

123 FERC ¶ 61,138  
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Joseph T. Kelliher, Chairman;  
Sudeen G. Kelly, Marc Spitzer,  
Philip D. Moeller, and Jon Wellinghoff.

Southern Star Central Gas Pipeline, Inc.

Docket No. CP08-4-000

ORDER ISSUING CERTIFICATE

(Issued May 9, 2008)

1. On October 5, 2007, Southern Star Central Gas Pipeline, Inc. (Southern Star) filed an application under section 7(c) of the Natural Gas Act (NGA) for a certificate of public convenience and necessity to authorize certain enhancements to its South Welda Storage Field (South Welda) in Anderson County, Kansas. Southern Star requests authorization to: (1) expand the certificated boundary and buffer zone; (2) install an additional natural gas compressor; and (3) reclassify the cap rock. Southern Star states that the purpose of the proposal is to protect the integrity of the field by expanding the field boundary both geographically and geologically and to collect gas that has migrated from the existing certificated storage reservoir. Moreover, Southern Star seeks additional specific property rights within the currently certificated boundary, as well as in the proposed expansion area. Finally, Southern Star proposes to increase the maximum certificated shut-in wellhead pressure in South Welda to 433 pounds per square inch gauge (psig) from 430 psig.

2. As discussed below, we find that approval of certain of Southern Star's proposals is necessary to protect the integrity and maintain the performance and reliability of the South Welda storage field. Therefore, we are granting Southern Star a certificate which grants its application, in part, subject to the conditions set forth herein.

**I. Background**

3. Southern Star is a natural gas company that owns and operates eight natural gas storage fields in Kansas and one in Oklahoma.<sup>1</sup> The original certificate authorizing the

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<sup>1</sup> Southern Star is a Delaware corporation authorized to do business in the States of Arkansas, Colorado, Delaware, Kansas, Kentucky, Missouri, Nebraska, Oklahoma, Texas, and Wyoming.

South Welda storage field in Kansas was held by a predecessor of Southern Star.<sup>2</sup> South Welda has a maximum certificated storage capacity of approximately 18.3 Bcf, including a working gas capacity of 6.7 Bcf, and a current certificated wellhead shut-in pressure of 430 psig. The maximum deliverability of the field is approximately 156 MMcf/d at 14.73 psia.

4. South Welda is bordered on its north boundary by Southern Star's North Welda Storage Field and on its south boundary by Southern Star's Colony Storage Field.<sup>3</sup> Gas flow for all three fields is controlled by compression at the existing 25,607 horsepower (hp) Welda compressor station. All three storage fields are located within Anderson County, Kansas with some acreage in Allen County, Kansas. The three storage fields are geologically connected by the Colony Sand (also referred to as the Colony Sandstone) formation which is laterally continuous as a narrow "shoestring" across the Welda storage complex. Southern Star stores gas within the Colony Sand formation in the three storage fields.

5. Southern Star states that the Colony Sandstone was originally developed as a gas production field in the early 1920s and has been utilized for gas storage by Southern Star and its predecessors since 1937. The certificated boundary of the South Welda field currently includes approximately 7,900 acres, 96 injection/withdrawal wells, 7 observation wells, and approximately 13 miles of storage lateral lines that use compression at the Welda compressor station to inject or withdraw natural gas into or out of the field. In the early 1980s, compression facilities and lateral lines were constructed by Southern Star in order to recover storage gas produced with oil production from the Squirrel Sandstone formations that overlie the Colony Sandstone. As a result of ongoing monitoring and the requirements of Kansas statutes and regulations,<sup>4</sup> Southern Star states

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<sup>2</sup> *Cities Service Gas Company*, 4 FPC 471 (1943).

<sup>3</sup> The Welda storage complex is comprised of the North Welda Storage Field, the South Welda Storage Field, and the Colony Storage Field.

<sup>4</sup> In 2002, the Kansas Corporation Commission adopted regulations pursuant to Kan. Stat. Ann. § 55-1,115(a) governing underground porosity storage of natural gas. Kan. Admin. Regs. § 82-3-1000 *et seq.* The regulations establish natural gas storage regulations for storage fields in Kansas. These regulations require a geologic and hydrogeologic evaluation of storage fields, monitoring and reporting requirements, and periodic inspections and testing of wells. Southern Star states that it is now operating under provisional permits from the KCC pending the acquisition of additional acreage to correctly define the storage field boundaries and provide additional buffer zone, as requested in this application.

that it contracted with Netherland, Sewell and Associates, Inc. (NSA) to perform an integrated geologic and engineering study of the Colony Sandstone formation at the South Welda field to identify specific storage field characteristics.

6. The Colony Sandstone certificated for Southern Star's storage of gas is the lowest portion of the Upper Cherokee Group, which begins approximately 800 feet below the surface. The Upper Cherokee Group includes other formations. Above the Colony Sandstone are the Lower and Upper Squirrel Sandstones. The Squirrel Sandstones are heterogeneous in nature and comprised of laterally discontinuous sand lenses with limited horizontal and vertical distribution. Between the Colony Sandstone and the Lower Squirrel Sandstone and between the Lower Squirrel Sandstone and the Upper Squirrel Sandstone are shale and siltstone. The heterogeneous Squirrel Sands also include significantly impermeable strata of shale and siltstone with the sand lenses.

7. The shale and siltstone should form a non-permeable barrier and, along with the Squirrel Sandstone layers in the Upper Cherokee, are classified as the confining layer or cap rock above the Colony Sandstone in which gas is stored. However, Southern Star states that NSA's study revealed that gas has migrated upward from the Colony Sandstone. The study reports that as a result of both ongoing oil operations since the 1940s and early storage well completion practices of the late 1970s, pathways have been created for storage gas to migrate upward from the Colony Sandstone into the oil-bearing Squirrel Sandstone of the Upper Cherokee. The NSA report states that the upward migration of storage gas has occurred over a fairly significant area where the Squirrel Sandstone formations overlie the Colony Sandstone reservoir. However, the report also states that the heterogeneity of the Squirrel Sandstone and general lack of lateral permeability in the Squirrel Sand formations are major limiting factors for lateral gas movement once storage gas has migrated upward into the Squirrel Sandstone.

## **II. Proposal**

8. To prevent the migration of storage gas from the South Welda storage field, Southern Star proposes to: (1) increase the certificated storage boundary and buffer zone and acquire certain property rights; (2) acquire additional specific property rights within the certificated storage boundary; (3) reclassify the cap rock, and (4) install compression.

9. Southern Star's proposed geographic expansion of the certificated storage boundary and buffer zone at South Welda would add approximately 560 additional acres

along the southwest border of the currently certificated boundary.<sup>5</sup> Southern Star seeks certificate authority that will enable it to acquire property rights in the expansion area to include all wells, oil and gas leases, oil, gas, mineral rights and interests (including, but not limited to, all working interests and royalty interests), surface rights, easements, gas storage rights (including, but not limited to, gas storage development rights and rights to inject, withdraw and store gas), and all property needed to examine, prepare, maintain, and operate its underground natural gas storage facilities. Southern Star avers that acquisition of these rights is essential to protect the integrity of the storage field. It would limit oil exploration efforts and the drilling of wells by shallow oil producers in the area of the storage field, thus limiting the likelihood that storage gas could be “produced” with the oil.

10. Within the currently certificated South Welda storage field boundary, Southern Star states that it currently owns all gas, gas rights and privileges, as well as storage rights and privileges from the surface to 1,050 feet below the surface. However, Southern Star does not own the oil rights.

11. Because Southern Star believes that its gas storage field has been compromised due to oil well development activities above the Colony Sandstone in which its gas is stored, it seeks certificate authority that will enable it to acquire all wells, oil and gas leases, oil, mineral rights and interests (including, but not limited to, all working interests and royalty interests), surface rights, easements, and all property that may be required to adequately examine, prepare, maintain, and operate underground natural gas storage facilities on five leases within the currently certificated boundary.<sup>6</sup> Southern Star asserts that acquisition of these rights and interests will provide it with complete control of all minerals on these five leases, as well as control and ownership of Squirrel Sand oil wells, with the ability to connect certain wells as part of Southern Star’s plan for recovering upwardly migrated storage gas and returning it to storage in the Colony Sandstone.

12. To further limit the possibility of oil production activities recovering stored gas, Southern Star seeks to redefine the confining layer or cap rock for the South Welda

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<sup>5</sup> Southern Star states that of the 560 acres, approximately 320 acres of the mineral and storage rights have already been acquired.

<sup>6</sup> The five leases Southern Star seeks to obtain in the certificated boundary include the Cooper Lease, Unit #3 Lease, Buchanan Lease, Tinsley Lease, and Brecheisen Lease. *See* Southern Star’s application at p. 7.

storage field as the interval from the base of the Ft. Scott Limestone (which lies above the Upper Cherokee) to the top of the Pawnee Limestone, which lies above the Lower Ft. Scott Limestone and the Labette Shale. The new cap rock will consist of shale and dense limestone with an average thickness of more than 90 feet across the site and with no porosity. As described above, Southern Star asserts that the 100-foot thick section of the Upper Cherokee currently classified as the cap rock over the Colony Sandstone has become compromised due to oil producers' activities to stimulate oil production, allowing gas to migrate upward from the Colony Sandstone through the shale and siltstone into the Upper and Lower Squirrel Sandstones in the Upper Cherokee, from whence it is being brought to the surface by oil producers, along with native oil in the Squirrel Sandstones, and vented.

13. Southern Star further asserts that redefining the cap rock so that its certificated storage formation includes the Squirrel Sandstones will allow it to use, as part of its gas recovery/recycle system, 11 existing oil wells that access the Squirrel Sandstone, which Southern Star will seek to acquire by eminent domain, if necessary, pursuant to its requested additional certificate authorizations.<sup>7</sup> Southern Star states that no new wells will be developed to inject gas into the Squirrel Sands, and that the existing 11 wells in the Squirrel Sands will only be used for gas recovery, not for gas storage operations.

14. Finally, Southern Star seeks to install and operate a 660 hp White Superior skid mounted natural gas compressor package at its existing South Welda Booster Station. Southern Star states that the existing booster facilities at South Welda have been experiencing operational problems, and the proposed compressor unit will be used as part of the gas recovery system designed to capture migrated storage gas and re-inject it back into the main storage reservoir of the Colony Sandstone.<sup>8</sup>

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<sup>7</sup> Response No. 5 of Southern Star's March 14, 2008 data response identifies the 11 wells and indicates that five of the wells are already connected in an indirect manner to its current gas recovery system. These five wells, as well as the other six wells, will be directly connected to the gas recovery system by new storage laterals to be installed under its Part 157 blanket certificate. Two of the 11 wells are located in the northern portion of the adjacent Colony Storage Field.

<sup>8</sup> The compressor package proposed for use at the South Welda storage field is currently located at Southern Star's Craig Storage Field, which is now abandoned. An unpublished letter order authorizing abandonment of the compressor was issued by the Director of the Commission's Office of Energy Projects under delegated authority on February 1, 2008, in Docket No. CP08-12-000.

15. Additionally, Southern Star states it will be installing certain minor facilities under its Part 157 blanket certificate in order to recover and recycle storage gas. These facilities will include various segments of 4-inch diameter lateral pipeline, totaling approximately 3.8 miles, and three oil/gas separators with collection tanks. Southern Star states that the enhancement to its existing gas recovery/recycle system will be configured by connecting the new laterals to the 11 existing oil wells in the Squirrel Sands, which have been identified as having a high potential for recovery of storage gas and will therefore be converted to pressure recovery wells.

16. Southern Star states that the storage lateral lines that will be constructed under its Part 157 blanket certificate will connect nine wells in the South Welda storage field's currently certificated storage and buffer boundary. A portion of one lateral will be constructed in the certificated boundary of the adjacent Colony Storage Field, tying the two wells located in the most northern section of the Colony Storage Field to the laterals in the South Welda field system. Southern Star contends this is logistically and economically superior to tying these wells into the existing laterals in the Colony Storage Field. The eleven existing oil wells will act as pressure relief wells, such that gas will only be withdrawn, when appropriate, to allow for gas to move back into the original storage reservoir in the Colony Sand. Indeed, Southern Star states that its proposals will not change any of the current operational parameters or capabilities of the storage field. Southern Star estimates the cost of its project, as proposed, at \$6,432,841, and states that it will finance the project with internally generated funds.

17. Finally, Southern Star seeks authorization to revise the maximum certificated wellhead shut-in pressure from the currently certificated pressure of 430 psig to 433 psig, which is the certificated pressure of the Colony storage field and is the pressure which has been requested for the North Welda storage field in Docket No. CP07-89-000. Southern Star asserts that this proposed change for the South Welda storage field would simplify operations at the Welda compressor station, located at the South Welda storage field, which controls compression for the entire Welda storage complex.

### **III. Interventions and Protest**

18. After due notice by publication in the *Federal Register* on October 29, 2007 (72 Fed. Reg. 61,217), timely, unopposed motions to intervene were filed by the Kansas Corporation Commission (KCC), the Missouri Public Service Commission, Aquila, Inc. d/b/a Aquila Networks, and Atmos Energy Corporation.<sup>9</sup>

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<sup>9</sup> Timely, unopposed motions to intervene are granted by operation of Rule 214 of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.214(d) (2007).

19. In its intervention, the KCC states that it previously expressed in other proceedings concerns over Southern Star's gas storage operations in the Colony Sand. In response to a staff data request, on February 15, 2008, the KCC filed internal reports, which it states indicate that it does not find Southern Star's existing gas recovery system to be effective in capturing storage gas that may be venting through existing oil production wells at South Welda. In Response No. 1, the KCC states that Southern Star has only one gas recovery compressor unit and that Southern Star's data indicates that the unit was out of service approximately 106 days in 2006. The KCC confirms Southern Star's assertion that when the gas recovery compressor unit is out of service, oil well operators vent storage gas through their separators.<sup>10</sup> The KCC suggests that to address the migration issue, Southern Star could either: (1) re-complete every open-hole well to seal the Colony Sand storage zone from the above (overlying) Squirrel Sand formations, or, as a potentially more cost-effective option, (2) install an adequate recovery system and require oil and gas wells to be shut-in whenever the recovery system is out of service.

#### IV. Discussion

##### A. Certificate Policy Statement

20. The Commission's September 15, 1999 Certificate Policy Statement provides guidance as to how we will evaluate proposals for certificating new construction.<sup>11</sup> It established criteria for determining whether there is a need for a proposed project and whether the proposed project will serve the public interest. The Certificate Policy Statement explains that in deciding whether to authorize the construction of major new pipeline facilities, we balance the public benefits against the potential adverse consequences. Our goal is to give appropriate consideration to the enhancement of competitive transportation alternatives, the possibility of overbuilding, subsidization by existing customers, the applicant's responsibility for unsubscribed capacity, the avoidance of unnecessary disruptions of the environment, and the unneeded exercise of eminent domain in evaluating new pipeline construction.

21. Under this policy, the threshold requirement for pipelines proposing new projects is that the pipeline must be prepared to financially support the project without relying on

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<sup>10</sup> KCC field staff determined that storage gas has been vented by third-party operators at a rate of 300 Mcf/per day in 2006.

<sup>11</sup> *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227, at 61,748 (1999); *order on clarification*, 90 FERC ¶ 61,128; *order on clarification*, 92 FERC ¶ 61,094 (2000) (Certificate Policy Statement).

subsidization from its existing customers. The next step is to determine whether the applicant has made efforts to eliminate or minimize any adverse effects the project might have on the applicant's existing customers, existing pipelines in the market and their captive customers, or landowners and communities affected by the route of the new pipeline. If residual adverse effects on these interest groups are identified after efforts have been made to minimize them, we will evaluate the project by balancing the evidence of public benefits to be achieved against the residual adverse effects. This is essentially an economic test. Only when the benefits outweigh the adverse effects on economic interests will we proceed to complete the environmental analysis where other interests are considered.

22. Southern Star's proposed pipeline and compression facilities and, as discussed below, its acquisition of some of the additional property rights that it seeks to acquire are intended to recapture and prevent further migration of stored gas from the South Welda storage field. Southern Star states that the proposed facilities, designed only to maintain current authorized service, will not result in increased revenues and will have a minimal effect on operating expenses. In its March 14, 2008 data response, Southern Star stated that the costs associated with the proposed facilities and acquisition of all the property interests it seeks to acquire would be included in its storage property, plant, and equipment accounts and used to derive the overall storage cost of service and associated rates for providing storage services in its next general rate case proceeding.

23. The Certificate Policy Statement provides that projects designed to improve service for existing customers by replacing existing capacity, improving reliability (as proposed in the instant proceeding), or providing flexibility, are for the benefit of existing customers. Increasing the rates of the existing customers to pay for these kinds of improvements is not a subsidy and the reasonable costs of such projects are permitted to be rolled in a future rate proceeding.<sup>12</sup>

24. Additionally, Southern Star's proposal will not have an adverse impact on other pipelines or their customers. Further, while the Commission does not agree that all of the additional property interests that Southern Star seeks to acquire are necessary, as discussed below, the success of its gas recovery plan does depend on its acquisition of certain additional property interests, and no landowners or owners of other potentially affected property interests have protested Southern Star's proposal. In any event, we find

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<sup>12</sup> Certificate Policy Statement, 88 FERC at 61,746, *Southern Star Central Gas Pipeline, Inc.*, 115 FERC ¶61,219 (2006).

that the benefits of Southern Star's proposals that are approved by this order outweigh any potential adverse impacts to landowners or holders of other property interests.

**B. Expansion of the Certificated Storage Boundary and Buffer Zone**

25. The Commission grants jurisdictional storage field operators additional certificate authority to revise the boundaries of storage fields when the applicants can demonstrate, with engineering and geological data, that such authorizations are required by the public convenience and necessity in order to improve the operation of the storage fields or to maintain their integrity.<sup>13</sup> In deciding whether the public convenience and necessity require approval of a company's request to enlarge its storage boundary due to gas migration problems, a material consideration is whether the storage reservoir has expanded and whether the company's estimations of the reservoir and protective boundaries are reasonable.<sup>14</sup>

26. The Commission's staff thoroughly analyzed Southern Star's proposal and issued a series of data requests seeking additional information to supplement the record.<sup>15</sup> Based upon the information provided by Southern Star, the Commission is convinced that Southern Star's gas recovery plan can be successfully instituted within currently certificated surface boundaries if: (1) the cap rock is reclassified such that Southern Star is granted certificate authority to acquire the portion of the Upper Cherokee containing the Squirrel Sandstone into which its storage gas is upwardly migrating; and (2) Southern Star is authorized to acquire certain specific oil wells and convert them to gas recovery wells. With control over the Squirrel Sandstone, Southern Star can ensure that oil producers do not capture its migrated gas. Certificate authority to install additional compression and to acquire specific oil wells for use as gas recovery wells, along with construction of laterals and other minor facilities under its Part 157 blanket certificate to

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<sup>13</sup> See *Williams Natural Gas Company*, 83 FERC ¶ 61,120 (1998); *Williams Natural Gas Company*, 77 FERC ¶ 61,150 (1996); *ANR Pipeline Company*, 76 FERC ¶ 61,263 (1996), *reh'g denied*, 78 FERC ¶ 61,122 (1997); and *Columbia Gas Transmission Corporation*, 35 FERC ¶ 61,345 (1986).

<sup>14</sup> *ANR Pipeline Company*, 76 FERC ¶ 61,263, at 62,346 (1996).

<sup>15</sup> Southern Star has responded to three Commission staff data requests. Responses to the first were filed on January 4, 2008, and January 17, 2008, and Southern Star filed responses to the second and third data requests on February 29, 2008, and March 14, 2008, respectively. The KCC also responded to one data request on February 15, 2008.

connect the gas recovery wells, will enable Southern Star to recover the migrated gas from the Squirrel Sandstone and re-inject it into the lower Colony Sandstone.

27. In view of the above considerations, the Commission is not persuaded that maintaining the integrity of the South Welda storage field also requires expanding the certificated surface boundary of the South Welda storage field by approximately 560 acres. Granting Southern Star such certificate authority would enable it to obtain by eminent domain the 240 acres of that area that it has not yet acquired. Further, we do not find that the public convenience and necessity require us to authorize Southern Star to acquire the surface rights in five oil lease areas above the existing certificated boundary where oil producers operate.

28. As stated above, Southern Star presented a report produced by NSA which provides a basis for its proposal to mitigate storage gas migration.<sup>16</sup> Based on the study's findings, Southern Star proposes to: (1) obtain additional property rights within the certificated boundary and the proposed expansion area, (2) reclassify the cap rock at the South Welda storage field, and (3) install a natural gas compressor, in order to help mitigate migration of storage gas from the currently certificated storage reservoir upward, and into the overlying Squirrel Sands.

29. A basic understanding of the geology in South Welda's currently certificated boundary and proposed expansion area is essential in evaluating the gas migration issues presented in this proceeding. NSA states, and our staff's analysis confirms, that the Colony Sandstone is an assemblage of interbedded sands and shales deposited as a series of stacked channel-fill, overbank, and meandering deposits. The South Welda storage reservoir, consisting of the Colony Sandstone, is entirely contained within the currently certificated boundary. The Colony Sandstone continues south of the certificated boundary of South Welda where it is the active storage reservoir for the Colony Storage Field. Overlying the Colony Sandstone are the Lower and Upper Squirrel Sandstones (Squirrel Sands), both of which are present sporadically inside and outside the certificated boundary.<sup>17</sup>

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<sup>16</sup> See Exhibit Z-1 of Southern Star's application.

<sup>17</sup> Figure 22 titled "Composite Colony/Squirrel Net Sand Isopach", filed in Southern Star's February 29, 2008 data response shows the largely sporadic and discontinuous nature of the Upper and Lower Squirrel Sands within and outside South Welda's current and proposed certificated boundary.

30. While both the Lower and the Upper Squirrel Sandstones overlie the Colony Sandstone to some extent in nearly all areas of the certificated boundary, the Lower and Upper Squirrel Sands are only present in limited areas within the proposed expansion acreage. However, where the Squirrel Sands are found in the proposed expansion area, the Colony Sandstone formation is not.

31. Staff evaluated the likelihood that gas, after migrating upward from the Colony Sandstone into either the Lower or Upper Squirrel Sands, could then migrate laterally to the proposed expansion area where oil producers' operations could capture and vent the gas. Figure 22 of NSA's report,<sup>18</sup> "Composite Colony/Squirrel Net Sand Isopach" shows the overlapping relationship between the three sandstone units. For gas to migrate to the proposed expansion area, the gas would need to first migrate upward into the overlying Squirrel Sands, and then migrate westerly approximately 1,750 feet to the nearest border of the proposed expansion area.

32. NSA, in its study, stated, "[b]ecause of the heterogeneous nature of the Squirrel Sandstones, lateral movement has been somewhat limited. Storage gas that has moved upward into the Squirrel Sandstone typically does not appear to travel over any great distance as it is produced locally as part of the oil and waterflooding operations."<sup>19</sup> Thus, Southern Star's consultant has concluded that lateral migration of storage gas to the expansion area is unlikely.

33. Further, a finding that storage gas is migrating to the proposed expansion area would be at odds with the information Southern Star has obtained from oil producers who, "provided, in varying detail, anecdotal information as to lease areas that were or were not showing evidence of excess gas production." Figure 13 of the NSA report depicts the findings of the survey and shows areas of "storage gas reported", "storage gas suspected", "no storage gas reported" and "no storage gas suspected." Response No. 3 of Southern Star's February 29, 2008 data response discusses the criteria on which the "storage gas" findings were made. "Storage gas reported" was defined as "areas with Squirrel Sandstone wells that (as evidenced during visual inspection or operator comment) produce more than a slight hydrocarbon vapor and exhibit increased pressure, or gas-filled well bores with measurable pressure." "Storage gas suspected" was defined as "[a]reas with Squirrel Sandstone wells that do not have reports of increasing gas pressure or gas-filled well bores with measurable pressure, but are of concern based on geologic mapping and proximity to areas which have reported storage gas."

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<sup>18</sup> Revised February 2008.

<sup>19</sup> NSA study at 5.

34. Figure 13-1 of the February 29, 2008 data response shows areas of the Squirrel Sands in the expansion acreage as “storage gas reported”, “storage gas suspected”, “no storage gas suspected” and “no storage gas reported.” The “storage gas reported” designation is confined to a sliver of the Squirrel Sand near the south-central portion of Section 21 immediately west of the certificated boundary, where only four production wells are depicted on Figure 13-1, and a portion of land that extends only approximately 250 feet into the western one-half of the northwestern quarter of Section 28, where most of the area is designated “no storage gas reported”, and where eight oil production wells are present.<sup>20</sup> The southwestern quarter of Section 16 and a portion of the northwestern quarter of Section 21 contains areas designated as “storage gas suspected.”

35. To further evaluate the “storage gas reported” portions of the expansion area, staff reviewed operator comments that were provided in Response No. 2 of Southern Star’s February 29, 2008 data response. Two Southern Star internal memoranda, dated June 2, 2005, and October 6, 2005, were provided. The June 2, 2005 memorandum details that M.A.E. Resources Inc., the largest oil producer in the South Welda field, reported that “the only wells outside the storage boundary with gas co-mingled with oil occurs in SE of 29-22s-19e.” This area is located west of the proposed expansion area. Other oil producers in the South Welda field such as Harry Conley Oil Co., Viva International Inc., Adams Oil, and Phoenix Kansas Energy reported “no gas” in oil wells through either visual inspections or telephone discussions.

36. The October 6, 2006 memorandum indicates that in a follow-up field meeting on September 13, 2005, M.A.E. Resources Inc. reported only very minor gas vapors associated with oil production on the leases they operate west of the South Welda storage boundary. Wells adjacent to South Welda in Sections 28 and 29 were found not to be venting gas, and it was reported that “[n]o storage gas is evident in the M.A.E. leases to the west of the field in Sections 21, 28 or 29-22s-19e.” The other four leases for which information was provided did not reveal gas presence in any oil wells through either visual inspection or through telephone conversation.

37. Southern Star also presented “storage gas” presence maps for each section of the proposed expansion area and those sections within the certificated boundary with gas pressure readings for wells that could be accessed. Figure 13-1K reveals no pressure readings identified as “storage gas reported” within the proposed expansion area in Section 21 or in Section 16 (Figure 13-1h).

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<sup>20</sup> A “Section” is one-square mile. Southern Star proposes to extend its certificated boundary into portions of Sections 16, 21, and 28.

38. Response No. 4 of Southern Star's February 29, 2008 data response provides information regarding gas pressures taken on February 11, 2008, on six oil wells in the portion of Section 16 proposed as part of the expansion area. No gas was found in 3 of the wells. Very low pressures (2, 3, and 10 psig) were reported on the remaining 3 wells.

39. To further evaluate storage gas presence in the proposed expansion area, Southern Star submitted gas compositional analysis from two of the wells in the portion of the proposed expansion area identified as "storage gas suspected,"<sup>21</sup> as well as from three storage wells within the currently certificated boundary.<sup>22</sup> Typically, natural gas that is native to gas producing formations, including crude oil production formations with associated gas, has a different composition when compared to stored natural gas. For example, stored natural gas might have a higher methane content and predictable minor amounts of other gases because pipeline quality gas starts with various native gases that are processed into marketable, pipeline quality gas. Here, Southern Star states in Response No. 8 that the gas samples from the oil wells in the proposed Section 16 expansion area do not match the gas storage well samples.

40. The western one-half of the northwestern quarter of Section 28 is also included in the proposed expansion area and as previously described contains the Lower Squirrel Sandstone which is indicated as mostly "no storage gas reported." A very small segment of this area, extending only approximately 250 feet into this particular 1/8 section, is designated "storage gas reported." Eight oil wells are located in the portion of this proposed expansion area identified as "no storage gas reported," and no pressure readings are given in this area on Figure 13-1p.

41. Based on the data and other evidence in the record regarding gas presence as reported by oil producers or by visual inspection, elevated gas pressure readings or gas compositional analysis, as well as NSA's comments regarding the limited potential for lateral gas migration within the Squirrel Sands, the Commission finds that Southern Star has not presented definitive data to support the presence of storage gas within the proposed expansion area. In fact, the only indication that gas may be present west of the South Welda storage field is the "very minor gas vapors" observation by M.A.E. Resources on September 13, 2005, as well as the three low pressure readings from three of the wells in Section 16. However, no additional supporting pressure measurements

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<sup>21</sup> See Response No. 8 of the February 29, 2008 data response.

<sup>22</sup> The storage wells are identified as Well Nos. 23, 88 and 104. Three other wells from within the certificated boundary and stated to be "storage gas reported" are identified as North Hyde #6, S. Koch #187 and Sec. 10 #29.

were provided in the expansion area, no gas compositional analysis confirming the presence of storage gas in the expansion area were provided, and the evidence suggests that the geologic characteristics of the Squirrel Sandstone do not provide a likely pathway for storage gas migration into the proposed expansion area.

42. As discussed above, in deciding whether a company's proposal to revise a storage field boundary is required by the public convenience and necessity, a material consideration is whether the storage reservoir has expanded and whether the company's estimations of the spatial area of the reservoir and protective boundaries are reasonable. Southern Star has not provided definitive data indicating that its South Welda storage reservoir has expanded. In fact, the storage formation, the Colony Sandstone, is not even present in the proposed expansion area. Nor has Southern Star provided definitive data indicating that storage gas is present in the expansion area. Rather, it appears that Southern Star's basis for expansion is founded upon reports of some "very minor gas vapors" in one lease area that contradict other comments regarding the same lease area that state, "No storage gas is evident in the M.A.E. leases to the west of the field in Sections 21, 28 or 29-22s-19e." Additionally, the very low pressures exhibited in three of the wells in Section 16 are offset by gas compositional analysis showing that gas samples from those two oil wells do not match Southern Star's storage gas. Accordingly, we find that Southern Star's proposal to expand its storage area and protective boundary is not justified. Therefore, we will deny its proposal to laterally expand the certificated boundary of the South Welda storage field.

**C. Upward Migration of Gas into the Squirrel Sands Formation within the Currently Certificated Boundary**

43. Southern Star also seeks to acquire additional rights and interests above the currently certificated South Welda storage field boundary. Southern Star asserts that it currently owns all gas, gas rights and privileges, as well as storage rights and privileges, from the surface to 1,050 feet below the ground surface. However, Southern Star does not oil own the oil rights above the Colony Sandstone in which its gas is stored. Southern Star states that the storage field has been compromised due to development activities by certain oil producers. In order to minimize those activities, Southern Star wishes to acquire all wells, oil and gas leases, oil, mineral rights and interests (including, but not limited to, all working interests and royalty interests), surface rights, easements, and all property that may be required to adequately examine, prepare, maintain, and operate underground natural gas storage facilities on five leases within the currently certificated boundary.

44. Southern Star presented Figure 13-1 in its February 29, 2008 data response that shows large areas within the certificated boundary as "storage gas reported" and "storage gas suspected", as well as numerous oil production wells and "injection wells" that are

likely associated with the waterflooding enhanced oil recovery for the oil wells. Also depicted are forty-two gas recovery wells completed in the Squirrel Sands associated with the current gas recovery system.<sup>23</sup>

45. The storage gas recycle system includes lateral lines connecting the recovery wells to Southern Star's existing piping network for the storage field. The system recovers the storage gas from the oil wells and compresses the gas back into the storage field piping network using a 310 hp Caterpillar compressor unit that was installed in 2001.<sup>24</sup>

46. In its February 29, 2008 data Response No. 2, Southern Star presented Table 1, which lists monthly shut-in wellhead pressures from over 70 wells within the certificated boundary from January 2001 to December 2007. The table shows well pressures that range from a trace to 439 psi.<sup>25</sup> Twenty-four of the wells from Table 1 are located in Section 22.

47. Additionally, twelve existing gas recovery wells are depicted on Figure 13-1 in Section 22. This figure and the pressure data indicate that upward migration of gas from the Colony Sandstone into the overlying Squirrel Sands is most pronounced in Section 22.<sup>26</sup>

48. Finally, Southern Star's Response No. 8 of its February 29, 2008 data response provided gas compositional analysis from three oil wells, the North Hyde #6, S. Koch #187 and Sec. 10 #29, located within the certificated boundary and identified as "storage gas reported." The compositional analysis of gas samples from those oil wells were

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<sup>23</sup> Southern Star or its predecessor companies were granted permission by the Commission in the 1980's to install facilities to recover storage gas produced with oil from the Squirrel Sands. *Cities Service Gas Company*, 20 FERC ¶ 61,209 (1982); *Northwest Central Pipeline Corporation*, 33 FERC ¶ 62,192 (1985).

<sup>24</sup> *Williams Gas Pipelines Central, Inc.*, 88 FERC ¶ 62,139 (1999).

<sup>25</sup> Included in Table 1 were various wells from the target lease acquisition areas of the Cooper Lease, the Unit #3 Lease, the Tinsley Lease and the Brecheisen Lease. Pressure readings were not provided for the Buchanan Lease in Section 3. Additionally, pressure readings for two M.A.E. Resources wells located in Section 33 south of the certificated boundary were provided.

<sup>26</sup> Oil well Rook #5, located within and near the western certificated boundary in Section 21, exhibited gas pressures ranging from zero to 328 psi.

compared to the results of gas compositional analysis from three of Southern Star's South Welda gas storage wells. Figures 25 and 26 of Response No. 8 show that the gas from these wells identified as "storage gas reported" closely matches the compositional analysis from the South Welda storage gas wells.

49. Our analysis of the data in the record convinces us that Southern Star has demonstrated migration of storage gas from the Colony Sandstone storage reservoir upward into the overlying Squirrel Sands only within the certificated boundary of the reservoir. We are persuaded that although the current gas recovery system is effective when operational, gas recovery should be enhanced with the additional gas recovery wells proposed in the instant application. However, we acknowledge, as the KCC states in its February 15 data response, that a key factor in the ineffectiveness of the existing system was that the gas recovery compressor unit was out of service for approximately 106 days in 2006, which resulted in gas being vented from third-party oil operations.

50. Southern Star states that the existing booster facilities at South Welda have been experiencing operational problems and the proposed unit compressor will be used as part of the gas recovery system designed to capture and re-inject the storage gas back into the main storage reservoir of the Colony Sandstone. The KCC also stated that the most cost-effective manner in which Southern Star could address the issue of storage gas migrating from the Colony Sandstone into the Squirrel Sandstone was to "install recovery equipment that works and require oil and gas wells to be shut-in when the recovery equipment is out of service."

51. The Commission concurs that an effectively operating gas recovery system should help resolve the venting of gas from Squirrel Sand oil production wells. In this proceeding, Southern Star seeks to install and operate a 660 hp White Superior skid mounted natural gas compressor package at its South Welda Booster Station.

52. In addition to installing a new compressor unit, in order to upgrade its existing gas recovery system, Southern Star proposes to enhance flow to five existing wells in the current gas recovery system, and connect six wells to new storage laterals that it will install under its Part 157 blanket certificate. Since the gas recovery system appears to be effective in the recovery of gas that has migrated upward from the Colony Sandstone into the overlying Squirrel Sands, we will approve the installation of the proposed compressor unit. We will grant certificate authority for Southern Star to acquire the 11 specific wells that it has demonstrated are needed to access the Squirrel Sandstones into which storage gas is upwardly migrating. Conversion of these wells for use as gas recovery wells will ensure the success of its gas recovery plan. However, Southern Star's certificate authority will be limited to these specific wells and, therefore, cannot be used by Southern Star to acquire the five oil leases in their entirety by eminent domain.

53. Further, the record does not support the need for a condition, as requested by the KCC, requiring oil and gas wells be shut-in when gas recovery equipment is out of service. First, the record shows that the existing facilities, when functioning properly, are effective. Logically, the enhanced facilities approved herein and those to be constructed by Southern Star under its Part 157 blanket certificate will also be effective at recovering storage gas; thus, a shut-in condition should not be necessary. Second, with respect to production wells, the Commission is without jurisdiction to order them to be shut-in when the recovery equipment is out of service. Accordingly, the Commission will not impose this requirement as a certificate condition.<sup>27</sup>

54. The upper portion of the Upper Cherokee, including the Squirrel Sands, is currently classified as the cap rock for Southern Star's gas stored in the Colony Sandstone in the lower portion of the Upper Cherokee. However, because the portion of the Upper Cherokee has been compromised, it can no longer constitute an effective cap rock for Southern Star's storage gas. Therefore, in its effort to recover storage gas from the Squirrel Sands, Southern Star also seeks to reclassify the cap rock for the South Welda storage field as the interval from the base of the Ft. Scott Limestone (directly above the top of the Upper Cherokee) to the top of the Pawnee Limestone. Reclassification the cap rock in this manner and granting certificate authority for Southern Star to include all of the Upper Cherokee in its certificated gas storage formation will enable Southern Star to gain the necessary control of the Squirrel Sands to recover its migrated storage gas and prevent it from being captured and vented by oil producers. However, Southern Star assures the Commission that no new wells will be developed to inject gas into the Squirrel Sands, and that the Squirrel Sands will not be used for gas storage operations.

55. In addition to seeking reclassification of the cap rock so that it is above the Squirrel Sands, Southern Star seeks to acquire, as stated described above, all rights and interests, including surface rights, in five oil leases above the currently certificated South Welda storage field boundary. Southern Star asserts that that it also needs to acquire full control over the five oil leases so that it can connect existing oil wells spread across the five leases to function as gas recovery wells as part of its gas recovery plan.

56. As discussed above, reclassifying the cap rock so that it is above the Squirrel Sandstones and granting Southern Star certificate authority to gain full control of the

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<sup>27</sup> NSA states in its report that "[c]ontinued oil production can be a viable operation under recycling conditions, although informed cooperation between oil lease operators in the area and Southern Star is necessary for safety and conservation reasons." The Commission believes that this is a viable working arrangement.

Squirrel Sandstones will enable it to bring a halt, if necessary, to the production of oil from the Squirrel Sandstones and, therefore, the capture of its gas that has migrated upward into the Squirrel Sandstones. Further, certificate authority for Southern Star to install additional compression and to acquire the certain oil wells in the five leases over the storage area, along with its authority under its Part 157 blanket certificate to install laterals to interconnect the wells, will enable Southern Star to implement its plan for recovering migrated gas from the Squirrel Sands and re-injecting the gas into storage. The record does not demonstrate that Southern Star needs certificate authority that would enable to acquire by eminent domain all interests in the five leases in which oil producers operate.<sup>28</sup>

57. In view of the above considerations, the Commission will authorize the requested reclassification of the cap rock and certificate Southern Star's (1) acquisition of the portion of the Upper Cherokee above its existing certificated storage area in the Colony Sandstone; (2) construction of the proposed compression facilities; and (3) acquisition of the 11 oil wells needed for use as gas recovery wells.<sup>29</sup> This certificate authorization will be conditioned to prevent Southern Star from injecting gas into the Upper or Lower Squirrel Sandstones or using the Squirrel Sands as a gas storage reservoir.

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<sup>28</sup> The Commission recognizes that granting Southern Star certificate authority to obtain control over the Squirrel Sands may result in cessation of all oil operations above its gas storage reservoir. However, the top of the Squirrel Sands lies 800 feet below the surface. Further, once Southern Star acquires all interests in the Squirrel Sands, it and the oil producers may be able to work out arrangements that will make it feasible for oil production activities to continue in the Squirrel Sands without jeopardizing Southern Star's recovery of gas migrating up from the Colony Sandstone. In this regard, we urge Southern Star to work cooperatively with operators so that, to the extent feasible, oil production can continue from Squirrel Sands wells.

<sup>29</sup> The 11 wells are RW-6 (SWB-56), RW-8 (SWB-58), RW-9 (SWB-54), RW-10 (SWB-55), and RW-12 (SWB-53) within the Unit # 3 Lease in Section 3; Peine R1 in Section 28 over Southern Star's adjacent Colony Storage Field; Knoeppel in Section 32 over Southern Star's adjacent Colony Storage Field; Well # 30/4 in Section 10; Brecheisen # 510 in the Brecheisen Lease; and Cooper # 14 and # 15 on the Cooper Lease. See Response No. 5 in Southern Star's Data Responses, filed March 14, 2008.

**D. Proposal to Increase the Maximum Certificated Shut-In Wellhead Pressure**

58. Southern Star proposes to increase the maximum certificated shut-in wellhead pressure of the South Welda storage field to 433 psig from 430 psig. Southern Star avers that the slight increase in the certificated shut-in wellhead pressure to 433 psig aligns with the maximum certificated shut-in wellhead pressure of 433 psig at the Colony Storage Field and that a common maximum certificated shut-in wellhead pressure would simplify operations at the Welda compressor station.<sup>30</sup> We agree, and thus authorize this increase.

**V. Environmental Analysis**

59. On November 2, 2007, the Commission's staff issued a Notice of Intent to Prepare an Environmental Assessment (EA) for the Proposed South Welda Storage Field Expansion Project and Request for Comments on Environmental Issues (NOI). The NOI was sent to about 100 individuals, organizations, federal and state agency representatives, county and local government agencies, elected officials, property owners potentially affected by the project, and other interested individuals. One comment was received in response to the NOI from the Kansas Department of Health and Environment, which recommended that should large amounts of natural gas need to be vented while wells are plugged or temporarily shut-in for the performance of activities authorized by the Commission, then the gas should be flared to protect public safety. The 11 wells that this order's certificate authority authorizes Southern Star to acquire will be converted to gas recovery wells for re-injection of migrated gas into storage. The certificate authority does not enable Southern Star to shut-in or plug any other wells. Further, the purpose of the certificate authority granted by this order to Southern Star is to ensure that oil producers will no longer capture and vent Southern Star's storage gas. In view of these considerations, the actions approved by the Commission should not result in any significant venting of gas. Further, since the Commission has limited Southern Star's certificate authority so that it can acquire only the 11 oil wells needed for its gas recovery plan, all other oil wells in the area will remain subject to the jurisdiction of the relevant state agencies, which can exercise their jurisdiction to ensure that any well shut-ins by oil producers are in accordance with those agencies' safety determinations.

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<sup>30</sup> In Docket No. CP07-89-000, Southern Star has filed an application in which it also requests to increase the maximum certificated well head pressure at its North Welda Storage Field.

60. Our staff prepared the EA to satisfy the requirements of the National Environmental Policy Act. The EA assessed the potential environmental effects of Southern Star's proposed project on geology, soils, water resources, wetlands, vegetation, wildlife, threatened and endangered species, cultural resources, land use, air quality, noise, and safety. The EA also addressed alternatives to the proposed project.

61. Based on the discussion in the EA, we conclude that if constructed in accordance with Southern Star's application and supplemental data responses filed January 4 and 17, 2007, approval of this proposal would not constitute a major federal action significantly affecting the quality of the human environment

62. Any state or local permits issued with respect to the jurisdictional facilities authorized herein must be consistent with the conditions of this certificate. The Commission encourages cooperation between interstate pipelines and local authorities. However, this does not mean that state and local agencies, through application of state or local laws, may prohibit or unreasonably delay the construction or operation of facilities approved by this Commission.<sup>31</sup>

63. Southern Star shall notify the Commission's environmental staff by telephone, e-mail, or facsimile of any environmental noncompliance identified by other Federal, state, or local agencies on the same day that such agency notifies Southern Star. Southern Star shall file written confirmation of such notification with the Secretary of the Commission within 24 hours.

64. The Commission on its own motion received and made a part of the record in this proceeding all evidence, including the application and exhibits thereto, submitted in support of the authorizations sought herein, and upon consideration of the record,

The Commission orders:

(A) A certificate of public convenience and necessity pursuant to Natural Gas Act section 7(c) is issued to Southern Star in Docket No. CP08-4-000 for its South Welda storage field, authorizing the installation of up to 660 hp of compression, reclassification of the cap rock as discussed herein so that the entire Upper Cherokee Group including the Squirrel Sandstones above the currently certificated boundary become part of Southern

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<sup>31</sup> See, e.g., *Schneidewind v. ANR Pipeline Co.*, 485 U.S. 293 (1988); *National Fuel Gas Supply v. Public Service Commission*, 894 F.2d 571 (2d Cir. 1990); and *Iroquois Gas Transmission System, L.P., et al.*, 52 FERC ¶ 61,091 (1990) and 59 FERC ¶ 61,094 (1992).

Star's certificated storage formation, acquisition of 11 wells as discussed herein for conversion and use as gas recovery wells, and increasing the maximum shut-in wellhead pressure to 433 psig.

(B) The authorizations issued in Ordering Paragraph (A) are conditioned on Southern Star's:

- (1) placing in service the compression and gas recovery wells authorized herein within two years of the date of the order in this proceeding as required by section 157.20(b) of the Commission's regulations;
- (2) complying with all regulations under the NGA including, but not limited to, Parts 154 and 284, and paragraphs (a), (c), (e), and (f) of section 157.20 of the Commission's regulations;
- (3) complying with the environmental conditions in the Appendix attached to this order;
- (4) conducting an annual inventory verification study;
- (5) not utilizing the Upper or Lower Squirrel formations for the injection or storage of natural gas;
- (6) using for withdrawal only the six new and five existing Squirrel wells that Southern Star plans to convert under its Part 157 blanket certificate; and
- (7) filing of all drillers' reports, well logs, mechanical integrity compliance reports, and well abandonment and plugging reports if required pursuant to KCC regulations.

(C) Southern Star shall notify the Commission's environmental staff by telephone, e-mail, and/or facsimile of any environmental noncompliance identified by other federal, state, or local agencies on the same day that such agency notifies Southern

Star. Southern Star shall file written confirmation of such notification with the Secretary of the Commission within 24 hours.

By the Commission.

( S E A L )

Nathaniel J. Davis, Sr.,  
Deputy Secretary.

## APPENDIX

As recommended in the EA, this authorization includes the following conditions:

1. Southern Star shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Commission order. Southern Star must:
  - a. request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary);
  - b. justify each modification relative to site-specific conditions;
  - c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
  - d. receive approval in writing from the Director of the Office of Energy Projects (OEP) **before using that modification.**
2. The Director of OEP has delegation authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the project. This authority shall allow:
  - a. the modification of conditions of the Commission Order; and
  - b. the design and implementation of any additional measures deemed necessary (including stop work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from project construction and operation.
3. **Prior to any construction**, Southern Star shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors, and contractor personnel will be informed of the environmental inspector's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.
4. **Prior to construction**, Southern Star shall file its Mead's milkweed survey report concurrent with the report being sent to the FWS. If surveys discover the presence of Mead's milkweed in an area that would be disturbed by project activity, Southern Star must not begin **any** project work until:

- a. staff reviews the survey report and any mitigation measures proposed by Southern Star;
  - b. staff has received written comments from the FWS regarding the proposed action and Southern Star's proposed mitigation measures;
  - c. staff has completed any necessary formal or informal consultation with the FWS; and
  - d. Southern Star has received written notification from the Director of OEP that construction may begin.
  
5. Southern Star must make all reasonable efforts to assure its predicted noise levels from the proposed modifications at the South Welda Booster Station are not exceeded at any of the six nearby noise sensitive areas (NSAs) and file noise surveys with the Secretary showing this no later than 60 days after placing the station in service. However, if the noise attributable to the operation of the station at full load exceeds a day-night sound level of 55 decibels on the A-weighted scale at any of the six nearby NSAs, Southern Star shall file a report on what changes are needed and must install additional noise controls to meet the level within 1 year of the in-service date. Southern Star shall confirm compliance with this requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.