STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

Illinois Commerce Commission	)	
On Its Own Motion	)	
	)	
vs.	)	
	)	**Docket No. 04-0677**
Illinois Power Company	)	
d/b/a AmerenIP	)	
	)	
Reconciliation of revenues collected under	)	
gas adjustment charges with actual costs	)	
prudently incurred.	)	

AmerenIP's
Brief on Exceptions to the
Administrative Law Judge's Proposed Order

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I. INTRODUCTION AND SUMMARY OF AMERENIP's EXCEPTIONS

Illinois Power Company d/b/a AmerenIP ("AmerenIP", "IP" or the "Company") submits this Brief on Exceptions to the Administrative Law Judge's ("ALJ") Proposed Order ("PO"). AmerenIP takes exception to the PO's conclusion that AmerenIP acted imprudently in its response to deliverability problems encountered at its Hillsboro Storage Field ("Hillsboro", "HSF" or the "Field"). (PO, pp. 10-11.) Specifically, the PO adopts as its conclusion on the Hillsboro issue the following conclusion from page 37 of the order in AmerenIP's 2003 PGA reconciliation case, Docket 03-0699 (the "2003 Order")[1]:

> In summary, the Commission concludes that all things considered, AmerenIP acted imprudently in its response to the deliverability problems at the Hillsboro Storage Field and agrees with Staff that the Company should have begun replacement of the HSF inventory in 2000. AmerenIP's repeated failures to properly operate and manage its natural gas storage fields in a prudent manner has resulted in cost increases that the Commission can no longer allow to be passed on to captive customers. While human error is inevitable, AmerenIP's repeated failures have risen to the level of imprudence. In the Commission's view, repeated human error demonstrates a lack of oversight and attention that constitutes imprudent operation and management of the Hillsboro Storage Field. (PO, p. 10.)

The PO does not provide any new or additional reasoning on the issue of AmerenIP's prudence with respect to the Hillsboro issue; rather, the PO simply states (referring to the 2003 Order) that "the Commission has already ruled on this issue." (PO, p. 10.) The PO states that the only open question is whether the imprudence found in the 2003 Order resulted in gas costs that were improperly charged to customers during 2004. (*Id.*) The PO adopts Staff's calculation that as a result of failing to begin reinjecting substantial quantities of replacement gas inventory to HSF in 2000, AmerenIP incurred $2,979,849 in additional gas costs in 2004 that should be refunded.

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[1]The 2003 Order is currently on appeal to the Third District Appellate Court (Case No. 03-06-0879).

(*Id*., pp. 10-11.) (The Company in fact began to reinject replacement gas inventory into HSF in 2003, and completed replenishment of the Field's inventory during 2005.)

AmerenIP does not dispute Staff's mathematical calculation that *if* the Company was imprudent in not beginning to reinject substantial quantities of replacement gas inventory to HSF in 2000, then $2,979,849 of additional gas costs were incurred in 2004.[2] However, as it did in Docket 03-0699 and continues to do in its appeal of the 2003 Order, AmerenIP strenuously disputes that it acted imprudently in its investigation and management of the Hillsboro Field and that it was imprudent in not beginning to reinject replacement gas inventory into HSF in 2000.

The conclusion that AmerenIP acted imprudently in its response to the deliverability issues at HSF and in not beginning to reinject replacement inventory in 2000 must be rejected. The record in this case affirmatively demonstrates AmerenIP acted prudently in its investigation, identification and remediation of the HSF deliverability decline. (*See* §II.A below.) Further, based on the record in this case, Staff's arguments – with which the PO "agrees" (PO, p. 10) -- do not establish that AmerenIP acted imprudently in investigating and determining the cause of the Hillsboro deliverability decline, or in not starting reinjections of gas inventory until 2003. (*See* §II.B below.) The conclusion the PO adopts from the 2003 Order lacks foundation in the record of this case and does not provide a basis for concluding that AmerenIP acted imprudently in investigating and determining the cause of the HSF deliverability decline or in not beginning substantial reinjections of replacement gas inventory into HSF prior to 2003. (*See* §II.C below.)

[2]Staff also presented an alternative calculation that would be applicable if the Commission concludes the Company should have begun reinjecting replacement gas inventory in 2001; under that conclusion, the amount of additional gas costs incurred in 2004 was $2,335,442. (Staff Ex. 2.00, Sch. 2.02.) AmerenIP did not dispute this mathematical calculation. Additionally, AmerenIP provided an alternate calculation showing that if the Commission were to conclude the Company should have begun reinjecting replacement gas inventory to HSF in 2002, then the amount of additional gas costs incurred in 2004 was $1,187,804. (AmerenIP Ex. 2.3.) Staff did not dispute this mathematical calculation. See the Alternative Exception in §II.D below.

In any event, for purposes of this case, the Commission is not bound by its decision in the 2003 Order[3], and its decision in this case must be based on the record in this case.

As an alternative exception, AmerenIP states that the record in this case shows the Company acted prudently in not beginning to reinject substantial quantities of replacement gas inventory into HSF in 2000 or 2001, while the Company continued to investigate the possible causes of the deliverability decline. If the Commission were to conclude the Company should have begun to reinject replacement gas inventory into HSF in 2002 (rather than in 2000, as the PO concludes, or in 2003, which is what AmerenIP actually did), then the amount of additional gas costs incurred in 2004 would be $1,187,804 rather than $2,979,849. (*See* §II.D below.)

The Appendix to this Brief on Exceptions contains AmerenIP's proposed revisions to the "Commission Analysis and Conclusion" section of the PO. The Appendix also includes alternative replacement language for use if the Commission concludes that AmerenIP was imprudent because it did not begin reinjecting replacement gas inventory in 2002.

II. ARGUMENT

A. The Record Demonstrates AmerenIP Prudently and Aggressively Investigated the Cause of the Hillsboro Deliverability Decline

The history of AmerenIP's investigation, determination and remediation of the causes of the HSF deliverability decline was described by AmerenIP witnesses Wayne Hood and Curtis Kemppainen, both Consulting Engineers in AmerenIP's Gas Operations Support Group, and Timothy Hower, President of MHA Petroleum Consultants, a geology and engineering consulting firm. Mr. Hood has been employed by AmerenIP or predecessor companies since 1977 and has been in positions directly supporting IP's gas storage fields since 1984. Mr.

[3] *Citizens Utility Board v. Commerce Commission*, 166 Ill. 2d 111, 125 (1995); *Mississippi River Fuel Corp. v. Commerce Commission*, 1 Ill. 2d 509, 513 (1953).

Kemppainen has 36 years of experience in the gas and oil industries and has been employed by IP since 1992 in gas storage and transmission operations. (AmerenIP Ex. 3.0, pp. 1-2.) Mr. Hower holds undergraduate and graduate degrees in Petroleum and Natural Gas Engineering, is a registered professional engineer, and has 24 years of experience working in the oil and gas industry, with much of that experience in the area of underground storage. Specifically, he has been involved in the design, analysis and implementation of gas storage reservoirs for 15 years. (AmerenIP Ex. 5.0, pp. 1-2.) These witnesses have both extensive industry experience and personal experience and knowledge concerning AmerenIP's investigation, identification and remediation of the HSF deliverability decline.

The PO refers to the standard for judging the prudence of utility decisions and actions that the Commission has long followed:

> Prudence is that standard of care which a reasonable person would be expected to exercise under the same circumstances encountered by utility management at the time decisions had to be made. In determining whether a judgment was prudently made, only those facts available at the time judgment was exercised can be considered. Hindsight review is impermissible.
>
> Imprudence cannot be sustained by substituting one's judgment for that of another. The prudence standard recognizes that reasonable persons can have honest differences of opinion without the one or the other necessarily being "imprudent."[4]

In applying this standard to the context of this case, it is important to recognize that, as the Commission stated in its Order in Docket 01-0701, AmerenIP's 2001 reconciliation case, "a natural gas aquifer storage field is a complex physical system."[5] The actual characteristics of an underground reservoir and the manner in which the injected gas is dispersed into the aquifer

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[4]PO, p. 3, citing *Illinois Commerce Comm'n v. Commonwealth Edison Co.*, Docket 84-0395, Order, Oct. 7, 1987, p. 17.

[5]*Illinois Commerce Comm'n v. Illinois Power Co.*, Docket 01-0701, Order, Feb. 19, 2004, p. 25.

cannot be observed directly but must be inferred from secondary information such as seismic analysis, hydrogen ion concentrations and well pressures. Moreover, industry experience shows that declines in deliverability are the most commonly-experienced problem in the gas storage industry, and that physical or structural problems are the most frequent causes of these deliverability declines. (AmerenIP Ex. 5.0, p. 19.) Thus, in investigating the cause of the Hillsboro deliverability decline, it was logical and appropriate for AmerenIP to focus its attention on possible structural or geologic causes, in light of both overall industry experience and the specific factors at Hillsboro including the recent significant expansion of the Field. Further, in investigating these potential causes, the Company used the same techniques used by other storage field operators in investigating unplanned or undesired declines in gas inventory. (AmerenIP Ex. 5.0, pp. 12-13.)

1. Expansion of the Hillsboro Storage Field

AmerenIP has had a storage field at Hillsboro since 1973; however, the Field was substantially expanded in the early 1990s. As a result of the upgrade, which was completed in 1993, the base and working gas volumes of the Field approximately doubled. (AmerenIP Ex. 3.0, p. 3.) Before the expansion, Hillsboro had five injection/withdrawal ("I/W") wells. In the expansion, nine additional I/W wells were drilled. Additionally, AmerenIP increased the number of compressors, dehydration systems and regulator runs and installed other new above-ground plant equipment, including redundant programmable logic controllers and input/output devices to monitor and control the plant. In expanding the above-ground equipment, the Company replicated existing facilities that had performed satisfactorily for many years. (*Id*., pp. 4-5.)

2. Identification of a Deliverability Problem at Hillsboro

Initially, the expanded Field performed as expected. In each of the 1993-1994 through 1996-1997 winters, Hillsboro tested at a peak deliverability of 125,000 Mcf/day or greater; and

for the 1993-1994 winter, approximately 7.6 Bcf of working gas was cycled. (AmerenIP Ex. 3.0, p. 5.) In subsequent winters, however, the amounts of gas that could be withdrawn declined. (*Id*.) Based on several years of declining deliverability, AmerenIP first became concerned there could be a potential problem with HSF following the 1995-1996 winter season.[6] (*Id*., p. 6.)

3. AmerenIP's Investigation of Potential Structural Causes for the Hillsboro Deliverability Decline

AmerenIP initially focused its investigation on whether there was a reservoir or structural problem with Hillsboro, that is, whether either (i) gas injected into the Field was migrating from the underground reservoir as the Company understood its structure, or (ii) the shape of the underground structure was different than what had been expected. The result in either case would be that gas injected into the Field was moving or being pushed to areas where it could not be reached by the Field's withdrawal wells. (AmerenIP Ex. 3.0, p. 7.) Investigating whether a reservoir problem was the source of the deliverability decline was the most logical area on which to focus investigation, because HSF had been significantly expanded in 1993 and deliverability began to decline in the second winter season after the expansion. Based on the actions that had been taken to expand the storage reservoir, the possibility existed that the reservoir was physically breached during the expansion, thereby allowing portions of the newly-injected, expanded gas inventory to escape from the reservoir. (*Id*., pp. 7-8.) A related possibility was that one of the new I/W wells was drilled near an undetected fault, with the result that a portion of the gas injected into that well could migrate off structure. (*Id*., p. 8.) Yet another possibility was that the shape of the underground reservoir was not what it was believed to be, or that

[6]A low withdrawal volume in a single inject-withdraw cycle would not necessarily indicate a problem, because exogenous factors such as weather and other load constraints could impact the volume of gas cycled in a given year. Observation of reduced deliverability over several years would be necessary to indicate that there could be a physical or operating problem that was reducing deliverability. (AmerenIP Ex. 3.0, p. 6.)

unknown substructures existed; in either case, some of the additional gas injected into HSF in the expansion could be migrating to areas from which it could not be recovered through the withdrawal wells. (*Id*.)

In contrast, AmerenIP did not at the outset concentrate its investigation on any potential problems with above-ground equipment. In expanding HSF, the Company had replicated and expanded existing above-ground facilities that had worked well prior to the expansion; therefore, it was not thought to be likely that a problem with above-ground facilities was the source of the deliverability decline. (*Id*., p. 8.)

Because there was a wide range of specific potential causes for the deliverability decline, each of which could have warranted a unique set of corrective actions, it was appropriate for AmerenIP to take a cautious approach to identifying the actual cause of the problem. Further, it was appropriate for AmerenIP to focus initially on a potential reservoir or structural problem as the most likely cause. The potential causes included gas migration out of the storage reservoir, gas leaks to the surface or to geologic strata above the storage formation, or damage to the I/W wells that would have inhibited gas withdrawals. (AmerenIP Ex. 5.0, pp. 6-7.) Increased gas volumes in a storage reservoir (such as were injected into HSF in the 1993 expansion) can often lead to gas migration out of the field across structural spill points; alternatively, it can create breaches in the caprock that forms a seal to hold the stored gas in place. (*Id*., p. 7.) Finally, it was important that AmerenIP first properly identify the cause(s) of the problem before designing and implementing corrective actions. (*Id*., pp. 6-7.)

To investigate potential reservoir problems as a cause of the Hillsboro deliverability decline, in 1997 AmerenIP had a vertical seismic profile ("VSP") of the Field prepared to evaluate if conducting a three-dimensional ("3-D") seismic profile of the Field would be a viable

approach to defining its structure. The conclusion of the VSP study, which was completed in 1998, was that a 3-D seismic profile would be a viable approach. AmerenIP therefore proceeded with a 3-D seismic analysis.[7] (AmerenIP Ex. 3.0, p. 8.) The preliminary results of the 3-D seismic study indicated that approximately 3.5 Bcf of gas had migrated to another sub-structure located to the northeast of HSF. (*Id*., p. 9.)

Based on the results of the 3-D seismic study, in November 2000 AmerenIP drilled a new well, the Furness well, to the northeast of the Field to confirm or reject the existence of the substructure and to access the gas believed to be migrating to it. (AmerenIP Ex. 3.0, p. 13; AmerenIP Ex. 7.0, pp. 7-8.) When the new well was drilled, however, a substructure was not found. This result was not consistent with the results of the 3-D seismic analysis. AmerenIP therefore asked its consultant to review and re-evaluate the original results of the 3-D seismic survey. (AmerenIP Ex. 3.0, p. 14.)

Although drilling the Furness well did not locate an additional substructure to the northeast of the Field, this outcome did not invalidate the theory that the most likely cause of the HSF deliverability decline was that the underground structure was different than what the Company had understood it to be. (AmerenIP Ex. 5.0, pp. 15-17.) It remained a distinct possibility that the general structural interpretation developed using the 3-D seismic data, namely, that gas was migrating away from the main reservoir, was correct, but that gas was not migrating to a separate structure specifically in the vicinity where the Furness well was drilled.

[7]A 3-D seismic profile is developed by measuring the travel times of sound waves propagated through the sub-surface; the signals reflect off the underground rock formations and bounce back to the surface where they are recorded. The reservoir structure is thereby identified in a 3-D image because the travel time of the reflected signal from structurally higher locations is shorter than in areas where the reservoir is deeper or farther below the surface. This process is conducted across the entire reservoir area, and the resultant recorded data is processed to yield a 3-D image of the reservoir. (AmerenIP Ex. 3.0, p. 9.)

(*Id*., p. 16.) Based on the information AmerenIP had from the analyses it had completed as of 2001, including drilling the Furness well, there were still a number of structural or geologic causes that could have been the source of the HSF deliverability decline, including the following:

- Gas losses into the caprock – in an underground reservoir, the caprock is assumed to form an impermeable seal on the top of the reservoir. In some cases, however, the caprock can be semi-permeable, so gas can migrate out of the storage reservoir into the overlying formation where it is no longer accessible. (*Id*., p. 9.)

- Unfavorable or irregular growth of the gas bubble due to adverse gas-water mobility in the reservoir – although gas injected into an aquifer like Hillsboro typically displaces the water in a piston-like manner, the injected gas can sometimes advance as thin channels or "fingers". This results in an irregularly shaped gas bubble where, in some locations, gas migrates beyond the area of the field developed for storage. Gas that has migrated out of the developed area of the field becomes trapped and is not accessible as working gas. (*Id*.)

- Gas losses across a fault or fracture in the reservoir – It is common in the gas storage industry that undetected faults or fractures (breaks or cracks in the reservoir rock) are found within storage reservoirs. Such faults or fractures can be conduits or pathways for gas to migrate out of the storage formation, causing it to be lost from the storage formation and no longer available as part of the working gas volume. (*Id*., pp. 9-10.)

To assist in further analysis of the 3-D seismic data, in June 2001 AmerenIP had crosswell seismic surveys performed between the Furness and Snyder No. 2 wells and the Roth Boyle No. 1 and Snyder No. 2 wells.[8] The information obtained from these surveys was used to reprocess the 3-D seismic study data. (AmerenIP Ex. 3.0, p. 14.) Based on the results from drilling the Furness well and the reprocessed 3-D seismic data, it was concluded in the Fall of 2001 that the additional structure that had been thought to exist to the northeast of the Hillsboro underground reservoir did not exist. (*Id*.)

[8]A crosswell seismic survey is a high resolution process capable of resolving features much smaller than those visible with 3-D surface seismic analysis. (AmerenIP Ex. 3.0, p. 14.)

4. Peterson Metering Study

While investigating possible reservoir or structural causes for the HSF deliverability decline, AmerenIP also retained Peterson Engineering to conduct an audit of the metering at Hillsboro. (AmerenIP Ex. 3.0, pp. 9-10.) Peterson issued its report in December 1999, identifying two problems:

(1) It was determined that two new turbine injection meters that had been installed at the Field were over-registering gas volumes under certain operating conditions. The plant compressors, when operating at certain loading steps, caused these meters to over-spin thereby recording greater injection volumes than were in fact passing through the meters. Peterson calculated the over-registration to be 26% when the compressors were operating at 50% loadings but only about 1.7% when the compressors were operating at 100% loadings. (*Id*., p. 10.)

(2) The audit found that the actual size of the orifice plate opening on the meter on the south secondary withdrawal run was smaller than the size value stamped on the orifice plate by the manufacturer.[9] The orifice opening size stamped on the equipment was the size AmerenIP had ordered, but was larger than the actual size of the opening, by 10% (5.5 inches versus 5.0 inches). The fact that the size of the opening was smaller than the value stamped on the orifice plate by the manufacturer meant less gas was being withdrawn from the Field through this meter than it recorded. (*Id*., pp. 10-11.)

To eliminate the over-registration by the injection meters, AmerenIP made operating procedure changes to avoid the 25% and 50% compressor loadings levels, which were the loadings causing the most significant over-registration on the meters. AmerenIP also relocated certain metering component. These steps, which were implemented in May 2000, corrected the injection meter measurement problem. (*Id*., pp. 12, 19.) To correct the withdrawal meter error, the correct value for the orifice opening was input into the meter's programmable logic controller so that it would accurately calculate the amount of gas passing through this meter. (*Id*., p. 12.)

[9]This meter is one of the four withdrawal meters at the Field. The "primary run" is the principal withdrawal facility into the south pipeline exiting the Field. The "secondary run" only operates occasionally, during high withdrawal periods. (AmerenIP Ex. 3.0, p. 10.)

Initially, it was determined that the over-registration at the injection meters and the over-registration due to the mis-labeled orifice opening on the withdrawal meter were approximately offsetting. (As discussed below, it was subsequently discovered that this was not the case and that the injection meter over-registration was much larger than the withdrawal meter over-registration.) (*Id*., p. 11.) The total amount of the over-registration on the withdrawal meter could be calculated with high accuracy, because it was a function of the difference between the actual size of the orifice opening and the incorrect size stamped on the plate. (*Id*., p. 12.) In contrast, the amount of over-registration that had occurred on the injection meters could not be determined with certainty. AmerenIP estimated a range for the injection meter over-registration. The lower end of this range, 5.4%, was based on the estimate that the compressors had operated at 50% loadings 15% of the time and at 100% loadings 85% of the time. (*Id*., pp. 12-13.) The volume of the injection over-registration at this end of the range was approximately the same as the volume of the withdrawal meter over-registration. (*Id*., p. 13)

5. Further Investigation and Analysis of Possible Structural Causes for the Hillsboro Deliverability Decline

Although the determination was reached in the Fall of 2001 (*see* §II.A.3 above) that there was not a separate structure to the northeast of the Field to which gas was migrating, this conclusion did not enable AmerenIP to rule out a reservoir/structural problem or other physical problems as the source of the deliverability decline. AmerenIP initiated additional studies and analyses focusing on other possible causes. (AmerenIP Ex. 3.0, p. 15.) Other possible reservoir/structural causes included:

- Gas was "fingering" off to the edges of the underground structure.[10]

[10]"Fingering", which results in gas becoming trapped and no longer available as part of the working gas inventory, is described in §II.A.3 above.

- Formation damage had occurred in the vicinity of one or more of the gas withdrawal wells, thereby limiting the ability to access all the working gas that had been injected into the Field.[11]

- Gas was leaking from the reservoir or was being lost due to recirculation through plant equipment. (*Id*., p. 15.)

To address the possibility of formation damage at withdrawal wells as a cause of the deliverability decline, AmerenIP performed a number of well stimulation treatments. These treatments consist of injecting chemicals into a well bore and thus into the underground reservoir to clean up or remove any damage to the formation and thereby increase productivity of the well. Well stimulations were performed on two wells in November 2000, on two additional wells in December 2001, and on two more wells in November 2002. (*Id*., p. 16.) Initially, the well stimulation treatments dramatically improved the performance of the individual wells, thus supporting the possibility that the deliverability decline was related to formation damage. (*Id*.)

AmerenIP also conducted a number of other analyses and investigations in the Spring of 2003 (*Id*., pp. 16-18.):

- Neutron log analyses – these analyses were used to determine if there was gas leakage from the reservoir to a shallower formation.[12] The neutron logs did not indicate any leakage. However, a comparison of these neutron logs to neutron logs performed in earlier years indicated the gas "bubble" in the reservoir was thinning. One possible cause of the thinning of the gas bubble was that gas was "fingering" to the edges of the underground structure. (*Id*., pp. 16-17.)

- Flame ionization surveys – these tests are conducted at ground level to identify any migration of gas at the surface that would not be detected through neutron logs. These surveys detected no gas leakage at the surface. (*Id*., p. 17)

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[11]"Damage" is an industry term referring to any barrier near the well bore that restricts injection or withdrawal, due to such causes as drilling, casing, cementing operations, perforating, solids invasion, scales, fines migration, emulsions or bacteria. (AmerenIP Ex. 3.0, p. 15.)

[12]A neutron log is a survey performed inside the well bore than can determine the gas-water mix within a reservoir by measuring the hydrogen ion concentration. (AmerenIP Ex. 3.0, p. 16.)

- Field metering versus plant metering comparison – The Company compared the gas injected into the Field as measured by the turbine meters to estimates of the gas injected at the individual I/W wells, using available data from various days during the injection seasons of 1994, 1995, 1998 and 1999. (*Id*.)

- Analysis of reservoir performance – The Company reviewed data on well water levels and water production over time at the Field's observation wells. This review indicated the working gas volumes in the reservoir had declined to a level below the volume of the Field (3.1 Bcf) prior to the 1993 expansion. This observation was an indication that the source of the deliverability decline was not a structural one. (*Id*., pp. 17-19.)

- Volumetric analysis – This technique used data on the volume of the HSF reservoir and gas saturation data from the neutron logs to develop an estimate of gas volumes in the reservoir. A comparison of the gas volumes in the Field in the Spring of 1993 to the Spring of 2002 indicated there was approximately 5.5 Bcf less gas in the Field in the Spring of 2002 than in 1993. (*Id*., p. 18.)

The field metering versus plant metering comparison and the volumetric analysis led to the conclusion that gas volumes in the reservoir had been significantly depleted. (*Id*., p. 18.) Further, the information gained from the other analyses and activities that had been conducted, including drilling the Furness well, the crosswell seismic surveys, reanalysis of the 3-D seismic data, the well stimulation treatments, the neutron logs and the flame ionization surveys, enabled AmerenIP to rule out structural or geological problems as the source of the deliverability decline. The results of these analyses focused attention on a measurement error as the source of the depletion of the gas volumes and thus of the deliverability decline. (*Id*.)

6. Determination of the Cause of the Hillsboro Deliverability Decline

As described in §II.A.5 above, the analyses the Company conducted in early 2003 led to the conclusions that (i) structural or geological problems could be eliminated as the source of the deliverability decline, and (ii) a measurement error should be pursued as the cause of the depletion of the gas in the Field. AmerenIP compared the gas volumes registered on the plant turbine injection meters to estimates of the gas volumes injected through the individual I/W well

meters (determined as described below) on various days during the 1994, 1995, 1998 and 1999 injection seasons. These comparisons indicated the turbine meters had recorded substantially more gas as injected than had actually been injected into the Field from 1994 to 1999.[13] (AmerenIP Ex. 3.0, pp. 19.) AmerenIP therefore concluded in early 2003 that the gas volumes had been substantially depleted due to the injection meter over-registration. (*Id*., p. 20.)

To make the comparison of the gas volumes injected at the individual I/W well meters to the volumes recorded as injected by the turbine meters, AmerenIP used pressure and temperature data that had been recorded on charts at the meters for the individual I/W wells. There are 14 I/W wells at Hillsboro; each well has an injection meter that records pressure and temperature data on a chart. The meters at the I/W wells do not record gas volumes into the Field, and in fact are not installed in accordance with AGA standards for custody transfer metering. (*Id*., p. 19; Tr. 63.) The data recorded on the I/W well charts are used by the operators to adjust methanol injection rates, open or close additional wells, monitor wells for hydrates, and assess the relative contribution of each well to the total injections or withdrawals at the Field. The meters at the individual I/W wells do not record gas volumes injected into the Field; however, the pressure and temperature data recorded on the individual I/W well charts can be used to calculate the amount of gas injected at each well for a day. (AmerenIP Ex. 3.0, pp. 19-20; Tr. 61.)

Historically, the temperature and pressure data was not maintained for each individual I/W well for each day. However, for those days for which well charts had been preserved for all the I/W wells that were operating that day, it was possible to combine, or "integrate", the data recorded on the individual well charts to develop an estimate of the total amount of gas injected

[13]As a result of the Peterson metering audit and the corrective actions AmerenIP took following that study (described in §II.A.4 above), the injection metering error had been largely mitigated in 2000. (AmerenIP Ex. 3.0, p. 19.)

into the Field through the I/W wells that day. This total could then be compared to the volume of gas the turbine injection meters had recorded as injected that day. By making such comparisons for several days in each month over the course of an injection season, AmerenIP was able to develop an estimate of the aggregate over-registration that had occurred on the main plant injection meters. (AmerenIP Ex. 3.0, p. 20.)

Having concluded that the gas volumes in the Field were significantly depleted due to the injection meter over-registration, AmerenIP developed a plan to reinject gas to restore the Field's inventory to the original post-expansion amount. Reinjections to restore the HSF inventory began in 2003. (*Id.*)

7. Summary

The foregoing discussion of AmerenIP's activities shows that it acted prudently in investigating the causes of the Hillsboro deliverability decline, in systematically isolating and eliminating potential causes, and in ultimately identifying the root cause and developing and implementing a plan to restore the Field to its intended levels of operation. AmerenIP investigated multiple possible causes for the deliverability decline, including structural and geological causes, which at the time the deliverability decline was identified were the most likely source of the problem in light of the fact that the HSF reservoir had recently undergone a major expansion. However, AmerenIP did not limit its focus to structural or other problems with the underground reservoir, but rather investigated other possible causes including metering errors, damage to wells and leakage from above-ground equipment. Extensive internal and external resources were employed in the investigation. Corrective actions recommended by outside consultants for identified problems were implemented. Potential causes of the deliverability decline were eliminated based on the results of the analyses, until the Company could ultimately

rule out potential reservoir or structural causes and establish depletion of the gas inventory due to the injection meter over-registration as the cause.

Further, the Company did not begin reinjections of substantial quantities of replacement gas inventory while it was still investigating potential reservoir problems or other structural causes of the deliverability decline, because based on the information the Company had at the time, beginning substantial reinjections carried the risk of losing more gas outside the reservoir structure (*i.e.*, outside the area in which it could be recovered by the withdrawal wells).

The history of AmerenIP's efforts to identify and remediate the cause of the Hillsboro deliverability decline demonstrates that it conducted a very thorough and logical work program to determine the cause. (AmerenIP Ex. 5.0, pp. 4-5.) AmerenIP carried out a thorough root cause analysis. The Company followed a logical and systematic approach to determine the underlying cause of the deliverability decline. (*Id.*, p. 6.) Further, the Company used the same techniques used by other storage field operators in investigating the causes of declines in gas inventory deliverability. (AmerenIP Ex. 5.0, pp. 13-14.)

In summary, the record demonstrates that in investigating, and ultimately identifying and resolving, the cause of the Hillsboro deliverability decline, AmerenIP exercised the standard of care that a reasonable person would be expected to exercise under the circumstances encountered by management at the time its decisions were being made and actions were being taken, based on the information available to management at those times.

B. Staff's Arguments Do Not Show AmerenIP Was Imprudent in Investigating, Determining and Remediating the Causes of the HSF Deliverability Decline

The PO accepts Staff's arguments that AmerenIP acted imprudently in investigating, determining and remediating the causes of the Hillsboro deliverability decline, and in particular in not concluding in 2000 that inventory depletion resulting from the injection meter over-

registration was the cause of the problem and commencing substantial reinjections of replacement gas inventory into HSF. (PO, p. 10.) However, Staff's arguments are insufficient to overcome the evidence of the Company's careful, thorough and diligent investigation of the HSF deliverability decline or to support the conclusion that AmerenIP acted imprudently.

Staff contended AmerenIP should have concluded in 2000 that the cause of the Hillsboro deliverability decline was the injection meter over-registration, and should have begun reinjecting gas into Hillsboro in 2000 to restore the depleted inventory. (Staff Ex. 2.00, p. 20; Tr. 56.) Had AmerenIP done so, we know in hindsight that there would have been a greater amount of working gas inventory in storage in 2004. Staff contended AmerenIP had three "opportunities" to detect the "inventory problem" at Hillsboro but failed to do so: (1) AmerenIP "had in its possession" in 2000 data that indicated "a large inventory shortfall", but instead concluded that the injection and withdrawal metering errors that had been discovered offset each other. (2) AmerenIP did not place a high priority on accurate measurement for withdrawals from HSF after its expansion and failed to follow guidelines to ensure accurate measurement of withdrawals from the Field. (3) The volume of gas being withdrawn from HSF in the winters of 1999-2000 and 2000-2001 was less than the amount historically withdrawn prior to the Field's expansion. (Staff Ex. 4.00, p. 5; Tr. 51-53; *see* PO, pp. 4-5.)

Alternatively, Staff contended that if it were determined AmerenIP acted reasonably in waiting until it had drilled the Furness well in November 2000 to determine if there was in fact a substructure to which gas was migrating, then after the Furness well was drilled and a substructure was not found, AmerenIP should have concluded that the Hillsboro deliverability decline was due to an "inventory problem," and begun to replace the inventory in 2001. (Staff Ex. 2.00, pp. 35-36; Staff Ex. 4.00, pp. 18-19; *see* PO, p. 6.)

As shown in §II.B.1 below, the three points cited by Staff relating to the operation of HSF do not demonstrate AmerenIP acted imprudently in its investigation and identification of the cause of the HSF deliverability decline, and do not demonstrate AmerenIP acted imprudently by not beginning substantial reinjections of replacement gas inventory in 2000, 2001 or 2002. To the contrary, consideration of the circumstances facing management and the information known and reasonably available to management in this time period demonstrates that it would have been *imprudent* to begin substantial reinjections, because the very real possibility remained that the cause of the Hillsboro deliverability decline was a structural or geological problem. Until these potential causes were adequately investigated and eliminated (or confirmed), beginning substantial reinjections of gas inventory into HSF ran the risk of loss of more gas into areas from which it could not be recovered. Thus, Staff's position (which the PO adopts) was not an appropriate application of the prudence standard, because it failed to encompass *all* the circumstances and information Company management had to take into account in 2000, 2001 and 2002 at Hillsboro. Rather, Staff's position was based on a few isolated items of information whose significance could only be appreciated in hindsight. Moreover, Staff's position as to what the Company should have done in 2000 and 2001 was formulated with the luxury of knowing that the HSF deliverability decline was not caused by a reservoir or structural problem – knowledge the Company did not have in those years.

Staff also based its position that AmerenIP was imprudent in not beginning to reinject replacement inventory into HSF in 2000 on several concerns Staff had regarding the Company's overall operation of its storage fields. (*See* Staff Init. Br., pp. 35-48.) As shown in §II.B.2 below, Staff's concerns about the overall operation of the storage fields were unfounded. Further, there was no causal relation between the overall storage concerns, on the one hand, and the timing of

the Company's determination of the cause of the HSF deliverability decline and the commencement of reinjections to restore the depleted inventory, on the other hand. Therefore, even if any of Staff's overall storage concerns had validity standing alone (which they do not), they do not provide justification for Staff's position, or the conclusion adopted in the PO, that AmerenIP was imprudent in its investigation, identification and remediation of the cause of the HSF deliverability decline and in not beginning to reinject significant amounts of replacement inventory in 2000.

1. Specific Hillsboro Storage Field Items

a. 1994 I/W Well Charts -- AmerenIP Was Not Imprudent in Not Using Well Chart Data in 2000 to Determine the Amount of the Injection Meter Over-Registration

As described in §II.A.5 and 6 above, in 2003 AmerenIP used information from the well charts from the individual I/W wells at Hillsboro from 1994, 1995, 1998 and 1999 to compare estimates of injection volumes at the individual wells to injection volumes recorded on the plant turbine meters on certain days during those years. From this comparison, the Company determined the turbine meters had significantly over-recorded injections. The metering at the individual I/W wells does not record the volume of gas injected, but does record temperature and pressure data that the operators use for various purposes. However, it is possible to use the recorded temperature and pressure data to calculate an estimate of the amount of gas injected at an I/W well on a day. (AmerenIP Ex. 3.0, pp. 19-20; Tr. 61-62.)

In 2003, AmerenIP used 624 well charts from 1994 (as well as from 1995, 1998 and 1999) to compare injections recorded on the plant metering to injections recorded on the individual well meters. (AmerenIP Ex. 3.0, p. 23.) Based on these facts, Staff contended that when AmerenIP determined in late 1999 that the injection meter over-registration and the withdrawal meter over-registration were approximately equal, AmerenIP "was in possession of

information that disputed that conclusion" and in fact "squarely pointed to a significant inventory shortfall" at Hillsboro. Staff also criticized the basis on which AmerenIP estimated the amount of the injection meter over-registration. Therefore, Staff contended, AmerenIP should have discovered in 2000 that it had a significant measurement error at HSF, and should have begun to reinject gas to restore the inventory shortfall in 2000. (Staff Ex. 2.00, pp. 22-23; Tr. 62.)

Staff's contentions were based on unsupportable premises, had the benefit of hindsight, and did not demonstrate any imprudence by AmerenIP. Staff criticized AmerenIP for using, in its 2000 estimate of the extent of the injection metering error, what Staff contended were unsupportable assumptions that the Hillsboro compressors had run on average 15% of the time at 50% loading and 85% of the time at 100% loading.[14] (Staff Ex. 2.00, p. 21; AmerenIP Ex. 3.0, p. 22.) However, in making its calculations, AmerenIP relied on information in the Peterson Report, and estimated the compressor loading levels based on its experience as to how they had been operated over time. Since Peterson had calculated the injection measurement error for two of the compressor loading steps (50% loading and 100% loading), these were the error measurements AmerenIP had available to use in developing an estimate of the overall injection over-registration. (AmerenIP Ex. 3.0, pp. 22-23.) Staff never suggested any basis on which AmerenIP could have made different or "better" estimates of the percentages of time at which the compressors had operated at various levels over the 1994-1999 period. In short, the Company's calculation of the cumulative amount of the injection meter over-registration was

[14]AmerenIP had not maintained logs of the operation of the compressors on a 24-hour basis, so it did not have documentation to determine the specific number of hours the compressors had operated at the various loading levels over the 1994-1999 period. (AmerenIP Ex. 3.0, p. 22.) Staff did not criticize the Company for not maintaining historic, 24-hour-per-day logs of the levels at which the HSF compressors were loaded and operated, and did not suggest that a prudent operator would have maintained such data.

based on the best information it had available to make that calculation in early 2000 after the injection meter over-registration was discovered.

Staff also argued that the Company's underestimation of the injection meter error was due to its reduction in the number of storage field supervisors.[15] (Staff Init. Br., pp. 9-10.) This argument is unfounded, and ignores the specific reason for the underestimation, namely, that the Company had not recorded, or maintained any records of, the amounts of time the compressors operated at the different loading levels. (AmerenIP Ex.3.0, p. 22.) Moreover, as noted above, the Company's estimate of the injection meter over-registration was based on the judgment and experience of its storage field personnel as to the amount of time the compressors had operated at the different loadings. Staff's arguments were inconsistent, because while Staff contended the Company could have made a better estimate of the injection meter over-registration if it had had more supervisory and technical personnel, Staff dismissed as "unsupported" (Staff Init. Br., p. 10) the calculation of the over-registration the Company actually made based on the judgment and experience of its storage field operating personnel.

Staff's assertion that in 1999, AmerenIP should have used the 1994 well charts from the individual I/W wells to determine that the injection meter over-registration was much larger than estimated, is also unfounded and does not demonstrate any lack of prudence. As noted above, the individual I/W wells do not actually record the volumes of gas injected at each well, but rather only record temperature and pressure data, which could be used to calculate the amount of gas injected at an individual well. (AmerenIP IP Ex. 3.0, p. 19; Tr. 61, 68.) Prior to the analysis performed in 2003, AmerenIP historically had not aggregated data from individual well charts for the purpose of determining total daily injection volumes at the I/W wells. (AmerenIP Ex.

[15]Staff's arguments relating to the reduction in number of storage field supervisors is addressed in detail in §II.B.2.b below.

3.0, p. 23.) Indeed, the I/W well meters were not set up in accordance with AGA guidelines and, as the Staff witness testified, were not reliable enough to be used to accurately calculate injections into the Hillsboro Storage Field. (Tr. 63-65.)

The well charts from 1994 had been integrated for a different purpose, specifically, to use in creating individual well histories to input into the Company's reservoir simulation model of the Hillsboro Field. (AmerenIP Ex. 3.0, p. 23.) Further, in that analysis (conducted in the mid-1990s), it was assumed that the main plant injection metering was correct and that the I/W well chart data was inaccurate or incomplete; the I/W well injection data was adjusted to match the daily volumes recorded on the main plant injection meters. (*Id*.)

Moreover, the individual I/W well charts historically were not maintained for each well for each day. (*Id*., p. 20.) When AmerenIP used the 1994 well charts in its 2003 study, it only had well chart data from about 45 days to use.[16] (*Id*., p. 23.) Additionally, in the 2003 study, the Company did not base its estimate of the amount of the inventory depletion directly on the well chart-to-plant meter comparison, but rather used this information in conjunction with the results of its reservoir simulation model for HSF. (*Id*., pp. 24-25.) The inventory correction factor ultimately developed in 2003 was developed using the reservoir simulation model. (*Id*., p. 28.)

As noted earlier, the Company did not identify until 2003 that it was possible to use I/W well chart data, from those days on which well charts from all operating I/W wells had been

[16]In order to use the well chart data to calculate the total amount of gas injected at the individual I/W wells on a particular day, it was necessary for AmerenIP to have maintained the well chart for each of the I/W wells that had operated on that day. Historically, this data had not been systematically maintained. (AmerenIP Ex. 3.0, p. 20; Tr. 70-71.) Thus, Staff's observation that in 2003, the Company used 624 well charts from 1994, while accurate, may give a misimpression as to the amount of data the Company had available. Because there are 14 I/W wells, 624 well charts represents only 45 days of injection data (i.e., 624 divided by 14). In 2003, when it used the I/W well chart data in estimating the amount of the HSF inventory depletion, the Company had compete well chart data for only about five days per month for four years. (Tr. 72.)

preserved, to estimate the volumes of gas injected on those days. Moreover, Staff provided no evidence that it was a common (or even an occasional) practice in the gas utility industry to maintain well chart data, or to use it to determine aggregate volumes of gas injected at a storage field's individual wells from day to day (and AmerenIP is not aware of such a practice). Nor did Staff cite any information to suggest why the Company should have recognized in 2000 that well chart data could be used for this purpose. Further, the record shows the Company used the same techniques used by other storage field operators to investigate the causes of delivery declines (AmerenIP Ex. 5.0, pp. 12-13), a fact Staff did not dispute. The fact that AmerenIP identified in 2003 that temperature and pressure data from the individual I/W well charts could be integrated to get a total injection volume estimate for a day, which could then be compared to the injection volumes recorded on the main plant meters for that day, in no way supports a conclusion that the Company was imprudent in not recognizing this possibility in 2000. Staff's argument was not supported by any evidence that making such comparisons was a typical or even an occasional practice by the Company or in the industry in general.[17] Thus, Staff's argument was based on hindsight – knowledge acquired in 2003 that data recorded on the individual I/W well charts could be used for this purpose -- and does not show the Company violated the prudence standard, i.e., what a reasonable person would be expected to do under the same circumstances encountered by utility management at the time (2000).

Further, as indicated above, there was limited availability of data from the individual I/W well charts to use to develop estimates of the amount of gas injected into the Field through the individual wells. This is because such estimates could be developed only for those days on

[17]Moreover, Staff never contended the Company should have maintained complete sets of well charts for every I/W well for every day, which is further evidence that the use of I/W well charts to determine injection volumes is not something other gas storage field operators do.

which well charts had been retained for each of the 14 I/W wells that were injecting on that day, and the well charts historically had not been systematically retained. For these and other reasons, in AmerenIP's 2004-2005 gas rate case, Docket 04-0476, the same Staff witness contended the Company's well chart analysis was not sufficiently accurate or reliable to produce an acceptable estimate of the amount of inventory depletion caused by the injection meter over-registration.[18] Specifically, he testified in that case that since the I/W meters were not set to AGA guidelines, they are not reliable enough to be used to calculate the injections into HSF, and that the inventory correction values the Company calculated using the well charts were at best inexact estimates. (Tr. 65, 67-68.) He also criticized the Company's use of the well charts in 2003 as incomplete and pointed out that the Company had only been able to use I/W well chart data from about 5 days per month. (Tr. 72.) He further testified that the 22% estimate of the inventory error AmerenIP had developed using the I/W well chart data was "not reasonable". (Tr. 73-74.) His overall recommendation in Docket 04-0476 was that AmerenIP's estimate of the gas measurement error was unreliable. (Tr. 74-75.)

In its Docket 04-0476 Order, the Commission accepted Staff's arguments concerning the lack of accuracy and reliability of AmerenIP's estimate of the amount of the inventory depletion that had occurred at Hillsboro due to the injection meter over-registration.[19] Moreover, in AmerenIP's appeal of the Docket 04-0476 Order, the Appellate Court affirmed the

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[18]*See, e.g.*, the Order in Docket 04-0476 (May 17, 2005), at page 13 ("According to Staff, *the methods used by IP to calculate the Hillsboro storage field measurement errors*, the resulting actual gas inventory, the recoverable base gas withdrawal, and *the injection amounts are simply too speculative and not sufficiently accurate* to provide a reasonable basis for an adjustment to and recalculation of the value of recoverable base gas amounts" (emphasis added)) and page 15 (referring to "Staff's criticisms of the well chart analysis.").

[19]*See* the Order in Docket 04-0476, p. 27 ("Based on its review of the record and the arguments of Staff and Illinois Power, the Commission concludes that Illinois Power's base gas inventory value for Hillsboro should be rejected").

Commission's conclusion on this point on the grounds that the conclusion was based on the Staff witness's testimony that the Company's estimate of the inventory depletion amount (*i.e.*, of the injection meter over-registration) was not accurate or reliable:

> The company contends that its determination of the amount of gas that was depleted was sufficiently reliable to justify inclusion of the investment in its rate base. The Commission disagreed with that contention and we must uphold that conclusion because it is not contrary to the manifest weight of the evidence. At the hearing, [Staff witness] *Lounsberry testified that it was unknown how much gas had been depleted from Hillsboro and that the Company's determination was not reliable. Lounsberry explained why he believed that the company's estimate in that regard could not be relied upon* . . . . The Commission ultimately adopted Lounsberry's analysis and rejected the analysis of [the Company witness] and the ALJ. . . . *The Commission's conclusions were founded upon Lounsberry's testimony* and thus, have adequate support in the record and are not contrary to the manifest weight of the evidence.[20]

Given that the Commission concluded in Docket 04-0476, based on Staff's testimony, that the use of the integrated I/W well chart data (from four years, not just one year) to produce an estimate of the amount of the injection meter over-registration (and thus of the inventory depletion) was not sufficiently accurate or reliable, it is fundamentally inconsistent to conclude that the Company was *imprudent* for failing to use the well chart data from just one year to estimate the amount of the injection meter over-registration.[21]

Additionally, while Staff argues that in 2000, the Company should have used the I/W well chart data from 1994 to estimate the injection meter error like it did in 2003, the fact is that in 2003 the Company used well chart data from <u>four</u> years to estimate the injection meter over-

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[20]*Illinois Power Co. v. Illinois Commerce Comm'n*, No. 3-05-0479 (3d Dist. May 12, 2006), slip opinion at p. 14 (emphasis added).

[21]In Docket 04-0476, Staff had other issues with AmerenIP's estimate of the HSF injection meter error and inventory depletion amount, in addition to the fact the I/W well chart data was inaccurate, incomplete and unreliable. However, had the I/W well chart-based estimates been deemed accurate and reliable, this could have mooted other concerns about accuracy of the overall estimate.

registration. The well chart data from the four years produced the following estimates of the injection meter over-registration:

1994: 22.1%
1995: 7.0%
1998: 12.7%
1999: 8.9%[22]

Had the Company in 2000 identified that it could use well chart data to attempt to estimate the amount of the injection meter over-registration, it certainly would not have used just the well chart data from 1994. Rather, the Company also would have used the well charts it had from 1995, 1998 and 1999 too (which, of course, existed in 2000) – just as it did in 2003. But the average of the four estimates that the Company developed in 2003 is only about 12.5% (much less than the estimate of 22.1% from the 1994 well chart data alone); and the lower end of the range for the four years (7.0%) is not much larger than the estimate AmerenIP made of the injection meter over-registration in 2000 (5.4%). Thus, use of the I/W well data would not have accounted for the full amount of the inventory depletion and would not have led to a conclusion that the injection meter over-registration was the sole source of the deliverability decline.[23] (AmerenIP Ex. 3.0, pp. 24-25.)

In short, when the circumstances presented and the information available at the time are considered, there is no basis to conclude AmerenIP was imprudent in 2000 in failing to use the

[22]AmerenIP Ex. 3.0, p. 24; Staff Ex. 2.00, p. 16; Tr. 72-73. The disparate values produced for the four years was one of the reasons Staff, in Docket 04-0476, concluded the estimate of the injection meter over-registration developed using the well chart data was not accurate or reliable.

[23]It is spurious for Staff to argue that in 2000, the Company should have used the well chart data it had for 1994, but not mention the well chart data from the three other years (1995, 1998 and 1999) that was also used in the 2003 analysis. Of course, the well chart data from the one year (1994) on which Staff chooses to base its argument yielded by far the largest estimate of the injection meter over-registration. As the discussion above shows, consideration of the estimates of the over-registration developed using all four years of pre-2000 well chart data substantially deflates Staff's argument.

I/W well charts it had from 1994 to develop an estimate of the amount of the injection meter over-registration over the 1994-1999 period.

b. Hillsboro Withdrawal Orifice Metering

The second of the three Hillsboro-specific facts on which Staff based its position that AmerenIP was imprudent in not beginning to reinject substantial quantities of replacement gas inventory in 2000 was that from 1993 to 1999, the Company had not inspected the orifice plates on the four withdrawal meters at Hillsboro. (Staff Ex. 2.00, p. 24.) Staff asserted this was inconsistent with the Commission's regulation at 83 Ill. Admin. Code 500.180(c), although the Staff witness acknowledged this provision is only applicable to customer billing meters, not to storage field metering, and stated "I am not suggesting that IP violated a Commission rule." (*Id*., pp. 25-26.) Staff also cited two AGA documents in support of its contention that AmerenIP should have inspected the orifice plates more frequently. (*Id*., pp. 26-28.) Staff's overall conclusion was that "IP did not place a high priority on accurate measurement for withdrawals from the Hillsboro storage field immediately after the expansion of the field" (*Id*., p. 33), and that if the Company had found the orifice plate error sooner, this "would have also allowed IP to focus solely on just the injection metering error" in 1999-2000. (*Id*.)

Staff's reliance on this point was misplaced and does not support its conclusion that AmerenIP was imprudent. First, the Company should not be found to have been imprudent for failing to follow regulations and guidelines which by their terms do not apply to storage field withdrawal meters. Second, there is no causal connection between the Company's maintenance practices for the HSF *withdrawal* meters and the fact that it was not determined until 2003 that the cause of the Hillsboro deliverability decline was the plant *injection* meter over-registration.

i. The Regulations and Guidelines Cited by Staff Do Not Apply to the HSF Withdrawal Metering

The Staff witness testified that in maintaining the HSF withdrawal meters, AmerenIP did not follow "minimum standards" or "minimum requirements." (Staff Ex. 2.00, pp. 26, 33.) To support this assertion, he cited three documents he contended the Company should have followed. First, he cited the inspection schedules and procedures for orifice-type meters in 83 Ill. Adm. Code §500.180(c). (*Id*., p. 25.) However, as he acknowledged (*Id*., p. 25; Staff Ex. 4.00, p. 12), Code Part 500.180 applies only to custody transfer meters (*i.e.* meters located at customer premises that are used to bill the customer for gas delivered). In fact, the Commission has no maintenance or inspection requirements for storage field metering. (AmerenIP Ex. 3.0, p. 30; AmerenIP Ex. 3.3, pp. 20-21; Tr. 83-84.) Code Part 500.180 simply is not a standard the Company was required to follow with respect to its storage field withdrawal meters. (AmerenIP Ex. 3.0, p. 30.) Staff provided no explanation as to why the prudence standard requires AmerenIP (or any other utility) to expend resources complying with Commission requirements that are not applicable to the meters in question.

Second, the Staff witness also relied on an AGA document titled Report No. 3, Part 2 – Specification and Installation Requirements. (Staff Ex. 2.00 pp. 26-27.) This document, however, does not contain guidelines for inspection and maintenance of orifice meters, but rather contains guidelines for the *installation* of orifice meters. (AmerenIP Ex. 3.0, pp. 30-31; AmerenIP Ex. 3.3, pp. 19-20.) Specifically, this document describes its contents as follows:

> A.G.A. Report No. 3., Part 2 furnishes the *specifications and installation* requirements for the measurement of single phase, homogenous Newtonian fluids using concentric, square-edged, flange-tapped orifice meters. It provides the specifications for the *construction and installation* of orifice plates, meter tubes, and associated fittings. (AmerenIP Ex. 3.3, pp. 19-20 (emphasis added).)

The Company in fact *installed* the four HSF withdrawal meters to the standards of this AGA document (AmerenIP Ex. 3.0, p. 30; AmerenIP Ex. 3.3, p. 20), and Staff did not dispute this.[24]

Third, Staff cited an AGA document titled "AGA Gas Measurement Manual, Orifice Meters, Part No. 3." (Staff Ex. 2.00, p. 27.) However, this document is a guideline document only, not an industry standard, and it suggests a more frequent inspection schedule than required even by ICC Code Part 500, which does not apply to storage field metering. (AmerenIP Ex. 3.0, p. 31; Tr. 84.)

In addition to citing the three documents discussed above, Staff also made a general assertion that "it is understood in the industry that in order to maintain accurate metering, frequent checking of orifice plates is necessary." (Staff Ex. 2.00, p. 28.) This assertion was not supported with any references to applicable regulations, codes or standards. The Company witnesses, who have many years of experience in gas storage field and transmission operations (AmerenIP Ex. 3.0, pp. 1-2), disputed this abstract and unsupported assertion, particularly in the context of non-custody transfer storage field metering. (AmerenIP Ex. 3.0, p. 32.) In fact, as discussed below, the circumstances of the operation of the HSF withdrawal meters indicate "frequent checking" is not necessary.

Thus, Staff did not identify any Commission regulations or industry standards applicable to non-custody-transfer storage field withdrawal metering that the Company was required to follow, but did not. Further, any implication created by Staff's assertions that AmerenIP did not perform maintenance on the Hillsboro withdrawal meters would be incorrect. AmerenIP had

[24]Additionally, when Hillsboro was expanded in 1993, the Company added instrumentation to electronically measure and perform the computation of withdrawal volumes, which improved measurement accuracy (as well as reducing processing time). (AmerenIP Ex. 3.0, p. 32.) Therefore, Staff's assertion that "IP did not place a high priority on accurate measurements for natural gas withdrawals from the Hillsboro storage field immediately after the expansion" (Staff Ex. 2.0, p. 27) is unfounded.

(and continues to follow) an annual maintenance procedure for the HSF withdrawal meters.[25] (AmerenIP Ex. 3.0, p. 31.)

There are a number of reasons why it is not necessary to disassemble and inspect the withdrawal meter orifice plates at Hillsboro with the frequency contended by Staff:

- At Hillsboro the withdrawal meters sit a short distance downstream of the dehydration towers; due to this location, the opportunity for contaminants to impinge or degrade the orifice plates is remote.[26] As the Staff witness agreed, the proximity of this equipment to the orifice withdrawal meters means most of the contaminants should be knocked out before reaching the orifice meters. (AmerenIP Ex. 3.0, p. 33; Tr. 92-93.)

- The withdrawal meters only operate (have gas passing through them) when gas is being withdrawn from the Field, which as a general matter occurs only during the winter months (and then not necessarily every day). Further, the mis-labeled orifice plate was on the south <u>secondary</u> withdrawal run which is generally only operated during high withdrawal periods when the primary withdrawal runs are operating near full capacity. (Ameren 30, p. 10) Thus, the frequency of operation of the storage field withdrawal meters is much less than the frequency of use of custody transfer meters (the type of meters to which the documents cited by Staff apply), through which gas is likely flowing almost every day of the year. (AmerenIP Ex. 3.3, p. 20.)

- In fact, from 1993 to 1999, the south secondary withdrawal run (which had the mis-labeled orifice plate) operated on only 195 days, or a total of about 6-1/2 months of operation in six calendar years. (AmerenIP Ex. 3.0, pp. 10, 32.) In other words, by late 1999 this orifice meter had not yet experienced even a year's worth of actual operation. As Staff testified, the orifice plates on a gas meter cannot get "dirty" unless gas is passing through them. (Tr. 93.)

- Moreover, unlike a custody transfer meter at a customer's premises, the HSF withdrawal meters are monitored in operation by storage field personnel who are on site more than 40 hours per week in the withdrawal season. (AmerenIP Ex. 3.3, p. 21.)

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[25]The Company annually calibrates the differential transmitters of each orifice fitting, calibrates the pressure transmitters for each withdrawal pipeline, checks the calibration of the resistant temperature detectors for proper temperature indication, and checks the signal tubing between the orifice fitting and the differential transmitter for fluids. (AmerenIP Ex. 3.0, p. 31.)

[26]The dehydration towers operate to remove moisture from the gas stream and therefore to remove or knock out particles or other contaminants carried in the gas stream.

- There are other, independent means of identifying potential problems with an orifice plate besides physical inspection of the plate, such as monitoring the pressure drops across the orifice openings to check that they are consistent (if one orifice has a significantly different pressure drop than the others, this would signal a potentially abnormal condition). (*Id*., pp. 33-34.)

- The more frequently an orifice meter is disassembled and the plate is removed, the greater the potential to damage the plate in handling or to re-install it improperly. (*Id*.) While a utility should expect its employees to be able to disassemble and reassemble an orifice meter without incident, opening the meter and removing the plates does involve a risk of improper re-installation which must be taken into account in evaluating the frequency of the procedure.[27]

In fact, when the four HSF orifice plates were opened and inspected in 1999, they were found not to be degraded and were re-installed. The four plates are still in use today, subsequent inspections having shown no reason to replace them.[28] (AmerenIP Ex. 3.0, pp. 31, 33.)

In summary, the Commission regulations and the AGA documents cited by Staff were not applicable to the non-custody transfer withdrawal meters at Hillsboro. The documents cited by Staff and the other facts and circumstances in the record showed <u>at most</u> a difference of opinion between the Staff witness and the Company as to the maintenance and inspection practices AmerenIP should have followed with respect to the HSF non-custody transfer

[27]A technical paper cited in Staff's testimony (Staff Ex. 2.00, pp. 29-30) provided information demonstrating that measurement errors due to erroneous reinstallation of orifice plates can be significant. This indicates the risks of improper installation are real and must be given operational consideration. (AmerenIP Ex. 3.0, p. 35.)

[28]The Staff witness cited two papers on the potential impacts of dirty orifice plates on orifice meter accuracy. (Staff Ex. 2.00, pp. 29-30.) However, the conditions modeled or studied in these papers were not representative of conditions at the Hillsboro orifice meters. For example, the measurement error he cited from one of the papers was based on an orifice plate coated entirely on both sides with ¼ inch of valve grease. This condition far exceeded what was experienced with the Hillsboro orifice plates. (AmerenIP Ex. 3.0, pp. 34-35.) The record shows that the two papers cited by Staff were not useful or applicable references. (*Id*., pp. 35-36; *see* AmerenIP Cross Ex. 1.)

withdrawal metering during the period in question. However, such a difference of opinion does not provide a basis to conclude the Company was imprudent.

ii. Earlier Discovery of the Mis-labeled Orifice Plate on the HSF Withdrawal Meter Would Not Have Led to Earlier Discovery of the Amount of the Injection Meter Over-Registration

The discussion in the preceding subsection focused on whether AmerenIP should have discovered the mis-labeled orifice plate on one of the four HSF withdrawal meters earlier than 1999. Staff contended that if the Company had found the mis-labeled orifice plate (and thus eliminated the withdrawal metering error) sooner, it would have "focus[ed] solely" on the injection meter over-registration when it was discovered in 1999. (Staff Ex. 2.00, p. 33.) Staff's contention was speculative and not supported by the record. Contrary to Staff's assertion, there is no basis to conclude that if AmerenIP had discovered the mis-labeled <u>withdrawal</u> meter orifice plate prior to 1999, this would have resulted in the Company developing a more accurate estimate of the <u>injection</u> meter over-registration when it was first discovered in late 1999.

After the injection meter over-registration and the mislabeled withdrawal meter orifice plate were discovered in late 1999, the Company estimated the cumulative amounts of these over-registrations and concluded they were approximately off-setting. However, this determination was the product of independent estimates of the impacts of the two occurrences. The determination that the amounts of the two metering errors were approximately offsetting resulted because the Company significantly under-estimated the amount of the <u>injection</u> meter over-registration. The cumulative amount of the <u>withdrawal</u> measurement error could be accurately calculated since it was simply a function of the difference between the mis-labeled orifice plate size that had been used in the metering algorithm and the actual orifice plate size (10% smaller). (AmerenIP Ex. 3.0, pp. 11-12.) The Company believed the injection over-

registration and the withdrawal over-registration were approximately equal *solely* because its calculation of the injection meter over-registration was inaccurate. That calculation was 997,000 Mcf, which was not a large amount in the absolute, and certainly was not large enough to explain the Hillsboro deliverability decline.[29] (AmerenIP Ex. 3.0, pp. 38.)

Stated differently, even if the withdrawal meter over-registration had been *zero* in 1999 (because the Company had discovered and corrected it earlier or it had never occurred), the calculated injection meter over-registration would not have been large enough to cause AmerenIP, in 2000, to focus on the injection meter over-registration as the sole or even a primary cause of the deliverability decline. (*Id.*) Thus, even if the Staff witness were correct that the Company's maintenance and inspection practices with respect to the HSF withdrawal meters were inadequate, this inadequacy did not cause or contribute to the inability to determine the actual amount of the injection meter over-registration at an earlier point in time.

c. Withdrawal (Top Gas)Volumes

The third and final Hillsboro-specific fact on which Staff premised its assertion that AmerenIP was imprudent in the investigation and determination of the cause of the Hillsboro deliverability decline was that the amount of working gas the Company was able to cycle from HSF in the 1999-2000 and 2000-2001 winter seasons was less than the working gas volume of the Field prior to its expansion. Staff stated that "the Company missed another opportunity to identify a large shortfall." (Staff Ex. 2.00, p. 35.) However, while it is correct that in the 1999-2000 and 2000-2001 winters, AmerenIP withdrew less gas from HSF than the pre-expansion level, Staff's assertion as to the conclusion the Company should have drawn from this information was unfounded.

[29]The cumulative amount of the withdrawal metering error was 937,000 Mcf. (AmerenIP Ex. 3.0, p. 38.)

Specifically, the fact that AmerenIP was unable to *withdraw* more than 3.1 Bcf (the pre-expansion working gas volume) from the Field in these two winters did not tell the Company that the *volume* of gas in the Field had declined below 3.1 Bcf, or that there were no structural problems or cause for the inability to withdraw more gas. To the contrary, there could have been adequate gas injected into HSF to support higher withdrawal levels, but the inability to withdraw more than 3.1 Bcf could have been due to reservoir/structural problems, such as injected gas migrating or fingering to locations inaccessible by the existing withdrawal wells, or formation damage to I/W wells that limited the ability to access and withdraw all the working gas inventory. (AmerenIP Ex. 3.0, pp. 38-39.) Conversely, if the total annual gas withdrawal had *stabilized* at the pre-expansion volume, this would have indicated the true working gas volume of the existing reservoir was 3.1 Bcf and that all the additional gas injected post-expansion had been lost off structure. (*Id*., p. 39; AmerenIP Ex. 3.3, p. 9.) In neither event, however, would the fact working gas *withdrawals* had declined to or below the pre-expansion level signal that the cause of the deliverability decline was *not* a reservoir or structural problem.

In short, the fact that the Company could not withdraw as much gas from HSF as it had withdrawn prior to the expansion was consistent with the occurrence of a breach in the underground reservoir during the expansion process, resulting in gas injected into the Field being lost off-structure. As of the 2000-2001 winter, AmerenIP was still investigating a number of plausible reservoir or structural problems, including the possible substructure to the northeast of the Field, gas losses into the caprock, loss of injected gas due to "fingering", and gas losses through faults or fractures in the reservoir formation. (AmerenIP Ex. 5.0, pp. 9-10.) The fact that deliverability had declined below 3.1 Bcf told the Company a physical breach of the reservoir could have occurred during the expansion. (AmerenIP Ex. 3.0, p. 39; AmerenIP Ex.

3.3, p. 10.) Under these circumstances and with the information the Company had, it would not have been prudent to inject additional gas into HSF at that time. (AmerenIP Ex. 3.0, p. 39.)

The record with respect to this item, like the record on the first two Hillsboro-specific issues cited by Staff as the basis for its position, shows at most a difference of opinion between the Staff witness and the Company personnel who were involved in investigating the causes of the deliverability decline as to the conclusions AmerenIP should have drawn from the reduced withdrawal volumes. The third HSF-specific item relied on by Staff, just like the other two, does not provide a basis for concluding AmerenIP was imprudent in not identifying the cause of the deliverability decline in 2000 and in not beginning to inject substantial quantities of replacement gas inventory into HSF in that year.

d. Even if AmerenIP Had More Accurately Estimated the Extent of the Injection Meter Over-Registration in 2000, 2001 or 2002, the Company Could Not Have Prudently Begun to Inject Substantial Replacement Inventory Before Eliminating Possible Reservoir or Structural Causes for the Hillsboro Deliverability Decline

Even if AmerenIP had recognized in 2000 (as Staff claims it should have) that the injection meter over-registration was much larger than estimated at the time, this information would not have warranted commencing substantial reinjections of replacement gas inventory into HSF at that time. Even had the Company recognized in 2000 that the injection meter over-registration was much larger than calculated at the time, that determination would not have enabled AmerenIP to rule out reservoir or structural problems as a cause of the Hillsboro deliverability decline. As a result (and contrary to Staff's position), the Company could not have prudently commenced reinjecting significant amounts of replacement gas inventory into HSF in 2000, before completing its investigation of the potential reservoir and structural problems and eliminating such problems as causes of the deliverability decline.

As of the beginning of the 2000 injection season, the results of the 3-D seismic analysis indicated there was a substructure to the northeast of the Field to which approximately 3.5 Bcf of gas had migrated. At the time, this and other possible reservoir/structural causes were plausible causes of the HSF deliverability decline. (AmerenIP Ex. 3.0, p. 26.) The Company also knew that the Field's deliverability had declined by about 3.1 Bcf (from 7.6 Bcf to 4.5 Bcf), a decline consistent with the size of the substructure that was believed to exist. (AmerenIP Ex. 3.3, p. 4.) Based on the information available at the time, injecting additional gas to compensate for the injection meter over-registration would have left the possibility that some or all of the additional gas injections would migrate off structure, and the deliverability problems would continue. (AmerenIP Ex. 3.0, p. 26.) Further, the injection meter over-registration, the existence of the separate substructure and the other possible reservoir/structural issues being evaluated in 2000 were not mutually exclusive. (*Id*.)

In short, in the Spring of 2000, even knowing that the injection meter over-registration substantially exceeded the withdrawal meter over-registration would not have been sufficient information to enable AmerenIP to conclude that the injection meter over-registration was the sole cause of the Field's deliverability decline, or to rule out possible structural causes. (*Id*.) The purpose of drilling the Furness well in November 2000 (as discussed in §II.B.3 above) was to confirm or reject the existence of the substructure adjacent to the main reservoir to which gas was migrating, as indicated by the 3-D seismic analysis.[30] (AmerenIP Ex. 5.0, p. 12; AmerenIP Ex. 3.3, p. 5.) It was not until the Furness well was drilled in November 2000 that AmerenIP

[30]Additional potential reservoir or structural causes of the HSF deliverability decline, based on the information available to the Company in 2000, were discussed in §II.A.3 above. Further, as of Spring 2000, AmerenIP also needed to perform well stimulation treatments (which it initiated in November 2000) to address the possibility that formation damage near some of the I/W wells was causing or contributing to the deliverability decline. (AmerenIP Ex. 3.0, pp. 15-16.)

obtained additional information to cause the existence of a substructure to the northeast of the Field to be questioned. (AmerenIP Ex. 3.0, p. 27.)

As AmerenIP witness Mr. Hower testified, "To commence reinjecting large volumes of replacement gas at this time [2000] would have been unthinkable as the Company, based on the information available to it at that time, reasonably believed that any replacement gas would migrate further away from the storage field and possibly be lost." (AmerenIP Ex. 5.0, pp. 7-8.) Given the likelihood, in light of the recent expansion of the Field, that a structural problem was a cause of the deliverability decline, it was appropriate in 2000 for AmerenIP to continue with an investigation program relating to the potential structural causes, including drilling the Furness well, before making a final determination as to the cause of the deliverability problem and taking specific corrective actions or reinjecting large quantities of replacement inventory.[31] (*Id*., p. 8.)

In fact, the Staff witness testified that, "I agree that had the Company found the inventory shortfall problem in a timely fashion the Company would have still had to consider potential problems with the reservoir or other structural problems." Similarly, in its Initial Brief Staff stated, "Staff does not dispute the Company's need to investigate the potential reservoir problems at the Field" and "It is true that an investigation into the potential problems with the reservoir or other structural problems was warranted." (Staff Init. Br., pp. 17, 23.) Nevertheless,

[31]Obviously, during the period in question, the Company did reinject some gas into HSF each year, but only the amount it had been able to withdraw during the previous season, and only to attempt to maintain a working gas inventory of 4 Bcf -- in 1999, the Company made an adjustment so that it operated HSF as though it had only 4 Bcf of working gas inventory. (Tr. 196-98, 200-201.) By injecting the same amounts it had been able to withdraw the previous season, the Company was injecting an amount it believed it was not at risk of losing due to leakage. (Tr. 200-201.) Even with this conservative approach, however, the amount of gas the Company was able to withdraw continued to decline each winter, and this trend continued even after the injection meter over-registration problem was discovered and remediated in 2000. (*See* Staff Ex. 2.00, p. 9.) This continued decline, each year, in the amount of inventory that could be withdrawn was itself consistent with loss of gas through leakage from the reservoir.

the Staff witness asserted that "this does not mean that the Company could not have started replacing the inventory shortfall in 2000", but rather that "in my opinion, the Company would have begun replacing the inventory shortfall while it was investigating whether there were other problems with the reservoir." (Staff Ex. 4.00, p. 7; Tr. 82-83.) He also contended there were other indications that the source of the deliverability problem was an "inventory shortfall." (*Id*., pp. 7-8.) The Staff position is untenable, and certainly does not indicate *imprudent* actions by AmerenIP. Given the information that AmerenIP had available in early 2000, it would have been extremely unwise for the Company to begin reinjecting substantial quantities of replacement gas into HSF before eliminating the realistic possibilities of structural or geologic-related problems with the reservoir. (AmerenIP Ex. 3.3, pp. 2-3.) Even had AmerenIP possessed better knowledge of the full extent of the injection meter over-registration, it still would have been unwise and imprudent to being reinjecting significant quantities of replacement gas into the Field (*i.e.*, enough to attempt to restore the full post-expansion working gas inventory of 7.6 Bcf) before fully investigating the implications of the data and analyses that indicated gas was migrating from the main reservoir structure to areas that were not accessible by the existing withdrawal wells. (*Id.*)

Staff also argued that by reviewing observation well water levels and water production over time, AmerenIP had observed the volume of gas in the reservoir was decreasing; and through use of neutron logs, the Company had observed the gas bubble thinning over time, which "could be caused by gas moving away from the structure or from an inventory shortfall." (Staff Ex. 4.00, pp. 7-8; Tr. 82-83.) Staff contended this information "would have supported the conclusion that the inventory shortfall was the cause of the problem." (Staff Ex. 4.00, p. 8.)

However, Staff's assertion that AmerenIP should have recognized there was an "inventory shortfall" or an "inventory problem" prove nothing:

- Based on the same data, a strong case could be built for loss of gas from the reservoir by leakage as the problem, or that gas was "fingering" to and becoming trapped at the edges of the underground reservoir where it was difficult to recover. (AmerenIP Ex. 3.0, p. 17; AmerenIP Ex. 3.3, p. 8; AmerenIP Ex. 5.0, p. 9.) In fact, the reduction in thickness of the gas bubble that the Company detected prior to 2003, though neutron logs, was one of the pieces of evidence that caused the Company to believe gas could be leaking from the reservoir structure. (Tr. 198.)

- Staff's own testimony recognized that the observed gas bubble thinning could have been caused by "gas moving away from the structure." (Staff Ex. 4.00, p. 8; Tr. 83.) Yet Staff leaped to the conclusion that only one of two possible causes of the bubble thinning should have been adopted. (AmerenIP Ex. 3.3, p. 8.)

- More generally, "inventory shortfall" was never the <u>cause</u> of the deliverability problem at Hillsboro, it was the <u>result</u> of the problem. (AmerenIP Ex. 5.1, p. 2.) The issue confronting management was isolating <u>why</u> there was an "inventory shortfall." The inability to withdraw 7.6 Bcf of gas from HSF over several winter seasons (i.e., the "inventory shortfall") could have been due to previously-injected gas migrating to locations where it could not be accessed for withdrawal (as the Staff witness acknowledged in the testimony quoted above).

- The water levels at the observation wells and the gas bubble thinning indicated by neutron logs, as well as the decline of the working gas volume below pre-expansion levels, are all consistent with the loss of gas from the underground reservoir by leakage. (AmerenIP Ex. 3.0, pp. 16-17.) Based on this information, the cause of the problem could have been that the structure of the expanded reservoir was different than what was originally believed, or that gas was being lost due to several possible causes such as leakage through the caprock or across a fault or fracture in the reservoir, or irregular growth of the gas bubble (fingering). (AmerenIP Ex. 5.0, p. 9; AmerenIP Ex. 5.1, p. 2.) These potential causes of the "inventory shortfall" needed to be investigated and either confirmed or ruled out before the Company could reasonably initiate specific corrective actions such as reinjecting significant quantities of replacement gas inventory.

Moreover, although Staff contended AmerenIP should have begun reinjecting inventory while it continued to investigate other possible problems at the Field, Staff offered no parameters as to how much gas or at what rate the Company should have reinvested while continuing to

investigate other potential causes, or at what point the Company should have ceased reinjections if it had not yet identified (or ruled out) other possible causes. (AmerenIP Ex. 3.3, p. 25.)

In fact, Staff did not testify that any of the analyses of potential structural or reservoir problems the Company conducted should not have been conducted. To the contrary, the Staff witness testified that he was not contending the Company should not have drilled the Furness well in 2000, conducted the crosswell seismic surveys in 2001, performed well stimulation treatments in 2000, 2001 and 2002, or performed neutron logs to ascertain if gas was leaking from the underground reservoir structure. (Tr. 77-81.)

Thus, in summary, based on the information available to it as of early 2000, AmerenIP had a reasonable basis to believe (despite the discovery of the injection meter over-registration) that there were reservoir or structural causes for the Hillsboro deliverability decline, and thus that any additional replacement gas the Company injected into the Field could migrate away from the reservoir and possibly be lost. (AmerenIP Ex. 5.1, pp. 1-2.) Staff suggested that "the Company, in order to determine which avenue [i.e., a structural problem or an "inventory shortfall"] was the problem at Hillsboro should have started replacing inventory in the field, in order to determine the impact the replacement inventory would have, while at the same time continuing its investigation into potential reservoir problems." (Staff Ex. 4.00, p. 8.) But injecting substantial quantities of additional replacement gas into a storage reservoir experiencing potential structural or geologic problems could have been a costly mistake, resulting in millions of dollars of lost gas. Rather than follow the course of action recommended by Staff after the fact (a recommendation developed with the benefit of hindsight), the Company took a cautious approach at the time based on the information available to it and the potential reservoir and structural causes of the deliverability decline that had not yet been investigated and eliminated.

Staff acknowledged the possibility that the Commission could conclude it was reasonable for AmerenIP not to begin reinjecting replacement inventory until it had drilled the Furness well in November 2000. (Staff Ex. 2.00, p. 37.) The Staff witness also testified, "I agree that the results of the Furness # 1 well drilling did not necessarily eliminate the potential that other problems existed at the Field." (Staff Ex. 4.00, p. 19; Tr. 83.) However, he asserted that once the Furness well was drilled and did not locate the substructure that had been indicated by the 3-D seismic analysis, AmerenIP should have recognized there was no reservoir problem and that "the Furness #1 well completely invalidated the structural variance theory." (Staff Ex. 2.00, p. 36.) He asserted that at this point there could not have been any other problem at the Field besides an "inventory problem."[32] (*Id*.) Once again, however, Staff's assertion does not demonstrate imprudence, because it fails to take into account all the information the Company was trying to evaluate at the time.

Although drilling the Furness well in November 2000 did not locate a substructure in the area indicated by the 3-D seismic analysis, this result did not invalidate the possibility of a reservoir or structural cause, and it did not even invalidate the conclusion as to the existence of the substructure. (AmerenIP Ex. 3.0, pp. 28-29; AmerenIP Ex. 5.0, pp. 15-16.) Nor did it eliminate the possibility that there were still deliverability issues based on the structure of the Field. (AmerenIP Ex. 3.0, p. 29.) It only specifically confirmed that there was not a substructure at the location indicated by the 3-D seismic analysis. It did not invalidate the more general conclusion developed from the 3-D seismic data, namely, that gas was migrating away from the

[32]AmerenIP disputes Staff's conclusion, as discussed immediately below. However, if in fact drilling the Furness well in November 2000 is the event that should have caused the Company to recognize that the HSF deliverability decline was not due to a reservoir or structural problem, then AmerenIP could not be expected to have commenced reinjecting gas until 2001 at the earliest, not during the 2000 injection season.

main reservoir to other structures. (AmerenIP Ex. 5.0, pp. 15-16; AmerenIP Ex. 5.1, p. 5.) After drilling the Furness well, the Company had conflicting information – the 3-D seismic analysis, which indicated the existence of a substructure to which approximately 3.5 Bcf of gas had migrated, and the results of drilling the Furness well, which did not confirm the existence of the substructure in the anticipated location. It was therefore necessary to have the 3-D seismic analysis results reinterpreted. (AmerenIP Ex. 5.0, p. 16; AmerenIP Ex. 3.0, p. 29; AmerenIP Ex. 3.3, p. 5.) The re-interpretation could have concluded that the substructure was in a different location than originally determined. (*Id*.; AmerenIP Ex. 3.0, p. 29.) Further, had it been the case that the general conclusion originally drawn from the 3-D seismic analysis – that there was a substructure to which gas was migrating – was correct, then beginning substantial additional reinjections after drilling the Furness well would have only resulted in more gas migration and more losses.[33] (AmerenIP Ex. 5.0, p. 16; AmerenIP Ex, 3.3, pp. 5-6.)

In order to have the 3-D seismic analysis reinterpreted and resolve the conflicting information, it was necessary to gather additional data, by performing crosswell seismic surveys involving the Furness well and two other wells. (AmerenIP Ex. 3.0, p. 29; AmerenIP Ex. 5.0, p. 16.) A crosswell seismic survey, performed in a specific area, is a higher resolution process than the basic 3-D seismic process that was used to develop a profile of the entire reservoir. (AmerenIP Ex. 3.0, pp. 14, 29.) The crosswell seismic surveys were performed in June 2001.

[33]Contrary to Staff's assertions (*see* Staff Ex. 2.0, pp. 35-37), the fact that AmerenIP did not observe migrating gas at the observation wells located around the perimeter of the Field did not invalidate the possibility of a separate sub-structure to which gas was migrating, either. The observation wells do not form a continuous "wall" around the perimeter of the storage field, but rather are drilled around the edge of the Field primarily for the purpose of measuring reservoir pressures. The individual observation wells are miles apart. The 3-D seismic data indicated structural features such as high and low points in the shape of the reservoir that could provide routes for gas migration that would never be detected by the observation wells. (AmerenIP Ex. 5.0, pp. 16-18.)

(*Id*., p. 29.) Thereafter, using the results of the cross well seismic surveys, the original 3-D seismic data were re-analyzed it and the conclusion was reached that there was not a separate substructure. This re-analysis was completed in the Fall of 2001. (*Id*., pp. 14, 29.)

However, even at this point (Fall 2001), the possibility of a reservoir or structural problem as the cause of the Hillsboro deliverability problems could not be eliminated. Several remaining reservoir or structural possibilities that could have been causing the deliverability decline remained, including formation damage in the wells; gas losses to the caprock; gas migration via faults or fractures in the reservoir; or fingering of gas away from the withdrawal wells or other irregular growth of the gas bubble. All of these were very plausible causes that had not yet been eliminated. (AmerenIP Ex. 3.0, p. 30; AmerenIP Ex. 3.3, p. 6; AmerenIP Ex. 5.0, p. 18.) The results of drilling the Furness well did not rule out any of these potential structural causes for the HSF deliverability decline. (*Id*.) Indeed, Staff acknowledged that "the results of the Furness #1 well drilling did not necessarily eliminate the potential that other problems existed at the field." (Staff Ex. 4.00, p. 19.) Further, as shown by the data on page 9 of Staff Exhibit 2.00, even though the injection meter problem had been identified and addressed in early 2000, the amount of gas the Company was able to withdraw from the Field continued to decline in 2000, 2001 and 2002.

In the Fall of 2001, therefore, additional analyses and studies were still needed to eliminate these remaining possible structural causes for the deliverability decline. (AmerenIP Ex. 3.0, p. 30.) It was very important, and prudent, for AmerenIP to continue to investigate the root cause of the HSF deliverability decline, so that the proper corrective actions could be taken, before beginning significant injections of replacement gas inventory. (AmerenIP Ex. 5.0, p. 14.) As described in §II.A.5 above, these additional analyses and studies were completed by the early

Spring of 2003. (*See* AmerenIP Ex. 3.0, pp. 16-20.) If any of the potential causes had remained – which had not been ruled out as of the 2001 and 2002 injection seasons – beginning substantial additional reinjections to replace the gas inventory shortfall would have resulted in additional gas losses as well as potential environmental damage. (AmerenIP Ex. 5.0, p. 18.) In short, it would not have been prudent for the Company, in 2001 or even in 2002, to have followed the course of action subsequently suggested by Staff, *i.e.*, to initiate significant additional reinjections while continuing to investigate potential reservoir and structural problems . (*Id.*)

Here again the Staff witness and the Company have a difference of opinion as to whether the Company should have begun reinjecting significant additional amounts of replacement gas into HSF in 2000 or, alternatively, in 2001 after drilling the Furness well. However, a difference of opinion is not sufficient basis to find the Company imprudent or to impose a disallowance.[34] Moreover, the Staff witness's opinion was arrived at with the benefit of hindsight – the knowledge that the completion of the Company's investigations in 2003 showed there was no reservoir or structural problem causing the deliverability decline. In contrast, the Company's actions were based on the information available to it in 2000, 2001 and 2002. Unlike the Staff witness's recommendation, originally made in 2005 (in Docket 03-0699), that AmerenIP should have begun reinjecting significant amounts of replacement gas inventory into HSF in 2000 (or alternatively, in 2001), Company management did not have the luxury in those years of knowing that gas was not leaking or migrating from the reservoir area or otherwise becoming inaccessible from the existing withdrawal wells, due to breaches in the reservoir structure, existence of unknown sub-structures, fingering or other reservoir or structural problems. Therefore, the Company took a cautious approach to reinjections. Based on the information available to

[34] *Illinois Commerce Comm'n v. Commonwealth Edison Co.*, Docket 84-0395 (Oct. 17, 1987), p. 17; *Illinois Power Co. v. Commerce Comm'n*, 339 Ill. App. 3d 425, 435 (5th Dist. 2003).

management at the time, the fact that AmerenIP did not begin reinjecting significant amounts of replacement gas inventory into HSF in 2000 cannot be considered imprudent. The Company was not imprudent in taking the cautious approach it followed.

2. Staff's "Overall Storage Concerns" Do Not Demonstrate AmerenIP Was Imprudent in its Investigation and Remediation of the Hillsboro Deliverability Decline or That the Company Should Have Discovered the Cause of the Deliverability Decline and Begun to Reinject Replacement Gas Inventory in 2000

In addition to the three Hillsboro-specific items discussed in §II.B.1 above, the Staff witness also cited several "overall storage concerns" in support of his contention that AmerenIP had been imprudent in its investigation and determination of the cause of the Hillsboro deliverability decline. Specifically, he cited (i) the fact that AmerenIP had reduced the peak day rating of Hillsboro and had also reduced (for one season, 2001-2002) the peak day rating of its Shanghai Storage Field; (ii) a reduction in the number of supervisors at the storage fields over the period 1991-2000; (iii) a reduced level of capital expenditure budgets for the storage fields in 2002-2004 compared to earlier years; and (iv) a purported inability to adequately identify problems. (Staff Ex. 2.00, pp. 37-55.) As discussed below, none of these "overall storage concerns" are valid. More generally, other than making general, unsupported assertions, the Staff witness showed no causal connection between any of these "concerns" and the Hillsboro deliverability decline or the speed with which AmerenIP investigated, identified and remediated the cause of the deliverability decline.

a. Reduction in Peak Day Capacity

The first "overall storage concern" was that on two occasions, AmerenIP has reduced the peak day capacity of a storage field. (Staff Ex. 2.00, pp. 38-39.) One of those instances is the

reduction in Hillsboro's peak day capacity.[35] Hillsboro operated at its full peak day capacity during 2004, and gas costs for this reconciliation period were not impacted by any operation below peak capacity. In any event, whether the reduction in the HSF peak capacity (if it is relevant to this reconciliation year at all) occurred as a result of imprudent actions should be decided on the basis of the specific facts and circumstances discussed in §II.A and II.B.1 above, not based on the mere fact the peak capacity was reduced.

The other occurrence was the reduction of the peak day capacity of the Shanghai Field for the 2001-2002 winter. (Staff Ex. 2.00, p. 39.) This capacity reduction was specifically at issue in the Company's PGA reconciliation case for 2001, Docket 01-0701, where the same Staff witness recommended the Commission find the Shanghai capacity reduction occurred due to imprudence. However, in its Order in Docket 01-0701 the Commission *rejected* the Staff recommendation and affirmatively found the Company had acted reasonably and prudently in reducing the peak capacity of Shanghai for the 2001-2002 winter. (Order in Docket 01-0701, Feb. 19, 2004, p. 25.) This determination was made on the basis of an extensive review of the facts relating to the causes for the temporary reduction in Shanghai's peak capacity and the Company's actions. (*Id.*, pp. 7-11, 16-19, 22-25.) In light of this prior, specific Commission finding, there is no basis for using the Shanghai capacity reduction in the 2001-2002 winter as grounds for an imprudence finding in 2004 relating to a *different* storage field.

Staff asserted that reduction of the capacity of a storage field is an "uncommon event" and thus "is not a positive indication" of the utility's management or oversight over the storage facility. (Staff Ex. 2.00, p. 39.) The assertion that reduction of the capacity of a storage field is an "uncommon event" is incorrect. Deliverability decline is the most common problem

[35]The peak day capacity rating of Hillsboro was restored to 125,000 Mcf/day prior to 2004, and HSF operated at its full peak capacity in 2004. (AmerenIP Ex. 2.2, p. 4.)

encountered by operators in the gas storage industry. (AmerenIP Ex. 5.0, p. 19.) According to information published by the U.S. Department of Energy ("DOE"), based on more than 350 U.S. storage reservoirs, most gas storage operators experience a loss in deliverability over time. (*Id*.; PO, pp. 19-20.) As an indication of the significance of this problem, the DOE has funded research to attempt to address the causes of declining productivity experienced by gas storage reservoirs. (*Id*.) Staff's characterization of the reduction in the capacity of a storage field as an "uncommon event" is not consistent with the experience of the U.S. gas storage industry. (*Id*., pp. 19-20.)

b. Manpower

The second "overall storage concern" cited by Staff was that "manpower levels at the Company's storage field operations changed over time". (Staff Ex. 2.00, p. 41.) Specifically, while the number of storage field operators has remained constant since 1991, the number of storage field supervisors was reduced from three or four during the 1991-1995 period to one in 2000. (*Id*.) Without citing any specific facts, Staff made the general assertion that "IP's reduction in oversight has caused it to operate its storage fields in a manner that is not safe, reliable and efficient." (*Id*., p. 42.)

However, the Staff witness did not show any relationship between the reduction in the number of supervisors and the HSF deliverability issues, and there is no such relationship to be shown. In 1991 the Company had a total of 16 storage field operators and three supervisors. The number of supervisors was reduced to two in 1995 and to one in 2000. Throughout this period, a staff of 16 operators was maintained. As of January 2003, the Company had 16 storage field operators and one supervisor, for a total of 17 employees at the storage fields, only two less than in 1991. (AmerenIP Ex. 2.2, p. 12.)

The reduction in number of supervisors occurred in conjunction with adoption, in 1995, of a manpower plan that included upgrading one of the operator positions at each storage field to a foreman's position. The manpower plan embodied a self-directed work team approach in which the work team for each field is responsible and accountable for the functions to be performed at the field to provide safe and reliable service. (*Id*., p. 13.) AmerenIP's storage field operators have more than 240 total years of gas storage experience (*id*.), which provides a strong foundation to carry out their responsibilities under the self-directed work team model.

In addition to the employees at the storage fields, throughout this period the Company had a manager of storage who was responsible for supervision of all the storage fields, as well as engineering and administrative personnel on its headquarters staff whose responsibilities include the storage fields. (*Id*., pp. 13-14.) The Company also used outside consultants and contractors for specific projects and studies relating to the storage fields, including unusual problems or occurrences that may arise at a storage field. (*Id*., p. 14.) Using outside consultants and contractors and headquarters engineering personnel to investigate and analyze such problems and occurrences minimizes the need to distract the personnel at the storage fields from their day-to-day operating responsibilities.

Nothing in the record supports Staff's assertion that the reduction in the number of storage field supervisors caused the Company to operate its storage assets in a manner that is not safe, reliable and efficient. AmerenIP's storage fields have had an excellent safety record, as indicated by these undisputed facts:

- From 1994-2004, the Company had only three lost time accidents at its storage fields, with no lost time accidents from August 1998 through 2004. (AmerenIP Ex. 2.2, p. 15.)

- The Company has never had an incident which endangered public safety at any of its storage fields. (*Id*.)

- The Company's storage field operators have received extensive training on numerous safety-related topics. (*Id*.)

- The Commission's Office of Pipeline Safety ("OPS") performs annual audits of each AmerenIP storage field, including all records at each field and verification that leakage surveys and pipeline patrols have been performed. OPS issued only one "Non-Compliance" and two "Observations" in total to the Company for all seven of its storage fields for 2002-2004. The issues involved in these findings were minor and the Company addressed them immediately. (*Id*., pp 15-16.)

Additionally, over the period cited by Staff, the Company improved the efficiency of its storage fields through capital improvement projects. (AmerenIP Ex. 2.2, p. 16.) AmerenIP has increased efficiencies at its storage fields by implementing advanced technologies as they have become available. (*Id*., p. 19.) The automation and remote control features of the control systems for the storage fields were improved; all the storage fields now have updated control systems that have been installed over the past eleven years, with the control system upgrade for the final storage field completed in 2004. (*Id*.) The upgraded control systems make the storage plants more efficient operationally and improve AmerenIP's ability to monitor their operations, both on-site and from the central gas dispatch center. As a result of these improvements, the gas system dispatchers at the central dispatch center are able to monitor the status and operations of the storage fields. (*Id*.) AmerenIP has also adopted standardized operations software which enables operators from one field to go to any other field and control it. (*Id*.)

Staff also contended in its briefs, but not in its testimony, that the Company had reduced the number of engineering and technical personnel with responsibilities for the storage fields. (*See* Staff Init. Br., pp. 39-40; PO, pp. 8, 9-10.) In fact, the Staff witness testified that the "reduction in management oversight" he was concerned about was the reduction in the number of storage field supervisors. (Tr. 54.) In any event, the record shows that from the early 1990s through 2001, the Company had a geologist and one to three storage engineers on staff. (Tr. 179-

80.) The geologist retired in 2001 and his position was taken by Mr. Kemppainen, an engineer who had been with the Company since 1992 and before that had 23 years of experience in oil and gas exploration and production. (AmerenIP Ex. 3.0. p. 2.) Between 1992 and 2001, Mr. Kemppainen, although assigned to the Company's gas transmission group, was available (due to his background in storage) to assist the gas storage group in investigations, analyses and other needs, and from 1996 forward he was involved in the investigation of the HSF deliverability decline. (Tr. 183-84, 194-95.) A second engineer was assigned to the storage field organization throughout the period of interest in this case. (Tr. 193). A third engineer was assigned to the storage field organization until 2001 when he moved to the gas control group. (Tr. 194.)

In addition to these directly assigned personnel, the Company used other internal engineering resources to help in investigating or analyzing storage field issues. (Tr. 195.) Additionally, throughout the period of the HSF investigation, the Company also used outside engineering resources such as consultants and contractors to assist in investigating and analyzing storage field issues or problems.[36] (Tr. 195.) In fact, Mr. Kemppainen testified that at no time during the period 1995-2004 did management deny a request to use outside engineering or geologic resources to assist in an investigation at HSF or other storage fields when Mr. Kemppainen thought there was a need for such external resources. (Tr. 195-96.)

Finally, it is noteworthy that after acquiring IP in 2004, thereby expanding its total number of storage fields from five to twelve, Ameren added a manager position over all twelve storage fields to its organization; however, Ameren did not find a need to add additional supervisors or operating personnel at the AmerenIP storage fields. (AmerenIP Ex. 4.1, pp. 3-5.)

[36]AmerenIP Ex. 2.6 lists numerous studies conducted by outside consultants during the 1998-2004 period at HSF and other storage fields, including studies by EN Engineering, Halliburton, Infrared Scanned Technologies, Peterson Engineering, Packer Engineering, MHA and Westport.

After it had the opportunity, post-closing of the acquisition, to fully review IP's storage field operations, Ameren did not find a need to add supervisors or operating personnel at the AmerenIP storage fields or to depart from IP's pre-acquisition staffing model. (*Id*, p. 5.)

In response to all the foregoing information, Staff provided no facts to in any way link the level of staffing at the storage fields to the speed and aggressiveness with which AmerenIP investigated, determined and remediated the causes of the Hillsboro deliverability decline. Moreover, AmerenIP witnesses Hood and Kemppainen, who were directly involved in the investigation and remediation of the HSF deliverability issues, testified:

> [W]ith respect to the impacts, if any, of the reduction in the number of storage field supervisors on the Company's ability to determine the causes of the Hillsboro and Shanghai deliverability declines, we have been involved in the investigation, discovery and remediation of the problems that led to the temporary reduction of peak day capacity at Hillsboro and Shanghai and the deliverability decline at Hillsboro. Based on our involvement, we do not believe there is any connection between the reduction in the number of storage field supervisors and the reduction of peak day capacity and deliverability or the time it took to determine the root cause of the problems. To the contrary, Illinois Power diligently investigated the source of the declining performance at the Hillsboro Field over a number of years until it was identified and corrected. These efforts were not hampered by a lack of supervisory resources. Similarly, there is no causal connection to support [Staff's] assertion in the "Conclusion" to the "Overall Storage Concerns" section of his testimony (lines 1189-1190) that "After reducing its manpower levels, IP's ability to identify and act upon problems at its storage fields declined." (AmerenIP Ex. 3.0, p. 40.)

Staff's assertions concerning manpower do not support any conclusion that AmerenIP was imprudent in its investigation, determination and remediation of the Hillsboro deliverability decline or that the Company should have determined the source of the deliverability decline and begun to replace the depleted inventory sooner than 2003.

c. Capital Expenditures

Staff's third "overall storage concern" was that the Company's capital expenditures for its storage fields have decreased. Staff specifically pointed to the storage field capital

expenditures for 2002 through 2004 which were lower than the levels in 2000 or 2001. Staff stated it was "concerned that IP is being reactive rather than proactive when determining when to make upgrades or other improvements at its storage fields", which, Staff asserted, "has contributed negatively to IP's ability to maintain its storage operations." (Staff Ex. 2.00, pp. 43-45; Tr. 54-56.)

Staff's contention that AmerenIP's levels of annual capital expenditures have "contributed negatively to IP's ability to manage its storage operations" was another unsubstantiated assertion. As with the assertion concerning manpower levels, Staff provided no facts demonstrating a causal relationship between the Company's annual storage field capital expenditure levels and the speed with which the cause of the Hillsboro deliverability decline was investigated and identified.

AmerenIP Exhibit 2.4 showed the annual storage field capital expenditures, on both a direct cost and loaded (*i.e.*, with overheads charged to construction) basis, for the years 1995-2004. The capital expenditures have fluctuated over this period, and were higher in those years that large, one-time projects were completed. (AmerenIP Ex. 2.2, p. 16.) AmerenIP Exhibits 2.5 and 2.6 provided lists of the storage field capital improvement projects and of studies concerning the storage fields that were completed over this period. The Company witness identified the specific large, one-time projects that were completed in those years that had higher capital expenditures. (AmerenIP Ex. 2.2, pp. 16-17.) AmerenIP has been proactive in identifying and correcting problems at all its storage fields, and has initiated numerous projects to avoid potential problems while trying to ensure maximum deliverability ratings.[37] (*Id.*, p. 17.)

[37]AmerenIP Ex. 2.5 listed numerous projects that replaced or upgraded storage field facilities and equipment or installed new facilities and equipment. *See also* the discussion of the new control, monitoring and dispatch systems the Company installed, in §II.B.2.b above.

Due in part to the completion of several major capital projects over the period 1995-2001, the Company simply did not identify any additional major projects that warranted capital expenditures in 2002-2004. (*Id*., p. 18.) The year-to-year storage field capital expenditures over the 1995-2003 period are exactly what one would expect to see in the context of a relatively small gas system segment, that is, annual capital expenditures have been high in those years when specific, major capital projects are implemented and lower in years in which there is not a major project being implemented. The Company has not established its capital budgets in a manner intended to show relatively constant levels of spending from year to year, but rather has budgeted and scheduled significant larger projects as needed, which accounts for the year to year fluctuations in capital expenditures. (*Id*., p. 17.) In addition, the Company witness testified that in his experience in a management position through four annual budgeting cycles, a requested storage field capital project was never rejected by Company management due to capital budget limitations. (*Id*., p. 18.)

AmerenIP Exhibit 2.7 showed the annual storage field operation and maintenance ("O&M") expenditures and combined capital and O&M expenditures for 1995-2004. Amounts spent on O&M, like capital expenditures, contribute to the ability of the storage fields to operate in a safe, efficient and reliable manner. (AmerenIP Ex. 2.2, p. 20.) This exhibit showed the Company's storage field O&M expenditures in each of the years 2001 through 2004 were <u>higher than in any of the preceding six years</u> (1995-2000). (*Id*., p. 21; AmerenIP Ex. 2.7.) Further, although Staff asserted the Company may have been "reactive not proactive" in maintaining its storage fields, many of the activities that would initially be undertaken to investigate a problem at a storage field, such as hiring a consultant to conduct a review or perform a study, would typically be expensed, not capitalized. (Ameren IP Ex. 2.2, pp. 21-22.) Staff was well aware of

the Company's storage field O&M spending history over the 1995-2004 period, having requested and received through discovery information on the annual O&M expenses, yet Staff expressed no criticism of the Company's storage field O&M expenditures. (Tr. 107-08.)

Staff contended AmerenIP may have been "reactive rather than proactive" in making improvements at its storage fields because it does not earn a return on capital investments until its next rate case, whereas gas supply costs are automatically recovered through the PGA. (Staff Ex. 2.00, p. 44.) However, the high, and generally increasing, levels of the Company's annual storage field O&M expenses disproves this accusation. O&M expenses are not recovered through the PGA. (Tr. 108-09.) If, between rate cases, a utility spends more in O&M than was included in the revenue requirement in its last rate case (which for AmerenIP, prior to the 2004 reconciliation year, was 1993-1994), the utility can *never* recover from its customers the increased O&M costs it incurs during the period between rate cases. Yet, AmerenIP's storage field O&M expenditures generally increased over the 1995-2004 period.

Staff also argued in its briefs (but not in its testimony) that due to reduced manpower, the Company became "reactive versus proactive with regard to its capital spending", because a reduction in manpower can cause a utility to delay capital projects until its next rate case. (*See* Staff Init. Br., p. 12; PO, pp. 9-10.) There is simply no logic, however, to the argument that a "reduction in manpower" would cause a utility to delay capital spending or capital projects until a future rate case. In any event, as shown in §II.B.2.b above, Staff's claims that the Company reduced storage field manpower were greatly overstated; and as shown immediately above, analysis of the Company's actual storage field capital projects and its storage field O&M spending over the period 1995-2004 shows the Company did not defer or eliminate capital projects or reduce O&M spending at its storage fields between rate cases.

In the face of all this information, Staff was unable to identify any capital projects that should have been undertaken but were not, including any projects that would have enabled the Company to identify and remediate the cause of the Hillsboro deliverability decline sooner. (AmerenIP Ex. 2.2, p. 20.) Moreover, the years Staff pointed to in which capital expenditures were lower (2002-2004) do not correlate to the years in which, Staff alleges, there was imprudent management at HSF. The years 2000 and 2001, Staff contended, are the years in which the Company should have discovered the cause of the HSF deliverability decline, yet 2000 and 2001 were two of the years with *higher* storage field capital expenditures. (*See* AmerenIP Ex. 2.4.) Obviously, the inability to determine the cause of the HSF deliverability decline by 2000 or 2001 was *not* caused by the levels of capital expenditures in *2002, 2003 or 2004*.[38]

In any event, there is absolutely no evidence that AmerenIP's investigation of the cause of the Hillsboro deliverability decline was hampered or delayed by any lack of capital resources. As Company witnesses Hood and Kemppainen testified:

> [B]ased on our personal involvement in attempting to ascertain the cause of the Hillsboro deliverability decline, the failure to discover the underlying cause sooner did not result from the failure to undertake any particular capital projects or from the level of capital expenditures generally. As we have described in this testimony [IP Ex. 3.0], Illinois Power devoted considerable internal and external resources to determining the source of the Hillsboro performance decline. (AmerenIP Ex. 3.0, p. 41.)

Similarly, Company witness Shipp testified that:

> [I]n the one area that is specifically at issue in this case, i.e., the deliverability decline and inventory depletion of the Hillsboro Field, Illinois Power was

[38]Additionally, after acquiring IP in 2004 and reviewing IP's storage field operations, Ameren found no evidence of necessary storage field capital projects that were rejected or deferred due to capital spending constraints, and no evidence that storage field capital projects were not implemented in a timely manner. Ameren found that the IP storage fields had been generally well maintained, that capital projects needed at the storage fields had not been deferred or avoided under the prior ownership, and that there was not a need for substantial "catch-up" capital expenditures. (AmerenIP Ex. 4.0 Rev., p. 9; AmerenIP Ex. 4.1, pp. 2-3.)

> extremely proactive, over an extended period of time, in trying to identify and correct the root causes of the problem. [Staff] has not identified any capital projects, in either this case or in Docket 04-0476, which [Staff] contends could have enabled IP to identify and remediate the HSF deliverability issues sooner but which IP failed to undertake, for budgetary or any other reasons. In fact, [Staff] contends that IP should have determined the cause of the Hillsboro deliverability decline by 2000 or 2001 at the latest, and yet the Company's storage field capital expenditures for the years 1997 through 2001 were at levels [Staff] apparently believes were acceptable. (AmerenIP Ex. 2.2, pp. 19-20.)

d. Identification of Problems/Root Cause Analysis

Staff's final "overall storage concern" was that it questioned "IP's ability to identify problems or conduct thorough root cause analyses at its storage fields." (Staff Ex. 2.00, p. 45.) This concern was based on two specific occurrences: (1) a December 2000 incident at Hillsboro in which a produced water tank became overpressurized and was launched from its foundation, and (2) the fact that, while the Hillsboro injection meters were recording more gas being injected into the Field than was actually the case over the 1994-1999 period, the Company did not recognize that additional volumes of gas were entering its gas system (rather than being injected into the storage field). (*Id.*)

As with other areas of its arguments, Staff contended the Company did not conduct adequate root cause analyses of problems at its storage fields due to reduced personnel. (*See* PO, pp. 9-10.) AmerenIP reiterates that Staff's contentions about the Company's purported reduction of storage field personnel are greatly exaggerated. Further, Staff's contention that the Company failed to conduct adequate root cause analyses at its storage fields is based on only two occurrences, (i) the December 2000 produced water tank incident at Hillsboro and (ii) the fact that (according to Staff) the Company's gas dispatch personnel should have detected the gas that was not being injected into HSF entering the distribution system. As to the December 2000 Hillsboro incident, the Company (as detailed immediately below) promptly hired a qualified engineering consulting firm to investigate the incident, determine its causes and make

recommendations for corrective and preventative actions; and the Company in fact implemented numerous corrective actions to prevent a recurrence. With respect to Staff's "gas dispatch tracking" concern (which is unfounded in any event, as shown below), it is specifically based on the failure (again, according to Staff) of the Company's central gas dispatch personnel, not its storage field personnel, to detect additional gas entering the distribution system due to the HSF metering error. (*See* Staff Init. Br., pp. 11-12.) In short, neither of Staff's "identification of problems" concerns was in any way impacted by storage field personnel levels.

i. December 2000 Hillsboro Incident

Staff contended AmerenIP failed to conduct an adequate investigation of the root cause of the December 2000 Hillsboro incident, which Staff argued was evidence of poor management oversight. (Staff Ex. 2.00, p. 52; Staff Ex. 4.00, p. 30.) Staff's characterization of the Company's actions is wrong, for numerous reasons:

- Within two days following the December 16 incident, the Company hired a qualified outside consulting firm, Packer Engineering, a recognized forensic engineering expert[39], to conduct an investigation of the incident and submit a report, which Packer did on February 14, 2001. (AmerenIP Ex. 3.0, pp. 41-42; Tr. 111-112.) Staff did not question Packer Engineering's qualifications to conduct this investigation. (Tr. 112.)

- Packer Engineering's report identified a specific root cause of the explosion. (AmerenIP Ex. 3.0, p. 42.)

- The Commission's OPS conducted a thorough, independent investigation of the December 2000 incident and issued a report, but did not make any findings of violations or non-compliances by AmerenIP, nor find any fault with the quality or completeness of the Company's (or Packer's) investigation. (AmerenIP Ex. 3.2; AmerenIP Ex. 3.0, pp. 46, 48.) In fact, the OPS report relied heavily on information in the Packer report and other information gathered by the Company in its investigation. (AmerenIP Ex. 3.0, p. 43; AmerenIP Ex. 3.3, pp. 23-34.)

[39]Packer Engineering specializes in investigating the causes of accidents involving chemicals, metallurgical failures, fire, explosions and similar occurrences. (AmerenIP Ex. 3.0, pp. 41-42.)

- Based on its investigation, including the recommendations of Packer Engineering as well as the ICC OPS report, AmerenIP implemented a number of corrective actions for the purpose of preventing a repeat of the December 16 incident. Neither the OPS, the Staff witness in this case nor any other Staff member has ever criticized the sufficiency or completeness of AmerenIP's corrective actions. (AmerenIP Ex. 3.0, pp. 46-48; AmerenIP Ex. 3.3, pp. 23-24; Tr. 113.)

Although Staff stated in rebuttal testimony that "Without conducting a thorough review of what actually happened, IP cannot be assured that it took appropriate corrective actions" (Staff Ex. 4.00, p. 30), in the four dockets in which Staff has raised this same issue relating to the December 2000 incident, Staff has never identified any respect in which it contended the Company's corrective actions were insufficient or incomplete, nor identified any additional corrective actions Staff believes AmerenIP should have implemented. (AmerenIP Ex. 3.0, pp. 47-48; AmerenIP Ex. 3.3, p. 25.) The Staff witness criticized the sufficiency of AmerenIP's root cause analysis of the December 2000 incident, but the purpose of a root cause analysis is to identify corrective actions that can be taken to prevent the incident from occurring again. The Company implemented numerous corrective and preventative actions following the December 2000 incident, based on its investigation, and the sufficiency and completeness of these actions has not been questioned. (AmerenIP Ex. 3.0, p. 48.)

Staff argued that it considered the factors that led to over-pressurization of the produced water tank involved in the December 2000 incident to have been the real root cause of the incident; and Staff's testimony indicated Staff believed the root cause(s) of the incident were (i) the gas-water separator caused high pressure gas to be released into the produced water tank, and (2) the bubbling of the high pressure gas up through the water in the tank caused splashing and foaming which in turn caused ice to form on the cold interior walls of the produced water tank and seal its manway and its 6 inch vent, thereby leading to over-pressurization of the tank. (Staff Init. Br., p. 44; Staff Ex. 2.00, pp. 52-54; AmerenIP Ex. 3.3, p. 24.) However, AmerenIP

implemented specific corrective actions to prevent the produced water tank from becoming over-pressurized by these causes.[40] Since the Company implemented corrective actions that specifically address what Staff believes were the root cause(s) of the December 2000 incident, and Staff has never identified any additional corrective actions it believes the Company should have implemented, Staff's criticisms that AmerenIP did not conduct a proper root cause analysis of the December 2000 incident are baseless.

In any event, there is no connection between the December 2000 incident or its causes and the injection metering over-registration that was the cause of the HSF deliverability decline, or the speed and aggressiveness with which AmerenIP investigated the causes of the deliverability decline. Even if the Commission were to conclude that the Company's investigation of the December 2000 incident was insufficient or not aggressive enough (a conclusion which would have no basis), this would provide no grounds to question the sufficiency and diligence of AmerenIP's investigation into the causes of the HSF deliverability decline, or to question the sufficiency of the resources and attention the Company devoted to it.

ii. Gas Dispatch Tracking

Staff noted that over the period the Hillsboro injection meter over-registration was occurring, approximately 1 Bcf of additional gas per year on average entered AmerenIP's gas system (rather than being injected into the Field), but was not noticed by the Company's gas

[40]Specifically: (1) the gas can now be vented to air without going into the produced water tank first, so a different pathway exists to vent high pressure gas from the separator rather than just into the tank; and (2) a pressure transmitter was installed which monitors the internal pressure of the tank and generates an alarm when pressure in the tank rises above normal levels. (AmerenIP Ex. 3.3, pp. 24-25.) Further, additional venting capability was installed on the produced water tank, including a vertical 20 inch rupture disk and a 12 inch emergency pressure vent on the tank roof plus installation of a Teflon gasket in the 24 inch manway vent on the tank. (*Id*., p. 25; AmerenIP Ex. 3.0, pp. 46-47.)

dispatchers. Staff asserted this was an "example of IP's failure to adequately oversee its operations." (Staff Ex. 2.00, p. 56.)

However, when the 1 Bcf of gas is translated to a daily amount, it can be seen why this additional amount of gas would not be identified by the gas dispatchers. The 1 Bcf of gas equates to about 4,000 Mcf per day on average during the injection season. (AmerenIP Ex. 2.2, p. 22.) During the months of April, May, October and November, AmerenIP's purchased gas volumes (including gas for storage) are approximately 300,000 Mcf to 400,000 Mcf per day. An incremental amount of 4,000 Mcf per day during this period would not stand out as a significant error. (*Id*., p. 23.) Further, in addition to the Company's gas purchases (for its system supply customers), customer-owned (transportation) gas also enters the system each day. On a real-time basis, the dispatchers cannot distinguish between deliveries for transport customers and other deliveries entering the system. (*Id*.) Thus, an incremental amount of 4,000 Mcf per day would be even less apparent against the combined daily deliveries of transport customer purchases and AmerenIP gas purchases.

Moreover, AmerenIP's retail transportation tariff, Service Classification 76, as in effect during the 1993-1999 period, allowed transportation customers a daily variance of 50% between nominations and deliveries, which equates to a potential difference between aggregate nominations by and aggregate deliveries for transportation customers of 30,000 – 50,000 Mcf in a day. This variance far exceeds the 4,000 Mcf average daily injection over-registration that occurred at Hillsboro. (AmerenIP Ex. 2.2, p. 23; AmerenIP Ex. 2.8 Rev., p. 12.) Further, on any given day the line pack in AmerenIP's gas system could be as much as 10,000 Mcf. Thus, the average daily amount of excess gas, 4,000 Mcf, that entered the system due to the metering error was less than the amount of line pack typically in the system. (AmerenIP Ex. 2.2, pp. 23-24.)

During the summer injection months (June-September), the amount of gas entering the system (utility purchases plus transport customer gas) is less, due to lower end-user demand, and is in the range of 220,000 Mcf to 280,000 Mcf per day. (*Id*., p. 24.) Again, a variance of 4,000 Mcf/day would not be noticeable in the context of these incoming daily volumes and the other factors mentioned immediately above. (*Id*.)

Additionally, although the gas dispatchers may know what the total pipeline deliveries to the Company are on a day, they do not know the actual customer consumption on each day to enable them to compare the two values to determine if load equals deliveries. (AmerenIP Ex. 2.2, p. 24.) The vast majority of AmerenIP's customers are not metered on a daily basis, but rather on a non-calendar month basis.[41] (*Id*.) The dispatchers do not have the means to compare total daily deliveries from the pipelines to total daily deliveries to customers (system supply plus transport) plus storage injections to see if there are significant variances between these values.

The Staff witness attempted to bolster his contention that AmerenIP's dispatchers should have seen an average measurement error of 4,000 Mcf/day, by presenting an analysis based on gas volumes on the system during a one-week period in July 2003. (Staff Ex. 4.00, pp. 31-32.) His presentation, however, was flawed and incomplete. As a starting point, calculating the metering error occurring during the 1994-1999 period as a percentage of the daily volumes on the system in July 2003 was an inapt comparison, because the total gas load on the Company's system has been declining over time and was lower in 2003 than in the 1994-1999 period. (AmerenIP Ex. 2.8 Rev., p. 13.) By using the lower 2003 daily volume as the denominator in his calculation, the Staff witness inflated the error percentage he calculated. Staff further inflated

[41]That is, retail customers' meters are read on a cycled basis throughout the month, with the result that for most customers, the monthly period for which customer usage is measured is not the calendar month and does not correspond with the pipelines' billing periods.

the calculated error percentage by comparing the average daily measurement error to *only* the daily throughput for *non-transportation customers* (i.e., AmerenIP's system supply load), and failed to include the gas delivered for transportation customers. (AmerenIP Ex. 2.8 Rev., pp. 11-12.) As noted above, the dispatchers are not able to distinguish on a daily basis between gas delivered for transport customers and gas delivered for system supply customers, but rather would see only total deliveries to the system. (*Id*., p. 13.) Additionally, Staff erroneously used a grossly understated figure for daily throughput of firm sales customers in July 2003, 294,984 therms rather than the correct figure of 538,984 therms, thereby overstating Staff's calculated error percentage by a factor of almost two. (*Id*., p. 12.) All told, a correct calculation resulted in a 2.8% error percentage, not 13% as claimed by Staff. (*Id*., pp. 12-13.)

In rebuttal testimony, Staff attempted to change its approach by presenting an analysis based on the estimated 1.5 Bcf metering error experienced in 1994, *i.e.*, by using the highest estimated error in any of the six years.[42] (Staff Ex. 4.00, pp. 31-32.) However, this new analysis was flawed just like the original analysis. The comparison of a meter error amount in 1994 to daily throughput on the system in July 2003 was even more inapt because the Company's total system throughput was almost 100,000,000 therms higher in 1994 than in 2003, so again the effect of the comparison Staff chose to present was to inflate the calculated percentage error. The estimated average daily meter error in <u>1994</u> was only 4% of the total system throughput on July 7, <u>1994</u>. (AmerenIP Ex. 2.8 Rev., p. 13.) Further, Staff continued to inappropriately compare the amount of the metering error only to gas <u>sales</u> data rather than to data on deliveries to the system for sales plus transportation customer load plus injections to storage, which is the

[42]The estimated error of 1.5 Bcf in 1994 was the highest estimated error in any year of the six-year period. The estimated average annual error at HSF over the period was slightly under 1.0 Bcf, much closer to the 1 Bcf figure used in the Staff witness's original analysis. (AmerenIP Ex. 2.8 Rev., p. 8.)

incoming gas that the dispatchers see. (*Id*., p. 8.) In 1994, the year on which the Staff witness's analysis was based, the total metering error was only 1.7% of the total gas delivered to AmerenIP's city gate.[43] (*Id*., pp. 8-9.) Additionally, for 1994, the total estimated injection metering error translated to about 7,100 Mcf per day during the injection season. For the reasons discussed above in connection with Staff's original analysis, this daily amount would not stand out to the Company dispatchers as a significant error in the context of the total gas volumes entering the system on a daily basis. (*Id*., p. 9.)

AmerenIP Exhibit 2.9 showed the gas delivery volumes to the system for each day of the 1994-1999 injection seasons, the estimated average daily measurement error for that year, and the estimated average daily measurement error as a percent of deliveries for each day. On average, the daily measurement error as a percent of pipeline deliveries was 4.3% in 1994, 2.5% in 1995, 2.4% in 1996, 2.1% in 1997, 2.5% in 1998 and 2.1% in 1999. The highest percentage on any day in the six-year period was only 4.5%, and in fact in no year after 1994 did the percentage on any day ever exceed 3.60%. (AmerenIP Ex. 2.8 Rev., p. 9.)

Staff argued that the estimated average daily metering error should not be compared to the total gas deliveries entering the Company's system each day because the Company has meters installed at the premises of large transportation customers that measure daily usage and therefore the usage of these transportation customers can be known after-the-fact.[44] (Staff Init. Br., p. 48.) However, the reason the gas dispatchers cannot know the system usage on a daily basis is because of the system supply (sales) customers, not the transportation customers. AmerenIP has approximately 200 large transportation customers on its system out of

[43]In the other five years of the six-year period, the total metering error ranged from 1.0% to 1.3% of the total gas delivered to AmerenIP's city gate in the year. (AmerenIP Ex. 3.3, p. 9.)

[44]The transportation customers' usage on a given day is not available in real time. (Tr. 149.)

approximately 455,000 total customers. For the remainder of those 455,000 customers, the Company has no way to know their daily usage on a particular day either in real time or after the fact.[45] (Tr. 155-156.) Additionally, deliveries to the system for storage injections must also be considered in the analysis. Finally, even though the usage of the large transportation customers on a particular day can be determined after the fact, the deliveries coming into the system specifically for transportation customers on a particular day cannot be known with exactitude because the Company's transportation tariff (as in effect during the period in question) allowed transportation customers a daily variance of 50% between nominations and deliveries. (AmerenIP Ex. 2.2, p. 23; AmerenIP Ex. 2.8 Rev., p. 12.)

Staff also argued that the delivery data for those delivery points on AmerenIP's system that are primarily used for storage injections should have made the metering error more readily apparent. (Staff Ex. 4.00, p. 34.) This argument was premised on an incorrect assumption, because there are not a small number of delivery points on the AmerenIP system that are used primarily for receipt of gas for storage injections. Rather, gas delivered to virtually any AmerenIP delivery point on the Natural Gas Pipeline Company of America, Panhandle Eastern Pipe Line Company or Mississippi River Transmission Corporation pipeline systems can be moved to the Hillsboro Field for injection. (AmerenIP Ex. 2.8 Rev., p. 14.) Further, on a real-time basis, AmerenIP does not nominate to individual stations, but rather on an aggregate basis for each pipeline. Therefore, AmerenIP would not be tracking nominations versus deliveries at individual gate stations, which would be necessary to detect the storage field metering error at individual stations or even in the aggregate at the stations that feed HSF in the manner suggested by Staff. (*Id.*)

[45]The usage of these customers is measured only on a non-calendar month billing cycle basis. (AmerenIP Ex. 2.2, p. 24.) Further, billing cycles are spread throughout the month.

Finally, Staff's entire "gas dispatch tracking" argument is fundamentally flawed because it is premised on the assumptions that (i) there was a total metering error at Hillsboro of 5.9 Bcf over the 1994-1999 period, and (ii) the amount of this total metering error occurring in each of the six years was as shown on Table 2 on pages 45-46 of Staff's Initial Brief (which was taken from Staff Ex. 2.00, pp. 55-56). However, the estimated measurement errors for each year are based on AmerenIP's estimates, developed in 2003, of the amount of the injection meter over-registration in each year 1994-1999. These are the same estimates that Staff criticized in AmerenIP's gas rate case, Docket 04-0476, as inaccurate and unreliable (Tr. 74-75), and that Staff and the Commission rejected. (*See* §II.B.1.a above.) Thus, Staff's entire "gas dispatch tracking" argument is premised on annual and total amounts of injection meter error at HSF that Staff and the Commission have never accepted as accurate.

In summary, Staff's "gas dispatch tracking" point, like Staff's other "overall storage concerns" did not demonstrate that AmerenIP has failed to manage its storage fields in a safe, reliable and efficient manner.

C. The Proposed Order's Conclusion Does Not Support a Determination That AmerenIP Was Imprudent in its Investigation and Determination of the Cause of the Hillsboro Deliverability Decline or In Not Beginning Inventory Replacement in 2000

The PO adopts the conclusion from the 2003 Order that "AmerenIP acted imprudently in its response to the deliverability problems at the Hillsboro Storage Field" and that the Commission "agrees with Staff that the Company should have begun replacement of the HSF inventory in 2000." (PO, p. 10.) The PO also adopts the conclusions from the 2003 Order that "AmerenIP's repeated failures to properly operate and manage its natural gas storage fields in a prudent manner has resulted in cost increases that the Commission can no longer allow to be passed on to captive customers;" that "AmerenIP's repeated failures have risen to imprudence;"

and that "repeated human error demonstrates a lack of oversight and attention that constitutes imprudent operation and management of the Hillsboro Storage Field." (*Id.*) As shown in §II.A and II.B above, however, the PO's conclusions are not supported by the record in this case.

Based on the record in this case, the PO's conclusion on the Hillsboro issue, which is premised on agreeing with Staff's arguments, does not comport with the standard of prudence that this Commission and the courts have adopted:

> Prudence is that standard of care which a reasonable person would be expected to exercise under the same circumstances encountered by utility management at the time decisions had to be made. In determining whether a judgment was prudently made, only those facts available at the time judgment was exercised can be considered. Hindsight review is impermissible.
>
> Imprudence cannot be sustained by substituting one's judgment for that of another. The prudence standard recognizes that reasonable persons can have honest differences of opinion without one or the other necessarily being "imprudent."

ICC v. Commonwealth Edison Co., Docket 84-0395 (Oct. 17, 1987), p. 17 (quoted at page 3 of the PO); *see also Illinois Power Co. v. Commerce Comm'n*, 245 Ill. App. 3d 367, 371 (3d Dist. 1993); *Illinois Power Co. v. Commerce Comm'n*, 339 Ill. App. 3d 425, 428, 435 (5th Dist. 2003).

The record in this case, viewed in its entirety, demonstrates prudence, not imprudence, by AmerenIP in the investigation, identification and remediation of the cause(s) of the HSF deliverability decline experienced after its expansion. As shown in §II.A above, the record demonstrates AmerenIP worked diligently and continuously to try to identify and resolve the cause(s) from the time a potential problem was first identified until the cause was isolated and corrective action began. AmerenIP considered and investigated multiple possible causes, and expended considerable internal and external resources on finding the cause of the deliverability decline. While AmerenIP focused attention, at the outset, on the most likely causes of the deliverability decline in light of the recent expansion of the Field and experience in the gas

storage industry, namely, structural causes or other problems with the underground aquifer reservoir, AmerenIP investigated non-structural causes as well. Staff did not criticize any of the areas of investigation and analysis that AmerenIP pursued as being unnecessary or inappropriate. (*See* Tr. 76-82.) Throughout, AmerenIP took a reasonable and conservative approach of not beginning to reinject substantial quantities of replacement gas inventory into HSF until it was determined that the deliverability decline was not due to structural causes or other reservoir problems that could result in loss of the replacement inventory.

Staff's arguments, which the PO accepts, are based on a few isolated facts or observations whose significance (if any) could become apparent only in hindsight and only by one in possession of the knowledge, available only after the fact, that there were no structural or other reservoir-related problems with Hillsboro that were resulting in loss of gas inventory. By adopting Staff's arguments – which relied on a few isolated points and observations as the basis for Staff's position that AmerenIP acted imprudently – rather than basing its conclusion on the entirety of AmerenIP's efforts to investigate, identify and remediate the causes of the HSF deliverability decline, the PO violates the legal standard for prudence because it fails to take into account all the circumstances confronting AmerenIP, which management had to take into account in determining what actions should be taken, during the period that, according to Staff and the PO, AmerenIP acted imprudently.

Further, Staff's argument that "the Company should have begun replacement of the HSF inventory in 2000" (with which the PO states agreement (PO, p. 10)), constitutes *at most* a difference in opinion as to what actions AmerenIP should have taken at particular points during the 2000-2002 period. Under the legal standard for prudence, however, differences in opinion and judgment are not sufficient to support a finding of imprudence.

Moreover, Staff's opinions as to the actions AmerenIP should have taken, which the PO adopts as the "prudent" actions, are judgments arrived at by Staff with the benefit of hindsight, *i.e.*, with the benefit of knowing after the fact what the actual cause of the HSF deliverability decline was, and with the benefit of knowing after the fact that the potential reservoir and structural causes AmerenIP was investigating during the period in question were in fact not the causes of the HSF deliverability decline. The actions AmerenIP took during the period in question, which the PO concludes constituted imprudence, were based solely on the circumstances confronting AmerenIP management and the information available to AmerenIP management at the time; whereas Staff's subsequently-developed opinion as to the actions AmerenIP *should have taken* during the period in question was arrived at with the benefit of hindsight, that is, with the benefit of knowing the potential causes AmerenIP was investigating during the period in question did not prove to be causes of the HSF deliverability decline. Under the legal standard for prudence, however, a determination that a utility was imprudent cannot be based on information that is available only in hindsight.

The PO is also erroneous to the extent it relies on Staff's "overall storage concerns" to support its conclusion. As detailed in §II.B.2 above, the record in this case showed that (i) none of Staff's four "overall storage concerns" indicated any imprudence on the part of AmerenIP; and (ii) in any event, there was no causal connection between Staff's "overall storage concerns" and the HSF deliverability decline or the speed or aggressiveness with which AmerenIP investigated, discovered and remediated the cause of the HSF deliverability decline.

The PO further states that AmerenIP has had "repeated failures to properly operate and manage its natural gas storage fields in a prudent manner;" that "AmerenIP's repeated failures have risen to the level of imprudence;" and that "repeated human error demonstrates a lack of

oversight and attention that constitutes imprudent operation and management of the Hillsboro Storage Field." (PO, p. 10.) None of these assertions are supported by the record, and none of them provide any basis for the PO's overall conclusions that AmerenIP was imprudent in its management of the Hillsboro Field and should have begun replacement of HSF inventory in 2000. These assertions are not supported by the record and are contrary to the legal standard for prudence, for a number of reasons.

> **First**, the record does not show AmerenIP has had "repeated failures to properly operate its natural gas storage fields in a prudent manner" or "repeated failures" at its storage fields. The only instances of imprudence in AmerenIP's management of any of its seven gas storage fields alleged by Staff in this or any other recent PGA reconciliation case have been (i) Staff's claim in Docket 01-0701 that the reduction in the peak capacity of the Shanghai Field for only one winter (2001-2002) was due to imprudence, and (ii) Staff's claim of imprudence relating to the HSF deliverability decline. In Docket 01-0701 the Commission found (after thorough review of the facts) "that IP acted reasonably and prudently with regard to its decision to reduce the peak day deliverability of Shanghai by 25,000 Mcf/d for purposes of its 2001 PGA reconciliation." (Order in Docket 01-0701, Feb. 19, 2004, p. 25.) There is no basis for the PO's assertions that there have been "repeated failures" in AmerenIP's management of its gas storage fields.
>
> **Second**, the record shows that over the period 1995-2004, AmerenIP completed a substantial number of capital projects to replace and upgrade equipment at all its storage fields, as well as expending substantial amounts each year on operation and maintenance of its storage fields. (*See* §II.B.2.b and c above.)
>
> **Third**, even if there were any basis in the record for the PO's assertions that there have been "repeated errors" or "repeated failures" in AmerenIP's management of its gas storage fields (and as shown above there is absolutely no basis for these assertions), these assertions do not provide a basis for concluding AmerenIP was imprudent in its investigation, identification and remediation of the causes of the HSF deliverability decline or in its determination as to when it was prudent to begin reinjecting substantial amounts of replacement inventory at HSF. The record does not show AmerenIP's investigation of the cause of the HSF deliverability decline was constrained at any time by any lack of manpower or capital resources.
>
> **Fourth**, the legal standard for prudence which the Commission and the courts have adopted requires that prudence be determined based on consideration of the actions taken by management in light of the circumstances confronting, and the information available to, management at the time of the specific decisions and actions in question – not based on generalized and unsupported assertions as the PO has done.

The PO's overall conclusion that AmerenIP was imprudent because it did not begin replacing the HSF inventory in 2000 (PO, p. 10) is not supported by the record in this case and is contrary to the legal standard for prudence, because the record shows that *even if* AmerenIP had more accurately determined the scope of the injection meter error in 2000, AmerenIP still would have needed to investigate potential reservoir and structural causes for the HSF deliverability decline, and eliminate these potential causes, before beginning to reinject replacement gas to restore the HSF inventory to its full, post-expansion value. The record shows it would not have been prudent for AmerenIP to begin reinjecting substantial quantities of replacement gas inventory into HSF before fully investigating and eliminating potential reservoir and structural problems such as migration of gas to inaccessible areas of the underground formation or to a different underground structure, leakage of gas from the reservoir through breaches in the structure or the caprock, "fingering" or unusual configurations of the gas "bubble" in the underground aquifer reservoir, or formation damage in the area of withdrawal wells, due to the risk that the reinjected gas could also be lost or migrate to inaccessible locations as a result of these potential causes. It was **prudent** for AmerenIP **not** to begin reinjecting substantial additional amounts of replacement gas inventory until it had completed investigating, and eliminated, the potential reservoir or structural causes for the HSF deliverability decline (which AmerenIP did in 2003).

In fact, Staff agreed that even if AmerenIP had not under-estimated the scope of the injection meter error in 2000, AmerenIP would have still had to consider potential problems with the reservoir or other structural problems. However, in the Staff witness's opinion, AmerenIP should have begun reinjecting gas inventory to HSF in 2000 while it continued to investigate possible structural problems with the reservoir.

> I agree that had the Company found the inventory shortfall problem in a timely fashion the Company would have still had to consider potential problems with the reservoir or other structural problems. However, this does not mean that the Company could not have started replacing the inventory shortfall in 2000. Rather, in my opinion, the Company would have begun replacing the inventory shortfall while it was investigating whether there were other problems with the reservoir. (Staff Ex. 4.00R, p. 7.)

AmerenIP, on the other hand, believed, *based on the information that was available in 2000, 2001 and 2002* that the course of action the Staff witness subsequently opined should have been followed **would have not have been a prudent** course of action.

What the record reflects is a *difference of opinion* between AmerenIP and Staff as to whether it would have been prudent to begin reinjecting substantial quantities of gas in 2000 to restore the inventory to its full post-expansion value. By concluding that Staff's opinion was correct and represented the prudent course of action, and that the actions AmerenIP took based on the information available at the time were imprudent, the PO misapplies the legal standard for prudence. The legal standard for prudence recognizes that imprudence **cannot** be based on differences in judgment, particularly when one of the opinions (in this case, Staff's opinion that is adopted by the PO) is rendered with the knowledge, available only in hindsight, but not known in 2000-2002, that there were no reservoir or structural problems at HSF.

D. Alternative Exception: Even if the Commission Were to Conclude AmerenIP Was Imprudent in Failing to More Accurately Estimate the Amount of the Injection Metering Error, the Company Was Not Imprudent in Not Beginning to Reinject Significant Quantities of Gas Inventory in 2000 and 2001

The PO concludes AmerenIP was imprudent because "it should have begun replacement of the HSF inventory in 2000." (PO, p. 10.) The PO's Conclusion is based on agreeing with Staff's argument that the Company was imprudent in not recognizing in 2000 that the amount of the injection meter over-registration was much larger than the Company had estimated, and therefore in not recognizing that an "inventory shortfall" was a significant cause of the HSF

deliverability decline. However, *even if* AmerenIP had more accurately estimated the extent of the injection meter over-registration in 2000 (as Staff contended it should have), it still would have been prudent for the Company, based on the information available to it at the time, *not* to begin reinjecting substantial quantities of replacement gas inventory into Hillsboro in 2000 or 2001.[46] Therefore, if the Commission were to conclude AmerenIP should have determined in 2000 that the amount of the inject meter over-registration was much larger than the Company estimated at the time, the Commission should still find (contrary to the PO's conclusion) that the Company acted prudently in not beginning to reinject substantial quantities of gas in 2000 and 2001. The record shows this was a prudent course of action in light of the information available in 2000-2001 – even if AmerenIP had known the amount of the injection meter over-registration was much larger.

As of early 2000, AmerenIP had completed the 3-D seismic survey of the HSF reservoir. Analysis of the 3-D seismic survey results yielded the conclusion that a separate sub-structure existed to the northeast of the known reservoir structure, in an area not accessible by the existing withdrawal wells, to which approximately 3.5 Bcf of gas had migrated. (AmerenIP Ex. 3.0, p. 9; AmerenIP Ex. 5.0, p. 7.) This figure was consistent with the decline that had occurred in the Field's deliverability of about 3.1 Bcf (7.6 Bcf to 4.5 Bcf). (AmerenIP Ex. 3.3, p. 4.) Thus, the data and analyses at that time indicated gas was migrating out of the main reservoir structure to areas that were not accessible by the existing withdrawal wells. (*Id.*; AmerenIP Ex. 5.0, pp. 7-8.) The Company was preparing to drill the Furness well in the area in which the separate

[46]In fact, as shown in §II.A and II.B.1.d above, the Company acted prudently by not beginning to reinject substantial amounts of gas into Hillsboro to restore the inventory to its full value until 2003, after investigating and eliminating possible reservoir problems or structural causes for the deliverability decline. AmerenIP maintain as its primary position that it was prudent not to begin reinjecting substantial quantities of gas into HSF until the 2003 injection season.

substructure was located, to confirm (or reject) its existence and recover gas that had migrated to it. (AmerenIP Ex. 3.0, p. 13; AmerenIP Ex. 3.3, p. 3; AmerenIP Ex. 5.0, p. 7.) Given that, in light of the recent expansion of HSF, a structural problem was potentially a cause of the deliverability decline, as well as the specific results of the 3-D seismic analysis, it was appropriate, based on the information available at the time, for the Company to continue its analysis of possible structural causes by drilling the Furness well, before beginning to reinject substantial amounts of gas inventory into the Field. (AmerenIP Ex. 5.0, pp. 7-8; AmerenIP Ex. 5.1, pp. 1-3.) The Furness well was drilled in November 2000, immediately following the 2000 injection season.[47] (AmerenIP Ex. 3.0, p. 13.)

The Staff witness recognized the possibility that the Commission could conclude it was reasonable and prudent for AmerenIP to follow up on the results of the 3-D seismic analysis by drilling the Furness well, before beginning to reinject substantial additional amounts of replacement inventory into HSF. He testified that "Since the Furness #1 well was not drilled until November 2000, it does not correspond to my recommendation that the Commission assume injections to replace the inventory shortfall start in the summer of 2000. However, it does mark another milestone for when IP should have discovered it was faced with an inventory problem and not a reservoir problem." (Staff Ex. 2.00, p. 37.) Even after drilling the Furness well in November 2000 and not locating the separate 3.5 Mcf substructure indicated by the 3-D seismic analysis, however, AmerenIP was not imprudent in not beginning to reinject substantial amounts of replacement inventory during the 2001 injection season. Rather, it was reasonable and prudent for AmerenIP to continue to investigate possible structural or reservoir causes of the

[47]Substantial lead time is necessary prior to drilling a new well due to the precedent activities including determining exactly where to drill the well; obtaining permits; surveying, staking and grading the location; building access roads to the site; contracting for a drilling rig and crew through a bidding process; and scheduling a drilling crew. (AmerenIP Ex. 5.0, pp. 11-12.)

deliverability decline during the 2001 injection season, and to not begin to reinject substantial amounts of gas at that time. Although drilling the Furness well did not locate a separate substructure in the area indicated by the 3-D seismic analysis, this result did not invalidate the possibility of a reservoir or structural cause, and it did not even invalidate the possible existence of the substructure. (AmerenIP Ex. 3.0, pp. 28-29; AmerenIP Ex. 5.0, pp. 14-17.) The results of drilling the Furness well only confirmed there was not a substructure at the specific location indicated by the 3-D seismic analysis. It did not invalidate the more general conclusion developed from the 3-D seismic data that gas was migrating away from the main reservoir to other structures. (AmerenIP Ex. 5.0, pp. 15-16; AmerenIP Ex. 5.1, p. 5.)

After drilling the Furness well, AmerenIP had conflicting information – the 3-D seismic analysis, which indicated the existence of a substructure to which approximately 3.5 Bcf of gas had migrated, and the results of drilling the Furness well, which did not confirm the existence of the substructure in the anticipated location. It was therefore necessary to have the 3-D seismic analysis results reinterpreted. (AmerenIP Ex. 5.0, p. 18; AmerenIP Ex. 3.0, p. 29.) The re-interpretation could have concluded that the substructure was in a different location than originally determined. (AmerenIP Ex. 3.0, p. 29.) Further, had it been the case that the general conclusion originally drawn from the 3-D seismic analysis – that there was a substructure to which gas was migrating – was correct, then commencing a massive reinjection program in 2001, after drilling the Furness well, would have only resulted in more gas migration and more losses. (AmerenIP Ex. 5.0, p. 16.)

In order to have the 3-D seismic analysis reinterpreted and to resolve the conflicting information, it was necessary to gather additional data, by performing crosswell seismic surveys involving the Furness well and two other wells. (AmerenIP Ex. 3.0, pp. 14, 29; AmerenIP Ex.

5.0, p. 16.) Whereas the 3-D seismic analysis provided a profile of the structure of the entire reservoir area, a crosswell seismic survey is a higher resolution process than the basic 3-D seismic process and provides more detailed information on the characteristics of the structure in a specific area of the reservoir. (AmerenIP Ex. 3.0, p. 14.) The crosswell seismic surveys were performed in June 2001.[48] (*Id.*) Thereafter, with the benefit of the results of the crosswell seismic surveys, the original 3-D seismic data was re-analyzed, and the conclusion was reached that there was not a sub-structure in the area originally indicated. (*Id.*, pp. 14, 29) This re-analysis was completed in the Fall of 2001. (*Id.*, p. 14.)

Moreover, the results of drilling the Furness well did not rule other potential reservoir or structural causes that could have been the source of the HSF deliverability decline, including losses of gas through the caprock, gas migration via faults or fractures in the reservoir, formation damage in the wells, fingering of gas away from the withdrawal wells or other irregular growth of the gas bubble. All of these were very plausible causes that had not yet been eliminated as of late 2000. (AmerenIP Ex. 3.0, p. 15, 30; AmerenIP Ex. 5.0, p. 18; AmerenIP Ex. 5.1, p. 5.) In fact, the Staff witness testified that "the results of the Furness #1 well drilling did not necessarily eliminate the potential that other problems existed at the field." (Staff Ex. 4.00, p. 19.)

The Staff witness contended that once the Furness well was drilled in November 2000 and did not locate the substructure that had been indicated by the 3-D seismic analysis, AmerenIP should have recognized that "the Furness #1 well completely invalidated the structural variance theory," and that at this point there could not have been any other problem at the Field besides an "inventory problem." (Staff Ex. 2.00, p. 36.) However, as described above, as of

[48]Although this was seven months after the Furness well was drilled, the planning and preparation of a crosswell seismic survey requires a considerable amount of lead time. (AmerenIP Ex. 5.0, p. 11.)

November 2000, there continued to be a number of potential reservoir or structural causes for the HSF deliverability decline that needed to be investigated and eliminated (or confirmed) before the Company began to reinject substantial additional amounts of replacement inventory into the Field, lest reinjected gas be lost as well. Further, Staff's characterization of the HSF deliverability decline as an "inventory problem" only begs the question of whether the inventory depletion was due to loss of gas from the reservoir structure or due to some other cause, such as a metering error (or both). At most, the Staff witness's contention was an expression of opinion, and one rendered with the benefit of the knowledge, in hindsight, that the HSF deliverability decline was not caused by any reservoir or structural problem.

Thus, based on the need to drill the Furness well in November 2000, to conduct the crosswell seismic surveys in 2001 to verify there was no separate substructure to which gas was migrating – or to determine that the substructure was at a different location than originally believed – and to continue to investigate the other potential causes listed above, it was appropriate for AmerenIP to conduct and complete the additional analysis described above during 2000-2001. Based on the information available after the Furness well was drilled, which continued to indicate the possibility of a significant structural cause for loss of gas from the reservoir, it was prudent for AmerenIP to not begin to reinject substantial quantities of replacement gas inventory during the 2001 injection reason. Therefore, there is no basis to conclude AmerenIP should have "begun replacement of the HSF inventory" (PO, p. 10) any sooner than the 2002 injection season.

III. Conclusion

For the reasons set forth herein, the Commission should modify the ALJ's Proposed Order in accordance with this Brief on Exceptions and should adopt the replacement language in the Appendix hereto.

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APPENDIX

REPLACEMENT LANGUAGE FOR PROPOSED ORDER

I. Replacement Language for §III.C Commission Analysis and Conclusions

The text in §III.C of the PO, "Commission Analysis and Conclusions, should be deleted in its entirety and replaced with the following text:

> Based on its review of the record, the Commission concludes that the record establishes the prudence of AmerenIP's actions in connection with the investigation, identification and remediation of the declines in the deliverability of the Hillsboro Storage Field that resulted from the depletion of the storage field inventory which in turn was caused by the turbine injection metering error. The record demonstrates that the Company acted aggressively and proactively, and expended considerable internal and external resources, in attempting to identify, and ultimately identifying and resolving, the causes of the HSF deliverability decline. Based on the record, the Commission concludes AmerenIP's actions and decisions met the standard of prudence that the Commission has adopted. The Company focused its initial investigation of the deliverability decline on possible structural causes, which was reasonable based on industry experience, the fact that the Hillsboro reservoir had recently undergone a significant expansion, and the indications from the initial analyses that were performed. While the record indicates the Company focused its investigation on possible structural or geologic causes of the deliverability decline and was cautious in not resuming injections of gas inventory into HSF until it had reasonably investigated and eliminated the plausible structural causes, these approaches were appropriate in light of the information that was reasonably available to Company management at the various points in time throughout the investigation detailed in this record. The Commission cannot conclude that the Company was imprudent because it did not begin reinjecting substantial quantities of gas inventory into Hillsboro in 2000, 2001 or even 2002 while there were still reasonable possibilities that structural conditions existed that could result in the newly-injected gas migrating to inaccessible locations and being lost.
>
> The Commission also cannot conclude that the three specific Hillsboro-related items cited by Staff warrant a finding of imprudence. The Company adequately explained that the estimate it made in 1999-2000 of the extent of the injection metering error, albeit erroneous, was based on the best information reasonably available to the Company at the time. The Commission does not agree with Staff that AmerenIP was imprudent because it did not recognize until a later date that well chart data from the individual I/W wells could be used to estimate the extent of the turbine injection metering error. In fact, the Commission notes that in AmerenIP's recent gas rate case, Docket 04-0476, Staff criticized the well chart method as not being a reliable methodology for

estimating the amount of the injection metering error and resulting inventory depletion. Further, in 2003 the Company used other methods, including principally its reservoir simulation model of Hillsboro, to estimate the amount of the inventory depletion. Additionally, the Commission observes that looking at the correction factors the Company calculated in 2003 for the four years using the well chart data, the average for the four years is much lower than 22%. In other words, the Commission cannot conclude that if the Company had looked at all the well chart data at an earlier date, it would have concluded that the sole source of the Hillsboro deliverability issues was the injection metering error. Staff's argument on this point is too speculative to form the basis for a finding of imprudence.

With respect to the Hillsboro orifice withdrawal metering issues raised by Staff, the Commission notes that the regulations and other documents cited by Staff concerning meter inspection practices are not specifically applicable to the storage field withdrawal metering, and concludes that prudence did not require AmerenIP to expend resources to implement and apply standards and practices that were not applicable to the metering in question. The Commission also finds the record shows that AmerenIP failed to recognize the true extent of the turbine injection metering error sooner due to its inaccurate estimate of that error, and that even if the Company had followed the inspection practices for the orifice withdrawal meters that Staff cited, it would not have led to earlier discovery of the true size of the injection metering error. Finally, AmerenIP adequately explained why the other indicators of a possible "inventory problem" cited by Staff did not provide sufficient basis for the Company to rule out remaining structural causes and to commencing reinjecting substantial amounts of gas inventory into the Field until the Company had completed its investigations of possible reservoir or structural causes in 2003.

While there is little or no dispute between AmerenIP and Staff concerning the underlying facts relating to the Hillsboro deliverability decline and the Company's investigation of it, there is considerable dispute between the parties as to the inferences and conclusions the Company should have drawn from the available information at various points in time. The Company believes the actions it took and decisions it made at the various points in time were reasonable, while Staff is of the opinion that the Company should have taken other or different actions. The Commission has recognized in the past that differences in opinion do not amount to imprudence. Here, the Commission must recognize that the decisions the Company made and the actions it took were based on the information it had at each point in time, while Staff's opinions of what the Company should have done are necessarily informed by hindsight, including the knowledge that in fact there were no significant structural or geologic problems with the reservoir that were causing loss of inventory.

The Commission is not persuaded that any of Staff's "overall storage concerns" amount to or should contribute to a finding that AmerenIP was

imprudent. The Commission fully addressed the previous reduction in the peak day capacity of the Shanghai Field in Docket 01-0701, based on a full record, and found that the Company had acted prudently. The Commission is addressing the Hillsboro issues in this case based on a full analysis of the Company's decisions and actions. The Commission sees no reason to conclude that AmerenIP acted imprudently simply because the peak capacities of these storage fields were temporarily reduced, without analysis of the underlying causes.

With respect to Staff's concerns about storage field manpower, the record shows that overall manpower and resource levels directed towards storage field operations remained at reasonable levels and that the reorganization of the Company's storage field work force was based on a well-structured and thought-out plan designed to enable the Company to continue to provide safe, reliable and efficient service. With respect to Staff's concerns about storage field capital expenditures, the Commission sees no evidence to suggest that AmerenIP has failed to make, or delayed in making, necessary and appropriate replacements and upgrades to storage field facilities. Although Staff raised questions based on variations in year-to-year capital expenditure totals, AmerenIP responded appropriately by detailing all of the capital projects it implemented over the 1995-2004 period and explaining capital project initiatives it has implemented to improve the reliability and efficiency of service, such as replacing and upgrading control systems at all storage fields. Staff did not identify any capital projects it believes that AmerenIP should have implemented but did not, whether for budgetary or any other reasons. Moreover, the Company's storage field O&M expenditures have generally increased over the period in question. Further, Staff did not identify any connection between the Company's storage field manpower levels and annual capital budgets, on the one hand, and the Hillsboro deliverability decline or the effort and attention the Company devoted to investigating and attempting to solve this problem. The record shows the Company devoted significant attention and resources over an extended period to investigating and attempting to remediate the Hillsboro deliverability issues. Finally, the two circumstances cited by Staff with respect to root cause analysis do not support Staff's recommendation for an imprudence disallowance in this case. In particular, the Commission notes that in the case of the December 2000 Hillsboro accident, the Company promptly retained qualified outside assistance to investigate the cause of the action and to make recommendations; and that the Company implemented an extensive list of corrective actions, which Staff has not identified any inadequacies in or otherwise questioned.

Alternative Conclusion if the Commission concludes that IP should have begun Hillsboro reinjections in 2002:

Based on its review of the record, the Commission concludes that the evidence establishes the prudence of AmerenIP's actions in connection with the investigation, identification and remediation of the declines in the deliverability of the Hillsboro Storage Field that resulted from the depletion of the storage field

inventory which in turn was caused by the turbine injection metering error, with one exception. That exception is that the Company prudently should have begun to reinject replacement gas inventory into Hillsboro in 2002. The record demonstrates the Company acted aggressively and proactively, and expended considerable internal and external resources, in attempting to identify, and ultimately identifying and resolving, the causes of the Hillsboro Storage Field deliverability decline. Based on the record, the Commission concludes AmerenIP's actions and decisions met the standard of prudence that the Commission has adopted with respect to its actions through 2001, but that the Company should have begun to reinject replacement gas inventory into Hillsboro in the 2002 injection season. The Company focused its initial investigation of the deliverability decline on possible structural causes, which was reasonable based on industry experience, the fact that the Hillsboro reservoir had recently undergone a significant expansion, and the indications from the initial analyses that were performed. While the record indicates the Company focused its investigation on possible structural or geologic causes of the deliverability decline and was cautious in not resuming injections of gas inventory into HSF until it had reasonably investigated and eliminated the plausible structural causes, these approaches were appropriate in light of the information that was reasonably available to Company management at the various points in time throughout the investigation as detailed in this record. The Commission cannot conclude that the Company was imprudent because it did not begin reinjecting substantial quantities of gas inventory into Hillsboro in 2000 or 2001 while there were still reasonable possibilities that structural conditions existed that could result in the newly-injected gas migrating to inaccessible locations and being lost. However, the Commission concludes that after drilling the Furness well in November 2000 to verify the possible existence of a separate substructure to which gas was migrating, conducting the crosswell seismic surveys in the summer of 2001 and completing the reanalysis of the 3-D seismic survey in the Fall of 2001, the Company had ruled out possible reservoir or structural causes of the HSF deliverability decline to a sufficient extent that it could have begun reinjecting replacement inventory in the 2002 injection season.

The Commission also cannot conclude that the three specific Hillsboro-related items cited by Staff warrant the finding of imprudence proposed by Staff. The Company adequately explained that the estimate it made in 1999-2000 of the extent of the injection metering error, albeit erroneous, was based on the best information reasonably available to the Company at the time. The Commission does not agree with Staff that AmerenIP was imprudent because it did not recognize until a later date that well chart data from the individual I/W wells could be used to estimate the extent of the turbine injection metering error. In fact, the Commission notes that in AmerenIP's recent gas rate case, Docket 04-0476, Staff criticized the well chart method as not being a reliable methodology for estimating the amount of the injection metering error and resulting inventory depletion. Further, in 2003 the Company used other methods, including principally its reservoir simulation model of Hillsboro, to estimate the amount of

the inventory depletion. Additionally, the Commission observes that looking at the correction factors the Company calculated in 2003 for the four years using the well chart data, the average for the four years is much lower than 22%. In other words, the Commission cannot conclude that if the Company had looked at all the well chart data at an earlier date, it would have concluded that the sole source of the Hillsboro deliverability issues was the injection metering error. Staff's argument is too speculative to form the basis for a finding of imprudence.

With respect to the Hillsboro orifice withdrawal metering issues raised by Staff, the Commission notes that the regulations and other documents cited by Staff concerning meter inspection practices are not specifically applicable to the storage field withdrawal metering, and concludes that prudence did not require AmerenIP to expend resources to implement and apply standards and practices that were not applicable to the metering in question. The Commission also finds the record shows the Company failed to recognize the true extent of the turbine injection metering error sooner due to its inaccurate estimate of that error, and that even if the Company had followed the inspection practices for the orifice withdrawal meters that Staff cited, it would not have led to earlier discovery of the true size of the injection metering error. Finally, AmerenIP adequately explained why the other indicators of a possible "inventory problem" cited by Staff did not provide sufficient basis for the Company to rule out remaining structural causes and to commencing reinjecting substantial amounts of gas inventory into the Field as early as 2000 or 2001. However, as described above, the Commission believes that based on the information available to the Company in 2002, it should have begun to reinject replacement gas inventory during the 2002 injection season.

While there is little or no dispute between AmerenIP and Staff concerning the underlying facts relating to the Hillsboro deliverability decline and the Company's investigation of it, there is considerable dispute between the parties as to the inferences and conclusions that the Company should have drawn from the available information at various points in time. The Company believes the actions it took and decisions it made at the various points in time were reasonable, while Staff is of the opinion that the Company should have taken other or different actions. The Commission has recognized in the past that differences in opinion do not amount to imprudence. Here, the Commission must recognize that the decisions the Company made and the actions it took were based on the information it had at each point in time, while Staff's opinions of what AmerenIP should have done are necessarily informed by hindsight, including the knowledge that in fact there were no significant structural or geologic problems with the reservoir that were causing a loss of gas inventory.

The Commission is not persuaded that any of Staff's "overall storage concerns" amount to or should contribute to a finding that AmerenIP was imprudent. The Commission fully addressed the previous reduction in the peak day capacity of the Shanghai Field in Docket 01-0701, based on a full record, and

found that the Company had acted prudently. The Commission is addressing the Hillsboro issues in this case based on a full analysis of the Company's decisions and actions. The Commission sees no reason to conclude that AmerenIP acted imprudently simply because the peak capacities of these storage fields were temporarily reduced, without analysis of the underlying causes.

With respect to Staff's concerns about storage field manpower, the record shows that overall manpower and resource levels directed towards storage field operations remained at reasonable levels and that the reorganization of the Company's storage field work force was based on a well-structured and thought-out plan designed to enable the Company to continue to provide safe, reliable and efficient service. With respect to Staff's concerns about storage field capital expenditures, the Commission sees no evidence to suggest that AmerenIP has failed to make, or delayed in making, necessary and appropriate replacements and upgrades to storage field facilities. Although Staff raised questions based on variations in year-to-year capital expenditure totals, AmerenIP responded appropriately by detailing all of the capital projects it implemented over the 1995-2004 period and explaining capital project initiatives it has implemented to improve the reliability and efficiency of service, such as replacing and upgrading control systems at all storage fields. Staff did not identify any capital projects it believes AmerenIP should have implemented but did not, whether for budgetary or any other reasons. Moreover, the Company's storage field O&M expenditures have generally increased over the period in question. Further, Staff did not identify any connection between the Company's storage field manpower levels and annual capital budgets, on the one hand, and the Hillsboro deliverability decline or the effort and attention the Company devoted to investigating and attempting to solve this problem. The record shows the Company devoted significant attention and resources over an extended period to investigating and attempting to remediate the Hillsboro deliverability issues. Finally, the two circumstances cited by Staff with respect to root cause analysis do not support Staff's recommendation for an imprudence disallowance in this case. In particular, the Commission notes that in the case of the December 2000 Hillsboro accident, the Company promptly retained qualified outside assistance to investigate the cause of the action and to make recommendations; and that the Company implemented an extensive list of corrective actions, which Staff has not identified any inadequacies in or otherwise questioned.

Accordingly, based on the conclusions reached herein with respect to the Hillsboro issues, AmerenIP's recoverable gas costs for the 2003 Reconciliation Period should be reduced by $1,187,804, as calculated on AmerenIP Exhibit 2.3. Staff did not dispute AmerenIP's calculation of this adjustment amount.

I. <u>Replacement Language for §IV. FINDINGS AND ORDERING PARAGRAPHS</u>

The Commission, having considered the entire record and being fully advised in the premises, is of the opinion and finds that:

(1) IP is a corporation engaged in the distribution of natural gas to the public in Illinois and, as such, is a public utility within the meaning of the Act;

(2) the Commission has jurisdiction over IP and of the subject matter of this proceeding;

(3) the statements of fact set forth in the prefatory portion of this Order are supported by the record and are hereby adopted as findings of fact;

(4) the evidence shows that during the Reconciliation Period, IP ~~did not~~ acted reasonably and prudently in its purchases of natural gas ~~with regard to the cost of gas related to the Hillsboro Storage Field deliverability~~;

(5) the proposed reconciliation of revenues collected under IP's PGA tariff with the actual cost of gas supplies during the Reconciliation Period, as described in Appendix A attached hereto, should be accepted [Note: AmerenIP Ex. 1.1 should be used as Appendix A] ; and

~~(6) IP should implement Factor O refunds of $2,846,138 for Rider A customers and $133,711 for Rider B Commodity customers in its first monthly PGA filing after the date of this Order;~~

~~(7)~~(6) all motions, petitions, objections, or other matters in this proceeding that remain unresolved of should be resolved consistent with the conclusions contained herein.

IT IS THEREFORE ORDERED by the Illinois Commerce Commission that in the reconciliation submitted by Illinois Power Company of the revenues collected under its PGA tariff with costs incurred for the purchase of natural gas for calendar year 2004 said costs were ~~not~~ prudent and reasonable.

IT IS FURTHER ORDERED that the approved reconciliation of revenues collected under IP's PGA tariff with the actual cost of gas prudently purchased for the reconciliation period is hereby approved as reflected in the attached Appendix A [NOTE: AmerenIP Exhibit 1.1 should be used as Appendix A].

~~IT IS FURTHER ORDERED that IP shall comply with Finding (6) of this order.~~

IT IS FURTHER ORDERED that all motions, petitions, objections, or other matters in this proceeding that remain unresolved are hereby resolved consistent with the conclusions contained herein.

IT IS FURTHER ORDERED that subject to the provisions of Section 10-113 of the Act and 83 Ill. Adm. Code 200.880, this Order is final; it is not subject to the Administrative Review Law.

Alternative if the Commission concludes AmerenIP should have begun Hillsboro reinjections in 2002

The Commission, having considered the entire record and being fully advised in the premises, is of the opinion and finds that:

(1) IP is a corporation engaged in the distribution of natural gas to the public in Illinois and, as such, is a public utility within the meaning of the Act;

(2) the Commission has jurisdiction over IP and of the subject matter of this proceeding;

(3) the statements of fact set forth in the prefatory portion of this Order are supported by the record and are hereby adopted as findings of fact;

(4) the evidence shows that during the Reconciliation Period, IP did not act reasonably and prudently in its purchases of natural gas in all respects with regard to the cost of gas related to the Hillsboro Storage Field deliverability;

(5) the proposed reconciliation of revenues collected under IP's PGA tariff with the actual cost of gas supplies during the Reconciliation Period, as described in Appendix A attached hereto, should be accepted [Note: see alternative Appendix A provided following this replacement language];

(6) IP should implement Factor O refunds of ~~$2,846,138~~ $1,134,591 for Rider A customers and ~~$133,711~~ $53,303 for Rider B Commodity customers in its first monthly PGA filing after the date of this Order; and

(7) all motions, petitions, objections, or other matters in this proceeding that remain unresolved of should be resolved consistent with the conclusions contained herein.

IT IS THEREFORE ORDERED by the Illinois Commerce Commission that in the reconciliation submitted by Illinois Power Company of the revenues collected under its PGA tariff with costs incurred for the purchase of natural gas for calendar year 2004 said costs were not in all respects prudent and reasonable.

IT IS FURTHER ORDERED that the approved reconciliation of revenues collected under IP's PGA tariff with the actual cost of gas prudently purchased for the reconciliation period is hereby approved as reflected in the attached Appendix A. [Note: see alternative Appendix A provided following this replacement language]

IT IS FURTHER ORDERED that IP shall comply with Finding (6) of this order.

IT IS FURTHER ORDERED that all motions, petitions, objections, or other matters in this proceeding that remain unresolved are hereby resolved consistent with the conclusions contained herein.

IT IS FURTHER ORDERED that subject to the provisions of Section 10-113 of the Act and 83 Ill. Adm. Code 200.880, this Order is final; it is not subject to the Administrative Review Law.

Illinois Power Company
PGA Reconciliation Summary
for the Year Ended December 31, 2004

Line No.	Description	Rider A	Rider B Demand	Rider B Commodity	Total Company (C+D+E)
(A)	(B)	(C)	(D)	(E)	(F)
1	Unamortized balance as of 12/31/03 per 2003 Reconciliation	$ 1,927,300	$ (154,699)	$ 336,092	$ 2,108,693
2	Factor A Adjustments Amortized to Schedule I at 12/31/03	6,172,728	(55,077)	153,578	6,271,229
3	Factor O Collected / (Refunded) during 2004	2,430,495	-	230,870	2,661,365
4	Balance to be Collected / (Refunded) during 2004 from prior periods (sum of lines 1 - 3)	$ 10,530,523	$ (209,776)	$ 720,540	$ 11,041,287
5	2004 Gas Costs	$ 297,647,946	$ 1,128,434	$ 18,937,270	$ 317,713,650
6	2004 PGA Revenues	(313,807,484)	(1,112,472)	(19,879,712)	(334,799,668)
7	Pipeline Surcharges / (Refunds)	(32,103)	-	(5,674)	(37,777)
8	Other Adjustments	-	-	-	-
9	Interest at 1.5% in 2004 and 2.5% in 2005	2,114	(2,103)	5,117	5,128
10	2004 Under / (Over)-Recovery (sum of lines 5 -9)	$ (16,189,527)	$ 13,859	$ (942,999)	$ (17,118,667)
11	Under / (Over)-Recovery Balance at 12/31/04	$ (5,659,004)	$ (195,917)	$ (222,459)	$ (6,077,380)
12	Factor A Adjustments Amortized to Schedule I at 12/31/04	$ (255,472)	$ (47,095)	$ (17,540)	$ (320,107)
13	Unamortized Balance at 12/31/04	$ (4,268,941)	$ (148,822)	$ (151,616)	$ (4,569,379)
14	Factor O Recovery/(Refund) (line 11 - line 12 - line 13)	$ (1,134,591)	$ -	$ (53,303)	$ (1,187,894)

CERTIFICATE OF SERVICE

The undersigned attorney hereby certifies that he caused copies of AmerenIP's Brief on Exceptions to the Administrative Law Judge's Proposed Order in ICC Docket 04-0677 to be served on each of the persons on the attached Service List by e-mail on May 25, 2007.

/s/ Owen E. MacBride_____
Owen E. MacBride
Attorney for Illinois Power Company d/b/a AmerenIP

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