Supreme Court, U.S.
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No. __, ORIGINAL

IN THE

Supreme Court of the United States

STATE OF ARKANSAS,

Plaintiff,

v.

STATE OF OKLAHOMA,

Defendant.

On Motion for Leave to File Bill of Complaint

APPENDIX TO MOTION FOR LEAVE TO FILE BILL OF COMPLAINT AND BILL OF COMPLAINT

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APPENDIX A

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

Case No. 4:05-cv-00329-JOE-SAJ
JURY TRIAL DEMANDED

LCvR3.1 Statement: This action is related to
City of Tulsa v. Tyson Foods, Inc., 01-CV-0900-EA(C)

STATE OF OKLAHOMA, ex rel. W.A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,

Plaintiff,

v.

TYSON FOODS, INC., TYSON POULTRY, INC., TYSON CHICKEN, INC., COBB-VANTRESS, INC., AVIAGEN, INC., CAL-MAINE FOODS, INC., CAL-MAINE FARMS, INC., CARGILL, INC., CARGILL TURKEY PRODUCTION, LLC, GEORGE'S, INC., GEORGE'S FARMS, INC., PETERSON FARMS, INC., SIMMONS FOODS, INC., and WILLOW BROOK FOODS, INC.,

Defendants.

FIRST AMENDED COMPLAINT

COMES NOW the Plaintiff, the State of Oklahoma, ex rel. W.A. Drew Edmondson, in his capacity as Attorney General of the State of Oklahoma and Oklahoma Secretary of the Environment C. Miles Tolbert in his capacity as the Trustee for Natural Resources for the State of Oklahoma under CERCLA, and alleges as follows:

I. NATURE OF THE CASE

1. Millions of chickens and turkeys, owned by the Poultry Integrator Defendants, are raised annually on thousands of farms throughout the Illinois River Watershed (the "IRW"), and include, without limitation, birds raised for food products ("broilers"), birds raised for egg production ("layers") and birds raised for breeding and resupply purposes ("breeders" and "pullets"). These "poultry growing operations" result in the generation of hundreds of thousands of tons of poultry waste for which the Poultry Integrator Defendants are legally responsible. It has been, and continues to be, the Poultry Integrator Defendants' practice to store and dispose of this waste on the lands within the IRW—a practice that has caused injury to the IRW, including the biota, lands, waters and sediments therein. The Poultry Integrator Defendants are responsible for this injury. Accordingly, pursuant to federal and state law, the State of Oklahoma brings this action against the Poultry Integrator Defendants seeking, *inter alia*, abatement of these practices, expenses for assessing the injury and damage to the IRW (including the biota, lands, waters and sediments therein) caused by these practices, remediation of the injury to the IRW (including the lands, waters and sediments therein) caused by these practices, damages for the lost value and restoration of the natural resources of the IRW caused by these practices, and equitable relief.

II. JURISDICTION & VENUE

2. The State of Oklahoma is asserting claims under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601, *et seq.* and the Solid Waste Disposal Act ("SWDA"), 42 U.S.C. § 6972. The State of Oklahoma is, further, asserting claims under the federal common law of nuisance. As such, this Court has jurisdiction over the subject matter of this lawsuit pursuant to 28 U.S.C. § 1331, 42 U.S.C. § 9613(b) and 42 U.S.C.

§ 6972(a). This Court has supplemental jurisdiction over the state law claims being asserted herein pursuant to 28 U.S.C. § 1367.

3. The State of Oklahoma has suffered injury to the IRW, including the biota, lands, waters and sediments therein, as a result of the Poultry Integrator Defendants' wrongful acts and omissions. The IRW, including the lands, waters and sediments therein, is situated, in part, in the Northern District of Oklahoma. As such, venue is proper in this Court pursuant to 42 U.S.C. § 9613(b). Additionally, the alleged endangerment giving rise to the State of Oklahoma's claim under the SWDA has occurred, in part, in the Northern District of Oklahoma. As such, venue is also proper in this Court pursuant to 42 U.S.C. § 6972(a). Further, a substantial part of the events or omissions giving rise to the claims being asserted herein occurred within the Northern District of Oklahoma, and a substantial part of the property that is the subject to the action is situated in the Northern District of Oklahoma. As such, venue is also proper in this Court pursuant to 28 U.S.C. § 1391(b).

4. Personal jurisdiction is properly exercised over each of the Poultry Integrator Defendants named herein in that each has engaged in acts or omissions within and outside of Oklahoma that have injured the IRW, including the biota, lands, waters and sediments therein, in Oklahoma and / or has deliberately engaged in significant activities in Oklahoma amounting to continuous and systematic contacts with Oklahoma. *See* Fed. R. Civ. P. 4(e), (k).

III. THE PARTIES

A. Plaintiff

5. The State of Oklahoma is a sovereign state of the United States. The State of Oklahoma, without limitation, has an interest in the beds of navigable rivers to their high water

mark, as well as all waters running in definite streams. Additionally, the State of Oklahoma holds all natural resources, including the biota, land, air and waters located within the political boundaries of Oklahoma in trust on behalf of and for the benefit of the public. The State of Oklahoma, by and through its Attorney General, brings this action on its own behalf and as parens patriae on behalf of the residents of Oklahoma. Attorney General W.A. Drew Edmondson, as chief law officer of the State of Oklahoma, possesses complete dominion over every litigation in which he properly appears in the interest of the State of Oklahoma, whether or not there is a relator or some other nominal party. Oklahoma Secretary of the Environment C. Miles Tolbert is the duly appointed trustee for natural resources for the State of Oklahoma under CERCLA.

B. Poultry Integrator Defendants

6. Poultry Integrator Defendant Tyson Foods, Inc. is a Delaware corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant Tyson Foods, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Tyson Foods, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

7. Poultry Integrator Defendant Tyson Poultry, Inc. is a Delaware corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant Tyson Poultry, Inc., individually and / or by

and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Tyson Poultry, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

8. Poultry Integrator Defendant Tyson Chicken, Inc. is a Delaware corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant Tyson Chicken, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Tyson Chicken, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

9. Poultry Integrator Defendant Cobb-Vantress, Inc. is a Delaware corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant Cobb-Vantress, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Cobb-Vantress, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing

operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

10. Poultry Integrator Defendant Aviagen, Inc. is a Delaware corporation with its principal place of business in Alabama. At times pertinent to this complaint, Poultry Integrator Defendant Aviagen, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Aviagen, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

11. Poultry Integrator Defendant Cal-Maine Foods, Inc. is a Delaware corporation with its principal place of business in Mississippi. At times pertinent to this complaint, Poultry Integrator Defendant Cal-Maine Foods, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Cal-Maine Foods, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

12. Poultry Integrator Defendant Cal-Maine Farms, Inc. is a Delaware corporation with its principal place of business in Mississippi. At times pertinent to this complaint, Poultry Integrator Defendant Cal-Maine Farms, Inc., individually

and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Cal-Maine Farms, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

13. Poultry Integrator Defendant Cargill, Inc. is a Delaware corporation with its principal place of business in Minnesota. At times pertinent to this complaint, Poultry Integrator Defendant Cargill, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Cargill, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

14. Poultry Integrator Defendant Cargill Turkey Production, LLC is a Delaware corporation with its principal place of business in Minnesota. At times pertinent to this complaint, Poultry Integrator Defendant Cargill Turkey Production, LLC, individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Cargill Turkey Production, LLC, has been engaged in poultry growing operations in the IRW, and is responsible for the

poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

15. Poultry Integrator Defendant George's, Inc. is an Arkansas corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant George's, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant George's, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

16. Poultry Integrator Defendant George's Farms, Inc. is an Arkansas corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant George's Farms, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant George's Farms, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

17. Poultry Integrator Defendant Peterson Farms, Inc. is an Arkansas corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry

Integrator Defendant Peterson Farms, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Peterson Farms, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

18. Poultry Integrator Defendant Simmons Food, Inc. is an Arkansas corporation with its principal place of business in Arkansas. At times pertinent to this complaint, Poultry Integrator Defendant Simmons Food, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Simmons Food, Inc., has been engaged in poultry growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

19. Poultry Integrator Defendant Willow Brook Foods, Inc. is a Missouri corporation with its principal place of business in Missouri. At times pertinent to this complaint, Poultry Integrator Defendant Willow Brook Foods, Inc., individually and / or by and through its duly authorized agents, servants, employees and / or contractors who were and are acting in the course and scope of their agency, servitude, employment and / or contracts and in the furtherance of the business of Poultry Integrator Defendant Willow Brook Foods, Inc., has been engaged in poultry

growing operations in the IRW, and is responsible for the poultry waste created by these poultry growing operations, its handling and storage, and its disposal on lands within the IRW and the resultant injury to the IRW, including the biota, lands, waters and sediments therein.

20. Defendants named above are collectively referred to as the "Poultry Integrator Defendants."

21. Unless otherwise noted, each and every count alleged herein applies to each and every Poultry Integrator Defendant.

IV. FACTUAL ALLEGATIONS

A. The Illinois River Watershed

22. The 1,069,530-acre Illinois River Watershed ("IRW") straddles the Oklahoma-Arkansas border. The approximately 576,030 acres of the IRW that are located in Oklahoma include portions of Delaware, Adair, Cherokee and Sequoyah counties. *See* Exhibit 1.

23. Within the IRW are the Illinois River, as well as its major tributaries, the Baron (a/k/a Barren) Fork River, the Caney Creek and the Flint Creek. Approximately 70 miles of the Illinois River have been designated by the Oklahoma Legislature as a Scenic River Area. Additionally, approximately 35 miles of the Barren Fork River and approximately 12 miles of the Flint Creek have been designated by statute as Scenic River Areas.

24. The designation as "Scenic River Areas" reflects a recognition by the Oklahoma Legislature that these rivers and streams "possess such natural scenic beauty, water conservation, fish, wildlife and outdoor recreation values of present and future benefit to the people of the state that it is the policy of the Legislature to preserve these areas for the benefit of the people of Oklahoma."

25. The Illinois River and its tributaries are viewed as outstanding water resources for, *inter alia*, recreation, fish and wildlife propagation and aesthetic values.

26. The Illinois River feeds into the 12,900 acre Tenkiller Ferry Lake, which has been described as "the emerald jewel in Oklahoma's crown of lakes."

27. Among the recreational uses for which the resources of the Illinois River, its tributaries, Tenkiller Ferry Lake and the adjoining lands have been justly noted are floating (canoes, kayaks and rafts), fishing, camping, swimming, diving, hiking and sightseeing.

28. Additionally, the waters of the IRW have been used, and are used, and may in the future be used as a source of drinking water.

29. In recent years these resources have been and are continuing to be polluted and degraded, and their uses have been and are continuing to be injured and impaired.

30. This pollution of and injury to the IRW, including the biota, lands, waters and sediments therein, are indivisible.

31. The Poultry Integrator Defendants, by virtue of their improper poultry waste disposal practices, are responsible for this pollution of, as well as the degradation of, impairment of and injury to the IRW, including the biota, lands, waters and sediments therein.

B. The Poultry Integrator Defendants' Domination and Control of the Actions and Activities of Their Respective Poultry Growers

32. Each of the Poultry Integrator Defendants is in the business of producing poultry and / or poultry products for sale and use / consumption in the United States and internationally.

33. Each of the Poultry Integrator Defendants is intimately involved in and controls each stage of the poultry growing process.

34. Each of the Poultry Integrator Defendants raises its birds itself and / or contracts with "growers" to raise its birds.

35. The contracts establishing the growing arrangements between the respective Poultry Integrator Defendants and their poultry growers are presented to the poultry growers with no opportunity to negotiate their essential terms, and constitute contracts of adhesion.

36. Under the terms of a typical contract for broilers, for example, a poultry grower agrees to raise to adulthood a flock of chicks and / or poults belonging to a respective Poultry Integrator Defendant.

37. Each of the Poultry Integrator Defendants supplies the chicks and / or poults to its respective poultry growers, and picks up the birds from its respective poultry growers when the birds reach maturity.

38. The birds are owned by the respective Poultry Integrator Defendants throughout the entire growing process.

39. Additionally, each of the respective Poultry Integrator Defendants formulates, provides and owns the feed that is fed to its birds during the growing process. The constituents found in poultry waste are influenced by the feed formulas.

40. Further, each of the Poultry Integrator Defendants dictates to its respective poultry growers all aspects of the care and handling for its birds. Specifically, each of the Poultry Integrator Defendants dictates to its respective poultry growers, without limitation:

a. the type of the buildings, equipment and other facilities used in the poultry grower's operation;

b. the feed to be fed to the birds;

c. the feed supplements to be fed to the birds;

d. the medications and vaccinations to be provided to the birds; and

e. the environmental conditions under which the birds are raised.

41. During the growing process, each of the Poultry Integrator Defendants makes numerous periodic site visits to its respective poultry growers' poultry growing operations to ensure compliance with its dictates regarding the care and handling of its birds.

42. Each of the Poultry Integrator Defendants is similarly intimately involved in and controls each stage of the poultry growing process with respect to layer, breeder and pullet growing operations.

43. In sum, each of the Poultry Integrator Defendants so dominates and controls the actions and activities of its respective poultry growers that the relationship is not one of independent contractor, but rather one of employer and employee or one of principal and agent, and one of owner, operator or arranger of poultry waste under CERCLA.

44. Alternatively, even should the relationship with the Poultry Integrator Defendants be one of independent contractor, the Poultry Integrator Defendants have known and have had reason to know that in the ordinary course of the poultry growers raising birds in the usual and prescribed manner poultry waste will be handled and disposed of in such a manner to cause injury to the IRW, including the biota, lands, waters and sediments therein, and therefore the Poultry Integrator Defendants are legally responsible for their respective poultry growers' poultry waste and its environmental impacts.

45. Additionally, many of the Poultry Integrator Defendants themselves own poultry growing operations. At these

operations, too, the respective Poultry Integrator Defendants control all aspects of the care and handling of the birds and are, therefore, owners, operators or arrangers of poultry waste under CERCLA.

C. The Poultry Integrator Defendants' Poultry Waste Generation

46. Poultry growing operations within the IRW are estimated to generate hundreds of thousands of tons of poultry waste per year.

47. Because each of the respective Poultry Integrator Defendants at all times owns its birds being raised within the IRW, because each of the respective Poultry Integrators at all times formulates and owns the feed being fed to its birds being raised within the IRW, and because each of the respective Poultry Integrator Defendants at all times so dominates and controls the actions and activities of its respective poultry growers with respect to the growing of its birds as well as controlling its own poultry growing operations, the Poultry Integrator Defendants are responsible for the safe handling and disposal of the poultry waste generated in the course of the poultry growing operations associated with their respective birds.

D. The Poultry Integrator Defendants' Improper Poultry Waste Disposal Practices and Their Impact

48. Each of the Poultry Integrator Defendants has long known that it has been and continues to be the practice to routinely and repeatedly improperly store the poultry waste generated in the course of its respective growing operations on lands within the IRW. *See, e.g.*, Exhibit 2.

49. Each of the Poultry Integrator Defendants has long known that it has been and continues to be the practice to dispose of the poultry waste generated in the course of its

respective growing operations by routinely and repeatedly applying it to lands within the IRW. *See, e.g.*, Exhibit 3.

50. Each of the Poultry Integrator Defendants has long known that the application of poultry waste to lands within the IRW, in the amounts that it is applied, is in excess of any agronomic need and is not consistent with good agricultural practices and, as such, constitutes waste disposal rather than any normal or appropriate application of fertilizer.

51. Each of the Poultry Integrator Defendants has long known that the application of its poultry waste to lands within the IRW, in the amounts that it is applied and with the frequency that it is applied, far exceeds the capacity of the soils and vegetation to absorb those nutrients present in the poultry waste.

52. Each of the Poultry Integrator Defendants has long known that these poultry waste disposal practices lead to the run-off and release of large quantities of phosphorus and other hazardous substances, pollutants and contaminants in the poultry waste onto and from the fields and into the waters of the IRW.

53. Each of the Poultry Integrator Defendants has long known that the application of poultry waste to lands within the IRW causes large quantities of phosphorus and other hazardous substances, pollutants and contaminants to accumulate in the soils. At many locations, phosphorus and other hazardous substances, pollutants and contaminants have built up in the soil to such an extent that, even without any additional application of poultry waste to the land, the excess residual phosphorus and other hazardous substances, pollutants and contaminants will continue to run-off and be released into the waters of the IRW in the future.

54. Despite this knowledge, each of the Poultry Integrator Defendants has, by virtue of its contracts, arranged for its respective growers to take possession of the poultry waste

coming from its birds. Each of the Poultry Integrator Defendants has made this arrangement with full knowledge that the growers were annually placing hundreds of thousands of tons of their poultry waste directly on the ground and that these actions would lead to the run off and release of phosphorus and other hazardous substances, pollutants and contaminants into the lands and waters of the IRW.

55. Simply put, each of the Poultry Integrator Defendants has long known that poultry waste is an enormous contributor to phosphorus and other pollution in the IRW. Nevertheless, each of the Poultry Integrator Defendants continues to allow large amounts of its respective poultry waste to be improperly stored and applied on lands within the IRW each year (hereinafter "poultry waste disposal practices").

56. The Poultry Integrator Defendants' poultry waste disposal practices are not, and have not been, undertaken in conformity with federal and state laws and regulations.

57. In sum, each of the Poultry Integrator Defendants has long known that such poultry waste disposal practices present the threat that constituents of poultry waste will run off and be released into and from the land to which the poultry waste is applied thereby potentially adversely impacting the IRW, including the biota, lands, waters and sediments therein, and that such practices have in fact resulted in constituents of poultry waste running off and being released into and from the land to which the poultry waste is applied thereby adversely impacting the IRW, including the biota, lands, waters and sediments therein.

58. Each of the Poultry Integrator Defendants has long known that poultry waste contains a number of constituents that can and do cause harm to the environment and pose human health hazards. These constituents include, but are not limited to:

a. phosphorus / phosphorus compounds;

b. nitrogen / nitrogen compounds;

c. arsenic / arsenic compounds;

d. zinc / zinc compounds;

e. copper / copper compounds;

f. hormones; and / or

g. microbial pathogens.

59. The lands and waters in the IRW in fact contain elevated levels of a number of such constituents.

60. The elevated levels of such constituents in the IRW, including in the lands, waters and sediments therein, as well as the resultant injury to the IRW, including the biota, lands, waters and sediments therein, have been caused by the Poultry Integrator Defendants' improper poultry waste disposal practices.

61. Phosphorus / phosphorus compounds and nitrogen / nitrogen compounds have been designated as hazardous substances under CERCLA. Elevated levels of phosphorus / phosphorus compounds, as well as elevated levels of nitrogen / nitrogen compounds, can cause periodic algae blooms, excessive algal growths, hypolimnetic anoxia and other adverse impacts, and have in fact caused periodic algae blooms, excessive algal growths, hypolimnetic anoxia and other adverse impacts in the waters of the IRW, resulting in eutrophication, a degradation in water quality and sediments, injury to biota and impaired uses. *See, e.g.*, Exhibit 4.

62. Certain arsenic / arsenic compounds, zinc / zinc compounds, and copper / copper compounds are also designated as hazardous substances under CERCLA. Elevated concentrations of arsenic, for example, have been shown to cause cancer, as well as adverse effects to the gastrointestinal tract, the cardiovascular system, blood, the liver, the lungs, skin and the nervous system, in humans. Elevated concen-

trations of zinc have been shown to cause adverse effects to the gastrointestinal tract and blood in humans. Elevated concentrations of copper have been shown to cause adverse effects to the gastrointestinal tract in humans. Additionally, elevated concentrations of these metals may be toxic to sensitive terrestrial, aquatic and sediment species.

63. Elevated levels of hormones, including estradiol, in rivers, streams and lakes cause—even in very low concentrations—adverse effects on the reproductive biology of fish and other aquatic vertebrate species.

64. Elevated levels of microbial pathogens, including e. coli and other coliforms, campylobacter, enterococci, yersinia, clostridium, salmonella and staphylococcus, are known to be present in poultry waste. These microbial pathogens are toxic and can cause illness when they are ingested by human beings and biota.

E. The Reason for This Lawsuit

65. In a recent advertisement published in Oklahoma, certain of the Poultry Integrator Defendants admitted that one source of excess nutrients in the waters of eastern Oklahoma is poultry waste.

66. Additionally, in a recent open letter published to the citizens of Oklahoma, certain of the Poultry Integrator Defendants admitted that their poultry waste "potentially impact[s] the health of the rivers and streams that lie within [Oklahoma's Scenic River Watersheds]."

67. In that same open letter, certain of the Poultry Integrator Defendants further admitted that they "are prepared to do [their] part to take care of the poultry portions of the nutrient equation."

68. To date, however, the Poultry Integrator Defendants' actions have not matched this rhetoric. By comparison, other major industries in Oklahoma have long accepted respons-

ibility for the proper management and disposal of wastes that are generated by their business so as not to cause any release to the environment.

69. Indeed, the Poultry Integrator Defendants continue with their improper poultry waste disposal practices to this day. Accordingly, the State of Oklahoma has been forced to bring this lawsuit against the Poultry Integrator Defendants to protect and restore the IRW, including the biota, land and waters therein.

V. CAUSES OF ACTION

A. Count 1: CERCLA Cost Recovery—42 U.S.C. § 9607

70. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

71. By and through the Poultry Integrator Defendants' activities and operations, "hazardous substances" within the meaning of CERCLA, 42 U.S.C. § 9601(14), including but not limited to phosphorus and phosphorus compounds, nitrogen and nitrogen compounds, zinc and zinc compounds, copper and copper compounds and arsenic and arsenic compounds, were disposed of in the IRW, including the lands, waters and sediments therein, resulting in "releases" and/or "threatened releases" of hazardous substances within the meaning of CERCLA, 42 U.S.C. § 9601(22), into the IRW, including the lands, waters and sediments therein.

72. The IRW, including the lands, waters and sediments therein, constitutes a "site or area where a hazardous substance . . . has been deposited, stored, disposed of, or placed, or otherwise come to be located; . . . ." and, as such, constitutes a "facility" within the meaning of CERCLA, 42 U.S.C. § 9601(9). Furthermore, the grower buildings, structures, installations and equipment, as well as the land to which the poultry waste has been applied, also constitute a

"facility" within the meaning of CERCLA, 42 U.S.C. § 9601(9), from which the "releases" and / or "threatened releases" of "hazardous substances" into the IRW, including the lands, waters and sediments therein, resulted.

73. Each of the Poultry Integrator Defendants is a "person" within the meaning of CERCLA, 42 U.S.C. § 9601(21).

74. The Poultry Integrator Defendants are covered persons within the meaning of CERCLA, 42 U.S.C. § 9607(a), in that they, individually and collectively, have arranged for the disposal of their poultry waste which contains hazardous substances, including but not limited to phosphorus and phosphorus compounds, nitrogen and nitrogen compounds, zinc and zinc compounds, copper and copper compounds and arsenic and arsenic compounds, which has been released to and within the IRW, including the lands, waters and sediments therein, and these hazardous substances have been released within the IRW, including the lands, waters and sediments therein.

75. Additionally, the Poultry Integrator Defendants are covered persons within the meaning of CERCLA, 42 U.S.C. § 9607(a), in that they, individually and collectively, have been owners and / or operators during the time their poultry waste containing these hazardous substances was generated and disposed of and released into the IRW, including the lands, waters and sediments therein.

76. As a result of responding to these releases or threatened releases of hazardous substances by the Poultry Integrator Defendants into the IRW, including the lands, waters and sediments therein, the State of Oklahoma has incurred, and will continue to incur, necessary response costs in a manner consistent with the National Contingency Plan ("NCP"), or alternatively, in a manner not inconsistent with

the NCP. These costs include, but are not limited to, costs of monitoring, assessing and evaluating water quality, wildlife and biota in the IRW.

77. Accordingly, the State of Oklahoma is entitled to recover from the Poultry Integrator Defendants, jointly and severally, all of the State of Oklahoma's past and present necessary response costs under CERCLA § 107. Further, the State of Oklahoma is entitled to a declaratory judgment holding the Poultry Integrator Defendants liable, jointly and severally, for all future necessary response costs incurred by the State of Oklahoma.

B. Count 2: CERCLA Natural Resource Damages—42 U.S.C. § 9607

78. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

79. The Oklahoma Secretary of the Environment, acting on behalf of the State of Oklahoma, is the designated CERCLA trustee for "natural resources" in, belonging to, managed by, held in trust by, appertaining to or otherwise controlled by the State of Oklahoma and shall assess damages to natural resources for purposes of CERCLA for those natural resources under their trusteeship.

80. By and through the Poultry Integrator Defendants' activities and operations, "hazardous substances" within the meaning of CERCLA, 42 U.S.C. § 9601(14), including but not limited to phosphorus and phosphorus compounds, nitrogen and nitrogen compounds, zinc and zinc compounds, copper and copper compounds and arsenic and arsenic compounds, were disposed of in the IRW, including the biota, lands, waters and sediments therein, resulting in "releases" and/or "threatened releases" of hazardous substances within the meaning of CERCLA, 42 U.S.C. § 9601(22), into the IRW, including the lands, waters and sediments therein.

81. The IRW, including the lands, waters and sediments therein, constitutes a "site or area where a hazardous substance . . . has been deposited, stored, disposed of, or placed, or otherwise come to be located; . . . ." and, as such, constitutes a "facility" within the meaning of CERLCA, 42 U.S.C. § 9601(9). Furthermore, the grower buildings, structures, installations and equipment, as well as the land to which the poultry waste has been applied, also constitute a "facility" within the meaning of CERCLA, 42 U.S.C. § 9601(9), from which the "releases" and / or "threatened releases" of "hazardous substances" into the IRW, including the lands, waters and sediments therein, resulted.

82. Each of the Poultry Integrator Defendants is a "person" within the meaning of CERCLA, 42 U.S.C. § 9601(21).

83. The Poultry Integrator Defendants are covered persons within the meaning of CERCLA, 42 U.S.C. § 9607(a), in that they, individually and collectively, have arranged for the disposal of their poultry waste which contains hazardous substances, including but not limited to phosphorus and phosphorus compounds, nitrogen and nitrogen compounds, zinc and zinc compounds, copper and copper compounds and arsenic and arsenic compounds, which has been released to and within the IRW, including the lands, waters and sediments therein, and these hazardous substances have been released within the IRW, including the lands, waters and sediments therein.

84. Additionally, the Poultry Integrator Defendants are covered persons within the meaning of CERCLA, 42 U.S.C. § 9607(a), in that they, individually and collectively, have been owners and / or operators during the time their poultry waste containing these hazardous substances was generated, disposed of and released into the IRW, including the lands, waters and sediments therein.

85. As a result of the release of hazardous substances by the Poultry Integrator Defendants into the IRW, including the lands, waters and sediments therein, there has been injury to, destruction of, and loss of natural resources in the IRW, including the land, fish, wildlife, biota, air, water, ground water, drinking water supplies and all other such resources therein, for which the Oklahoma Secretary of the Environment is trustee on behalf of the State of Oklahoma.

86. This injury to, destruction of, and loss of natural resources in the IRW, including the land, fish, wildlife, biota, air, water, ground water, drinking water supplies and all other such resources therein, for which the Oklahoma Secretary of the Environment is trustee on behalf of the State of Oklahoma is continuing.

87. The natural resources that have been and continue to be injured, destroyed, or lost as a result of the release of hazardous substances by the Poultry Integrator Defendants include, but are not limited to the land, fish, wildlife, biota, air, water, ground water, drinking water supplies and all other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the State of Oklahoma.

88. The State of Oklahoma has incurred reasonable and necessary costs to assess and evaluate this injury, destruction and loss of the natural resources.

89. Accordingly, the Poultry Integrator Defendants are jointly and severally liable to the State of Oklahoma and the Oklahoma Secretary of the Environment as trustee under CERCLA 107 for damages for injury to, destruction of, and loss of these natural resources in the IRW, including the land, fish, wildlife, biota, air, water, ground water, drinking water supplies and all other such resources therein, including but not limited to (a) the cost to restore, replace, or acquire the equivalent of such natural resources; (b) the compensable

value of lost services resulting from the injury to such natural resources; and (c) the reasonable cost of assessing injury to the natural resources and the resulting damages.

C. Count 3: SWDA Citizen Suit

90. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

91. On or about March 9, 2005, in accordance with the applicable federal statutes and regulations, the State of Oklahoma served its Notice of Intent to File Suit under the Solid Waste Disposal Act ("SWDA"), by registered mail, properly addressed and postage prepaid, to each of the Poultry Integrator Defendants as well as the appropriate federal and state officials. A copy of this Notice is attached hereto as Exhibit 5.

92. Poultry waste is a solid and / or hazardous waste under the SWDA.

93. Each of the Poultry Integrator Defendants has in the past been or is now a generator of poultry waste and / or has in the past been or is now an owner or operator of a treatment, storage or disposal facility for poultry waste.

94. Each of the Poultry Integrator Defendants is a "person" under the SWDA who has contributed to and / or is contributing to the past or present handling, storage, treatment, transportation or disposal of poultry waste in the IRW and lands and waters therein.

95. An imminent and substantial endangerment to health or the environment may be presented and is in fact presented as a direct and proximate result of each of the Poultry Integrator Defendants' respective contribution to the handling, storage, treatment, transportation or disposal of poultry waste in the IRW and lands and waters therein.

96. Accordingly, the State of Oklahoma is entitled to an injunction restraining each and all of the Poultry Integrator Defendants from their respective pollution-causing conduct, to remediate the IRW and the lands and waters therein, and to take all such other action as may be necessary to abate the imminent and substantial endangerment to health or the environment.

97. Additionally, the State of Oklahoma is entitled to all appropriate civil penalties under the SWDA, as well as all costs of litigation (including reasonable attorneys and expert witness fees).

D. Count 4: State Law Nuisance

98. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

99. As a result of their poultry waste disposal practices, the Poultry Integrator Defendants have intentionally caused an unreasonable invasion of, interference with and impairment of the State of Oklahoma's and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein, thereby causing the State of Oklahoma and the public inconvenience, annoyance, impairment of use, interference with enjoyment, and other injury. This unreasonable and intentional invasion of, interference with and impairment of the State of Oklahoma's and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein, by the Poultry Integrator Defendants continues to this day.

100. Additionally, as a result of their poultry waste disposal practices, the Poultry Integrator Defendants' wrongful conduct has caused an unreasonable and substantial danger to the public's health and safety in the IRW, including the lands, waters and sediments therein. This unreasonable and substantial danger to the public's health and safety in the IRW,

including the lands, waters and sediments therein, by the Poultry Integrator Defendants continues to this day.

101. Such conduct thereby constitutes a private and public nuisance under applicable state law. The nuisance and injuries caused thereby are substantial, tangible, continuing, and both temporary and permanent. The continuation of such conduct threatens irreparable harm.

102. The Poultry Integrator Defendants have at all times pertinent to this complaint known that an invasion of, interference with and impairment of the State of Oklahoma's and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein, as well as the creation of an unreasonable and substantial danger to the public's health and safety, have resulted from, or have been substantially certain to result from, their wrongful poultry waste disposal practices.

103. Further, by statute, the Poultry Integrator Defendants' pollution of the waters within the IRW and placement / contribution to the placement of poultry wastes where they are likely to cause pollution of the IRW, including the lands, waters and sediments therein, constitute a public nuisance *per se* pursuant to 27A Okla. Stat. § 2-6-105.

104. Yet further, by statute, the Poultry Integrator Defendants are subject to the jurisdiction of the Oklahoma Department of Agriculture, Food, and Forestry pursuant to the Oklahoma Environmental Quality Act and, as such, their pollution of the land and waters within the IRW constitutes a public nuisance *per se* pursuant to 2 Okla. Stat. § 2-18.1.

105. By reason of the foregoing, the State of Oklahoma is entitled to equitable relief, including but not limited to an injunction requiring each and all of the Poultry Integrator Defendants to abate their pollution-causing conduct—including immediate cessation of all releases of poultry waste constituents to the soils and waters of the State of Okla-

homa—to remediate the IRW, including the lands, waters and sediments therein, and to pay all costs associated with quantifying the amount of remediation and natural resource damages as well as the amount of natural resource damages itself.

106. By reason of the foregoing, the State of Oklahoma has also incurred, and will incur in the future, damages, including special and direct damages, costs and expenses as a result of the nuisance for which it is entitled to receive compensation and reimbursement from the Poultry Integrator Defendants, jointly and severally.

107. Exemplary and punitive damages should also be awarded based on the Poultry Integrator Defendants' reckless and intentional indifference to and disregard of the public's health and safety in the IRW, including the lands, waters and sediments therein.

108. The State of Oklahoma is further entitled to reasonable attorneys fees, court costs and interest pursuant to 12 Okla. Stat. § 940.

E. Count 5: Federal Common Law Nuisance

109. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

110. As a result of their poultry waste disposal practices, the Poultry Integrator Defendants have intentionally carried on an activity that has caused and is causing an unreasonable invasion of, interference with, impairment to, inconvenience to, annoyance to and injury to the State of Oklahoma and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein.

111. Additionally, as a result of their poultry waste disposal practices, the Poultry Integrator Defendants have intentionally carried on an activity that has significantly threatened

to cause and is significantly threatening to cause an unreasonable invasion of, interference with, impairment to, inconvenience to, annoyance to and injury to the State of Oklahoma and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein.

112. Furthermore, as a result of their poultry waste disposal practices, the Poultry Integrator Defendants have intentionally carried on an activity that has caused and is causing unreasonable and substantial danger to the public's health and safety in the IRW, including the lands, waters and sediments therein.

113. Additionally, as a result of their poultry waste disposal practices, the Poultry Integrator Defendants have intentionally carried on an activity that has significantly threatened to cause and is significantly threatening to cause unreasonable and substantial danger to the public's health and safety in the IRW, including the lands, waters and sediments therein.

114. Such conduct thereby constitutes a nuisance under applicable federal law. The injuries caused thereby are substantial, tangible and continuing, and are both temporary and permanent. The continuation of such conduct threatens irreparable harm.

115. The Poultry Integrator Defendants have at all times pertinent to this complaint known that an invasion of, interference with and impairment of the State of Oklahoma's and the public's beneficial use and enjoyment of the IRW, including the biota, lands, waters and sediments therein, as well as the creation of an unreasonable and substantial danger to the public's health and safety, have resulted from, or have been substantially certain to result from, their wrongful poultry waste disposal practices.

116. By reason of the foregoing, the State of Oklahoma is entitled to equitable relief, including but not limited to an

injunction requiring each and all of the Poultry Integrator Defendants to abate their pollution-causing conduct, to remediate the IRW, including the lands, waters and sediments therein, and to pay all costs associated with quantifying the amount of remediation and natural resource damages as well as the amount of natural resource damages itself.

117. By reason of the foregoing, the State of Oklahoma has also incurred, and will incur in the future, damages, including special and direct damages, costs and expenses as a result of the nuisance for which it is entitled to receive compensation and reimbursement from the Poultry Integrator Defendants, jointly and severally.

118. Exemplary and punitive damages should also be awarded based on the Poultry Integrator Defendants' reckless and intentional indifference to and disregard of the public's health and safety in the IRW, including the lands, waters and sediments therein.

F. Count 6: Trespass

119. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

120. The Poultry Integrator Defendants' poultry waste disposal practices have resulted in an actual and physical invasion of and interference with the State of Oklahoma's property interests in the IRW, including the biota, lands, waters and sediments therein. This actual and physical invasion of and interference with the State of Oklahoma's property interests in the IRW, including the biota, lands, waters and sediments therein, by the Poultry Integrator Defendants is continuing.

121. The Poultry Integrator Defendants have known that their poultry waste disposal practices have resulted in or have been substantially certain to result in an actual and physical

invasion of and interference with the State of Oklahoma's property interests in the IRW, including the biota, lands, waters and sediments therein, and thus have been and continue to be intentional.

122. This actual and physical invasion of and interference with the State of Oklahoma's property interests in the IRW, including the biota, lands, waters and sediments therein, by the Poultry Integrator Defendants have been, and continue to be, without authority or consent.

123. Such conduct thereby constitutes a trespass under applicable state law. The trespass and injuries caused thereby are substantial, tangible, continuing, and both temporary and permanent. The continuation of such conduct threatens irreparable harm.

124. By reason of the foregoing, the State of Oklahoma is entitled to equitable relief, including but not limited to an injunction requiring each and all of the Poultry Integrator Defendants to abate their pollution-causing conduct, to remediate the IRW, including the lands, waters and sediments therein, and to pay all costs associated with quantifying the amount of remediation and natural resource damages as well as the amount of natural resource damages itself.

125. By reason of the foregoing, the State of Oklahoma has also incurred, and will incur in the future, damages, costs and expenses as a result of the trespass for which it is entitled to receive compensation and reimbursement from the Poultry Integrator Defendants, jointly and severally.

126. Exemplary and punitive damages should also be awarded based on the Poultry Integrator Defendants' reckless and intentional indifference and harm to the State of Oklahoma's property interests in the IRW, including the biota, lands, waters and sediments therein, as well as their

reckless and intentional disregard of the public's health and safety in the IRW, including the lands, waters and sediments therein.

127. The State of Oklahoma is further entitled to reasonable attorneys fees, court costs and interest pursuant to 12 Okla. Stat. § 940.

G. Count 7: Violation of 27A Okla. Stat. § 2-6-105 & 2 Okla. Stat. § 2-18.1

128. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

129. The Poultry Integrator Defendants, by and through their wrongful poultry waste disposal practices, have caused pollution of the waters in the IRW within Oklahoma. Each instance of this conduct constitutes a violation of 27A Okla. Stat. § 2-6-105.

130. Additionally, the Poultry Integrator Defendants, by and through their wrongful poultry waste disposal practices, have placed or caused to be placed poultry waste in locations where it is likely to cause pollution of the air, land and waters in the IRW in Oklahoma. Each instance of this conduct also constitutes a violation of 27A Okla. Stat. § 2-6-105.

131. Additionally, the Poultry Integrator Defendants are subject to the jurisdiction of the Oklahoma Department of Agriculture, Food, and Forestry pursuant to the Oklahoma Environmental Quality Act and, by and through their wrongful poultry waste disposal practices, have caused pollution of the land and waters within the IRW in Oklahoma. Each instance of this conduct constitutes a violation of 2 Okla. Stat. § 2-18.1.

132. Pursuant to 27A Okla. Stat. § 2-3-504 and 2 Okla. Stat. § 2-16, the State of Oklahoma is entitled to an assessment of civil penalties against the Poultry Integrator Defen-

dants for each respective violation together with attorneys fees and costs associated with the collection of such civil penalties, injunctive relief against the Poultry Integrator Defendants compelling compliance with 27A Okla. Stat. § 2-6-105 and 2 Okla. Stat. § 2-18.1, respectively, and all such other relief as may be provided for under the law.

H. Count 8: Violation of 2 Okla. Stat. § 10-9.7 and Oklahoma Administrative Code § 35:17-5-5

133. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

134. The Poultry Integrator Defendants' wrongful poultry waste disposal practices, by and through those practices that occurred in Oklahoma, have caused, among other things, the runoff of poultry waste into the waters in the IRW within Oklahoma, contamination of the waters of the IRW within Oklahoma, and the creation of an environmental or public health hazard within Oklahoma. Each instance of this conduct constitutes a violation of the Animal Waste Management Plan criteria set forth in the Oklahoma Registered Poultry Feeding Operations Act, 2 Okla. Stat. § 10-9.7, and of the Oklahoma Administrative Code, § 35:17-5-5.

135. Additionally, the Poultry Integrator Defendants, by and through their poultry waste disposal practices that occurred in Oklahoma, have caused, among other things, discharges or runoffs or releases of significant pollutants to the waters in the IRW in Oklahoma, contamination of the waters of the IRW within Oklahoma, and the creation of an environmental or public health hazard within Oklahoma. Each instance of this conduct also constitutes a violation of the Animal Waste Management Plan criteria set forth in the Oklahoma Registered Poultry Feeding Operations Act, 2 Okla. Stat. § 10-9.7, and of the Oklahoma Administrative Code, § 35:17-5-5.

136. Pursuant to 2 Okla. Stat. § 10-9.11, the State of Oklahoma is entitled to an assessment of civil penalties against the Poultry Integrator Defendants for each violation together with attorneys fees and costs associated with the collection of such civil penalties, injunctive relief against the Poultry Integrator Defendants compelling compliance with the Animal Waste Management Plan criteria set forth in the Oklahoma Registered Poultry Feeding Operations Act, 2 Okla. Stat. § 10-9.7, and with the Oklahoma Administrative Code, § 35:17-5-5, and all such other relief as may be provided for under the law.

I. Count 9: Violation of Oklahoma Administrative Code, § 35:17-314

137. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

138. The Poultry Integrator Defendants' wrongful poultry waste disposal practices, by and through those practices that occurred in Oklahoma, have caused the runoff of poultry waste resulting in a discharge to the surface and ground waters of the IRW within Oklahoma. Each instance of this conduct, to the extent the poultry waste disposal practice occurred on land owned or leased by the owner of a poultry growing operation subject to Oklahoma Concentrated Animal Feeding Operation Act, 2 Okla. Stat. § 9-200, *et. seq.*, constitutes a violation of the Animal Waste Management Plan criteria set forth in the Oklahoma Administrative Code, § 35:17-3-14.

139. Pursuant to 2 Okla. Stat. § 9-212, the State of Oklahoma is entitled to an assessment of civil penalties against the Poultry Integrator Defendants for each violation together with attorneys fees and costs associated with the collection of such civil penalties, injunctive relief against the Poultry Integrator Defendants compelling compliance with the Animal Waste

Management Plan criteria set forth in the Oklahoma Administrative Code, § 35:17-3-14, and all such other relief as may be provided for under the law.

J. Count 10: Unjust Enrichment / Restitution / Disgorgement

140. The State of Oklahoma realleges and incorporates herein the foregoing allegations of this Complaint, and further alleges as follows:

141. The Poultry Integrator Defendants have engaged in improper poultry waste disposal practices, as described above.

142. By engaging in these improper poultry waste disposal practices, the Poultry Integrator Defendants have avoided the costs of properly managing and disposing of their poultry waste—not only to their enormous economic benefit and advantage, but also at great cost to the lands and waters comprising the IRW and at the expense of, and in violation of, the State of Oklahoma's rights.

143. In fairness and equity, these are costs that should have been borne by the Poultry Integrator Defendants.

144. The State of Oklahoma has thereby conferred a benefit upon the Poultry Integrator Defendants.

145. This benefit has not been voluntarily conferred upon the Poultry Integrator Defendants by the State of Oklahoma.

146. The Poultry Integrator Defendants have knowingly retained this benefit and have, therefore, been unjustly enriched.

147. There exists no other remedy at law that can adequately compensate the State of Oklahoma for the entirety of the loss and damages it has suffered as a result of the Poultry Integrator Defendants' improper poultry waste disposal practices and pollution of the IRW, including the lands, waters and sediments therein, and therefore the State of Oklahoma is

entitled to restitution from the Poultry Integrator Defendants. Further, the State of Oklahoma is entitled to disgorgement of all gains the Poultry Integrator Defendants realized in consequence of their wrongdoing.

VI. PRAYER FOR RELIEF

Wherefore, the State of Oklahoma and, where applicable, the Oklahoma Secretary of the Environment respectfully request that this Court enter judgment against the Poultry Integrator Defendants, jointly and severally, on each of the claims alleged above and award the following relief:

1. All past monetary damages suffered by and all costs and expenses incurred by the State of Oklahoma as a result of and in connection with the Poultry Integrator Defendants' past wrongful conduct;

2. A declaration that the Poultry Integrator Defendants are liable for all future monetary damages suffered by and all costs and expenses incurred by the State of Oklahoma as a result of and in connection with the continuing effects of the Poultry Integrator Defendants' past wrongful conduct;

3. A permanent injunction requiring each and all of the Poultry Integrator Defendants to immediately abate their pollution-causing conduct in the IRW, to remediate the IRW, including the lands, waters and sediments therein, to take all such actions as may be necessary to abate the imminent and substantial endangerment to the health and the environment, and to pay all costs associated with assessing and quantifying the amount of remediation and natural resource damages as well as the amount of natural resource damages itself;

4. Restitution in an amount sufficient to make the State of Oklahoma whole for the loss and damages it has suffered on account of the Poultry Integrator Defendants' improper poultry waste disposal practices and pollution of the IRW, including the lands, waters and sediments therein, as well as

disgorgement of all gains the Poultry Integrator Defendants realized in consequence of their wrongdoing;

5. Punitive and exemplary damages, to the maximum extent allowable under the law;

6. Statutory penalties, to the maximum extent allowable under the law;

7. Prejudgment interest;

8. All attorneys fees and costs of suit (including but not limited to court costs, expert and consultant costs, and litigation and investigative expenses); and

9. All such other and further relief as is just and appropriate.

VII. JURY DEMAND

The State of Oklahoma requests a trial by jury on all issues so triable.

Respectfully submitted,

/S/ _____

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DATED: August 19, 2005

APPENDIX B

MEMORANDUM

TO: James R. Barnett, Executive Director

FROM: R. Thomas Lay, General Counsel

DATE: March 13, 1981

RE: Pollution Remedies and Jurisdictional Considerations Under the [Arkansas-Oklahoma] Arkansas River Basin Compact, 82 O.S. 1971, §§1421, 1422

Pursuant to your request, I have reviewed the matter of appropriate and available legal remedies for interstate water pollution concerns relative to the Arkansas River Basin (Illinois River) under the above referred Arkansas River Basin Compact.

APPROPRIATENESS AND AVAILABILITY OF LEGAL REMEDIES UNDER THE COMPACT AND THROUGH THE COMPACT COMMISSION

Unquestionably, the pursuit of interstate water pollution remedies or abatement through the Arkansas River Basin Compact and the Compact Commission is proper, appropriate and contemplated under the Compact and applicable law. Article I of the Compact designates interstate water pollution concerns as one of the five "major purposes" of the Compact. Current federal law encourages states to utilize the interstate compact mechanism for purposes of resolving interstate water pollution problems. 33 USC 1253.

With regard to that which the states of Arkansas and Oklahoma have agreed to respecting pollution, the states have agreed in the Compact to continue the support of both states in an active pollution abatement program; to provide state cooperation in the investigation and abatement of interstate pollution sources; to enter into joint programs to identify and

control pollution sources; and to utilize available state and federal law and, water quality standards in the resolution of pollution problems.

With respect to the power and Authority of the Compact Commission to act affirmatively on a matter of interstate water pollution, Article IX of the Compact clearly provides such authority. This Article, among other things, authorizes the Commission to conduct hearings, compel the attendance of witnesses, take testimony and receive other appropriate evidence and to issue appropriate orders necessary for the proper administration of the Compact. Such orders are expressly made enforceable in any court of competent jurisdiction.

JURISDICTIONAL CONSIDERATIONS— PURSUIT OF POLLUTION REMEDY

The particular forum to which the State of Oklahoma might make resort for purposes of pursuing a matter of interstate water pollution is an important consideration, legally and otherwise. If the forum alternatives were reduced to making first resort to the courts or first resort to the Compact and the Compact Commission, it is clear that first resort should be made to remedies available through the Compact and the Commission.

First, the States of Arkansas and Oklahoma have essentially agreed through the Compact to pursue resolution of interstate pollution concerns through the Commission before making resort to other available legal remedies. Paragraph "E" of Article VII of the Compact does provide for the mutual agreement of the states to utilize applicable state and federal water pollution laws and water quality standards in the resolution of any pollution problems affecting the waters of the Arkansas River Basin. The adopted comment on this Article explains the intent and purpose of this provision and this comment states, in relevant part:

> "Through active pollution abatement programs the states hope to avoid the conflict over future problems, but have

provided that, if necessary, they may utilize the provisions of the Federal Water Pollution Control Act *in cases which cannot be resolved within the provisions of the Compact.*" (Emphasis Supplied)

Second, making first resort to the Compact Commission establishes a foundation for direct and ready access to the federal courts should resort to the Commission ultimately prove to be unsatisfactory. Article XIII of the Compact provides for the consent of the states to be sued for controversies arising under the Compact. Additionally and independent of this jurisdictional provision, 33 U.S.C. Section 466g-1 grants original jurisdiction to the United States District Courts for the resolution of controversies between signatory states under an interstate compact. The obvious statutory mechanism is thus to present the matter to the Commission first and then, if necessary, proceed to federal district court.

Third, making first and direct resort to the federal courts creates practical as well as jurisdictional questions and complications. If such litigation were in the nature of a controversy between two states and/or a state and the United States, the provisions of 28 U.S.C. 1251 would in all probability require that such an action be instituted and maintained only before the United States Supreme Court. Federal district court jurisdiction to entertain such a controversy would indeed be questionable under Section 1251 and Chapter 85 of Title 28, U.S.C. As you know, maintaining an original action before the United States Supreme Court typically involves a very prolonged and tedious litigation proceeding.

If first resort were made to the United States Supreme Court in an effort to resolve the pollution concerns, in my opinion there would be an extremely high probability that after considering the matter, the United States Supreme Court would consider the availability of the Compact as a source of administrative remedy to the controversy and may indeed

thereupon remand or defer the controversy to the Compact Commission under the exhaustion of available remedies doctrine.

CONCLUSION

In conclusion, the Compact Commission is clearly an authorized and viable forum capable of entertaining matters of interstate pollution concern and of effecting a satisfactory remedy for those concerns. In fact, the States of Arkansas and Oklahoma have implicitly agreed to first work through the Commission in an effort to resolve such problems before making resort to other available legal remedies.

Making first resort to the Compact Commission would provide for a much more expeditious consideration of the pollution concerns and would additionally provide, by law, for direct access to the federal district courts should the Commission resolution of the problem be deemed unsatisfactory to the State of Oklahoma. This must be considered a preferable alternative to pursuing litigation through the United States Supreme Court which could very well simply remand the matter to the Compact Commission for exhaustion of available legal remedies.

Should you desire any further information on this matter, please advise.

APPENDIX C

OKLAHOMA COMMISSIONERS' REPORT
Arkansas-Oklahoma Arkansas River Compact Commission

Annual Meeting
Shangri-La Resort
Afton, Oklahoma
September 24, 2003

STATE CLIMATE & STREAMFLOW

Recent rainfall has alleviated emerging drought conditions in Oklahoma. For the current water year (since October 1, 2002), the Northeast climate division, which encompasses much of the Kansas-Oklahoma Arkansas River Compact area, has received 34.52 inches of rainfall, a deficit of 4.1 inches (89 percent of normal). The North Central and Northwest/ Panhandle climate divisions have received 91 and 103 percent of normal rainfall, respectively, for the water year. For the summer season (since June 1), the Northeast, North Central, and Northwest/Panhandle climate divisions have received 123, 78, and 127 percent of normal precipitation, respectively.

WATER RESOURCE STUDIES

Surface Water

- Last year, the OWRB and U.S. Bureau of Reclamation began an initial cooperative assessment of water quality, quantity, and base flow hydrology on Sweetwater Creek and the North Fork of the Red River watersheds, which include Lugert-Altus Reservoir. A proposed second phase of this study would determine the potential effects of groundwater withdrawals in the basins and include development of models to evaluate the augmentation of Lugert-Altus Reservoir's dependable yield.

- In 2002, the Board completed its instream flow study of the Baron Fork River, in eastern Oklahoma, and passed its instream flow rule of 50 cubic feet per second (cfs). The study, conducted in cooperation with Oklahoma State University, quantified instream flow requirements sufficient to protect the river's environmental benefits while balancing the water supply needs of area residents. The 50 cfs rule was established in cooperation with the Oklahoma Department of Wildlife Conservation.

- In a cooperative effort with the Tulsa District of the U.S. Army Corps of Engineers, through the Corps' Planning Assistance to the States Program, a study was completed in June 2003 to evaluate water supply alternatives for Adair County Rural Water District No. 5. The District, which currently is supplied through direct diversions from the Baron Fork River, is seeking options for a dependable future water supply. Conceptual level design and cost data were developed for three alternatives.

- Another Corps study, an effort with the Indian Nations Council of Governments, will assist in development of a master plan for the Arkansas River Corridor in the Tulsa vicinity (from Keystone dam to the Tulsa/Wagoner County boundary).

Groundwater

- Congress is preparing to appropriate $700,000 for the OWRB, through the Bureau of Reclamation, to conduct the second year of a comprehensive multi-year study of southeast Oklahoma's Arbuckle-Simpson Aquifer. The aquifer supplies flow to many area rivers and streams—including Byrd's Mill Spring and the Blue River, the drinking water source for the City of Ada—but more information is required to properly

manage and protect the region's water resources. The first year of the analysis will primarily consist of reviewing literature and existing data and preliminary field investigations. The initial phase will culminate in a report, which will include information on the Arbuckle-Simpon's geology, hydrology and water quality; resulting data will be compiled in digital format. Anticipated field work includes installation of two stream gages (on the Blue River and Pennington Creek), updating the current inventory of water wells and springs, and collecting measurements and samples from wells, springs, and streams in the area. Special emphasis will be afforded to deeps wells, on which a variety of hydrologic tests will be performed.

Water Quality

- Continuing efforts to improve water quality in Lake Thunderbird, the OWRB and the Central Oklahoma Master Conservancy District (COMCD) have begun their fourth year of monitoring chlorophyll and nutrient concentrations in the lake. The OWRB has recommended several management alternatives that have been implemented by the COMCD that have greatly improved the lake's algae and chlorophyll problems.

- Shoreline erosion control projects at Lake Carl Blackwell and Lake Thunderbird are being implemented through EPA's §319 non-point source pollution grants program. By demonstrating innovative ways to combat erosion and suspended sediment, the OWRB seeks to educate lake managers on the habitat-friendly benefits of establishing aquatic plants to improve the health of our state's aquatic communities.

- Development of a watershed model for Lake Wister is underway in conjunction with the Poteau Valley Improvement Authority (PVIA). OWRB is providing

analysis of data and model construction while PVIA is collecting the samples. The study will provide details of the type and severity of loadings (sediment, nutrients) to the lake from the watershed. Staff are also monitoring the success of a recent project to establish aquatic vegetation in shallow reaches of Lake Wister. If successful, the plantings will reduce the lake's nutrient content, increase clarity, and provide valuable habitat for fish and wildlife.

THE 2003 OKLAHOMA LEGISLATIVE SESSION

The Oklahoma State Legislature adjourned sine die on May 30, 2003. A summary of primary legislation impacting the Oklahoma Water Resources Board is presented below.

- *HB 1146 Confidential Water Vulnerability Assessments*: This legislation directs certain state environmental agencies and public utilities to keep information relating to vulnerability assessments of water and wastewater systems confidential. Information may be used for internal and for survey purposes only.
- *HB 1219 Tourism and Recreation Loan Repayment*: The Oklahoma Tourism and Recreation appropriations bill creates a "Tourism and Recreation Environmental Loan Proceeds Revolving Fund" for administering OWRB Clean Water SRF Loan proceeds for wastewater infrastructure improvements at several state lodges. It appropriates $477,674 for the purpose of repaying the OWRB Clean Water SRF loan.
- *SB 155 OWRB Gross Production Tax REAP Appropriation*: This bill authorizes the expenditure and transfer of funds from the gross production tax REAP Water Projects Fund for the following: 1) OWRB—$535,000 for water studies, dam repair, rural development issues and other activities; 2) Conservation Commission—$160,000 for section 319 match,

$500,000 for Cost-Share Program, $500,000 for Upstream Watershed Rehabilitation Program, and $118,000 for Conservation District operations; and 3) Oklahoma Rural Water Association—$118,000 for technical assistance and training to rural water and wastewater system operators and board members. The Oklahoma Tax Commission estimated $5.17 million would be available to the Fund from gross production taxes. HB 1207, the appropriation bill for the Oklahoma Corporation Commission, directed $3,260,000 from the Fund be transferred to the Commission to pay for administration expenses.

- *SB 288 Arbuckle Simpson Aquifer Moratorium*: This legislation imposes a moratorium on the issuance of any temporary groundwater permit for municipal or public water supply use outside of any county that overlays, in whole or in part, the Arbuckle Simpson Aquifer. The moratorium also applies to municipal and political subdivisions outside the basin from entering into contracts for use of such water. The moratorium would also apply to pending applications and any revalidation of existing temporary permits. The moratoriums are to remain in effect until such time as the OWRB conducts a hydrologic study of the aquifer and approves a maximum annual yield that will not reduce the natural flow of water from springs or streams emanating from the aquifer. The legislation also adds another requirement for groundwater permit approval for use within the basin. The Board must find that the proposed use is not likely to degrade or interfere with springs or streams emanating from the aquifer.
- *SB 408 Grand Lake Water Studies*: This legislation mandates numerous administration and operation initiatives to the Grand River Dam Authority. Of

importance to the OWRB is a comprehensive study of Grand Lake. The bill directs the Secretary of Environment, with assistance of state environmental agencies, to conduct a comprehensive study of Grand Lake to identify factors that may impact the economic growth and environmental beneficial use of the lake and its tributaries for area residents and the expected population growth of the area. As part of the study or as a separate study, the OWRB is to conduct a Clean Lakes Study and produce a bathymetric map of the lake for assessment of current capacity and the amount and location of deposited sediment. Studies proposed would be funded at least in part with $125,000 appropriated in the legislation.

BENEFICIAL USE MONITORING PROGRAM

The OWRB's FY-04 appropriation includes, for the first time since inception of the program, $1,000,000 in the agency's base appropriation for the Beneficial Use Monitoring Program (BUMP). The BUMP, one of the finest state-run monitoring programs in the nation, facilitates science-based decision-making concerning impaired waters. In tandem with Oklahoma's Water Quality Standards, the program has become a cornerstone of state water quality management.

NUMERICAL WATER QUALITY STANDARD FOR PHOSPHORUS

The state, represented by Oklahoma Secretary of Environment Miles Tolbert, continues talks with officials from the State of Arkansas to implement Oklahoma's first-ever numeric water quality standard for phosphorus. The two states are attempting to reduce phosphorus levels in shared waters, with particular emphasis on the Illinois River Basin, with minimal economic impacts to municipalities and poultry operations in the region. The standard applies solely to Oklahoma's designated Scenic Rivers. Oklahoma's Water

Quality Standards are currently waiting approval from EPA's Region Six headquarters in Dallas, Texas.

UPDATE OF THE OKLAHOMA COMPREHENSIVE WATER PLAN (2005)

OWRB staff have begun initial work in preparation for the 2005 update of the Oklahoma Comprehensive Water Plan. The Board's update strategy is to incorporate a region-based planning approach to maximize citizen involvement, likely involving Oklahoma's 11 substate planning districts. The Corps of Engineers is providing technical assistance in updating water demand and supply projections for the state and Bureau of Reclamation staff have assisted in updating agricultural water demand projections for the Water Plan.

WEATHER MODIFICATION RESEARCH

Although the Legislature has declined funding for the state's weather modification program since 2001, the OWRB continues to support research of the technology. For FY-02 and FY-03, Congress included $2 million and $3.5 million, respectively, in the budget of the Bureau of Reclamation to implement a multi-year, regional research program to determine the effectiveness and applicability of cloud seeding in mitigating severe weather events. The States of Oklahoma and Texas will utilize research scientists and agencies of the Oklahoma Weather Center, a unique alliance of federal, state and University of Oklahoma organizations based in Norman, Oklahoma.

WATER RESOURCES FINANCING

The Oklahoma Water Resources Board administers the State *Financial Assistance Program* (FAP), backed by the Statewide Water Development Revolving Fund, which awards loans and grants for the construction and improvement of water and sewer facilities. The Board offers loans from proceeds of revenue bonds to eligible communities for

sewer and water improvements and refinancing. To date, the Board has approved 283 bond loans totaling almost $482 million statewide. The emergency grant program, funded by interest earnings on the Revolving Fund, has approved 500 grants for almost $29.3 million. These grants have stimulated many millions of dollars more in water/wastewater projects throughout the area.

The Board also provides loans through the Clean *Water (CWSRF) and Drinking Water Construction Revolving Fund (DWSRF) Programs* for various wastewater and water treatment/distribution projects, respectively, which are often required to bring borrowers into compliance with EPA requirements. The CWSRF Loan Program, which provides funds for the construction of new wastewater facilities or the replacement or rehabilitation of existing facilities, has approved 148 loans for more than $498 million. The DWSRF, a cooperative program recently developed by the OWRB and Oklahoma Department of Environmental Quality, was created to assist municipalities and rural water districts in constructing drinking water treatment and distribution system improvements required to comply with the federal Safe Drinking Water Act. The program has approved 32 loans for more than $86 million.

The *Rural Economic Action Plan (REAP)* grant program is operated by the Board in a manner very similar to its emergency grant program. REAP gives priority to communities with populations less than 1,500 and rural water districts with less than 450 household taps. The Board has approved 382 REAP grants totaling more than $33 million.

APPENDIX D

Joint Arkansas/Oklahoma Scenic River
Monitoring Proposal

Developed by the States of Arkansas and
Oklahoma in accordance with the Statement of
Joint Principles and Actions to monitor water quality
in shared Oklahoma Scenic River watersheds

September 22, 2004

Participating State and Federal Entities:

Arkansas Department of Environmental Quality*

Arkansas Department of Health

Arkansas Forestry Commission

Arkansas Game and Fish Commission

Arkansas Soil and Water Conservation Commission*

Environmental Protection Agency

Oklahoma Conservation Commission*

Oklahoma Department of Agriculture, Food, and Forestry

Oklahoma Department of Environmental Quality*

Oklahoma Department of Wildlife Conservation

Oklahoma Office of the Secretary of the Environment

Oklahoma Scenic Rivers Commission

Oklahoma State University

Oklahoma Water Resources Board*

United States Geological Survey

University of Arkansas

University of Arkansas—Arkansas Water Resources Center

*member of Scenic River Monitoring Technical Workgroup

Introduction

Oklahoma shares five designated Scenic River watersheds with the state of Arkansas—the Illinois River, Flint Creek, Barren Fork River, Lee Creek, and the Mountain Fork of the Little River (Figure 1). Flint Creek and the Barren Fork River are part of the Illinois River watershed. In addition, Little Lee Creek is a designated Scenic River in Oklahoma but is not shared with Arkansas. Four lakes of concern are present in the watersheds. In Oklahoma, the Illinois River and Mountain Fork River flow into terminal reservoirs, Tenkiller Ferry Lake and Broken Bow Reservoir, respectively. In addition, Lee Creek terminates in Arkansas at Lee Creek Reservoir, and the Illinois River is bisected at the state line by the remnants of Lake Francis.

In the recent past, various monitoring programs in both Arkansas and Oklahoma have shown an increase in various pollutants including phosphorus, suspended sediments, and bacteria. Several actions have been taken by both states to reduce phosphorus in these watersheds. In response to the eutrophication of Tenkiller Lake, the Arkansas-Oklahoma Arkansas River Compact Commission set a phosphorus reduction goal of 40%. Additionally, both states have enacted

legislation to help reduce nutrient and sediment loading to the Illinois River and its contributing streams. In 2003, the Arkansas General Assembly enacted legislation that requires registration and nutrient plans for farms in certain watersheds and designated the Illinois River watershed a nutrients surplus area. In 2002, the Oklahoma Water Resources Board (OWRB) promulgated a total phosphorus criterion of 0.037 mg/L in Scenic Rivers with full compliance by 2012. In a Statement of Joint Principles and Actions (JPA) agreed upon in 2003, the states of Oklahoma and Arkansas entered into an agreement to improve these watersheds. In the agreement, both states express several common goals for water quality in the shared watersheds:

1. Improve water quality.
2. Reduce phosphorus through control of both point and non-point sources.
3. Develop coordinated strategies to meet water quality goals in the watersheds.
4. Develop Watershed Plan according to EPA Clean Water Act (CWA) 319 guidance.

A central tenet of the agreement is the development of a coordinated monitoring program in partnership with the Compact Commission. On April 15-16, 2004, in an effort to implement the agreement, various stakeholders in the watersheds, including state and federal environmental agencies and university researchers from both Oklahoma and Arkansas, met in Tahlequah, Oklahoma to discuss the implementation of the agreement. This group characterized the purpose of the agreement in the following questions and statements:

1. Will current and future implementation efforts detect a difference in the water quality of the watersheds, particularly nutrients, sediment and biologically?
2. Provide data for the successful implementation of the Watershed Plan.

3. Provide baseline data to facilitate current and future water quality monitoring and management activities.

A Scenic River Monitoring Technical Workgroup was formed to develop a water quality monitoring program to address these specific questions. The workgroup's membership represents the pertinent environmental monitoring agencies in both states, including the Arkansas Department of Environmental Quality (ADEQ), Arkansas Soil and Water Conservation Commission (ASWCC), Oklahoma Conservation Commission (OCC), Oklahoma Department of Environmental Quality (ODEQ), and OWRB. On May 12, 2004, the group met in Fort Smith, Arkansas to construct a monitoring proposal. This proposal was formulated to meet the following monitoring objectives:

1. Determine if the Oklahoma Scenic River total phosphorus criterion is being met.
2. Determine if water quality is improving in all the Scenic River watersheds.
3. Determine if Oklahoma and Arkansas are meeting the 40% phosphorus reduction goal using the current agreed upon methodology.
4. Develop a monitoring plan that meets the requirements of a Watershed Plan.

Project Location and Study Design

To meet the goals and objectives outlined above, the Scenic River Monitoring Technical Workgroup proposes that a coordinated and comprehensive monitoring program be initiated in each of the Scenic River watersheds. The monitoring program is designed to provide sufficient data to:

1. Assist in the implementation of the Oklahoma Scenic River total phosphorus criterion;
2. Determine if water quality is improving throughout the Scenic River watersheds;

3. Determine if a 40% reduction in total phosphorus is occurring using the previously agreed upon methodology, and;

4. Support implementation of a Watershed Plan.

To address the data needs characterized in these objectives, a wide variety of parameters will be measured. All parameters will be quantified using EPA approved methods. With the exception of all *in situ* parameters, turbidity, light transmissivity, and discharge, all parameters will be measured in an analytical laboratory. Parametric coverage will include the following series:

Series 1(*in situ*)—dissolved oxygen (DO), specific conductivity (SpC), pH, and water temperature (measured with a multi-parameter instrument or individual meters)
Series 2 (clarity)—total suspended solids (TSS), volatile suspended solids (VSS), light transmissivity (field measurement), and turbidity (field or laboratory measurement)

Series 3 (nutrients)—total phosphorus, ortho-phosphorus, nitrogen as nitrate, nitrogen as nitrite, total Kjeldahl nitrogen, nitrogen as ammonia, and calculated total nitrogen

Series 4 (minerals)—total dissolved solids (TDS), chloride, and sulfate

Series 5 (biological)—sestonic chlorophyll-a, fecal coliform, and enterococci or E. coli

Series 6 (discharge)—development of rating curves at all stations through the relationship of instantaneous flow and stage

Series 7 (climate)—continuous rainfall and various measurements during site visits, including air temperature, wind direction and speed, and cloud cover

A two-tiered spatial approach is proposed to allow for monitoring on both the Scenic River mainstems and within Scenic River watersheds (Figures 2 and 3). Stations will be divided into two tiers with monitoring occurring on priority segments (Tier 1) and important segments (Tier 2) in both Oklahoma and Arkansas. These stations are listed in Table 1. The workgroup proposes thirteen (13) Tier 1 stations for monitoring. These stations will provide basic coverage for each of the five Scenic River watersheds shared between Arkansas and Oklahoma. The workgroup also proposes nineteen (19) Tier 2 stations for monitoring. These stations are of importance for a variety of reasons including:

1. Provide other mainstem river stations for more intensive coverage (e.g., Illinois River near Ellerville).
2. Monitor potential contributors of pollutants to Scenic Rivers (e.g., Sager Creek and Osage Creek).
3. Provide spatial coverage to include potential phosphorus contributors to Lake Tenkiller (e.g., Caney Creek).
4. Provide adequate spatial coverage for Watershed Plan implementation.

Table 1. Stations proposed for Monitoring.

No.	Station	Tier	County	Latitude	Longitude
1	Illinois River, US 62, near Tahlequah	1	Cherokee, OK	35.9260	-94.9238
2	Illinois River, US 59, near Watts	1	Adair, OK	36.1299	-94.5715
3	Illinois River, SH 59, near Siloam Springs	1	Benton, AR	36.1086	-94.5333
4	Illinois River, SH 16, near Savoy	1	Washington, AR	36.1017	-94.345
5	Illinois River below Osage Creek	1	Benton, AR	36.1447	-94.4947
6	Flint Creek near W. Siloam Springs	1	Benton, AR	36.2422	-94.4867
7	Flint Creek, off US 412, near Kansas	1	Delaware, OK	36.1867	-94.7068
8	Barren Fork, CR21, near Dutch Mills	1	Washington, AR	35.8764	-94.4611
9	Barren Fork, SH 51, near Eldon	1	Cherokee, OK	35.9217	-94.8372
10	Lee Creek, SH 101, near Short	1	Sequoyah, OK	35.5658	-94.5315
11	Lee Creek, SH 59, near Natural Dam	1	Crawford, AR	35.4838	-94.3927
12	Mountain Fork River, SH 246, near Hatfield	1	Polk, AR	34.5052	-94.4306
13	Mountain Fork River, SH 4, near Smithville	1	McCurtain, OK	34.4616	-94.6323
14	Illinois River, off SH 82, near Ellerville	2	Cherokee, OK	36.0318	-94.9110
15	Illinois River, off SH 16, near Prairie Grove	2	Washington, AR	36.0861	-94.3453
16	Osage Creek, CR70, near Elm Springs	2	Benton, AR	36.2219	-94.2883
17	Spring Creek	2	Benton, AR	36.2157	-94.1722
18	Muddy Fork	2	Washington, AR	36.07	-94.3483
19	Goose Creek near Viney Grove	2	Washington, AR	36.0511	-94.3094
20	Cincinnati Creek	2	Washington, AR	36.0939	-94.5089
21	Ballard Creek, off US 59, near Watts	2	Adair, OK	36.1063	-94.5650
22	Sager Creek, off US 412, near West Siloam Springs (OK)	2	Delaware, OK	36.2016	-94.6053
23	Sager Creek near Siloam Springs (AR)	2	Benton, AR	36.1930	-94.5638
24	Little Flint Creek	2	Benton, AR		
25	Battle Branch, off US 412, near West Siloam Springs (OK)	2	Delaware, OK	36.2104	-94.6843
26	Barren Fork, US 59, near Baron	2	Adair, OK	35.9192	-94.6193
27	Evansville Creek, SH 51, near Piney	2	Adair, OK	35.8262	-94.5725
28	Shell Branch, US 59, near Baron	2	Adair, OK	35.9237	-94.6158
29	Little Lee Creek, SH 101, near Greasy	2	Sequoyah, OK	35.5754	-94.5554
30	Barren Fork, off US 62, near Welling	2	Cherokee, OK	35.8690	-94.8979
31	Caney Creek, off SH 100, near Barber	2	Cherokee, OK	35.7849	-94.8555
32	Tahlequah Creek, off US 62, near Tahlequah	2	Cherokee, OK	35.8905	-94.9494

To quantify both the ambient concentrations and loads of various pollutants, stations will be monitored on two temporal scales. To measure ambient concentrations of pollutants, all stations will be monitored at a fixed interval on a bi-weekly schedule with 26 annual samples collected per station. To obtain a representative sample, a depth-integrated composite will be collected. During these sampling periods, parameter series 1, 6, and 7 as well as light transmissivity and turbidity will be measured in the field. The composite sample will be properly preserved and delivered to the analytical laboratory for the measurement of parameter series 2, 3, 4 and 5. To quantify loads of certain pollutants at Tier 1 stations, approximately 50 stormwater samples per station will be collected throughout the year using autosamplers. Discrete point grab samples will be taken during increased periods of discharge at

select points through the hydrograph. Auto-samplers will be programmed based on the station's rating curve. The discrete samples will be preserved and delivered to the analytical laboratory for the measurement of parameter series 2, 3 and 4. Autosamplers will not be installed at Tier 2 stations. To measure contributing loads from these watersheds, a minimum of six (6) storm events will be sampled per year. The sampling events will exhibit and be representative of seasonal variability and encompass a minimum of one (1) sampling event per season (January-March, April-June, July-September, and October-December).

So that data from both Tier 1 monitoring schemes may be grouped, calibration samples will be collected during both fixed interval and stormwater sampling. During each fixed interval event, a discrete sample will be taken from the autosampler. These samples will be delivered to the analytical laboratory for the measurement of parameter series 2, 3 and 4. During at least 6 storm events throughout the year, a depth-integrated composite will be collected around the time period that the autosampler is pulling a discrete sample. Throughout the year, representative samples should be taken through the stormwater hydrograph. These samples will be preserved and delivered to the analytical laboratory for the measurement of parameter series 2, 3, 4, and 5.

A discharge rating curve will be established, and stage will be measured continuously at all stations. Currently, all but two Tier 1 stations are rated through USGS cooperative agreements, and it is recommended that the two ungauged stations be added to the relevant cooperative agreements. In addition, it is recommended that each of the Tier 1 stations be telemetered to assist in the collection of autosamples. Of the 19 Tier 2 stations, only four (4) stations are currently gauged. Therefore, gauges will be installed at the remaining fifteen (15) stations, and a rating will be established. To save cost, not all Tier 2 gauges will be outfitted with telemetry equipment.

The workgroup recommends that this monitoring strategy go through periodic review. Future data needs as well as data overlap cannot be projected. The review should be based on empirical data and should be performed on multiple levels. The Technical Workgroup should conduct an annual informal review. Recommendations should be made to the respective states concerning parametric, spatial, and temporal design as well as special studies, and the review should be forwarded to the Compact Commission. In addition, the States, in partnership with the Compact Commission, should conduct a biennial or triennial formal review of the program. At this time, annual review recommendations should be considered for implementation. This review structure is conceptual and is not meant to be a fully considered recommendation. However, it is the opinion of the workgroup that something analogous should be developed so that the program can provide the best possible information to answer the questions outlined in this proposal.

Special Studies

In addition to the general monitoring program described above, the Technical Workgroup proposes that short-term studies be developed and funded as part of this proposal. An additional $200,000 per year is requested to fund these studies. Although no specific study designs have been fully formulated, the studies could address issues, such as:

1. Reservoir monitoring including Broken Bow Reservoir, Lee Creek Reservoir, Lake Francis, and Tenkiller Ferry Lake.
2. Biological response including measurement of algal biomass or characterization of community health through multiple assemblages (fish, aquatic macroinvertebrates, and algae).
3. Habitat characterization including geomorphology and erosion.

4. Toxics analysis including sediments.
5. Bed Load analysis.
6. Clarity studies to determine organic and inorganic contributors.

Data Management, Interpretation, and Reporting

To effectively coordinate the management of the shared watersheds within the framework of the agreement, a comprehensive data management, interpretation, and reporting scheme will need to be developed. To date, the workgroup has not thoroughly explored the details of such a scheme. However, the framework for how to approach these issues was discussed in the Fort Smith meeting with these resulting recommendations:

1. Data Management—It was agreed that a central database or data-sharing network is essential. The workgroup will explore available options before the September Compact Commission Meeting. If possible, a recommendation will be made at the meeting.
2. Data Interpretation Protocols (JPA)—Per the agreement, data quality objectives include the tracking of improvement of water quality. Because the available dataset will change if this proposal is implemented, analysis methodologies may also change. The workgroup may request the services of a 3rd party consultant to determine the best statistical methods. Additionally, the workgroup recommends continuing to gather the data for the protocol used in determining the 40% phosphorus reduction in the Illinois River watershed at Horseshoe Bend.
3. Data Interpretation Protocols (Oklahoma Scenic River criterion)—Implementation of the Oklahoma Scenic River total phosphorus criterion will follow the rulemaking process outlined in the Oklahoma Administrative Code (OAC). A use support assess-

ment protocol (USAP) will be developed and promulgated into state rule (OAC 785:46-15). Pursuant to state law, the USAP will go through a public participation process, be considered by the Oklahoma State Legislature, and be signed into law by the Governor. Arkansas has expressed a strong desire to be heard in this process, and agency officials in Oklahoma concur that Arkansas input is desirable and advantageous.

4. Data Reporting—It was agreed by the workgroup that a coordinated, comprehensive data report be generated annually.

Watershed Plan

The JPA specifically states that the states "will work together in partnership with the Arkansas-Oklahoma Arkansas River Compact Commission toward the goal of producing a Watershed Plan". This specific section of the JPA has been referenced in the goals and objectives of this proposal. Specifically, watershed monitoring will attempt to address the water quality data needs of the Plan. To fully develop the Plan, the States will partner with the Compact Commission to develop a timetable for preparing the Watershed Plan.

Budget and Funding

Separate budgets have been developed for the Tier 1 and Tier 2 monitoring designs and are presented in Tables 3 and 4, respectively. For convenience, a combined budget is presented in Table 5. Budgets are projections based on the past experiences of other monitoring programs but should still be considered estimates. Personnel costs are based on a field crew of seven persons. In addition, 2 administrative personnel have been included. Overhead (fringe benefits and indirect including office space and equipment) is calculated at 80% of personnel cost. Laboratory costs are based on a price schedule provided by the ODEQ State Environmental Laboratory and

are available upon request. To ensure that data is of the highest quality, quality assurance samples were calculated at 75% of actual sampling cost. Equipment and supplies costs are based on capital outlays during the first year for vehicles, sampling equipment and supplies, autosamplers, and stage recorders. These capital costs also include estimates for installation. In addition, annualized costs for depreciation at 20%, replacement at 10%, and maintenance were calculated over the five years of the program.

Due to shrinking or static state budgets and increasing monitoring needs, neither Arkansas nor Oklahoma is capable of supporting or providing matching funds for the work outlined in this proposal. Therefore, the states suggest that a federal funding source provide monies for all programmatic costs. Furthermore, it is necessary that this source be outside the current federal funding coming to the states from various CWA programs. These monies are needed to continue other monitoring activities not funded through state appropriated monies. If funding is not complete, programmatic cuts will be made in the following order (personnel and equipment will be cut accordingly):

1. Special study monies at $200,000 annually
2. Temporal coverage for Tier 2 stations
3. Spatial coverage for Tier 2 stations
4. Parametric coverage for Tier 2 stations beginning with variables not assessed with numerical criteria
5. Temporal coverage for Tier 1 stations
6. Autosamplers for Tier 1 stations
7. Spatial coverage for Tier 1 stations
8. Parametric coverage for Tier 1 stations beginning with variables not assessed with numerical criteria
9. Quality Assurance reductions

Table 2. Total monitoring budget

Budget Category	Cost
Personnel--Years 1-5	$1,556,656
Overhead--Years 1-5	$1,245,324
Laboratory Analysis--Years 1-5	$4,254,780
Equipment and Supplies--Year 1	$661,750
Equipment and Supplies--Years 2-5	$599,000
Special Studies--Years 1-5	$1,000,000
Total Cost =	**$9,317,510**

Table 3. Tier 1 monitoring budget

Personnel		Person Yrs.		Expenditure
1.0 Program Manager		5.00		$230,000
3.5 Field Crew		5.00		$548,328
	Total Person Years =	*22.50*	*Total Salary =*	*$778,328*
Overhead (includes fringe, all indirect, office space, and office supplies/equipment)				
80% of Salaries				$622,662
Laboratory Analysis (Contractual)	**Annual Cost**			
Biweekly Composites w/75% QA	$146,692			$733,460
Biweekly Discrete w/75% QA	$120,075			$600,375
Storm Sampling--Composites w/75% QA	$56,420			$282,100
Storm Sampling--Autosamplers w/75% QA	$230,913			$1,154,565
			Total Lab =	*$2,770,500*
Equipment and Supplies	**Annual Cost**			
Year 1 Capital Outlay and Related Costs				$373,950
Year 2-5 Equipment Costs	$81,950			$327,800
			Total E&S =	$701,750
			Total Tier 1 Program Costs	$4,873,240

Table 4. Tier 2 monitoring budget

Personnel		Person Yrs.		Expenditure
1.0 Statistician		5.00		$230,000
3.5 Field Crew		5.00		$548,328
	Total Person Years =	22.50	Total Salary =	$778,328
Overhead (includes fringe, all indirect, office space, and office supplies/equipment)				
80% of Salaries				$622,662
Laboratory Analysis (Contractual)	**Annual Cost**			
Biweekly Composites w/75% QA	$214,396			$1,071,980
Storm Sampling--Composites w/ 75% QA	$82,460			$412,300
			Total Lab =	$1,484,280
Equipment and Supplies	**Annual Cost**			
Year 1 Capital Outlay and Related Costs				$287,800
Year 2-5 Equipment Costs	$67,800			$271,200
			Total E&S =	$559,000
			Total Tier 2 Program Costs	$3,444,270

APPENDIX E

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

[Filed: Jun 21, 1982]

Community Center, Poteau, Oklahoma
October 1, 1981

Minutes of Meeting

A meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order in Poteau, Oklahoma, on October 1, 1981, at 10:05 A.M. by Chairman John B. Luce.

A letter from Jim Barnett, one of the Oklahoma Commissioners expressed his regret that he was unable to attend the meeting but designated Harold Springer to vote in his stead on all issues properly brought before the commission. John Saxton, also absent, had conflicts. Commissioners present included Sister Pierre Vorster from Fort Smith, representing Arkansas; Dr. Lloyd Church from Wilburton, representing Oklahoma; Keith Cogswell from Russellville, representing Arkansas; and John Moffitt from Fort Gibson, representing Oklahoma. A quorum was present.

Minutes of the last meeting were discussed. A motion was made by Mr. Cogswell that the minutes as they now stand along with the revised minutes from Oklahoma be approved. Dr. Church seconded the motion, which was unanimously approved.

Mr. Luce announced that the Oklahoma Archives Board and the Oklahoma Historical Association have asked that Dr. Church's papers be incorporated and put in the files in Oklahoma City. We are very happy that they are going to take his records and recognize his accomplishments and we appreciate him for his 62 years of service.

The next item on the agenda was the financial report for the states. About a year ago, the federal government took over much of the operation expenses for the office, leaving only a small share for each state to pay. A copy of the budget is attached. The chairman asked for approval for the Fiscal Year (1981-1982) Budget. Mr. Cogswell made the motion, Dr. Church seconded. The motion carried.

The people in charge of the Civic Center allowed the Commission the use of the center free of charge and John Luce extended his thanks to them.

Since June 18, several commissioners have made meetings throughout the area. We tried to ask a commissioner residing close to the meeting being held to go, and John Moffit attended a meeting at Tahlequah.

Mr. Moffitt reported that a meeting was held by the Corps of Engineers in Tahlequah on September 24. It was a public-input type of meeting on the restudy of Tenkiller Lake. About five different actions that they were studying in connection with Tenkiller were discussed. Basically, the issue was whether to raise the dam and raise the flood-control pool, conservation pool, and inactive pool for furtherance of water supplies. There was some discussion of hydroelectric power. The public, for the most part, objects to Tulsa being included in this study, (1) because Tulsa wasn't in the water impoundment area and (2) because of the fluctuation of the lake level at Tenkiller. A questionnaire was distributed that listed seven options. The results of the questionnaire have not been revealed as some people were going to mail them in. Some options were: no action on the lake, raise the conservation pool by two feet, raise the inactive pool by 25½ feet, raise the flood control by three feet, reallocate conservation funds for water supply and provide some 166,000 million gallons per day, add hydroelectric power capacity, and comment on seasonal pool operation.

Sister Pierre reported on a meeting she attended in Fort Smith. The public meeting by the Corps of Engineers concerned the easement rights of part of the Arkansas and Poteau Rivers and the Garrison and Lee Creeks. The people who spoke were opposed to these easement rights. The Corps of Engineers indicated this was a public meeting, not a hearing, and that two public hearings had been held.

Before Sister Pierre became a member of the commission, Mr. Luce said, there were three options for what is known as the Van Buren Bend, or Shufly Bend, that runs from Lock and Dam 14 to Lock and Dam 13. These three options were offered by the Tulsa District Corps of Engineers: (1) let the river remain as it is, with no easements and flooding would continue just as it has since the river was made navigable in the mid-60's; (2) tear out the cutoff walls, jetties, levies, and so forth, and let the river flow pretty well as it has in the past; and (3) the most economical and agreed on at that time was to buy as much flowage easements on that land which flooded at 135,000 instead of 150,000 cubic feet per second. In other words, that river was designed to flow through that bend at 150,000 cfs and, by the time it got somewhere in the 130,000 cfs, it came out of its banks, the same way it does on the Poteau. The Little Rock District is buying these easements and the Tulsa District is telling them where they need them. The Poteau won't involve much easement purchase because it is under study. They are only going to buy vertical easements now, meaning vertical feet along the river's bank.

Discussion was led by Dr. Church on the progress of the Poteau River and flood control on said river and its tributaries, the past and present studies by the Corps of Engineers and Soil Conservation Service.

Brother John E. Evans was the original president. This committee promoted and got the upstream flood control program running in Arkansas and Oklahoma. Promoting flood control on the Poteau River would aid many people, as

much of this watershed is first-class agricultural land, especially in Oklahoma. Eastern Oklahoma and Western Arkansas need promotion to preserve what they have for the future.

Mr. Wayne Morgan, Tulsa District Corps of Engineers, gave a short status report on the Poteau River. The Poteau River Basin Study resumed in October, 1979, and we completed a reconnaissance report in January, 1981. The Corps is updating and collecting new information data for the Poteau River Basin because the studies completed in the early 70's are out of date. Soon there will be a Stage 2 workshop that will be a public information meeting, not a hearing, that will allow people an opportunity to talk about their needs and tell what alternative plans are being considered. About 75 percent of the work has been done on those plans and preliminary costs and benefits are being finalized for the alternative plans to present at the meeting. The final report on the Poteau River Basin Study is scheduled for October, 1984. The Corps is concentrating on the larger scale projects. An alternative is being considered on Brazil Creek for hydropower and water supply, flood control; one on James Fork at the lower Hackett site for water supply, hydropower, and flood control; water supply and hydropower at Wister; we are also considering Panama, Oklahoma.

Mr. Luce pointed out that 27 Soil Conservation Service sites are incorporated in this river basin.

Mr. Morgan said the status of the SCS plan in the Poteau will be considered in this study and will be coordinated with the SCS.

The Governor of Arkansas has asked to be notified of a Corps meeting so he can have a representative attend.

Mr. Moffitt reported that Tulsa wants to pump water out of the Illinois River north to the Spavinaw River. This would be crossing one whole watershed to put into their lakes that feed Tulsa from the Spavinaw Watershed. We have been

concerned about Fayetteville dumping their treated sewerage from a plant in the Illinois River Watershed. The downstream towns and residents in Arkansas below Fayetteville and the people in Oklahoma have objected to that discharge.

We have heard various other plans about piping it to the Arkansas River in the vicinity of Fort Smith. The City of Fayetteville has been notified by the Arkansas Pollution Control Commission that they cannot put more sewer waste into the White River, which is not in the jurisdiction of this Compact, but does flow directly into the Beaver Reservoir. So, with all of our objections to Fayetteville's treated discharge being dumped into the Illinois River, then being eliminated from the White River, and the EPA not approving the discharge all the way down to the Arkansas River, it leaves Fayetteville about one alternative, to pipe that sewer affluent to an electric generating plant at Gentry. To do that, the City Engineer said, "that water will not only leave that plant treated, but will have to be retreated to be used as cooling water in that power plant."

Jim Barnett attended a meeting with a discussion with Major General Hugh Robinson, Regional Chief, Corps of Engineers, Dallas, with a statement on the national water crisis. It's the General's opinion that in a very few years water is going to become a very, if not the most, critical issue in this nation.

Steve Monn and Herman Jarrett attended a meeting on clean water and pollution held by the Science Information Center of the University of Arkansas. Mr. Monn reported that Dr. John Melton, Director of the University Science Information Center, got an EPA public participation training grant to work with four area wide agencies in the state. Seminars and/or workshop-type meetings are planned to bring together various representatives and citizens advisory groups in order to plan for the coordination of various public participation activities relating to non-point pollution and,

specifically, agriculture, forestry, and mining practices. There are many opportunities for the general public to get involved. The UALR Science Information Center has developed a good slide presentation dealing with the subject of non-point pollution, etc., and it is available from Mr. Monn.

Mr. Jarrett reported that there were two or three federal agencies, two states' Departments of Pollution Control and Ecology, two citizens groups, and the Sierra Club represented at that meeting.

According to Mr. Luce, if a state lowers its surface water standards lower than its sister state, this commission has jurisdiction over pollution from one state to another, as well as the allocation of the water. In other words, if Arkansas just recently lowered the dissolved oxygen necessary to carry in their surface water, what happens if Oklahoma objects to that water as it crosses into Oklahoma. This new mining law, in all probability, is going to give us a problem.

Jack Freeze, Mayor of Fort Smith, reported that Jack Daily, the City Attorney for Fort Smith in the late 20's and 30's, divided the City of Fort Smith against this very project, because the waters would back into the State of Oklahoma. The City of Fort Smith owns and operates a $100 million area water distribution system. It supplies water to communities in Oklahoma and Arkansas. The early study of Lower Lee Creek shows if a dam were built at Mile 3.2, water could be backed up to the Oklahoma line and have a 10 million gallon per day yield from that impoundment. By raising the dam and backing the water into the State of Oklahoma with al location for and participation from citizens in Oklahoma, there would be a 100-year water supply for the area at almost no additional cost to the citizens of Arkansas. An $11 million loan for the citizens of Eastern Oklahoma is needed so they can participate in this effort. The Sunbelt District planned to try to secure financing from Farmers Home Administration by being a two-county, rather than a two-city, organization. If

that district is able to finance it cheaper than Fort Smith and it would cost the individual user less than what Fort Smith is doing, we would like for them to take the project and complete it, Mayor Freeze said.

It was Mr. Springer's belief that this water right situation was a matter to be handled within the state and not by the Compact Commission. Mr. Luce asked for the allocation which was made up for the water rights on Lee Creek. The City of Fort Smith plans to build a dam. It is their understanding that they are not allowed, according to an Oklahoma Statute, to impound water in one state to use in a sister state.

Larry Burrough stated that the State of Oklahoma has a Scenic Rivers Bill that was passed 10 or 15 years ago. About 10 years ago, a section of Lee Creek which runs through Oklahoma was added to the Scenic Rivers Bill. That bill states that you cannot build a dam or impound water on a scenic river, except for municipal or industrial purposes, and only then if it is almost an emergency. After the Compact Commission was formed, a Department of Justice opinion was obtained on this matter. The opinion, according to Mr. Burrough, was that the provision of the Compact, which was ratified by both states and the United States Congress, did give this board the power to supersede that Scenic Rivers Bill, as such.

In other words, stated Mr. Luce, the States of Oklahoma and Arkansas and the United States government signed a contract on these interstate streams, and there was no provision outlining what that water was to be used for, specifically. They could either transfer it through there and impound it and use it in a sister state. Fort Smith's request is that this Commission, although Fort Smith is not impounding water in the State of Oklahoma, give them the assurance that they can legally do so at some future date, if necessary. Or, according to Mr. Burrough, Fort Smith may want to transfer

Pine Mountain water via Lee Creek channel, which also comes under the authority of the Compact. The initial plan calls for the creation of a small impoundment totally within the State of Arkansas with a dam structure at Mile 3.2 on Lee Creek. The options that could be utilized in the future to provide additional water to the Fort Smith-Van Buren and Eastern Oklahoma area would be to raise that impoundment and create a much larger lake, which would be a bi-state impoundment, up to Elevation 480, which would deliver approximately 100 to 170 million gallons per day to the area, or somewhere lower than that, depending on the economics of the situation. The Pine Mountain impoundment proposed by the Corps of Engineers could be constructed with open channel transmission of that water down to the small initial impoundment through Oklahoma, where it could be captured for treatment and usage. A small impoundment could be constructed on Cedar Creek which, utilized with the small initial impoundment, would produce about 60 millon gallons per day. Probably the least viable alternative would be at Mile 3.2 of this small impoundment where, with the normal navigation from Lock and Dam 13, the Arkansas River could be held back up to the toe of this dam. If the quality of the water improves in the Arkansas River, it could be utilized by constructing a lake and running the water back into the intake water structure. These are the three options Fort Smith needs to get the Commission's cooperation and approval on. Mayor Freeze emphasized the City of Fort Smith is working with the Sunbelt District. Because its tax base would be spread over two counties, the cost could be reduced for the individual water user, which is a primary concern.

Mr. Burrough presented some exhibits. What the City of Fort Smith wants to know is "If the lower lake is built, can or will this Commission give them authority to enlarge that lake and back it into Oklahoma in case the need arises," or "If Pine Mountain is built, will the Commission grant permission

to open the channel and transfer that water down Lee Creek and back into Arkansas from the proposed Pine Mountain Reservoir."

According to Mr. Springer, it is the strong feeling of Mr. Barnett that, under Article 1, there is nothing mentioned in the purpose of the Compact Commission for approval or disapproval or expression of any type of opinion in any way in this type of matter (on the Lower Lee Creek site). Under Article 9, he felt that there was nothing that would give the commission the power and that this is an inappropriate body to take action.

Mr. Barnett had not expressed an opinion about the transfer of water from Pine Mountain through Oklahoma back into Arkansas.

Mr. Springer said things are allowable by the Compact, but it's not for the commission to approve or disapprove.

Mr. Burrough presented a slide presentation of the three phases of water impoundment on Lower Lee Creek. The first stage planned for construction is the smaller impoundment at Mile 3.2 on Lee Creek. A concrete-type wier would be constructed across the channel at this point that would impound approximately 10 million gallons, about 7100 acre/feet of storage, providing approximately 10 million gallons per day net per yield. That particular impoundment would create a lake of about 635 acres. The surface area at elevation is 420. If the impoundment is raised some time in the future to create a larger bi-state impoundment, this same dam site would be utilized and would be raised, principally utilizing a rock-filled structure with an impervious face. This impoundment could be raised anywhere from the 420 elevation to above 500; 480 may be the maximum practical size. At the 480 elevation, more than half the lake would be into Oklahoma. Another option is the open channel transmission of water from Pine Mountain, which would be located at 37.2 on Big Lee Creek

just above Natural Dam in Arkansas. That structure, if completed and built, would release the water and would flow down the Lee Creek channel through Oklahoma and back in and be captured at the smaller impoundment. The 65 million gallons per day is about the 100-year supply for the Fort Smith area. Mr. Burrough showed a planned view of the two possible dam sizes. He explained that the small impoundment, based on Fort Smith's present rate of growth and present utilization of water, would be adequate for probably 15 years. He estimated that about 3½ miles of the river would be backed up into Oklahoma. However, it's still within the stream banks on Phase I. The Van Buren wier elevation is 402 and will be raised to 420. If there is an Oklahoma entity that enters into an agreement with the City of Fort Smith (or whoever builds and constructs the dam), it would control that amount of water.

Mr. Springer asked if that water passes through Oklahoma, would Oklahoma residents have the right to use that water at the time it passes through, or would that be completely controlled by Arkansas.

Mr. Burrough answered that it would be controlled by Arkansas; 'but, that doesn't mean the people along the stream do not have certain water rights. They have the right to the water generated within the state of Oklahoma. Theoretically, what has to be done is, where the water crosses the state line, assure that the amount of water running out of Arkansas is running back.

Mr. John Shannon, Administrator of the Oklahoma Scenic Rivers Commission, discussed briefly the Oklahoma Scenic Rivers Act (Title 82, Section 4252, Oklahoma State Laws). The initial reason for that act being written was to halt any impoundment on the scenic rivers, and Lee Creek is one of them. It seems that the Compact Commission may indeed have the authority to approve the impoundment. The Scenic Rivers Commission has learned that the City of Fayetteville is

really up against the wall about what to do with its sewage, because they were hoping to get some federal Environmental Protection Agency money for the construction of their 55-mile pipeline to the Arkansas River, and that money is no longer available. They also wanted federal money to build a pipeline to the Swepco Power lake in Gentry, Arkansas, and that money is also no longer available. They are being threatened with a lawsuit from their own Beaver Lake Authority if they continue to dump their sewage into the White River. Suddenly, the Illinois River is a very real choice again for discharge of Fayetteville's sewage. The Oklahoma Scenic Rivers Commission was set up specifically to take care of the scenic qualities of the Illinois River. Therefore, it has the statutory responsibility to take a stand on this issue. The Scenic Rivers Commission recently passed unanimously a resolution, and a copy was provided each member of the Compact Commission. Historically, Arkansas and Oklahoma have had a fine cooperative relationship, and it is important to continue. This is absolutely not directed at the State of Arkansas, but it is necessary to carry out the statutory responsibilities to take a stand strongly against the discharge of the Fayetteville sewage directly or indirectly into one of Oklahoma's scenic rivers.

Mr. Springer offered this summation. The purpose of the Compact is for the apportionment of the Arkansas River water between Arkansas and Oklahoma. This has been done, if there isn't a conflict with the apportionment of the water. The other parts have been worked out in the negotiation of the Compact as far as allowing one state to impound water in another state and, also, the transmission of water through one state. It is Mr. Barnett's opinion that it is not the purpose of the Compact Commission to approve or disapprove a plan for a city water supply or regional water supply. The Compact Commission may help facilitate those types of plans and things, but not approve them. If Oklahoma is interested in a plan, then they would go to the Oklahoma Water Resources

Board. In Arkansas they should go to their state water office (Arkansas Soil and Water Conservation Commission).

Mayor Freeze said Fort Smith would probably not build this Lower Lee Creek site without the future holding a permit to enlarge it and run it back into Oklahoma.

Mr. Luce stated that the Compact Commission is not saying they have the jurisdiction over what Fort Smith is trying to build or proposing to build; but, if they should enlarge, then the Commission would have the jurisdiction. The Commission has the authority to override the Scenic Rivers Act. It is understood that the City of Fort Smith does not want to violate any laws.

Mr. Burrough stated that the plans conform to the details and considerations contained in the Compact and asked if there is anything in the plans that he has outlined today that are is conflict with any provisions of the Compact.

Mr. Cogswell had no objection, but felt the Commission has no authority. Whether it can override the Scenic Rivers Act is another point to be investigated.

Mayor Freeze said he would appreciate it if the Commission would investigate the matter and take it up at the next meeting.

The Commissioners agreed to get an opinion from their respective attorney generals and voted unanimously to do this. Mr. Luce will consult the U.S. Justice Department for further assurance.

Mr. Cogswell could not see anything being proposed that was his idea of what the Commission is about.

Mayor Freeze reemphasized that Fort Smith is trying to get authority which overrides the Oklahoma Scenic Rivers Act and, according to the U.S. Attorney General, the Commission has that authority.

Mr. Gene Washburn, Little Rock Corps of Engineers stated, for the record, for the Commission's deliberation, the consideration that the Corps is giving for issuing a section permit for construction of this particular project, because it is a navigable stream. Within the authority that is vested in the Corps, if two states are involved, it does require an Act of Congress to be able to issue a permit for construction of that project. If it only involves one state, then the legislatures of each state would be responsible for issuing a permit for the placement of a structure in a navigable stream. So, that consideration is ongoing now, and as a part of the Commission's decision, that should be considered. This was being considered a one-state project. Now it would be considered a two-state project. Even though it is within the banks of the stream, it is backed into Oklahoma.

Mr. Luce asked if the Van Buren wier impedes any navigation above Mile 3.2 for both states.

Mr. Washburn agreed to share the Corps legal department's opinion regarding Lower Lee Creek. He said a physical structure across the stream does not necessarily prevent navigability. Portage is also capable of going around permanent structures.

Mr. Luce asked if the Little Poteau, Big Poteau, Spavinaw, and Illinois are also considered navigable streams. Mr. Washburn said the Corps could make a determination on that.

Mr. James Craig reported on nuclear waste disposal by a company in Sequoyah County, Oklahoma. He is a facility manager for Kerr-McGee at the Sequoyah Facility in Gore. What they have proposed is to bury solid waste that is low-level radioactive material by category in the Sequoyah County area of Oklahoma on the present plant property. It would be in a specially constructed pit. The liquid part of this waste is currently being rendered essentially non-radioactive. In fact, it contains much less radioactivity than commercial

fertilizers being used on the land. This application was made to the Nuclear Regulatory Commission last year. It received recent publicity under the proposed law in which the states will operate a regional compact to dispose of low-level waste. When that was under consideration, Kerr-McGee made a presentation before the State Legislative Committee on low-level waste stating that since we had been in operation since May of 1970, Kerr-McGee had stored the approximate quantity of 10 million gallons of sludge and that this had been proposed to the NRC as a disposal method. So far as discharges into the river or anything like that, there would be none. It would be a monitored site and it would be subject to full review by the NRC. At this time, it is not known whether this involves public hearings.

Mr. Luce said the first paragraph in the Compact law, under which the Commission operates, says the Commission is to control the quantity and quality of the interstate waters. This is the reason it was brought to the attention of this Commission. Other instances of nuclear activity in certain streams have been reported. Nuclear agencies checked them out and none proved viable up until this time. It was not known what Kerr-McGee's deposit was. Letters of inquiry were sent to the commission. If Kerr-McGee meets the criteria of the state and federal governments (NCR), it is certain that the Compact Commission will agree. Interstate waters are our business.

Mr. Craig said Kerr-McGee does discharge into the back-waters of the Arkansas River under an infeed DES permit. Discharge requirements are met there, but do not directly relate to the other proposal that has been made. The pollution control people enforce the permit Kerr-McGee operates under. It was probably originally issued by the Corps of Engineers, and is now enforced by the Oklahoma State Health Department Water Resources Board. It is in the process of being revised into a consolidated permit where the permitting

is made standard for EPA state water agencies and other agencies. Air feed material comes from New Mexico. They say we cannot ship it back, because it is not a waste material; however, it is considered a viable option to concentrate the material where it is a feed material, at which point it might both legally and economically be a feed material back into New Mexico. He described the pit (600′ x 500′ x 60′) lined with 5′ compacted clay liner and an impervious membrane over that. The material would be set with cement. It will not be filled until year 2000, covered with clay, another sheet of impervious material, and at least 5′ of earth (and some places 10′) so water would drain. It has monitor wells, and that type of thing.

Rev. John Evans of Waldron, Arkansas, mentioned the need to revive, for the time being, the Poteau River Watershed Council that was organized for 15 years. That was very successful because some of the best speakers in the U.S. from various sections of the country got involved and a lot of people were reached. Arkansas has an entity called the Arkansas River Basin Association that could be used to bring in the people. Rev. John Evans and Dr. Church will get a meeting called to reorganize that council.

Dr. Church said some kind of organization should be added, possibly a laymen's organization, to help this Compact Commission. Mr. Luce encouraged others to give some thought to this matter.

Mr. Luce said the Poteau River is the biggest major stream problem in the Southwest that hasn't had anything done to it in its lower reaches below Wister Resevior. He stressed that the Commission is interested in the smaller dams as well as the larger ones. Everyone interested in the Poteau River development was asked to remain after the meeting for making some plans.

Sister Pierre made the motion that the meeting be adjourned. Dr. Church seconded. The motion carried.

Respectfully submitted,

John B. Luce
Federal Chairman and Commissioner

Approved:

For United States _____

For Arkansas _____

For Oklahoma _____

APPENDIX F

ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT
COMMISSION MEETING
HOLIDAY INN, FORT SMITH
JULY 11, 1982

MINUTES

John Luce, Chairman of the Arkansas-Oklahoma Arkansas River Compact Commission, presided over the meeting which was called to order at 11:05 a.m. Commissioners in attendance were: John Saxton, Sister Pierre Vorster, Dr. Lloyd Church, and new appointee Ben Thayer. Representing Barnett were Glenn Hammond and Tsfai Ghermazien from OWRB. A quorum was declared not present from Oklahoma.

Mr. Luce introduced Ben Thayer as the new commissioner who replaced Keith Cogswell of Arkansas. He also acknowledged the presence of Harold Jones, Soil & Water Conservation Commission, and Ralph Campbell from the Oklahoma Department of Pollution Control. Another distinguished guest in attendance was Barbara Brown, Design Engineer on the Poteau River Tulsa District.

Because a quorum was not present, the Commission did not vote on any matters, but agreed to hear reports cited on the Agenda.

The first order of business was the Secretary-Treasurer's report, which Mr. Luce presented in her absence. The balance of the States' finances for the Commission is $1,238.35, with the State of Arkansas contributing $742.50 and Oklahoma still owing $371.25, and a check which was reissued for $250.00 for the fiscal year 1981. Mr. Luce advised that the Commission would probably not need any more money from the states for the fiscal year of 1982-83 and, if it did, the Commission would bill the states. Both states agreed that

such an arrangement would be satisfactory. However, Glenn Hammond of OWRB requested the Commission give them as much advance notice as possible. Mr. Luce responded that Oklahoma already had a bill on the balance they owed and informed him that Oklahoma probably would not have to go to the legislature for financing, that the federal government was financing the majority of the expenses for the Commission, and further clarified that Oklahoma at present owes a fiscal balance for this year of $371.25 to make Oklahoma even with Arkansas for fiscal year 1981.

The next item of business was the Engineering Committee report. There was no one there who had any engineering to report, although there were several items that pertained to engineering.

The Commission progressed to the next item on the Agenda, the public hearing held on the Poteau River at Poteau, Oklahoma, May 24, 1982. Mr. Luce called on Barbara Brown to report on the progress on the design, at least of the main stem of the Poteau River.

Ms. Brown reported that there were about 135 people who attended the hearing, at which meeting a discussion was held on the lower site at James Fork and the Brazil Creek Dam. She stated they would probably discontinue any action on further flood control, such as the James Fork and Brazil Creek and concentrate on raising the pool level at Wister Lake. She reported that there was a lot of discussion and explained that they would have to go through authorizations. At the present what the Corps will probably be doing for the rest of the year is a hydrological detail study. Next year they intend to finish the detailed study on Wister Dam and put out a report, then will probably have another study to present on the Poteau River in about a year.

Mr. Luce asked for questions from the floor. There were none. He then asked Ms. Brown the following question: There are 19 flood control structures upstream from the

Wister Reservoir, principally SCS structures. If those structures were to be completed in the near future, would it be possible to raise the level of Wister Lake on a statutory basis? He added that was the biggest complaint heard at the Poteau hearing. Oklahoma has several of those and Arkansas has some of those. Those people were unhappy about the water the Corps was holding at Wister Lake, and the Commission understands your problem. If those structures were to be completed, would it be possible for that lake level to be raised to some higher level?

Ms. Brown responded that it would and that will be one of the things the Corps will be checking into in its plans. It would be no more than two or three foot, she added, but that is all they are asking for. The main problem with that is that primarily SCS structures are flood retarding installations. They don't really have the 25-year flood; they don't really hold it back. They simply delay the peak a little bit. So, it's possible it wouldn't have any effect downstream on Wister, as far as the Corps being able to raise the pool level at present. That is just one of the things the Corps is going to have to end up checking, Ms. Brown added.

Mr. Luce asked if it were possible, and Ms. Brown answered that it was but hesitated to say it was probable. Then Mr. Luce posed another question. When you eliminate the lower Hackett site, the Brazil Creek site, if the lower Hackett site were to contain municipal water for the surrounding towns, would that cost ratio in that lake make it cost feasible?

Ms. Brown responded that they had already checked that, and it would not. The lower Hackett site is located right between two ridges. The cost for a spillway for either a concrete OG wier, or a cutting through one of the ridges is pretty high, which is what pretty well drives up the cost ratio so far. The Corps checked it with water supply in it, and it raised the DC ratio up from .3 to .34 to 1.

Mr. Luce explained the whole county is in desperate shape for municipal water from some source and the south end of Sebastian County especially, as well as the east of it, and Fort Smith.

Ms. Brown reported that since Hackett went back up into Arkansas and they could take the water out of the upper end, they had already checked that. They found that they are all small communities, so the total net need adds, up to 8 to 10 MGD, which is 10 million gallons per day for Smith, which is quite a bit, and when you are talking about storage and yield, it just doesn't increase it that much.

Mr. Luce commented that there were Oklahoma communities that could be interested, which Barbara agreed with.

Mr. Saxton inquired how this would come under the jurisdiction of the Commission, and Mr. Luce responded that Hackett was designed to lie in both states. He then explained that there was one site, either 7 or 11, and asked if when finalized, did the Corps see any chance for the lower Hackett site to be built.

Ms. Brown responded that they did not.

The next item was a report on Garrison Creek, Arkansas and Oklahoma, from Mr. Bill Clemmons of the Little Rock Corps District.

Mr. Clemmons reported that the Corps, Soil Conservation people, and others have been looking at the drainage in the Garrison Creek Bottom since 1974. In the interim, the Corps of Engineers, Tulsa and Little Rock Districts, coordinated a report inciting additional requirements. As a part of the results of that study, there will be additional acquisition of flowage easements. He then referred to the plat the Commission had in its possession, explaining the drainage in that area. In the course of real estate activity. The Corps would determine the values and benefits on a preferred tract basis within the Bottom, and it is quite possible that in enforcing

the acquisition they would require all the potential benefits that might be applied to justify the additional costs. So the Corps will recommend, as it did in its letter, that such a study be deferred until these benefits are determined.

Mr. Luce asked him to clarify if it were the pool as a whole or just the Garrison pool?

Mr. Clemmons responded that the particular Garrison Creek Bottom will be included in the Lock and Dam 13 pool as far as the real estate action is concerned. He then explained the maps to the Commission and reviewed the Garrison Creek property.

Mr. Luce asked if there was a possibility then the Corps might clear the Arkansas end of Garrison Creek.

Mr. Clemmons answered that they would recommend that after the real estate actions have been completed on Garrison Creek, which is a result of the Arkansas River project itself, then they would go back and look at any remaining benefits that might be applied to a cleaning out if a cleaning out is needed on Garrison Creek. He further added that they were not saying they would not do that, what they are recommending is that the study be deferred until after the Corps can point out the benefits that will remain after the real estate actions are completed. With the use of a map, he then explained how the channel would be cleaned out. The present project which has been built in the bottom goes down and connects with the natural channel of Garrison Creek somewhere in the vicinity of between the Oklahoma line. On the lower end of the creek there are a couple selected "settle ranges," as the Corps calls them, from the Arkansas River that also extend across Garrison Creek. In a periodic resurvey of those ranges, if you superimpose the effects of the Arkansas River pool on the cross-section at the time, they don't currently represent a particular need for cleaning that

channel as a result of sudden building. This was not the actual study, because the Corps has not done a study for the present problem.

Mr. Luce then asked representatives from Sequoyah County to make a statement, and Mr. Barry Boller of the Soil Conservation Service explained that the problem was not the inundating. The problem is debris, trash, settle, whatever, that stops the flow back into the Arkansas River as it falls back to normal.

Clemmons agreed that such was quite possible, and Mr. Boller further explained that the river is allowed to go down, but the water is still being held back. Mr. Clemmons inquired if the lands were being affected by it and further discussion between the two followed, with Mr. Clemmons noting that buying the land would be buying the benefits. Mr. Boller then explained that he was concerned that this was a piecemeal effort and suggested that if they were having a drainage problem, the Corps should include the whole area.

Mr. Saxton inquired if it should be coordinated with Arkansas, and Paul Weeks commented that he did not think the Commission would be authorized to go past its boundaries.

Sister Pierre Vorster then asked the Corps to clarify if it were temporarily tabling the matter until they had purchased or gotten easment on the land. She was concerned that it may take as much as ten years and during this time the farm lands in the area of the Garrison Creek would be flooded.

Mr. Clemmons responded that the Corps is actively pursuing the ramifications and acquisition. They are scheduled to begin at the pool and work upstream in some orderly fashion, which should only take a year or two to complete. Mr. Clemmons further stated that the Corps has acquired all the interest necessary to operate the park but that doesn't mean all the legal ramifications will be settled.

Sister Pierre asked if it would be done on the recommendations of the Corps, and Mr. Clemmons answered that the Corps is funded for a detail project report, perhaps a one-year study, and then planning. Then they would come back with direct recommendations, which is why it is referred to as the "Continuing Authority Program"—because authority for management and construction of the program has been delegated through the Corps of Engineers.

Sister Pierre inquired why the Corps could not just get in there and clean out the ditch because the farmers are losing crops now.

Mr. Luce asked for further questions. There were none.

A discussion of an item not listed on the agenda followed. Congressman John Paul Hammerschmidt of the 3rd District at present has a $2 million appropriation resolution before the Congress for further study of the Arkansas River and its tributaries in Oklahoma and Arkansas. Mr. Luce stated that some of the Oklahoma Commissioners are going to try to get their congressmen to participate in this.

The Commission transcriptionist then read aloud the letter and resolution dated April 23, 1982, from Congressman Hammerschmidt, as well as a letter from Lt. Col. Larry S. Bonine, Corp of Engineers. Both letters are attached to these minutes.

Mr. Luce then asked Mr. John Saxton for a brief explanation of the new Arkansas law on surface waters in Arkansas.

Mr. Saxton reported that the law was not really new. It was enacted in 1957. In 1980 and 1981, it became necessary in different situations. The basis of the Commission's allegations is that there are certain restrictive blanks on any water. The allocation to Oklahoma has it designated within the boundaries of the Compact. The Commission has prede-

termined the amount of water to be allowed to run through the Compact systems in Arkansas. The Commission is working with the U.S. Geological Survey to develop a new base program wherein it would be determine more available in any stream at any given time. The Geological Survey is preparing this program, which would be put on our computer at the end of this year and the Commission would use their data. Mr. Saxton further stated that they have had a series of public hearings and revisions have been made to the proposed rules. Now another series of hearings and revisions will take place.

The first meeting will be held at the Greenwood Courthouse at 1 p.m., July 6, in Greenwood, Arkansas. Then other hearings will be scheduled around the state at various locations. After these hearings, then recommendations will be made in line with public comment as well as our thinking on the law.

Mr. Saxton further stated that the allocation that this commission needs won't be affected by this law, as far as the water going into Oklahoma.

Mr. Luce then proceeded to Dr. Church's presentation because those who were to report on the hearing held in Fayetteville, Arkansas, on May 25, were still detained by the weather conditions.

Dr. Church then explained that he has spent many years working for water throughout Arkansas and Oklahoma, and has seen many changes since 1919. Dr. Church was the Soil Conservation District Supervisor for 38 years, and has helped in a volunteer capacity to create programs that led to the creation of the Oklahoma Water Resources Board. Dr. Church feels the key to planning is input from the public, coordination with government agencies, and forming laymen's organizations to develop plans. This was his presentation to the people in attendance at the Commission meeting.

Mr. Luce further explained that Dr. Church has held several meetings, six in all, which some of the Commissioners have attended. He asked for their concensus of opinion on these laymen's organizations. The Commissioner overwhelming felt that such organizations should be formed.

Mr. Luce then supported Dr. Church's comments, stating that there have been close to 100 laymen asked if they would be willing to serve on such a committee within this 7,000-mile area. These are people who have experienced frequent flooding and drought. Only one man refused, due to being hospitalized.

Mr. Luce then suggested that the Planning and Development Districts could assist in a clerical capacity and as advisors. He then explained that Dr. Church had hesitated to go any further until he brought it before the Commission because the Commission would serve as a supervisor of sorts. The Commission does not expect anyone to drive unreasonable distances and has distributed hearings throughout most of the 17 counties. Mr. Luce stated the laymen are very anxious to begin, one man calling him four different times wanting to know when they could get started.

Mr. Luce noted that three planning and development organizations in Northwest Arkansas and one here has volunteered their services, as well as the one in Wilburton.

Julie Ferguson then added that the EODD in Sallisaw is ready and waiting, and verified that John Guthrie with Western Arkansas PDD is also.

Don Reikes of Arkhoma Regional Planning they also are ready to help.

To illustrate the growth of the Commission and the interest in water, Mr. Luce stated his first year as chairman he spent 100 hours. This year alone he has spent 5,500 hours on Commission business. The Commission receives approxi-

mately 25 calls a day concerning water, interstate water, and other problems. The Commission is becoming a clerical agency between the two capitols and Washington. Incidentally, a detailed map is being drawn of this 7,000-square mile Compact area as the original was insufficient and did not include the whole area.

Mr. Saxton suggested to the Chairman that he refer those problems that are within the state to the proper agency, rather than the Compact Commission trying to solve them.

Mr. Luce clarified that referral has been the policy through the years.

Glenn Hammonds then stated that Mr. Barnett would concur with Mr. Saxton in referring any problems.

Mr. Luce stated there are 41 commissions, agencies, etc. that he refers them to. Many people don't know where to call or who to call on Arkansas Pollution Control.

Mr. Luce then presented copies of Articles 7, 9, 13, and 17 of Public Law 87-830, and explained the portions cirled in red. Article 7 concerns the transfer of water into individual states in an effort to abate manmade pollution. He pointed out that at the bottom of this Article that the states recommended that there is no serious interstate pollution problem facing them at the present, and the states are obligated to maintain adequate water quality in the Arkansas River Basin through whatever means available. An important provision is that neither state can require the other for the additional water purpose of water quality control. An active pollution abatement program has been instigated, thereby the states hope to avoid the conflict over future problems, and may utilize the provisions of the Federal Water Pollution Control Act in cases which cannot be resolved within the provisions of the Compact.

In Article 9, there are several references made to pollution of interstate waters. There is a resolution by the Senate of the

State of Oklahoma concerning the proposal of Fayetteville on disharge and pollution and then there is a law suit for $100 million filed against the State of Arkansas by Oklahoma, citing several other objectional waste discharges in the Illinois River Basin.

Mr. Luce said he would like some comment from the Scenic Rivers Commission concerning the Illinois River, and asked for comment from those in attendance on what they think the Commission's part is in this particular problem.

Mr. Saxton inquired if this were for city, state, or what.

Mr. Luce responded that the Commission has been asked verbally by the people of Northwest Arkansas about where the Commission's jurisdiction starts and ends, whether it is by city officials, individuals, or people who are concerned about that legislation, what Public Law 93-152 means these various articles. Mr. Luce explained that on three occasions he attended meetings at Fayetteville to listen to the comments being made. He was asked to provide a copy of PL 93-152 and did so, only citing the articles in the public law. No recommendations were made, other than they could refer to the copies.

Mr. Saxton had an opinion, to wit.

Mr. Luce explained that these things are sent to him as Chairman of the Commission, but certainly the Commission has not made any comment on it.

Mr. Saxton made his feelings clear that it is not the Commission's place to comment on anything of this magnitude. The Commission would do everything it can to facilitate the cooperation, but as far as any power, its only power is within the water between the states.

Mr. Luce inquired who would have jurisdiction over that, and Mr. Saxton stated he felt it would be the Supreme Court.

Mr. Luce responded that the law specifically states that one should go before the United States District Court.

Mr. Saxton then stated that as far as the Commission taking a position on the Fayetteville situation, the state of Arkansas has not yet been presented a proposal on Fayetteville. The only information the Commission has is heresay. So, Mr. Saxton further stated, as a state representative on this Commission, he could not make a decision without more substantial information.

Mr. Luce then reiterated that he was asked to give the provisions of this act to the Study Committee, which one was sent.

If the Commission has one duty to perform, it is to be impartial. When the time comes, then they will have the law and what the Commission has to do with it, if anything.

Glenn Hammond then asked to report Mr. Barnett's thoughts on behalf of the Water Resources Board, and Mr. Barnett as a Commissioner. Mr. Hammonds stated that Mr. Barnett is certainly in agreement with Mr. Saxton that while certain purposes may be set out in the Compact, this matter is not ready for the Commission to take any action on it, if the Commission does have any power. Mr. Barnett feels that Article 9 of the Compact which does set forth all of the powers, it just does not mention any active role like this. He also feels that as far as promoting interstate comity between the states of Arkansas and Oklahoma, there is no problem existing as far as conflict between the two states in that it's not like one state is chosen to do some kind of drastic action and another one is opposing it or something of that nature. He feels it is just premature at this time for the Commission to try to take any action.

Mr. Luce then responded that the reason the copy of the Public Law was compiled was so the Commissioners could be aware of what they may or may not do. He further

explained that when the Commission is requested to provide copies of paragraphs which refer to pollution, he simply outlined the portions in red and provided same.

Mr. Hammonds then suggested that in addition to the paragraphs that were highlighted, that all of Article 9 be highlighted as to the Commission's powers, even though it may or may not make specific mention of the pollution. Certainly, he said, the Commission is bound by what the Compact says its powers are, regardless of its purpose involved.

Mr. Luce then asked for the concensus of the Commission, as they could not vote without a quorum present.

Mr. Luce offered copies of 208 and other laws. He said he would forward copies of Public Law 87-830 and hesitated to send copies of 208 for it is quite volumnous.

In closing, Mr. Luce explained that if the majority of the Commissioners ask for a meeting, then the Commission will call one. By law, it must meet the last Thursday in September of each year. One of the reasons for the present meeting was for Dr. Church's presentation, the other was to get the budget squared away, and to present what the Commission had compiled concerning pollution of interstate water.

Mr. Hammonds then reported to the Commission Mr. Barnett's regrets for not being able to attend this meeting, but he also indicated that maybe the Commission should try to have a little more interaction, maybe conversation between members as to setting up any special meetings. He felt that it was unfortunate this meeting was originally scheduled for Tuesday, which was the Water Resources Board monthly meeting, and there was no way to attend. Mr. Hammonds then said Mr. Barnett already had made plans for out-of-state travel for Friday, and according to him this meeting may not have been necessary.

Mr. Luce advised that Mr. Moffett's car was broken down somewhere between Fort Smith and Fort Gibson which was

the reason for his absence and a lack of a quorum for Oklahoma.

Meeting adjourned at 1:55 p.m.

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John Luce, Chairman

NOTE: One tape recorder was not recording throughout the meeting, thus Mrs. Lane's small recorder did not pick up some of the statements. Therefore, these minutes are not as complete as they should be.

APPENDIX G

ARKANSAS-OKLAHOMA ARKANSAS RIVER
COMPACT COMMISSION MEETING
Wilburton, Oklahoma
September 23, 1982

A meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was held Thursday, September 23, 1982, at the City Hall in Wilburton, Oklahoma. The meeting was called to order at 11:00 a.m. by Chairman John B. Luce, who asked for a roll call of Commissioners present. Those in attendance were: Dr. Lloyd Church, Jim Barnett, Ben Thayer, John Moffitt, Sister Pierre Vorster, and John Luce. A quorum was declared present.

Minutes of the last meeting were approved, John Saxton and Jim Barnett then signed them.

Dr. Church then introduced Mayor Hood of the City of Wilburton who welcomed the Commission and expressed that the townspeople are very happy to have groups such as the Commission meet in Wilburton and indicated they hope to accommodate the Commission again. Mr. Luce extended his appreciation to the City for its hospitality as well as the refreshments provided the Commission.

Mr. Luce then asked for reports from Commissioners on any special meetings they had attended since the last meeting regarding Commission business. John Barnett, Ben Thayer, and John Moffitt said they had not transacted any Commission business. Due to a recent hospitalization, Dr. Church had not attended any meetings. Sister Pierre Vorster accompanied Mr. Luce to several meetings throughout the area, including the one at Fayetteville, and turned the floor over to Mr. Luce who reported on that meeting, as follows: Fayetteville is not going to dump sewerage into the Illinois River but will revamp their treatment plant on the River. Comments and discussion followed that Mr. Luce was possibly instru-

mental in their decision when he merely cited the Public Law under which Fayetteville would have to be governed. It was agreed that the greatest influence came from the lawsuit recently filed by the State of Oklahoma, also that Fayetteville's five engineering firms who had been working on it finally got together.

John Saxton arrived after the meeting was already underway and Mr. Luce asked for any reports he might have concerning special meetings he may have attended. Mr. Saxton responded that he had not attended any since the last meeting.

A discussion of the progress on the Poteau River was then conducted by Mr. Luce. Dr. Church stated that he had attended an ABDA meeting the other day in Tulsa and the Corps of Engineers was there. A Reverend Harmon related to Dr. Church that the U.S. Congress had appropriated $400,000. Mr. Luce then corrected that an amount of $2 million had been appropriated for the study of the Arkansas River. Dr. Church said he understood it to be for the Poteau River alone, that part of it was for the Arkansas River, or other rivers, but that $400,000 was for the study of the Poteau.

Dr. Church then reported that there was an article in *The Oklahoman* which indicated some funds had been appropriated for the study of the Poteau River. He did not know what the study would be about. Mr. Luce responded that the Corps of Engineers had stopped by his office last week and said they would have a report for the Commission in November and then there would be another public hearing held somewhere in the Poteau River Basin as they had found some problems they had not foreseen which would necessitate further study. They had hoped to have the study ready for the September Commission meeting.

Dr. Church asked if the study was on the navigation up the Panama, and Mr. Luce indicated that was part of it but the Corps had never indicated exactly what they will do until the study is completed.

The next order of business was the discussion of the U.S. Supreme Court Decision 81-613, "Sporehase versus Nebraska." Mr. Luce reported that he received a copy of the Decision about 6:00 a.m. this date via express mail from Washington, D.C., that the Justice Department was to have sent a representative to Fort Smith to explain the Decision but backed out when they learned how difficult it is to get in and out of Fort Smith. Instead they sent a testimony that Carol Dinkins Assistant Attorney General for the Land and Natural Resources Division, testified before the Subcommittee on Water Resources and the Committee on Environment and Public Works in the U.S. Senate. Mr. Luce said he and Ben Thayer had both met her and she is a very personable, intelligent person. Because Mr. Luce did not have time to look over the information, he tabled any discussion on it and distributed copies of the Decision to the Commission members. He did stress that it is vital to the state Water laws. He explained the handouts as such: Supreme Court Decision handed down July 2, Carol Dinkins' testimony, another comment on that same legislation, that amounted to the amount of repudiated water rights theory, non-reserved water rights theory, and the non-reserve theory. Also included was the interpretation of these made by different people, the resume of, the Supreme Court overturns ban on the groundwater transfer. Mr. Luce said that according to some, the majority of the opinion is too broad, and the Supreme Court decision was not unanimous, a five to two decision, then the state control of water affirmed. Mr. Luce explained that these were being furnished the members to pursue at their leisure, that these would be items sent to the Commission by one source or another on opinions at a later date.

Jim Barnett then questioned Mr. Luce as to the source on the handout entitled "Divisions on State Water." Mr. Luce replied that it was sent to him by *Mainstream*, an American Waterwork Association periodical.

Dr. Church then asked for the opinion of the Commissioners if there were a lot of groundwater problems in the compacted area. Comments were that there was not enough groundwater to amount to anything, and John Saxton explained that the quality of the water and the quantity of the groundwater in the Arkansas part of the compacted area is not really of any sufficient quantity to be of any real concern.

Jim Barnett said they had reviewed it and had a lot of questions and concern about it from a whole spectrum of people as to our legal status. What happened was the Court went further than they needed to reach their final decision. They could have started and stopped with the old Altus case in Southwest Oklahoma where they were accused of buying Texas groundwater. It's the additional language that has everyone in an uproar. The holding itself doesn't seem to be a real change in what we had always thought the law was anyway. Mr. Barnett said he didn't know how Arkansas views the potential impact, but Oklahoma really doesn't see it as having a great deal on the State of Oklahoma or the way they operate.

Mr. Saxton explained that technically they are not too concerned with it. Politically, there is a lot of agitation legislation on it. It continues to be an issue at election time. He stated he did not know of anywhere, except in the alluvial areas along the Arkansas River at Crossett, where there is any major groundwater in the Basin that could really produce substantial amounts of water.

Dr. Church inserted his feeling that if there is not sufficient groundwater in future years, there will be a lot of impounded water in this part of Oklahoma and Arkansas to serve the

general public. He stated that this compact area may not have the groundwater and not have to worry about it, but this area will surely have to develop a lot of reservoirs and impound a lot of water in the ensuing years.

Mr. Luce asked for additional comments from other Commissioners. There were none.

Mr. Luce then noted that in reading the handouts, they have mentioned compacts very favorably. He then reported that he had met with Congressman Hammerschmidt about the appropriations for the Arkansas River Basin and the possibility of it extending throughout the River Basin. Hammerschmidt said that was what he had invisioned when he asked for the appropriation. The money hadn't come through yet, but he is very optimistic about it, and that the Commission certainly needs to reevaluate its thinking in the Arkansas River Basin. Mr. Luce also mentioned to Congressman Hammerschmidt the Commission's concern for desalination of the Arkansas River and the pollution that the River continues to receive. Mr. Luce asked the members if any of them had talked to their Congressmen or Senators about that phase of the appropriation.

Dr. Church said there was an article in the newspaper about Congressman Wes Watkins and money provided for studies on the Poteau River.

Mr. Luce then asked if anyone else had talked to anyone in authority about this appropriation. No one had.

Mr. Luce introduced the Garrison Report as an order of business and asked for further reports from the members. He then advised that since the last Commission meeting, it has been learned that there is a railroad involved in this stoppage and that the railroad has reverted back to the Cherokee Nation simply because the railroad abandoned it. Within that railroad system there is a bridge which is about half-destructed, forming a complete dam at times right at the state line that

impends the outflow of water back into Oklahoma that has backed out of the Arkansas River into Oklahoma. The Oklahoma side of Garrison Creek is in pretty good shape, but when the water reaches the state line where the dilapidated bridge is, a dam is formed holding water on the crops. Mr. Luce reported that he had talked with the Colonel again and after the first of the year they would take another advisory look at it. It is certainly a problem that requires a solution because several thousand acres of crops are being damaged every time there is a rise on the river.

Jim Barnett inquired if there is a substantial amount involved in removing it, or what seemed to be the problem. Mr. Luce replied that this creek is part of the Arkansas River Study which they have not yet completed and recommendations cannot be made until it is.

Jim Barnett asked if the actual problem is on the Oklahoma side of the line. Mr. Luce said the bridge is almost on the line, within a few feet.

Sister Vorster pointed out that there are also some wetlands involved to the south and west. No further discussion was held on the Garrison Creek.

Mr. Luce then reported the finances of the Commission. There presently is a balance of $1,388.59 in the treasury.

Mr. Luce informed the Commission that some time ago he asked the USGS to put in more guaging stations up and down the state line, starting almost at the Missouri line running down to the south end of the Compact area. The creeks involved are: Bear Creek and Sugarloaf, which head in Scott County and flow into LeFlore County; Cedar Creek, which flows out of Oklahoma into Sebastian County; Flint Creek, and the creek that flows from Arkansas into the Spavinaw creek; Little Lee Creek in Adair County; and Weber Creek coming out of Arkansas that flows just inside the Oklahoma line. Mr. Luce advised that he recently wrote the USGS that

the Commission had been very patient with them but would like to have some reply. We get inquiries in that office and we have no way of telling other than guessing on how much water is coming in or out of those streams, in either state.

Mr. Luce then asked for a show of hands on how many Commissioners had been contacted by a writer from the *Readers Digest* who is compiling an article on the Arkansas River in Arkansas all the way to the mouth.

Dr. Church was called on to report on his laymen's league which would be formed of local citizens interested in planning for future water for the compacted area, meeting once a month for eleven months, to educate, plan, and study the area for the next fifty years. He further explained that the citizen advisory committees work out quite well as a means of getting input into some of the programs, such as soil and water conservation.

Sister Pierre asked if what Dr. Church was saying was that he is advocating a grass roots group comprised mainly for educational purposes, so that they understand the condition of the water and thereby can insure food and water for future generations, using some structured organization from which to function. Dr. Church conferred and Sister Pierre further clarified that what he was hoping for then was an attitudinal change.

John Saxton commented that the Arkhoma Regional Planning Commission was established and structured for the development of the things Dr. Church was speaking about. He further stated he felt the Compact would be stepping out of its area of jurisdiction unless someone wants to take this on voluntarily. This would be ideal for the planning and development districts, however.

Mr. Bain with the KEDDO in Wilburton addressed the Commission at Mr. Luce's request. We feel this is a perfect function for the economic development districts. It is the type

thing they were legislatively and legally set up to do. The districts, including Southeast Oklahoma, Western Arkansas, Northeastern Oklahoma, and Northwestern Arkansas, are not only willing to help but see it as ajunct to their views and consider it a prime charge. Mr. Bain said the districts wholeheartedly want do it.

Jim Barnett said there is a real void as far as some sort of citizens organization in the water area, in that there is not a water organization in Oklahoma. Most other Western states have active water organizations that work in both the state capitol and in local levels to do exactly what the Commission is talking about now. However, it would not be appropriate to use the Compact Commission as a booster organization, as it is a compact between two state governments involving the federal government to resolve problems they might have, and to try to make it some sort of local booster organization or regulatory organization would make it in competition with the states.

Mr. Alan Parham, circuit rider/city manager in Sequoyah County commented that he feels the Commission is set up for resolving problems, but that as individuals they could help form organizations.

Ben Thayer then asked Dr. Church what kind of success he was having with the meetings. Mr. Bain reported that there had been meetings in Muskogee, Sallisaw, Waldron, Fort Smith, Wilburton, Talequah, of which most John Luce had attended, and most of those in attendance were civic leaders and politicians. Mr. Bain then continued that he did not feel, as Jim Barnett indicated in his response, that Dr. Church was advocating that the Commission itself get into those areas of inappropriateness, but that the Commission, in its wisdom, sees the need for an advisory group for all projects and not necessarily local or point specific projects. They are interested that all 7,000 miles be developed in an orderly fashion.

John Moffitt added that he feels it is a public awareness that the Commission is going to have to have, regardless of how it is structured, organized or whatever.

Mr. Luce then requested the Commissioners to review the handouts distributed concerning the Supreme Court Decision and stressed his feeling that this is one of the most dynamic decisions that has come down from the Supreme Court affecting the nations waters in a long time.

There being no further business, the meeting adjourned at 12:10 p.m.

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John Luce, Federal Representive

_____ _____

John Saxton, Arkansas Jim Barnett, Oklahoma

APPENDIX H

SPECIAL MEETING
ARKANSAS-OKLAHOMA COMPACT COMMISSION
AND
LAYMEN'S ADVISORY COMMITTEE
DECEMBER 7, 1982

MINUTES

A special meeting of the Arkansas-Oklahoma Compact Commission and Laymen's Advisory Committee was held December 7, 1982, in the Conference Room of the Western Arkansas Planning and Development District offices, 523 Garrison Avenue, Fort Smith, Arkansas. The meeting was called to order at 11:10 a.m., by John B. Luce, Chairman of the Compact Commission, presiding. Those commissioners in attendance were: Dr. Lloyd Church, Sister Pierre Vorster, and Ben Thayer. John Luce reported that he had promises from more than eighty people who planned to attend the meeting. Each layman who volunteered to serve on the Advisory Committee was personally contacted about the meeting. In attendance from the laymen's group was Levester Shoate from Spiro, Oklahoma. Also in attendance were representatives from KEDDO, RedArk Development, ARPC, and the Tulsa District Corps of Engineers.

Mr. Luce expressed his disappointment at the small turnout and noted that the special presentations from the water experts in attendance would have been well worth the time. He then introduced Dr. Lloyd Church, who is the organizer of the laymen's group. Dr. Church made a few remarks about the importance of laymen input in the water planning of this 7,000-square mile water compact area. He emphasized the need for planning for the next fifty years for roads, water development, resource stations, and natural resources.

Mr. Luce added that Dr. Church is not only an avid supporter in Oklahoma but has been very instrumental in

helping Western Arkansas. Eastern Oklahoma and Western Arkansas are one of the most productive water areas for surface water in the United States. Unfortunately, the greatest source of water, the Arkansas River, is contaminated, with high salt content being the greatest contaminate. The lower Poteau River below Wister Dam is the largest uncontrolled tributary of the Arkansas River. The Poteau, the Illinois, and the Canadian Rivers are the three largest tributaries of the Arkansas River.

Barbara Brown, project engineer on the Poteau River, from the Tulsa District then presented the Corps of Engineers' findings on the Poteau River from the Wister Darn downstream to where it mouths with the Arkansas River.

Ms. Brown reported that basically the Corps had looked at four purposes on the Poteau River: flood control, water supply, navigation, and hydropower. In the mid-60's the Corps did some studies on flood control, looking at a lot of little dams both above and below Wister. The Corps had ruled out then that some of the smaller dams above Wister would not be economically justified. In the recent study, the Corps looked at two damsites downstream.

Ms. Brown explained that there are two major tributaries downstream from Wister Lake that contribute significantly to flooding around Panama—Brazil Creek and James Fork. Two damsites were considered—one at the lower Hackett damsite on the James Fork and one at the Brazil damsite on Brazil Creek. The Corps looked at water supply, hydropower, and flood control, and neither of those turned out to be economically justified. Therefore, the studies on these two damsites were discontinued, which left two other areas of study: modifying Wister Lake for those purposes and a navigation channel from Panama down to the Port of Fort Smith.

The lower two miles of the Poteau is navigable up to the Fort Smith port. Ms. Brown referred to the handout she distributed to the group, which was a summary of what the

Corps checked. The items describing the navigation channels do not include any locks and dams. The reason the navigation channel stops at Panama is because if you go any higher than Panama, a lock and dam must be built. In fact, according to the old study, it took three locks and dams to get from Panama up to Wister Lake. Therefore, if anything had a chance of being justified—because navigation channels are very expensive—it would be the section that does not require locks and dams. Therefore, the Corps took the navigation channel which goes up to the port of Fort Smith, extended the 130-foot bottom level in that same configuration on up to Panama. Ms. Brown then explained that 130 foot is not very wide, only enabling the passage of one barge one width, one tow, at a time. Also, the Poteau has many curves, so the study calls for making the curves less sharp so that barges can navigate on the river. There are four bridges that would have to be raised, a lot of tree stumps and vegetation, snags in the river, that would have to be cleared out. Under new environmental standards, a strip of land along the edge of the navigation channel would have to be purchased, dikes built around it, and then whatever is dredged out of the river disposed of inside the dikes so that anything in the sludge would not be a contaminate to the farmlands.

The Corps then looked at what the benefits would be on this channel. The benefits, as the Federal criteria relates them, is any transportation savings incurred by going by this waterway rather than the presently traversed route. For instance, the two major commodities in the basin are coal and soybeans, bulk commodities that would probably travel on this. A lot of coal is trucked over to Keota, a lot of soybeans trucked up to Webbers Falls and some down to Van Buren. The savings would be a shorter truck haul from wherever the soybeans are produced and trucking them to Panama the shorter distance, rather than having to truck all the way to another port. Approximate annual benefits in trucking savings were $2 million for coal, and $150,000 for soybeans.

The first cost for the navigation channel would have been $115 million, which translates to $10.5 million a year, or about $2,150,000 in benefits which comes up to a .2BC ratio under federal criteria, and those are the guidelines this study is having to operate under. What it comes down to is just basically bad news: we can't build it, it is not going to be justified.

The remainder of the study, which focuses on modifying Wister Dam primarily for hydropower, is not complete. With the energy crisis, there is a big push on to take all the lakes that do not have hydropower and could, possibly to generate power out of them. Wister could support about a 15 to 20 megawatt plant from which power could be sold. In fact, it looks so good that some private industry now has a permit to study their putting a site on it. The Corps is working with them; however, it is a toss-up right now as to whether it will be the federal government or private industry who actually develops the plant.

A draft report, actually a brief synopsis, outlining the points covered here today will be completed in May, 1983. At that time a public meeting will probably be held in Poteau at which time people will have a chance to comment on it. It's possible, at that time, that new input and ideas will necessitate further study.

As a brief summary, the Corps' focus on the Poteau will be in the area of hydropower. There will be no navigation and no levy coverage.

Dr. Church stated that years ago there had been a navigation plan from Fort Smith to Oklahoma City. If navigation were prepared to Panama, could any part of that be part of the future navigation?

Ms. Brown responded that such involved federal planning criteria, which under current criteria, each segment of the navigation channel has to be economically justified; so, if the

first segment isn't justified, then the rest of it wouldn't be either. That isn't to say, however, that navigation is not possible up to Oklahoma City. This particular study authority is limited to the Poteau Basin. Therefore, it is possible that navigation to Oklahoma City is justified. In other words, the study authority on this project is really not big enough to encompass what we could probably do.

Ben Thayer then commented on the coal production in the Poteau area, noting that the benefit-to-cost ratio would probably change over the next five years as coal prices escalated.

Ms. Brown answered in the affirmative. As a matter of fact, in the mid-60's when the Corps looked at navigation very briefly, the decision was to wait on it until the completion of the Arkansas, as there might be some development on the coal. The problem is in projecting what coal production will do.

Mr. Thayer then inquired concerning the volume of coal reserves in the area. Ms. Brown reported that it could be mined for day and night for almost 30 to 40 years. Mr. Thayer clarified that realistically it could be mined for one hundred years. Ms. Brown agreed, however, pointed out that the production of coal is very sensitive to market price.

Harvey Ballinger of RedArk inserted that the volume of coal moving makes a difference, but the real situation is that one port has to compete with an existing port as far as economic analysis is concerned. To justify extensions in the navigation system, you need to open up a new market area, which means getting the navigation system extended into as big a new market area as you possibly can. Looking at coming up to Panama, it's easy to get there from the standpoint that it's the least cost of getting a port extended because you don't need any locks. The problem is you don't get very far from the Arkansas channel authority. Although you have made an impact, you have not made a significant impact into

getting into a new market area. In other words, a port at Panama would be competing with Fort Smith, Webber Falls, and Coweta.

Ms. Brown clarified that what Mr. Ballinger was saying is basically what she had explained earlier to Dr. Church. Under this particular study, you can't do it. But that's not to say it's not justified.

Mr. Luce asked if the studies propose to raise the Wister Dam.

Ms. Brown replied that the sentiment at public hearings is strong to raise the conservation pool. In fact, Congressman Watkins has a proposal in the legislature right now to raise it two or three feet, three feet during the winter months and maintain that same seasonal rate.

Mr. Luce commented that past contention has been that Wister has not really controlled the flooding on the lower Poteau, not to the extent that the people who are farming or the industry or the cities along the Poteau River are being protected as they should be by the Wister Dam. There has been a lot of flooding in the past five years in the Poteau River bottoms, where many crops have been lost simply because there was no protection when Brazil Creek and James Fork and a few more flooded into the Poteau, sometimes twice during a growing season. Possibly the lower Hackett side and the Brazil Creek is not feasible, what about the smaller structures on those tributaries?

Ms. Brown responded that one of the problems is the increased cost of construction. In the mid-60's a flood plan inventory revealed there were crop plants all in the flood plain area. The new 1980 study showed that same land to be in pasture and timber now. A study was not made between the mid-60's and 1980, so it may be because of flooding that the lands were converted to pasture and timber, or it may be because of the agriculture cycle that a lot of people went to

cattle. In any event, since it is now in pasture and timber, flooding does not cause as much dollar damage as when it was cropland. So flood control benefits are now lower than in the mid-60's. It's a vicious cycle. It flooded, so you put it in pasture and timber—you lower your benefits. Putting SCS dams there now would be too costly. If another cycle comes around and everyone puts the land back into crops, those SCS dams might pay out. The Corps is constrained. The studies have to be done in the present.

Levester Shoate, a layman in the group, related his childhood years on the Arkansas River, testifying to the flooding and subsequent improvements made by the existing locks and dams.

Dr. Church then asked if it were true that Wister Dam would be raised anywhere from nine to 13 feet.

Ms. Brown said the dam itself does not really need to be raised. This is one of the things the Corps has been talking about and is still under study. Ms. Brown then explained that putting a hydropower plant in that area would render incidental flood control benefits, releasing 9,000 CFS, taking flowage easements on approximately 1,500 acres, letting more water out of the dam even when a little bit came in flood. It is just something the Corps is looking at and would probably help on flood control.

Mr. Luce commented that the same problem is occurring in the Van Buren bend. It's not carrying the capacity it was designed for.

Levester Shoate asked if the Wister Dam were raised, how many acres would it cover.

Ms. Brown replied that it would not cover any more private land. Any land that would be affected would be already government-owned.

John clarified that if and when the Poteau were straightened for navigation, there would have to be additional land purchased, and Ms. Brown answered in the affirmative.

Harvey Bollinger of RedArk presented a slide presentation to the group, outlining the program RedArk has developed which also ties in with the Poteau River. The program deals with the area between the Arkansas River and Red River in Oklahoma, which also encompasses the Poteau River Basin. It is a program put together by Congressman West Watkins, 3rd District of Oklahoma. The plan provides not only guidelines but is a plan that calls for action. It is called an action plan because the effort is not complete until the implementation is tied into it.

The geographical area RedArk covers is the 3rd Congressional District in Oklahoma, plus four counties. The additional four counties were added because they are in the three economic development districts of KEDDO, SODO, and COEDD, so the area covers 24 counties, roughly a quarter of the state of Oklahoma—20 counties in the 3rd Congressional District and four outside.

The goal is to have a maximum development of water resources and natural resources to obtain maximum opportunities in two areas, economic development and improvements in employment—in unemployment as well as "underemployment."

RedArk is not opposed to transferring water to other parts of the state as long as it has first reached its goal: maximizing the water development and natural resources for water for the area the water came out of. Once that has been accomplished, water will be shared with anyone who needs it. RedArk feels the resource should first be used to improve economic and employment conditions in the area that the resource comes from. As the plan progresses, you will see that there is no intent to transfer any water out of the Poteau River Basin.

There is a movement of water around in the basins, but it will not result in the water being transferred out of the Poteau River Basin to the west yet, which doesn't mean RedArk is opposed to that concept, as long as resource development in that area has been maximized first.

Typically, a plan develops strategies and overcomes any obstacles. However, implementation is sometimes the key that gets left out. The whole thrust behind the RedArk Program is implementation.

When you start talking about water, you must realize there are really two parts to a piece of legislation dealing with water. Arkansas and Oklahoma have been very fortunate in the past to have a chain that could move or pull water projects from the idea stage into the construction or realization stage. McClellan and Kerr were very instrumental links in that chain. The Compact Commission and lay groups as Dr. Church has served on for a number of years are another important part of that chain. The Corps and the other federal agencies is another important link. With the passing of McClellan and Kerr a major part of the chain was lost, however, and it has taken awhile to get it put back together, as Dr. Church proposes.

Congressman Watkins sits on the House Appropriations Committee, and more importantly, he sits on two subcommittees: the Energy and Water Development Subcommittee, and the Agricultural and Rural Development Subcommittee. Every piece of federal water money moves through these two committees. Any federal agency that gets water money gets it out of one of those two subcommittees. Appropriations, however, is simply the money side of it. The other side to a federal water project is authorization.

A federal water project has to be authorized for study, for construction, and then funded for both aspects. So, it takes authorizing legislation and appropriating legislation. As

already explained, Congressman Wes Watkins of the 3rd Congressional District of Oklahoma sits on the appropriation side.

Concerning the authorizing side, that's where the states of Arkansas and Oklahoma again can team together—like they did with McClellan and Kerr. Congressman Hammerschmidt sits on the authorizing committee that authorizes federal water projects. So, you've got that "Kerr-McClellan" team put back together, a joint working relationship. At present Congressman Hammerschmidt's authorizing legislation has brought about appropriations for a major study of the Arkansas River, which includes the Poteau Deep Fork area, which is a water supply that includes both Arkansas and Oklahoma. An appropriation of $310,000 for this portion of the study is going before the House this week, and it looks very favorable.

Due to our particular effort in Oklahoma, RedArk put together an action team composed of the Tennessee Valley Authority who receives funds through that subcommittee, the Corps of Engineers, Bureau of Reclamation, and the Soil Conservation Service—in other words, the federal water agencies. We then added the Water Resources Board as a state agency and other state agencies. The actual team that has responsibility for water and natural resource development, however, is comprised of federal agencies.

Tennessee Valley Authority (TVA) is the only federal corporation in existence. It is a unique animal in that it is a public agency run like a private corporation. It has a board of directors, and is run like a corporation. It has a 50-year history of taking the resources in the river basin and turning those resources into benefits. Therefore, their expertise will be utilized predominantly in the area of natural resources. The other three agencies can handle the water side of the development, but the natural resources also must be developed too. When you start talking about navigation, you

suddenly begin discussing natural resources, agriculture, minerals—because that's what really makes a navigation project work.

RedArk is located in the KEDDO offices at Wilburton, Oklahoma, where it shares their space and talents. RedArk also works with COEDD and SODA, forming two task forces to move forward with the development of this action plan. The plan will be in print within the next 30 to 45 days and will identify some of the initial strategies. The first year we assessed the resources, developed some strategies, and now we will move into implementation.

The Natural Resources Task Force is headed by TVA. Their findings have been proposed to a lot of different groups, gathering input throughout the area from both public and private sectors. We have researched skills and development of human resources, data analysis and industrial development. RedArk is now evaluating how to develop those resources to their maximum.

One reason coal is not being used in Oklahoma is because it is passed off because we can't burn it. So, we're tying another resource together—forestry. Hardwood burned with coal reduces pollution and meets emission standards, and Oklahoma has a hardwood industry that has never been utilized. You develop your forestry in conjunction with your coal, and suddenly a barrier is eliminated that will cause the coal to move.

Also, TVA is presently working with Effrey, the coal industry's private research group, to do what is called "fluidized bed burning of coal." It's a new technology that will create a bigger market for our coal—which means more of it is going to move.

This is the type of approach RedArk is taking. And when you start developing resources, you naturally start talking

about water, which is the reason RedArk feels both should be looked at.

The Water Resources Task Force is headed by the Corps of Engineers, with the Bureau of Reclamation, TVA, Oklahoma Water Resources Board in three substates, and the Soil Conservation Service also involved. Three water systems were identified in 24 counties: East Central, Poteau Deep, Fork, and the Red River. Basically, the Red River System feeds part of the 24 counties that drain into the Red River Basin. The East Central System is comprised of seven counties that lie in the East Central part of Oklahoma.

RedArk is looking at certain purposes for these water systems: water storage, treatment and distribution. It will concentrate on "storage," not "supply." RedArk holds a different view than the Corps traditionally has. RedArk believes the Water Supply Act of 1958 that authorized the development of water supplies really meant to get the water to the consumer, to the demand centers, to the people that need it. During the 80's drought, people in Oklahoma as well as Arkansas were rationing water, and those cities were sitting among all the water in those lakes. The missing link is the delivery system. Water storage has been built but the treatment and transmission have not. Therefore, RedArk, is looking at water storage, treatment and distribution. Both the Corps and the Bureau believe they have the authority, and RedArk concurs in their present projects. Navigation and hydropower are the areas we want to look at together. RedArk is also interested in looking at the other purposes of flood control: recreation, irrigation and water pollution. We looked at current and past projects or systems, 46 of the Corps, ten of the Bureau; and six of the SCS. These three agencies analyzed the projects in the 24-county area and basically came back with the same conclusions independently: past projects are limited. Changing economic conditions have made some of the old studies not applicable,

and some projects that weren't feasible in the past are feasible now. Some have been converted. Some projects have been made obsolete. Mainly, we have an outdated comprehensive analysis. It's been almost 20 years since this area has been studied. What RedArk is saying is these systems need to be viewed as systems, not as individual projects, and start tying some of these together, as Mother Nature has.

Mr. Bollinger then discussed the Poteau River Basin. RedArk's only focus is not the Poteau, but a broad area in which the Poteau is a very significant part. When you look at the significant long-term development of the Poteau River, you start talking navigation. But unless you get into a new market area, you have a problem justifying navigation. The old Central Oklahoma Project studies identified several alternative routes to get to Oklahoma City. But the coal boom was over then, and the Bituminous Coal Reserve was not sufficient to justify the project. Times have changed, however; and the thing that killed the project 20 years ago may be what makes it fly this time. Of course there are alternative routes, like the one through Dirty, Butter Creek. But RedArk strongly supports a routing through the Poteau River up Fourche Maline across the divide into the Gaines Creek arm of Lake Eufala. Then we use Lake Eufala right on up the Deep Fork arm and then navigate on into Arcadia Still.

At present the Corps is still constrained in that they can't really count anything but federal benefits. They can look at other benefits, but they just can't count them.

RedArk has suggested that a Poteau Deep Fork Association be formed to work with larger associations, like the Arkansas Basin Development Authority and smaller groups, such as the Laymen's Advisory Committee, to look at the Poteau picture together. There may be a problem going across the divide of actually having sufficient water to continually keep the navigation channel afloat, so to speak. Higgins Reservoir would help, but not totally, so we may actually go into the

Red River side and possibly bring water out of the future Teskaoma Lake and the under-construction Sardis Lake and utilize it in the Poteau Basin itself to take water the direction we need to take-take [sic] it. So, in essence, you're really not taking water out of the basin as much as you probably ultimately will be transferring it in. The Corps has its hands tied and can go only so far with the authority they have. RedArk is going beyond that authority. We have had meetings in McAlester, Poteau, and all up and down the river, with a good response from the people. This is the kind of association that would work with the upper and lower ends. The group we are talking about will be a mover, a shaker type group that will go to Washington and testify before committees.

Mr. Bollinger stressed the importance of forming lay water associations. Presently the Red River Valley Association, which is a major entity pushing the development of the Red River that got navigation implemented, is headquartered in Shreveport, at the head of navigation. These associations play important roles in the development of water projects. They go testify and support. Congressman Bevell, Chairman of the Water Energy Committee in Oklahoma, spent the night in Poteau, visiting with people and looking over the area. He talked about Wister. He now realizes there are local people who support water projects. Associations should be formed of public and private sectors: bankers, city managers, mayors, laymen, farmers, ranchers, etc., that are willing to meet and rally when there is a need. And RedArk is helping get these associations started.

Mr. Luce then reported that there is a 545,139AF annual discharge out of the Poteau River into the Arkansas. Most of that water goes on into the Mississippi which they don't need. It is rumored that there is to be a saline removal effort in the Red River Basin and, of course, we are also interested in the removal of the salt in the Arkansas River. Mr. Luce called on

Steve Cone with the Tulsa District Corps of Engineers to report on the removal of this saline pollution of the river.

Mr. Cone stated that he would report on what has happened with the Arkansas River Basin project and would also briefly touch on the Red River, and solar pond power plants, which are most likely to occur in the extreme western portions of Oklahoma and Texas.

The Arkansas Red River Basin covers some 250,000 square miles. It is a major drainage area and a major natural resource. Runoff in the basin again is a major natural and regional water resource; however, the use of the water in many areas is significantly limited. This is not a result of man-made pollution or industrial pollution, but primarily due to salt natural chloride pollution from ancient oceans buried underground for millions of years. Because of this natural chloride pollution, there are significant impacts when trying to use the water out of the Arkansas and Red River. It is more significant in other areas as far as damages than in some areas. In Little Rock, for instance, it is not a major problem as it is around Tulsa. Likewise, on the Red River, it is not a problem in Shreveport as it is in the Wichita Falls area.

What are the problems? If you try to use the water for irrigation, it can cause crop damage, soil damage. If you try to use it for municipal water supply, it requires high treatment costs, damages to household pipes, plumbing, equipment.

Chloride control in the Arkansas and Red River Basin was authorized as one project in the Flood Control Act of 1970. Studies actually began in 1964 with Public Health Service. In 1965 the Corps of Engineers was called in to help develop and devise a plan. The initial plan from the studies, which began in 1974 or 1975, was authorized by the Flood Control Act of 1970. Internally the Corps has separated the two basins because all the source of pollution from the underground standpoint is the same, but the impacts when the salt creeps to

the surface and as it gets into the rivers is different in the two basins.

Mr. Cone then gave a slide presentation, outlining in detail the Arkansas Flouride Control Project. There are 15 major naturally occuring salt pollution source areas, with five areas in the Arkansas and Red River Basins. In the Arkansas River Basin there are four areas, all in Oklahoma, and one in Kansas. Likewise, in the Red River Basin there are ten salt source areas, nine in Texas and one in Oklahoma.

As an example, Keystone Lake is an area of good measurement in that it's a population center. It does not have a great deal of pollution from the Illinois River, the Poteau, the Grand River, etc., which come in below the city of Tulsa at Keystone Dam. Reference is normally made to the area around Tulsa or Keystone Lake. On the long-term average, there are 11,900 tons of salt per day which flow into Lake Keystone. Of this, 7,900 tons is from these five naturally appearing major salt source areas. Another 4,000 tons is from either minor unidentified source areas or from man-made salt pollution sources, particularly oil field brine disposal from oil field activities. In other words, two-thirds of the salt that flows into the Arkansas River is from natural pollutant areas.

An area well known because of the large recreational areas associated with it is called Area WATT. It is in the vicinity of the Great Salt Plains Reservoir which was a dam constructed by the Corps in 1941, located in Alfalfa County in North Central Oklahoma. The salt brine originates and underground salt formations seep to the surface where it evaporates, leaving a salt crustation—sometimes up to six inches thick. From this area, about 2,000 tons is contributed to the 7,900 tons that flow into the Arkansas, about one-fourth the natural salt, one-fifth of-the total salt.

Areas II and III are actually two emission areas, but due to the close proximity and the way we analyzed salt in this

problem, we call them one area: Area II-III. These are located on the Cimmaron River, and are referred to as big and little salt plains. The salt source area here is the big salt plain and the little salt plains Area II-III. They are located again in North Central Oklahoma near Kansas. Over 5,000 tons per day, or over one-half, of the natural flouride, with a crust up to six inches, will form as water percolates and evaporates from the seams and springs in the basin floor.

Area IV, again in Oklahoma, on Salt Creek in Blaine County is a smaller area, contributing not quite 300 tons per day of salt.

There is a fifth area in the Arkansas Basin, a little salt marsh referred to as Area XII, located in Stafford County, Kansas, along Rattle Snake Creek. This area too contributes about 300 tons per day. This source area is extremely long, which presents a major problem from an engineering standpoint of capturing the salt. It seeps and rises to the surface over about a 20 or 30 mile stretch of the river, which creates a tremendous capture problem with the water. We have not been able to come up with a plan that we felt would be technically or economically feasible.

Booklets were distributed, describing in detail the various plans developed for each area. Area I is basically a diversion of water around the salt source and seep area. Area II-III is likewise a diversion plan to divert the fresh water around the salt emission areas. Area IV is a much smaller area, more refined in a canyon, where a low flow dam would be constructed to capture brine and not diminish the stream flow significantly. The salt would be moved over and evaporated in an off-stream brine lake. The cost and semi-graphic configurations are reflected in the booklets.

Running downstream at Little Rock, chloride contamination is not as great a problem because of the other streams that flow in and dilute the brine. Currently only six percent of

the time does water exceed 250 mg per liter of chlorides; 94 percent of the time it's acceptable from the chloride standpoint. Therefore, the Arkansas River water is in some instances usable and could be used even further in the Little Rock area, after it would be cleaned up to the point where it could be used 100 percent of the time without going into any elaborate treatment processes. So, we are somewhere between the extremely bad water in Tulsa and the relatively good water in Little Rock.

Based on the charts for Tulsa and Little Rock, the Corps believes the Arkansas River project is technically feasible. It would accomplish the objective of making the water useful for municipal, industrial and agricultural purposes. The cost of the project is almost $900 million. Annually, that translates into $92 million, based on July, 1980 prices. With current prices, you can tag on a 15 percent increase safely.

Estimated annual benefits from improved river water quality would be at $23,340,000. The cost is $92 million, with a benefits cost ratio of 0.25. In other words, for every one dollar expended, 25 cents would be returned. Therefore, the project is not economically feasible and it is recommended to defer the project.

In June of 1978 the Corp first made a draft report, stating the project is economical, with $135 million in benefits, $49 million in cost, for 2.8 to 1 benefits cost ratio. Then we were directed by our higher authorities in Washington, including the Secretary of the Army and the Office of the Chief of Engineers, to take a closer look. We analyzed alternative sources of water very carefully and lost the benefit. Agriculturally, we did not change significantly. The major benefits in this project are agriculture. In June, 1978, we had $17,300,000. In July, 1980, we had $17,800,000. Most of this is above Keystone Lake where the most significant clean-up of water would occur. However, municipally we lost our benefits, from $12,900,000 to slightly over $1,000,000. In

industrial benefits, which included steam electric power plants, we went from almost $100 million to approximately $3,000,000. Other benefits included some recreational flood control and so forth.

Detailed studies showed the reason for the discrepancy in municipal benefits was that there are lower cost supplies of water, particularly in the major demand centers. The water could be used out of the river with this project, yet there are lower cost sources of water. Through relocation of existing reservoirs or constructing new reservoirs, that could be done at a lower cost. For general industry, studies showed that there was lower cost sources of supply in the major demand centers. Most significant, however, was the power companies showed little damage from steam electric benefits. We felt there would be significant damages to steam electric power plants from use of high saline water. But when the utility companies were approached, they said they were going to have to build certain standards of pumps, piping, equipment that could take high saline water. Even if the utilities were not using high saline water, they would use those same types of non-corrosive equipment to build their plants.

In summary, it is technically feasible to capture the brine and divert fresh water around it and make a significant improvement in the water quality of the Arkansas River. However, it is not economically feasible because there are alternative water supply sources available. The problem with the water in this area is not supply, but treatment and distribution. A copy of the Executive Summary was distributed to those attending the meeting. Mr. Cone concluded that the project will be deferred until there are significant changes in the basin in technology which would make the project more feasible from a benefits standpoint and reduce the cost of the project.

Mr. Cone then reported briefly on the Red River Basin. The Red River Basin is comprised of ten major pollution

sources, nine in Texas, and one in Oklahoma; 5,400 tons per day flow into Lake Texoma, a little less than one-half of the salt pollution that flows into the Arkansas River. Again, there is a mixture of about two-thirds, or 3,600 tons, from the major natural pollution sources, and 1,800 tons, or one-third, from unidentified natural and man-made sources of flouride contamination.

There are not any diversion plans in the Red River Basin because either there is not substantial stream flow or the sources are of a smaller geographical area that we were able to capture the brine and dispose of it there. This is known as the dispose concept. In one area in Oklahoma, brine is captured on side where it emmits from three box canyons, disposing of it over a brine dam off stream. In the Wichita River Basin, Area 8 is currently under construction. This was authorized by the Water Resource Development Act of 1976. Area 8, which is a low flow collection dam pipeline of disposal, into what we call Truscott Brine Dam, is under construction, about 80 to 85 percent complete. We were directed by Congress, who appropriated the funds, to begin building in this area. The Truscott Brine Dam pipeline and low flow dam should be finished in March, 1984. Eventually, if constructed, another area would tie into this and there would be two areas that would be disposed of by the evaporation of Truscott Brine Dam. Several of the other areas would tie into what is called Crowell Brine Dam, and some of the remaining areas are reserved for future work if at some time they become economically feasible.

Currently Lake Texoma meets the water quality standards for chloride only three percent of the time; 97 percent of the time it exceeds 250 mg per liter of chloride. After the project, 94 percent of the time it would meet the water quality standards. So, again, by cleaning up these natural pollution sources and reducing their pollution into the river, we would have a substantial clean-up on the Red River Basin. The first

cost of this project is almost $200 million. On the Arkansas River, it was $881 million; so, less than one-quarter of the cost to clean up about half the volume of chlorides. Annually, it is $12,900,000. Benefit-wise, we have the same categories of benefits in municipal, industrial, and agricultural. We also have a hydropower fort gone—that's a negative benefit because by capturing the brine at its source area, stream flow is diminished. By inducing agricultural irrigation by cleaning up the water, there is going to be some withdrawals from the river, which is going to have an impact on hydropower production at Lake Texoma. Therefore, total benefits are $23,300,000, almost identical to those benefits on the Arkansas River. The mixture of benefits is a little different, however. Again, as on the Arkansas River, agriculture leads—with, 60 percent of the benefits on the Red River. The big difference is in the municipal and industrial benefits. Again, the total benefits were almost the same, but the cost on the Arkansas River project is over four times as much as the Red River.

In summary, Truscott in Area 8 is under construction and will be complete in the spring of 1984. To construct any additional areas, it's going to require approval of the Secretary of the Army and appropriation of funds by Congress, which is currently tied up in some very controversial cost sharing discussion. The administration is wanting Oklahoma, Texas, Arkansas, and Louisiana (the benefiting stage of the Red River) to pay a major portion of the project costs. The states believe there are prior commitments from authorizing legislation that stated if the states would make efforts to clean up the natural pollution by regulating the oil field industry to reduce oil field brine disposal contaminants into the river, the federal government would—and should—pay for the clean-up with the natural pollution sources. Those discussions are presently going on by correspondence and meetings. Mr. Cone concluded that the chloride control project in the Red River Basin is technically, environ-

mentally, and economically feasible and requires the approval of the Secretary of the Army and Congressional funding.

In answer to a question from Dr. Church, Mr. Cone stated that 417 semi-truckloads of salt in solid form flow by Tulsa on an average day. Right now we envision that the salt will sit in evaporation ponds and the liquid in the salt will evaporate. The ponds would be built large enough to hold 100 years of salt deposits in that area. It is very possible that at some point in time someone can find a use for that salt, because it is presently being used and mined in some areas now, and those people will come to us to purchase the salt, either for cattle salt licks, deep well injection, oil field discovery, or for solar pond power.

Robert Bain of KEDDO asked if alternate water supplies had been considered, for instance if the salt water backs up several miles up the Poteau which would make the water almost as salty as the Arkansas River.

Mr. Cone replied that alternative water supplies were looked at. However, the biggest problem, particularly in Tulsa, was not that they didn't have water; they had the water and the rights to reservoirs around the city, but they did not have the pipelines to tap that water to get it to the city. Fort Smith is in a little different situation. They could probably use the water out of the Arkansas River now, if it weren't for other contaminants that keep them from doing so. The city of Bossier, Louisiana, uses water directly out of the Red River. They do not have quite the salt volume that is present here, but the, technique they use is to pull water whenever it is at a higher flow and not polluted and then store it in a reservoir, so they have enough water to supply their city for 60 days during a low flow period when the water quality is below what they want. The technique is referred to as scalping of high flow.

Mr. Cone then presented a new technological development that could have a significant impact in both river basins, known as solar pond power plants, or SP3.

Basically, it is a condensed solar collector. The lower layer is a 200,000 mg per liter slush of salt water, much more condensed than sea water. The middle layer is a little heavier than sea water and provides a thermal supressant to the lower layer. The upper layer is the convecting zone of water, and is more like sea water. As the sun penetrates through the water's surface, thermal energy is captured down in the lower layer. Due to the salt mixture with water and because it is gradient through the water, thermal energy is captured and the bottom layers of the pond heat up, to 170 or 180 degrees F, while the upper layer maintains an atmospheric temperature of 70 to 80 degrees F. Therefore, you have up to a hundred degree temperature range in the upper and lower layers of the pond. This is unique in the sense that a normal body of water, a pressure body of water, is going to turn over as water penetrates. As the sunlight and solar energy penetrate, the lower level is heated up. It, of course, rises to the top. In this type of pond, the lower layer of salt brine cannot escape, or it escapes at a much slower rate. There are tremendous temperature differentials, and thermal energy operates at differential.

A solar salt pond located in Miamisburg, Ohio, is used to provide space heating for a recreational building and swimming pool. Mr. Cone then showed a picture of the same kind of pond with ice on top of it. The temperature at the bottom, with about a foot of ice on the top, is 90 degrees F. So, you can see, it will hold the temperature for a long time and can be drawn off and used.

There are eight ponds in the United States. Most are located around Ohio where there has been considerable research by the Ohio State University. Two are located in New Mexico, as the University of New Mexico is very

involved in solar salt pond research. There is also one located in Tennessee, which is probably due to the Tennessee Valley Authority.

As mentioned earlier, the pond can be used for thermal energy. But it can also be used to produce electricity by drawing hot brine from the bottom of the pond, cleaving it through a heat exchanger which is full of an organic working fluid, such as freon. As the fluid evaporates, it drives a turban which operates a generator and produces electricity. The vapor travels up to a condensor, cooler water from another source or from the top of the pond is run through, condenses the vapor back into its liquid state, and returns back. It operates not because the water is so hot, but because there is a temperature differential between the top and bottom of the pond.

A salt pond for the production of electricity has been in operation in Israel since 1979. It is a 1.5-acre pond that produces 150 kw of electricity, located near the Dead Sea which is a very good source of salt water. This year they will fill a 250-acre pond, which will produce 20 mg of energy on a peaking basis, 5 mg of energy on a base load basis. By the year 2000 their plans are to provide 2,000 mg of energy from various 50-acre 50 mg modules of ponds.

In the United States, recently completed studies by the Department of Energy and the Department of Defense entitled regional applicability and potential of salt gradient solar ponds in the United States. This was issued in March, 1982, and states that the Red River region, which includes the Arkansas River Basin, is the top ranking region in the United States, with 60 percent of the potential in the U.S. right here.

Truscott brine lake is already under construction; we've got construction funds coming in, and we've got a demand for energy. If we can produce enough electricity to supply our own pipeline needs to pump the brine, and we can do it

cheaper than what we can purchase energy from a utility grid, then we have something right here. We were directed by the House and Senate Subcommittee on Appropriations to look into this. We were given one year to complete the study, which is a very short time frame for looking into something we are all very new to. Therefore, we designed a 20-acre solar pond to produce 1.92 mg of energy, which would be enough energy to meet the pumping needs of what we've got under construction right now, the pumping plant and pipeline. We completed our study in September, 1982, and the report has been sent to the Department of Energy who will submit it to the House and Senate.

The report provides a cost benefit analysis on this particular design layout: a little over $5 million for the pond, cost per kw hour is almost 30 cents. We can buy power off utility grids for about 26 cents. To produce this type of power at these costs, the benefit cost ratio is .88 to 1. Therefore, we did not quite make it, but firmly believe that further studies using scaling optimization of the scale will. We did get very close to one-to-one benefit cost ratio, however. Actually, we ran out of time, and it's being shelved right now until someone becomes interested further.

The Truscott brine source is not our best brine source. There are other areas in the Red River Basin which might have much higher volumes and concentrations of brine. Likewise, there are areas in the Arkansas River that are more condensed sources of brine. You do not have to have the evaporation ponds. In Area 6 in Oklahoma we could almost use the brine straight as it comes out of the ground, it is that condensed.

In April, 1982, we were appropriated funds and initiated investigation of the feasibility of adding this solar pond power plant concept to all of the areas in the Red River Basin. We expect sometime in December to have a preliminary design and cost estimate of what we feel are the most likely

areas, which would be Areas 13, 14, and 6. We are contacting those people who have ponds constructed and in operation now.

The Arkansas and Red River Basins have the key ingredients in abundance of salt, sunshine, water, and land. We are focusing our attention on the Red River Basin because we have a justified project for other purposes. We are hesitant to step into the Arkansas River Basin as we have a lot of opposition from the landowners, from the environmental interests on the Arkansas Basin Desalination Project itself. After we are sure we can do something in the Red River Basin, in the future we could possibly move into the Arkanas River Basin, and these ponds potentially could be the technological key that would make something happen as far as desalination.

The ponds presently in existence are experimental ponds, mostly independently financed. But the study of the Red River Basin was largely due to the interest from the Department of Energy, and then Congress when the House Appropriations Committee added some additional funds to expand our studies of the Red River Basin.

Mr. Luce then clarified that by building these ponds, some of the salt content of the main stem of the Arkansas River will be reduced, which would add energy for pumping and so forth, and at the same time would reduce the salt content of the Arkansas River.

Mr. Cone replied that it would require less land to build these ponds than to build the giant evaporation brine bed. The biggest problem in the Arkansas River Basin has been the landowners who do not see a benefit coming directly to them. They feel Tulsa and Fort Smith are the ones who are getting the benefits, while they have their land taken away and construction on it. By providing a power supply source in that area, however, it could reduce their energy costs for irrigation and various activities. The ponds would take up less land as

well as provide a dual purpose of the overall project. There are some other technologies underway that would incorporate the solar ponds into actual desalination plans, which would provide both power and fresh water out of salt brine. It is in the future, but it would give the people in Western Oklahoma water for themselves as well as energy.

Meeting adjourned at 1:50 p.m.

APPENDIX I

MINUTES

ANNUAL MEETING

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

"CHICKASAW" ROOM, SHERATON INN
5711 ROGERS AVENUE
FORT SMITH, ARKANSAS

NOVEMBER 17, 1983
9:00 A.M.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

ANNUAL MEETING

MINUTES OF NOVEMBER 17, 1983

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order by Sharon L. Shipley, Chairman of the Commission at the Sheraton Inn, Fort Smith, Arkansas, at 9:00 A.M. on November 17, 1983.

The Pledge of Allegiance was led by Baren Healey.

The invocation was given by Mrs. Shipley.

ATTENDANCE:

Those in attendance were as follows: Sharon L. Shipley, John Saxton, James Barnett, Dr. Lloyd Church, Sister Pierre Vorster. Ben Thayer and John Moffitt were not present. There was a quorum present of voting members.

Mr. Baren Healey, alternate federal representative, was also present.

The following guests were in attendance: Colonel James H. Phillips, Retired, Executive Director of the Arkansas Wate Waste Commission; William McMurray, Land Resources,

Arkansas Soil and Water Conservation Commission; Ken Carter, Corps of Engineers, Little Rock District; Paul F. Whittington, U.S. Department of Agriculture; Terrence E. Lamb, Chief Hydraulic Surveillance Officer, U.S. Department of Intetior, Geological Survey.

MINUTES OF LAST ANNUAL MEETING-SEPTEMBER 23, 1982:

There was one correction, a typographical error on Page 1 in the fourth paragraph, the name "John Barnett" now stands "Jim Barnett". Mr. Saxton made a motion that the Minutes be approved as distributed and amended. The motion was seconded by Mr. Barnett. Motion carried.

CHAIRMAN'S REPORT:

Mrs. Shipley presented the federal report. The total net federal funds for the access of the U.S. Commissioner in the operation of the office and Compact services provided by the Federal Government was $12,003.00 last year. The total amount spent was $11,989.00. Through May 19th, $10,592.67 was spent. At the time that she became Commissioner there was very little money left in the federal budget and she proposed an interim federal budget. She requested $1,410.30 and it was granted. The total expenditures during her administration were $1,396.33. The total expenditures of both administrations were $11,989.00.

STATE REPRESENTATIVES' REPORTS:

OKLAHOMA:

Report presented by Mr. Barnett. A written report will be made available. Progress has been made in the Compact area in the past year. One of these areas is the raising of the level on Lake Wister, one of the primary reservoirs of the Compact area. Also the new state-wide quality water standards have been completed. Also during this year the draft report on Lake Francis has been completed. This is a small reservoir on

the Oklahoma side of the line on the Illinois River. Through the State's financial assistance program grants have been made to several communities within the Compact area, including Boynton in Muskogee County and The Burnt Cabin Rural Water District in Sequoyah County.

ARKANSAS:

Report is presented by Mr. Saxton. We feel that the City of Fort Smith is making progress in attempting to develop a new water source. There is also progress being made concerning the City of Fayetteville Wastewater Treatment program. Arkansas also has a State financial assistance program to aid communities within the compacted area.

COMMENTS RELATIVE TO ACTIVATING THE BUDGET AND LEGAL COMMITTEES (BY MRS. SHIPLEY):

Activation of the Budget Committee was requested because of the need for an interim budget projected to the States. The Legal Committee was activated because of some possible conflicts between the rules and regulations of the federal and state laws.

COMMITTEE REPORTS:

BUDGET COMMITTEE REPORT (BY MR. J. R. YOUNG):

The accounts of the Compact Commission have been audited and a copy contained of the audit in the folder. That audit covers the fiscal year ending September 30, 1983. It also shows a record of the disbursements separated between the two separate Chairmen of the Compact Commission. The cash balance beginning on October 1, 1982, is shown; and it reflects contributions from Oklahoma and Arkansas of $1,500.00 per state. The balance is $2,862.00. In the proposed budget for the period of October 1, 1983, through September 30, 1984, a recommendation was made for a total budget figure of $1,250.00. This revised budget was mailed to both states in June. The first item is for postage at $100.00. The

second item is for stationery and the amount is $32.00. The third item is for secretarial support and the cost is $500.00. The fourth item is a professional appointment book for the Federal Chairman for 1984, and the cost is $16.00. There is the annual audit cost of $250.00. The cost of the meeting place for the annual meeting is $95.00. Typing cartridges for the typewriter is $25.00, and maintenance for the typewriter is $82.00. Surety bond for the Federal Chairman is $50.00, and there is a contingency fund of $100.00. These items total $1,250.00. That should leave at the end of September 30, 1984, a balance of $1,612.00.

Mr. Barnett made a motion that the budget be accepted. Mr. Saxton seconded the motion. The motion carried.

LEGAL COMMITTEE (BY MR. R. THOMAS LAY):

No assignments to report on at this time.

ENGINEERING REPORT (MR. J. A. WOOD):

There is a short, written report. There were no special assignments for the previous year.

COMMENTS BY DR. LLOYD CHURCH:

Dr. Church feels that the problems we face with the water and soil are the responsibility of the people, and ways need to be found to solve these problems and the cost associated with these problems.

COMMENTS BY SISTER VORSTER:

Expressed concerns about the future of quality water and who will bear the cost of this. Another concern expressed by her was the progress of the hydropower dam on Mayo Lock and Dam 13 and also the desalinization of the Arkansas River.

IDENTIFY PROBLEM AREAS:

A motion was made by Sister Vorster that Minutes of the Compact Commission be recorded in a Minute form, rather

than line-by-line. The motion was seconded by Mr. Barnett. Motion carried.

A motion was made by Mr. Saxton that each set of Minutes that is maintained in the office of the Arkansas-Oklahoma Arkansas River Compact office (The federal office) and with the Oklahoma Water Resources Board and Arkansas Soil and Conservation Commission hold the signatures of the following three individuals: The federal representative, the representatives of Arkansas and Oklahoma (Oklahoma Water Resources Board and Arkansas Soil and Conservation Commission). The Minutes should be dated and the seal of the Compact Commission should be affixed thereto. The motion was seconded by Mr. Barnett. Motion carried.

A motion was made by Mr. Saxton that the Chairperson act also as the Secretary-Treasurer at this time. The motion was seconded by MR. Barnett. Motion carried.

IDENTIFYING PROBLEM AREAS:

COMMENTS BY MR. JOHN F. GIBSON:

He feels that the following five things have been agreed on by the Compact Commission:

(1) Tearing down the artifical barriers that state boundary line creates . . . meeting once a year.

(2) Providing for an equitable apportionment.

(3) Providing the agency to accomplish mutual respect between states. This agency is operating.

(4) Pollution abatement.

(5) Facilitating the cooperation of the water agencies of the two states.

Speaking on behalf of the Legal Committee, they are ready to help at preparing a draft for the rules and regulations.

A motion was made by Mr. Barnett that the Legal Committee be assigned the task of preparing a draft of rules and regulations for circulation in a timely fashion and with the expectation that they could be formally adopted at the next meeting. Motion was seconded by Mr. Saxton. Motion carried.

MRS. SHIPLEY:

Let the record reflect that all Commissioners wish for the Legal Committee to identify the problem area that we might have in conjunction with coordinating our rules and regulations according to states and federal law and that they will make a report and presentation to us to be mailed to all of the Commissioners three months in advance of the next annual meeting in order for them to make any amendments or have any discussion before the next annual meeting.

CONTINUED DISCUSSION CONCERNING PROBLEM AREAS:

There was discussion concerning identifying the role of the Commission. Mr. Gibson's comments were as follows: He felt that any interstate problem would first go to that particular state's agency . . . and then through that agency, it could come before this Commission at which time this agency could conduct a hearing if we find it is necessary to resolve any dispute between the two states that this Compact has jurisdiction over. There is an arbitration procedure in the case of a tie vote. Then it could go on to the federal courts for a review process. The court would already have a record established by this agency and it would greatly assist the court in making a determination.

A motion was made by Mr. Saxton that in the development of the rules by the Legal Committee that a section be inserted which delineates the type of items that this Commission can consider in its deliberations and also the procedures on how these items are brought to the attention of the Commission,

such as it first must be considered by the state agency and then if there is an interstate impact . . . it is processed to the Commission. Motion is seconded by Mr. Barnett. Motion carried.

COMMENTS BY MR. LAY:

He noted for the record that the Commission really has no existing rules and regulations. This is starting on a fresh process.

A motion was made by Mr. Saxton that they have not been able to discover any proof of the fact that thy rules were adopted or not adopted by the Commission. The assumption is that they were never adopted . . . and he moves that recognition be made of the apparent fact that the Commission has not adopted a set of rules to this date and must initiate a program of development and adoption of rules of procedure. Seconded by Mr. Barnett. Motion carried.

FURTHER DISCUSSION IDENTIFYING PROBLEM AREAS:

A motion was made by Sister Vorster that the Commission listen to the testimony of the representative from the Corps of Engineers, Mr. Ken Carter. Seconded by Mr. Barnett. Motion carried.

COMMENTS BY MR. KEN CARTER, CORPS OF ENGINEERS:

Concerning the desalinization of the Arkansas River, he didn't feel that the Corps of Engineers was pursuing anything in that area at this time. Reports have been prepared concerning hydroelectric power development on the River. The Little Rock District has prepared three reports: (1) Murray Lock and Dam, Lock and Dam No. 7, at Little Rock, (2) Lock and Dams 13 and 9 and Tulsa Ferry Lock and Dam, which is Lock and Dam 8, (3) Lock and Dams 2, 3, 4, 5 and David E. Terry Lock and Dam. The Tulsa report was on W.

D. Mayo Lock and Dam, Lock and Dam 14. It is unlikely that these reports will be processed at this time. These studies are on-going. There is the possibility of federal development or nonfederal development or a federal project with a cost-sharing sponsor on the local level.

RECOGNITION OF THE FORMER U.S. COMMISSIONER, JOHN B. LUCE.

A motion was made by Mr. Saxton that there be a short break of 20 minutes. Seconded by Mr. Barnett. Motion carried.

MEETING RECONVENES.

Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission is called to order by Chairman Shipley.

FURTHER DISCUSSION CONCERNING PROBLEM AREAS.

DISCUSSION CONCERNING THE ANNUAL REPORT DUE DATE AND THE POSSIBILITY OF AN INTERIM REPORT.

A motion was made by Mr. Barnett that the Engineering Committee be assigned the task of preparing an annual report for the last ensuing fiscal year . . . being September 30, 1982, through October 1, 1983, and that Committee be assigned the task of preparing a draft report for the Compact Commission's consideration. Mr. Saxton seconded the motion. Motion carried.

A motion was made by Mr. Saxton that the Legal Committee give the Commission a determination relative to the authority, if any, of this Commission in relation to the charge in the statute concerning pollution control, or pollution abatement, however it is stated. Seconded by Mr. Barnett. Motion carried.

RESOLUTION HONORING MR. JOHN B. LUCE.

Dr. Church read the Resolution honoring Mr. John B. Luce for his many years of service on the Compact Commission.

Resolution was passed by the Commission.

A copy of the Resolution was presented to Mr. Luce, and the original will be given to him at a later date when it has been signed by all of the Commissioners.

Response by Mr. Luce thanking the Commission for honoring him.

A motion was made by Mr. Barnett that the meeting adjourn for lunch. It was seconded by Sister Vorster. Motion carried.

BREAK FOR LUNCH.

MEETING RECONVENES.

The meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order by Chairman Shipley.

APPOINTMENT OF COMMITTEE REPRESENTATIVES FOR PRESENT PERIOD TO SEPTEMBER 30, 1984.

There was a discussion concerning the appointment of the same committee members that the Commission had during the previous year and a chairman should be appointed for each Committee.

A motion was made that J. R. Young and Michael Melton serve on the Budget Committee; that John F. Gibson and . Thomas Lay serve on the Legal Committee; and that America J. Bryniarski and J. A. Wood serve on the Engineering Committee. The motion was made by Mr. Barnett and seconded by Sister Vorster. Motion carried.

A motion was made by Mr. Barnett that John F. Gibson serve as Chairman of the Legal Committee, J. R. Young as

Chairman of the Budget Committee and J. A. Wood as Chairman of the Engineering Committee. Seconded by Mr. Saxton. Motion carried.

RECOMMENDATIONS AND ASSIGNMENTS TO COMMITTEES.

Discussion of whether or not the cost of the preparation of the Geological Survey should be borne by only Arkansas or partly by Oklahoma.

A motion was made by Mr. Saxton that an assignment be given our Engineering Committee to look at the information that is now being given in our annual Geological Survey report to determine whether or not this is adequate and also to look at some of the possibilities of revising the current method of preparation and/or funding. Seconded by Mr. Barnett. Motion carried.

Discussion of the assignments to the Legal Committee-and Engineering Committee. The Legal Committee is to prepare a draft of rules and regulations and at least research what the Commission does have and provide in those rules such things as the annual meeting date, provisions for a public hearing from lay organizations, set out a fiscal year and determine .what that fiscal year is supposed to be. The Committee is to also look into the agency's responsibilities on pollution control.

A motion was made by Mr. Saxton that, the Chairman call a special meeting of the Commission to consider the proposed rules and regulations within a reasonable period of time after the proposal has been distributed by the Legal Committee to consider those rules and regulations, and further, that the annual report also be prepared in sufficient time to be adopted by the Commission at that special meeting, and the time period for this being between four and five months from this date. Seconded by Sister Vorster. Motion carried.

A motion was made that the meeting be adjourned.

The motion was made by Dr. Church and seconded by Mr. Saxton. Motion carried.

MEETING ADJOURNED.

Respectfully Submitted,

_____

Sharon L. Shipley
Commissioner

_____

Mr. John Saxton
Arkansas Soil and Water Conservation
Commission

_____

Mr. James Barnett
Oklahoma Water Resources Board

I, Lynda Hayes, do hereby state that the foregoing pages were taken and transcribed by me.

DATED this 13th day of February, 1984.

/s/ Lynda Hayes
Notary Public
Court Reporter.

My Commission Expires:
4-1-91

APPENDIX J

MINUTES

ANNUAL MEETING

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

SALLISAW CIVIC CENTER
SALLISAW, OKLAHOMA

SEPTEMBER 27, 1984

1:00 P.M.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION ANNUAL MEETING

MINUTES OF SEPTEMBER 27, 1984

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order by Sharon L. Shipley, Chairman of the Commission, at the Sallisaw Civic Center, Sallisaw, Oklahoma, at 1:00 P.M. on September 27, 1984.

The Pledge of Allegiance was led by Mrs. Shipley.

The invocation was given by Mrs. Shipley.

ATTENDANCE:

Members in attendance were as follows: Sharon L. Shipley, John P. Saxton, Ben Thayer, James Barnett, Dr. Lloyd Church, John Moffit. Sister Pierre Vorster and Baren Healey were not present. There was a (quorum present of voting members.

Staff members present from the Oklahoma Water Resources Board were R. Thomas Lay, General Counsel, and J. A. Wood, Stream Water Division Chief.

Staff members present from the Arkansas Soil and Water Conservation Commission were J. R. Young, Deputy Director, John F. Gibson, Attorney, and Paul Acre, Water Resources

Also present were Bruno Kirsch, Arkansas Department of Health; Bob Blanc and Phil Deisch and David Harkness, Department of Pollution Control and Ecology; Gene Gann and Terry Lamb. U. S. Geological Survey, Little Rock office, and Leland Hauth, Oklahoma City office: David Borough, Carol Scoggins, U.S. Army Corps of Engineers; Pearlie Reed and Paul Whittington, U.S. Soil Conservation Service.

MINUTES OF LAST ANNUAL MEETING-NOVEMBER 17, 1983:

Mr. Barnett presented a written memorandum listing minor Corrections to be made to last year's Minutes. After the reading of the memorandum by the members, Mr. Saxton made a motion that the Minutes be approved as amended. The motion was seconded by Dr. Church. Motion carried.

CHAIRMAN'S REPORT:

Mrs. Shipley presented the federal report and expressed pleasure that problem areas have been identified and progress made toward finding solutions. Expenses have been cut because the Federal Commissioner's office has no staff, such as an executive director manning an office on a day to day basis, and the office itself is to be closed by the end of December, 1984. Some properties will need to be stored. Travel expenses will likely increase as more areas are developed within the Compact.

COMMITTEE REPORTS:

BUDGET COMMITTEE REPORT: (BY MR. J. R. YOUNG)

Copies of the proposed budget for period of October 1, 1984 through September 30, 1985 were given to members. Expenditures for period October 1, 1983 through September

19, 1984 were reviewed. Next year's budget was reviewed. It is identical to last year's budget except for secretarial support, which was raised from $500 to $1,850. It was proposed that this budget ($2,600.) be funded by projected fund balance at end of current Fiscal year of $1600. plus $500. equal assessment from Arkansas and Oklahoma. Discussion was held concerning the treasury balance and it was suggested that it was due to a time span problem as to when the fiscal year actually ends and when the books are audited. It was predicted that the present surplus will disappear after this year and in future budget cycles, each State may have to provide $1300. to $1500. for the budget.

It was recommended that part of the money budgeted for secretarial support be used to pay for reproduction of the annual report. After discussion concerning the question of apportionment of funds from the Federal Government and the two States for future years, Mr. Saxton made a motion that the matter be referred to the Legal Committee for research and clarification of their opinion. The motion was seconded by Mr. Barnett. Motion carried.

LEGAL COMMITTEE REPORT: (BY MR. JOHN F. GIBSON, JR.)

A draft of the proposed rules and regulations for the AOARCC was provided to each member and the18-page document was read aloud by Mr. Gibson and Mr. Lay. After a general discussion, the following amendments were suggested: Article 4.4 on page 4: Change the last sentence to read:

> 'Other than as may be required by the State, no advance public notice shall be required for the calling and conducting of emergency meetings.' Add the following sentence: 'The public will be notified of any action taken at an emergency meeting at the earliest possible date.'

Article 10.10 on page 16. Amend to read:

> 'With permission of the Commission, a party may conduct cross-examination required for a full and true disclosure of the facts.'

Page 17, in last sentence of Article 10.11, strike 'd' from 'experienced', making it read 'Commission's experience'. Page 18, Article 10.13. Amend to read:

> 'Any party who is recognized by the Commission shall at all times have the right to counsel . . .'.

Page 18: Change Article XII to Article XI.

Page 18. Add the following paragraphs as Article XII.

ARTICLE XII

POLLUTION

12.1 The Commission may provide a forum for the identification and discussion of pollution occurring in the Arkansas River Basin to the end that the signatory states will cooperate with each other and jointly encourage the maintenance of an active pollution abatement program in each of the two States.

12.2 The Commission shall encourage each individual State to take positive steps in the abatement of pollution identified by the Commission to exist in the Arkansas River Basin; provided however, neither State may require the other to provide water for the purpose of water quality control as a substitute for adequate waste treatment.

12.3 The Commission shall collect, analyze and report on data pertaining to water quality within the basin. For this purpose the Commission may enter into contracts as provided by Art. IX A (2) to be approved at a Commission meeting. Unless formally approved by the Commission, no such report shall be published or have any validity.

A motion was made by Mr. Barnett to accept the report of the Legal Committee, approve the adoption of the rules and regulations as drafted and as amended and revised according to the report of the Legal Committee given today. The motion was seconded by Mr. Thayer. Motion carried.

STATE REPRESENTATIVES' REPORTS:

ARKANSAS: (MR. SAXTON)

No report.

OKLAHOMA: (MR. BARNETT)

A brief written report was provided. A significant achievement of Governor Nigh's administration was the passage of a constitutional amendment allowing the Oklahoma Water Resources Board to make low interest loans to local governments for needed water supply and wastewater treatment system improvements. Oklahoma and Arkansas are very fortunate to have the viable Compact Commission for utilization in resolving any interstate water difficulties that might arise.

COMMISSIONERS' REPORTS AND COMMENTS:

DR. LLOYD CHURCH:

The Arkansas-Oklahoma Compact covers a 7,000 square mile area in the two States. This is an area of great potential. There is a need for an organization of the people within this area to facilitate their working with the Compact Commission to develop the resources of the area.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVES COMMENTS:

MR. GENE GANN:

The U.S. Geological Survey, Water Resources Division, Agency of the Department of the Interior is the designated agency for furnishing liaison and administrative support to

the Federal representative on the AOARCC. It is also the agency operating gauging stations within the Compact boundary from which yield computations are made. A supportive relationship has been enjoyed in the past and is expected to continue in the future.

ADDRESS BY MICHAEL C. TURPEN, ATTORNEY GENERAL OF OKLAHOMA

Mr. Barnett introduced Attorney General Turpen, who presented a written Application for Hearing. The purpose of the Hearing is "to take testimony, receive evidence and issue such orders as is deemed necessary to protect the Illinois River from pollution which will be caused by the proposed discharge of treated effluent into the Illinois River Basin from the City of Fayetteville, Arkansas proposed sewage treatment facility." Two expert witnesses were introduced by Mr. Turpen. Herschel Roberts and Mike Schornich presented information from an engineering standpoint showing that the Illinois River is already being impacted negatively in stress by pollution from various sources. Charts, graphs and slides were used to describe and illustrate the pollution problem and observations and projections were made concerning future degradation of the water quality if the problem is not addressed now. Mr. Turpen stressed that the Hearing would be conducted in a spirit of cooperation and not confrontation.

Chairman Shipley asked the Commission what response they wished to make to the specific request by Attorney General Turpen for a Hearing before the AOARCC. A motion was made by Dr. Church recommending that the Hearing be granted. Seconded by Mr. Thayer. Motion carried.

Chairman Shipley announced that nominations were in order for the Commission to elect a representative from Arkansas and a representative from Oklahoma to preside over the Hearing. They, in conjunction with the Legal Committee would make arrangements of date, time, place, notice pro-

visions, etc. for the Hearing. After a consultation between the two State agencies, the Chairman and legal counsel, Chairman Shipley recommended that the names of Mr. Barnett and Mr. Saxton be placed in nomination. She stressed that it was only the Chair's suggestion that these individuals be nominated and that it was up to the Commission to place the names in nomination. A motion was made by Mr. Moffit nominating Mr. Barnett as the Oklahoma representative and Mr. Saxton as the representative from Arkansas. Seconded by Mr. Thayer. No further nominations were made. Motion carried.

Mr. Lay announced that the presiding officers would meet and confer to make arrangements for the date, time and place of the Hearing and the applicant would be notified.

After a 5-minute recess, the meeting was re-convened and the Chair recognized Mr. J. A. Wood of the Engineering Committee.

ENGINEERING REPORT: (MR. J. A. WOOD)

A one-page report of the Engineering Advisory Committee of the AOARCC was presented. Two assignments given to the Engineering Committee at the last annual meeting were outlined in the report. The Engineering committee was assigned the task of preparing the Draft Annual Report for the Compact Commission's consideration. The Draft Annual Report covering years 1983 and 1984 has been prepared and mailed to all commissioners and committee members for review and the committee recommends that the Commission consider any corrections, changes or additions to the report and approve the final version of the report for publication.

Mr. Wood identified a time frame problem area and asked for clarification of whether the Commission would operate on a calendar year, fiscal year, water year or Federal year. He recommended that the reports be published on a fiscal year basis, covering 1983 and 1984 in one report.

Mr. Saxton asked how that would correlate with the water year an which the data is collected.

Mr. Wood explained that only data for water year 1983 was included in the report because water year data for 1984 will not become available from the U.S.G.S. until approximately March of 1985, so that information would be put in the next fiscal report.

Mr. Saxton made a motion that the Engineering report be accepted. Seconded by Mr. Thayer. Motion carried.

Mrs. Shipley asked for clarification of the time frame problem and further discussion was held. Mr. Gann identified the fiscal year as July to June 30 and the Federal fiscal year as October 1 through September 30, which is comparable to the water year.

Mr. Wood asked for clarification as to what time period the budget recommendation should be made. He suggested using the Red River Compact Commission plan as a model. Budgeting would be planned for a two year cycle and next year's recommendation would be from October 1, 1985 through June 30, 1986 and July 1, 1986 through June 30, 1987.

Mr. Barnett agreed that plan had worked well for the Red River Compact and suggested it would be appropriate to give the Budget Committee that guidance.

Mr. Wood, continuing with the Engineering report, passed out copies of a letter from Mr. Gann, dated July 10, 1984, addressed to Mr. Saxton, giving 1985 fiscal year costs for the operation and maintenance of AOARCC gauging stations and publication of daily streamflow records. Also included was a $2,000. charge for compilation, computation and publication of annual yields for the Compact report. Mr. Wood posed the question of whether Oklahoma was to pay half of this $2,000. charge and Mr. Barnett verified that each of the two States was to pay $1,000.

Mr. Saxton made a motion that the second phase of Mr. Wood's report be accepted. Seconded by Mr. Moffit. Motion carried.

APPOINT COMMITTEE REPRESENTATIVES

Chairman Shipley complimented the representatives of the Budget, Legal and Engineering committees for the very fine job done this year in dealing with difficult legal, budget and calendar problems.

The committee chairmanships are to alternate every year.

Mr. Barnett noted the absence of Michael Melton and explained that it is sometimes difficult for both of them to attend Compact meetings. He suggested replacing Mr. Melton on the Budget Committee and asking Mr. J. A. Wood to serve on both the Budget Committee and the Engineering Committee for the next year.

It was suggested by Mr. Saxton that the committee be made up of the same people as last year.

A motion was made that J.A. Wood and J.R. Young serve on the Budget Committee with Mr. Wood as Chairman; that John F. Gibson and R. Thomas Lay serve on the Legal Committee with Mr. Lay serving as Chairman; and that Americ J. Bryniarski serving as Chairman, Mr. J.A. Wood serving as Vice-Chairman of the Engineering Committe; Mr. Bryniarski being responsible for the Engineering Report. The motion was made by Dr. Church and seconded by Ben Thayer. Motion carried.

ELECT SECRETARY-TREASURER OF COMPACT COMMISSION

Chairman Shipley announced that for cost-efficient reasons she has served as Secretary-Treasurer during the last fiscal year, but feels that until the Commission has a paid employee serving as secretary, someone on the Commission other than the Chairman should act as Secretary-Treasurer. Dr. Church

nominated Ben Thayer. Mr. Saxton seconded and made a motion that Mr. Thayer be named the new Secretary-Treasurer of the Commission. Motion carried.

RECOMMENDATIONS AND ASSIGNMENTS TO COMMITTEES:

Mr. Lay asked for clarification on the assignment to the Legal Committee dealing with the budget issue that was made earlier in the meeting.

Mr. Saxton clarified the assignment as an investigation to determine whether or not the Federal money that was formerly used for the defraying of expenses of the Compact office could be used for secretarial support services. He suggested that Mr. Gann be consulted for his opinion.

Chairman Shipley recognized Mr. Gann for comments.

Mr. Gann said he preferred to defer a response until after consulting with the Federal legal counsel.

Mr. Young proposed broadening the assignment to include the entire scope of what should be paid for by the Federal Government versus what is the States' responsibility, other than just the conversion of the money from the office fund to the secretarial support fund.

A motion was made by Mr. Barnett that this assignment be made to the Legal Committee. Seconded by Mr. Saxton. Motion carried.

ASSIGNMENT TO ENGINEERING COMMITTEE:

Mr. Saxton defined a question concerning the water rights in Lake Francis. He described a situation which occurred during a drought period when water collected in the Siloam Springs reservoir was released under order issued by the Oklahoma Water Resources Board. He asked that the Engineering Committee determine Arkansas' share of the runoff accumulated in the Siloam Springs reservoir and that the

Legal Committee make a determination of the water rights in this case.

Mr. Barnett expressed agreement that the problem was a legitimate mutual concern worthy of referral to the Engineering and Legal Committees.

A motion was made by Mr. Saxton that the problem be investigated by the Engineering Committee and then referred to the Legal Committee. Seconded by Mr. Barnett. Motion carried.

FURTHER COMMITTEE ASSIGNMENTS:

A motion was made by Mr. Moffit that the Engineering Committee be assigned the responsibility of preparing the next Annual Report. Seconded by Mr. Thayer. Motion carried.

FURTHER BUSINESS:

A motion was made by Dr. Church that Attorney General Turpen should be commended by the Commission for his interest in conservation and natural resources and for his visit here today. Seconded by Mr. Barnett. Motion carried.

Chairman Shipley recognized Julie Ferguson, Board member of Sallisaw Chamber of Commerce, who asked permission to submit a written request to be placed on the Commission agenda for a presentation concerning Lee Creek. She asked that Rick Murphy, Manager of the Sallisaw Chamber of Commerce and Colonel Bill Strang, President of the Short Rural Water District be permitted to speak briefly concerning a resolution that the Sallisaw Chamber Board passed in support of Fort Smith's application for the development of a dam on Lee Creek.

Chairman Shipley asked if Commission members were in favor of hearing their comments concerning the Lee Creek Project.

Mr. Saxton expressed the opinion that the matter of the Lee Creek impoundment was not an appropriate subject for discussion before the Commission at this time, but rather a matter for the State of Arkansas. He said that after the Federal Energy Regulatory Commission issues Fort Smith a license, the engineer would make the final design on the structure and then Fort Smith would apply for a permit to construct a dam. He predicted that would occur sometime in 1985 and said that at that time the procedural process for issuing or not issuing a permit for the dam construction would begin. The issue might become a matter for the Compact Commission when it becomes interstate in nature.

Mr. Barnett agreed with this assessment.

Chairman Shipley expressed a need for a determination by the Legal Committee of when and how a request for a Hearing should be brought before the Commission, thus giving legal protection for the Commission with reference to when and how to give audience to any entity.

Mr. Gibson agreed that this was an appropriate assignment for the Legal Committee and felt that the rules should include the procedure and specific grounds for bringing matters before the Commission.

Chairman Shipley recognized Mr. Rick Murphy, Sallisaw Chamber of Commerce Manager.

Mr. Murphy said that he understood and respected the point made by Mr. Saxton that it was premature for the Commission to discuss Lee Creek. He said the request was made partly because of statements and mis-statements concerning the Lee Creek proposal being made by people outside Sequoyah County. The Hearing would afford an opportunity for presentation of factual data in a spirit of cooperation and might avoid a confrontation at a future time.

Mr. Saxton requested that he be given for his files a copy of the letter sent by Mrs. Ferguson to Chairman Shipley. This would facilitate notifications to her of specifics of the situation at the appropriate time.

Chairman Shipley after consultation with legal counsel, expressed to Mrs. Ferguson as further clarification, that copies will be made of subsequent pertinent correspondence that she receives, as Commission Chairman, and will be forwarded to both State representatives and to other members of the Commission. She asked for a motion to put into the Legal Committee the problem of discerning how and when a request for a presentation before the Commission should be made.

A motion was made by Mr. Saxton that the legal Committee be charged with developing a set of rules outlining procedures for submitting an application to the Commission for a Hearing.

Seconded by Mr. Barnett. Motion carried.

A motion was made that the meeting be adjourned. The motion was made by Mr. Moffit and seconded by Mr. Thayer. Motion carried.

MEETING ADJOURNED

Respectfully submitted

_____

Sharon L. Shipley
U.S. Commissioner

_____

Mr. John Saxton
Arkansas Soil and Water Conservation
Commission

_____

Mr. James Barnett
Oklahoma Water Resources Board

I, Ann D. Woods, do hereby state that the foregoing pages were taken and transcribed by me.

Dated this 2nd day of January, 1985.

/s/ Ann D. Woods
Notary Public
Court Reporter

My commission expires:

3-20-92

APPENDIX K

MINUTES

ANNUAL MEETING

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

REGENCY INN
FORT SMITH, ARKANSAS

SEPTEMBER 26, 1985

9:00 A.M.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION ANNUAL MEETING

MINUTES OF SEPTEMBER 2A, 1985

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at the Regency Inn in Fort Smith, Arkansas, at 9:00 a.m. on September 26th, 1985.

ATTENDANCE:

Members in attendance were as follows: Randy Young, Ben Thayer, Sister Pierre Vorster, James R. Barnett Jr., Dr. Lloyd Church, John Moffitt and Baren Healey.

MINUTES OF LAST ANNUAL MEETING—September 27, 1984:

Mr. Young verbally suggested minor corrections to be made to last year's Minutes. Mr. Barnett made a motion that the Minutes be approved as amended. The motion was seconded by Sister Vorster. Motion carried.

SECRETARY-TREASURER'S REPORT: (Mr. Ben Thayer)

Mr. Thayer presented the Auditor's statement and briefly explained the cash flow for the past year. He expressed some

concern about the expenditures caused from previous Hearings before the Commission and the transcriptions made necessary by these Hearings. It was concluded that in the future regarding any expenses incurred from transcriptions requested by a party, it will be clarified as to what party is responsible for those expenses before the approval for the transcription is made. Motion was made by Sister Vorster to accept the report. Mr. Moffitt seconded. Motion carried.

COMMISSIONERS' REPORT:

OKLAHOMA: (Mr. James R. Barnett)

A brief written report was provided. Basically, the report dealt with the rainfall experienced in the Arkansas River Basin this year. The above normal rainfall has caused some problems with flooding, particularly in the Spring along the navigation channel. There has been no significant changes in the Compact Area or in the amount of water that can be expected to reach the Arkansas Oklahoma State border as a result of any state action in Oklahoma.

ARKANSAS: (Mr. J. Randy Young)

No report.

COMMITTEE REPORTS:

BUDGET COMMITTEE REPORT: (Mr. J.A. Wood)

Copies of the proposed budget reports were given to members. The Committee had been instructed to try to get back on a fiscal year running July 1st to June 30th which they had attempted to do. Discussion followed on how this budget compared to others. Mr. Young stated that the amount of the budget was based on the amount of money that was available from the two States. Since the funds were so low, Mr. Barnett indicated that the State of Oklahoma would pay their $1,000 upon receipt of a written bill. Motion was made that the budget be approved by Mr. Barnett. Motion was seconded and the budget was approved.

ENGINEERING COMMITTEE REPORT: (Mr. Americ J. Bryniarski)

It is anticipated that the annual report for the current fiscal year will be completed and distributed by the end of the year. At this time the problem of Lake Francis in Siloam Springs cannot be answered until the Legal Committee has answered all legal questions. The Engineering Report was accepted as presented.

LEGAL COMMITEEE REPORT: (Mr. R. Thomas Lay)

A signed copy of the report was distributed. The Legal Committee basically had four assignments from the last annual meeting. The first pertained to the question of which governments were responsible for expenses under the Compact. It was concluded that any expense to the individual Commissioners is the responsibility of the State that the Commissioner represents. Any Commission expense which is a "common" expense of the Commission involving administration of the Compact should be divided by the two States. In the particular context of the Federal Commissioner, his expenses should be paid by the Federal Government.

The second assignment was to continue aiding the presiding officers for the Illinois River-Fayetteville discharge hearing, in connection with legal matters. (See details in written report distributed).

The third assignment involving Lake Frances water rights, will be completed when information from the Engineering Committee is received.

This assignment dealt with the issue of whether releases required by the Oklahoma Water Resources Board were consistent with Oklahoma's obligations under the Compact. After significant discussion, it was decided that the two committees, Engineering and Legal, should get together and determine water runoff and flow data and how this affects releases,

and file a consolidated report to the Commission. As a final assignment, the committee was also asked to make recommendations with regard to applications for hearings and to advise the Commission as to what rules the Compact already provided. The Committee suggested some language for an amendment to Rule 10.1 of the present rules which would simply recognize the right of the interested party to come before the Commission and make application for a hearing to be held in some manner arising under the Compact. With regard to procedural aspects, the Rule suggests that the application be in writing and filed with the Chairman and copies furnished to other Commissioners. The application should describe and identify who the applicants are; what their interest in the matter is; what the issue is; if it falls under the Compact and if there is some particular kind of relief or other remedies desired. The Rule also states that unless the Commission determines otherwise that the application would come up on the Commission's next regular meeting for consideration. Mr. Young moved that the amendment to the Rules be adopted. Mr. Barnett seconded. Motion carried.

An amendment to Rule 10.9 was suggested in regard to evidence submitted at a hearing. This would require that the parties submitting evidence at a hearing to supply three copies; one for the presiding officer from each state and one copy for the Commission records. Motion was made and seconded to accept this amendment. Motion carried.

FURTHER BUSINESS:

ILLINOIS RIVER BASIN HEARING: (Mr. James R. Barnett)

The hearing on the Illinois River Basin was held in Fayetteville, Arkansas on June 3rd and 4th. Mr. Barnett and Mr. Young conducted the hearing. Because of a delay in receiving the transcription of this hearing along with the proposed findings from the two Attorney Generals' Offices it was proposed that a written report be completed and circ-

ulated to the members of the Commission in November. Mr. Thayer made the motion that a special meeting be held on November 26th, to review this written report. Mr. Barnett seconded. Motion carried.

NEW BUSINESS:

Mr. Robert Morris with the Corps of Engineers in Little Rock gave a summary of the Arkansas River M.I.A. Study (Municipal, Industrial and Agricultural). This study is expected to be completed by the summer of 1986. A recommendation will be made at that time.

Mr. Steve Cone from the Tulsa District also addressed the Commission concerning the M.I.A. Study as regards Oklahoma's participating in the study. A written report will be completed in a week or so and copies will be provided to the members of the Commission. Mr. Cone also mentioned matters relating to Wister Lake, dam safety modification and a possible water supply reallocation, along with the status of the Fort Gibson hydropower units and adding hydropower to W.D.Mayo Lock and Dam. His office is recommending that modifications to Wister Dam be made to meet the current dam safety criteria. These recommendations have been submitted to the Southwest Division Office for approval. Mr. Cone briefly explained the Arkansas River Southcentral Southeast Oklahoma Comprehensive Study. The purpose of this study being to develop a comprehensive water resource management plan to achieve maximum employment and economic opportunity in the Poteau and Deepfork River Basin.

Mr. Brooks Gallman with the Arkansas Distric Geological Survey expressed his gratitude for the good relations which has existed between the Compact Commission and his Office.

NEW BUSINESS:

APPOINTMENT OF COMMITTEE: (Files and Records)

Mr. Young and Mr. Barnett were appointed to determine what arrangements should be made as to the files of the Compact and determine some type of storage of these records

LEE CREEK PROJECT:

Mr. Jerry Harris, with the Little Rock District Corp of Engineers reported that an application was made for a Section 404 permit from the City of Fort Smith to construct a water supply and hydroelectric facility on Lee Creek (Phase I). The Commission was asked for their views. The question was raised as to whether the Compact had jurisdiction over the State Agencies involved in making the decision on whether or not the permit should be issued. The Legal Committee was asked to review all pertinent information on this issue and have a report ready for the next meeting scheduled for November 26th.

COMMITTEE NOMINATIONS:

The nominations of the committees for the next year were made. Mr. Thayer was appointed to remain as Secretary-Treasurer; Mr. Wood was made Chairman of the Engineering Committee; Mr. Gibson was nominated to be Chairman of the Legal Committee; Mr. Young was appointed as Chairman of the Budget Committee. Motion was made and seconded to accept these nominations. Motion carried.

OTHER:

Ms. Sharon Shipley, former U.S. Chairman of the Arkansas-Oklahoma Arkansas River Compact Commission expressed her gratitude for the support given to her during her term as former Commissioner.

ADJOURNMENT:

Mr. Barnett made the motion that the meeting be adjourned. Motion was seconded. Motion carried. Meeting was adjourned at 12:00 noon.

Respectfully submitted,

/s/ Baren Healey
BAREN HEALEY
U.S. Commissioner

/s/ J. Randy Young
MR. J. RANDY YOUNG P.L.
Arkansas Soil and Water
Conservation Commission

/s/ James R. Barnett
MR. JAMES R. BARNETT
Oklahoma Water Resources
Board

APPENDIX L

MINUTES

ANNUAL MEETING

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

1ST NATIONAL CENTER CONFERENCE ROOM
McALESTER, OKLAHOMA

SEPTEMBER 25, 1986

9:00 A.M.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION ANNUAL MEETING

MINUTES OF SEPTEMBER 25, 1986

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order in the Conference Room of the First National Center in McAlester, Oklahoma, at 9:00 a.m. on September 25, 1986.

Attendance

Members in attendance were as follows: Baren Healey, Randy Young, Sister Pierre Vorster, Ben Thayer, James Barnett, Dr. Lloyd Church and John Moffitt.

MINUTES OF SPECIAL MEETING—NOVEMBER 26, 1985:

Mr. Young made a motion that the minutes of the Special Meeting held in Fort Smith, Arkansas on November 26, 1985, be approved as amended. The motion was seconded by Mr. Moffitt. Motion carried.

MINUTES OF LAST ANNUAL MEETING—SEPTEMBER 26, 1985:

Mr. Barnett made a motion to approve the minutes of the Annual Meeting held on September 26, 1985. The motion was seconded by Sister Vorster. Motion carried.

SECRETARY-TREASURER'S, REPORT: (Mr. Ben Thayer)

Mr. Thayer presented an audited statement and briefly explained the cash flow for the past year. Dr. Church made a motion to accept the Secretary-Treasurer's report. Motion was seconded by Mr. Young. Motion carried.

Also, discussion was made concerning the high cost of Court Reporter services for recording of minutes. Mr. Barnett made a motion that the hosting state for the Annual Meeting should be responsible for recording the meeting and producing minutes. Motion was seconded by Mr. Thayer. Motion carried.

COMMISSIONER'S REPORT:

OKLAHOMA: (Mr. James Barnett)

A brief written report was provided. The report stated that there is no problem with the amount of water available in the Arkansas River System. Three developments in Oklahoma of interest to the compact mentioned were: Corps of Engineers reallocation of storage to water supply on Lake Wister, ongoing Illinois River study regarding waste discharge and pollution problems, and the Arkansas River Basin Study being conducted by the Corps of Engineers.

ARKANSAS: (Mr. Randy Young)

Mr. Young mentioned that the Corps of Engineers' Arkansas River Recon Study completed in the last year recommended additional feasibility studies. Problems arise concerning the requirement of cost sharing between the states and the federal government for additional studies.

The 1985 Arkansas Legislature mandated identification of present and future critical water use areas and areas of existing surplus water.

The Corps of Engineers modified the operation of the McClellan Kerr Navigation System to control navigation,

hydropower and flood control in Oklahoma. High flow is a concern of both farmers and navigational interests.

COMMITTEE REPORTS:

BUDGET COMMITTEE REPORT: (Mr. Randy Young)

Copies of the proposed budget reports were given to members. Mr. Young pointed out one change made in the budget concerning the Annual Water Yield Report by U.S.G.S. Discussion followed on how this budget compared to previous years. Mr. Young then moved that the proposed budget be adopted. Sister Vorster seconded the motion. Motion carried.

ENGINEERING COMMITTEE REPORT: (Mr. J.A. Wood)

Mr. Wood presented the draft annual report with a brief explanation of the contents. Mr. Young made a motion to approve the Engineering Report. Motion was seconded by Mr. Thayer. Motion carried.

Also, Mr. Wood discussed the Engineering Advisory Committee's role in assisting the Legal Committee on annual yield figures for the Illinois River Basin Study. Motion was made and seconded that in the future, depletions and accretions be included in the Engineering Report. Motion carried.

LEGAL COMMITTEE REPORT: (Mr. John Gibson)

One assignment from the 1985 Annual Meeting was to report again on the Lake Frances Water Rights Issue. Figures from the Engineering Committee and proposed reiteration of the legal issues were presented. No resolution concerning the Lake Frances Water Rights Issue has been made. Mr. Gibson proposed that the issue be held in abeyance until it can be refined.

Mr. Barnett made a motion to accept the Legal Committee's Report. Motion was seconded by Mr. Young. Motion carried.

Another assignment of the Legal Committee was to draft a proposed letter to Colonel Whitehead of the Little Rock Corps of Engineers concerning the Lee Creek Issue. Copies of the draft letter were presented to members. Recommended modifications to the proposed draft letter were voiced. Mr. Young made a motion that the revised letter be approved. Motion was seconded by Mr. Healey. Motion carried.

FURTHER BUSINESS:

SEQUOYAH FUELS: (Mr. James Barnett)

The Commission was advised that a draft discharge permit from the Oklahoma Water Resources Board for Sequoyah Fuels is awaiting Public Hearing. A Public Hearing will be held in Tulsa in thirty (30) to sixty (60) days, the purpose of which will be to address proper means for disposal of waste products.

LEE CREEK PROJECT:

Further discussion concerning the letter to Colonel Whitehead on the Lee Creek Project was held. A suggestion was made to include a statement of agreement between the states concerning the project. Mr. Thayer made a motion to reconsider the proposed letter to Colonel Whitehead. Motion was seconded by Mr. Young. A show of hands was called for: three in favor, three opposed. Motion failed.

NEW BUSINESS:

Joanne Kurklin with U.S.G.S., explained the role of U.S.G.S. to the Compact in providing discharge data for seven compact sites.

Two projects are being considered in the Compact area. One project includes adding seven monitoring sites along Bird Creek and Mingo Creek near Tulsa. Also a proposal is being considered with the Scenic River Commission for a new gauging station on the Ilinois River near Chewey.

Brooks Gallman from the Bureau of Reclamation gave a status report of the McGee Creek Project in Atoka County. Mr. Gallman also mentioned planning activities, including the Kiamichi Hydropower Study and the East Central Municipal Industrial Water Supply Study. These studies are assessing the potential for developing water supply, recreation, flood control and hydropower.

Under the Technical Assistance Program the Bureau is determining wind power potential. A proposed study of the Roubidoux Aquifer addressing quality yield, recharge and pollution is also being examined.

John Hill of the Tulsa District Corps of Engineers briefly explained the completed Big and Little Sallisaw Navigation Project. The Corps of Engineers is presently working with the Oklahoma Water Resources Board in developing additional components of the state water plan.

Gene Washburn of the Little Rock District Corps of Engineers gave a status report on the Arkansas River Basin Study. Mr. Washburn also mentioned the Mill Creek construction in downtown Fort Smith.

Terry Lamb of the Arkansas District of the United States Geological Survey described the services provided to the Compact by the Arkansas District of the U.S.G.S.

COMMITTEE NOMINATIONS:

Nominations of committees for the next year were made. The nominations were: Mr. Wood as Chairman of the Budget Committee; Mr. Bryniarski as Chairman of the Engineering Committee; Mr. Gibson as Chairman of the Legal Committee; Mr. Thayer as Secretary-Treasurer. Motion was made and seconded to accept these nominations. Motion carried.

OTHER:

Mr. Barnett extended invitations to the Tar Creek dedication on October 27 at the diversion site near Pryor and to

the Governor's Water Conference on October 28 in Oklahoma City.

Congratulations were given to Mr. Young for his new position on the I.C.W.P. Board of Directors.

ADJOURNMENT:

The Annual Meeting was dismissed at approximately 12:30 p.m.

Respectfully submitted,

/s/ Baren Healey
BAREN HEALEY
U.S. Commissioner

/s/ Mr. J. Randy Young, P.E.
MR. J. RANDY YOUNG, P.E.
Arkansas Soil and Water
Conservation Commission

/s/ Mr. James Barnett
MR. JAMES BARNETT
Oklahoma Water Resources Board

APPENDIX M

Minutes of the
ARKANSAS-OKLAHOMA ARKANSAS RIVER
COMPACT COMMISSION

Annual Meeting

September 24, 1987

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 24, 1987, at 9:00 A.M., Room 4A-400, State Multi-Agency Complex, One Capitol Mall, Little Rock, Arkansas.

Commission members in attendance were Baren Healey, Federal Chairman; James Barnett and John Moffitt, Oklahoma Commissioners; Randy Young, Sister Pierre Vorster and J. T. Gilliam, Arkansas Commissioners. Oklahoma Commissioner Dr. Lloyd Church was absent.

Guests in attendance included: Major General Jerome B. Hilmes, James Hair, and Jerrel Sarton, Corps of Engineers, Southwest Division, Dallas; Colonel Anthony V. Nida, Robert J. Moix, David Burrough, and Charles C. Stein, Corps of Engineers, Little Rock District; Colonel Frank Patete, Robert D. Brown, and John Hill, Corps of Engineers, Tulsa District; Gary J. Steigman and Danny P. Goodwin, Soil Conservation Service, Arkansas; E. E. "Gene" Gann, U.S. Geological Survey, Arkansas; Charles R. Burchett and Leland Hauth, U.S. Geological Survey, Oklahoma; William D. Hoffman; Ben Shipley, Attorney; Owen Proctor, Arkansas Democrat; Carol Griffee, Editorial Services, Inc.; J. A. Wood and Dean Couch, Oklahoma Water Resources Board; Emon Mahony, Earl T. Smith, Jr., Americ J. Bryniarski, John F. Gibson, Dr. Hugh Jeffus, Mark Bennett, Vicki Pollard, and Pris Houchens, Arkansas Soil and Water Conservation Commission.

Mr. Healey called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission to order at 9:00 A.M. Introductions were made.

APPROVAL OF AGENDA

The agenda was approved by the Commission as amended.

APPROVAL OF MINUTES; SEPTEMBER 25, 1986

Mr. Moffitt made a motion to approve the Minutes of the Annual Meeting held on September 25, 1986 as circulated and amended. The motion was seconded by Sister Pierre. Motion carried.

Mr. Healey thanked the host State of Arkansas for the meeting arrangements and activities planned for the entertainment of the out-of-town guests.

Upon motion by Sister Pierre one minute of silence was granted in memory of John B. Luce, who was one of the signers of Public Law 93-152 in 1970 and served as Federal Representative to the Arkansas-Oklahoma Arkansas River Compact from 1976 to May 1983 when he chose to resign for health reasons. Mr. Luce died February 17, 1987. Sister Pierre further requested that his wife, Fern, be informed of this action. The Commission unanimously concurred with Sister Pierre's request.

NEW BUSINESS

Mr. Young requested permission to include on the agenda a letter from Mr. Jimmie M. Alford, Alford Engineering Company, Inc., representing the City of Heavener, Oklahoma. Mr. Young explained that the letter is in regard to water shortages experienced by the City and their desire to look at existing storage in small reservoirs. The Commission concurred with Mr. Young's request to allow Mr. Alford an opportunity to make an appearance.

Major General Hilmes, Division Engineer with the Corps of Engineers, Southwest Division, Dallas, Texas, briefly addressed the Commission regarding the Arkansas River Basin Comprehensive Study. MG Hilmes advised the Commission that the study is on schedule and, in his opinion, a very important venture for the region.

ARKANSAS: Mr. Young provided a brief written report on behalf of the Commissioners from the State of Arkansas. Among items highlighted by Mr. Young were the Arkansas River Basin Comprehensive Study; the City of Fort Smith's efforts to develop an alternate water supply; and the appointment of Mr. J. T. Gilliam to replace Mr. Ben Thayer on the Commission.

Resolution: Mr. Young moved for the adoption of a resolution commending former Commissioner and Secretary-Treasurer, Mr. Ben Thayer, for his years of dedicated service as a Commissioner on the AOARCC. The motion was seconded by Mr. Barnett and carried. Mr. Young offered his assistance in drafting the resolution.

OKLAHOMA: Mr. Barnett submitted a written summary on behalf of the Commissioners from the State of Oklahoma. Mr. Barnett briefly discussed items of interest to the Commission which included a groundbreaking ceremony to start the development of a 300 megawatt cogeneration facility below Wister Reservoir; hydrologic studies of stream systems located in the Compact area; and the completion of a technical report on irrigation water requirements in Oklahoma.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVES' REPORTS

ARKANSAS RIVER BASIN COMPREHENSIVE STUDY: Mr. David Burrough, Little Rock District, Corps of Engineers, presented a slide presentation summarizing the Arkansas River Basin Comprehensive Study. Mr. Burrough reported that the study is the first multi-state multi-district

cost shared study signed by the Corps of Engineers. The study area consists of the Arkansas River Basin in Oklahoma and Arkansas. The reconnaissance phase was conducted jointly by the Little Rock and Tulsa Districts, Corps of Engineers, and coordinated with the Arkansas Soil and Water Conservation Commission and the Oklahoma Water Resources Board. The initial thrust of the study, Mr. Burrough explained, was to evaluate the need and opportunities for additional municipal, industrial and agricultural water supply. The reconnaissance report was completed in August 1986 with a recommendation that feasibility level studies be performed on additional navigation related items, flood reduction, recreation, municipal, industrial and water supply needs for the two states. The total cost of the study was estimated at $2,000,000. Navigation costs were approximated at $1,170,000 which, Mr. Burrough advised the Commission are 100% federally funded. Whereas non-navigation costs in the amount of $415,000 are subject to a 50/50 cost share to be borne by nonfederal interests. Mr. Burrough discussed management of the feasibility study by an Executive Committee established to provide guidance and direction regarding the overall study. Mr. Burrough projected a date of July 1990 for completion of the feasibility phase of the study.

Mr. Young discussed the proposal by the National Forest Service to reclassify several streams within its jurisdiction as "wild, scenic and recreational". Mr. Young voiced his concerns with this proposal and need for coordination between both state and federal agencies with respect to this matter.

TULSA DISTRICT, CORPS OF ENGINEERS: Colonel Frank Patete, Tulsa District, Corps of Engineers, presented a slide presentation with regard to Tulsa District activities within the Arkansas River Basin. Colonel Patete discussed improvements to Wister Lake; the Big/Little Sallisaw Project; and planning assistance to states.

U. S. GEOLOGICAL SURVEY:

Arkansas: Mr. E. E. "Gene" Gann, District Chief, U.S. Geological Survey, Arkansas, provided a brief summary of current hydrologic data collection and analysis activities of the U.S. Geological Survey in Arkansas within the confines of the Compact area.

Oklahoma: Mr. Bob Burchett, District Chief, U.S. Geological Survey, Oklahoma, provided a written report to the Commission. Among topics of interest to the Commission summarized by Mr. Burchett were a cooperative effort with the City of Tulsa's Water Authority to monitor continuous records of both surface water and water quality along Bird Creek; the City of Tulsa's Storm Water Management Department's cooperation on an additional six streamflow stations and four rainfall-runoff-hydrograph stations within the Tulsa metropolitan area; the upgrade of stream-gaging stations in anticipation of future floods; and the National Stream Quality Accounting Network (NASQAN) a nationwide data-collection network designed to meet information needs of government agencies and other groups.

REPORT OF THE SECRETARY-TREASURER

Mr. Healey expressed his appreciation of Mr. Thayer's service to the Commission in the capacity of Secretary-Treasurer.

Mr. Barnett moved for the appointment of Sister Pierre as the Secretary-Treasurer for the coming year. The motion was seconded by Mr. Gilliam. Motion passed.

Sister Pierre presented a written report and briefly updated the Commission concerning the financial status of the Compact funds. Sister Pierre reported total unobligated funds in the amount of $1,171.58.

Brief discussion followed regarding the excessive cost expended to conduct the annual audit of the Compact funds.

Mr. Barnett recommended rotation of the audit responsibility between the two signatory states. Mr. Gibson advised the Commission that the Compact mandates an independent audit be performed.

Upon motion by Mr. Young, second by Mr. Barnett, the Commission approved the Secretary-Treasurer's Report as presented by Sister Pierre.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Mr. Wood provided copies of the operating budget proposal (July 1, 1987 through June 30, 1990) to members of the Commission for consideration. Mr. Wood outlined changes to the proposed budget. Mr. Young moved for the adoption of the proposed budget as presented. The motion was seconded by Mr. Moffitt. Motion carried.

ENGINEERING COMMITTEE: Mr. Bryniarski updated the Commission regarding completion of the Annual Report of the Arkansas-Oklahoma Arkansas River Compact Commission. Mr. Bryniarski stated that the draft report is expected to be completed for review in October and the final draft ready for print in late December.

LEGAL COMMITTEE: Mr. Gibson provided background information with respect to the charge to report on the Lake Frances Water Rights Issue given the Legal Committee at the 1985 Annual Meeting. Mr. Couch and Mr. Gibson presented their state's views respectively concerning the issue.

Mr. Barnett recommended that the Commission accept Mr. Gibson's offer to prepare a written report of the Legal Committee for circulation among the Commissioners for consideration. Mr. Young recommended that the report include a summary of the rules and regulations that the Oklahoma Water Resources Board follows in making determinations relative to release requirements. Upon motion by Mr. Barnett, second by Mr. Young, the Commission moved

to direct the Legal Committee to submit a written report. Motion carried.

UNFINISHED BUSINESS

Mr. Couch advised the Commission that the Oklahoma Legislature amended the State of Oklahoma's Administrative Procedures Act definition of agency to include interstate commissions. Mr. Couch explained that the Compact addresses the matter by stating that the "procedures employed for the administration of the Compact shall not be subject to the Administrative Procedures Act of either state".

Mr. Couch discussed a recent opinion issued by the Oklahoma Supreme Court recognizing riparian rights to natural flows of streams over appropriated permitted rights.

In conclusion, Mr. Couch advised the Commission that the Oklahoma Water Resources Board has conducted six days of administrative hearings on the proposed discharge and waste disposal permit for the Sequoyah Fuels Corporation.

NEW BUSINESS

MR. JIMMIE M. ALFORD (CITY OF HEAVENER, OKLAHOMA): Mr. Jimmie M. Alford, Alford Engineering Company, Inc., addressed the Compact Commission on behalf of the City of Heavener, Oklahoma. Mr. Alford explained that the City of Heavener is experiencing exceptional growth in industrial development and the need for a firm water source parallels that industrial growth. As the demands for water supply exceed the delivery capability of the Wister Reservoir, Heavener is placed in increasing jeopardy to meet its water supply contracts from the Poteau River. Mr. Alford stated that a proposal has been submitted to the Soil Conservation Service in Arkansas to secure agreements which would permit low flow augmentation by scheduled releases out of some portion of the water stored in reservoirs above Heavener. Mr. Alford appealed to the

Compact Commission to provide any possible assistance to encourage the States of Arkansas and Oklahoma to consider the possibility of low flow augmentation to aid the City of Heavener in satisfying its growing needs.

Following a recommendation made by Mr. Young and Mr. Barnett, the Commission directed the Engineering Committee to work with the Soil Conservation Service and local Improvement District to look into Mr. Alford's proposal and report back to the Commission at the next annual meeting.

Mr. Danny P. Goodwin and Mr. Gary J. Steigman, USDA Soil Conservation Service, Arkansas, discussed Mr. Alford's proposal. Mr. Goodwin advised the Commission that a letter from the State Conservationist to Mr. Alford has been prepared advising Mr. Alford to address the Commission for support. Mr. Steigman elaborated on the technical aspects of the proposal.

DEPARTMENT OF INTERIOR, BUREAU OF RECLAMATION: Mr. Barnett presented a written activity report for the record submitted by the Bureau of Reclamation.

COMPACT COMMISSION ADDRESS: Mr. Young requested the Commission's input regarding the official address to be used for the Compact Commission. Following brief discussion, Sister Pierre moved that the address of both the Arkansas Soil and Water Conservation Commission and the Oklahoma Water Resources Board appear on Compact Commission correspondence. The motion was seconded by Mr. Moffitt. Motion passed.

APPOINTMENT OE COMMITTEE CHAIRMEN

Upon motion by Mr. Barnett, second by Sister Pierre, the Commission approved the nomination of Committee Chairmen for the next year as follows:

> Budget Committee, J. Randy Young, P.E., Chairman
> Engineering Committee, J. A. Wood, Chairman
> Legal Committee, John F. Gibson, Jr., Chairman

ADJOURNMENT

There being no further business, the meeting was adjourned at 11:30 a.m.

Respectfully submitted,

/s/ Baren Healey
BAREN HEALEY
Federal Chairman

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Director
Arkansas Soil and Water Conservation Commission

/s/ James R. Barnett
JAMES R. BARNETT, Executive Director
Oklahoma Water Resources Board

APPENDIX N

ANNUAL MEETING ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION

Robert S. Kerr Conference Center
Poteau, Oklahoma
September 22, 1988—9:00 A.M.

MINUTES

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at the Robert S. Kerr Conference Center in Poteau, Oklahoma, at 9:00 A.M. on September 22, 1988.

ATTENDANCE:

Commissioners in attendance were as follows: Randy Young, Sister Pierre Vorster, J.T. Gilliam, James R. Barnett, Dr. Lloyd E. Church, John Moffitt and Baren Healey. Committee members in attendance were: Dean Couch, John Gibson, J.A. Wood and Dr. Hugh Jeffus (for Earl Smith). A list of others in attendance is attached.

MINUTES OF LAST ANNUAL MEETING—September 24, 1987:

John Moffitt made a motion to approve the minutes of the Annual Meeting held on September 24, 1987. The motion was seconded by J.T. Gilliam. Motion carried.

SECRETARY-TREASURER'S REPORT: (Sister Pierre Vorster)

Sister Pierre Vorster presented a statement and briefly explained the cash flow for the past year. Randy Young made a motion to accept the Secretary-Treasurer's report. Motion was seconded by John Moffitt. Motion carried.

COMMISSIONER'S REPORT:

ARKANSAS: (Randy Young)

A brief written report was provided. Mr. Young reported four developments in Arkansas: (1) the Arkansas Soil & Water Conservation Commission conducted a public hearing April 7, 1988, in Ft. Smith, Arkansas, concerning the issuance of a dam construction permit on Lee Creek for the City of Fort Smith. The issuance of a permit had been challenged in court.

(2) A water rights problem existed below Lincoln Lake, located in the compact area, in northwest Arkansas. A problem developed during low rainfall periods, causing downstream users to experience water shortages. An emergency hearing was held and the commission entered a temporary order directing the city of Lincoln to begin a release. It is expected that the commission will adopt an order ensuring some level of minimum release to maintain stream needs.

(3) The Arkansas Basin Arkansas-Oklahoma Comprehensive Study, addresses potential uses that can be made of water in the Arkansas River from a water supply standpoint. The State of Arkansas, the State of Oklahoma, and the Corps of Engineers are cost sharing in the conduction of this study. The water quality phase of the study is progressing well.

(4) Arkansas has been engaged in revising and updating the Arkansas Water Plan. An executive summary of the plan was released in July 1988. One problem addressed is groundwater overdraft where pumping exceeded natural recharge in two critical areas.

OKLAHOMA: (James R. Barnett)

A brief written report was distributed. Mr. Barnett reported that Oklahoma has been involved in numerous studies located in the Arkansas River Basin. The Arkansas River Comprehensive Study is currently being conducted and is being

funded by Oklahoma, Arkansas and the Corps of Engineers. Oklahoma hoped to utilize this study to build new reservoirs to address flooding. Completion date for this study is September 1990.

Several Stream System studies are underway in Oklahoma. A fundemental requirement under Oklahoma law is to perform hydrological studies to determine the quantity of water in particular stream systems, for appropriation purposes.

The Illinois River Hydrologic Study was recently completed and a study on the Poteau River is currently being conducted. The Bureau of Reclamation and the Corps of Engineers are assisting in various studies.

Various legislative measures are being considered in Oklahoma to ensure water availability, and to secure financing for water improvements. The Oklahoma Water Resources Board approved loans for the Heavener Utilities Authority and the Poteau Valley Improvement Authority to upgrade their water systems.

COMMITTEE REPORTS

BUDGET COMMITTEE REPORT: (Mr. Randy Young)

A proposed budget was distributed to the Commission members. Mr. Young suggested that the line reading "Printing", for the Annual Report, be changed to "Printing and Reproduction" to pay expenses incurred other than the printing of the Annual Report. The budget reflected additional monies for such printing expenses. Randy Young pointed out that each year a reserve amount of budget appeared. Mr. Young suggested that the Commission allow the reserve to build each year until a desired amount is reached. Randy Young made the motion that the proposed budget be accepted. Sister Pierre Vorster seconded the motion. Motion carried.

ENGINEERING COMMITTEE REPORT: (Mr. J.A. Wood)

Mr. Wood presented the engineering report. One assignment covered was the preparation of the Annual Report. Randy Young made the motion that the Annual Report be approved. John Moffitt seconded the motion. Motion carried.

The second assignment mentioned was the appearance of Alford Engineering Company before the Commission to discuss concerns with water availability from Wister Lake for the City of Heavener. The Soil Conservation Service has addressed this issue. Mr. Bob Price, Soil Conservation Service, Little Rock, Arkansas, referred to a letter written to the Soil Conservation Service in September 1987 by Alford Engineering, requesting the release of upstream water to replenish flow in the Poteau River. The Soil Conservation Service suggested that the watershed improvement district and the landowners would have to enter into some type of agreement to provide for the low flow releases requested by Alford Engineering. Mr. Price also discussed the problem associated with storage of the water. James R. Barnett made a motion that the entire engineering report be accepted. Randy Young seconded the motion. Motion carried.

LEGAL COMMITTEE REPORT: (Mr. John Gibson)

A written report to the Commission for consideration on the issue of Lake Francis Water Rights was submitted. The report stated Arkansas' and Oklahoma's conflicting positions on this matter. It was Oklahoma's position that in regulating the use of water in Lake Francis, the only specific obligation of Oklahoma was to recognize Arkansas' right to deplete not more than 60% of the annual yield of the Illinois River Subbasin. Arkansas' position was that the Oklahoma Water Resources Board cannot require releases from storage of water in Lake Francis by the City of Siloam Springs as long as the annual yield of the Illinois River Subbasin was not depleted by more than 60% in operation of the reservoir.

Arkansas was willing to require Siloam Springs to release water in Lake Francis to meet essential downstream requirements during low flow periods provided further that these releases be in accordance with standards set by order of the Arkansas-Oklahoma Arkansas River Compact Commission. Oklahoma's view on this aspect was that during low flow periods, when releases would be required, the time element involved would not allow for a meeting of the Compact Commission to decide on the releases. Arkansas and Oklahoma agreed that at this time, the issue of Lake Francis Water Rights could not be resolved.

Randy Young made the motion to accept the report of the Legal Committee. John Moffitt seconded the motion. Motion carried.

J.T. Gilliam made a motion that the record reflect the fact that the Compact Commission supported Phase I of the Lee Creek Water Issue, and further that the Legal Committees attempt to settle any controversies between the two states concerning Lee Creek. Sister Pierre Vorster seconded the motion. One vote was cast in support of the motion. One vote was cast in opposition to the motion. Motion failed.

NEW BUSINESS

APPOINTMENT OF COMMITTEE CHAIRMEN—1989

Randy Young made the motion that J.A. Wood be named Chairman of the Budget Committee for 1989. James R. Barnett seconded the motion. Motion carried. James R. Barnett made the motion that Earl Smith be named Chairman of the Engineering Committee for 1989. Motion was seconded by Randy Young. Randy Young made the motion that Dean Couch be named Chairman of the Legal Committee for 1989. John Moffitt seconded the motion. Motion carried.

FEDERAL AGENCIES REPORTS

SOIL CONSERVATION SERVICE

Don Vandersypen discussed a proposed study be made jointly by Oklahoma and Arkansas to discover the impact of agricultural practices on the waters of the Illinois River Subbasin. This study would be submitted to EPA for funding under the Clean Water Act.

The Brazil Creek Watershed project had been approved for planning. This project deals with flood prevention and water supply.

U.S. GEOLOGICAL SURVEY

Leland Hauth discussed sampling being done by USGS in cooperation with the Grand River Dam Authority above Grand Lake. The samples were concerned with heavy metals associated with the bottom sediments.

Five new gaging stations had been installed upstream from the compact area. Four of these stations were continually monitoring water quality. These stations were located on the North Canadian River in and around Oklahoma City. The fifth new gaging station was located on Bird Creek. There were an additional 19 gaging stations within the compact area. Eighteen of the total 23 gaging stations provided real time data.

Some gaging stations were being upgraded in the compact area to accommodate probable maximum flood for the Corps of Engineers. This involved raising existing stations.

Two USGS reports had been published in FY 1988. One was a summary of activities of all projects conducted in Oklahoma, as well as a list of all gaging stations operated or presently operating and the information available from these stations. Also, a statistical summary of streamflow records in Oklahoma had been published. This report contained high-

low flow frequencies, means, flow duration and additional graphs providing daily flow information for all streams.

Terry Lamb, of the Arkansas District of the USGS, discussed the Lee Creek gage. Upon completion of the first phase of the Lee Creek project, flow would be no longer measurable due to backwaters. Efforts were being made to maintain ample flow for gaging measurements.

The gage located on the Arkansas River may be affected by a proposed hydropower plant. Current gaging measurements would be bypassed when the hydropower plant was put in operation. A solution was being sought for this situation.

Mr. Lamb also discussed the ability to provide assistance for the Lake Francis issue by providing real time data from a nearby gaging station.

BUREAU OF RECLAMATION

A report from the Bureau of Reclamation was circulated. No representative was available.

U.S. ARMY CORPS OF ENGINEERS

Steve Cone, with the Tulsa District Corps of Engineers, mentioned four current activities. The first item discussed was the assistance provided by Coe to the OWRB in hydrologic studies for the appropriation of water rights. Water supply needs projections were supplied by the COE to assist the OWRB in furthering the Oklahoma Comprehensive Water Plan. Reservoir yield studies were conducted on a requested basis for small non-Federal structures.

Steve Cone also discussed the major dam rehabilitation work of Wister Lake. Seepage through the embankment posed a safety concern and erosion of the downstream channel due to spillway releases had become costly. The COE was formulating solutions to these problems.

The Arkansas River Tributaries Comprehensive Study was coming to a conclusion. This was a comprehensive water resource study consisting of nine counties in eastern Oklahoma and the Poteau and Deep Fork River watersheds. The purpose of this study was to make recommendations for the development and utilization of the water resources in the area. This study had examined the potential extension of the McClellan-Kerr Navigational System. Navigation on the Poteau River was being examined. Possible hydropower plants at Eufaula Lake and Wister Lake dam sites were being studied.

The Arkansas River Basin Arkansas-Oklahoma Feasibility Study was a cost share study, involving the Tulsa District COE, the Little Rock District COE, the Oklahoma Water Resources Board, and the Arkansas Soil and Water Conservation Commission. This study focused on: the economic feasibility of any potential multi-purpose reservoir sites in Oklahoma; potential levee rehabilitation or expansion projects within the state of Arkansas; the potential for municipal, industrial, and agricultural water uses; and the evaluation of alternative operating plans for the Arkansas River and the multi-purpose reservoir system. Project completion was scheduled for September 1990.

Robert Moix with the Little Rock District of the Corps of Engineers discussed problems associated with low water levels in the Arkansas River affecting the McClellan-Kerr Navigational System. Due to low water elevations, dredging has been necessary.

Another area of interest discussed by Mr. Moix was tow mileage on the McClellan-Kerr Navigational System. A problem existed in transporting tows through the locks. The COE was addressing this situation. The annual inspection of the Arkansas River McClellan-Kerr Navigational System was scheduled for the 26th of September. The inspection would begin at the Port of Catoosa.

A Section 404 permit for a water supply hydroelectric dam on Lee Creek was issued on February 24, 1988. The permit contained several conditions requiring submission of mitigation plans in the areas of water quality, fish and wildlife, recreation, and water conservation. The city was making submittals in compliance with these requirements. No construction had been done to date.

1989 MEETING SITE

Arkansas would host the 1989 Arkansas River Arkansas-Oklahoma Compact Commission meeting. The site would be determined at a later date.

ADJOURNMENT

Meeting was adjourned by Federal Chairman Baren Healy at 11:25 a.m. on September 22, 1988.

Respectfully submitted,

/s/ Baren Healey
BAREN HEALEY
Federal Chairman

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Director
Arkansas Soil and Water Conservation Commission

/s/ James R. Barnett
JAMES R. BARNETT, Executive Director
Oklahoma Water Resources Board

APPENDIX O

Minutes of the
ARKANSAS-OKLAHOMA ARKANSAS RIVER
COMPACT COMMISSION

Annual Meeting

September 28, 1989

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 28, 1989, at 9:00 A.M., in the Cherokee Room, Sheraton Inn, Fort Smith, Arkansas.

Commission members in attendance were: J. J. Vigneault, Federal Commissioner and Chairman; James Barnett and John Moffitt, Oklahoma Commissioners; Randy Young and Sister Pierre Vorster, Arkansas Commissioners. Baren Healey, Alternate Federal Commissioner; Dr. Lloyd Church, Oklahoma Commissioner; and J. T. Gilliam, Arkansas Commissioner were absent.

Guests in attendance included: Velma Brown, Corps of Engineers, Little Rock District; John Hill, Corps of Engineers, Tulsa District; Bob Price, Soil Conservation Service, Arkansas; Don R. Vandersypen, Soil Conservation Service, Oklahoma; E. E. "Gene" Gann, U.S. Geological Survey, Arkansas; Leland Hauth, U.S. Geological Survey, Oklahoma; Jerry Wright, Bureau of Reclamation; J. A. Wood and Dean Couch, Oklahoma Water Resources Board; Earl T. Smith, Jr., John F. Gibson, and Pris Houchens, Arkansas Soil and Water Conservation Commission.

Mr. Vigneault called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission to order at 9:00 A.M. Introductions were made.

APPROVAL OF AGENDA

Upon motion by Mr. Young, second by Mr. Moffitt, the agenda was approved as amended to include an opportunity for public comment. (Copy amended agenda attached to the Minutes).

APPROVAL OF MINUTES: SEPTEMBER 22, 1988

Mr. Barnett moved to dispense with the reading of the Minutes of the Annual Meeting held on September 22, 1988 and for approval as presented. The motion was seconded by Mr. Young. Motion carried.

REPORT OF THE CHAIRMAN

Mr. Vigneault expressed his pleasure at being appointed the Federal Commissioner and Chairman of the Arkansas-Oklahoma Arkansas River Compact Commission.

REPORT OF THE SECRETARY-TREASURER

Sister Pierre presented a written report and briefly updated the Commission concerning the financial status of the Compact funds. Sister Pierre reported total unobligated funds in the amount of $4,320.30. Upon motion by Mr. Young, second by Mr. Moffitt, the Commission approved the Secretary-Treasurer's report as presented by Sister Pierre. (Copy of the financial report attached to the Minutes).

REPORT OF THE COMMISSIONERS

OKLAHOMA: Mr. Barnett submitted a written summary on behalf of the Commissioners from the State of Oklahoma. (Copy of the Oklahoma Commissioner's report attached to the Minutes). Mr. Barnett briefly discussed items of interest to the Commission which included the above average rainfall for 1989 in the Compact area of Oklahoma; water quality studies recently completed or underway; floodplain management activities; dam safety inspection activities; Oklahoma Water Resources financial assistance program; and the

Annual Oklahoma Water Conference scheduled for December 13, 1989.

ARKANSAS: Mr. Young provided a brief written report on behalf of the Commissioners from the State of Arkansas. (Copy of the Arkansas Commissioner's report attached to the Minutes). Among items highlighted by Mr. Young was the status of the Arkansas River Basin Comprehensive Study; legislative initiatives from the 1989 Legislative Session; Refunding of 1987 Series, Water Resources Development General Obligation Bonds; Waste Disposal/Pollution Abatement General Obligation Bond Program; and upcoming Arkansas Water Conference.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Mr. Wood provided copies of the operating budget proposal (July 1, 1989 through June 30, 1992) to members of the Commission for consideration. Mr. Wood outlined changes to the proposed budget. Mr. Moffitt moved for the adoption of the proposed budget as presented. The motion was seconded by Mr. Young. Motion carried. (Copy of the approved budget attached to the Minutes).

ENGINEERING COMMITTEE: Mr. Smith updated the Commission regarding completion of the 1988-1989 Annual Report of the Arkansas-Oklahoma Arkansas River Compact Commission. Mr. Smith advised the Commission that a draft of the report was previously circulated for review and that no adverse comments were received. Mr. Barnett moved to authorize the staff to proceed with the printing and distribution of the annual report. The motion was seconded by Sister Pierre and carried.

LEGAL COMMITTEE: Mr. Couch presented a written report advising the Commission that the Legal Committee received no assignments at the previous meeting and accordingly had no report at this time. (Copy of Legal Committee report attached to the Minutes).

UNFINISHED BUSINESS

There was no unfinished business at this time.

APPOINTMENT OF COMMITTEE CHAIRMEN

The next item of business included the appointment of committee chairmen. Commission action is as follows:

BUDGET COMMITTEE: Upon motion by Mr. Young, second by Mr. Barnett, the Commission approved the appointment of Pris Houchens as Chair-person of the Budget Committee.

ENGINEERING COMMITTEE: Upon motion by Mr. Barnett, second by Mr. Young, the Commission approved the appointment of J. A. Wood as Chairman of the Engineering Committee.

LEGAL COMMITTEE: Upon motion by Mr. Young, second by Mr. Moffitt, the Commission approved the appointment of John F. Gibson, Jr. as Chairman of the Legal Committee.

FEDERAL REPRESENTATIVES' REPORTS

Representatives of several federal agencies provided written reports to the Commission. (Copies of available reports attached to the Minutes).

Mr. Young made a motion that the Commission charge the Engineering Committee with the responsibility of working with the U.S. Geological Survey and others as necessary to develop a recommendation with respect to the modifications necessary to the gages on Lee Creek and Lock and Dam No. 13 in order to provide data that the Commission needs to ensure Compact requirements. The motion was seconded by Mr. Moffitt and passed. The report shall be filed with the Commission prior to the meeting scheduled for its discussion pursuant to the rules, regulations and modes of procedure governing formal committee reports.

PUBLIC COMMENT/ADJOURNMENT

There being no public comment or further business at this time, the meeting was adjourned.

Respectfully submitted,

/s/ J. J. Vigneault
J. J. VIGNEAULT
Federal Commissioner and Chairman

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Executive Director
Arkansas Soil and Water Conservation Commission

/s/ James R. Barnett
JAMES R. BARNETT, Executive Director
Oklahoma Water Resources Board

APPENDIX P

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Annual Meeting

September 27, 1990

The annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held September 27, 1990, at 9:00 A.M., at the Fountainhead Resort Hotel, Eufaula, Oklahoma.

Commission members in attendance were: J. J. Vigneault, Federal Commissioner and Chairman; J. Randy Young, Sister Pierre Vorster and J. T. Gilliam, Arkansas Commissioners; James R. Barnett, J. Denny Moffett and Blaine Miller, Oklahoma Commissioners. Baren Healey, Alternate Federal Commissioner was absent.

Others in attendance included: Pris Houchens, Earl Smith and Mark Bennett, Arkansas Soil & Water Conservation Commission; Brita Haugland, Oklahoma Attorney General's Office; Dr. Lloyd E. Church, Wilburton, OK; Parthenia Evans & Therese M. Schuele, Spencer-FaneBritt-Browne Law Firm, Attorneys for Siloam Springs, Arkansas; Gene Gann, U.S. Geological Survey, Arkansas Division; Don Vandersypen, SCS, Stillwater, OK; John Hill, Tulsa District, Corps of Engineers; Bob Price, SCS, Arkansas; Kathy Peter and Bob Blazs, U.S. Geological Survey, Oklahoma City, OK; Jerry Wright, Bureau of Reclamation, Oklahoma City, OK; John Dodge, Attorney, City of Siloam Springs; J. A. Wood, Dean Couch, Donnie Blanlot & Andrew Huskey, Oklahoma Water Resources Board.

Mr. Vigneault called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission to order at 9:00am and introductions were made.

APPROVAL OF AGENDA

Mr. Young offered a motion to approve the agenda with an amendment to add "Item B" on the agenda, which was the application from the City of Siloam Springs requesting a hearing regarding their rights to water stored in those springs, to "New Business". Mr. Barnett seconded and motion carried.

APPROVAL OF MINUTES: SEPTEMBER 28, 1989

Randy Young made a motion and James Barnett seconded to approve the minutes as written and motion passed.

REPORT OF THE CHAIRMAN

Mr. Vigneault expressed his appreciation to the planners of the meeting regarding the great hospitality of the State of Oklahoma.

REPORT OF THE SECRETARY-TREASURER

Sister Pierre presented a written report and briefly updated the Commission concerning the financial status of the Compact funds. Sister Pierre reported that as of this date the balance was $6,244.37. Mr. Young made the motion and Mr. Barnett seconded to accept the report by the Secretary-Treasurer and motion passed. (Copy of Financial Report attached to Minutes).

REPORT OF THE COMMISSIONERS

OKLAHOMA: Mr. Barnett submitted a written summary on behalf of the Commissioners from the State of Oklahoma. (Copy of the Oklahoma Commissioner's report attached to the Minutes). Mr. Barnett introduced Ms. Brita Haugland from the Oklahoma Attorney General's Office, Donnie Blanlot and Andrew Huskey from the Oklahoma Water Resources Board, McAlester Branch Office and Dr. Church a long-time Oklahoma Compact Commissioner. Mr. Barnett pointed out to the Commission, that a great deal of work was ongoing in the Arkansas River Basin and that most of the

work going on would be the subject of the reports of the Federal Agencies. Another item was the Financial Assistance Program which was one of the positive things and explained that Oklahoma was having a great success in infusing capital in particular parts of the state for water and sewer improvements. Also, Mr. Barnett expressed his appreciation to the two new Oklahoma Commissioners, J. Denny Moffett and Jacob Blaine Miller.

ARKANSAS: Mr. Young provided a written report on behalf of the Commissioners from the State of Arkansas (Copy of the Arkansas Commissioner's report attached to the Minutes). Mr. Young made mention of the Executive Summary of their New Arkansas Water Plan. Among items highlighted by Mr. Young was that the Arkansas Soil & Water Conservation Commission has the legal authority to grant water rights for nonriparian use of excess surface water and are directed to establish minimum streamflows in order to protect abuses. Another item mentioned by Mr. Young was that their Commission opened bids on the purchase of $10,000,000 of new Pollution Abatement/Waste Disposal General Obligation bonds to help municipalities and local governments finance wastewater treatment facilities and solid waste disposal facilities.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Ms. Houchens provided copies of the operating budget proposal (July 1, 1990 through June 30, 1993) to members of the Commission for consideration. Ms. Houchens pointed out that it had been recommended a reduction in state assessment of $445.00 for each State, so the assessment will be $2,260 each for the next two fiscal years. Mr. Young made a motion and Mr. Barnett seconded to approve the budget as submitted by the Budget Committee and motion passed. (Copy of the approved budget is attached to the Minutes).

ENGINEERING COMMITTEE: Mr. Wood passed out copies of written report (Copy of Engineering Committee Report attached to the Minutes). Mr. Wood stated that the Engineering Committee had two (2) assignments. The first being an on-going assignment where the committee puts together the Annual Report, which was mailed out prior to the meeting and no additions or corrections were received. Mr. Young made a motion and Mr. Barnett seconded to approve the Annual Report and motion passed. The second assignment was to look into some problems that were detected on the proper gaging of streamflows on Lee Creek and Arkansas River. Mr. Wood reported that the U.S.G.S. had solved the problem of gaging the Arkansas River flow properly at Lock and Dam 13, near Van Buren, Arkansas. For gaging of Lee Creek, the Engineering Committee suggests that a letter be sent to the U. S. Geological Survey recommending that the gage on Lee Creek be relocated due to a new reservoir being built at the old gage location. Mr. Young made the motion and Mr. Barnett seconded to accept the Engineering Committee Report and take the necessary action to relocate the gage and motion passed. After some discussion it was suggested that the State of Arkansas be responsible for sending a letter to the U.S. Geological Survey concerning the relocation of the gage.

LEGAL COMMITTEE: Mr. Bennett gave the report for Mr. Gibson who was absent. Mr. Bennett stated that he talked to Mr. Gibson and reviewed the minutes of the 1989 meeting and it was his understanding that the Legal Committee received no assignments at the previous meeting and accordingly had no report at this time.

UNFINISHED BUSINESS

Mr. Barnett asked Sister Pierre if she would like to discuss the audit and the possibility of dispensing with that expense. Sister Pierre suggested that the Commission not have an audit every year as the law did not specify that, the law says

"frequently" and the Rules and Regulations say "annually". Therefore, Sister Pierre made the motion that the Commission have an audit every two years as opposed to every year and amend the Rules accordingly. Mr. Vigneault stated that first they would vote on amending the Rules and then if that passed they would vote on the audit. Mr. Young made a motion and Mr. Barnett seconded to amend the Rules and motion passed. Then Mr. Vigneault asked if there was a second to Sister Pierre's proposal that the Commission have an audit every other year and Mr. Barnett seconded the motion and motion passed. Mr. Young made the motion and Mr. Barnett seconded at this point to make an assignment to the Legal Committee to draft the appropriate changes to our Rules and Regulations and motion passed.

NEW BUSINESS

Mr. Vigneault stated that the next item would be the appointment of the committee chairmen. Commission action is as follows:

BUDGET COMMITTEE: Mr. Young made a motion and Mr. Barnett seconded for Mr. Wood to be the chair-person of the Budget Committee for the next meeting, and motion passed.

ENGINEERING COMMITTEE: Upon motion by Mr. Barnett and second by Mr. Young, the commission approved the appointment of Earl Smith as Chairman of the Engineering Committee for the next meeting.

LEGAL COMMITTEE: Mr. Young made a motion and Mr. Barnett seconded that the commission approve the appointment of Dean Couch as Chairman of the Legal Committee for the next meeting, and motion passed.

CITY OF SILOAM SPRINGS, ARKANSAS

Ms. Parthenia Evans, Spencer-Fane-Britt & Browne Law Firm, Attorney for the City of Siloam Springs, Arkansas,

gave a brief report for the City of Siloam Springs water rights out of Lake Frances. (Copy of Report attached to the minutes.)

After a lengthy discussion Mr. Young made a motion that the Commission assign the Legal Committee with the responsibility of providing a brief for the Commission's consideration on the question of the case of Siloam Springs' water rights as to whether they come under the jurisdiction of the Compact Commission. What extent does this water right come under the jurisdiction of the Oklahoma Water Resources Board and the Arkansas Soil and Water Conservation Commission? Recommend that the Legal Committee report back to the Commission within forty-five (45) days and the Commissioners schedule a special meeting for the Commission to consider their report within 30 days following the receipt of the Committee Report. Mr. Barnett seconded and motion carried.

FEDERAL REPRESENTATIVES' REPORTS

Representatives of several federal agencies provided written reports to the Commission. (Copies of available reports attached to the minutes).

The question was addressed on the yield report of excess surface water to Mr. Gene Gann, District Chief of the Arkansas Division of the U.S.G.S., if the water was not reported in Oklahoma would that have any affect on the annual yield report? Mr. Gann stated that as he recalled the initial Compact did not require the individual diversions either in Oklahoma or Arkansas be subtracted at the time those yield computations were made. Also, he said that it was initially a fairly insignificant amount being used and a very small percent of the total yield was even being affected.

At this point Mr. Barnett made a motion and Mr. Young seconded to direct the Engineering Committee to look into that matter and explore whether water use in the Compact

area is significant enough to warrant inclusion of that data in the standard yield computations and motion passed.

Mr. Barnett stated that he had been requested to bring before the Commission the Resolution supporting the construction of Montgomery Point Lock and Dam at the entrance channel to the McClellan-Kerr Arkansas River Navigation System. (Copy of Resolution attached to the minutes). Mr. Barnett made the motion which was seconded by Mr. Young to approve the Resolution Supporting Congressional Legislation for Construction of Montgomery Point Lock and Dam at the Entrance Channel to the McClellan-Kerr Arkansas River Navigation System and motion passed.

Mr. Barnett also presented Resolutions of Appreciation for Oklahoma's past Commissioners, Dr. Church and John Moffitt and asked that the Commission approve them as presented. Mr. Young made the motion and Mr. Gilliam seconded to approve Resolutions for Dr. Church and John Moffitt and motion passed.

Mr. Barnett stated that the Commission needed to discuss the next annual meeting. As discussed previously it had been suggested of having a joint meeting of the Arkansas-Oklahoma Arkansas Compact Commission with the Kansas-Oklahoma Arkansas Compact Commission with Oklahoma acting as the host. It was agreed that each state would discuss this among their Commissioners and get back with the other states at a later date.

PUBLIC COMMENT/ADJOURNMENT

There being no public comment or further business at this time, the meeting was adjourned.

Respectfully submitted,

/s/ Baren Healey
BAREN HEALEY
Alternate Federal Commissioner

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Executive Director
Arkansas Soil and Water Conservation Commission
And Arkansas Comissioner

PATRICIA P. EATON, Executive Director
Oklahoma Water Resources Board
And Oklahoma Commissioner

* *Informational note:* Oklahoma Commissioner, Patricia P. Eaton, elected not to sign the minutes of the 9/27/90 AOARCC meeting as she was not a Commissioner at the time of the meeting.

APPENDIX Q

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 25, 1991

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Wednesday, September 25, 1991, at 8:30 A.M., Shangri-La Resort, Afton, Oklahoma. The meeting was held in conjunction with the Kansas-Oklahoma Arkansas River Compact Commission annual meeting.

Commission members in attendance were Patricia P. Eaton and Jacob "Blaine" Miller, Oklahoma Commissioners; J. Randy Young, P.E. and Sister Pierre Vorster, Arkansas Commissioners. Alternate Federal Commissioner Baren Healey, Arkansas Commissioner J. T. Gilliam, and Oklahoma Commissioner Denny Moffett were absent.

Kansas-Oklahoma Arkansas River Compact Commission members in attendance were: Paul E. Thornbrugh, Chairman and Federal Commissioner; Roy Lawrence, Oklahoma Commissioner; David L. Pope and Arthur T. Woodman, Kansas Commissioners; Bob Hedman, Secretary-Treasurer.

Other guests in attendance included: John Hill, USA Corps of Engineers, Tulsa District; Bob Blazs, US Geological Survey, Oklahoma District; Don R. Vandersypen, USDA Soil Conservation Service, Stillwater, Oklahoma; Jay Gillespie, US Geological Survey, Lawrence, Kansas; Terry Lamb, US Geological Survey, Little Rock, Arkansas; Shirley J. Shadix, US Bureau of Reclamation, Oklahoma City, Oklahoma; Julia Smethurst, USA Corps of Engineers, Little Rock District; Glen Cheatham, Oklahoma Department of Commerce; Leland E. Rolfe, Kansas State Board of Agriculture, Division

of Water Resources; J. A. Wood and Dean Couch, Oklahoma Water Resources Board; Earl T. Smith, Jr., John Frank Gibson, Jr., and Pris Houchens, Arkansas Soil and Water Conservation Commission.

It was announced that Federal Commissioner J. J. Vigneault had resigned his position on the Compact in early August of 1991 and that Alternate Federal Commissioner Baren Healey was called away as a result of a family emergency. Members of the Commission, following consultation with the Legal Committee, were in accord that Commissioner Eaton serve as Acting Chairman in the absence of the Federal and Alternate Commissioners. Mrs. Eaton called the regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission to order at 8:30 A.M. and welcomed the group to Oklahoma. Introductions were made.

APPROVAL OF AGENDA

Upon motion by Mr. Young, second by Mr. Miller, the agenda was approved as presented. (Copy of agenda attached to the Minutes).

APPROVAL OF MINUTES

Sister Pierre moved for approval of the Minutes of the Arkansas-Oklahoma Arkansas River Compact annual meeting held September 27, 1991, and special meeting held November 27, 1990 as presented. The motion was seconded by Mr. Miller and carried.

REPORT OF THE CHAIRMAN

No report was presented.

REPORT OF THE SECRETARY-TREASURER

Sister Pierre presented a written report and briefly updated the Commission concerning the financial status of the Compact funds. Sister Pierre reported total unobligated funds in

the amount of $6,957.90. Upon motion by Mr. Young, second by Mr. Miller, the Commission approved the Secretary-Treasurer's report as presented by Sister Pierre. (Copy of the financial report attached to the Minutes).

REPORT OF THE COMMISSIONERS

OKLAHOMA: Mrs. Eaton submitted a written summary on behalf of the Commissioners from the State of Oklahoma. (Copy of the Oklahoma Commissioner's report attached to the Minutes). Mrs. Eaton briefly discussed items of interest to the. Commission which included a summary of 1991 precipitation; water quantity and quality studies recently completed or underway in the Arkansas River Basin area of Oklahoma; discussion by Oklahoma Governor David Walters and Arkansas Governor Bill Clinton to establish a Task Force to work on programs of common interest to the State of Oklahoma and Arkansas; continued floodplain management assistance; and the upcoming Annual Oklahoma Water Conference scheduled for December 18th in Oklahoma City.

ARKANSAS: Mr. Young provided a brief written report on behalf of the Commissioners from the State of Arkansas. (Copy of the Arkansas Commissioner's report attached to the Minutes). Among items highlighted by Mr. Young included the status of the construction of the Lee Creek Dam; the issuance of a non-riparian permit to the City of Siloam Springs to withdraw water from the Illinois River; reorganization of the Arkansas Soil and Water Conservation Commission and relocation of the Commission's offices.

Of special interest, Mr. Young discussed the recent meeting between Governors Clinton of Arkansas and Walters of Oklahoma, as previously mentioned by Mrs. Eaton. Mr. Young suggested that the Commission recommend to the two Governors that consideration be given to designate the Compact as the proper entity to address water quality issues common to both states. Mr. Young further suggested that the

Commission make an assignment to the Legal Committee to research proper amendments to the Compact to provide for this purpose. Upon motion by Mr. Young, second by Mr. Miller, the Commission adopted a resolution to both Governors suggesting that the Compact be designated to carry out the joint environmental concerns of the two states. Should favorable response be given by both Governors, the motion included the assignment to the Legal Committee to investigate necessary amendments to the Compact to reflect that charge.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Mr. Wood provided copies of the operating budget proposal (July 1, 1990 through June 30, 1994) to members of the Commission for consideration. Mr. Wood outlined changes to the proposed budget which included an explanation of actual expenses incurred for FY 91 and adjustments made to line items in an effort to keep the state assessments consistent as previously forecasted. Mr. Miller moved for adoption of the proposed budget as presented. The motion was seconded by Sister Pierre and carried. (Copy of the approved budget attached to the Minutes).

ENGINEERING COMMITTEE: Mr. Smith discussed efforts to prepare the 1990-1991 Annual Report of the Arkansas-Oklahoma Arkansas River Compact Commission. Mr. Smith advised the Commission that a draft of the report was previously circulated for review and that no changes or comments were received. Upon motion by Mr. Young, second by Sister Pierre, the staff was authorized to modify the letter of transmittal to reflect the signatory block and chair for the 1991 meeting. The staff was further authorized to proceed with the printing and distribution of the annual report.

Mr. Smith reported that at its September 27, 1990 regular meeting, the Engineering Committee was directed to explore whether water use in the Compact area was significant

enough to warrant inclusion of that data in the standard yield computations. Upon motion by Mr. Young, second by Mr. Miller, the Commission accepted the Engineering Committee report and recommendation for inclusion of the data in the annual yield report for water year 1992.

LEGAL COMMITTEE: Mr. Couch presented a written report of the Legal Committee. (Copy of Legal Committee report attached to the Minutes). Mr. Couch explained that at its annual meeting on September 27, 1990, the Commission voted to amend its rules to have an audit conducted once every two years, rather than annually as provided for in the published rules. The Legal Committee was assigned to draft appropriate amendments to the rule governing audits of receipts and disbursements. Upon motion by Mr. Miller, second by Sister Pierre, the Commission adopted the resolution presented by the Legal Committee amending Article VII, Paragraph 7.4 of the Commission's Rules by deleting the word "yearly" and substituting therefor the words "at least once every two years."

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

The next item of business included appointments to committees and selection of a committee chair. Commission action is as follows:

BUDGET COMMITTEE: Upon motion by Mr. Young, second by Sister Pierre, the Commission approved the appointment of Pris Houchens (Arkansas), Chair-person and J. A. Wood (Oklahoma).

Upon motion by Mr. Young, second by Mr. Miller the Commission made the following appointments to the Engineering and Legal Committees:

ENGINEERING COMMITTEE: J. A. Wood (Oklahoma), Chairman and Earl T. Smith, Jr. (Arkansas).

LEGAL COMMITTEE: John F. Gibson, Jr. (Arkansas), Chairman and Dean Couch (Oklahoma).

The next item of business included consideration of resolutions of appreciation for two former Commissioners. Upon motion of Mr. Miller, second by Mr. Young, the Commission adopted a resolution for Mr. James Barnett in appreciation for service as a Commissioner representing the State of Oklahoma on the Compact. Upon motion by Mr. Young, second by Mr. Miller, the Commission adopted a resolution for Mr. J. J. Vigneault in appreciation for service as Commissioner representing the United States on the Compact. (Copies of the resolutions are attached to the Minutes).

FEDERAL REPRESENTATIVES' REPORTS

Representatives of several federal agencies provided written reports to the Commission. (Copies of available reports attached to the Minutes).

1992 MEETING

Members briefly discussed the next annual meeting. It was agreed that the State of Arkansas will host the 1992 annual meeting of the Compact. The location will be left to the discretion of the host state.

There being no further business at this time, the meeting was adjourned.

Respectfully Submitted,

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Executive Director
Arkansas Soil and Water Conservation Commission

/s/ Patricia P. Eaton
PATRICIA P. EATON, Executive Director
Oklahoma Water Resources Board

APPENDIX R

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 24, 1992

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 24, 1992, at 9:00 A.M., Inn of the Ozarks Conference Center, Eureka Springs, Arkansas.

Commission members in attendance were Joe Allbaugh, Alternate Federal Commissioner and Acting Chairman; Patricia P. Eaton, Denny Moffett, and Jacob "Blaine" Miller, Oklahoma Commissioners; J. Randy Young, P.E., J. T, Gilliam, and Emon Mahony, Arkansas Commissioners. Federal Commissioner Ronald Fuller was absent.

Other guests in attendance included: Robert Moix, USA Corps of Engineers, Little Rock District; Robert Price, USDA Soil Conservation Service, Little Rock, Arkansas; E. E. "Gene" Gann, US Geological Survey, Arkansas District; Wade Hodge, Arkansas Office of the Attorney General; Craig Uyeda, Arkansas Game and Fish Commission; Bob Blaze, US Geological Survey, Oklahoma District; Don R. Vandersypen, USDA Soil Conservation Service, Stillwater, Oklahoma; Jerry Wright, US Bureau of Reclamation, Oklahoma City, Oklahoma; Dean Couch and Harold Springer, Oklahoma Water Resources Board; Earl T. Smith, Jr., John Frank Gibson, Jr., Betty Dickey Poole, and Pris Houchens, Arkansas Soil and Water Conservation Commission.

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Alternate Federal Commissioner Joe Allbaugh.

APPROVAL OF AGENDA

Upon motion by Mr. Young, second by Mrs. Eaton, the agenda was approved as presented. (Copy of agenda attached to the Minutes).

APPROVAL OF MINUTES

Mr. Young moved for approval of the Minutes of the Arkansas-Oklahoma Arkansas River Compact annual meeting held September 25, 1991 as presented. The motion was seconded by Mrs. Eaton and carried.

REPORT OF THE CHAIRMAN

No report was presented.

REPORT OF THE SECRETARY-TREASURER

Mrs. Houchens presented a written financial report for fiscal year ending June 30, 1992 prepared by the Commission's Secretary-Treasurer, Sister Pierre Vorster. The report indicated a beginning cash balance of $6,905.02; cash receipts and interest earned, $2,552.08; cash disbursements, $1,580.70; leaving a balance of $7,876.40 as of June 30, 1992. Also included in the report was interest earned during July and August of 1992 which totaled $40.41 leaving a balance of $7,916.81 unobligated funds as of September 1, 1992. The Secretary-Treasurer's report was accepted as presented. (copy of the financial report attached to the Minutes).

REPORT OF THE COMMISSIONERS

OKLAHOMA: Mrs. Eaton submitted a written summary on behalf of the Commissioners from the State of Oklahoma. (Copy of the Oklahoma Commissioner's report attached to the Minutes). Mrs. Eaton briefly discussed items of interest to the Commission which included information relating to above normal precipitation throughout the State of Oklahoma and unusually low streamflows for water year 1991 within the Compact area.

Among legislative activities addressed by Mrs. Eaton was the passage of a measure which consolidates the environmental regulatory functions of the state into a new agency, the Department of Environmental Quality.

Mrs. Eaton highlighted the status of statewide loan and grant programs administered by the Oklahoma Water Resources Board. Under the recently created Wastewater Facility Revolving Loan Program eight loans totaling more than $44.7 million have been provided. Under the State Financial Assistance Program 102 loans totaling in excess of $95.2 million and 269 grants in excess of $16.2 million have been approved by the Board.

In conclusion, Mrs. Eaton advised the Commission that Special Master Muys had completed his draft report on the final issue remanded back by the supreme Court earlier this summer regarding the matter of *Oklahoma and Texas v. New Mexico*, No. 109 Original. The involved parties met in Denver for oral arguments. The Special Master has indicated his desire to finalize the report and present it to the Court by October 1st.

ARKANSAS: Mr. Young provided a written report on behalf of the Commissioners from the State of Arkansas. (Copy of the Arkansas Commissioner's report attached to the Minutes). Among items highlighted by Mr. Young included the adoption of rules by the Arkansas Soil and Water Conservation Commission to implement the provisions of the Ground Water Protection and Management Act.

Mr. Young discussed the establishment of the Arkansas-Oklahoma Environmental Task Force by the Governors of the two states. Several meetings have been held that focus on identification of problems and concerns of the states. Recommendations of the Task Force will be presented to the Governors in a final report.

Since the delegation of the management of the state's non-point source pollution management program, the Commission has been engaged in an active information and education program and monitoring of best management practices. The Commission has also been actively working with Governor Clinton's Animal Waste Task Force. The task force has worked on advising direction for the nonpoint pollution program. A major accomplishment was assistance provided in drafting and review of the Arkansas Pollution Control and Ecology's rules on disposal of liquid animal waste.

Briefly highlighted was the evaluation of alternatives by the Corps of Engineers for the Section 404 permit application for the City of Siloam Springs. The project would construct a new municipal water supply intake structure on the Illinois River.

In closing, Mr. Young reported that the structure for the Lee Creek Dam is now complete. The City of Fort Smith is now utilizing water from the Lee Creek Reservoir as a municipal water source.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Mrs. Houchens highlighted the operating budget proposal (July 1, 1991 through June 30, 1995). Changes to the proposed budget include actual expenses incurred for FY 92 and adjustments made to line items to absorb any known increases in order to keep state assessments consistent as previously forecasted. Commissioner Miller suggested that the Commission consider establishing a ceiling on the fund balance as well as the possibility of reducing state assessments. Following discussion and upon motion by Mrs. Eaton, second by Mr. Mahony, the Commission adopted the budget recommendation for one year with the intent that the matter be added as an agenda item for the 1993 annual meeting. (Copy of the approved budget attached to the Minutes).

Mrs. Houchens advised the Commission that a statement of cash receipts and disbursements from July 1, 1990 through June 30, 1992 was included in the provided handout information. The Commission's rules and regulations require a biennial audit of receipts and disbursements. No discrepancies were found. (Copy of audit attached to the Minutes).

ENGINEERING COMMITTEE: Mr. Springer presented a brief written statement indicating that the Engineering Committee was not given any specific assignment at the last annual meeting and therefore had no specific report. (Copy of Engineering Committee statement attached to the Minutes).

As an ongoing assignment, Mr. Springer explained that the Engineering Committee had worked on the draft of the 1991-1992 Annual Report of the Arkansas-Oklahoma Arkansas River Compact Commission and requested authorization to prepare the annual report consistent with previous assignments. The Engineering Committee report was accepted as presented and informally the assignment to prepare and distribute the annual report was given. Mr. Springer discussed the incorporation of water use data in next year's annual report stating that the Engineering Committee members agreed that it should be placed within the USGS portion of the report.

LEGAL COMMITTEE: Mr. Gibson stated that the Legal committee had no assignments from the previous annual meeting.

Mr. Gibson addressed a report prepared by Mr. Couch entitled "Report of the Legal Advisory Committee, of the Arkansas-Oklahoma Arkansas River Compact commission to the Arkansas-Oklahoma Environmental Task Force, August 26, 1992. Mr. Gibson reflected that the Compact Commission had not made an assignment to the Legal Committee to prepare such a report. The task force at its meeting on June 3, 1992, requested that the Compact Commission's Legal Com-

mittee provide them with a discussion and recommendation regarding the use of the existing compact as a vehicle to deal with water quality issues involving the States of Arkansas and Oklahoma. Mr. Gibson stated that, in his opinion, until the Compact Commission requests or directs the Legal Committee to make a report the Committee cannot or should not make a report to another agency or task force.

Mr. Couch noted that the written statement did reflect that it was the report of the Legal Advisory Committee and reaffirmed his apology to the Arkansas representatives stating that the report was not distributed. Mr. Couch agreed with Mr. Gibson that the report should have been properly titled "Report of the Oklahoma Member" and was not an official report from the Legal Committee and that it should be an assignment from the Commission.

Members of the Commission discussed in length the charge to the Arkansas Oklahoma Environmental Task Force and the issue regarding use of the existing compact as a vehicle to address water quality issues involving the two states. Upon motion by Mr. Miller, second by Mr. Young, the Commission directed the Legal Committee to prepare a legal memorandum describing the existing authority of the Commission to establish interstate water quality standards and to provide enforcement of interstate standards. The report is due before the next task force meeting which is scheduled for November 13, 1992.

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

APPOINTMENTS TO COMMITTEES: Upon motion by Mr. Young, second by Mrs. Eaton, the following appointments to committees were approved. The motion further

authorized the rotation of committee chairmanship with the host state of the upcoming annual meeting.

Budget Committee: Harold Springer (Oklahoma), Chairman Pris Houchens (Arkansas)

Engineering Committee: Harold Springer (Oklahoma), Chairman Earl T. Smith, Jr. (Arkansas)

Legal Committee: Dean Couch (Oklahoma), Chairman John F. Gibson, Jr. (Arkansas)

RESOLUTION OF APPRECIATION: Mrs. Houchens read a resolution prepared for Sister Pierre Vorster in appreciation for her service as a Commissioner representing the State of Arkansas on the Compact Commission. Upon motion by Mr. Miller, second by Mr. Young, the resolution was approved with a minor correction to reflect the correct location of the annual meeting. (Copy of resolution attached to the Minutes).

ELECTION OF OFFICERS: Upon motion by Mrs. Eaton, second by Mr. Mahony, the Commission approved the election of Mrs. Houchens as Secretary-Treasurer to the Compact Commission.

1993 ANNUAL MEETING: Arrangements for the next annual meeting were briefly discussed. It was agreed that the State of Oklahoma will host the 1993 annual meeting of the Compact. The location will be left to the discretion of the host state.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVES' REPORTS

Representatives of the following federal agencies provided written reports to the Commission: US Geological Survey; USA Corps of Engineers; and US Bureau of Reclamation. (Copies of available reports attached to the Minutes).

PUBLIC COMMENT/ADJOURNMENT

There being no public comment or further business at this time, the meeting was adjourned.

Respectfully Submitted,

/s/ Joe M. Allbaugh
JOE M. ALLBAUGH, Acting Chairman and
Alternate Federal Commissioner

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Executive Director
Arkansas Soil and Water Conservation Commission

/s/ Patricia P. Eaton
PATRICIA P. EATON, Executive Director
Oklahoma Water Resources Board

APPENDIX S

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 24, 1993

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Friday, September 24, 1993, beginning at 9:00 A.M., at the Western Hills Guest Ranch near Wagoner, Oklahoma.

Commission members in attendance were Joe Allbaugh, Alternate Federal Commissioner and Acting Chairman; Patricia P. Eaton, Denny Moffett, and Edwin Martin, Oklahoma Commissioners; J. T. Gilliam and Emon Mahony, Arkansas Commissioners. Arkansas Commissioner Randy Young and Federal Commissioner Ronald Fuller were absent.

Other guests in attendance included: Senator Herb Rozell, Oklahoma; Ed Morris, US Geological Survey, Arkansas District; Kathy Peter and Joann Kurklin, US Geological Survey, Oklahoma District; Jerry Wright and Teresa Provine, US Bureau of Reclamation, Oklahoma City, Oklahoma; Wayne Morgan, US Army Corps of Engineers, Tulsa District; Scott Robinson, Muskogee Port Authority; Don Vandersypen, Soil Conservation Service, Stillwater, Oklahoma; Pris Houchens, Earl T. Smith, Jr., John Frank Gibson, and Mark Bennett, Arkansas Soil and Water Conservation Commission; Dean Couch, Harold Springer, and Mary Sturgeon, Oklahoma Water Resources Board.

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 A.M. by Alternate Federal Commissioner Joe Allbaugh. Senator Rozell welcomed everyone to Oklahoma and especially to his District and this area of the state.

APPROVAL OF AGENDA

Upon motion by Emon Mahony, second by Mrs. Eaton, the agenda was approved as presented. (Copy of agenda attached to the Minutes)

APPROVAL OF MINUTES

Mrs. Eaton moved for approval of the Minutes of the Arkansas-Oklahoma Arkansas River Compact annual meeting held on September 24, 1992 in Eureka Springs, Arkansas, as proposed. The motion was seconded by Mr. Mahony and carried.

REPORT OF THE CHAIRMAN

No report was presented.

REPORT OF THE SECRETARY-TREASURER

Mrs. Houchens presented a written financial report for the fiscal year ending June 30, 1993. The report indicated a beginning cash balance of $7,876.40; cash receipts and interest earned, $2,468.68; cash disbursements, $2,013.31; leaving a balance of $8,331.77 as of June 30, 1993. The Secretary-Treasurer's report was accepted as presented. (Copy of the financial report is attached to the Minutes)

REPORT OF THE COMMISSIONERS

ARKANSAS: Mr. Mahony provided an oral and written report on behalf of the Commissioners from the State of Arkansas, (copy of the Arkansas Commissioner's report is attached to the Minutes). Ground water activities centered on data collecting and monitoring pesticides. The increased use of GIS is an important part of the modeling which is currently in an experimental stage. The Non-Point Source Pollution Program has been implemented utilizing Section 319 (Clean Water Act) funding. The Soil Conservation Service is providing assistance to local conservation districts who are working with local landowners to incorporate best manage-

ment practices at a level that will protect the stream quality on a voluntary basis. This program has been fairly successful.

The Arkansas-Oklahoma Task Force has submitted a report to the Governors of Arkansas and Oklahoma. One of the recommendations of the Task Force was to request the creation of standing committees on the environment for both the Arkansas-Oklahoma Arkansas River Compact Commission and the Red River Compact Commission.

The 1993 legislative session in Arkansas produced an initiative to eliminate the use of phosphorus in detergent for domestic use and to increase fee's for dam permits. The legislature also gave authority to charge fees for certain ASWCC activities such as non-riparian permits. The Governor's Animal Waste Task Force recommended the permitting of liquid animal waste in it's final report and the Arkansas Pollution Control and Ecology Commission has adopted this recommendation as a regulation. Other recommendations from the task force are also being considered.

OKLAHOMA: Mrs. Eaton submitted a written summary on behalf of the Commissioners from the State of Oklahoma, (copy of the Oklahoma Commissioner's report is attached to the minutes). Streamflow in the state was not unusual considering the above normal precipitation.

The Oklahoma legislature passed House Bill 1308 which was designed to simplify the State's water permitting and water rights legislation to make the OWRB work more efficiently. The OWRB has steamlined its permitting process. The legislature also gave the Water Resources Board authority to impose administrative penalties where appropriate. Senate Bill 54 clarified legislative intent by adopting the 1963 comprehensive laws regarding stream water use. Under the bill the appropriation system will be used to regulate stream water use. All future unused riparian rights except domestic were extinguished.

In conclusion, Mrs. Eaton mentioned that the Oklahoma Supreme Court had readopted their 1990 opinion earlier in April, 1993, which directed the Board on applications for stream water appropriations to determine if such would interfere with reasonable riparian rights.

REPORT OF COMMITTEES

BUDGET COMMITTEE: Mr. Springer summarized the operating budget proposal (July 1, 1992 through June 30, 1996). The proposed budget basically remains the same for the next two years. The cost of the Biennial Audit was changed to reflect $125 per year instead of $250 every other year as done in the past. The greatest change is reflected in the FY-96 budget where we tried to estimate the additional cost for the future activities of the proposed Environmental and Natural Resources Committee. We hope to have a better estimate of the future needs next year.

Mrs. Eaton responded to a question raised last year by Commissioner Miller concerning the money carried over each year. Since we do not know what the cost of the proposed committee will be, it seems appropriate not to deal with the reserve at this time and to hold it until we have a feel for the additional costs.

A motion was made and approved to accept the Budget Committee Report. (A copy of the Budget Committee Report is attached to the Minutes).

ENGINEERING COMMITTEE: Mr. Springer presented a brief written report to the Commission and stated that the Engineering Committee met for about two hours on September 23, 1993. The Committee had no specific assignments, however, the Committee worked on the draft annual report and met with the U.S. Geological Survey. The committee discussed including water use information in the

report prepared annually by the USGS for the Commission and about a proposed stream gage network for the Compact area. The USGS discussed the proposal later in the meeting.

The Committee recommended submitting water withdrawal data to the USGS to be included in future reports. The Engineering Committee report was accepted as presented and informally assigned the preparation and distribution of the 1992-93 Annual Report. (Copy of the Engineering Committee Report is attached to the Minutes).

LEGAL COMMITTEE: Mr. Couch stated that the legal committee was given the assignment to prepare a memorandum describing the legal authority of the Compact Commission to establish and enforce interstate water quality standards and to present it to the Arkansas-Oklahoma Environmental Task. Force. The memorandum was prepared and presented to the Task Force at their meeting in Tahlequah on November 13, 1992. (A copy of the memorandum is attached to the Minutes).

Dean Couch, Oklahoma Water Resources Board, and Mark Bennett, Arkansas Soil and Water Conservation Commission, and presented a proposed motion and resolution to amend the Commission's rules to create a standing Committee of the Commission as recommended by the Task Force. The proposed motion and resolution are attached to the Legal Committee Report. (A copy of the Legal Committee Report is attached to the Minutes).

UNFINISHED BUSINESS

The only unfinished business before the Commission was consideration of the formation of a standing Environmental and Natural Resources Committee. Mrs. Eaton discussed the work of the Task Force and the support from the Task Force and Governors of both states for the concept of the new committee. The Legal Committee had prepared a proposed motion which was moved by Mr. Mahony and seconded by

Mr. Martin. The motion was approved creating the standing Environment and Natural Resources Committee.

NEW BUSINESS

APPOINTMENTS TO COMMITTEES: The commissioners moved and approved a motion making the following appointments to committees.

Budget Committee:	Pris Houchens (Ark.), Chairperson Harold Springer (Okla.)
Engineering Committee:	Earl T. Smith (Ark.), Chairman Harold Springer (Okla.)
Legal Committee:	John Frank Gibson (Ark.), Chairman Dean Couch (Okla.)

Environment and Natural Resources Committee:

Senator Wayne Dowd (Ark.), Chairman
Representative B.G. Hendrix (Ark.)
John Elrod (Ark.)
Randy Young (Ark.)
J.W. Looney (Ark.)
Randall Mathis (Ark.)
Senator Herb Rozell (Okla.)
Representative Larry Adair (Okla.)
Patty Eaton (Okla.)
Gary Sherrer (Okla.)
Clyde Cole (Okla.)
Mark Coleman (Okla.)

COMMITTEE ASSIGNMENTS: Committee assignments had been inadvertently omitted from the agenda and the assignments needed to be made. The assignment for the Budget Committee consisted of the usual budget preparation taking into consideration the extra expenses of the new environmental committee. Mrs. Eaton recommended that the Engineering Committee prepare a joint report on active interstate issues whether quantity or quality related that are not

addressed by the Environmental Committee. Mr. Springer also added that the Engineering Committee needed to furnish the USGS water withdrawal data for each state to be included in the Water Yield Report prepared by the USGS. This data will need to be submitted to the USGS by April of each year. A motion was made and approved by the Commission to assign the Engineering Committee to compile the necessary information on water use and water quality to be submitted to the USGS by April of each year. No specific assignment was given to the Legal Committee.

Mr. Allbaugh asked if any future meetings had been planned for the Environmental Committee. Mrs. Eaton responded that we had been working with Senator Dowd to establish some meeting dates and at this time it appears the next meeting will be during the first week of December.

RESOLUTION OF APPRECIATION: Mrs. Houchens read a resolution prepared for Jacob B. "Blaine" Miller in appreciation for his service as a Commissioner representing the State of Oklahoma on the Compact Commission. A motion was made and approved by the Commission for the resolution. (Copy of resolution attached to the Minutes).

ELECTION OF OFFICERS: No action was necessary concerning the election of officers with the current officers holding their same positions.

1994 ANNUAL MEETING: Next year's annual meeting will be held in Arkansas and the Arkansas Commissioners will decide where and when to have the meeting and notify the other Commissioners.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVES' REPORTS

Representatives of the following federal agencies provided written reports to the Commission: U.S. Geological Survey, U.S. Army Corps of Engineers, and the Bureau of Reclamation. (Copies of reports attached to the Minutes).

Don Vandersypen gave a brief oral report for the Soil Conservation Service.

Scott Robinson gave an oral report for the Muskogee Port Authority stating that last year was the largest amount of shipping from Oklahoma ports. New industries and expansions are taking place at both Oklahoma ports reflecting the growth of the use of the navigation system. Mr. Robinson also briefly updated the Commission on the status of the Montgomery Point Lock and Dam.

The U.S. Geological Survey also presented a stream monitoring proposal to the Commission. (Copy of proposal attached to the Minutes).

PUBLIC COMMENT/ADJOURNMENT

There being no public comment or further business at this time, the meeting was adjourned.

Respectfully Submitted,

/s/ Ronald N. Fuller
RONALD N. FULLER, Chairman and
Federal Commissioner

/s/ J. Randy Young
J. RANDY YOUNG, P.E., Executive Director
Arkansas Soil and Water Conservation Commission

/s/ Patricia P. Eaton
PATRICIA P. EATON, Executive Director
Oklahoma Water Resources Board

APPENDIX T

REPORT OF THE ENVIRONMENTAL AND NATURAL RESOURCES COMMITTEE TO THE ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

I. Assignments

The Environmental and Natural Resources Committee (Committee) received no assignments for the 1994 Annual Meeting.

II. Meetings

The Committee held an organizational meeting December 2, 1993 in Fort Smith, Arkansas. Additional meetings were conducted on June 8, 1994 in Poteau, Oklahoma and on September 28, 1994 at Eureka Springs, Arkansas. Topics discussed included:

- Animal waste regulation and programs (Attachment "A")
- USGS Monitoring Program (Attachment "B")
- Oklahoma's Clean Lakes Study for Lake Tenkiller (Attachment "C")
- Total maximum daily loading (TMDL) activities within the Illinois River Basin
- Fayetteville, Prairie Grove and Rogers NPDES permits
- Fort Smith Water Supply Study
- Problems in the Wister Lake Watershed
- Oklahoma State University Poteau River/Lake Wister Studies (Attachment "D")
- Siloam Springs water rights issue

- Review of National Water Policy (Attachment "E")
- University of Arkansas Moore's Creek/Illinois River Studies (Attachment "F")

III. Recommendations

1. Monitoring

The need for consistent water quality monitoring is recognized at those sites which will provide for the thorough understanding of ambient conditions. Past and current interstate environmental issues have been clouded by the lack of water quality information. This has resulted from both a shortage of sites as well as inconsistent parametric coverage and sampling schedules. The lack of data has been a hindrance to the development of a cooperative approach between the states. Because of these reasons, it is recommended that the Arkansas-Oklahoma Arkansas River Compact Commission support the proposed monitoring plan of the United States Geological Survey and recommend to the respective state legislatures and USEPA Region VI that this proposal be funded in full.

2. Total Maximum Daily Load

The principle of TMDL combines the understanding of the sources of pollution and their magnitude with allocation of pollutant loading to those contributors in order to achieve a determined level of water quality. The TMDL process provides a means for managing water quality improvements as it is based upon the establishment of measurable goals which can be achieved through a scientifically based reduction of pollutant loading. This objective approach would allow the states to move forward in addressing water quality issues in a manner which will provide a fair and equitable analysis of each state's contribution to a given problem and their role in achieving water quality goals. The use of TMDLs in addressing inter-state water quality issues holds much

promise. TMDL proposals for the compact area should be brought before the Compact Commission for review and comment.

/s/ Wayne Dowd
WAYNE DOWD, ENRC Chairman

Supplemental Report of the Arkansas-Oklahoma
Arkansas River Compact Commission
Environmental and Natural Resources Committee

A meeting of the Environmental and Natural Resources Committee was held September 28, 1994, at 1:00 p.m. at the Inn of the Ozarks in Eureka Springs, Arkansas. The following items are recommendations 3 and 4 to the report of the Environmental and Natural Resources Committee.

3. The Committee recommends that the Commission file a written request with the U.S. Fish and Wildlife Service to extend the public comment period on the proposed rule to list the Arkansas River Basin population of the Arkansas River shiner as endangered. The Committee further recommends that the U.S. Fish and Wildlife Service conduct an Economic Impact Analysis of the proposed rule on the two states and finally that the Commission file formal comments as provided for in the rule making process.

4. The Committee recommends that to enhance coordination of joint efforts. In all interstate sub-basins of the Arkansas/Oklahoma Arkansas River Compact Commission area, the various agencies should submit joint work plans for funding under the Clean Water Act to the Environmental Protection Agency and that the project study managers meet not less than twice per year and report annually study(s) progress to the Environmental and Natural Resources Committee.

Respectfully submitted,

/s/ Wayne Dowd
WAYNE DOWD, Chairman

APPENDIX U

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 29, 1994

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 29, 1994, at 9:00 a.m., at the Inn of the Ozarks Conference Center, Eureka Springs, Arkansas.

Commission members in attendance were Ronald Fuller, Federal Commissioner and Chairman; Patty Eaton and Ernie Gilder, Oklahoma Commissioners; Emon Mahony, John Elrod, and Randy Young, Arkansas Commissioners. Alternate Federal Commissioner Joe Allbaugh and Oklahoma Commissioner Edwin Martin were absent.

Other guests in attendance included: Arkansas Senator Wayne Dowd; Don Vandersypen, USDA Soil Conservation Service, Oklahoma; Craig Uyeda, Arkansas Game and Fish Commission; Kathy Peter and Joanne Kurklin, US Geological Survey, Oklahoma; Ray Elliott, Oklahoma Department of Agriculture; Lou Klaver and Harold Springer, Oklahoma Water Resources Board; Fred Helms; Ed Morris, US Geological Survey, Arkansas; Tonie Patterson, Office of the Governor of Arkansas; Bob Lynch, Kelley Smith, and Sylvia Ritzky, Oklahoma Office of the Secretary of Environment; Teresa Provine, Bureau of Reclamation; Brenda Puloma, USA Corps of Engineers, Little Rock District; Earl Smith, Mark Bennett, and Pris Houchens, Arkansas Soil and Water Conservation Commission.

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Federal Commissioner and Chairman, Ronald Fuller.

Roundtable introductions of Commission members and guests were made.

APPROVAL OF AGENDA

The Secretary-Treasurer was asked to read the agenda. The agenda was accepted as read. (Copy of Agenda; Attachment "A").

APPROVAL OF MINUTES

Mr. Mahony moved for approval of the Minutes of the Arkansas-Oklahoma Arkansas River Compact Commission annual meeting held September 24, 1993 as presented. The motion was seconded by Mrs. Eaton and carried.

REPORT OF THE CHAIRMAN

No report was presented.

REPORT OF THE SECRETARY-TREASURER

A written financial report for fiscal year ending June 30, 1994 was presented by the Compact Commission's Secretary-Treasurer, Mrs. Pris Houchens. The report indicated a beginning cash balance of $8,331.77; cash receipts and interest earned, $2,483.90; cash disbursements, $1,841.64; leaving a balance of $8,974.03 as of June 30, 1994. (Copy of the Financial Report; Attachment "B").

Mrs. Houchens advised the Commission that the biennial audit of the Compact Commission's funds had been completed and that a copy of the audit was included in their packets. No discrepancies were noted by the auditor. Also included in Commissioner packets was a revised membership list of the Compact Commission, its Committee members, and contact agencies. Mrs. Houchens requested any corrections be provided in order to keep the information current.

REPORT OF THE COMMISSIONERS

Oklahoma: Commissioner Eaton presented a written report on behalf of the Commissioners from the State of Oklahoma.

(Copy of the Oklahoma Commissioner's Report; Attachment "C"). Items highlighted included climate and streamflow information for 1993; status of water resources financing for the construction and improvement of water and sewer facilities; major agency-related legislative measures enacted during the recent session; status in the resolution of the Canadian River Compact dispute; status of groundwater studies underway; efforts to update the Oklahoma Comprehensive Water Plan; Oklahoma's efforts to respond to the US Fish and Wildlife Service proposal to list the Arkansas River shiner as endangered; beginning of revisions of Oklahoma's Water Quality Standard; plans for the upcoming Governor's Annual Water Conference scheduled for November 2nd in Oklahoma City; and efforts to resolve the Siloam Springs water rights issue. The report of the Oklahoma Commissioners was accepted as presented.

Arkansas: Commissioner Young presented a written Report of the Commissioners from the State of Arkansas. (Copy of Report of the Arkansas Commissioners; Attachment "D"). Items highlighted in the report included formation of a Water Resources and Wetlands Task Force by the Arkansas Governor Tucker; status of the nonpoint source pollution abatement program in Arkansas; and status of state's groundwater protection and management program. Mr. Young advised the Commission that Arkansas is beginning its triennial review of Water Quality Standards. Mr. Young also touched on efforts by interests to have Crooked Creek designated as an extraordinary water resource stream and addressed potential impacts on existing gravel operations if this effort is successful. The report of the Arkansas Commissioners was accepted as presented.

REPORT OF THE COMMITTEES

Budget Committee: Mrs. Houchens presented the recommendation of the Budget Committee regarding the operating budget proposal for July 1, 1993 through June 30, 1997. Mrs.

Houchens explained that the proposed budget reflects actual expenses incurred during FY 94 as well as the current FY 95 budget approved at the last annual meeting. FY 96 and 97 proposals reflect increases in three line items: (1) Increases are expected in printing and reproduction associated with preparation of the annual report; (2) Due to the addition of the Environmental and Natural Resources Committee and more frequent committee meetings, costs associated with meetings of the Commission and its committees are anticipated to increase; and (3) The US Geological Survey (USGS) has proposed a significant increase in their charge for computation of the annual water yield for the Arkansas River Basin and printing of the yield report. USGS has indicated that the proposed increases more realistically reflect the actual cost of data collection and preparation of the report. The Joint Funding Agreement for FY 95 reflected an increase in cost from $1,410.00 to $3,120.00. Mrs. Houchens reported that following discussion with Mr. Ed Morris of the Arkansas District, USGS has agreed to accept the $1,410.00 as previously approved in the Commission's FY 95 budget. She added that USGS has however, proposed an increase to $3,276.00 for FY 96 and $3,440.00 for FY 97. Upon motion by Mr. Mahony, second by Mr. Young, the Commission approved the budget as recommended by the Budget Committee. (Copy of Approved Budget; Attachment "E").

Engineering Committee: The report of the Engineering Committee was presented by its Chairman, Earl Smith. Mr. Smith advised the Commission that the only specific charge to the Engineering Committee was to attend the meetings of the Environmental and Natural Resources Committee in order to provide technical assistance and support. All members attended the Environmental and Natural Resources Committee meetings and plan to attend future meetings. Mr. Smith reported that the Committee has completed work on the draft of the 1992-1993 Annual Report of the Arkansas-Oklahoma Arkansas River Compact Commission and will continue to

work on the 1993-1994 annual report. Upon motion by Mr. Young, second by Mr. Gilder, the Commission approved the Engineering Committee report as presented. (Copy of Engineering Committee Report; Attachment "F").

Environmental and Natural Resources Committee: The report of the Environmental and Natural Resources Committee was presented by its Chairman, Arkansas Senator Dowd. The report was previously circulated to members of the Commission in draft form for comment. At its meeting on September 28th, the Committee made two additional recommendations to be included as a supplement to the report. Upon motion by Mr. Young, second by Mr. Mahony, the Commission approved the report and supplemental report of the Environmental and Natural Resources Committee. (Copy of Report and Supplemental Report; Attachment "G").

Legal Committee: The report of the Legal Committee was presented by its Chairman, Mr. Mark Bennett. Mr. Bennett reported that in the Commission's September 24, 1993 no formal assignments were given to the Legal Committee. The Committee has continued to work with the newly created Environmental and Natural Resources Committee of the Compact Commission. Legal Committee members, or their representatives from each state, attended the meetings of the Environmental and Natural Resources Committee and presented legal advice on matters coming before that committee. Upon motion by Mrs. Eaton, second by Mr. Young, the Commission approved the Legal Committee report as presented. (Copy of Legal Committee Report; Attachment "H").

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

Appointments/Assignments to Committees and Selection of Committee Chair: The Secretary-Treasurer was directed to

read the membership of each committee and its current chair. She explained that traditionally, the chairmanship rotated with the host state of the upcoming annual meeting. The following committee membership, selection of chairman, and assignments were accepted by the Commission.

Budget Committee:

Pris Houchens, Arkansas
Harold Springer, Oklahoma (Chairman)

No assignments were given the budget committee other than their ongoing charge of preparation of the Commission's budget proposal.

Engineering Committee:

Earl Smith, Arkansas
Harold Springer, Oklahoma (Chairman)

The Engineering Committee was directed to continue to provide technical advice and support to the Environmental and Natural Resources Committee. The Committee was also given its ongoing charge of preparation of the annual report of the Compact Commission.

Environmental and Natural Resources Committee:

Senator Wayne Dowd, Arkansas
Representative B. G. Hendrix, Arkansas
John Elrod, Arkansas
Randy Young, Arkansas
Dr. J. W. Looney, Arkansas
Randall Mathis, Arkansas
Senator Herb Rozell, Oklahoma
Representative Larry Adair, Oklahoma
Patty Eaton, Oklahoma (Interim Chairman)
Gary Sherrer, Oklahoma
Clyde Cole, Oklahoma
Mark Coleman, Oklahoma

The Commission authorized the Chair of the Environmental and Natural Resources Committee in consultation with the Engineering Committee Chair to draft an appropriate request for extension of the comment period on the US Fish and Wildlife proposal to list the Arkansas River shiner as endangered for the Chairman of the Commission's signature. The Committee was directed to review the proposal and draft comments for Commission consideration. The draft comments are to be circulated to members of the Commission for their review and comment within a two week period following circulation. If it is determined that a meeting of the Commission is not required regarding the comments, the Commission's Chair was authorized to forward the Commission's comments to the US Fish and Wildlife Service. Drafting of the proposed comments is to be coordinated with the Engineering and Legal Committees.

Legal Committee:

Mark Bennett, III, Arkansas
Dean Couch, Oklahoma (Chairman)

The Legal Committee was directed to continue to provide legal advice and support to the Environmental and Natural Resources Committee.

Commissioner Mahony commended the Environmental and Natural Resources Committee on action taken by that Committee since its creation at the 1993 annual meeting.

Resolution of Appreciation; J. T. Gilliam: Upon motion by Mr. Mahony, second by Mrs. Eaton, the Commission adopted a resolution of appreciation for former Commissioner J. T. Gilliam for his seven years of service as a Commissioner representing the State of Arkansas on the Arkansas-Oklahoma Compact Commission. (Copy of Resolution; Attachment "I").

Resolution of Appreciation; J. Denny Moffett: Upon motion by Mr. Young, second by Mr. Mahony, the Commission adopted a resolution of appreciation for former Commissioner J. Denny Moffett for his years of service as a Commissioner representing the State of Oklahoma on the Arkansas-Oklahoma Compact Commission. (Copy of Resolution; Attachment "J").

Election of Commission Secretary and Treasurer: Upon motion by Mrs. Eaton, second by Mr. Young, Mrs. Mary Schooley with the Oklahoma Water Resources Board was elected Secretary and Mrs. Houchens was re-elected Treasurer of the Compact Commission.

1995 Annual Meeting Plans: Commissioner Eaton discussed plans for the State of Oklahoma to host the 1995 annual meeting of the Compact Commission. She indicated that tentative plans are to conduct the Arkansas-Oklahoma Arkansas River Compact Commission meeting in conjunction with the annual meeting of the Kansas-Oklahoma Arkansas River Compact Commission at the Shangri-La Resort in late September. Upon motion by Mr. Young, second by Mr. Mahony, the Commission accepted Mrs. Eaton's offer for Oklahoma to host the 1995 annual meeting. Specific details, including the date and location of the meeting will provided at a later date.

REPORT OF FEDERAL AND STATE GOVERNMENT REPRESENTATIVES

Representatives of the following federal agencies provided reports to the Commission: US Geological Survey, Oklahoma; US Bureau of Reclamation; USDA Soil Conservation Service; and USA Corps of Engineers, Little Rock District. (Copies of available written reports; Attachment "K").

PUBLIC COMMENT

No public comment was received.

There being no further business, the meeting was adjourned.

/s/ Emon A. Mahony, Jr.,
EMON A. MAHONY, JR.,
Federal Commissioner and Chairman

/s/ Gary Sherrer
GARY SHERRER, Oklahoma Commissioner

/s/ J. Randy Young
J. RANDY YOUNG, Arkansas Commissioner

APPENDIX V

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

December 5, 1995

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Tuesday, December 5, 1995, at 9:00 a.m. at the Santa Fe Inn, Oklahoma City, Oklahoma.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Fred Helms, Alternate Federal Commission; Oklahoma Commissioners Eddie Martin, Ernie Gilder, Gary Sherrer; and Arkansas Commissioners John Elrod, Mike Carter, and Randy Young.

Other guests in attendance included: Kathy Peter, Joanne Kurklin, and Bob Blazs, U.S. Geological Survey, Oklahoma City; and Bob Burchett, U.S. Geological Survey, Austin, Texas. Also, Sue Haslett, Tulsa District Corps of Engineers, Arkansas State Representative B.G. Hendrix; Charles Freeman, Oklahoma Department of Agriculture; Mike Sullivan, U.S. Department of Agriculture-Natural Resource Conservation Service, Little Rock; Chuck Bennett, Martin Maner, Randall Mathis, Arkansas Department of Pollution Control and Ecology; Scott Dewald, Office of the Secretary of Environment; and Duane Smith, Dean Couch, Harold Springer, and Mary Schooley with the Oklahoma Water Resources Board.

CALL TO ORDER

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Federal Commissioner and Chairman Emon Mahony.

INTRODUCTIONS AND ANNOUNCEMENTS

Chairman Mahony introduced newly appointed Commissioner to Arkansas, Mike Carter.

APPROVAL OF AGENDA

Chairman Mahony said this item is for the approval of the tentative agenda. Commissioner J. Randy Young of Arkansas moved to approve the tentative agenda for the December 5, 1995 Annual Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission, and Commissioner Elrod seconded. Those in favor voted aye; no opposed. The agenda was approved. (Attachment "A")

READING, CORRECTION, AND APPROVAL OF MINUTES OF THE 9/29/94 COMPACT COMMISSION MEETING

Chairman Mahony said the draft minutes of the 9/29/94 meeting had been previously distributed, and he asked for a motion to dispense with the reading of the minutes. Commissioner Young moved to dispense with the reading of the minutes and that they be approved as distributed. Oklahoma Commissioner Gary Sherrer seconded. Those in favor of the motion voted aye; there were none opposed, and the minutes of the September 9, 1994 Annual Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission were approved.

READING, CORRECTION, AND APPROVAL OF MINUTES OF THE 6/19/95 TELEPHONIC SPECIAL MEETING

Chairman Mahony stated the draft minutes of the 6/19/95 telephonic special meeting had been previously distributed. Commissioner Young moved to dispense reading, and for approval of the 6/19/95 minutes; Commissioner Sherrer seconded. Those in favor voted aye; no opposed, and the motion carried. (Attachment "B")

REPORT OF THE CHAIRMAN

Chairman Mahony stated the Chairman did not have a report.

REPORT OF THE SECRETARY-TREASURER

Chairman Mahony asked for the report of the Secretary-Treasurer. There was no report by Secretary Mary Schooley. Treasurer Pris Houchens presented an itemized category report for fiscal year ending June 30, 1995. The report showed that both states' assessments had been paid, and $250 in interest earnings had been earned from dividend income. She said the report showed a special project that the State of Arkansas is contributing $51,400.00 for water quality monitoring on the Illinois River. The total income was $53,910.22. Compact expenses included biennial audit fees of $225.00; meeting expenses of $157.69 and treasurer's bond of $100.00 for total expenditures of $482.69, leaving a balance of $53,427.53.

Ms. Houchens also distributed the FY96 itemized Category Report bringing up to date the current balance. She noted the interest earned had increased significantly due to the monies contributed by Arkansas. The expenses to date included $1,410.00 to the U.S. Geological Survey (contract agreement through June 1995); printing of the annual report of $335.83 to the Arkansas Department of Corrections; and again the treasurer's bond of $100.00. Total expenses were $1,845.83, leaving a total income of $2,996.28.

The third report distributed by Ms. Houchens was a General Ledger Report showing a checkbook balance sheet reflecting the current balance of $65,397.84.

Ms. Houchens concluded her report noting the annual report was completed and distributed, and an updated member roster was also distributed.

Commissioner Young moved the Treasurer's report be accepted; Commissioner Martin seconded the motion. Commis-

sioner Elrod asked if the $51,400 contributed by Arkansas was legislated, and was the amount a special appropriation for water quality monitoring.

Commissioner Young responded the money was legislated through the Arkansas Soil and Water Conservation budget, but was not a special appropriation but budgeted by the Soil and Water Commission for this purpose. Mr. Elrod asked if the monitoring stations were in place; Mr. Young replied an agreement had been entered into between the Compact Commission and the U.S. Geological Survey, and the work has been initiated. Earl Smith added that the contract is in effect, and sampling began in November. He said that withdrawals will be made quarterly as certain testing is completed.

Chairman Mahony asked about procedures set forth in hiring a CPA to perform an audit, and if the auditor followed private auditing standards or government auditing standards. Pris Houchens answered she was not certain what standards the auditor followed. The Chairman suggested when the next audit is performed that a set of standards be specified.

There was no other discussion, and the Chairman called for the vote. Those in favor of approving the Treasurer's report voted aye; there were none opposed. The Treasurer's report was approved. (Attachment "C")

REPORT OF THE COMMISSIONERS

A. ARKANSAS COMMISSIONERS

Commissioner Randy Young presented a written report of the Arkansas Commissioners detailing three items: continued information and education activities of the Nonpoint Pollution Program, including technical assistance to landowners and a physical habitat survey of the Illinois River. Mr. Young also mentioned a public hearing on the designation of a five county area in south Arkansas as a critical groundwater area (which is outside the compact area); and the appointment by

Governor Tucker of the Arkansas Water Resources and Wetlands Task Force which recommended four pieces of legislation that was passed by the General Assembly. There was discussion about the legislation allowing for an increased tax credit for development of surface water reservoirs, an additional tax credit for wetland restoration, and creation of a wetland mitigation bank. Commissioner Carter added that regarding the designation of critical groundwater area, several ingenious proposals had been submitted involving the behavior of water above and below ground. Commissioner Young concluded remarks. The report of the Arkansas Commissioners was accepted as presented. (Attachment "D")

B. OKLAHOMA COMMISSIONERS

Commissioner Gary Sherrer stated that he, Duane Smith and Harold Springer would present the report of the Oklahoma Commissioners. Harold Springer, Chief Engineer of the Oklahoma Water Resources Board, reviewed the information on climate and stream flow in Oklahoma in 1994, the Blaine Recharge Demonstration Project, update of the Oklahoma Rural Water Survey, and the Statewide Rural Energy & Water Conservation Program. Mr. Springer updated the members on the status of the proposed listing of the Arkansas Shiner as an endangered species. He said the Compact's Engineering and Legal Committees worked with the Environmental and Natural Resources Committee in developing a statement. He said the OWRB had been very involved, and he and General Counsel Dean Couch had attended two hearings conducted by the U.S. Fish and Wildlife Service. He said there is a lot of opposition to the listing, and at this time, there will not be any further action until Congress reauthorizes the Endangered Species Act.

OWRB Assistant Director spoke to the Commissioners about activities on the status of the Oklahoma Comprehensive Water Plan. He said it is an update of the State's 1980 plan, and noted water transfer was an issue contained in the report.

He said there are a lot of issues contained in the plan common to Texas and to Arkansas. A citizens advisory committee was created (excluding bureaucrats), and a technical advisory committee (state agency personnel) which identified 31 major issues to be addressed in the plan. He anticipated the final document, which is now undergoing the public participation process, will be prepared by early 1996. The plan will be updated every 10 years. Chairman Mahony asked if there was an effort to coordinate both state's water plans in regard to the compact area. Mr. Smith said that the OWRB had reviewed other states' work and in particular the work Arkansas and surrounding states had done; however, it appeared that western states seemed to have more common water issues than eastern states, but no conferring between the states had occurred. Chairman Mahony said he thought it should be decided who had jurisdiction in regard to formulating a plan in the compact area.

Commissioner Sherrer continued the Oklahoma report saying that water transfer has been a difficult issue in Oklahoma primarily because of a southern Oklahoma lake known as Sardis Lake, and a contract between the State of Oklahoma and the Federal Government for repayment. One proposal to meet that obligation was to transfer water from Oklahoma to the State of Texas, but legislation is required in Oklahoma. Public meetings have been conducted in southeast Oklahoma in an effort to find other ways to market the water to meet the obligation of the debt. The local citizens are concerned about adequate water in the lake for future growth. Both the PVIA, Poteau Valley Improvement Authority, and the City of Poteau are looking at building a reservoir, but because of the expense it will most likely look to Sardis as well as a future water supply. Commissioner Sherrer also reported on the Board's Financial Assistance Program, one of the two most popular state programs with state legislators. He spoke about the Board's 1995 bond issue. Mr. Sherrer concluded his report updating the Commissioners about progress within the

OWRB in relation to relocating in the aftermath of the OKC bombing, and he thanked them for their concern.

Commissioner Sherrer concluded his report, and general questions and discussion about the Sardis Lake situation followed. (Attachment "E")

COMMITTEE REPORTS

A. Budget Committee

Harold Springer, OWRB, said that in the prepared material, two budgets had been developed by the committee. He said regarding the regular budget, increases in the cost of the U.S.G.S. contract for computing annual water yields, therefore the amount each state is to contribute was increased. The other items were increased slightly due to the increase in cost of doing business. The second is a special budget, for the $51,400.00 granted to Arkansas and the work contracted with the University of Arkansas. There is no obligation to Oklahoma or the assurance that future funding will be made. The Budget Committee recommended approval of the budgets as presented.

Chairman Mahony noted the regular budget was flexible, in that most expenditures are basically the same, and if there is a need, special budgeting can be done when necessary. He also noted the proposed budget was for several years, and in Arkansas, agencies cannot be obligated for more than two years. Commissioner Young responded the budget as approved is "factored in" when he submits a budget request to the Governor and General Assembly. Chairman Mahony commented that Oklahoma had requested special funding for similar joint projects but has been unsuccessful. Commissioner Sherrer said the Oklahoma Legislature will convene early February and it is his intention to to [sic] request funding.

There being no further discussion, Commissioner Randy Young moved that the budget, and the special budget be

approved, and Commissioner Eddie Martin seconded. Those in favor voted aye; there were none opposed.

The Budget Committee report was approved as presented, (Attachment "F")

B. Engineering Committee

Harold Springer, Chairman, stated to the members that at the September 1994 meeting, the Engineering Committee had not been given a specific assignment. He said it is a continuing assignment of the Committee to publish the annual report, which has been done. The Engineering Committee did work together with other Compact Committees to compose a letter to the U.S. Fish and Wildlife Service regarding the Arkansas Shiner. Mr. Springer concluded the report.

Upon motion by Commissioner Young, and second by Commissioner Sherrer, the Engineering report was accepted as presented. (Attachment "G")

C. Environmental and. Natural Resources Committee

Commissioner Sherrer asked Scott Dewald, director of the Office of the Secretary of Environment, to present the report of the Environmental and Natural Resources Committee. Mr. Dewald spoke to the members saying the Committee met on December 4; and he listed those who attended. He distributed a copy of the agenda and report, noting that one assignment of the Committee had been to work with the other committees in drafting a letter to the U.S. Fish and Wildlife Services as official comment about the Arkansas Shiner listing. The second assignment was to explore the possibility of submitting joint state work plans for funding; however, this has not yet been pursued, but the Committee agreed to continue the project for 1996. Mr. Dewald advised there had been some project coordinating on the Illinois River Maximum Daily Loads, facilitated by EPA Region 6, and will be followed by public meetings in 1996. He said the Committee

recommended continued enhancement and coordination on discharge permit applications of which there is common interest between the two states. He said some coordination had been taking place in the form of development of a system to share information.

Discussion by the Commissioners included the status of Illinois River Basin and implementation of BMPs through a comprehensive basin plan; outcome of the Lake Tenkiller. study effects in making determinations for planning in the Illinois River. Commissioner Elrod expressed his desire to see both states' agencies begin thinking of dealing with poultry producers/companies in terms of creative solutions i.e., the producers should be encouraged with a carrot and not punished for being proactive. Mr. Randall Mathis, Arkansas Department of Pollution Control and Ecology, commented about all state agencies and parties involved getting together, taking a partnership approach, to resolve the issues in the Illinois River basin. He said it is not a simple process and will take time, but wanted to work with all those in the basin and to commit resources to solve the problems. Commissioner Sherrer commented to Oklahoma's attitude that cooperation, not intimidation, through a common-sense approach is the key to working through the current serious problems. The Commissioners expressed a desire that the states work together, through private companies and governmental agencies having a free exchange of information, and that the Compact play major role.

Commissioner Young moved to approve the Environment and Natural Resources Committee report, and Commissioner Martin seconded. The report was accepted as presented. (Attachment "H")

D. Legal Committee

Mr. Dean Couch, General Counsel, OWRB, distributed a brief report stating the members of the Legal Committee continue to be involved in various issues discussed by the

Commission, and that no assignments had been specifically given to the Legal Committee at the September 1994 meeting. Chairman Mahony and the Commissioners discussed what notice of the meetings is required, and whether the Compact was subject to the provisions of each state's Open Meeting Laws and, to the extent that they may exist, federal law. Mr. Couch stated previous research had been conducted, and it was determined there were no specific requirement for the interagency body, although there may be specific requirements under each states' laws. The Commission agreed the Legal Committee should further investigate and report on the requirement of proper public notice of Compact meetings. (Attachment "I")

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

Appointments/Assignments to Committees and Selection of Committee Chair. Chairman Mahony asked what changes, if any, are needed. Upon motion offered by Commissioner Young and seconded by Commissioner Sherrer, the following committee memberships were approved by the Commission:

Budget Committee:

Pris Houchens, Arkansas (Chairman)
Harold Springer, Oklahoma

Engineering Committee:

Earl Smith, Arkansas (Chairman)
Harold Springer, Oklahoma

Environmental and Natural Resources Committee:

Senator Wayne Dowd, Arkansas (Chairman)
Representative B.G. Hendrix, Arkansas
Commissioner John Elrod
Dr. J.W. Looney, Arkansas

Randall Mathis, Arkansas
Commissioner Randy Young, Arkansas
Senator Herb Rozell, Oklahoma
Representative Larry Adair, Oklahoma
Commissioner Earnie Gilder, Oklahoma
Commissioner Gary Sherrer, Oklahoma
Clyde Cole, Oklahoma
Mark Coleman, Oklahoma
Dennis Howard, Oklahoma

Legal Committee:

Mark Bennett, Arkansas (Chairman)
Commissioner Mike Carter, Arkansas
Dean Couch, Oklahoma
Commissioner Eddie Martin, Oklahoma

Regarding Committee Chairmanships, upon motion by Commissioner Young and second by Commissioner Sherrer, the Commission approved that Arkansas will Chair the Committees for the 1996 meeting (as indicated above).

For clarification, Commissioner Young moved that Senator Wayne Dowd be selected as chairman of the Environmental Committee, and that Mark Bennett be selected as chairman of the Legal Committee. Commissioner Sherrer seconded. The motion was approved.

Upon motion by Commissioner Young and seconded by Commissioner Gilder, the Commission requested the Legal Committee to submit its report prior to the next meeting regarding proper notice, and if more notice is determined, that the committee is authorized to do so. The Chairman instructed the committee chairman to advise the secretary what notice is required.

B. RESOLUTIONS OF APPRECIATION—PATRICIA P. EATON

Chairman Mahony noted that a proposed resolution for appreciation to former Commissioner Patty Eaton of Oklahoma had been circulated. He read the resolution to the Commission. Upon motion by Commissioner Sherrer and seconded by Commissioner Young, the resolution was unanimously approved. (Attachment "J")

Commissioner Young stated that although not presently prepared, he would move that a similar resolution be adopted for former Federal Chairman Ron Fuller and former Alternate Federal Commissioner Joe Allbaugh, and circulated for signature. Commissioner Sherrer seconded the motion. The motion was unanimously adopted.

C. ELECTION OF OFFICERS (Secretary and Treasurer)

Upon motion by Commissioner Young, and second by Commissioner Sherrer, Ms. Pris Houchens of the Arkansas Soil and Water Commission was selected as Secretary-Treasurer for 1996.

D. 1996 ANNUAL MEETING

Commissioner Young stated that it had been suggested the 1996 annual meeting be held at Eureka Springs, AR, although that location is a few miles outside the river basin. He said the meeting will be held the fourth Thursday of September. Upon motion by Commissioner Sherrer and second by Commissioner Young, the Commission voted to conduct its 1996 Annual Meeting on September 26, 1996, at Eureka Springs, Arkansas.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVES REPORT

Representatives of the following federal agencies provided reports of activities within the Arkansas River Basin to the Commission: U.S. Geological Survey, Oklahoma: U.S. Geo-

logical Survey, Arkansas; and U.S. Army Corps of Engineers, Tulsa and Little Rock Districts. The Commissioners heard reports and commented on such issues as stream flow and water quality within the basin and along the states' border; the states' water quality standards; satellite monitoring for nonpoint sources; study for evaluation of flood control and activities of the Grand/Neosho Committee and reactivation of the Arkansas Basin Coordinating Committee; and activities in the Wister Lake watershed (copies of the reports: Attachment "K").

PUBLIC COMMENTS

Mr. Bob Burchett, U.S. Geological Survey, thanked those present for their support of the U.S.G.S. in light of proposed federal budget cuts. Mr. Burchett commended the Commissioners for the involvement and cooperation of the Compact in working for solutions in the basin.

Mr. Randall Mathis, ADPC&E, commented about the state's 305 (b) report containing information on stream monitoring in northwest and eastern corridor of Arkansas which can be extracted from the report and distributed.

Chairman Mahony noted that following adjournment, the members and audience were encouraged to remain and engage in conversation about the future of the compact. Prior to adjournment, Commissioner Young noted that the Commission had not made committee assignments. After some discussion, and upon motion by Commissioner Young and second by Commissioner Gilder, the commission instructed the Legal Committee to research for possible recommendation by the Compact to both states as to what might be done through a legislative standpoint regarding legal liability protection to swine and poultry integrators. The motion carried.

Commissioner Young moved and Commissioner Sherrer seconded that the Environment Committee coordinate the compilation of both Oklahoma and Arkansas water quality

standards, as well as EPA, for inclusion in the U.S.G.S. data reports; and, to determine if possible what (level) is good and what is not good. The motion carried.

Upon Commissioner Young's suggestion, the Commissioners agreed to a continuing assignment to the Engineering Committee and to the Budget Committee to publish the annual report.

Commissioner Carter moved and Commissioner Martin seconded that the Legal Committee be further assigned to provide to the Compact sometime prior to the next meeting the kind of authority the Compact can exercise, with reference to both states, and the kind of funding requirements, if any, the Compact can suggest or impose on both states to conduct its activities. The motion carried.

ADJOURNMENT

There being no further business, Federal Chairman Emon Mahony adjourned the Annual Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission at 12:00 p.m., on December 5, 1996, at Oklahoma City, Oklahoma.

/s/ Emon A. Mahony, Jr.
EMON A. MAHONY, JR.,
Federal Commissioner and Chairman

Attachment "A" - Agenda

Attachment "B" - 6/19.95 Minutes

Attachment "C" - Secretary/Treasurer Report

Attachment "D" - Arkansas Commissioners' Report

Attachment "E" - Oklahoma Commissioners' Report

Attachment "F" - Budget Committee Report

Attachment "G" - Engineering Committee Report

Attachment "H" - Environmental and Natural Resources Committee Report

Attachment "I" - Legal Committee Report

Attachment "J" - Resolution for Patricia P. Eaton

Attachment "K" - Federal Agencies' Reports

APPENDIX W

MINUTES OF THE SPECIAL TELEPHONIC MEETING
OF THE
ARKANSAS-OKLAHOMA ARKANSAS RIVER
COMPACT COMMISSION

FEBRUARY 29, 1996

Minutes of the
Arkansas-Oklahoma Arkansas River Compact Commission
February 29, 1996

A special telephonic meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was held February 29, 1996, beginning at 10:00 a.m.

A roll call was made and the Commission's Chairman, Emon Mahony, called the meeting to order.

Commissioners present included:

Emon Mahony, Federal Commissioner
Fred Helms, Alternate Federal Commissioner
Randy Young, Arkansas
Mike Carter, Arkansas
Garry Sherrer, Oklahoma
Edwin Martin, Oklahoma
Ernie Gilder, Oklahoma

Commissioner absent was John Elrod, Arkansas.

Others in attendance included:

Pris Houchens, AOARCC Secretary-Treasurer
Mark Bennett, Arkansas Legal Committee Member
Bob Morgan, Arkansas Soil & Water Conservation Commission
Chuck Bennett, Arkansas Department of Pollution Control & Ecology

Michelle Hillier, Arkansas Democrat-Gazette
Shane Barks, US Geological Survey, Arkansas
Chris Hicklin, USA Corps of Engineers, Little Rock District
Duane Smith, Oklahoma Water Resources Board
Dean Couch, Oklahoma Legal Committee Member
Harold Springer, Oklahoma Engineering Committee Member
Derek Smithee, Oklahoma Water Resources Board
Scott Dewald, Oklahoma Office of the Secretary of Environment
Mike Talkington, Oklahoma Department of Agriculture

The first item of discussion was proposed Resolution No. 96-01 expressing support for an expanded monitoring network for water quantity and quality within the compact area and expressing support to the State of Oklahoma in its efforts to obtain necessary funding. Commissioner Sherrer discussed specific changes made in the draft resolution previously circulated to the Commission. Commissioner Young advised the Commission that he had spoken with Harold Springer earlier regarding the proposed changes and fully supported the changes as proposed. Upon motion by Commissioner Martin, second by Commissioner Sherrer, Resolution No. 96-01 was adopted as amended and presented. (Copy of Resolution No. 96-01 Attachment "A").

The second item of business was proposed Resolution No. 96-02 expressing support for the funding of Montgomery Point Lock and Dam. Commissioner Young presented the proposed Resolution and advised members that the Commission is already on record September 27, 1990 in support of the Montgomery Point Lock and Dam. Upon motion by Commissioner Sherrer, second by Commissioner Gilder, the Commission reaffirmed its support for the funding of Montgomery Point Lock and Dam in the adoption of Resolution No. 96-02. (Copy of Resolution 96-02 Attachment "B").

The final item of discussion was the findings and conclusions of the Final Report for the Cooperative "Clean-Lakes" Project Phase I Diagnostic-Feasibility Study on Tenkiller Lake in Oklahoma. Oklahoma has scheduled a public meeting on the study findings and recommendations in Tallequah on March 28th. Following discussion, the Chairman referred the matter to the Environmental and Natural Resources Committee to review the report with respect to the scientific basis for the study recommendations for remediation efforts and report back to the Commission. It was agreed that the Environmental and Natural Resources Committee should be represented at the March 28th public meeting and in order to be prepared for the public meeting have a full Committee meeting prior to that date. Commissioner Young agreed to contact Senator Wayne Dowd, Chairman of the Environmental and Natural Resources Committee, to establish a date and location for the Committee meeting and coordinate such with Commissioner Sherrer.

There being no further business, the meeting was adjourned.

/s/ Emon A. Mahony, Jr. Date: 10/3/96
EMON A. MAHONY, JR.,
Federal Commissioner and Chairman

ATTEST:

/s/ Pris Houchens
PRIS HOUCHENS, Secretary

APPENDIX X

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

October 3, 1996

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, October 3, 1996, at 9:00 a.m. at the Inn of the Ozarks Conference Center in Eureka Springs, Arkansas.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Arkansas Commissioners Mike Carter and Randy Young; and Oklahoma Commissioner Earnie Gilder. Oklahoma Commissioner Gary Sherrer was represented by Duane Smith. Commissioners not in attendance were Fred Helms, Alternate Federal Commissioner; John Elrod, Arkansas Commissioner; and Eddie Martin, Oklahoma Commissioner.

For others in attendance see Attendance Roster, Attachment "A".

CALL TO ORDER

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Federal Commissioner and Chairman Emon Mahony. Chairman Mahony indicated that there was a question regarding the presence of a quorum in accord with the articles of the Compact. Duane Smith, Deputy Director of the Oklahoma Water Resources Board presented a letter from Oklahoma Commissioner Gary Sherrer authorizing him to act on his behalf regarding any Compact matters. (Letter, Attachment "B"). Chairman Mahony indicated that he would ask for ratification of today's action at a subsequent meeting.

INTRODUCTIONS AND ANNOUNCEMENTS

At the request of Chairman Mahony, Bob Morgan with the Arkansas Soil and Water Conservation Commission provided information on the activity following the Commission meeting.

APPROVAL OF AGENDA

Upon motion by Commissioner Young, second by Commissioner Carter, the agenda for the October 3, 1996 meeting of the Commission was approved. (Agenda, Attachment "C").

APPROVAL OF MINUTES: 12/5/95 AND 2/29/96

Upon motion by Duane Smith, second by Commissioner Gilder, the Commission approved the minutes of the regular meeting held December 5, 1995 and the special telephonic meeting held February 29, 1996. The approval included the correction noted by Chairman Mahony on the last page of the minutes of December 5, 1995.

REPORT OF THE CHAIRMAN

Chairman Mahony stated the Chairman did not have a report; however he suggested the Commission give thought to reviewing its powers and duties as provided by the Compact, and review the question of alternate state Commissioner, which is not addressed by the Compact. He anticipated discussion of this item at some future date.

REPORT OF THE SECRETARY-TREASURER

Pris Houchens presented the report of the Secretary-Treasurer. Mrs. Houchens advised that a membership roster of the Commission and its committees had been prepared and included in the Commissioner's packets. Any corrections or changes should be provided to Mrs. Houchens. She also advised that the biennial audit had been prepared and included in their packets as well. (Audit, Attachment "D"). She reported no adverse findings in the audit and responded

to Chairman Mahony's question posed at the December meeting regarding the type of audit performed on the Compact Commission's funds. She summarized a letter from the CPA who performs the audit. The audit is conducted under generally accepted auditing standards and is in conformity with general accepted accounting principles. The auditor does 100% testing of transactions. Internal controls or compliance with laws and regulations are not tested. As stated in the letter, if an entity receives over $300,000 in governmental funds, it is required to have a governmental audit and that audit must meet the standards outlined in the yellow book. Mrs. Houchens advised that if a governmental audit was performed, the fee for the audit would approximately double. (CPA Letter, Attachment "E"). She responded to Duane Smith's question regarding the special project noted in the audit in the amount of $51,400.00. These funds were provided by the State of Arkansas for a special water quality monitoring project on the Illinois River.

Mrs. Houchens summarized an itemized category report for fiscal year ending June 30, 1996. The report reflected both states' assessments had been paid, and $1,650.08 in interest earnings from dividend income. The total income was $6,041.08. Expenses included preparation of the annual report, $335.83; meeting expenses from the 1995 annual meeting, $194.02; Treasurer's Bond, $100.00; and two USGS payments for preparation of the annual yield report, $1,410.00 (7/1/94-6/30/95) and $3,276.00 (7/1/95-6/30/96), leaving a balance of $63,126.79. She explained that the funds were applied to two categories, non-restricted funds for day to day operation of the compact ($11,726.79) and restricted funds set aside for the special water quality project ($51,400.00). (FY 96 Year End Report; Attachment "F").

The final report summarized by category was an interim fiscal year report through October 3, 1996. The report reflected both states' assessments had been paid, and $437.07

in interest earnings from dividend income. The total income was $5,047.07. Expenses included payment of $38,550.00 from the special project account; $225.00 for preparation of the biennial audit; and $100.00 for the Treasurer's Bond. Total expenses were reported at $38,875.00 leaving a balance of $29,298.86 (non-restricted funds, $16,448.86; restricted funds, $12,850.00). (FY 97 Interim Report; Attachment "G").

REPORT OF THE COMMISSIONERS

Oklahoma Commissioners: Duane Smith presented a written report of the Oklahoma Commissioners detailing ten items. (Oklahoma Report; Attachment "H"). Of special interest to the Commission, Mr. Smith expressed his opinion that the Commission's action in support of an expanded monitoring network for water quantity and quality within the compact area and support to the State of Oklahoma in its efforts to obtain necessary funding was a major contributing factor in the Oklahoma Water Resources Board's ability to obtain $148,590.00 from the legislature during its recent session.

Arkansas Commissioners: Commissioner Young presented a written report of the Arkansas Commissioners detailing seven items. (Arkansas Report; Attachment "I"). For informational purposes, Commissioner Young presented a written summary regarding the proposed expansion of the City of Fayetteville's wastewater collection and treatment capacity. The two options being evaluated were described in the document. These were: 1.) One-Plant Option: Expand the existing Noland Wastewater Treatment Facility (WWTF) to treat all future flows from the Service Area, and develop the collection system for delivery of all wastewater to a single plant. 2.) Two-Plant Option: Expand the existing WWTF to treat only the wastewater flows originating within the White River watershed Service Area. Build a new treatment plant on the west side of the City to serve that portion in the Illinois

River watershed Service Area. Develop the collection system to deliver wastewater flow to both plants. (Proposal; Attachment "J").

COMMITTEE REPORTS

Budget Committee: Pris Houchens, Budget Committee Chairman, presented the proposed budget covering the period of July 1, 1995 through June 30, 1999 for Commission consideration. She advised that all of the line item expenses remained the same with the exception of the US Geological Survey's cost for computation and preparation of the annual water yield data report. The USGS has proposed an increase from $3,440.00 in FY 97 to prepare the report to that of $5,738.50 in FY 98 and $6,026.00 in FY 99. Duane Smith stated that representatives from Oklahoma had discussed the proposed increase and suggested that the data in the format the report is currently being prepared under is not being used. He suggested the matter be referred to the Engineering Committee for review of the data usage and report content. John Terry with the USGS addressed the cost increase and explained that the increases would be more in line with what the actual cost was to prepare the report. Following discussion and upon motion by Duane Smith, second by Commissioner Young, the Commission approved the budget but referred the matter to the Engineering Committee to examine the usage and report content. The budget is subject to modification based on the findings of the Engineering Committee and further Commission action. (Budget; Attachment "K").

Commissioner Young discussed continuing the special project budget for one additional year to allow a more accurate flow study covering a two-year period. Earl Smith responded to a question regarding the proposed cost to continue the project. He recommended one gaging station be monitored at an approximate cost of $25,000.00. Commissioner Young suggested that each state address funding sources. Duane Smith indicated that he was not in a position to make a

commitment at this meeting but agreed to explore Oklahoma's ability to participate in funding the project. It was also suggested that this be an agenda item for any special meeting scheduled prior to the next annual meeting.

Joint Report of the Engineering/Environmental and Natural Resources Committees: Earl Smith, Engineering Committee Chairman, presented a joint written report of the Engineering Committee and Environmental and Natural Resources Committee. (Report; Attachment "L"). He advised that the committees held a joint meeting on October 2nd which was well attended. The focus of the meeting was discussion of key issues involved in setting phosphorus reduction goals for Tenkiller Lake in Oklahoma. A meeting of the Arkansas and Oklahoma agencies, as well as the Environmental Protection Agency, will be held in Fort Smith, Arkansas on November 7, 1996, in an attempt to agree on a position paper to present to the Environmental and Natural Resources Committee. Senator Wayne Dowd, Environmental and Natural Resources Committee Chairman, commented on the results of the joint committee meeting and indicated that a meeting of his committee would be called following the November 7th meeting in Fort Smith. Discussion followed regarding the Commission's responsibility and ability to intervene by implementing standards in this area. It was generally agreed that progress has been made and that the Commission has made a positive impact on water quality. It was further suggested that the Commission continue to manage problems as it has without litigation if at all possible. Commissioner Carter stressed his opinion that the Commission has an obligation, as well as the states, to carry out the duties and responsibilites of the Compact.

Commissioner Young asked the Commission to consider adoption of a resolution expressing support for the high priority ranking of the Illinois River Watershed by the US Department of Agriculture. He advised that the USDA

Natural Resources Committee been charged with the responsibility of administering the Environmental Quality Incentive Program. Under this program, funding can be allocated to high priority areas to lower the impact of environmental problems caused by nonpoint source pollution. Chairman Mahony read the proposed resolution for the record. Upon motion by Commissioner Young, second by Duane Smith, the Commission adopted Resolution No. 96-03 supporting the high priority ranking of the Illinois River Watershed. (Resolution 96-03; Attachment "M").

Chairman Mahony expressed a desire to have the states explore their ability to partially fund a full-time staff person with the direct responsibility to the Compact Commission and state staff members providing support to the Commission.

Legal Committee: Mark Bennett, Legal Committee Chairman, presented a written report of the Legal Committee. (Legal Report; Attachment "N"). Mr. Bennett thanked committee member Dean Couch for his preparation of the draft report. The three charges assigned the committee at the December 5, 1995 meeting were addressed as follows by both Mr. Bennett and Mr. Couch: 1.) Open meeting law and meeting notice requirements; 2.) Research concerning possible recommendation the Commission could make to each state as to what might be done by legislation regarding legal liability protection to swine and poultry integrators; and 3.) Kind of authority Compact can exercise, with reference to both states, and the kind of funding requirements, if any, the Compact can suggest or impose on both states to conduct its activities. Items one and two were satisfactorily addressed by the committee; however, item three was continued for further research by the committee. The Commission also asked the committee to address substitute ability of Commissioners and report back.

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

Appointments/Assignments to Committees and Selection of Committee Chair: Upon motion by Commissioner Young, second by Commissioner Gilder, the Commission approved the following committee memberships and respective chairman:

Budget Committee:

Harold Springer, Oklahoma (Chairman)
Pris Houchens, Arkansas
Assignments: No new assignments were made.

Engineering Committee:

Harold Springs, Oklahoma (Chairman)
Earl Smith, Arkansas
Assignments:

1.) Standing assignment to prepare annual report for distribution;
2.) Review current contract with the US Geological Survey and examine the usage and report content and make any necessary recommendations on proposed changes; and
3.) Continue to provide technical support to the Environmental & Natural Resources Committee.

Environmental & Natural Resources Committee:

Senator Herb Rozell, Oklahoma (*Co-Chairman)
Representative Larry Adair, Oklahoma (*Co-Chairman)
Commissioner Earnie Gilder, Oklahoma
Commissioner Gary Sherrer, Oklahoma
Clyde Cole, Oklahoma
Mark Coleman, Oklahoma
Dennis Howard, Oklahoma

Senator Wayne Dowd, Arkansas (Co-Chairman)
Representative B. G. Hendrix, Arkansas
Commissioner John Elrod, Arkansas
Commissioner Randy Young, Arkansas
Dr. J. W. Looney, Arkansas
Randall Mathis, Arkansas

(**Note:* Oklahoma's co-chair will be either Senator Rozell or Representative Adair depending on which agrees to hold the position. Oklahoma's representation will contact and notify of co-chair selection).

Assignments: No new assignments were made.

Legal Committee:

Commissioner Eamie Gilder, Oklahoma (Co-Chairman)
Commissioner Eddie Martin, Oklahoma
Dean Couch, Oklahoma
Commissioner Mike Carter, Arkansas (Co-Chairman)
Mark Bennett, Arkansas

(*Note:* Commissioner Gilder agreed to serve as Legal Committee Co-Chairman since Commissioner Martin was not present to accept the position).

Assignments: Upon motion by Commissioner Carter, second by Commissioner Gilder, the Commission accepted the Legal Committee's report previously given.

1.) Continue with research of the kind of authority the Compact can exercise, with reference to both states, and the kind of funding requirements, if any, the Compact can suggest or impose on both states to conduct its activities;
2.) Research the ability of the Compact to impose water quality standards; and
3.) Research the substitute ability of Commissioners.

Duane Smith complimented Senator Dowd on his chairmanship and work on the Environmental and Natural Resources Committee.

Election of Officers: (Secretary-Treasurer) Upon motion by Duane Smith, second by Commissioner Young, Mary Schooley with the Oklahoma Water Resources Board was elected Secretary for 1997 and Pris Houchens was re-elected Treasurer for 1997.

1997 Annual Meeting: The State of Oklahoma agreed to host the 1997 annual meeting of the Compact Commission in Oklahoma City on September 25, 1997. The meeting will be held at the Santa Fe Inn.

FEDERAL AND STATE REPRESENTATIVES REPORT

Representatives of the following federal agencies provided reports of activities within the Arkansas River Basin to the Commission: US Geological Survey, Arkansas and Oklahoma Districts; and US Army Corps of Engineers, Little Rock and Tulsa Districts.

PUBLIC COMMENTS

There were no public comments made.

ADJOURNMENT

There being no further business, the meeting was adjourned upon motion by Commissioner Gilder, second by Commissioner Young.

/s/ Emon A. Mahony, Jr.
EMON A. MAHONY, JR.
Federal Commissioner and Chairman

ATTEST:

/s/ Pris Houchens
PRIS HOUCHENS
Secretary-Treasurer

APPENDIX Y

Minutes of the
Arkansas-Oklahoma Arkansas River Compact Commission
January 31, 1997

A special telephonic meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was held January 31, 1997, beginning at 10:00 a.m.

A roll call was made and the Commission's Chairman, Emon Mahony, called the meeting to order.

Commissioners present included: Emon Mahony, Federal Commissioner and Chairman; Randy Young, Arkansas; Mike Carter, Arkansas; Garry Sherrer, Oklahoma; and Ernie Gilder, Oklahoma.

Commissioners absent were Fred Helms, Alternate Federal Commissioner; John Elrod, Arkansas; and Edward Martin, Oklahoma.

The purpose of the meeting was to consider the proposal by Arkansas to continue the sampling and analysis program at the gaging station on the Illinois River at Arkansas Highway 59. Following brief discussion and upon motion by Mr. Gilder, second by Mr. Carter, the Commission approved the proposal to enter into an agreement with the US Geological Survey and contract with the University of Arkansas to continue a sampling and analysis program at the automatic sampling and flow gaging station on the Illinois River at Arkansas Highway 59. Sampling will be conducted for twelve months starting January 1, 1997. The State of Arkansas will provide the $28,000.00 funding necessary to continue the project. The State of Oklahoma would not be obligated for any portion of the funding.

There being no further business, the meeting was adjourned.

/s/ Emon A. Mahony, Jr.
EMON A. MAHONY, JR.
Federal Commissioner and Chairman

ATTEST:

/s/ Pris Houchens
PRIS HOUCHENS
Secretary-Treasurer

APPENDIX Z

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 24, 1998

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 24, 1998, at 9:00 a.m. at Westark College in Fort Smith, Arkansas.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Arkansas Commissioners Mike Carter, Randy Young, and Xollie Clinger; and Oklahoma Commissioner Duane Smith, Brian Griffin, and Ronald Howell. Commissioner not in attendance was Fred Helms, Alternate Federal Commissioner.

For others in attendance see Attendance Roster, Attachment "A".

CALL TO ORDER

Federal Commissioner and Chairman Emon Mahony called Arkansas-Oklahoma Arkansas River Compact Commission to order at 9:00 a.m. and welcomed the group to Fort Smith. Introduction of new Commissioners Xollie Clinger, Brian Griffin, and Ronald Howell was made. Roundtable introduction of the guests and staff in the audience followed.

APPROVAL OF AGENDA

Upon motion by Commissioner Young, second by Commissioner Smith, the agenda for the September 24, 1998 meeting of the Commission was approved. (Agenda; Attachment "B").

APPROVAL OF MINUTES; 9/25/97, 12/2/97, and 1/12/98

Upon motion by Young, second by Commissioner Carter, the Commission approved the minutes of the annual meeting held September 25, 1997 and the special telephonic meetings held December 2, 1997 and January 12, 1997.

REPORT OF THE CHAIRMAN

The Chairman indicated that he had no report to present.

REPORT OF THE SECRETARY-TREASURER

Pris Houchens presented the report of the Secretary-Treasurer. Mrs. Houchens provided three itemized category reports: FY 98 Financial Report, FY 99 Interim Financial Report, and Special Project Report. The FY 98 Year-End Financial Report reflected income and expenses through June 30, 1998. A beginning balance of $13,322.87 on July 1, 1997 was shown, state assessments were paid, and expenditures of $28,730.24 were reported, ending the fiscal year with $51,390.01. (FY 98 Report; Attachment "C"). The FY 99 Interim Financial Report summarized income and expenses through September 22, 1998. Again both state assessments have been paid. Total expenses were reported at $2,500.00 leaving a balance of $56,124.38. Mrs. Houchens advised that $30,840.00 was obligated for the special water quality monitoring project and that the actual cash balance available was $25,284.38. (FY 99 Interim Financial Report; Attachment "D"). The final report provided was the Special Project Report, which summarized income and expenses on that item since its inception in 1995. (Special Project Report; Attachment "E").

Mrs. Houchens advised that the biennial audit had been prepared and included in their packets as well. (Audit, Attachment "F"). She reported no adverse findings in the audit.

In closing, Mrs. Houchens advised that the annual report was being prepared for printing and should be available in the

near future. She explained that the hold up in processing the report had been completion and receipt of the biennial audit, which is made a part of the report. Upon motion by Commissioner Young, second by Commissioner Howell, the report of the Secretary-Treasurer was approved as presented.

REPORT OF THE COMMISSIONERS

Oklahoma Commissioners: Duane Smith presented a written report of the Oklahoma Commissioners detailing several items. (Oklahoma Report; Attachment "G"). Of special interest to the Commission, Mr. Smith discussed initiatives relating to water resources and the environment considered by the Oklahoma Legislature during its 1998 session. He explained that much of the debate pertained to the growing swine industry and its potential impact on the environment, as well as the poultry industry after studies indicated that phosphorous from poultry litter was impacting streams and lakes in eastern Oklahoma. A statewide moratorium on administrative processing of applications for water use for certain kinds of swine animal feeding operations was enacted March 9, 1998, and with the passage of the stricter regulations for swine production, the moratorium was lifted August 1, 1998. Commissioner Smith reported that an increased emphasis on data collection and monitoring of groundwater and stream water resources prompted the Governor and Legislature to appropriate $1 million to establish a coordinated monitoring program based on Oklahoma's Water Quality Standard's established beneficial uses. The Oklahoma Water Resources Board will lead the coordination effort of all environmental agencies conducting monitoring activities. Commissioner Griffin expressed his desire to continue the cooperative effort working with the State of Arkansas on environmental issues and commended Commissioner Young and others for their work. Commissioner Howell expressed his honor in being appointed to serve on the Commission and excitement about working on cooperative water issues between the states.

Arkansas Commissioners: Commissioner Young presented a written report of the Arkansas Commissioners summarizing several nonpoint source pollution program related items. (Arkansas Report; Attachment "H"). A draft comprehensive update has been completed on Arkansas' Nonpoint Source Pollution Program. The Poteau and Illinois Rivers have been identified in the update as priority waters for the implementation of Nonpoint Source Management Projects for the next five years. Discussion of several Arkansas efforts followed and several questions were asked and responded to. Two upcoming meetings were announced for benefit of the Commission and audience. The meetings included the upcoming Arkansas Governor's Water Conference in Little Rock October 7-9, and Poultry Conference in Springdale October 19-21.

COMMITTEE REPORTS

Budget Committee: Pris Houchens, Budget Committee Chairman, presented the proposed budget covering the period of July 1, 1997 through June 30, 2001 for Commission consideration. The proposal would provide for a budget over the next two fiscal years (FY 2000 through FY 2001). She advised that the present budget for FY 99 would need to be revised to reflect the actual budget as approved at the 1997 annual meeting since assessments in the amount of $3,500.00 had already been paid by both states. Also noted were the considerable savings on the line item for computation of annual water yield and publishing of report since the Commission has contracted with Terrance Lamb to do the work. Upon motion by Commissioner Smith, second by Commissioner Young, the Commission approved the budget as presented with corrections as noted by Mrs. Houchens. Pursuant to the provisions of the Arkansas-Oklahoma Arkansas River Compact (Article VIII.F) expenses that are incurred by the Commission incident to the administration of the

Compact shall be borne equally by the two states. (Budget; Attachment "I").

Engineering Commission & Environmental and Natural Resources Committee: Earl Smith, Engineering Committee Chairman, presented a report of both the Engineering Committee and the Environmental and Natural Resources Committee who met jointly the previous day. (Engineering Committee Report; Attachment "J"). The Committee was previously given two assignments: 1.) To report on progress toward meeting the goal of reducing phosphorous in the Illinois River by 40%; and 2.) Contract the annual yield and deficiency report for the Arkansas River Basin area. The following is a summary of the report and Committee recommendations.

1.) Progress report on meeting the goal of reducing phosphorus in the Illinois River by 40%: Mr. Smith provided background on the history of water quality concerns in the Illinois River watershed and cooperative efforts by the States of Arkansas and Oklahoma to address these concerns. At the 1997 annual meeting, the Compact Commission adopted a voluntary phosphorus reduction goal of 40%. In general Mr. Smith reported, the data collected from the stations specified in the agreement indicate that a reduction in phosphorus loading for the past five years "rolling average" has occurred when compared to the data collected for the base years of 1980 to 1993. The method utilized to calculate rolling average was explained. Additional information on this is included in the written report.

2.) Contract annual yield and deficiency report: The Commission contracted with Terrance E. Lamb of Hydrologic Information Services to perform the computation of annual yield and selected hydrologic data report for the Arkansas River Basin. The report indicated that there was no violation of compact requirements.

Commissioner Smith requested that the Committee address and document activities in the watershed and include that information in their report on the phosphorus reduction effort at next year's meeting.

The Committee made the following recommendations, which were approved by the Commission upon motion by Commissioner Smith, second by Commissioner Young:

1.) Continuation of the sampling and analysis program at the gaging station on the Illinois River at Arkansas Highway 59. Cross section analysis of the riverbed at the station will be added to the last year's sampling program. The State of Arkansas will provide the $41,691.00 funding necessary to continue the project. The State of Oklahoma would not be obligated for any portion of the funding. The proposal will allow the Commission to enter into an agreement with the US Geological Survey and contract with the University of Arkansas to continue a sampling and analysis program at the automatic sampling and flow gaging station on the Illinois River at Arkansas Highway 59. Sampling will be conducted for a twelve-month period beginning January 1, 1999.

2.) Award of the contract for computation of annual yield and selected hydrologic data for the Arkansas River Basin area for water year 1998 to Terrance E. Lamb, Hydrologic Information Services, in the amount of $3,400.00. The estimated cost for preparing this document for Compact budget purposes is $3,600.00 for water year 1999 and $3,800.00 for water year 2000.

Legal Committee: Mark Bennett, Legal Committee Chairman, responded to a question asked earlier in the meeting concerning the responsibility of the states in shouldering the burden of the Compact Commission's expenses. He reviewed the provisions of the Arkansas-Oklahoma Arkansas River Compact (Article VIII.F) and explained that expenses incurred by the Commission incident to the administration of the Compact are to be borne equally by the two states. Dean

Couch, Oklahoma member of the Legal Committee, clarified that this was with respect to the budget adopted by the Commission. Brief discussion of this matter followed.

Mr. Bennett reported that copies of several state's laws regulating phosphorus use were collected and provided to the Oklahoma delegation.

Mr. Bennett advised that the Legal Committee has also provided assistance to the Engineering Committee and Environmental and Natural Resources Committee as necessary and as directed by the Compact Commission.

Upon motion by Commissioner Young, second by Commissioner Griffin, the report of the Legal committee was approved.

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

Resolutions of Appreciation for Former Commissioners: Upon motion by Commissioner Griffin, second by Commissioner Young, resolutions of appreciation were adopted for former Commissioners John Elrod (Arkansas), Ernie Gilder (Oklahoma), and Edward Martin (Oklahoma). Resolutions circulated for signature revealed two had been prepared for former Commissioner Martin and that Commissioner Gilder's had been omitted. It was the general consensus of the Commission and Secretary-Treasurer that this was in error and that a resolution for former Commissioner Gilder be circulated following the meeting for signature. (Resolutions; Attachment "J").

APPOINTMENTS/ASSIGNMENTS TO COMMITTEES AND SELECTION OF CHAIRS

The next item of business was appointments and assignments to committees and selection of committee chairs. As set forth in the Commission's Rules and Regulations, the

Committee Chairmanship rotates between the two states. During the discussion and included in the following motion, the Commission agreed to a rule change to provide methodology for changes to committee membership to provide written notification on all committee changes to members of the Compact Commission, as well as substitution to keep committee membership in equal proportion, which included changes to the Commission's Rules, Regulations and Modes of Procedure. Upon motion by Commissioner Clinger, second by Mr. Young, the Commission approved the following:

Budget Committee: No additional assignments other than continuous assignment of preparation of budget. Members are:

Mike Mathis, Oklahoma (Chairman)
Pris Houchens, Arkansas

Engineering Committee:

Mike Mathis, Oklahoma (Chairman)
Earl Smith, Arkansas

Environmental and Natural Resources Committee: As previously mentioned, the Committee was assigned to review the implementation of point source and nonpoint source management efforts and correlate with phosphorous data to provide a status report at the next annual meeting of the Compact Commission. The Committee was also charged with continuing the implementation and monitoring of the 40% reduction of phosphorous goal. (Chairmanship will rotate with the host state.)

Representative Larry Adair, Oklahoma (Co-Chair)
Senator Herb Rozell, Oklahoma
Commissioner Duane Smith, Oklahoma
Derek Smithee, Oklahoma
Clyde Cole, Oklahoma
Mark Coleman, Oklahoma

Dennis Howard, Oklahoma
Senator Wayne Dowd, Arkansas (Co-Chair)
Commissioner Xollie Clinger, Arkansas
Commissioner Randy Young, Arkansas
B. G. Hendrix, Arkansas
Dr. J. W. Looney, Arkansas
Randall Mathis, Arkansas
(Vacant, Arkansas)

Legal Committee: The Legal Committee was charged with drafting the appropriate language for the mentioned rule change above and provide to the Compact Commission at its next annual meeting for ratification.

Brian Griffin, Oklahoma (Co-Chair)
Dean Couch, Oklahoma
Mike Carter, Arkansas (Co-Chair)
Mark Bennett, Arkansas

ELECTION OF COMMISSION OFFICERS

Upon motion by Commissioner Smith, second by Commissioner Young, the Commission approved the selection of Mary Schooley with the Oklahoma Water Resources Board as the 1999 Compact Commission Secretary. The motion further approved the selection of Pris Houchens to continue in the office of Treasurer.

DISCUSSION OF LEE CREEK RESERVOIR

Chairman Mahony provided a brief background on the next item on the agenda "Discussion of Lee Creek Reservoir". The item was also briefly addressed during the joint meeting of the Engineering Committee and Environmental and Natural Resources Committee on September 23rd. The City of Fort Smith's Board of Directors has reviewed alternatives to develop a long-term water supply for the City. Among the options that were considered included a proposal to raise the Lee Creek Dam to increase volume or raise the Lake Fort

Smith Dam. As a result of the review and concerns voiced by officials from Oklahoma, Lee Creek is not under immediate consideration as an extended water source. Mr. Mahony advised that he felt the Commission meeting would be a good opportunity for the various agencies to voice their concerns publicly, however, he further explained that formal notification had been given by the various agencies and that there had been no change in Oklahoma's position with respect to the Lee Creek alternative. The Chairman did afford an opportunity for representatives in the attendance to make a brief statement of their agency positions. He asked that simple statements on their positions be given. It was generally agreed that it was going to take a lot of good will and coordinated effort to find a common solution to a common cause in the matter.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Informational activity reports were given by representatives of the following agencies: Terry Daniel, US Army Corps of Engineers, Little Rock District; Kathy Peter, US Geological Survey, Arkansas and Oklahoma Districts jointly; and Bob Price, USDA Natural Resources Conservation Service. (Copies of available reports attached to Minutes; Attachment "K".) Information includes a copy of Dr. Marc Nelson's report on 1997 pollutant loads at Arkansas Highway 59 Bridge. Dr. Nelson made a detailed presentation before the Engineering Committee and Environmental and Natural Resources Committee on September 23rd.

Chairman Mahony discussed the increased use of the Arkansas River for municipal, industrial and irrigation purposes and the need for availability of information on water use for future planning. Upon motion by Commissioner Young, second by Commissioner Howell, the Commission authorized the Federal Chairman to contact both the Little

Rock and Tulsa Districts to request their assistance in obtaining this information.

With respect to the USDA Natural Resources Conservation Service presentation, Mr. Young commended Arkansas' representation in the cooperative development of a unified watershed assessment for the State of Arkansas. Arkansas was nationally commended as doing one of the best jobs in completion of the project.

PUBLIC COMMENT

No public comment was made.

1999 ANNUAL MEETING

The State of Oklahoma agreed to host the 1999 annual meeting of the Compact Commission. Commissioner Howell suggested the meeting be held in Tulsa at the Philbrook Museum with a reception to be held the evening prior to the meeting at his home. It was generally agreed that the State of Oklahoma as the host state has the latitude to determine the location and associated activities in conjunction with the next annual meeting. The meeting will be held on the fourth Thursday in September as provided for in the Compact Commission's rules unless otherwise agreed to by the Commission.

ADJOURNMENT

There being no further business, the Chairman adjourned the meeting.

_____ _____

EMON A. MAHONY, JR. Date
Federal Commissioner and Chairman

ATTEST:

_____

PRIS HOUCHENS, Secretary-Treasurer

APPENDIX AA

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 29, 1999

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 29, 1999, at 9:00 a.m. at the Philbrook Museum, Williams Conference Room, Tulsa, Oklahoma.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Oklahoma Commissioners Brian Griffin, Ron Howell, and Duane Smith; and Arkansas Commissioners Mike Carter and Randy Young. Arkansas Commissioner Xollie Clinger was absent.

See Attendee List, Attachment A for list of others in attendance.

A. CALL TO ORDER

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Federal Commissioner and Chairman Emon Mahony. The Chairman recognized a quorum of Commissioners present.

B. INTRODUCTIONS AND ANNOUNCEMENTS

There were no introductions or announcements.

C. APPROVAL OF AGENDA

There were no changes to the agenda, and no objections to the proposed agenda. Chairman Mahony approved the agenda as presented. (Attachment B)

D. CONSIDERATION OF COMMISSION MEETING MINUTES

Chairman Mahony said the draft minutes of the September 24, 1998, meeting had been previously distributed. He asked for amendments or additions to the minutes. Commissioner Mike Carter stated he had endeavored to present a study of and phosphorous loading on Lake Champlain. He said the Chairman sustained an objection of Commissioner Smith about including the whole study, which he had accepted. The minutes did not reflect he had tendered the study, and he asked the minutes be amended, and the introductory page be attached.

Chairman Mahony stated that with no objections, a sentence be added to the minutes. Commissioner Carter moved the minutes of the meetings as amended, and Oklahoma Commissioner Duane Smith seconded. There was no discussion. Those in favor of the motion voted aye; there were none opposed, and the minutes of the September 24, 1998 Annual Meeting, of the Arkansas-Oklahoma Arkansas River Compact Commission were approved and ratified. (Attachment C)

E. REPORT OF THE CHAIRMAN

Chairman Mahony stated the Chairman did not have a report. He mentioned that when he agreed to serve as chairman, he had high possibilities of what the Commission might be able to accomplish. He said the potential ability to do things for an interstate compact are great, and there isn't any question legally about anything within its jurisdiction as defined by the statute that creates it. Anything that an interstate compact does has the potential to do more than two states acting together, and it has been a means over the years through which some states that work together cooperatively have been able to accomplish some significant things. It is his personal belief that this particular compact—the commissioners of two states, and some cooperative elements of the governments of the two states—has the potential to clean up,

among other things, the entire compact area. He said in his mind there is no question this compact could, if it so desired and worked together cooperatively, completely clean up the area. He said he is hopeful that possibilities for action by the Commission be brought to fruition and that the two states work cooperatively to make the region a model for the rest of the nation.

F. REPORT OF THE TREASURER

Mr. Earl Smith, Acting Treasurer, stated that actual expenses for the year totaled $2,908.25 He mentioned there was a special project approved through the Compact and the University of Arkansas for the Highway 59 bridge station. The funding has totaled approximately $43,000 per year and accounting has been done separately. Mr. Smith said all assessments have been paid, and everything is in good shape.

Chairman Mahony stated the Treasurer's Report has been presented and accepted (Attachment D)

G. REPORT OF THE COMMISSIONERS

1. Arkansas—Commissioner Randy Young presented the written Arkansas report. He briefed the Commission on the contents of the report saying, Arkansas voters approved a $3 million general bond issue for financing water, sewer, and solid waste infrastructure projects and was follow up to two previous bond issues of $100 million and $250 million for water and wastewater projects. The Arkansas Soil and Water Conservation Commission (ASWCC), is designated by the Governor to administer the 319 program in concert with the Arkansas Department of Pollution Control and Ecology and local conservation districts. Work in the compact area has identified the Poteau River and the Illinois River as priority watersheds for Section 319 funding under the Clean Water Act, and watershed restoration action strategies will be developed with the local leadership groups. The ASWCC is continuing to implement throughout the state a cost-share

program for the purpose of assisting dairy farmers with carrying out waste management plans funded initially with $500,000.00. The agency has made a grant application to EPA for 319 funding to cost-share with individual landowners for carrying out best management practices, working with the local conservation district. The Poteau watershed will be involved.

Commissioner Young stated that in addition to the Clean Water Act funding, the Arkansas General Assembly appropriated the last four years $500,000.00 annually for the purpose of funding—in cooperation with the local conservation districts—water quality technicians to assist writing public water management plans as a guide for BMPs (Best Management Practices) on a voluntary incentive basis for the landowner to implement. With that level of funding, conservation districts have been able to employ about thirty technicians. In addition, in cooperation with the Natural Resource Conservation Service, the ASWCC has been able to initiate the first in the nation, dollar-for-dollar matching grant program to conservation districts for the same purpose. The cost has been $750,000.00 annually for employ of water quality technicians in western and northern Arkansas.

Commissioner Young mentioned other activities, including a partnership with the Cooperative Extension Service for training for permits under the animal waste program; a nonpoint source project with Fayetteville and Rogers regarding impact of pollutants within the cities; and a partnership program with Oklahoma Conservation Commission for implementation of BMPs in the Spavinaw/Eucha watershed. He commended the Benton County Conservation District in Arkansas and the Delaware Conservation District in Oklahoma for work on the cooperative project.

Other activities of interest noted by Commissioner Young are the designation of critical groundwater areas resulting in the formation of a local water management district author-

izing a levee for use of the water. The proceeds will be used to develop alternative surface supplies of water. There are three regional irrigation projects in various stages of planning, the most advanced will bring surface water from the White River to the Grand Prairie. The local conservation district is in the process of petitioning the circuit court to establish an improvement district that has the ability to levee a tax for that area in order to assist in financing the local share on that project. Another project is in the planning stages by the Corps of Engineers, and the third project is in southeast Arkansas and would divert excess water out of the Arkansas River system into the Boeuf-Tensas Basin.

Commissioner Carter commented about the aquifer project in southern Arkansas. Chairman Mahony asked, and Derek Smithee of Oklahoma responded, about genetic research involving grain crops in an effort to reduce phosphorous concentration in chicken litter. (Attachment E)

2. Oklahoma—Commissioner Duane Smith presented the written report of the Oklahoma Commissioners. He noted highlights of the report saying there is a lot of activity involving Lake Wister specifically a vegetation project in the upper regions to decrease turbidity. The program is a cooperative effort between the Oklahoma Water Resources Board and the Corps of Engineers. Derek Smithee addressed questions by Chairman Mahony about types of vegetation, perennial and annual, and their growth during fluctuating lake level conditions.

Commissioner Smith continued his report updating the members on the OWRB's efforts in updating the state's water quality standards. He explained recent legislation requiring state environmental agencies to establish use support protocols for uniform determination of impaired waters on the state's 303(d) list submitted to the Environmental Protection Agency. The state agencies are also now required to develop implementation plans for the consistent implementation of the

standards. There was discussion among the members and attendees about regulations imposed by EPA because of waters listed on the 303(d) list, how impairment is defined, and national coordination of the issues.

Commissioner Smith reported the OWRB is working on an instream flow analysis on the Barren Fork River as a result of controversy that arose due to a rural water district withdrawing water from the river. The agency is working with Oklahoma State University to develop an incremental methodology for determining what level needs to be maintained in the Barren Fork to maintain the fishery. The project is viewed as developing a template for stream water permits on all state rivers.

The Oklahoma Legislature continued funding for the state Weather Modification Board, this past year creating a governing board and establishing a funding mechanism whereby insurance companies can make voluntary contributions to funding the program which focuses on hail suppression and rain enhancement. There was discussion about the controversial success of the weather modification programs, and the sharing of information among state and federal agencies.

Commissioner Smith concluded his report stating funding was received for the continuation of the state's Beneficial Use Monitoring Program (BUMP), and he noted financial assistance provided to Oklahomans to date: 241 bond loans totaling $307 million, 441 emergency grants for $25.3 million; 91 loans Clean Water and Drinking Water construction, revolving fund program loans totaling $325.5 million; and 168 Rural Economic Action Plan grants totaling $13.3 million.

Commissioner Howell asked if there were programs that were not funded by the 1999 Legislative session, and in anticipation of higher oil prices and a better revenue picture, what are we looking for in the next session. Commissioner

Smith answered the Corps of Engineers has experienced a $300,000 shortfall for the streamgaging program and the agency will ask the Legislature for funding. He said $1 million for continuation of the Beneficial Use Monitoring Program will be requested, and $2 million is needed to match the Safe Drinking Water to receive $10 million in federal grant funds. Commissioner Howell in follow up to Chairman Mahony's earlier comments about the federal government's lack of funding on the Lake Wister project, asked if it is an appropriate function of the Commission to contact each state's congressional delegation. Chairman Mahony asked Mr. Howell if he would like, and make in the form of a motion, that the Commission approves communication encouraging water quality study funding for Lake Wister. Chairman Mahony stated that water quality is significantly bad in the Poteau Valley Improvement Authority area, and a lot of issues would have been addressed in the Environmental Impact Statement had one been made when the water level was raised from 476 to 478. Commissioner Howell moved that the Commission add its appropriate voice to reinforce back to the Oklahoma Congressional Delegation at selected and appropriate times that there is the same level of support as in other parts of the United States. Commissioner Brian Griffin seconded. The motion was unanimously approved.

Chairman Mahony asked about studies conducted by Oklahoma on streams in the Northern Washita basin as the water is a different color, and what are the impacts to Lake Wister. Mr. Derek Smithee responded that to a limited extent, chemical analyses on aquatic vegetation have been conducted. Some work has been done on the upper reaches of the Poteau and Fouche Maline on existing aquatic plants that appear to be thriving over other plants in an effort to replicate those plants in the reservoir. Mr. Smithee said that Wister Lake has "bad genes" and will never be like Broken Bow or

Tenkiller reservoirs, but Oklahoma has looked at how to accentuate the positive, and how to slow down the accelerated eutrophication. (Attachment F)

H. COMMITTEE REPORTS

1. *Budget Committee*—Mr. Mike Mathis, chairman, stated to the Commissioners that the committee had prepared a proposed budget for the Commission's consideration. Essentially, he said a modest budget increase is proposed based on the report of the treasurer. The Committee felt it was prudent to provide a small increase through fiscal year 2000. The Committee recommended approval.

Commissioner Young moved to approve the budget, and Commissioner Howell seconded. The motion was approved. (Attachment G)

2. *Engineering Committee*—Mr. Mathis, chairman, stated to the Commissioners that the only assignment to the committee was the ongoing assignment of the annual yield proficiency report. He said that Terry Lamb, contractor with Hydrologic Engineering Services, has reported there have been no violations of the compact provisions. The committee has two recommendations for the Commission, (1) awarding computation of yield study report for the coming year to Hydrologic Engineering Services in the amount of $3,600; and (2) continue work on Highway 59 station on Illinois River, with funding at 100% from the State of Arkansas. The committee recommended approval.

Commissioner Griffin moved to approve the report of the Engineering Committee and recommendations as presented, and Commissioner Young seconded. The motion was approved. (Attachment H)

Prior to the report of the Environmental Committee report, Chairman Mahony returned to the discussion on Lake Wister. Mr. Couch suggested the Commission assign to the Legal

Committee to draft correspondence to the Congressional delegation. Chairman Mahony then assigned to the Legal Committee that a draft be prepared, circulated to state agencies for input, and then be forwarded to the delegation or to the chairman for signature.

3. *Environmental & Natural Resources Committee*—Mr. Derek Smithee presented the report on behalf of Chairman Larry Adair. Representative Adair attended the September 28 Committee meeting. Mr. Smithee reported on the Committee's meeting of September 28 where several presentations were made by the University of Arkansas, the State of Arkansas, State of Oklahoma, and the U.S. Geological Survey on ongoing monitoring activities in the Compact basin area. He said that by way of historical reference, in early-to-mid 1990 a study was completed on Lake Tenkiller recommending reduction of total phosphorus loadings to the lake. In response, the states of Arkansas and Oklahoma met and proposed to the Compact Commission that a 40% reduction at Horseshoe Bend on the Illinois River be established, which was voted on and accepted by the Commission. Since that time, the states have worked diligently to achieve that 40% reduction goal. One major piece of information that was lacking in the assessment of Tenkiller and the goal itself, was high-flow data. The states' previous recommendations had been based on base flow data only, and historical stormwater flows were needed. Both states have conducted a lot of work looking at stormwater flows and how they are increasing the total phosphorous concentration into the lake and streams that was originally unknown. Information presented at the meeting by both states indicated that the baseline total phosphorous loading represents about one-half to two-thirds of the total phosphorous loading and that stormwater total phosphorous loads may be contributing between 33-66% more total phosphorous that had been originally realized.

Mr. Smithee said that regarding the 40% reduction goal, the Baron Fork and Flint Creek appear to be close to achieving reduction based upon base flow data. The Illinois River has not yet been able to achieve that, but all sites are showing steady progress in reductions of total phosphorous concentrations and loads. The states are strongly encouraged that at least base flow concentrations are showing decreases in phosphorous concentrations at all sites. He said the Committee agreed to meet again within the next few months to, first, evaluate the new stormwater total phosphorous data, evaluate a method to incorporate that information into the 40% reduction goal, and how that might be accomplished. And, secondly, to determine if the current method of evaluation on whether the 40% goal is being achieved using the 5-year rolling average is being done correctly.

Mr. Smithee stated the Committee recommended that the Commission instruct the Environmental and Natural Resources Committee to meet to evaluate those two activities. He presented a written summary to the Committee meeting and recommendations to the Commissioners. (Attachment I)

Commissioner Carter moved that the Commission assigns to the Environmental and Natural Resources Commission the task of evaluating stormwater flow total phosphorous data and method to use the information in achieving the 40% reduction goal, and Commissioner Smith seconded. The motion carried.

In response to an inquiry by Commissioner Smith, there was discussion about reduction of phosphorous during base flow times; contributions to phosphorous loading and possible contributions to the reductions. The Commission agreed that the Environmental Committee should gather information about activities in the watershed that contribute to success in reducing the amount of phosphorous, continue monitoring Lake Tenkiller, determine how success is measured, and make recommendations to the Commission about what efforts should be undertaken in the future.

4. *Legal Committee*—Mr. Dean Couch, Committee Chairman, presented the report to the Commissioners on behalf of committee co-chair Commissioners Carter and Griffin. He stated to the Committee's assignment was to develop a minor rule amendment about membership on committees. The Commissioners approved the concept at the 1998 meeting, and asked the Committee to develop actual language to address the issues of concern.

The Compact itself does not mention anything about committees other than being authorized to organize itself to conduct business. The current rule states members of the standing committees shall be appointed by the Commission, each state shall be represented equally with nominations by each state, and the chairmanship will alternate annually. The Commissioner had previously discussed vacancies occurring in the interim that caused an unequal number of committee members, and the possibility of members appointing designees. The Compact provides no guidance on the matter, and it appeared that the Commission could make a change to its own rules to address the concerns.

The Legal Committee suggested language amending the current rules adding that if a committee member resigns or is removed by the Commissioners, the Commissioners from that state may replace the committee member by interim appointment which will be subject to ratification by the Commission at its next meeting. Notice of such interim appointment shall be provided as soon as practical. The language included that interim committee members shall be deemed nominated for committee membership to attend and participate, unless otherwise specified by the Commissioners making the appointment.

Mr. Couch stated there is no procedure for adopting the rules amendment, but the Compact authorizes that Commission rules can be amended at any Commission meeting. He suggested the Commission make the amendment either

separately as a rule amendment, or by adopting the Legal Committee report.

Commissioner Griffin moved for the adoption of both the Committee report and the rule amendment. Commissioner Carter seconded. The motion carried.

Mr. Couch said the adopted language would be forwarded to the Engineering Committee for inclusion in the Compact report which contains a copy of the rules. (Attachment J)

I. UNFINISHED BUSINESS

There was no unfinished business for discussion or action by the Commission.

J. NEW BUSINESS

1. *Appointments/Assignments to Committees and Selection of Chairs*

Commissioner Young noted that traditionally the Host State assumes the chair of each committee. He asked that Earl Smith be appointed as Chair of the Budget Committee. Commissioner Smith noted there are no changes in the Oklahoma membership.

Commissioner Carter moved that the membership of each Committee remain as currently constituted, authorizing Commissioner Young to designate the chairs of the respective committees. Commissioner Young stated Mr. Smith's appointment to the Budget Committee is a new appointment. Commissioner Griffin seconded. The motion carried.

2. *Election of Officers*

Commissioner Young nominated Mr. Earl Smith as Treasurer. Commissioner Smith seconded. The motion carried.

3. *2000 Annual Meeting*

Chairman Mahony stated that the State of Arkansas would be host for the 2000 meeting. Commissioner Carter stated the

meeting would be held in Fort Smith, on the fourth Thursday of September as provided by the Compact.

K. FEDERAL AND STATE GOVERNMENT REPRESENTATIVES REPORTS

Department of Environmental Quality—Mr. Quang Pham, representating the Oklahoma Department of Environmental Quality, addressed the Commission and stated his agency is responsible for the development of TMDLs in Oklahoma. The DEQ is currently working in two watersheds of interest to the Commission: Lake Wister and Illinois River/Lake Tenkiller. He said the DEQ is looking at nonpoint sources in the watersheds to develop TMDLs, and hopefully he would be able to report next year on the high flow information and loadings. Oklahoma's work stops at the stateline, but the agency coordinates with the responsible Arkansas agency. Earl Smith said he was concerned with separate efforts ongoing, and asked that the DEQ share its information with the Environmental and Natural Resources Committee.

Chairman Mahony stated that it would be appropriate for the Commission to determine what role, if any, the Commission should play in this area. He said he did not want to read another Supreme Court decision "Oklahoma versus Arkansas", but that the states work it out. Commissioner Smith said that the Oklahoma DEQ is the lead agency for TMDL development. The statute does not say, however, its work be done in a vacuum, but in cooperation with other agencies. He said it would be appropriate for the Commission through the Environmental Committee to have formal input into the process. The Environmental Committee would need to meet at times so that the DEQ can be involved.

Chairman Mahony suggested the Commission direct the Environmental Committee to add to its assignments to coordinate TMDL determinations cooperatively between the states. Mr. Pham said the State's TMDL workgroup is comprised of the environmental agencies of the state.

Commissioner Young moved to make that assignment to the Environmental Committee (that efforts to develop TMDLs be coordinated) and further to gather information about what each state is doing in order to assess the effectiveness of the nonpoint program. Chairman Mahony added that a recommendation be made for action to the Commission, if any. Commissioner Smith seconded the motion. The motion carried.

There was no other state agency presentations to the Commission.

U.S. Geological Survey—Ms. Kathy Peter, District Chief in Oklahoma City, stated to the Commissioners both Oklahoma and Arkansas staff would make a report to the Commission. She noted reports that were available on changes in phosphorous management nationwide, and especially a report nutrients and pesticides with very controlled data collected in early 1990s. Ms. Peter stated she would like to give a power point presentation on the USGS streamgaging program following reports by both states. Mr. Bob Blazs, Oklahoma City, presented a written and oral report on the year's stream flow information. The U.S. G.S. noted that while the streamgaging program is partnered with many entities, a reduction in funding has resulted in a decrease in long-term stations. (Attachment K)

Arkansas Representatives Shane Barks added the situation is similar in Arkansas. Like Oklahoma, the major cooperator is the U.S. Army Corps of Engineers, which has experienced a number of budget cuts over the past few years. The work has been funded through other sources, specifically, the State of Arkansas. This year, funding for eleven stream gages will be maintained at a different level. Funding is a major concern, and specifically regarding the Compact area, there is a possibility for new work in the Lee Creek basin for the City

of Fort Smith, just above Lee Creek reservoir. A new gage to measure quality as well as quantity was installed on Lee Creek a few weeks ago, and more may be added.

U.S. Fish and Wildlife Service—Mr. Jerry Brabander, Tulsa office, described to the first year of operation of the High Plains Partnership program. Commissioner Smith asked how the Compact could become involved. Mr. Brabander responded there are several resources such as water quality and stream flow complications that the USF&WS is concerned about and where the Service and Compact can share information. Chairman Mahony invited the Service to comment on such matters as the Commission's resolution to the Congressional Delegation about lack of an environmental impact statement on Lake Wister in light of the wildlife refuge that is at the lake. Commissioner Smith noted that the Oklahoma Water Resources Board could assist as a critical partner in the restoration of High Plains habitat, particularly regarding groundwater and streamwater issues. Chairman Mahony stated the resolution about funding should also be sent to the Chairs of the Congressional Appropriations Committees, with copies to the Corps of Engineers and US Fish and Wildlife service so that those agencies could express support if they desired. (Attachment L)

U.S. Army Corps of Engineers—Ms. Sue Haslett, representing both the Tulsa and Little Rock Districts, distributed a written report and noted the projects in the Compact area. There was general discussion in response to questions from the Commissioners about the sewer study at Lake Texoma, status of the zebra mussel, and an operation study of the Arkansas River Navigation System. (Attachment M)

U.S. Department of Agriculture, Natural Resource Conservation Service—Mr. Jamey Wood was present representing Oklahoma State Conservationist Ron Clark. Mr. Wood did not have a prepared, report; however, he talked to the Commission about priority projects of interest in the Compact area. The

EQUIP, or Environmental Quality Incentive Program, is a cost-share program dealing with various environmental concerns and works largely with the poultry industry on disposal of poultry litter. The NRCS said in regard small watershed flood protection, most of the structures have reached their life expectancy, and Congressman Lucas has offered a bill which is now in committee. He said there is not a significant number of structures in the Compact area. Mr. Wood also commented on the NRCS Emergency Watershed Protection program, assisting local partners in protecting infrastructures i.e., tornado damage. He said the program had also provided assistance in the Poteau River area to stabilize a road.

L. PUBLIC COMMENT

There were no comments from the public. Chairman Mahony expressed the Commission's appreciation to Mr. Ron Howell for hosting this year's meeting. Commissioner Howell invited those who could stay to tour the Philbrook Museum. Ms. Peter invited those interested to remain and view the USGS Stream Flow Monitoring Program.

M. ADJOURNMENT

Chairman Mahony thanked those in attendance for participating in the meeting, and said he was very encouraged by the spirit of cooperation expressed. There being no further business, Chairman Mahony adjourned the September 29, 1999 Annual Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission meeting at 11:54 p.m.

/s/ Emon A. Mahoney, Jr. Date: 9-28-00
EMON A. MAHONY, JR.
Federal Commissioner and Chairman

ATTEST:

/s/ Mary Schooley
MARY SCHOOLEY, Secretary

APPENDIX BB

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 28, 2000

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 28, 2000, at 9:00 a.m. at the Baldor Building #101, Westark College, Fort Smith, Arkansas.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Arkansas Commissioners Randy Young and Leo Anhalt; and Oklahoma Commissioners Duane Smith and Gary Sherrer. Commissioners not in attendance were Arkansas' Xollie Clinger Duncan, Oklahoma's Brian Griffin, and Fred Helms, Alternate Federal Commissioner. For others in attendance see Attachment A.

CALL TO ORDER

Federal Commissioner and Chairman Emon Mahony called the Arkansas-Oklahoma Arkansas River Compact Commission Meeting to order and welcomed all in attendance to Fort Smith.

APPROVAL OF AGENDA

Young made a motion to approve the agenda and Smith seconded the motion. The motion carried the agenda was approved. (Attachment B).

APPROVAL OF MINUTES September 29, 1999

Young advised that the Treasurer's Report should have read $2,908.25 rather than $4,403.45 in the minutes.

Anhalt made a motion to approve the minutes with the change to the Treasurer's Report and Sherrer seconded the motion. The minutes were approved as corrected.

REPORT OF THE CHAIRMAN

Introduction of new Commissioner Gary Sherrer was made. Roundtable introduction of the guests and staff in the audience followed.

REPORT OF THE TREASURER

The FY 99 Financial Report reflected income and expenses through June 30, 2000. A beginning balance of $108,810.71 on July 1, 1999 was shown, state assessments were paid, and expenditures of $36,057.04 were reported, ending the fiscal year with $72,566.18. (Attachment C).

A biennial audit was completed and no adverse findings were found. (Attachment D).

Sherrer made a motion to approve the Treasurer's Report and Anhalt seconded the motion. The motion carried and the Treasurer's Report was approved as presented.

REPORT OF THE COMMISSIONERS

Arkansas Commissioners: Commissioner Young presented a written report of the Arkansas Commissioners (Attachment E). He advised that Commissioner Clinger had resigned due to a Governor appointed Judgeship. He stated a update was performed on several nonpoint source pollution activities and he noted that the Poteau, Illinois and Little Rivers were identified as priority watersheds. He referred to the Dairy/ Cost Sharing Program, Best Management Practices and Cost Sharing for the implementation of Best Management Practices. The funds were successfully used to initiate a program to provide water quality technicians employed by the western and northern conservation districts of Arkansas. The technicians prepare waste management plans (animal waste application and storage facilities), working with the land owners to

attain cost share incentives and implement land use activities that protect the water quality. The first on farm construction contract was to be signed that day. Other cooperative projects include the Cities of Fayetteville and Rogers and address the urban impact of water quality. Further, Northwest Arkansas and East Oklahoma continue to provide cost share and technical assistance through local conservation districts.

Young noted that other topics of interest included critical groundwater designation in east Arkansas and start of construction of the Grand Prairie Demonstration Project by the Corps of Engineers, alternative water projects from the Arkansas and White Rivers. Of interest is a joint project of the Arkansas Game & Fish Commission, Arkansas Soil and Water Conservation Commission and local irrigation districts in which other Arkansas River water is diverted for a wildlife management area and for agricultural irrigation west of Morrilton.

Young made a motion that a resolution be prepared expressing the Commission's appreciation for Randall Mathis' service on the Environmental Committee and Smith seconded the motion. The motion carried.

Commissioner Mahony thanked Oklahoma for admirable work performed in cleaning the Arkansas River.

Oklahoma Commissioners: Commissioner Duane Smith presented a written report of the Oklahoma Commissioners (Attachment F). He welcomed and introduced new Commissioner, Garry Sherrer. Commissioner Sherrer previously held the position, Director of the Water Resources Board/Secretary of the Environment.

Commissioner Sherrer commented that he was influenced in accepting the Commission appointment by his work experience with the professionalism of both Oklahoma and Arkansas.

Commissioner Mahony stated the Commission was delighted to have Commissioner Sherrer, noting Sherrer was aware of the Compact's potential.

Smith advised that the Supreme Court required a determination be made by the Water Resources Board relative to waste by pollution. Therefore, water quantity permits for groundwater cannot be issued until it is determined that pollution will not occur. Congressman Watkins is sponsoring a Southeast Oklahoma water supply study. The goal is to provide water to Southeast Oklahoma.

Derek Smithee stated that the Lake Whisler project included several federal and state partners to reintroduce natural acquatic vegetation into the shoreline to minimize shoreline erosion and stabilize the sediments.

Smith advised that there was reproducible scientific evidence for hail suppression in the Weather Modification Program.

COMMITTEE REPORTS

Budget Committee: Earl Smith, Budget Committee Chairman, Advised that the Budget Committee met the night before. (Budget, Attachment "G"). The assessment for last year was $7,000 or $3,500 for each state. He advised that it was recommended a contingency fee of $1,800 be removed and the total assessments for next year be $5,485 or $2,742.50 for each state.

Engineering Committee

Environmental and Natural Resources Committee: Earl Smith, Engineering Committee Chairman, presented a report by the Engineering and the Environmental and Natural Resources Committees which met jointly the previous day. The Engineering Committee reported that the annual yield reports was performed and no deficiencies were found. The Engineering Committee recommended retaining the same contractor for the 2001 annual report.

Young made a motion to accept the Engineering Committee Report and recommendation. No discussion followed. The motion carried.

It was reported that the Environmental Committee met extensively the previous day and received substantial information relating to the testing methodology utilized in the Illinois River. The proper method to sample and compute the aspect of storm loadings in the event a total phosphate level was not determined. A one-year contract was proposed utilizing both the University of Arkansas and USGS; the present testing process would continue, however, different methodologies to test stream load and high water flow will be added. The Environmental Committee recommended that the Commission authorize the study to provide an economical and competent level of sampling and computing of loads. The cost of the study is an estimated $18,000.

Earl Smith explained that the Committee believed the twice a month sampling was not sufficient to determine accurate annual loads. Although, the intensive sampling as found at Highway 59 provided accurate total loads, it was too expensive to utilize in a network of several stations.

Smith made a motion to accept the Environmental Committee Report and recommendation and fund the study. Extensive discussion followed relating to: inconsistent findings, phosphorus fates and the lack of a definitive study methodology, the proposed study to compare the various existing data sets to provide standard deviations at (competent or confidence) levels and resulting costs associated. It was determined that the proposed study would investigate several methods of monitoring regimens in order to create an economical monitoring regime that would consistently produce an accurate total load. The motion carried.

Smith made a motion to maintain the $3,500 assessment. No discussion followed. The motion carried.

Mark Derichsweiler, Engineering Manager of the Watershed Planning and Toxics Control Section with the Oklahoma Department of Environmental Control gave an explanation of the status of the TMDL exercise on the Illinois River in Oklahoma.

Legal Committee: Mark Bennett, Legal Committee Chairman, reviewed the Legal Committee's Report. (Legal Committee Report, Attachment "H"). He advised that Dean Couch, Oklahoma member of the Legal Committee, provided the report. The Legal Committee had two assignments. The first referred to proposed changes in streamgaging, however that issue has been resolved. The second item referred to the Lake Wister water quality study.

Mr. Couch explained that Commissioner Howell's motion from a year earlier was unclear. The motion seemed to include the issue of streamgaging but the motion occurred following discussion about Lake Wister. Upon follow-up it was found that there has been progress in Congress, House Bill 4733 Energy and Water Development Appropriation sets out $700,000 from the Senate for the Lake Wister study. This reallocation study is to prepare documentation necessary to address the permanent seasonal pool increases of Wister Lake Oklahoma. A draft letter to support the study was presented to the Commission for consideration.

Upon motion by Commissioner Young, second by Commissioner Griffin, the report of the Legal committee was approved.

Smith made a motion to approve the letter as recommended by the Legal Committee and Young seconded the motion. No discussion followed. The motion carried.

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

ELECTION OF COMMISSION OFFICERS

Upon motion by Smith, second by Young, the Commission approved the selection of Mary Schooley with the Oklahoma Water Resources Board as the 2001 Compact Commission Secretary. The motion further approved the selection of Earl Smith to continue in the office of Treasurer.

2001 ANNUAL MEETING

The State of Oklahoma agreed to host the 2001 annual meeting of the Compact Commission. It was generally agreed that the host state has the latitude to determine the location and associated activities in conjunction with the next annual meeting. The meeting will be held on the fourth Thursday in September as provided for in the Compact Commission's rules unless otherwise agreed to by the Commission.

APPOINTMENTS/ASSIGNMENTS TO COMMITTEES AND SELECTION OF CHAIRS

The next item of business was appointments and assignments to committees and selection of committee chairs. As set forth in the Commission's Rules and Regulations, the Committee Chairmanship rotates between the two states. Upon motion by Sherrer, second by Young, the Commission approved the following:

Budget Committee: No additional assignments other than continuous assignment of preparation of budget. Members are:

Mike Mathis, Okalhoma (Chairman)
Earl Smith, Arkansas

Engineering Committee:

Mike Mathis, Oklahoma (Chairman)
Earl Smith, Arkansas

Environmental and Natural Resources Committee: (Host state.)

Representative Larry Adair, Oklahoma (Chairman)

Legal Committee:

Dean Couch, Oklahoma (Chairman)
Mark Bennett, Arkansas

Sherrer made a motion to approve the appointments and Young seconded the motion. The motion carried.

The Engineering Committee is to continue the Yield Report, the Environmental Committee was directed to utilize the testing methodology of the University of Arkansas and USGS for one year; and the Legal Committee is to prepare a resolution in recognition of Randall Mathis.

Young made a motion to approve the assignments and Sherrer seconded the motion. The motion carried.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Informational activity reports were given by representatives of the following agencies: Terry Daniel, US Army Corps of Engineers, Little Rock District; Kathy Peter, US Geological Survey, Arkansas and Oklahoma Districts jointly; and Bob Price, USDA Natural Resources Conservation Service. (Copies of available reports attached to Minutes; Attachment "I".) Information includes a copy of Dr. Marc Nelson's report on 1997 pollutant loads at Arkansas Highway 59 Bridge. Dr. Nelson made a detailed presentation before the Engineering Committee and Environmental and Natural Resources Committee on September 27.

Chairman Mahony discussed the increased use of the Arkansas River for municipal, industrial and irrigation purposes and the need for availability of information on water use for future planning. Upon motion by Young, second by

Howell, the Commission authorized the Federal Chairman to contact both the Little Rock and Tulsa Districts to request their assistance in obtaining this information.

With respect to the USDA Natural Resources Conservation Service presentation, Young commended Arkansas' representation in the cooperative development of a unified watershed assessment for the State of Arkansas. Arkansas was nationally commended as doing one of the best jobs in completion of the project.

PUBLIC COMMENT

No public comment was made.

ADJOURNMENT

There being no further business, the Chairman adjourned the meeting.

/s/ Emon A. Mahoney, Jr. _____
EMON A. MAHONY, JR. Date
Federal Commissioner and Chairman

ATTEST:

/s/ Laura Brown
LAURA BROWN, Secretary

APPENDIX CC

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

October 17, 2001

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held October 17, 2001, at 9:00 a.m. at the Conference Center at Shangri-La Resort, at Afton, Oklahoma.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Oklahoma Commissioners Gary Sherrer and Duane Smith; and Arkansas Commissioner Randy Young. Oklahoma Commissioner Brian Griffin and Arkansas Commissioner Leo Anhalt were absent. One Arkansas Commissioner position was vacant.

See Attendee List, Attachment A for list of others in attendance.

A. CALL TO ORDER

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission was called to order at 9:00 a.m. by Federal Commissioner and Chairman Emon Mahony. The Chairman recognized there was not a quorum of Commissioners present; however, he stated the Commission would proceed with the agenda as an informal conference for the purposes of setting up the agenda to be approved by a quorum of members at a later date.

B. INTRODUCTIONS AND ANNOUNCEMENTS

There were no announcements. Chairman Mahony asked those persons in attendance to introduce themselves.

C. APPROVAL OF AGENDA

There were no changes to the agenda, and no objections to the proposed agenda. Chairman Mahony approved the agenda as presented. (Attachment B)

D. CONSIDERATION OF COMMISSION MEETING MINUTES

Chairman Mahony said the draft minutes of the September 28, 2000, meeting had been previously distributed. He asked for amendments or additions to the minutes. Arkansas Commissioner Randy Young noted that the first time the word "Wister" appears it is spelled, "Wistler" and he asked for correction. With that change, Commissioner Young moved for approval. Oklahoma Commissioner Duane Smith seconded. There was no discussion. Those in favor of the motion voted aye; there were none opposed, and the minutes of the September 28, 2000 Annual Meeting, of the Arkansas-Oklahoma Arkansas River Compact Commission were approved subject to ratification in a meeting attended by a quorum of Commissioners. (Attachment C)

E. REPORT OF THE CHAIRMAN

Chairman Mahony stated he was unable to attend the Environmental Committee meeting on the previous afternoon. He briefly looked at the reports of the Commissioners, and he said he did not see where the Oklahoma Legislature had taken the step to ban use of all phosphorous detergents which is simple to do and has been done in Arkansas. Phosphorous bans have probably been the single most effective action to deal with phosphorous issues across the United States. He questioned why there is so much emphasis on best management practices in one state and not in the other. He said it has been reported to the Commission that there has been stated positive results in small, isolated identified watersheds of implementing best management practices, and it has been demonstrated to be an extremely effective device. He said he

hoped the Compact would continue to push for those practices and implementation in both states. He said that to the extent there can be results, the Compact will accomplish one of its main purposes, which is to get the two states to work together to decrease pollution problems.

F. REPORT OF THE TREASURER

Mr. Earl Smith, Treasurer, stated that actual income for the fiscal year (the compact operates on a July-June fiscal year) totaled $9,012.19; $7,000 of that amount is the state's allotment. There was dividend income of over $2,000.00. Expenses for the year totaled $52,736.52; $42,000 is the cost of the streamgaging station at Highway 59 for which the budget has been deposited in the Commission's account previous to July 1, 2000, and was a carryover balance that covered that expense. The Compact ended the fiscal year with $28,841.85 in the Commission's account; since that time there have been expenses of $5,500 and there are outstanding payments to be made on contract and printing invoices that have not yet been received totaling over $9,000. The balance of the Commission's account to date is $25,382.06 and a workable balance of $16,200.00 after subtracting the outstanding invoices. Chairman Mahony asked the amount of the beginning balance; Mr. Smith responded it was a little over $43,000. He clarified that the pay out on the gaging station had been made previous to July 1, 2000, and therefore, it does not show on this balance sheet. Mr. Smith said the documents from the special projects will be discussed under the Environmental Committee's report. Chairman Mahony stated that if there are no objections, he would accept the Treasurer's Report as presented. There were no objections. (Attachment D).

G. REPORT OF THE COMMISSIONERS

1. Arkansas—Commissioner Randy Young presented the written Arkansas report. He said that most of the items

presented in the written report were discussed at the last meeting. He noted the state's increased activities regarding the development of nutrient management plans and over 6,000 plans have been completed for poultry growers. He said the Governor and Legislature had increased funding for the program by $200,000 by adding an additional technician in Benton County and Northwest Arkansas to help expedite work in that priority watershed area. He said this is a cooperative effort with the State of Oklahoma's Conservation Commission and that the two states (four county area) are doing good work in the Eucha-Spavinaw area. Mr. Young also noted work being done outside the compact area regarding the White River irrigation demonstration projects and critical groundwater area, and the Bayou Meto irrigation project. Chairman Mahony added that project would not be successful without Oklahoma's efforts to reduce chlorides in the Arkansas River. (Attachment E)

Chairman Mahony asked about cooperative efforts to implement best management practices as in the Eucha-Spavinaw area in the Illinois River and Poteau River watersheds? Commissioner Young and Earl Smith answered there are cooperative activities, but no cost-share; the primary focus has been in the Eucha-Spavinaw area which may be used as a demonstration in other areas. Mr. Young added that Oklahoma has contributed the funding for the project not only in Oklahoma but also in Arkansas for the Eucha-Spavinaw project.

2. Oklahoma—Commissioner Duane Smith presented the written report of the Oklahoma Commissioners. Mr. Smith asked that the Commissioners be mindful that the Oklahoma report does not reflect work regarding the implementation of BMPs using 319 funding as that is operated by the Oklahoma Conservation Commission. He said he would like to supplement the report at a later date with information regarding those activities. He said Oklahoma is proud of the efforts in terms of phosphorous reduction, and at the OWRB there is

work in the water quality standards looking at numerical limits for nutrients. Support is found by the Oklahoma Conservation Commission and the Oklahoma Scenic Rivers Commission, but it will be difficult from a scientific point of view. He explained that a narrative standard would, for example, mean there would not be certain algae growth, where with a numerical standard there would be, for example, a phosphorous limit of 1—from all sources with an end result. He said the state is also moving forward on TMDL development. Commissioner Smith said that for poultry operations located in a nutrient limited watershed (as determined by the water quality), in those watersheds that are susceptible to runoff that would cause high phosphorous concentrations, the poultry growers have to do soil testing, for example. Mr. Smith mentioned that Commissioner Brian Griffin, who could not attend today because his father is gravely ill, is very active in exploring options and technologies to take phosphorous out of the watershed.

Commissioner Smith reported on activities regarding in-stream flow studies on the Baron Fork, not only for water quality protection, but to protect the fisheries. The Oklahoma Department of Wildlife Conservation is involved to determine for appropriation purposes how much water needs to be in the stream to protect recreation and fisheries. The primary impetus is the growth in northeast Oklahoma and the rural water districts that are trying to expand and identify various water supplies. One of the most controversial projects has been one that involved the Choctaw and Chickasaw Nations in southern and southeastern Oklahoma on a water compact that deals with water rights administration, water quality standards administration, and economic development. A draft compact is scheduled for public release in November and offered for consideration by the Oklahoma Legislature in February. He said the compact is part of a plan for economic development for Oklahoma in partnership with the Tribes to enhance Oklahoma's ability to be productive in the future

and, as a side, Texas would have a drink of water. He said there have been some concerns from southwest Arkansas, but clearly, the Red River Compact will be complied with.

Chairman Mahony said that water absent of nutrients is not ideal, and he asked what limit Oklahoma was looking at, and what work is being done, is there an ideal nutrient level? Mr. Derek Smithee, chief of the OWRB Water Quality Division, responded that there probably is an ideal level, but it is stream-specific, and each stream would have to be studied which would cost hundreds of thousands of dollars so it is cost prohibitive. He explained that EPA has attempted to derive alternative, broad-scale criteria, that Oklahoma is not supportive of and EPA came up with a national criteria that applies to both Oklahoma and Arkansas, but the nutrient mix to protect beneficial uses is very elusive.

Commissioner Smith continued with his report stating that the Oklahoma Legislature had appropriated $1.2 million for beneficial use monitoring across the state. The agency would prefer that funding be placed in the base appropriations instead of having to ask for special appropriations each year. It has been a very successful program. The OWRB received $250,000.00 for drought preparedness to develop plans and implementation. Mr. Smith stated the state's water resources financing has been an incredibly successful program and there have been over $600 million in loans and grants to cities and towns for water and wastewater infrastructure. He said that particularly the growth in northeast Oklahoma and the pressure upon the water supplies and the balance between environmental protection and water supply development is ongoing and critical. He said that as the state moves forward in attracting industry in northeast and southeast areas, identifying water supplies and striking a balance with environmental protection is going to be controversial. Chairman Mahony asked about regional projects and purposes of the Clean Water Act financing programs. There was discussion

about cities placing restrictions on upstream water users to protect municipal water systems, incentive payments, and watershed and wellhead protection programs.

Upon suggestion by Chairman Mahony, Commissioner Young moved and Commissioner Sherrer seconded that the Legal Committee make a report about incentive payments to the compact at its next meeting, and to make recommendations for action, if any.

Commissioner Sherrer added that each time he attends these meetings he sees the complex problems that exist in trying to keep our water clean and safe, all the external pressures; he admires the people that work in this area, and the expertise that they have. In most cases, he believed that if funding were available, and political roadblocks removed, a lot more positive things could be done in both states and across the country. He said he is pleased to be in northeast Oklahoma, and that considering the things that have gone on in our country recently, he is pleased the group can meet today. (Attachment F)

Commissioner Smith thanked Commissioner Sherrer and his company, KAMO Electric for sponsoring the reception.

H. COMMITTEE REPORTS

1. *Budget Committee*—Mr. Mike Mathis, chairman, stated to the Commissioners that the committee had prepared a proposed budget for the Commission's consideration. He said the committee had reviewed expenditures and determined that the proposed budget on the final year could be extended for another year and more than adequately cover the costs of commission operation, with one caveat. He said that if there were decisions made at the Commission for additional, or special kinds of activities that warranted a budget change, that would need to be taken into account for preparation of the final budget. Mr. Mathis said that in concert with the Commission's approach of maintaining an assessment of $7,000

total, or $3,500 per state, it appeared that would adequately fund the general budget to meet the compact needs.

Commissioner Young moved to accept the report of the Budget Committee, and Commissioner Smith seconded. The motion was approved, subject to ratification. (Attachment G)

2. *Engineering Committee*—Mr. Mathis, chairman, stated to the Commissioners that the only assignment to the committee has been the calculation of the yield and that is being done by a private consultant, Terrance Lamb, and is in the budget to do every year. The Committee had nothing further to report.

Commissioner Sherrer moved to accept the report of the Engineering Committee, and Commissioner Young seconded. The motion was approved subject to ratification.

3. *Environmental & Natural Resources Committee*—Mr. Derek Smithee presented the report on behalf of Chairman Larry Adair. He said the committee met on October 16 for 2 1/2 hours. Mr. Smithee said that as has happened historically in the past, there was an update on the 40% reduction goal of total phosphorous for the Illinois Basin. (Report entitled, "Water Quality Monitoring Stations, Illinois River Basin, Arkansas and Oklahoma.") A five-year rolling average has been employed to calculate progress toward that 40% reduction goal. For the second year on the Illinois River proper, total phosphorous did increase somewhat, and there are potential reasons, including the methodology used to track progress is fundamentally flawed. In response, the Commission charged the U.S. Geological Survey and the University of Arkansas to work with the Environmental Committee to come up with a prescribed method to calculate loadings on the Illinois River. He said the University of Arkansas and USGS tried to come up with a unified prescribed mechanism anywhere in either state, unfortunately, what happened was that no consensus was reached and instead each institution provided information on what it

believed to be the most appropriate method. The University recommended auto samplers, which is an acceptable yet costly way to sample the watershed versus a model loads approach recommended by the USGS which utilizes less frequently collected data and is cheaper, but not accurate. Mr. Smithee said the committee recommended that next year in regard to the report on progress toward the 40% reduction goal, if the more rigorous "Cadillac" method is available that would be included in report. If not, the USGS method would also be included in the report along with the historical 5-year rolling average. Also, the Committee recommended that Mr. Smithee (OK) and Mr. Earl Smith (AR) be charged with meeting with both groups to try to determine cost and time estimate of the two methods for each site in Arkansas and Oklahoma. They would then report to the Commission next year with actual cost of the "Cadillac" versus the "Chevy" versus the existing method. Then rational decisions can be made based upon costs and needs and acceptable error.

Commissioner Young stated he thought the Commission ought to give guidance as to what it wants. He said he would like to have data sufficient to show the effectiveness of the BMPs. He said the question was raised several times at the Committee meeting, "What does the Commission want to show?"

Commissioner Smith said he would agree, but he asked what the data shows this year? Mr. Smithee responded that the data shows this year on the Baron Fork and on Flint Creek the loads are about the same as last year; on the Illinois River itself, loads have increased for the second year in a row. He said there can be a number of reasons the loads go up or down, and the trick is to filter out the natural as well as the 20-year wet and dry cycles. He said they believed it is possible to account for the variables and evaluate overall whether loading in 2000 went up or down and whether we are headed in the right direction in meeting the 40% reduction

goal. Mr. Smithee said that the Arkansas USGS actually showed that by using a different method, the loads may have decreased, and they would like to investigate that methodology as well.

Chairman Mahony stated that given the political nature of the work here, he had always thought the better data worked because it will be questioned, and the harder it is to controvert the data, the better the chances of progress, knowing that whatever is done may hurt one or the other of the states.

There was a long discussion about what is the cost of better data, the determination of whether the loadings are going down, whether the 40% goal is being met, and how reliable is the base load the 40% is being reduced from, and that while both states continue to put more phosphorous reduction measures in the basin, the loadings appear to have increased.

Mr. Smithee presented a resolution which was considered and passed by the Committee requesting support of an appropriation from the federal government to (1) update the Clean Lakes Study on Lake Tenkiller, with the Corps of Engineers and the Oklahoma Water Resources Board's continued monitoring of Lake Tenkiller, (2) a re-evaluation of how loads are calculated in Lake Tenkiller and how changes in land use in the watershed have impacted the reservoir, and (3) how can we be more effective in wastewater distribution and water supply contribution in the Lake Tenkiller watershed.

Commissioner Young moved to approve the resolution, and Commissioner Sherrer seconded. The motion was approved subject to ratification. (Attachment H)

The Commissioners continued to asked questions and discuss the matter of conflicting and flawed methods of determining whether there has been progress in achieving the 40% reduction goal. There was a long discussion about the use of the 5-year rolling average, calculation of baseflow data

and stormwater data, the Tenkiller Report, available and adequate data on storm sampling, whether 40% is the correct number, the need for a new Clean Lakes Study on Tenkiller, and the need to re-evaluate the body of data as it becomes a better source of information. The members talked about whether there should be an agreed-upon starting point, or whether to use the current Tenkiller Study and determine how to monitor the 40% reduction in annual total phosphorous loads at each trigger point in the basin, and whether we are meeting the goal and what is the trend annually?

The members agreed that the report is inaccurate, there is now more data that proves that, and the report should not be accepted; that the rolling five-year average is inappropriate, that the report be re-calculated based upon the data now available. They talked about whether the information needed is daily or annually so as to use automatic sampling or the regression method, and that the Committee should report on some discussion of goal setting and measures, and to make a recommendation on methodology. It was agreed that two goals the committee should look at are: (1) status quo at Lake Tenkiller (which would include how much phosphorous is going into Lake Tenkiller), and (2) evaluation at the state line what Oklahoma is contributing and what Arkansas is contributing.

Commissioner Young said that he was still troubled with the report, and wanted to include a caveat as to how the material was used and how valid it is. John Terry suggested the statement be included to say, in essence, the number should be looked at and based on better information available and better methodology to determine flows, and that number should not be considered absolute. Commissioner Young asked that the statement be included with the acceptance of the report, and he so moved. Commissioner Smith seconded, and there was unanimous acceptance of the motion.

Commissioner Smith then moved that the Environmental Committee propose a monitoring plan that included two goals: the status quo of Lake Tenkiller and an evaluation of the water quality at the state line (annual phosphorous loading), taking into consideration the accuracy of the data and the cost as well as the importance of the site. Commissioner Young seconded. The motion carried subject to ratification. (Attachment I).

4. *Legal Committee*—There was no report by the legal committee as there had been no assignment to the committee at the previous year's meeting.

I. UNFINISHED BUSINESS

There was no unfinished business for discussion or action by the Commission.

J. NEW BUSINESS

1. *Appointments/Assignments to Committees and Selection of Chairs*

Commissioner Young noted that traditionally the Host State assumes the chair of each committee.

2. *Election of Officers*

Commissioner Young nominated Ms. Laura Brown as Secretary. Commissioner Sherrer seconded. The motion carried subject to ratification.

3. *2002 Annual Meeting*

Chairman Mahony stated that the State of Arkansas would be host for the 2002 meeting. Commissioner Young stated the meeting would be held in Fort Smith, on the fourth Thursday of September as provided by the Compact, which will be September 26, 2002.

K. FEDERAL AND STATE GOVERNMENT REPRESENTATIVES REPORTS

U.S. Geological Survey—Ms. Kathy Peter, District Chief in Oklahoma City, first asked to respond to the Chairman's question about phosphorous and detergents. She said she had read a report by the US Geological Survey on nutrients and pesticides in the United States, that after states banned phosphorous in detergents, the industry removed the phosphorous in detergents voluntary. This eliminated the need for bans by the state, so a need for a ban by Oklahoma may have become moot. She asked Bob Blazs, the Oklahoma USGS Data Chief to present the flow information in the compact area. Mr. Blazs said the written report reflects flow data on selected sites, and there is no significance overall when compared to the previous year. He said data from 1991-2000 demonstrates the extremes for the last ten years; 1999 is significant as being high and 2000 was about average or below. (Attachment J)

There were no other reports by federal or state agencies.

L. PUBLIC COMMENT

Mr. Ed Fite, Executive Director of the Oklahoma Scenic Rivers Commission, stated he had been spending time in Arkansas, particularly in Fayetteville, Bentonville, Springdale, Siloam Springs and Rogers, visiting about the continual growth in northwest Arkansas. He said he had mentioned the discussions of the compact and its adoption of a 40% reduction goal. He said he had come to the realization that point sources and nonpoint sources are two separate "apples in the bushel" and point sources (wastewater treatment plants) amount to only about 15% of the problem in the basin. He said in his work with the cities, he is trying to identify ways that they can be involved in nonpoint source mitigation as a switch-off for increased loads, and whether that would be a feasible mechanism in the arsenal of dealing with growth. He

said he has been running into the "fear factor" on both sides of the line, but he intends to continue to inform people the compact exists and it can play a mediating role. Mr. Fite said he hoped the states would spend money, for example, toward water sampling that everyone agrees to, or riparian area targets farmers can live with, or establish better road grading guidelines to reduce sediment loads to the streams, rather than fighting in court.

M. ADJOURNMENT

There being no further business, Chairman Mahony adjourned the Annual Meeting of the Arkansas-Oklahoma Arkansas River Compact Commission meeting at 11:30 a.m., on October 17, 2001.

_____

EMON A. MAHONY, JR. Date
Federal Commissioner and Chairman

ATTEST:

/s/ Mary Schooley
MARY SCHOOLEY, Secretary

AGENDA ITEM D.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION APPROVAL OF MINUTES ANNUAL MEETINGS OF 2000, 2001, 2002

On September 24, 2003, the Commissioners of the Arkansas-Oklahoma Arkansas River Compact Commission met in regular session to consider approving the minutes of the September 2000, October 2001, and September 2002 annual meetings that were not formally approved by the Commission due to a lack of a quorum. The minutes of the 2000, 2001, and 2002 meetings were unanimously approved on September 24, 2003.

ARKANSAS	OKLAHOMA
/s/ Randy Young RANDY YOUNG	/s/ Duane A. Smith DUANE A. SMITH
/s/ Mike Carter MIKE CARTER	/s/ Miles Tolbert (abstaining from vote) MILES TOLBERT
/s/ Leo Anhalt LEO ANHALT	/s/ Gary Sherrer GARY SHERRER

APPENDIX DD

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 26, 2002

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Thursday, September 26, 2002, at 9:00 a.m. at the Office of the Arkansas Oil & Gas Commission, 3309 Phoenix, Fort Smith, Arkansas.

Commission members in attendance were Emon Mahony, Federal Commissioner and Chairman; Arkansas Commissioners Randy Young, Leo Anhalt and Mike Carter; and Oklahoma Commissioner Duane Smith. Commissioners not in attendance were Oklahoma's Brian Griffin, and Gary Sherrer. For others in attendance see Attachment A.

CALL TO ORDER

Federal Commissioner and Chairman Emon Mahony called the meeting to order and welcomed all in attendance to Fort Smith. He stated that there was not a quorum present and he recognized that any actions on a motion would be deferred until a meeting with a quorum took place. He proposed the Commission proceed with the agenda informally and a telephonic meeting be held in the near future. He requested Arkansas prepare an agenda with the concurrence of Oklahoma for the telephonic meeting.

U.S Geological Survey Report

John Terry, Arkansas District Chief, USGS, stated that there is great interest in a consistent and valid manner in which to collect and interpret (particularly phosphorus) data from both sides of the border. He stated sufficient data was

being withdrawn from both sides of the border currently. There were two focuses: one to compliance and monitoring to understand current changes in the system; the other was a robust sampling network with calibration predictive tools to better understand the transport of nutrients (including phosphorus) in the delivery loads to a receiving water body.

Brian Clark demonstrated the use of an available website pertaining to data collected in the Illinois River Basin with special GIS abilities and reports by USGS.

Shane Barks stated that USGS operated a stream gauge at the Highway 59 and Highway 16 site in 1980 however due to decreased funding it was discontinued. The Highway 16 gauge was reinstalled with federal funds this past summer. Mr. Barks advised that the gauge will be introduced to the public within a couple of months and the audience was encouraged to attend the event.

Dr. Kim Winton, Oklahoma District Chief, USGS, reviewed a report on flow data of each of the stream gauges with a water year of October through October. She confirmed that she had a high degree of confidence in the accuracy of the data.

John Terry stated implementation of the robust sampling network and a couple of years to collect the data in an attempt to calibrate these predictive tools would allow one to understand and plan for management practices.

John Terry is to provide a summary in layman terms from the data on the river's present possibilities.

REPORT OF THE CHAIRMAN

Chairman Mahony stated that his concerns expressed in the minutes last year had not abated. He reiterated that the Compact has the opportunity and obligation to solve or attempt to solve the problem of nutrient loadings of the

streams in the basin and he was hopeful that the two states would move forward to solve the problem.

REPORT OF THE TREASURER

The FY 02 Financial Report reflected income and expenses through June 30, 2002. The beginning balance was $28,841.85 on July 1, 2001, state assessments were paid, and expenditures of $12,290.34 were reported, ending the fiscal year with $23,753.15. (Attachment C).

The Interim balance as of August 31, 2002 was $17,288.23. A biennial audit was completed and no adverse findings were found. (Attachment D).

Chairman Mahony asked for questions and there being none he accepted the report as presented.

REPORT OF THE COMMISSIONERS

Arkansas Commissioners: Commissioner Young presented a written report of the Arkansas Commissioners (Attachment E). He advised that the report addressed implementation activities since the early 1990s. Principal agencies involved are the Arkansas Soil & Water Conservation Commission, the Arkansas Department of Environmental Quality and local conservation districts. The Arkansas Soil & Water Conservation Commission staff has met with Oklahoma officials and significant progress was made. The non-point source management program priorities have been directed toward watersheds that were identified as part of the National Unified Watershed Assessment Program in Arkansas. ADEQ and other state and federal agencies were involved in this endeavor. This resulted in priority being placed on the Illinois, the Poteau, and the Little River Watersheds. He noted that while the Spavinaw Watershed was not a priority under that process, significant money has been devoted to implementation in that watershed using state and federal 319 resources. A state cost share program has been sought and established to

assist farmers with implementation of management practices developed for Benton and Washington Counties as well as the Poteau River Conservation District. Farmers are afforded cost sharing up to 40% for the practice with a cap at $7,500. He stated about $650,000 dollars were budgeted for Ballard Creek, Spavinaw Creek, and Poteau River projects. The state is also utilizing the State Revolving Loan Fund to provide low interest financing to farmers to implement Best Management Practices for their operations. The State is investing approximately $750,000 annually to the local conservation districts to hire water quality technicians to develop comprehensive nutrient management plans with the landowners. There are 27 water technicians and they should develop 1000 plans per year. Many plans need to be written, as there were 7,500 poultry operations alone. He noted that all the plans written in 2001 met comprehensive nutrient management criteria. A phosphorus index developed by the Arkansas Conservation Partnership has been utilized for about one and one half years; all of the CMNPs are based on that phosphorus index. Arkansas has also devoted attention to nonpoint source impacts from urban projects in Fayetteville and Rogers, both within the Illinois River Basin. The initial focus in Rogers was on Osage Creek and development of an urban Nonpoint Source management plan for that basin. The second phase of the Rogers' program is to demonstrate the effectiveness of Greenway Best Management Practices in order to protect areas adjacent to the stream and stream habitat. The City of Fayetteville is working with the Washington County Extension Service to develop an urban nonpoint source education program. They are also working with local agencies in the Northwest Regional Arkansas Educational Planning Commission to do that. The University of Arkansas has also initiated a project to review the impacts of onsite disposal of domestic wastewater systems in the Bella Vista area of Northwest Arkansas. Numerous workshops concerning construction BMPs have been held by ADEQ in

the Little Rock and Fayetteville areas. Arkansas Forestry's BMP Manual has been completed and is being distributed.

Chairman Mahony requested Mr. Young address the Arkansas/Oklahoma issue.

Mr. Young stated the first meeting's goal was to put together a two-state strategy that mirrored each other. The Arkansas Department of Environmental Quality proposed the cities of Fayetteville, Springdale, Rogers and Siloam Springs be limited to one milligram per liter phosphorus discharge from wastewater treatment plants. The Arkansas Soil and Water Conservation Commission will institute and regulate a statewide registration program for animal feeding operations. He explained that although this has been instituted on a voluntary basis since 1990, it is now to be regulated. Further, criteria are to be adopted to prioritize watersheds to accelerate the development and implementation of the plans that include a date for completion inspection and enforcement authority. One key component will be a requirement for addressing all nutrients (commercial fertilizer and animal waste.) It is proposed to certify the professionals developing the comprehensive nutrient management plans to assure appropriate and consistent criteria be followed in the development of the plans. Upon implementation of these practices; Arkansas will quantify the excess chicken litter that exists in the Illinois and other basins and have a strategy in place to utilize/dispose of the excess litter.

Mr. Young stated he was pleased that the governor had once again appointed Mike Carter to the Commission.

Emon Mahony suggested that once the P Index methodology is agreed upon with Oklahoma and Arkansas it should be put in place by the Compact.

Oklahoma Commissioners: Commissioner Duane Smith presented a written report of the Oklahoma Commissioners (Attachment F). He advised that he agreed with Mr. Young

and as policy makers, the two will implement whatever the scientists agreed to for a P index. Oklahoma will work on ways to remove litter from the watershed. He advised that Oklahoma has always requested one milligram per liter on the point source issue. He emphasized that Oklahoma already had implemented registration mandatory training of litter applicators, and soil testing. He noted that commercial fertilizer was not considered and it was a valid point to be reviewed. Mr. Smith advised that annual soil and litter tests were performed on nutrient limited watersheds in Oklahoma. The regulations prioritize activities to the basins that have documented problems. In the Loan and Grant Program 55 loans for a total of $58 million have been given for the Illinois River Watershed (point sources and non point sources, eligible rural water districts to upgrade water, wastewater infrastructure needs in the basin.) He stated he believed that over a period of time litter removal from the watershed can be a viable operation and he hoped for help from the federal government.

Mr. Smith advised that last year the Oklahoma Water Resources Board adopted a numeric criterion for phosphorus in scenic rivers at .037 milligrams per liter. He stated he was encouraged and believed that placing the BMPs on the farms and removing excess litter from the watersheds along with the communities going to 1 milligram per liter would achieve the goal of .037. Mr. Smith reviewed bills now before the Oklahoma legislature. He advised that Oklahoma was looking into updating their water plan however costs may limit such ideas to policy options.

Chairman Mahony requested that Mr. Smith communicate with border cities to encourage participation in the plan. Mr. Smith agreed.

Mr. Smith advised that Oklahoma had 39 federally recognized Indian Tribes. The issue of checker-boarding water rights and water quality standards administration is major.

Mr. Smith announced that the 23rd Annual Governor's Conference is to be held in Tulsa, October 9, 2002. He invited the Commissioners and interested parties to attend and he advised that tribal water rights, water quality issues and legal ramifications of water transfer would be discussed.

COMMITTEE REPORTS

Budget Committee: Earl Smith, Budget Committee Chairman, advised that the Budget Committee met briefly. (Budget, Attachment "G"). The committee recommended that the assessment be continued at $3,500 for each state.

Engineering Committee and Environmental and Natural Resources Committee: Earl Smith, advised that the Engineering and the Environmental and Natural Resources Committees met for a lengthy meeting the previous day. The key element in the discussions was an explanation of an error discovered in the calculations for the previous year's reports. The monitoring report was corrected and discussion followed relative to intensive monitoring by the University of Arkansas, storm flow calculations, trends displayed by the intensive monitoring and progress toward the 40% reduction goals. Oklahoma provided information on trends they calculated using the last ten years of data at the two stations. The Committee's recommendation is to instruct the Committee to review methodologies that were agreed upon in the 1997, 40% reduction goal and to investigate other methods available to assess phosphorus in the watershed with a goal to report back to the Compact Commission. It was specifically asked that the Lake Francis contribution be investigated.

Chairman Mahony noted that there was no objection from the Commissioners on a voluntary basis that the Committee goes forward with the proposal.

Legal Committee: Mark Bennett, Legal Committee Chairman, reviewed the Legal Committee's Report. (Legal Committee Report, Attachment "H"). He advised that the Com-

mittee had one brief assignment. The Legal Committee was to investigate the availability of water protection funds.

Mr. Couch advised that information about the incentive payments in the watershed were presented in the Oklahoma Commissioner's report. There was no other specific direction as to legal aspects.

Mr. Bennett advised EQIP through USDA and NRCS is the largest water protection fund in Arkansas and that they put in $7 million last year. An additional designated $2 million is to be utilized in the Illinois watershed. The Clean Water Revolving Fund is making low interest loans through banks to help with the costs. 319 Program provides funds in Arkansas and EPA funds; historically northwest Arkansas receives about 40% of that. He advised that the cities of Fayetteville, Siloam Springs, Lowell, and Bentonville have already requested money to develop various improvement projects.

Commissioner Carter stated that the US Congress developed the Arkansas-Oklahoma Arkansas River Compact to solve disagreements; however; no one has ever defined its authority. He questioned whether the Compact is merely an advisory board or if it had teeth. He stated he wanted to make a motion to authorize the legal council to file a request for a declaratory judgment in a United States District Court asking how the Compact's authority and power with reference to both states is to be construed. He noted that the Compact is compelled to agree as one State could not impose something upon the other.

Mr. Dowd requested a report of any studies of Lake Tenkiller be provided at the next meeting. Derek Smithee responded that he would be happy to provide a summary report at the next meeting.

Earl Smith asked if an annual yield report was to be continued and he recommended that the compact again contract with Terry Lamb to produce the report.

Chairman Mahony noted that there was no objection from the Commissioners.

UNFINISHED BUSINESS

NEW BUSINESS

2003 ANNUAL MEETING

Duane Smith advised that Mary Schooley with the Oklahoma Water Resources Board would be the 2003 Compact Commission Secretary and that Earl Smith is to continue in the office of Treasurer. The meeting is to be held the fourth Thursday in September, which will be September 25, 2003.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Win Hargis, US Army Corps of Engineers, Little Rock District gave an informational activity report.

PUBLIC COMMENT

Commissioner Anhalt commented that he supported the suggestion to ask the federal government to help in the effort of collection and monitoring the streams to get more reliable information on the nutrients in the streams.

Chairman Mahony stated he remained optimistic and thought that there would be real progress in the months ahead. He applauded Oklahoma's warm response and acknowledgement of Arkansas Department of Environmental Quality's activities in controlling release levels of point source. He stated that he hoped the Commission could keep the ball rolling.

ADJOURNMENT

There being no further business, the Chairman thanked everyone and adjourned the meeting.

_____

EMON A. MAHONY, JR. Date
Federal Commissioner and Chairman

ATTEST:

/s/ Laura Brown
LAURA BROWN, Secretary

AGENDA ITEM D.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION APPROVAL OF MINUTES ANNUAL MEETINGS OF 2000, 2001, 2002

On September 24, 2003, the Commissioners of the Arkansas-Oklahoma Arkansas River Compact Commission met in regular session to consider approving the minutes of the September 2000, October 2001, and September 2002 annual meetings that were not formally approved by the Commission due to a lack of a quorum. The minutes of the 2000, 2001, and 2002 meetings were unanimously approved on September 24, 2003.

ARKANSAS	OKLAHOMA
/s/ J. Randy Young J. RANDY YOUNG	/s/ Duane A. Smith DUANE A. SMITH
/s/ Mike Carter MIKE CARTER	/s/ Miles Tolbert (abstaining from vote) MILES TOLBERT
/s/ Leo Anhalt LEO ANHALT	/s/ Gary Sherrer GARY SHERRER

APPENDIX EE

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 24, 2003
9:00 a.m.

Bradford Meeting Room at Shangri-La Resort near Afton, Oklahoma

A. CALL TO ORDER

Federal Commissioner and Chairman Dick Seybolt welcomed all in attendance to the Shangri-La Resort on Grand Lake O' the Cherokees. Chairman Seybolt called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) to order at 9:00 a.m. on September 24, 2003.

B. INTRODUCTIONS

Commission members in attendance were Richard C. Seybolt, Federal Commissioner and Chairman; Oklahoma Commissioners Duane Smith, Gary Sherrer and Miles Tolbert; and Arkansas Commissioners Randy Young, Leo Anhalt and Mike Carter. Chairman Seybolt asked for those in attendance to make self-introductions (Attachment A.). He recognized a quorum present, and asked if there were any announcements. Being none, the Chairman proceeded with the agenda.

C. APPROVAL OF AGENDA

Chairman Seybolt asked for a motion to approve the agenda unless there were additions or deletions. There being none, Commissioner Gary Sherrer moved that the agenda be approved as presented, and Commissioner Leo Anhalt seconded. The motion carried.

D. REVIEW OF 2001 AND 2002 ANNUAL COMMISSION SCHEDULED MEETINGS AND CONSIDERATION OF RELATED ACTIONS.

1. Consideration of approval of minutes of September 28, 2000 annual meeting
2. Consideration of approval of summary minutes of meetings scheduled for October 17, 2001, and September 26, 2002
3. Consideration of approval of reports, assessments for States and committee assignments presented at meetings scheduled for October 17, 2001, and September 26, 2002

Chairman Seybolt stated that the minutes of the September 2000 annual meeting needed to be approved. He noted that the 2001 and 2002 meetings lacked a quorum of members, and the notes and assignments from those two meetings need to be accepted by the Commission. With that, he said he would entertain a motion to approve all three items. Commissioner Smith moved to approve items D. 1., 2., and 3., and Commissioner Sherrer seconded. The motion carried; however, Commissioner Miles Tolbert abstained. (Attachment B.)

E. REPORT OF THE CHAIRMAN

Chairman Seybolt said he only had brief remarks since this is his first meeting and he is getting acquainted with the Commissioners and the compact proceedings. He thanked the Commissioners for making the effort to be present today after two years of meetings without a quorum. Chairman Seybolt stated he felt that was a vote of confidence that the Commission will address issues that haven't been addressed, and he expressed his intent to be active.

F. REPORT OF THE TREASURER

Mr. Earl Smith, Arkansas, stated the FY 03 Financial Report reflected income and expenses through June 30, 2003.

He said there was an income of $7,046.51, and there were expenses of $3,875.00, which were the 2001 yield report, and audit services. The current outstanding balance is $3,600.00. Mr. Earl Smith stated the bank balance stands at $24,054.74.

Commissioner Duane Smith asked if that balance is the same as last year, or had it gone up or down? He asked if the Commission had ever set a policy about maintaining a balance? Mr. Earl Smith answered that the Commission had generally wanted to keep a balance in case there were special projects the Commission wanted to do. He said the income exceeds the expenses by a few thousand dollars each year, and the expenses are usually the yield report, the audit, and meeting expenses. He said the state assessments are $7,000, so typically the balance usually gains a few thousand each year. There were no other matters for discussion regarding the report.

Commissioner Randy Young moved to approve the Treasurer's Report, and Commissioner Duane Smith seconded. The motion was unanimously approved. (Attachment C.)

G. REPORT OF THE COMMISSIONERS

1. Arkansas

Commissioner Randy Young presented the report for the State of Arkansas. Commissioner Young submitted a written report, and highlighted some of the activities of the state during the past year. Particularly, he noted the three pieces of legislation which he had mentioned at last year's meeting and that were approved by the Arkansas General Assembly and the result of negotiations with the State of Oklahoma: (1) HB1635 required the annual registration of poultry feeding operations, defined as having 2,500 birds and eight items of information required to be filed, and provides the information for action under the conservation district law; (2) HB1652 required the Arkansas Soil and Water Conservation Commission to operate a state-wide nutrient management training

and certification program for individuals preparing plans and applying nutrients; and (3) HB1654, or the nutrient utilization bill, provides for legislative declaration that eight watersheds in west and northwest Arkansas are "nutrient surplus areas" including the headwaters of all of the Oklahoma scenic rivers as well as the Upper White River, the watershed above the confluence of the Buffalo River, allowing the state to address water quality concerns for the Beaver Reservoir, which is the heart and soul of water supply for northwest Arkansas. It also enables the ASWCC to address potential impacts to the White River that flows into the Missouri. Comprehensive nutrient management plans are required for the application of all nutrients including urban areas as well as farm and ranch land. No certification is required on residential property of 2-1/2 acres or less within the nutrient surplus areas, as long as application is documented.

Commissioner Young stated those were three very aggressive pieces of legislation, and he was pleased the General Assembly enacted those bills. He said the Soil and Water Conservation Commission recently directed the staff to proceed with the rulemaking process for adopting the regulations that further describes how those laws are going to be implemented for the registration program and the two certification programs. He said the goal is to have everything in place by the end of the calendar year. Commissioner Gary Sherrer asked what the farmers and ranchers were unhappy about the legislation; Mr. Young answered that basically the cattle farmers now have to have a comprehensive nutrient management plan whether they purchase chicken litter or whether they purchase commercial fertilizer. He said it is his belief the problem is nutrients and phosphorous in commercial fertilizer which is more soluble in water than phosphorous in chicken litter. Duane Smith asked if there was a number of cattle in the operation that triggered the management plan requirement; Mr. Young answered a plan is required if nutrients are applied.

Another matter Commissioner Young mentioned was that the Arkansas Department of Environmental Quality had been working with the four major cities in northwest Arkansas and has made tremendous strides in addressing phosphorous limits in wastewater treatment plants. All done on a volunteer basis, the City of Springdale has reduced its phosphorous load from approximately 1000 ppd in June of 2002 to approximately 100 ppd in June of 2003, with a concentration of 1.0 mgl, primarily by working with industrial discharge. The City of Rogers was 150 ppd, and now is 25-30 ppd, and a concentration of .5 mgl, down from 7-8.0 mgl. Fayetteville agreed to have a 1.0 mgl in its permit limit at the last renewal, and is discharging 30-40 ppd. He said additionally the Department of Environmental Quality will be proposing amendments to the non-point source elimination discharge program regulations (Regulation No. 6) for all the cities that have flows greater than 1 million gallons per day to 1.0 mgl concentration in their effluent by 2010. Amending Regulation No. 6 will give the ADEQ and the ASWCC the ability to enforce the regulations. Siloam Springs, he said, has a tougher road to go and must secure financing for the improvements. He said he is pleased with the progress Arkansas has made over the past two years to address the phosphorous situation.

Commissioner Miles Tolbert, who also serves as Oklahoma's Secretary of Environment, stated to the Commission that he is very excited about the progress that has been made in northwest Arkansas. He said that being able to take an existing treatment system and through careful engineering and hard work, modifying it to take the discharge down to a tenth of the loading it was previously, is the result of real leadership, and it will make a real difference in the river. He said that Governor Henry is pleased, and it is encouraging that with hard work those numbers can be achieved without crushing economic costs, and it is very good news and he appreciates the effort.

Commissioner Young complimented the staff at the ADEQ. Chairman Seybolt added his commendation. There were no comments by the other Arkansas Commissioners, and Mr. Young concluded his report. (Attachment D.)

2. Oklahoma

Commissioner Duane Smith first expressed his appreciation on behalf of all compact participants for the hospitality of Mr. and Mrs. Seybolt and said that the compact is a great opportunity for the two states to get together to resolve issues. Commissioner Smith presented a written report for the State of Oklahoma, and highlighted several areas of interest. He said he appreciated Mr. Young's report on the legislation passed in Arkansas, recognizing Mr. Young's significant role in the success of the legislation.

He said that the states are fairly comparable, although there are some differences in the way water quality issues are handled. He talked about achievements in the area of poultry operations, where nutrient limit designations require soil testing and management plans by the Oklahoma Department of Agriculture, and now Arkansas is doing some of those things. He said that in 1996, Tahlequah spent $15 million to get its discharge to 1.0 mgl, and the state is working with Westville to get its discharge to 1.0 mgl, at a cost of over $4.5 million—a burden to a community of that size, but they recognize the benefits. He said that people are beginning to understand that good quality water is a benefit, and there will not be development without it. He said he appreciated Arkansas cities "stepping up to the plate" as well.

Commissioner Smith stated that this last year in Oklahoma was dominated by the budget situation, and the Oklahoma Water Resources Board received a 23% cut in state appropriated dollars, and the other environmental agencies had similar cuts. The good news is that sampling on the Illinois River and the scenic rivers; the cooperative program with US

Geological Survey will continue, and a contract was signed recently. Tax receipts are up for the same time last year, so hopefully the budget situation will improve.

The $1 million-dollar Beneficial Use Monitoring Program was approved without a cut, indicating the Legislature's recognition of the program as being a vital monitoring program. The numeric standard for .037 is at EPA; the States are negotiating, and hopefully those concerns will be resolved so that EPA can approve the standard. Mr. Smith said the State's Financial Assistance Program received an AA+ rating on its bond program bonds, which sold at .87%, enabling the State to loan money to communities at 1.6%. He noted the program's rating is higher than the State of Oklahoma, the highest rated state entity program in Oklahoma as well as the highest rated blind pool financing anywhere in the country. He said the state is looking at a three billion dollar need over the next twenty years, and will be looking at ways to get cash into the program. The program will be used to fund non-point source projects.

Commissioner Smith added that the Oklahoma Legislature approved legislation to conduct a study on Grand Lake that will be coordinated through the Office of the Secretary of Environment. He said the lake is one of Oklahoma's "crown jewels" and the Grand Lake Public Works Authority has pioneered a waste water treatment system for Monkey Island, getting residences and businesses off septic systems and onto a regionalized treatment system. It is anticipated this pilot project will be implemented at other Oklahoma lakes such as Tenkiller and Texoma. Chairman Seybolt, who is a member of the Grand Lake Public Works Authority, has been instrumental in the project, and he made a few comments.

Commissioner Tolbert interjected that his office had received a number of complaints recently and in previous years from landowners along Flint Creek about the lack of flow during August. Clearly, he said, summer is the hottest and

driest time of the year and there are other needs for water, i.e. municipal, cooling, etc., and it seems that it would make sense as part of the Compact to look at a procedure to address these issues of low flows. Commissioner Tolbert said he would be willing to make a motion in support of directing the Engineering Committee to look at the question of low flow and the development of a cooperative relationship, if possible, to ensure a level of minimum flow in the shared waterways. Commissioner Young said his staff had been working with the Oklahoma Water Resources Board staff, and it would be appropriate to formally charge the Engineering Committee with completing its work to bring back to the Commission. Commissioner Young so moved, and Commissioner Tolbert seconded. The motion passed unanimously.

Commissioner Smith stated in that regard, Oklahoma established an instream flow rule of 50 cfs on the Baron Fork. He said any new permits that come in for the Baron Fork, will have the condition that once the water level reaches 50 cfs, pumping will have to cease. He said the state is looking at something similar for Flint Creek. Commissioner Carter inquired about the uses on the Baron Fork and the Commissioners talked about the uses of the Baron Fork by both Arkansas and Oklahoma.

There were no other comments by Oklahoma Commissioners, and Commissioner Smith concluded the report for the State. (Attachment E.)

H. COMMITTEE REPORTS

1. Budget Committee

Mike Mathis, Oklahoma, Chair of the Budget Committee, advised the Commissioners that the Budget Committee had met briefly. He said the Committee reviewed the basic expenses incurred by the Commission that is reflected in the proposed budget, noted comments earlier by the Treasurer about contingency funding, and recommended that the

assessment be continued at $3,500 for each state. He said the Budget Committee recommended approval.

Commissioner Gary Sherrer moved to approve the Budget Committee report, and Commissioner Young seconded. The motion carried unanimously. (Attachment F.)

2. Engineering Committee

Mr. Mike Mathis, Oklahoma, Chair of the Engineering Committee, informed the Commissioners that the Engineering Committee had not received any assignments from the Commissioners; therefore, there is no activity to report regarding the Engineering Committee.

3. Environmental and Natural Resources Committee

Derek Smithee, Oklahoma, advised that the Engineering and the Environmental and Natural Resources Committees met for about an hour and 45 minutes the previous afternoon. He said the meeting was very well attended, and there was active discussion with attendees. He said there had been two charges remaining from last year's Commission meeting to the Committee: (1) investigate potential vegetation issues within the Compact area, and (2) investigate salinity issues within the Compact area. The U.S. Army Corps of Engineers was contacted and while there were no known salinity problems, the COE was working on a project at Skiatook Reservoir involving brine discharges as a result of oil and gas activities. Regarding vegetation issues, none were known except Pat Haynes in Texas is working on a water milfoil problem, but that has not manifested in Oklahoma or Arkansas.

Mr. Smithee stated the .037 numerical limits for Oklahoma scenic rivers was also discussed. He said resolution to the issue is being anxiously awaited.

Foremost on the Committee's agenda was the eighth year in the discussions of the five-year rolling average looking at total phosphorous trends in loads on interstate waters and

particularly Oklahoma's scenic rivers. Mr. Smithee presented a report entitled, "Water Quality Monitoring Report—Illinois River Basin" noting the executive summary of the report, and giving the "Reader's Digest" conclusions that there was a reduction of phosphorous by 24% in the Illinois River, and Arkansas in historical computations. However, unfortunately, an increase in phosphorous was shown to be found in the Illinois River in Oklahoma over the baseline phosphorous load, 1980-1993. At the Committee meeting, there was discussion about how the data were developed, what they mean, and what they can be used for the future, and it became clear there is a need for more effective and efficient coordination of the monitoring occurring in both states. Mr. Smithee said the Environment committee discussed whether the Full Commission could instruct the Committee to put together a process for coordinating monitoring activities for the comparison of "apples to apples and oranges to oranges" to compare the results in the future i.e. lakes studies, TMDLs, load calculations, trends and concentrations, etc. The Committee recommended to the Commission that it construct some sort of charge to the Committee to develop a process to coordinate monitoring in the Compact area.

Commissioner Duane Smith stated he had attended the Environmental Committee meeting, and there is a lot of monitoring activity going on by both states in the Compact area. He said it occurred to him that some of the methodologies of collecting data is different, and it is confusing to him in trying to draw conclusions, and it seemed a good idea to assign to the Committee to investigate a way to come to some agreement on water quality monitoring between the two states in the Compact area. He said there is a lot of expertise, and the Committee can provide advice to the Commission. Chairman Seybolt asked if Mr. Smith was referring to a standardized monitoring process between the two states and

Mr. Smith answered that the Committee should look at whether that is possible, and bring a recommendation to the Commission if it is.

Commissioner Carter asked if there are differences in the process now? Commissioner Smith answered that is correct, and Commissioner Young added that essentially one of the key differences that is reflected in the 5-year rolling average report that has been presented is representative of base flow conditions with intermittent information on high-flow events. He said the work the University of Arkansas (U of A) does under the contract with the Commission (paid for by the State of Arkansas) focuses on capturing high flow events, and consequently is probably more reflective of what a true load is than the 5-year rolling average. He said that people are having difficulty separating what the report says and what the U of A report means, and we need to agree, compact wise, about monitoring networks and protocols if there is a difference in sampling and protocols so that everyone is talking about the same thing. Commissioner Carter said, then, the Arkansas numbers are apples and oranges; and Commissioner Young responded that the Arkansas numbers are apples and the work the U of A is doing is oranges. Carter asked about the numbers [in the report] from Arkansas and Oklahoma, and Commissioner Young answered that is "apples and apples." Commissioner Smith said that Oklahoma is doing some work with the USGS on high flows as well, but it is collected differently.

Commissioner Smith so moved that the Environmental and Natural Resources Committee be assigned the task to investigate a way to come to some agreement on water quality monitoring between the two states in the Compact area, and Commissioner Young seconded. The motion passed unanimously. (Attachment G.)

4. Legal Committee

Dean Couch, Oklahoma, Legal Committee Chairman, reviewed the Legal Committee's Report. He advised that the Committee had no specific assignments from the last two non-meetings; however, in response to Commissioner Carter's request to the Chairman, the Chairman indicated that the Commission should be briefed (Item I. below). As the Oklahoma advisor, Mr. Couch had put together some information, and unless Mr. Bennett had comments, there is no other matter to report from the Legal Committee. Mr. Bennett did not have any comments. (Attachment H.)

I. UNFINISHED BUSINESS

1. Consideration of Commissioner Carter's motion to direct the Legal Committee to file a declaratory judgment action concerning the scope of the Commission's authority to promulgate water quality standards.

Commissioner Carter stated that his position is well set out in the September 18, 2003, letter sent to the Chairman and the Arkansas and Oklahoma Commissioners. Accordingly, the general thrust of the motion is set forth in the letter, and he moved the letter be made part of the minutes of this meeting, and that it constitute the motion and his discussion preceding the motion for the compact to authorize a federal court, in Arkansas or Oklahoma, to ascertain if the Commission has authority to do anything. He said if we have authority, then comes the question whether there is "guts" to do something about it. The attorneys have different opinions on the matter, and when there are differing opinions, it is best to let a judge decide. This issue is not whether we have it, but that it could be original and exclusive, as the letter stated; do we work together or not at all? He said the authors of the Compact met several times over a space of 15-16 years (excerpt from the letter: indicating the matter was contemplated and created a vehicle that would compel the states to act jointly).

Commissioner Carter then moved that his letter of September 2003, and the Chairman's response of June 2003, be made part of the minutes of this meeting. And that the Compact Commission institute a declaratory judgment action in Federal Court asking the Court to declare the jurisdiction of the Compact on pollution issues, specifically addressing authority over unilateral state action, jurisdiction exclusiveness and originality, and compact enforcement authority. Commissioner Leo Anhalt seconded the motion.

Chairman Seybolt asked if there was discussion; there was no discussion. Commissioner Young called for the question. Chairman Seybolt called for the vote:

AYE: Commissioner Anhalt, Commissioner Carter, Commissioner Young

NAY: Commissioner Tolbert, Commissioner Sherrer, Commissioner Smith

The motion failed.

Chairman Seybolt commented that he saw his responsibility as seeing that the two differences of opinion continue to be discussed. He said the Commissioners are responsible to the states and can make things happen. He noted the legislative actions in Arkansas to address the issues, and Commissioner Tolbert expressed Oklahoma's appreciation. He said he believed that the states should continue to work together, to have a dialogue more frequently in order to get something done.

Commissioner Carter said that the state of Arkansas and Commissioner Young had been very successful in educating the legislature. He said northwest Arkansas has a problem regardless of what happens to the water after it crosses the state line; those problems have been recognized and are being addressed. By the same token, Oklahoma made a unilateral decision that the water quality standard would be .037. He said the authors of the compact were far-sighted men who compelled the compact states to work together.

The discussion continued that there is growth in northwest Arkansas, and in central Oklahoma, and that is good to the states' success and real estate values, etc. Commissioner Young stated that if the Compact is going to achieve the goal set under the Chairman's leadership, the members are going to have to act, not just come and talk, but to work together. Commissioner Tolbert stated that this entity is one that effectively only works by consensus, and he had heard that previous meetings had been less than cordial, making it difficult to proceed by consensus. He said he is pleased with the tone of the discussions today and recognize it as a good exchange on a number of important questions. He said the challenge of making the Commission work is to identify ways its important work can be done by consensus, not the work that will be done in one morning in the fall when the Commission meets, but the work that will be done the rest of the days of the year. He said he is encouraged by today's experience, and the fact that there is a quorum today shows a new commitment; it is the only body that bridges the two states, and it is an appropriate forum to address certain questions.

Commissioner Smith added that while Commissioner Carter made the statement that Oklahoma had acted unilaterally, likewise Arkansas had done some things unilaterally that did not improve or maintain water quality in Oklahoma. When Oklahoma came to the Commission for resolution, Oklahoma felt it was Arkansas that wanted to protect economic development and not water quality. And to say now that Arkansas wants the Commission to have the authority to develop water quality standards by consensus, he would probably say the state would be opposed. But now, there are things in the Compact changing: Arkansas has passed three significant statutes that sends a great sign to Oklahoma about Arkansas being serious about improving water quality. The communities are coming to 1.0 mgl discharge—which Oklahoma has asked for for years—and as those things continue to happen, the Commission will have a much better chance of

success. Carter said he had no question about that, and he recalled the difficulty with Lee Creek and there is no doubt there are real and perceived grievances on both sides, but we need to do something about it now. He said Arkansas has recognized it has a problem with water quality in Arkansas before it gets to Oklahoma, and this issue has been a catalyst to get some of those things accomplished. Commissioner Carter stated he would be willing to meet more that once per year, and Chairman Seybolt stated he wanted to call more meetings each year, improve the dialogue and see if more things can be accomplished.

J. NEW BUSINESS

1. Appointments/Assignments to Committee and Selection of Chairs

Chairman Seybolt stated he would entertain a motion to appoint Committee Chairs. Commissioner Smith stated to the Chairman that it is tradition that the host state serve in the committee chair capacity, and he would recommend that the committee members remain the same, with Arkansas as the host state serving as chair. Commissioner Young stated that would be correct, with one change, that being Mr. Mark Bennett, who has served for many years as General Counsel and on the Legal Committee, accepted a new position at Arkansas Soil and Water as Chief of the Water Development Division. He said Edward Swartz would be the new General Counsel and legal representative on the committee; all other appointments will remain the same.

Commissioner Smith commended Mr. Bennett on his work with the Commission, that Oklahoma had enjoyed his association, and that his smiling face would be missed! Commissioner Young moved that the Commission present Mr. Bennett a resolution of appreciation in the future, and

Commissioner Sherrer seconded. The motion carried unanimously. Committee Chair appointments are as follows:

a. Budget Committee—Earl Smith

b. Engineering Committee—Earl Smith

c. Environmental and Natural Resources Committee—Earl Smith

d. Legal Committee—Edward Swartz

2. Election of Officers (Secretary of Treasurer)

Chairman Seybolt said Earl Smith will continue to serve as Treasurer, and Laura Brown with the Arkansas Soil and Water Conservation Commission will serve as the 2004 Compact Commission Secretary.

3. 2004 Annual Meeting

Chairman Seybolt stated the 2004 meeting is to be held the fourth Thursday in September, which will be September 23, 2004. He said he would also like to have a mid-year if not quarterly meeting, but did not anticipate the format would be the same for presenting formal reports, etc., but to get updated on issues and work together in a less formal setting.

In regard to committee assignments Commissioner Smith stated Mike Mathis had noted the assignment regarding the low flow (Flint Creek) to the Engineering Committee should be a joint assignment to the Environmental Committee if the Commissioner agreed. There was no opposition.

K. FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Mr. Bob Blazs, United States Geological Survey, stated to the members that his purpose at the Compact meeting is to inform the Commissioners of flow information in the basin. He distributed the report (Attachment I), and explained the data regarding low flows, high flows, peak this year and

historic peak, and historic averages, etc., noting the graphs and charts that are a pictorial of what is going on in the basin.

There was some discussion about the low flows on Flint Creek, and Mr. Blazs said that some of the stations in the Illinois basin are below average, and some of the stations are above, but the entire basin has been up and down from the average. He presented long-term statistics for a 30-year cycle, and said we are now at the peak, and it will most likely go down, if there is confidence in the 30-year cycle.

Ms. Kim Winton, District Director for the USGS in Oklahoma City, noted a report published by the USGS in cooperation with the Oklahoma Water Resources Board and the Oklahoma Scenic Rivers Commission regarding phosphorus concentrations, loads and yields in the Illinois River Basin, Arkansas and Oklahoma from 1997-2001 (Attachment J). She said one of the primary areas of the report the Commission may want to look at is how to better define how to conduct the sample collections and evaluations of the loads. There is a diagram that breaks out base flow versus high flows phosphorous and indicates what to expect next year. Commissioner Smith asked what the conclusion is; are the phosphorous levels going up or going down? Ms. Winton responded that the period between 1997-2001 there were slight increases. She said that 70-80% of the phosphorous is coming from the runoff in the storm events, and in some areas that data is being captured, and in some areas it is not, and that is something that the group needs to focus on. Commissioner Smith asked if that result is similar to other data that is coming in. Ms. Winton responded that as it has been discussed many times, there are multiple ways to collect the data and Bill Andrews said it has been looked at from a different way, and the 70-80% is still the same. Chairman Seybolt asked if the actual location of the poultry operations and the relevance to the runoff are taken into consideration. Ms. Winton answered that the diagram shows at each location

what the runoff area is, but consideration of the number of poultry houses in the basin are not included in the data. Chairman Seybolt said he has seen maps showing the location of poultry houses, and as a suggestion perhaps the USGS along with the OWRB can include that data in a future document. Ms. Winton said the report does indicate the land use. She said now there are two more years of data available, including additional parameters that can now be considered.

There were no other reports by federal or state agencies.

L. PUBLIC COMMENT

There was no public comment.

M. ADJOURNMENT

There being no further business, Federal Commissioner and Chairman Dick Seybolt thanked everyone for attending and adjourned the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission at 10:27 a.m., September 24, 2003.

/s/ Richard C. Seybolt Date: 09-24-04
RICHARD C. SEYBOLT
Federal Commissioner and Chairman

ATTEST:

/s/ Mary Schooley
MARY SCHOOLEY, 2003 Commission Secretary

APPENDIX FF

Minutes of the

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

Regular Meeting

September 24, 2004

The regular meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) was held Friday, September 24, 1998, at 9:00 a.m. at Lake Dardanelle State Park, Russellville, Arkansas.

Commission members in attendance were, Federal Commissioner and Chairman; Arkansas Commissioners Mike Carter and Randy Young; and Oklahoma Commissioners Duane Smith and C. Miles Tolbert. Commissioners not in attendance were Scott Campbell, Gary Sherrer and Alternate Federal Commissioner, David Vandergriff.

For others in attendance see Attendance Roster (Attachments "A-C").

CALL TO ORDER

Federal Commissioner and Chairman Richard C. Seybolt called Arkansas-Oklahoma Arkansas River Compact Commission to order at 9:00 a.m. and welcomed all in attendance.

APPROVAL OF AGENDA

Upon motion by Commissioner Young, second by Commissioner Tolbert, the Agenda for the September 24, 2004 Meeting of the Commission was approved. (Attachment "D").

APPROVAL OF MINUTES; 9/24/03, 03/10/04 and 07/01/04

Commissioner Tolbert requested a correction to the minutes dated March 10, 2004 (page 2, paragraph 3) identifying Okla-

homa technical environmental committee members; he advised that it read the Department of Agriculture, Food and Forestry.

Upon motion by Tolbert, second by Commissioner Young, the Commission approved the minutes of the annual meeting held September 24, 2003; the meeting minutes for March 10, 2004 (corrected), and July 1, 2004.

REPORT OF THE CHAIRMAN

Chairman Seybolt stated he was glad to see a good turnout. This was the fourth meeting since he was appointed chair man with excellent attendance and input. He anticipated the 2005 meeting to be held at Grand Lake, Oklahoma with a similar BBQ.

REPORT OF THE TREASURER

Earl Smith presented the Financial Report, FY 04, (July 1, 2003-June 30, 2004). Income was $7,023.37, Expenses $5,056.47 with a Net Total of $1,966.90 (Attachment "E"). He explained that this was fairly reflective of the budget for the last several years. The bank balance is $26,017.81 and the assessments for both states are current. The biggest expense for the year is the Annual Water Yield report as reflected in the budget (Attachment "F"). The biennial audit was included in the packets (Audit, Attachment "G").

Upon motion by Commissioner Young, second by Commissioner Carter, the Treasurer's report was approved.

REPORT OF THE COMMISSIONERS

Arkansas Commissioners: Commissioner Young presented a written report of the Arkansas Commissioners (Attachment "H".) He explained that the Arkansas Soil and Water Conservation Commission is in the process of updating the Nonpoint Source Pollution Management Plan for 2005-2010 in partnership with the University of Arkansas' Department of Biological and Agricultural Engineering and Cooperative

Extension Service. The revised plan is to be completed January 1, 2005 and a copy will be provided to Oklahoma upon its completion. The Soil and Water Assessment Tool (SWAT) model is being refined with the help of the Department of Biological and Agricultural Engineering at the University of Arkansas to guide future compact watershed area work. A comprehensive nutrient management plan will be developed with an inventory of the golf courses in Washington County. A three-year agriculture cost-share program is being implemented in Benton County with a total budget of $580,000 available to farmers providing BMPs at a 40% cost share maximum up to $7,500.

Marcus Devine stated that stream segments of the Arkansas and Poteau Rivers were by federal standards criteria to be placed on the impaired 303 D list; both flow from Oklahoma into Arkansas. The Arkansas River was impaired by total dissolved solids. The standard is 500 mg per liter with no more than 10% of collected samples to exceed the standard. During the 1998-2003 data set/reporting period 9 out of 59 samples collected (12%) exceeded the level and ranged from 547 to 777 mg per liter.

The Poteau River was impaired at both all-full and base-flow turbidity. The standard for all-full is 40 NTUs and base-flow is 21 NTUs. The assessment criteria being not more than 15% of samples collected within any period to exceed 40 NTUs and not more than 25% of the samples between June 1 and October 30 to exceed the base-flow standard of 21 NTUs. The Poteau River samples exceeded the assessment criteria with 55% all-flow and 73% base-flow turbidity.

The Arkansas River is designated a primary public drinking water supply throughout the state and there are three forms of minerals associated with drinking water: (1) chlorides, (2) sulfates and (3) total dissolved solids. The 2004 assessment reveals the total dissolved solids (TDS) exceed the criteria of 500 mg per liter. The values were found at the first

monitoring station as the river enters Arkansas, the source is unknown; the minerals could be a combination of sulfates and chlorides.

Upon motion by Commissioner Tolbert, second by Commissioner Carter, the Arkansas Commissioner's Report was approved.

Oklahoma Commissioners: Duane Smith presented a written report of the Oklahoma Commissioners ("I".) He advised that they were working on municipal financing to improve water and wastewater treatment capacities. The Governor's Office has worked on additional program financing. A major milestone of a triple-A rating has been accomplished on their bond issues. This is the highest ratings of bonds by the State of Oklahoma. The plan is to blend the money with the drinking water program to present a 60% market rate for the communities. A comprehensive water plan for Oklahoma is also being considered with a focus on how to get water to Oklahoma. He noted great growth in Oklahoma communities, therefore it is imperative to work on the planning process to provide adequate supplies while balancing environmental needs.

Commissioner Tolbert stated that there was good environmental news with money available for implementation of conservation practices on private land. Ninety-five percent (95%) of the land in Oklahoma is privately owned with the vast majority agricultural. The money allocated to Oklahoma for the farm bill has tripled in two years. He stated that there was a system in place to address point source pollution (one issue being the Arkansas River Basin.) He concluded, the key to water quality is working cooperatively with landowners to address nonpoint source pollution.

Commissioner Young commented that Arkansas' Nonpoint Program plans to enforce regulation of commercial fertilizer and he was pleased that Oklahoma's Scenic Rivers Commission took action to recommend Oklahoma do the same. The

regulations require a soil test, a nutrient management plan or a protective rate with application by a certified individual. The goal being management plans and the protective rate based on soil testing. He hoped that regulations will be adopted by the Arkansas Soil and Water Conservation Commission in December.

Upon motion by Commissioner Young, second by Commissioner Carter, the Oklahoma Commissioner's Report was approved.

COMMITTEE REPORTS

Budget Committee: Earl Smith, Budget Committee Chairman, presented the proposed budget covering the period of July 1, 2004 through June 30, 2006 for Commission consideration. The proposal would provide for a budget over the next two fiscal years (FY 2004 through FY 2005). He advised that the assessments were the same and no additional expenses were seen. The committee recommended that the assessments remain the same ($3,500) as the bank balance was sufficient to cover short-term expenses.

Upon motion by Commissioner Young, second by Commissioner Tolbert, the Budget Committee's Report was approved.

Engineering, Environmental and Natural Resources Committees: Earl Smith, Engineering Committee Chairman, presented a joint report of the Engineering, Environmental and Natural Resources Committee. He explained he had several assignments to discuss; the first (assigned two years earlier) to investigate low flows in Flint Creek. The Arkansas staff prepared a report on the Flint Creek assignment. There was a question about water use and reporting by a power plant on Flint Creek—it was found that the total withdrawals for cooling water were being reported rather than the consumptive water use. In other words, they were reporting the withdrawn amount without subtracting their return flow to the

river. The report concluded that the compact requirements were being met. It was further recommended that Siloam Springs look into a non-riparian permit and a way to allow water to pass through Siloam Springs Lake, a main stem of Flint Creek.

Mark Latham, City Administrator of Siloam Springs advised that Siloam Springs is undertaking a lake study at the cost of $180,000. They also have a water quality study at Cedar Creek.

Earl Smith stated that the second issue involved computations of the draft annual yield report. The draft report supplied was unusual in that computations were approaching the 60/40 percentages on the Illinois River watershed. The combination of a low flow year coupled with non-consumptive figures is misleading. The Committee recommended appropriately utilizing the consumptive numbers.

Commissioner Smith asked if Arkansas had planned as to the projected water needs of the northwest cities. Would additional storage be necessary to meet those needs or are the riparian withdrawals adequate to supply those cities in the future if approaching the 60/40 split?

Earl Smith stated Beaver Lake is the bulk water source for the foreseeable future. Future planning should consider the smaller towns and withdrawals from the Illinois watershed.

Commissioner Young noted that the primary drinking water source is Beaver Lake in the White River Watershed. He stated some of the wastewater discharges from the White River Basin are actually discharged into the Illinois and perhaps other basins. He asked how were the discharges accounted for in the report or were they being addressed.

Earl Smith answered that they were not addressed in the past reports and they should certainly be considered an interbasin transfer contributions from the White River Basin into the Illinois River Basin.

Commissioner Young stated he would like the contributions from the White River Basin subtracted before computing the annual yield.

Earl Smith stated that as the area grows and if the water source continues to be Beaver Lake which is in the White River Basin, that where as the number was insignificant twenty years ago, it may not be twenty years from now.

Commissioner Young stated it would be interesting to look at how much water is transferred from the White River Basin into the compact area.

Earl Smith stated that the committee had major discussions on the Water Quality Monitoring Report -2003 (Attachment "J"). He noted that it was a dry year, most of the stations show a significant decline in total phosphorus; the sheer volume of water that moved was significantly down.

Derek Smithee stated that as it was a dry year; good storm flow events could not be drawn. However, there was a lot of base flow information and base flow is primarily driven by point source discharges. For the first time statistically significant reductions in total phosphorus have been shown at every site with the exception of Flint Creek near Kansas. At Flint Creek near Kansas increasing trends continue for base flow and low flow conditions. He stated he was excited to see water quality improvements as a result of improving the efficiency of discharges by wastewater treatment plants.

Dick Cassat advised that data for the eight months of 2004 (a wet year) showed approximately 50% lower than data found in 2003. The Department of Environmental Quality data is not segregated from high flows or low flows.

Commissioner Tolbert suggested the report be expanded to include other information that would add to its utility to the Commission. He suggested the environmental committee be

charged to bring all information they think would be relevant and not limit it to the annual loading figure to gauge progress to date.

Commissioner Young referred to page 8 and page 15 and the concentrations on the Illinois River for 1999-2002 comparing Arkansas and Oklahoma. He asked why the Oklahoma concentrations jumped dramatically.

Derek Smithee stated this was discussed but without further monitoring and work they did not have an answer.

Commissioner Young stated it would be wise to figure out the answer, because that was a great load.

Commissioner Smith stated, "Let's be careful about jumping to conclusions. Our technical folks say we need a better data collection program etc. We know point source controls work and with the data we got we would expect those concentrations to go down and we are seeing that happen. The rest is still inconclusive, but we are on the road to better understand that." One of the concerns is the growth that is to happen in NW Arkansas and NE Oklahoma. Additional point sources, small communities that do not have these controls and future growth in Siloam Springs and Tallequah have the potential to reverse that trend if we are not diligent in reviewing those and working cooperatively to make sure the phosphorus and nutrient controls are in place. The warning signs are to assure that the growth is controlled in such a way that we do not see a reverse in these trends.

Commissioner Carter noted that this was the first step in a ten-year study.

Commissioner Smith stated that he and Commissioner Young were in Washington, DC and talked to members of the delegations about funding and were very encouraged by their support. The basic message was that they would do what they could to support a unified effort by Oklahoma and Arkansas.

Earl Smith stated that the committee estimated yearly monitoring monies spent in the compact watersheds of $550,000 with about $250,000 from Oklahoma and $300,000 from Arkansas.

Derek Smithee stated that Oklahoma is developing a use support assessment protocol in response to the .037 phosphorus criterion. The first informal public meeting was held on technical considerations; language was being developed to interpret ambient data to make use support decisions for impairments. He was encouraged that a technically supportive consensus approach would be produced.

Commissioner Tolbert made a motion to instruct the Environmental Committee to include in next year's Water Quality Monitoring Report all information that the committee decides would be useful for the Commission in tracking the conditions and progress in the shared rivers and Young seconded the motion. The motion carried unanimously. It was noted that existing available data is to be utilized.

Derek Smithee asked Commissioner Tolbert what specific information he would like in the report.

Commissioner Tolbert responded that he would like to see flow rate numbers for concentration and if possible data separated for high flow and low flow.

Commissioner Smith asked that the graphs include the .037 line and illustrate accomplishment of that standard.

Earl Smith noted that the compact report did not utilize the same method of calculation that is proposed in Oklahoma's USAP.

Commissioner Smith stated that the whole target is .037.

Commissioner Tolbert stated it would be good to have the USAP and include the USAP, however there was a vertical axis that shows concentration and it would be nice to see the .037 line on that vertical.

Commissioner Young asked what was the USAP time frame?

Derek Smithee estimated next year and stated it would allow time for incorporation.

Legal Committee: Edward Swaim, Legal Committee Chairman, stated that there were two assignments: (1) Accounting for water quantity and compact compliance and (2) paying for monitoring schemes across state lines.

Following the Engineering Committee Report on the Flint Creek situation, the Commission asked the Legal Committee to look at how annual flows are calculated. The Compact defines annual yield that the 60/40 split comes off of as the computed annual flow runoff from any specified sub-basin which would have passed any certain point on a stream and would have originated within any specified area under natural conditions during the water year. Under Article 5b of the Compact, instantaneous flow might be relevant in limited situations.

Cross-border monitoring may be accomplished and paid for using existing Oklahoma and Arkansas law. Each state has an Interlocal Cooperation Act which would allow various types of districts, such as Conservancy Districts in Oklahoma, and Conservation Districts in Arkansas, to work together.

Upon motion by Commissioner Young, second by Commissioner Smith, the reports of the Engineering, Environmental and Natural Resources, and Legal Committees were accepted.

ELECTION OF COMMISSION OFFICERS

Upon motion by Commissioner Tolbert, second by Commissioner Young, the Commission approved the selection of Mary Schooley with the Oklahoma Water Resources Board as the 2005 Compact Commission Secretary. The motion further approved the selection of Earl Smith to continue in the office of Treasurer.

FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Bob Blatz with U. S. Geological Survey, presented a joint report from Arkansas and Oklahoma USGS with a summary of historical survey sites requested by the compact. He advised that per trend analysis, rolling averages and filters, a historically long (20-30 years) wet period was coming to an end.

Dr. Reed Green mentioned that the USGS programmed $194,443,000 into the Scenic Rivers Basin in the 2003 fiscal year and that was matched by $145,000 state money and other interests. He explained that there was other federal funding applied but not associated with this USGS report.

Commissioner Tolbert requested that the next report include the point source improvements made and the amount of phosphorus removed. He stated it would be instructive and worthy of profiling.

Commissioner Seybolt stated that improvements are being made, progress is being made, the water quality is getting better and people are becoming more aware and conscious of it.

Commissioner Young stated that it needs to be emphasized that resources are necessary to implement a monitoring program that the commission has agreed upon. He acknowledged that USDA is working to achieve cost effective science whereby the Commission may pinpoint the implementation of BMPs relative to water quality goals down stream. He stated it would be misleading the public if the Commission does not make them understand we have further to go to justify or document whether or not we will be able to meet those goals. All agreed more resources are necessary to complete the job.

APPOINTMENTS/ASSIGNMENTS TO COMMITTEES AND SELECTION OF CHAIRS

Commissioner Young referred to the monitoring plan and the Joint Principles and Actions. He asked that Chairman Seybolt formally transmit the agreed on monitoring plan to EPA.

Commissioner Young made a motion to assign the Joint Engineering and Environment and Natural Resources Committee to look at the impaired water bodies reported by the Director of the Department of Environmental Quality and made joint recommendations on appropriate actions by the two states to address this. He asked that the committees look at the concentrated numbers for the Highway 59 Bridge site and the Watts and Tahlequah stations in Oklahoma that jumped in the 1999-02 period and confer with other state/ agency experts to see if they can offer a rational explanation. Commissioner Tolbert seconded the motion and the motion carried.

Chairman Seybolt stated that continued work on funding was the major goal to accomplish.

Commissioner Young stated that there was a continued need to meet with the delegation at every opportunity, particularly when the timing is right to get the required dollars.

Chairman Seybolt asked for further public comment, there being none, he announced that the next meeting would be held in March at the Kerr Center in Poteau. He thanked all for their participation and commended all with acknowledgement to Morrill Harriman and Sammy Cox for their help in sponsoring the event.

UNFINISHED BUSINESS

There was no unfinished business before the Commission.

NEW BUSINESS

Chairman Seybolt requested that a joint report be made to both state's congressional delegations. A report that states something the two states agreed upon.

The commissioners will be polled in January with the proposal of a meeting in March at the Kerr Center in Poteau.

PUBLIC COMMENT

No public comment was made.

2005 ANNUAL MEETING

The State of Oklahoma agreed to host the 2005 annual meeting of the Compact Commission.

ADJOURNMENT

There being no further business, the Chairman adjourned the meeting at 10:50 AM.

/s/ _____ _____

RICHARD SEYBOLT Date
Federal Commissioner and Chairman

ATTEST:

/s/ _____

LAURA BROWN, Secretary

APPENDIX GG

STATEMENT OF JOINT PRINCIPLES AND ACTIONS

WHEREAS the States of Arkansas and Oklahoma share a number of streams and rivers that flow from Arkansas into Oklahoma, six (6) of which are designated as Scenic Rivers in the State of Oklahoma;

WHEREAS the States of Arkansas and Oklahoma share a common goal of improving water quality within the States' shared watersheds;

WHEREAS the States of Arkansas and Oklahoma agree that excess nutrients from point and non-point sources can result in nutrient surplus for phosphorus and nitrogen;

WHEREAS excess phosphorus in watersheds is known to degrade water quality and threaten aquatic life;

WHEREAS Arkansas and Oklahoma agree that reducing the amount of phosphorus present in the States' shared watersheds will further the States' shared goal of improving water quality;

WHEREAS, in an effort to reduce the amount of phosphorus present in its Scenic Rivers, the State of Oklahoma has passed, and submitted to the United States Environmental Protection Agency for approval under Section 303(c) of the Clean Water Act, a total phosphorus criterion of .037 mg/l for its six (6) Scenic Rivers, modified by an implementation schedule that allows dischargers to undertake interim actions designed to improve water quality in the Scenic Rivers consistent with achieving compliance with the State of Oklahoma's .037 mg/l criterion for phosphorus, by 2012;

WHEREAS, Arkansas has steadfastly insisted and maintains that the .037 mg/l criterion for total phosphorus is neither attainable nor appropriate;

WHEREAS, Arkansas and Oklahoma agree that individual but coordinated strategies to meet water quality goals is in the best interest of both States;

The States of Arkansas and Oklahoma, acting through their environmental agencies, including, but not limited to, the Arkansas Department of Environmental Quality, the Arkansas Soil and Water Conservation Commission, the Oklahoma Secretary of Environment, the Oklahoma Water Resources Board, the Oklahoma Department of Environmental Quality and the Oklahoma Scenic Rivers Commission, are working together to reduce phosphorus in the shared Scenic Rivers Watersheds. In furtherance of that goal, the States of Arkansas and Oklahoma, acting through their environmental agencies, enter into this Statement of Joint Principles and Actions.

ARKANSAS LEGISLATION

In furtherance of the States' shared phosphorus reduction goals, the Arkansas General Assembly enacted significant legislation to improve the States' shared watersheds. Consequently, the Arkansas Soil and Water Conservation Commission is committed to developing regulations to implement the following recently passed Arkansas legislation:

- Act 1059 of 2003, requiring the Arkansas Soil and Water Conservation Commission to develop and implement programs to certify the minimal competence and knowledge of persons preparing nutrient management plans and of persons making nutrient application, including the proper utilization of litter,
- Act 1060 of 2003, requiring the Arkansas Soil and Water Conservation Commission to operate an annual registration program to assemble and maintain information on the number, composition, and practices of poultry feeding operations in the state, including the land application practices used by each individual

poultry feeding operation, as well as the amount of litter stored, applied and transferred by each operation, and

- Act 1061 of 2003, declaring certain areas, including the Illinois River Watershed, to be nutrient surplus areas for phosphorus and nitrogen, and making it a violation of State law to apply designated nutrients within a nutrient surplus area except in compliance with a nutrient management plan approved by the Arkansas Soil and Water Conservation Commission or at a protective rate established by Arkansas Soil and Water Conservation Commission.

LITTER REMOVAL/REUSE TECHNIOUES

The States of Arkansas and Oklahoma, acting through their environmental agencies, will jointly pursue funding, including federal grants or other federal funding, for various litter removal and reuse techniques, such as:

- the development of a litter bank;
- burning litter for energy;
- the use of biological treatment (e.g. the Stamper Project);
- pelletization to produce a marketable fertilizer product; and
- transportation of excess litter from the affected watersheds.

JOINT PHOSPHORUS INDEX

The States of Arkansas and Oklahoma, acting through their environmental agencies, are working together toward development of a Joint Phosphorus Index by August 2004. The States will consider utilization of the Joint Phosphorus Index for the development of Nutrient Management Plans.

DATA COLLECTION

Although information collected pursuant to Act 1060 of the 2003 Arkansas General Assembly, quantifying the amount of litter stored, applied and transferred by individual poultry feeding operations is made confidential under the statute, the Arkansas Soil and Water Conservation Commission will prepare detailed compilations and summaries of this information and make these compilations and summaries available upon request to the public, the Oklahoma Environmental Agencies and EPA.

The Arkansas Soil and Water Conservation Commission will work with Oklahoma in determining the formal for these compilations and summaries (e.g., information by county, geographic area or watershed), as well as the amount of detail necessary to address Oklahoma's reasonable concerns. Similarly, Oklahoma will work with Arkansas to provide comparable information for poultry operations in Oklahoma.

WATERSHED MONITORING

The States of Arkansas and Oklahoma, acting through their environmental agencies, will coordinate monitoring in partnership with the Arkansas/Oklahoma Arkansas River Compact Commission throughout the shared Oklahoma Scenic Rivers Watersheds based on a common protocol and will share all information/data resulting from such monitoring. The States will hold discussions aimed at arriving at the agreed upon monitoring protocol by August 2004.

The States will submit the agreed upon design to EPA for review and endorsement.

EPA has committed to seek to obtain federal funding for the agreed upon monitoring.

REOPENER PROVISION

Oklahoma periodically reevaluates all of its water quality standards. In particular, Oklahoma will reevaluate Okla-

homa's .037 mg/l criterion for total phosphorus in Oklahoma's Scenic Rivers by 2012, based on the best scientific information available at that time, and with the full, timely inclusion of officials from the State of Arkansas representing both point and non point source dischargers.

CONTROLS ON LARGER ENTITIES

The States of Arkansas and Oklahoma, acting through their environmental agencies, understand that point source dischargers will need time to achieve water quality improvements in the affected watersheds consistent with Oklahoma's criterion for total phosphorus. Therefore, the States, acting through their environmental agencies, will issue to the point source dischargers to the shared Oklahoma Scenic Rivers Watersheds with a design capacity of greater than 1 MGD, specifically the Cities of Fayetteville, Rogers, Springdale, Siloam Springs and Bentonville, Arkansas, National Pollutant Discharge Elimination System ("NPDES") permits reflecting an effluent limit for total phosphorus of 1 mg/l (30 day average) pursuant to the implementation schedule set out below. The City of Tahlequah, Oklahoma received an NPDES permit issued in 1992 requiring it to meet a total phosphorus effluent limit of 1 mg/l.

The States of Arkansas and Oklahoma, acting through their environmental agencies, will reissue the above-specified cities' NPDES permits on a normal five (5) year reissuance cycle, with the understanding that NPDES permits for these point source dischargers to the shared Oklahoma Scenic Rivers Watersheds issued in the year 2012 or beyond must include phosphorus limits stringent enough to meet applicable water quality standards.

Schedule for Large Cities

Rogers—to meet 1 mg/l limit starting in 2004

Springdale—expansion to meet 1 mg/l limit starting in 2007

Siloam Springs—expansion to meet 1 mg/l limit starting in 2009

Fayetteville—existing facility already complies; new facility to meet 1 mg/l limit once operational (circa 2005)

Bentonville—new facility to meet 1 mg/l limit once operational (date unknown),

CONTROLS ON SMALLER ENTITIES

The State of Arkansas, acting through its environmental agencies, will work aggressively throughout the implementation period with those existing Arkansas entities with design capacities of less than 1 MGD but greater than or equal to .5 MGD to reduce the level of phosphorus in their discharges to the maximum extent possible through voluntary controls aimed at reaching either 1 mg/l total phosphorus or a phosphorus loading limit based on 1 MGD x 1 mg/l by the year 2012. The City of Westville, Oklahoma is currently under a compliance order to meet a 1 mg/l limit within two (2) years.

NOTE: The States of Arkansas and Oklahoma, acting through their environmental agencies, understand that the above described controls do not apply to facilities, such as cooling water intake facilities, whose discharges do not contribute phosphorus to the receiving stream, so long as those facilities discharges do not contain increased concentrations of phosphorus.

WATERSHED PLAN

The States of Arkansas and Oklahoma, acting through their environmental agencies, will work together in partnership with the Arkansas-Oklahoma Arkansas River Compact Commission toward the goal of producing a Watershed Plan.

NOTE: EPA's Clean Water Act Section 319 guidance sets out nine (9) elements for a Watershed Plan.

GENERAL PROVISIONS

The parties understand that this document is not intended to create, diminish or waive any legal rights or obligations among the parties or any other person or entity not a party to this document, including individual farmers. Nothing in this document creates any rights of causes of action for any person, whether party to this document or not.

The parties recognize that a request by Oklahoma for more stringent NPDES permit concentration limits than those set out in this document, or a challenge by Arkansas to Oklahoma's phosphorus standard, would terminate this document. If a third party brings a lawsuit inconsistent with the terms of this document, both parties will indicate to the Court their support for the terms of this document.

EPA has told the parties this document represents a very positive step by the States, acting through their environmental agencies, toward improving water quality in the shared Oklahoma Scenic Rivers Watersheds, which is consistent with achieving compliance with the State of Oklahoma's .037 mg/l criterion for total phosphorus in the State's Scenic Rivers.

The States of Arkansas and Oklahoma, acting through their environmental agencies, understand that as parties to this document, they intend to respect and follow the commitments made herein, and that so long as all commitments made herein are met, the parties will continue to seek progress under this document toward achieving improvements in water quality.

/s/ Marcus C. Devine — December 18, 2003

MARCUS C. DEVINE — Date

Executive Director

Arkansas Department of Environmental Quality

/s/ J. Randy Young 12/18/03
J. RANDY YOUNG, P.E. Date
Executive Director
Arkansas Soil & Water Conservation Commission

/s/ Miles Tolbert 12/18/03
MILES TOLBERT Date
Oklahoma Secretary of Environment

/s/ Duane A. Smith 12/18/03
DUANE A. SMITH Date
Executive Director
Oklahoma Water Resources Board

/s/ Edward H. Fite, III 12/18/2003
EDWARD H. FITE, III Date
Executive Director
Oklahoma Scenic Rivers Commission

/s/ Steven A. Thompson 12/18/03
STEVEN A. THOMPSON Date
Executive Director
Oklahoma Department of Environmental Quality

APPENDIX HH

THE OPPORTUNITY COST OF REGULATING PHOSPHORUS FROM BROILER PRODUCTION IN THE ILLINOIS RIVER BASIN*†

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* Research supported in part by grant No. R825791 from the USEPA Science to Achieve Results Program. This research has not been subjected to any EPA review and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred.

† The authors would like to thank the editor and referees for their helpful comments. Any errors remain the sole responsibility of the authors.

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(September, 2005)

THE OPPORTUNITY COST OF REGULATING PHOSPHORUS FROM BROILER PRODUCTION IN THE ILLINOIS RIVER BASIN

(ABSTRACT)

The Illinois River Basin in eastern Oklahoma and northwest Arkansas is an example of a region where significant growth in poultry production has been accompanied by water quality problems. The primary concern in the Basin is the problem of phosphorus in runoff that is associated with application of litter to crops. Existing data suggests that there is a continuing decline in the quality of water in the Illinois River, and discussions have focused on developing and implementing a phosphorus standard. The specific objectives of this study are to estimate the reduction in poultry production necessary to achieve the reduction in phosphorus runoff under a set of phosphorus constraints, including soil text phosphorus, and to estimate the opportunity costs of reducing poultry production in the basin under each phosphorus constraint on the economic activity in the watershed. A mathematical programming model that incorporates poultry production and cropping decisions is developed. The parameters for the model are identified, and then it is solved to provide a base solution Model solutions are then developed for the different policy target levels of phosphorus. The model structure is then modified to account for the presence of soil test phosphorus levels and the corresponding limits on soil test phosphorus throughout the basin. This formulation includes current soil test phosphorus throughout the basin. All

of the applications assume that the only disposal option for poultry litter is land application. An economic impact assessment of the effects of phosphorus limitations in the basin is also conducted for Arkansas counties only, Oklahoma counties only, and all five affected counties combined.

The key findings of this study are as follows. The limits imposed on phosphorus for the entire basin range from a 20 percent reduction in base-level phosphorus values to target amounts of phosphorus that correspond to a concentration level of 0.02 mg./L. The opportunity cost for the entire basin with the 20 percent reduction is approximately $1.5 million, while the opportunity cost of imposing a phosphorus target consistent with a concentration level 0.02 mg./L. is approximately $7.7 million. The opportunity cost of a phosphorus target consistent with 0.037 mg./L. is roughly $6.5 million. A regional disaggregation of the opportunity costs shows that the majority of the impact lies with the counties in Arkansas. The opportunity cost per ton of litter reduction for the phosphorus restrictions is also calculated. These costs range from $52 per ton of litter reduced to $65 per ton of litter removed. These per-ton costs reflect the assumption that land-based application of litter is the only alternative for disposal of litter generated in the basin and provide a benchmark for comparing alternative options of dealing with litter, including export.

THE OPPORTUNITY COST OF REGULATING PHOSPHORUS FROM BROILER PRODUCTION IN THE ILLINOIS RIVER BASIN

INTRODUCTION

In recent years, poultry production has become an important component of the economic base for many regions around the United States. These production increases have been almost exclusively in operations now defined as Animal Feeding Operations (AFOs) by the USDA. A corresponding byproduct of poultry production is the generation of poultry litter. Poultry litter contains a variety of nutrients (Govindasamy, Cochran, and Buchberger, 1994), which suggests a potential source of crop nutrients. Moreover, poultry litter can serve as a substitute for commercially produced fertilizers. Production of these nutrients often surpass the amount that can reasonably be utilized by operations on which the litter is produced, resulting in export of the nutrients to nearby farms and ranches and potentially increasing the possibility for nutrient runoff into water sources, according to recent studies on water quality (Gollehon et al., 2001; Kellogg et al., 2000). Some researchers (Govindasamy, Cochran, and Buchberger, 1994; Govindasamy and Cochran, 1995a, 1995b, and 1998) have argued that high concentrations of poultry litter may result in litter applications where nutrient requirements are exceeded and excessive nutrients in surface and groundwater become a problem. For example, increased application of poultry litter could lead to concerns about the environmental impacts of increased nitrate, phosphorus, and bacteria levels in water supplies (Sharpley et al., 1994). The presence of phosphorus in agricultural runoff is thought to be an important source of eutrophication (Sharpley et al., 1994).

Several contemporary research pieces have investigated the impacts of limiting land application of animal nutrients to attempt achieving water quality goals at the local level (Ribaudo et al., 2001; Roe et al., 2002). Similar analyses have

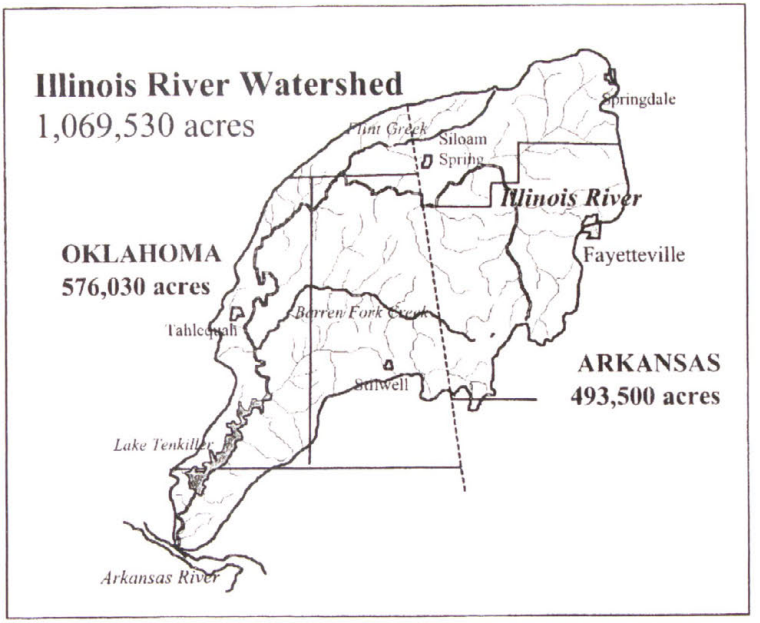
examined impacts at the national level (EPA, 2001; FAPRI, 2001; USDA-NRCS, 2002). The attendant water quality problems resulting from the presence of phosphorus in runoff from agricultural nonpoint sources clearly suggests the need for developing phosphorus management policies (Meo et al., 2002). These policies should reflect a combination of factors, including a balance between crop needs and the total available soluble phosphorus, transport processes for surface and groundwater, erosion and runoff susceptibility of soils, and proximity to eutrophication-sensitive surface waters. Kaplan, Johansson, and Peters (2004) used a mathematical programming approach to examine the implications of a policy whereby only CAFOs (most poultry operations are CAFOs) meet nutrient constraints such as plant nutrient uptake. They allowed crop and animal production decisions to respond to price effects precipitated by these constraints, but posited that their analysis could not reveal how individual operations would benefit or be harmed by the constraints.

An example of a region where significant growth in poultry production has been accompanied by water quality problems is the Illinois River Basin in eastern Oklahoma and northwest Arkansas. (A map of the Illinois River Basin is presented in Figure 1.) The Illinois River Basin covers an area of 433,160 hectares; 54 percent of the total basin is located in Oklahoma. The portion of the Illinois river in Oklahoma is a popular tourist and recreation attraction and was the first river designated as wild and scenic by the state of Oklahoma. Annually an estimated 180,000 people float the Illinois River by canoe, raft, or kayak while approximately 350,000 enjoy swimming, fishing, camping, hiking, birding, and hunting opportunities (Meo et al., 2002). The Illinois River is a source of drinking water for several municipalities and irrigation water for farms and nurseries and provides a habitat for several state and federal threatened and endangered species (Bality et al., 1998). Tourism is an important component of the economic base in the Basin, especially the portion in

Oklahoma. A substantial amount of income is also derived from agriculture, plant nurseries, forestry, and gravel and limestone mining. Agricultural activities include cattle ranching and poultry operations; sales from broiler production alone increased from $171.4 million to $291.7 million over the period 1982 to 2002 (USDA, 2004).

The historical evolution of water policy in the Illinois River Basin with respect to Arkansas and Oklahoma is highlighted with controversy in recent periods (Meo et al., 2002). For example, a controversy in the late 1980s and early 1990s involved the discharge of municipal waste water into the Illinois River by the City of Fayetteville, Arkansas. Given the river's natural heritage designation in Oklahoma, increased wastewater discharges from sources in Arkansas triggered a lawsuit by Oklahoma (Bality et al., 1998). This legal action resulted in a U.S. Supreme Court decision in 1992 that resolved the conflict in favor of Arkansas. The lawsuit was based on the proposition that Fayetteville must meet Oklahoma's water quality standards at the state line, but it was concluded that existing evidence did not prove that the city of Fayetteville violated Oklahoma water quality standards. In 1996 a report on Tenkiller Lake, which is downstream on the Illinois River, contained a recommendation for phosphorus reductions in the Illinois River Basin (Storm et al., 1996). In 1997, the Arkansas—Oklahoma River Compact Commission established a goal to reduce phosphorus in the Basin by 40 percent.

Figure 1: Illinois River Basin



The status of water quality in the Illinois River Basin continues to be a concern. Existing data indicate that the Illinois River's scenic river status in Oklahoma is seriously threatened by excess nutrients, including phosphorus. Moreover, available data indicate nutrient loads are increasing (Vieux and Moreda, 2003). The sources of phosphorus include sewage treatment plant discharges and agricultural and urban/residential runoff (Vieux and Moreda, 2003). The continual decline in water quality has led to discussions focused on developing and implementing a phosphorus standard.

The purpose of this paper is to identify the sources and estimate the opportunity costs of the various phosphorus limitation proposals that have been proposed to address the decrease in water quality. Opportunity costs would come in the form of forgone agricultural returns resulting from limited application of poultry litter and decreased poultry numbers in the study area as a consequence of phosphorus limits. The

analysis will examine a set of proposed target levels for the Illinois River Basin, including an Oklahoma Scenic Rivers Commission standard of 0.020 mg/L and a target level of 0.037 mg/L, which is designed to control algal growth. The state of Oklahoma has decided to adopt the target level of 0.037 mg/L. The policy discussions for controlling phosphorus have also included efforts to monitor and control soil test phosphorus levels in the river basin. For example, Oklahoma has placed limits on the ability to land apply poultry litter based upon the amount of soil test phosphorus per acre. The impact of policies imposing limitations on soil test phosphorus levels throughout the basin as an alternative to reduced levels of phosphorus loads in the Illinois River Basin are examined. The latter analysis will include an examination of the corresponding amounts of phosphorus that appears in runoff. The main question in this case is whether the soil test phosphorus limits are sufficient to bring about the necessary reductions in basin-wide levels of phosphorus. It is assumed throughout these analyses that all litter generated in the river basin is disposed of by land application within the river basin. Therefore, phosphorus levels in runoff may be reduced primarily by curtailing poultry production in the river basin.

The specific objectives of this study are to:

- Estimate the reduction in poultry production necessary to achieve the reduction in phosphorus runoff under each of the aforementioned constraints, including soil test phosphorus and
- Estimate the opportunity costs of reducing poultry production in the watershed under each phosphorus constraint on the economic activity in the watershed.

A mathematical programming model that incorporates poultry production and cropping decisions is developed in the next section. The parameters for the model are identified and then it is solved to provide a base solution. Model solutions

are then developed for the different policy target levels of phosphorus. The model structure is then modified to account for the presence of soil test phosphorus levels and the corresponding limits on soil test phosphorus throughout the basin. This formulation will include current soil test phosphorus data throughout the basin. All of these applications assume that the only disposal option for poultry litter is land application. An economic impact assessment of the effects of phosphorus limitations in the basin is also conducted for Arkansas counties only, Oklahoma counties only, and all five effected counties combined.

MODEL STRUCTURE

Several studies have examined the economic and environmental impacts of poultry litter generation, fertilizer use, and disposal (Govindasamy and Cochran, 1995, 1998; Govindasamy, Cochran, and Buchberger, 1994; Xu, Prato, and Fulcher, 1993). A common feature of the model structures used in these studies is that poultry litter is treated as a factor of production. The models used by Govindasamy and Cochran (1995a, 1995b, 1998) and Govindasamy, Cochran and Buchberger (1994) focus more on poultry litter applications and pay less attention to nutrients, particularly nitrogen and phosphorus. Poultry litter is introduced into the model structures used in these studies through a balance equation that traces the use of poultry litter. One part of the equation describes the quantity of poultry litter produced in the watershed while other terms quantify uses of poultry litter. The uses are the amounts of litter applied to crops in the region of study as well as the amount of litter transported from the watershed for use in other regions. No explicit consideration is given to nutrient demands. Xu, Prato, and Fulcher (1993) explicitly model the demand for nutrients and also consider the tradeoffs between litter as a source of crop nutrients and commercial fertilizers. The supply sources of litter are treated as exogenous in all of these models. Among

other things, it is assumed that the generation of poultry litter is proportional to poultry production. This implies that reductions in poultry litter require a proportional reduction in broiler production. Schwabe (2000) uses a mathematical programming model to evaluate alternative management strategies for reducing nutrient loadings in the Neuse River, which is located in eastern North Carolina.

An important extension of the modeling structures cited above is to make the supply of nutrients and hence the generation of poultry litter endogenous. This can be accomplished by explicitly incorporating broiler production decisions. The outcome of this extension is an integrated modeling structure that offers the advantage of allowing the flexibility of broiler production responses to be reflected in the opportunity costs of various situations. This integrated framework also provides a more realistic perspective of the opportunity cost of environmental policies.

The modeling framework used in this paper incorporates poultry production and cropping decisions as well as decisions pertaining to litter application. This framework is used to measure the opportunity cost of the different target levels (and related policies) for phosphorus from poultry litter. Assume that profit maximization is the decision criterion within the river basin. It is then possible to identify a profit level in the absence of phosphorus restrictions. Implementation of a restriction on phosphorus usually causes profits to be lower in the presence of such a restriction. This reduction in profits represents the opportunity cost of a particular restriction. Thus if Λ denotes the opportunity cost of a target level of phosphorus, then:

$$\Lambda = \bar{\pi} - \hat{\pi} \tag{1}$$

where: $\bar{\pi}$ = profits in the absence of a target level for phosphorus, and

$\hat{\pi}$ = profits with a target level of phosphorus in place.

The development of the integrated modeling structure should reflect, as closely as possible, the realities of broiler production, litter generation and disposal, and cropping activities. The majority of broilers are produced under some type of contract arrangement between a poultry company (integrator) and a grower. The integrator provides the birds and feed and supervises the growth of the birds through a "service person." (Note that the integrator retains ownership of the birds.) The grower provides housing, equipment, and labor. In addition, the grower is also responsible for waste management. In many cases, the contracts between integrators and growers call for compensation or a price to be paid per unit of weight. The contract may also include incentives to encourage efficient production. A more detailed discussion and analysis of these contracts is beyond the scope of this paper. The interested reader should consult Knoeber and Thurman (1995). Within each production region, broiler production is defined on the basis of a "contract broiler production unit", where each unit, or production house, is assumed to be homogenous throughout the region.

The profitability levels are based on a mathematical programming model structure. Let the index i ($i = 1, \ldots, I$) denote the type of crop produced and k ($k = 1, \ldots K$) the area or region of production. Let the index z, where $z = 1, 2$, denote the separate political jurisdictions where 1 equals Oklahoma and 2 equals Arkansas. The index n ($n = 1, 2$) is used to denote the nutrient for crops, either phosphorus or nitrogen. In addition, the following notation is used:

P_i = price for crop i;

L_{ik}^z = total amount of land for crop i in region k;

Ω_{ik}^z = productivity of crop i, region k;

c_{ik}^z = per-unit cost of crop i produced in region k;

η_k^z = amount of manure generated per unit of broiler weight for region k;

e_{ki}^{z} = cost of spreading a unit of poultry litter on crop i in region k from broiler production in region k;

θ_{kin}^{z} = amount of nutrient n in a unit of poultry litter from a broiler production unit spread on crop i in region k;

Γ_{k}^{z} = response matrix coefficient for phosphorus in runoff in production region k, political jurisdiction z;

r_{1k}^{z} = profit margin for a unit of broiler output from a broiler production unit in region k;

m_{ki}^{z} = profit margin for crop i produced in region k $\left(m_{ik}^{z} = p_i \Omega_{ki}^{z} - c_{ki}^{z}\right)$;

a_{kin}^{z} = amount of nutrient n needed to produce a unit of crop i in region k;

q_{k}^{z} = number of birds in a broiler production unit in region k;

J_{k}^{z} = number of broiler production units in region k;

W_{k}^{z} = weight for an individual bird in a production unit in region k;

M_{ki}^{z} = amount of poultry litter applied to crop i in production area k, political jurisdiction z;

F_{k}^{z} = amount of feedstuff used for an individual bird in a production unit in region k;

G = total amount of phosphorus from runoff;

β_{ki}^{z} = proportion of phosphorus not used by crop i in region k that becomes runoff or available for runoff; and

V_{k}^{z} = total amount of poultry produced in region k, political jurisdiction z;

α_{kin}^{z} = proportion of applied nutrient n that is available for use by crop i in region k.

Economic profits from broiler production and cropping activity (in the absence of an environmental policy) are determined by the following integrated mathematical programming model:

$$max\ \pi = \sum_{z=1}^{2}\sum_{k=1}^{K} r_{k}^{z} V_{k}^{z} + \sum_{z=1}^{2}\sum_{k=1}^{K}\sum_{i=1}^{I} m_{ki}^{z} L_{ki}^{z} - \sum_{z=1}^{2}\sum_{k=1}^{K}\sum_{i=1}^{I} e_{ki}^{z} M_{ki}^{z} \qquad (2)$$

subject to:

$$W_{k}^{z} = \phi_{1k}^{z} + \phi_{2k}^{z} F_{k}^{z} + \phi_{3k}^{z} \left(F_{k}^{z}\right)^{2} \qquad (3)$$

$$(z = 1, 2)$$

$$(k = 1, \ldots, K)$$

$$V_{k}^{z} = J_{k}^{z} q_{k}^{z} W_{k}^{z} \qquad (4)$$

$$(z = 1, 2)$$

$$(k = 1, \ldots, K)$$

$$\sum_{i=1}^{I} L_{ik}^{z} \leq \bar{L}_{k}^{z} \tag{5}$$

$$(z = 1, 2)$$

$$(k = 1, \ldots, K)$$

$$\eta_{k}^{z} Y_{k}^{z} - \sum_{i=1}^{I} M_{ik}^{z} = 0 \tag{6}$$

$$(z = 1, 2)$$

$$(k = 1, \ldots, K)$$

$$a_{i_{im}}^{z} L_{ik}^{z} = \alpha_{i_{im}}^{z} \left(\theta_{i_{im}}^{z} M_{ik}^{z}\right) \tag{7}$$

$$(z = 1, 2)$$

$$(k = 1, \ldots, K)$$

$$(i = 1, \ldots, I)$$

$$(n = 1, 2)$$

$$\sum_{z=1}^{2} \sum_{k=1}^{K} \sum_{i=1}^{I} \Gamma_{k}^{z} \left[\beta_{ik}^{z} \left(1 - \alpha_{i_{in}}^{z}\right)\left(\theta_{i_{in}}^{z} M_{ik}^{z}\right)\right] - G = 0. \tag{8}$$

The objective function equation (2) is defined as economic profit where the variables are broiler live weight produced, land use activities and litter applications to crops. It should be noted that equation (2) explicitly represents the cost of spreading litter. The components of the constraint set can be divided into two logical components. The set of constraints (3) and (4) are concerned with broiler production. The set of constraints (5) through (8) is concerned with cropping activities and the disposition of poultry litter. The last constraint is concerned with tracking phosphorus available for runoff from nonpoint sources throughout the study region. These constraints are explained in more detail in the following paragraphs.

The production of broilers in this model is based on the notion of a "broiler production unit." This definition includes a set number of birds produced in the unit along with a return

per unit of live weight. The weight gain for broiler production is usually stated in terms of a biological or growth response function (Pestie, Arreas, and Miller 1985; Miller, Arreas, and Pesti, 1986; and Gonzalez-Alcorta, Dorfman, and Pesti, 1994). The development of these response functions is based on test trials where a growth function or biological response function is estimated for a single bird (Gonzalez-Alcorta, Dorfman, and Pesti, 1994).

The model formulation for broiler production draws from the formulations reported in Gonzalez-Alcorta, Dorfman, and Pesti. (1994). Equation (3) is a biological response function that shows weight gain to be a function of feed intake. Feed intake is an implicit function of changes in metabolizable energy levels and protein levels in the broiler diet. Equation (3) is assumed to have positive but diminishing marginal returns. Finally, equation (4) is a relationship that tabulates the total weight of broilers produced in the region.

The remaining components of the constraint set are concerned with cropping activities and poultry litter disposition. Production regions based on political sub-jurisdictions or other geographic units are explicitly represented in the model. Constraint (5) represents restrictions on land availability. (It is also possible that this set of constraints could include other factors such as participation in the agricultural commodity reserve programs.) The variable L^z_{ki} represents amounts of land in crop-related activity.

Constraint (6) is a balance equation reflecting the sources and disposition of poultry litter. The first term on the left-hand side of constraint (6) denotes the amount of litter generated from broiler production. The second term shows the amount of litter spread on the different crops.

Equations (7) and (8) show a set of relationships that pertain to the supply and demand of the nutrients phosphorus and nitrogen applied to crops in the model as well as the

amount of phosphorus lost to runoff. In particular, equation (7) shows the equality of the supply of nutrients and the corresponding demand for each production region. This equation shows that the source of nutrients is derived from poultry litter.

The nutrient formulations use a structural process design and nutrient balance approach that is similar to the formulations used by Xu et al. (1993) and Schwabe (2000). Crop production activities and land-based disposal of litter is represented by a set of discrete production activities with unit activity vectors. It is assumed that part of the nutrients applied to the *i*th crop in region *k*, political jurisdiction z, are taken up by the crops while the remaining portion is lost to runoff. The amount of nutrient lost to runoff is assumed to be proportional to the amount of nutrient not taken up by crops. Constraint (8) is concerned with tracking nutrients from cropping activities that find their way into runoff.

The final constraint in the model is concerned with the implementation of phosphorus limitations in the Illinois River Basin. This constraint is written as:

$$G \leq \bar{\bar{G}} \tag{9}$$

where the right-hand side of equation (9) reflects the upper bound for phosphorus in the Illinois River Basin.

Empirical Application and Results

This model is implemented for the Illinois River Basin. The production regions are defined on the basis of a set of counties located in the river basin. The counties in Oklahoma are Adair, Delaware, and Cherokee. The counties in Arkansas are Benton and Washington. Within each county, broiler production is defined on the basis of a "contract broiler production unit." These units are assumed to be homogenous throughout each production region. (A more in-depth discussion of these is presented below.) The level of aggregation

for cropping activities is assumed to be at the production region or county level.

The biological response function for broiler weight gain is:

$$W_k = -0.2068 + 4.3219F_k - 2.0507F_k^2. \qquad (10)$$

This function was adapted from functions developed in Gonzalez-Alcorta, Dorfman, and Pesti (1994). A detailed development of this function is given in the appendix.

The procedures used to develop the parameters for this model are described in the following paragraphs. Information on poultry production data is presented in Table 1. The poultry returns data are derived from information presented by Doye, Berry, and Norris (1993) for a "contract broiler production unit." A broiler production house is assumed to raise six batches of chicks each year with each batch consisting of 25,000 chicks with a 4 percent death loss and 1 percent condemnation. (This amounts to 23,712 birds per batch.) As noted previously, the chicks, feedstuff, medication, and hauling are provided by the integrator. The birds are assumed to be sold at 4.69 pounds, the average live weight of broilers, at a base pay of for \$0.045 per pound (USA Poultry). The total costs per pound live weight of raising the birds must be subtracted from the base pay value. In addition, the return above all costs must be adjusted to reflect the fact that litter disposal has been treated as a separate activity in the model. The adjusted returns above costs, r_{lk}, was found to be approximately \$0.011 per pound of live weight or \$22.4818 per ton of live weight. A "litter generation" coefficient and the corresponding cost of litter removal and land application per ton are also shown in Table 1. The nutrient loadings for each ton of poultry litter shown in Table 1 are taken from Smith et al. (1996).

Table 1
Broiler Production Data

Broiler Returns:	
r_{1k}	= $22.4818/ton
Litter Generation and Removal:	
η_k	= 0.5833826
e_{kl}	= $8.066/ton
Nutrient Loadings for Litter:	
phosphorus ($n = 1$) θ_{k1}	= 50 pounds/ton litter
nitrogen ($n = 2$) θ_{k2}	= 60 pounds/ton litter

Data on poultry production units for the production areas or counties included in this study are shown in Table 2. The data for 1997 were calculated using information from the Census of Agriculture for 1997. Data for the production areas showing broiler production, litter generation, and the related nutrients nitrogen and phosphorus are shown in Table 3 and used for the model parameters.

Table 2
Poultry Production Units

County	1997
Adair (OK)	103
Cherokee (OK)	20
Delaware (OK)	185
Benton (AR)	807
Washington (AR)	742
Total	1,857

Source: Census of Agriculture, 1997

Table 3
Broiler Production, Litter Generation, and Related Nutrients for 1997

County	Number of Broilers	Broiler Live Weight (tons)	Tons of Litter	Tons of Nitrogen	Tons of Phosphorus
Adair (OK)	14,622,238	34,288	20,003	600	500
Cherokee (OK)	2,897,415	6,794	3,963	118	99
Delaware (OK)	26,314,540	61,706	35,998	1,079	899
Benton (AR)	114,881,331	269,392	157,158	4,714	3,928
Washington (AR)	105,565,996	247,548	144,415	4,332	3,610
Total	264,281,520	619,728	361,537	10,843	9,036

The crops represented in the mathematical programming model for each of the Illinois River Basin counties are shown in Table 4. Production and economic returns data for the crops are shown in Table 5. The information included in Table 4 indicates the nutrient demands for the different crops produced in each county. Production and return data were taken from the Oklahoma State University Enterprise Budget Generator (Kletke, 1979). The base year in the optimization is 1999. The data shown in Table 3 were used as a basis to calibrate the initial base solution for the optimization model.

Table 4
Cropping Activities for Illinois River Basin Counties

Crop	Adair	Cherokee	Delaware	Benton	Washington
Bermuda Grass	$n = 1$	$n = 1$	$n = 1$		
& Pasture ($i = 1$)	$n = 2$	$n = 2$	$n = 2$		
Wheat for Grain ($i = 2$)	$n = 2$	$n = 2$	$n = 2$		
Native Grass Pasture ($i = 3$)	x	x	x	x	x
Soybeans ($i = 4$)	$n = 1$	$n = 1$	$n = 1$		
Alfalfa Hay ($i = 5$)	x	x	x	x	x
Fescue Hay	$n = 1$	$n = 1$	$n = 1$	$n = 1$	$n = 1$
& Pasture ($i = 6$)	$n = 2$	$n = 2$	$n = 2$	$n = 2$	$n = 2$

$n = 1$ – phosphorus, $n = 2$ – nitrogen, x = no specified nutrient demand.

Table 5

Production and Economic Returns Parameters

	Bermuda Grass Hay and Pasture ($i = 1$)	Wheat for Grain* ($i = 2$)	Native Grass Pasture** ($i = 3$)	Soybeans ($i = 4$)	Alfalfa Hay*** ($i = 5$)	Fescue Hay and Pasture ($i = 6$)
Net returns per acre	m_{k1}^{i} = $156.75/acre	m_{k2}^{i} = $36.23/acre	m_{k3}^{i} = $6.29/acre	m_{k4}^{i} = $77.33/acre	m_{k5}^{i} = $128.56/acre	m_{k6}^{i} = $39.95/acre
Production	Bermuda Hay Ω_{k1}^{i} = 2.5 tons/acre Pasture Ω_{k1}^{i} = 6 AUMS[1]/acre	Wheat Ω_{k2}^{i} = 29 bu[2]/acre Small Grazing Pasture Ω_{k2}^{i} = 0.9 AUMS/acre	Ω_{k3}^{i} = 1.38 AUMS/acre	Ω_{k4}^{i} = 29 bu/acre	Ω_{k5}^{i} = 3.25 tons/acre	Fescue Hay Ω_{k6}^{i} = 0.75 tons/acre Fescue Grazing Pasture Ω_{k6}^{i} = 6.50 AUMS/acre
Nutrient Demand	Phosphorus a_{k11}^{i} = 40 lbs/acre Nitrogen a_{k17}^{i} = 275 lbs/acre	Nitrogen a_{k22}^{i} = 56 lbs/acre		Phosphorus a_{k41} = 30 lbs/acre		Phosphorus a_{k61}^{i} = 40 lbs/acre Nitrogen a_{k62} = 180 lbs/acre
Production Counties	k = 1 Adair k = 2 Cherokee k = 3 Delaware	k = 1 Adair k = 2 = Cherokee k = 3 Delaware	k = 1 Adair k = 2 Cherokee k = 3 Delaware k = 4 Benton k = 5 Washington	k = 1 Adair k = 3 Delaware	k = 1 Adair k = 2 Cherokee k = 3 Delaware k = 4 Benton k = 5 Washington	k = 1 Adair k = 2 Cherokee k = 3 Delaware k = 4 Benton k = 5 Washington

* Small grain for clay and loam soils with custom harvest. **Deferred grazing, good to excellent conditions. ***Clay and loam soils, usually classes I and II, owned equipment custom hauling.

[1] AUMS = Animal Unit Months. This is defined as the amount of forage to supply one month's grazing for one 1,000 pound beef/dairy animal.

[2] bu = bushel

The relationship between the amount of nutrients applied and the amount for crop uptake is assumed to be a proportional relationship, as shown in Equation (7). The phosphorus uptake coefficient used in this model is 0.33 and the coefficient for phosphorus remaining in the soil is 0.67 (Dr. Phillip A. Moore, USDA/ARS, personal communication). It is also assumed that the amount of phosphorus in runoff is proportional to the amount of phosphorus not used for crop uptake and remaining in the soil as shown in equation (8). Dr. Moore has suggested a value of 0.08 for this coefficient. The total amount of phosphorus in runoff in the Illinois River Basin is adjusted to reflect the percentage of land in each of the five counties included in this study that lie in the Illinois River Basin. These percentages are shown in Table 6.

Table 6
County Lands in the Illinois River Basin

County	Percentage of the County in the Illinois River Basin
Adair (OK)	80
Cherokee (OK)	50
Delaware (OK)	10
Benton (AR)	40
Washington (AR)	50

The range of limits set on phosphorus in runoff for the Illinois River Basin is shown in Table 7. These limits are assumed to correspond to the maximum mass loadings of phosphorus in the Illinois River as measured by monitoring devices located in the Illinois River south Tahlequah, Oklahoma. The estimated base value for phosphorus is 153 tons per year. These values are based on a modeling exercise that is described in Meo et al. (2002) and Vieux and Moreda (2003). The mathematical programming model was solved using the set of target levels shown in Table 7 for G in constraint (9).

The remainder of this section is concerned with an analysis of using the set of target levels shown in Table 7. These discussions are focused on the opportunity costs and corresponding impacts regulating phosphorus will have on the regional economy throughout the Illinois River Basin. No discussion on the processes governing the transport and bioavailability of *P* in surface runoff from agriculture landscapes is provided since this is beyond the scope of this paper. This type of discussion for the Illinois River Basin can be found in Viieux and Moreda (2003).

Table 7
Phosphorus Reductions

Allowed Phosphorus Level (Tons)	Required Phosphorus Reduction (Tons)	Nature of Reduction
153	—	—
122	31	20% below base
77	77	50% below base
56	97	0.05 mg/L
41	112	0.037 mg/L
31	123	80% below base
22	131	0.02 mg/L

The opportunity costs for a range of phosphorus restrictions in the Illinois River Basin are shown in Table 8. The limits imposed on phosphorus for the entire range from a 20 percent reduction in base-level phosphorus values to a target amount of phosphorus that corresponds to a concentration level of 0.02 mg./L. The opportunity cost for the entire basin with the 20 percent reduction is approximately $1.5 million, while the opportunity cost of imposing a phosphorus target consistent with a phosphorus concentration of 0.02 mg./L. is approximately $7.7 million. The opportunity cost of a phosphorus target consistent with 0.037 mg./L. is roughly $6.5 million. The opportunity cost shown in Table 8 increases by 517 percent over the range of phosphorus reductions shown in Table 8 for the Illinois River Basin.

A regional disaggregation of the opportunity costs is also shown in Table 8. Consider first the impacts on the portions of the river basin located in Oklahoma. The opportunity cost of the basin-wide restriction for the Oklahoma region of the Illinois River Basin ranges from $402,000 to approximately $554,000. This represents roughly a 38 percent increase in the opportunity cost as the phosphorus limit becomes more restrictive. It is also interesting to note that the largest impact in Oklahoma of the basin-wide phosphorus restrictions lie with Adair County over the entire range of phosphorus limits. The opportunity cost for Cherokee County becomes nonzero when the phosphorus limit corresponding to a concentration level of 0.05 mg/L. is imposed on the River Basin. According to the results reported, Delaware County, in contrast, is not impacted by the basin-wide phosphorus restrictions.

Table 8
Opportunity Cost of Phosphorus Restrictions
in the Illinois River Basin

	20 % Reduction	50 % Reduction	0.05 mg/L Target	0.037 mg/L Target	80 % Reduction	0.02 mg/L Target
Oklahoma						
Adair County	$402,386	$402,386	$524,794	$524,794	$524,794	$524,794
Cherokee County	0	0	29,253	29,253	29,253	29,253
Delaware County	0	0	0	0	0	0
Total	$402,386	$402,386	$554,047	$554,047	$554,047	$554,047
Arkansas						
Benton County	0	0	1,040,960	2,081,089	2,799,069	3,369,132
Washington County	1,093,921	3,639,425	3,816,254	3,816,254	3,816,254	3,816,254
Total	$1,093,921	$3,639,425	$4,857,214	$5,897,343	$6,615,323	$7,185,386
River Basin Total	$1,496,307	$4,041,811	$5,411,261	$6,451,390	$7,169,370	$7,739,433

Opportunity costs of the region of the Illinois River Basin located in Arkansas are shown to range from $1.1 million to $7.2 million, which represents an approximate 650 percent increase in opportunity cost as the phosphorus limit becomes more restrictive for the Illinois River basin (Table 8). Table 8 shows that most of the opportunity costs for the basin-wide phosphorus limits lie with the region of the basin located in Arkansas. Initially 73 percent of the opportunity costs lie with

the Arkansas region and increases to 94 percent when the most restrictive phosphorus limit is imposed on basin-wide activity. Initially all of the opportunity costs are shown to lie with Washington County. The magnitude of the opportunity costs in Benton County approach the size of the opportunity costs observed for Washington County as the basin-wide phosphorus limits become more restrictive.

An additional perspective of the adjustment process across the Illinois River Basin with more restrictive limits on basin-wide phosphorus levels is presented in Table 9, which shows poultry production in the Illinois River Basin. Table 9 shows that the largest amount of poultry production of the three counties in the Oklahoma portion of the River Basin is in Delaware County. However, this county is not impacted by the basin-wide phosphorus restrictions: only 10 percent of the land area in Delaware County is located in the Illinois River Basin. This is a much smaller area relative to the other counties in the Basin. In addition, the crops produced in Delaware County exhibit a high enough demand for phosphorus as a nutrient to support the poultry litter applications observed in the model solutions.

Table 9
Poultry Production for the Illinois River Basin
(Tons of Live Weight)

	Base	20 % Reduction	50 % Reduction	0.05 mg/L Target	0.037 mg/L Target	80 % Reduction	0.02 mg/L Target
Oklahoma Counties							
Adair	33,442	10,805	10,805	5,958	5,958	5,958	5,958
Cherokee	6,494	6,494	6,494	4,848	4,848	4,848	4,848
Delaware	60,065	60,065	60,065	60,065	60,065	60,065	60,065
Total	100,001	77,364	77,364	70,871	70,871	70,871	70,871
Arkansas Counties							
Benton	250,231	250,231	250,231	191,672	133,159	92,768	60,700
Washington	214,685	153,146	9,948	0	0	0	0
Total	464,916	403,377	260,179	191,672	133,159	92,768	60,700
Two-State Total	564,918	480,741	337,543	262,543	204,030	163,639	131,571

The data in Table 9 shows the impacts resulting from the basin-wide phosphorus restrictions. The two Arkansas counties account for roughly 82 percent of the poultry production

in the Illinois River Basin, the base solution. In addition, this region of the River Basin accounts for roughly 88 percent of the phosphorus in runoff that is generated throughout the Illinois River Basin.

The last item to consider in this section is the opportunity cost per ton of litter reduction for phosphorus restrictions. These data are shown in Table 10. Notice that costs range from $52 per ton of litter reduced to $65 per ton of litter removed. These per-ton costs reflect the assumption that land-based application of litter is the only alternative for disposal of litter generated in the basin and provide a benchmark for comparing alternative options of dealing with litter throughout the basin, including export.

Table 10
Per-Ton Opportunity Cost of Litter Reduction
for Phosphorus Restrictions

	Opportunity Cost Per Ton of Litter
20 percent reduction	$52
50 percent reduction	57
0.05 mg/L Target	61
0.037 mg/L Target	63
80 percent reduction	64
0.02 mg/L Target	65

LIMITS OF SOIL TEST PHOSPHORUS AS AN ALTERNATIVE TARGET

Some administrators in Oklahoma advocate a phosphorus policy based on limiting the amount of phosphorus per acre in the soils. This approach includes an assessment of phosphorus levels in the soil on a per-unit basis; however, the implications of using soil test phosphorus limits as a surrogate measure for phosphorus in runoff for the Illinois River Basin is unknown. Alternatively, what soil test phosphorus limits would be consistent with three different phosphorus target levels currently being discussed for the Illinois River Basin?

The distribution of soil test phosphorus levels within region k is described by:

$$STP_k^z + N_k^z = X_k^z \tag{11}$$

where: N_k^z = value of phosphorus added to the soil per acre in region k, political jurisdiction z

X_k^z = total amount of phosphorus in the soil per acre in region k, political jurisdiction z.

STP_k^z = initial level of phosphorus in the soil per acre in region k, political jurisdiction z.

$(z = 1, 2)$

$(k = 1, \ldots, K)$.

The limit of soil test phosphorus per acre is given as:

$$X_k^z \leq \bar{X}_k^z \tag{12}$$

$\bar{X}_k^z$ = maximum amount of phosphorus in soil per acre in region k, political jurisdiction z.

$(z = 1, 2)$

$(k = 1, \ldots, K)$.

The value of $\bar{X}_k^z$ is set by a policy maker while STP_k^z is an estimated value of phosphorus in the soils within the Illinois River Basin.

The total amount of phosphorus added to the soil in region k from poultry litter application is based on the number of acres to which litter is applied times the additional amount of phosphorus added per acre. Let L^z_k denote the total acres to which phosphorus has been added. Then:

$$L_{kz}^z = \sum_{i=1}^{I} L_{ikz}^z \tag{13}$$

where constraint (5) is satisfied.

The total amount of phosphorus added to the ground in region k, Q_k^z, can be defined as

$$Q_k^z = N_k^z L_{kz}. \tag{14}$$

Notice that equation (14) is a nonlinear relationship. The following expression is used to approximate Q_k^z.

$$Q_k^z = \bar{L}_{kz}^z N_k^z + \bar{N}_k^z L_{kz}^z - \bar{L}_{kz}^z \bar{N}_k^z \tag{15}$$

where: $\bar{L}_{kz}^z$ = initial value of land area covered with phosphorus, and

$\bar{N}_k^z$ = initial value of phosphorus added to the soil per acre.

If we define $\bar{Q}_k^z = \bar{L}_{kz}^z \bar{N}_k^z$, then the equation can be rewritten as:

$$Q_k^z = \bar{L}_k^z N_k^z + \bar{N}_k^z L_k^z - \bar{Q}_k^z \tag{16}$$

$$(k = 1, \ldots, K)$$

$$(z = 1, 2)$$

The final step requires defining the sources of phosphorus generation that is applied to each region and theoretically includes both commercial fertilizer and poultry litter. The total amount of phosphorus is:

$$Q_k^z = \sum_{i=1}^{I} \left\{ (1 - \beta_{ki}^z)(1 - \alpha_{ki}^z)\theta_{ki}^z M_{ki}^z \right\} \tag{17}$$

$$(k = 1, \ldots, K)$$

$$(z = 1, 2).$$

Equation (9) is now replaced by equations (12), (16), and (17). In addition, equation (8) is used to calculate the total amount of phosphorus in runoff.

The initial per acre soil test phosphorus values for each of the counties included in the modified optimization model are shown in Table 11. These values were based on soil test analyses done by the cooperative extension service offices with Oklahoma State University and the University of Arkansas.

Table 11
Initial Soil Test Values

County	Lbs Per Acre
Adair (OK)	215
Cherokee (OK)	55
Delaware (OK)	233
Benton (AR)	307
Washington (AR)	272

Soil test phosphorus limits ranging from 500 lbs per acre down to 320 acres per acre were imposed for all production regions in the model. The corresponding basin-wide amounts of total phosphorus in runoff for each the respective model solutions are shown in Table 12.

Table 12
Soil Test Phosphorus Limits and Phosphorus in Runoff

Soil Test Phosphorus Limit (lbs/Acre)	Total Phosphorus In Runoff for Illinois River Basin (tons)
500	154
400	154
350	154
325	139
320	96

The key observation from this exercise is that the total phosphorus in runoff for the Illinois River Basin are well above the corresponding amounts for the three alternative basin-wide phosphorus limits discussed by officials from Oklahoma and Arkansas for the Illinois River Basin. The optimization model was again resolved with the three different basin-wide phosphorus limits imposed to identify the corresponding per acre soil test phosphorus values for each county or production region in the model. These results are shown in Table 13.

Table 13
Per Acre Soil Test Phosphorus Values For Basin-Wide Phosphorus Limits for the Illinois River Basin

County	Base Solution (lbs/acre)	0.02 mg/L (lbs/acre)	0.037 mg/L (lbs/acre)	0.05 mg/L (lbs/acre)
Adair (OK)	226	220	220	220
Cherokee (OK)	59	58	58	58
Delaware (OK)	249	249	249	249
Benton (AR)	327	321	322	325
Washington (AR)	290	282	282	282

The results show that the basin-wide targets for phosphorus in runoff cannot be achieved by imposing a per-acre limit on soil test phosphorus. Daniels et al. (1999) reports that for lands with high soil test phosphorus levels, appreciable amounts of soluble phosphorus can exist in runoff water and can significantly impact water quality in receiving streams and lakes. More specifically, it has been shown in recent research that an examination of the top one inch of a soil profile shows that the concentration of phosphorus increases as soil test phosphorus increases. These findings have led some soil scientists and the Natural Resources Conservation Service to recommend a soil test phosphorus limit of 300 pounds per acre as an example.

Daniels et al. (1999) also attempt to address the rationale of a soil test phosphorus limit such as 300 pounds per acre. They argue that such a limit is reasonable because it represents more than the available phosphorus needed for crop production. Moreover, this value is hopefully low enough to minimize phosphorus in runoff that will create water quality problems. But the environmental impacts of a soil test phosphorus limit of 300 pounds, for example, have not been established. The complex set of variables governing the transfer of phosphorus from land surface to aquatic systems makes its environmental impact difficult to assess.

The existing evidence suggests that soil test phosphorus may serve as an indicator of situations where a significant

concentration of dissolved phosphorus could be found in runoff, but it does not offer any indication of the amount or rate of runoff that may be generated for a particular set of conditions. The total amount of phosphorus leaving a field is a function of the runoff phosphorus concentration and the runoff volume. The real issue in this matter is not phosphorus concentration in the runoff from the edge of any particular field, but the total phosphorus load transported to the stream or lake of an entire watershed. The maximum amount of phosphorus that can be assimilated in a watershed without causing eutrophication depends on several factors such as soil test phosphorus levels, distance from significant streams, slope, soil types, buffer strips, type of crop or forage cover, as well as the characteristics of the streams or lakes themselves.

ECONOMIC IMPACT ASSESSMENT

To assess the economic impact of implementing the proposed basin-wide phosphorus reduction policies on the counties comprising the Illinois River watershed, an IMPLAN analysis was conducted utilizing data from the USDA and Bureau of Economic Analysis adjusted according to the preceding model results. IMPLAN is modeling software that is based on the theories and assumptions of input-output analysis (Elrod, 1969; MIG, Inc., 2004). It must again be mentioned that reductions in poultry litter in this research effort are made only by a corresponding reduction in poultry production and processing in the study region; alternative methods of reducing poultry litter in the basin, such as transport from the river basin boundaries or processing into products that may be moved from the watershed, are not considered. Detailed analyses for the two Arkansas counties, the three Oklahoma counties and all five counties combined were conducted and are reported in the following sections.

Arkansas Only Region

The Arkansas Only (Benton and Washington counties) economy consists of 190,447 jobs where employees earn $5.4 billion in salaries and produce $8.2 billion in value added production. The poultry production and processing sectors are responsible for over 10 percent of those jobs, income, and value added production. These sectors contribute 21,438 of those jobs, $607 million in income, and $823 million in value added.

The six scenarios examined lead to six different levels of reduced economic activity, brought on by changes in the poultry processing sector that filter throughout the economy. These losses, shown in Table 14, represent 10 to 60 percent reductions in the poultry industry's direct contribution to the local economy. Table 15 shows the final level of economic activity in the region associated with current (1999) conditions and under six phosphorus limitations. These changes represent a reduction of one to six percent in overall economic activity in the region.

While the impact to the overall economy may seem small, six general sectors of the economies felt close to ninety percent of all impacts. Those sectors are Processed Meats, Poultry and Egg Production, Wholesale and Retail Trade, Miscellaneous Services, Financial/Real Estate and Health Services.

Table 14
Reductions in Contributions of Economic Activity by the Poultry Industry Due to Six Different Phosphorus Limitation Scenarios in the Arkansas Only Region

Scenario	Employment	Income	Value Added
20% Less	-2,038	$-57,595,180	$-78,194,196
50% Less	-6,793	-191,655,646	-260,201,670
0.05 mg/l	-8,924	-252,134,319	-342,310,639
0.037 mg/l	-11,279	-318,874,983	-432,623,245
80% Less	-11,985	-338,583,723	-459,678,846
0.02 mg/l	-12,976	-367,197,811	-498,443,995

Table 15
Final Levels of Economic Activity in the Economy Under the Current (Baseline) Scenario and Under Six Phosphorus Limit Scenarios in the Arkansas Only Region

Scenario	Employment	Income	Value Added
Baseline	190,477	$5,440,577,000	$8,299,776,000
20% Less	188,440	5,382,981,820	8,221,581,804
50% Less	183,684	5,248,921,354	8,039,574,330
0.05mg/l	181,553	5,188,442,681	7,957,465,361
0.037mg/l	179,198	5,121,702,017,	7,867,152,755
80% Less	178,492	5,101,993,277	7,840,097,154
0.02mg/l	177,501	5,073,379,189	7,801,332,005

Oklahoma Only Region

The Oklahoma Only (Adair, Cherokee, and Delaware counties) economy consists of 39,140 jobs where employees earn $865 million in salaries and produce $1.2 billion in value added. The poultry production sector is responsible for over three percent of those jobs, income, and value added. These sectors contribute 1,445 of those jobs, $24 million in income, and $35 million in value added.

The six scenarios examined lead to only two different levels of reduced economic activity, brought on by changes in the poultry production sector that filter throughout the economy. These losses, shown in Table 16, represent 21 to 27

percent reductions in the poultry industry's direct contribution to the local economy. Table 17 shows the final level of economic activity in the region associated with current (1999) conditions and under six phosphorus limitations. These changes represent a reduction of one-half to one percent in overall economic activity in the region.

Table 16
Two Levels of Reductions in Contributions of Economic Activity by the Poultry Industry Due to Six Different Phosphorus Limitation Scenarios in the Oklahoma Only Region

Scenario	Employment	Income	Value Added
20% Less & 50% Less	-304	-5,168,036	$-7,522,283
0.05mg/l, 0.037 mg/l, 80% Less, 0.02mg/l	-392	-6,657,836	-9,690,747

Table 17
Two Final Levels of Economic Activity in the Economy Under Current (baseline) Scenario and Under Six Phosphorus Limit Scenarios in the Oklahoma Only Region

Scenario	Employment	Income	Value Added
Baseline	39,140	$865,312,000	$1,219,205,000
20% Less & 50% Less	38,836	860,143,964	1,211,682,717
0.05mg/l, 0.037 mg/l, 80% Less, 0.02 mg/l	38,748	858,654,164	1,209,514,253

Although the impact to the overall economy may seem small, six areas of the economies felt close to 84 percent of all impacts. Those sectors are Poultry and Egg Production, Utility Services, Financial/Real Estate, Transportation and Communication, Wholesale and Retail Trade, and Construction and Health Services.

Combined Arkansas-Oklahoma Regional Study

The Arkansas-Oklahoma Regional (Benton, Washington, Adair, Cherokee, and Delaware counties) economy consists of 229,616 jobs where employees earn $6.3 billion in salaries and produce $9.5 billion in value added. The poultry production and processing sectors are responsible for over 10

percent of those jobs, income, and value added. These sectors contribute 26,151 of those jobs, $711 million in income, and $969 million in value added.[1]

Table 18
Reductions in Contributions of Economic Activity by the Poultry Industry Due to Six Different Phosphorus Limitation Scenarios in the Combined Arkansas-Oklahoma Region

Scenario	Employment	Income	Value Added
20% Less	-2,957	$-80,251,929	$-109,449,416
50% Less	-8,145	-221,003,233	-301,409,259
0.05 mg/l	-10,695	-290,202,971	-396,785,453
0.037 mg/l	-12,876	-349,355,178	-476,458,585
80% Less	-14,041	-380,966,968	-519,571,526
0.02 mg/l	-15,124	-410,379,763	-559,685,316

Table 19
Final Levels of Economic Activity in the Economy Under Current (baseline) Scenario and Under Six Phosphorus Limit Scenarios in the Combined Arkansas-Oklahoma Region

Scenario	Employment	Income	Value Added
Baseline	229,616	$6,305,887,000	$9,518,978,000
20% Less	226,659	6,225,635,071	9,409,528,584
50% Less	221,471	6,084,883,767	9,217,568,741
0.05 mg/l	218,921	6,015,684,029	9,122,192,547
0.037 mg/l	216,740	5,956,531,822	9,042,519,415
80% Less	215,575	5,924,920,032	8,999,406,474
0.02 mg/l	214,492	5,895,507,237	8,959,292,684

The six scenarios examined lead to six different levels of reduced economic activity, brought on by changes in the poultry processing sector that filter throughout the economy. These losses, shown in Table 18 represent 11 to 58 percent

[1] Note that there are slight differences in levels of impacts from the Arkansas-Oklahoma combined region and the sum of the Arkansas Only and Oklahoma Only. This is a frequent occurrence in IMPLAN analyses and can be attributed here to differences in types of poultry (production vs. processing) activity and differences in regional purchasing coefficients in the two sub-regions.

reductions in the poultry industry's contribution to the local economy. Table 19 shows the final level of economic activity in the region associated with current (1999) conditions and under six phosphorus limitations. These changes represent a reduction of one to seven percent in overall economic activity in the region.

While the impact to the overall economy may seem small, six areas of the economies felt close to eighty-eight percent of all impacts. Those sectors are Processed Meats, Poultry and Eggs, Wholesale and Retail Trade, Miscellaneous Services, Financial/Real Estate, and Health Services.

Summary and Conclusions

The Illinois River Basin in eastern Oklahoma and northwest Arkansas is an example of a region where significant growth in poultry production has been accompanied by water quality problems. The primary management concern in the basin is to reduce phosphorus levels in surface runoff in areas where poultry litter is applied to agricultural land. Existing data suggests that there is a continuing decline in the quality of water in the Illinois River Basin and efforts have focused on developing and implementing a phosphorus standard.

The limits imposed on phosphorus in runoff for the entire basin ranged from a 20 percent reduction in base-level values from the initial calibrated model solutions to the target amount of phosphorus corresponding to a concentration level of 0.02 mg/L. The opportunity cost for the entire basin was shown to range from approximately $1.5 million with the 20 percent reduction in phosphorus to $7.7 million with the limit corresponding to concentration of 0.02 mg/L. The difference between these two limits represents a 517 percent increase in the opportunity cost for the entire river basin. A regional disaggregation of the opportunity costs reveals that the majority of these costs were borne by the sub-basin located in Arkansas. It was also shown that the opportunity cost per ton

of litter reduction for the phosphorus restrictions ranged from $52 per ton of litter reduced to $65 per ton of litter reduced. These costs reflect the assumption that land-based application is the only alternative for disposal of litter in the basin and provide a benchmark for comparing alternative options for dealing with litter. An economic impact assessment of the basin-wide phosphorus limitations was also conducted for the Arkansas counties only, the Oklahoma counties only, and all five affected counties. It was shown that economic activities related to poultry grower activity were substantial in the region. Moreover, it was shown in this analysis that the more restrictive phosphorus limits imposed relatively large losses on the regional economy.

Policy makers have also advocated a phosphorus policy based on setting limits on the amount of phosphorus in the soils per acre. This analysis was designed to address the question of whether soil test phosphorus limits would be consistent with the three different phosphorus concentration levels currently being discussed for the Illinois River Basin. The results reported in this research showed that the basin-wide targets for phosphorus could not be achieved by imposing a per-acre limit on soil test phosphorus, nor could they be approached without serious consequences to economic activities in the study area.

The major caveat for this research is that the only alternative for disposal of poultry litter generated in the Illinois River Basin considered is land-based applications. The only response to achieve the basin-wide limits imposed on phosphorus present in runoff is to reduce poultry production as a way to reduce poultry litter applied to the land. Although several research and implementation initiatives are currently underway to utilize poultry litter, alternative methods of reducing poultry litter in the river basin are not considered. Some of these options include transport from the river basin boundaries by a non-profit third-party enterprise known as the

Ozark Litter Bank (Goodwin, 2004) or processing into energy or value-added products that may be moved from the river basin. Thus, the opportunity costs of the alternatives examined in this research may overstate what these costs would be with additional alternatives for disposing of poultry litter generated within the Illinois River Basin. The process of identifying additional alternatives to land application of poultry litter in nutrient-surplus watersheds is currently being evaluated alongside the transport of litter out of the watershed. Determining the respective opportunity costs of a range of limitations on phosphorus present in runoff for the Illinois River Basin is currently underway.

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APPENDIX

The empirical version of the biological response function equation (4) is adapted from functions derived by Gonzalez-Alcorta, Dorfman, and Pesti (1994). The weight gain function developed by these authors is a function of energy and protein levels and can be written as follows:

$$W_k^z = B_{0k}^z + B_{1k}^z E_k^z + B_{2k}^z \left(E_k^z\right)^2 + B_{3k}^z D_k^z + B_{4k}^z \left(D_k^z\right)^2 \qquad \text{(A.1)}$$

where: E_k^z = energy level of a production unit in region k, political jurisdiction z, and

D_k^z = protein in diet of a production unit in region k, political jurisdiction z.

A number of steps can be taken to restate equation (A.1) in terms of feed intake that reflects the proportion of each ingredient in the cost minimization solution and also reflects the corresponding energy and protein content values. Assume that the amount of each ingredient in the cost minimizing diet is written as:

$$X_{ij}^z = \bar{x}_{ij}^z F_k^z \qquad \text{(A.2)}$$

where: $\bar{x}_k^z$ = fixed proportion of ingredient j in the diet for a broiler production unit in region k (this is determined from the integrator's dietary cost minimization model),

X_k^z = amount of ingredient type i in the diet for a broiler production unit in region k, and

F_k^z = feedstuff intake for a broiler in a production unit in region k.

In general, the energy and protein contents in a broiler diet can be written as follows:

$$E_k^z = \sum_{j=1}^{J} \varepsilon_{kj}^z X_{ij}^z \qquad \text{(A.3)}$$

$$D_k^z = \sum_{j=1}^{J} \varphi_{kj}^z X_{ij}^z \qquad \text{(A4)}$$

where: φ_{kj}^z = protein content per unit of the zth ingredient in broiler diet for a broiler production unit in region k, and

ε_{kj}^z = energy content per unit of zth ingredient in broiler diet for a broiler production unit in region k.

Equation (A.2) can be used to rewrite equations (A.3) and (A.4) as follows:

$$E_k^t = \mu_k^t F_k^t \tag{A.5}$$

$$D_k^t = \Phi_k^t F_k^t \tag{A.6}$$

where:

$$\mu_k^t = \sum_{j=1}^{J} \varepsilon_{kj}^t \bar{x}_{kj}^t$$

$$\Phi_k^t = \sum_{j=1}^{J} \varphi_{kj}^t X_{kj}^t.$$

The parameter μ_{kj}^t can be interpreted as the "weighted average" value of the energy content per unit of the feedstuff while Φ_{kj}^t is the "weighted average" value of protein content per unit of feedstuff. (Recall that weights are the proportional factors $\bar{x}_{kj}^t$.)

Equations (A.5) and (A.6) can be used to rewrite equation (A.1) as follows:

$$W_k^t = \varphi_{1k}^t + \varphi_{2k}^t F_k^t + \varphi_{3k}^t \left(F_k^t\right)_2 \tag{A.7}$$

where:

$$\varphi_{1k}^t = B_{0k}^t$$

$$\varphi_{2k}^t = B_{1k}^t \mu_k^t + B_{2k}^t \Phi_k^t$$

$$\varphi_{3k}^t = B_{3k}^t \left(\mu_k^t\right)^2 + B_{4k}^t \left(\Phi_k^t\right)^2.$$

The broiler diet ingredients and their respective proportions are shown in Table A.1, while the metabolizable energy and protein values are shown in Table A.2. These data are used to determine μ_k^t and Φ_k^t in equations (A.5) and (A.6).

Table A.1
Broiler Finisher Diet

Ingredient	Percent
Yellow Corn (NRC)	72.3450
Soybean Meal (NRC)	18.7820
Meat & Bone (NRC)	4.9180
Poultry Oil (NRC)	2.5130
Limestone	0.5833
Salt	0.3738
Broiler Vitamin (PWW)	0.2000
Trace Mineral (PWW)	0.1000
Threonine	0.0820
DL Methionine 98	0.0528
Lysine HCL 98%	0.0499

Table A.2
Broiler Energy and Protein Values

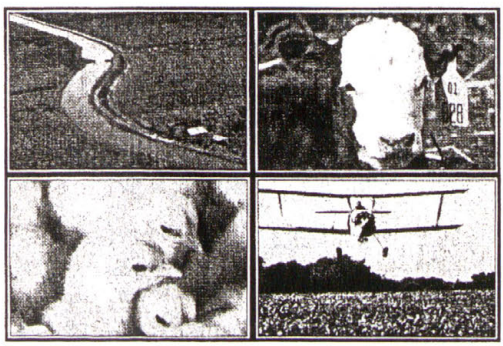
Ingredient	Metabolizable Energy (kcal/kg)	Protein (%)
Yellow Corn (NRC)	3,350	8.5
Soybean Meal (NRC)	3,500	94.1
Meat & Bone (NRC)	2,150	50.4
Poultry Oil (NRC)	2,360	81.0
Limestone	--	--
Salt	--	--
Broiler Vitamin (PWW)	--	--
Trace Mineral (PWW)	--	--
Threonine	--	--
DL Methionine 98	3,606	57.52
Lysine HCL 98%	3,607	94.4

The biological response function for broiler weight gain is:

$$W_t = -0.2068 + 4.3219F_t - 2.0507F_t^2. \qquad \text{(A.8)}$$

APPENDIX II

Impact of the Agricultural Sector on the Arkansas Economy in 2001



Jennie Popp, Gina Vickery,
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ARKANSAS AGRICULTURAL EXPERIMENT STATION
Division of Agriculture — University of Arkansas System
February 2005 — Research Report 975

This publication is available on the web at: http://www.uark.edu/depts/agripub/Publications/bulletins/

Technical editing and cover design by Amalie Holland

Arkansas Agricultural Experiment Station, University of Arkansas Division of Agriculture, Fayetteville. Milo J. Shult, Vice President for Agriculture; Gregory J. Weidemann, Dean, Dale Bumpers College of Agricultural, Food and Life Sciences and Associate Vice President for Agriculture—Research, University of Arkansas Division of Agriculture. SG550QX6. The University of Arkansas Division of Agriculture follows a nondiscriminatory policy in programs and employment.

ISSN:1539-5944 CODEN:AKABA7

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Impact of the Agricultural Sector on the Arkansas Economy in 2001

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Executive Summary

Agriculture has historically been one of Arkansas' primary economic sectors. Agriculture is defined as the sum of agricultural production and processing activities unless otherwise specified. Agriculture contributes to the economy through direct agricultural production and value-added processing which generates economic activity in other parts of the economy.

This report represents the second in a series of biennial reports, examining the impact of agriculture on the Arkansas economy. Utilizing data from the United States Bureau of Economic Analysis and the State of Arkansas, the economic impact of agriculture on the Arkansas economy was estimated for the most recent year available, 2001. Gross State Product (GSP) information for Arkansas was compared to those of other states in the southeast U.S. to compare the relative importance of agriculture in Arkansas to that of other states. The total impact of agriculture (direct, indirect, and induced effects) as measured by value added, employment, and labor income was estimated using the Impact Analysis for Planning System (IMPLAN). Economic impacts of agricultural production and processing were estimated for agriculture as a whole and also separately for the crop, livestock, and forestry sectors. Key findings of the IMPLAN analysis are:

- Agriculture adds $13.1B total value to the state's economy; roughly $.20 of every $1 in value generated in the state. Agriculture is a larger share of Arkansas' economy than it is in any other state in the Southeastern US—10.7 percent of the total GSP (or value added) of $67.9B
- Agriculture accounted for 291,290 jobs, nearly one of every five jobs in the state. Direct employment in agriculture production and processing is 173,856, 11.4 percent of all jobs in the state.

- Poultry production and processing alone provides over 17 percent of the state's agricultural jobs.
- Agriculture is accredited with adding $7.8B in wages, nearly 13 percent of the state's total payroll. Directly, agriculture payrolls total $4.45B, 7.2 percent of the state total.
- Agriculture generates value added, employment, and wages in all 45 sectors used in the study. The wholesale and retail trade, financial/real estate, miscellaneous services, transportation and communication services, and health services sectors capture significant benefits from agricultural activities in the state.
- The crop sector creates $4.14B in value, 86,176 jobs and $2.06B in wages. The food grain, miscellaneous food processing, and miscellaneous services industries have the greatest direct impact on the state economy. The financial/real estate, health services, miscellaneous services, transportation and communication services, and wholesale and retail trade sectors receive the greatest indirect and induced benefits from crop production and processing activities in the state.
- The livestock sector generates $4.07B in value added, 111,548 in jobs, and $2.78B in wages. Poultry production and processing alone accounts for $1.21B in value added, 50,705 jobs, and $1.68B in wages, or 82 percent of direct value added, 74 percent of direct employment, and 78 percent of direct wages. Primary sectors impacted by livestock production and processing are health service, miscellaneous service, and wholesale and retail trade. Agricultural, forest and fishery service, and farm inputs and machinery sectors receive large employment and wage impacts, and the financial/real estate sector receives large value added effects.

- Forestry generates $4.63B in value added, 88,294 in jobs, and $2.83B in wages. From these total impacts, wood processing and paper processing account for 39 percent of value added, 33 percent of jobs, and 42 percent of wages. Sectors receiving the largest benefits from Arkansas' forest industry as measured by value added, employment and wages are the wholesale and retail trade, transportation and communication services, miscellaneous services, health services, and financial/real estate sectors.

The total impact of agriculture on the Arkansas economy has remained relatively constant in the past several years despite depressed agricultural commodity prices and market imbalances in supply and demand. Indications from 2002 and 2003 farm-level sales data are that the declines in agricultural prices have reversed and that the impact of agriculture may well be re-established in Arkansas' economy to levels more typical historically. Regarding the share of GSP in Arkansas, the decline in its relative share of the economy is larger in magnitude than either the regional or national averages. Nonetheless, Arkansas remains more dependent upon agriculture for its GSP than do its neighbors in the Southeast. There have been some shifts within agriculture as a whole between production and processing and among the crop, livestock, and forestry sectors. The vital importance of agriculture to Arkansas' economy, particularly rural areas of the state with limited alternatives for economic activity and growth is highlighted by the significant economic activity generated in associated industrial and human service sectors as a result of the indirect and induced impacts of agriculture.

The Impact of Agriculture in Arkansas

Introduction

Agriculture continues to be a primary stimulus of economic growth in Arkansas. While agriculture contributes to the economy through direct agricultural production and value-

added processing, it also plays an important role by creating economic activity in other sectors of Arkansas' economy: The use of non-agricultural goods and services as inputs into the agriculture sector promotes diversified growth in Arkansas economy, thereby allowing agriculture to remain a vital part of the Arkansas state economy.

This report:

- compares the relative size of the agriculture sector in Arkansas and neighboring states, the Southeastern region of the United States, and the nation;
- provides an overview of Arkansas' economy and discusses agriculture's importance to the state economy;
- examines components of agricultural production and processing, including a review of historical sales trends for raw and processed agricultural products;
- compares impacts of agriculture on the Arkansas economy in 1999 and 2001 and discusses possible reasons for these changes over time; and
- discusses the overall impact of agriculture on Arkansas' economy, including the direct, indirect, and induced effects of the agriculture sector.

This report builds upon similar reports by Miller and Sato (1999) and Goodwin et al. (2002). This report utilizes data for 2001, the most recent year for which all relevant data are available. All dollar values are expressed in 2001 constant dollars, unless otherwise noted.[1]

---

[1] Throughout this report, all numerical references to agricultural trends are calculated using constant dollars. The use of constant dollars factors in the effects of inflation and other economic fluctuations on price and allows for a value comparison over time. Constant dollars are derived from the Bureau of Economic Analysis' (BEA's) 1996 chained-dollar series, adjusted to a base year of 1999. The BEA uses industry-specific deflators to adjust current dollars to constant dollars.

Agriculture—The Regional Context

In the following regional analysis of the Southern U.S., the agriculture sector is defined as the sum of agricultural production and processing, unless otherwise mentioned. Gross State Product (GSP) data,[2] published by the Bureau of Economic Analysis (BEA), are used to measure agricultural production and processing.[3]

Arkansas' agriculture sector, expressed as a percentage of total GSP, has exceeded those of contiguous states since at least 1969 when the BEA began publishing regional GSP information (Miller, 2002). The agriculture sector also accounts for a larger percentage of GSP in Arkansas' economy than do the agriculture sectors of the Southeast region[4] and the nation in their respective economies. In 2001 the agriculture sector accounted for nearly 11 percent of Arkansas' GSP (Table 1). In addition, Arkansas' agriculture sector as a percentage of its GSP was more than double that of the United States' (US) agriculture sector as a percentage of its Gross Domestic Product (GDP)[5] in 2001.

---

[2] GSP is a measurement of economic activity in the state economy. GSP is equivalent to value-added, or the sum of employee compensation, proprietary income (e.g., rent payments), and indirect business taxes (e.g., sales taxes paid by individuals to firms). GSP is also equivalent to gross output minus the cost of intermediate output.

[3] The BEA defines agricultural production as Agriculture Forestry and Fisheries. They define agricultural processing as Lumber and Wood; Furniture and Fixtures; Food and Kindred Products; Tobacco Products; Textile Mill Products; Paper Products in the processing.

[4] The BEA includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the Southeast region.

[5] GDP is the national equivalent to GSP.

Table 1. The Agriculture Sector as a Percentage of Gross State Product, 2001*

State / Region	Percent of GSP
Arkansas	10.74
Mississippi	9.12
Tennessee	5.45
Missouri	5.44
Oklahoma	4.19
Louisiana	3.41
Texas	2.99
Southeast[b]	6.31
U.S.	4.22[c]

Source: USDC, BEA, Regional Accounts Data (2003).

a Current 2001 dollars

b In 2001, the BEA data for the Southeast region includes Alabama. Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia

c Agriculture is measured as a percent of GDP for the U.S. GDP is the equivalent measure of GSP used for the nation

The individual contributions of agricultural production and processing also comprise a greater percent of GSP to Arkansas' economy than agricultural production and processing sectors in neighboring states and the nation contribute to their own economies (Figure 1). In 2001, agricultural production contributed 3.3 percent to Arkansas' GSP, compared to only 2.8 percent in Mississippi which had the next highest contribution in the region.

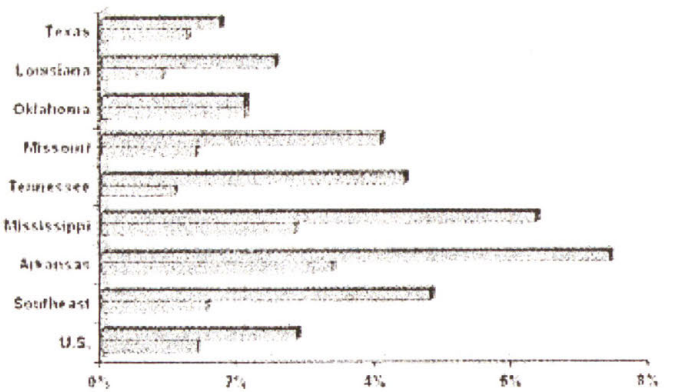
Similarly, agricultural processing, the largest component of Arkansas' agriculture sector, contributed 7.4 percent to total GSP, while agricultural processing in Mississippi contributed only 6.3 percent total GSP in Mississippi.

Overall agriculture's share of total GSP in the southeast has fallen 0.8 percent from 1999 to 2001. Nationwide, agriculture's share of GSP fell by 0.4 percent in the same period. Even in Arkansas, from 1999 to 2001 agriculture's share of GSP fell 1.7 percent (0.4 percent for agricultural production and 1.3 percent for agricultural processing) from 1999 to

2001. However, Arkansas remains first of six contiguous states in the percentage of GSP contributed by agricultural production and processing.

The diversity of Arkansas' agriculture sector fosters its strength. Arkansas' varied climate and terrain allows for row crops in the east, livestock in the west, and forestry in the south. Arkansas is one of the top fifteen states in the production of fifteen different agricultural products (Justice, 2002). In the nation, Arkansas is the leading producer of rice, the second largest producer of broilers, and the third largest producer of both catfish and turkey (Farm Bureau, 2002). Arkansas also has a large share of land in forests, equal to 56 percent of its total land base. In the forestry sector, relatively low valued timber is processed to produce higher valued products (e.g., lumber, paper, and furniture). States that are more than 50 percent forested, including Arkansas, Mississippi, and Tennessee, tend to have high values of agricultural processing. Oklahoma, the only state contiguous to Arkansas with a lower value of agricultural processing than production, is only 17 percent forested (American Forest and Paper Association, 2001).

Figure 1. Production and Processing as a Percentage of Gross State Product. 2001[a]



Source: USDC. BEA, Regional Accounts Data (2003).

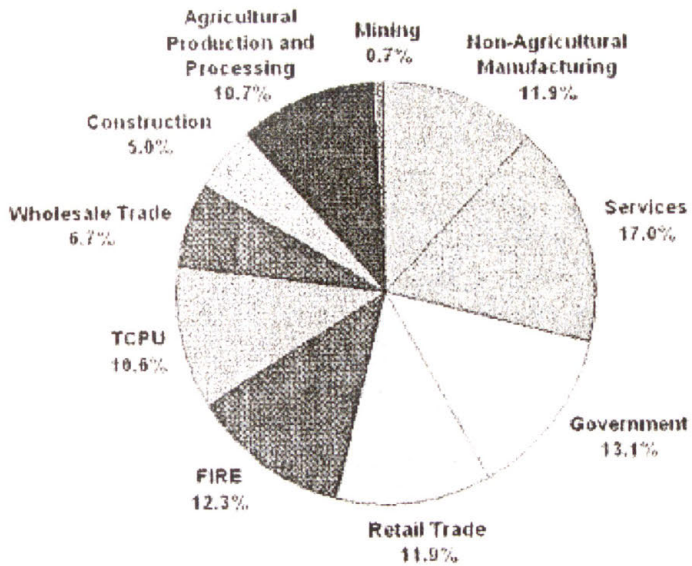
[a] Current 2001 dollars

[B] The BEA includes Alabama. Arkansas, Florida. Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the Southeast region.

Agriculture and the Arkansas Economy

In 2001, Arkansas' total GSP was equal to $67.9B (current dollars) (USDC, BEA, 2003). The agriculture sector contributed 10.7 percent to Arkansas' GSP. Agricultural production contributed $2.24B (current dollars) or 3.3 percent to Arkansas' GSP (Figure 2). Agricultural processing, contributed $5.03B (current dollars) or 7.4 percent of GSP. Food and kindred products, paper products, and lumber and wood account for most of Arkansas' agricultural processed goods. These industries are discussed further in the "Processed Agricultural Products" section.

Figure 2. Sector Percentages of Arkansas' Gross State Product, 2001[a]



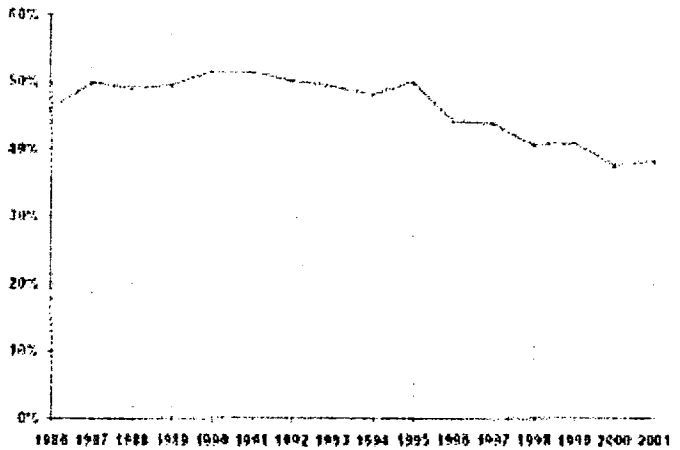
Source: USDC, BEA, Regional Accounts Data (2003).

[a] Current dollars

Historically agricultural processing has been a major component of Arkansas' manufacturing sector. However, by 1999 agricultural processing as a percentage of total manufacturing had declined 8.5 percent since 1995 (Figure 3). The decline in its share of manufacturing is primarily due to the falling prices of agricultural processed goods and is further discussed in the "Processed Agricultural Products" section of this report. From 1999 to 2000 agricultural processing's share of manufacturing fell 6.0 percent. However from 2000 to 2001, processing recaptured some of its strength and only declined by 3.2 percent s [sic] from 1999 to 2001.

In Arkansas, the expanding electronic equipment and primary metal sectors have propelled the growth in overall manufacturing, contributing to the recent decline of agricultural processing as a percentage of the manufacturing sector.

Figure 3. Agricultural Processing's Share of Manufacturing GSP, 1986-2001[a]



Source: Computed using USDC, BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year

As was reported in Goodwin et al. (2002), the manufacturing sector's GSP increased about 73 percent between 1986 and 1999. During the same time period, the GSP of electronic equipment, which includes household appliances, electric lighting equipment, and communication equipment, grew 217 percent, and the GSP of primary metals, which includes iron, steel, aluminum, and copper, grew 243 percent. However, between 1999 and 2001 the total GSP of manufacturing (constant, base year of 2001) fell from 14.491B to 13.136B or 9.4 percent, due primarily to a slow down in the electronic equipment sector.

The contribution of the agriculture sector to Arkansas' GSP has remained relatively stable from 1987 through 1993. Agriculture's share of GSP rose from 1993 to 1995 then began falling, reaching a low of 11 percent in 2001 (Figure 4). Most of this loss is explained by falling prices for agricultural products.

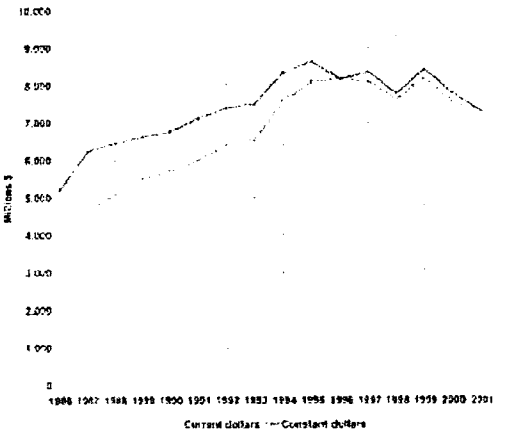
In 1995, Arkansas' agriculture sector's GSP peaked at $8.4B and then remained steady near $8B through 1999 (Figure 5). From 1999 to 2001, the agriculture sector's share of GSP fell 13.3 percent to 7.291. From 1999 to 2001, agricultural production's share of GSP declined from 2.469 B to 2.263B or 8.3 percent while agricultural processing's share fell from 5.939B to 5.028B or 15.3 percent (Figure 6). As will be discussed, the decline in agricultural processing's GSP can be attributed to falling prices for agricultural processed goods. Typically, in a period of normal inflation, the constant dollars series in Figure 5 should not fall below the current dollars series. The fact that constant dollars fell below current dollars between 2000 and 2001, during a time period of normal inflation, reveals an environment of depressed prices specific to the agriculture sector.

Figure 4. The Agricuture Sector's Share of Arkansas Gross State Product, 1986-2001[a]

Source: Computed using USDC, BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year)

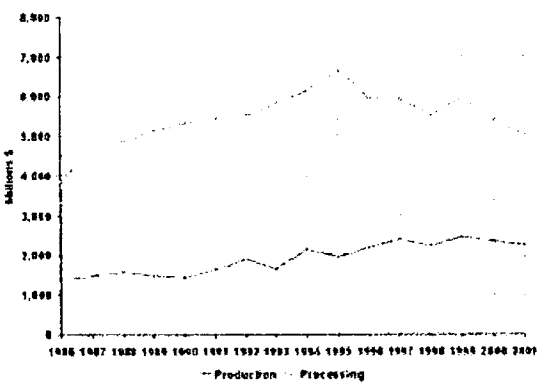
Figure 5. Arkansas' Agricuture Sector Gross State Product, 1986-2001[a]



Source: Computed using USDC, BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year)

Figure 6. Gross State Product for Arkansas' Agricultural Production and Processing 1986-2001[a]



Source: Computed using USDC, BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year)

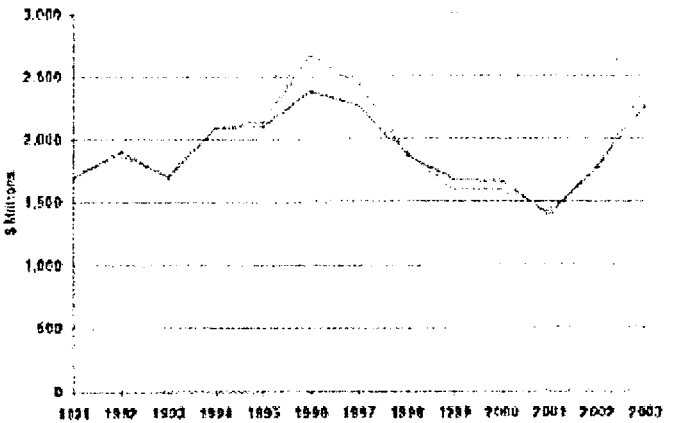
Agricultural Production

Crop and livestock production, forestry, aquaculture, and horticulture are the primary agricultural production industries found in Arkansas. The GSP of agricultural production trended upward from 1986 to 1999 and then fell slightly from 1999 to 2001. The growth of agricultural production's GSP stalled in recent years due to low agricultural prices in the world market, especially in the crop sector.

Crop Production

While crop production continues to be an important part of Arkansas' economy, the sales value of crop production has experienced periods of both increases and declines since 1986. Crop production sales peaked in 1996 and then declined sharply through 1999. These declines and reasons for these declines (falling prices coupled with decreases in US share of the global rice, soybean, and cotton markets) were explained in detail in Goodwin et al. (2002). The downward trend continued through 2001 as shown in Figure 7. The value of crop production fell to $1.395B (in constant 1990-1992 dollars) in 2001, the lowest in over a decade. This low value will be reflected in the economic impacts presented in the second half of this document. Since 2001, however both prices and US exports of agricultural products have improved. As a result, the value of Arkansas's crop production sales in the most current period has increased a dramatic 61.7 percent to $2.256B.

Figure 7. Arkansas' Crop Production Sales, 1991-2003[a]



Source: Computed using data from the USDA, NASS (2004).

For selected crops: Rice, Soybeans, Cotton, Hay, Wheat, Corn, Sorghum, and Oats.

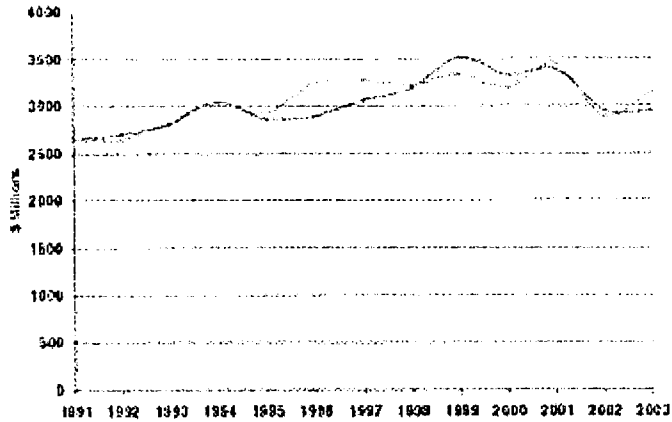
[a] Note new base year of 1990-1992

Livestock Production

Livestock production is also a major component of Arkansas' agricultural production. The value of livestock production from 1991 to 2003 is tracked in Figure 8. The value of livestock production was computed using cash receipts data (USDA, ERS, 2004). Cash receipts data measures income from sales and marketings. The values of broilers, cattle and calves, eggs, turkeys, hogs and pigs, milk, catfish, farm chickens, and honey production are found in Figure 8.

As shown in Figure 8, livestock production remained stable during the late 1990s, the same time period in which the value of crop production declined. As a result, livestock production replaced a portion of crop production's agricultural share of the Arkansas economy through 2001. From 1986 to 1999, cash receipts for livestock production increased 31.8 percent, and in 1999, the current value of livestock production was nearly $2B greater than that of crop production.

Figure 8. The Value of Arkansas' Livestock Production, 1991-2003[a]



Source: Computed using data from the USDA, ERS (2004).

For selected livestock: Broilers, Cattle and Calves, Eggs, Turkeys, Hogs and Pigs, Milk, Catfish, Farm Chickens, and Honey.

[a] Constant dollars (1990-1992 base year)

Arkansas' livestock sector is also susceptible to changes in global agricultural policies. The dominant industry within the sector, poultry, has exported roughly 20 percent of production nationally since the mid 1990s. The top export market, Russia, has exhibited instability in recent years, most notably in 1998 and 2002, when trade and food safety disputes have negatively impacted exports through import bans. Additionally, unstable economic conditions in Asia (Hong Kong and Japan are also major export markets for the U.S.) and Russia have also negatively impacted trade. As a consequence, surplus numbers of birds were present in the market for the next period, further contributing to existing depressed prices in the poultry sector. Thus, careful attention to the global markets and international agricultural policies is also necessary in the livestock sector.

Forestry Production

The state of Arkansas does not require sawmills to disclose the price paid for timber (Levins, 2002); therefore, it is not possible to produce an accurate representation of the value of the forestry industry. Forestry production, however, is essential to Arkansas' economy. Foresters supply wood product manufacturers with raw materials. Arkansas' timber is fundamental to such industries as paper, lumber and wood, and furniture and fixtures. As will be discussed later, processed goods derived from forestry production are the largest component of direct processed agricultural goods, in terms of employment, labor income, and value-added.

Other Production

Other production consists of agricultural, forestry, and fishery services (e.g., crop dusting), landscape and horticultural services (e.g., lawn and garden services), aquaculture, and commercial fishing. The largest component is agricultural, forestry, and fishery services. Reliable historical estimates of employment and value added are not available for each of the Other Production components and therefore have not been included in this report.[6]

Agricultural Processing

Processed crop, livestock, forestry, and other agriculture products are an integral part of agriculture in Arkansas. Arkansas' manufacturing sector depends upon raw materials from the crop, livestock, and forestry sectors for use in many of its largest industries. Broiler production and processing, for example, may lead to such processed goods as frozen chicken, eggs, animal feed, and animal oils.

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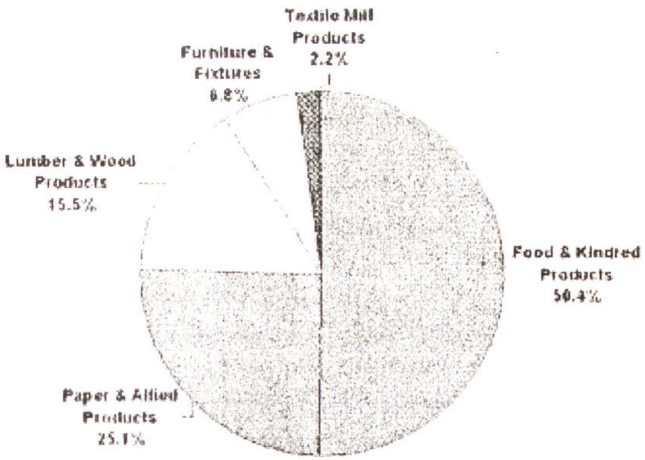
[6] Spotty information (selected years) is available for most of the Other Production components. But this information is insufficient to accurately gage the level of these activities in Arkansas or to compare the value of these activities over time.

Figure 9. Components of Arkansas' Agricultural Processing Sector, GSP, 2001[a]



Source: USDC, BEA, Regional Accounts Data (2003).

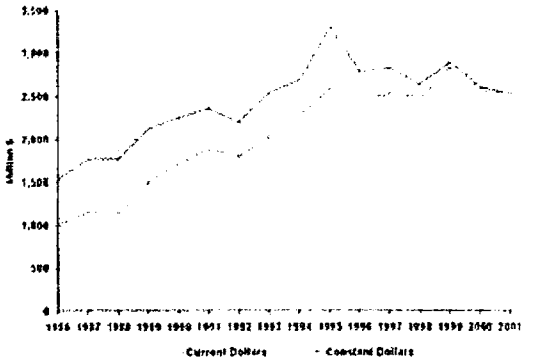
[a] Current dollars

The contribution of individual agricultural processing industries to agricultural processing is shown in Figure 9. Although prices for agricultural processed goods fell overall, each processing industry faced a different price environmen and certain processing industries managed to increase in value during the late 1990s. A discussion of each industry's value over time, as a percentage of GSP, follows.

Food and Kindred Products

The food and kindred products sector is the largest processing sector in Arkansas, accounting for 50.4 percent of agricultural processing's GSP. The GSP of the food processing sector increased 87.2 percent from 1986 to 1999 (Figure 10) but declined 12.4 percent from 1999 to 2001.

Figure 10. The Gross State Product of Food and Kindred Products, 1986-2001[a]

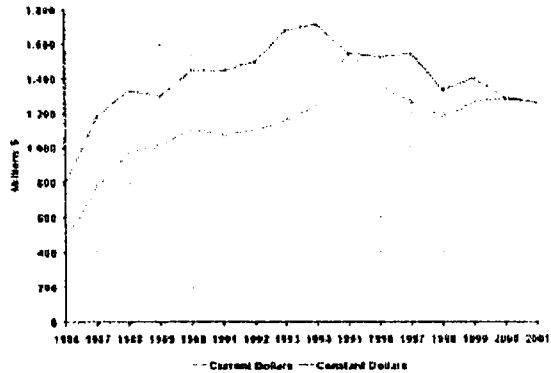


Source: Computed using USDC BEA, Regional Accounts Data (2003).
[a] Current and constant 2001 dollars

Paper and Allied Products

The paper and allied products sector is consistently one of the three largest processing industries in Arkansas. In 1999, its GSP was $1.3B, almost twice that of its 1986 GSP (Figure 11). Despite the industry's growth, pulp and paper manufacturers in North America were strongly affected by the Asian financial crisis during the mid to late 1990s (Simard, 1999) that continued to impact manufacturers through 2001. Figure 11 shows a substantial decline in the industry's value from 1995 to 1999, with the sharpest price decline from 1997 to 1998. From 1999 to 2001 the constant value of paper and allied products fell an additional 10 percent.

Figure 11. The Gross State Product of Paper and Allied Products, 1986-2001[a]

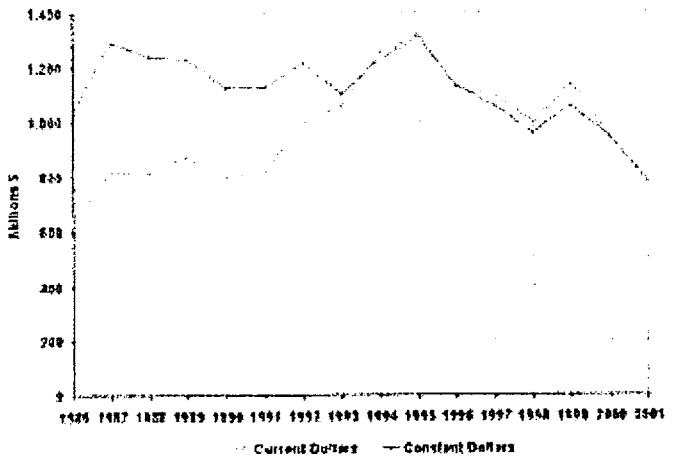


Source: Computed using USDC, BEA, Regional Accounts Data (2003).
[a] Current dollars

Lumber and Wood Products

The lumber and wood sector remained relatively stable throughout the late 1980s and early 1990s (Figure 12). In 1996, lumber and wood's GSP began to decline, similar to food processing. However, unlike food processing, the GSP of lumber and wood did not stabilize and except for a slight rebound in 1999, continued to decline reaching a 25-year low in 2001. The lumber and wood sector's GSP fell sharply from 1995 to 2001. Much of this loss is attributable to a slow down in the international market for US wood chips and a drop in soft wood prices that followed an influx of Canadian wood in the market. The only variation from this downward trend was a slight increase in GSP in 1999. However, this rise in GSP was followed by a sharp decline of 26 percent from $1.059B to $0.78113 in constant dollars.

Figure 12. The Gross State Product of Lumber and Wood Products, 1986-2001[a]



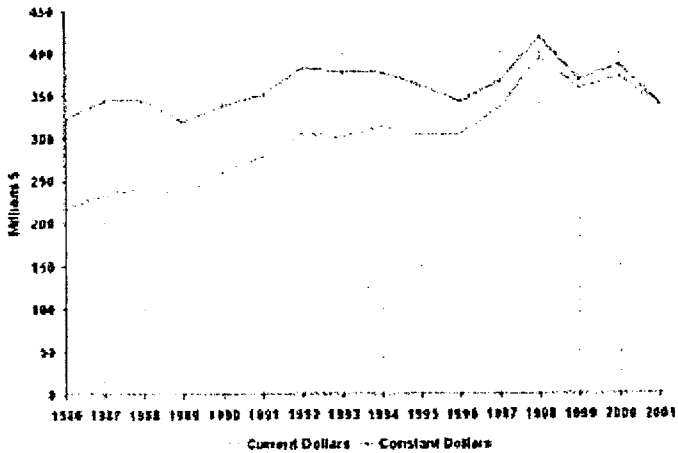
Source: Computed using USDC, BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year)

Furniture and Fixtures

During the period in which most agricultural processing sectors experienced a decline in GSP the furniture and fixtures sector managed to increase its GSP from $0.3B in 1996 to $0.4B in 1998 (Figure 13). Furniture and fixtures benefited from a strong resale housing market throughout the 1990s. The resale housing market is a leading indicator of demand for the furniture industry (Schuler, Taylor and Araman, 2001). However, as housing activity slowed in the late 1990s, lumber and furniture GSP also fell, as witnessed in a 7.9 percent decline from 1999 to 2001. Increased housing starts and other real estate activity in 2002 suggest that forthcoming data for lumber and furniture GSP will improve.

Figure 13. The Gross State Product of Furniture and Fixtures, 1986-2001[a]



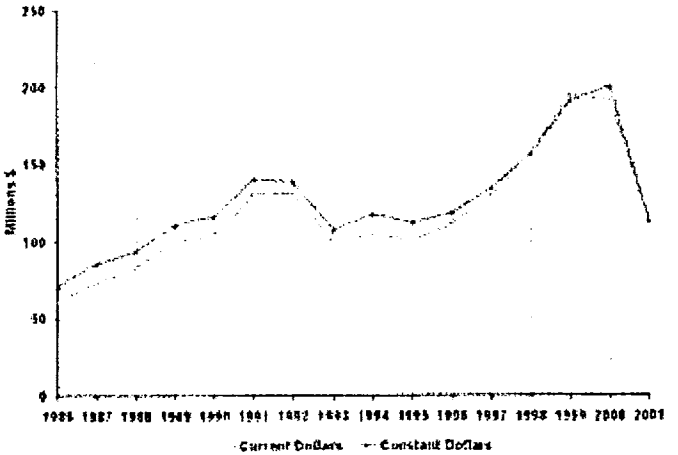
Source: Computed using USDC. BEA, Regional Accounts Data (2003).

[a] Constant dollars (2001 base year)

Textile Mill Products

The textile sector was the fastest growing agricultural processing sector in Arkansas from 1986 to 2000, The high growth did not have a significant impact on agriculture since its GSP was less than one percent of agricultural processing's GSP in 2000, Textile's GSP was nearly 170 percent greater in 1999 than it was in 1986 (Figure 14). Several economic studies (USCG, 2002; USDA, FAS 2001; Wall, 2000) attribute the rise in value to the North American Free Trade Agreement (NAFTA). Although the overall effect of NAFTA on the US economy is controversial, many studies find that NAFTA has spurred demand for U.S. textiles in Mexico and Canada. Figure 14 suggests that the post-1994 increase in the textile sector's GSP may be a result of NAFTA's implementation in the same year. However, textile manufacturers in the U.S. continue to have difficulty competing with foreign manufacturers with lower labor costs. A major textile manufacturer closed it's last Arkansas plant in 2000, resulting in a steep decline in textile GSP in 2001.

Figure 14. The Gross State Product of Textile Goods, 1986-2001[a]



Source: Computed using USDC, BEA. Regional Accounts Data (2003).
[a] Constant dollars (2001 base year)

Summary of the Trends in Gross State Product for Agriculture

In Goodwin et al (2002) the agricultural sector was found to be a very strong part of the Arkansas economy. However, between 1999 and 2001, agriculture lost share and value in nearly all of its production and processing areas. Much of this loss is attributed to depressed prices and lost market share that existed at that time. Available data indicate that since 2001, much of the agricultural sector has rebounded. The crop production areas are benefiting from improved prices. Much of the forestry sector is benefiting from improved housing starts and an active real estate market. Surplus numbers in the poultry sector and in corresponding inventories have been reduced and outbreaks of disease in major poultry producing and exporting countries, primarily in Southeast Asia, have further aided in the recovery of poultry prices. Decreases in imports of Canadian feeder cattle due to BSE restrictions and increasing meat demand due to dietary changes in the U.S.

have resulted in increased beef and pork prices as well. This suggests that agriculture will remain a strong a vital part of the Arkansas economy into the future.

Direct, Indirect, and Induced Impacts of Agriculture

The economic impact of the agriculture sector in Arkansas is much more than the direct impact of agricultural production and processing. To measure agriculture's total economic impact, the indirect and induced impacts of agriculture must also be taken into consideration. Indirect impacts occur when the agriculture sector purchases goods and services from local businesses. The production of certain farm machinery and equipment, for example, is an indirect impact of agricultural production. Agriculture's induced impacts are measured by increases in economic activity to satisfy the personal consumption by employees of the agriculture sector or by employees of firms that provide inputs to the agriculture sector. The sum of direct, indirect, and induced agricultural effects provides a measure for the total economic impact of agriculture.

Methods

As in Goodwin et al. (2002), the economic impacts of Arkansas' agricultural sector were modeled using the Impact Analysis for Planning (or IMPLAN) System (MIG, 2000). However, due to an overhaul in the development of IMPLAN data, results from Goodwin et al. (2002) cannot be directly compared to results from this study (MIG., Inc. 2004). Only general trends in the overall impact of agriculture will be compared.

Goodwin et al. (2002) employed IMPLAN data that consisted of a 528 sector input-output transactions table that was based on the Standard Industrial Classification (SIC) system. Goodwin et al. (2002) then followed methods similar to Barnett and Reinschmiedt (1996) to combine the 528 sectors into 51 aggregated sectors—29 agricultural sectors and 22

non agricultural sectors (see Goodwin et al. (2002)) for details. However, beginning with the 2001 year data, IMPLAN models are based a new government classification system call the North American Industry Classification System (NAICS). This conversion went all the way down to the local business level. All industries are affected by this conversion. NAICS groupings are not comparable to SIC groupings.[7]

The IMPLAN model now uses a 509 sector input-output transactions table.[8] The 509 sectors are combined in this study to form 45 aggregated sectors (noted in italics throughout this text)—24 agricultural sectors and 21 nonagricultural sectors (see Appendix A, Table 1).

As before, but using this new scheme, the impacts of agriculture were evaluated four ways: crop agriculture, livestock agriculture, forestry agriculture and aggregate agriculture. The agriculture sectors used to calculate the impacts in each scenario are documented in Appendix A, Table 2. Note that the impacts of the crop, livestock, and forestry scenarios do not sum up to the impacts of aggregate agriculture as certain agricultural enterprises were added to the aggregate agriculture scenario that were not included in the crop, livestock, or forestry scenarios. In some cases, results are presented as production and processing impacts. The sectors that contributed to these impacts are listed in Appendix A, Table 3. IMPLAN Arkansas data for 2001, the

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[7] Go to the Minnesota Working Group, Inc. website www.implan.com for more information.

[8] Agricultural sectors in IMPLAN may represent one or more production/processing enterprises. For example, cotton production in IMPLAN is the sole enterprise captured in a IMPLAN sector called "Cotton." Rice, however, is captured with wheat in an IMPLAN sector called "Food Grains." The structure of the IMPLAN model makes it very difficult to separate the contributions of grouped enterprises, such as wheat and cotton. Therefore their contributions are reported together in various tables in Appendix B.

most recent data available, were used to calculate all impacts. Total employment, wages, and value added impacts for each aggregated sector for each scenario are detailed in Appendix B and are summarized below. All wages and value added figures are reported in 2001 dollars, unless otherwise noted.

The Aggregate Agricultural Sector

In 2001, the agricultural sector made large contributions to the economy in terms of employment, wages, and value added. The agriculture sector provided 291,290 jobs, or 19.2 percent, of state employment. That is, nearly one in five Arkansas jobs can be attributed to agriculture. In that same year, agriculture paid $7.8B in per 12.7 or wages cent of total state labor income. Additionally, the agriculture sector a Current dollars added $13.1 B of value to the state economy, or 19.6 percent of state value-added. That is, about $1 out of every $5 in value added can be attributed to agriculture. Details of these impacts are presented in Appendix B, Table 1 and are summarized in Tables 2 through 4 on the following page.

Total Impact of Arkansas Agriculture, 2001*
Employment 291,290 (nearly 1 out of 5 Arkansas jobs)
Wages $7.8 B (13 percent of Arkansas wages)
Value Added $13.1 B (nearly $1 of every $5 of added value)

*Current dollars

Agriculture generates employment in all of the 45 aggregate sectors. Almost half, or 48 per-cent, of all agriculture-generated jobs are in five sectors (see highlight box). The poultry sector (Comprised of Poultry Processing and Poultry and Eggs) alone provides 50,705 jobs or 17.4 percent of all

agriculture-generated jobs in Arkansas. Poultry Processing, part of Processed Meat/Eggs employed 35,317 of these workers. The remaining 15,388 workers are employed in Poultry and Eggs.

Jobs Generated by Agriculture, 2001* Top Five Sectors
Processed Meat/Eggs 39,888 jobs (Poultry processing alone employs 35,317 people)
Miscellaneous Services 39,575 jobs
Wholesale and Retail Trade 29,085 jobs
Wood Processing 15,850 jobs
Poultry and Eggs 15,388 jobs

Source: Computed using the 2001 Arkansas database from MIG (2004).

* Current dollars

The far-reaching impacts of agriculture are seen in the distribution of agriculture-generated value added throughout the economy. The highlight box at right shows which five sectors benefit the most from value added generated by agriculture. Note that three of those sectors (Wholesale and Retail Trade, Miscellaneous Services, and Financial Real Estate) are outside of agriculture. In fact, nearly half ($5.55B or 42.5 percent) of all agriculture-generated value added accrues outside agricultural sectors. Within the agricultural sectors, Paper Processing, Processed Meats/Eggs, and Miscellaneous Food Processing add the largest amount of value in the economy. Over 35 percent (or $2.626B) of the value added within agriculture is generated from forestry production and processing. Livestock production and processing contribute $2.050B (or 27 percent) in value, and crop production and processing contribute $2.46B (or 32.3 percent) of all agriculture-generated value added in the economy.

Value Added Generated by Agriculture, 2001* Top Five Sectors
Wholesale and Retail Trade
$1.31 Billion
Paper Processing
$1.21 Billion
Miscellaneous Services
$1.20 Billion
Financial Real Estate
$1.16 Billion
Processed Meat and Eggs
$1.0 Billion

Source: Computed using the 2001 Arkansas database from MIG (2004)

* Current dollars

As with value added, much of the income generated attributable to agricultural activity is generated outside of agriculture sectors. In 2001, $3.27B, or nearly 42 percent of all wages, went to workers in non-agricultural sectors. Within the agricultural sectors, Processed Meats and Eggs, Paper Proc essing, and Miscellaneous Food Processing, Poultry and Eggs, and Furniture employees received $3.23B or 41 percent of all wages generated.

Wages Generated by Agriculture, 2001* Top Five Sectors
Processed Meat/Eggs
$1.04 Billion
Miscellaneous Services
$887 Million
Wholesale and Retail Trade
$823Million
Paper Processing
$711 Million
Wood Processing
$483 Million

Source: Computed using the 2001 Arkansas database from MIG (2004)

*Current dollars

The agricultural sector's direct impact on the state economy is measured by the sum of the impacts of farm production and processing of farm products. There were 173,856 workers employed by the agricultural production and processing sectors. The livestock industry employed more than one out of every three (or 39 percent) of these workers (Tables 3 and 4). Crop industries employed 29 percent and forestry nearly 26 percent. These workers, and owners of these farms and businesses, received over $4.4B in wages. Seventy percent of these wages went to workers in processing industries. Crop, livestock, and forestry industries directly added value of $7.3B[9] to the Arkansas economy, nearly two thirds of which came from processing industries.

Indirect impacts result when agricultural firms purchase raw materials and services from other Arkansas businesses to produce their products. In 2001, there were 53,931 workers employed by industries supplying goods and services to the farm production and processing industries. These workers and the owners of those establishments received $1.8B in wages and salaries, and these industries added value of over $3B to the state economy.

Induced impacts result when employees of agricultural firms and employees of the raw material and service firms make local purchases. There were 63,503 workers employed by businesses providing goods and services to the employees in agriculture and its supplying industries. These employees and the proprietors of these businesses received over $1.5B in wages and salaries and added value of roughly $2.7B to the Arkansas economy.

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[9] This figure, $7.5B, differs from that reported by BEA on page X. This is to be expected as "agriculture" is defined differently by BEA and IMPLAN.

Table 2. The Aggregate Agriculture Sector's Impact on Arkansas' Economy, 2001

	Employment [a]			Labor Income [b]			Value Added [c]		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million $ [d]	% Total Impact	% Total Arkansas Labor Income	Million $	% Total Impact	% Total Arkansas Value Added
Production [e]	73,434	25.9	5.0	1,280	16.4	2.1	2,624	20.1	3.9
Processing [f]	98,421	33.8	6.5	3,169	40.6	5.1	4,694	36.0	7.1
Direct Impact	**173,856**	**59.7**	**11.4**	**4,449**	**57.0**	**7.2**	**7,317**	**56.1**	**11.0**
Indirect Effects [g]	53,931	18.5	3.6	1,847	23.6	3.0	3,051	23.4	4.6
Direct + Indirect Impact	**227,787**	**78.2**	**15.0**	**6,296**	**80.6**	**10.2**	**10,368**	**79.4**	**15.6**
Induced Effects	63,503	21.8	4.2	1,515	19.4	2.5	2,686	20.6	4.0
Total Impact	**291,290**	**100.0**	**19.2**	**7,810**	**100.0**	**12.7**	**13,053**	**100.0**	**19.6**

Source: Computed using the 2001 Arkansas database from MIG (2004)

[a] Equivalent to full- and part-time jobs (MIG, 2000)

[b] Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

[c] Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

[d] Current dollars

[e] Appendix A, Table 3 lists sectors of direct agriculture production, in terms of IMPLAN sectors.

[f] Appendix A, Table 3 lists sectors of direct agriculture processing, in terms of IMPLAN sectors.

[g] Apart from the direct (farm and non-agricultural activity, it also a portion of the indirect impact of agriculture. 100 percent of the following IMPLAN sectors is considered indirect agricultural activity: P Sand and Gravel Mining; Phosphate Rock Mining; Fertilizer Mineral Mining, N.E.C.; Asphalt Shingle and Coating Materials Manufacturing; Nitrogenous and Phosphatic Fertilizers; Mixing Only: Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; Farm Machinery and Equipment, and Food Products Machinery

Table 3. The Contribution of Major Agricultural Sectors to Agricultural Production, 2001

	Employment [a]		Labor Income [b]		Value Added [c]	
	(Number of Jobs)	(% Ag. Prod.)	(Million $) [d]	(% Ag. Prod.)	(Million $)	(% Ag. Prod.)
Crop	31,781	42.1	406	31.7	1,111	42.4
Livestock	27,986	37.1	500	39.1	902	34.4
Forestry	5,662	7.8	170	13.3	429	16.3
Other	9,805	13.0	204	15.9	182	6.9
Total	75,434	100.0	1,280	100.0	2,624	100.0

Source: Computed using the 2001 Arkansas database from MIG (2004)

[a] Equivalent to full- and part-time jobs (MIG, 2000).

[b] Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

[c] Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

[d] Current dollars.

Table 4. The Contribution of Major Agricultural Sectors to Agricultural Processing, 2001

	Employment [a]		Labor Income [b]		Value Added [c]	
	(Number of Jobs)	(% Ag. Proc.)	(Million $) [d]	(% Ag. Proc.)	(Million $)	(% Ag. Proc.)
Crop	19,043	19.3	649	20.5	1,348	28.7
Livestock	40,552	41.2	1,059	33.4	1,149	24.5
Forestry	38,827	39.4	1,460	46.1	2,198	46.8
Other	0	0.0	0	0.0	0	0.0
Total	98,421	100.0	3,169	100.0	4,694	100.0

Source: Computed using the 2001 Arkansas database from MIG (2004).

[a] Equivalent to full- and part-time jobs (MIG, 2000).

[b] Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000).

[c] Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

[d] Current dollars.

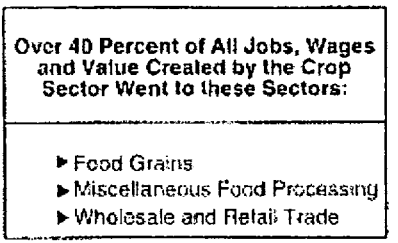
The Crop Sector

The crop sector includes all enterprises engaged in the production and processing of cotton, food and feed grains, oil bearing crops, fruits, nuts and vegetables, and hay and pasture (Appendix A, Table 3). These enterprises were responsible for 86, 176 jobs, or 5.7 percent of state employment. Those workers received $2B in wages, or 3.3 percent of state labor income as presented in the highlight box. The crop sector added $4.14B, or 6.2 percent of state value-added. At least 40 percent of all jobs, wages and value created by the crop sector Food Grains, Miscellaneous Food Processing, and Wholesale and Retail Trade sectors. Details of these impacts are presented in Appendix B, Table 2 and are summarized below in Table 5.

Impact of the Crop Sector, 1999 *
Employment
86,176 jobs
Labor Income
$2.0 Billion
Value-Added
$4.14 Billion

*2001 current dollars

The crop sector's direct impact on the economy is the sum of the impacts of production and processing of crop products. Crop production provided more than half of the direct jobs and wages; however, processing accounted for a larger share of direct value added. There were 50,824 workers. These workers and owners of these farms and businesses received over $1B in wages, and these industries added value of nearly $2.5B to the Arkansas economy.



Additional jobs, wages and value were created in supporting industries (such as Wholesale and Retail Trade, Transportation and Communication Services, Miscellaneous Services, Financial/Real Estate and Health Services) by the crop sector. There were 35,352 additional jobs created in supporting industries. These workers and the owners of those establishments received $1B in wages and salaries and these industries added value of nearly $1.7 B to the state economy.

Table 5. The Crop Sector's Impact on Arkansas' Economy, 2001

	Employment [a]			Labor Income [b]			Value-Added [c]		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million $ [d]	% Total Impact	% Total Arkansas Labor Income	Million $	% Total Impact	% Total Arkansas Value Added
Production [e]	31,781	36.9	2.1	406	19.8	0.7	1,111	26.8	1.7
Processing [f]	19,043	22.1	1.3	649	31.6	1.1	1,348	32.5	2.0
Direct Impact	**50,824**	**59.0**	**3.3**	**1,055**	**51.3**	**1.7**	**2,459**	**59.3**	**3.7**
Indirect Effects [g]	18,608	21.6	1.2	601	29.2	1.0	977	23.6	1.5
Direct + Indirect Impact	**69,432**	**80.6**	**4.6**	**1,656**	**80.6**	**2.7**	**3,436**	**82.9**	**5.2**
Induced Effects	16,744	19.4	1.1	399	19.4	0.6	708	17.1	1.1
Total Impact	**86,178**	**100.0**	**5.7**	**2,056**	**100.0**	**3.3**	**4,144**	**100.0**	**6.2**

Source: Compiled using the 2001 Arkansas database from IMPLAN (2004).

[a] Expressed in full- and part-time jobs (MIG, 2000)

[b] Labor income represents all forms of employment income, it is the sum of employee compensation and proprietor income (MIG, 2000)

[c] Value added is the sum of employee compensation, proprietary income, and indirect business taxes.

[d] Current dollars

[e] Appendix A, Table 3 lists sectors of direct agricultural production, in terms of IMPLAN sectors

[f] Appendix A, Table 3 lists sectors of direct agricultural processing, in terms of IMPLAN sectors

[g] Apart from the broke down direct agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors is considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphatic Rock; Chemical Fertilizer Mineral Mining, N.E.C.; New Farm Structures, Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

The Livestock Sector

The livestock sector, includes all enterprises engaged in the production and processing of livestock including the poultry and egg, cattle, dairy farm, hogs and pigs, other livestock, processed meat, and dairy processing industries (Appendix A, Table 3). The livestock sector accounted for 111,548 jobs in 2001, or 7.3 percent of state employment. These workers received $2.7B in wages, or 4.5 percent of state labor income. In 2001, the livestock sector added $4.07B of value to the state economy, or 6.1 percent of state value-added. Table 6 below provides a summary of the livestock sector's total impact on Arkansas' economy. Details can be found in Appendix B, Table 3.

Impact of the Livestock Sector, 2001[1]
Employment
111,548 jobs
Labor Income
$2.7B
Value-Added
Nearly $4.1 B

[1] 2001 current dollars

The livestock's sector's direct impact on the state economy is measured by the sum of the impacts of animal production and processing of crop products. There were 68,538 workers employed by the livestock production and processing sectors. Workers and owners of these farms and businesses received over $1.6B in wages and these industries added value of nearly $2.1B to the Arkansas economy. The poultry industry (comprised of Poultry and Egg and Poultry Processing industries) alone created 50,705 jobs, paid $1.21B in wages and added $1.68B in value to the economy (see highlight box). These represent 74 percent of direct livestock employment, 78 percent of direct wages, and 82 percent of direct value added. Many rural communities have poultry production and processing as their primary economic engine,

supporting either directly or indirectly their local infrastructures and businesses. In addition, much of the economic activity associated with cattle production is directly tied to poultry production, as the majority of poultry producers also have cow/calf operations in conjunction with broiler and turkey operations. An additional 43,010 jobs, workers employed by industries supplying goods and services to the livestock production and processing industries. These workers and the owners of those establishments received $1.22B in wages and salaries, and these industries added value of over $2.02 B to the state economy. Most of these people are employed in Miscellaneous Service, Agricultural, Forestry and Fisheries Services, Wholesale and Retail Trade, Health Services, and Farm Inputs and Machinery sectors. Value added is generated in Financial/Real Estate, Wholesale and Retail Trade, Transportation and Communication, Health Services, and Miscellaneous Services sectors.

The Poultry Industry (Poultry and Egg and Poultry Processing) Contributed:

- 50,705 Jobs
  (1 in 6 Ag-Generated Jobs)
- $1.68Billion in Value Added
  (More than $1 in $8 of Ag-Generated V.A.)
- $1.21 Billion in Wages
  (More than $1 in $7 of Ag-Generated Income)

Table 6. The Livestock Sector's Impact on Arkansas' Economy, 2001

	Employment [3]			Labor Income [4]			Value-Added [4]		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million $ [4]	% Total Impact	% Total Arkansas Labor Income	Million $	% Total Impact	% Total Arkansas Value Added
Production [1]	27,986	25.1	1.8	500	18.0	0.8	902	22.1	1.4
Processing [1]	40,552	36.4	2.7	1,059	38.1	1.7	1,148	28.2	1.7
Direct Impact	**68,538**	**61.4**	**4.5**	**1,559**	**56.0**	**2.5**	**2,050**	**50.3**	**3.1**
Indirect Effects [5]	20,352	18.2	1.3	683	24.5	1.1	1,067	26.2	1.6
Direct + Indirect Impact	**88,889**	**79.7**	**5.9**	**2,242**	**80.6**	**3.6**	**3,117**	**76.5**	**4.7**
Induced Effects	22,658	20.3	1.5	540	19.4	0.9	958	23.5	1.4
Total Impact	**111,548**	**100.0**	**7.3**	**2,782**	**100.0**	**4.5**	**4,074**	**100.0**	**6.1**

Source: Computed using the 2001 Arkansas database from MIG (2003).

[3] Equivalent to full- and part-time jobs (MIG, 2003).

[4] Labor income represents all forms of employment income. It is the sum of employee compensation and proprietor income. (MIG, 2003).
Value-added is the sum of employee compensation, proprietary income, and indirect business taxes.
Current dollars.

[1] Appendix A, Table 3 lists sectors of direct agricultural production in terms of IMPLAN sectors.

[2] Appendix A, Table 3 lists sectors of direct agricultural processing, in terms of IMPLAN sectors.

[5] Apart from the trickle-down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors is considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock Chemical Fertilizer Mineral Mining, N.E.C.; New Farm Structures; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

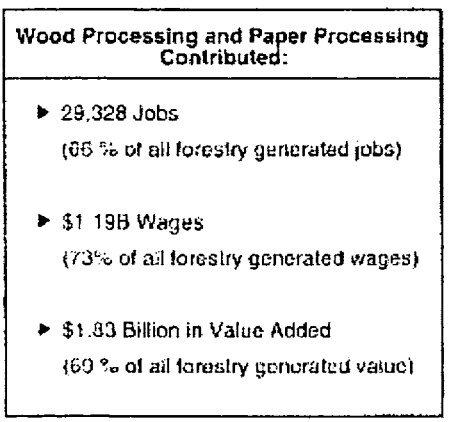
The Forestry Sector

The forestry sector is primarily comprised of forest products, furniture and wood, and paper processing enterprises (Appendix A, Table 2). The forestry sector was responsible for 88,294 jobs in 2001, or 5.8 percent of state employment, and $2.83B in labor income, or 4.6 percent of state labor income. In 1999, the forestry sector added $4.63B of value to the state economy, or 7.0 percent of state value-added. Within the forestry sector, Wood Processing and Paper Processing contributed at least half of all jobs, wages and value added. Details can be found in Appendix B Table 4. These impacts are summarized in Table 7 below.

Impact of the Forestry Sector, 2001[a]
Employment
88,294 jobs
Labor Income
$2.83 Billion
Value-Added
$4.63 Billion

[a] 2001 current dollars

The forestry sector's direct impact on the state economy is measured by the sum of the impacts of timber production and processing. There were 44,688 workers employed by the forestry production and processing sectors. Workers on and owners of these farms and businesses received $1.63B in wages, and these industries added value of over $2.6B to the Arkansas economy. The Wood Processing and Paper Processing sectors provide 29,328 jobs, paid $1.19B in wages and added $1.83B in value. This represents nearly 66 percent of direct employment, 73 percent of direct wages, and 69 percent of direct value added. Remaining jobs, income and value added were attributable to the Furniture and Forest Products areas.



In 2001, there were 43,606 workers employed by industries supplying goods and services to the forestry production and processing industries. These workers and the owners of those establishments received $1.20B in wages and salaries, and these industries added value of nearly $2.0B to the state economy Of the indirect and induced impacts generated by the forestry sector, over 85 percent of the jobs, 87 percent of wages, and 87 percent of value added went to the Wholesale and Retail Trade, Transportation and Communication Services, Miscellaneous Services, Health Services, and Financial/ Real Estate sectors.

Table 7. The Forestry Sector's Impact on Arkansas' Economy, 2001

	Employment [a]			Labor Income [b]			Value-Added [c]		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million $ [c]	% Total Impact	% Total Arkansas Labor Income	Million $	% Total Impact	% Total Arkansas Value Added
Production [d]	5,862	6.6	0.4	170	6.0	0.3	429	9.3	0.6
Processing [e]	38,827	44.0	2.6	1,460	51.6	2.4	2,198	47.5	3.3
Direct Impact	**44,688**	**50.6**	**2.9**	**1,630**	**57.6**	**2.8**	**2,626**	**56.8**	**4.0**
Indirect Effects [f]	20,560	23.3	1.4	650	23.0	1.1	1,025	22.2	1.5
Direct + Indirect Impact	**65,238**	**73.9**	**4.3**	**2,280**	**80.6**	**3.7**	**3,652**	**78.9**	**5.5**
Induced Effects	23,055	26.1	1.5	550	19.4	0.9	974	21.1	1.5
Total Impact	**88,294**	**100.0**	**5.8**	**2,830**	**100.0**	**4.6**	**4,626**	**100.0**	**7.0**

Source: Computed using the 2001 Arkansas database from MIG (2004)

[a] Equivalent to full- and part-time jobs (MIG, 2000)

[b] Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000).

[c] Value added is the sum of employee compensation, proprietary income, and indirect business taxes

[c] Current dollars

[d] Appendix A, Table 3 lists sectors of direct agricultural production, in terms of IMPLAN sectors

[e] Appendix A, Table 3 lists sectors of direct agricultural processing, in terms of IMPLAN sectors

[f] Apart from the trickle down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors is consid

Indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical Fertilizer Mineral Mining, N.E.C.; New Farm Structures

Nitrogenous and Phosphatic Fertilizers, Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery

Summary

Data from the Bureau of Economic Affairs indicates that Arkansas' agriculture sector is more important to the state's economy than it is to other states' economies in the southeastern U.S. According to 2001 IMPLAN data and subsequent analyses, about one dollar in five of the total state value added and employment can be attributed to agriculture and its indirect and induced impacts. One in seven dollars of wage income can be attributed to agriculture as well.

After a period of rapid growth in the 1980s, the GSP attributable to agriculture in Arkansas stabilized at around $8B in the mid 1990s. This phenomenon is primarily due to price pressures for agricultural commodities and an oversupply of processed agricultural goods relative to demand. Indications from 2002 and 2003 farm-level sales data are that the declines in agricultural prices have reversed and that the impact of agriculture may well be re-established in Arkansas economy to levels more typical historically. Regarding the share of GSP in Arkansas, the decline in its relative share of the economy is larger in magnitude than either the regional or

national averages. Nonetheless, Arkansas remains more dependent upon agriculture for its GSP than do its neighbors in the Southeast. In addition, growth in other economic sectors has occurred such that the overall importance of agriculture has leveled off relative to the total economy. Contrariwise, the size of Arkansas' agriculture processing industry results in a relative vulnerability to the price swings of processed agricultural goods. These swings are precipitated not only by world market supply and demand, but also by world political dynamics and subsequent food and agricultural policies that impact trade.

World and domestic price stability and associated agricultural and food policies will continue to have a significant impact on Arkansas agriculture and its contribution to the Arkansas economy. Careful attention must be paid to price trends and policies to allow Arkansas to maintain a vibrant and stable agricultural industry. Continued strength of agriculture is of paramount importance if the social and economic fabric of rural Arkansas communities is to be retained and if the essential infrastructure and services that translate into an acceptable quality of life for its residents are to be maintained.

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Appendix A

Description of IMPLAN Sectors and Aggregation Schemes

Table 1. Major Components of the Agriculture Sector as defined by BEA Industries.

Aggregated Sector	BEA Industry
AGRICULTURAL PRODUCTION	Agriculture, Forestry, and Fisheries
AGRICULTURAL PROCESSING	Lumber and Wood, Furniture and Fixtures, Food and Kindred Products, Tobacco Products, Textile Mill Products, Paper Products

Table 2. Major Components of Agricultural Production as defined by IMPLAN Sectors.

Aggregated Sector	IMPLAN Sector
CROP PRODUCTION	All other crop farming; Cotton farming; Fruit farming; Grain farming; Greenhouse and nursery production; Oilseed farming ;Sugarcane and sugar beet farming; Tobacco farming; Tree nut farming; Vegetable and melon farming
LIVESTOCK PRODUCTION	Animal production- except cattle and poultry and eggs; Cattle ranching and farming; Poultry and egg production
FORESTRY PRODUCTION	Forest nurseries- forest products- and timber track; Logging
OTHER PRODUCTION	Agriculture and forestry support activities

Table 3. Major Components of Agricultural Processing as defined by IMPLAN Sectors.

Aggregated Sector	IMPLAN Sector
CROP PROCESSING	All other food manufacturing; Bread and bakery product- except frozen- manufactucturing; Breakfast cereal manufacturing; Breweries; Broadwoven fabric mills; Carpet and rug mills; Cigarette manufacturing; Coffee and tea manufacturing; Confectionery manufacturing from cacao beans;, Confectionery manufacturing from purchased chocolate; Cookie and cracker manufacturing; Distilleries; Dry pasta manufacturing; Fabric coating mills; Fats and oils refining and blending; Fiber- yarn- and thread mills; Flavoring syrup and concentrate manufacturing; Flour milling; Frozen cakes and other pastries manufacturing; Frozen food manufacturing; Fruit and vegetable canning and drying; Knit fabric mills;Malt manufacturing; Mayonnaise- dressing- and sauce manufacturing; Mixes and dough made from purchased flour; Narrow fabric mills and schiffli embroidery; Nonchocolate confectionery manufacturing; Nonwoven fabric mills; Other apparel knitting mills; Other hosiery and sock mills; Other miscellaneous textile product mills; Other oilseed processing; Other snack food manufacturing; Other tobacco product manufacturing; Rice milling; Roasted nuts and peanut butter manufacturing; Sheer hosiery mills; Soft drink and ice manufacturing; Soybean processing; Spice and extract manufacturing; Sugar manufacturing; Textile and fabric finishing mills; Tire cord and tire fabric mills; Tobacco stemming and redrying; Tortilla manufacturing; Wet corn milling
LIVESTOCK PROCESSING	Animal- except poultry- slaughtering; Cheese manufacturing; Creamery butter manufacturing; Dog and cat food manufacturing; Dry- condensed and evaporated dairy products; Fluid milk manufacturing; Ice cream and frozen dessert manufacturing; Meat processed from carcasses; Other animal food manufacturing;Poultry processing; Rendering and meat byproduct processing; Seafood product preparation and packaging
FORESTRY PROCESSING	All other converted paper product manufacturing; Blind and shade manufacturing; Coated and laminated paper and packaging materials; Coated and uncoated paper bag manufacturing; Custom architectural woodwork and millwork; Cut stock- resawing lumber- and planing; Die-cut paper office supplies manufacturing; Engineered wood member and truss manufacturing; Envelope manufacturing; Institutional furniture manufacturing ; Manufactured home- mobile home- manufacturing; Miscellaneous wood product manufacturing; Nonupholstered wood household furniture manufacturing; Other household and institutional furniture; Other millwork- including flooring; Paper and paperboard mills; Paperboard container manufacturing; Prefabricated wood building manufacturing; Pulp mills; Reconstituted wood product manufacturing; Sanitary paper product manufacturing; Sawmills; Showcases- partitions- shelving- and lockers ; Stationery and related product manufacturing; Surface-coated paperboard manufacturing Upholstered household furniture manufacturing; Veneer and plywood manufacturing; Wood container and pallet manufacturing; Wood kitchen cabinet and countertop manufacturing; Wood office furniture manufacturing; Wood preservation; Wood windows and door manufacturing
OTHER PROCESSING	Farm machinery and equipment manufacturing; Fertilizer- mixing only- manufacturing; Food product machinery manufacturing; New farm housing units and additions and alterations; Nitrogenous fertilizer manufacturing; Other nonmetallic mineral mining; Pesticide and other agricultural chemical manufacturing; Phosphatic fertilizer manufacturing; Sawmill and woodworking machinery

Table 4. Major Components of the Agriculture Sector as defined by IMPLAN Sectors, 1999[1].

Aggregated Sector	IMPLAN Sector
AGRICULTURAL/FORESTRY/ FISHERY SERVICES (Other)	Agricultural, Forestry, Fishery Services, Commercial Fishing, Canned and Cured Sea Foods; Prepared Fresh or Frozen Fish or Seafood
FARM INPUTS AND MACHINERY (Other)	Potash, Soda, and Borate Minerals, Phosphate Rock, Chemical, Fertilizer Mineral Mining, Not Elsewhere Classified ("N.E.C."); New Farm Structures; Manufactured Ice; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; Food Products Machinery
DAIRY FARM PRODUCTS (Livestock)	Dairy Farm Products
POULTRY AND EGGS (Livestock)	Poultry and Eggs
CATTLE (Livestock)	Ranch-Fed Cattle; Range-Fed Cattle; Cattle Feedlots
OTHER LIVESTOCK (Livestock)	Sheep, Lambs, and Goats; Other Meat Animal Products; Miscellaneous Livestock
HOGS, PIGS, AND SWINE (Livestock)	Hogs, Pigs, and Swine
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Food Grains
FEED GRAINS (Crop)	Feed Grains; Prepared Feeds, N.E.C.
HAY AND PASTURE (Crop)	Hay and Pasture
FRUITS (Crop)	Fruits
VEGETABLES (Crop)	Vegetables
TREE NUTS (Crop)	Tree Nuts
OTHER CROPS (Crop)	Tobacco; Sugar Crops; Miscellaneous Crops
OIL BEARING CROPS (Crop)	Oil Bearing Crops
HORTICULTURE/NURSERY (Crop)	Grass Seeds; Greenhouse and Nursery Products
LANDSCAPE AND HORTICULTURAL SERVICES (Other)	Landscape and Horticultural Services
FOREST PRODUCTS (Forestry)	Forest Products; Forestry Products
PROCESSED MEAT/EGGS (Livestock)	Meat Packing Plants; Sausages and Other Prepared Meats; Poultry Processing; Dog, Cat, and Other Pet Food; Animal and Marine Fats and Oils
DAIRY PROCESSING (Livestock)	Creamery Butter; Cheese, Natural and Processed; Condensed and Evaporated Milk; Ice Cream and Frozen Desserts; Fluid Milk

Table 4. (Continued)

MISCELLANEOUS FOOD PROCESSING (Crop)	Canned Specialties; Canned Fruits and Vegetables; Dehydrated Food Products, Pickles, Sauces, and Salad Dressings; Frozen Fruits, Juices, and Vegetables; Frozen Specialties; Bread, Cake, and Related Products; Cookies and Crackers; Sugar; Confectionary Products; Chocolate and Cocoa Products; Chewing Gum; Salted and Roasted Nuts and Seeds; Roasted Coffee; Potato Chips and Similar Snacks; Macaroni and Spaghetti; Food Preparations, N.E.C.; Cigarettes; Cigars; Chewing and Smoking Tobacco; Tobacco Stemming and Redrying
GRAIN/FLOUR MILLING (Crop)	Flour and Other Grain Mill Products; Cereal Preparations; Rice Milling; Blended and Prepared Flour; Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Cottonseed Oil Mills; Soybean Oil Mills; Vegetable Oil Mills, N.E.C.; Shortening and Cooking Oils
SOFT DRINKS AND LIQUOR (Crop)	Malt Beverages; Malt; Wines, Brandy, and Brandy Spirits; Distilled Liquor, Except Brandy; Bottled and Canned Soft Drinks and Water; Flavoring Extracts and Syrups, N.E.C.
FABRIC MILLS (Crop)	Broadwoven Fabric Mills and Finishing; Narrow Fabric Mills; Women's Hosiery, Except Socks; Hosiery, N.E.C.; Knit Outerwear Mills; Knit Underwear Mills; Knit Fabric Mills, Knitting Mills, N.E.C.; Yarn Mills and Finishing of Textiles, N.E.C.; Carpets and Rugs; Thread Mills; Coated Fabrics, Not Rubberized; Tire Cord and Fabric; Nonwoven Fabrics; Cordage and Twine; Textile Goods, N.E.C.
WOOD PROCESSING (Forestry)	Logging Camps and Logging Contractors; Sawmills and Planing Mills, General; Hardwood Dimension and Flooring Mills; Special Product Sawmills, N.E.C.; Millwork, Veneer and Plywood; Structural Wood Members, N.E.C.; Wood Containers; Wood Pallets and Skids; Mobile Homes; Prefabricated Wood Buildings; Wood Preserving; Reconstituted Wood Products; Wood Products, N.E.C.
PAPER PROCESSING (Forestry)	Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; Paperboard Containers and Boxes; Paper Coated and Laminated Packaging; Paper Coated and Laminated, N.E.C.; Bags; Paper, Die-cut Paper and Board; Sanitary Paper Products; Envelopes; Stationery Products; Converted Paper Products, N.E.C.
FURNITURE (Forestry)	Wood Kitchen Cabinets; Wood Household Furniture; Upholstered Household Furniture; Wood TV and Radio Cabinets; Household Furniture, N.E.C.; Wood Office Furniture; Public Building Furniture; Wood Partitions and Fixtures; Blinds, Shades, and Drapery Hardware; Furniture and Fixtures, N.E.C.
LEATHER	Leather Tanning and Finishing; Leather Gloves and Mittens; Personal Leather Goods; Leather Goods, N.E.C.
FOOD STORES	Food Stores
EATING AND DRINKING	Eating and Drinking

Table 4. (Continued)

MINING	Iron Ores; Copper Ores; Lead and Zinc Ores; Gold Ores; Silver Ores; Ferroalloy Ores, Except Vanadium; Metal Mining Services; Uranium-Radium-Vanadium Ores; Metal Ores, N E C ; Coal Mining; Natural Gas and Crude Petroleum; Natural Gas Liquids; Dimension Stone; Sand and Gravel; Clay, Ceramic, and Refractory Minerals; Nonmetallic Minerals (Except Fuels) Service; Nonmetallic Minerals, N E C.
CONSTRUCTION	New Residential Structures; New Industrial and Commercial Buildings, New Utility Structures; New Highways and Streets; New Mineral Extraction Facilities; New Government Facilities; Maintenance and Repair, Residences; Maintenance and Repair, Other Facilities; Maintenance and Repair, Oil and Gas Wells
PETROLEUM AND CHEMICALS	Alkalies and Chlorine; Industrial Gases; Inorganic Pigments, Inorganic Chemicals, N E C., Cyclic Crudes, Interm. and Indus Organic Chemicals; Plastic Materials and Resins; Synthetic Rubber; Cellulosic Man-made Fibers; Organic Fibers, Noncellulosic; Drugs; Soap and Other Detergents; Polishes and Sanitation Goods; Surface Active Agents; Toilet Preparations; Paints and Allied Products; Gum and Wood Chemicals; Adhesives and Sealants; Explosives; Printing Ink; Carbon Black, Chemical Preparations, N.E C., Petroleum Refining; Paving Mixtures and Blocks; Asphalt Felts and Coatings; Lubricating Oils and Greases; Petroleum and Coal Products, N E C., Tires and Inner Tubes; Rubber and Plastics Footwear; Rubber and Plastics Hose and Belting; Gaskets, Packing and Sealing; Fabricated Rubber Products, N.E.C.; Miscellaneous Plastics Products; Bags, Plastic
METAL INDUSTRIES	Blast Furnaces and Steel Mills; Electrometallurgical Products; Steel Wire and Related Products; Cold Finishing of Steel Shapes; Steel Pipe and Tubes; Iron and Steel Foundries; Primary Copper; Primary Aluminum; Primary Nonferrous Metals, N E C; Secondary Nonferrous Metals; Copper Rolling and Drawing; Aluminum Rolling and Drawing; Nonferrous Rolling and Drawing, N E C ; Nonferrous Wire Drawing and Insulating; Aluminum Foundries; Brass, Bronze, and Copper Foundries; Nonferrous Castings, N E C ; Metal Heat Treating; Primary Metal Products, N E C., Metal Cans; Metal Barrels, Drums and Pails; Cutlery, Hand and Edge Tools, N E C ; Hand Saws and Saw Blades; Hardware, N E C ; Metal Sanitary Ware; Plumbing Fixture Fittings and Trim; Heating Equipment, Except Electric; Fabricated Structural Metal; Metal Doors, Sash, and Trim; Fabricated Plate Work (Boiler Shops); Sheet Metal Work; Architectural Metal Work; Prefabricated Metal Buildings; Miscellaneous Metal Work; Screw Machine Products and Bolts, Etc ; Iron and Steel Forgings; Nonferrous Forgings; Automotive Stampings; Crowns and Closures; Metal Stampings, N E C.; Plating and Polishing; Metal Coating and Allied Services; Small Arms Ammunition; Ammunition, Except For Small Arms, N E C., Small Arms; Other Ordnance and Accessories; Industrial and Fluid Valves; Steel Springs, Except Wire; Pipe, Valves, and Pipe Fittings; Miscellaneous Fabricated Wire Products; Metal Foil and Leaf; Fabricated Metal Products, N.E C

Table 4. (Continued)

GLASS, STONE, AND CLAY	Glass and Glass Products, Except Containers; Glass Containers; Cement, Hydraulic; Brick and Structural Clay Tile; Ceramic Wall and Floor Tile; Clay Refractories; Structural Clay Products, N.E.C.; Vitreous Plumbing Fixtures; Vitreous China Food Utensils; Fine Earthenware Food Utensils; Porcelain Electrical Supplies; Pottery Products, N.E.C.; Concrete Block and Brick; Concrete Products, N.E.C.; Ready Mixed Concrete; Lime; Gypsum Products; Cut Stone and Stone Products; Abrasive Products; Asbestos Products; Minerals, Ground or Treated; Mineral Wool; Nonclay Refractories; Nonmetallic Mineral Products, N.E.C.
MACHINERY AND EQUIPMENT	Steam Engines and Turbines; Internal Combustion Engines, N.E.C.; Lawn and Garden Equipment; Construction Machinery and Equipment; Mining Machinery, Except Oil Field; Oil Field Machinery; Elevators and Moving Stairways; Conveyors and Conveying Equipment; Hoists, Cranes, and Monorails; Machine Tools, Metal Cutting Types; Machine Tools, Metal Forming Types; Industrial Patterns; Special Dies and Tools and Accessories; Power Driven Hand Tools; Rolling Mill Machinery; Welding Apparatus; Metalworking Machinery, N.E.C.; Textile Machinery; Woodworking Machinery; Paper Industries Machinery; Printing Trades Machinery; Special Industry Machinery N.E.C.; Pumps and Compressors; Ball and Roller Bearings; Blowers and Fans; Packaging Machinery; Power Transmission Equipment; Industrial Furnaces and Ovens; General Industrial Machinery, N.E.C.; Commercial Laundry Equipment; Refrigeration and Heating Equipment; Measuring and Dispensing Pumps; Service Industry Machines, N.E.C.; Carburetors; Pistons; Rings; Valves; Fluid Power Cylinders & Actuators; Fluid Power Pumps & Motors; Scales and Balances; Industrial Machines N.E.C.; Transformers; Switchgear and Switchboard Apparatus; Motors and Generators; Carbon and Graphite Products; Relays & Industrial Controls; Electrical Industrial Apparatus, N.E.C.; Household Cooking Equipment; Household Refrigerators and Freezers; Household Laundry Equipment; Electric Housewares and Fans; Household Vacuum Cleaners; Household Appliances, N.E.C.; Electric Lamps; Wiring Devices; Lighting Fixtures and Equipment; Storage Batteries; Primary Batteries, Dry and Wet; Engine Electrical Equipment; Magnetic & Optical Recording Media; Electrical Equipment, N.E.C.
TRANSPORTATION AND COMMUNICATION SERVICES	Railroads and Related Services; Local, Interurban Passenger Transit; Motor Freight Transport and Warehousing; Water Transportation; Air Transportation; Pipe Lines, Except Natural Gas; Arrangement of Passenger Transportation; Transportation Services; Communications, Except Radio and TV; Radio and TV Broadcasting

[1]This aggregation scheme was used in Goodwin et al. (2002). Since MIG, Inc. has revised all sectors, this aggregation scheme is no longer valid for the current stud and has been replaced with table A.5 below. It is shown here for comparative purposes only.

Table 5. Aggregation Scheme for an IMPLAN Input-Output Analysis of the Agriculture Sector's Impact on the Arkansas Economy, 2001.

Aggregated Sector	IMPLAN Sector
AGRICULTURAL/FORESTRY SERVICES (Other)	Agriculture and forestry support activities
FARM INPUTS AND MACHINERY (Other)	New farm housing units and additions and alterations; Farm machinery and equipment manufacturing; Fertilizer- mixing only- manufacturing; Food product machinery manufacturing; Nitrogenous fertilizer manufacturing; Pesticide and other agricultural chemical manufacturing; Phosphatic fertilizer manufacturing; Sawmill and woodworking machinery; Other nonmetallic mineral mining
POULTRY AND EGGS (Livestock)	Poultry and Egg Production
CATTLE (Livestock)	Cattle Ranching and Farming
OTHER LIVESTOCK (Livestock)	Animal production- except cattle and poultry and eggs
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Grain Farming
FRUITS (Crop)	Fruit Farming
VEGETABLES AND MELONS (Crop)	Vegetable and melon farming
TREE NUTS (Crop)	Tree Nut Farming
OTHER CROPS (Crop)	Tobacco; Sugarcane and Sugar Crops; All other crops
OIL BEARING CROPS (Crop)	Oil Seed Farming
GREENHOUSE AND NURSERY (Crop)	Greenhouse and Nursery Production
FOREST PRODUCTS (Forestry)	Forest nurseries- forest products- and timber tracts;Logging
PROCESSED MEAT/EGGS (Livestock)	Animal- except poultry- slaughtering; Dog and cat food manufacturing; Meat processed from carcasses; Other animal food manufacturing; Poultry processing; Rendering and meat byproduct processing; Seafood product preparation and packaging
DAIRY PROCESSING (Livestock)	Cheese manufacturing; Creamery butter manufacturing; Dry- condensed- and evaporated dairy products; Fluid milk manufacturing; Ice cream and frozen dessert manufacturing

Table 5. (Continued)

Aggregated Sector	IMPLAN Sector
MISCELLANEOUS FOOD PROCESSING (Crop)	All other food manufacturing; Bread and bakery product- except frozen- manufactu; Cigarette manufacturing; Coffee and tea manufacturing; Confectionery manufacturing from cacao beans; Confectionery manufacturing from purchased chocola; Cookie and cracker manufacturing; Dry pasta manufacturing; Frozen cakes and other pastries manufacturing; Frozen food manufacturing; Fruit and vegetable canning and drying; Mayonnaise- dressing- and sauce manufacturing; Mixes and dough made from purchased flour; Nonchocolate confectionery manufacturing; Other snack food manufacturing; Other tobacco product manufacturing; Roasted nuts and peanut butter manufacturing; Spice and extract manufacturing; Sugar manufacturing; Tobacco stemming and redrying; Tortilla manufacturing
GRAIN/FLOUR MILLING (Crop)	Breakfast cereal manufacturing, Rice Milling, Flour Milling, Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Fats and oils refining and blending; Other oilseed processing; Soybean processing
SOFT DRINKS AND LIQUOR (Crop)	Breweries; Distilleries; Flavoring syrup and concentrate manufacturing; Malt manufacturing; Soft drink and ice manufacturing; Wineries
FABRIC MILLS (Crop)	Broadwoven fabric mills; Carpet and rug mills; Fabric coating mills; Fiber- yarn- and thread mills; Knit fabric mills; Narrow fabric mills and schiffli embroidery; Nonwoven fabric mills; Other apparel knitting mills; Other hosiery and sock mills; Other miscellaneous textile product mills; Sheer hosiery mills; Textile and fabric finishing mills; Tire cord and tire fabric mills
WOOD PROCESSING (Forestry)	Custom architectural woodwork and millwork; Cut stock- resawing lumber- and planing; Engineered wood member and truss manufacturing; Manufactured home- mobile home- manufacturing; Miscellaneous wood product manufacturing; Other millwork- including flooring; Prefabricated wood building manufacturing; Reconstituted wood product manufacturing; Sawmills; Veneer and plywood manufacturing; Wood container and pallet manufacturing; Wood preservation; Wood windows and door manufacturing
PAPER PROCESSING (Forestry)	All other converted paper product manufacturing; Coated and laminated paper and packaging materials; Coated and uncoated paper bag manufacturing; Die-cut paper office supplies manufacturing; Envelope manufacturing; Paper and paperboard mills; Paperboard container manufacturing; Pulp mills; Sanitary paper product manufacturing; Stationery and related product manufacturing; Surface-coated paperboard manufacturing
FURNITURE (Forestry)	Blind and shade manufacturing; Institutional furniture manufacturing; Nonupholstered wood household furniture manufacturing; Other household and institutional furniture; Showcases- partitions- shelving- and lockers; Upholstered household furniture manufacturing; Wood kitchen cabinet and countertop manufacturing; Wood office furniture manufacturing
LEATHER	Leather Tanning and Finishing; Other leather product manufacturing

Table 5. (Continued)

FISHING AND HUNTING	Fishing; Hunting and Trapping
MINING	Coal mining; Copper- nickel- lead- and zinc mining; Drilling oil and gas wells; Gold- silver- and other metal ore mining; Iron ore mining; Oil and gas extraction; Sand- gravel- clay- and refractory mining; Stone mining and quarrying; Support activities for oil and gas operations; Support activities for other mining
CONSTRUCTION	Commercial and institutional buildings; Highway- street- bridge- and tunnel construction; Maintenance and repair of farm and nonfarm residents, Maintenance and repair of highways- streets- bridges; Maintenance and repair of nonresidential buildings, Manufacturing and industrial buildings; New multifamily housing structures- nonfarm; New residential 1-unit structures- nonfarm; New residential additions and alterations- nonfarm; Other maintenance and repair construction; Other new construction ; Water- sewer- and pipeline construction
PETROLEUM AND CHEMICALS	Adhesive manufacturing, All other petroleum and coal products manufacturin; Asphalt paving mixture and block manufacturing, Asphalt shingle and coating materials manufacturin; Cellulosic organic fiber manufacturing, Custom compounding of purchased resins, Explosives manufacturing; Foam product manufacturing, Industrial gas manufacturing; Laminated plastics plate- sheet- and shapes, Noncellulosic organic fiber manufacturing, Other basic inorganic chemical manufacturing, Other basic organic chemical manufacturing; Other miscellaneous chemical product manufacturing; Other rubber product manufacturing Paint and coating manufacturing, Petrochemical manufacturing, Petroleum lubricating oil and grease manufacturing; Petroleum refineries; Pharmaceutical and medicine manufacturing, Photographic film and chemical manufacturing, Plastics bottle manufacturing, Plastics material and resin manufacturing, Plastics packaging materials- film and sheet; Plastics pipe- fittings- and profile shapes; Plastics plumbing fixtures and all other plastics, Polish and other sanitation good manufacturing, Printing ink manufacturing; Resilient floor covering manufacturing, Rubber and plastics hose and belting manufacturing, Soap and other detergent manufacturing; Surface active agent manufacturing; Synthetic dye and pigment manufacturing; Synthetic rubber manufacturing, Tire manufacturing, Toilet preparation manufacturing

Table 5. (Continued)

METAL INDUSTRIES	All other forging and stamping; Alumina refining; Aluminum extruded product manufacturing; Aluminum foundries; Aluminum sheet- plate- and foil manufacturing; Ammunition manufacturing; Ball and roller bearing manufacturing; Copper rolling- drawing- and extruding; Copper wire except mechanical- drawing Custom roll forming; Cutlery and flatware- except precious- manufacturing; Electroplating- anodizing- and coloring metal; Enameled iron and metal sanitary ware manufacturing; Fabricated pipe and pipe fitting manufacturing; Fabricated structural metal manufacturing; Ferroalloy and related product manufacturing Ferrous metal foundaries; Hand and edge tool manufacturing; Hardware manufacturing; Industrial pattern manufacturing; Iron and steel forging; Iron and steel mills, Iron- steel pipe and tube from purchased steel; Kitchen utensil- pot- and pan manufacturing; Machine shops; Metal can- box- and other container manufacturing; Metal coating and nonprecious engraving; Metal heat treating; Metal tank- heavy gauge- manufacturing; Metal valve manufacturing; Metal window and door manufacturing; Miscellaneous fabricated metal product manufacturi; Nonferrous forging, Nonferrous foundries- except aluminum; Nonferrous metal except copper and aluminum- shap; Ornamental and architectural metal work manufactur; Other aluminum rolling and drawing; Other ordnance and accessories manufacturing; Plate work manufacturing; Power boiler and heat exchanger manufacturing, Prefabricated metal buildings and components; Primary aluminum production; Primary nonferrous metal- except copper and alumin; Primary smelting and refining of copper; Rolled steel shape manufacturing; Saw blade and handsaw manufacturing; Secondary processing of copper; Secondary processing of other nonferrous; Secondary smelting and alloying of alominum; Sheet metal work manufacturing; Small arms manufacturing; Spring and wire product manufacturing; Steel wire drawing; Turned product and screw- nut- and bolt manufacturing

Table 5. (Continued)

MACHINERY AND EQUIPMENT	AC refrigeration and forced air heating; Air and gas compressor manufacturing; Air purification equipment manufacturing; All other industrial machinery manufacturing; Automatic vending commercial laundry and drycleanCarbon and graphite product manufacturing; Construction machinery manufacturing; Conveyor and conveying equipment manufacturing; Cutting tool and machine tool accessory manufacturing; Electric house wares and household fan manufacturing; Electric lamp bulb and part manufacturing; Electric power; and specialty transformer manufacturing; Elevator and moving stairway manufacturing; Fiber optic cable manufacturing; Fluid power cylinder and actuator manufacturing; Fluid power pump and motor manufacturing; Heating equipment-except warm air furnaces; Household cooking appliance manufacturing; Household laundry equipment manufacturing;Household refrigerator and home freezer manufacturing;Household vacuum cleaner manufacturing;Industrial and commercial fan and blower manufacturing;Industrial mold manufacturing;Industrial process furnace and oven manufacturing,Industrial truck- trailer and stacker manufacturing;Lawn and garden equipment manufacturing;Lighting fixture;manufacturing;Measuring and dispensing pump manufacturing;Metal cutting machine tool,manufacturing,Metal forming machine tool manufacturing;Mining machinery and equipment manufacturing;Miscellaneous electrical equipment manufacturing;Motor and generator manufacturing;Office machinery manufacturing;Oil and gas field machinery and equipment;Optical instrument and lens manufacturing;Other commercial and service industry machinery manufacturing,Other communication and energy wire manufacturing;Other engine equipment manufacturing;Other major household appliance manufacturing;Overhead cranes hoists- and monorail systems; Packaging machinery manufacturing; Paper industry machinery manufacturing; Photographic and photocopying equipment manufacturing; Plastics and rubber industry machinery; Power-driven hand tool manufacturing; Primary battery manufacturing; Printing machinery and equipment manufacturing; Pump and pumping equipment manufacturing; Relay and industrial control manufacturing; Rolling mill and other metalworking machinery; Scales- balances- and miscellaneous general purpose; Semiconductor machinery manufacturing; Special tool- die- jig and fixture manufacturing; Speed changers and mechanical power transmission equipment;Storage battery manufacturing;Switchgear and switchboard apparatus manufacturing;Textile machinery manufacturing;Turbine and turbine generator set units manufacturing;Welding and soldering equipment manufacturing;Wiring device manufacturing
TRANSPORTATION AND COMMUNICATION SERVICES	Air transportation; Book publishers; Cable networks and program distribution; Couriers and messengers; Data processing services, Database- directory- and other publishers; Information services, Motion picture and video industries, Newspaper publishers, Periodical publishers, Pipeline transportation; Postal service Radio and television broadcasting, Rail transportation, Scenic and sightseeing transportation and support, Software publishers, Sound recording industries; Telecommunications; Transit and ground

Table 5. (Continued)

	passenger transportation; Truck transportation; Warehousing and storage; Water transportation
TECHNOLOGY INDUSTRIES	All other electronic component manufacturing; Analytical laboratory instrument manufacturing; Audio and video equipment manufacturing; Audio and video media reproduction; Automatic environmental control manufacturing; Broadcast and wireless communications equipment; Computer storage device manufacturing; Computer terminal manufacturing; Dental equipment and supplies manufacturing; Dental laboratories; Electricity and signal testing instruments; Electromedical apparatus manufacturing; Electron tube manufacturing; Electronic computer manufacturing; Industrial process variable instruments; Irradiation apparatus manufacturing; Laboratory apparatus and furniture manufacturing; Magnetic and optical recording media manufacturing; Ophthalmic goods manufacturing; Other communications equipment manufacturing; Other computer peripheral equipment manufacturing; Search- detection- and navigation instruments; Semiconductors and related device manufacturing; Software reproducing; Surgical and medical instrument manufacturing; Surgical appliance and supplies manufacturing; Telephone apparatus manufacturing; Totalizing fluid meters and counting devices; Watch-clock- and other measuring and controlling
TRANSPORTATION EQUIPMENT	Aircraft engine and engine parts manufacturing; Aircraft manufacturing; All other transportation equipment manufacturing; Automobile and light truck manufacturing; Boat building; Guided missile and space vehicle manufacturing; Heavy duty truck manufacturing; Military armored vehicles and tank parts manufactu; Motor home manufacturing; Motor vehicle body manufacturing; Motor vehicle parts manufacturing; Motorcycle- bicycle- and parts manufacturing; Other aircraft parts and equipment; Propulsion units and parts for space vehicles; Railroad rolling stock manufacturing; Ship building and repairing; Travel trailer and camper manufacturing; Truck trailer manufacturing
MISCELLANEOUS MANUFACTURING	Accessories and other apparel manufacturing; Blankbook and looseleaf binder manufacturing; Books printing; Broom- brush- and mop manufacturing; Burial casket manufacturing; Buttons- pins- and all other miscellaneous manufac; Commercial printing; Curtain and linen mills; Cut and sew apparel manufacturing; Doll- toy- and game manufacturing; Flexible packaging foil manufacturing; Footwear manufacturing; Gasket- packing- and sealing device manufacturing; Jewelry and silverware manufacturing; Manifold business forms printing; Mattress manufacturing; Metal household furniture manufacturing; Musical instrument manufacturing; Office furniture-except wood- manufacturing; Office supplies- except paper-manufacturing; Prepress services; Sign manufacturing; Sporting and athletic goods manufacturing; Textile bag and canvas mills; Tradebinding and related work

Table 5. (Continued)

NONMETALLIC MINERAL PRODUCTS	Abrasive product manufacturing; Brick and structural clay tile manufacturing; Cement manufacturing; Ceramic wall and floor tile manufacturing; Clay refractory and other structural clay products; Concrete block and brick manufacturing; Concrete pipe manufacturing; Cut stone and stone product manufacturing; Glass and glass products- except glass containers; Glass container manufacturing; Ground or treated minerals and earths manufacturing; Gypsum product manufacturing; Lime manufacturing; Mineral wool manufacturing; Miscellaneous nonmetallic mineral products; Nonclay refractory manufacturing; Other concrete product manufacturing ; Porcelain electrical supply manufacturing; Ready-mix concrete manufacturing; Vitreous china and earthenware articles manufacturing; Vitreous china plumbing fixture manufacturing
UTILITY SERVICES	Natural Gas Distribution; Power generation and supply;Water, sewage and other systems
WHOLESALE AND RETAIL TRADE	Building material and garden supply stores; Clothing and clothing accessories stores; Electronics and appliance stores; Food and beverage stores; Furniture and home furnishings stores; Gasoline stations; General merchandise stores; Health and personal care stores; Miscellaneous store retailers; Motor vehicle and parts dealers; Nonstore retailers; Sporting goods- hobby- book and music stores; Wholesale trade
FINANCIAL/REAL ESTATE	Automotive equipment rental and leasing; Funds- trusts- and other financial vehicles; General and consumer goods rental except video tape;Insurance agencies brokerages and related, Insurance carriers; Lessors of nonfinancial intangible assets; Machinery and equipment rental and leasing; Monetary authorities and depository credit; Nondepository credit intermediation and related ; Owner-occupied dwellings; Real estate; Securities- commodity contracts-investments; Video tape and disc rental
MISCELLANEOUS SERVICES	Accounting and bookkeeping services; Advertising and related services; All other miscellaneous professional and technical; Architectural and engineering services; Automotive repair and maintenance- except car wash; Business support services; Car washes; Child day care services; Civic- social- professional and similar organization; Commercial machinery repair and maintenance; Computer systems design services; Custom computer programming services; Death care services; Dry-cleaning and laundry services; Electronic equipment repair and maintenance; Employment services; Environmental and other technical consulting servi; Facilities support services; Food services and drinking places; Grant making and giving and social advocacy organize; Hotels and motels- including casino hotels; Household goods repair and maintenance; Investigation and security services; Legal services; Management consulting services; Management of companies and enterprises; Office administrative services; Other accommodations; Other computer related services- including facilit; Other personal services; Other support services; Personal care services; Photographic services; Private households; Religious organizations; Scientific research and development services; Services to buildings and dwellings; Social assistance- except child day care services; Specialized design services; Travel arrangement and reservation services; Veterinary services; Waste management and remediation services

Table 5. (Continued)

ARTS ENTERTAINMENT AND RECREATION	Bowling centers; Fitness and recreational sports centers, Independent artists- writers- and performers, Museums- historical sites- zoos- and parks; Other amusement- gambling- and recreation industries; Performing arts companies, Promoters of performing arts and sports and agents; Spectator sports
HEALTH SERVICES	Home health care services; Hospitals; Nursing and residential care facilities; Offices of physicians- dentists- and other health; Other ambulatory health care services
EDUCATION	State & Local Education; Colleges- universities- and junior colleges; Elementary and secondary schools; Other educational services
GOVERNMENT	Federal electric utilities; Federal Military;Federal Non-Military;Other Federal Government enterprises; Other State and local government enterprises; State & Local Non Education; State and local government electric utilities; State and local government passenger transit
BALANCE	Inventory valuation adjustment; Noncomparable imports; Rest of the world adjustment to final uses;Scrap; Used and secondhand goods

Table 6. Major Components of the Crop Sector as defined by IMPLAN Sectors, 2001.

Aggregated Sector	IMPLAN Sector
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Grain Farming
FRUITS (Crop)	Fruit Farming
VEGETABLES AND MELONS (Crop)	Vegetable and melon farming
TREE NUTS (Crop)	Tree Nut Farming
OTHER CROPS (Crop)	Tobacco, Sugarcane and Sugar Crops; All other crops
OIL BEARING CROPS (Crop)	Oil Seed Farming
GREENHOUSE AND NURSERY (Crop)	Greenhouse and Nursery Production
MISCELLANEOUS FOOD PROCESSING (Crop)	All other food manufacturing; Bread and bakery product- except frozen- manufactu; Cigarette manufacturing; Coffee and tea manufacturing; Confectionery manufacturing from cacao beans; Confectionery manufacturing from purchased chocola; Cookie and cracker manufacturing; Dry pasta manufacturing; Frozen cakes and other pastries manufacturing; Frozen food manufacturing; Fruit and vegetable canning and drying; Mayonnaise- dressing- and sauce manufacturing; Mixes and dough made from purchased flour; Nonchocolate confectionery manufacturing; Other snack food manufacturing; Other tobacco product manufacturing; Roasted nuts and peanut butter manufacturing; Spice and extract manufacturing; Sugar manufacturing; Tobacco stemming and redrying; Tortilla manufacturing
GRAIN/FLOUR MILLING (Crop)	Breakfast cereal manufacturing; Rice Milling; Flour Milling; Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Fats and oils refining and blending; Other oilseed processing; Soybean processing
Portion Allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (84.0 percent); Fertilizers, Mixing Only (78.1 percent); New Farm Structures (20.0 percent); Farm Machinery and Equipment (47.0 percent); Food Products Machinery (43.4 percent)
SOFT DRINKS AND LIQUOR (Crop)	Breweries; Distilleries; Flavoring syrup and concentrate manufacturing; Malt manufacturing; Soft drink and ice manufacturing; Wineries
FABRIC MILLS (Crop)	Broadwoven fabric mills; Carpet and rug mills; Fabric coating mills; Fiber- yarn- and thread mills; Knit fabric mills; Narrow fabric mills and schiffli embroidery; Nonwoven fabric mills; Other apparel knitting mills; Other hosiery and sock mills; Other miscellaneous textile product mills; Sheer hosiery mills; Textile and fabric finishing mills; Tire cord and tire fabric mills

Table 7. Major Components of the Livestock Sector as defined by IMPLAN Sectors., 2001

Aggregated Sector	IMPLAN Sector
AGRICULTURAL/FORESTRY SERVICES (Other)	Agriculture and forestry support activities
Portion Allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (11.9 percent); Fertilizers Mixing Only (18.5 percent); New Farm Structures (75.0 percent); Farm Machinery and Equipment (16.1 percent); Food Products Machinery (25.3 percent)
POULTRY AND EGGS (Livestock)	Poultry and Egg Production
CATTLE (Livestock)	Cattle Ranching and Farming
OTHER LIVESTOCK (Livestock)	Animal production- except cattle and poultry and eggs
PROCESSED MEAT/EGGS (Livestock)	Animal- except poultry- slaughtering; Dog and cat food manufacturing; Meat processed from carcasses; Other animal food manufacturing; Poultry processing; Rendering and meat byproduct processing; Seafood product preparation and packaging
DAIRY PROCESSING (Livestock)	Cheese manufacturing; Creamery butter manufacturing; Dry-condensed- and evaporated dairy products; Fluid milk manufacturing; Ice cream and frozen dessert manufacturing

Table 8. Major Components of the Forestry Sector as defined by IMPLAN Sectors, 2001.

Aggregated Sector	IMPLAN Sector
AGRICULTURAL/FORESTRY SERVICES (Other)	Agriculture and forestry support activities
Portion Allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (2.8 percent); Fertilizers Mixing Only (2.4 percent); New Farm Structures (3.0 percent); Farm Machinery and Equipment (1.3 percent); Food Products Machinery (3.6 percent)
FOREST PRODUCTS (Forestry)	Forest nurseries- forest products- and timber tracts;Logging
WOOD PROCESSING (Forestry)	Custom architectural woodwork and millwork; Cut stock- resawing lumber- and planing; Engineered wood member and truss manufacturing; Manufactured home- mobile home- manufacturing; Miscellaneous wood product manufacturing; Other millwork- including flooring; Prefabricated wood building manufacturing; Reconstituted wood product manufacturing; Sawmills; Veneer and plywood manufacturing; Wood container and pallet manufacturing; Wood preservation; Wood windows and door manufacturing

Appendix B

Agriculture-Generated Activity by Sector

Table 1. Agriculture-generated Activity by Sector, 1999.

Aggregate Agriculture Contribution to:	Employment Total (Number of Jobs)	Income Total (Million $)	Value Added Total (Million $)
Processed Meat Eggs	39,889	1,036	1,111
Miscellaneous Services	39,575	887	1,199
Wholesale and Retail Trade	29,685	823	1,311
Wood Processing	15,830	483	616
Poultry and Eggs	15,388	333	779
Food Grains	14,230	148	465
Paper Processing	13,479	711	1,212
Miscellaneous Food Processing	12,337	404	899
Transportation And Communication Services	12,136	480	684
Oil Bearing Crops	11,334	198	305
Health Services	10,646	399	439
Financial Real Estate	9,850	231	1,163
Agricultural Forestry Services	9,805	204	182
Furniture	9,498	266	369
Cattle	7,851	117	81
Forest Products	5,862	170	429
Other Livestock	4,757	50	42
Fabric Mills	3,185	107	147
Other Crops	2,896	36	127
Cotton	2,559	84	148
Farm Inputs and Machinery	2,515	96	184
Petroleum and Chemicals	2,130	88	156
Arts, entertainment, and recreation	2,122	28	35
Construction	1,623	46	82
Grain, Flour Milling	1,569	52	91
Government	1,197	58	89
Utility Services	1,282	83	216
Education	1,155	21	23
Soft Drinks and Liquor	1,150	53	135
Fats and Oils Processing	902	33	57
Miscellaneous Manufacturing	742	20	28
Metal Industries	740	27	38
Mining	725	28	54
Dairy Processing	662	23	37
Technology Industries	531	16	23
Transportation Equipment	486	17	20
Machinery and Equipment	404	15	21
Greenhouse and nursery	407	13	31
Vegetables and melons	289	9	25
Nonmetallic mineral products	216	7	12
Fruits	143	6	10
Tree Nuts	21	1	1
Leather	18	0	1
Balance	0	0	0
Lodging and Hunting	55	0	1
Total	**291,290**	**7,810**	**13,053**

Table 1. (Continued)

Aggregate Agriculture Contribution to:	Employment Total (Number of Jobs)	Income Total (Million $)	Value Added Total (Million $)
Processed Meat Eggs	39,889	1,036	1,111
Miscellaneous Services	39,575	887	1,198
Wholesale and Retail Trade	29,065	823	1,311
Wood Processing	15,850	481	636
Poultry and Eggs	15,388	333	779
Food Grains	14,230	148	465
Paper Processing	14,479	711	1,212
Miscellaneous Food Processing	12,337	304	898
Transportation And Communication Services	12,136	489	684
Oil Bearing Crops	11,334	108	305
Health Services	10,646	300	439
Financial Real Estate	9,850	231	1,163
Agricultural Forestry Services	9,805	201	482
Furniture	9,498	266	369
Cattle	7,841	117	81
Forest Products	5,862	170	329
Other Livestock	4,757	50	42
Fabric Mills	3,185	107	147
Other Crops	2,896	96	127
Cotton	2,559	84	148
Farm Inputs and Machinery	2,515	96	184
Petroleum and Chemicals	2,130	88	156
Arts, entertainment, and recreation	2,122	28	35
Construction	1,623	46	42
Grain/Flour Milling	1,569	52	91
Government	1,397	58	89
Utility Services	1,282	83	216
Education	1,155	21	23
Soil Drinks and Liquor	1,130	51	153
Fats and Oils Processing	862	33	57
Miscellaneous Manufacturing	742	20	28
Metal Industries	740	27	98
Mining	725	28	54
Dairy Processing	662	23	37
Technology Industries	531	16	23
Transportation Equipment	486	17	20
Machinery and Equipment	401	15	21
Oilseed/meal products	407	13	31
Vegetables and nuts	269	9	25
Nonmetallic mineral products	216	7	12
Fruits	143	6	10
Tree Nuts	24	1	1
Leather	18	0	0
Balance	0	0	0
Fishing and Hunting	55	0	1
Total	**291,290**	**7,810**	**13,053**

Source: Computed using the 2001 Arkansas database from MIG (2004)
[a] Full-time equivalent jobs

Table 2. Crop-generated Activity by Sector, 2001.

Crop Contribution to:	Employment Total (Number of Jobs)	Income Total (Million $)	Value Added Total (Million $)
Food Grains	14,230	148	465
Miscellaneous Food Processing	12,337	404	898
Oil Bearing Crops	11,334	108	305
Miscellaneous Services	10,084	220	298
Wholesale and Retail Trade	8,817	257	413
Transportation And Communication Services	3,513	139	197
Fabric Mills	3,185	107	147
Other Crops	2,896	36	127
Financial Real Estate	2,880	66	340
Health Services	2,804	103	116
Cotton	2,559	84	148
Agricultural Forestry Services	2,359	49	44
Grain/Flour Milling	1,569	52	91
Soft Drinks and Liquor	1,150	53	155
Farm Inputs and Machinery	900	35	62
Fats and Oils Processing	802	33	57
Petroleum and Chemicals	659	27	46
Arts, entertainment, and recreation	570	8	9
Construction	428	12	11
Government	417	17	26
Utility Services	311	20	51
Greenhouse and nursery	307	13	31
Education	304	5	6
Vegetables and melons	289	9	25
Metal Industries	218	9	12
Miscellaneous Manufacturing	240	7	9
Mining	229	9	17
Nonmetallic mineral products	165	6	9
Fruits	143	6	10
Transportation Equipment	122	4	5
Technology Industries	110	3	5
Machinery and Equipment	102	4	5
Tree Nuts	24	1	1
Paper Processing	22	1	1
Cattle	17	0	0
Fishing and Hunting	15	0	0
Poultry and Eggs	13	0	1
Other Livestock	13	0	0
Leather	5	0	0
Furniture	2	0	0
Wood Processing	1	0	0
Forest Products	1	0	0
Processed Meat Eggs	0	0	0
Dairy Processing	0	0	0
Balance	0	0	0
Total	**86,176**	**2,056**	**4,144**

Source: Computed using the 2001 Arkansas database from MIG (2004).
[a] Full-time equivalent jobs

Table 3. Livestock-generated Activity by Sector, 2001.

Livestock Contribution to:	Employment Total (Number of Jobs)	Income Total (Million $)	Value Added Total (Million $)
Processed Meat Eggs	39,889	1,036	1,111
Poultry and Eggs	15,388	333	779
Miscellaneous Services	15,141	363	372
Wholesale and Retail Trade	9,710	271	430
Cattle	7,841	117	81
Other Livestock	4,757	50	42
Transportation And Communication Services	4,599	180	258
Health Services	3,791	139	156
Financial Real Estate	3,675	85	418
Agricultural Forestry Services	1,168	21	22
Arts, entertainment, and recreation	768	19	12
Dairy Processing	662	23	37
Construction	630	18	16
Petroleum and Chemicals	515	21	42
Farm Inputs and Machinery	483	16	24
Government	453	19	30
Utility Services	452	29	77
Education	417	7	8
Miscellaneous Manufacturing	242	6	9
Mining	208	8	16
Transportation Equipment	166	6	7
Machinery and Equipment	142	5	7
Metal Industries	123	5	6
Technology Industries	120	4	5
Food Grains	57	1	2
Oil Bearing Crops	27	0	1
Paper Processing	23	1	1
Fishing and hunting	20	0	0
Nonmetallic mineral products	17	1	1
Fabric Mills	16	0	0
Leather	6	0	0
Cotton	6	0	0
Furnaims	2	0	0
Other Crops	1	0	0
Wood Processing	1	0	0
Miscellaneous Food Processing	0	0	0
Fruits	0	0	0
Forest Products	0	0	0
Vegetables and melons	0	0	0
Greenhouse and nursery	0	0	0
Tree Nuts	0	0	0
Grain Flour Malting	0	0	0
Soft Drinks and Liquor	0	0	0
Balance	0	0	0
Fats and Oils Processing	0	0	0
Total	111,548	2,782	4,074

Source: Computed using the 2001 Arkansas database from MIG (2004)
[a] Full-time equivalent jobs

Table 4. Forestry-generated Activity by Sector, 2001.

Forestry Contribution to:	Employment Total (Number of Jobs)	Income Total (Million $)	Value Added Total (Million $)
Wood Processing	15,850	483	616
Miscellaneous Services	13,732	293	410
Paper Processing	13,479	711	1,212
Wholesale and Retail Trade	10,125	283	449
Furniture	9,408	266	369
Forest Products	5,862	170	429
Transportation And Communication Services	3,890	155	222
Health Services	3,856	141	159
Financial Real Estate	3,163	77	388
Agricultural Forestry Services	3,143	65	58
Petroleum and Chemicals	980	37	66
Arts, entertainment, and recreation	745	10	12
Construction	540	15	11
Government	509	21	33
Utility Services	506	33	85
Education	414	7	8
Metal Industries	349	13	18
Technology Industries	291	9	12
Mining	277	11	21
Miscellaneous Manufacturing	247	6	9
Farm Inputs and Machinery	228	8	11
Transportation Equipment	188	6	8
Machinery and Equipment	142	6	7
Food Grains	112	1	5
Oil Bearing Crops	67	1	2
Nonmetalhe mineral products	33	1	2
Cattle	23	0	0
Fishing and hunting	20	0	0
Poultry and Eggs	18	0	1
Other Livestock	18	0	0
Fabric Mills	16	0	0
Cotton	13	0	1
Leather	6	0	0
Other Crops	2	0	0
Fruits	1	0	0
Miscellaneous Food Processing	1	0	0
Vegetables and melons	0	0	0
Greenhouse and nursery	0	0	0
Grain/Flour Milling	0	0	0
Processed Meat Eggs	0	0	0
Tree Nuts	0	0	0
Dairy Processing	0	0	0
Soft Drinks and Liquor	0	0	0
Balance	0	0	0
Fats and Oils Processing	0	0	0
Total	**85,294**	**2,830**	**4,626**

Source: Computed using the 2001 Arkansas database from MIG (2004).
[a] Full-time equivalent jobs