

STATE OF KANSAS
DIVISION OF WATER RESOURCES
KANSAS STATE BOARD OF AGRICULTURE
TOPEKA, KANSAS

BEFORE

DAVID L. POPE, CHIEF ENGINEER-DIRECTOR
DIVISION OF WATER RESOURCES
KANSAS STATE BOARD OF AGRICULTURE

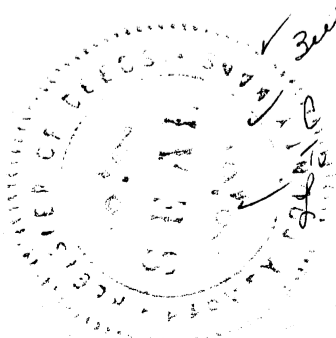
IN THE MATTER OF THE PROPOSED DESIGNATION OF AN
INTENSIVE GROUNDWATER USE CONTROL AREA IN THE
VICINITY OF BURRTON, KANSAS

The Chief Engineer-Director, Division of Water Resources, Kansas State Board of Agriculture, (hereinafter referred to as the "Chief Engineer") after having given due consideration to all evidence, testimony and other information presented to him at the hearings in Burrton, Kansas, on August 4, 1982, and February 21, 1984, regarding the proposed designation of an approximately 36 square mile area in the vicinity of Burrton, Kansas, as an intensive groundwater use control area, makes the following findings, conclusions and order:

FINDINGS

1. That on June 11, 1982, the Chief Engineer received a letter from the Equus Beds Groundwater Management District No. 2 (hereinafter referred to as "District No. 2") which indicated the Board of Directors (hereinafter referred to as "The Board") of District No. 2 had adopted a motion on June 8, 1982, requesting the Chief Engineer to initiate proceedings for designation of an intensive groundwater use control area near Burrton, Kansas, in a 36 square mile area described as follows:

an area in the vicinity of Burrton, Kansas, including Sections 14 through 23 and 26 through 35, Township 23 South, Range 3 West; Sections 2 through 11, Township 24 South, Range 3 West; and Sections 13, 24, 25 and 36, Township 23 South, Range 4 West; and Sections 1 and 12, Township 24 South, Range 4 West; all located within the boundaries of District No. 2.



97677
HARVEY COUNTY, STATE OF KANSAS
This instrument was filed for record on
the 18 day of June A.D. 1983
at 9:30 o'clock A.M. and duly recorded in
book 302 of 700
on Page 614-634 Fee \$ 25.00
Jack A. Day
Register of Deeds
Winifred A. Rowland Deputy

ORIGINAL COMPARED WITH RECORD

2. That the request was made by District No. 2 on the basis of deteriorating water quality because high chloride concentrations had been detected in the groundwater in that area.
3. That on June 24, 1982, Guy E. Gibson, Chief Engineer, issued notice of a public hearing to be held at 9:00 a.m. on Wednesday, August 4, 1982, at the Board of Education meeting room in the office of the Superintendent of Schools, 211 E. Lincoln, Burrton, Kansas, at which time all interested parties would have an opportunity to be heard regarding the proposed designation of an intensive groundwater use control area in the area described above. The purpose of the hearing was to determine if an intensive groundwater use control area should be established, and, if so, what the boundaries should be, and what types of restrictions, if any, should be placed on the appropriation of water in that area.
4. That notice of this hearing was sent to all water right holders of record in the office of the Chief Engineer and all known landowners in the proposed intensive groundwater use control area; that notice of the hearing was also published in the Wichita Eagle-Beacon, the Burrton Graphic, the Halstead Independent, the Hutchinson News and the Newton Kansan; that affidavits of publication show these newspapers published notice of this hearing more than 30 days prior to the hearing; notice of the hearing was also sent to state agencies having an interest in water resources, known interested legislators, members of the Kansas Water Authority and members of the Kansas State Board of Agriculture; numerous articles appeared in local newspapers concerning the proposed intensive groundwater use control area.
5. That on July 29, 1982, the Division of Water Resources received a document dated July 28, 1982, entitled "Initial Report - Identification of Salt Water Sources Affecting Groundwater in the Burrton Area, Harvey County, Kansas - Donald O. Whittenore and Chris L. Basel - Kansas Geological Survey, Lawrence, Kansas;" that this report

✓ INDEXED
 ✓ ORIGINAL COMPARED
 WITH RECORD
 ✓ NUMERICAL

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STATE OF KANSAS } ss
 RENO COUNTY }

This instrument was filed for record on the 21 day of June A.D. 1984 at 2:05 o'clock P. M. and duly recorded in Book 201 on Page 176 (21)
 Fee \$ 25.00

Rosa Mary Moore
 REGISTER OF DEEDS

concluded that geochemical evidence, based primarily on bromide/chloride ratios and supported by sodium/chloride and iodide/chloride ratios indicates that the main source of salinity in District No. 2 near Burrton is oil field brine. The mixture could have been derived from salt water in the "Lost-Circulation Zone" of the Wellington formation; that during the 1930's pressure injection of oil brine into disposal wells in this formation forced salt water up nearby boreholes to the surface; that the report was furnished by Mr. Donald O. Whittemore, Associate Scientist, Kansas Geological Survey, and indicated he would not be able to be present at the hearing on August 4th and asked that his report be entered into the record.

6. On August 4, 1982, at approximately 9:15 a.m., the hearing was convened in the Board of Education meeting room in the office of the Superintendent of Schools, 211 E. Lincoln, Burrton, Kansas, by the Chief Engineer; that Leland E. Rolfs, Legal Counsel for the Division of Water Resources, and Mr. David L. Pope, then Assistant Chief Engineer, were also present and assisting the Chief Engineer at the hearing.
7. That District No. 2 appeared by its attorney, Mr. Thomas A. Adrian, Adrian & Epp, Old Mill Plaza, Suite 300, Newton, Kansas 67114.
8. That K.S.A. 1981 Supp. 82a-1036, 82a-1037 and 82a-1038 provide that upon recommendation of a groundwater management district, the Chief Engineer shall initiate, as soon as practicable, proceedings for the designation of a specifically defined area within such groundwater management district as a control area; that these statutes further provide that the Chief Engineer has the authority and duty to hold a public hearing on the question of designating such area as a control area; that the Chief Engineer shall make written notice of the hearing to every person holding a water right in the area in question and publish notice of the hearing by one publication in a newspaper or newspapers of general circulation within the area at

least 30 days prior to the date for such hearing; that at the hearing, documentary and oral evidence shall be taken and a full and complete record of the same shall be kept.

9. That Mr. Thomas C. Bell, Manager, District No. 2, testified on behalf of District No. 2 as follows: That he had been manager of the District for approximately six years; that soon after he became manager the District became aware of a potential salt water problem in the Burrton area; that in 1977 the Harvey County Commission made available some revenue sharing moneys to drill a series of monitoring wells in this area in cooperation with a drilling rig furnished by the Wichita Water Department; that 84 monitoring wells were drilled and cased; that these wells were designed to monitor salt water concentrations in the area; that there were two wells at almost all locations designed to monitor shallow groundwater and deep groundwater; that the wells ran from 30 to 50 feet deep and 40 to 100 feet deep; that the general groundwater gradient is in a southeasterly direction in the Burrton area; that Mr. Bell submitted Exhibit 1, a document entitled "A Summary of Data Presented at a Public Hearing Concerning an Intensive Groundwater Use Control Area around Burrton, Kansas, by Thomas C. Bell, Manager, Equus Beds GMD No. 2" which was admitted and made a part of the record of the hearing; that the monitoring of the test wells showed a number of wells with chloride concentrations greater than 250 parts per million; that the Environmental Protection Agency (hereinafter referred to as EPA) recommends that it is best to use water for drinking purposes that has chloride concentrations of no greater than 250 parts per million; that the District feels that a maximum 500 parts per million chloride is safe to use for irrigation purposes in that area; that item 7 in Exhibit 1 shows 21 wells with a chloride concentration in an excess of 250 parts per million with the maximum being 2,105 parts per million; that a total of nine wells show a concentration of more than 1,000

parts per million; that municipal usage out of this area averages 4,000 acre feet per calendar year, industrial usage 230 acre feet per calendar year, and irrigation usage 2,000 acre feet per calendar year.

10. That Mr. Bell further testified that at the time the Board requested the Chief Engineer initiate proceedings for an intensive groundwater use control area (IGUCA) the Board requested no applications to appropriate water for beneficial use filed within the proposed area on or after June 8, 1982, be processed or approved but rather placed on file with the Division of Water Resources pending completion of the study within the proposed area and completion of the hearing by the Chief Engineer on the proposed intensive control area and also that all applications to appropriate water for beneficial use on file with the Division of Water Resources not be approved pending specific recommendations on those applications by District No. 2.
11. That Dr. Marios Sophocleous, Associate Scientist, Kansas Geological Survey, testified on behalf of the District as follows: He has been employed with the Kansas Geological Survey for four years and holds a Ph.D. in hydrogeology, a master's degree in water resources and a bachelor's degree in natural sciences and geology; that he had, as part of his activities as the Kansas Geological Survey (KGS), undertaken a modeling study to test several pollutant transport models and had specifically looked at data in the Burrton area; that the data which went into the model included static water levels in the area, bedrock elevations, boundaries of the aquifer, saturated thickness of the aquifer and physical properties of the aquifer such as permeability, chemical concentrations of water quality, chemical parameters, etc.; that the models are used to predict movement of salt water and salt water concentrations in the Burrton area; that these models could be used to evaluate potential effects of future applications to appropriate water in this area; that additional time

was needed to obtain data to complete the model and to do more modeling work to accurately portray what is happening to the pollution and what will happen to it in the future; that he stated Application No. 35,887, which proposes withdrawal of 136 acre feet per year at a rate of 1,300 gallons per minute, could be approved if restricted to the upper formation and, if so, it would cause minimal effect on the aquifer; that additional time could allow him to improve the accuracy of his recommendations.

12. That Mr. William R. Bryson, Director, Bureau of Oil Field and Environmental Geology, Kansas Department of Health and Environment, testified on behalf of that agency as follows: That the primary source of pollution in the Little Arkansas River Basin originated from oil production practices consisting of disposals of salt brines in surface ponds, ponds, pits or depressions prior to 1960; that brines from these facilities migrated downward through seepage and leakage polluting the shallow groundwater reservoirs; that by 1957 deep disposal was underway throughout the Basin; that the Department has documented 67 brine pits that were used during the period 1930 to 1960's; that chloride disposal in the Wellington Lost-Circulation Zone has contributed to additional chlorides in the lower depths of the Equus Beds aquifer; that Mr. Bryson urged that a task force be created, to address the problem, made up of state agencies, the District and a representative of the oil and gas industry in the Burrton area.
13. That Mr. Jim Schoof, as an employee of the Kansas Corporation Commission, Conservation Division, Wichita, Kansas, testified as follows: That a total of 53 oil and gas wells, two disposal wells and two repressuring injection wells had been completed in the proposed area; he recommended a task force be formed and that a member of the Kansas Independent Oil and Gas Association be placed on the task force.

14. That Mr. Donald J. Darling, Hutchinson resident and a retired water well driller and citizen, testified on his own behalf that he felt a study should be made, but it should be completed within a five year maximum.
15. That the Chief Engineer continued the hearing to allow District No. 2 to conduct additional investigations and do additional research, or cause to have conducted such additional research and investigations, and to submit reports and analysis of the results of such investigations and research to the Chief Engineer on any matters relevant to whether an intensive groundwater use control area should be established in the Burrton area and, if so, what the boundaries should be and what controls, if any, should be adopted; that the hearing was also continued in accordance with the requests made by the Kansas Department of Health and Environment, the Kansas Geological Survey, the Kansas Water Office and District No. 2 that a task force be created; that the Chief Engineer created and appointed a task force composed of the Department of Health and Environment, District No. 2, the Kansas Water Office, the Kansas Corporation Commission, the Kansas Water Authority, the Kansas Geological Survey, the Kansas Independent Oil and Gas Producers Association and the manager of District No. 2 as the Chairman of the task force; that the holders of water rights in the area could also select and make recommendation to the Chief Engineer for a person to be made a member of said task force; that the task force was commissioned to investigate and research the water quality problems in the Burrton area and other problems they deemed appropriate to this area which had been discussed at this hearing and requested to submit recommendations, findings and conclusions and any control provisions they deemed appropriate as well as proposed boundaries of the intensive groundwater use control area to the Chief Engineer; that the Chief Engineer instructed the Task Force to file a report with the Chief Engineer no later than six months from the date of the hearing; that the hearing

was continued until such time as the Chief Engineer decided to reconvene the hearing or until such time as District No. 2 petitioned the Chief Engineer to have the hearing reconvened; that the Chief Engineer further declared that any application to appropriate water for beneficial use, except those applications filed for domestic use and temporary permits, filed after 2:30 p.m. on August 24, 1982, for which the proposed point of diversion is located within the area set forth in the notice of this hearing shall be kept for filing in the office of the Chief Engineer and given a priority number as required by law, however such applications would not be further processed until such time as the hearing was concluded and a decision made as to whether an intensive groundwater use control area would be established; that at that time such applications would be processed in accordance with the provisions of the Kansas Water Appropriation Act, the Groundwater Management District Act and any adopted policies or rules and regulations of District No. 2 or the Division of Water Resources and in accordance with any intensive groundwater use control area provisions that might be in effect if a control area were established.

16. That by letter received February 2, 1983, Mr. Thomas C. Bell, Chairman, Burrton Task Force, wrote to Mr. Guy E. Gibson, Chief Engineer, and furnished him a progress report on the Task Force's work; he indicated the task force had met three times and had expanded its study area two miles north and two miles west of the proposed area. Mr. Bell listed 10 ongoing or completed tasks of the Task Force and indicated the Task Force's work had been going very well and excellent progress was being made.
17. That on January 20, 1984, David L. Pope, Chief Engineer-Director, issued a notice that the public hearing which was held on Wednesday, August 4, 1982, would be continued at 9:00 a.m. on Tuesday, February 21, 1984, at the Board of Education meeting room in the Superintendent of School's office, 211 E. Lincoln, Burrton, Kansas, at which

time all interested parties would have an opportunity to be heard regarding the proposed designation of an intensive groundwater use control area near Burrton, Kansas. The proposed area had been expanded to approximately 42 square miles in area and was described as follows: an area in the vicinity of Burrton, Kansas, including Sections 14 through 23 and 26 through 35, Township 23 South, Range 3 West; Sections 2 through 11, Township 24 South, Range 3 West; Sections 13, 14, 23, 24, 25, 26, 35 and 36, Township 23 South, Range 4 West; Sections 1, 2, 11 and 12, Township 24 South, Range 4 West, all located within the boundaries of the Equus Beds Groundwater Management District No. 2; that this hearing notice was sent to all those previously notified plus water right holders of record in the office of the Chief Engineer-Director and all known landowners located in the additional six square mile area.

18. That the hearing was reconvened at 9:15 a.m. on February 21, 1984, in the Board of Education meeting room in the Superintendent of School's office, 211 E. Lincoln, Burrton, Kansas; that Mr. Pope was assisted by Leland E. Rolfs, Legal Counsel for the Division of Water Resources, and Mr. James O. Bagley, Engineer in charge of the Water Appropriation Section of the Division of Water Resources.
19. That District No. 2 was represented by Mr. Thomas A. Adrian, Legal Counsel.
20. Mr. Thomas C. Bell, Manager, District No. 2, testified as Chairman of the Task Force and submitted what was marked District Exhibit No. 1 and entitled "Report of the Burrton Task Force to the Chief Engineer-Director of the Kansas State Board of Agriculture, Division of Water Resources, concerning the proposed Burrton Intensive Groundwater Use Control Area - February 21, 1984;" that the members of the Burrton Task Force consisted of representatives from District No. 2; the Kansas Corporation Commission, Conservation Division; Kansas

Department of Health and Environment, Division of Environment, Bureau of Oil Fields and Environmental Geology; Kansas Geological Survey; Kansas Independent Oil and Gas Association; Kansas Water Authority and the Kansas Water Office. That the report contained the following conclusions:

- "1. The geology of the area consists of unconsolidated Pleistocene and some Pliocene sands, gravels, silts, and clays of the Equus Beds. The proposed Intensive Groundwater Use Control Area (IGUCA) is underlain by Wellington Shale and a portion of the Wellington Aquifer.
2. Clay layers beneath the area range from 1 to 75 feet thick and are discontinuous. The clay layers tend to disperse the chlorides in the groundwater. As salt water travels downward in the aquifer and meets a clay layer, it tends to disperse laterally until it reaches the edge of the clay layer and can continue its downward trend. The basal part of the Equus Beds aquifer contains water of lower chloride concentration in some areas of the Burrton IGUCA than shallower groundwater in the same areas.
3. The concentrations of chloride greater than 1000 mg/l in the groundwater have a smaller areal extent at less than 50 feet deep than in the deep groundwater, because the clay layers tend to disperse the chloride with depth.
4. Municipal usage in the proposed Intensive Groundwater Use Control Area averaged 3,936 acre-feet per year from 1977 through 1982. Irrigation usage averages 1,854 acre-feet and industrial usage averaged 231 acre-feet per year for the same period.
5. Chloride concentrations in the Burrton area ranged from 10 to 100 mg/l prior to 1931 and oil field activity. By 1948, chloride concentrations ranged to greater than 1,000 mg/l. Currently chloride concentrations range up to 2450 mg/l.
6. From 1931 to 1943, brine was disposed into brine ponds. From 1943 to the mid 1950's, 95% of the brine was disposed through deep disposal wells and 5% was disposed through ponds. Currently all brine is disposed through deep disposal and enhanced recovery wells.
7. A large percentage of the estimated 1.9 million tons of salt produced in brine from 1931 to 1943 entered the groundwater in the area.
8. The majority of the groundwater pollution in the Burrton area occurred through brine disposal ponds from 1931 to 1943. The second most predominant source of saltwater pollution was the use of shallow brine disposal wells, many under pressure, into the "lost circulation zone" of the Wellington Formation. The injection pressures forced salt water up into the Equus Beds through unplugged or improperly plugged test holes and improperly constructed wells. The major source of pollution in the last 15 years has been from steady leaks, massive brine line breaks, saltwater tank leaks, overflows, and malfunctioning disposal wells.

9. The average chloride concentration of brine disposed into ponds in the 1930's and early 1940's is estimated to have been 96,000 mg/l.
10. All the known shallow disposal wells into the "lost circulation zone" of the Wellington Formation in the Burrton area have had their permits cancelled and the wells have been plugged. If these wells are properly plugged, no new additions of oil brine to the Wellington saltwater aquifer should occur, which could increase the hydraulic head and cause salt water to flow into the overlying freshwater aquifer (Equus Beds).
11. Saltwater brine is being transported in the Burrton area through several types of pipelines, including asbestos-cement Transite, steel, vitrified clay, and Orangeburg sewer line pipe. It is estimated the condition of many of these lines is poor.
12. Depth to bedrock in the proposed Burrton Intensive Groundwater Use Control Area ranges from 100 to 250 feet. A bedrock high, just south of Burrton, seems to influence the deep brine-plume movement.
13. The predominant source of high chlorides in the groundwater in the proposed Burrton Intensive Groundwater Use Control Area is oil-field brine. This conclusion is primarily based upon bromide/chloride versus chloride ratios of the groundwater in the area. South and southwest of the proposed Burrton Intensive Groundwater Use Control Area, the source of chloride is from halite solution. Iodide/chloride ratios suggest the salt water originated at or near the surface and flowed downwards.
14. A mass transport model of the salt water in the Burrton area estimates that the 250 mg/l iso-chlore will move approximately one mile south and east by the year 2000, assuming no additional appropriations.
15. The mass transport model of the proposed IGUCA estimates that the average chloride concentration of the groundwater in Sec. 4-T24S-R3W., in the vicinity of Application 35887 (Regier, Inc.), will be approximately 409 mg/l in the year 2000. The model estimates that the approval of Application 35887 in the proposed Burrton IGUCA area will produce insignificant change in the chloride concentration of the groundwater in the area."

21. Then the Task Force Report contained the following recommendations:

"Recommendation 1. Move Entire Proposed Intensive Groundwater Use Control Area West One Mile

Based upon the results and conclusions of this study by the Burrton Task Force, the Task Force recommends that the proposed 36 square-mile Intensive Groundwater Use Control Area be moved west one mile. Moving the proposed control area west one mile means that the following sections would be deleted on the east side of the currently proposed area: Sections 14, 23, 26, and 35, Township 23 South, Range 3 West, and Sections 2 and 11, Township 24 South, Range 3 West. Moving the proposed control area west one mile would mean adding the following six sections along the west side of the currently proposed area: Sections 14, 23, 26, and 35, Township 23 South, Range 4 West, and Sections 2 and 11, Township 24 South, Range 4 West.

Information gathered from the six sections west of the currently proposed control area indicate high chlorides ranging up to 1000 mg/l in those sections. Therefore, it is suggested those sections be included in the control area.

Kansas Geological Survey modelling of the area predicted water quality and chloride movement in the area to the year 2000. The model predicted only one of the six sections on the east side of the currently proposed control area (Section 26) would have chloride ranging from 100 to 500 mg/l chloride. All other sections along the east side are estimated to have chloride concentrations of less than 100 mg/l. Therefore, the Task Force is recommending that the eastern six sections in the currently proposed Intensive Groundwater Use Control Area be deleted.

Recommendation 2. Check Integrity of Saltwater Lines

The saltwater disposal and gathering line systems have been in operation since the mid 1940's. Although the exact date of installation of each system is not known, a map dated December 1940 showed some of the systems in place at that time. Other maps used for reference were not dated. The integrity of these lines at any point from 1940 to present is not known and continual chloride contamination could be occurring if corroded lines, leaking joints and collars exist. The contribution of chloride to the groundwater from these services, if they exist, is an unknown factor that will have a decided effect on the assumptions made in developing a mass transport model for the area.

The majority of the lines for the North Burrton Salt Water Disposal Association and Resource Recovery Corporation lie in the eastern part of T23S-R4W and the western part of T23S-R3W. Samples of water from wells collected from these areas had high chloride concentrations and Dr. Whittemore's study determined were contaminated (sic) by brine. Brine line leakage could be one source of chloride contamination in these wells.

Brine lines of various sizes and materials were used in the Burrton Oil Field. Transite lines of resistant material were present, as were separate lines of non-resistant material. Sizes of the lines ranged from 2 to 7 inches and most of the Transite lines and other lines of resistant materials were 3 inches in diameter. The lead line sizes were not recorded on the maps, however, it is assumed all are made of steel.

Numerous lines were made of "non-resistant" (probably steel) material and many were of rather short length leading from the tank battery to the disposal well. These lines are corrosion prone and have leaked at sometime.

Transite lines are resistant to corrosion, however, they are somewhat porous and probably not water tight. The rubber rings used in the collars as a seal may have broken down and become brittle with time.

The integrity of the disposal systems should be checked. All leaking lines should be repaired and those that have been repaired numerous times, replaced. Larger diameter lines could possibly have smaller liners installed inside if found to be leaking. This will be the responsibility of KCC-KDHE to work with all the saltwater disposal associations to check their lines for leakage.

Recommendation 3. Check Competency of Cement-Lined Saltwater Pits

The water retention competency (sic) of the cement-lined saltwater pits should be evaluated. Sealed ponds which are leaking represent a continuous pollution source to groundwater resources. Pond overflows are another source of intermittent pollution. Each of these ponds should be field checked and evaluated. A sampling of the observation wells surrounding the pits as well as the competency of the pits will be done by KDHE.

Recommendation 4. Conduct Detailed Lease Investigations

A detailed lease inspection should be run on all leases which water quality data indicates may be potential water pollution contributors. Such inspections should look for abandoned wells not on the inventories, abandoned wells not plugged, injection wells not authorized, and any suspicious potential water pollution situations.

Recommendation 5. Investigate Integrity of Plugs In Wells Suspected Of Leaking

Plugged abandoned wells, which water sampling data indicates are potential pollution sources, should be drilled out and replugged. As much data as practical should be obtained during the drilling out of the plugged hole relative to water and mud qualities, cement quality and possibility of vertical fluid movement in the hole.

Recommendation 6. Conduct Mechanical Integrity Tests On All Injection Or Disposal Wells In Area

The new Underground Injection Control (UIC) regulations require that all injection and disposal wells have a mechanical integrity test every five years. This is a new program that is just beginning. The Task Force recommends that the Burrton area be placed very high in the order of testing and that priority be given by testing the injection and disposal wells in the proposed Burrton Intensive Groundwater Use Control Area.

Recommendation 7. Sample Soil Of Area Of Several Abandoned Saltwater Ponds

The majority of the pollution to this area has been caused by past and present oil field activities. One past activity that contributed significant pollution was the oil field saltwater ponds. Residual leachate from these pond areas could still be contributing to the observed pollution levels because of the amount and concentrations of brines that were disposed into them during their years of usage. They could possibly add enough chloride to the groundwater to retard the rate of dilution.

KDHE proposes locating at least one of these abandoned and filled in salt water ponds for the purpose of taking continuous split-spoon core samples from the surface down to at least three feet below the base of the filled in pond excavation. The soil samples would require analysis for residual salts. The purpose is to ascertain if the old saltwater ponds are a present contributor to pollution, and if so, the level of pollution contribution that exist.

Recommendation 8. Establish Deeper Aquifer Monitoring Wells

Locations for additional deep monitoring wells, 100-to-250 feet deep, should be selected to the immediate west and southwest of the City of Burrton. Please refer to Figures 14 and 19. No specific locations are recommended because there may be wells in this area that may meet the location and depth criteria assigned by the task force, thus the drilling of additional wells may not be necessary. Any new monitoring wells should be constructed to exclude any groundwater above the screened interval. The well diameter should be conducive for pumped samples.

Recommendation 9. Utilize Polluted Groundwater for Enhanced Recovery Of Oil

Resource Recovery's water well is located in the SWSWSE 19-23W-3W. The depth of this well is 124 feet and is used as a source of fresh water for injection into wells for enhanced recovery of oil. The groundwater from this well contains 401 mg/L chloride.

Located immediately to the east of the above well in the SESESE 19-23S-3W, are wells showing groundwater chloride concentrations from 1480 mg/L to 1830 mg/L. The depths from which these samples were collected are 60 feet and 110 feet, respectively. Please refer to Figures 13 and 14 and Table 3.

The task force responsibilities are to evaluate the existing groundwater pollution, the past and present sources of that pollution, and to make recommendations to the Chief Engineer of the Division of Water Resources (sic) as to whether an intensive groundwater control area should be established on the basis of deteriorating groundwater quality.

From a groundwater management standpoint, Resource Recovery or any other oil company who presently is using or will be using groundwater for water flood injection, should be required to use polluted groundwater for enhanced recovery purposes. Utilizing the polluted groundwater will help remove the contaminants from the aquifer and, if the well is appropriately located, may also help retard their migration down gradient. Resource Recovery should consider installing a water well to a depth of around 120 feet in the SESESE 19-23S-3W to intercept and use this polluted groundwater for use in their secondary recovery project. Chemical analyses would determine if the polluted groundwater would be compatible with the brine in the producing formation.

Recommendation 10. Recommend Continuous Monitoring Program In Area

Continuous monitoring and research of the groundwater quality in the proposed IGUCA and adjacent areas is recommended until quality and movement improves to meet State and groundwater management standards.

Recommendation 11. Educate Public In Area About Problem And Future Salinity Trends

Educate the water users and the public in the area about the seriousness of the present and future salinity trends.

Recommendation 12. Continue Appropriating Water Under Safe Yield Policy By Considering Applications On An Individual Basis

Consider remedial actions. Given that no present pollution sources exist and that most pollution sources are oil-field brine related, continuation of usual water rights appropriation policies may not be a bad policy in the long term, provided that the irrigators are educated as to what to expect. This is because additional pumpage will speed up aquifer restoration to natural water quality, although in the short run it may divert marginal quality water to the pumping centers. Interception of the brine plume could be considered, if economically feasible. KGS is currently investigating this approach.

Any new application for beneficial use of water should be evaluated on an individual basis to ascertain if the proposed point of diversion will meet district and State management standards.

Recommendation 13. Implement Additional Water Well Construction Standards

All future water wells constructed, reconstructed or plugged within the proposed IGUCA should be evaluated for their construction, reconstruction or plugging prior to the actual work being done by the Kansas Department of Health and Environment. This is to prevent cross communication of waters of differing quality."

22. That presentations were also made by other persons contributing to the Task Force Report summarizing their portions of the Task Force Report: Dr. Marios Sophocleous, Mr. William Bryson, Mr. Jim Schoof and Mr. Donald O. Whittemore. Mr. Bryson and Mr. Schoof agreed that their respective agencies, the Kansas Department of Health and Environment and the Kansas Corporation Commission would cooperate to help implement the recommendations of the Task Force.
23. That Mr. John Francis Weber, Route 1, Halstead, Kansas, testified on his own behalf that he felt that rather than excavating the old brine ponds which had been backfilled, it would be better to fill them over in such a manner that the water would run off rather than infiltrate down through the ponds; that this would be a more practical solution to salt leaching downward from the salt water disposal ponds which are no longer in use.
24. That Mr. Thomas C. Bell was recalled as a witness on behalf of District No. 2 and testified that District No. 2 made the following recommendation in addition to those made by the Task Force: That flow meters be installed on all water wells except domestic wells within the proposed IGUCA; that the integrity of salt water disposal

lines be checked, perhaps by use of pressurized smoke, and that all such lines which are discovered to be leaking be replaced by lines made of a well sealing noncorrosive material such as PVC or some other plastic-based material and that all cement-lined pits be replaced with plastic or fiberglass tanks to minimize and eliminate salt water leaking into the groundwater; that the District further recommended the Chief Engineer place priority on the Burrton Task Force Recommendation Nos. 1, 2, 3, 6, 10, 12 and 13, but did note that all the recommendations were important.

25. That the Chief Engineer kept the record of the hearing open for 30 days in order to receive any additional comments by any member of the public or any additional information that might become available from either the Task Force or the District or other agencies; the hearing was closed at approximately 12:10 p.m. on February 21, 1984.
26. That K.S.A. 1981 Supp. 82a-1038 provides:

"(a) In any case where the chief engineer finds that any one or more of the circumstances set forth in K.S.A 1978 Supp. 82a-1036 exist and that the public interest requires that any one or more corrective controls be adopted, said chief engineer shall designate, by order, the area in question, or any part thereof, as an intensive groundwater use control area.

(b) The order of the chief engineer shall define specifically the boundaries of the intensive groundwater use control area and shall indicate the circumstances upon which his or her findings are made. The order of the chief engineer may include any one or more of the following corrective control provisions: (1) A provision closing the intensive groundwater use control area to any further appropriation of groundwater in which event the chief engineer shall thereafter refuse to accept any application for a permit to appropriate groundwater located within such area; (2) a provision determining the permissible total withdrawal of groundwater in the intensive groundwater use control area each day, month or year, and, insofar as may be reasonably done, the chief engineer shall apportion such permissible total withdrawal among the valid groundwater right holders in such area in accordance with the relative dates of priority of such rights; (3) a provision reducing the permissible withdrawal of groundwater by any one or more appropriators thereof, or by wells in the intensive groundwater use control area; (4) a provision requiring and specifying a system of rotation of groundwater use in the intensive groundwater use control area; (5) any one or more other provisions making such additional requirements as are necessary to protect the public interest.

(c) The order of designation of an intensive groundwater use control area shall be in full force and effect from the date of its entry in the records of the chief engineer's office unless and until its operation shall be stayed by an appeal therefrom in accordance with the provisions of subsection (d) of K.S.A. 1978 Supp. 60-2101. The chief engineer upon request shall deliver a copy of such order to any interested person who is affected by such order, and shall file a copy of the same with the register of deeds of any county within which such designated control area lies."

CONCLUSIONS

1. That unreasonable deterioration of the quality of water is occurring or may occur within the area in question.
2. That an intensive groundwater use control area should be established and corrective control provisions initiated in order to protect the public interest.
3. That the boundaries of the intensive groundwater use control area should be an area of approximately 36 square miles in the vicinity of Burrton, Kansas, including Sections 15 through 22 and 27 through 34, Township 23 South, Range 3 West; Sections 3 through 10, Township 24 South, Range 3 West; Sections 13, 14, 23, 24, 25, 26, 35 and 36, Township 23 South, Range 4 West; Sections 1, 2, 11 and 12, Township 24 South, Range 4 West, all located within the boundaries of the Equus Beds Groundwater Management District No. 2.
4. That in order to more accurately monitor the groundwater withdrawals in the area and the effect of those withdrawals on salt water movement in the area, all groundwater users in the control area should be metered, except for domestic and temporary use.
5. That the public interest requires all applications to appropriate water for beneficial use within the proposed intensive groundwater use control area be reviewed on a case by case basis, and which may include analysis on the computer model constructed by the Kansas Geological Survey, if appropriate.
6. That the recommendations of the Task Force should be forwarded to the other entities or agencies having jurisdiction or authority in the area.

ORDER

NOW, THEREFORE, It is the decision and order of the Chief Engineer-Director, Division of Water Resources, Kansas State Board of Agriculture, that an intensive groundwater use control area should be and is hereby established in Harvey and Reno Counties, Kansas, within the boundaries set forth below, and the following corrective control provisions shall be in full force and effect within the area described from and after the date of this Order:

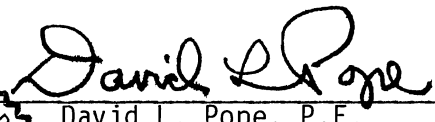
1. That the boundaries of the intensive groundwater use control area shall be an area of approximately 36 square miles in Harvey and Reno Counties, Kansas, generally located in the vicinity of Burrton, Kansas, which include the following described tracts of land: Sections 15 through 22 and 27 through 34, Township 23 South, Range 3 West; Sections 3 through 10, Township 24 South, Range 3 West; Sections 13, 14, 23, 24, 25, 26, 35 and 36, Township 23 South, Range 4 West; Sections 1, 2, 11 and 12, Township 24 South, Range 4 West, all located within the boundaries of the Equus Beds Groundwater Management District No. 2.
2. That this intensive groundwater use control area shall be subject to the following corrective control provisions:
 - a. That within the intensive groundwater use control area the approval of all applications for permit to appropriate water for beneficial use and the approval of all applications for change in change in point of diversion if the diversion works have not been completed under the original approved application shall be reviewed on a case by case basis, which may include analysis using the computer models referred to in these proceedings.
 - b. That the Board of Directors of the Equus Beds Groundwater Management District No. 2 shall annually review all hydrologic data in the intensive groundwater use control area including, but not limited to, static water level information, water use information and water quality information; that annually District No. 2 may,

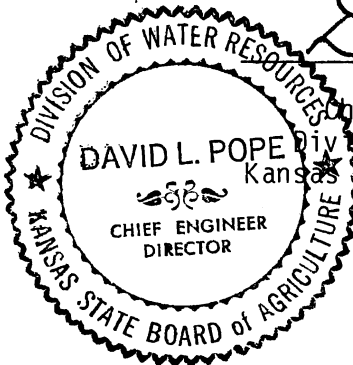
no later than April 1, request a rehearing before the Chief Engineer-Director on the matter of the boundaries of the intensive groundwater use control area, the reconsideration of corrective control provisions or any other matters relative to this intensive groundwater use control area.

- c. That by July 15, 1984, or within any authorized extension of time thereof for good cause shown by the water user, flow meters shall be installed on all water wells now existing in the intensive groundwater use control area except on those wells used solely for domestic purposes and those wells authorized by temporary permits; that these meters shall meet or exceed the specifications for flow meters adopted by the Chief Engineer-Director on March 27, 1980, and amended on March 16, 1981, unless a written waiver is obtained from the Chief Engineer-Director prior to the use of the well; that flow meters shall be installed on all water wells, except those to be used solely for domestic purposes and those authorized by temporary permits, constructed after the date of this Order; and those flow meters shall meet or exceed the specifications required by the Chief Engineer-Director at the time the well is constructed unless a written waiver is obtained from the Chief Engineer-Director prior to use of the well; that each water right holder in the intensive groundwater use control area shall file water use reports no later than March 1 of the year following the usage or such other time as may be indicated by the Chief Engineer-Director; that in addition to reporting the information normally required in the water use reports, each water right holder shall also report: (a) the depth to static water level in each well in the intensive groundwater use control area determined and in a manner acceptable to the Chief Engineer-Director, (b) the serial number of the water meter, and (c) the meter reading at the beginning and end of the calendar year.

- d. That the meters installed in accordance with paragraph number 2(c) shall be maintained in a condition satisfactory to the Chief Engineer-Director;
- e. That paragraph numbers 2(c) and 2(d) of this Order are hereby incorporated as terms, conditions and limitations of each approved application for a permit to appropriate water for beneficial use, certificate of appropriation or vested right for all wells located within the intensive groundwater use control area as described in paragraph number 1.
- f. That a copy of this order shall be forwarded to the Equus Beds Groundwater Management District No. 2, the Kansas Corporation Commission, the Kansas Department of Health and Environment, the Kansas Geological Survey, the Kansas Independent Oil and Gas Association, the Kansas Water Authority and the Kansas Water Office with a request that the remaining recommendations of the Task Force and of the Equus Beds Groundwater Management District No. 2 be carried out by the agencies or entities who have an interest, expertise, jurisdiction or authority in those areas.
- g. In all other respects, not inconsistent with this Order, the Chief Engineer shall continue to administer water rights and process applications filed pursuant to the Kansas Water Appropriation Act in accordance with the Kansas Water Appropriation Act, rules and regulations, and policies in effect in the Equus Beds Groundwater Management District No. 2.
- h. That the Chief Engineer specifically retains jurisdiction in this matter with authority to make such changes in the boundaries of the intensive groundwater use control area or the corrective control provisions which have been instituted within the area or any other provisions of this Order which he may deem to be in the public interest.

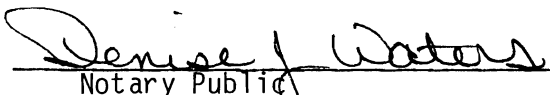
Dated at Topeka, Kansas, this 1st day of June, 1984.


David L. Pope, P.E.
Chief Engineer-Director
Division of Water Resources
Kansas State Board of Agriculture



State of Kansas)
County of Shawnee) SS

The foregoing instrument was acknowledged before me this 1st day of June, 1984, by David L. Pope, P.E., Chief Engineer-Director, Division of Water Resources, Kansas State Board of Agriculture.


Notary Public

My appointment expires: March 1, 1986

