only included an allowance for general overheads, and did not account for the direct overheads associated with locomotive repairs that it excluded from LUM expenses. Similarly, Arizona's separate calculation of the fuel expense did not account for the direct overheads or general overheads.[157] As a result, Arizona understated the total LUM cost.

With the adjustments addressed earlier (*see* n. 144, *supra*), we use Santa Fe's figures, which appropriately include all LUM costs, and have added 7.2 miles per trip in 1994, and 7.3 miles to each trip in 1995, to account for refueling the locomotives. These distances, developed in Santa

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[154] Arizona used an annuity factor to compute the capital cost, but did not identify its source, so its calculations could not be verified. Furthermore, Arizona's numbers contained unexplained inconsistencies. Arizona used a service life of 16.64 years for locomotives in 1st Quarter 1994 and 16.54 years for all subsequent quarters. It used an annual depreciation rate of 5.29% for 1st Quarter 1994 and 5.32% for all other quarters. Because of these discrepancies, we cannot use Arizona's evidence. In any event, we see no advantage in using an annuity process, because all the specific data are available for the actual locomotives in each quarter.

[155] Arizona used many of these same quarterly averages. For the cycle time, however, Arizona used only the running time in both directions. Because locomotives must wait at the power plant while cars are being unloaded, Santa Fe's evidence included time spent idling while waiting for the return movement. Our restatement is based on the entire round trip time, including the waiting time, because the locomotives are not available for other revenue-producing service during that time. Where quarterly averages were not available, we have developed them from Santa Fe's workpapers.

[156] *Railroad Cost of Capital - 1995*, 1 S.T.B. 46 (1996) (*1995 Cost of Capital*).

[157] For example, for 1st Quarter 1994, Arizona eliminated $0.64225 in other LUM cost for locomotive repairs, but only included $0.42261 per LUM as locomotive repair expense. In its LUM cost, Arizona eliminated $1.07155 for fuel including overheads, but only included $0.79772 as the base amount on which its fuel expense was adjusted.

Fe's workpapers, are based on the actual mileage to and from a fueling station and the number of trips completed between refueling runs.

9. Freight Car Ownership Expense.

Arizona based ownership cost per car on system-average depreciation expense and ROI for special-service open-top hopper cars. It based the total number of cars on Santa Fe's quarterly cycle time, including loading time taken from its "Coal Unloading Report," plus a 10% spare margin.

Santa Fe developed ownership cost (depreciation expense and ROI) for railroad-owned cars based on the original cost, actual age and net book value. It based ownership costs for leased cars on actual lease expense. Because the cars used to provide service to Arizona are used exclusively to service Cholla, Santa Fe allocated all ownership cost for these cars to Arizona.

We accept Santa Fe's method. The cars used to provide service to Arizona are dedicated cars, and ownership cost based on the actual cars used provides the most accurate measure of the costs associated with providing the service. Furthermore, we agree with Santa Fe that, because these cars are dedicated exclusively to serving Arizona, the total ownership cost for all the cars is properly allocated to the Arizona service. The different numbers in our restatement are due to our development of service units on a quarterly basis.

10. Freight Car Operating Expense.

Both parties agree that Santa Fe used both leased and railroad-owned open-top hopper cars bearing AAR car type code K340 to move the issue traffic. Arizona developed freight car operating expense based on URCS system-average car-day and car-mile unit costs for both leased and railroad-owned "open top hopper - special service cars." Santa Fe, on the other hand, developed significantly higher freight car operating expenses based on the unit costs for railroad-owned "open top hopper - general service cars." Because Santa Fe's Annual Report Form R-1 recognizes cars having a "K" designation as open top hopper - special service cars, we reject its use of costs for open top hopper - general service cars.[158]

11. Loop Track Expense.

Arizona used the same costs per GTM and LUM for loop track that it used to compute other GTM and LUM costs. As discussed above, we have rejected these costs. Our restatement therefore employs Santa Fe's procedure and the unit costs from our final 1994 URCS.

12. End of Train Devices - Ownership Expense.

The parties included different costs for end of train devices (EOTD), but provided little detail supporting their calculations. Arizona included two EOTDs per train (front and rear of train), while Santa Fe included one EOTD per train. Arizona used freight car cycle time, whereas Santa Fe used locomotive cycle time, to determine the EOTD requirements. Arizona included the cost for EOTDs

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[158] There is no evidence in the record that users bear the responsibility for leased-car operating costs, and Santa Fe includes cost only for railroad-owned cars. Therefore, we exclude operating costs for leased cars.

purchased new in 1994, whereas Santa Fe's records indicate that it assumed EOTDs had an average age of 1.5 years in the 1st Quarter 1994.

In the absence of any other evidence, we accept Santa Fe's estimate of one EOTD per train because we assume the railroad is familiar with its operational requirements. We accept Santa Fe's cost per EOTD, which is based on the actual units used in the issue service.[159]

13. Loss and Damage Expense.

The parties agreed on the L&D expense.

14. Indexing.

The parties used the same general procedures to index 1994 variable costs to 1995,[160] but grouped expenses somewhat differently.[161] Arizona indexed virtually all variable cost categories except line-haul crew wages, which according to Santa Fe records were already at current cost levels.[162] In addition to line-haul crew wages, Santa Fe did not index locomotive and rail car ownership expenses, which also were at current cost levels. Santa Fe developed all of its index factors from AAR's *Quarterly Indexes of Charge-Out Prices and Wage Rates* (*AAR Quarterly Indexes*). Arizona used the *AAR Quarterly Indexes* for some expenses and the PPI for others. Arizona obtained a composite index (excluding fuel) of 1.00601 for the 1st Quarter 1994, compared to Santa Fe's figure of 1.00354 for the same period. Both parties indexed the 1st Quarter 1994 fuel expense by a factor of .93314.

We find Santa Fe's indexing procedure more appropriate and accurate,[163] but we have made modifications in three areas. First, in developing base year 1994 wage supplements, Santa Fe inappropriately included $11,653,000 from line 504, column (e) in its total wage supplement figure of $125,259,000. We have removed this amount and recalculated the total wage supplements to

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[159] Our restatement for this cost category differs from Santa Fe's evidence because the railroad used a cycle time that differed from the cycle time evidence it used to develop other costs.

[160] *Explanation of Rail Cost Update Procedures*, ICC Statement 1E3-80 (April 1980), as supplemented in *Complaints Filed Under Section 229 of the Staggers Rail Act of 1980*, 365 I.C.C. 507 (1980) (*Section 229 Complaints*).

[161] Arizona's categories were: (1) total labor and fringes excluding unemployment insurance; (2) net rents; (3) materials and supplies; (4) fuel; (5) expenses indexed by the Producers Price Index (PPI); and (6) expenses not indexed. Santa Fe's categories were: (1) wages (without train and engine crew wages); (2) wage supplements less unemployment insurance; (3) materials and supplies (without fuel); (4) fuel; (5) other indexable expenses (purchased services, taxes and general expenses); and (6) non-indexable expenses.

[162] Arizona Rebuttal, Exh. CLC-21, pages 1-22.

[163] We have found several inaccuracies in the evidence Arizona used to develop its index. For example, Arizona developed a materials and supplies expense figure for 1994 of $597,988,000, while Santa Fe used a figure of $118,257,000. Santa Fe's 1994 Annual Report Form R-1, Schedule 410 (*Railway Operating Expenses*), line 620, column (c) (*Materials, tools, supplies, fuels, and lubricants*) shows a total carrier expense of $370,517,000. Subtracting the fuel and related expenses of $252,260,000 results in a total materials and supplies expense (excluding fuel) of $118,257,000.

be $113,374,000. The $11,653,000 from line 504 has been transferred to the "other indexable expenses" category for purposes of computing the composite index.

The second modification is to Santa Fe's mathematical calculations of the materials and supplies indices. In 1st Quarter 1994 Santa Fe's calculation of the period index of .99810 is incorrect and should have been .99821. We have adjusted this index in each quarter to reflect the correct amount.

The last adjustment involves the "other expenses" category. Arizona used the PPI to index expenses in this category, while Santa Fe relied upon *AAR Quarterly Indexes. Section 229 Complaints* clearly states that the PPI should be used to index the "other expenses" category unless an acceptable alternative is presented in a particular case. Santa Fe has failed to justify its use of a different factor here. Therefore, we use the PPI indexes in our restatement of the composite index. With these modifications, we have recalculated the composite index (excluding fuel) for 1st Quarter 1994 to be 1.00504.

IV. RESTATED VARIABLE COST SUMMARY

Based on our restatement of the variable cost elements discussed above, we have developed total variable costs for each quarter of 1994 and the first two quarters of 1995. Table D-4 summarizes our restated variable costs by component and our composite variable cost per ton amounts for each of the 6 quarters.

Table D-4
STB Restated Variable Costs
(McKinley Mine to Cholla Plant)

Expense Item	1st Qtr. 1994	2nd Qtr. 1994	3rd Qtr. 1994	4th Qtr. 1994	1st Qtr. 1995	2ndQtr. 1995
Carloads - Clerical O/T	$ 11.06	$ 11.07	$ 11.07	$ 11.07	$ 11.07	$ 11.06
Carload Handling-Other	0.74	0.74	0.74	0.74	0.74	0.74
Switch - Road Loco. Non-Yard	0.16	0.21	0.20	0.20	0.18	0.14
Gross Ton-Mile Expense	54.00	56.42	55.82	55.46	55.15	54.02
Train-Mile O/T Crew	0.30	0.32	0.33	0.33	0.32	0.26
Train-Mile T&E Crew	25.50	29.33	28.39	29.96	27.17	23.85
Locomotive Ownership	19.00	27.07	34.62	41.75	42.37	30.63
Loco Unit-Mile Expense	14.56	19.99	18.20	18.25	16.91	13.01
Car Ownership Expense	17.52	13.89	10.70	12.25	16.49	22.61
Car Operating Expense	8.35	8.14	7.88	8.03	8.45	9.04
Loop Track Expense	0.27	0.34	0.32	0.32	0.30	0.26
End of Train Device	0.03	0.04	0.05	0.05	0.05	0.04
Loss and Damage	0.26	0.25	0.25	0.25	0.25	0.25
TOTAL VC/CAR - UNINDEXED	$151.75	$167.81	$168.57	$178.66	$179.45	$165.91
TOTAL VC/CAR - INDEXED	$150.95	$167.73	$169.81	$180.85	$180.22	$167.79
AVERAGE TONS PER CAR	98.99	98.40	97.93	96.55	98.16	98.36
VARIABLE COST PER TON	$ 1.51	$ 1.69	$ 1.72	$ 1.86	$ 1.83	$ 1.70

APPENDIX E

AGRR DISCOUNTED CASH FLOW ANALYSIS

In performing the SAC analysis, we compare the revenues that would be available to the AGRR with the revenues that would be needed by the AGRR. Because our SAC analysis is based upon a 20-year period, we must first determine the stream of revenues that would be available to the AGRR throughout that period. As discussed in the body of this decision, we use Santa Fe's own revenue inflation values: an upward adjustment (90% of RCAF-U) for Salt River's Coronado traffic, and a downward adjustment (100% of the RCAF-A) for Arizona's Cholla traffic. However, we assume that the Arizona rate would not fall below the statutorily determined threshold level of rail captive traffic pricing (180% of Santa Fe's R/VC). Based on these assumptions, the quarterly revenue stream that would be available to the AGRR is shown in Table E-1.

Table E-1

AGRR REVENUE STREAM

		SALT RIVER TRAFFIC			ARIZONA TRAFFIC					
Period	Quarter	Santa Fe Rate	Tons	Revenues	Santa Fe Rate	180% R/VC Rate Floor	Santa Fe Rate Limited By R/VC Floor	Tons	Revenues	COMBINED AGRR REVENUES
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	-11
1	1994 1	$6.40	625,000	$4,000,000	$6.31	$2.72	$6.31	858,417	$5,416,611	$9,416,611
2	1994 2	6.40	625,000	4,000,000	6.20	3.04	6.20	799,622	4,957,656	8,957,656
3	1994 3	5.76	625,000	3,601,500	6.25	3.10	6.25	1,014,795	6,342,469	9,943,969
4	1994 4	4.84	625,000	3,025,000	6.17	3.35	6.17	862,550	5,321,934	8,346,934
5	1995 1	6.56	625,000	4,100,000	6.17	3.29	6.17	613,581	3,785,795	7,885,795
6	1995 2	6.56	625,000	4,100,000	6.16	3.06	6.16	447,143	2,754,401	6,854,401
7	1995 3	5.93	625,000	3,706,751	6.13	3.15	6.13	896,999	5,497,962	9,204,713
8	1995 4	4.98	625,000	3,110,809	6.04	3.15	6.04	517,277	3,122,556	6,233,365
9	1996 1	6.60	625,000	4,127,958	5.88	3.24	5.88	875,000	5,144,399	9,272,357
10	1996 2	6.52	625,000	4,075,896	5.78	3.24	5.78	875,000	5,057,167	9,133,063
11	1996 3	5.90	625,000	3,688,256	5.76	3.24	5.76	875,000	5,036,969	8,725,225
12	1996 4	5.03	625,000	3,144,596	5.77	3.24	5.77	875,000	5,048,642	8,193,238
13	1997 1	6.79	625,000	4,241,228	5.73	3.31	5.73	875,000	5,018,005	9,259,233
14	1997 2	6.75	625,000	4,220,955	5.70	3.33	5.70	875,000	4,987,553	9,208,509
15	1997 3	6.09	625,000	3,804,631	5.67	3.35	5.67	875,000	4,957,287	8,761,918
16	1997 4	5.14	625,000	3,212,805	5.63	3.37	5.63	875,000	4,927,204	8,140,009
17	1998 1	6.93	625,000	4,333,224	5.60	3.40	5.60	875,000	4,897,304	9,230,528
18	1998 2	6.90	625,000	4,312,511	5.56	3.42	5.56	875,000	4,867,585	9,180,096
19	1998 3	6.22	625,000	3,887,157	5.53	3.44	5.53	875,000	4,838,047	8,725,203

		SALT RIVER TRAFFIC			ARIZONA TRAFFIC					
Period	Quarter	Santa Fe Rate	Tons	Revenues	Santa Fe Rate	180% R/VC Rate Floor	Santa Fe Rate Limited By R/VC Floor	Tons	Revenues	COMBINED AGRR REVENUES
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	-11
20	1998 4	5.25	625,000	3,282,494	5.50	3.47	5.50	875,000	4,808,687	8,091,181
21	1999 1	7.08	625,000	4,427,215	5.46	3.49	5.46	875,000	4,779,506	9,206,722
22	1999 2	7.05	625,000	4,406,053	5.43	3.53	5.43	875,000	4,750,502	9,156,556
23	1999 3	6.35	625,000	3,971,472	5.40	3.55	5.40	875,000	4,721,675	8,693,147
24	1999 4	5.37	625,000	3,353,694	5.36	3.56	5.36	875,000	4,693,022	8,046,715
25	2000 1	7.24	625,000	4,523,245	5.33	3.60	5.33	875,000	4,664,542	9,187,788
26	2000 2	7.20	625,000	4,501,624	5.30	3.62	5.30	875,000	4,636,236	9,137,860
27	2000 3	6.49	625,000	4,057,617	5.27	3.65	5.27	875,000	4,608,102	8,665,718
28	2000 4	5.48	625,000	3,426,438	5.23	3.67	5.23	875,000	4,580,138	8,006,576
29	2001 1	7.39	625,000	4,621,358	5.20	3.71	5.20	875,000	4,552,344	9,173,702
30	2001 2	7.36	625,000	4,599,268	5.17	3.73	5.17	875,000	4,524,718	9,123,987
31	2001 3	6.63	625,000	4,145,630	5.14	3.76	5.14	875,000	4,497,261	8,642,890
32	2001 4	5.60	625,000	3,500,827	5.11	3.80	5.11	875,000	4,469,969	7,970,796
33	2002 1	7.55	625,000	4,721,689	5.08	3.82	5.08	875,000	4,442,844	9,164,533
34	2002 2	7.52	625,000	4,699,120	5.05	3.85	5.05	875,000	4,415,883	9,115,002
35	2002 3	6.78	625,000	4,235,633	5.02	3.87	5.02	875,000	4,389,086	8,624,718
36	2002 4	5.72	625,000	3,576,831	4.99	3.91	4.99	875,000	4,362,451	7,939,282
37	2003 1	7.72	625,000	4,824,198	4.96	3.94	4.96	875,000	4,335,978	9,160,176
38	2003 2	7.68	625,000	4,801,139	4.93	3.96	4.93	875,000	4,309,665	9,110,804
39	2003 3	6.92	625,000	4,327,589	4.90	4.00	4.90	875,000	4,283,513	8,611,102
40	2003 4	5.85	625,000	3,654,485	4.87	4.03	4.87	875,000	4,257,518	7,912,003
41	2004 1	7.89	625,000	4,928,933	4.84	4.05	4.84	875,000	4,231,682	9,160,615
42	2004 2	7.85	625,000	4,905,373	4.81	4.09	4.81	875,000	4,206,003	9,111,375
43	2004 3	7.07	625,000	4,421,542	4.78	4.12	4.78	875,000	4,180,479	8,602,021
44	2004 4	5.97	625,000	3,733,824	4.75	4.16	4.75	875,000	4,155,110	7,888,935
45	2005 1	8.06	625,000	5,035,941	4.72	4.18	4.72	875,000	4,129,895	9,165,837
46	2005 2	8.02	625,000	5,011,870	4.69	4.21	4.69	875,000	4,104,833	9,116,703
47	2005 3	7.23	625,000	4,517,535	4.66	4.25	4.66	875,000	4,079,924	8,597,459
48	2005 4	6.10	625,000	3,814,887	4.63	4.28	4.63	875,000	4,055,165	7,870,052
49	2006 1	8.23	625,000	5,145,273	4.61	4.32	4.61	875,000	4,030,557	9,175,830
50	2006 2	8.19	625,000	5,120,679	4.58	4.36	4.58	875,000	4,006,098	9,126,776
51	2006 3	7.38	625,000	4,615,612	4.55	4.39	4.55	875,000	3,981,787	8,597,399
52	2006 4	6.24	625,000	3,897,709	4.52	4.43	4.52	875,000	3,957,624	7,855,333
53	2007 1	8.41	625,000	5,256,978	4.50	4.46	4.50	875,000	3,933,608	9,190,586
54	2007 2	8.37	625,000	5,231,850	4.47	4.50	4.50	875,000	3,937,500	9,169,350

		SALT RIVER TRAFFIC			ARIZONA TRAFFIC					
Period	Quarter	Santa Fe Rate	Tons	Revenues	Santa Fe Rate	180% R/VC Rate Floor	Santa Fe Rate Limited By R/VC Floor	Tons	Revenues	COMBINED AGRR REVENUES
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	-11
55	2007 3	7.55	625,000	4,715,818	4.44	4.54	4.54	875,000	3,969,000	8,684,818
56	2007 4	6.37	625,000	3,982,329	4.41	4.57	4.57	875,000	4,000,500	7,982,829
57	2008 1	8.59	625,000	5,371,109	4.39	4.61	4.61	875,000	4,032,000	9,403,109
58	2008 2	8.55	625,000	5,345,435	4.36	4.64	4.64	875,000	4,063,500	9,408,935
59	2008 3	7.71	625,000	4,818,200	4.33	4.68	4.68	875,000	4,095,000	8,913,200
60	2008 4	6.51	625,000	4,068,787	4.31	4.72	4.72	875,000	4,126,500	8,195,287
61	2009 1	8.78	625,000	5,487,717	4.28	4.75	4.75	875,000	4,158,000	9,645,717
62	2009 2	8.74	625,000	5,461,486	4.26	4.79	4.79	875,000	4,189,500	9,650,986
63	2009 3	7.88	625,000	4,922,804	4.23	4.84	4.84	875,000	4,236,750	9,159,554
64	2009 4	6.65	625,000	4,157,121	4.20	4.88	4.88	875,000	4,268,250	8,425,371
65	2010 1	8.97	625,000	5,606,857	4.18	4.91	4.91	875,000	4,299,750	9,906,607
66	2010 2	8.93	625,000	5,580,056	4.15	4.95	4.95	875,000	4,331,250	9,911,306
67	2010 3	8.05	625,000	5,029,680	4.13	5.00	5.00	875,000	4,378,500	9,408,180
68	2010 4	6.80	625,000	4,247,373	4.10	5.04	5.04	875,000	4,410,000	8,657,373
69	2011 1	9.17	625,000	5,728,583	4.08	5.08	5.08	875,000	4,441,500	10,170,083
70	2011 2	9.12	625,000	5,701,200	4.05	5.13	5.13	875,000	4,488,750	10,189,950
71	2011 3	8.22	625,000	5,138,876	4.03	5.17	5.17	875,000	4,520,250	9,659,126
72	2011 4	6.94	625,000	4,339,585	4.00	5.22	5.22	875,000	4,567,500	8,907,085
73	2012 1	9.36	625,000	5,852,952	3.98	5.26	5.26	875,000	4,599,000	10,451,952
74	2012 2	9.32	625,000	5,824,975	3.96	5.31	5.31	875,000	4,646,250	10,471,225
75	2012 3	8.40	625,000	5,250,442	3.93	5.35	5.35	875,000	4,677,750	9,928,192
76	2012 4	7.09	625,000	4,433,799	3.91	5.40	5.40	875,000	4,725,000	9,158,799
77	2013 1	9.57	625,000	5,980,021	3.88	5.44	5.44	875,000	4,756,500	10,736,521
78	2013 2	9.52	625,000	5,951,437	3.86	5.49	5.49	875,000	4,803,750	10,755,187
79	2013 3	8.58	625,000	5,364,430	3.84	5.54	5.54	875,000	4,851,000	10,215,430
80	2013 4	7.25	625,000	4,530,057	3.81	5.58	5.58	875,000	4,882,500	9,412,557

We next compare the quarterly revenues available to the AGRR, derived from Table E-1, to its quarterly revenue requirements.[164] The resulting DCF model is summarized in Table E-2 and its various components are then discussed.

[164] Operating expenses must be recovered in the period in which they would be incurred. Recovery of capital costs is distributed over the 20-year SAC analysis period.

Table E-2
QUARTERLY AGRR CASH FLOW

Period	Quarter	Capital Recovery Costs	Operating Expenses	Stand-Alone Costs	Revenues	Overpayments Or (Shortfalls)	Present Value Overpayments Or (Shortfalls)	Cumulative Present Value Overpayments Or (Shortfalls)
		(current $)	(current $)	(current $)	(current $)	(current $)	(1994 $)	(1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1994 1	$3,928,121	$1,024,604	$4,952,725	$9,416,611	$4,463,886	$4,400,965	$4,400,965
2	1994 2	3,768,778	1,019,625	4,788,403	8,957,656	4,169,253	3,995,422	8,396,388
3	1994 3	4,395,082	1,041,531	5,436,613	9,943,969	4,507,356	4,198,516	12,594,904
4	1994 4	3,979,690	1,040,536	5,020,225	8,346,934	3,326,708	3,012,024	15,606,928
5	1995 1	3,282,156	1,053,480	4,335,636	7,885,795	3,550,159	3,125,398	18,732,325
6	1995 2	2,850,930	1,065,429	3,916,358	6,854,401	2,938,043	2,515,785	21,248,111
7	1995 3	4,082,561	1,075,386	5,157,947	9,204,713	4,046,767	3,370,402	24,618,513
8	1995 4	3,055,498	1,074,390	4,129,888	6,233,365	2,103,477	1,703,999	26,322,512
9	1996 1	4,062,398	1,061,446	5,123,844	9,272,357	4,148,513	3,268,572	29,591,083
10	1996 2	4,113,112	1,058,459	5,171,571	9,133,063	3,961,492	3,035,528	32,626,612
11	1996 3	4,164,530	1,069,412	5,233,942	8,725,225	3,491,283	2,601,779	35,228,391
12	1996 4	4,216,663	1,087,335	5,303,997	8,193,238	2,889,241	2,094,011	37,322,402
13	1997 1	4,269,521	1,093,834	5,363,354	9,259,233	3,895,879	2,746,064	40,068,466
14	1997 2	4,323,116	1,100,371	5,423,487	9,208,509	3,785,022	2,594,678	42,663,144
15	1997 3	4,377,459	1,106,948	5,484,407	8,761,918	3,277,511	2,185,090	44,848,234
16	1997 4	4,432,561	1,113,564	5,546,125	8,140,009	2,593,884	1,681,843	46,530,077
17	1998 1	4,488,435	1,120,220	5,608,654	9,230,528	3,621,874	2,283,906	48,813,982
18	1998 2	4,545,092	1,126,915	5,672,007	9,180,096	3,508,090	2,151,421	50,965,404
19	1998 3	4,602,544	1,133,650	5,736,194	8,725,203	2,989,009	1,782,756	52,748,160
20	1998 4	4,660,803	1,140,426	5,801,229	8,091,181	2,289,952	1,328,315	54,076,475
21	1999 1	4,719,882	1,657,242	6,377,125	9,206,722	2,829,597	1,596,280	55,672,755
22	1999 2	4,779,794	1,664,099	6,443,893	9,156,556	2,712,662	1,488,299	57,161,054
23	1999 3	4,840,552	1,670,997	6,511,549	8,693,147	2,181,598	1,164,070	58,325,124
24	1999 4	4,902,168	1,677,936	6,580,104	8,046,715	1,466,611	761,078	59,086,202
25	2000 1	4,964,656	1,174,916	6,139,573	9,187,788	3,048,215	1,538,402	60,624,604
26	2000 2	5,028,030	1,181,939	6,209,969	9,137,860	2,927,892	1,437,107	62,061,710
27	2000 3	5,092,303	1,189,003	6,281,306	8,665,718	2,384,412	1,138,218	63,199,928
28	2000 4	5,157,489	1,196,109	6,353,599	8,006,576	1,652,977	767,398	63,967,326
29	2001 1	5,223,603	1,203,258	6,426,862	9,173,702	2,746,840	1,240,216	65,207,542
30	2001 2	5,290,659	1,210,450	6,501,109	9,123,987	2,622,877	1,151,733	66,359,274
31	2001 3	5,358,672	1,217,685	6,576,357	8,642,890	2,066,534	882,523	67,241,798
32	2001 4	5,427,657	1,224,963	6,652,619	7,970,796	1,318,177	547,479	67,789,276
33	2002 1	5,497,628	1,232,284	6,729,912	9,164,533	2,434,621	983,410	68,772,687
34	2002 2	5,568,602	1,239,649	6,808,251	9,115,002	2,306,751	906,179	69,678,866
35	2002 3	5,640,594	1,247,058	6,887,653	8,624,718	1,737,066	663,651	70,342,517
36	2002 4	5,713,621	1,254,512	6,968,132	7,939,282	971,149	360,844	70,703,360
37	2003 1	5,787,697	1,262,010	7,049,707	9,160,176	2,110,469	762,644	71,466,005

Period	Quarter	Capital Recovery Costs (current $)	Operating Expenses (current $)	Stand-Alone Costs (current $)	Revenues (current $)	Overpayments Or (Shortfalls) (current $)	Present Value Overpayments Or (Shortfalls) (1994 $)	Cumulative Present Value Overpayments Or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
38	2003 2	5,862,841	1,269,553	7,132,394	9,110,804	1,978,410	695,295	72,161,300
39	2003 3	5,939,069	1,277,141	7,216,209	8,611,102	1,394,893	476,764	72,638,064
40	2003 4	6,016,397	1,284,774	7,301,171	7,912,003	610,832	203,046	72,841,111
41	2004 1	6,094,844	1,292,453	7,387,297	9,160,615	1,773,318	573,283	73,414,394
42	2004 2	6,174,427	1,300,177	7,474,605	9,111,375	1,636,771	514,613	73,929,007
43	2004 3	6,255,164	1,307,948	7,563,113	8,602,021	1,038,909	317,673	74,246,680
44	2004 4	6,337,073	1,315,766	7,652,839	7,888,935	236,095	70,210	74,316,890
45	2005 1	6,420,174	1,955,630	8,375,803	9,165,837	790,033	228,490	74,545,380
46	2005 2	6,504,483	1,963,541	8,468,024	9,116,703	648,679	182,458	74,727,838
47	2005 3	6,590,022	1,971,499	8,561,522	8,597,459	35,937	9,831	74,737,668
48	2005 4	6,676,810	1,979,505	8,656,315	7,870,052	(786,263)	(209,180)	74,528,488
49	2006 1	6,764,866	1,355,559	8,120,425	9,175,830	1,055,405	273,074	74,801,563
50	2006 2	6,854,211	1,363,661	8,217,872	9,126,776	908,904	228,713	75,030,275
51	2006 3	6,944,865	1,371,811	8,316,676	8,597,399	280,723	68,700	75,098,976
52	2006 4	7,036,849	1,380,011	8,416,860	7,855,333	(561,527)	(133,648)	74,965,328
53	2007 1	7,130,185	1,388,259	8,518,444	9,190,586	672,142	155,583	75,120,911
54	2007 2	7,224,894	1,396,556	8,621,450	9,169,350	547,900	123,343	75,244,254
55	2007 3	7,320,998	1,404,903	8,725,901	8,684,818	(41,082)	(8,995)	75,235,259
56	2007 4	7,418,519	1,413,300	8,831,819	7,982,829	(848,990)	(180,773)	75,054,486
57	2008 1	7,517,481	1,421,747	8,939,228	9,403,109	463,881	96,061	75,150,547
58	2008 2	7,617,906	1,430,244	9,048,151	9,408,935	360,784	72,661	75,223,208
59	2008 3	7,719,818	1,438,793	9,158,611	8,913,200	(245,411)	(48,068)	75,175,140
60	2008 4	7,823,241	1,447,392	9,270,634	8,195,287	(1,075,347)	(204,842)	74,970,298
61	2009 1	7,928,200	1,456,043	9,384,243	9,645,717	261,474	48,441	75,018,738
62	2009 2	8,034,718	1,464,746	9,499,463	9,650,986	151,522	27,300	75,046,038
63	2009 3	8,142,821	1,473,500	9,616,321	9,159,554	(456,767)	(80,038)	74,966,001
64	2009 4	8,252,536	1,482,307	9,734,843	8,425,371	(1,309,472)	(223,155)	74,742,845
65	2010 1	8,363,887	1,491,166	9,855,053	9,906,607	51,553	8,544	74,751,390
66	2010 2	8,476,902	1,500,079	9,976,981	9,911,306	(65,675)	(10,586)	74,740,804
67	2010 3	8,591,607	1,509,045	10,100,651	9,408,180	(692,471)	(108,553)	74,632,251
68	2010 4	8,708,029	1,518,064	10,226,093	8,657,373	(1,568,720)	(239,164)	74,393,087
69	2011 1	8,826,198	1,527,137	10,353,335	10,170,083	(183,252)	(27,171)	74,365,916
70	2011 2	8,946,141	1,536,265	10,482,405	10,189,950	(292,455)	(42,172)	74,323,743
71	2011 3	9,067,886	1,545,447	10,613,333	9,659,126	(954,207)	(133,821)	74,189,923
72	2011 4	9,191,464	1,554,683	10,746,147	8,907,085	(1,839,062)	(250,834)	73,939,088
73	2012 1	9,316,904	1,563,976	10,880,879	10,451,952	(428,927)	(56,896)	73,882,192
74	2012 2	9,444,236	1,573,323	11,017,560	10,471,225	(546,335)	(70,480)	73,811,712
75	2012 3	9,573,492	1,582,727	11,156,219	9,928,192	(1,228,027)	(154,073)	73,657,638
76	2012 4	9,704,703	1,592,186	11,296,890	9,158,799	(2,138,091)	(260,889)	73,396,749
77	2013 1	9,837,901	1,601,703	11,439,603	10,736,521	(703,082)	(83,435)	73,313,315

Period	Quarter	Capital Recovery Costs (current $)	Operating Expenses (current $)	Stand-Alone Costs (current $)	Revenues (current $)	Overpayments Or (Shortfalls) (current $)	Present Value Overpayments Or (Shortfalls) (1994 $)	Cumulative Present Value Overpayments Or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
78	2013 2	9,973,118	1,611,276	11,584,394	10,755,187	(829,207)	(95,700)	73,217,615
79	2013 3	10,110,387	1,620,906	11,731,293	10,215,430	(1,515,863)	(170,145)	73,047,470
80	2013 4	10,249,743	1,630,594	11,880,337	9,412,557	(2,467,780)	(269,386)	72,778,083

1. Time Frame for Analysis

As discussed in the body of this decision, our DCF model uses a 20-year (80-quarter) analysis period. Columns 1 and 2 of Table E-2 reflect this time period.

2. Capital Recovery Cost

Column 3 of Table E-2 contains the AGRR's quarterly capital recovery cost. This is a complex computation, involving the various factors discussed below.

a. *Cost of Capital*

Because all construction would take place in 1993, the parties used the ICC-determined 1993 railroad industry cost of debt (6.9%) as the embedded cost of debt throughout the 20-year analysis period. The parties used the average railroad industry cost of equity for 1993 and 1994 (13.5%, based on the ICC's findings of 13.2% for 1993 and 13.8% for 1994) for the full analysis period. They used a capital structure ratio of 25.7% debt. We have modified the average cost of equity capital figure to include the additional year 1995,[165] which has the effect of slightly reducing the average equity cost for the AGRR (to 13.47%).

b. *Total Property Investment*

Our analysis and restatement of the AGRR's property investment appear in Appendix B.

c. *Interest During Construction*

Interest during construction (IDC) is the opportunity cost of the capital invested during the construction of the railroad. The parties agree on the method for calculating IDC. The difference between their figures is due to Santa Fe's use of a much higher initial investment base. Based on the investment that we have accepted, we compute the IDC figure to be $8.694 million, of which $1.346 million is debt-related.

[165] *See, 1995 Cost of Capital.*

d. *Debt Amounts and Schedule*

Interest payments made on the debt portion of the investment base are tax deductible. In order to determine the tax deduction for interest that would be paid to debtholders in each of the 20 years of the SAC analysis, a debt schedule was prepared. This schedule combines total investment plus IDC for the construction year. The total was multiplied by the percentage of debt financing. The result was then amortized over 20 years using a debt interest rate. The parties used the current cost of debt for 1993 as a fixed interest rate over the full 20-year period. We use the parties' method, applied to our restated investment base.

e. *Road Property Tax Depreciation*

The parties used the same depreciation ranges and service lives (based on a modified accelerated cost recovery system) for the various road property accounts. We have calculated tax depreciation using the parties' method and our restated investment base.

f. *Adjustment of Capital Recovery Cost for Inflation*

The DCF calculation is designed to determine the total revenue requirement that, over the 20-year SAC analysis period, would be sufficient to attract the needed investment in road property at a given cost of capital. To do this, the model allows for adjusting the revenue requirement to reflect the effect of inflation that can be expected over the life of the SARR. Consistent with the parties' approach, we allow for inflation by indexing the capital requirement for road property of the AGRR and applying the cost of capital to the indexed capital requirement.

While Santa Fe and Arizona agree on the need for indexation, they indexed differently and presented their results in different formats, as discussed below.

(1) *Treatment of Operating Expenses*

Santa Fe departed from the traditional model used in prior SAC cases by including annual operating expenses in the capital recovery cost portion of its model. Arizona maintains that operating expenses are not an investment that requires a return element, and we agree. We show operating expenses as a separate component of the DCF analysis, in column 4 of Table E-2, because separate treatment of operating expenses and capital costs makes the model easier to understand.[166]

(2) *Adjusting for Inflation*

Santa Fe also departed from prior cases in its procedure for adjusting the AGRR's capital recovery cost for inflation over the 20-year analysis period. Santa Fe applied the RCAF adjusted by the ICC's quarterly productivity adjustment (held constant at 1.44% per quarter[167]). Santa Fe argues that prices for transportation are declining and that this fact should be reflected in the capital

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[166] Arizona argues that any inclusion of operating expenses in the DCF computation allows for a return on those operating expenses at the current cost of capital rate, but that is not true.

[167] This figure was based on the latest productivity adjustment available at the time its pleadings were filed.

carrying charge calculation. The purpose of asset indexation, however, is to adjust capital recovery cost to reflect expected inflation in asset prices. The RCAF is an inappropriate index because it is not limited to asset prices but includes other expenses as well.

Arizona applied a weighted average inflation in asset prices, as in *Nevada Power I*, 6 I.C.C.2d at 72, and *West Texas*, 1 S.T.B. at 714-15. Arizona developed its quarterly inflation index for road property assets, except land,[168] by weighting each asset component (*e.g.*, bridges, trestles, ties, labor) by the appropriate Railroad Cost Recovery Indexes (RCRI) developed by the AAR. (Arizona held the forecast tonnage levels constant at 1.5 million tons per quarter.) We accept the weighted indexes developed by AAR.[169]

In applying the asset inflation index, Arizona calculated the change in the inflation index for each quarter beginning in 1994; this quarterly change (latest quarter's index divided by prior quarter's index) was then multiplied by the prior quarter's factor. In contrast, Santa Fe measured the change in the inflation index from the most recent quarter to the fourth quarter of 1993, and multiplied this change by the prior quarter's factor. We favor Arizona's method, because it results in each quarter's change being based entirely on the incremental change between the latest and immediately prior quarter.[170]

We have made certain adjustments to Arizona's computation, however. Because 1995 inflation indexes are now available, we computed the actual changes for that year as well, using Arizona's method. Also, Arizona erroneously used the quarterly changes for "material prices and wage rates combined (excluding fuel)" in lieu of "material prices, wage rates and supplements combined (excluding fuel)" for road property accounts 3, 6, 13, 27, and 39.[171] Our restatement of the DCF model reflects the correct index and uses this procedure from 1996 forward.

g. *Calculation of the Present Value of Replacement Costs for the AGRR*

Both parties allowed for asset replacement at the end of an asset's service life. To calculate this replacement cost, they inflated the value of each asset to its replacement cost at the end of its service life and discounted that future replacement value to a value as of January 1, 1994, using the AGRR's cost of capital. By including this replacement cost in the capital recovery calculation, the AGRR would have sufficient money to replace these assets.

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[168] Arizona Witness Christensen used a 2.71% index for land, which Santa Fe has not challenged.

[169] Both parties calculated the AAR's Western District RCRI from 1990 through 1994 (although Santa Fe did not use these numbers in its DCF calculation). Because inflation factors for the full year 1995 became available after the parties' submissions, our restatement reflects these more recent indexes.

[170] It should be noted that the two methods do not produce radically different results. Most of the difference between the parties' figures is due to the difference in the starting investment bases used by the parties.

[171] This appears to be an inadvertent error caused by accidently using the wrong line from the AAR's railroad cost index publication.

Arizona excluded replacements costs for grading, arguing that grading would not need to be replaced. Santa Fe contends that grading has a finite service life and must be replaced like any other asset.[172] We agree and have included a replacement cost for grading in our computations.[173]

We have computed the present value of the replacement cost to be $10.249 million, based on the investment base discussed above.[174]

h. *Income Tax Liability*

Both parties calculated Federal income taxes in the same manner, and used the same procedure to compute Arizona and New Mexico state income taxes. We use their procedure to compute the AGRR's tax liability.

4. Operating Expense

Column 4 of Table E-2 shows the quarterly operating expenses. As explained in Appendix C, these operating expenses were first developed on an annualized basis (*see* Table B-1) and then divided by four to obtain a quarterly figure of $1,041,531 (expressed in 3rd Quarter 1994 dollars). Both parties used the RCAF-U to index expenses (forward and backward) for each quarter. The RCAF-U for 1995 and 1996 became available after the parties' submissions, and we apply those figures as well.

5. Quarterly SAC Requirement

Column 5 of Table E-2 combines the quarterly capital requirements (Column 3) and the quarterly operating expenses (Column 4) to express the total quarterly stand-alone costs of the AGRR.

6. Actual and Forecasted Revenues

Column 6 of Table E-2 contains our restated quarterly revenue figures for the AGRR traffic group, from column 11 of Table E-1.

7. Discounted Value of Required Revenues and Actual and Projected Revenues

Column 7 of Table E-2 compares the required flow of funds that would be needed by the AGRR (column 5) to the revenues available to the AGRR based on Santa Fe's rate structure (column 6), producing either an overpayment or shortfall in revenues on a quarterly basis, in current dollar terms. Column 8 expresses those overpayments and shortfalls on a constant basis, in 1994 dollars.

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[172] Santa Fe points out that grading has a finite life for tax depreciation purposes.

[173] *Accord, West Texas*, 1 S.T.B. at 714.

[174] Arizona and Santa Fe computed the replacement cost to be $16.7 million and $25.7 million, respectively, based on their proposed investment bases. Our lower replacement cost reflects the lower inflation in asset prices shown in the updated asset inflation indexes.

8. Cumulative Comparison of Revenues and Costs of the AGRR

Column 9 of Table E-2 shows the cumulative present value of the quarterly revenue overpayments and shortfalls from Column 8. It yields a total cumulative present value of overpayments over the 20-year period, based on the evidence in this proceeding, of $72,778,083. This indicates that the rates charged by Santa Fe on the Arizona traffic are higher than the levels that ought to be charged for efficient rail service.

APPENDIX F

CALCULATION OF MAXIMUM RATES FOR ARIZONA TRAFFIC

Table F-1 contains our initial calculation of the necessary AGRR rates using the percentage rate reduction method discussed in the body of this decision. It produces some overpayments in quarters which cannot be further reduced because of our use of the 180% R/VC rate. To address this, we must redistribute the portion of the overpayments that cannot be avoided in that quarter because of the rate floor (column 7) to other quarters where the rate level is not constrained by the rate floor.[175] This calculation is summarized in Table F-1.

[175] All redistributions are made only to quarters which do not have shortfalls, because rates should not be reduced in time periods where revenues are inadequate to cover the quarterly stand-alone costs. *See, Coal Trading*, 6 I.C.C.2d at 436.

The redistribution of the portion of overpayments attributable to the 180% R/VC rate floor is made on the basis of constant 1994 dollars, with each dollar of overpayment receiving the same weight. This distributes the residual overpayment to those periods which have the largest overpayments, in constant 1994 dollars. This procedure serves to reduce rates by a greater degree in those time periods where revenues exceed the quarterly stand-alone cost by larger margins.

Table F-1
INITIAL CALCULATION OF
QUARTERLY PERCENTAGE-REDUCED RATE

Period (1)	Quarter (2)	Revenues (current $) (3)	Present Value Overpayments Or (Shortfalls) (1994 $) (4)	Excess Revenues After Distributing Shortfalls (1994 $) (5)	Overpayments From Rates Above 180% R/VC Floor (1994 $) (6)	Additional Overpayments From Rates Held At R/VC Floor (1994 $) (7)	Result Of Allocation of Additional Overpayments To Rates Above R/VC Floor (1994 $) (8)	Required Reduction In Revenues (current $) (9)	Percentage Rate Reduction (10)	Salt River Santa Fe Rate (current $) (11)	Salt River Initial Reduced Rate (current $) (12)	Arizona Santa Fe Rate Limited By R/VC Floor (current $) (13)	Arizona Initial Reduced Rate (current $) (14)	Arizona Greater of Reduced Rate or R/VC Floor (current $) (15)
1	1994 1	$9,416,611	$4,400,965	4,223,279	4,223,279	0	4,244,341	4,305,023	45.72%	$6.40	3.47	$6.31	3.43	$3.43
2	1994 2	8,957,656	3,995,422	3,834,109	3,834,109	0	3,853,231	4,020,875	44.89%	6.40	3.53	6.20	3.42	$3.42
3	1994 3	9,943,969	4,198,316	4,029,003	4,029,003	0	4,049,097	4,346,945	43.71%	5.76	3.24	6.25	3.52	$3.52
4	1994 4	8,346,934	3,012,024	2,890,415	2,890,415	0	2,904,830	3,208,315	38.44%	4.84	2.98	6.17	3.80	$3.80
5	1995 1	7,885,795	3,125,398	2,999,211	2,999,211	0	3,014,169	3,423,813	43.42%	6.56	3.71	6.17	3.49	$3.49
6	1995 2	6,854,401	2,515,783	2,414,212	2,414,212	0	2,426,252	2,833,481	41.34%	6.56	3.85	6.16	3.61	$3.61
7	1995 3	9,204,713	3,370,402	3,234,324	3,234,324	0	3,250,454	3,902,747	42.40%	5.93	3.42	6.13	3.53	$3.53
8	1995 4	6,233,365	1,703,999	1,635,201	1,635,201	0	1,643,356	2,028,617	32.54%	4.98	3.36	6.04	4.07	$4.07
9	1996 1	9,272,357	3,268,572	3,136,605	3,136,605	0	3,152,247	4,000,873	43.15%	6.60	3.75	5.88	3.34	$3.34
10	1996 2	9,133,063	3,035,528	2,912,970	2,912,970	0	2,927,498	3,820,538	41.83%	6.52	3.79	5.78	3.36	$3.36
11	1996 3	8,735,225	2,601,779	2,496,734	2,496,734	0	2,509,185	3,367,033	38.59%	5.90	3.62	5.76	3.54	$3.54
12	1996 4	8,193,238	2,094,011	2,009,467	2,009,467	0	2,019,488	2,786,416	34.01%	5.03	3.32	5.77	3.81	$3.81
13	1997 1	9,259,233	2,746,064	2,635,193	2,635,193	0	2,648,335	3,757,229	40.58%	6.79	4.03	5.73	3.41	$3.41
14	1997 2	9,208,509	2,594,678	2,489,919	2,489,919	0	2,502,337	3,650,318	39.64%	6.75	4.08	5.70	3.44	$3.44
15	1997 3	8,761,918	2,185,090	2,096,868	2,096,868	0	2,107,325	3,160,863	36.08%	6.09	3.89	5.67	3.62	$3.62
16	1997 4	8,140,009	1,681,843	1,613,940	1,613,940	0	1,621,989	2,501,571	30.73%	5.14	3.56	5.63	3.90	$3.90
17	1998 1	9,230,538	2,283,906	2,191,694	2,191,694	0	2,202,624	3,492,976	37.84%	6.93	4.31	5.60	3.48	$3.48
18	1998 2	9,180,096	2,151,421	2,064,559	2,064,559	0	2,074,855	3,383,242	36.85%	6.90	4.36	5.56	3.51	$3.51
19	1998 3	8,735,203	1,782,756	1,710,778	1,710,778	0	1,719,310	2,882,634	33.04%	6.22	4.16	5.53	3.70	$3.70
20	1998 4	8,091,181	1,328,315	1,274,685	1,274,685	0	1,281,042	2,208,456	27.29%	5.25	3.82	5.50	4.00	$4.00
21	1999 1	9,206,722	1,596,280	1,531,831	1,531,831	0	1,539,471	2,728,896	29.64%	7.08	4.98	5.46	3.84	$3.84
22	1999 2	9,136,556	1,488,259	1,428,210	1,428,210	0	1,435,332	2,616,122	28.57%	7.05	5.04	5.43	3.88	$3.88
23	1999 3	8,693,147	1,164,070	1,117,071	1,117,071	0	1,122,642	2,103,958	24.20%	6.35	4.82	5.40	4.09	$4.09
24	1999 4	8,046,715	761,078	730,350	730,350	0	733,992	1,414,416	17.58%	5.37	4.42	5.36	4.42	$4.42
25	2000 1	9,187,788	1,538,402	1,476,290	1,476,290	0	1,483,652	2,939,733	32.00%	7.24	4.92	5.33	3.63	$3.63
26	2000 2	9,137,860	1,437,107	1,379,084	1,379,084	0	1,385,962	2,823,692	30.90%	7.20	4.98	5.30	3.66	$3.66
27	2000 3	8,665,718	1,138,218	1,092,263	1,092,263	0	1,097,710	2,299,554	26.54%	6.49	4.77	5.27	3.87	$3.87
28	2000 4	8,006,576	767,398	736,415	736,415	0	740,087	1,594,150	19.91%	5.48	4.39	5.23	4.19	$4.19
29	2001 1	9,173,702	1,240,216	1,190,143	1,190,143	0	1,196,078	2,649,084	28.88%	7.39	5.26	5.20	3.70	$3.71
30	2001 2	9,123,987	1,151,733	1,105,232	1,105,232	0	1,110,744	2,529,332	27.72%	7.36	5.32	5.17	3.74	$3.74
31	2001 3	8,642,890	882,523	846,892	846,892	0	851,115	1,992,988	23.06%	6.63	5.10	5.14	3.95	$3.95
32	2001 4	7,970,796	547,479	525,375	525,375	0	527,995	1,271,265	15.95%	5.60	4.71	5.11	4.29	$4.29
33	2002 1	9,164,533	983,410	943,706	943,706	0	948,412	2,347,976	25.62%	7.55	5.62	5.08	3.78	$3.82
34	2002 2	9,115,002	906,179	869,593	869,593	0	873,930	2,224,657	24.41%	7.52	5.68	5.05	3.81	$3.85
35	2002 3	8,624,718	663,651	636,856	636,856	0	640,032	1,675,246	19.42%	6.78	5.46	5.02	4.04	$4.04
36	2002 4	7,939,282	360,844	346,275	346,275	0	348,002	936,387	11.80%	5.72	5.05	4.99	4.40	$4.40
37	2003 1	9,160,176	762,644	731,853	731,853	0	735,503	2,035,360	22.22%	7.72	6.00	4.96	3.85	$3.94
38	2003 2	9,110,804	695,295	667,223	667,223	0	670,551	1,908,001	20.94%	7.68	6.07	4.93	3.89	$3.96
39	2003 3	8,611,102	476,764	457,515	457,515	0	459,797	1,345,250	15.62%	6.92	5.84	4.90	4.13	$4.13
40	2003 4	7,912,003	203,046	194,848	194,848	0	195,820	589,093	7.45%	5.85	5.41	4.87	4.50	$4.50

												Salt River		Arizona		
Period (1)	Quarter (2)	Revenues (current $) (3)	Present Value Overpayments Or (Shortfalls) (1994 $) (4)	Excess Revenues After Distributing Shortfalls (1994 $) (5)	Overpayments From Rates Above 180% R/VC Floor (1994 $) (6)	Additional Overpayments From Rates Held At R/VC Floor (1994 $) (7)	Result Of Allocation of Additional Overpayments To Rates Above R/VC Floor (1994 $) (8)	Required Reduction In Revenues (current $) (9)	Percentage Rate Reduction (10)	Santa Fe Rate (current $) (11)	Initial Reduced Rate (current $) (12)	Santa Fe Rate Limited By R/VC Floor (current $) (13)	Initial Reduced Rate (current $) (14)	Greater of Reduced Rate or R/VC Floor (current $) (15)
41	2004 1	9,160,615	573,383	550,137	550,137	0	552,881	1,710,208	18.67%	7.89	6.41	4.84	3.93	$4.05
42	2004 2	9,111,375	514,613	493,835	493,835	0	496,398	1,578,520	17.32%	7.85	6.49	4.81	3.97	$4.09
43	2004 3	8,602,021	317,673	304,847	304,847	0	306,367	1,001,935	11.65%	7.07	6.25	4.78	4.22	$4.22
44	2004 4	7,888,935	70,210	67,375	67,375	0	67,711	227,693	2.89%	5.97	5.80	4.75	4.61	$4.61
45	2005 1	9,165,837	228,490	219,265	219,265	0	220,359	761,917	8.31%	8.06	7.39	4.72	4.33	$4.33
46	2005 2	9,116,703	182,458	175,091	175,091	0	175,964	625,593	6.86%	8.02	7.47	4.69	4.37	$4.37
47	2005 3	8,597,459	9,831	9,434	9,434	0	9,481	34,658	0.40%	7.23	7.20	4.66	4.64	$4.64
48	2005 4	7,870,052	(209,180)	0	0	0	0	0	0.00%	6.10	6.10	4.63	4.63	$4.63
49	2006 1	9,175,830	273,074	262,049	262,049	0	263,356	1,017,844	11.09%	8.23	7.32	4.61	4.10	$4.32
50	2006 2	9,126,776	228,713	219,478	219,478	0	220,573	876,558	9.60%	8.19	7.41	4.58	4.14	$4.36
51	2006 3	8,597,399	68,700	65,927	65,927	0	66,256	270,732	3.15%	7.38	7.15	4.55	4.41	$4.41
52	2006 4	7,855,333	(133,648)	0	0	0	0	0	0.00%	6.24	6.24	4.52	4.52	$4.52
53	2007 1	9,190,586	155,583	149,302	149,302	0	150,046	648,222	7.05%	8.41	7.82	4.50	4.18	$4.46
54	2007 2	9,169,350	123,343	118,363	0	118,363	0	0	0.00%	8.37	8.37	4.50	4.50	$4.50
55	2007 3	8,684,818	(8,995)	0	0	0	0	0	0.00%	7.55	7.55	4.54	4.54	$4.54
56	2007 4	7,982,829	(180,773)	0	0	0	0	0	0.00%	6.37	6.37	4.57	4.57	$4.57
57	2008 1	9,403,109	96,061	92,183	0	92,183	0	0	0.00%	8.59	8.59	4.61	4.61	$4.61
58	2008 2	9,408,935	72,661	69,727	0	69,727	0	0	0.00%	8.55	8.55	4.64	4.64	$4.64
59	2008 3	8,913,200	(48,068)	0	0	0	0	0	0.00%	7.71	7.71	4.68	4.68	$4.68
60	2008 4	8,195,287	(204,842)	0	0	0	0	0	0.00%	6.51	6.51	4.72	4.72	$4.72
61	2009 1	9,645,717	48,441	46,485	0	46,485	0	0	0.00%	8.78	8.78	4.75	4.75	$4.75
62	2009 2	9,650,986	27,300	26,198	0	26,198	0	0	0.00%	8.74	8.74	4.79	4.79	$4.79
63	2009 3	9,159,554	(80,038)	0	0	0	0	0	0.00%	7.88	7.88	4.84	4.84	$4.84
64	2009 4	8,425,371	(223,155)	0	0	0	0	0	0.00%	6.65	6.65	4.88	4.88	$4.88
65	2010 1	9,906,607	8,344	8,199	0	8,199	0	0	0.00%	8.97	8.97	4.91	4.91	$4.91
66	2010 2	9,911,306	(10,386)	0	0	0	0	0	0.00%	8.93	8.93	4.95	4.95	$4.95
67	2010 3	9,408,180	(108,533)	0	0	0	0	0	0.00%	8.05	8.05	5.00	5.00	$5.00
68	2010 4	8,657,373	(239,164)	0	0	0	0	0	0.00%	6.80	6.80	5.04	5.04	$5.04
69	2011 1	10,170,083	(27,171)	0	0	0	0	0	0.00%	9.17	9.17	5.08	5.08	$5.08
70	2011 2	10,189,950	(42,172)	0	0	0	0	0	0.00%	9.12	9.12	5.13	5.13	$5.13
71	2011 3	9,659,126	(133,821)	0	0	0	0	0	0.00%	8.22	8.22	5.17	5.17	$5.17
72	2011 4	8,907,085	(250,834)	0	0	0	0	0	0.00%	6.94	6.94	5.22	5.22	$5.22
73	2012 1	10,451,952	(56,896)	0	0	0	0	0	0.00%	9.36	9.36	5.26	5.26	$5.26
74	2012 2	10,471,225	(70,480)	0	0	0	0	0	0.00%	9.32	9.32	5.31	5.31	$5.31
75	2012 3	9,928,192	(154,073)	0	0	0	0	0	0.00%	8.40	8.40	5.35	5.35	$5.35
76	2012 4	9,158,799	(260,889)	0	0	0	0	0	0.00%	7.09	7.09	5.40	5.40	$5.40
77	2013 1	10,736,521	(83,435)	0	0	0	0	0	0.00%	9.57	9.57	5.44	5.44	$5.44
78	2013 2	10,755,187	(95,700)	0	0	0	0	0	0.00%	9.52	9.52	5.49	5.49	$5.49
79	2013 3	10,315,430	(170,145)	0	0	0	0	0	0.00%	8.58	8.58	5.54	5.54	$5.54
80	2013 4	9,412,557	(269,386)	0	0	0	0	0	0.00%	7.25	7.25	5.58	5.58	$5.58

Application of the percentage rate reduction (Table F-1, column 10), as well as the redistribution of shortfalls made in Table F-1, causes some of the resulting Arizona rates (column 15) to again fall below the 180% R/VC rate floor. Therefore, an additional application of these procedures is required to redistribute the portion of the newly-derived overpayments that again cannot be avoided because of the rate floor. This second calculation is shown in Table F-2.

Table F-2
RECALCULATION OF QUARTERLY
PERCENTAGE-REDUCED RATE

		Salt River		Arizona													
Period	Quarter	Initial Reduced Rate (current $)	Tons	Greater Of Initial Reduced Rate Or R/VC Floor (current $)	Tons	Combined Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments Or (Shortfalls) (1994 $)	Over-payments From Rates Above R/VC Floor (1994 $)	Allocation of Over-payments from Rates Held At R/VC Floor (1994 $)	Required Additional Reduction In Revenues (current $)	Additional Percentage Rate Reduction	New Salt River Reduced Rate (current $)	NEW ARIZONA REDUCED RATE (current $)	New Stand-Alone Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	1994 1	$3.47	625,000	$3.43	858,417	$5,111,589	$4,952,725	$156,625	$156,625	$18,974	$19,246	0.38%	$3.46	$3.41	$5,092,343	$4,952,725	$137,650
2	1994 2	3.53	625,000	3.42	799,622	4,936,781	4,788,403	142,192	142,192	17,226	17,975	0.36%	3.51	3.40	4,918,806	4,788,403	124,966
3	1994 3	3.24	625,000	3.52	1,014,795	5,597,024	5,436,613	149,420	149,420	18,101	19,433	0.35%	3.23	3.51	5,577,591	5,436,613	131,318
4	1994 4	2.98	625,000	3.80	862,550	5,138,618	5,020,225	107,194	107,194	12,986	14,343	0.28%	2.97	3.79	5,124,276	5,020,225	94,208
5	1995 1	3.71	625,000	3.49	613,581	4,461,981	4,335,636	111,229	111,229	13,475	15,306	0.34%	3.70	3.48	4,446,675	4,335,636	97,754
6	1995 2	3.85	625,000	3.61	447,143	4,020,919	3,916,358	89,534	89,534	10,847	12,667	0.32%	3.84	3.60	4,008,252	3,916,358	78,687
7	1995 3	3.42	625,000	3.53	896,999	5,301,966	5,157,947	119,948	119,948	14,531	17,447	0.33%	3.40	3.52	5,284,519	5,157,947	105,417
8	1995 4	3.36	625,000	4.07	517,277	4,204,748	4,129,888	60,643	60,643	7,347	9,069	0.22%	3.35	4.06	4,195,679	4,129,888	53,297
9	1996 1	3.75	625,000	3.34	875,000	5,271,484	5,123,844	116,324	116,324	14,092	17,886	0.34%	3.74	3.33	5,253,598	5,123,844	102,232
10	1996 2	3.79	625,000	3.36	875,000	5,312,555	5,171,571	108,030	108,030	13,087	17,080	0.32%	3.78	3.35	5,295,476	5,171,571	94,943
11	1996 3	3.62	625,000	3.54	875,000	5,358,192	5,233,942	92,594	92,594	11,217	15,052	0.28%	3.61	3.53	5,343,140	5,233,942	81,377
12	1996 4	3.32	625,000	3.81	875,000	5,406,822	5,303,997	74,523	74,523	9,028	12,457	0.23%	3.31	3.80	5,394,365	5,303,997	65,495
13	1997 1	4.03	625,000	3.41	875,000	5,502,004	5,363,354	97,729	97,729	11,839	16,797	0.31%	4.02	3.40	5,485,207	5,363,354	85,889
14	1997 2	4.08	625,000	3.44	875,000	5,558,191	5,423,487	92,341	92,341	11,187	16,319	0.29%	4.06	3.43	5,541,872	5,423,487	81,155
15	1997 3	3.89	625,000	3.62	875,000	5,601,049	5,484,407	77,764	77,764	9,421	14,131	0.25%	3.88	3.61	5,586,918	5,484,407	68,344
16	1997 4	3.56	625,000	3.90	875,000	5,638,438	5,546,125	59,855	59,855	7,251	11,183	0.20%	3.55	3.89	5,627,255	5,546,125	52,604
17	1998 1	4.31	625,000	3.48	875,000	5,737,552	5,608,654	81,281	81,281	9,847	15,615	0.27%	4.30	3.47	5,721,937	5,608,654	71,434
18	1998 2	4.36	625,000	3.51	875,000	5,796,855	5,672,007	76,566	76,566	9,276	15,125	0.26%	4.35	3.50	5,781,730	5,672,007	67,291
19	1998 3	4.16	625,000	3.70	875,000	5,842,569	5,736,194	63,446	63,446	7,686	12,887	0.22%	4.16	3.69	5,829,682	5,736,194	55,760
20	1998 4	3.82	625,000	4.00	875,000	5,882,725	5,801,229	47,273	47,273	5,727	9,873	0.17%	3.81	3.99	5,872,853	5,801,229	41,546
21	1999 1	4.98	625,000	3.84	875,000	6,477,826	6,377,125	56,810	56,810	6,882	12,199	0.19%	4.97	3.84	6,465,627	6,377,125	49,927
22	1999 2	5.04	625,000	3.88	875,000	6,540,434	6,443,893	52,967	52,967	6,417	11,695	0.18%	5.03	3.87	6,528,738	6,443,893	46,550
23	1999 3	4.82	625,000	4.09	875,000	6,589,189	6,511,549	41,428	41,428	5,019	9,406	0.14%	4.81	4.08	6,579,783	6,511,549	36,409
24	1999 4	4.42	625,000	4.42	875,000	6,632,299	6,580,104	27,086	27,086	3,281	6,323	0.10%	4.42	4.42	6,625,976	6,580,104	23,804
25	2000 1	4.92	625,000	3.63	875,000	6,248,055	6,139,573	54,750	54,750	6,633	13,142	0.21%	4.91	3.62	6,234,913	6,139,573	48,117
26	2000 2	4.98	625,000	3.66	875,000	6,314,169	6,209,969	51,145	51,145	6,196	12,623	0.20%	4.97	3.65	6,301,545	6,209,969	44,949
27	2000 3	4.77	625,000	3.87	875,000	6,366,164	6,281,306	40,508	40,508	4,907	10,280	0.16%	4.76	3.86	6,355,884	6,281,306	35,600
28	2000 4	4.39	625,000	4.19	875,000	6,412,426	6,353,599	27,311	27,311	3,309	7,127	0.11%	4.39	4.19	6,405,300	6,353,599	24,002
29	2001 1	5.26	625,000	3.71	875,000	6,531,352	6,426,862	47,178	0	0	0	0.00%	5.26	3.71	6,531,352	6,426,862	47,178
30	2001 2	5.32	625,000	3.74	875,000	6,594,454	6,501,109	40,989	40,989	4,966	11,308	0.17%	5.31	3.73	6,583,146	6,501,109	36,023
31	2001 3	5.10	625,000	3.95	875,000	6,649,902	6,576,357	31,408	31,408	3,805	8,910	0.13%	5.10	3.95	6,640,992	6,576,357	27,603
32	2001 4	4.71	625,000	4.29	875,000	6,699,531	6,652,619	19,484	19,484	2,360	5,683	0.08%	4.70	4.29	6,693,848	6,652,619	17,124
33	2002 1	5.62	625,000	3.82	875,000	6,850,981	6,729,912	48,903	0	0	0	0.00%	5.62	3.82	6,850,981	6,729,912	48,903
34	2002 2	5.68	625,000	3.85	875,000	6,922,727	6,808,251	44,970	0	0	0	0.00%	5.68	3.85	6,922,727	6,808,251	44,970
35	2002 3	5.46	625,000	4.04	875,000	6,949,472	6,887,653	23,618	23,618	2,861	7,489	0.11%	5.45	4.04	6,941,983	6,887,653	20,757
36	2002 4	5.05	625,000	4.40	875,000	7,002,694	6,968,132	12,842	12,842	1,556	4,187	0.06%	5.04	4.39	6,998,507	6,968,132	11,286

		Salt River		Arizona																
Period	Quarter	Initial Reduced Rate (current $)	Tons	Greater Of Initial Reduced Rate Or R/VC Floor (current $)	Tons	Combined Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments Or (Shortfalls) (1994 $)	Over-payments From Rates Above R/VC Floor (1994 $)	Allocation of Over-payments from Rates Held At R/VC Floor (1994 $)	Required Additional Reduction in Revenues (current $)	Additional Percentage Rate Reduction	New Salt River Reduced Rate (current $)	NEW ARIZONA REDUCED RATE (current $)	New Stand-Alone Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
37	2003 1	6.00	625,000	3.94	875,000	7,201,528	7,049,707	54,862	0	0	0	0.00%	6.00	3.94	7,201,528	7,049,707	54,862
38	2003 2	6.07	625,000	3.96	875,000	7,260,675	7,132,394	45,084	0	0	0	0.00%	6.07	3.96	7,260,675	7,132,394	45,084
39	2003 3	5.84	625,000	4.13	875,000	7,265,852	7,216,209	16,967	16,967	2,056	6,014	0.08%	5.84	4.13	7,259,838	7,216,209	14,912
40	2003 4	5.41	625,000	4.50	875,000	7,322,910	7,301,171	7,226	7,226	875	2,634	0.04%	5.41	4.50	7,320,276	7,301,171	6,351
41	2004 1	6.41	625,000	4.05	875,000	7,552,494	7,387,297	53,405	0	0	0	0.00%	6.41	4.05	7,552,494	7,387,297	53,405
42	2004 2	6.49	625,000	4.09	875,000	7,630,781	7,474,605	49,103	0	0	0	0.00%	6.49	4.09	7,630,781	7,474,605	49,103
43	2004 3	6.25	625,000	4.22	875,000	7,600,086	7,583,113	11,306	11,306	1,370	4,479	0.06%	6.25	4.22	7,595,607	7,563,113	9,936
44	2004 4	5.80	625,000	4.61	875,000	7,661,242	7,652,839	2,499	2,499	303	1,018	0.01%	5.80	4.61	7,660,224	7,652,839	2,196
45	2005 1	7.39	625,000	4.33	875,000	8,403,920	8,375,803	8,132	8,132	985	3,406	0.04%	7.38	4.33	8,400,514	8,375,803	7,147
46	2005 2	7.47	625,000	4.37	875,000	8,491,110	8,468,024	6,493	6,493	787	2,797	0.03%	7.47	4.37	8,488,313	8,468,024	5,707
47	2005 3	7.20	625,000	4.64	875,000	8,562,801	8,561,522	350	350	42	155	0.00%	7.20	4.64	8,562,646	8,561,522	307
48	2005 4	6.10	625,000	4.63	875,000	7,870,052	8,656,315	(209,180)	0	0	0	0.00%	6.10	4.63	7,870,052	8,656,315	(209,180)
49	2006 1	7.32	625,000	4.32	875,000	8,354,525	8,120,425	60,571	0	0	0	0.00%	7.32	4.32	8,354,525	8,120,425	60,571
50	2006 2	7.41	625,000	4.36	875,000	8,440,376	8,217,872	55,990	0	0	0	0.00%	7.41	4.36	8,440,376	8,217,872	55,990
51	2006 3	7.15	625,000	4.41	875,000	8,326,667	8,316,676	2,445	2,445	296	1,210	0.01%	7.15	4.41	8,325,457	8,316,676	2,149
52	2006 4	6.24	625,000	4.52	875,000	7,855,333	8,416,860	(133,648)	0	0	0	0.00%	6.24	4.52	7,855,333	8,416,860	(133,648)
53	2007 1	7.82	625,000	4.46	875,000	8,792,198	8,518,444	63,367	0	0	0	0.00%	7.82	4.46	8,792,198	8,518,444	63,367
54	2007 2	8.37	625,000	4.50	875,000	9,169,350	8,621,450	123,343	0	0	0	0.00%	8.37	4.50	9,169,350	8,621,450	123,343
55	2007 3	7.55	625,000	4.54	875,000	8,684,818	8,725,901	(8,995)	0	0	0	0.00%	7.55	4.54	8,684,818	8,725,901	(8,995)
56	2007 4	6.37	625,000	4.57	875,000	7,982,829	8,831,819	(180,773)	0	0	0	0.00%	6.37	4.57	7,982,829	8,831,819	(180,773)
57	2008 1	8.59	625,000	4.61	875,000	9,403,109	8,939,228	96,061	0	0	0	0.00%	8.59	4.61	9,403,109	8,939,228	96,061
58	2008 2	8.55	625,000	4.64	875,000	9,408,935	9,048,151	72,661	0	0	0	0.00%	8.55	4.64	9,408,935	9,048,151	72,661
59	2008 3	7.71	625,000	4.68	875,000	8,913,200	9,158,611	(48,068)	0	0	0	0.00%	7.71	4.68	8,913,200	9,158,611	(48,068)
60	2008 4	6.51	625,000	4.72	875,000	8,195,287	9,270,634	(204,842)	0	0	0	0.00%	6.51	4.72	8,195,287	9,270,634	(204,842)
61	2009 1	8.78	625,000	4.75	875,000	9,384,243	9,384,243	48,441	0	0	0	0.00%	8.78	4.75	9,645,717	9,384,243	48,441
62	2009 2	8.74	625,000	4.79	875,000	9,650,986	9,499,463	27,300	0	0	0	0.00%	8.74	4.79	9,650,986	9,499,463	27,300
63	2009 3	7.88	625,000	4.84	875,000	9,159,554	9,616,321	(80,038)	0	0	0	0.00%	7.88	4.84	9,159,554	9,616,321	(80,038)
64	2009 4	6.65	625,000	4.88	875,000	8,425,371	9,734,843	(223,155)	0	0	0	0.00%	6.65	4.88	8,425,371	9,734,843	(223,155)
65	2010 1	8.97	625,000	4.91	875,000	9,906,607	9,853,053	8,544	0	0	0	0.00%	8.97	4.91	9,906,607	9,853,053	8,544
66	2010 2	8.93	625,000	4.95	875,000	9,911,306	9,976,981	(10,586)	0	0	0	0.00%	8.93	4.95	9,911,306	9,976,981	(10,586)
67	2010 3	8.05	625,000	5.00	875,000	9,408,180	10,100,651	(108,553)	0	0	0	0.00%	8.05	5.00	9,408,180	10,100,651	(108,553)
68	2010 4	6.80	625,000	5.04	875,000	8,657,373	10,226,093	(239,164)	0	0	0	0.00%	6.80	5.04	8,657,373	10,226,093	(239,164)
69	2011 1	9.17	625,000	5.08	875,000	10,170,083	10,353,335	(27,171)	0	0	0	0.00%	9.17	5.08	10,170,083	10,353,335	(27,171)
70	2011 2	9.12	625,000	5.13	875,000	10,189,950	10,482,405	(42,172)	0	0	0	0.00%	9.12	5.13	10,189,950	10,482,405	(42,172)
71	2011 3	8.22	625,000	5.17	875,000	9,659,126	10,613,333	(133,821)	0	0	0	0.00%	8.22	5.17	9,659,126	10,613,333	(133,821)
72	2011 4	6.94	625,000	5.22	875,000	8,907,085	10,746,147	(250,834)	0	0	0	0.00%	6.94	5.22	8,907,085	10,746,147	(250,834)
73	2012 1	9.36	625,000	5.26	875,000	10,451,952	10,880,879	(56,896)	0	0	0	0.00%	9.36	5.26	10,451,952	10,880,879	(56,896)
74	2012 2	9.32	625,000	5.31	875,000	10,471,225	11,017,560	(70,480)	0	0	0	0.00%	9.32	5.31	10,471,225	11,017,560	(70,480)

		Salt River		Arizona													
Period	Quarter	Initial Reduced Rate (current $)	Tons	Greater Of Initial Reduced Rate Or R/VC Floor (current $)	Tons	Combined Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments Or (Shortfalls) (1994 $)	Over-payments From Rates Above R/VC Floor (1994 $)	Allocation of Over-payments from Rates Held At R/VC Floor (1994 $)	Required Additional Reduction In Revenues (current $)	Additional Percentage Rate Reduction	New Salt River Reduced Rate (current $)	NEW ARIZONA REDUCED RATE (current $)	New Stand-Alone Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
75	2012 3	8.40	625,000	5.35	875,000	9,928,192	11,156,219	(154,073)	0	0	0	0.00%	8.40	5.35	9,928,192	11,156,219	(154,073)
76	2012 4	7.09	625,000	5.40	875,000	9,158,799	11,296,890	(260,889)	0	0	0	0.00%	7.09	5.40	9,158,799	11,296,890	(260,889)
77	2013 1	9.57	625,000	5.44	875,000	10,736,521	11,439,603	(83,435)	0	0	0	0.00%	9.57	5.44	10,736,521	11,439,603	(83,435)
78	2013 2	9.52	625,000	5.49	875,000	10,755,187	11,584,394	(95,700)	0	0	0	0.00%	9.52	5.49	10,755,187	11,584,394	(95,700)
79	2013 3	8.58	625,000	5.54	875,000	10,215,430	11,731,293	(170,145)	0	0	0	0.00%	8.58	5.54	10,215,430	11,731,293	(170,145)
80	2013 4	7.25	625,000	5.58	875,000	9,412,557	11,880,337	(269,386)	0	0	0	0.00%	7.25	5.58	9,412,557	11,880,337	(269,386)

The reduced rates shown in columns 14 and 15 of Table F-2 are the rate levels that would be needed in order for the AGRR to just recover the total stand-alone cost. This is confirmed by applying the reduced rates for both shippers to their actual and projected tonnages to determine the ultimate revenue stream these reduced rate levels would produce. This ultimate revenue stream is compared to the stand-alone cost stream to determine the resulting quarterly overpayments and shortfalls, which are then discounted to constant 1994 dollars and netted. The reduced rates for both shippers would yield sufficient revenues to just cover the AGRR's total cost requirement over the 20-year SAC analysis period. This is confirmed by a cumulative present value of the overpayments and shortfalls of zero (found at the bottom of column 18).

As discussed in the body of this decision, the shaded rates arrayed in column 15 of Table F-2 are the rates from which reparations are based for Arizona traffic moving in 1994, 1995 and 1996.

Because, as discussed in the body of this decision, we believe it is more appropriate to prescribe future rates on an annual basis, Tables F-3, F-4, F-5 and F-6 present the results of the same percentage-rate reduction analysis performed on an annual basis. Table F-3 is an annual version of Table D-2, *Quarterly AGRR Discounted Cash Flow*. Tables F-4, F-5 and F-6 are annual versions of the quarterly iterative process shown in Tables F-1 and F-2. The shaded rates arrayed in column 15 of Table F-6 are the resulting maximum rates which Santa Fe may charge Arizona for the service it provides from the P&M mine from 1997 forward, and from which any reparations must be based for traffic moving under the challenged rates after 1996.

Table F-3

ANNUAL AGRR CALCULATED CASH FLOW

Period	Year	Capital Recovery Costs (current $)	Operating Expenses (current $)	Quarterly Stand-Alone Costs (current $)	Revenues (current $)	Over Payments Or (Shortfalls) (current $)	Present Value Overpayments Or (Shortfalls) (1994 $)	Cumulative Present Value Overpayments Or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	1994	$16,071,670	$4,126,296	$20,197,966	$36,665,170	$16,467,204	$15,558,190	$15,558,190
2	1995	13,271,144	4,268,685	17,539,829	30,178,274	12,638,445	10,673,041	26,231,231
3	1996	16,556,704	4,276,651	20,833,354	35,323,883	14,490,529	10,950,014	37,181,245
4	1997	17,402,657	4,414,717	21,817,373	35,369,669	13,552,296	9,161,845	46,343,090
5	1998	18,296,873	4,521,211	22,818,084	35,227,009	12,408,925	7,504,882	53,847,972
6	1999	19,242,397	6,670,274	25,912,671	35,103,140	9,190,469	4,972,640	58,820,613
7	2000	20,242,479	4,741,968	24,984,447	34,997,942	10,013,496	4,847,019	63,667,632
8	2001	21,300,592	4,856,356	26,156,947	34,911,375	8,754,428	3,791,023	67,458,655
9	2002	22,420,445	4,973,503	27,393,948	34,843,535	7,449,587	2,886,028	70,344,683
10	2003	23,606,005	5,093,477	28,699,482	34,794,085	6,094,604	2,112,290	72,456,972
11	2004	24,861,509	5,216,344	30,077,853	34,762,947	4,685,093	1,452,666	73,909,639
12	2005	26,191,490	7,870,176	34,061,665	34,750,051	688,386	190,950	74,100,588
13	2006	27,600,791	5,471,042	33,071,833	34,755,339	1,683,505	417,774	74,518,362
14	2007	29,094,596	5,603,018	34,697,614	34,778,761	81,147	18,015	74,536,378
15	2008	30,678,447	5,738,176	36,416,623	34,820,278	(1,596,346)	(317,054)	74,219,324
16	2009	32,358,275	5,876,596	38,234,870	34,879,859	(3,355,011)	(596,128)	73,623,195
17	2010	34,140,425	6,018,354	40,158,779	34,957,484	(5,201,294)	(826,793)	72,796,402
18	2011	36,031,688	6,163,532	42,195,220	35,053,142	(7,142,078)	(1,015,663)	71,780,739
19	2012	38,039,336	6,312,212	44,351,548	35,166,831	(9,184,717)	(1,168,505)	70,612,234
20	2013	40,171,149	6,464,478	46,635,628	35,298,558	(11,337,069)	(1,290,343)	69,321,890

Table F-4
INITIAL CALCULATION OF PERCENTAGE-REDUCED RATE

Period	Year	Revenues (current $)	Present Value Overpayments Or (Shortfalls) (1994 $)	Excess Revenues After Distributing Shortfalls (1994 $)	Overpayments From Rates Above 180% R/VC Floor (1994 $)	Additional Overpayments From Rates Held At R/VC Floor (1994 $)	Result Of Allocation of Additional Overpayments To Rates Above R/VC Floor (1994 $)	Required Reduction in Revenues (current $)	Percentage Rate Reduction	Salt River		Arizona	
										Santa Fe Rate (current $)	Initial Reduced Rate (current $)	Santa Fe Rate Limited by R/VC Floor (current $)	Initial Reduced Rate (current $)	Greater of Initial Reduced Rate or R/VC Floor (current $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	1994	$36,665,170	$15,558,190	$14,469,756	$14,469,756	$0	$14,469,756	$15,115,175	43.30%	$5.85	$3.32	$6.23	$3.53	$3.53
2	1995	30,178,274	10,673,041	9,926,366	9,926,366	0	9,926,366	11,734,273	33.37%	6.01	4.00	6.13	4.08	4.08
3	1996	35,323,483	10,950,014	10,183,962	10,183,962	0	10,183,962	13,476,786	38.39%	6.01	3.71	5.80	3.57	3.57
4	1997	35,369,669	9,161,845	8,520,892	8,520,892	0	8,520,892	12,604,191	36.01%	6.19	3.96	5.68	3.64	3.64
5	1998	35,227,009	7,304,882	6,979,848	6,979,848	0	6,979,848	11,540,809	33.06%	6.33	4.23	5.55	3.71	3.71
6	1999	35,103,140	4,972,640	4,624,759	4,624,759	0	4,624,759	8,547,513	24.53%	6.46	4.88	5.41	4.08	4.08
7	2000	34,997,942	4,847,019	4,507,927	4,507,927	0	4,507,927	9,312,962	26.77%	6.60	4.84	5.28	3.87	3.87
8	2001	34,911,175	3,791,023	3,525,807	3,525,807	0	3,525,807	8,141,977	23.42%	6.75	5.17	5.16	3.95	3.95
9	2002	34,843,535	2,886,028	2,684,124	2,684,124	0	2,684,124	6,928,421	19.94%	6.89	5.52	5.03	4.03	4.03
10	2003	34,794,085	2,112,290	1,964,516	1,964,516	0	1,964,516	5,668,231	16.31%	7.04	6.91	4.91	4.11	4.11
11	2004	34,762,947	1,452,666	1,351,039	1,351,039	0	1,351,039	4,337,329	12.53%	7.20	6.87	4.79	4.19	4.19
12	2005	34,750,051	190,950	177,591	177,591	0	177,591	640,227	1.84%	7.35	7.34	4.68	4.59	4.59
13	2006	34,755,339	417,774	388,547	388,547	0	388,547	1,563,739	4.49%	7.51	7.17	4.97	4.75	4.75
14	2007	34,778,761	18,015	16,755	16,755	0	16,755	75,470	0.22%	7.67	7.66	4.85	4.84	4.84
15	2008	34,820,278	(317,034)	0	0	0	0	0	0.00%	7.84	7.84	4.73	4.73	4.73
16	2009	34,879,859	(596,128)	0	0	0	0	0	0.00%	8.01	8.01	4.82	4.82	4.82
17	2010	34,957,484	(856,795)	0	0	0	0	0	0.00%	8.19	8.19	4.99	4.99	4.99
18	2011	35,053,142	(1,015,663)	0	0	0	0	0	0.00%	8.36	8.36	5.15	5.15	5.15
19	2012	35,166,831	(1,168,305)	0	0	0	0	0	0.00%	8.54	8.54	5.33	5.33	5.33
20	2013	35,298,558	(1,290,343)	0	0	0	0	0	0.00%	8.73	8.73	5.51	5.51	5.51

Table F-5
INTERMEDIATE CALCULATION OF
ANNUAL PERCENTAGE-REDUCED RATE

		Salt River		Arizona											Arizona	
Period	Year	Initial Reduced Rate (current $)	Tons	Greater Of Initial Reduced Rate Or Rate Floor (current $)	Tons	Combined Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments Or (Shortfalls) (1994 $)	Over-payments from Rates Above R/VC Floor (1994 $)	Excess Revenues After Distributing Shortfalls (1994 $)	Required Reduction In Revenues (current $)	Additional Percentage Rate Reduction	Revised Salt River Reduced Rate (current $)	Revised Reduced Rate (current $)	Greater of Revised Reduced Rate or R/VC Floor (current $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	1994	$3.32	2,500,000	$3.53	3,535,384	$20,789,039	$20,197,966	$558,445	$558,445	$396,090	$419,232	2.02%	$3.25	$3.46	$3.46
2	1995	4.00	2,500,000	4.08	2,475,000	20,108,624	17,539,829	2,169,322	2,169,322	1,538,642	1,821,978	9.06%	3.64	3.71	3.71
3	1996	3.71	2,500,000	3.57	3,500,000	21,762,349	20,833,354	702,010	702,010	497,917	658,911	3.03%	3.59	3.46	3.46
4	1997	3.96	2,500,000	3.64	3,500,000	22,631,604	21,817,373	550,450	550,450	390,419	577,512	2.55%	3.86	3.54	3.54
5	1998	4.23	2,500,000	3.71	3,500,000	23,581,859	22,818,084	461,929	461,929	327,634	541,725	2.30%	4.14	3.63	3.63
6	1999	4.88	2,500,000	4.08	3,500,000	26,491,943	25,912,671	313,424	313,424	222,303	410,862	1.55%	4.80	4.02	4.02
7	2000	4.84	2,500,000	3.87	3,500,000	25,630,416	24,984,447	312,681	312,681	221,776	458,169	1.79%	4.75	3.80	3.80
8	2001	5.17	2,500,000	3.95	3,500,000	26,734,634	26,156,947	250,162	250,162	177,433	409,738	1.53%	5.09	3.89	3.89
9	2002	5.52	2,500,000	4.03	3,500,000	27,896,475	27,391,948	194,683	194,683	138,083	356,429	1.28%	5.45	3.98	3.98
10	2003	6.91	2,500,000	4.11	3,500,000	31,667,378	28,699,482	1,028,624	1,028,624	729,576	2,105,050	6.65%	6.45	3.84	3.98
11	2004	6.87	2,500,000	4.19	3,500,000	31,853,930	30,077,855	550,693	550,693	390,592	1,259,724	3.95%	6.60	4.03	4.10
12	2005	7.34	2,500,000	4.59	3,500,000	34,409,384	34,061,665	96,453	96,453	68,411	246,628	0.72%	7.28	4.56	4.56
13	2006	7.17	2,500,000	4.75	3,500,000	34,532,520	33,071,833	367,443	367,443	260,618	1,050,212	3.04%	6.96	4.60	4.60
14	2007	7.66	2,500,000	4.84	3,500,000	36,087,613	34,697,614	308,590	308,590	218,874	965,890	2.73%	7.45	4.71	4.71
15	2008	7.84	2,500,000	4.73	3,500,000	36,173,848	36,416,623	(48,218)	0	0	0	0.00%	7.84	4.73	4.73
16	2009	8.01	2,500,000	4.82	3,500,000	36,913,128	38,234,870	(234,851)	0	0	0	0.00%	8.01	4.82	4.82
17	2010	8.19	2,500,000	4.99	3,500,000	37,914,966	40,158,779	(356,675)	0	0	0	0.00%	8.19	4.99	4.99
18	2011	8.36	2,500,000	5.15	3,500,000	38,926,244	42,195,220	(464,876)	0	0	0	0.00%	8.36	5.15	5.15
19	2012	8.54	2,500,000	5.33	3,500,000	40,010,167	44,351,548	(552,322)	0	0	0	0.00%	8.54	5.33	5.33
20	2013	8.73	2,500,000	5.51	3,500,000	41,103,946	46,633,628	(629,596)	0	0	0	0.00%	8.73	5.51	5.51
								5,578,369		7,864,907					

Table F-6
FINAL CALCULATION OF
ANNUAL PERCENTAGE-REDUCED RATE

		Salt River		Arizona														
Period	Year	Revised Reduced Rate (current $)	Tons	Greater Of Revised Reduced Rate Or R/VC Floor (current $)	Tons	Combined Revenues (current $)	Stand-Alone Costs (current $)	Present Value Over-payments Or (Shortfalls) (1994 $)	Over-payments Above R/VC Floor (1994 $)	Allocation of Over-payments From Rates Held At R/VC Floor (1994 $)	Required Reduction In Revenues (current $)	Additional Percentage Rate Reduction	Salt River Ultimate Reduced Rate (current $)	ARIZONA ULTIMATE REDUCED RATE (current $)	Ultimate Stand-Alone Revenues (current $)	Stand-Alone Costs (current $)	Present Value Overpayment: Or (Shortfalls) (1994 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	1994	$3.25	2,500,000	$3.46	3,535,384	$20,369,807	$20,197,966	$162,355	$162,355	$22,760	$24,090	0.12%	$3.25	$3.46	$20,345,717	$20,197,966	$139,595
2	1995	3.64	2,500,000	3.71	2,475,000	18,286,646	17,539,829	630,680	630,680	88,413	104,694	0.57%	3.62	3.69	18,181,952	17,539,829	542,266
3	1996	3.59	2,500,000	3.46	3,500,000	21,103,438	20,833,354	204,093	204,093	28,611	37,862	0.18%	3.59	3.46	21,065,576	20,833,354	175,482
4	1997	3.86	2,500,000	3.54	3,500,000	22,054,092	21,817,373	160,030	160,030	22,434	33,185	0.15%	3.86	3.54	22,020,907	21,817,373	137,596
5	1998	4.14	2,500,000	3.63	3,500,000	23,040,134	22,818,084	134,295	134,295	18,826	31,129	0.14%	4.13	3.62	23,009,005	22,818,084	115,469
6	1999	4.80	2,500,000	4.02	3,500,000	26,081,081	25,912,671	91,121	91,121	12,774	23,609	0.09%	4.80	4.02	26,057,472	25,912,671	78,347
7	2000	4.75	2,500,000	3.80	3,500,000	25,172,247	24,984,447	90,905	90,905	12,744	26,327	0.10%	4.74	3.80	25,145,920	24,984,447	78,161
8	2001	5.09	2,500,000	3.89	3,500,000	26,324,896	26,156,947	72,729	72,729	10,196	23,544	0.09%	5.08	3.88	26,301,352	26,156,947	62,533
9	2002	5.45	2,500,000	3.98	3,500,000	27,540,046	27,393,948	56,599	56,599	7,935	20,481	0.07%	5.44	3.97	27,519,565	27,393,948	48,665
10	2003	6.45	2,500,000	3.98	3,500,000	30,057,760	28,699,482	470,757	0	0	0	0.00%	6.45	3.98	30,057,760	28,699,482	470,757
11	2004	6.60	2,500,000	4.10	3,500,000	30,866,631	30,077,853	244,569	0	0	0	0.00%	6.60	4.10	30,866,631	30,077,853	244,569
12	2005	7.28	2,500,000	4.56	3,500,000	34,162,756	34,061,665	28,041	28,041	3,931	14,172	0.04%	7.28	4.56	34,148,585	34,061,665	24,110
13	2006	6.96	2,500,000	4.60	3,500,000	33,502,309	33,071,833	106,826	106,826	14,976	60,347	0.18%	6.94	4.59	33,441,961	33,071,833	91,850
14	2007	7.45	2,500,000	4.71	3,500,000	35,101,723	34,697,614	89,715	89,715	12,577	56,651	0.16%	7.44	4.70	35,045,072	34,697,614	77,138
15	2008	7.84	2,500,000	4.73	3,500,000	36,173,848	36,416,623	(48,218)	0	0	0	0.00%	7.84	4.73	36,173,848	36,416,623	(48,218)
16	2009	8.01	2,500,000	4.82	3,500,000	36,913,128	38,234,870	(234,851)	0	0	0	0.00%	8.01	4.82	36,913,128	38,234,870	(234,851)
17	2010	8.19	2,500,000	4.99	3,500,000	37,914,966	40,158,779	(356,675)	0	0	0	0.00%	8.19	4.99	37,914,966	40,158,779	(356,675)
18	2011	8.36	2,500,000	5.15	3,500,000	38,926,244	42,195,220	(464,876)	0	0	0	0.00%	8.36	5.15	38,926,244	42,195,220	(464,876)
19	2012	8.54	2,500,000	5.33	3,500,000	40,010,167	44,351,548	(552,322)	0	0	0	0.00%	8.54	5.33	40,010,167	44,351,548	(552,322)
20	2013	8.73	2,500,000	5.51	3,500,000	41,103,946	46,635,628	(629,596)	0	0	0	0.00%	8.73	5.51	41,103,946	46,635,628	(629,596)
									1,827,388								
								256,177									(0)