Approved: 3-9-93
Date

MINUTES OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES.

The meeting was called to order by Chairperson Don Sallee at 8:00 a.m. on February 22, 1993 in Room 423-S of the Capitol.

All members were present or excused:

Committee staff present: Raney Gilliland, Legislative Research Department
Dennis Hodgins, Legislative Research Department
Don Hayward, Revisor of Statutes
Clarene Wilms, Committee Secretary

Conferees appearing before the committee:
Robert T. Stephan, Attorney General
William Craven, Kansas Chapter, Sierra Club
Memorandum from Secretary Robert C. Harder, KDHE concerning information related to possible low level waste disposal sites in Kansas

Others attending: See attached list

SB-246 - central interstate low-level radioactive waste compact

Attorney General Robert T. Stephan appeared as an opponent on SB-246 telling committee members that, in his opinion, adoption of the amendments at this time would not be in the best interest of the State of Kansas. Attachment 1 Mr. Stephan noted the proposed amendments were not the product of negotiations, that under Nebraska law, any state which does not accept these amendments cannot dispose of waste in Nebraska. That requirement is in direct conflict with the current compact and sets a precedent which, at a later date, could cause difficulty. He further noted that at such time as Nebraska drops its law suit, that would be the time to consider appropriate, negotiated amendments to the Compact.

A member asked whether the Attorney General's office had been able to view the audit that was done on the Compact. John Campbell from the office of the Attorney General, confirmed that Nebraska refused to allow the audit to include them, and the activities that had taken place in Nebraska, and their subcontractors. Mr. Campbell advised that Nebraska has never cooperated in any way to answer any of the main questions.

A member questioned the statement that Nebraska with one state would have majority vote. The Attorney General conceded it could stop action but it couldn't pass action.

A member noted that where Kansas is the lowest generator of waste, Kansas, rather than conceding any vote, is almost certain to be outvoted where the cost is to be spread among the states and the new language could be in the state's best interest to specify the order of collection of funds. The Attorney General reminded members of the committee that at the present time Nebraska is in the middle of a lawsuit and the member reiterated his request concerning a counter suit noting there seemed to be good reason for compliance to this language, that the state would be in a stronger position if they were to file a case of anticipatory breach, than if we had done everything they had asked.

The Attorney General noted he did not understand why the other states had all conceded to the requested language and since the Compact was involved, the cost of litigation was too large to consider at this time. He noted this situation was political.When asked if he had spoken to the Nebraska Attorney General, Mr. Stephan noted he had not nor had he talked to the Attorney Generals of the other involved states. In his opinion talking with them wouldn't do much good.

The suggestion was made that Kansas could be the next probable site and Kansas would want these concessions. The Attorney General noted that it would not guarantee any additional gains. He further noted that to his knowledge there had been no progress at any proposed site and the issue will always be a political issue. He noted the original compact was fair but now Nebraska and their governor wanted to change the rules of the game.

A member suggested that perhaps one of the reasons the other states agreed so readily to language was that, when looking at potential siting areas, there were only two states of the five with siting possibilities for a disposal site, Kansas and Nebraska. A further question was asked as to whether Kansas, if they do not agree with the language changes, would be ousted from the Compact. The Attorney General noted that as it now stands Kansas would not be ousted.

A member questioned the Attorney General about the fact that Nebraska was obligated to be the host state for thirty years. He replied yes, thirty years or storage of 5 million cubic feet of waste. The member noted there was some time in which to argue this Compact. The Attorney General reiterated he didn't see any need for change in the Compact at this time, that it didn't mean that Nebraska wouldn't ask for more concessions and it didn't mean that they were going to honor their commitment to be the location of the site.

William Craven, Kansas Sierra Club, appeared in opposition of SB-246 noting his organization agreed with much of the Attorney General's testimony although they held a different view of the Nebraska lawsuit.. Attachment 2 Mr. Craven, in his written testimony, noted four events have eclipsed KDHE's insistence on adhering to the compact model for Low-level Radiation Waste.

Mr. Craven noted he differed in opinion on the shared liability from KDHE's testimony since the state has the most funds. He also noted nuclear waste generators are treated more generously than other businesses who can't depend on the state to share liability. He further suggested several amendments for consideration in his testimony if this legislation was considered for passage. He recommended, rather than transporting waste hundreds of miles, to store it near the site of production.

A member corrected Mr. Craven's statement concerning wasted funds, noting this was credit applied to future storage credit in the future. It was also noted that should Kansas keep their waste in Kansas, it will be in some other community other than the Wolf Creek area. Mr. Craven stated that recently there seemed to be a bit more leeway in the Nuclear Commission's regulations ; also, he still contended that the Boyd site cannot be licensed.

A member questioned the suggestion of a compact of states who would individually store their waste and preclude taking waste from other states. Mr. Craven was asked whether his ultimate goal was to stop nuclear power in Kansas. He replied he couldn't do that but if we were generating such waste it didn't do any good to ship it to another state, but should keep it in area already contaminated. Another member questioned the issue of decommissioning Wolf Creek and its being contaminated, stating it was contrary to everything he had ever heard. Mr. Craven noted he arrived at this opinion from the closure and decommissioning procedures. A member stated he would like to see some citation of such information.

Mr. Craven reiterated his opinion that it seemed sensible to store the waste near where it is generated, that is to keep Kansas waste in Kansas.

A member asked Mr. Craven whether it was the Sierra Club's position that we not have nuclear energy and Mr. Craven replied he was not aware of such a position. The member further asked whether it was the Sierra Club's position that the United States was better with fifty disposal sites rather than to have a selected twelve or fifteen sites. Mr. Craven noted he did not know if the Sierra Club had such a position. The member questioned Mr. Craven, noting Nebraska had two nuclear generating power plants, whether it wouldn't be best to consolidate waste into one site as opposed to two different sites. Mr. Craven replied he felt that should be up to Nebraska. He was reminded that Nebraska did join in the compact and eventually conceded it was unlikely an acceptable site would be found either in Nebraska or Kansas.

The chairman announced discussion on SB-246 would be discussed on Wednesday.

Minutes for February 16, 17, 18 and 19 were presented for approval or correction with Senator Lawrence making a motion, with a second from Senator Morris, to approve the minutes as presented. The motion carried.

Committee members were presented with a memorandum from Secretary Harder, KDHE concerning information related to possible low level waste disposal sites in Kansas. Attachment 3

The meeting adjourned at 9 a.m.

The next meeting is scheduled for February 23, 1993.

GUEST LIST

SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES

DATE February 22, 1993

(PLEASE PRINT) NAME AND ADDRESS	ORGANIZATION
Robert Harder	KDHE
Charles Jones	KDHE
Bill Craven	Sierra Club
Harold Spiker	KDHE
Jim Ludwig	Western Resources
Patrick J. Hurley	KCPL
Bill Fuller	Kansas Farm Bureau

STATE OF KANSAS

OFFICE OF THE ATTORNEY GENERAL

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ATTORNEY GENERAL

February 22,1993

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SENATE ENERGY AND NATUARAL RESOURCES COMMITTEE

SB 246

TESTIMONY IN OPPOSITION

BY

ROBERT T. STEPHAN

ATTORNEY GENERAL

Mr. Chairman, members of the Committee, I am here today to testify in opposition to Senate Bill 246. This bill seeks to amend the Central Interstate Low-Level Radioactive Waste Compact. The adoption of the suggested amendments at this time would not be in the best interest of the State of Kansas.

As you know, in 1987 the State of Nebraska was selected as the state which would host a regional waste disposal facility. At that time Nebraska promised to accept that responsibility and serve in that role. Over $44 million dollars has been spent in reliance on that promise.

And yet today, we have no regional disposal facility. Even worse we may be no closer to a facility today than we were in 1987. By both litigation and administrative actions, the Governor of Nebraska is seeking to prevent the construction and licensure of the regional waste facility which Nebraska promised to provide.

The proposed amendments to the compact are drastic. For example, under these amendments Kansas would surrender all control over the fees which would be charged at the

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regional waste facility. Not only would Kansas not be able to vote on the amount of fees charged, but it would have no vote in how those fees are collected, saved, or, spent.

Further, the proposed amendments would give Nebraska an extra vote on the Compact Commission. This amendment would give Nebraska veto power over any action by the Commission that it and one other state did not want.

These amendments were not the product of negotiations. Under Nebraska law, any state which does not accept these amendments cannot dispose of waste in Nebraska. That requirement is in direct conflict with the current compact and sets a precedent which could come back to haunt us.

The amendments suggested by Nebraska are legitimate areas for negotiation. However, until such time as Nebraska drops its suit and is willing to make a time certain commitment to accept a specific amount of waste from the other compact states, I fail to see a reason to agree to these amendments.

In making these statements I do not attack the Compact; I seek only to support it. But what good is a Compact which must be changed with every threat. It is time for the Governor of Nebraska to live up to the promises made by his state.

When Nebraska drops its law suit, then and only then will it be time consider appropriate, negotitated, amendments to the Compact.

SIERRA CLUB

Kansas Chapter

Central Interstate Low Level Radioactive Waste Compact Amendments
S.B. 246
Testimony of William Craven
Legislative Coordinator, Kansas Sierra Club
Senate Energy and Natural Resources Committee
Feb. 22, 1993

Thank you, Mr. Chairman, for providing an opportunity for the Kansas Sierra Club to express its strong views on this bill. This bill ranks as one of the most important environmental bills of this session. It is an important bill not only for those of us who are presently considering this policy, but it is far more important for the next generations who must live with—and pay for—the decisions which will be made as you consider this legislation. I have been working on this issue for years, and although I certainly don't consider myself an expert, I have some familiarity with a good number of these issues. I will do my best to condense what I want to say into the few minutes I have. I assure you, it won't be easy.

At the outset, I want to make it clear that much of what was said last week by KDHE officials was, in my opinion, far from the whole story. A separate problem is that KDHE does not approach this issue with clean hands, if you will pardon a lawyer's expression. It is hard for me to see that KDHE is being intellectually honest. At the very least, it is being short-sighted. The department seems far too concerned with the fate of investor-owned utilities which generate most of the low level radioactive waste (LLRW) in this state than it does with the public interest. This is an issue in which the public and the large generators have divergent interests.

What with the recent actions taken against Bob Eye, clearly one of the state's, if not the nation's authorities on the LLRW issue, and the revelation that Acting Secretary of Health and Environment Robert Harder mistakenly failed to disclose his wife's inheritance of stock in Western Resources, the company which is a part-owner of Wolf Creek, the largest generator of LLRW in Kansas, many members of the public as well as members of this legislature have said publicly that KDHE's judgment on this issue is likely to be skewed. I hope you consider the department's testimony as such. Frankly, I am more concerned about the absence of Bob Eye's advice to the department on this matter than I am about Dr. Harder's amended Statement of Substantial Interest, although both are cause for some concern. I want to make it clear that these remarks are not intended as a personal attack on Dr. Harder. Both of these concerns are simply facts taken from the public record which, I contend, warrant the interpretation I have provided.

Four events have eclipsed KDHE's insistence on adhering to the compact model for LLRW disposal, to the allegiance KDHE professes to the compact of which Kansas is a model, and the site which this compact has chosen, the site

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Attachment 2

in Boyd County. First, the referendum in Boyd County in which a huge percentage of those voting rejected the site there negates the requirement of Nebraska law and compact policy that community consent be achieved. The vote in that referendum was 1,098-86 against the Boyd County site. That vote is now the subject of the Nebraska governor's lawsuit against the compact. Incidentally, instead of recognizing the validity of that vote, Secretary Harder, as the Kansas representative on the compact, supported the compact's decision to defend that litigation. That is a clear indication that the leadership of KDHE is in the camp of the utilities, not following the stated policy of the compact to avoid building a facility in an area where there is no community consent. It is also an indication that KDHE, while professing loyalty and paying lip service to the concept of Kansas' moral obligation to honor the laws of the states which formed this compact, selectively limits these concerns about morality to only those statutes which suit its purposes.

The second noteworthy event is the Nebraska Department of Environmental Quality's announced intention to deny the licensure of the Boyd County facility. This decision is not a "technical reason" as KDHE suggested. Instead, it is a decision which cuts the heart out of the Boyd County proposed site. The site in Boyd County has springs which have flowed on the surface for decades, even during the Dust Bowl. More than 40 acres of what U.S. Ecology once called "pristine wetlands" are on the site. Frequent ponding occurs on the surface, and the groundwater under the site is sometimes only 2-3 feet below the surface of the land. This is clearly a site which doesn't meet the requirements of the Nuclear Regulatory Commission, which prohibits a site in wetlands areas.

The third event is the recent decision in the case of New York v. United States, which stands for the proposition that federal law notwithstanding, states are free to make their own arrangements for disposal of their own waste. This decision, more than the first two events I mentioned, is of critical importance in sorting out what options Kansas has. The decision, especially the opinion of Justice O'Connor, made it clear that states do not have to dance to the tune of the utilities which generate the lion's share of the LLRW waste. If states have the political will—the guts—then they can require the utilities to dance to the song the states sing. In other words, while there may be some financial penalty to Kansas in abandoning this compact, there is no longer any reason to continue on this path which is not only wrong, but which will surely subject the state to far greater financial liability.

Governor Nelson in Nebraska, among others, has accurately described the compact as a front for the big generators. In a moment, I will propose a way for Kansas to address the opportunity presented by the decision in this case.

The final event that is important was the decision made in Illinois last fall. There, another compact involving Illinois and Kentucky had selected a site for a LLRW facility in Martinsville, Illinois. Our compact has spent $46 million on the Boyd County site. That compact had spent close to $90 million on the Martinsville site. That compact's rules provided that a three-member commission had to approve the site, and, following three months of testimony, that commission rejected the site. Testimony in that hearing lasted 72 days, there were 100 witnesses, and there were 20,000 pages of transcribed testimony. The governor of Illinois accepted the decision. The compact is back

to square one, and I have not heard that the Southeast Compact is threatening Illinois or Kentucky with denial of access to Barnwell, as they have done to Nebraska. I could talk about the Martinsville case at length, but in the interests of time, I think what is most important is to know that the site was rejected for reasons of geology, hydrology, and site construction. Even if concrete can be made to last 500 years, one commission member said, that isn't good enough when some of the radionuclides will last for thousands, if not tens of thousands of years. We face that same issue in Boyd County. The facility could not be relied upon to isolate LLRW from the public, from water, and from the air. Aside from the convenience of subsidizing the generators of this waste, those are the only reasons for such a facility. The record in that case makes references to Boyd County, and the opinion of many people, including several scientific experts and the chairman of the Illinois commission, with whom I spoke, is that the Martinsville site was superior to that in Boyd County. Incidentally, that person is a former justice of the Illinois Supreme Court in case you had any misconceptions that he is a misguided member of the Sierra Club.

US Ecology claims that its concrete structure will last 3,500 years. That is a claim not supported by any accepted scientific data. According to federal data, concrete may last as long as several hundred years, assuming weather and moisture conditions are favorable. Northern Nebraska is not such a place. But it doesn't really matter if the concrete lasts 500 or 3,500 years. Carbon-14, iodine-129, and niobium-94 have respective half-lives of 5,300, 17 million, and 20,000 years. These substances, which will be shipped in some quantity, however small, to Boyd County, will remain hazardous long after the proposed facility collapses.

As for the bill itself, first, the Sierra Club supports the amendments which extend another vote to Nebraska, and we wholeheartedly support making the compact subject to Nebraska's open meetings and public records act.

It is on the specific issue of shared liability that I split company from KDHE's testimony. What rational reason is there for states, taxpayers, and ratepayers to subsidize utility companies in the generation of nuclear waste? If I were a utility company, I couldn't think of a better deal. If and when something happens at this LLRW site—and it will, sooner or later, because it has at all prior sites—all of the entities listed in the bill may be brought into the liability chain. And guess who has the deepest pockets of all? As near as I can tell, it is the states.

Yesterday you were told that in this compact, states are to be last in the chain of liability and in a proportion to the waste they generate. But the fees which this amendment gives Nebraska the exclusive right to determine also include "the cost of defending or pursuing liability claims against any party or state." (page 4, line 26.) In other words, even if Kansas is not directly liable, Kansas, because of the shared liability language, will end up paying to defend a site which never should have been built. This language also creates the unusual possibility that Kansas has to pay for litigation against itself.

Under this compact, nuclear waste generators are treated much more generously than say, Vulcan out of Wichita, which is a national leader in generating hazardous waste. Vulcan can't rely on the state to bail it out if it

has an accident while shipping hazardous waste to Emelle, Alabama, the largest hazardous waste dump in the nation. Nor can Vulcan rely on the state to share liability with it if the Alabama site is involved in litigation of any sort.

If I were Vulcan, or a similar company, I think I would trot up to Topeka and see if I couldn't talk the legislature into making the taxpayers liable for my accidents, too. Why shouldn't Vulcan come here and ask for a shared liability package? If this amendment is passed, there will be ample precedent.

I was distressed to hear the remark last week by a member of this committee that the $40-plus million which has already been wasted in developing this site is not really such a waste because it will eventually be spread over the utilities' rate-bases.

Who do you suppose pays utility rates? The last time I looked, it was the ratepayers, those who have electricity in their homes, businesses, and apartments. It is also far from automatic that these costs will, or should be included in the rate base. The very basic requirement is that the expenses must first be found to be used and useful, and second, prudent and reasonable. Given what we now know about the administration of this compact, and the contractor, U.S. Ecology, I suspect that a strong case can be made that the facility will never be used, and thus will never be useful. Given that, it is hard to argue that further expenditures will be both prudent and reasonable. It seems to me that the utility companies are facing a major battle if they think Kansas ratepayers will roll over if and when there is an attempt to ratebase these expenditures. Precedent in this state, from the Wolf Creek construction case, is that construction work in progress can't be put in the ratebase until the construction is actually generating revenue for the company from the sale of energy.

You know, members of this body have been known to blow a gasket when it is revealed that the state spent a couple of million dollars for a computer system for PVD which doesn't work, or millions of dollars for reappraisal that still isn't finished, and in many areas, is worse than when we began that process. Those are just two examples. When it is taxpayer money that is being squandered, the most conservative of you start bouncing off walls. Why is it that I don't hear any reaction to the fact that some $46 million has been spent on a facility facing a $90 million cost overrun? What does it take to get this committee tuned in to what is happening here? Even if you don't appreciate the environmental issues, you should surely appreciate the fiscal arguments.

It is improper to argue that Kansas signed the compact, and is thus bound to follow the compact wherever it might lead. That is the path of somebody who doesn't think for himself or herself. This issue—especially this issue—is always open to reconsideration and to new developments. If I could impart just one thing here today, it is this: Don't approach this issue with blinders on.

Conclusion.

With the compact arrangement, nuclear generators have managed to institutionalize the risks, hazards, and liability of their business. By institutionalize, I mean they have managed to make the public responsible for damages caused by their enterprise. Plain and simple, this is welfare for the largest companies in America.

If you insist on passing this flawed legislation, several amendments seem essential. First, two very basic amendments should be to require proof of a very substantial amount of liability insurance on the part of US Ecology and proof of insurance on the part of the major generators in this state. Insurance limits of $750 million for US Ecology and half that for the operators of Wolf Creek may seem high, but they really aren't all that out of line. Those of you who follow large verdicts should know that these figures are not out of line.

Another essential amendment would re-work the shared liability provisions insofar as it affects the states if US Ecology declares bankruptcy. As it is currently worded, I read the amendment as creating an incentive for the company to declare bankruptcy and to shift its liability to others.

Article III, § (d) of the compact permits Nebraska to establish fees to "cover all anticipated present and future costs associated with" decommissioning, closure, institutional control, and extended care of the facility. What are those costs expected to be? Currently, my information is that the operators of Wolf Creek are not collecting money for those costs. Will there be sufficient money available from the generators to cover these costs?

How can fees be assessed to generators for remediation of a site over which they have no authority? Can't they argue that they had nothing to do with the how the site was selected, and that they own neither the waste nor the site? If that argument is successful, doesn't that increase the likelihood that damages will be shifted to the states?

What is the cost of Art. III, subsection 5, which provides that fees may be collected by Nebraska to pay "compensation and incentives to the host community." Given the adamant opposition of Boyd County to the site, I wonder if enough money is printed to satisfy that requirement.

Does anyone think that the language of Art. III, § (c), which permits the commission to approve the criteria by which rates are set, conflicts with the language of §d which grants that same authority to Nebraska?

Does the shared liability language mean that Kansas would be liable if, for example, a utility in a compact state declared bankruptcy? What would happen, for example, if Louisiana Power and Light declared bankruptcy? Shouldn't possibilities like that be addressed in the compact?

Under this amendment, relating to institutional control, Nebraska says it will be responsible for the site for 100 years after closure. Yet some elements of the waste remain radioactive for tens of thousands of years. Are you satisfied that the period of institutional control is long enough? Are you worried that the shared liability which implicates Kansas could expose the state to virtually unlimited liability, even if that liability is proportional?

Kansas should not be buffaloed by these companies, or by the compact which serves their needs. What we should do is reject the shared liability amendment, and conditionally withdraw from the compact. The condition is that our withdrawal from the compact is not complete until a new compact with Nebraska, and maybe some other interested states, is entered. Many states are

facing the same problem, facing the same crisis of conscience that Kansas is. The new compact would declare that each state remains responsible for its own waste, and that at least so far as Kansas is concerned, that waste should remain on-site at or near Wolf Creek and that Wolf Creek should also be the repository for the very small amount of waste generated by hospitals and universities and other industry. Wolf Creek has recently announced its intent to build storage space for five years worth of LLRW.

If we do that, we will subject Kansas to some financial penalty, specifically the amount of fees which Kansas generators would have paid US Ecology.

Barnwell is leaking, and even if we get booted out of Barnwell, it is no real loss. Barnwell, according to some experts, is likely to become the largest Superfund clean-up site in the nation, after it is closed. One suspects that the exorbitant fees ($400 per cubic foot) charged to Kansas and users of that site has the expensive remediation costs there firmly in mind. Last week, KDHE talked about the moral responsibility we have to work with the states in our compact. Don't we have the same moral obligation not to pollute South Carolina?

The bottom line, so far as I am concerned, is that there is no reason to contaminate Boyd County, Nebraska, when Kansas already has a site which will be radioactive for thousands of years. It may not have been smart to build Wolf Creek without first figuring out what to do with its waste, but we did. Rather than transport that waste hundreds of miles, the least we can do is keep track of our own mess.

Now is the time to stop the madness. KDHE, as well as this committee, should recognize once and for all that the Boyd County, Nebraska site is not licensable, will never be built, should never be built, and if, by some strange quirk, it is built, it threatens to expose Kansas to millions of dollars in liability.

Thank you, and I will be pleased to respond to any questions.

STATE DEPARTMENT OF HEALTH AND ENVIRONMENT
OFFICE OF THE SECRETARY

MEMORANDUM

DATE: February 18, 1993

TO: Members of the Senate Energy & Natural Resources Committee

FROM: Robert C. Harder, Secretary

RE:

Enclosed is the summary material from Dames & Moore, the consulting firm that studied and provided information related to possible low level waste disposal sites in Kansas.

If you have any questions, please give me a call at X-0461.

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Attachment 3

Table S-1

POTENTIAL SITING AREAS (PSA)

PHASE II SITING STUDY

State	Phase I Candidate Areas (sq. mi)	Phase II PSA (sq. mi)	# of PSA Areas
ARKANSAS	1,820	5	2
KANSAS	10,496	833	109
LOUISIANA	1,536	2	1
NEBRASKA	10,908	265	36
OKLAHOMA	1,228	0	0
TOTAL:	25,988	1,105	147

Table S-3

KANSAS PHASE II PSA

K-1 CANDIDATE AREA

COUNTY	PSA (sq. mi)	# OF PSA
MARSHALL	35.5	5
NEMAHA	35.5	8
BROWN	35.5	7
DONIPHAN	4.5	2
JACKSON	1.0	1
ATCHINSON	7.5	2
TOTAL:	119.5	25

K-2 CANDIDATE AREA

PHILLIPS	19.5	4
SMITH	85.0	13
GRAHAM	4.5	2
ROOKS	50.0	9
OSBORNE	112.5	10
JEWELL	52.5	8
MITCHELL	36.5	7
REPUBLIC	37.5	6
LINCOLN	4.5	1
TOTAL:	383.0	60

K-4 CANDIDATE AREA

WALLACE	42.5	5
LOGAN	104.5	10
GOVE	183.5	9
TOTAL:	330.5	24

K-1	119.5	25
K-2	383.0	60
K-3	330.5	24
TOTAL:	833.0	109

However, geologic studies in this area indicate that this area is under lain by the Rison Clay Member of the White Bluff Formation of the Jackson Group. (Wilbert, 1953)/ The Rison Clay Member is over 100 feet thick in this area and overlies the basal Caney Point Member of White Bluff Formation. The Caney Point Member overlies the Cockfield Formation. The Rison Clay is principally a marine clay but locally contains silty and sandy beds especially near the upper portions.

Data on water table depths within the Jackson Group in this area is lacking but it is likely to occur at shallow depths in these clay units.

2.1.1.2 A-2 PSA

Only one PSA occurs in A-2 A (Figures 9 and 10) within the Cook Mountain Formation outcrop zone northwest of Fordyce. Boring data in the vicinity indicate unsuitable sandy units characterize the unit in this area.

2.2 KANSAS

All three of the candidate areas in Kansas examined in this Phase II study (K-1, K-2, and K-4) contain PSA. The results of the Step 1 and 2 evaluations are presented in the following figures:

Candidate Area	Subarea	Figure Numbers Step 1	Step 2
K-1	A	14	15
K-1	B	16	17
K-1	C	18	19
K-2	A	20	21
K-2	B	22	23
K-2	C	24	25

K-2	D	26	27
K-4	A	28	29
K-4	B	30	31

2.2.1 Kansas Potential Siting Areas (PSA)

2.2.1.1 K-1 PSA

PSA are located in six of the counties within K-1 in the glacial drift areas of Northeast Kansas (Marshall, Nemaha, Brown, Doniphan, Jackson, and Atchinson). No PSA were identified in Washington County on the west or Jefferson County in the southeast (Figures 14 through 19). Two small PSA occur in western Doniphan County. The nearest data in the northern PSA indicates unsuitable conditions in the upper 40 feet. The other PSA in southwest Doniphan County shows both suitable and unsuitable conditions in borings adjacent to the areas. The two PSA in northern Atchinson county also show mixed results from boring data. Eight PSA are identified in Brown County. Except for the PSA along the southeast border, all the boring data within and adjacent to the other PSA indicate favorable conditions. One PSA is located in northern Jackson County along the northern border and has boring data which shows unfavorable conditions. Eight PSA are identified in Nemaha County. Boring data within or adjacent to all these PSA suggest unfavorable conditions. Five PSA are identified in Marshall County. Sparse boring data suggests favorable conditions in all but the northwestern PSA where unfavorable conditions are indicated.

Interstream divide areas in K-1 are characterized locally by thin loess deposits, (silt) over the glacial drift units. In Marshall County, the loess is generally less than 10 feet and does not exceed 25 feet. In Brown County most areas are less than 20 feet. In Jackson County loess is generally between 5 to 10 feet thick. Perched water conditions may occur at the interface between the silty loess and the glacial till units.

Where substantial thickness of silty loess deposits occur (greater than 20 feet) overlying the favorable host units such as glacial till or Cretaceous shale units, potentially very favorable conditions occur. Loess deposits in general have hydraulic conductivities within the range of 10-5 to 10-7m/sec (Freeze and Cherry, 1979). A loess deposit near Scott City, Kansas, located just south of K-4 candidate area, had hydraulic conductivity of $6x10^{-7}$m/sec (Gillespie and Hargadine, 1976). In addition, these loess deposits have very uniform properties and the results of computer modeling of ground water migration would have a high degree of confidence.

2.2.1.2 K-2 PSA

PSA have been identified in seven of the nine counties within candidate area K-2. No PSA are identified in Cloud or Norton Counties (Figure 20 through 27). The suitable geologic units within K-2, the Cretaceous Niobrara Chalk and the underlying Carlile Shale dip at gentle angles to the northwest. The Niobrara Chalk averages about 600 feet thick and the Carlile Shale is about 300 feet thick. The Niobrara is the suitable host unit for PSA in western and northwestern portion of K-2; in Phillips, Graham, Rooks, and Smith counties and in western Osborne and northwestern Jewell counties.

The Carlile Shale is the host geologic unit for PSA in eastern and south-central Osborne, southern Jewell, Mitchell, Lincoln and Republic counties. Unfavorable beds may characterize the lower 40 to 85 feet of the Niobrara Chalk (the Ft. Hays Limestone Member) and the upper 25 to 80 feet of the Carlile Shale (Codell Sandstone Member). PSA areas which may occur within proximity to this unfavorable portion of the Nirobrara-Carlile stratigraphic section include: 1) The westernmost PSA in Republic County, 2) The southwesternmost PSA in Jewell County and 3) PSAs in central portions of Osborne county.

Loess deposits mantle many of the interstream divide areas in K-2. Thick deposits (between 70 and 120 feet) characterize Republic County especially in northern areas. All PSA in Republic County have

loess mantle. Loess deposits in Jewell County generally exceed 50 feet and all PSA are mantled with loess. In Mitchell County loess deposits are generally less than 30 feet. PSA areas in central portion of the County are only partially mantled with loess. Lincoln county has loess thickness between 5 and 15 feet thick. Northwestern portions of K-2 (Phillips and Smith counties) have loess thicknesses from 10 to 30 feet. Graham County has loess thickness between 5 and 20 feet. Comparable thickness may characterize Rooks and Osborne County areas as well. Perched water conditions may occur at the base loess-shale contacts.

2.2.1.3 K-4 PSA

PSA areas occur in all three counties of K-4 (Figures 28 through 31). Suitable geologic host units are the Cretaceous Pierre Shale and the underlying Niobrara Chalk. These units dip at gentle angles to the north and northwest in K-4. The Pierre shale underlies Wallace County, the northern PSA areas in Logan County and the PSAs in northwest and segments of central Gove County. The Pierre ranges in thickness from 0 to as much as 800 feet toward northwestern Wallace County. The Niobrara Chalk ranges in thickness from about 220 feet in Gove County in the east to 650 feet in Wallace County in the west and is the host geologic unit for PSA areas in southern Logan County and in southern and eastern Gove County.

Numerous surface faults are exposed in the Niobrara and Pierre along the Smoky Hill River Valley in Logan County. The interstream divide areas located away from the exposed Cretaceous units are mantled with loess deposits. Faulting may also occur in these areas but is not identified due to this loess cover. The loess thickness within K-4 generally range from 10 to 30 feet. A number of depression features with related buffer zones have been mapped in and adjacent to PSA throughout K-4. It has been suggested that depressions in this area may be related to solution effects within the Niobrara along fault trends. Zeller et al, 1976 have identified surface geomorphic lineaments from the analysis of Earth Resources Technology Satellite (ERTS-1) in conjuction with the evaluation of uranium mineralization

in the Central Great Plains, including areas in Western Kansas within K-4 and K-2. These lineaments are believed to be shear zones representing major planes of weakness (faults and joints) which have functioned as vertical transmission paths for mineralized ground water. Subsequent site studies in such areas would need to demonstrate the lack of faulting within the Cretaceous units beneath the loess.

2.3 LOUISIANA

Based on step 1 and step 2 analysis, no PSA have been identified in L-2, L-3, and L-4 and only one PSA is identified within L-1. The results of this analysis are presented in the following figures:

		Figure Numbers	
Candidate Area	Subarea	Step 1	Step 2
L-1	A	32	33
L-1	B	34	--
L-1	C	35	--
L-1	D	36	
L-1	E	37	--
L-2	A	38	--
L-3	A	39	--
L-3	B	40	--
L-4	A	41	--

2.3.1 Louisiana Potential Siting Areas (PSA)

2.3.1.1 L-1 PSA

One small PSA occurs in southern Claiborne Parish. The host geologic unit is the Cook Mountain Formation. Specific boring data is