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EVALUATION OF THE DRAFT ENVIRONMENTAL  
ASSESSMENTS FOR DEAF SMITH AND SWISHER COUNTIES

for

Texas Nuclear Waste Programs Office  
Office of the Governor

by

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### Evaluation of Guideline on Socioeconomics

Analysis presented in this paper indicates that the DOE has not done a good job of estimating the socioeconomic impacts the proposed repository may have on affected communities. In general, the DOE has underestimated these impacts. The flawed analysis and judgments that are behind the underestimation are very apparent in Chapter 6. The following analysis concerns the Technical Guideline on socioeconomic impacts (Guideline 10 CFR 960.5-2-6, EA pp. 6-44 to 6-48, 6-64 to 6-66).

Favorable condition (1), ability of area to absorb population, in no way accounts for impacts on specific communities. The entire region within commuting distance is the geographic unit under consideration. Thus, because only a 2 percent population increase is projected, a favorable condition is found. This fails to consider major disruptions likely to occur in small communities close to the proposed site, such as Vega. For this condition to be useful, it must be fine-tuned to detect impacts at the community level. Furthermore, the socioeconomic impact analysis contained in the EAs is an entirely inadequate basis for the finding of this favorable condition. As detailed elsewhere in this paper, baseline data is poor, the population in-migration model is flawed, the population allocation model is not credible, and accepted methods of analysis are haphazardly employed. These deficiencies make it impossible to conclude that the area can absorb project-related population

increases without significant disruption. Also, the evaluation states that excess capacity in the housing market will be found. This is not supported with sufficient documentation.

Favorable condition (2), adequate labor force, is not present. This is based on the assumption that no extraordinary measures are undertaken to increase local hiring. However, measures to increase hiring such as training programs should be studied and incorporated into the analysis. Such a study may show that a training program may lure workers away from local industries, thus causing a decline in homegrown employment and prompting local businesses unrelated to the repository to close. Again, because of data deficiencies, old information, and lack of any meaningful local labor force analysis, confidently concluding that an adequate labor force is not present is not possible. Also, "adequate labor force" is not defined anywhere in the EA.

Favorable condition (3) concerning increases in employment, business sales, government revenues, and improved community services is found to be present. Yet, not enough evidence is presented in the EA to make this determination, particularly for improved community services. The EA states, "The existence of improved community services will be dependent on the quality of services in each community and is a policy question to be determined by local officials" (page 6-46). This seems to indicate that DOE has no idea whether or not community services will improve. Thus, improved services cannot and should not be claimed with any confidence. A more likely probability is that service levels will

decline in communities facing a large population influx. Fiscal capacity analysis of Deaf Smith County indicates that the ability of county government to finance improved services is extremely limited. In addition, the EA states, "The actual amounts of tax revenues cannot presently be estimated" (page 6-46). If they cannot be estimated, why is the assumption made that they will increase? The factual basis for finding this favorable condition present is extremely shaky.

Favorable condition (4), "no projected substantial disruption of primary sectors of the economy of the affected area," is also found to be present. However, finding this condition to be present, based on the mediocre analysis conducted to date, stretches the limits of credibility. First, economic disruption is very narrowly defined as "any substantial decrease in employment." Other indicators of economic disruption such as loss of business income, inflation, and local labor shortages are completely ignored. Thus, the conclusion is based on extremely limited criteria, which discredits the end result. Second, the potential loss of agricultural income due to perceived contamination of agricultural products is not discussed. The limited discussion of the issue on pages 5-134 to 5-138 concludes that sales in general should not be affected. Insufficient evidence is presented to substantiate this conclusion. This undocumented conclusion leads to its absence in the favorable condition discussion. Third, and most important, the DOE contradicts the finding of no economic disruption on page 6-78 with the statement, "Impacts on primary

sectors are potentially adverse." The statement, "More detailed economic analysis is required," appears on page 6-65. Essentially, then, the DOE has drawn three different conclusions on this condition: (1) no significant disruption; (2) impacts are potentially adverse; and (3) more study is required. The best conclusion from their point of view was the one selected.

The potentially adverse conditions contained in the guideline are essentially a rewording of the favorable conditions. Thus, the preceding comments on favorable conditions are applicable to the adverse conditions as well. However, one more observation bolsters the discussion on economic disruption. Significant economic disruption of primary sectors is listed as potentially adverse condition number (4). The finding is that a potentially adverse condition is not present. Yet on the same page (6-66), the statement is made, "Effect on agriculture and manufacturing is not determined." If agriculture is considered to be a primary sector of the Deaf Smith economy, the logical conclusion from the statement is that the finding has no basis in fact and should be withheld until the proper analysis can be completed.

In conclusion, much more analysis is needed in order for DOE to be able to state that a favorable condition is present for favorable conditions (1), (3), and (4), and that potentially adverse conditions (1) and (4) do not exist.

### General Comments on Methods of Analysis

➤ Most detailed comments on methodology are made in the sections on particular topics. Several themes, however, run through much of the socioeconomic analysis in the draft EA.

One major flaw is the use of single point estimates for impact analysis. When a great deal of uncertainty is involved, it is not prudent to place importance on a single point estimate. Using a range of alternative estimates, which lead to different magnitudes of potential changes, is recommended. This approach should be used for most of the key socioeconomic variables such as the number of in-migrants, the number of new residents allocated to various communities, and so forth.

A related issue is the reliance on the expected scenario, not worst case scenarios. Recognizing that there are limitations in forecasting for complex facilities should lead to planning for potential major errors and potential major socioeconomic problems. For a unique facility such as the repository, it is imperative that highly improbable results and scenarios be analyzed in great detail.

Considering a broader range of possible socioeconomic impacts will illustrate another problem, namely the tendency to view all impacts as incremental changes. Many social and economic systems, as well as physical systems, do not behave in an incremental fashion. An additional 20 families in Vega will not simply mean a

slight increase in water and sewage usage but rather will force new systems to be built. Likewise, a repository probably would not require that the Wildorado volunteer fire service be beefed up minimally; according to local residents, it is more likely that the volunteer service would disband entirely and need to be reorganized with a full-time fire department service. An incrementalism viewpoint pervades the draft EA and often seems unwarranted.

Another related problem (discussed further in the in-migration section) is the emphasis on estimating potential impacts for the peak years rather than for every year. There are two difficulties with this. First, the DOE analysis indicates that off-peak year estimates are less accurate than peak year estimates, which will lead to a higher probability of unexpected impacts. Second, the focus on the peak year impacts avoids the more difficult problem of estimating the rate of change before and after the peak years. The DOE approach, in other words, looks mostly at the needed infrastructure capacity for the peak years, ignores the process and impacts of change prior to the peak year, and then assumes that post-peak year impacts will be less severe because of excess capacity.

Just as the incremental approach often would be invalid for the growth phases, so too would it be invalid for the repository contraction periods. The draft EA sections on decommissioning are written as if the problem is one that needs no attention now because it is 40 years away. However, there is an earlier



contraction phase during the transition from construction to operation. From year 5 of construction to year 8, the work force declines by approximately 25 percent. Then for the next five years, it grows gradually back up by about 15 percent. In fact, the operations work force does not match the construction work force peak until sometime between years 13 and 18. So there will be a trough period of at least 8 years and perhaps up to 13 years. The possible socioeconomic effects of this interim contraction phase are not addressed at all in the draft EA.

A final general methodological issue relates to the overall socioeconomic system that would be affected by the repository. There is a theme in the draft EA that many of the social, economic, and population effects would occur independently of many others. In our judgment, there is more connection among these and other socioeconomic variables than portrayed in the draft EA. The degree of interdependence is higher, and therefore even small changes in some variables will have substantial ripple effects. The draft EA gives the impression of effects occurring more independently, almost in isolation.

More specific methodological comments are given in the next section.

## Transportation

➤ The analysis of the transportation sections of the draft EAs concentrates on these items:

1. Adequacy of baseline data presented.
2. Failure to fully acknowledge potentially severe traffic congestion problems.
3. Lack of analysis on impact mitigation (p. 4-115 mentioned)
4. Analysis of DOE evaluation of technical guideline on transportation (10 CFR 960.5-2-7).

1. The primary characteristics of roads in the Deaf Smith Site area are presented in Table 3-42, page 3-180. The table has several problems. First, the average daily traffic (ADT) counts are presented in ranges, some of which are so large as to be useless. The range for I-40 is 7,700 to 58,000. To make the data useful, the ADT counts should be broken down by location of the traffic counters. For I-40, the logical locations are Vega, Wildorado, Bushland, and Amarillo. This would help the reader to obtain a more accurate picture of the traffic situation. In addition, a weekday/weekend ADT count breakdown is suggested. Second, more recent data are needed. Traffic counts have probably increased since 1981. Third, another route that may carry repository-related traffic is omitted -- FM 809 from Wildorado to FM 2587 and FM 2587 east of US 385. Also, the substandard condition of FM 1062 should be mentioned. This condition severely decreases

its maximum service volume. (Another omission is the page that should fall between 3-183 and 3-184 of the Deaf Smith EA. It probably contains information on airports, waterways, and utilities.)

2. Site characterization, construction, and operation of the repository will increase traffic congestion around the site significantly. The true extent of the increase is not fully acknowledged in the text. Tables show that certain roads will be congested at levels two to three times their maximum service volumes at peak time. Yet, the text understates the problem. These roads "will provide diminished levels of service during peak use periods" (p. 4-115), for example. A more accurate assessment is not given, even though methods are available. Transportation research has developed relatively precise definitions of levels of service. The following table shows level of service definitions for highway facilities that are widely used by transportation specialists.

LEVEL OF SERVICE	OPERATING CONDITIONS
A	Free flow, low volume, high-operating speed, high maneuverability.
B	Stable flow, moderate volume; speed somewhat restricted by traffic conditions, high maneuverability.
C	Stable flow, high volume; speed and maneuverability determined by traffic conditions.
D	Unstable flow, high volumes, tolerable but fluctuating operating speed and maneuverability.
E	Unstable flow, high volumes approaching roadway capacity, limited speed (approximately 30 mph), intermittent vehicle queuing.
F	Forced flow, volumes lower than capacity due to very low speeds. Heavy queuing of vehicles, frequent stoppages.

SOURCE: Transportation Research Board

Level-of-service E is generally considered to represent the maximum physical capacity of the road. Levels A, B, and C represent desirable operating capacities. Traffic flows over 100 percent of maximum service volume are considered to be level-of-service F.

Repository activities will contribute to and create level-of-service F on several area roads. Site characterization will further contribute to traffic congestion on I-40, which is already at service level F at peak hour. Site characterization will cause US 385 from Hereford to FM 1062 to go from tolerable conditions to

level F at peak hour. Repository construction and operation will cause FM 2587 to reach level-of-service F at peak times in addition to the two roads mentioned above. The analysis states only that "drivers will experience some loss of maneuverability, although driving speeds will not be substantially diminished where the flow of traffic is uninterrupted" (p. 5-88). The more accurate description is that peak hour traffic levels will result in traffic gridlock at certain locations.

The increased levels of traffic flow vary from minor to enormous when viewed on a percentage basis. Following are traffic count percentage increases for peak hour use during repository operation:

ROUTE SEGMENT	PERCENT INCREASE CAUSED BY EXPECTED TRAFFIC AT PEAK HOUR (OPERATION PHASE)
1-40/US 66 (Amarillo-Vega)	7.4%
US 60 (Canyon-Hereford)	5.4%
US 385 (Vega-FM 2587)	312.6%
US 385 (Hereford-FM 1062)	30.8%
US 385 (FM 1062-FM 2587)	195.6%
FM 1062 (US 60-US 385)	100.0%
FM 2587 (US 385-Site Boundary)	3,134.6%
FM 214 (I-40/US 66-FM 2487)	9.1%

Lesser, but still substantial increases are expected for the site characterization and construction phases. These increases and consequent potentially disruptive effects have, for the most part, been minimized in the EA. (Note: Traffic impacts are not as severe for the Swisher site. Only two road segments will exceed capacity at peak hour.)

3. Because the adverse impacts of increased traffic flow have been minimized, very little discussion is found on impact mitigation. On page 4-115, road improvements and schedule adjustments are noted as possible mitigation measures. This is the extent of mitigation discussion. The potentially severe traffic impacts make a more extensive discussion of specific mitigation measures at specific locations necessary.

4. Several comments on DOE's evaluation of the transportation guideline (pages 6-48 to 6-56, 6-66 to 6-68) are listed below.

A. Favorable Condition (1) - Only two of the five characteristics (40%) are present, yet the finding is that evidence indicates that a favorable condition is present. If less than half the characteristics are found, how can a favorable condition be found?

B. Favorable Condition (2) - Proximity needs to be defined; 26 miles seems a bit distant. In another part of the EA, a 5 mile distance was considered remote.

C. Favorable Condition (4) - The minimum number of interchange points is not defined.

D. Favorable Condition (6) - No evidence is given that carriers are willing to handle high-level waste shipments.

E. Favorable Condition (8) - The existence and adequacy of local emergency response plans should be evaluated as a part of this guideline also.

### Baseline Population Data

There are several minor and major problems with the data and the analysis:

- (1) Page 3-184 begins in the middle of a sentence and there is no previous sentence. The beginning of Section 3.6 has been deleted.
- (2) A nine-county area is used for most of the population discussion. Only four counties should be used (Deaf Smith, Oldham, Potter, and Randall), as it is unlikely that Curry and Quay counties (and Parmer, Castro, and Swisher to a lesser extent) would be affected in terms of their labor force. Population density for the four counties is only 19 percent lower than the national average.
- (3) There is no basis for assuming that city population increases will be directly proportional to county population increases (page 3-189, Table 3-46). City growth would exceed county growth because of the magnet characteristic of cities in that part of the state. The effect will be a greater demand on services than anticipated by DOE.



(4) Adding to the greater demand for services will be higher than anticipated populations in several of the counties. Both Potter and Randall counties are growing more rapidly than DOE has projected. In fact, Potter County has between 106,000 and 110,000 population as of January 1985, while DOE projected its population to be 112,730 in 1996. According to the most recent population estimates of the Census Bureau, which may be three years more recent than in the draft EA, Deaf Smith County has shown a slight decrease (-2.8 percent) in population since 1980. In Table 3-46, DOE projected population growth in Deaf Smith County as being more rapid than in the Amarillo area.

The importance of new population information is that most of the later DOE analysis of in-migration, population allocation, government service standards, and infrastructure capacities will need revision.

### Repository Work Force

(NOTE: The principal primary source document, Mathews (1983), was unavailable for review, so the following comments are based solely on the draft EA document.)

The first problems encountered are discrepancies on the size of the work force and when the peak work force complement will occur. In Figure 5-7 on page 5-18, the peak number of employees is 1,250 and that occurs in the sixth construction year. Yet in Table 5-2 on page 5-7, the peak number of employees is 1,370 and that occurs in the fifth construction year. Hence, the draft EA contains a discrepancy of nearly 10 percent in the anticipated construction work force and a discrepancy of one year for the peak year. The latter discrepancy may be due to another discrepancy: in Table 5-2, construction is planned to take 8 years, while in Figure 5-7, construction would be done over 7 years.

A second set of problems involves the characteristics of the work forces during construction and operations. There is no detailed information in the draft EA on occupational characteristics, so it is unclear what types of training and compensation would be anticipated. And without even rudimentary information on the skills required and a work force profile, it is impossible to estimate the repository's impacts on the local labor force.

Baseline information on the local labor force is sparse. For the most part, the information consists of (1) aggregate employment

data (by broad industrial sources for Texas, New Mexico, 9-County Area, Deaf Smith County); (2) unemployment rates for the same geographical areas; and (3) migrant farmworker data, by county, for 1975. The unemployment data for Deaf Smith, 9.7 percent in June 1983, is twice the rate for 1974, 1977, and 1980 as given in Table 3-52, page 3-195. There is no discussion of this striking difference, and no data is offered on the types of last jobs that had been held previously by the 1983 unemployed workers. Nowhere is mention made of the seasonal fluctuations of the work force due to agriculture in the Deaf Smith area. And only three sentences are provided on the substantial number of migrant farmworkers a decade ago.

3 With so little known about the existing local labor force and almost no information provided on the repository work force, any projections on the number of local residents to be hired would be guesses. Because the number of local hires will determine partially the number of in-migrants, and therefore, many of the resulting socioeconomic impacts, much more precise information on the repository work force is necessary.

### In-Migration Model

- There are major deficiencies with the in-migration model and with analyses based on the model. (Comments under the repository work force heading are pertinent and would serve as background to this section.)

First, on page 5-100, paragraph 5, it is stated that the model was validated for peak year projections and that projections for other years are not as accurate. Because the peak year work forces for both construction and operations come at least five years after the beginning of their respective phases, inaccurate in-migration data could be quite detrimental during the early years of each phase. Also, while some socioeconomic impacts will be reduced by planning against the peak in-migration figure, others will not. An inaccurate estimate of the number of school children is nearly as bad if it is high as if it is low. Off-peak year accuracy needs improvement.

Second, on page 5-100, paragraph 6, it is stated that the analysis is a "worst case scenario." There is only minimal support for that statement in the draft EA and primary source document (Goldsmith 1984). The analysis, in point of fact, is the expected case under rather optimistic assumptions.

Third, there are numerous and substantial discrepancies between the draft EA and the Goldsmith source document. In

Table 5, page 16 of the Goldsmith memo, there are 17 variables that correspond roughly to the entries in Table 5-25 on page 5-103. Nine of the items show discrepancies including important ones such as the percent of repository work force in-migrating during construction (.50 in draft EA versus .80 for variable PINCO); family size multiplier for repository work force during operations (3.8 versus 4.3 for variable DFSMOP); and percent of repository work force in-migrating during operations (.45 in draft EA versus .60 for variable PINOP). Most, although not every, change would lower the expected number of in-migrants. No explanation for the changes is provided.

Fourth, the model documentation as outlined in the Goldsmith memo is not particularly convincing. Many assumptions are made about the direct multipliers and percentages for variables when there seems little basis for the assumptions. In some cases, the reasons for making a selection are obscure and in other cases, highly subjective. It is highly doubtful that other researchers would have chosen many of the particular numbers for the variables. In an especially disputable area, under scenario hypothesis testing on pages 17 and 18, it appears that Deaf Smith would be closest to scenario 2 and closer to scenario 1 than to scenario 3. Yet the final figures on the indirect employment multiplier for construction, percent of repository work force in-migrating during construction, and percent of local daily commuters in the indirect work force during construction are for scenario 3, except for a

slight variation in the first item. Less in-migration, again, is the result of such a selection.

Both the sensitivity analysis and the historical replication have technical weaknesses. The sensitivity analysis did not examine interaction effects of simultaneous changes in the values of several variables. This is not necessarily required, but certainly is a procedure called for when the data and the data selection process are so imprecise. A related problem is that the change in value for each of the variables' values was plus .10. For example, the indirect employment multiplier for the construction phase was raised from .50 to .60. While for this variable the increment amounted to a 20 percent increase, for some of the other variables, the change was much less: direct family size multiplier during construction went from 3.70 to 3.80, only a 2.7 percent increase. With such uncertain data and unsubstantiated assumptions, every variable should have been tested by a similar increase, and the minimum should have been at least 30 percent.

The historical replication of the model is totally unconvincing. No attempt is made to replicate the indirect in-migration because of insufficient data. And in the two tests for direct in-migration, one comes in very close to the upper limit, while in the other case it appears to fail with the percentage of in-migrants at 32 percent when the lower limit was 35 percent and the upper limit was 45 percent.

Many other specific problems with the draft EA and the Goldsmith memo could be cited. Most will be deferred until later,

but three deserve mention now. There is an assumption that the percentage of in-migrating repository work force would remain constant during the construction and operation phases at .50 and .45, respectively. Regardless of what percent is selected, it is highly unlikely that the rate of entry of in-migrants will be constant. The repository's growth would require different occupations at different times, and few of these occupational skills are likely to be distributed evenly in the local and non-local work forces. So the rate of in-migration needs as much analysis as the absolute level of in-migration.

Another problem that was identified earlier needs emphasis. For many reasons, including the model limitations self-identified in the Goldsmith memo, the in-migration model must be viewed as a much more imprecise model. The room for error in most simulation models is large, but this one rests on minimal empirical data, elliptical documentation, and insufficient testing. As a result, large errors are highly probable.

Finally, specification of the model does not include several variables that could prove important in determining the number of in-migrants. The local unemployment rate and compensation levels for repository workers could determine, in large part, the number of locally hired workers. Not all skills and occupations would be available locally, but most would be and could be influenced by a specific policy. The point is that the number of in-migrants can be altered so as to reduce socioeconomic impacts. There is no acknowledgment of this possibility in the draft EA. Without a

concerted effort to reduce in-migration, however, it looks much larger than hypothesized in the draft EA.



## Out-Migration

Testimony given at hearings and surveys conducted by the state indicate that a substantial percentage of the local population will move away or might move away in the event of repository siting. The draft EAs make no mention of any out-migration that may occur related to the repository. Out-migration should be estimated for two reasons: (1) it is important in the analysis of the overall socioeconomic impact; and (2) it is an indicator of economic disruption caused by the repository.

4 A component of the SEARS model estimates the number of people who would out-migrate due to an excess of workers for repository positions. However, these would be mostly workers who in-migrated in the first place. There is no model that estimates out-migration of long-time residents based on factors such as fear of radioactive waste. Making an estimate of this nature would be difficult and somewhat qualitative. On the other hand, some data are available. Some individuals and businesses would be forced to move because they are within the potential siting boundaries. The number of these who would move away could be estimated.

Since a high-level waste repository has never been sited, new models will have to be developed to deal with this potential out-migration. Among the techniques that might assist this effort are surveys and comparisons with experiences at other facilities that have evoked similar fears.

### Population Allocation Model

- The draft EAs use a gravity model to estimate where new residents will locate in relation to the repository site. The basic assumption behind use of a gravity model is that in-migrants will tend to settle in communities in direct proportion to the population size of the communities, but in inverse proportion to the distance between the community and the repository site. Despite the fact that the gravity model is widely accepted and used as a way to predict settlement patterns, it has been poorly employed in the draft EAs. This is extremely disturbing because the population allocation projection is one of the most critical elements of the socioeconomic impact analysis. The entire socioeconomic impact analysis is based on the results of the projected population increases and their dispersion as predicted by the population allocation model.

Concerns relating to the use of the gravity model and its adequacy are listed below.

1. The version presented in the draft EAs is overly simplistic. Other factors besides distance and population size must be considered in order to obtain an accurate estimate of settlement patterns. Numerous other factors should be included: cost-of-living in the community; housing availability; quality and extent of health care; ethnicity; and traffic congestion and road conditions between the site and the community. The SEARS model employs

a "community attractiveness" index which would be based on these suggested factors and others. The community attractiveness index allows different weights to be assigned to particular cities relating to factors that make the city in question more attractive than others. Use of this index contributes to more realistic population allocation. Sources for computing a community attractiveness index include data compiled locally and judgments from locally knowledgeable persons. Another possibility to be explored is the potential for city officials to intentionally redirect population growth either toward or away from their city.

2. Because supporting documentation is missing, the model cannot be checked or replicated. Basic social science research methods require that evidence be made available which shows how a particular conclusion is reached. Among the missing pieces of information: the radius of the area considered for population allocation, the communities included, and the distance and population figures used. (In the Deaf Smith EA, the equation is given incorrectly. The summation sign has been omitted.) Having the distance figures is particularly important because the distance is raised to a power. A change of even 2 or 3 miles can affect the equation results due to the sensitivity a power interjects into the equation. Discrepancies in the EAs indicate that the DOE is not sure of distance figures. In the Swisher EA, page 6-9, Tulia is 5 miles from the site. On page 6-58, Tulia is 10.5 miles away. Which was used in the gravity model? Similar inconsistent figures appear in the Deaf Smith EA. In addition, there are two methods of

calculating distances -- straight line (as the crow flies) and actual highway mileage. Using straight-line distances would distort the allocation results. It is recommended that actual highway mileages be used to obtain accurate results.

3. No rationale is given for choosing 2 (page 5-104, Deaf Smith; page 5-98, Swisher) as the distance-elasticity-with-respect-to-job-location variable, also known as the gravity power in the SEARS model. SEARS uses three different gravity powers -- one each for construction workers, operation workers, and indirect workers. The highest of these is 1.8. If the use of 2 is justified, some documentation is required so that a third party can make an independent determination. Alternative settlement pattern results based on the use of various gravity powers are absolutely crucial.

4. The population allocation model should be run for every year of the project's expected life, rather than merely for the peak construction year and the peak operation year. Several years will have already passed by the time the peak is reached, and it is likely that some of the most severe impacts will occur in the first few years. Thus, it is important to know what the increased population will be in year 1, so that planning can be done to accommodate the growth. Additionally, allocation patterns in earlier years may affect patterns in later years. Running the model for each year can help detect these changes. For example, if

the Swisher site is picked, in-migrants may overrun Tulia in the early years, causing a decline in the quality of life and prompting future in-migrants to locate in Happy. Curiously, Happy is not even considered to be a potential settlement community in the Swisher EA. Since Happy is only 17 miles from the site, its exclusion is a gross oversight.

### Alternative Models for Socioeconomic Impact Analysis

• After a detailed study of the EAs we suggest that alternative predictive models (such as the SEARS model) be used instead of the hodgepodge of models and methods contained in the EA. Other models combine population projections, in-migration estimates, population allocation estimates, and a variety of other important factors in a coherent manner which recognizes the interdependency of the numerous variables. It is recommended that a more advanced model be employed in the final EAs so that a more realistic assessment of socioeconomic impacts can be developed. Such an assessment prior to site characterization is critical so that site characterization does not proceed on the wrong sites.

### Governmental Fiscal Conditions

. The EA should describe the fiscal conditions of affected local governments and assess the fiscal impacts of a repository on these local governments. The draft EAs fail miserably in this attempt. How local jurisdictions deal with the siting of the repository is an issue of critical concern. Yet the EA devotes only five pages of text (out of over 1,000) to the subject.

The baseline description and impact analysis of fiscal conditions is inadequate for several reasons.

1. The information provided is not specific to individual jurisdictions. The small bit of baseline information that is specific is not used in the impact analysis. Information offered is generalized to the point of being useless. Conclusions are offered with no supporting evidence. An adequate analysis would analyze all affected jurisdictions individually. Otherwise, the specific impacts on individual local governments cannot be discerned.

2. A large number of local governmental entities are omitted from the analysis. Counties are barely mentioned. Water districts and river authorities are totally ignored. At least nine water districts and river authorities have jurisdiction in the vicinity of the two Texas sites. These districts control a substantial amount of the water used for municipal purposes. Any discussion of governmental structure and fiscal conditions is incomplete without

including these water entities. Also, the soil and water conservation districts in the vicinity of the sites should be included. In addition, there are some significant omissions of potentially affected jurisdictions. The City of Happy, which is about 17 miles from the proposed Swisher site, is not mentioned. This makes no sense because Happy is the closest incorporated place to the site after Tulia. The City of Adrian, which is approximately 25 miles away from the Deaf Smith site, is also ignored. Both of these cities would be affected by a repository. Their existence should not be overlooked.

3. The baseline analysis for government finance contains only two tables with any kind of fiscal data. These data are extremely limited. The impact analysis is virtually devoid of numbers. A thorough analysis would include these indicators: total and per capita revenue, total and per capita expenditures, fiscal capacity (a measure of tax effort in relation to tax capacity), amount of federal and state aid, and total and per capita bonded indebtedness. The amount of bonded indebtedness for each affected jurisdiction would seem to be a particularly important piece of information since Section 5.4.5.1 of the EA suggests that governments issue bonds for capital improvements associated with the waste repository. If a city has a limited tax base for supporting bonded indebtedness, the suggestion is impractical.

Fiscal capacity indicators show a government's tax capacity and tax effort. Deaf Smith County, for example, has one of the 25



lowest per capita tax capacities of all Texas counties in 1984. In other words, its theoretical tax-generating capacity is very low in relation to the statewide average. Furthermore, Deaf Smith's per capita tax effort was among the highest in the state. This means the county is taxing close to its limit. These figures indicate that county government in Deaf Smith has very little potential to expand its tax collections in order to provide services needed for in-migrants.

4. Trend analysis is virtually nonexistent. Much can be learned by comparing the above-mentioned fiscal indicators over a period of years. This analysis is vital to obtaining a realistic picture of a government's financial condition.

5. No attempt is made to quantify the expected increased cost of providing additional services due to the repository on a government-by-government basis. Only general, qualitative statements are made. Also, more definitive information is needed on the timing of various impacts on local governments.

6. Much of the socioeconomic baseline data in Chapter 3 is out-of-date. This is a comment we have made before concerning the document entitled "Socioeconomic Data Base for the Permian Basin," from which the EA data were drawn. In particular, per capita income figures have been significantly revised in the last two years. This has caused, for example, Oldham County's per capita income figure for 1980 to decrease from \$15,512 to \$6,914. The draft EA contains the out-of-date figure. In addition, more recent population projections are available. Using the more recent

numbers will necessitate revision of much of the impact analysis in Chapter 5. In addition, it would seem prudent to compare these projections with other in-state projections made by the Texas Department of Health. Other dated figures include unemployment statistics, migrant worker population, and national municipal service standards.

## Service Ratios

### (Baseline and Projected Impacts)

Most of the DOE analyses of baseline protective services (3.6.3.5. on page 3-210) and impacted community services (5.4.3. on pages 5-138 through 5-146) are based primarily on per capita service ratios, such as the number of firefighters per 1,000 residents. These ratios are inadequate for the following reasons:

- (1) The ratios are dependent on baseline population data which is out-of-date and needs substantial revision.
- (2) Many of the service ratios are out-of-date since the DOE analysis used 1979 standards. New average service level ratios have been compiled by the various local government professional associations, and the International City Management Association has data based upon July 1984 figures.
- (3) Average service level ratios traditionally are not useful for either very large or very small jurisdictions where special conditions prevail or for jobs that require a minimum number of personnel to be involved. For instance, an average service level ratio of 1.65 firefighters per 1,000 residents is meaningless for a town

like Vega because a minimum of 3 to 5 firefighters will always be needed to put out a fire.

(4) Average service level ratios are based solely on labor and ignore equipment and facility components. No organization or local government agency relies only on labor inputs.

(5) DOE's focus on an input indicator (labor in this case) is too simplistic and is not used extensively by well-managed local government agencies. More critical and realistic indicators are being used by these organizations. For example, a response time of less than 3 to 5 minutes is often used for fire departments. The International Association of Chiefs of Police regularly use measures such as the incidence of particular crimes (burglaries) and the volume of calls to the police. In other words, the input indicator used by DOE is much less useful than the activity measures being used widely by professional government managers.

(6) The DOE labor input indicator deals only with the quantity of the service being provided. Quality of a service is not addressed.

- (7) Other deficiencies with the DOE indicator are that it is based on a national average as opposed to a regional, state, or small town/rural average, and there is an assumption that additional personnel can be obtained without difficulty. Recruitment of physicians to rural areas is one obvious example when this is not the case.

### Impact Mitigation

The impact analysis in Chapters 5 and 6 of the draft EAs identifies several potentially adverse socioeconomic impacts due to the siting of the repository. Often this is followed by the statement that the adverse impact can be mitigated. Yet, further elaboration concerning the details of specific mitigation methods is missing. In some cases, statements such as "adverse conditions may be mitigated" (p. 6-64) and "exceptions, if encountered, can be relieved by mitigating measures" (p. 6-77) are made with no further discussion. Examples of adverse impacts and suggested mitigation follow:

ADVERSE IMPACT	SUGGESTED MITIGATION	PAGE NUMBER
Local business may have difficulty competing with new large volume stores attracted to the area.	Technical planning assistance, improvement loans or grants	5-110, 5-112
Inflationary pressures and increased cost of living may strain the budgets of fixed income people	None	5-110
Conflict between new and long-time residents	Social programs to increase interaction	5-147

ADVERSE IMPACT	SUGGESTED MITIGATION	PAGE NUMBER
In-migration of repository workers because local labor force is inadequate.	Employment training programs	5-110, 5-112, 6-78
Decline in land value and marketability near the site	None	5-112
Loss of jobs during decommissioning resulting in excess housing and community services	Economic development efforts by local community is assumed	5-140
Service needs of new residents	NWPA compensation provisions for communities	6-78

The listings in the preceding table under the heading "Suggested Mitigation" are the only descriptions of actual mitigation techniques in the draft EAs. Payment-in-lieu-of-taxes is also mentioned once or twice. Brief mention of an impact method does not constitute an adequate discussion of the issue. From what appears in the EAs, seemingly DOE cannot state with any confidence that a particular adverse impact can, in fact, be mitigated. It is recommended that the final EAs contain significantly more detail on impact mitigation and compensation methods. Otherwise DOE may find it more difficult to "not support a finding that the site is not likely to meet the qualifying condition" on socioeconomic impacts (10 CFR 960.5-2-5) which states in part, "Any significant social

and/or economic impacts induced in communities and surrounding regions by repository siting, construction, operation, closure and decommissioning can be offset by reasonable mitigation or compensation. . . " (page 6-64). This condition necessitates a much more thorough analysis of impact mitigation.



### Meteorological Conditions

The baseline information on climate (pages 3-165, 166, 167, 168) is a mixture of data that is difficult to decipher. The time period for windspeed in Table 3-37 seems to be 1975-1979, while other time periods are used for other conditions in the same table. The 58 mile per hour maximum wind speed for that five-year period seems too low.

Also, the 100 year mean recurrence intervals (85 mph wind speed, 6.5 inches rainfall, and heaviest weight of snow on the ground) are suspect -- the rainfall figure has been exceeded three times in the past several years.

Hereford's meteorological data is for 1938-1967. Table 3-38 does not include any wind speed or wind direction data for Hereford for any period of time.

### Socioeconomic Impacts from Site Characterization

Specific problems abound in Chapter 4:

1. By the DOE national service standard of 100 gallons per day per capita for wastewater, the planned wastewater treatment facility at the site during characterization is insufficient. There will be 260 people and only a 15,000 gallon facility (page 4-46, paragraph 3). The situation may be worse than that because in another part of the same chapter (page 4-116, second paragraph from the bottom), it is stated that 356 workers will be in the area during the peak.

2. There has not been detailed planning on many specific items. For instance, DOE indicates that if site restoration occurs, the sewage treatment facility will be salvaged or disposed of in an appropriate place. No criteria for making this decision are offered, nor are possible locations identified. (Page 4-61, 4.1.2.4.5).

3. On page 4-74, last paragraph, it is stated that some site characterization activities will be conducted outside the protected area. The activities listed are drilling boreholes, conducting seismic surveys, and performing environmental studies. No information is presented on the extent, timing, and scope of these activities.

4. On page 4-76, third paragraph from the bottom, it is estimated that 229 acres of either agricultural land or rangeland

would be removed and that 229 acres is less than 0.1 percent of the county total. There is no mention of the uniqueness or quality of that land as opposed to its quantity.

5. On page 4-115, third paragraph, it is concluded that no estimates can be made of potential impacts on current accident rates in the vicinity of the site. No data from the DOE analysis are presented. If DOE conducts future accident probability research, the accident rate experiences of workers at major new facilities should be examined. Also, truck-car collision rates should be looked at due to their higher fatality rates.

6. Off-site traffic accidents due to shaft construction activities are estimated. However, these estimates are based on data in Table 4-27 (page 4-114), and there are serious deficiencies in the table. The US 60 Canyon to Hereford route is extraneous as it would never be used by workers. A road quite likely to be heavily traveled between Wildorado and the site, FM 809 to FM 2587, is not in the table. Nor is a plausible route from Canyon to the site: US 60 to FM 1062 to FM 809 to FM 2587.

7. Of the 356 site characterization workers, only 10 to 25 percent would be hired locally. Little information is provided on why this is so low when the local hiring rate would be 50 percent for repository construction. In addition, an indirect employment multiplier of 50 percent is used, which seems overly optimistic. More importantly, it is unrealistically assumed that all of the indirect employment jobs would be filled by local residents and that not one person would in-migrate for an indirect job.

More major problems are evident in the site characterization chapter as well.

1. Because the entire socioeconomic analysis (including traffic flows) is predicated upon the poor baseline data, the inexact site characterization work force data, and the seriously flawed gravity model, the expected impacts are incorrect. With such major problems, the magnitude of errors could be quite large or relatively small. No one knows. Yet we suspect that the possible impacts are seriously underestimated, particularly for smaller-populated jurisdictions and for Hereford.

2. The extent of disruption for individual landowners is estimated to range from severe to insignificant. This would be due primarily to the drilling of as many as 70 boreholes (and necessary access roads) on the site and in the vicinity. The actual likely number of boreholes and their exact locations would not be known presumably until sometime during the characterization phase. The uncertainty for individual landowners would be more than if a detailed drilling plan were developed. This would be an extremely stressful and poor situation for landowners.

3. Even if the DOE analysis is accepted, and one overlooks the major flaws with service ratios, the population allocation model, baseline data, and so forth, only general approaches are offered to reduce detrimental social and economic impacts. One of the four approaches listed (page 4-124, fifth paragraph) would limit in-migration of family members, which seems undesirable.

There is no discussion of what would occur if the four measures did not guide the settlement pattern.

### Socioeconomic Studies During Characterization

During the characterization period, DOE proposes to gather additional data on socioeconomic conditions. The proposed studies would simply update the baseline data. There is no indication that serious flaws in the gravity model, service ratios, and in-migration models, among others, would be rethought.

Three other matters deserve mention. First, on pages 4-67 and 4-68, DOE indicates that data will be collected on land ownership after characterization has begun. Second, on page 4-117, Figure 4-23, there is a detailed monthly schedule of the DOE socioeconomic/environmental work force complement for a 30-month period. There is considerable change in personnel, but nowhere is there a corresponding schedule of the studies that would be done, their duration, or their degree of sophistication. Third, the planned transportation study is described in general terms and essentially will be an examination of the air, rail, and road capacities. This does not seem sufficient.

### Two-Phase Repository Design Concept

The two-phase design would be a significant departure from the EA reference design. Because of the compressed construction schedule and other operational changes, the socioeconomic impacts would be substantially greater. A new Environmental Assessment should be prepared if DOE chooses the two-phase design.

### Concluding Observations

While quality varies and some sections do include solid analysis, overall the socioeconomic sections are poor. The baseline information is generally outdated and of dubious quality and utility. As a result, it does not yield an accurate picture of current conditions. Problems in the assumptions, data, and models to project impacts from the repository exist throughout. Many are serious. And in those cases where more intensive reviews have occurred, the reliability and quality of the EA analysis decreases rather than becoming more solid. In our judgment, the projected impacts are extremely unreliable and often were not derived by generally accepted social science methodologies.

Because of the many methodological problems with the projected impact sections, it is difficult to assess how unreliable the projected results are. No assertions can be made with a high level of confidence. However, there has been a pattern of underestimation, and in several key instances, serious underestimation. If this is the case, it is especially distressing that no plan has been set forth to cope with unanticipated socioeconomic impacts that occur as a consequence of poor analysis, misjudgments, and imperfect implementation.

In sum, a more thorough, realistic, and professional analysis of socioeconomic conditions and possible impacts is needed.



State of Texas Comments  
on  
DOE/RW-0014  
Draft Environmental Assessment  
Deaf Smith County, Texas  
December, 1984

Executive Summary

Page 3, paragraph 2 -- In this paragraph and numerous other paragraphs in the DEA it is stated that DOE must recommend not fewer than three sites for characterization as candidate sites. In fact the NWPA states that DOE must recommend three sites for for characterization as candidate sites.

Page 6, paragraph 1 -- The selected site is closer to Vega than to Herford and the size of Vega is similar to towns that are discussed more extensively in other EA's. It seems that Vega should be given greater attention.

Page 6 & 7 -- The mileage to the nearest railroad is given as 26 miles on page 6, paragraph 2 and as 19.5 miles on page 7, paragraph 7. Which is correct?

Page 9, paragraph 2 -- Vertical dissolution rates and interior dissoulution rates along fracture zones should also be addressed in the paragraph.

Page 9, paragraph 6 -- Last sentence states that no surface discharge has been identified from the deep brine aquifer. However, on page 2-5, it states that discharge from the lower aquifer units occurs primarily to the east of the site. Which is correct?

Page 10, Figure 3 -- This cross section does not even include Deaf Smith County as stated in the caption (see Figure 3-3); a reference map should be included. The Ogallala and Dockum Formations are not identified in the figure. Since they are an

integral part of this study, they should be included in this figure. The cross section line starts in Oldham County goes to northern Randall County and then to northern Swisher County. The nearest point to the site along the cross section line is almost 20 miles.

Page 11, paragraph 2 -- Calculations based on figures given on page 2 indicate that more than 85 percent of the area around the site is used for cropland. In addition the amount of cropland will vary seasonally.

Page 11, last paragraph -- Vegetables, sugar beets, small grain seed and cotton are also important crops in the area.

Page 12, paragraph 4 -- How is the 260 acres calculated? What are the components and how much acreage is required for each?

Page 13, paragraph 4 -- The last sentence states that the quality of ground water will not be significantly affected during excavation of the shafts but does not mention quality of ground water after excavation.

Page 14, paragraph 3 -- The mine sites within 100 miles of the Deaf Smith site should be specified. Also, what will be the impact of windblown salt on the immediate vicinity of the site and what will be done to mitigate the impact? The uncertainties of the disposal site given in later sections should be reflected here also.

Page 15, paragraph 1 -- In earlier reports it has been stated that the surface would possibly be leased back to farmers for normal use. If this is the case, there would be draw down of the aquifer from irrigation of crops in addition to that connected with repository construction. This is not considered in this paragraph or elsewhere in the report.

Page 15, paragraph 5 -- This paragraph assumes that the locations of the sources of waste will always be the same. Is that a certainty or could the locations change over the life of the repository?

Page 17, paragraph 1 -- This paragraph which begins on page 16 summarizes features of the Deaf Smith site that contribute to its ability to isolate waste. It lists many characteristics of bedded salt which pertain to all bedded salt, not just Deaf Smith salt beds. This should be made clear so that it is not misunderstood to mean that Deaf Smith only has these characteristics.

## CHAPTER 1

Page 1-3, paragraph 3 -- The Act also requires the DOE to prepare site-characterization plans for State and public review as well as NRC review. It also requires review of updates.

Page 1-18, Figure 1-2 -- From this figure it is impossible to determine if Deaf Smith and Swisher sites are in the High Plains or the Nonglaciated Central Region. This figure is also different from Figure 3-5 which should show the same thing.

Page 1-20, paragraph 2 -- The geohydrologic system should include the Triassic Dockum Group including the Santa Rosa aquifer. The Triassic Santa Rosa aquifer is not a minor aquifer at the site and it has high quality water within the site area. This omission must should be corrected throughout the DEA.

## CHAPTER 2

Page 2-2, Figure 2-1 -- The source cited for this figure is incorrect. It was in DOE/CH/10140-2.

Page 2-5, paragraph 7 -- The first sentence states "Recharge of the High Plains aquifer is principally from precipitation collected in playa lakes." This is only theorized for the Ogallala. Also, this is not true of the Dockum which is included in the High Plains aquifer. The last sentence states that discharge from the lower aquifer is primarily to the east yet on page 9 of the Executive Summary it is stated that there is no discharge. Which is correct? Are the locations of discharge points known? If so, where are they?

Page 2-5, last paragraph -- DOE/NWTS - 33(2) states "Before a

site can be determined to be suitable, the information must be complete on the full range of characteristics to allow comparison of chosen sites against all siting criteria." This statement and the above cited paragraph are in disagreement. Please explain.

Page 2-6, Figure 2-4 -- The entry for Triassic Dockum in the last column is incorrect. The Dockum has a large supply and low total dissolved solids at the site.

Page 2-7, paragraph 4 -- The last sentence states that few boreholes have been drilled through the salt in Texas. How many is a "few" and how does that number compare to the number drilled through the salt in Utah?

Page 2-10, Figure 2-5 -- The source of this figure is incorrect, it was in DOE/CH/10140-2.

Page 2-12, Table 2-2 -- Why is thickness of Host Rock not a discriminator at Palo Duro Location A?

Page 2-15, Table 2-4 -- Human Interference Guideline-statements are not accurate and do not reflect conditions in the area. Exploration has been conducted in the area and resources have been discovered. Environmental Quality Guideline-statements say that the environment can be protected. Does that mean the DOE will guarantee protection of the Ogallala aquifer. If not, how do you propose to mitigate any releases into the Ogallala? Socioeconomic Impacts Guideline-statements do not adequately address the issue. It is not a matter of comparison with water consumption for the whole county but the impact on the quantity of water available in the vicinity of the site and the possible contamination of the sole water source. Rock Characteristics Guideline-there is no substantial proof that a shaft can be satisfactorily sealed.

### CHAPTER 3

Page 3-7, Figure 3-4 -- This is a very poor quality figure. The

Basin outlines are not present and, therefore, the figure cannot be used for reference. Faults shown in Figure 3-18 of DOE/CH-10(1) are not shown in this figure.

Page 3-9, paragraph 2 -- This paragraph states that the youngest structurally offset unit is the Glorieta Formation of Leonardian age, however, there could be unidentified faults that are more recent. The site has not been thoroughly investigated since there no seismic lines across the site.

Page 3-9, -- There is no mention of oil and gas production in section 3.2.1 Regional Geology, yet this section in the Swisher County Assessment addresses this point. The 1982-83 Texas Almanac gives a value for oil production in Deaf Smith County which exceeds that given for Swisher.

Page 3-10, Figure 3-5 -- This figure is not consistent with Figure 1-2. Which is correct?

Page 3-11, paragraph 1 -- The reference made to Gustavson et al (1980a, p.78) is incorrect. The publication cited only has 40 pages. What is the correct reference?

Page 3-11, paragraph 2 -- The reference made to Gustavson et al, 1980a, Figure 30, is incorrect. This figure has nothing to do with erosion, it shows a developing salt pan. What is the correct reference?

Page 3-14, Figure 3-7 -- On this time scale the upper Tertiary is termed the Neogene. On pages 3-4, 3-9, and 3-25 the period is called Neocene. Which is correct?

Page 3-17, Figure 3-9 -- A location map reference to this cross section is not given. The figure is useless without one. Also, this cross section is a considerable number of miles south of the Deaf Smith site.

Page 3-25, paragraph 7 -- The host rock thickness is given as

160 feet yet in Figure 3-19 it appears to be 150 feet at the site. Illustrations should agree with the text. Which is correct? By what criteria was the thickness determined.

Page 3-43, Figure 3-20 -- Gustavson *et al* 1980b, Figure 42 also shows salt margins. His figure, however, is slightly different and suggests that the boundary could go through the NW corner of Deaf Smith county.

Page 3-49, paragraph 3 -- The reference to Gustavson *et al*, 1980a, Table 1 is incorrect.

Page 3-49, paragraph 6 -- In number 1 of this paragraph reference is made to Figure 3-4 yet this figure does not show that the bedded salts deepen basinward as indicated by the reference.

Page 3-51, paragraph 4 -- Reference is made to Figure 3-24 in the last sentence. This figure does not illustrate what is being described in the paragraph and should not be used as a reference.

Page 3-52, paragraph 2--This paragraph speaks of several faults near the Deaf Smith site the closest being 50 miles away. However in Figure 3-4 the nearest fault is 40 miles away. It should also be noted that there is no seismic profile across the site to show an indication of faulting.

Page 3-52, paragraph 3 -- Reference is made to the Bonita Fault and the Alamosa Fault which are not even on Figure 3-4. Where are these faults located?

Page 3-52, paragraph 6 -- This paragraph admits that the age of the jointing and its relation to tectonic stress are not defined. Jointing and stresses are important clues to the tectonics of an area. This is a subject that needs a great deal more attention than it has received. Published literature provides a much better coverage of joints and fracturing than is indicated in this paragraph. Fracturing has also been noted in several of the DOE test wells that is not mentioned.

Page 3-41 through 52, sections 3.2.3.3 through 3.2.5.2 -- A complete discussion should be included to provide a complete picture of the relationship between fracturing and dissolution that is apparent in the published literature. Evidence has been offered to suggest that fracturing is relatively close to the both the Deaf Smith and Swisher sites and that it may be associated with fracture trends. If fracturing does extend through the entire salt section and is the locus of dissolution, it is clear that these selected sites should be disqualified.

Page 3-55, Figure 3-25 -- It is interesting that the faults displayed on this map end where available data ends. This is a good indication that if more data were available, more faults would be found. This is a poor geological interpretation.

Page 3-58, paragraph 1 -- This paragraph along with the following two paragraphs states that the Palo Duro Basin has a "very low" level of seismic activity. This is based on little known data and no measured data. The Palo Duro Basin has always been sparsely populated, therefore, there were few reports of seismicity. That does not mean that there has been none. Much more data is needed on this subject and measured data over an extended period is the only truly reliable data. Seismic monitoring of the area should have been initiated at the start of this investigation. Why was this important data acquisition been deferred so long?

Page 3-58, paragraph 4 -- Reference is made to Figure 3-20 for location of nearby volcanic activity. This figure does not show volcanic activity.

Page 30-61, Figure 3-27 -- This figure does not agree with Figure 3-5 in DOE/CH-10(1) at the level of detail represented.

Page 3-63, paragraph 1 -- More needs to be said about uplift in the area. This is a subject which must be carefully studied and understood before selection of a site is in order.

Page 3-64, paragraph 1 -- The last sentence states that the

maximum horizontal compressive stress orientation is consistent with Oklahoma and New Mexico but inconsistent with data from west-central Texas. This could suggest that there is a problem with the available data or the analysis of that data. What is the significance of this inconsistency in data?

Page 3-64, paragraph 5 -- It is stated in the first sentence that clastics generally become more competent with depth. At what depth do they become competent? A more specific statement is needed here.

Page 3-67, Table 3-2 -- It should be noted that there are no tests results for the San Andres Unit 4. Because this is the proposed host rock it would be helpful to know the tensile strength of the formation. Why were no tests performed on the San Andres Unit 4 from this well? Also, the column headings are incorrect.

Page 3-70, paragraph 1 -- The first sentence speaks of laboratory creep tests that indicate that Palo Duro Basin salt has a relatively high ductility. What laboratory tests are being referred to in this paragraph? A more complete citation is needed.

Page 3-70, paragraph 2 -- Test data from the Deaf Smith site does not substantiate this statement. Stratigraphic uniformity cannot be assumed at this level of detail.

Page 3-70, paragraph 3 -- In this paragraph a permeability classification is set out. What is this classification based on? Has it been used in the literature before? If it has been used before, a proper citation should be included. If this type of classification has not been used before, a more complete explanation is needed. Is the same classification used for permeability at all other salt sites? If not, why?

Page 3-71, paragraph 1 -- This paragraph suggests that the permeability for the Dockum found in Swisher County can be used in Deaf Smith County. That is questionable.

Page 3-72, paragraph 2 -- Nothing is mentioned about the clays



or the presence of brines in the sandstones above the San Andres.

Page 3-72, paragraph 5 -- Nothing is mentioned about the salt filled fractures in the interbeds of Unit 4.

Page 3-73, Figure 3-31 -- In the explanation a symbol is given for dissolution zones. The symbol cannot be read and it certainly cannot be found on the cross section. This makes the figure useless with respect to dissolution zones.

Page 3-80, paragraph 3 -- Reference is made to Ramondetta (1981). Yet in the Swisher County EA the same reference says Ramondetta (1982). Which is correct?

Page 3-90, Figure 3-36 -- This figure (like many other figures in the DEA) is impossible to use because the explanation cannot be deciphered.

Page 3-92, paragraph 1 -- This paragraph and subsequent paragraphs indicate that undiscovered resources in Deaf Smith are hypothetical and subeconomic. However, it should be noted that resources all over the world that are being extracted from the ground today were once thought to be "hypothetical and subeconomic". If the information on projections of oil and gas resources is correct, how can it be reconciled with the current growing interest in oil and gas exploration in the area of the site.

Page 3-96, Figure 3-39 -- This figure doesn't completely agree with prime farm land in Figure 3-37 in DOE/CH-10(1).

Page 3-97, Figure 3-40 -- This is another figure that is virtually useless because the patterns used to distinguish one soil from another are indistinguishable.

Page 3-98, paragraph 6 -- Here it is pointed out that the discharge zone of the deep basin brine aquifer is not yet defined. This is a very important point to be considered. If it is true that a downward flow potential exists, the leakage would be into the lower aquifer and then out into the environment at the discharge

zone. Where would that be?

Page 3-102, Table 3-14 -- This table is based on 1968 USDA information. Is there nothing more recent than that? Figure 3-40 references a 1980 source. The Swisher County EA has a 1982 version provided by The Soil Conservation Service.

Page 3-105, Figure 3-42 -- This figure does not have all the same impoundments marked on it as the Swisher County EA does. It would be helpful to have all impoundments on each figure.

Page 3-107, Table 3-16 -- This table does not have much recent data on it. Is there no recent data available to make this table more meaningful?

Page 3-112, Figure 3-44 -- The label on this figure says Peak Flood Flows in the Tule Creek Drainage Basin. Presumably it is mislabeled and should be for the Palo Duro Creek. Even with the correct label, the figure is hard to use without geographic references on the map.

Page 3-114, Figure 3-46 -- The flood limits for the playas are the same for the maximum flood and the 500-year flood. Would the playas not flood a larger area in a time of maximum flood than at a 500 year flood?

Page 3-115, paragraph 4 -- Specific yields for the Ogallala are given in this paragraph. There are no data to indicate that specific yields at the site are similar to those given here.

Page 3-115, paragraph 5, last sentence -- Well data from the Santa Rosa exists and generally do not support this presumption.

Page 3-115, paragraph 7 -- Do more recent withdrawal rates support this projection?

Page 3-119, paragraph 4 -- Several things mentioned in this paragraph and subsequent paragraphs indicate that there is water movement through the salt. Because this would be detrimental to

waste isolation within the salt, this is a subject that must be better understood prior to recommendation of the site for site characterization.

Page 3-122, paragraph 7 -- To calculate a flow rate for HSU C, a permeability of 1.0 md was used. Can this value be justified since in paragraph 4 a permeability range of 0.15 to 26.6 is given based on SWEC calculations.

Page 3-128, paragraph 1 -- It is stated that no surface discharge from HSU C has been identified, yet on page 3-132, paragraph 6, it says in the southern section of the saline spring region, saline springs and shallow saline ground waters may have a component of deep basin discharge. Are these not related? Has discharge from this lower unit been identified or has it not?

Page 3-128, paragraph 2 -- There seems to be some discrepancy between the values given in the paragraph and the values on Figure 3-56. For example does the depth to water range from 275 to 300 feet as stated in the text or from 260 to 290 feet as illustrated on the figure?

Page 3-128, paragraph 3 -- The last sentence says that porosities based on neutron logs are probably much higher than formation effective porosities. Is there any data available showing the relationship between neutron logs and porosity?

Page 3-128, paragraph 6 -- The effective porosities stated in this paragraph are from a well 20 miles away from the site. Are these better numbers to use than neutron log porosities? If so, why?

Page 3-128, paragraph 7 -- It is stated that HSU B is composed of 60 percent evaporite, yet from addition of evaporites in Figure 3-16 it appears that the percent evaporite is more like 47 percent. This would make the value for average vertical permeability incorrect. Please explain.

Page 3-128, paragraph 9 -- In this paragraph and the following

paragraph, many values are given for porosity and permeability for HSU C. The wide range of these values points out that it is very important to actually measure the porosity and permeability of a formation in the precise location being considered rather than estimating from nearby data. Porosities and permeabilities commonly vary greatly within formations.

Page 3-129, Figure 3-55 -- This figure does not completely agree with Figure 3-012 in DOE/CH-10(1).

Page 3-132, paragraph 5 -- The cross-sectional model also demonstrated that 20 percent of the groundwater flow in the Wolfcamp and deeper saline aquifers could be attributed to leakage through the evaporite aquitard. These results should also be included in this paragraph.

Page 3-134, paragraph 1 -- The last sentence suggests that the data on complexing of radionuclides is incomplete ("Results to date..."). According to previous DOE logic it should be concluded that complexing of radionuclides will be significant.

Page 3-134, last paragraph -- Data for the Dockum exist and have not been used in the DEA. Data sent to DOE for inclusion in the DEA is not used or referenced.

Page 3-138, Table 3-22 -- State Well Number 07-61-1A(c), annotation is incorrect and State Well Number 07-60-38(b), well number is incorrect. Additional well data in the vicinity of the site exists but have not been included. All wells must be identified.

Page 3-140, last paragraph -- The reference to Figure 3-55 is incorrect, the correct range of saturated thickness according to the figure is 50 to 115 feet. Also, the reference is incorrectly cited. The explanation in Figure 3-55 the contour interval is given as 25 Feet (7.6 Meters) therefore the citation should agree with the figure instead of giving the thickness in meters (feet).

Page 3-153, paragraph 3 -- Define "mile roads".

Page 3-153, paragraph 3 -- In this paragraph it is pointed out that 32 percent of the privately owned lands are leased for oil exploration. That is a significant amount ,yet it is treated as though it were insignificant. It is also stated that there are no producing oil fields in the county to date. However, in the 1982-83 Texas Almanac oil production is reported for Deaf Smith county. Where is this oil being produced if not from oil fields?

Page 3-154, Table 3-31 -- The number of playa wetlands has no value in the 10-kilometer site vicinity column.

Page 3-156, paragraph 3 -- In the last sentence it mentions that there are approximately 14 playas within the site vicinity. It should be possible to determine the exact number of playas in the area rather than relying on an approximation. Are there more or less than 14 playas?

Page 3-158, paragraph 6 -- This paragraph states that the data presented in Tables 3-33 through 3-36 are from near the Deaf Smith site. These data only represent the nearest available data not data near the site.

Page 3-164, paragraph 2 -- This paragraph says that TSP data excludes concentrations associated with dust storm activity. Since dust storms are of major concern in the area they should not be excluded. The data presented here is based on a study of a five year period. This is hardly enough time to assimilate enough data to make an accurate judgement about pollutants.

Page 3-165, paragraph 3 -- It is unclear what "area" these data represent.

Page 3-165, paragraph 8 -- Why are values for wind speed etc. used which are not the highest non-tornado recordings? It seems that the highest recordings should be considered.

Page 3-167, Table 3-38 -- This table is based on data from 1938-67. The greatest available period of record should be summerized. A more representative summary of area conditions can

be compiled.

Page 3-168, paragraph 1 -- See comments for page 1-165, paragraph 8. The higher recordings should be considered. They happened once. They could happen again.

Page 3-168, paragraph 2 -- It is unclear what area around the Deaf Smith site is being considered.

Page 3-171, paragraph 3 -- How is it known that the EPA guideline for farmland sound level is met at most places near the site?

Page 3-171, paragraph 8 -- This paragraph says that 9 percent of the site vicinity exhibits a moderate amount of visual variety. This paragraph cannot be reconciled with Figure 3-68.

Page 3-172 & 173, Table 3-40 & 3-41 -- These tables are based on 4 days of data gathering. Is that enough to provide representative data?

Page 3-176, Figure 3-69 -- In the explanation areas of potential historic resources and other land have the same pattern. Once again, this is an unusable figure because of problems with the explanation.

Page 3-177, paragraph 6 -- In this paragraph the dose equivalent rate to an individual at the site is given as 95 millirem per year yet in paragraph 1 of the following page it says 93 millirem. Which is correct? It is also stated in this paragraph that the dose rates are higher at the site because of the larger contributions from cosmic radiation, which increases with altitude. That would imply that Deaf Smith was higher in altitude than all other sites. That is far from the truth. Give an adequate explanation for the higher dose rates at this site

Page 3-179, Figure 3-70 -- The size of the gas lines and the configuration of electric transmission lines given in this figure are not the same as given in Figure 3-33 in DOE/CH-10(1).

Page 3-184 -- At this point in the manuscript, a large portion of the text is left out. This includes section 3.5.3 Airports, 3.5.4 Waterways, 3.5.5 Utilities, 3.5.5.1 Electric, 3.5.5.2 Gas, and 3.5.5.3 Water Supply and Sewage Treatment. Why were these sections left out?

Page 3-190, Table 3-47 -- The source for this table is different from the source listed for the same table in the Swisher EA. Can they both be right?

## CHAPTER 4

Page 4-1, paragraph 3 -- 40 CFR Part 191 should be identified as being Proposed. The sufficiency of the level of information for expected environmental effects is debatable. Therefore, this judgmental statement should be deleted.

Page 4-2, Table 4-1 -- Environmental and Socioeconomic data collection activities should also be outlined. They will likely have economic effects on the local community.

Page 4-4, paragraph 4 -- The location of potential injection wells should be identified. If nearby injection wells are fully subscribed it may be necessary to permit a new injection well for these brines.

Page 4-5, Figure 4-1 -- What was the basis for determining facility and borehole locations? With this configuration is the site large enough to comply with all applicable regulations? Without land purchases can access to borehole drill sites be assured?

Page 4-65, Table 4-16 -- In the past DOE has stated that there will be no discharge to drainage from the site. Items 8 & 9 appear to represent a change in this position. Explain.

Page 4-15, Table 4-2 -- How were field activity requirements determined? What are the uncertainties in their determination? How will the uncertainties be reflected in expected effects of site characterization?

Page 4-23, paragraph 2 -- This does not accurately reflect the DOE shaft construction decision dated November 29, 1984. This decision must be factored into all determinations in this chapter.

Page 4-27, Table 4-3 -- A comparison of Figure 3-27, 3-46 and Table 4-3 of the DEA does not permit verification of the depth to the shaft stations being 2555 feet. It appears that they would be shallower than indicated. On page 111 of DOE/CH-10(1) the more preferred depth is given as 2500 feet or less. Yet the depth of the in situ site characterization facility seems to be planned for a depth greater than 2500 feet. What is the rationale for this discrepancy?

Page 4-45, paragraph 5 -- During periods when high wind conditions prevail for long periods, excessive wetting of the salt may cause recharge of brine into the Ogallala and/or Santa Rosa Aquifers.

Page 4-45, paragraph 6 -- What are the maximum quantities of brine expected during this operation?

Page 4-47, paragraph 1 -- Are the DOE contractors subject to MSHA regulations?

Page 4-53 & 55, Figure 4-13 & 14 -- The figure should have a north arrow so the proposed shafts and excavation can be oriented with respect to the geologic conditions.

Page 4-62, paragraph 2 -- Does the rehabilitation of the surface include addition of fertilizer to replace nutrients lost while the soil was in stockpile? If so, what will be done to determine the type of fertilizers needed for most efficient revegetation? Will the area be irrigated? If irrigation is used, what quantities of water will be needed and have these quantities of water been included in the overall estimates of water consumption?



Page 4-67, paragraph 5 -- Are there any contingency plans for the event that existing land fills may not be available for waste materials?

Page 4-67, section 4.1.3.1.1 -- How can the impacts of site characterization be determined if these data are not available?

Page 4-68, paragraph 6 -- Since a program will be provided "for an evaluation of the radionuclide uptake and content in edible crops..." does that mean some contamination can be expected from this operation?

Page 4-75, paragraph 5 -- The location and history of the previously operated salt stockpile sites should be included to provide an evaluation of the impact of the salt on the environment.

Page 4-76, paragraph 2 -- How do conditions in the areas where salt contamination has been observed compare to conditions in Deaf Smith County? It would be appropriate to compare wind direction, wind speed, humidity, rainfall, and other parameters between these areas for an accurate appraisal of the potential impact.

Page 4-85, last paragraph -- Background meteorological data should be obtained directly from the site. It seems odd that background values for a rural area are obtained from a metropolitan area 30 miles away.

Page 4-87, paragraph 2 -- Dust storm days are excluded from analyses of background concentrations for pollutants. Should dust storm days be excluded when they occur so frequently in the area?

Page 4-90, Figure 4-16 -- The location of the surface facility for exploratory shafts is not in the same place on this diagram as it is on figure 4-1. Which is correct?

Page 4-93, paragraph 5 -- In the middle of this paragraph titled Ground-Water Resources, there are two sentences about salt in playa lakes and ephemeral streams. These sentences are certainly out of place. What should have been in their place? Also, these

statements should be transferred to the proper place.

Page 4-94, paragraph 2 -- This paragraph says that construction activities are not expected to significantly increase the volume of runoff and sediment from the site. Nothing is said, however, about increased runoff caused by the clearing and covering of the ground by the facility and the roads and pavement that will be there for the next quarter century. This problem should be addressed.

Page 4-94, paragraph 5 -- In the model used to analyze the impact of ground-water withdrawals it is assumed that privately owned wells both on and off the site were not pumping. Why was this assumption made? If some of the area is returned to agricultural use as mentioned earlier some of those wells will undoubtedly be pumped. The model should be reevaluated to insure that it is consistent with proposed site operation.

Page 4-96, paragraph 5 - This paragraph addresses the problem of the dissolution and dispersement of a saline plume in the Ogallala. The cumulative effect of continual addition of salt to the aquifer over a long period of time should also be considered. One saline plume might not have significant effect but continual salt leaching into the ground-water supply certainly will.

Page 4-98, Figure 4-19 -- Once again there is a discrepancy between figures showing the same thing. This figure is slightly different from Figure 3-57. Which is correct?

Page 4-99, Figure 4-20 -- The same comment can be made for this figure as Figure 4-19. It is different from Figure 3-55 which illustrates the same thing.

Page 4-100, last paragraph -- If soils are contaminated and must be disposed of, where would it be disposed and would it be replaced by uncontaminated soil suitable to the area?

Page 4-101, paragraph 2 -- Potential salt effects on soils in the site vicinity are compared to soils around salted roads and soil effected by sea spray in a Texas Gulf Coast area. Are the soils and

climate similar to Deaf Smith soils and are they used for growing crops as are soils in Deaf Smith? Certainly the soils and climate of the Gulf Coast area have a great contrast to the soils and climate in this area. Contrasting data tends to invalidate conclusions.

Page 4-101, paragraph 3 -- The addition of gypsum to soils to flush sodium will have impacts on the agricultural capability of the soil also. This mitigation method also wrongly assumes as does the evaluation of salt impacts, that the soil is not already subject to a salt burden that affects production.

Page 4-103, paragraph 2 -- The noise of development of an exploratory shaft is considered in terms of people around the site area but not in terms of the farm and ranch animals around the site. Animals are often adversely effected by loud sudden noises such as explosives. The effects to animals must also be considered.

Page 4-104, Figure 4-21 -- This figure has yet another location for the exploritory shaft. Inconsistancies make these figures impossible to use. Also, this figure gives the percent of "highly annoyed" people. Was there no consideration given to people slightly annoyed or annoyed in any manner? What are the cumulative effects of different levels of noise exposure over differing periods of time?

Page 4-105, paragraph 5, page 4-108, figure 4-22 -- There is no way that the equipment used to construct the exploritory shafts can be considered to be compatable with the character of the area which is essently flat. There is no way that "visual integrity" can be maintained.

Page 4-109, paragraph 1 -- It is stated that the visual intrusion is similar to that associated with exploratory drilling for oil and gas and therefore not atypical in the region. Yet several times in chapter 3 oil and gas exploration was said to be hypothetical and insignificant. Either there is a visual intrusion dissimilar to any existing sights or oil and gas exploration is more prevelant in the area than stated in Chapter 3. Which is it?

Page 4-111, paragraph 7 -- No consideration is given to the

effect of the meteorological tower on crop duster planes and other low flying aircraft.

Page 4-113, paragraph 1 -- The first sentence states that no impacts on regional or local utilities are expected yet the last sentence that commercial power will be used. Where will electricity be obtained if not from a public utility? Will land acquisition be necessary to provide needed electrical service to the site?

Page 4-114, Table 4-27 -- Reference is made to Table 3-52 which is about unemployment in the area and has little to do with estimated traffic accidents.

Page 4-118, paragraph 5 -- This paragraph states that the loss of agricultural revenues due to land being used for site characterization activities is extremely small when compared to the total crop revenues generated in the vicinity. However, what should be considered in addition is the loss to the individuals whose production is being impacted without compensation, inconvenience, market perceptions, changing costs of services, etc. How much is their loss of revenue?

Page 4-132, Table 4-32 cont. -- The heading for this page should be Exploratory Shaft, not Geologic Field Studies.

Page 4-132, Table 4-32 cont. Number 1 -- The second statement gives the agricultural land use in the site vicinity as 0.01 percent of total county cropland. This may appear to be a small amount in comparison to the county as a whole but is not insignificant when the amount of production on the land is considered and what the loss of the land actually means. Comparing the site vicinity to the county is an attempt to dilute the significance. Also, the amount of land around the site vicinity which will become unusable because of drawdown of the water table or salt contamination is not considered.

## CHAPTER 5

Page 5-4, Table 5-1 -- Do the surface area land control rights

include Railroad right-of-ways? How does the exploratory shaft decision of November 29, 1984 impact this chapter? It must be fully factored in and described in the final EA.

Page 5-9, Figure 5-2 -- The salt stockpile is in a different location than in Figure 5-1. Which is correct?

Page 5-10, Figure 5-3 -- This is a reverse image view of the waste handling and packaging facility shown in Figure 5-2. It makes comparison of the two figures difficult. Which is correct?

Page 5-19, Figure 5-8 -- In this figure the site appears to be about 7 miles west of U.S. Highway 385. In other figures (for example Figure 3-70) it is not that far away. Why is the location different? Also it is different from Figure 5-9 in various aspects such as the configuration of the railroad. Which is correct? It is also unclear why a new gas line must be put out to the site when on Figure 3-70 there is an existing gas line in almost the same location.

Page 5-30, Figure 5-11 -- There is no reference for this figure. What data are used to construct this figure?

Page 5-36, paragraph 2 -- This paragraph says the highest rate of salt deposition is 190 pounds per acre, per year for 109 yard radius. In Table 5-10 the worst case for the same size area is 563 pounds per acre per year. Is this not the number that should be used? And still a comparison is being made between the salt dispersion at the site and salt dispersion in areas with dissimilar soil and vegetation.

Page 5-39, paragraph 7 -- Why has salt concentrations in playa lakes and ephemeral streams due to repository construction and operation not yet been determined? How can these impacts be evaluated without necessary data?

Page 5-40, paragraph 5 -- The paragraph tells what would happen

in the event of liner failure but does not consider what could be done to try to stop the flow of leachate into the water table. This problem should be addressed, and there are engineering methods to collect and monitor leakage.

Page 5-41, paragraph 6 -- Figure 3-60 and Table 3-23 are referenced in this paragraph, they are obviously not the correct references because they do not show well locations or indicate drawdown relative to the site location. Provide the proper illustrations. As stated earlier, this projected drawdown does not take into account the ongoing use of wells for irrigation water.

Page 5-41, paragraph 7 -- Table 30-31 is referenced in this paragraph it is obviously incorrect, because it relates to potential natural habitat. Provide proper illustration.

Page 5-42, paragraph 3 -- Why are water requirements for decommissioning and closure activities not yet established? They can probably be estimated to the same degree of uncertainty as site characterization and repository activities, because they are only a result of conceptual design.

Page 5-42, paragraph 5 -- It is noted that approximately 90 percent of the site is prime farmland. This is not consistent with other stated percentages in the DEA, although it is probably the correct number.

Page 5-43, paragraph 3 -- It is suggested that if harmful levels of salt deposition are being approached, impacts can be avoided by adding calcium to the soil in the form of gypsum to flush excess sodium. What effect would gypsum have on the soil and vegetation?

Page 5-46, last paragraph -- There may be a wide tolerance of many species for accepting elevated salt concentrations for short periods but what should be considered here is a long period of time relative to appropriate species as well as the salt build up in playas.

Page 5-50, paragraph 7 -- What impact will the chemical stabilizers used to control fugitive dust have on the soil?

Page 5-61, paragraph 2 -- The problem of fugitive dust in the form of salt escaping from trucks as it is being transported away from the site is not addressed in this paragraph. Also, it is stated that most of the salt pile will be covered. This is not consistent with the next sentence nor many other statements in the DEA.

Page 5-62, paragraph 5 -- Several assumptions are made in order to predict the amount of salt likely to be deposited in the area surrounding the site. What is the basis of these assumptions? Is a pile of 60 feet considered to be ground level?

Page 5-64, paragraph 1 -- How will 13 pounds per acre per year affect the soil and vegetation at the "receptors" to the north and northeast of the site.

Page 5-65, paragraph 1 -- Reference is made to Figure 3-69. This is the wrong figure.

Page 5-66, section 5.2.7 -- No consideration is given to the affect of noise on livestock and farm animals.

Page 5-67, Figure 5-21 -- All the nearby residential sites are not on this figure.

Page 5-87, paragraph 2 -- It should be pointed out that the total railroad right-of-way will include at least 182 acres and affect 5 irrigation systems and 12 residences. Nothing is said about the soil that will be contaminated if salt is carried out by rail and escapes as fugitive dust.

Page 5-99, paragraph 5--The first sentence says all of the candidate potash mines are believed to presently have rail access. It is important to know for certain if rail access is or is not

available. Also, the availability of these mines for disposal has not been established. What about other disposal options?

Page 5-114, paragraph 4 -- This paragraph does not include land removed by railroad right-of-ways, land that cannot be used because of salt contamination, and land that cannot be irrigated because of aquaifer drawdown. Also, there is no basis for the 200 cattle count.

Page 5-145, paragraph 3 -- Exactly what other sources other than the Ogallala could be used to mitigate the strain on the water supply from the repository during construction? The generic discussion is insufficient in light of current water use needs and sources.

## CHAPTER 6

Page 6-9, paragraph 4 -- Reference is made to Figure 3-73 which has nothing to do with population distribution.

Page 6-14, paragraph 2 -- Reference is made to section 3.4.3.6, but there is no such section. This paragraph makes no mention of tornados that occur several times per year.

Page 6-16, paragraph 7 -- On figure 3-70 it appears that a natural gas pipeline crosses the site at the location of the surface facility. It is not 3000 feet away as indicated by this paragraph.

Page 6-29, last column -- There is no projected ability to meet requirements for the Texas Clean Air Act. Can DOE meet the requirements?

Page 6-32, last column -- There is no projected ability to meet requirements for the Texas Water Quality Act. Can DOE meet the requirements?

Page 6-38, third column, first item -- What exactly is a "reasonable natural state" and who decides what is reasonable?



How long will it take?

Page 6-59, last column, last item -- It states that the evidence indicates that a favorable condition is present, yet in the text it says that a potentially adverse condition is present. Which is correct?

Page 6-61, last column, item 5 -- It states that a favorable condition is not present, yet in the text it says a potentially adverse condition is not present. Which is correct?

Page 6-61, last column, last item -- Is a favorable or potentially adverse condition not present? See comment for item 5.

Page 6-70, paragraph 5 -- Without detailed demographic data on the near-site setting it should be impossible to make a valid decision on radiation exposure.

Page 6-70, last paragraph -- This paragraph speaks of the problem of Vega in the prevailing wind direction but makes no mention of rural residents or people traveling on the roads in the direction of the prevailing winds. In addition, 40 CFR 191 should be noted as proposed.

Page 6-79, third column -- There are two conclusions in this column that should be in the last column. Also the figure of \$18.6 million for construction of a new railroad does not include acquisition of land.

Page 6-81, last paragraph -- Fracture permeability often is not regional and therefore cannot be derived from regional trends. The entire issue of vertical permeability has only been slightly acknowledged, yet it is most likely variable in the region.

Page 6-82, paragraph 1 -- If more water were introduced by a change in climate for example, would the travel times change?

Page 6-82, paragraph 2 -- There is no basis to assume that the "single variable pathway" determination is correct given the lack of all relevant data and further it cannot be demonstrated to be the fastest pathway.

Page 6-83, paragraph 4 -- How slow is "very slow" as used to describe horizontal hydraulic gradient changes?

Page 6-87, last paragraph -- What about salt dissolution from penetrated Ogallala and Santa Rosa percolating downward around shaft openings?

Page 6-89, paragraph 2 -- Overestimation with an incomplete data base is not equivalent to conservative estimation. Where is the evidence that the criterion is expected to be met even at 300 years?

Page 6-92, item 5 -- The exact amount of clay in the host rock at or near the site is not known. The value of 3 percent is inferred from regional data and is of little value without site specific data regarding interbeds.

Page 6-95, paragraph 4 -- Why are physical phenomena such as changes in density, compressibility, and crystal structure not expected to have any effect on waste containment?

Page 6-95, paragraph 5 -- What will be the effect of moist atmospheric conditions on the host rock where it is exposed from excavation of the shaft?

Page 6-96, paragraph 2 -- Over what period of time is the 2.4 feet of settlement expected and what impact will this have on groundwater travel times due to induced fracturing of the strata surrounding the host rock?

Page 6-97, paragraph 7 -- What sort of recharge is expected for HSU C with a return to pluvial conditions?

Page 6-99, paragraph 10 -- Instead of the average rates, the

highest possible rates of erosion should be considered. Even the maximum rates are likely to be exceeded during pluvial periods. Why were these factors not given consideration?

Page 6-106, Rates of Peripheral Dissolution -- The rates of dissolution given here are the rates present in the area now. Isn't it likely that these rates would have been higher during Pleistocene pluvial periods and pluvial periods that may occur in the future? Also, Pleistocene dissolution is reported in the literature. What has happened to stop that dissolution?

Page 6-107, section 6.3.1.6.4 -- No consideration has been given to the fact (reported in the literature) that interior dissolution is apparently controlled by structural influence. If structural influence is a controlling factor then interior dissolution is probably not restricted to the upper salt units. Kreitler, *et al* (OF-WTWI-1984-52) indicates that a significant quantity of the water in the Wolfcamp aquifer appears to be migrating through the salt. Evidence presented in Kreitler's paper tends to indicate that transmission through the evaporite aquitard is related to fracturing. This condition would cause dissolution in all of the salt intervals.

Page 6-116, last column, fourth item -- The evidence indicated that a favorable condition is present, yet chapter 7 shows NP for this same guideline. Which is correct?

Page 6-122, last column, fifth item -- The evidence indicated that a favorable condition is present, yet chapter 7 shows NP for this same guideline. Which is correct?

Page 6-126, last column, last item -- The evidence indicates that a favorable condition is not present, yet chapter 7 shows P for this same guideline. Which is correct?

Page 6-139, last paragraph -- This paragraph says that no in situ characteristics have been identified as requiring unusual engineering measures. This is understandable since no data has even been gathered at the site and, therefore, no in situ characteristics

can be identified. The judgement is debatable based upon an assumption that the expected conditions will be found at the site.

Page 6-142, last paragraph -- Flooding of the playa lake on the east side of the site is mentioned, but what about the playa lake on the west side of the site?

Page 6-144, paragraph 5 -- What about faults that could be reactivated by repository construction and operation? This subject should be considered.

Page 6-146, last column, fourth item -- Is this a favorable condition or a potentially adverse condition? It appears one way in the text and another on the table.

Page 6-186, paragraph 5 -- What about water that might flow from the aquifers, down the outside of the shaft liners and then begin dissolving the host rock? This water would not be saturated with sodium and chloride and could readily dissolve the salt, yet nothing is said about this type of dissolution.

Page 6-196, paragraph 1 -- Expecting the brine to distribute uniformly over the package surface is not reasonable. In order for this to occur, there would have to be a perfectly uniform contact between the salt and the container. Since salt is backfilled around the container, it is unlikely that a perfect contact between the two can be made. Therefore, uniform corrosion is not as likely as pitting.

Page 6-206, paragraph 4 -- In the next to last sentence it states that "faulty shaft seals might affect radionuclide transport". It should say, faulty shaft seals will affect radionuclide transport. There is no way they would not contribute to radionuclide transport.

Page 6-217, paragraph 5 -- The second sentence says, "There is no reasonable basis for anticipating that a repository would be disrupted by the development of new faults or other structures." Of course there is no basis for anticipation of disruption because the data are not available (no seismic profiles across the site) to base

any analysis on. All the faults have not been identified yet and therefore the structure for the site is not even known yet. It is hard to form a basis from no data.

## CHAPTER 7

Page 7-7, Deaf Smith column -- The findings for the four parts of favorable conditions (continued) do not appear on the chart of page 6-117. Why is there a discrepancy? Also, why are the findings on this page of the table in parenthesis but are not on the other pages of the table?

Page 7-11, paragraph 1 -- A range of 87,000 to 361,000 years is given for ground-water flow time from the barrier to the environment. Such a large range would indicate that the available data are not enough to make an accurate prediction of the flow time and, therefore, should be considered highly speculative at best.

Page 7-11, last paragraph -- The Quaternary Period at Yucca Mountain included cyclic fluctuation in precipitation. Deaf Smith has also had fluctuations in precipitation in the past, yet from this paragraph, one would assume that Yucca Mountain was the only site that had this characteristic.

Page 7-16, last paragraph -- The first sentence says, "The high salinity of the ground water at all of the salt sites...would inhibit the formation of particulates and colloids". This should refer to the deep basin aquifer and the brines in the evaporite section at Deaf Smith. The upper aquifers are not highly saline at the site.

Page 7-21, last paragraph -- This paragraph says that Deaf Smith has radionuclide-sorbing minerals but, this is not a known fact at this time.

Page 7-27, paragraph 2 -- Yucca Mountain and Deaf Smith should change places because Deaf Smith did not score as well as Yucca Mountain according to Table 7-3. Why?

Page 7-27, paragraph 5 -- Why are phenomena that could affect isolation expected to not have a significant effect at any of the sites? These phenomena should be considered significant at all sites.

Page 7-28, last paragraph -- Could changes in surface-water conditions increase salt dissolution? Why is this not considered?

Page 7-31, last paragraph -- The conclusion for this condition is based on available data from the Quaternary record. Yet in paragraph 3 it is stated that data in the Palo Duro Basin are insufficient to determine the effects of changes on the hydrologic system. Therefore, the evidence is based on insufficient data.

Page 7-32, paragraph 2 -- An increase in recharge and discharge may not alter the permeability within the salt sequence but might increase salt dissolution at the salt-rock interface and salt margins.

Page 7-32, paragraph 3 -- The sites are considered as ranked equally, yet according to Table 7-4, Yucca Mountain seems to be slightly better than the other sites.

Page 7-36, last paragraph -- The statement that no significant host-rock dissolution has been identified in Deaf Smith is based on a log from a well 3 miles away and seismic-reflection data that does not cover the site.

Page 7-39, paragraph 2 -- The Needles fault zone 11 miles west of the Davis Canyon site is mentioned, but the Pennsylvanian faults only 7 miles from the Deaf Smith site are not. Why? Also, could the rates at which dissolution fronts are migrating increase with the predicted increase in precipitation.

Page 7-43, paragraph 2 -- Movement on preexisted faults near the Davis Canyon site is mentioned but movement on faults near the Deaf Smith site could also be taking place. Why was this not considered?

Page 7-44, final paragraph -- The order of ranking as presented is not supported by Table 7-7.

Page 7-49, paragraph 3 -- Why can resources be ruled out at Deaf Smith and not at Richton?

Page 7-51, paragraph 2 -- How would depletion of the High Plains Aquifer change the "favorable downward hydraulic gradient"? Also, the "favorable downward hydraulic gradient" is a regional feature; can it be stated definitely that the gradient is the same at all points within the basin?

Page 7-72, paragraph 1 -- How can Yucca Mountain be ranked last when it appears to be as good as Davis Canyon on Table 7-12?

Page 7-84, paragraph 1 -- How will the repository's effect on the High Plains aquifer compare to the reduced rate of aquifer use if the farmers move to dry land crops or significant reductions in water use.

Page 7-86 & 87, Deaf Smith column -- The findings for favorable condition (1), parts (i), (ii), (iii), (iv), and (v) are not included in Table 6-7. Why?

Page 7-90, paragraph 5 -- In this paragraph it says the access routes at Deaf Smith do not require cuts, fills, tunnels, or bridges and that Deaf Smith routes might require minor cuts, fills and bridgework. Which statement is correct?

Page 7-106, paragraph 1 -- Deaf Smith should be ranked lower than Hanford according to the results presented in Table 7-17.

Page 7-110, paragraph 1 -- What preliminary data indicate that adequate quantities of water can be obtained from the Dockum?



**COMMENTS ON U.S. DEPARTMENT OF ENERGY DRAFT ENVIRONMENTAL ASSESSMENTS  
FOR PROPOSED HIGH-LEVEL NUCLEAR WASTE REPOSITORY SITES  
IN DEAF SMITH AND SWISHER COUNTIES**

**Texas Department of Agriculture  
March 1985**

All comments submitted by the Texas Department of Agriculture apply to the proposed sites in both Deaf Smith and Swisher counties.

**Summary of General Comments**

Errors and omissions in socioeconomic impact assessments should be corrected and submitted for public review before final acceptance of Environmental Assessments, before final site rankings are announced, and before site characterization. Socioeconomic information in the Draft EA's is inadequate to evaluate whether conditions at the Texas sites are "favorable" or "unfavorable" under the DOE siting guidelines or to compare Texas sites to others in the nation. If additional information is not collected, then conservative assumptions should be applied, as stated in 6.1.2, and Texas sites should be judged unfavorable for socioeconomic impacts.

1. The Draft Environmental Assessments give inadequate attention to unique agricultural resources of the impact areas. These omissions understate the potential impact of a high-level nuclear waste repository in Texas.



For example, hybrid seed production is not mentioned in the Chapter 3 description of existing conditions in the proposed site areas; yet the High Plains is exceptionally well-suited to seed production, and this area is the chief seed-producing region in Texas. The foundation seed operation located in and next to the proposed Deaf Smith site is not mentioned in later chapters describing effects of site characterization and of the repository itself. The attached statement by Kenneth Boatwright, Director of TDA's Seed Division, gives additional information about seed production in the impact areas.

Other specialized agricultural operations also receive inadequate attention. For example, a food-grade sunflower-seed processor located within a proposed site is not mentioned in the description of the site. Food processors play a critical role in the High Plains economy because they keep value-added dollars circulating locally. These value-added dollars are an increasing share of the food dollar, so they are crucial to a healthy economy for agricultural regions.

2. DOE assumptions concerning effects of a repository on food sales are unsupported and illogical. Past experience indicates that unlabeled products can be affected by consumer fears about product safety. In addition, the possibility of actual contamination of crops must be considered. The failure to discuss possible socioeconomic effects of accidents is a serious omission in the Draft EA's as a whole.

3. The Draft EA's represent a sloppy and inaccurate use of agricultural statistics. Sources should be clearly stated and errors corrected in new drafts submitted for public review. Numerous errors in these drafts undermine confidence in DOE's competence to plan and build a high-level nuclear waste repository.

4. Real, current information about agricultural activities in the proposed sites should be used in the Environmental Assessments rather than estimates based on county-wide averages. Use of county-wide averages understates the value of agriculture in the proposed sites. These estimates must be corrected before final site rankings are determined, so that the rankings are based on accurate and complete information.

5. Draft EA's indicate several areas where additional information would be useful: for example, studies of the effects of perceived contamination on marketability of agricultural products. These studies should be completed before site characterization. Socioeconomic studies may reveal impacts that cannot be mitigated. Documentation of effects that cannot be mitigated would indicate that these sites are less suitable under the terms of the Nuclear Waste Policy Act.

6. The Department of Energy has a responsibility to develop socioeconomic baseline data for the repository site, as acknowledged in chapter 6. Studies by the Texas Department of Agriculture and the

Governor demonstrate that consideration of Texas as a possible repository site has already affected the local economy, and these effects will multiply if Texas is chosen for site characterization. A realistic effort to establish baseline data must be complete before final rankings of the sites are announced.

7. The Department of Energy has not adequately met its responsibility under NWPA to provide public access to the decision-making process. A substantial proportion of the residents of both site counties are Hispanic and speak Spanish as their primary language. DOE has made no effort to make information concerning site-selection available in Spanish. Further information concerning the importance of bilingual information is found in the February 21, 1985 letter from Agriculture Commissioner Jim Hightower to Secretary John Herrington.

### Specific Comments by Section

All comments submitted by the Texas Department of Agriculture apply to both the Deaf Smith and Swisher County Draft Environmental Assessments. Page numbers and table numbers from the Deaf Smith Draft EA are provided for readers' convenience, although comments apply to both counties.

3.6.2.4 General information concerning the national agricultural economy is of limited relevance in deciding whether to locate a high-level nuclear waste repository in the rich agricultural lands of the Texas Plains. The current depression in agriculture is largely a result of national policies and could change. In contrast, "prime" farmland and water in the Ogallala and Santa Rosa aquifers are permanent natural resources that could be permanently destroyed by releases of high-level nuclear wastes.

A detailed discussion of economic conditions for agriculture in the High Plains would be more relevant to assessing the potential economic impact of building a nuclear repository here. This chapter omits any mention of the extensive seed industry in this area (see comments by Kenneth Boatwright for further information). It also fails to discuss other unique agricultural businesses, such as crops produced and processed for health-food markets. The role of food processors in the agricultural economy and the potential for growth in this sector should be included in this chapter.

Many of the figures used in this chapter are out-of-date. For

example, the number of agricultural establishments is based on a 1978 source. The 1982 agricultural production figures used throughout the EA's are not the most recent available.

Other figures are inadequately documented. For example, no source is given for land values presented on page 3-200, although estimated land values might vary greatly depending on the source of the estimate. Production and cost figures for single years are also used throughout the documents without any discussion of fluctuations due to weather or other unique conditions that may affect agricultural statistics for a particular year.

4.1.3.2 This section discusses socioeconomic studies planned for site characterization. These studies should be incorporated into environmental assessments completed before site characterization. For example, this section states that studies during site characterization will establish "base" figures for the site, but "base" conditions will no longer exist during site characterization. Research sponsored by the Texas Department of Agriculture and the Governor's Office indicates that some farmers have already reduced their investment in agriculture because of the possibility that their area may be chosen as a nuclear waste repository. Several landowners have said that they are unable to sell their property because of its location in or near the proposed repository sites, that some properties have been on the market for long periods of time, or that property has been sold below its expected value. This evidence that DOE's current site-selection activities are affecting the local economy indicates that site characterization is

likely to have substantial economic effects, so that baseline studies must be completed before site characterization begins.

The Nuclear Waste Policy Act requires the Department of Energy to provide an assessment of the regional and local impacts of locating the proposed repository at a particular site. This requirement can only be met if adequate baseline studies are conducted for the specific site and for the local and regional impact areas.

4.2.1.1 This section states that the maximum loss of agricultural land during site characterization is the "5,760-acre protected area." However, the following section (4.2.1.1.1) discusses boreholes to be drilled outside the nine-square-mile site. Exact locations of land referred to in these two sections is unclear, but the sections appear to be contradictory.

The practice throughout the Environmental Assessments of referring to agricultural land areas as a percent of agricultural land in the county or region gives the incorrect impression that these land areas are of negligible size. The two site counties are exceptionally rich agricultural areas, ranking consistently among the top ten Texas counties in cash receipts from crops and livestock. The USDA ranks Deaf Smith County as approximately two-thirds "prime" farmland, and Swisher as approximately four-fifths "prime." "Prime" farmland within the nine-square-mile sites is no less "prime," simply because neighboring soils are also extremely productive. In fact, the vast expanse of productive farmland is one characteristic of this region that makes it uniquely suited for seed production, since cultivation of

neighboring lands reduces weed contamination problems.

4.2.1.1.4 The Department of Energy has not provided adequate evidence for the statement that "no significant cumulative and long-term impacts on regional land use are expected from site characterization activities." As indicated in the following paragraph of this section, long-term damage is possible from salt contamination. This paragraph states, "it is not possible to predict whether deposition [of salt] will preclude agricultural usage of the land." This issue should be resolved before site characterization. If it cannot be resolved, then the "worst-case" assumption that the land will be damaged is appropriate.

4.2.1.5.2 This section and some of the following sections in this chapter state that land near the repository shaft will be reclaimed to "an acceptable and agriculturally productive condition" if the site is not chosen for a repository. The Draft EA's do not indicate whether land will be reclaimed to the exceptionally productive "prime" soil level now common throughout both Texas sites.

Once again, the important issue of possible adverse effects from salt contamination is raised, but not resolved. Information about effects of other salt sources in other areas of the country is difficult to evaluate, since the Draft EA does not include wind or rainfall figures for those areas or other information to indicate whether conditions are truly comparable. The example of salt in the Texas Gulf Coast area is not relevant because of vastly different

conditions affecting agriculture in that area.

4.2.2 The Draft EA's do not provide enough information to enable the states and the public to evaluate projections concerning the size of the workforce or the number of workers likely to be hired locally for site characterization or for construction of the repository. No reference is given in this section to documentation of projections given here. In any case, the review period for Draft EA's has been too short to allow for a comprehensive critical review of reference materials. Projections concerning total employment and percent local hires are of great interest to the state and to local residents, and the basis for these projections should be provided for public review.

The number of workers who "could" be hired locally is of minimal relevance to estimating the actual effects of site characterization. Estimates of the number of workers that "could" be hired locally should not be applied to the in-migration model. At the top of page 4-118, the Draft EA states, "To determine the number of in-migrants, the lowest percentage of local workers to be hired should be assumed." The following sentence uses the assumption that at least 10 percent of workers will be hired locally. However, on the basis of information provided in the Draft EA, zero local hires is the appropriate assumption.

Comments about the in-migration model are included with the discussion of chapter 5.

Lost revenues from agriculture should be discussed in absolute terms, not as percentages. The fact that crop revenues lost within the



site will be a small percentage of regional crop revenues is a reflection of the exceptional agricultural productivity of this area.

Estimates of lost revenues also should be site-specific, not based on county-wide averages. Since both Texas sites include areas of seed production, the revenues lost are likely to exceed estimates made from county-wide averages. Production of other specialized crops, such as sugar-beets or "health food" grains would also yield revenues above the estimates made from county averages. The loss of agriculture-related businesses, such as a food-grade sunflower seed processor, within the site also would create additional revenue losses that should be included in the Environmental Assessment. Possible revenue losses outside the sites also should be included. For example, effects of site characterization on Richardson Seed Farms, located both in and adjacent to the Deaf Smith site, are likely to be quite substantial.

Effects of site characterization on agricultural businesses, in general, are not adequately discussed in the Draft EA's. This section lists possible business benefits related to services for site characterization workers and their families, but it does not discuss business losses related to displaced agricultural production.

The basis for estimates of site-characterization expenditures should be presented for public review.

The discussion of impacts on social structure and quality of life mentions potential lifestyle conflicts between current residents of the site areas and in-migrants. This section should specifically discuss the implications of in-migrants locating in communities that are very strongly opposed to hosting a nuclear waste repository. Studies

conducted by TDA and the Governor have identified deep distrust and hostility among Deaf Smith and Swisher county residents toward the U.S. Department of Energy and its contractors, and these feelings are also apparent in public comments at DOE and state hearings. Intense hostility is likely to extend to future employees of the nuclear waste program. Several participants in TDA surveys have threatened violence against the repository.

The Draft EA mentions possible alternatives for reducing social and economic effects of site characterization, but these alternatives are not described in enough detail to allow for evaluation of their likely effectiveness or appropriateness.

5.1.1.1 This section states that waste-water ponds will "minimize" seepage of contaminated water into the ground. Does this wording indicate that some seepage will occur? What will be the extent and consequence of seepage? This issue is of critical importance, since the repository sites are located over the Ogallala and Dockum Group aquifers, freshwater resources which are essential to the Texas Plains.

5.1.2.3 The Draft EA's discuss the possible need to use water to control dispersion of excavated salt. Do the estimates of repository water demands include allowances for water used for this purpose?

Studies concerning salt dispersion should be completed before site characterization, since salt excavation will begin with characterization.

Table 5-6. AEC injury and fatality rates shown in this table are for 1943-1975, so the most recent data included in these rates is nearly 10 years old. Long-term risks for employees at nuclear facilities (for example, increased cancer rates) are not included at all. Environmental Assessments should provide realistic, current information about worker safety at the repository.

5.1.5.2 The Draft EA's present no evidence that DOE can reasonably expect to construct signs that will effectively communicate to civilizations 10,000 years in the future to warn them that drilling over the repository site would be hazardous. The proposed monuments might, in fact, attract curious explorers to excavate the site.

5.2.1.2 Farm operators in Deaf Smith and Swisher counties believe that their land does have potentially valuable mineral resources. Among farm operators who responded to surveys sponsored by TDA and the Governor, 35 percent believe the value of their mineral rights has been damaged by DOE consideration of their area as a possible repository site; 74 percent believe their mineral values will decline if their county is chosen for the repository. These results indicate that mineral values are an important part of property values in the site region. Whether or not these properties actually have undiscovered hydrocarbons or other minerals, property values are reduced by the possibility of DOE drilling restrictions. In addition, several property owners have described recent lease negotiations with major oil companies, and these landowners believe negotiations fell through

because of DOE activities.

5.2.3.1 Studies of unique agricultural lands in the site areas should be completed before site characterization, since site characterization could disturb these lands.

Beans, carrots, and onions--three crops identified in the Draft EA's as salt-sensitive--are all grown in the site counties. Despite DOE assurances that salt effects will be negligible, Draft EA's do not include adequate information to judge effects of salt contamination. They also do not indicate whether individual farmers will be expected to pay costs of suggested decontamination with gypsum; they do not discuss the possibility that salts "flushed" out of soils will contaminate water supplies, and they do not discuss implications of using limited irrigation water supplies for salt decontamination.

5.3.1.2 The Texas Department of Agriculture does not have the expertise to evaluate estimates of radiological and nonradiological risks presented in this section. However, the closing statement that risks from the nuclear waste program are small compared to "comparable" risks is inappropriate, since the other risks discussed in this section are not comparable. Extensive research by P. Slovic, B. Fischhoff, S. Lichtenstein, and their colleagues indicates that the public does not consider risks from traffic accidents or from natural causes to be comparable to the risk of radiation releases from nuclear facilities. Technological hazards which have potential effects on "innocent bystanders" who had no choice in exposing themselves to risk are

consistently rated as less acceptable to the public than other sources of risk. In particular, nuclear hazards are "dreaded."

Surveys by TDA and the Governor indicate that a majority of residents of Deaf Smith and Swisher counties are concerned about radiological hazards and other health and environmental risks associated with the nuclear waste repository. (Please refer to the report of this research for further information.) These concerns are, in themselves, an important effect of building a nuclear waste repository in Texas, since they indicate that the repository is likely to be a source of stress for local residents.

5.4 The in-migration model used here is critical to estimates of socioeconomic effects of the repository. However, information provided in the Draft EA's is inadequate to evaluate the accuracy of this model. We understand that reference materials have recently been provided to the Texas Nuclear Waste Programs Office, but we have been unable to review them within the time limit for submitting comments to DOE.

Although the references indicate supporting documentation for the model itself, some estimates used in the model are not referenced. For example, what is the basis for estimates of the size of the repository workforce? What "other large-scale developments in rural settings" are the basis for Table-25, and how closely comparable are they to the nuclear repository? Does the model consider effects of demographic trends, for example increases in dual-career households? Since repository construction and operation will not begin for several years,

these trends could significantly influence socioeconomic effects of the repository. What is the basis for assumptions about employment of workers' spouses? The possibility that some spouses may be unemployed should be considered.

The gravity model formula on page 5-104 appears to be incorrect, since the numerator and denominator are the same.

Since a nuclear waste repository has never been constructed before, many of the multipliers and value estimates used in the in-migration model have a relatively insubstantial empirical basis. Therefore, Draft EA's should include sensitivity analyses, indicating a likely range of values for key elements of the model.

A serious flaw in the DOE population model is the failure to include any estimates for out-migration due to the repository. In surveys sponsored by TDA and the Governor, 44 percent of residents of Deaf Smith, Swisher, and southern Oldham counties said they had considered moving out of the area because of the repository. Farm operators who participated in a similar survey were asked what kind of changes they expect to make if their county is chosen for the repository, and 18 percent said they would move out of the area. Residents of Deaf Smith, Oldham, and Swisher counties said they plan to move because they believe the repository would threaten their health and their livelihood.

5.4.1.4 The use of county-wide averages to project the number of residents in the nine-square-mile sites is inappropriate. Actual counts are readily obtainable and should be used. Actual counts should

also be used wherever possible for displacement due to road or rail construction.

This section concerning "displacement of residents" should include not only residents living within the repository sites, but also residents displaced because of effects of the repository on agriculture and agriculture-related businesses surrounding the repository. Farm operators and employees at food processing plants may be displaced because the repository threatens marketability of their products.

5.4.2.1 The possibility that effects of the repository can be mitigated by DOE programs is mentioned in this section and several other sections of this chapter, but no specific plan is presented. Until a credible plan is presented, no mitigation should be assumed.

5.4.2.2.1 The Draft EA's state that DOE has inadequate data to estimate effects of the repository on land values. They do not describe any efforts to obtain relevant data. Estimates of effects on land values are an important part of the environmental assessment and should not be omitted simply because DOE does not have this information already in hand.

Surveys conducted by the State of Texas indicate that 48 percent of farm operators believe their land values have already gone down because of the possibility of a nuclear repository in their county. Half of the farm operators "strongly agree" that landowners next to the proposed repository sites have already been hurt financially, and 19 percent "somewhat agree" that these landowners have been hurt. Several

farm operators indicated that they have been unable to sell land near the sites, and others said they decided not to buy additional land until they know whether a repository will be built in Texas.

A survey of residents of Deaf Smith, Swisher, and southern Oldham counties shows that 60 percent believe the value of their own home will go down if a nuclear repository is built in their county, and 80 percent believe the value of farmland would go down because of the repository. Sixty-eight percent of the residents of Crosby and Moore counties--located in the Texas Plains more distant from the proposed repository sites--believe the value of farmland in their own county will go down if Texas is chosen for the repository. Since land values are based, in part, on buyers' expectations about future values, local residents' opinions about effects of the repository must be considered in assessing economic impacts of the nuclear waste program.

5.4.2.3 and 5.4.2.4 Draft EA's grossly understate economic losses that would result from building a repository in Texas. These estimates should be corrected before final EA's are accepted.

Complete site-specific information about agricultural impacts and displacement of economic activities should be included in the EA's. Both Texas sites include unique agricultural activities, particularly seed production, so county-wide averages are likely to understate economic losses. Information about actual agricultural activities in the proposed sites is readily available from local sources, and this information should be used instead of estimates.

The EA's cite 1982 TDA/USDA sources for agricultural statistics,



although 1983 figures are available. Problems with using agricultural statistics for a single year have already been mentioned. The TDA agricultural cash receipts figures cited in the EA's do not include the value of seed production, so the value of seed must be added to get a reasonable estimate of agricultural revenue.

Draft EA's also understate economic losses by failing to consider indirect effects of lost agricultural production. The Texas Department of Water Resources econometric model for Texas specifies a multiplier of 3.1 for receipts from irrigated agriculture and 3.4 for dryland farms. These multipliers can be used to estimate the effects of agricultural losses on the Texas economy; additional losses outside of Texas would be expected.

5.4.2.4.2 The importance of obtaining accurate site-specific information about agriculture is particularly apparent in this section where estimates based on county-wide figures are quite different from local information about what is actually grown on the proposed sites.

The Draft EA text concerning crop values (page 5-117) conflicts with information in Table 5-35. The text states that DOE assumes, for purposes of impact assessment, that crop values will remain constant at 1982 levels: "As Table 5-35 indicates, the estimated annual value of lost crop production due to repository activities will be approximately \$625,070." Actually, Table 5-35 uses average crop values for 1980-1982, showing \$824,672 in annual crop losses. (This error is found in the Swisher County Draft EA, too, and the table number is also given incorrectly for Swisher.)

Table 35 illustrates several general problems with the treatment of agricultural statistics in the Draft EA's. First, the references are too vague to allow for independent checking of source materials. TDA is unable to verify some of the figures. For example, Table 35 gives the 1982 value per acre for irrigated corn at \$390. The 1982 Texas County Statistics shows 130 bushels per harvested acre as the 1982 yield for Deaf Smith County. The 1983 Texas Agricultural Cash Receipts, Prices Received and Paid by Farmers shows \$3.07 as the season-average corn price for 1982 for reporting district 1-N, including Deaf Smith County. For 130 bushels at \$3.07 per bushel, the value is \$399; not \$390. DOE may be using other sources; if so, these sources should be specified.

Table 35 says vegetable values are not available. Texas Vegetable Statistics compiled by Texas Crop and Livestock Reporting Service gives values for carrots, onions, potatoes, and other vegetables grown in Deaf Smith County. An average value for all vegetables is not provided and would not be appropriate because of variation among values for different vegetables. Use of accurate information for the repository sites would reduce this problem. In any case, assigning a value of zero for vegetables in Table 35 is inappropriate.

Table 35 illustrates variations from year-to-year in agricultural statistics. Justification for and implications of the decision to use 1980-1982 averages should be discussed.

Page 5-117 says landowners will be compensated for values at the time land is acquired. Evidence indicating that the DOE site-selection process is reducing local land values means that this strategy will

undercompensate landowners.

Problems found in the calculations on page 5-121 are similar to those in Table 5-35. On page 5-121, a 1981 source is cited, yet some of the numbers are identified as including 1982 information. TDA has not had time to study the entire Draft EA's for Deaf Smith and Swisher counties for errors in agricultural statistics. However, the number of errors readily identified reduces our confidence in the accuracy of the entire documents. We believe that new drafts should be issued for public review to assure that these errors are corrected before the repository site-selection process proceeds any further.

Since the basis for figuring average crop receipts per acre is unclear, we are unable to evaluate whether the assumption of two percent annual increases is reasonable. This assumption appears to be in conflict with the assumption on page 5-126 of 4 percent annual increases in production costs. Although crop receipts are now below production costs for some farmers, this trend cannot continue for another 20 years, the period used for DOE projections.

Discussion of effects of the repository on availability of water for irrigation should be site-specific, and they should consider the Dockum Group (Santa Rosa) aquifer, as well as the Ogallala.

Cattle figures should be current, local figures, not county-wide estimates.

"Potential Effect of Perceived Contamination on Agricultural Products" (page 5-134). This section grossly understates the deep concern of local residents about possible contamination of agricultural products and about reduced sales of farm products because of consumer

fears of contamination. Surveys conducted by the State of Texas show that 58 percent of farmers in Deaf Smith and Swisher counties "strongly agree" that it will be more difficult for them to sell their crops if a repository is built in their county, and 22 percent "somewhat agree." Two-thirds believe they would receive lower prices for their produce because of the repository. Among residents of Deaf Smith, Swisher, and southern Oldham counties, 57 percent believe it is "very likely" that the repository would lead to contamination of food grown in their county, and 20 percent believe contamination is "somewhat likely." Additional comments by survey participants clearly indicate that many local residents believe the agricultural economy of their area would be devastated by a nuclear repository.

Draft EA's assert that the problem of contamination of agricultural products is merely a psychological one, since actual contamination will be "miniscule." This statement neglects the possibility of accidental radiation releases. The economic and health effects of accidents should be included in Environmental Assessments.

Draft EA's state that as long as there is no actual food contamination, effects of perceived contamination may be a "'short-term' impact of greatest significance during the first 1 to 13 years of repository operation." Thirteen years is by no means a "short-term" impact on agricultural businesses. Even if effects of perceived contamination will disappear after 13 years, agricultural businesses will have disappeared in the meantime.

Furthermore, fears of contamination will not, in fact, go away after 13 years. The possibility of accidental radiation releases at

the repository will be a permanent threat. Even if food remains uncontaminated in the thirteenth year of repository operation, that is no guarantee of safety for the fourteenth year or for the hundredth year.

Agricultural businesses and the public are well-aware that nuclear facilities are subject to accidents and that federal assurances of safety at these facilities have repeatedly been proved wrong. The accident at Three Mile Island is only the best-known of many nuclear fiascoes. Studies by the Pennsylvania Department of Agriculture document substantial damage to food sales for the entire state following the TMI accident. Farmers and food processors in the Deaf Smith and Swisher county areas would similarly face continuing risks to their sales if a nuclear repository is built here. Farmers and businesses do not want to assume these risks. Several food processors have publicly stated that they plan to move if a repository is located here, and 18 percent of the farmers surveyed by the State of Texas said they would move. New food processors are also unlikely to move into the area.

The Draft EA states, "there was no literature identified that quantitatively measures business or individual consumer reactions when faced with the perception that food products may be radiologically contaminated." Major food companies that are interested in using radiation for food preservation have been actively researching consumer responses to irradiated food. Their research is proprietary and not available to TDA. However, it offers a possible source that DOE could investigate. Similar studies more directly related to the repository

also should be conducted by DOE as part of the environmental assessment process.

Even without quantitative estimates of consumer reactions, overwhelming public resistance to possible radiation contamination of food is obvious. Press reports that the food industry is considering radiation for food preservation were headlined, "Proposed Use of Irradiation Stirs Debate" (The Wall Street Journal, March 19, 1984), "Variety of foes riled by proposal to irradiate food" (Houston Post, February 16, 1984), "Irradiation in Lieu of EDB: Cause for Caution" (The New York Times, February 28, 1984). Public Citizen and the Center for Science in the Public Interest have both warned of possible dangers of irradiated food.

DOE should also refer to studies of public reaction to other food contaminants. The overwhelming concern about EDB in recent years is one example of the devastating effect of perceived contamination on food sales.

The Draft EA's go on to say that they cannot estimate effects of perceived food contamination because of "lack of specific data on sales and employment of agricultural businesses in the region." This information should be collected and included in the final EA's. Employment figures are available from the Bureau of Business Research at the University of Texas at Austin.

The Draft EA's claim that food sales will not be affected by the repository unless products are marked with regional identification so that consumers can identify their source. This assumption is unsupportable for several reasons. As mentioned earlier, research by

the Pennsylvania Department of Agriculture showed food sales declined for the entire state after the accident at TMI. Apparently consumers who were uncertain whether milk and other foods came from the TMI area chose to "play it safe" by avoiding products from anywhere in Pennsylvania. Similarly, when consumers became concerned about EDB contamination of fruit and grains, they responded by increasing purchases of labeled products, such as Arrowhead Mills grains, which had been tested and shown to be free of EDB. Consumers who were uncertain of the source of unlabeled grains they had already purchased brought them to TDA for testing, and grocery stores throughout Texas posted signs indicating the sources of their unmarked grains. More recently, when a major beef producer (Cactus Feeders of Dumas, Texas) announced that they would not feed antibiotics to their cattle, consumers from throughout the Southwest telephoned to ask where they could obtain Cactus Feeders' beef, although beef is not normally marked with the feedlot origin.

DOE's assumption that unmarked products will not be affected is also in error because consumers are not the only buyers in the chain of food sales. Intermediate buyers, including food processors and wholesalers may also be leary of produce grown near a nuclear dump. Mr. Frank Ford of Arrowhead Mills testified that wholesalers at out-of-state trade shows he attended recently were quite aware of the threat of a nuclear repository in Deaf Smith County.

Table 5-45 which summarizes DOE's unsupported assumptions about the effects of perceived food contamination is invalid, as discussed above.

Draft EA's say, "businesses may wait for some real indication of

changing demand associated with a repository before deciding to relocate or find new suppliers." This assumption is without basis. Several food processors have publicly stated that they will not wait. Businesses that wait until after consumers reject their products have waited too long to assure their own profitability. DOE statements throughout this section of the drafts are based on unvalidated assumptions that should be tested by further research prior to final ranking of the repository sites. Socioeconomic impacts of a repository in Texas cannot be estimated without this research.

The Draft EA states that DOE does not know whether locally produced corn products, such as tortillas, are made from locally grown corn. This information is readily available from local sources. Although TDA has not yet completed a survey of local food processors, informal contacts with local businesses indicate they are major buyers of local crops. One tortilla factory buys 500 million pounds of corn per year from the local area, approximately twice as much as Frito-Lay. Their final products are all clearly marked with their origin.

DOE notes that sales of hybrid sorghum seed might be affected. Other seed sales may also decline.

6.2.1.2.3 (1) Actual residential, seasonal, and daytime population statistics should be used rather than projections based on county-wide estimates. In addition, the likely in-migrant population should be considered.

Table 6-2 Draft EA's state that the purpose of the Farmland



Protection Policy Act is to "minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses." A nuclear waste repository would clearly cause irreversible destruction of farmland. Since other options for nuclear waste disposal are available, this loss of farmland is unnecessary.

Table 6-4 Statements concerning ground water imply that some contamination is expected. The extent and implications of contamination should be spelled out.

This table also states that soil contamination will be kept to "acceptable levels." Contamination is not acceptable to the state or to local residents.

The discussion of land use does not consider that seed production is extremely difficult to relocate and that the Deaf Smith site would affect a unique foundation seed operation. DOE also ignores the fact that loss of land where local families have lived and farmed for many generations cannot be compensated by relocation to other land. DOE states that effects on neighboring farms will be mitigated, but no credible plan is presented. The plan to compensate farmers within the site on the basis of land values at the time of condemnation is not "adequate," since farmland values have already declined because of DOE activities.

6.2.1.7.1 Baseline studies must be completed before final rankings of the repository sites. Research sponsored by TDA and the Governor

indicates that DOE site-selection activities have already affected the local economy, and these effects are expected to increase with site characterization. The existing baseline information described in chapter 3 is inadequate, as discussed earlier.

6.2.1.7.2 (1) Projected population changes must consider out-migration. In considering out-migration, out-migrants may not be subtracted from in-migrants to obtain a net impact figure. Loss of local residents, including families that have lived for several generations in the site area, will have significant effects on local communities. Out-migration estimates should be added to in-migration estimates to project total population disruption.

(4) The assumption that markets for agriculture and manufacturing will not be affected because these sectors export to areas outside the DOE study area is unsupported and invalid. The introduction to chapter 6 states that conservative assumptions should be used where existing data is incomplete. In this case, the assumption of major disruption to agriculture and to agriculture-related businesses is clearly appropriate. Further, the statement that "no substantial loss of employment is anticipated in the primary sectors" is contrary to public statements by several major employers. (This comment also applies to 6.2.1.7.3 (4)).

6.2.1.7.4 Potential effects of the repository on water cannot be adequately evaluated without additional information about possible

accidents and about Dockum Group (Santa Rosa) water. Without this information, DOE should assume the Texas sites are disqualified.

6.4.1.3 Discussion of radiation levels should specifically consider potential effects on hybrid seed crops.

Table 7-14. On the basis of information provided earlier in these comments, TDA believes that ratings of the Texas sites should be changed. For "projected net increases in employment and business sales..." (b3), DOE has not realistically considered losses to agriculture and related businesses. The favorable condition is not present in Texas.

DOE further projects no "substantial disruption of primary sectors of the economy" (b4). Existing evidence indicates substantial disruption is likely, and the favorable condition is not present in Texas. Similarly, the adverse condition "potential for major disruptions of primary sectors of the economy" (c4) is present in Texas.

The adverse condition, "need for repository-related ...acquisition of water rights, if such rights could have significant adverse impacts on the present or future development of the affected area" (c3) is present in Texas, since irrigation and drinking water from the Ogallala and Santa Rosa aquifers would be used by the repository or restricted by the repository control zone. Additional water supplies might also be contaminated. Thus, the disqualifying condition for water (d) is present in Texas.

The text related to Table 7-14 says adverse effects on agriculture "will be offset by the expected benefits to other parts of the agricultural sector" (p. 7-83). How can high-level nuclear wastes benefit agriculture?

Discussion of the site rankings for socioeconomic impacts (p. 7-85) states that in-migration requiring mitigation will occur at both Deaf Smith and Davis Canyon, and that effects on agriculture, a major sector of the Deaf Smith economy, are possible. The following ranking of the Deaf Smith site as more desirable than Davis Canyon seems to be arbitrary.



D-1  
Part 3  
1-4

COMMENTS BY KENNETH BOATWRIGHT, TDA SEED DIVISION DIRECTOR,  
CONCERNING U.S. DEPARTMENT OF ENERGY DRAFT ENVIRONMENTAL  
ASSESSMENTS FOR DEAF SMITH AND SWISHER COUNTIES

March 1985

I began work as a seed analyst for the Texas Department of Agriculture in 1970. I was later named chief seed analyst for the state and I am now Director of the Texas Department of Agriculture Seed Division, responsible for administering all state seed laws and regulations. Information concerning Texas seed laws is attached. My comments are based on 15 years of experience in working with seed growers throughout the State of Texas.

Seed production is a unique agricultural operation requiring both exceptional skill on the part of the farm operator and exceptional physical conditions, including appropriate soil, climate, water availability, and geographic isolation. The Texas High Plains is one of the most productive seed-growing areas in the world. Approximately 80 to 90 percent of the state's seed production is in this area, including hundreds of varieties of seed.

In addition, approximately 85 percent of the world's sorghum seed is produced in the High Plains. This area is uniquely suited for seed production for several reasons. The low humidity contributes to exceptionally high germination rates of about 90 percent.

The rich soil promotes unusually high productivity in pounds of seed per acre, and the warm growing season also contributes to very high yields. Low rainfall protects the quality of the seed during the harvest season. Finally, growing seed in an intensely cultivated area, such as the Texas High Plains, offers advantages because Johnson grass, which interbreeds with sorghum, is less prevalent on surrounding farmland than on land not used for crops. Attempts to grow sorghum seed in other areas of the nation and the world have never equaled the productivity and quality of the Texas High Plains. For example, recent efforts to develop sorghum production in the southeastern United States resulted in germination rates of only 60 to 70 percent. Since sorghum seed can be grown with the greatest efficiency and quality on the Texas High Plains, loss of this production would mean increased cost and reduced quality for seed buyers.

Demand for sorghum seed is likely to expand during coming years beyond current production levels, as agricultural markets are just learning the value of sorghum for both livestock feed and human consumption. Sorghum is an exceptionally economical crop because it produces protein values comparable to corn, but without the high requirements for water and other inputs needed to produce corn. Sorghum is used as a human food in Africa, and Texas sorghum seed is also exported to South America, Asia, and Europe.

The counties defined by the Department of Energy as the impact areas for the Deaf Smith and Swisher county repository sites are extremely productive seed growers. TDA records show twenty-eight seed companies operating in these impact areas. The attached chart shows the volume of Texas retail sales for seed companies in these counties, and in the Texas Ogallala region as a whole. The Texas Department of Agriculture collects a tax of four cents per hundredweight on retail sales of seed within the state and maintains regularly audited records of these sales. The figures in the attached chart represent the volume of seed produced in the impact counties and sold within Texas. TDA records show 1984 Texas retail sales of 307,287,302 pounds of seed for the Swisher impact area, 157,322,792 pounds for the Deaf Smith impact area, and 2,425,978,081 pounds for the area over the Ogallala aquifer.

These numbers represent only a fraction of the total amount of seed produced in this area, since a large proportion of Texas seed is exported to other states or other nations. For example, TDA records show retail sales of 6.8 million pounds of seed for Oldham County, but Richardson Seed Farms of Vega, Texas, estimates its total seed production at 60 million pounds. TDA figures are presented here to indicate the importance of the seed industry in the High Plains, but more complete seed production figures are needed to estimate the effects of building a high-level nuclear repository in this area.

TDA estimates the value of Texas retail sales of seed at \$184 million for the Swisher County impact area; \$94 million for the Deaf Smith County impact area; and \$1.5 billion for the Ogallala

region. These figures are based on a conservative estimate of 60 cents per pound as the average value of seed in this area. Seed prices range from approximately 35 cents per pound for cotton seed to approximately \$7 per pound for grass seed. Once again, these values represent only sales in Texas. Any estimate of the economic impact of building a nuclear repository in Texas will be incomplete until additional data about the volume and price of exported seed is included in the impact assessment.

The most obvious effect of building the repository here would be loss of seed production in and immediately adjacent to the repository site. Both the Deaf Smith and Swisher sites include seed growers. DOE Draft Environmental Assessments provide estimates of lost value of production for the proposed sites, but these figures do not consider seed production. Accurate estimates must specifically consider seed production on this land, since farmers receive higher prices for seed sales than for other crops.

In addition, impact assessments must consider effects on the unique Richardson Seed Farms operation in and adjacent to the Deaf Smith repository site. This farm is a particularly valuable agricultural resource for the State of Texas. Its large size allows for excellent isolation of seed crops from possible contaminants, and the foundation seed operation serves farmers throughout the state and the southwest. Statements from Texas A&M University, from the USDA, and from others outline the importance of this foundation seed operation in providing new genetic strains to southwestern farmers; I refer you to them for additional information. I would also like to



add that biogenetic engineering will have an increasingly important role in agriculture worldwide, so high-quality foundation seed farms will remain critical to keeping American agriculture efficient and economically competitive.

I have personally visited Richardson Seed Farms, and based on my 15 years of experience as a seed analyst for the State of Texas, I can say without any doubt that Richardson Seed Farms is operated with exceptional skill and dedication. The remarkably high yield and quality of Richardson seed is also an indication of exceptional soil, climate, and geographic isolation. In addition, Wayne Richardson has been able to provide optimal irrigation for his crops, and loss of access to water would undoubtedly reduce his production. An operation such as Richardson's is virtually impossible to move or replace. Richardson has taken 30 years to build his operation, and it is difficult to imagine assembling another farm with comparable geographic isolation, climate, soil and water in less than a decade at the very least.

Other seed producers in the proposed repository sites would also be extremely difficult to replace or move. Although it is possible to introduce seed production on land previously used for crops, this process is expensive, since genetic contaminants must be removed. In addition, seed production requires direct or indirect control of very large areas of land. Seed growers often have built understandings with their neighbors over many years to protect their seed from contamination. For example, sorghum seed cannot be grown next to grain sorghum or hay, since these crops would interbreed with the seed

crop. Problems of compatibility with neighboring crops would contribute to difficulties in relocating a seed operation.

Seed companies also develop long-standing relations with the individual growers who supply them, so disruption of seed production would affect both seed companies and these individual growers. Because of the technical skill required to grow high-quality seed, seed companies could not easily replace any farmers who left their business because of the of the nuclear repository. Seed companies need to be sure that their growers are experienced in seed production and will follow optimum growing procedures. The attached publications concerning Texas seed certification standards indicate some of the technical considerations in seed production.

Beyond the effects on farmers displaced directly by repository construction, the Texas Department of Agriculture believes the effect of a nuclear waste repository on the Texas seed industry will be widespread, extending far past the boundaries of the Department of Energy facility. The fact that radiation can produce genetic mutations that destroy the identity of hybrid seeds is widely known, so seed buyers may be unwilling to risk their own crops by purchasing seed produced near highly radioactive wastes. DOE Draft Environmental Assessments acknowledge that radiation releases in transportation and handling of wastes are expected. Seed producers in the repository impact areas would face the possibility that planned or accidental radiation releases could ruin the genetic purity of their crops. This increased risk could affect financing and insurance for seed producers as well as affecting their markets. Economic impact assessments for

the nuclear waste repository must include these considerations.

In summary, the proposed repository sites, the surrounding impact areas, and the larger region over the Ogallala aquifer are all very productive areas for seed crops. These areas are exceptionally well-suited to production of many types of seed. In particular, the vast majority of the world's sorghum seed is produced here, and markets for this crop are likely to expand in coming years. The Deaf Smith site also includes a uniquely valuable foundation seed operation. This operation and other seed farms would be very difficult to relocate. Attempts to forecast the economic impact of a nuclear waste repository must include detailed information about direct effects of construction on seed production within the sites. Economic assessments must also estimate effects on markets, financing, and insurance for other seed producers in the area, and they must consider effects on seed companies and farmers throughout the southwest and the world who rely on seed from the Texas High Plains.

I appreciate the opportunity to comment on DOE Draft Environmental Assessments for the nuclear waste repository. I hope this information will be useful in making DOE officials aware of the rich resources for seed production in the Texas High Plains. I will be happy to provide any additional information that may be helpful. As Director of the Seed Division of the Texas Department of Agriculture, I would welcome DOE officials who visited my office to learn more about Texas' very productive seed industry.

# TEXAS RETAIL SALES OF SEED FROM THE OGALLALA REGION FOR 1984

	<u>Pounds of Seed</u>
<u>Counties in the Deaf Smith Impact Area</u>	
Deaf Smith	102,297,513
O'Dham	6,783,768
Parmer	3,279,976
Randall	98,825
Swisher	44,862,710
Total	157,322,792
<u>Counties in the Swisher Impact Area</u>	
Deaf Smith	102,297,513
Hale	159,600,924
Potter	427,330
Randall	98,825
Swisher	44,862,710
Total	307,287,302
<u>Ogallala Region</u>	
Total	2,425,978,081

Note: These seed production figures represent Texas retail sales. They do not include seed produced in the affected counties, but sold outside the state. The Ogallala region includes the following Texas Crop Reporting Districts: Northern High Plains (1-N), Northern Low Plains (2-N), and Southern High Plains (1-S).



# COMMISSIONER OF AGRICULTURE

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## Testimony Before U.S. Department of Energy Hearing to Review Draft Environmental Assessments for Proposed Nuclear Waste Repository Sites in Deaf Smith and Swisher Counties

Texas Agriculture Commissioner Jim Hightower  
Austin, Texas  
March 1, 1985

I have here some 2,000 pages of information that DOE has compiled about Deaf Smith and Swisher counties and their good neighbors on the Texas Plains. These documents tell the average number of sunny and cloudy days in Amarillo for every month of the year. They describe the travel habits of the black-footed ferret, and they tell how many cars and trucks drove through Adrian on FM 214 in 1981.

But these seven pounds of analyses are lacking that one critical ounce of common sense that would have told even the most closed-minded analyst that the Texas Panhandle is an unsuitable site for dumping high-level nuclear trash: Deaf Smith County and surrounding areas rely on agriculture for their livelihood and way of life. The soil, the water and the people combine in this part of the world to be richly and uniquely productive in high-quality food, yet only ten pages of narrative in DOE's "Draft Environmental Assessment" address the impact that the proposed dump would have on agriculture. But, while the Draft is mighty light on analysis, it is very heavy on conclusion, flatly stating that the effect on farming would be "slight, ...negligible, ...not substantial."

These conclusions must have been drawn by a group of faraway consultants who mistakenly pulled the wrong state into their computer model. One trip to Deaf Smith County would have corrected their mistake, but apparently your analysts didn't want to get any manure on their Guccis or any tarnish on their preconceptions.

The reality is that this is farming country, pure and simple. Tampering with these agricultural resources is so dumb we shouldn't even be discussing it further, much less moving ahead to spend a billion dollars for "intensive characterization studies" in Deaf Smith County. The best use of this land, this water and these people is to feed people, not to store toxic wastes.

The Ogallala region you have chosen produces 78 million bushels of wheat each year and about 10% of the nation's beef--in fact, a million cattle are raised within 50 miles of the Deaf Smith dumpsite. Corn, vegetables, soybeans, sugar beets--you name it, it's grown there--bring in a third of our state's total cash receipts for crops and livestock. That's between 3 and 4 billion dollars every year, and as that money ripples through the economy, it generates about \$10 billion in total economic activity for Texas.

In addition to cash receipts for crops and livestock, the Ogallala region produces more than three-fourths of the state's seed, worth an estimated \$1.4 billion a year. Last year Texans bought 2.4 billion pounds of seed grown in this area, including barley, corn, cotton, oats, soybeans, wheat, and several other varieties. Eighty-five percent of the world's sorghum seed is grown here. They even produce grass seed for city lawns. Two hundred and eleven million pounds of certified seed were grown last year in the counties defined by DOE as the impact area for the Deaf Smith site, and 262 million pounds was grown in the DOE impact area for the Swisher site. These seed production figures are official Texas sales records maintained by TDA and audited regularly. Yet Chapter 3 of the DOE Environmental Assessments describes the current state of agriculture in Deaf Smith and Swisher counties without even mentioning the seed industry and its fundamental role in High Plains agriculture.

They missed a few other basic facts, too. According to the families that live and farm on the Deaf Smith site, DOE is 100 percent off-base in their

estimate of the amount of irrigated cropland in the nine-square-mile site, they're 500 percent off on the number of cattle, and they completely overlooked several working water wells.

The Department of Energy says they can't find out enough about the Santa Rosa aquifer to even consider it in the site-selection process. But the people of Vega already know plenty about that water: They know that just one Santa Rosa well located in the Deaf Smith site can supply their town for the next 300 years, and they know of no other water source to meet their needs. The DOE can't plug holes in their own report, yet they want us to believe that they can seal-off a 22-foot shaft through two aquifers for 10,000 years--a technological feat that has never been tried.

DOE's socioeconomic models attempt to convince us that 70,000 tons of lethal radioactive trash is going to be good for Texas rural communities. Their "In-Migration Model Logic of Calculations" has 37 boxes and 43 arrows showing the number of new workers they think are going to move into the site area, the number who are going to commute, the number bringing husbands or wives who need jobs, the number with school-age children, and so on. Nowhere in this report, however, does the DOE say anything about how many folks are going to move out. How many families are going to pull up stakes because they don't want their farms and businesses ruined, and because they don't want to raise their children with the threat of nuclear disaster.

While DOE was working up dreamy scenarios from their offices in Columbus, Ohio, and Washington, D.C., the Texas Department of Agriculture, in cooperation with the Governor, was contacting more than a thousand Panhandle residents to ask them what changes they foresee if this new neighbor moves to town. In our scientific opinion surveys of Deaf Smith and Swisher counties, we asked farmers what changes they would make if their county was chosen as a nuclear waste dump.

Without any question from us, nearly 18% of the farmers interviewed said they would move out. Families that have farmed their land for three or four generations said they would sell their land, even though they know the threat of the repository will mean selling at a loss.

Many farmers believe just the threat of a nuclear dump being built in their county has already caused economic damages. Nearly half say their land values have already gone down because of the dump. Dozens of farmers said they have put their personal and financial plans on hold, delaying maintenance and repairs, deciding not to drill new wells or buy land and equipment, and even hesitating to pass their land on to their children for fear their legacy will be a nuclear mess. If these effects are already being documented now, what kind of disaster can we expect if DOE actually moves in with their drilling rigs to start punching through the Ogallala and the Santa Rosa aquifers for their "site characterization" experiments? Nearly two-thirds of the farmers we surveyed think that their soil and water could be contaminated just by the tests DOE plans to conduct, much less by actually putting the dump in place.

In our poll of a representative group of Deaf Smith and Swisher residents, 61 percent said they think it "very likely" that the dump would ruin their water, and 54 percent said it will contaminate their land. Half said the dump is "very likely" to mean health problems for themselves and their neighbors, and 44 percent said they would consider moving out if their county is chosen as the repository site.

Local residents are not the only ones who say they will leave town if the dump moves in. Several major food processors, including Frito-Lay and Holly Sugar, have said the dump could ruin their product sales nationwide.

Aside from the tremendous variety of food and fiber grown on Deaf Smith and Swisher farmland, these counties have sprouted a bumper crop of innovative,



home-grown entrepreneurs. Wayne Richardson of Richardson Seed Farm worked 30 years to establish a unique foundation seed operation that supplies the first generation of new wheat strains for six states. Frank Ford of Arrowhead Mills founded one of the nation's biggest producers of health-food grains and oil. And Cipriano Ramirez built a two-room shop that grew into the Hereford Tortilla Factory now operated by his children, Rose and Rene, with more than 80 employees. These agricultural businesses are critical to the High Plains economy because they keep value-added dollars circulating in our farm communities.

The DOE Environmental Assessments say farm-related businesses will wait until after the repository is built to see whether consumers object to their products. The business owners themselves, however, say they know already that their products will be "tainted" in the public mind, and they have no intention of staking their good name on a nuclear gamble.

DOE also says farm sales won't be hurt because consumers won't notice that their breakfast cereal was grown over a nuclear dump. But we have seen time and again that people do care about the purity of the food they eat. DOE is so busy dreaming 10,000 years into the future that they can't remember even the recent past. Just a little more than a year ago consumers were literally walking into TDA offices with sacks of flour begging our labs to test their groceries for a little chemical named EDB. Grocery stores all over the state were posting signs telling shoppers exactly where their grains and fruits were grown and stored. People want to know where their dinner is coming from.

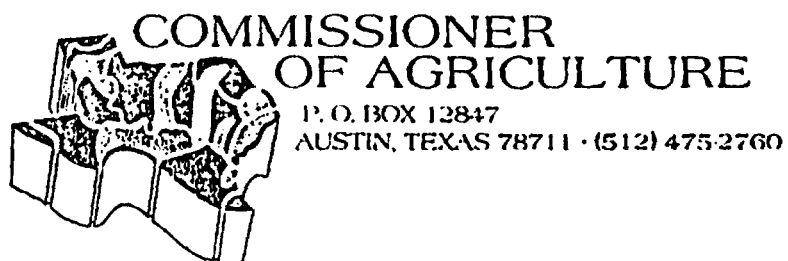
Another three-letter piece of history that DOE can't seem to remember is TMI. A study by the Pennsylvania Department of Agriculture showed the accident at Three Mile Island wrecked milk sales for the entire state. A major dairy in Harrisburg faced a 50-percent drop in sales within two weeks of the accident,

and supermarkets as far away as Maryland and Washington, D.C., were advertising to assure consumers that they weren't buying milk from anywhere in Pennsylvania. Nearly a year after the accident, a survey of farmers within 15 miles of TMI found that milk and vegetable sales still hadn't recovered to where they were before the hydrogen bubble.

When TMI was on the drawing boards, I'm sure the nuclear power companies and their friends at the DOE and the NRC never told these farmers that their businesses would be hurt, that their families would be forced to evacuate, or that detrimental health effects would surface slowly over the coming years. A study by the Pennsylvania Department of Health found hundreds of infant deaths in communities downwind from TMI were caused by the accident.

Now the DOE Environmental Assessments tell us they don't "expect" any dangerous radiation releases; they don't "anticipate" any significant effects on agriculture. We don't think they know what they are talking about, and we don't trust them. There are just too many unknowns in the DOE equations. They don't know whether they can keep radioactive wastes out of the Ogallala. They don't know where the excavated salt is going to end up. They don't know whether 8,000 truckloads of highly radioactive spent fuel are going to make it through Dallas on I-40 without a hitch.

Farmers are hardly living a life of prosperity on the High Plains right now. Agriculture is in deep economic trouble. Good farmers are face to face with another season of crop prices below the cost of production. But we are looking for positive solutions to these problems: solutions that build on our commitment to feed the world and to protect our God-given resources of soil and water for our children. But, while we're helping families fight economic foreclosure in the short run, we cannot let DOE slip in and foreclose forever on these farming resources.



Economic Effect of High-Level Nuclear Waste Repository in Texas  
Testimony Before U.S. Committee on Environment and Public Works

Texas Agriculture Commissioner Jim Hightower  
Hereford, Texas  
February 11, 1985

Senator Bentsen, thank you for this opportunity to appear before the U.S. Senate Committee on Environment and Public Works. I'm glad someone in Washington is worrying about what a nuclear dump would mean for Texas farmers and food processors, and for all the rest of us who enjoy their high-quality produce.

The U.S. Department of Energy has blindly asserted that their plan to sweep nuclear waste under the productive agricultural carpet of the Panhandle will not be a big deal to the local economy. But, they show no sign that they even know what the local economy is. In nearly 1,000 pages of information about the repository, the DOE Draft Environmental Assessment for Deaf Smith County devotes just ten pages of text to the dump's impact on agriculture. They conclude that the effect on farming would be "slight,...negligible,...not substantial."

These folks are farther out than Pluto, living in an isolated world of statistics, computer models and samples of salt beds. You don't have to be any brighter than a 20-watt bulb to know that burying nuclear wastes under our own food and water is going to pose a contamination threat to both and reduce consumer confidence in the purity of our products. This dump threatens our state's most basic business, and it could wreck

farmland values .. and permanently destroy markets for Texas produce.

DOE's assumptions about the Texas agricultural economy are made from the misty, distant vantage point of Columbus, Ohio, and Washington, D.C. It is apparent from their flimsy report that their consultants and analysts didn't get any manure on their Guccis, didn't talk to any real farmers or business people to put a dose of reality in their report. If they had bothered to check with the people who try to make a living in this country, they would have learned in a New York minute that it will be an economic disaster to put 70,000 metric tons of the nastiest stuff ever created in the midst of one of the world's most productive centers for growing the food we eat. We may be rubes, but we know our business, and we know better than to buy bureaucratic descriptions like "slight...negligible...not substantial." We realize that, even without a leak, the public perception of possible contamination will have a major, negative effect on agricultural sales.

Not only are local people in the best position to make these judgments, all past evidence and simple commonsense support them: consumers don't want to eat food grown near something as deadly as high-level nuclear waste. The unknowns in this experiment are too numerous; the possibility of the unforeseen occurring is far too great of a risk. Put plainly, we don't think DOE knows what it's talking about, we can't believe their nonchalant assurances, and we don't trust them.

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This is farming country, pure and simple--vegetables, wheat, corn, soybeans, cotton, cattle, sorghum, sugarbeets, you-name-it are produced in abundance here and shipped throughout the world. The Ogallala region on the High Plains of Texas brought in between 3 and 4 billion dollars in agricultural cash receipts in 1983. That's more than a third of the entire state's total for crops and livestock. And, as that money ripples through the economy, it generates about \$10 billion in total economic activity for our state.

But it's not just the quantity of food production that is at risk DOE also is messing with the finest quality food goods, yet they failed even to address this unique, economic factor.

Deaf Smith County and the Texas Plains have a reputation for producing a great abundance of healthy, nutritious, pure food--beef, vegetables and grain that are, literally, shipped around the world. Arrowhead Mills, a major health-food producer, named some of their nationally distributed products after Deaf Smith County. Food producers recognize the importance of preserving this reputation for wholesomeness and unquestioned quality. That's why Cactus Feeders, Inc., of Dumas, the world's largest commercial cattle feeding operation, announced last month that they are voluntarily removing low-level antibiotics from their beef. They say that even though they've had no final proof that these antibiotics are harmful to humans, "the quality of the food supply must be beyond question." Co-owner Paul F. Engler

says he has received dozens of letters and phone calls from consumers thanking him for this decision. He doesn't want to see the mail that would pour in if a nuclear dump moves down the road from his feedyards in Wildorado or Tulia. Panhandle farmers and processors do not want to risk becoming another Three Mile Island, Love Canal or Bhopal: one more synonym for technological disaster.

Several major processors have already told us they won't play roulette with their products' reputation. They'll move. That means a loss of hundreds of jobs and the end of production contracts with area growers.

In addition to these major producers, the Deaf Smith and Swisher County areas are home to many smaller food processors, such as a tortilla factory here in Hereford that buys 500-million pounds of Deaf Smith corn each year for tortillas and chips sold in seven states. They don't know what they'll do if the repository comes here. And one vegetable shed in Hereford ships 2,500 truckloads a year of onions, potatoes, lettuce and carrots. Texas does not want to trade that for 8,000 truckloads of lethal radioactive waste.

Even if DOE is willing to write off the Panhandle as a "negligible" sacrifice for meeting their own artificial and unrealistic deadlines, are they really willing to write off a significant part of the U.S. food supply? Are they really willing to interrupt a food-production chain that starts with wheat seed at Richardson Seed Farms and ends up as bread on dinner tables across the nation?

Last year, 2.4 billion pounds of seed were grown over the Ogallala aquifer in Texas. The counties included in DOE's narrow definition of the impact area for the Deaf Smith site produced 211 million pounds of seed. These figures are not guesses or projections. They are based on TDA records that are audited regularly. This seed is worth an estimated \$126 million per year for the Deaf Smith impact area and \$1.4 billion for the Ogallala area.

One of Texas' most valuable seed producers is located in and next to the Deaf Smith repository site. Richardson Seed Farms produces foundation wheat seed that brings the newest strains of wheat to farms in six states. I know Mr. Richardson is going to provide you with further details, but I do want to emphasize that his operation is a unique resource. The Texas Department of Agriculture tests and certifies seed throughout the state, so the director of our seed division is speaking from broad experience when he says there is no one else in the southwest who can provide the same quality and volume of foundation seed production as Richardson Seed Farms.

There is no cleaner seed farm anywhere. That's why Texas A&M trusts their newest genetic discoveries to his meticulous care. Genetic scientists produce only a handful of seeds for each new hybrid. Are they going to send these precious new discoveries to be grown next to a nuclear dump? Are farmers going to trust seed grown here? Farmers want to know what they're planting. They do not want to run their own experiments to see what kind of wild mutations nuclear waste might produce.

Eighty-five percent of the world's sorghum seed is grown right here. It is shipped to Australia, Europe, South America--around the globe. Does DOE consider that a "negligible" impact on world food production? Do they realize that nearly 15 percent of the beef eaten in the United States comes from the very area they're eying as a waste dump? DOE may try to accuse us of provincialism, of falling prey to the "not in my back yard" syndrome. But let me tell you, the Panhandle is the back yard garden for a pretty big chunk of this country. For all their months of research about effects of the dump, DOE has never gone to local businesses and asked them what difference it would make to them. The Texas Department of Agriculture, in cooperation with Governor White, is going to do that: systematically contacting area businesses to learn how a nuclear dump will affect their purchases, employment, financing and markets. We will report results of this survey later this spring.

In the meantime, Panhandle farmers have already spoken out about the dump in no uncertain terms: They don't want it here. Testimony at earlier hearings leaves no doubt about where farmers stand. In addition, TDA and the Governor's Office conducted a scientific survey of farm operators in Deaf Smith and Swisher counties. Preliminary results were announced last fall, but we have some additional information to report to you now. Our survey includes responses from 564 farmers in the site counties. Less than one out of ten farmers who participated in the study believes that a nuclear waste repository will have no



effect on farming. Four out of five think it will be harder to sell their crops if a repository is built in their county, and 84 percent say their land values will go down.

These opinions are economic facts. You don't have to be the wizard of Wall Street to know that if potential buyers believe the price is going to go down, it is going down. In fact, nearly half of the farmers we surveyed say the value of their land has already been hurt by plans for a dump nearby. The DOE projects a "slight" effect on agriculture out in the year 2005, but farmers are being hurt right now by the possibility of this nasty neighbor moving to town.

A majority of farmers are trying to hold on, hoping that the nuclear cloud will pass by. But 13 percent of the farmers we surveyed have already changed their plans because of the repository. They have postponed expansion plans and delayed maintenance work.

Nearly half of the farmers we polled said they expect to make changes if their county is actually chosen for the dump. In answer to a general question--"what changes do you expect to make"--more than a hundred farmers said they plan to move, including some families that have been farming their land for three generations.

Farmers are not the only ones who fear for their health and their livelihood. Our survey shows four-fifths of the residents of the site counties oppose the dump. Sixty-one percent believe it is "very likely" that radiation will contaminate the Ogallala

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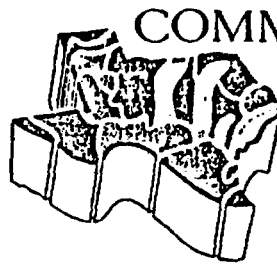
if a repository is built here, 57 percent believe contamination of food is "very likely," and half consider it "very likely" that the repository would create health problems for residents.

Despite this overwhelming public opposition and the dictates of commonsense, DOE is still here in Texas trotting out their socioeconomic models trying to convince us that nuclear waste shot through our land and water isn't going to bother anybody one bit. No wonder 73 percent of the farm operators we surveyed said they don't trust the federal government to build a nuclear waste repository that's safe. Sixty-three percent think DOE could ruin their land and water during test drilling even before a final repository site is even selected. And 83 percent said the DOE site selection process is unfair.

The agricultural economy is in trouble right now. The Texas Panhandle today is no Norman Rockwell vision of rural serenity and prosperity. Farmers are hurting. Good farmers are going broke. But here in Deaf Smith and Swisher counties we have part of the positive solution to the farm crisis. We have specialized, high-quality operations like Richardson Seed and Arrowhead Mills. We have food processors like Frito-Lay and Holly Sugar that keep those critical value-added food dollars circulating in the Texas economy. We have a brand new manure-burning electric power generator that brings safe, inexpensive energy to Texas cities and opens a new market for agriculture. Our sorghum seed produces a high-protein, heat and

drought resistant crop that can feed starving nations during the years ahead. That's where Texas farmers see their duty to the nation and the world.

We're here to feed people, and to protect our soil and water as vital resources for our nation's future. These agrarian entrepreneurs, this rich soil, this irreplaceable aquifer--all of these are natural resources that will be productive for us far longer than 10,000 years, if those of us in policy making positions don't do something unutterably stupid, such as DOE has proposed. We must be good stewards of these resources. Don't let them dump on our farms.



COMMISSIONER  
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February 21, 1985

Mr. John Herrington  
Secretary  
U.S. Department of Energy  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585

Dear Secretary Herrington:

At the U.S. Department of Energy information briefing in Austin, January 16, a Deaf Smith County resident asked whether your department plans to provide information in Spanish about the high-level nuclear waste repository proposed for Texas. Mr. Jeff Neff, manager of the Salt Repository Project Office, replied that DOE has not provided Spanish information because no one asked for it.

I believe the U.S. Congress intended for DOE to make this information available when it passed the Nuclear Waste Policy Act of 1982. The act requires the Secretary of Energy to inform local residents of DOE plans and allow residents to review and comment on those plans. Common sense and common courtesy dictate that local residents be informed and given an opportunity to comment in their own language. In addition, I understand from local residents that they have requested Spanish-language information in the past.

If the mandate of Congress and the requests of local residents are not enough for Mr. Neff, then I ask you to provide information and opportunities for comment to Spanish-speaking residents of this state.

The importance of bilingual information is apparent from personal contacts with residents of both site counties and from statistical data about this area. As part of TDA's ongoing efforts to identify public concerns about the repository and to document its social and economic effects, two bilingual interviewers from this department visited Deaf Smith and Swisher counties in October and met with approximately 30 representatives of Hispanic businesses and church and community groups. These Hispanic leaders repeatedly expressed their concern about effects of the repository on farmworkers and Hispanic employees in agricultural businesses, and they stressed the need for bilingual information and outreach to Hispanic communities.

Mr. John Herrington  
February 21, 1985  
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Statistical reports also confirm the need for bilingual information. The 1980 U.S. Census indicates that 41 percent of the population of Deaf Smith County and 28 percent of the population of Swisher County is Hispanic. Census figures show that 40 percent of the people in Deaf Smith and 26 percent of those in Swisher speak Spanish at home. In TDA's scientific surveys of households in these counties, 38 percent of Hispanics preferred to be interviewed in Spanish. These residents, like their nonhispanic neighbors, are deeply disturbed about plans for a nuclear dump in their area. Our surveys show that Hispanics are just as concerned as others about the dump's safety and its effects on the local economy. They want to know more: 80 percent of Hispanics who participated in our surveys said they need more information about DOE plans.

I am asking the Department of Energy to provide this information to Spanish-speaking residents of Deaf Smith and Swisher counties now, as required by the Nuclear Waste Policy Act, and to give these residents equal access to participation in the repository site-selection process. I am not talking about providing highly technical translations that will sit on the shelf. I am asking DOE to go out and talk to all groups in Deaf Smith and Swisher counties in language they can understand, and I'm asking DOE to listen to what these people have to say--in Spanish or in English--about plans to bury 70,000 tons of nuclear trash under their land and their water.

Sincerely,

  
JIM HIGHTOWER

/rh

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# **1984 TEXAS SEED LAW RULES AND REGULATIONS**

**EFFECTIVE  
February, 1984**

**PUBLISHED BY THE  
TEXAS  
DEPARTMENT OF AGRICULTURE**

This publication contains the Texas Seed Law as recodified by the 67th Texas Legislature and the Rules and Regulations considered to be appropriate for an orderly system of producing, conditioning, labeling and marketing seed. The Seed Law, administered by the Texas Department of Agriculture, is designed to furnish the seed purchaser with truthful information as to the value of a given lot of seed. Such information is valuable protection to farmers, seed vendors, and seedsmen alike.

# Texas Seed And Plant Certification Act And Certification Standards 1984

## Food Producers and Fellow Texans:

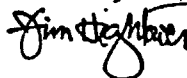
Food is the most fundamental economic activity in the world, and seed is the most fundamental requirement of the farmer. No matter how good he is, the farmer cannot produce a crop without good (viable) seed.

In Texas alone, farmers, ranchers and food producers generate some 43.7 billion dollars a year in sales and employ one out of every five workers in the economy. And all this springs from one thing, the seed. No matter how good a farmer may be, if the seed is not good, the harvest is not good, and the whole economy suffers. We depend upon the seed industry to help farmers and ranchers put three square meals on family tables every day.

Texas is fortunate in that our seed industry is committed, not just to good seed, but better seed, and these Seed Certification Standards are dedicated to the spirit of continually striving for improvement. We at TDA are proud to be working with Texas farmers and the seed industry on a Certified Seed Program to help assure that tomorrow's seed will be even better than today's.

All Texans, and the rest of the world as well, benefit from the success of this cooperative effort.

Best regards,



JIM HIGHTOWER



## Texas Department of Agriculture



# Facts about the High-Level Nuclear



## Waste Repository

(AUSTIN)--The federal government is considering Deaf Smith and Swisher counties as possible sites for building a high-level nuclear waste repository. If Deaf Smith or Swisher county is chosen for the repository, highly radioactive wastes from nuclear power plants and possibly from nuclear weapons production would be buried deep underground for thousands of years.

How much do you know about the proposed nuclear waste repository?

Some of the statements below are true and some are false. You can quiz yourself by covering the correct answer below each statement.

**High-level nuclear wastes are radioactive for thousands of years.**

**TRUE.** High-level nuclear wastes take many years to lose their radioactivity. The U.S. Department of Energy (DOE) says these wastes must be isolated from people and the environment for 10,000 years.

**Drilling for oil and gas will be allowed on land over the repository.**

**FALSE.** Drilling will have to be restricted over the repository to assure that radioactive wastes do not escape accidentally through a drill hole.

**More than a thousand people will be needed to build the repository.**

**TRUE.** The U.S. Department of Energy estimates that the workforce for building the repository in Texas will be more than 1,000 workers during the peak construction period. Construction of the repository is expected to take five to eight years.

**The repository will be big enough for all the wastes from nuclear power plants for the next century.**

**FALSE.** The U.S. Department of Energy projects that the repository would receive waste shipments for approximately 30 years. After that the repository would be closed and decommissioned. Planning for a second nuclear waste repository is already

underway. Decisions being made now about building and operation of nuclear power plants will affect the amount of storage space needed for nuclear wastes for many years to come.

**Once the repository is built, it will permanently employ 1,000 workers.**

**FALSE.** A Texas repository would employ approximately 870 workers for 30 years of operation, according to early estimates by the U.S. Department of Energy. Employment forecasts for construction and operation of the repository may change as the Department of Energy develops detailed plans for repository design. After the repository is closed, it might be monitored by a small work crew or it might be monitored by technology that doesn't require any personnel at the repository site.

**There is no evidence that radiation can cause birth defects.**

**FALSE.** Extensive scientific evidence shows that exposure to radiation can cause birth defects. Scientists disagree about whether there is any "safe" level of radiation exposure.

**The government has already done some drilling in Deaf Smith and Swisher counties as part of the site selection program for the repository.**

**TRUE.** The federal government has drilled test boreholes in both counties to gather geologic and hydrologic information that is important in determining whether a safe repository could be built in this area.

**The Deaf Smith and Swisher county area is being considered as a possible repository site because of its underground salt deposits.**

**TRUE.** If Texas is chosen for the repository, nuclear wastes would be stored in underground bedded salt. Basalt, tuff, and granite are other geologic rock types that are being considered for a repository.

**All of the salt dug out of the repository during construction will be put back into the repository eventually.**

**FALSE.** About 200-million cubic feet of salt would be excavated from the repository and not all of it will fit back into the underground repository. The U.S. Department of Energy doesn't know yet how or where excess salt would be disposed.

**The nuclear waste repository will not be finished for at least 10 years.**

**TRUE.** The repository is scheduled to open in 1998. So far, planning for the repository has fallen behind DOE's target dates.

**The President of the United States is personally responsible for approving the site for the nuclear waste repository.**

**TRUE.** According to the Nuclear Waste Policy Act of 1982, the President is responsible for recommending a repository site to Congress.

**If a nuclear waste repository is built in Texas, it will be located above the underground water of the Ogallala aquifer.**

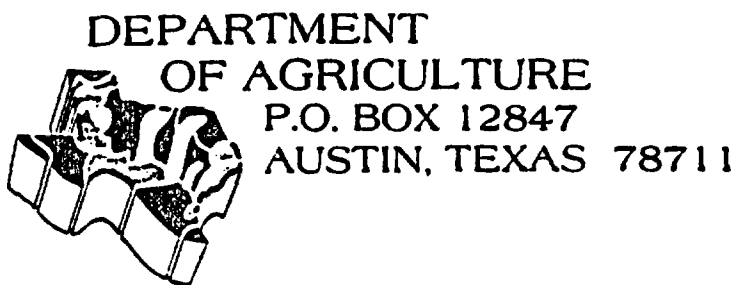
**FALSE.** A Texas site for the repository would mean drilling shafts through the Ogallala, the nation's largest freshwater aquifer. Nuclear wastes would be placed below the Ogallala and below the deeper Santa Rosa aquifer. The Santa Rosa is another important aquifer that provides water for drinking and for irrigation.



# PANHANDLE RESIDENTS' VIEWS OF HIGH-LEVEL NUCLEAR WASTE STORAGE

## Part I: Summary of Survey Results

A Report of the  
Texas Department of Agriculture  
October, 1984



# **PANHANDLE RESIDENTS' VIEWS OF HIGH-LEVEL NUCLEAR WASTE STORAGE**

## **Part II: Survey Questions and Responses**

**A Report of the  
Texas Department of Agriculture  
October, 1984**

